TECHNICAL MANUAL

AVIATION UNIT AND AVIATION INTERMEDIATE MAINTENANCE MANUAL

CH-47D HELICOPTER

This copy is a reprint which includes current pages from Changes 1 through 30

HEADQUARTERS, DEPARTMENT OF THE ARMY

10 MAY 1983

URGENT

TM 55-1520-240-23-5
C 36

CHANGE

NO. 36

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CH-47DHELICOPTER

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6-479 and 6-480	6-479 and 6-480
6-480.1 and 6-480.2	6-480.1 and 6-480.2
5-573 and 5-574	5-573 and 5-574

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6-143 and 6-144	6-143 and 6-144
6-161 and 6-162	6-161 and 6-162

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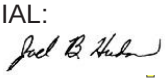
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6-143 and 6-144	6-143 and 6-144
6-161 and 6-162	6-161 and 6-162

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6-145 and 6-146	6-145 and 6-146
6-319 and 6-320	6-319 and 6-320
6-361 and 6-362	6-361 and 6-362

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6-319 and 6-320	6-319 and 6-320

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A through E/(F blank)	A through E(F blank)
6-146.1/(6-146.2 blank)	6-146.1/(6-146.2 blank)
6-285 and 6-286	6-285 and 6-286

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-----	A through E/(F blank)
6-27 and 6-28	6-27 and 6-28
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i and ii	i and ii
6-479 and 6-480	6-479 and 6-480
6-492.7 and 6-492.8	6-492.7 and 6-492.8

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6-170.1/(6-170.2 blank)	6-170.1/(6-170.2 blank)

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Remove pages	Insert pages
i and ii	i and ii
6-265 and 6-266	6-265 and 6-266
6-293 and 6-294	6-293 and 6-294
6-303 and 6-304	6-303 and 6-304
6-306.1 and 6-306.2	6-306.1 and 6-306.2
6-319 and 6-320	6-319 and 6-320
6-480.1 and 6-480.2	6-480.1 and 6-480.2

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Remove pages	Insert pages
i and ii	i and ii
6-25 through 6-28	6-25 through 6-28
6-49 and 6-50	6-49 and 6-50
6-57 and 6-58	6-57 and 6-58
6-150.3 and 6-150.4	6-150.3 and 6-150.4
6-291 and 6-292	6-291 and 6-292
6-357 through 6-360	6-357 through 6-360
6-361 through 6-364	6-361 through 6-364
6-479 and 6-480	6-479 and 6-480
6-480.1 through 6-480.4	6-480.1 through 6-480.3/(6-480.4 blank)
6-481 through 6-466	- - -
6487/(6-488 blank)	6-487 and 6-488
6-491 and 6-492	6-491 and 6-492
6492.1 through 6-492.4	6-492.1 through 6-492.4
	6-492.5 through 6-492.8
6-493 and 6-494	6-493 and 6-494
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6-41 and 6-41	6-41 and 6-42
6-47 and 6-48	6-47 and 6-48
6-51 through 6-54	6-51 through 6-54
6-65 and 6-66	6-65 and 6-66
----------	6-70.1 and 6-70.2
6-75 and 6-76	6-75 and 6-76
6-80.9 and 6-80.10	6-80.9 through 6-80.11/(6-80.12 bank)
6-83/(6-84 blank)	6-83/(6-84 blank)
6-143 through 6-146	6-143 through 6-146
6-150.3 and 6-150.4	6-150.3 and 6-150.4
6-155 and 6-156	6-155 and 6-156
6-161 and 6-162	6-161 and 6-162
6-169 and 6-170	6-169 and 6-170
----------	6-170.1/(6-170.2 bank)
6-303 and 6-304	6-303 and 6-304
6-306.1 and 6-306.2	6-306.1 and 6-306.2
6-341 and 6-342	6-341 and 6-342
6-371 and 6-372	6-371 and 6-372

Remove pages	Insert pages
6-403 and 6-404	6-403 and 6-404
6-455 and 6-456	6-455 and 6-456
6-480.1 and 6-480.2	6-480.1 and 6-480.2
6-489 and 6-490	6-489 and 6-490
6-493 and 6-494	6-493 and 6-494
6-535 and 6-536	6-535 and 6-536

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6-31 and 6-32	6-31 and 6-32
6-43 and 6-44	6-43 and 6-44
6-53 and 6-54	6-53 and 6-54
6-75 and 6-76	6-75 and 6-76
6-80.3 and 6-80.4	6-80.3 and 6-80.4
6-80.9 and 6-80.10	6-80.9 and 6-80.10
6-81 and 6-82	6-81 and 6-82
6-83/(6-84 blank)	6-83/(6-84 blank)
6-89 through 6-92	6-89 through 6-92
6-98.1 through 6-98.4	6-98.1 through 6-98.4
6-99 and 6-100	6-99 and 6-100
6-105 and 6-106	6-105 and 6-106
6-130.1 through 6-130.3/(6-130.4 blank)	6-130.1 through 6-130.3/(6-130.4 blank)
6-137 and 6-138	6-137 and 6-138
6-143 and 6-144	6-143 and 6-144
6-153 and 154	6-153 and 154
6-154.1 through 6-154.4	6-154.1 through 6-154.4
6-155 and 6-156	6-155 and 6-156
6-171 and 6-172	6-171 and 6-172
6-174.1 through 6-174.4	6-174.1 through 6-174.4
6-216.1 through 6-216.3/(6-216.4 blank)	6-216.1 and 6-216.3/(6-216.4 blank)

TM 55-1520-240-23-5
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Remove pages	Insert pages
6-231 and 6-232	6-231 and 6-232
6-263 through 6-266	6-263 through 6-266
6-403 and 6-404	6-403 and 6-404
6-408.1 through 6-408.4	6-408.1 through 6-408.4
6-496.1 through 6-496.3/(6-496.4 blank)	6-496.1 through 6-496.3/(6-496.4 blank)
- - - - -	6-597 through 6-612

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6-41 and 6-42	6-41 and 6-42
6-45 through 6-54	6-45 through 6-54
6-75 and 6-76	6-75 and 6-76
6-213 through 6-216	6-213 through 6-216
6-225 and 6-226	6-225 and 6-226
6-317 and 6-318	6-317 and 6-318
6-339 and 6-340	6-339 and 6-340
----	6-340.1 and 6-340.2
6-341 and 6-342	6-341 and 6-342

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6-13 and 6-14	6-13 and 6-14
6-17 and 6-18	6-17 and 6-18
6-21 through 6-24	6-21 through 6-24
6-31 and 6-32	6-31 and 6-32
6-43 and 6-44	6-43 and 6-44
6-51 through 6-54	6-51 through 6-54
6-80.1 and 6-80.2	6-80.1 and 6-80.2
----	6-80.2.1/(6-80.2.2 blank)
6-80.5 and 6-80.6	6-80.5 and 6-80.6
6-80.9 and 6-80.10	6-80.9 and 6-80.10
6-81 and 6-82	6-81 and 6-82
6-211 and 6-212	6-211 and 6-212
6-229 through 6-232	6-229 through 6-232
6-402 through 6-404	6-402 through 6-404
6-480.1 through 6-480.3/ (6-480.4 blank)	6-480.1 through 6-480.4
----	6-487/(6-488 blank)
6-491 and 6-492	6-491 and 6-492
----	6-492.1 through 6-492.4
6-493 and 6-494	6-493 and 6-494

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Remove pages	Insert pages
6-2.1 and 6-2.2	6-2.1 and 6-2.2
6-77 through 6-79/6-80	6-77 through 6-80
6-80.1 through 6-80.4	6-80.1 through 6-80.10
6-81 and 6-82	6-81 and 6-32
6-82.1/6-82.2	6-82.1 through 6-82.8
6-83 and 6-84	6-83/6-84

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Remove pages	Insert pages
6-319 and 6-320	6-319 and 6-320

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CHANGE
NO. 17

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WASHINGTON, D.C., 30 April 1992

Aviation Unit and Aviation
Intermediate Maintenance Manual

CH-47D HELICOPTER

TM 55-1520-240-23-5, 10 May 1983, is changed as follows:

1. Remove and insert pages as indicated below. New or changed text material is indicated by a vertical bar in the margin. An illustration change is indicated by a miniature pointing hand.

Remove pages	Insert pages
6-19 and 6-20	6-19 and 6-20
6-23 through 6-30	6-23 through 6-30
6-30.1 and 6-30.2	6-30.1 through 6-30.5/6-30.6
6-31 and 6-32	6-31 and 6-32
6-37 and 6-38	6-37 and 6-38
6-41 through 6-44	6-41 through 6-44
6-55 through 6-58	6-55 through 6-58
6-61 and 6-62	6-61 and 6-62
6-74.1/6-74.2	6-74.1/6-74.2
6-80.1 and 6-80.2	6-80.1 and 6-80.2
6-81 and 6-82	6-81 and 6-82
--- -	6-82.1/6-82.2
6-83 and 6-84	6-83 and 6-84
6-98.3 and 6-98.4	6-98.3 and 6-98.4
6-119 through 6-122	6-119 through 6-122
6-133 and 6-134	6-133 and 6-134
6-143 through 6-146	6-143 through 6-146
--- -	6-146.1/6-146.2
6-147 and 6-148	6-147 and 6-148
6-154.1 and 6-154.2	6-154.1 and 6-154.2
6-177 and 6-178	6-177 and 6-178
6-181 and 6-182	6-181 and 6-182
6-187 and 6-188	6-187 and 6-188
6-209 and 6-210	6-209 and 6-210
6-219 and 6-220	6-219 and 6-220
6-231 and 6-232	6-231 and 6-232
6-261 through 6-266	6-261 through 6-266
6-279 and 6-280	6-279 and 6-280
6-303 and 6-304	6-303 and 6-304
6-341 and 6-342	6-341 and 6-342
6-347 and 6-348	6-347 and 6-348
6-353 and 6-354	6-353 and 6-354
6-402	6-402
6-403 and 6-404	6-403 and 6-404
6-417 and 6-418	6-417 and 6-418

TM 55-1520-240-23-5
C 17

Remove pages	Insert pages
6-480.1 and 6-480.2	6-480.1 and 6-480.2
6-491 through 6-494	6-491 through 6-494
6-563/6-564	5-563 through 5-596

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Aviation Unit and Aviation
Intermediate Maintenance Manual

CH-47D HELICOPTER

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Remove pages	Insert pages
6-23 and 6-24	6-23 and 6-24
6-49 and 6-50	6-49 and 6-50
6-98.3 and 6-98.4	6-98.3 and 6-98.4
6-154.1 and 6-154.2	6-154.1 and 6-154.2
6-157 and 6-158	6-157 and 6-158
6-265 and 6-266	6-265 and 6-266
6-341 and 6-342	6-341 and 6-342
6-403 and 6-404	6-403 and 6-404

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CH-47D HELICOPTER

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Remove pages	Insert pages
6-5 through 6-8	6-5 through 6-8
6-27 and 6-28	6-27 and 6-28
6-43 and 6-44	6-43 and 6-44
- - - -	6-44.1/6-44.2
6-80.1 through 6-80.4	6-80.1 through 6-80.4
6-115 and 6-116	6-115 and 6-116
6-137 and 6-138	6-137 and 6-138
6-143 through 6-146	6-143 through 6-146
6-161 and 6-162	6-161 and 6-162
6-271 through 6-274	6-271 through 6-274
6-289 and 6-290	6-289 and 6-290
6-295 through 6-297/6-298	6-295 through 6-297/6-298
6-299 through 6-302	6-299 through 6-302
6-302.23/6-302. 24	6-302.23 and 6-302.24
6-303 and 6-304	6-303 and 6-304
6-315 through 6-321/6-322	6-315 through 6-321/6-322
6-417 and 6-418	6-417 and 6-418
6-443 and 6-444	6-443 and 6-444
6-447 through 6-450	6-447 through 6-450
6-517 and 6-518	6-517 and 6-518
- - - -	6-518.1/6-518.2
6-519 through 6-522	6-519 through 6-522
6-537 through 6-544	6-537 through 6-544
6-545 and 6-546	6-545 and 6-546
- - - -	6-546.1 through 6-546.9/ 6-546.10

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C 14

CHANGE
NO. 14

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Aviation unit and Aviation
Intermediate Maintenance Manual

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Remove pages	Insert pages
6-33 and 6-34	6-33 and 6-34
6-75 and 6-76	6-75 and 6-76
6-96.1 and 6-96.2	6-96.1 and 6-96.2
6-217 and 6-218	6-217 and 6-218
6-335 and 6-336	6-335 and 6-336
6-339 and 6-340	6-339 and 6-340
6-347 and 6-348	6-347 and 6-348
6-403 and 6-404	6-403 and 6-404
6-478.1 and 6-478.2	6-478.1 and 6-478.2
6-491 and 6-492	6-491 and 6-492

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TM 55-1520-240-23-5
C 13

CHANGE
NO. 13

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Aviation Unit and Aviation
Intermediate Maintenance Manual

CH-47D HELICOPTER

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6-341 and 6-342	6-341 and 6-342
6-347 and 6-348	6-347 and 6-348

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CH-47D HELICOPTER

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Remove pages	Insert pages
6-37 and 6-38	6-37 and 6-38
6-57 and 6-58	6-57 and 6-58
6-71 through 6-74	6-71 through 6-74
6-80.1 through 6-80.4	6-80.1 through 6-80.4
6-81 through 6-84	6-81 through 6-84
6-101 and 6-102	6-101 and 6-102
6-117 and 6-118	6-117 and 6-118
6-137 and 6-138	6-137 and 6-138
6-143 through 6-146	6-143 through 6-146
6-150.3 and 6-150.4	6-150.3 and 6-150.4
6-151/6-152	6-151/6-152
6-211 and 6-212	6-211 and 6-212
6-229 and 6-230	6-229 and 6-230
6-271 and 6-272	6-271 and 6-272
6-283 and 6-284	6-283 and 6-284
6-289 and 6-290	6-289 and 6-290
6-290.1/6-290.2	6-290.1/6-290.2
6-293 and 6-294	6-293 and 6-294
6-319 and 6-320	6-319 and 6-320
6-479 and 6-480	6-479 and 6-480
6-491 and 6-492	6-491 and 6-492
6-497 and 6-498	6-497 and 6-498
6-559 through 6-562	6-559 through 6-562

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Intermediate Maintenance Manual

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Remove pages	Insert pages
6-81 and 6-82	6-81 and 6-82
6-231 and 6-232	6-231 and 6-232
6-339 through 6-342	6-339 through 6-342
6-347 and 6-348	6-347 and 6-348
6-480.1 and 6-480.2	6-480.1 and 6-480.2
6-491 and 6-492	6-491 and 6-492

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Remove pages	Insert pages
6-391 through 6-400	6-391 and 6-392
6-401 and 6-402	6-402
6-480.1 through 6-488	6-480.1 through 6-480.3/6-480.4

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Remove pages	Insert pages
6-23 and 6-24	6-23 and 6-24
6-80.3 and 6-80.4	6-80.3 and 6-80.4
6-81 and 6-82	6-81 and 6-82

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CH-47D HELICOPTER

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Remove pages	Insert pages
6-30.1/6-30.2	6-30.1 and 6-30.2
6-43 and 6-44	6-43 and 6-44
6-80.3 and 6-80.4	6-80.3 and 6-80.4
6-399 and 6-400	6-399 and 6-400
6-403 and 6-404	6-403 and 6-404
6-487 and 6-488	6-487 and 6-488
6-491 and 6-492	6-491 and 6-492

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6-80.3 and 6-80.4	6-80.3 and 6-80.4

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Remove pages	Insert pages
i through iv	i through iv
6-71 and 6-72	6-71 and 6-72
6-115 and 6-116	6-115 and 6-116
6-121 and 6-122	6-121 and 6-122
6-122.1 through 6-122.4	6-122.1 through 6-122.4
---	6-122.5 through 6-122.8
6-127 and 6-128	6-127 and 6-128
6-137 through 6-142	6-137 through 6-142
6-145 through 6-148	6-145 through 6-148
6-169 and 6-170	6-169 and 6-170
6-227 and 6-228	6-227 and 6-228
6-271 through 6-274	6-271 through 6-274
6-276.1 through 6-276.4	6-276.1 through 6-276.4
6-289 and 6-290	6-289 and 6-290
6-323 and 6-324	6-323 and 6-324
6-363 and 6-364	6-363 and 6-364
6-383 and 6-384	6-383 and 6-384
6-403 and 6-404	6-403 and 6-404
6-421 and 6-422	6-421 and 6-422
6-451 and 6-452	6-451 and 6-452
6-461 and 6-462	6-461 and 6-462
6-477 and 6-478	6-477 and 6-478
---	6-478.1 through 6-478.3/6-478.4
6-531 through 6-534	6-531 through 6-534
6-543 and 6-544	6-543 and 6-544
6-545 and 6-546	6-545 and 6-546

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Remove pages	Insert pages
6-295 and 6-296	6-295 and 6-296
6-297/(6-298)	6-297/(6-298)
6-321/(6-322)	6-321/(6-322)
6-403 and 6-404	6-403 and 6-404

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Intermediate Maintenance Manual

CH-47D HELICOPTER

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Remove pages	Insert pages
g/h	g/h
6-9/6-10	6-9/6-10
6-11 and 6-12	6-11 and 6-12
6-27 through 6-30	6-27 through 6-30
---	6-30.1/6-30.2
6-35 through 6-52	6-35 through 6-52
6-67 and 6-68	6-67 and 6-68
6-91 and 6-92	6-91 and 6-92
---	6-96.1 through 6-96.6
6-97 and 6-98	6-97 and 6-98
6-101 and 6-102	6-101 and 6-102
6-105 through 6-110	6-105 through 6-110
6-113 through 6-118	6-113 through 6-118
6-121 and 6-122	6-121 and 6-122
6-122.1 through 6-122.4	6-122.1 through 6-122.4
6-131 and 6-132	6-131 and 6-132
6-135 and 6-136	6-135 and 6-136
6-147 through 6-150	6-147 through 6-150
6-150.1 and 6-150.2	6-150.1 and 6-150.2
6-151/6-152	6-151/6-152
6-154.3 and 6-154.4	6-154.3 and 6-154.4
6-155 and 6-156	6-155 and 6-156
6-161 and 6-162	6-161 and 6-162
6-181 and 6-182	6-181 and 6-182
6-191 and 6-192	6-191 and 6-192
6-195 through 6-198	6-195 through 6-198
6-201 and 6-202	6-201 and 6-202
6-205 through 6-208	6-205 through 6-208
---	6-208.1 through 6-208.6
6-216.1 through 6-216.3/ 6-216.4	6-216.1 through 6-216.3/ 6-216.4
6-217 and 6-218	6-217 and 6-218
6-221 and 6-222	6-221 and 6-222
6-227 and 6-228	6-227 and 6-228
6-233 and 6-234	6-233 and 6-234
6-241 and 6-242	6-241 and 6-242

Remove pages	Insert pages
---	6-242.1 through 6-242.6
6-243 through 6-246	6-243 through 6-246
6-249 and 6-250	6-249 and 6-250
6-253 through 6-256	6-253 through 6-256
6-259 and 6-260	6-259 and 6-260
6-263 through 6-274	6-263 through 6-274
6-277 and 6-278	6-277 and 6-278
6-281 and 6-282	6-281 and 6-282
6-285 through 6-290	6-285 through 6-290
6-291 through 6-294	6-291 through 6-294
6-295 and 6-296	6-295 and 6-296/6-297
6-298	6-298
---	6-298.1/6-298.2
6-299 through 6-302	6-299 through 6-302
---	6-302.1 through 6-302.23/ 6-302.24
6-303 through 6-306	6-303 through 6-306
6-307 through 6-321/6-322	6-307 through 6-321/6-322
6-325 and 6-326	6-325 and 6-326
6-329 and 6-330	6-329 and 6-330
6-330.1 and 6-330.2	6-330.1 thru 6-330.3/6-330.4
6-332.1 and 6-332.2	6-332.1 and 6-332.2
6-359 and 6-360	6-359 and 6-360
---	6-360.1 and 6-360.2
6.373 and 6-374	6-373 and 6-374
6-385 and 6.386	6-385 and 6-386
6-393 through 6-396	6-393 through 6-396
6-397 through 6-400	6-397 through 6-400
6-404.1 and 6-404.2	6-404.1 and 6-404.2
6-408.1 and 6-408.2	6-408.1 and 6-408.2
6-415 through 6-418	6-415 through 6-418
6-418.1 and 6-418.2	6-418.1 and 6-418.2
6-435 and 6-436	6-435 and 6-436
---	6-436.1 through 6-436.4
6-451 through 6-454	6-451 through .6-454
---	6-460.1 and 6-460.2
6-477 and 6-478	6-477 and 6-478
6-482.3/6-482.4	6-482.3/6-482.4
6-483 through 6-486	6-483 through 6-486
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---	6-544.1 through 6-544.4
6-554.1 and 6-554.2	6-554.1 and 6-554.2
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By Order of the Secretary of the Army:

JOHN A. WICKHAM, JR.
General, United States Army
Chief of Staff

Official:

R. L. DILWORTH
Brigadier General, United States Army
The Adjutant General

DISTRIBUTION:
To be distributed in accordance with DA Form 12-31, AVUM and AVIM requirements for CH-47D Helicopter, Cargo Transport.

URGENT

TM 55-1520-240-23-5
C3

CHANGE NO. 3

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D. C., 22 November 1985

Aviation Unit and Aviation Intermediate Maintenance Manual

CH-47D Helicopter

TM 55-1520-24023-5, 10 May 1983, is changed as follows:

1. Remove and insert pages as indicated below. New or changed text material is indicated by a vertical bar in the margin. An illustration change is indicated by a miniature pointing hand.

Remove pages	Insert pages
6-479 and 6-480	6-479 and 6-480
---	6-480.1 through 6-480.4
6-487 and 6-488	6-487 and 6-488
6-491 and 6-492	6-491 and 6-492

2. Retain these sheets in front of manual for reference purposes.

By Order of the secretary of the Army

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General, United States Army
Chief of Staff

Official:

MILDRED E. HEDBERG
Brigadier General, United States Army
The Adjutant General

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URGENT

TM 55-1520-240-23-5
C 2

CHANGE
No. 2

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., 16 August 1985

Aviation Unit and Aviation Intermediate
Maintenance Manual

CH-47D Helicopter

TM 55-1520-240-23-5, 10 May 1983, is changed as follows:

1. Remove and insert pages as indicated below. New or changed text material is indicated by a vertical bar in the margin. An illustration change is indicated by a miniature pointing hand.

Remove pages	Insert pages
6-227 and 6-228	6-227 and 6-228

2. Retain this sheet in front of manual for reference purposes.

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URGENT

CHANGE NO. 1

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., 4 MARCH 1985

Aviation Unit and Aviation Intermediate Maintenance Manual

CH-47D HELICOPTER

TM 55-1520-240-23-5, 10 May 1983, is changed as follows:

1. Remove and insert pages as indicated below. New or changed text material is indicated by a vertical bar in the margin. An illustration change is indicated by a miniature pointing hand.

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6-561 through 6-563/6-564	6-561 through 6-563/6-564
Index 1 through Index 118	----

2. Retain this sheet in front of manual for reference purposes.

By Order of the Secretary of the Army:

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General, United States Army
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Official:

DONALD J. DELANDRO
Brigadier General, United States Army
The Adjutant General

DISTRIBUTION:
To be distributed in accordance with DA Form 12-31, Organizational, Direct Support, and General Support Maintenance requirements for CH-47D aircraft.

WARNING AND FIRST AID DATA.

For artificial respiration and other first aid data, refer to FM 21-11.

Personnel performing instructions involving operations, procedures, and practices which are included or implied in this technical manual shall observe the following instructions. Disregard of these warnings and precautionary information can cause serious injury, illness, death, or an aborted mission.

WARNING

An operating procedure, practice, etc., which if not correctly followed, could result in personal injury or loss of life.

CAUTION

An operation procedure, practice, etc., which if not strictly observed, could result in damage to or destruction of equipment.

NOTE

An operating procedure, condition, etc., which is essential to highlight.

WARNING

Cleaning Solvents

- **Those areas of skin and clothing that come in contact with cleaning solvents should be thoroughly washed immediately.**
- **Saturated clothing should be removed immediately.**
- **Areas in which cleaning solvents are used should be adequately ventilated to keep vapors to a minimum.**
- **If cleaning solvents contact the eyes, nose, or ears, flush them with generous quantities of water, and then seek medical attention immediately.**

WARNING

Electrical and Electronic Equipment Maintenance

- **Do not wear rings, watches, or metal jewelry when working around electrical equipment. Serious burns can result.**
- **Be careful when working on 150- and 300-volt dc circuits and on ac generator 115- and 200-volt ac outputs. Serious burns can result.**

WARNING

Dangerous Static Charges

Ground the helicopter during parking, fueling, or defueling. Sparks can cause fuel vapor to ignite.

WARNING

Dangerous Voltages at Antenna Terminals

Be careful when working near antenna or antenna terminals. Radio frequency (rf) voltages exist at these points when transmitters are operating. Contact with radiating antennas can cause serious rf burns.

WARNING

Poisonous Carbon Monoxide Fumes

Toxic carbon monoxide fumes may be present inside the helicopter whenever engines or apu are operating with cargo ramp open. Ventilate the cockpit.

WARNING

Corrosive Battery Electrolyte
(Potassium Hydroxide)

- **The electrolyte used in nickel-cadmium batteries contains potassium hydroxide which is a caustic substance.**
- **Contact with skin or eyes will cause burns.**
- **Use rubber gloves, rubber apron, and protective eye covering or face shield when handling battery.**
- **If personal contact with electrolyte occurs, flush immediately with large amounts of only clean water. Get medical attention immediately.**

WARNING

Explosive Battery Hazard

- **Before removing or installing battery, make sure battery switch is OFF and battery has cooled down if overheated.**
- **Connecting or disconnecting battery connector while battery is under load may cause explosion or electrical arcing resulting in injury to personnel.**

WARNING

Electrolyte Contamination

- **Separate nickel-cadmium batteries and lead-acid type batteries as far as possible from each other.**
- **Do not let anything associated with a lead-acid battery, including air, come in contact with a nickel-cadmium battery or its electrolyte. Sulfuric acid fumes from a lead-acid battery could result in damage to a nickel-cadmium battery leading to battery failure and a hazard to personnel.**
- **Do not use same tools or protective clothing for both types of batteries.**
- **If sulfuric acid has been somehow mixed with electrolyte in the battery, the upper areas of the battery cells will appear green in color indicating battery failure or damage and potential danger to personnel unless replaced.**

WARNING

Acids and Alkalines

- **Do not add water to acid. A violent action will result. Add acid to water in small quantities.**
- **Rust stripper is an alkaline solution.**
- **Avoid skin contact. Wear protective clothing. Wash thoroughly after using.**

WARNING

Windshield Rain Repellent

- **Do not let windshield rain repellent contact open flame. Deadly hydrogen fluoride gas could be generated.**
- **Wash hands with soap and water after handling repellent.**

WARNING

Antiseize Compounds

- **Some antiseize compounds are irritants. Avoid inhaling fumes and contact with skin.**
- **Wear protective clothing. Wash thoroughly after using.**

WARNING

Paints, Varnishes, Dopes, Thinners, and Lubricants

- **These materials are generally highly flammable and may be irritants. Work in a well-ventilated area away from open flames.**
- **Avoid inhaling fumes and prolonged contact with skin. Wash thoroughly after using.**

WARNING

Epoxy Resins, Cements, and Adhesives

- **These materials may contain toxic or irritating substances. They may also be flammable. Work in a well-ventilated area away from open flames.**
- **Wear protective clothing. Avoid contact with skin. Wash thoroughly after using.**

WARNING

Radiation Hazard

- **Some instruments contain radioactive material. Do not try to disassemble these instruments. They present no radiation hazard unless seal is broken.**
- **If you think seal is broken, do not remove instrument from helicopter before consulting Base Radioactive Protection Officer (AR 40-15).**
- **Use a beta-gamma radiac meter AN/PDR-27 or equivalent to determine if instrument contains radioactive material (radium).**

WARNING

Firs Extinguishing Agents

- **Monobromotrifluoromethane (CF_3Br) is highly volatile but is not easily detected by smell. It is not toxic, but reduces oxygen available for proper breathing.**
- **If liquid CF_3Br contacts skin, it can cause frostbite or low temperature burns.**
- **If agent touches eyes or skin, immediately flush affected area with running water. Get medical attention.**

WARNING

Noise

- **Sound pressure levels in this helicopter during some operating conditions exceed the Surgeon General's hearing conservation criteria (TB MED251).**
- **Hearing protection devices, such as aviator helmet or ear plugs, shall be worn by all personnel in and around the helicopter during operation.**

WARNING

FOD

- **Make sure area is clear of foreign objects before closing access doors, panels, and fairings.**
- **If area is not clear, damage to components or systems could result in personal injury or death.**

WARNING

JP-4/JP-5 Fuel
MIL-T-5624

- **Fuel is flammable. Do not use near welding areas, open flames, or on very hot surfaces.**
- **Use only with adequate ventilation.**
- **Avoid prolonged or repeated contact with skin. Prolonged contact may cause drying and irritation of skin.**
- **Remove saturated clothing immediately.**
- **Do not smoke when handling fuel.**
- **Do not take internally.**
- **Store in approved, metal safety containers.**

WARNING

Lubricating Oils
MIL-L-23699 or MIL-L-7808

- **If oil is decomposed by heat, toxic gases are released.**
- **Prolonged contact with liquid or mist may cause dermatitis and irritation.**
- **If there is prolonged contact with skin, wash affected area with soap and water. If oil contacts eyes, flush with water immediately. Remove saturated clothing.**
- **If swallowed, do not try to vomit. Seek immediate medical attention.**
- **When handling liquid oil, wear rubber gloves. If prolonged contact with mist is likely, wear approved respirator.**

WARNING

Lifting Components With Hoist

- **Lifting or hoisting of components shall only be done by designated personnel.**
- **The load capacity rating shall be clearly marked on hoist. Do not exceed load rating.**
- **Inspection and testing for cracks or defects in hoist system shall be performed on a regular basis.**
- **Before lifting, alert personnel in immediate areas.**
- **Before lifting, balance the load.**
- **Do not stand under load while it is being moved from one area to another on a hoist.**
- **Do not stand under load to do maintenance work.**

WARNING

Hydraulic Pressures

- **High pressures used in testing hydraulic components can cause line rupture or component failure.**
- **Only qualified personnel shall operate, service, and maintain hydraulic test equipment.**
- **Use heavy plastic shielding at least 1/2-inch thick when applying pressures over 250 psi to prevent injury to personnel.**

WARNING

Hydraulic Fluid

- **Hydraulic fluid is toxic. It can irritate skin and eyes and cause burns. When fluid is decomposed by heating, it releases toxic gases.**
- **Avoid inhaling. Use only with adequate ventilation. If prolonged contact with mist is likely, wear an appropriate respirator.**
- **Avoid contact with skin, eyes, or clothing. Wear rubber gloves if handling liquid.**
- **In case of contact with skin, immediately wash skin with soap and water. In case of contact with eyes, flush them immediately with clear water and get medical attention.**
- **If liquid is swallowed, do not induce vomiting; get immediate medical attention.**

WARNING

Compressed Air

- **Do not use more than 30 psi compressed air for cleaning purposes. Debris propelled under pressure can cause injury to eyes.**
- **Use eye protection to prevent injury to personnel.**

WARNING

Flare Dispenser

- **Flares can accidentally fire, sometimes from stray voltage. Injury or death can result.**
- **Remove all electrical power from helicopter before installing loaded payload module on dispenser assembly.**
- **Keep hands and face away from end of payload module during installation.**

WARNING

Maintenance Platforms/Workstands

- **Use only appropriate maintenance platforms/workstands illustrated in TM 55-405-10, or other approved locally procured stands and restraint equipment, when working above 10 feet on helicopters in a nontactical environment. Otherwise, personnel injury could result from accidental falls.**

WARNING

- **Do not wear eyeglasses having light sensitive lenses while performing magnetic particle (black light) or fluorescent penetrant inspections.**
- **Such lenses have a 16 to 45 percent light transmission loss.**
- **Wearing them can result in failure to detect flaws and cracks under ultraviolet light.**

WARNING

Cadmium-Plated Tools

- **Use only chrome-plated or unplated steel tools when working on the helicopter.**
- **Cadmium or zinc-plated tools are not permitted, since these platings are prone to chipping and flaking. The chips and flakes could cause corrosion or fluid contamination.**
- **All tools, regardless of plating type, shall be serviceable and free of chipping.**

LIST OF EFFECTIVE PAGES

Insert latest changed pages; dispose of superseded pages in accordance with regulations.

N0TE: On a changed page, the portion of the text affected by the latest change is indicated by a vertical line, or other change symbol, in the outer margin of the page. Changes to illustrations are indicated by miniature pointing hands. Changes to wiring diagrams are indicated by shaded areas.

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6–118	0
6–119	1
6–120 – 6–121	17
6–122 – 6–122.8	6
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6–127	6
6–128 – 6–130	0
6–130.1 – 6–130.2	22
6–130.3/6–130.4 blank	22
6–131	0
6–132	4
6–133	1
6–134	17
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6–151/6–152 blank	12
6–152.1/6–152.2 blank	0
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6–221	1
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6–223 – 6–224	1
6–225	21
6–226	0
6–227	6
6–228	4
6–229	1
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6–235	1
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6–237	1
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6–243	0
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6–271	12
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6–275/6–276 blank	0
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6–277	4
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6–280	1
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6–286 – 6–287	0
6–288	4
6–289 – 6–290	15
6–290.1/6–290.2 blank	12
6–291	0
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6–313	0
6–314 – 6–315	4
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6–326	0
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6–329	1
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6–330.3/6–330.4 blank	4
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6–332.2	4
6–332.3 – 6–332.4	0
6–333/6–334 blank	0
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6–334.3	1
6–334.4	0
6–335	14
6–336	0
6–337	1
6–338 – 6–339	0
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6–342	21
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6–347 – 6–348	17
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6–354	17
6–355	1
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6–357	24
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6–359	24
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6–368	1
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6–407/6–408 blank	0
6–408.1 – 6–408.3	22
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6–422 – 6–425	0
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6–437	0
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6–445 – 6–447	0
6–448 – 6–449	15
6–450	0
6–451	6
6–452 – 6–453	4
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6–456	23
6–457	1
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6–521	15
6–522 – 6–523	0
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6–530.3/6–530.4 blank	4

Page No.	*Change No.
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6–534	6
6–535	23
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TECHNICAL MANUAL

NO. 55-1520-240-23

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., 10 May 1983

Aviation Unit and Aviation Intermediate
Maintenance Manual
CH-47D HELICOPTER

REPORTING OF ERRORS AND RECOMMENDING IMPROVEMENTS

You can help improve this manual. If you find any mistakes or if you know of any way to improve the procedures, please let us know. Mail your letter, DA Form 2028 (Recommended Changes to Publications and Blank Forms), or DA Form 2028-2 located in the back of this manual direct to: Commander, U.S. Army Aviation and Missile Command, ATTN: AMSAM-MMC-LS-LP, Redstone Arsenal. AL 35898-5230. A reply will be furnished to you. You may also send in your comments electronically to our e-mail address: ls-lp@redstone.army.mil or by fax 205-842-6546/DSN 788-6546. Instructions for sending an electronic 2028 may be found at the back of this manual immediately preceding the hard copy 2028.

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CHAPTER 6

DRIVE SYSTEM

SECTION I

DRIVE SYSTEM

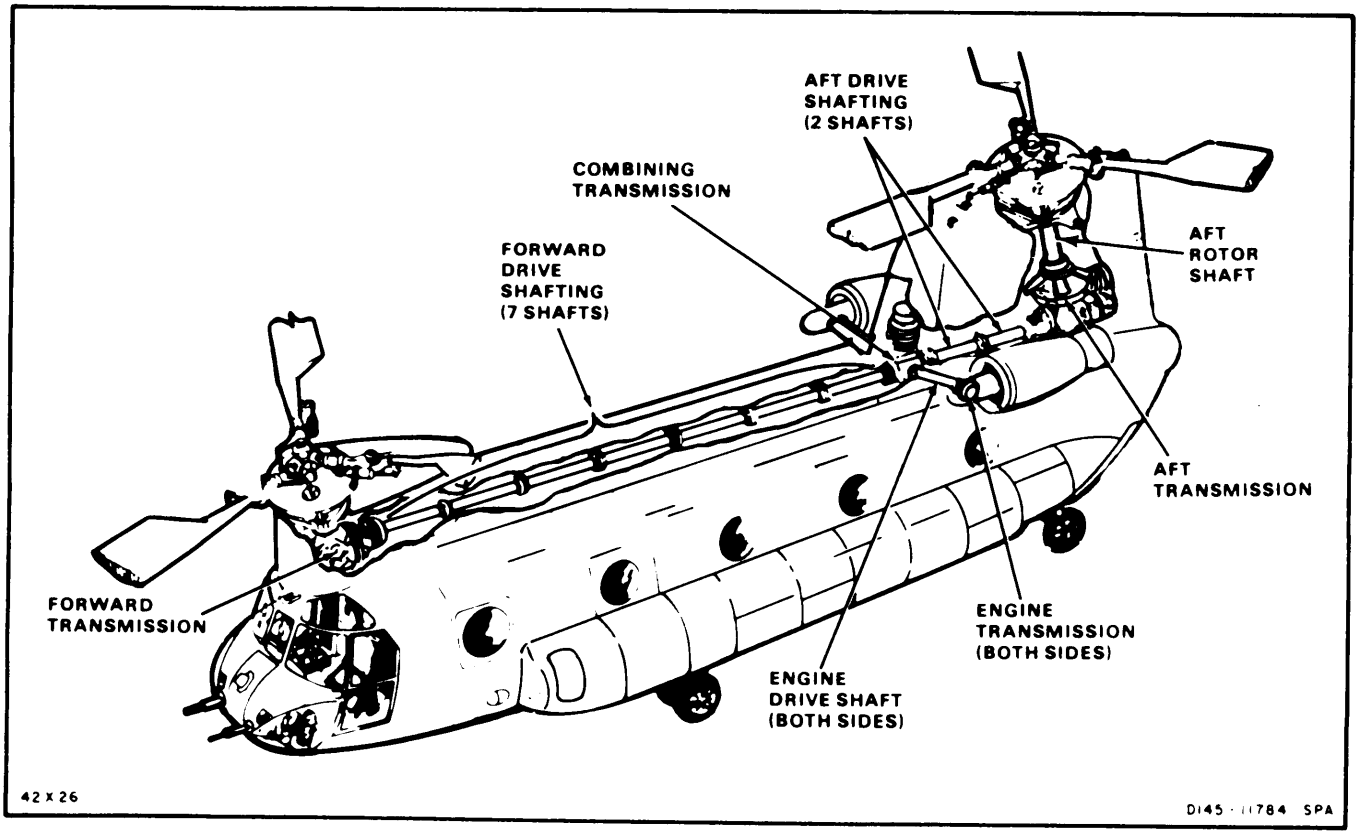
DESCRIPTION AND OPERATION

6-1 DRIVE SYSTEM

The drive system delivers torque from the engines to the rotary-wing heads and blades. It also drives the ac generators and pumps for the flight control and utility hydraulic systems.

The drive system consists of five transmissions, drive shafting to connect the transmissions. and an aft rotor shaft:

1. An engine transmission is mounted on the front of each of the two engines. Torque is transmitted from the engine to the transmission by a splined quill shaft.
2. Output torque from each engine transmission is delivered through an engine drive shaft to the combining transmission. The combining transmission combines the torque from both engines and transmits it to a forward transmission and an aft transmission through drive shafting.
3. The forward transmission is splined directly to the rotary-wing head to drive the forward rotor blades.
4. The aft transmission drives a separate vertical aft rotor shaft. This shaft is splined to the aft rotary-wing head to drive the aft rotor blades.
5. The forward drive shafting consists of seven aluminum tubes joined by flexible adapter assemblies. The tubes are referred to as No. 1 thru No. 7, beginning at the forward end of the shafting. The shafting is supported in a bearing at each adapter assembly by two rubber and metal mounts.
6. The aft drive shafting consists of two aluminum tubes joined by a flexible adapter assembly. The tubes are referred to as No. 8 (forward) and No. 9 (aft). The shafting is supported in a bearing at the adapter assembly by two rubber and metal mounts.



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FORWARD DRIVE SHAFTING

The forward drive shafting transmits torque from the combining transmission to the forward transmission. It consists of seven shafts coupled by six adapter assemblies.

The shafts are numbered 1 thru 7, beginning with the forward shaft.

Shafts 1 thru 6 consist of an aluminum tube with an adapter riveted to each end. The forward adapter is a three-cornered aluminum forging. The aft adapter is a steel forging with external splines and internal threads. Shafts No. 2 thru 6 are identical and interchangeable.

The adapter assemblies between shafts consist of a pack of flexible steel plates bolted to a three-fingered steel adapter. Each adapter is held in a bearing and support assembly. The assemblies are internally splined to mate with the external splines on the shaft aft adapters. Each adapter assembly is indexed to its mating shaft and balanced as a unit with the shaft.

Shaft No. 7 is an aluminum tube with a three-cornered aluminum adapter riveted to each end.

The shafting is carried on the helicopter structure on two elastomeric mounts at each of the six bearing and support assemblies.

Separate adapter assemblies couple the shafting to the forward and combining transmissions. Access to the shafting is through covers on the top of the fuselage.

AFT DRIVE SHAFTING

The aft drive shafting transmits torque from the combining transmission to the aft transmission. It consists of two individual shafts coupled by an adapter assembly.

The two shafts are numbered 8 (forward) and 9 (aft), to continue the numbering of the forward drive shafting.

Shaft No. 8 consists of an aluminum tube with an adapter riveted to each end. The forward adapter is a three-cornered aluminum forging. The aft adapter is a steel forging with external splines and internal threads.

The adapter assembly consists of a pack of flexible steel plates bolted to a three-fingered steel adapter. The assembly is held in a bearing and support assembly that is internally splined to mate with the external splines on the aft adapter of shaft No. 8. The adapter assembly is indexed to shaft No. 8 and balanced as a unit with the shaft.

Shaft No. 9 is an aluminum tube with a three-cornered aluminum adapter riveted to each end.

The shafting is carried on the helicopter structure on two elastomeric mounts at the bearing and support assembly.

Separate adapter assemblies couple the shafting to the combining and aft transmissions. Access to the shafting is from inside the cabin.

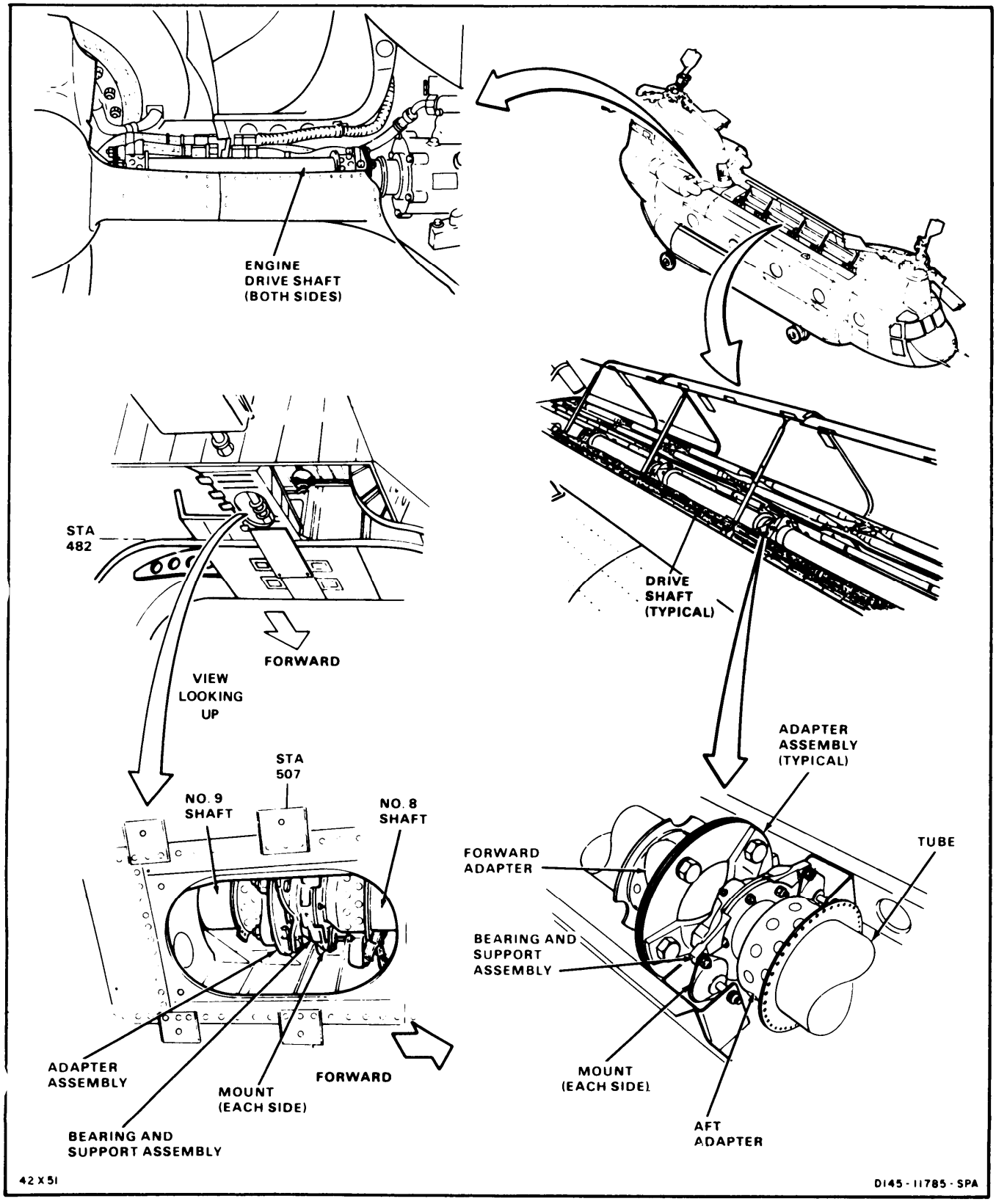
ENGINE DRIVE SHAFTS

An engine drive shaft transmits torque from each engine transmission to the combining transmission. On helicopters without 51, the shaft consists of an aluminum tube with a three-cornered aluminum adapter riveted to each end. On helicopters with 51, it is a one-piece aluminum shaft with flanged ends.

Each shaft is connected to the transmissions by an adapter assembly at each end. Each of the three-piece riveted shafts is serial numbered and dynamically balanced as a unit with the two adapter assemblies. One-piece shafts are balanced separately from their adapters and are separately replaceable.

Access to each shaft is through a fairing between the engine transmission and combining transmission.

6-1 DRIVE SYSTEM (Continued)



GO TO NEXT PAGE

FORWARD TRANSMISSION

The forward transmission receives input torque from the combining transmission through the forward drive shafting. It transmits it directly to the forward rotary-wing head and blades through an integral shaft.

A slider shaft IS mounted around the integral shaft and bolted to the top of the transmission. It provides the bearing surface for swashplate motion.

An integral spur gear at the bottom of the transmission provides power to drive a pump for the flight control hydraulic system.

The transmission is bolted to structure directly above the cockpit, It is part of a package that can be removed and installed as an assembly. In addition to the transmission, the package includes the rotary-wing head and head controls, a weather-protective cover, and two flight control bellcranks. Access to the top of the transmission is through hinged work platforms at each side of the forward transmission fairing. Access to the bottom of the transmission is through a removable drip pan.

Lubrication System

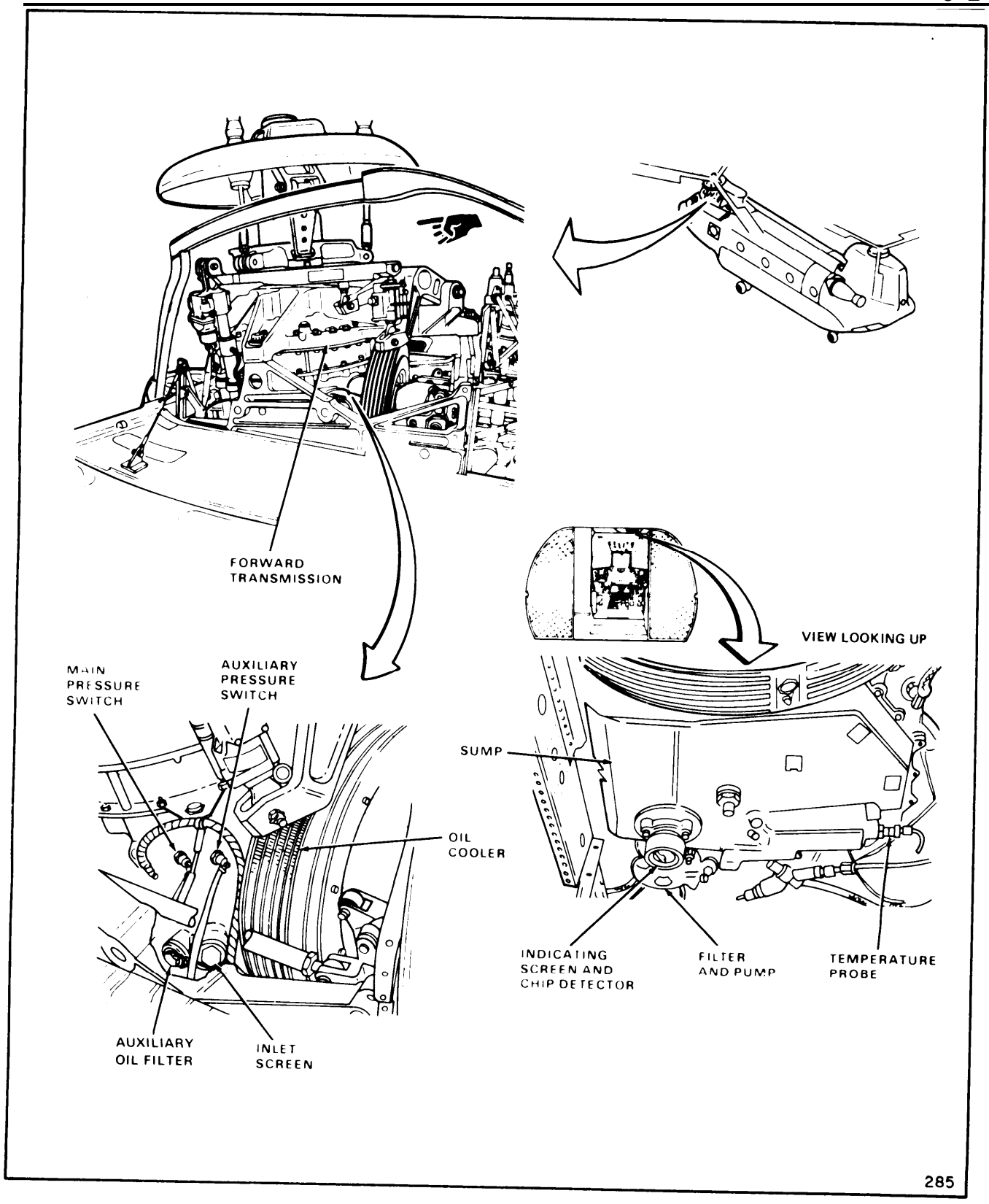
The forward transmission is lubricated with oil from a sump at the bottom of the transmission. Oil is circulated by main and auxiliary pumps mounted on the bottom of the transmission. The main pump is externally mounted. The auxiliary pump is covered by the sump.

The lubrication system IS monitored and protected by the following:

- A combined indicating screen and chip detector and temperature sensor on the sump.
- A pump inlet screen inside the sump.
- A main filter inside the main pump.
- Main and auxiliary pressure switches, an auxililary filter, and an inlet screen on the left side of the transmission,

Hot oil from the transmission passes through a circular 011 cooler mounted on the aft end of the transmission. The 011 is cooled by air forced through the cooler by an impeller. The impeller fit within the cooler and is splined to the transmission input shaft.

GO TO NEXT PAGE



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COMBINING TRANSMISSION

The combining transmission receives input torque from the two engine transmissions through the engine drive shafts. It combines the torque and transmits it to the forward and aft drive shafting through output shafts.

The transmission is bolted to the airframe in the lower forward part of the pylon. Access is through hinged fairings at the forward end of the pylon.

Lubrication System

The combining transmission contains an integrated lubrication system that supplies the combining transmission and both engine transmissions.

Oil for the system is contained in a sump bolted to the top of the transmission. The sump is divided into three sections, one for the combining transmission and one for each of the two engine transmissions. Oil is circulated by a main and an auxiliary oil pump inside the transmission.

The lubrication system is monitored and protected by the following:

- Two debris detection screens and a chip detector at the lower forward end of the transmission. With 37, a chip burnoff system lets the chip detector burn off light fuzz and similar normal debris before it activates indicators on the master caution and maintenance panels.
- An inlet screen and a main filter on the sump cover.
- A temperature probe at the forward end of the sump.
- An auxiliary filter and a pressure switch at the forward end of the transmission.

Hot 011 from the transmission passes through a circular 011 cooler mounted on the sump cover under 011 coolers for the left and right engine transmission. The oil is cooled by a fan that pulls air through the coolers. The fan is driven by a vertical shaft that is driven by a gear on the aft output shaft of the transmission.

ENGINE TRANSMISSION

The engine transmissions turn the direction of engine torque 90 degrees to direct it towards the combining transmission.

A one-way clutch in each transmission allows the drive system to overrun the engines during autorotation or a sudden reduction in engine rpm. Each of the two engine transmissions is the same except for the location of some external parts. Either transmission can be converted to one for the opposite side by exchanging the location of these parts.

Lubrication System

Each engine transmission is lubricated by oil from a section of the combining transmission sump. Oil is delivered to each transmission by a separate oil pump in the combining transmission.

Oil is carried between the combining transmission and each engine by two external oil hoses. A vent hose carries oil vapor from the transmission to the combining transmission sump.

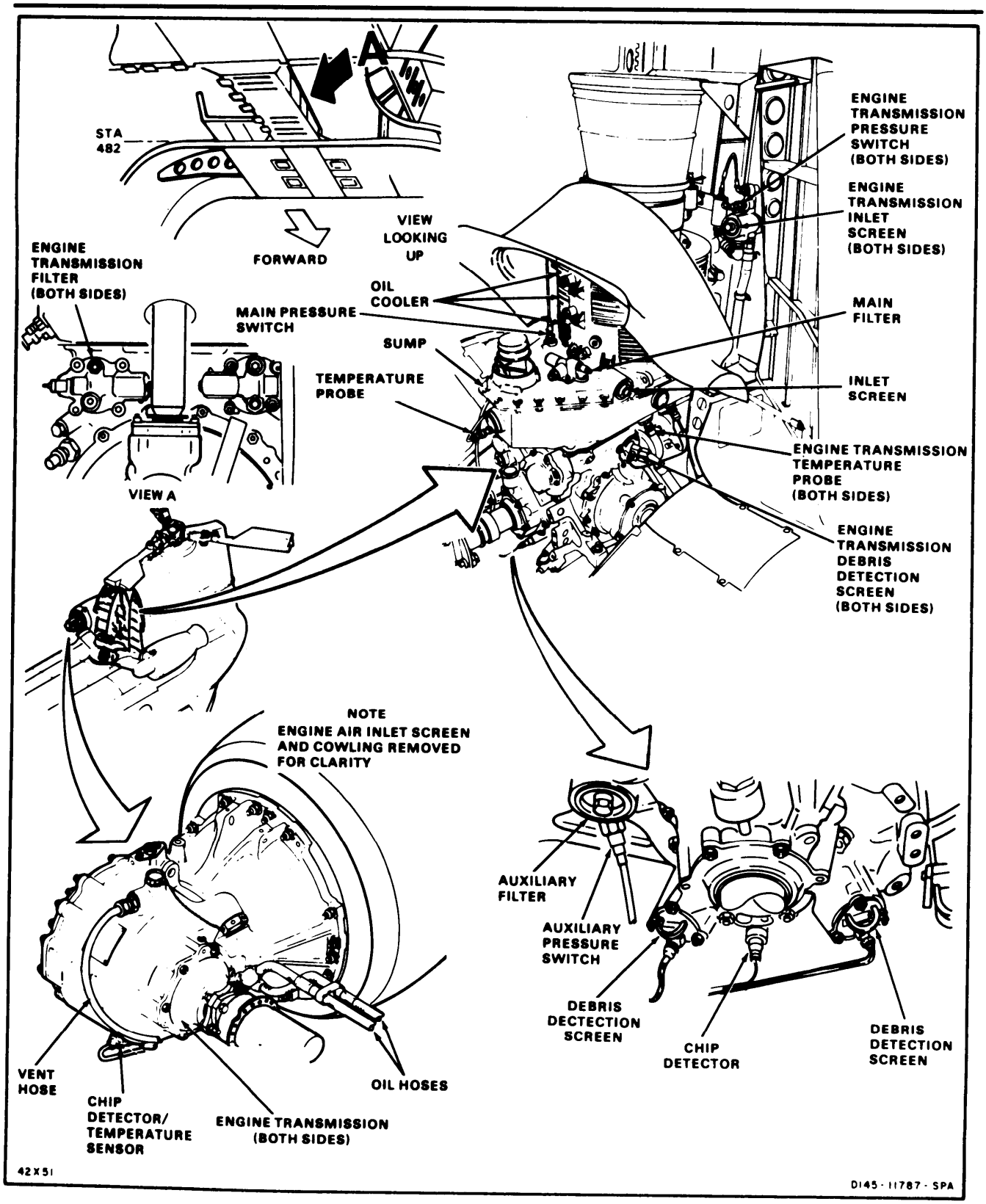
The lubrication system is monitored and protected by the following for each engine transmission:

- A temperature probe and a debris detection screen on the side of the combining transmission.
- A main filter on the back of the combining transmission.
- An inlet screen and a pressure switch on the airframe above and aft of the combining transmission. With 37, the combined detector and switch is replaced by a separate chip detector and plugstat. They are part of a chip burnoff system that lets the chip detector burn off light fuzz and similar normal debris before it activates indicators on the master caution and maintenance panels.
- A combined chip detector and overtemperature switch at the bottom of the engine transmission.

Hot oil from each engine transmission is cooled in a separate oil cooler mounted on the combining transmission sump cover.

GO TO NEXT PAGE

6-1 DRIVE SYSTEM (Continued)



GO TO NEXT PAGE

AFT TRANSMISSION

The aft transmission receives input torque from the combining transmission through the aft drive shafting. It transmits torque to the aft rotor shaft through a splined connection.

Spur gears in the transmission provide power to drive pumps for the flight control and utility hydraulic systems and two ac generators.

The transmission is mounted above the ramp area of cabin at the base of the pylon. Access is through hinged baffles and a removable drip tray at the bottom of the transmission.

AFT ROTOR SHAFT

The aft rotor shaft is splined to the top of the aft transmission. It transmits input torque from the transmission to the aft rotary-wing head and rotor blades. The shaft turns in a bearing that is part of a support bolted to the pylon structure.

A slider shaft is mounted on the rotor shaft and bolted to the support. It provides the bearing surface for aft swashplate motion.

Lubrication System

Hot oil from the aft transmission and rotor shaft passes through a circular oil cooler mounted on the aft end of the transmission. The oil is cooled by a fan that pulls air through the cooler. The fan is driven by the transmission through a splined shaft

Oil is circulated by main and auxiliary pumps. The main pump is at the aft end of the transmission. The auxiliary pump is at the bottom of the transmission, covered by the sump.

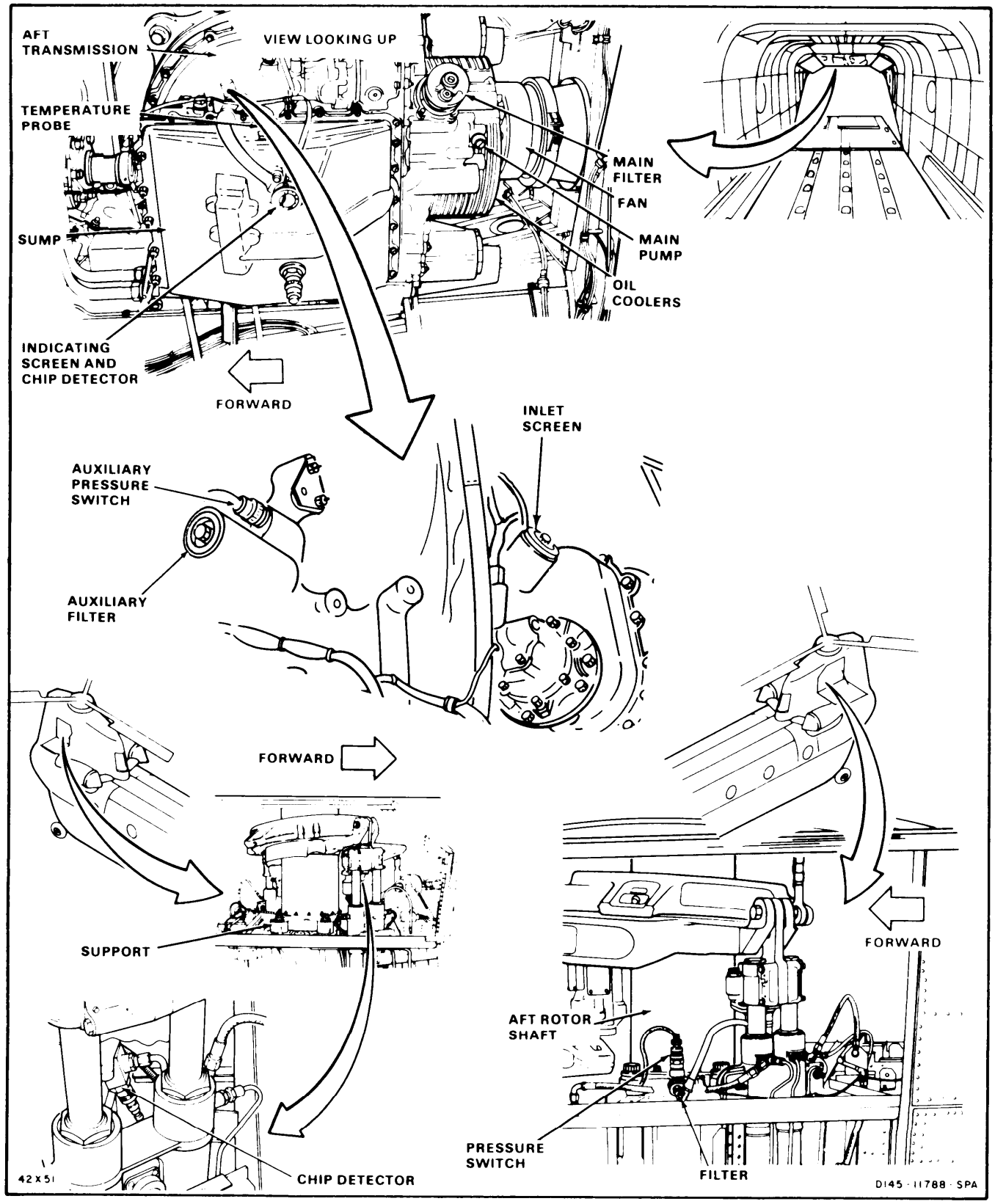
The lubrication system is monitored and protected by the following:

- A combined indicating screen and chip detector, and a temperature sensor on the aft transmission sump. With 37, a chip burnoff system lets the chip detector burn off light fuzz and similar normal debris before it activates indicators on the master caution and maintenance panels.
- An inlet screen inside the aft transmission sump.
- Main and auxiliary pressure switches, a main inlet screen and an auxiliary filter on the left side of the aft transmission.
- A main filter at the aft left of the aft transmission.

In addition, the condition of oil at the aft rotor shaft bearing is monitored by a chip detector, a pressure switch, and a filter in the shaft support.

GO TO NEXT PAGE

6-1 DRIVE SYSTEM (Continued)



END OF TASK

SECTION II

DRIVE SHAFTING

6-2 REMOVE NO. 1 DRIVE SHAFT 6-2

INITIAL SETUP

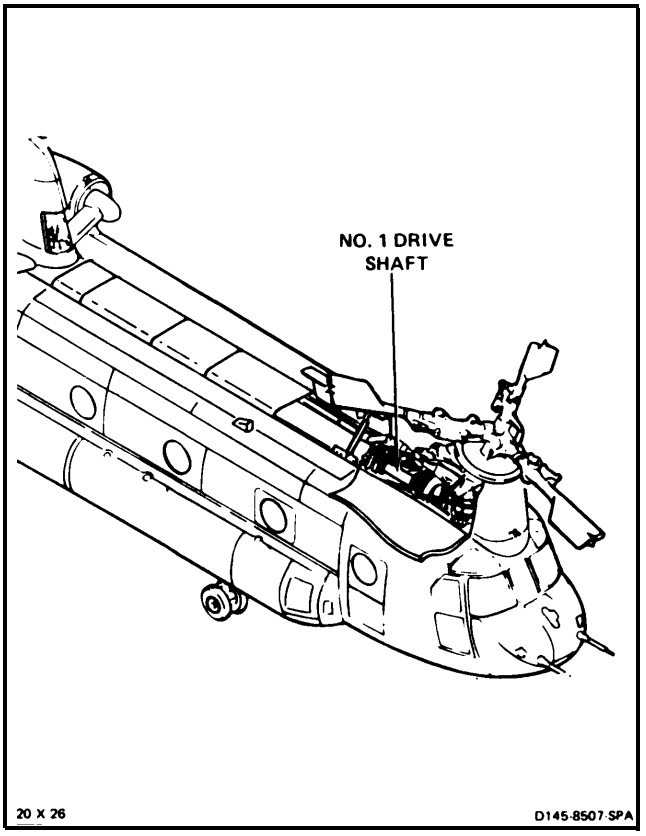
Applicable Configurations:
All

Tools:
Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692

Materials:
Barrier Material (E80)
Cloths (E120)

Personnel Required:
Medium Helicopter Repairer (2)

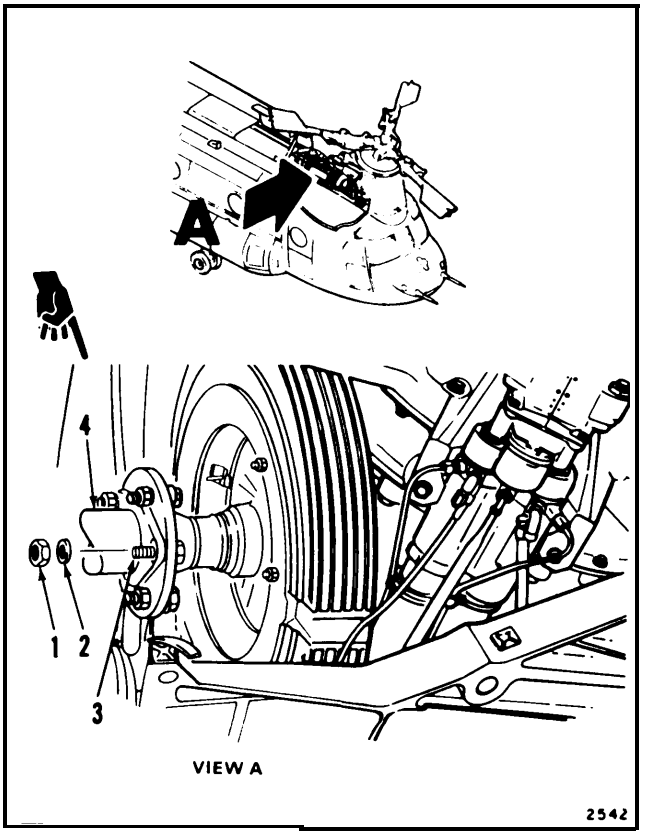
Equipment Condition:
Battery Disconnected (Task 1-39)
Electrical Power Off
Forward Transmission Drip Pan Removed (Task 2-3)
Forward Transmission Aft Fairing Removed (Task 2-63)
Forward Transmission Oil Cooler Air Inlet Duct Removed (Task 6-12 1)
No. 2 Drive Shaft Removed (Task 6-3)



CAUTION

Do not allow bolts to turn. If bolts turn, bolts and plates can be damaged.

1. **Remove nuts (1) and washers (2)** from three bolts (3) at forward end of shaft (4). During removal, hold head of bolts with a wrench. Do not remove bolts at this time.



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6-2 REMOVE NO. 1 DRIVE SHAFT (Continued)

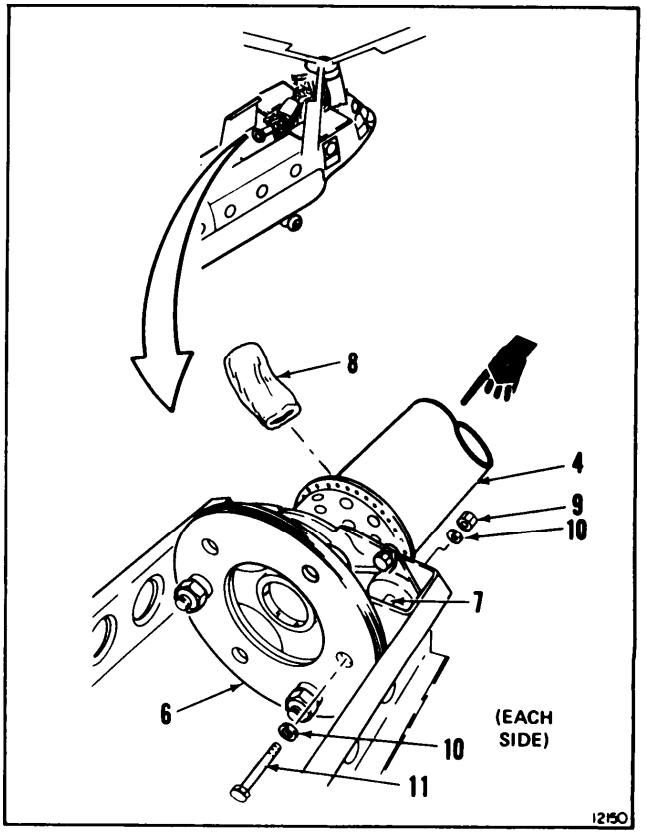
WARNING

Rotor blades will turn when shaft rotates. Turning blades can injure personnel. Keep clear of blades as they turn.

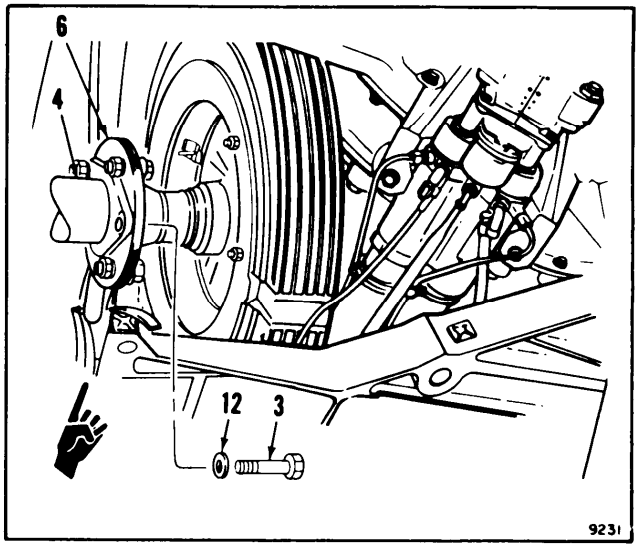
NOTE

Remove bolt from mount at each side of adapter assembly in same way. Right side shown here.

2. Rotate shaft (4) to align one of the bolt holes in adapter assembly (6) with mount bushing (7).
3. Support shaft (4) with cloths (E120) or barrier material (E80) (8).
4. **Remove** nut (9), washers (10), and bushing **bolt (11).** Remove bolt through bolt hole in adapter assembly (6). Use socket and extension.



5. **Remove three bolts (3)** and special washers (12) from shaft (4) and forward transmission adapter assembly (6).

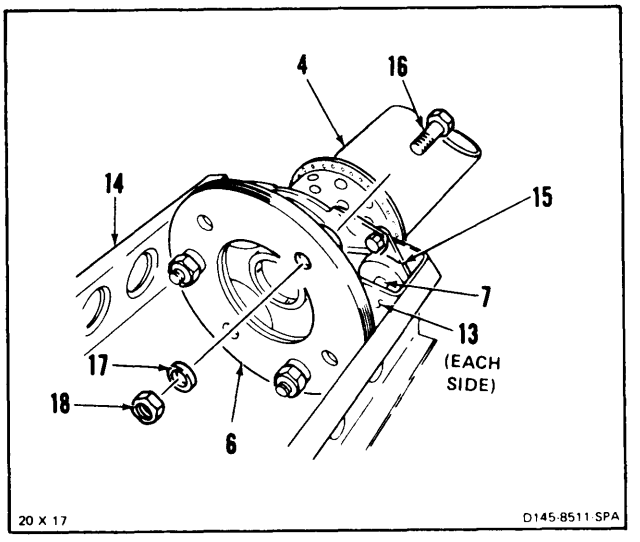


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6-2 REMOVE NO. 1 DRIVE SHAFT (Continued)

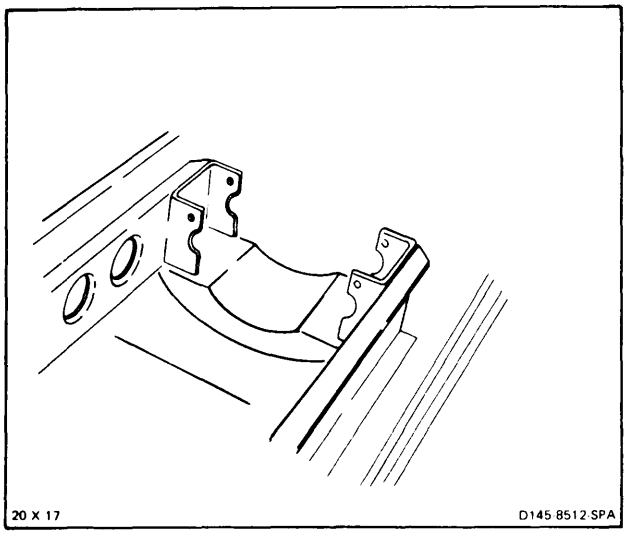
6. Lift adapter assembly (6) out of two brackets (1 3). With aid of helper, withdraw shaft (4) from helicopter structure (14). **Remove shaft** from helicopter.

7. If shaft (4) is being replaced, remove bushing (7) from mount (15) on each side of adapter assembly (6). Install bolt (16), special washer (17) and nut (18) in adapter assembly.



FOLLOW-ON MAINTENANCE:

None



END OF TASK

6-3 REMOVE NO. 2 THRU NO. 6 FORWARD DRIVE SHAFT 6-3

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692

Materials:

Barrier Material (E80)

Cloths (E120)

Personnel Required:

Medium Helicopter Repairer (2)

Equipment Condition:

Battery Disconnected (Task 1-39)

Electrical Power Off

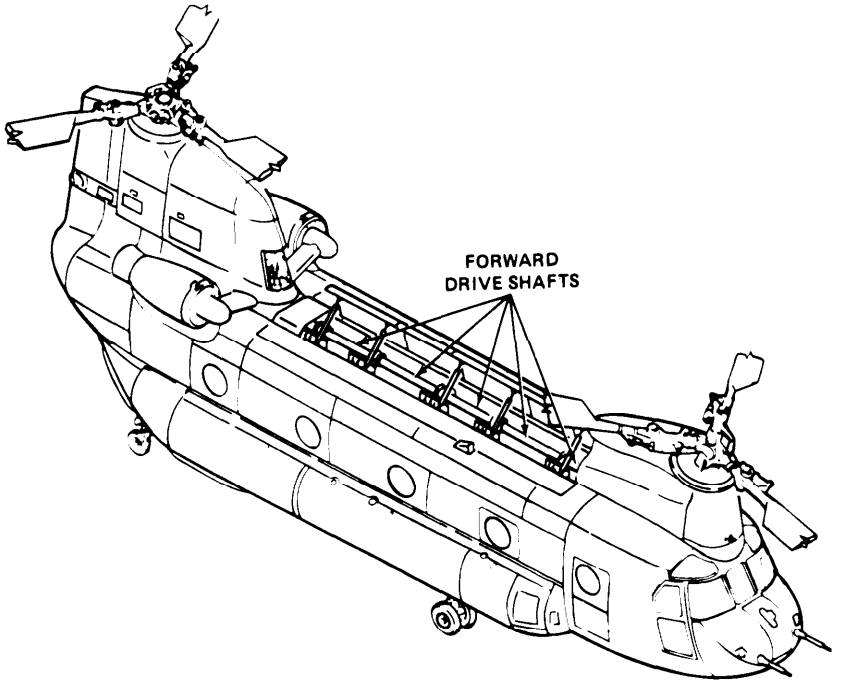
Forward Drive Shaft Tunnel Access Covers Open, As Needed (Task 2-2)

Remove Cabin Tunnel Smoke Baffle (Task 2-170.1)

General Safety Instructions:

WARNING

Rotor blades will turn when shaft rotates. Turning blades can injure personnel. Keep clear of blades as they turn.



D145-8501-SPA

GO TO NEXT PAGE

NOTE

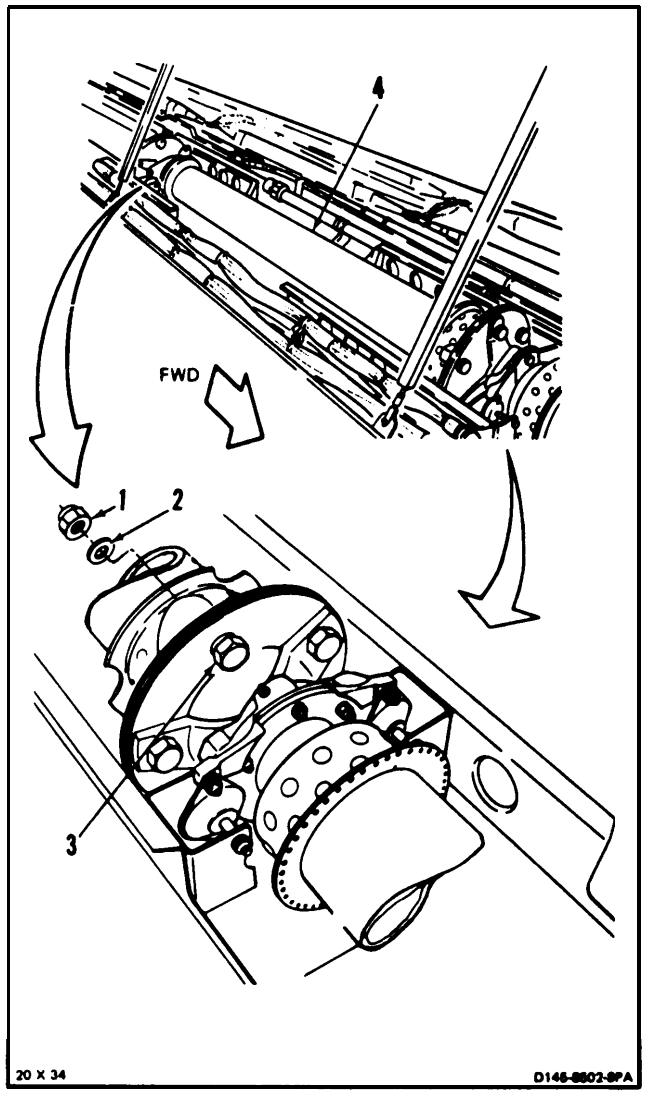
Remove any of shafts No. 2 thru No. 6 in same way. Typical shaft shown here.

REMOVE END NUTS

CAUTION

Do not allow bolts to turn. If bolts turn, bolts and plates can be damaged.

1. **Remove nuts (1) and washers (2)** from three bolts (3) **at each end of shaft (4).** During removal, hold head of bolts with wrench. **Do not remove bolts** at this time.



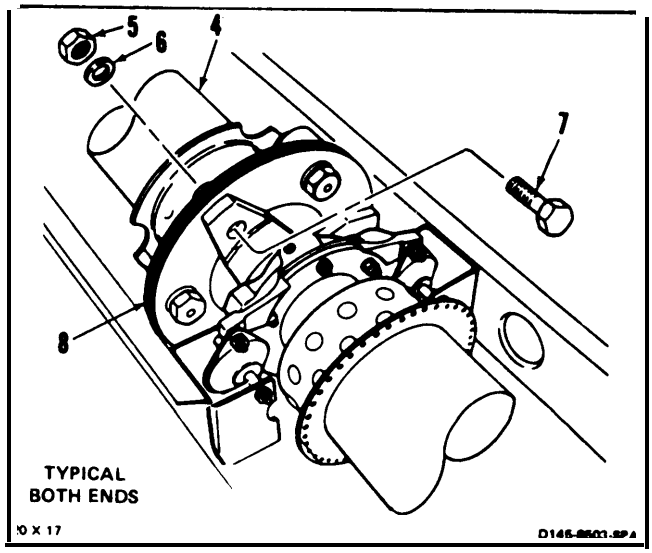
CAUTION

Do not allow bolts to turn. If bolts turn, bolts and adapter assembly can be damaged.

NOTE

If more than one bolt is removed from each adapter assembly, assembly will have to be balanced.

2. **Remove one nut (5), special washer (6), and bolt (7)** from adapter assembly (8) **at each end of shaft (4).** During removal, hold head of bolts with wrench.



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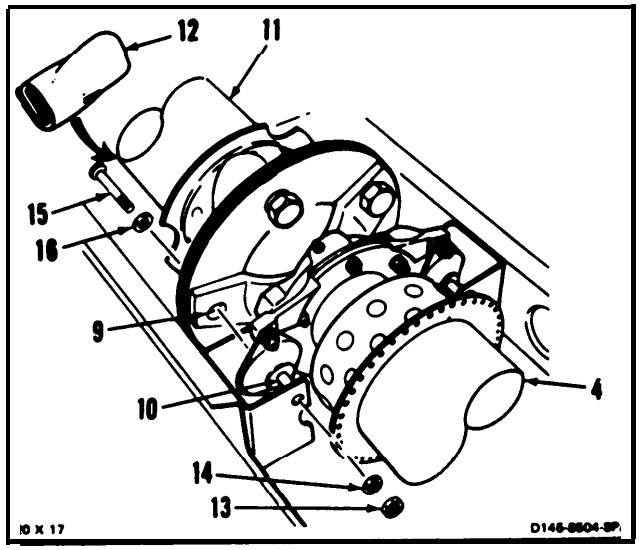
6-3 REMOVE NO. 2 THRU NO. 6 FORWARD DRIVE SHAFT (Continued)

REMOVE MOUNT BOLTS

NOTE

- Remove bolt from mount at each side of adapter assembly in same way. Right mount shown here.
- All shafts must be rotated as a unit to keep blades in phase.

3. Rotate shaft (4) to align bolt hole (9) with mount bushing (10).
4. Support shaft (11) with pad (12) of cloths (E120) or barrier material (E80).
5. Remove nut (13) and washer (14) from bushing bolt (15). **Remove bushing bolt** and washer (9) through bolt hole (9). Use socket and extension.

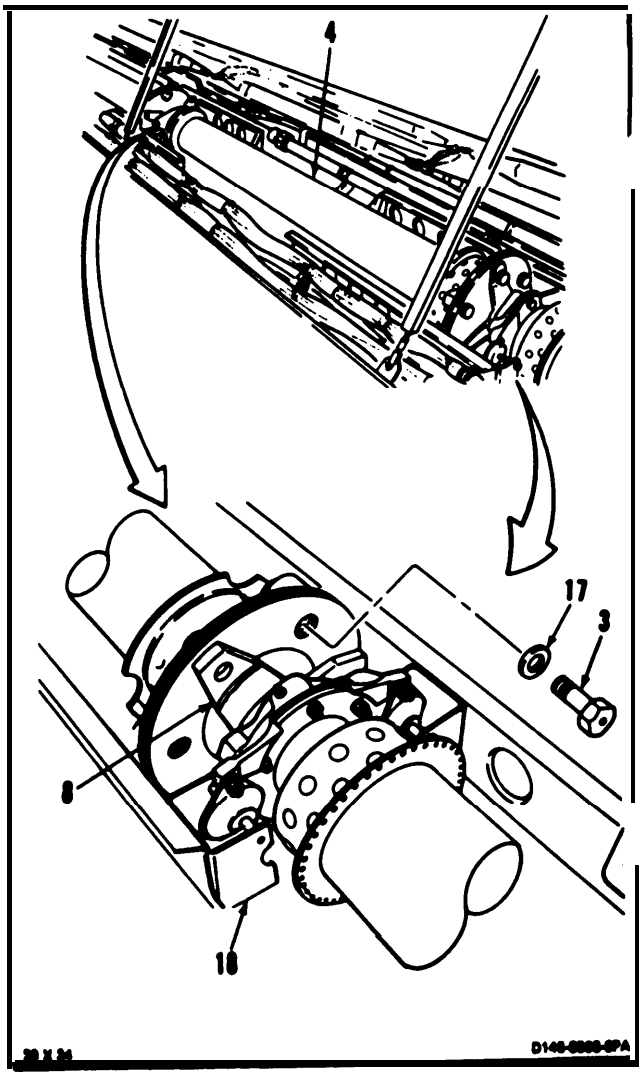


REMOVE SHAFT

NOTE

All shafts must be rotated as a unit to keep blades in phase.

6. Rotate shaft (4) to **position two bolt holes** in adapter assemblies (8) **at top of shaft.**
7. **Remove three bolts** (3) and special washers (17) **from each end of shaft (4).**
8. With aid of helper, lift shaft (4) from brackets (18). **Remove shaft.**



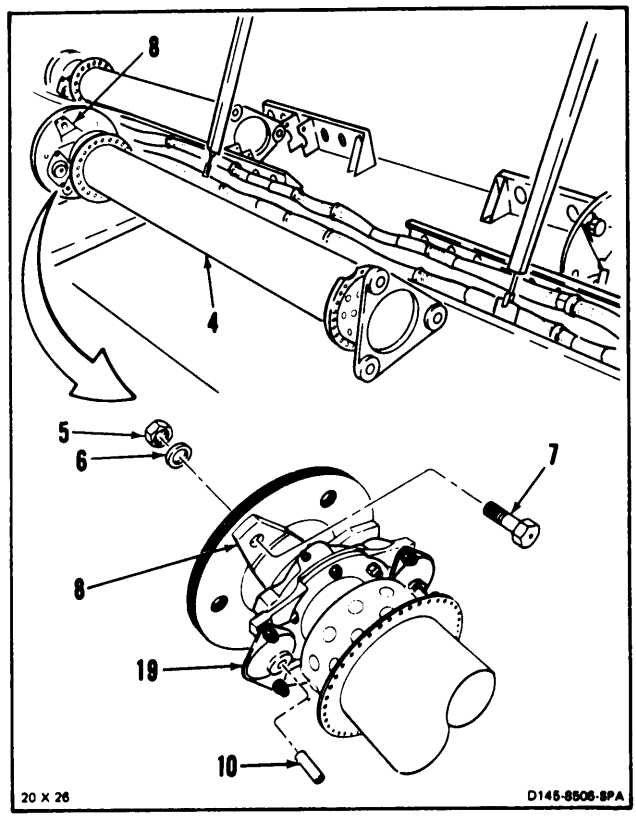
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6-3 REMOVE NO. 2 THRU NO. 6 FORWARD DRIVE SHAFT (Continued)

9. If shaft (4) is being replaced, install bolt (7), special washer (6) and nut (5) in adapter assembly (8). Remove bushing (10) from mount (19) on each side of adapter assembly.

FOLLOW-ON MAINTENANCE:

None



END OF TASK

6-4 REMOVE NO. 7 DRIVE SHAFT

INITIAL SETUP

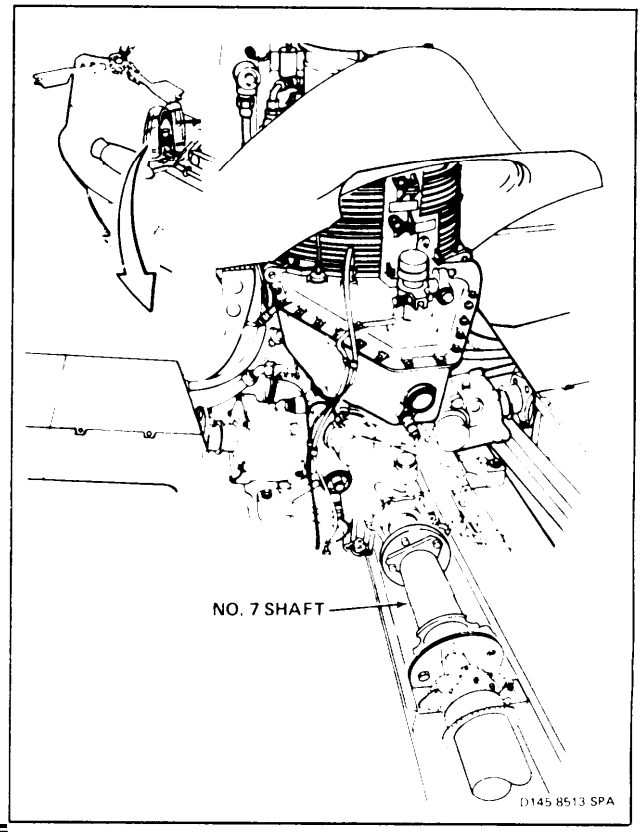
Applicable Configurations:
All

Tools:
Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692

Materials:
Barrier Material (E80)
Cloths (E120)

Personnel Required:
Medium Helicopter Repairer (2)

Equipment Condition:
Battery Disconnected (Task 1-39)
Electrical Power Off
Pylon Hinged Fairing Open (Task 2-2)
Pylon Lower Fairing Raised (Task 2-2)
Forward Drive Shaft Tunnel No. 6 Access Cover Open (Task 2-2)
Remove Cabin Tunnel Smoke Baffle (Task 2-170.1)



CAUTION

Do not allow bolts to turn. If bolts turn, bolts and adapter assembly can be damaged.

NOTE

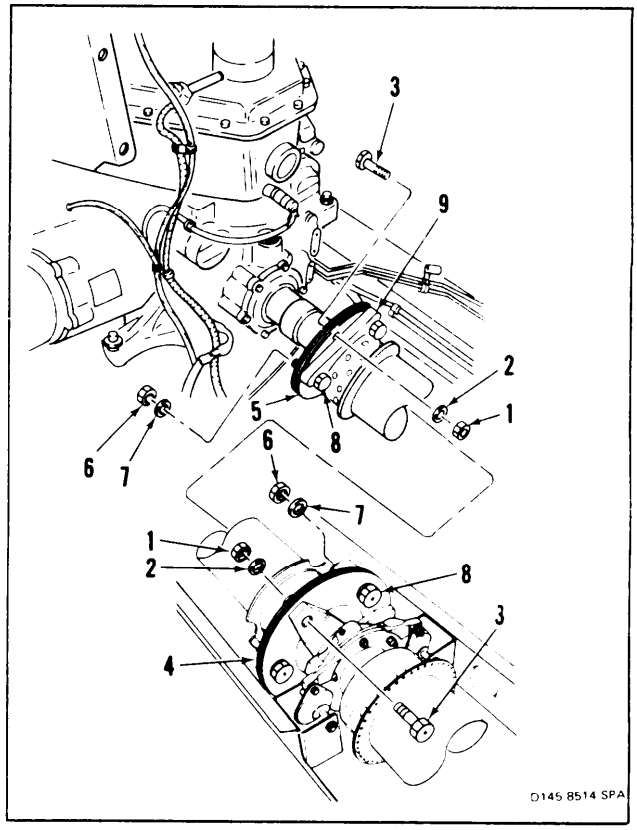
If more than one bolt is removed from each adapter assembly, assembly will have to be balanced.

1. **Remove one nut (1), special washer (2), and bolt (3) from adapter assemblies (4 and 5).** During removal, hold head of bolts with wrench.

CAUTION

Do not allow bolts to turn. If bolts turn, bolts and plates can be damaged.

2. **Remove three nuts (6) and washers (7)** from bolts (8) **at each end of shaft (9).** During removal, hold head of bolts with wrench. **Do not remove bolts** at this time.



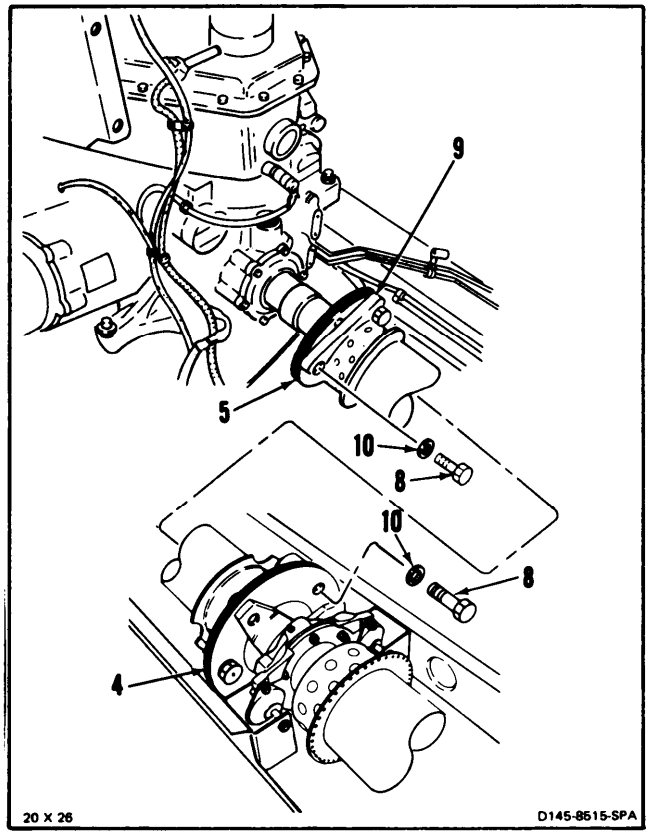
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6-4 REMOVE NO. 7 DRIVE SHAFT (Continued)

NOTE

All shafts must be rotated as a unit to keep blades in phase.

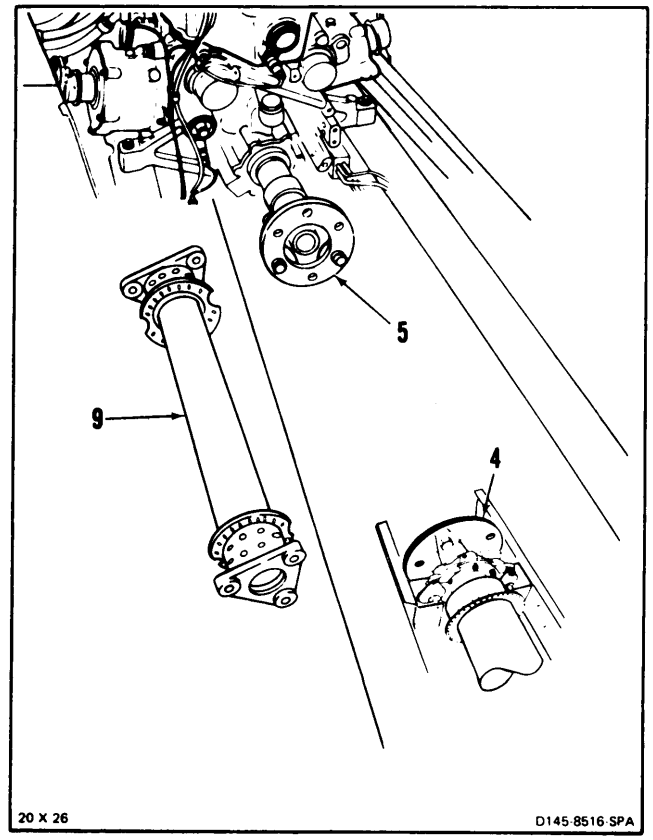
3. Rotate shaft (9) to position two bolt holes in adapter assemblies (4 and 5) at top of shaft.
4. Support shaft (9) with cloths (E120) or barrier material (E80).
5. **Remove three bolts (8)** and washers (10) **from each end of shaft (9).**



6. With aid of helper lift shaft (9) from between adapter assemblies (4 and 5). **Remove shaft.**

FOLLOW-ON MAINTENANCE:

None



END OF TASK

6-5 REMOVE FORWARD TRANSMISSION ADAPTER ASSEMBLY 6-5

INITIAL SETUP

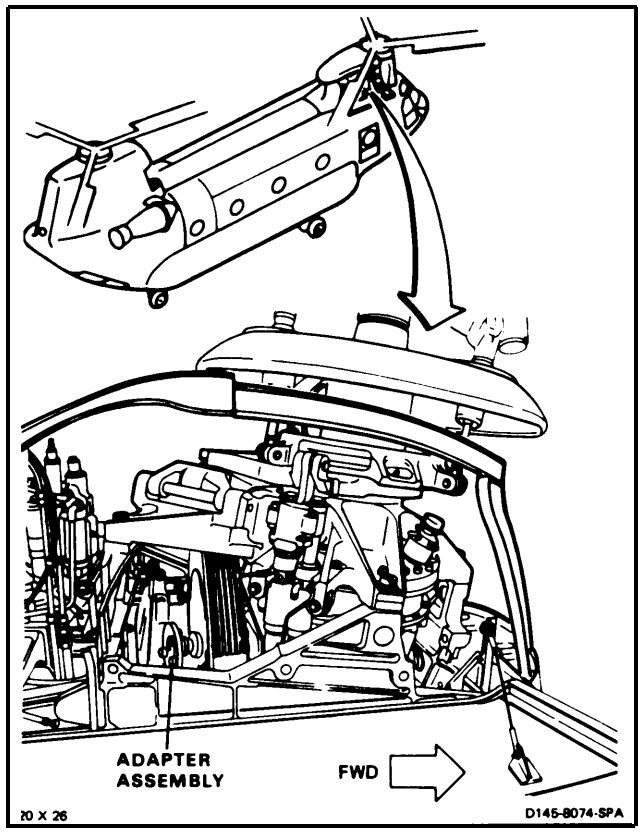
Applicable Configurations:
All

Tools:
None

Materials:
None

Personnel Required:
Medium Helicopter Repairer

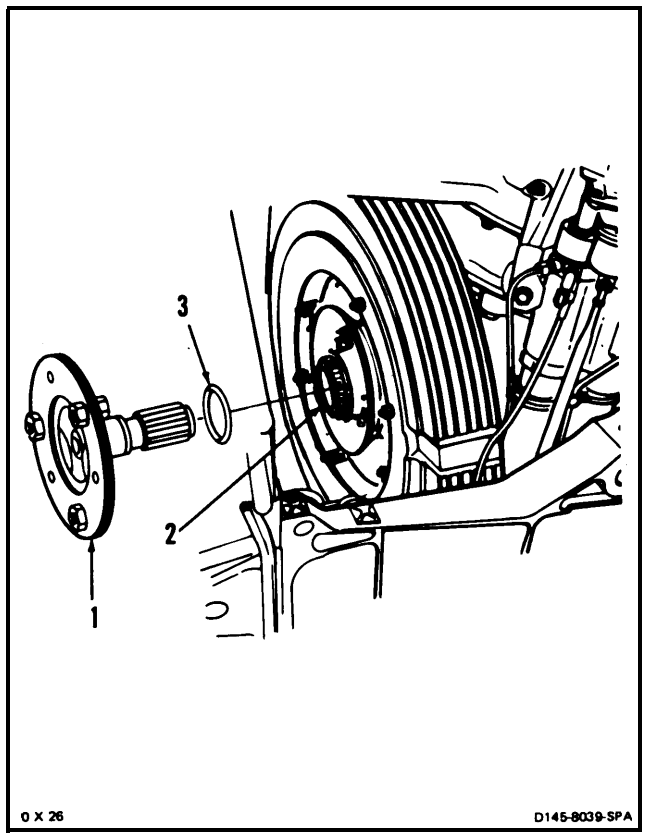
Equipment Condition:
Battery Disconnected (Task 1-39)
Electrical Power Off
Forward Transmission Right Fairing Open (Task 2-2)
Oil Cooler Air Inlet Duct Removed (Task 6-121)
No. 1 and No. 2 Drive Shafts Removed (Task 6-2 and 6-3)



NOTE

If more than one bolt is loosened or removed from the adapter assembly, the adapter assembly must be rebalanced.

1. **Remove adapter assembly (1)** from transmission input shaft (2).
2. **Remove packing (3)** from adapter assembly (1).



FOLLOW-ON MAINTENANCE:
None

END OF TASK

6-6 REMOVE COMBINING TRANSMISSION FORWARD ADAPTER ASSEMBLY

INITIAL SETUP

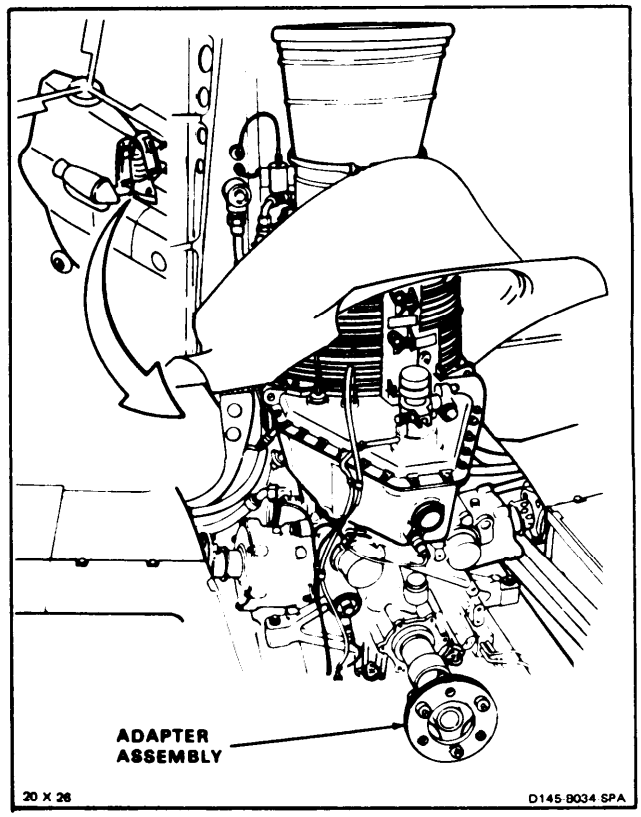
Applicable Configurations:
All

Tools:
Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692
Wood Dowel, 1 Inch x 18 Inches

Materials:
None

Personnel Required:
Medium Helicopter Repairer

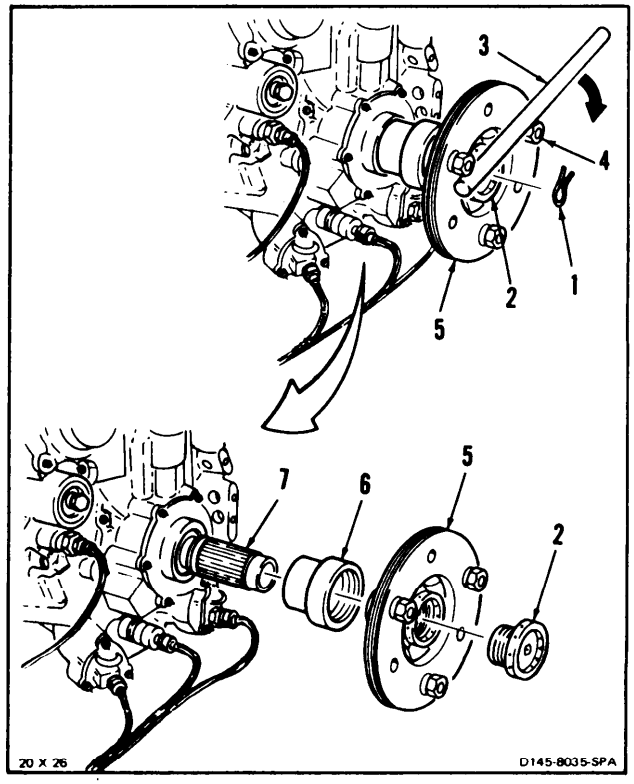
Equipment Condition:
Battery Disconnected
Electrical Power Off
Aft Pylon Access Doors Open (Task 2-2)
Aft Pylon Lower Fairing Open (Task 2-2)
No. 7 Drive Shaft Removed (Task 6-4)



1. **Remove lockring** (1) from retainer (2).
2. Place wood dowel (3) across nuts (4) as shown. Hold dowel to keep adapter assembly (5) from turning. Remove retainer (2).
3. **Remove adapter assembly (5) and retainer (6)** from output shaft (7).

FOLLOW-ON MAINTENANCE

None



END OF TASK

6-7 INSPECT FORWARD DRIVE SHAFT ADAPTER ASSEMBLY

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4962

Materials:

Abrasive Paper (E15)

Personnel Required:

Inspector

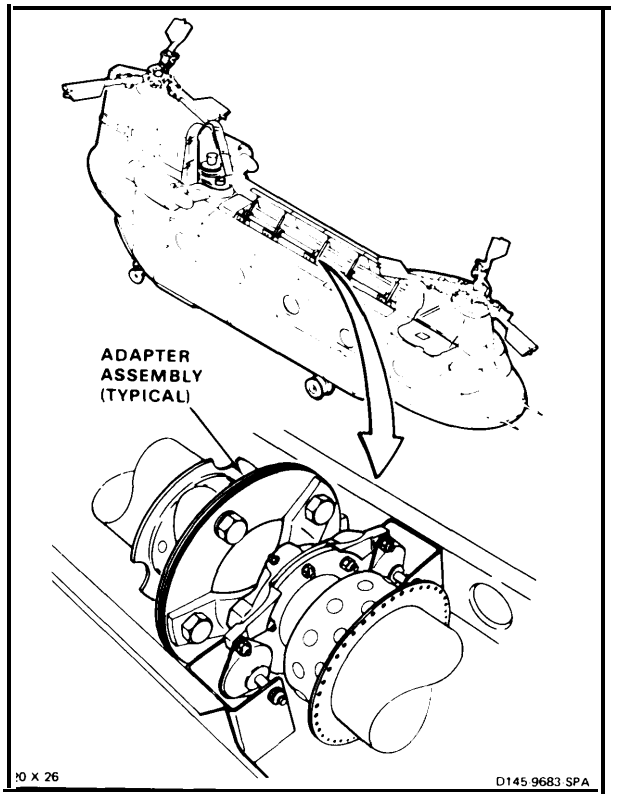
Equipment Condition:

Battery Disconnected (Task 1-39)
Electrical Power Off
Forward Drive Shaft Tunnel Access Covers Open (Task 2-2)
Forward Transmission Fairing Work Platforms Open (Task 2-2)
Aft Pylon Doors Open (Task 2-2)
Aft Pylon Lower Fairing Open (Task 2-2)

General Safety Instructions:

WARNING

Keep clear of turning rotor blades when rotating adapter assembly. Turning blades can injure personnel.



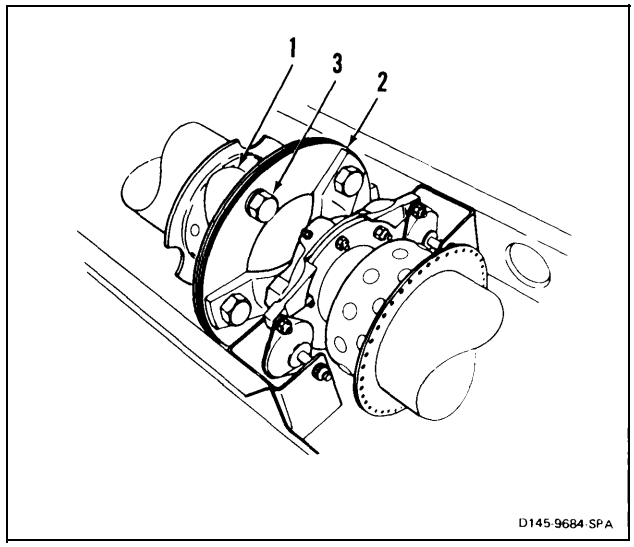
GO TO NEXT PAGE

6-7 INSPECT FORWARD DRIVE SHAFT ADAPTER ASSEMBLY (Continued)

NOTE

- Inspect all adapter assemblies in same way. Typical assembly shown.
- Use magnifying glass to inspect.
- Rotate adapter assembly as needed for complete check.
- If more than one bolt is loosened or removed from adapter assembly, the adapter assembly must be rebalanced.

1. **Inspect adapter (1) and plates (2) for cracks.** Pay special attention to areas around bolts (3). There shall be no cracks.
2. **Inspect adapter (1). There shall be no nicks, scratches or gouges.**
3. **Inspect plates (2). There shall be no sharp dents or distorting. There shall be no nicks on inside edge.** Feel for nicks with pointed scriber.
4. **Inspect outside edge of plates (2) for light scratches, fretting corrosion or nicks.** Repair damage (Task 6-11). Use abrasive paper (E15).



FOLLOW-ON MAINTENANCE:
Close aft pylon lower fairing (Task 2-2).
Close aft pylon doors (Task 2-2).
Close forward transmission fairing work platforms (Task 2-2).
Close forward drive shaft tunnel access covers (Task 2-2).

END OF TASK

6-8 INSTALL FORWARD TRANSMISSION ADAPTER ASSEMBLY

INITIAL SETUP

Applicable Configurations:
All

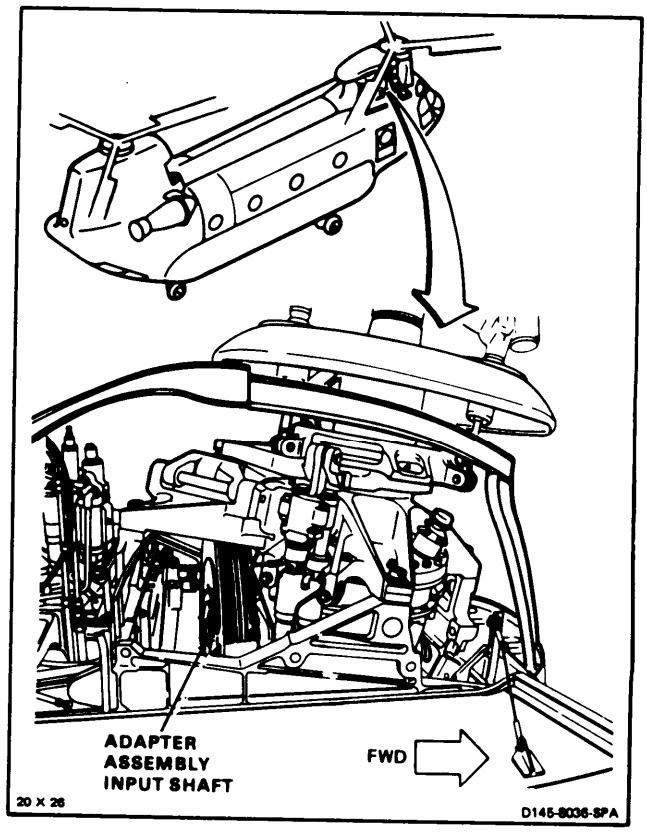
Tools:
None

Materials:
Dry Cleaning Solvent (E162)
Grease (E190.1)
Cloth (E120)
Gloves (E186)
Abrasive Pad (E2)

Parts:
Packing

Personnel Required:
Medium Helicopter Repairer
Inspector

References:
TM 55-1520-240-23P



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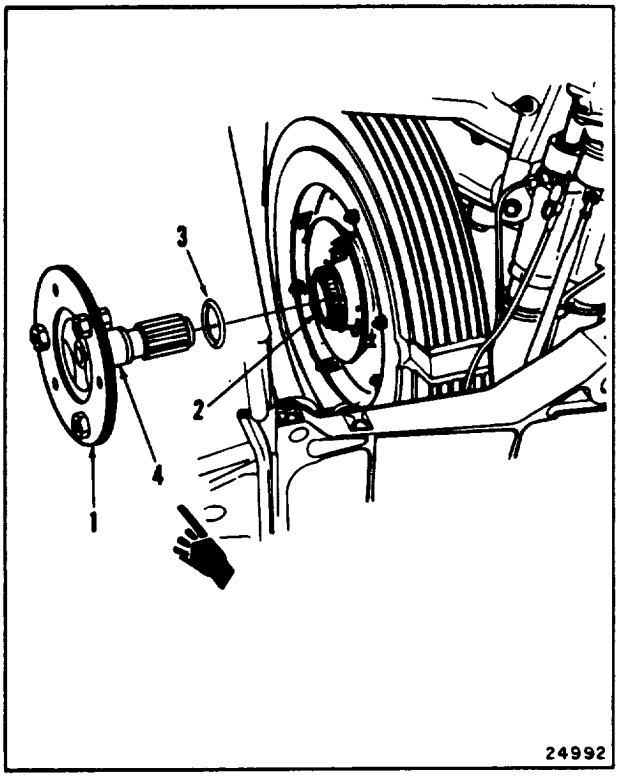
WARNING

Dry cleaning solvent (E162) is flammable and toxic. It can irritate skin and cause burns. Use only in well-ventilated area, away from heat and open flame. In case of contact, immediately flush skin or eyes with plenty of water for at least 15 minutes. Get medical attention for eyes.

NOTE

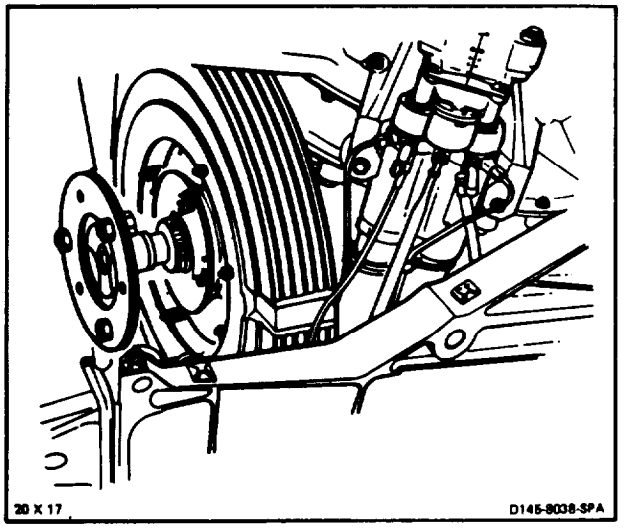
If more than one bolt is loosened or removed from the adapter assembly, the adapter assembly must be rebalanced.

1. Clean splines of adapter assembly (1) and input shaft (2). Use dry cleaning solvent (E162) and clean cloths (E120). Using abrasive pad (E2) thoroughly remove any fretting corrosion from adapter surface (4) and mating surface of input shaft. Wear gloves (E186).
2. Coat packing (3) with grease (E190.1). **Install packing** on adapter assembly (1).
3. **Pack splines** of input shaft (2) and adapter assembly (1) **with grease (E190.1).**
4. Completely cover adapter surface (4) with grease (E190.1).
5. **Install adapter assembly** (1) in input shaft (2). Make sure assembly is fully seated. Wipe off excess grease with cloth (E120).



FOLLOW-ON MAINTENANCE:

Install No. 1 and No. 2 drive shafts (Task 6-17 and 6-18).
Phase rotary-wing blades (Task 6-28).
Install forward transmission oil cooler air inlet duct (Task 6-122).
Close forward transmission right fairing (Task 2-2).



END OF TASK

6-9 INSTALL COMBINING TRANSMISSION FORWARD ADAPTER ASSEMBLY 6-9

INITIAL SETUP

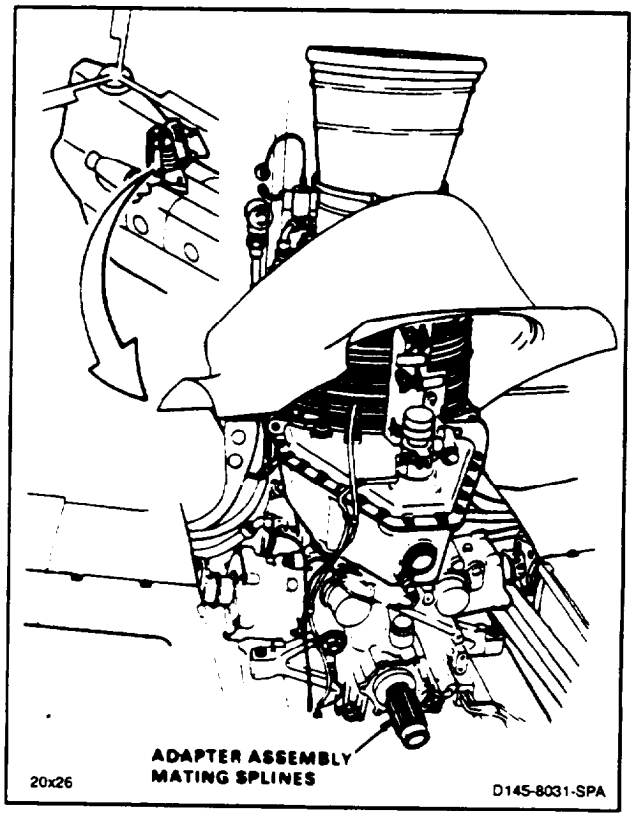
Applicable Configurations:
All

Tools:
Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692
Torque Wrench, 700 to 1600 Inch-Pounds
Wood Dowel, 1 Inch x 18 Inches

Materials:
Dry Cleaning Solvent (El 62)
Cloths (E120)
Grease (E190)
Gloves (E186)

Personnel Required:
Medium Helicopter Repairer
Inspector

References:
TM 55-1520-240-23P



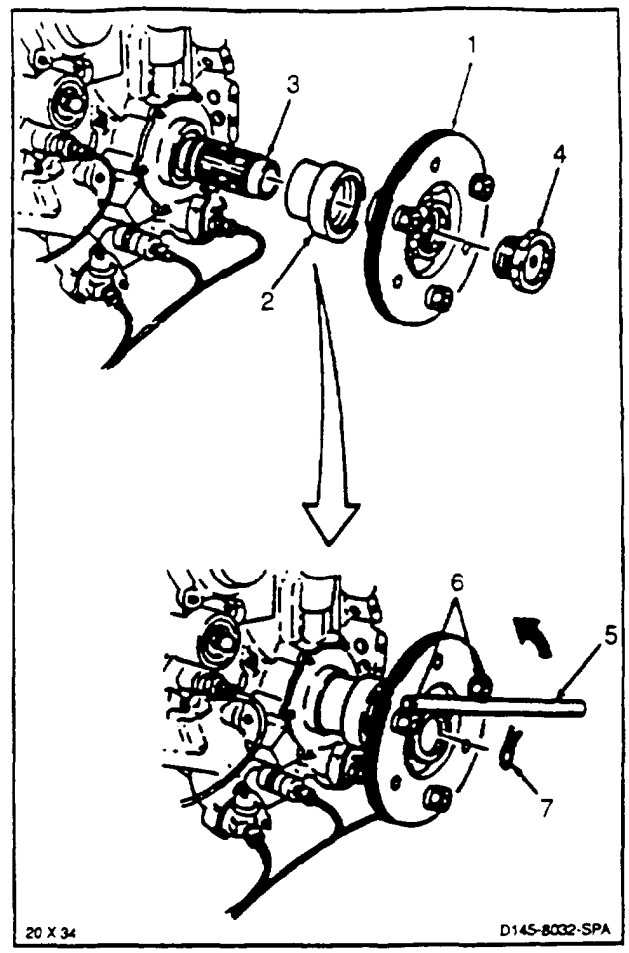
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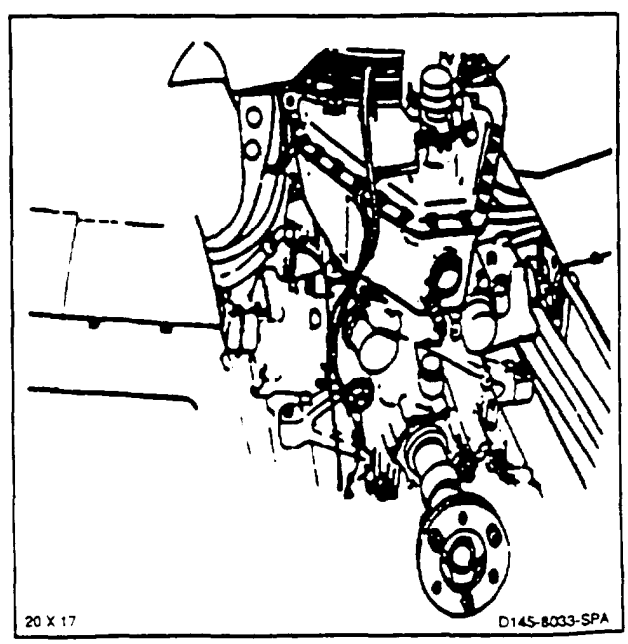
6-9 INSTALL COMBINING TRANSMISSION FORWARD ADAPTER ASSEMBLY (Continued) 6-9

WARNING

Dry cleaning solvent (E162) is flammable and toxic. If can irritate skin and cause burns. Use only in well-ventilated area, away from heat and open flame. In case of contact, immediately flush skin or eyes with plenty of water for at least 15 minutes. Get medical attention for eyes.

1. Clean splines of adapter assembly (1). retainer (2), and output shaft (3). Use dry cleaning solvent (E162) and cloths (E120). Wear gloves (E186).
2. If adapter assembly (1) is either removed or replaced, align drive shafting (Task 6-20).
3. Pack splines of adapter assembly (1), retainer (2), and output shaft (3) with grease (E190).
4. Install retainer (2) and adapter assembly (1) on output shaft (3). Wipe off excess grease with cloths (E120).
5. Coat thread of retainer (4) with grease (E190). Install retainer.
6. Place wood dowel (5) across nuts (6) as shown. Hold dowel to keep adapter assembly (1) from turning. Torque retainer to 825 inch-pounds.
7. Continue tightening retainer (4) to align holes in retainer (4) and adapter assembly (1). Install lockring (7). Lockring shall protrude at least 0.06 inch through adapter assembly (1).





INSPECT

FOLLOW-ON MAINTENANCE:

Install No. 7 drive shaft (Task 6-19).
Phase rotary-wing blades (Task 6-28).
Close aft pylon lower fairing (Task 2-2).
Close aft pylon access doors (Task 2-2)

END OF TASK

6-10 INSPECT DRIVE SHAFTING ON AIRCRAFT 6-10

INITIAL SETUP

Applicable Configurations:

All

Tools:

Technical Inspection Tool Kit,

NSN 5180-00-323-5114

Machinist's Scriber,

NSN 5120-00-221-7063

Light Source

Materials:

Acetone (E20)

Epoxy Primer (E292)

Personnel Required:

Inspector

References:

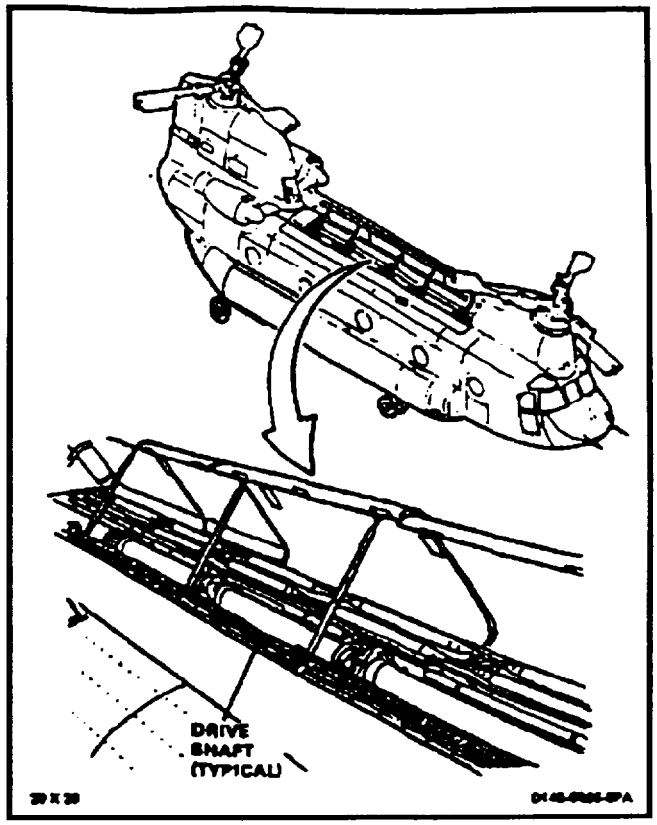
TM 43-0103

Equipment Condition:

Battery Disconnected (Task 1-39)

Electrical Power Oft

Drive Shaft Tunnel Access Covers Open (Task 2-2)



General Safety Instructions:

WARNING

Keep clear of turning rotor blades when rotating drive shaft. Turning blades can injure personnel.

GO TO NEXT PAGE

NOTE

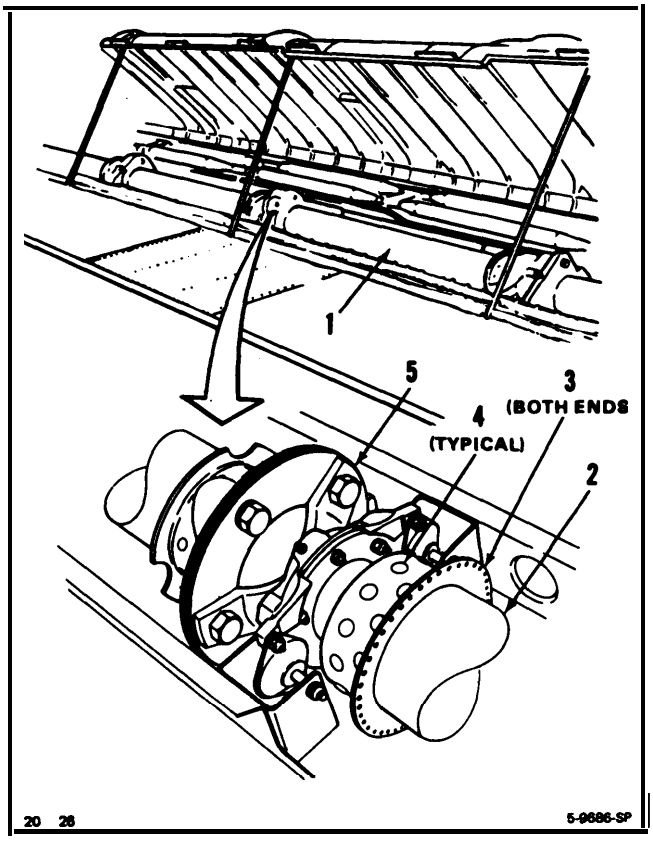
- Inspect all drive shafts in same way. Typical shaft shown.
- Rotate shaft as needed to do a complete check.
- Tube and adapter are balanced together. if one is damaged, both must be replaced.

1. **Inspect shaft (1) for damage** listed below. There shall be no such damage.
   a. **No cracks in tube (2) allowed.**
   b. **No dents in tube (2) more than 1-inch diameter or 0.040-inch deep allowed.**
   c. **No two allowable dents shall be closer than 4.50-inches.**
   d. **No more than one allowable dent around the circumference of tube (2) at any one point.**
   e. **No dent within 1.25 inches of end flange (3).**
   f. **Loose or cracked rivets (4) at ends of tube.**

NOTE

Adapters have a shotpeened surface. Damage cannot be repaired.

g. **Cracks, nicks, scratches, or gouges in adapter (5).** Use a five-power magnifying glass to check.



GO TO NEXT PAGE

h. **Cracks in plates (6).** Use a five-power magnifying glass to check.

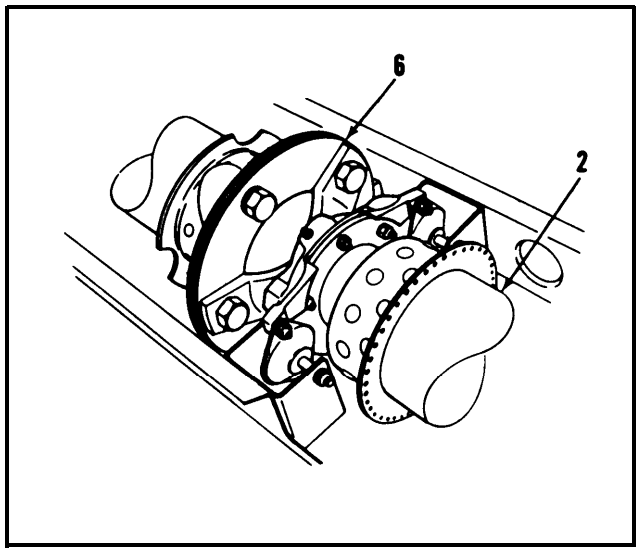
i. **Nicks on inside edge of plates (6).** Use a pointed scribe to check.

j. **Cracks, nicks, scratches, or gouges in dents in tube (2).** Use fluorescent inspection to check (TM 43-0103).

NOTE

Vibro-engraved factory markings on tube are allowed.

2. **Inspect** for nicks, scratches, or gouges in **tube (2) and plates (6).** Repair damage (Task 6-11).
3. Visually inspect tubes (2) for circumferential scoring. Observe following limits:
   a. Depth after blending: 0.010 inch maximum.
   b. Length after blending: 2.0 inches maximum.
   c. Width after blending: 0.40 inch maximum.
   d. Minimum distance from adapter rivets is: 7 inches, each end.
   e. Minimum axial distance between circumferential scoring repair is 4.5 inches.
   f. Maximum of one circumferential scoring repair around tube O. D. at any one point.



4. Check for free movement of each shock mount (7) on spacer (8). Replace nicked, scored, or gouged spacers.

5. Check shock mounts (7) as follows:

CAUTION

Do not use screwdrivers to displace shaft. They may slip and damage elastomer.

a. Displace shaft in vicinity of mounts (7) later ally and vertically by hand pressure.

b. While shaft assembly is displaced, inspect for tears in elastomer (9).

c. Displace the shaft axially and radially by hand. Inspect for excessive play or binding between mount bushing (10) and spacer (8).

d. Any tear in elastomer (9) over 1/4-inch long (including separation of elastomer from inner face of bushing (10)) is cause for rejection of mount. Tears usually occur at 6 o'clock position on mount (7).

e. Excessive radial movement or irregularities interfering with free axial movement between bushing (10) and spacer (8) noted during the inspection process requires removal of mount (7) and spacer for detailed inspection and measurement as follows:

NOTE

Measurements shall be taken at 3 locations of equal distance along length of part.

(1) Spacer - Replace if OD is worn to less than 0.432 inch.

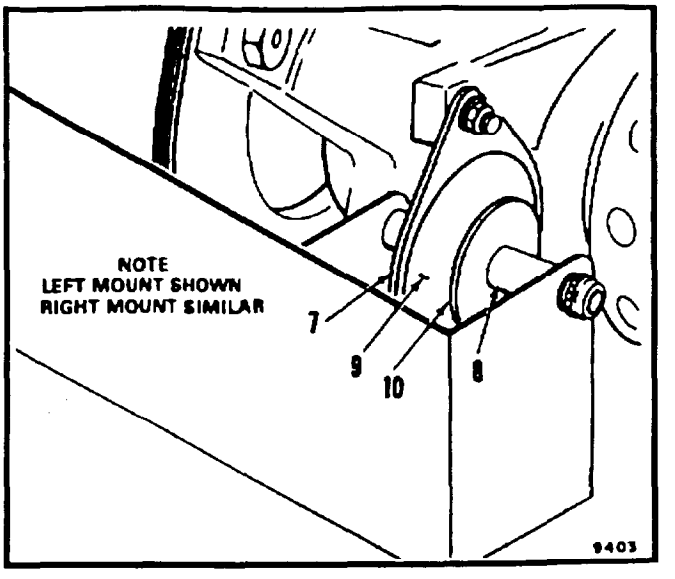
(2) Mount - Replace if ID of bushing (10) is more than 0.441 inch.

NOTE

The following inspection is required when the drive shaft retainer nut cotter pin (1) is missing.

6. Remove the affected shaft assembly from the aircraft (Task 6-2, 6-3, 6-4, or 6-21).

7. Check the torque on the retainer nut (2) in the tightening direction. If the torque is 1500 inch-Rounds or greater, replace the cotter pin (1) and reinstall the drive shaft assembly (Task 6-17, 6-18, 6-19, or 6-29).



8. If the retainer nut (2) torque is less than 1500 inch-pounds

a. Disassemble the drive shaft (Task 6-12).

b. Inspect spacer (5) for wear. Replace the spacer if length is less than 0.60 inch.

c. Inspect drive splines in the adapter assembly (3) and on the drive shaft (6) for wear. Replace the shaft assembly it the spline wear step exceeds 0.005 inch.

9. Check clearance between any aircraft non rotating structure (pay particular attention to the shaft mounting brackets) and the rotating sync shafts are at least .25 inches.

NOTE

Move the sync shaft by hand as far forward and aft as possible while making check as clearance may be reduced by shaft rivets.

a. Rotate sync shaft at least one full revolution while checking to ensure minimum clearance of .25 inches is obtained.

b. If clearance .25 or less, go to step 10.

c. If clearance is more than .25, no further action is required.

NOTE

As damage to the sync shafts may occur if correction procedures are done with sync shaft installed, it is recommended the sync shafts be removed.

10. Mark mounting bracket at place where clearance will be obtained.

CAUTION

Minimum distance from the edge of the mounting bolt hole to the edge of the bracket shall be no less than .244 Inches.

11. File/grind excess material required to obtain the required .25 inch clearance between sync shaft and the bracket edge.

12. Deburr and remove all metal shavings.

WARNING

Acetone (E20) is extremely flammable. It can be toxic. Avoid inhaling. Use only with adequate ventilation. Avoid contact with skin, eyes, or clothing. Keep away from heat, spark, or open flame. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.

13. Clean exposed areas of the mounting bracket with acetone (E20).

WARNING

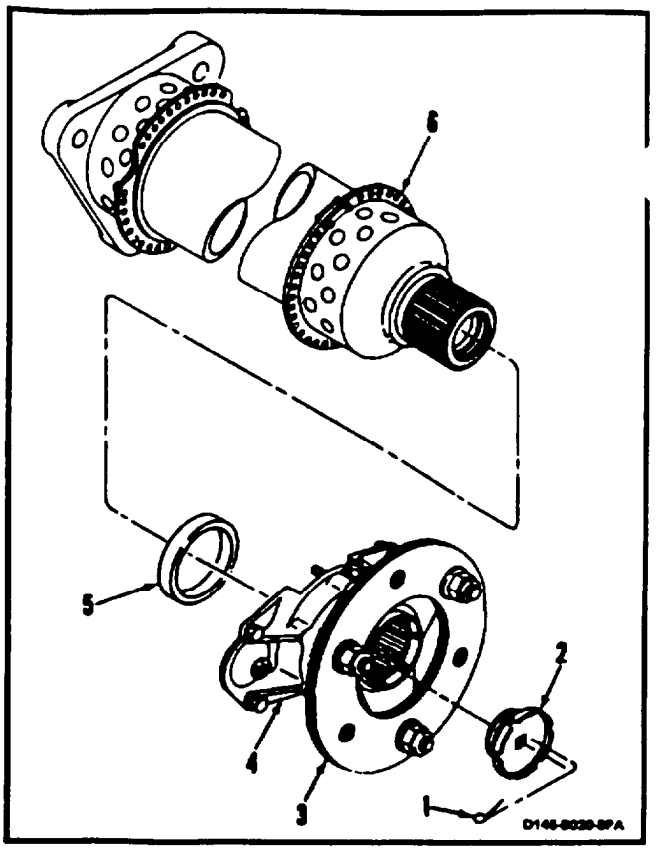
Epoxy primer (E292) is extremely flammable and very toxic. Protective clothing or body suit with respirator and eye protection is required if material is to be applied by spraying. Avoid inhaling. Use only in well ventilated areas. Avoid contact with skin, eyes, or clothing. Keep away from heat, spark, or open flame. In case of contact, Immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.

*14. Apply MIL-P-23377 primer (E292) to the bare metal surfaces of bracket.

*15. Install sync shaft (if removed).

*16. Repeat step 9.

FOLLOW-ON MAINTENANCE:
Close drive shaft tunnel access covers (Task 2-2).



PIN: 053350-029

END OF TASK

6-10.1 CLEAN AND INSPECT DRIVE SHAFTING OFF AIRCRAFT

INITIAL SETUP

Applicable Configurations:

All

Tools:

Technical Inspection Tool Kit,
NSN 5180-00-323-5114
Light Source
Bucket, 4 gallon

Materials:

Alcohol (E64)
Brush (E85.2)
Cleaning Compound (E117.2)
Dry Cleaning Solvent (E161 or E162)
Gloves (E186.1)
Tape (E385.1)
Twine (E433)

Personnel Required:

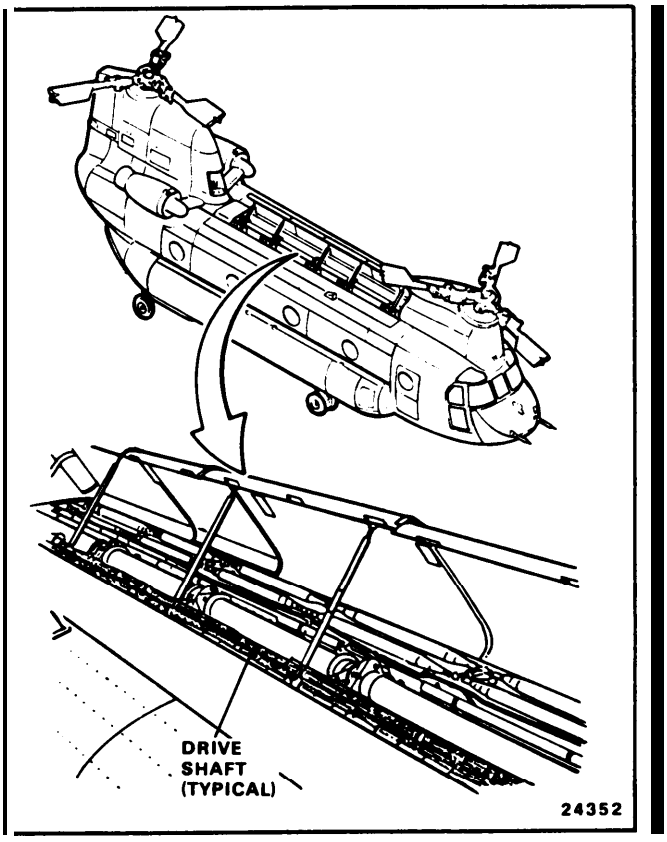
Medium Helicopter Repairer
Inspector

References:

Task 6-2 Task 6-12
Task 6-3 Task 6-21
TM 55-1500-335-23

Equipment Condition:

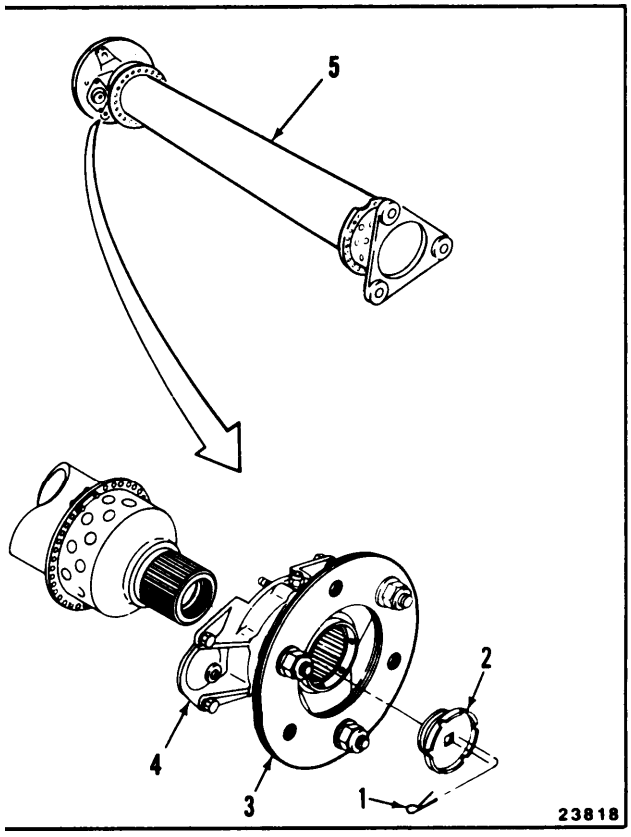
Off Aircraft



NOTE

This inspection pertains only to the No.1 thru No. 6 and No. 8 drive shafts.

1. Remove drive shafts (Tasks 6-2, 6-3, and 6-21).
2. Remove cotter pin (1) and retainer nut (2) from adapter assembly (3).
3. Remove adapter assembly (3) and bearing housing assembly (4) from drive shaft (5) (Task 6-12).



GO TO NEXT PAGE

Drive Shaft Cleaning, Primary Method

4. **Clean Drive Shafts As Follows:**

WARNING

Dry cleaning solvent (E161 or E162) is flammable and toxic. It can irritate skin and cause burns. Use only in well-ventilated area, away from heat and open flame. In case of contact, immediately flush skin or eyes with plenty of water for at least 15 minutes. Get medical attention for eyes.

NOTE

Drive shaft must be thoroughly clean before corrosion inspection can be accomplished.

a. Submerge steel adapter end (6) of shaft (5) into a bucket containing 9 inches of solvent (E161 or E162). Wear gloves (E186.1).

b. Attach brush (E85.2) to wooden handle. Use tape (E385.1) or twine (E433).

c. Insert brush through hole in the aluminum adapter end (7) of shaft.

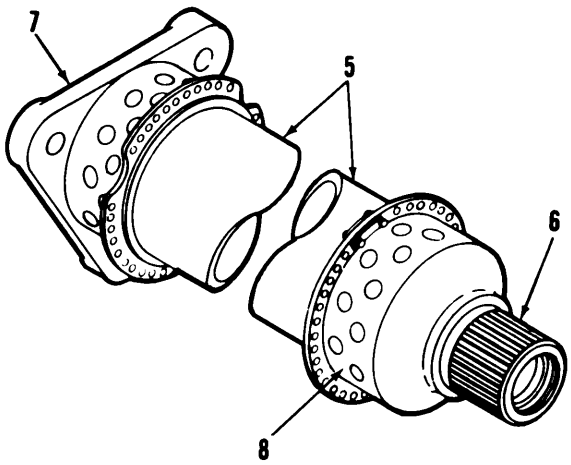
d. Scrub interior section of steel adapter end (6) and riveted portion of shaft (8). Use lengthwise stokes while rotating the drive shaft, to remove dirt/grease.

e. Scrub exterior section of steel adapter end (6) and riveted portion of shaft (8). Use brush (E85.2).

f. Continue scrubbing until drive shaft is clean enough for inspection.

WARNING

Alcohol (E64) is flammable and toxic. Avoid inhaling. Use only with adequate ventilation. Keep away from heat, sparks, or open flame. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.



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NOTE

Compressed air can be used to speed up the drying process.

g. Drain and rinse solvent from shaft. Use alcohol (E64). Wear gloves (E186.1). Allow the shaft to air dry.

h. If dirt/grease was not adequately removed from drive shaft, reclean drive shaft using alternate cleaning method (Step 5).

i. If dirt/grease was adequately removed from drive shaft, inspect drive shaft for corrosion (Step 6).

GO TO NEXT PAGE

Drive Shaft Cleaning, Alternate Method

5. **Clean Drive Shafts As Follows:**

NOTE

Drive shaft must be thoroughly clean before corrosion inspection can be accomplished.

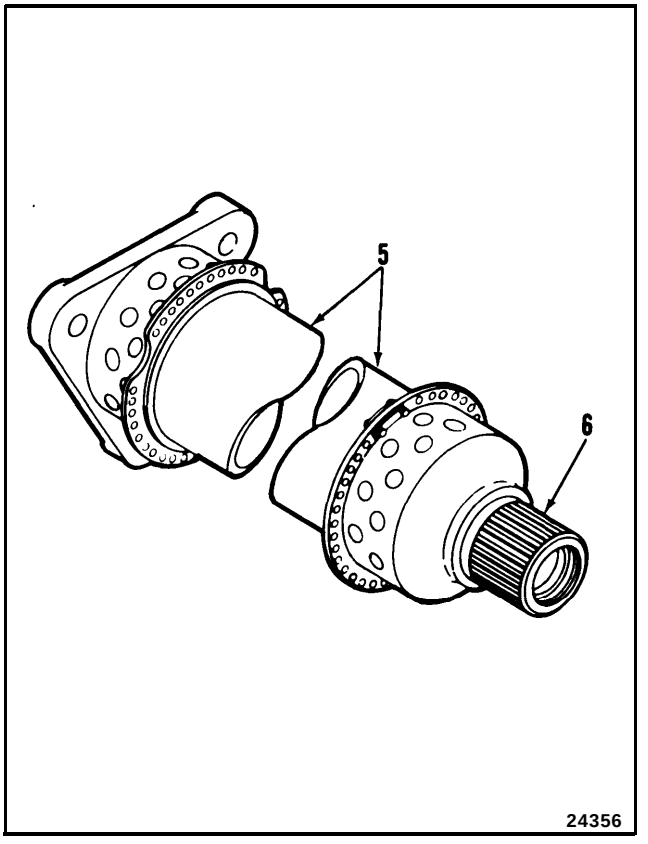
a. Mix 1 part cleaning compound (117.2) in 4 parts water. Submerge steel adapter end (6) of shaft (5) into a bucket containing 9 inches of the cleaning solution. Wear gloves (E186.1).

b. Repeat steps 4b thru 4f.

c. Drain and rinse shaft with water. Final rinse with alcohol (E64). Wear gloves (E186.1). Allow shaft to air dry.

d. If dirt/grease was not adequately removed from drive shaft, reclean drive shaft (Step 5).

e. If dirt/grease was adequately removed from drive shaft, inspect drive shaft for corrosion (Step 6).



6. **Inspect for corrosion as follows:**

a. Insert light source at both ends of drive shaft (5).

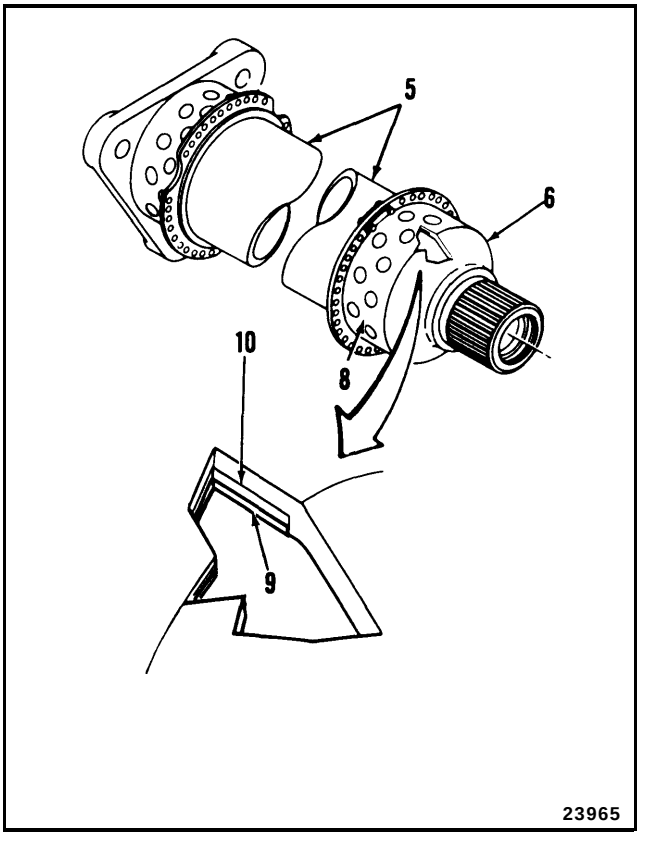
b. Insert inspection mirror in steel adapter end (6).

c. Inspect internal surfaces of steel adapter end (6) and shaft (5).

d. Inspect inside diameter of shafts riveted area (8).

e. Inspect end of aluminum shaft edge (9), next to the adapter internal shoulder (10).

f. **Replace drive shaft if any corrosion or exfoliation is found.**



FOLLOW-ON MAINTENANCE:
Install No.1 Drive Shaft (Task 6-17)
Install No. 2 Thru No.6 Drive Shaft (Task 6-18)
Install Aft Drive Shafting (Task 6-29)

END OF TASK

6-11 REPAIR FORWARD DRIVE SHAFT 6-11

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692
Dial Indicating Depth Gage 643J

Materials:

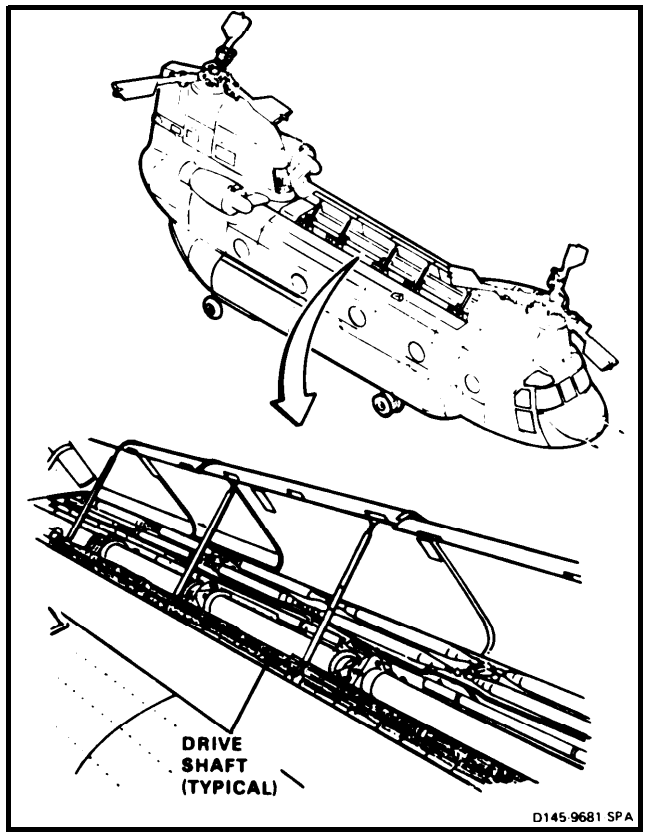
Abrasive Paper (E15)
Epoxy Primer (E292) or (E293)

Personnel Required:

Medium Helicopter Repairer
Inspector

Equipment Condition:

Battery Disconnected (Task 1-39)
Electrical Power Off
Forward Drive Shaft Tunnel Access Covers Open (Task 2-2)



GO TO NEXT PAGE

NOTE

Repair all drive shafts in the same way. A typical shaft is shown.

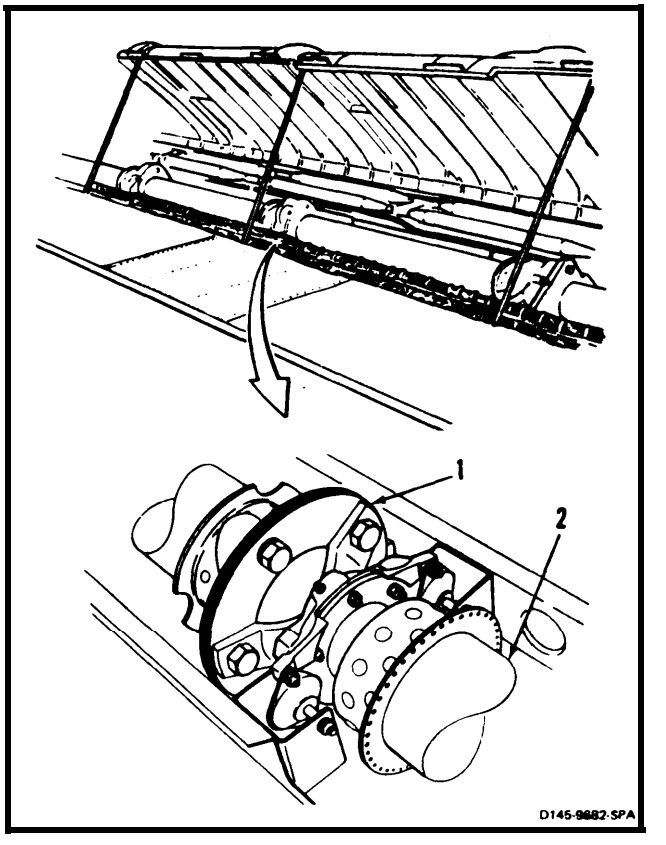
1. **Remove light scratches, corrosion and nicks from outside edge of plates (1).**
2. **Blend out nicks, scratches and gouges on the face of plates (1)** with abrasive paper (E15). **Do not go deeper than 0.001 inch.**
3. **Blend out scratches, nicks, and gouges** on tube (2) with abrasive paper (E15). **Do not go deeper than 0.010 inch.** Keep a blend radius of at least **1/2-inch. Maximum blend area is 0.80 square inch.**

INSPECT

WARNING

Epoxy primer (E292) and (E293) is flammable and toxic. It can irritate skin and cause bums. Use only with adequate ventilation, away from heat or open frame. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.

4. Touch up tube (2) as needed with epoxy primer (E292) or (E293).



FOLLOW-ON MAINTENANCE:
Close forward drive shaft tunnel access doors (Task 2-2).

END OF TASK

6-12 DISASSEMBLE DRIVE SHAFT

INITIAL SETUP

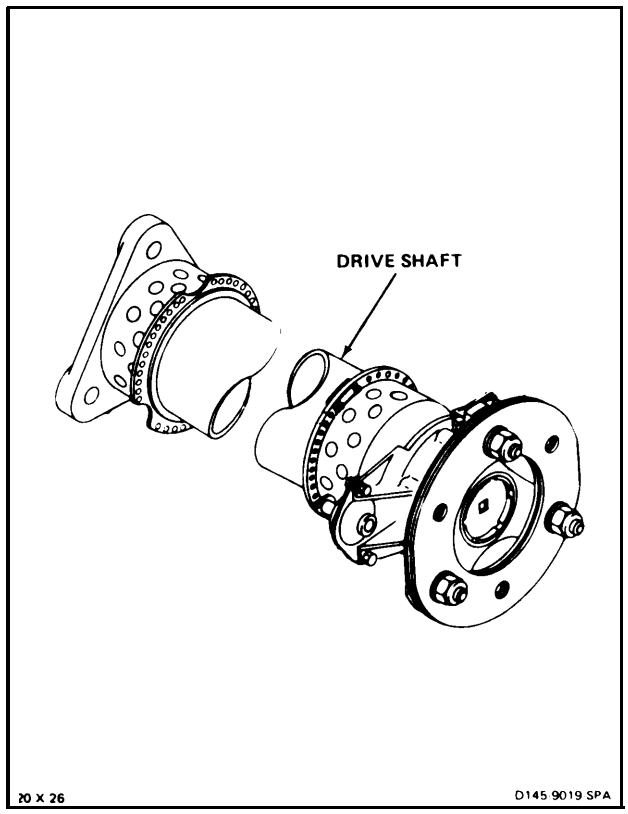
Applicable Configurations:
All

Tools:
Powertrain Tool Kit,
NSN 5180-00-323-5267
Heat Lamp

Materials:
Temperature Indicating Strips (E413)

Personnel Required:
Aircraft Powertrain Repairer

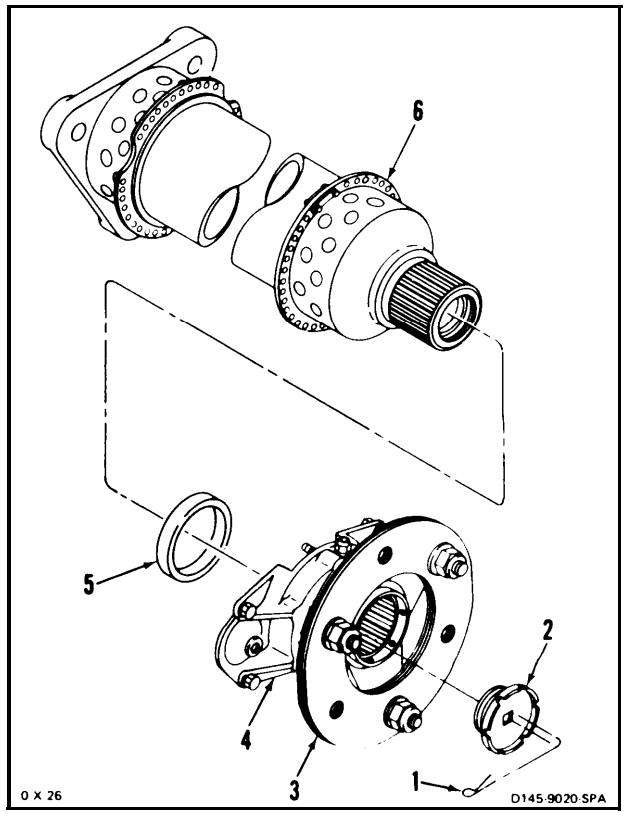
Equipment Condition:
Off Helicopter Task



NOTE

Disassembly procedure is for No. 1 thru No. 6 drive shaft. Typical shaft shown here.

1. Remove cotter pin (1). **Remove retainer (2).**
2. **Remove adapter assembly (3), bearing support (4) and spacer (5)** from drive shaft (6).



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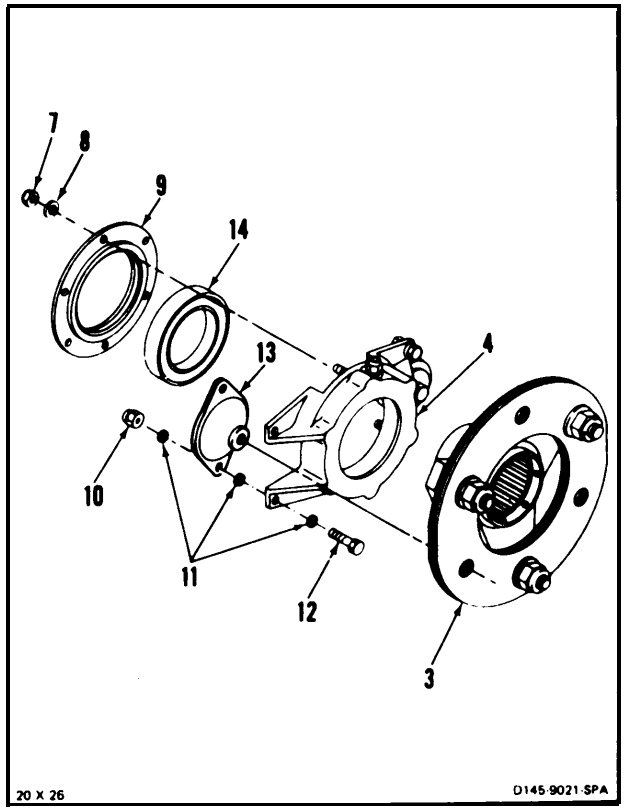
6-12 DISASSEMBLE DRIVE SHAFT (Continued) 6-12

3. Remove six nuts (7), and washers (8) from bearing retainer (9). **Remove retainer.**
4. **Remove bearing support (4)** from adapter assembly (3).

CAUTION

Do not put pressure on inner race of bearing to remove bearing. Damage to bearing can occur.

5. Remove two nuts (10), six washers (11) and two bolts (12) from mount (13) on each side of bearing support (4). **Remove mounts.**
6. **Remove bearing (14)** from bearing support (4) If bearing does not remove easily, heat support to 175°F (80°C) Use heat lamp. Monitor temperature with temperature Indicating strips (E413).



FOLLOW ON MAINTENANCE:

None

END OF TASK

6-13 INSPECT REMOVED DRIVE SHAFT MOUNT AND BUSHINGS 6-13

INITIAL SETUP

Applicable Configurations:
All

Tools:
Micrometer Caliper Set GGG-C-105
Telescoping Gage Set GGG-C-17, Type III, Class 2

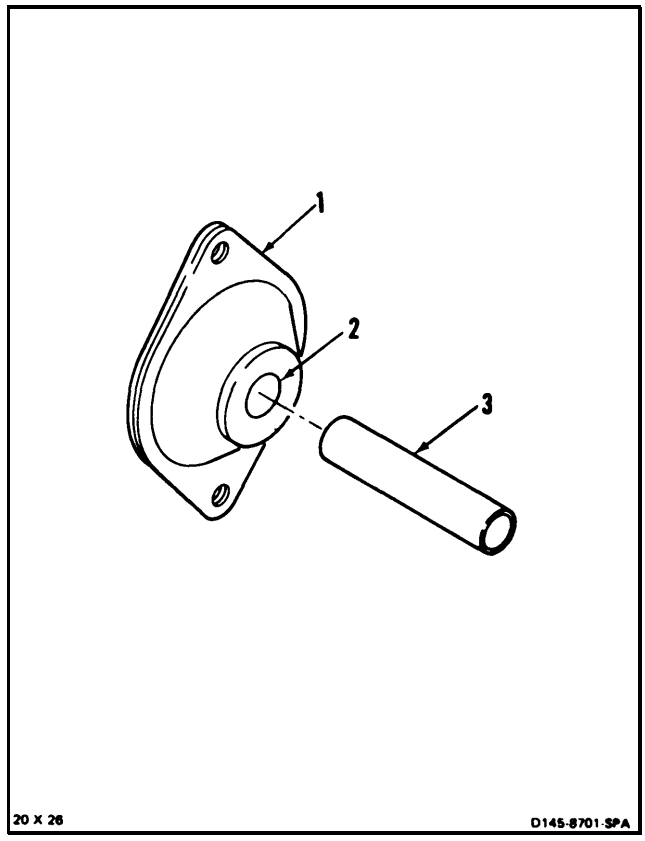
Materials:
None

Personnel Required:
Medium Helicopter Repairer

References:
TM 55-1520-240-23P

Equipment Condition:
Off Helicopter Task

1. **Check mount (1)** for swollen or torn rubber and unbending of rubber from metal. **There shall be no swelling or unbonding. There shall be no tears more than 0.25 inch long.**
2. **Measure diameter of bushing hole (2)** in mount (1). **Diameter shall not be more than 0.441 inch. Measure outside diameter of bushing (3). Diameter shall not be less than 0.432 inch.**



FOLLOW-ON MAINTENANCE:
None

END OF TASK

6-14 REMOVE FORWARD DRIVE SHAFT MOUNT

INITIAL SETUP

Applicable Configurations:
All

Tools:
Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692

Materials:
Cloths (E120) or
Barrier Material (E80)

Personnel Required:
Medium Helicopter Repairer (2)

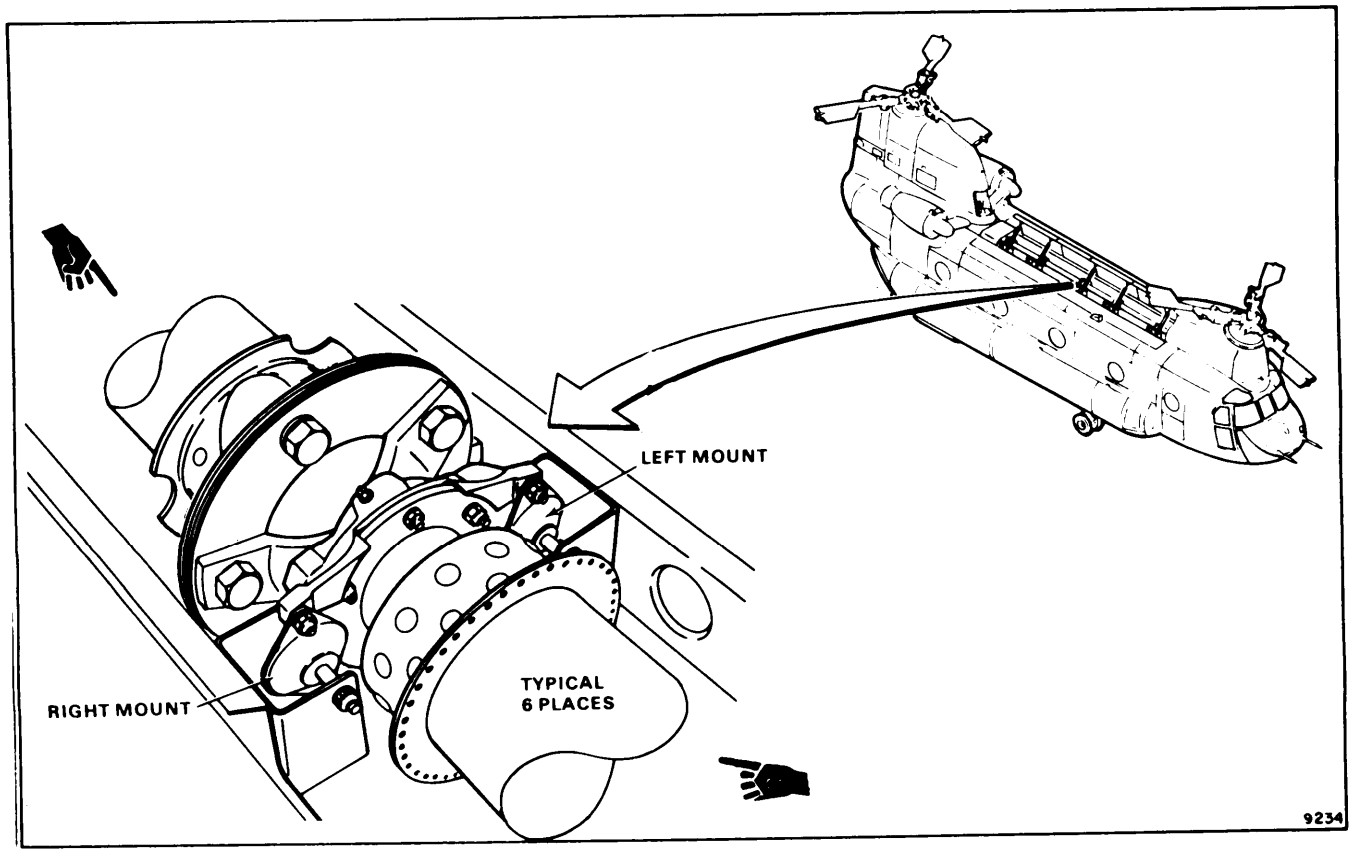
References:
TM 55-1520-240-23P

Equipment Condition:
Battery Disconnected (Task 1-39)
Electrical Power Off
Forward Drive Shaft Tunnel Access Covers Open (Task 2-2)
Forward Transmission Aft Fairing Removed (If Removing Forward Mounts) (Task 2-63)

General Safety Instructions:

WARNING

Rotor blades will turn when shaft rotates. Turning blades can injure personnel. Keep clear of blades as they turn.



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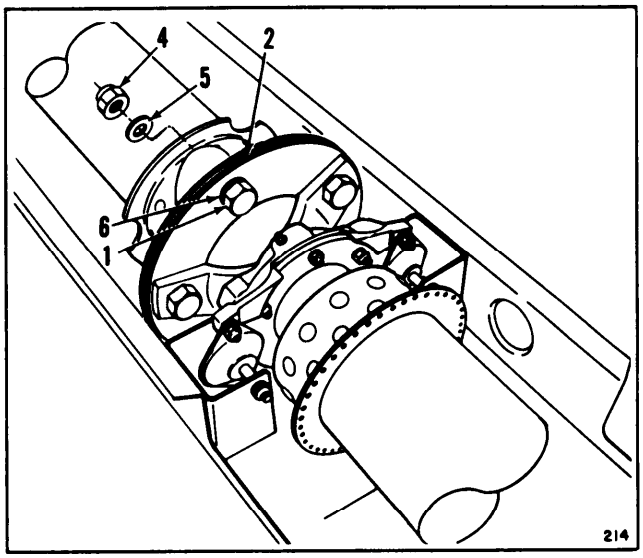
CAUTION

Do not allow bolt to turn. If bolt turns, it can damage bolt and plates.

NOTE

Remove left or right mount at any of six places in same way. Typical right mount is shown here.

1. Hold head of one bolt (1) in plates (2). Keep bolt from turning and remove nut (4) and special washer (5). **Remove bolt and special washer (6).**

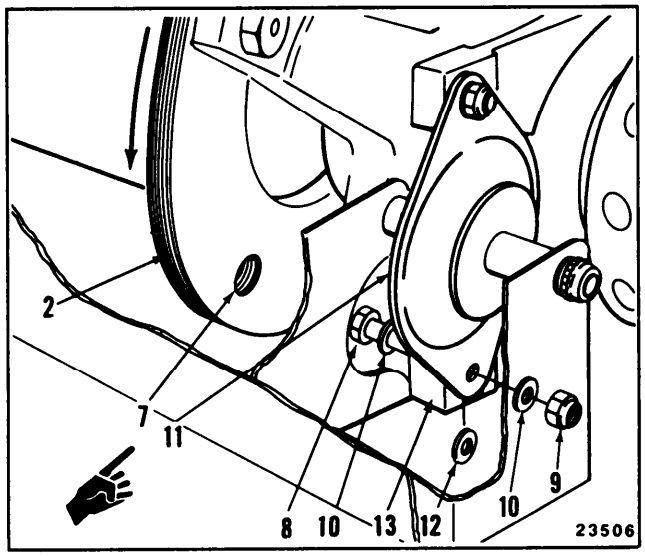


2. Rotate plates (2) to align hole (7) with lower of two mounting bolts (8).

NOTE

Reach lower bolt on drive shaft mount through bolt hole in plates. Use socket and extension.

3. **Remove nut (9), two washers (10), and bolt (8)** from top and bottom of mount (11). **Remove thin washer (12)** from between mount and support (13).

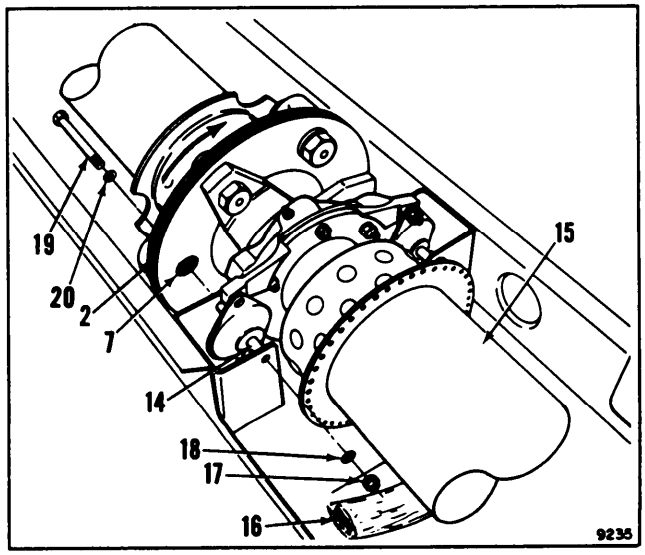


4. Rotate plates (2) to align hole (7) with mount bushing (14).
5. Support shaft (15) with cloths (E120) or barrier material (E80) (16).

NOTE

Reach center bolt on mount through bolt hole in plates. Use socket and extension.

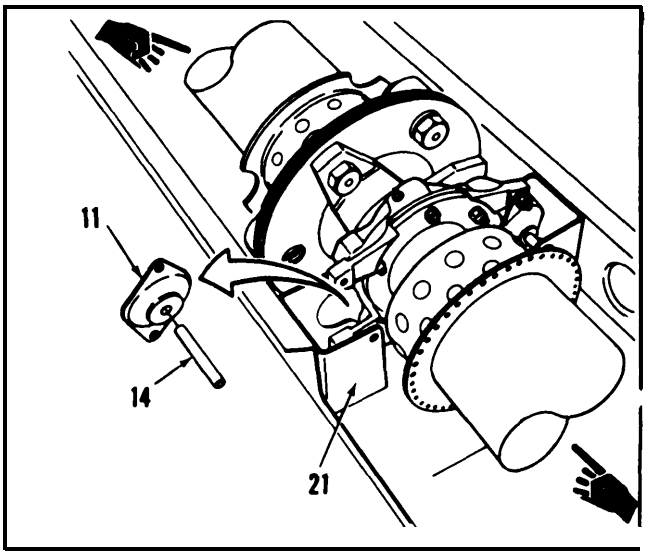
6. Remove nut (17) and washer (18) from bushing bolt (19). **Remove bolt and washer (20).**



GO TO NEXT PAGE

6-14 REMOVE FORWARD DRIVE SHAFT MOUNT (Continued) 6-14

7. **Remove mount (11) and bushing (14)** from bracket (21).
8. Remove bushing (14) from mount (11).



FOLLOW-ON MAINTENANCE:

None

END OF TASK

6-15 INSTALL FORWARD DRIVE SHAFT MOUNT 6-15

INITIAL SETUP

Applicable Configurations:
All

Tools:
Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692
Torque Wrench, 30 to 150 Inch-Pounds
Torque Wrench, 100 to 750 Inch-Pounds
Torque Wrench, 0 to 600 Foot-Pounds

Materials:
Oil (E254)

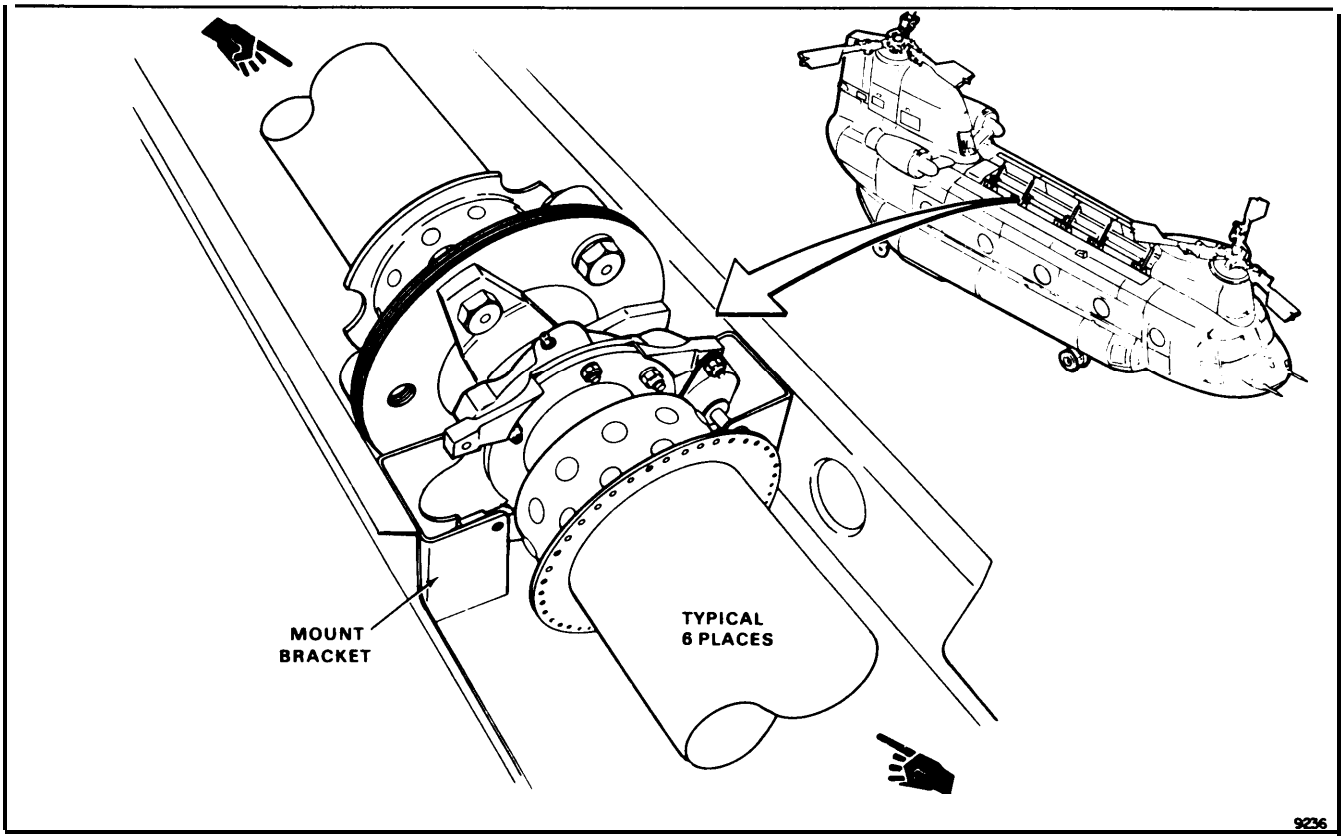
Personnel Required:
Medium Helicopter Repairer (2)
Inspector

References:
TM 55-1520-240-23P

General Safety Instructions:

WARNING

Rotor blades will turn when shaft rotates. Turning blades can injure personnel. Keep clear of blades as they turn.



GO TO NEXT PAGE

6-15 INSTALL FORWARD DRIVE SHAFT MOUNT (Continued) 6-15

NOTE

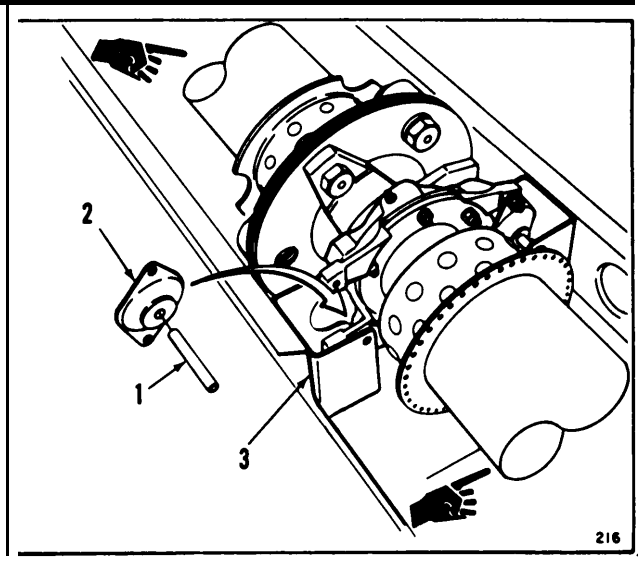
Install left or right mount at any of six places in same way. Typical right mount is shown here.

1. Install bushing (1) in mount (2).

NOTE

There are two types of mount and bushing assemblies used. Helicopters with 1 and those modified by attrition have improved mount and bushing assemblies. Be sure to install matching part number mounts and bushings on both sides of shaft.

2. **Position mount (2)** with bushing (1), into bracket (3).

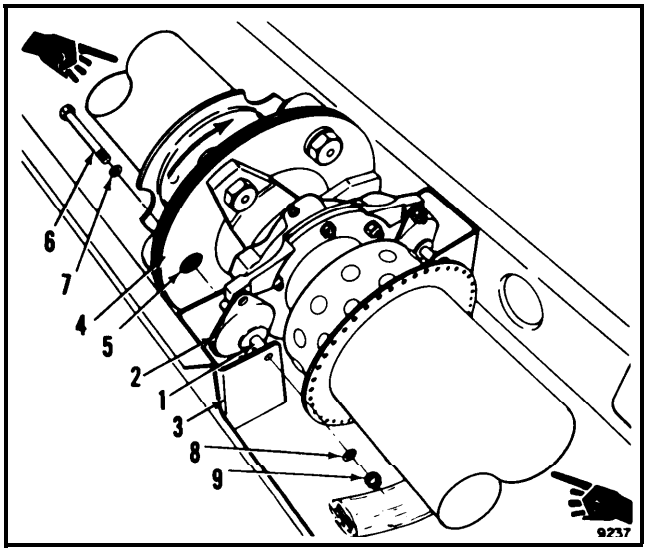


3. Rotate plates (4) to align bolt hole (5) with bushing (1).

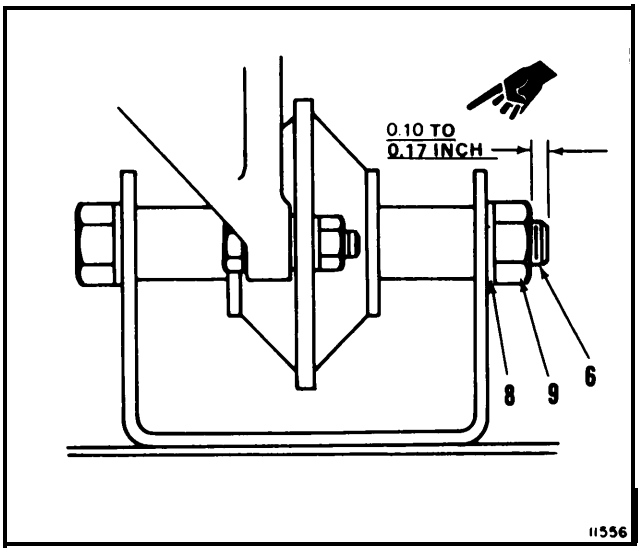
NOTE

Reach center bolt hole in mount through bolt holes in plate. Use socket and extension.

4. **Coat thread of bolt (6) with oil (E254). Install bolt** and washer (7) through bracket (3) and bushing (1).
5. Install washer (8) and nut **(9). Torque nut to 155 inch-pounds.**



6. **Check bolt (6).** There shall be 0.10 to 0.17 inch of bolt extending through nut (9). Install another washer (8) or thinner washer, if needed.



GO TO NEXT PAGE

6-15 INSTALL FORWARD DRIVE SHAFT MOUNT (Continued) 6-15

7. Rotate plates (4) to align hole (5) with lower of two mounting bolt holes in support (10).

NOTE

Reach lower bolt holes in mount through bolt hole in plates. Use socket and extension.

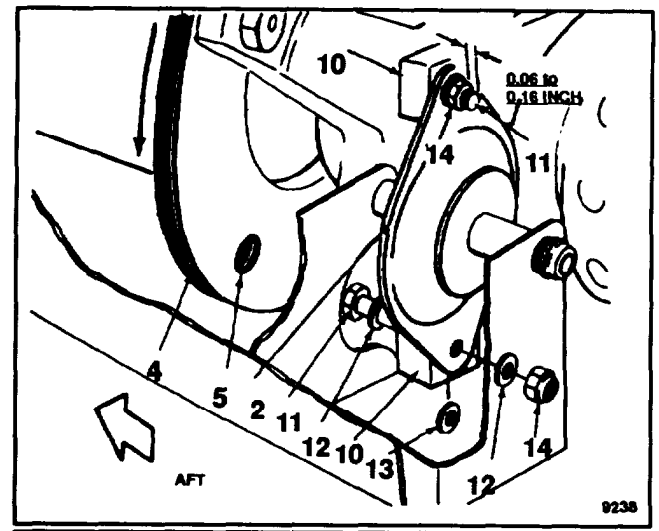
8. Install two bolts (11), four washers (12), two thin washers (13), and two nuts (14) through mount (2) and upper and lower supprts (10). Install bolts with head aft. Install thin washer between support and mount. **Torque bolts to 30 to 35 inch-pounds**

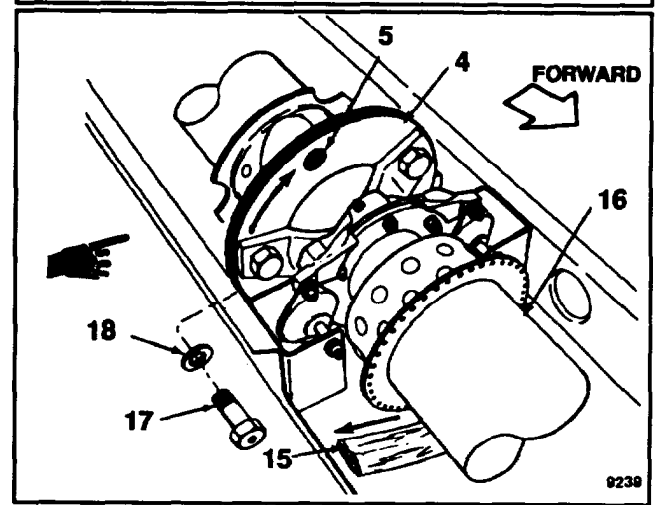
9. Checkbolts (11). There shall be 0.06 to 0.16 inch of bolt threads extending through nut (14). Install another washer (12) or a thinner washer (13) if needed.

10. **Remove cloths or barrier material (15)** from under shaft (16).

11. **Rotate plates (4)** to position hole (5) on top.

12. Coat thread of bolt (17) with oil (E254). **Install bolt** (head forward) and special washer (18) through plates (4).





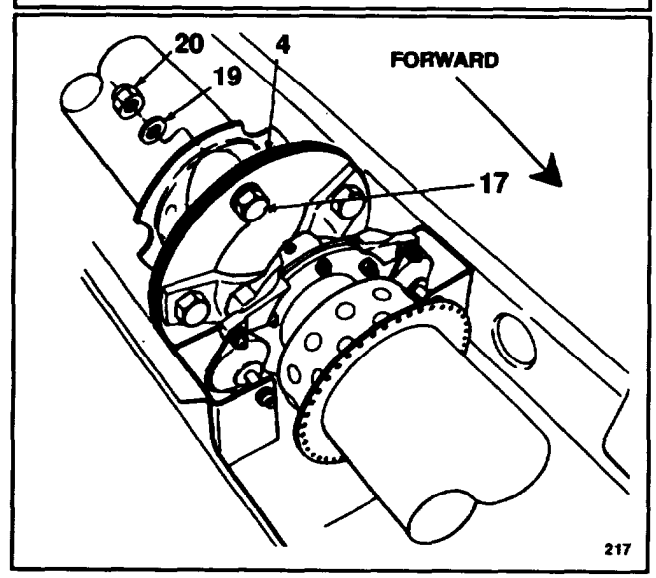
13. **Install washer (19) and nut (20).**

CAUTION

Do not allow bolt to turn when torquing nuts If bolt turns, it can damage bolt and plates.

14. Hold head of bolt (17) with wrench. **Check nut (20) for friction torque of at least 24 inch-pounds.** If nut does not meet torque, replace it.

15. **Torque nuts (20) to 1000 to 1100 inch-pounds.**



INSECT

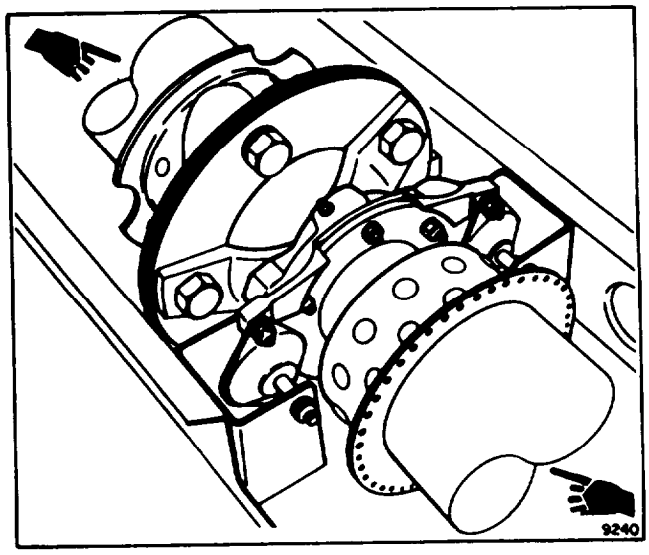
GO TO NEXT PAGE

6-15 INSTALL FORWARD DRIVE SHAFT MOUNT (Continued)

FOLLOW-ON MAINTENANCE:

Close forward drive shaft tunnel access doors (Task 2-2).

Install forward transmission fairing (if removed) (Task 2-67).



END OF TASK

6-16 ASSEMBLE DRIVE SHAFT 6-16

INITIAL SETUP

Applicable Configurations:
All

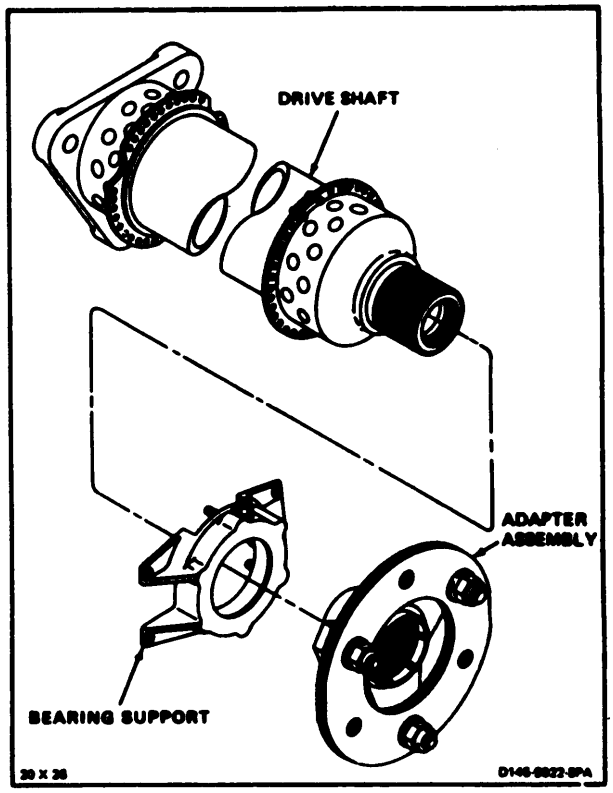
Tools:
Powertrain Tool Kit.
NSN 5280-00-323-5267
Torque Wrench, 30 to 150 Inch-Pounds
Torque Wrench, 700 to 1600 Inch-Pounds
Aluminum Tube, 3-inch id, 1/8-inch Thick Wall, 1 to 6 Inches Long
Arbor Press

Materials:
Grease (E190)
Antiseize Compound (E75)
Cloths (E120)

Parts:
Cotter Pin

Personnel Required:
Aircraft Powertrain Repairer
Inspector

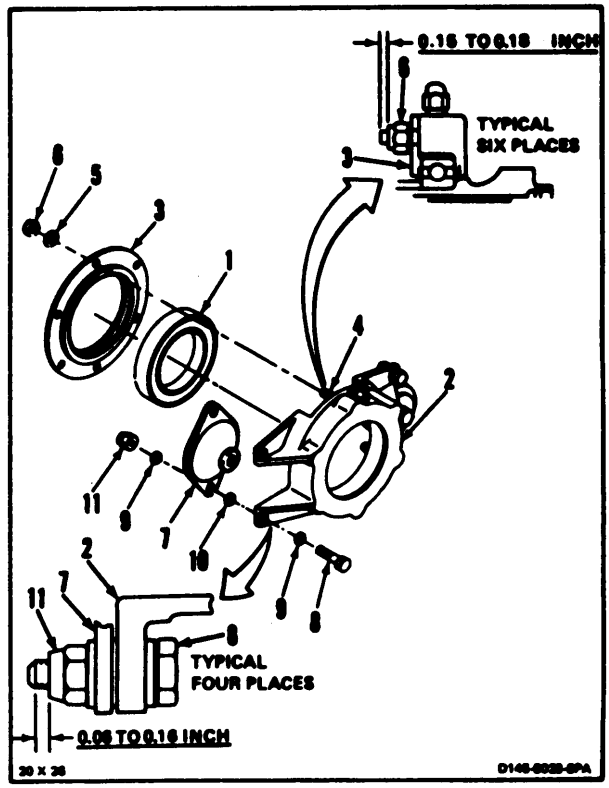
References:
TM 55-1520-240-23P



NOTE

Assembly procedure is for No. 1 thru No. 6 drive shaft. Typical shaft shown here.

1. Pack bearing (1) with grease (E190).
2. **Install bearing (1)** in bearing support (2). Use aluminum tube as a tool. Make sure bearing seats firmly in support.
3. **Install bowing retainer (3)** on six studs (4) of bearing support (2). Smooth side of retainer shall face out.
4. Install six washers (5) and nuts (6). **Torque nuts to 60 inch-pounds.** Check studs (4). There shall be 0.15 to 0.18 inch of stud extending through nut.
5. **Position mount (7)** on each side of support (2). Install bolt (8), two washers (9), thin washer (10) and nut (11) two places on each mount. **Torque nuts to 35 inch-pounds.**
6. Check bolts (8). There shall be 0.06 to 0.16 inch of bolt extending through each nut (11).



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7. Clean the splines of adapter assembly (12) and shaft (13). **Visually inspect splines** for wear steps. Wear step on any spline shall not exceed 0.005 inch.
8. Install bearing support (2) on adapter assembly (12). Use arbor press and aluminum tube.
9. Check that **length of spacer (14)** is at least 0.60 inch. If replacement is necessary, only a steel spacer shall be used. Check with a magnet.
10. Install spacer (14) into adapter assembly (12).
11. Examine adapter (12) and shaft (13) as follows:

NOTE

If the adapter assembly and shaft do not have the same serial number, they must be balanced.

a. **Check** that adapter assembly (12) and shaft (13) have the same **stenciled serial number.** If stenciled numbers are not readable, check that vibro-engraved serial numbers on adapter assembly and drive shaft match numbers recorded in DA Forms 2410 or 2408-16.

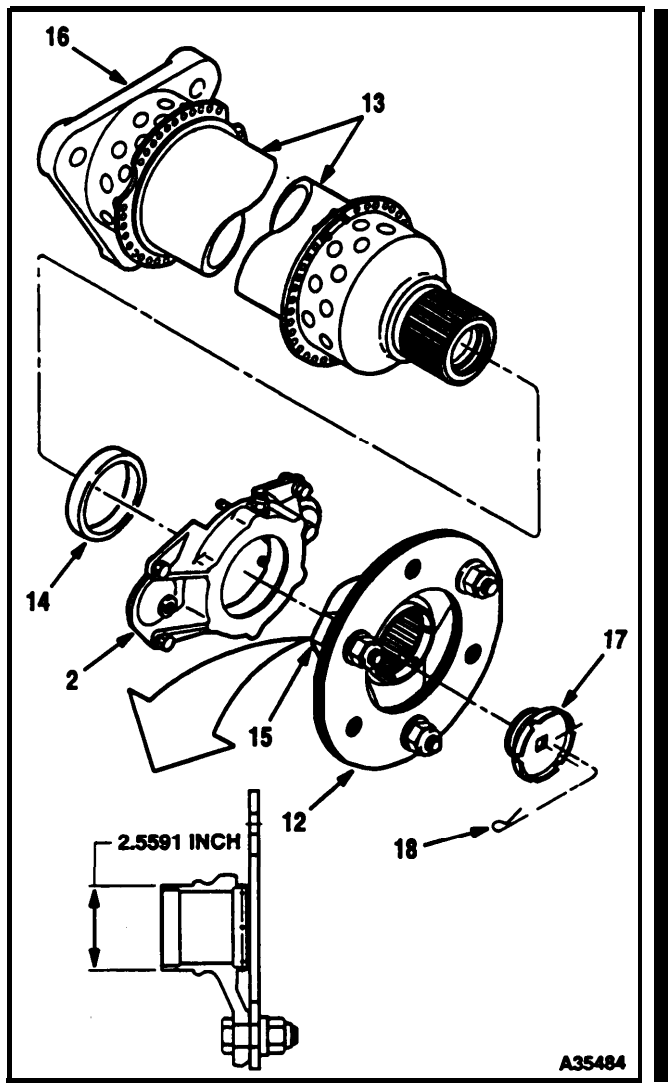
b. Clean the splines of adapter assembly (12) and shaft (13). Clean the outside surface of the shaft. Use cloths (E120).

c. Visually **inspect the outside surface of the shaft of adapter assembly (12)** for signs of wear. if wear is evident, measure the diameter of the shaft. The minumum diameter shall be 2.5591 inches.

12. Apply a light coat of grease (E190) to the splines of adapter assembly (12) and shaft (13). Wipe off excess with cloths (E120).
13. **Align leg (15)** marked 1 on adapter assembly (12) **with corner of flange (16)** marked 2 on shaft (13). Install adapter assembly on splines of shaft.

NOTE

If a new retainer nut is not available, a used nut may be used if the two nylon inserts are present.

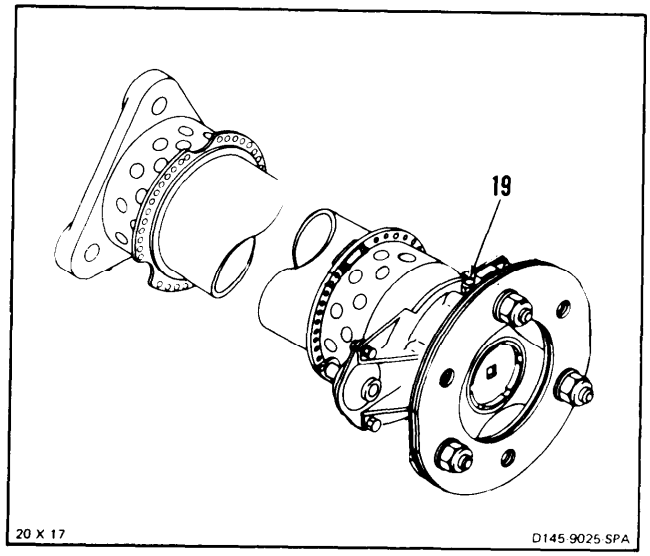


14. Check retainer nut (17) for presence of two nylon self-locking inserts. Coat threads of nut with antiseize compound (E75). **Install nut** in shaft (13). Check for a run-on torque of at least 60 inch-pounds for a used nut or 180 inch-pounds for a new one.
15. **Torque nut (17) to 1500 inch-pounds.** Continue to tighten the nut until slot in nut lines up with hole in adapter assembly (12). **Install cotter pin (18),** with head on inside of nut.

GO TO NEXT PAGE

16. Add grease (E190) at fitting (19).

INSPECT



FOLLOW-ON MAINTENANCE:
None

END OF TASK

6-17 INSTALL NO. 1 DRIVE SHAFT

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Torque Wrench, 100 to 150 Inch-Pounds
Torque Wrench, 700 to 1600 Inch-Pounds

Materials:

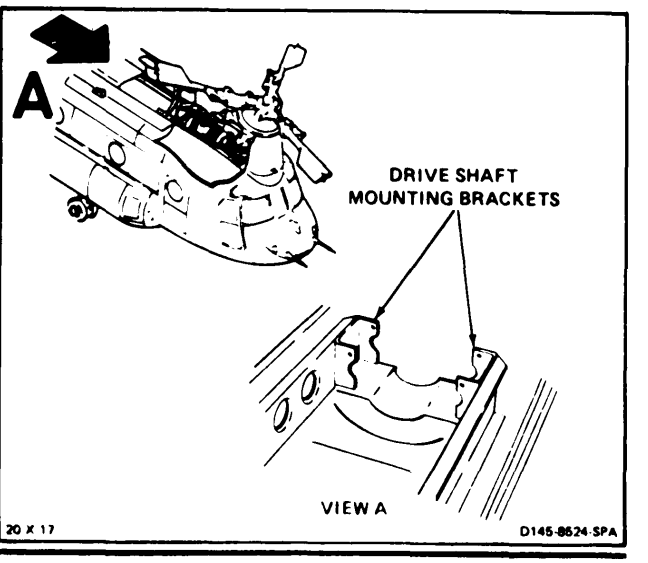
Oil (E254)

Personnel Required:

Medium Helicopter Repairer (2)
Inspector

References:

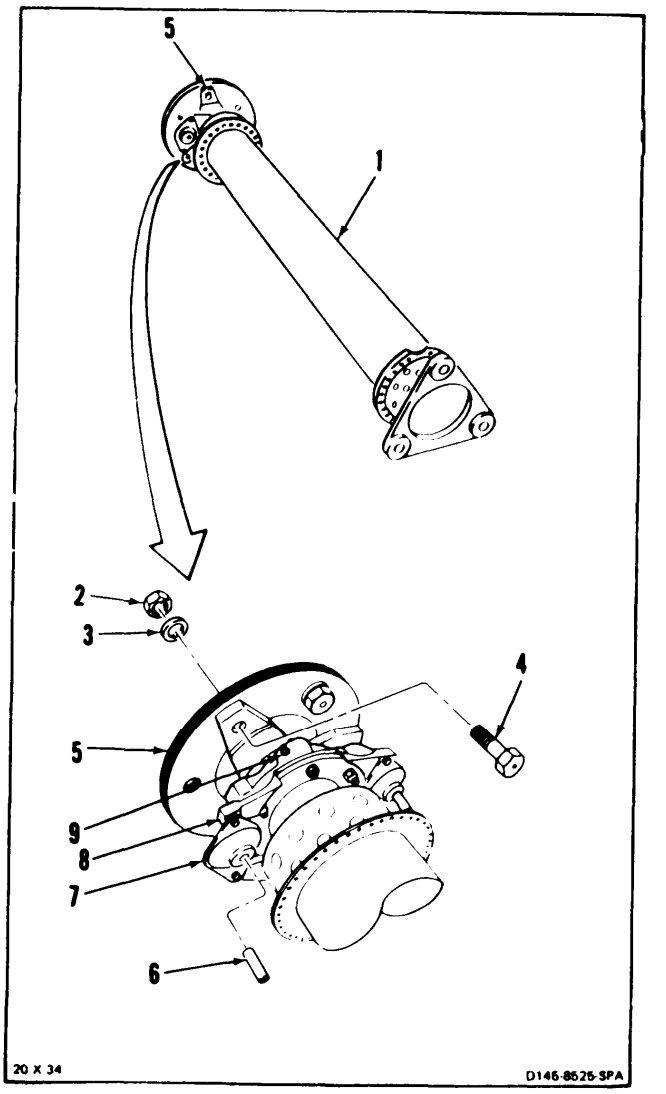
TM 55-1520-240-23P



CAUTION

Do not allow bolt to turn. If bolt turns, bolt and plates can be damaged.

1. If a replacement shaft (1) is being installed, remove one nut (2), washer (3), and bolt (4) from adapter assembly (5). During removal, hold head of bolt with wrench. Install bushing (6) on mount (7) at each side of adapter assembly.
2. **Turn bearing support housing (8) so that grease fitting (9) faces up.**



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3. With aid of helper, **position shaft (1)** in structure (10) against forward transmission adapter (11). **Install two mount bushings (6) in brackets (12).**
4. Coat thread of three bolts (13) with oil (E254). **Install bolts, head forward, special washers (14), washers (15), and nuts (16)** at forward end of shaft (1).

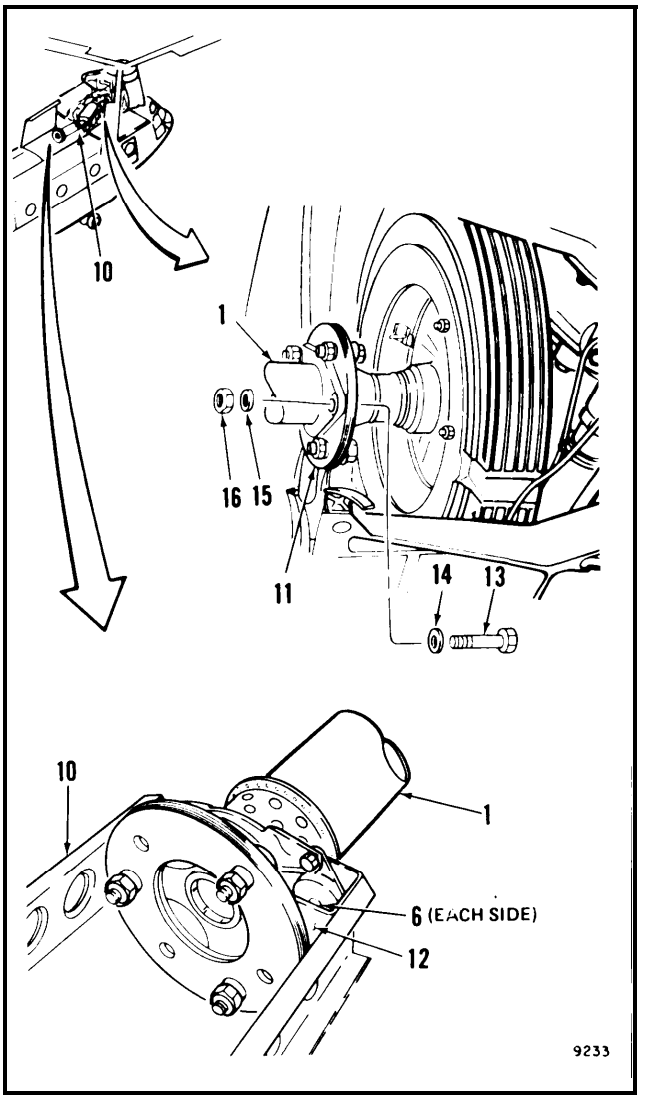
CAUTION

Do not allow bolts to turn when torquing nuts. If bolts turn, bolts and plates can be damaged.

NOTE

If nuts do not meet friction torque, they must be replaced.

5. Hold head of bolts (13) with wrench. **Check nuts (16) for friction torque of at least 24 inch-pounds.**
6. **Torque nuts to 1000 to 1100 inch-pounds.**



6-17 INSTALL NO. 1 DRIVE SHAFT (Continued) 6-17

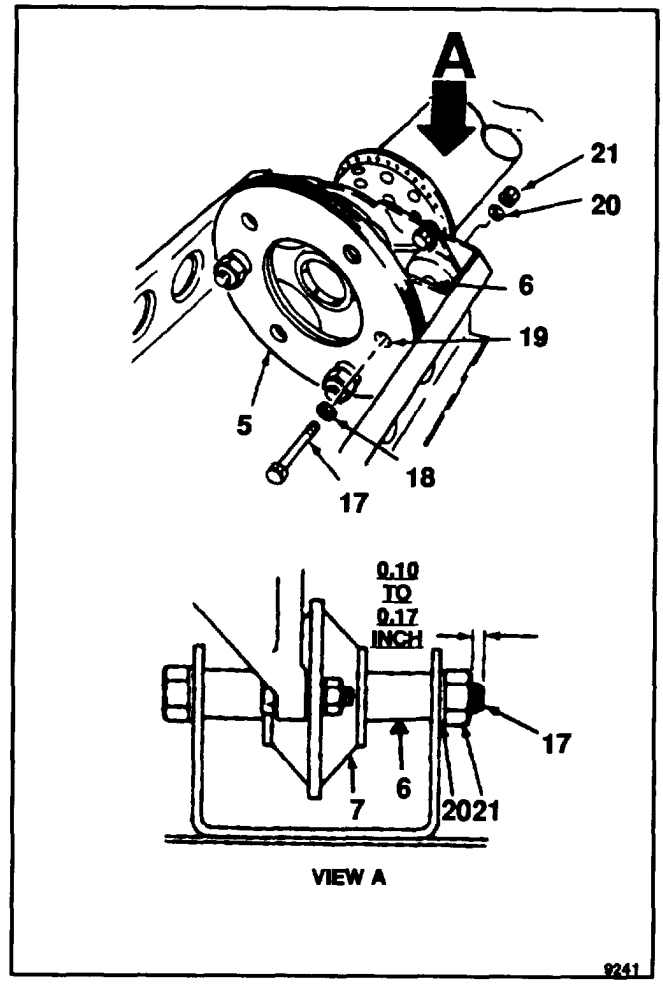
CAUTION

Rotor blades will turn when shaft rotates. Turning blades can injure personnel. Keep clear of blades as they turn.

NOTE

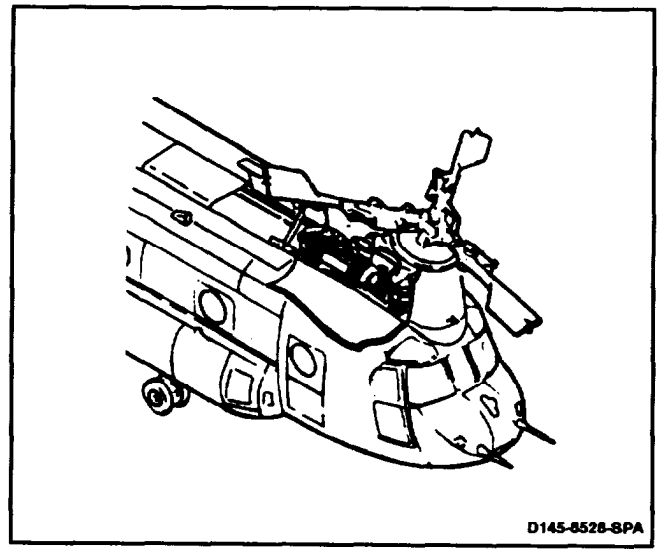
Install bolt in mount at each side of shaft in same way. Right mount shown here.

7. Rotate shaft to align one of the bolt holes in adapter assembly (5) with mount bushing (6).
8. Coat thread of bolt (17) with oil (E254). **Install bolt and washer** (18) through bolt hole (19) into bushing (6). Use socket and extension.
9. **Install washer (20) and nut (21). Torque nut to 150 to 160 inch-pounds**
10. Check bolt (17). There shall be 0.10 to 0.17 inch of bolt extending through nut (21). Install another washer (20) or a thinner washer if needed.
11. **Check mount (7) for freedom of motion** on bushing (6). There shall be no binding.



INSPECT

FOLLOW-ON MAINTENANCE:
Inspect forward drive shaft (Task 6-10).
Install No. 2 drive shaft (Task 6-18)
Check rotary-wing blade phasing (Task 6-27.1).
Install forward transmission aft fairing (Task 2-68).
Close forward drive shaft tunnel access cover (Task 2-2).
Perform vibration test.



END OF TASK

6-18 INSTALL NO. 2 THRU NO. 6 FORWARD DRIVE SHAFT

INITIAL SETUP

Applicable Configurations:
All

Tools:
Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692
Torque Wrench, 100 to 750 Inch-Pounds
Torque Wrench, 700 to 1600 Inch-Pounds

Materials:
Oil (E254)

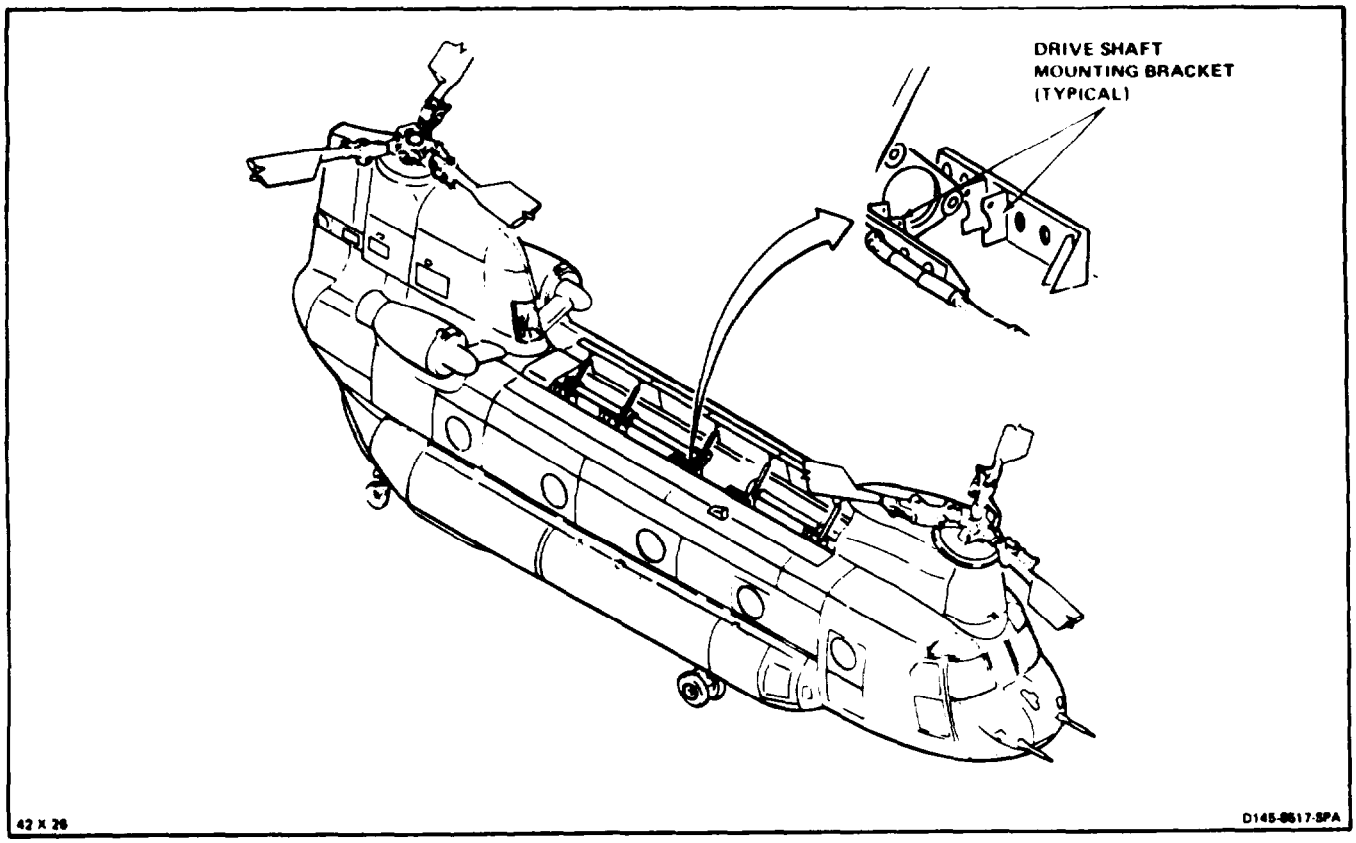
Personnel Required:
67U10 Medium Helicopter Repairer
67U20 Medium Hellicopter Repairer
67U30 Inspector

References:
TM 55-1520-240-23P

General Safety Instructions:

WARNING

Rotor blades will turn when shaft rotates. Turning blades can injure personnel. Keep clear of blades as they turn.



GO TO NEXT PAGE

6-18 INSTALL NO. 2 THRU NO. 6 FORWARD DRIVE SHAFT (Continued) 6-18

NOTE

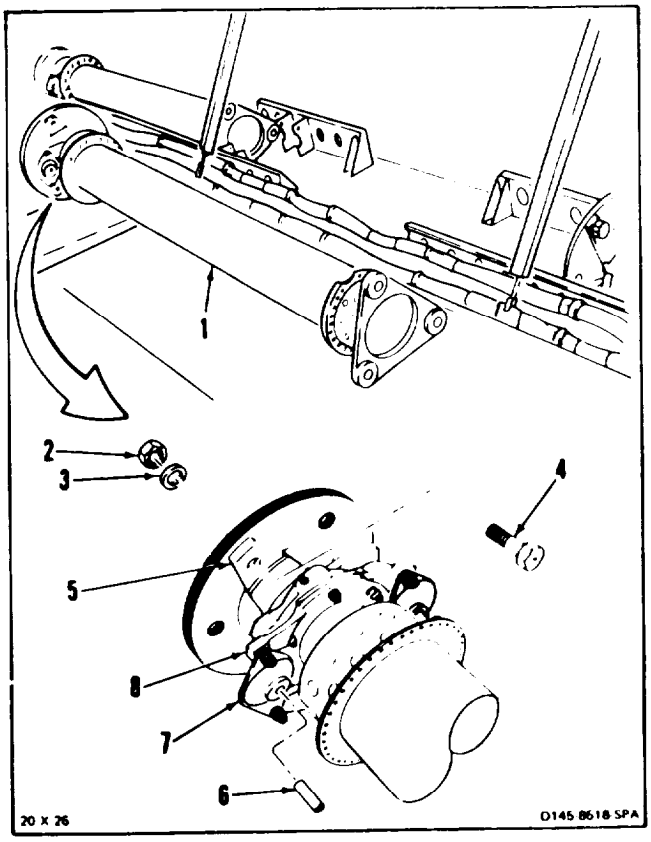
Install shaft No. 2 thru No. 6 in same way. Typical shaft shown here.

INSTALL SHAFT

CAUTION

Do not allow bolt to turn. if bolt turns, bolt and plates can be damaged.

1. If a replacement shaft (1) is being installed, remove one nut (2), washer (3), and bolt (4) from adapter assembly (5). During removal, hold head of bolt with wrench. Install bushing (6) on mount (7) at each side of support housing (8).

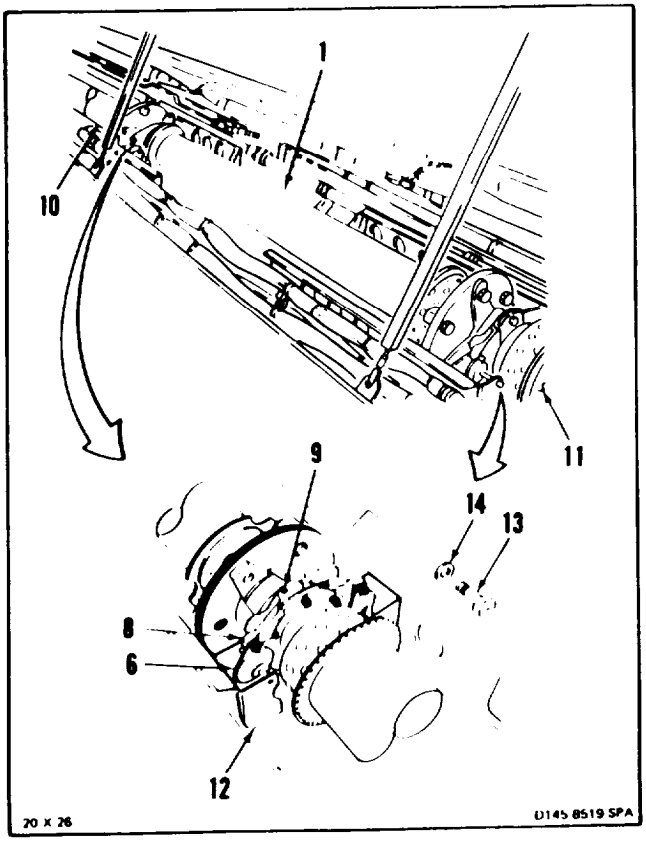


2. **Turn bearing support housing (8) so that grease fitting (9) faces up.**

NOTE

Do not disturb alignment of installed shafts. This keeps forward and aft rotor blades in phase.

3. With aid of helper, **position shaft** (1) between installed shafts (10 and 11). with two mount bushings (6) in brackets (12).
4. Coat thread of six bolts (13) with oil (E254). **Install three bolts, head forward, and special washers (14) at each end of shaft (1).**



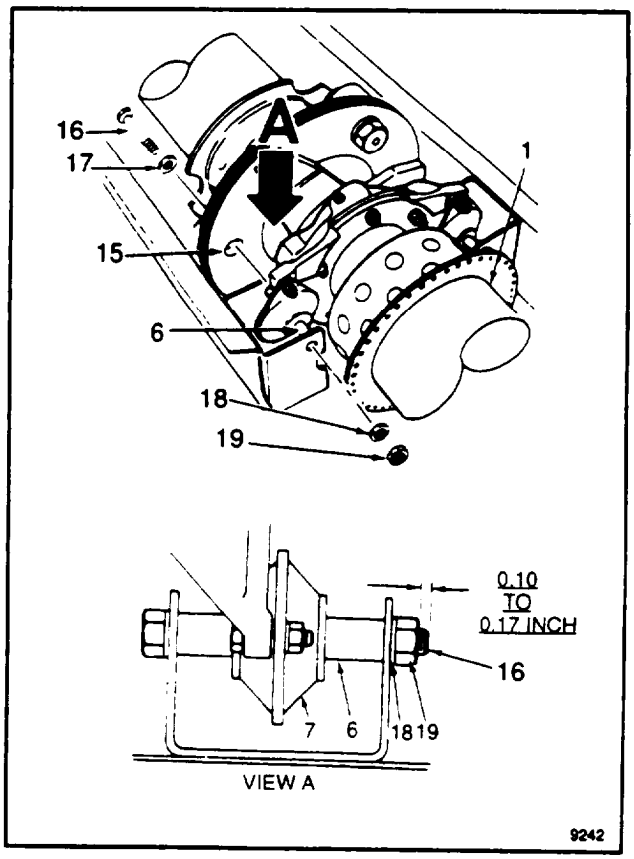
GO TO NEXT PAGE

INSTALL MOUNT BOLTS

NOTE

- Install bolt in mount at each side of shaft in same way. Right mount shown here.
- All shafts must be rotated as a unit to keep rotor blades in phase.

5. Rotate shaft (1) to align bolt hole (15) with mount bushing (6).
6. Coat thread of bolt (16) with oil (R254). Install bolt and washer (17) bolt hole (15) into bushing (6) Use socket and extension.
7. Install washer (18) and (19). Torque nut to 150 to 160 inch-pounds.
8. Check bolt (16). There shall be 9.10 to 0.17 inch of bolt threads extending through nut (19). Install another washer (18) or a thinner washer if needed.
9. Check mount (7) for freedom of motion on bushing (6). There shall be no binding.
10. If all forward shafting is now installed, check that mount (7) between shafts 3 and 4 is centered on bushing (6) within ±0.06 inch. If it is not, align shafting (Task 6-20).



INSTALL END BOLTS

11. Install washers (20) and nuts (21) on three bolts (13) at each end of shaft.

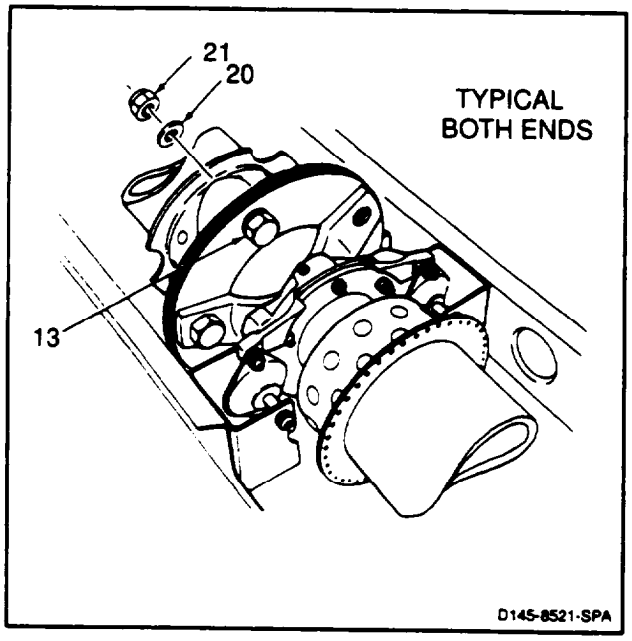
CAUTION

Do not allow bolts to turn when torquing nuts. If bolts turn, bolts and plates can be damaged.

NOTE

If nuts do not meet friction torque, they must be replaced.

12. Hold head of bolts (13) with wrench. **Check nuts for friction torque of at least 24 inch-pounds.**
13. Torque nuts to 1000 to 1100 inch-pounds.



GO TO NEXT PAGE

6-18 INSTALL NO. 2 THRU NO. 6 FORWARD DRIVE SHAFT (Continued) 6-18

14. Coat two adapter assembly bolts (4) with oil (E254). **Install bolts, special washers (3), and nuts (2).**

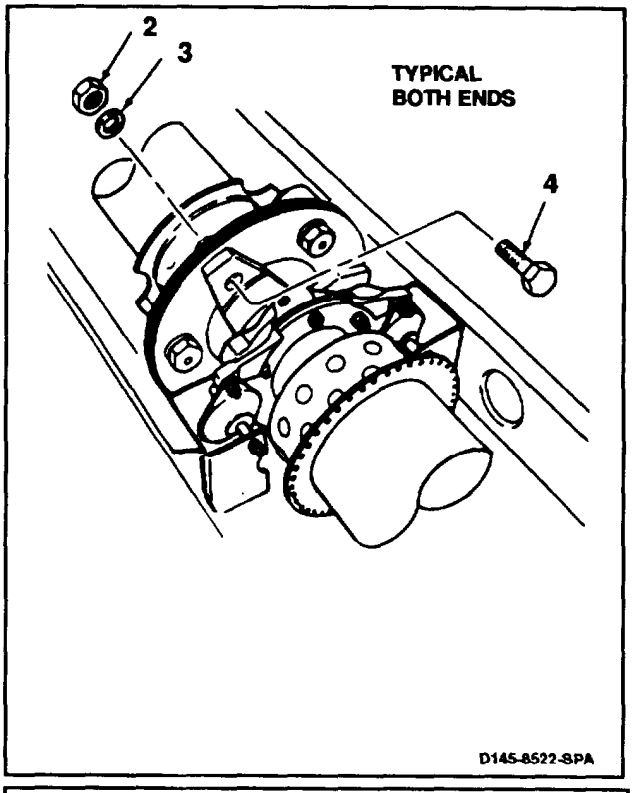
CAUTION

Do not allow bolts to turn when torquing nuts. if bolts turn, bolts and adapter assembly can be damaged.

NOTE

If nuts do not meet friction torque, they must be replaced.

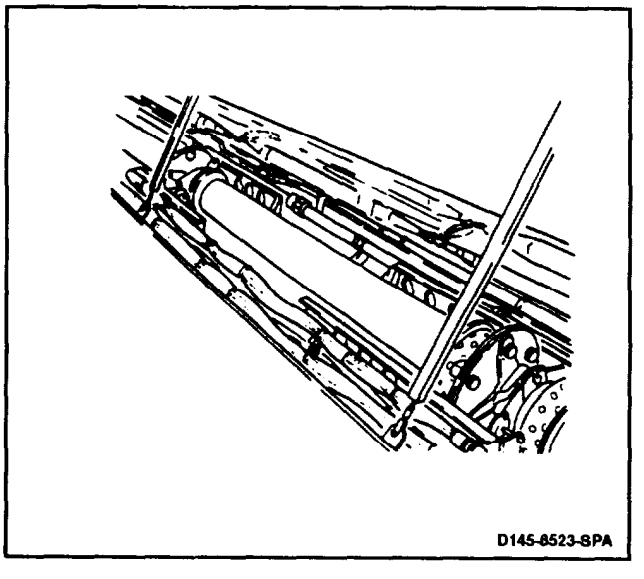
15. Hold head of bolts (4) with wrench. **Check nuts for friction torque of at least 24 inch-pounds.**
16. Torque nuts to 1000 to 1100 inch-pounds



INSPECT

FOLLOW-ON MAINTENANCE:

Inspect forward drive shaft (Task 6-10).
Check rotary-wing blade phasing (Task 6-27.1).
Close forward drive shaft tunnel access covers (Task 2-2).
Install cabin tunnel smoke baffle (Task 2-170.1).
Perform ground run (TM 55-1520-240-10).



END OF TASK

6-19 INSTALL NO. 7 DRIVE SHAFT

INITIAL SETUP

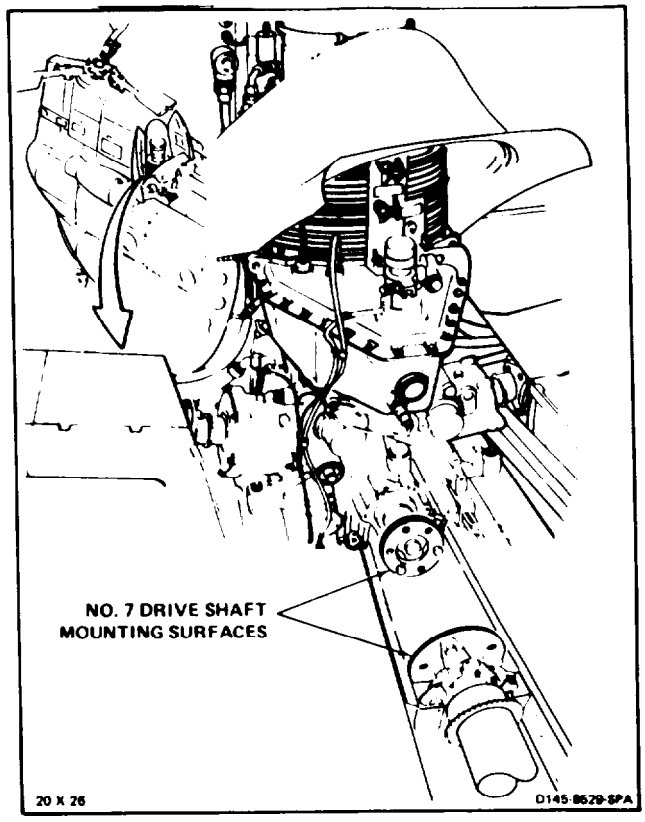
Applicable Configurations:
All
Tools:
Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Torque Wrench, 700 to 1600 Inch-Pounds
Torque Wrench, 30 to 150 Inch-Pounds
Materials:
Oil (E254)
Personnel Required:
Medium Helicopter Repairer (2)
Inspector
References:
TM 55-1520-240-23P
General Safety Instructions:

WARNING

Oil (E254) is a skin irritant. If oil gets on skin, wash thoroughly. If oil soaks into clothes, change clothes immediately.

WARNING

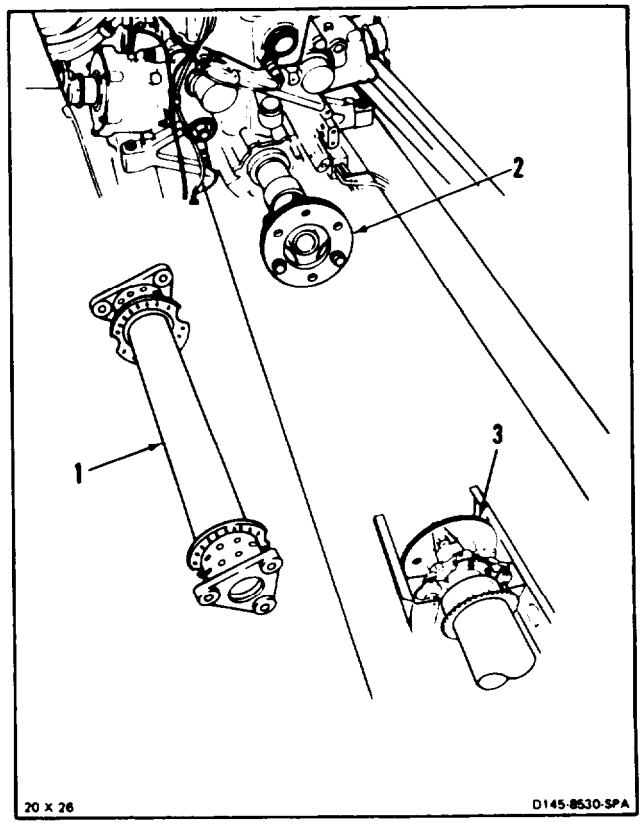
Oil (E254) gives off fumes that can cause injury to personnel. Use oil in a well-ventilated area.



NOTE

Do not disturb alignment of installed adapter assembly and shaft. This keeps forward and aft rotor blades in phase.

1. With aid of helper, **position shaft (1)** between combining transmission adapter assembly (2) and No. 6 drive shaft (3).



GO TO NEXT PAGE

NOTE

Special washers are installed against adapter assemblies.

2. Coat thread of six bolts (4) with oil (E254 or E254.1). **Install three bolts, head forward, special washers (5), washers (6). and nuts (7) at each end of shaft (1).**

CAUTION

Do not allow bolts to turn when torquing nuts. If bolts turn, bolts and plates can be damaged.

NOTE

If nuts do not meet friction torque, they must be replaced.

3. Hold head of bolts (4) with wrench. **Check nuts for friction torque of at least 24 inch-pounds.**
4. **Torque nuts to 1000 to 1100 inch-pounds.**
5. Coat two adapter assembly bolts (8) with oil (E254). **Install bolts, special washers (9), and nuts (10).**

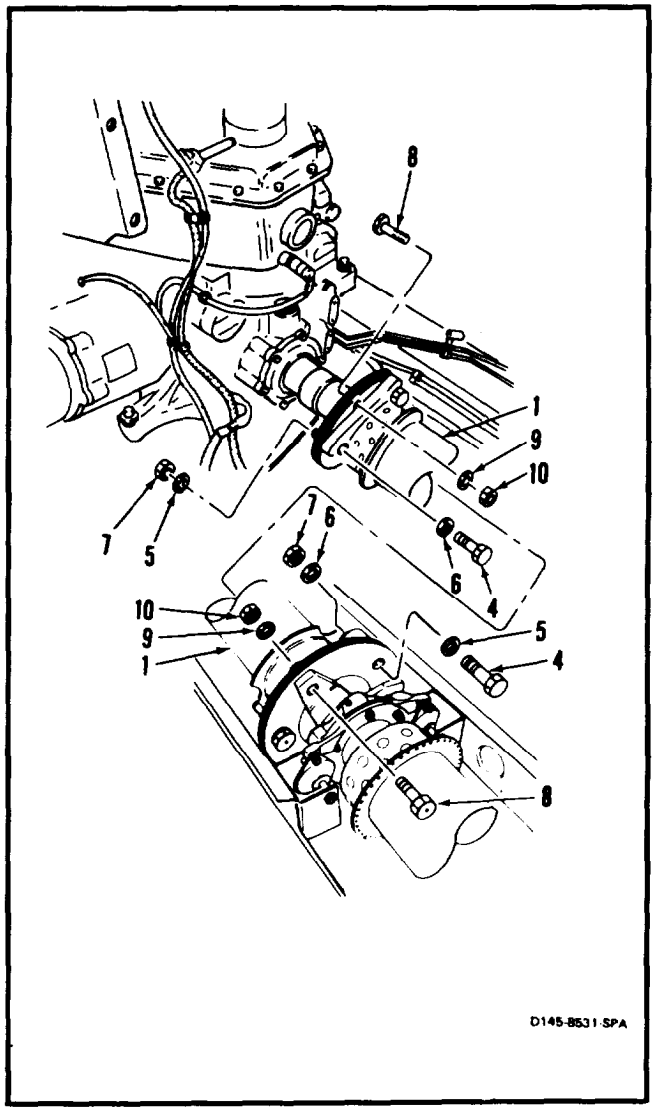
CAUTION

Do not allow bolts to turn when torquing nuts. If bolts turn, bolts and adapter assembly can be damaged.

NOTE

If nuts do not meet friction torque, they must be replaced.

6. Hold head of bolts (8) with wrench. **Check nuts for friction torque of at least 24 inch-pounds.**
7. **Torque nuts to 1000 to 1100 inch-pounds.**



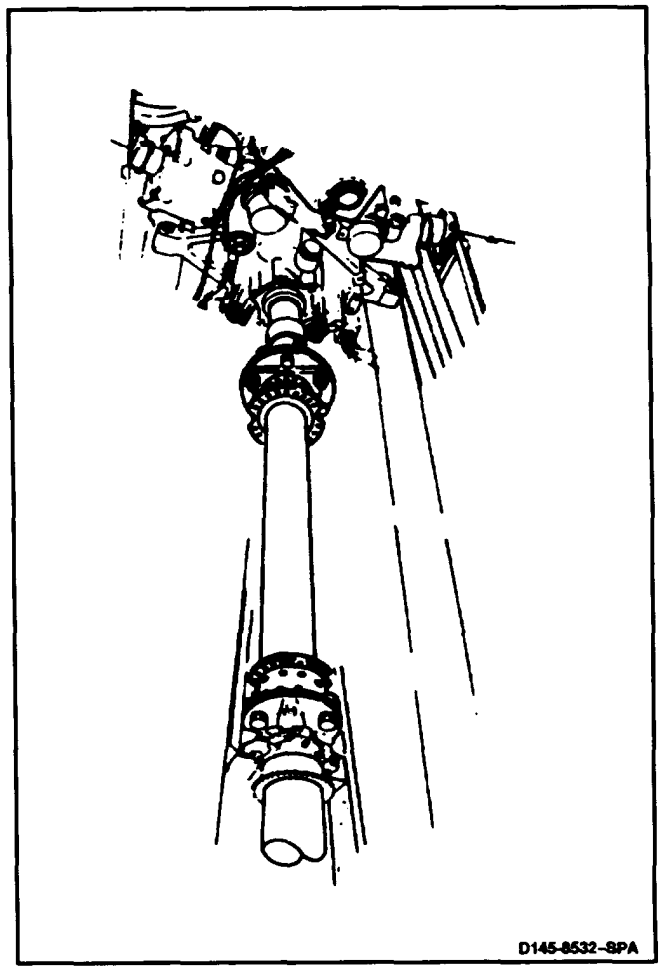
INSPECT

GO TO NEXT PAGE

6-19 INSTALL NO. 7 DRIVE SHAFT (Continued) 6-19

FOLLOW-ON MAINTENANCE:

- Check rotary-wing blade phasing (Task 6-27.1).
- Close forward drive shaft tunnel No. 6 drive shaft cover (Task 2-2).
- Close pylon lower fairing (Task 2-2).
- Close pylon hinged fairing (Task 2-2).
- Install cabin tunnel smoke baffle (Task 2-170.1).
- Perform a combining transmission oil cooler fan vibration check (Tasks 6-217 through 6-223, **as** applicable).
- Perform vibration test.



END OF TASK

6-20 ALIGN FORWARD DRIVE SHAFTING

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692
Torque Wrench, 700 to 1600 Inch-Pounds

Materials:

Dry Cleaning Solvent (E162)
Cloths (E120)
Gloves (E186)
Grease (E190)

Personnel Required:

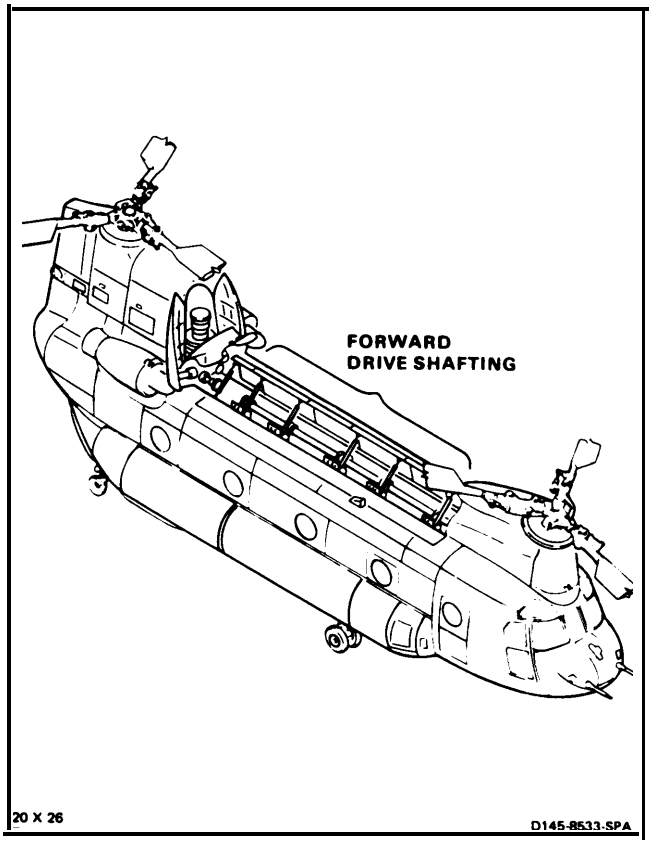
Medium Helicopter Repairer
Inspector

References:

TM 55-1520-240-23P
Task 6-9
Task 6-19

Equipment Condition:

Battery Disconnected (Task 1-39)
Electrical Power Off
Pylon Hinged Fairing Open (Task 2-2)
Pylon Lower Fairing Raised (Task 2-2)
No. 7 Drive Shaft Removed (Task 6-4)
Combining Transmission Forward Adapter Assembly Removed (Task 6-6)
Forward Drive Shaft Tunnel Access Covers Open (Task 2-2)



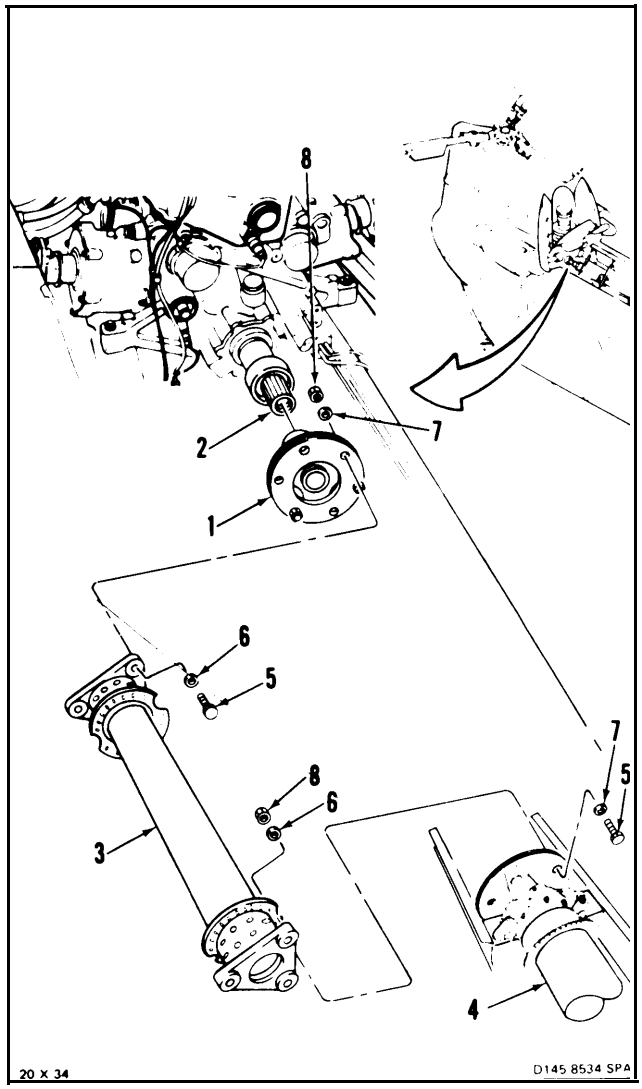
GO TO NEXT PAGE

6-20 ALIGN FORWARD DRIVE SHAFTING (Continued)

NOTE

Do not change position of combining transmission output shaft or No. 6 drive shaft. If positions are changed, rotary-wing blades will be put out of phase.

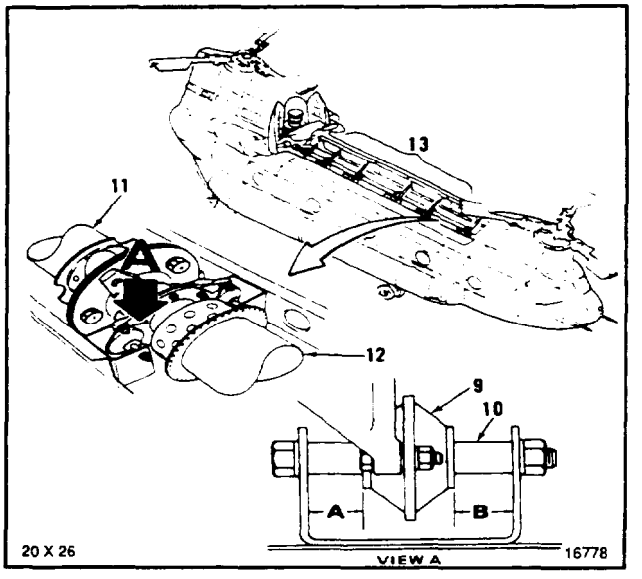
1. **Install adapter assembly (1)** on combining transmission forward output shaft (2).
2. **Position No. 7 drive shaft (3)** between No. 6 drive shaft (4) and adapter assembly (1). **Temporarily install shaft** with one bolt (5). washer (6), special washer (7) and nut (8) at each end.



GO TO NEXT PAGE

6-20 ALIGN FORWARD DRIVE SHAFTING (Continued) 6-20

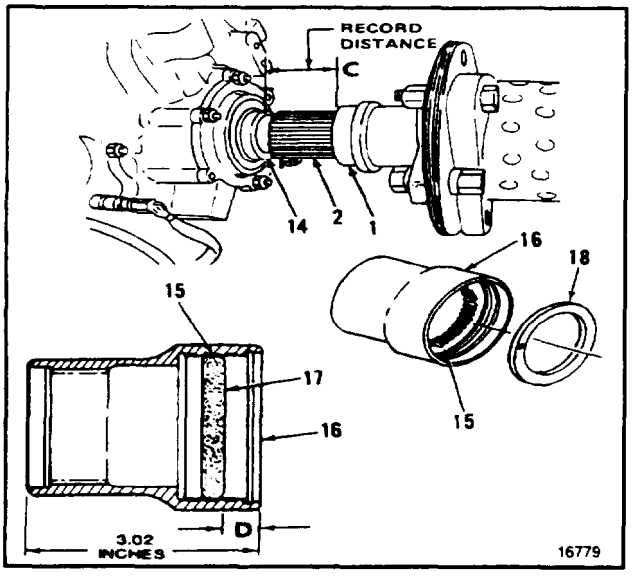
3. **Check position of mount (9)** on bushing (10) on either side between No. 3 drive shaft (11) and No. 4 drive shaft (12). **Mount shall be centered on bushing so that dimension A is within ±0.06 inch of dimension B.** Move entire drive shafting assembly (13) forward or aft as needed to position mount.



4. **Measure distance between aft end of adapter assembly (1) and forward face of shoulder** (14) on combining transmission output shaft (2). Use a steel rule. Record measurement as dimension C.

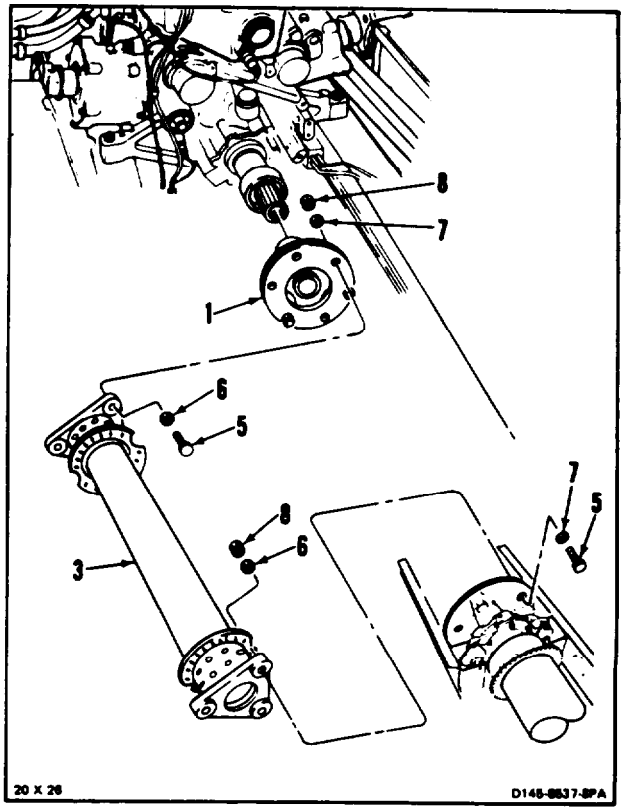
5. **Subtract dimension C of step 4 from 3.00 inches.** Record this measurement as dimension D. Adjust threaded ring (15) so that distance from the end of retainer (16) to ring face (17) equals dimension D.

6. Install retaining ring (18).



GO TO NEXT PAGE

7. Remove nuts (8), washers (6 and 7) and bolts (5) from both ends of shaft (3). **Remove shaft.**
8. **Remove adapter assembly** (1).



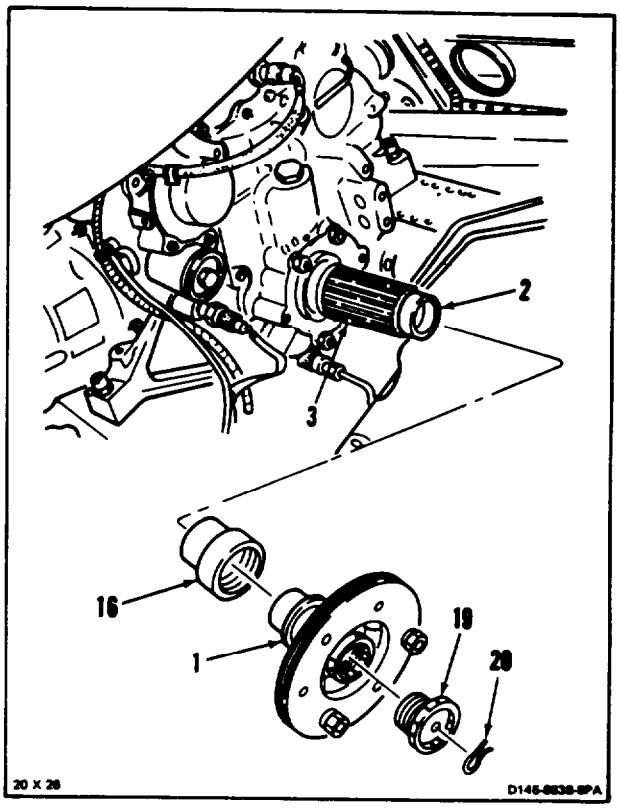
WARNING

Dry cleaning solvent (E162) is flammable and toxic. It can irritate skin and cause burns. Use only In well-ventilated area. away from heat and open flame. In case of contact, immediately flush skin or eyes with plenty of water for at least 15 minutes. Get medical attention for eyes.

8.1. Clean splines of adapter assembly (1), retainer (16) and output shaft (2). Use dry cleaning solvent (E162) and cloths (E120). Wear gloves (E186).

8.2. Pack splines of adapter assembly (1), retainer (16) and output shaft (2) with grease (E190). Wipe off excess grease with cloths (E120).

9. Install adapter assembly (1) with retainer (16) on splines (3) of output shaft (2). Then install retainer (19) and lockring (20). (Task 6-9).



10. **Install No. 7 drive shaft (3) (Task 6-19).**

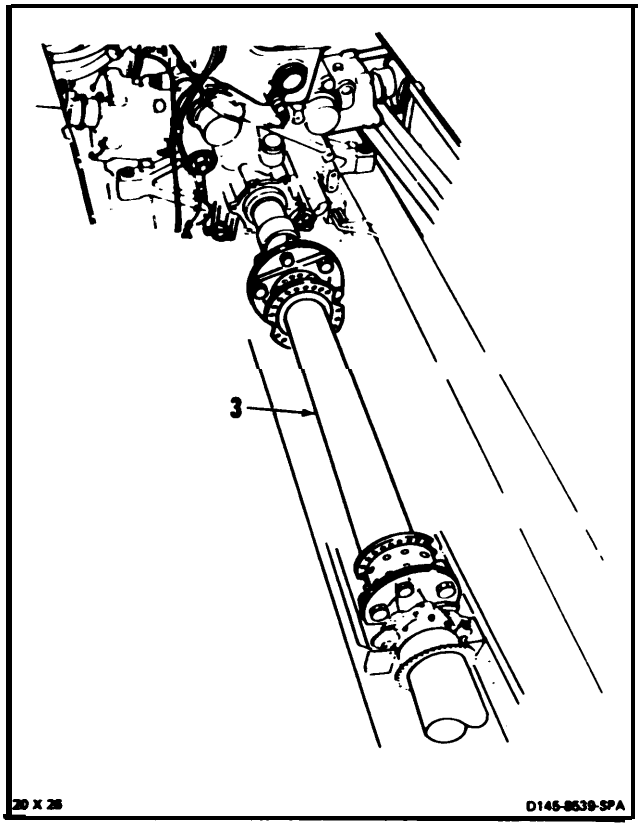
INSPECT

FOLLOW-ON MAINTENANCE:

Close pylon lower fairing (Task 2-2)

Close pylon hinged fairing (Task 2-2).

Perform ground run (TM 55-1520-240-10).



END OF TASK

6-21 REMOVE AFT DRIVE SHAFTING

INITIAL SETUP

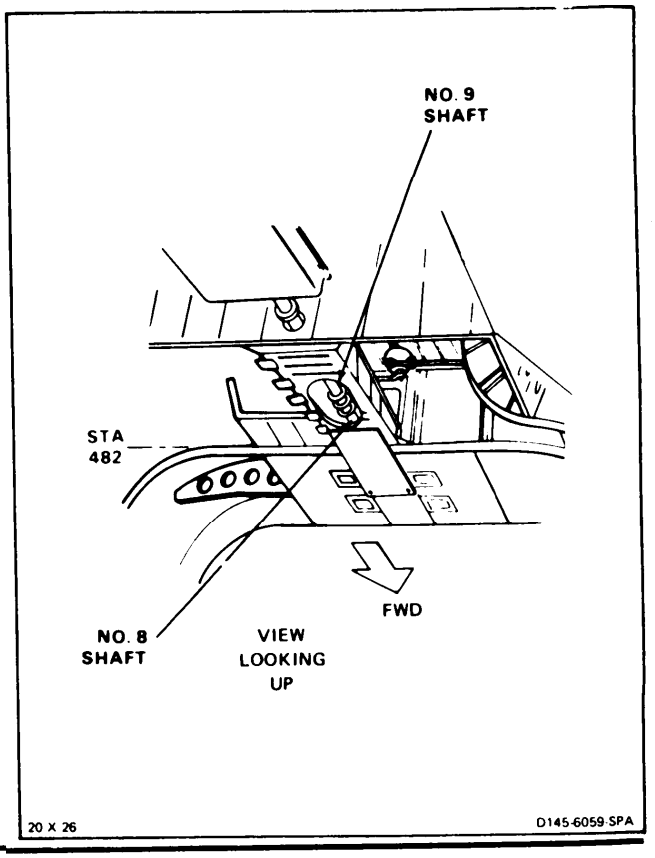
Applicable Configurations:
All

Tools:
Aircraft Mechanic's Tool Kit
NSN 5180-00-323-4692
Workstand (2)

Materials:
None

Personnel Required:
Medium Helicopter (2)

Equipment Condition:
Battery Disconnected (Task 1-39)
Electrical Power Off
Aft Drive Shaft Access Panel Open (Task 2-2)
Cargo Ramp Open and Level (TM 55-1520-240-T)
Baffles Under Aft Transmission Open (Task 2-2)
Aft Transmission Drip Tray Removed (Task 2-3)
Aft Pylon Doors Open (Task 2-2)
Aft Pylon Lower Fairing Open (Task 2-2)



REMOVE NO. 9 SHAFT

CAUTION

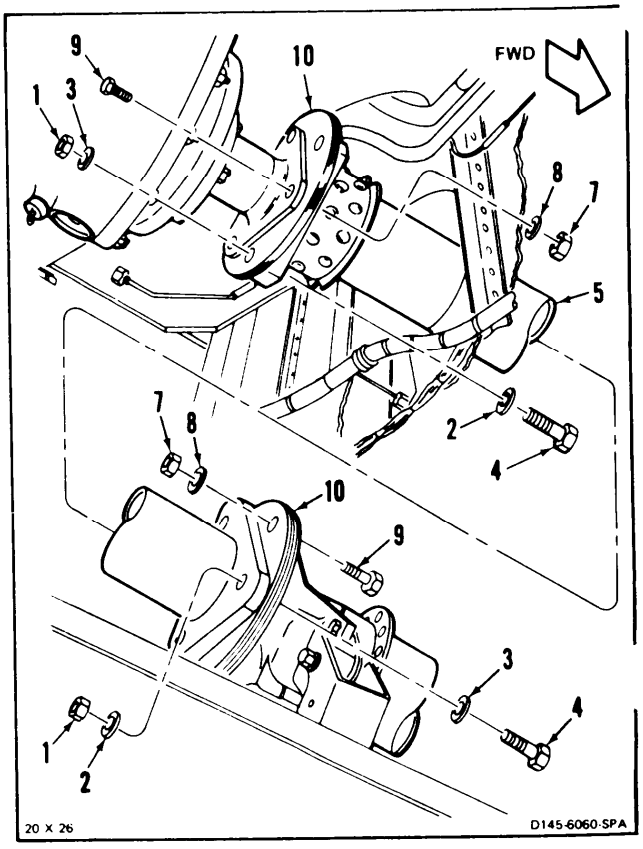
Do not allow bolts to turn when removing nuts. If bolts turn, damage to bolts and plates can result.

1. **Remove nuts (1),** washers (2), or special washers (3), and **three bolts (4)** at each end of No. 9 shaft (5). During removal, have helper hold head of bolts with wrench (6).

CAUTION

If more than one bolt on adapter assembly is removed, assembly will have to be balanced.

2. **Remove one** nut (7), special washer (8), and **bolt (9)** from adapter assembly (10) **at each end of shaft (5)** for clearance. During removal, have helper hold bolts.
3. Remove shaft (5).



GO TO NEXT PAGE

REMOVE NO. 8 SHAFT WITHOUT 48

CAUTION

Do not allow bolts to turn while removing nuts. If bolts turn, damage to bolts and plates can result.

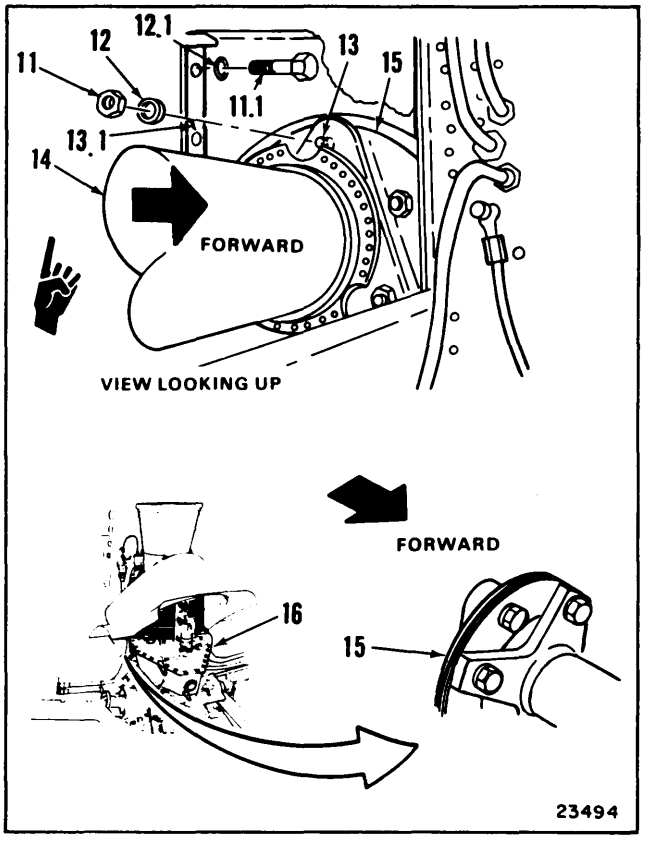
NOTE

Helper reaches bolts from top of helicopter.

4. **Remove three nuts (11) and washers (12)** from three bolts (13) that secure No. 8 shaft (14) to adapter assembly (15) aft of combining transmission (16). During removal, have helper hold head of bolts with wrench. Do not remove bolts at this time.

REMOVE NO. 8 SHAFT WITH 48

4.1. **Remove eight bolts (11.1) and washers (12.1)** from baffle (13.1). Remove baffle.

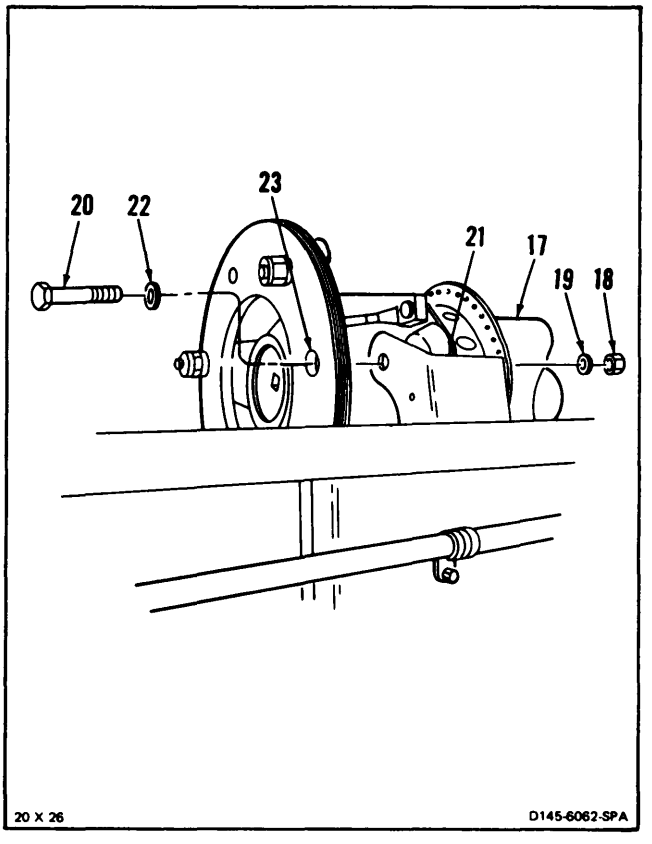


5. Have helper suppport shaft (17). Remove nut (18) and washer (19) from bolt (20). Work through bracket (21) at each side of shaft.

NOTE

Rotate shaft as needed to align hole with bolts.

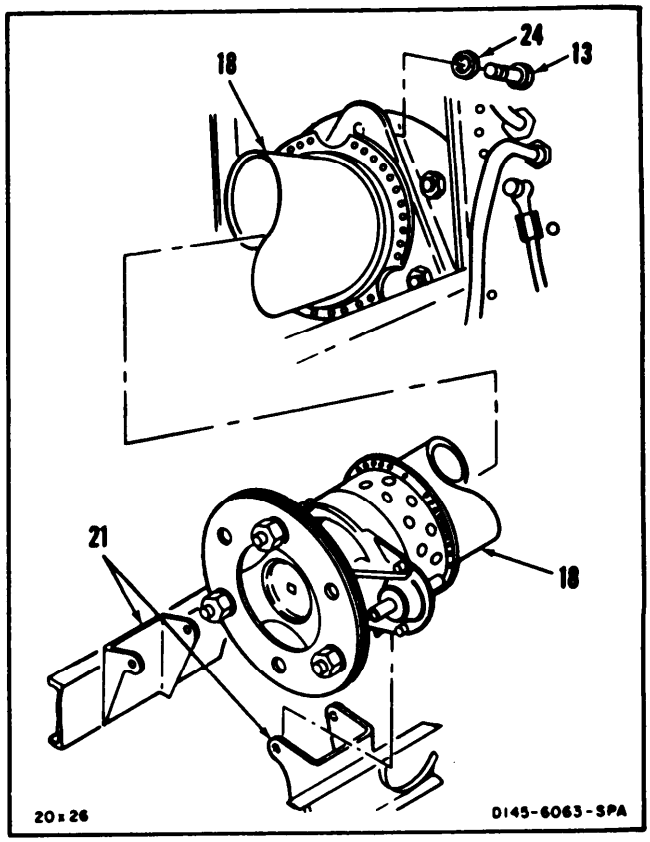
6. **Remove two bolts (20) and washers (22)** through one of three holes (23).



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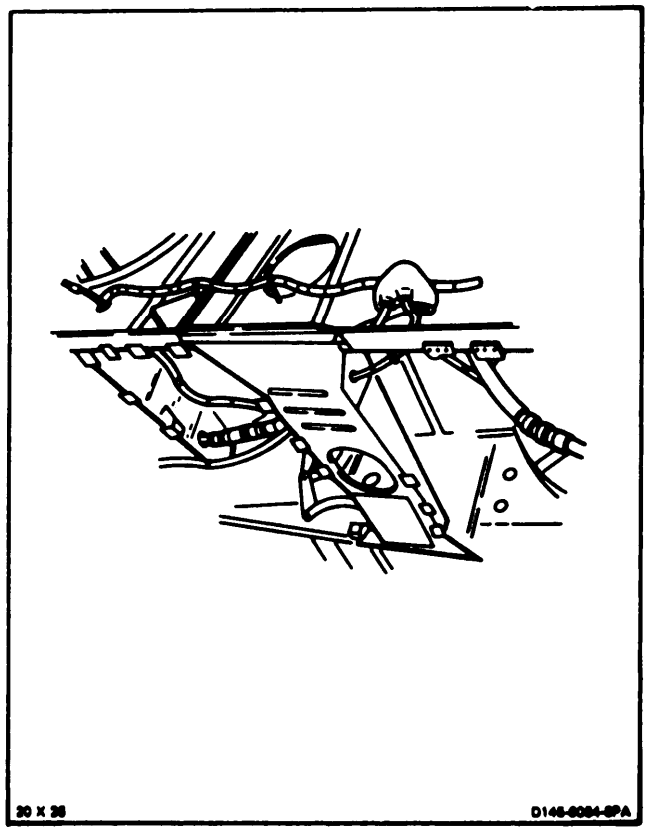
6-21 REMOVE AFT DRIVE SHAFTING (Continued)

7. **Remove three bolts (13)** and special washers (24).
8. Lift shaft (18) out of brackets (21). **Remove shaft.**



FOLLOW-ON MAINTENANCE:

None



END OF TASK

6-22 REMOVE COMBINING TRANSMISSION AFT OUTPUT SHAFT ADAPTER ASSEMBLY

INITIAL SETUP

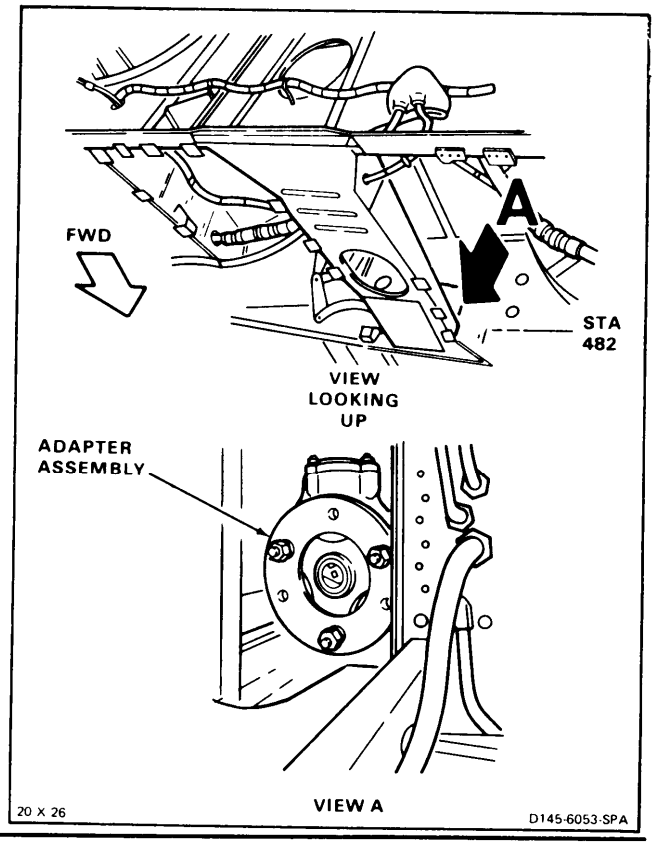
Applicable Configurations:
All

Tools:
Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692
Workstand

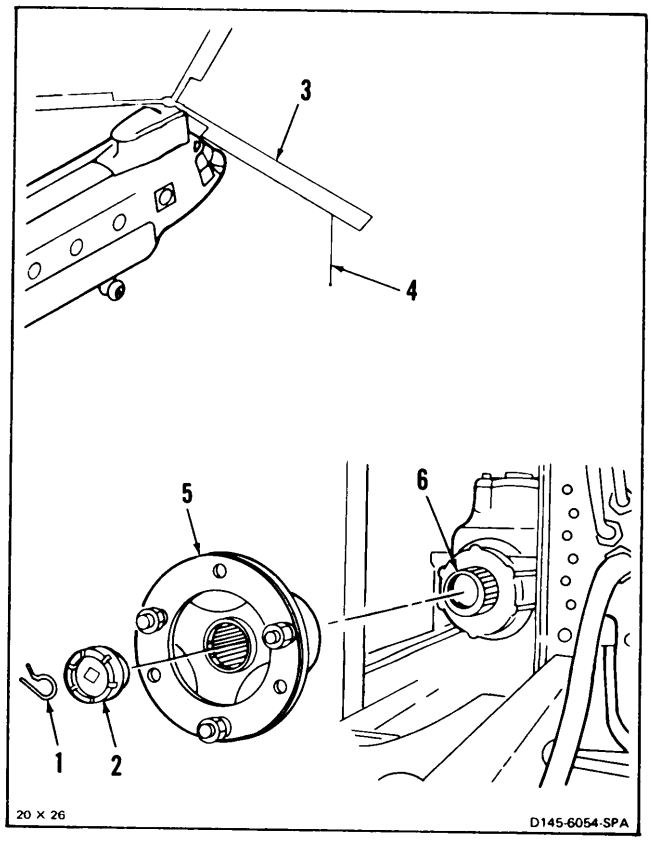
Materials:
None

Personnel Required:
67U10 Medium Helicopter Repairer (2)

Equipment Condition:
Battery Disconnected (Task 1-39)
Electrical Power Off
Aft Drive Shafting Removed (Task 6-21)
Tiedown Line Installed on One Forward Rotor Blade (Task 1-26)



1. **Remove lockring (1)** from retainer (2).
2. Have helper hold rotor blade (3) in position with tiedown line (4).
3. **Remove retainer (2)** from adapter assembly (5).
4. **Remove adapter assembly (5)** from output shaft (6).



FOLLOW-ON MAINTENANCE:

None

END OF TASK

6-23 REMOVE AFT TRANSMISSION ADAPTER ASSEMBLY

INITIAL SETUP

Applicable Configurations:
All

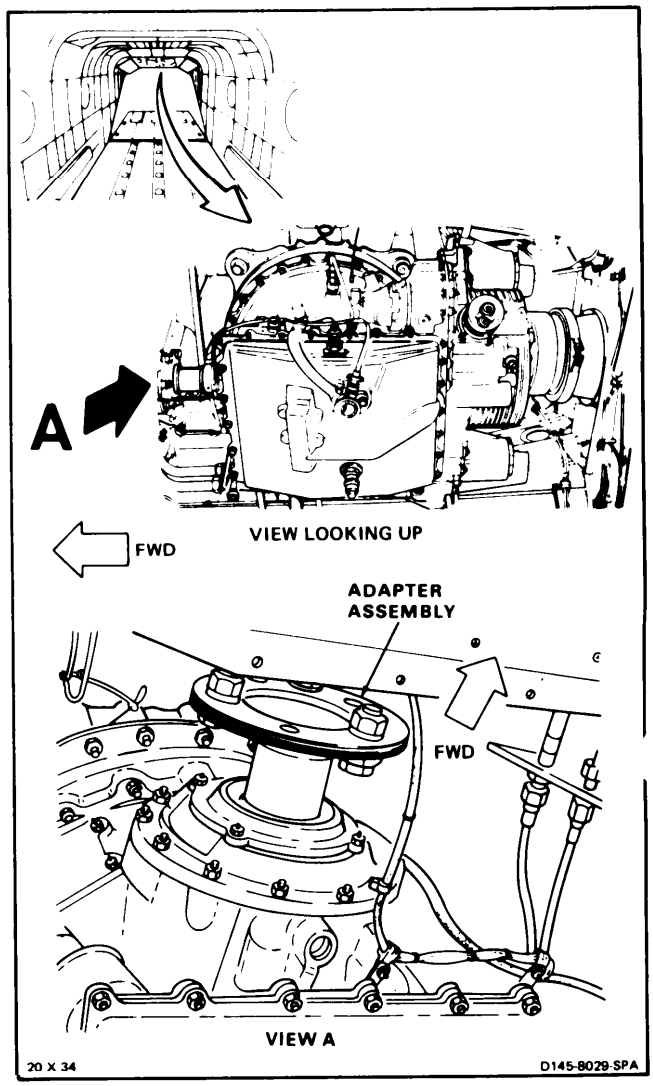
Tools:
Workstand

Materials:
None

Personnel Required:
67U10 Medium Helicopter Repairer

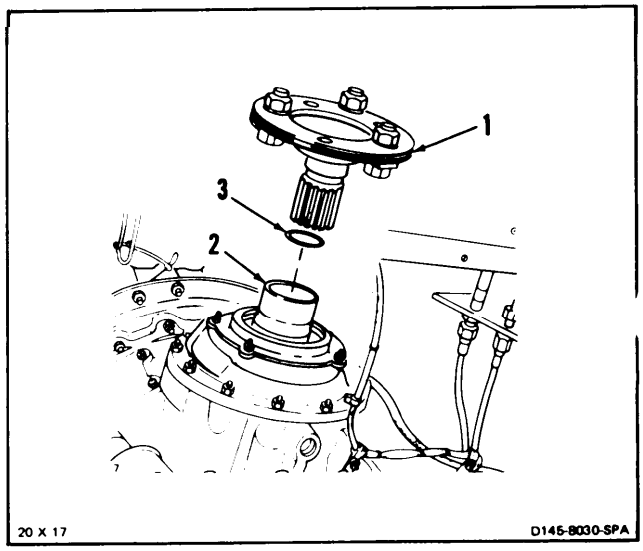
Equipment Condition:

Battery Disconnected (Task 1-39)
Electrical Power Off
Cargo Ramp Open and Level (TM 55-1520-240-T)
Baffles Under Aft Transmission Open (Task 2-2)
Aft Transmission Drip Tray Removed (Task 2-3)
No. 9 Drive Shaft Removed (Task 6-21)



1. **Remove adapter assembly (1)** from transmission input shaft (2). Do not disturb position of input shaft.
2. **Remove packing (3)** from adapter assembly (1).

FOLLOW-ON MAINTENANCE:



END OF TASK

6-24 INSTALL COMBINING TRANSMISSION AFT OUTPUT SHAFT ADAPTER ASSEMBLY 6-24

INITIAL SETUP

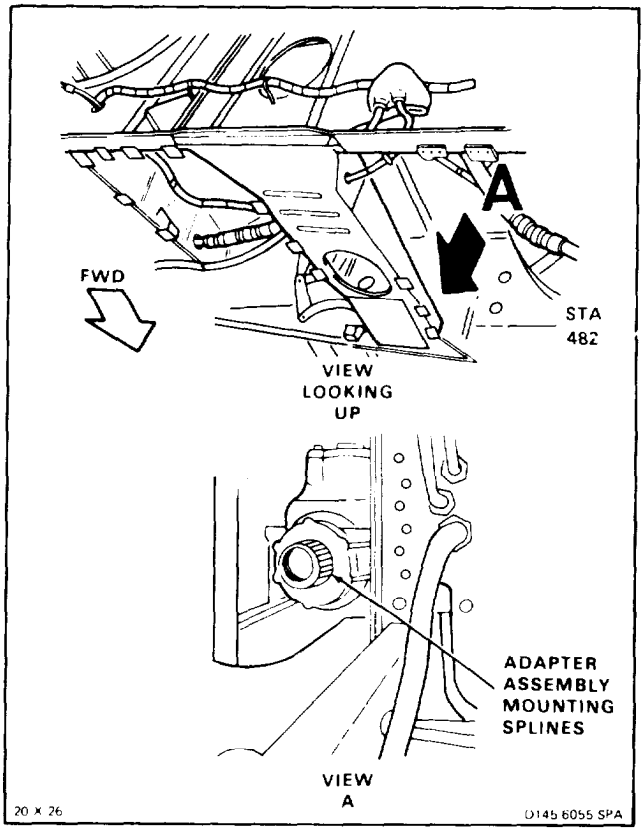
Applicable Configurations:
All

Tools:
Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Torque Wrench, 700 to 1600 Inch-Pounds
Workstand

Materials:
Dry Cleaning Solvent (E162)
Grease (E190)
Cloths (E120)
Gloves (E186)
Grease (E75)

Personnet Required:
Medium Helicopter Repairer
Inspector

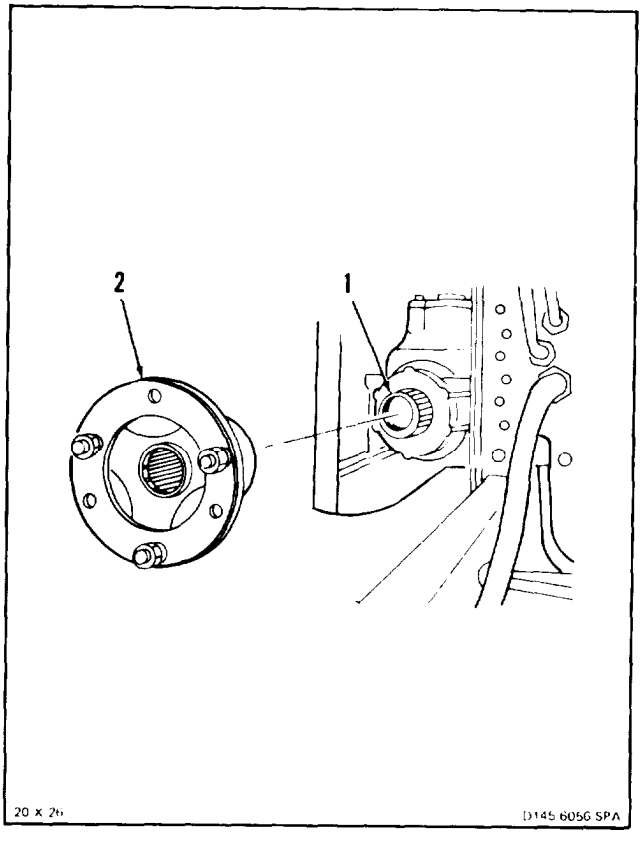
References:
TM 55-1520-240-23P



WARNING

Dry cleaning solvent (E162) is flammable and toxic. It can irritate skin and cause burns. Use only in well-ventilated area, away from heat and open flame. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.

1. Clean splines on aft output shaft (1) and adapter assembly (2). Use dry cleaning solvent (E162) and cloths (E 120). Wear gloves (E186) and goggles.
2. Pack splines on shaft (1) and adapter assembly (2) with grease (E190).
3. **Install adapter assembly (2)** on shaft (1). Wipe off excess grease with cloths (E120).

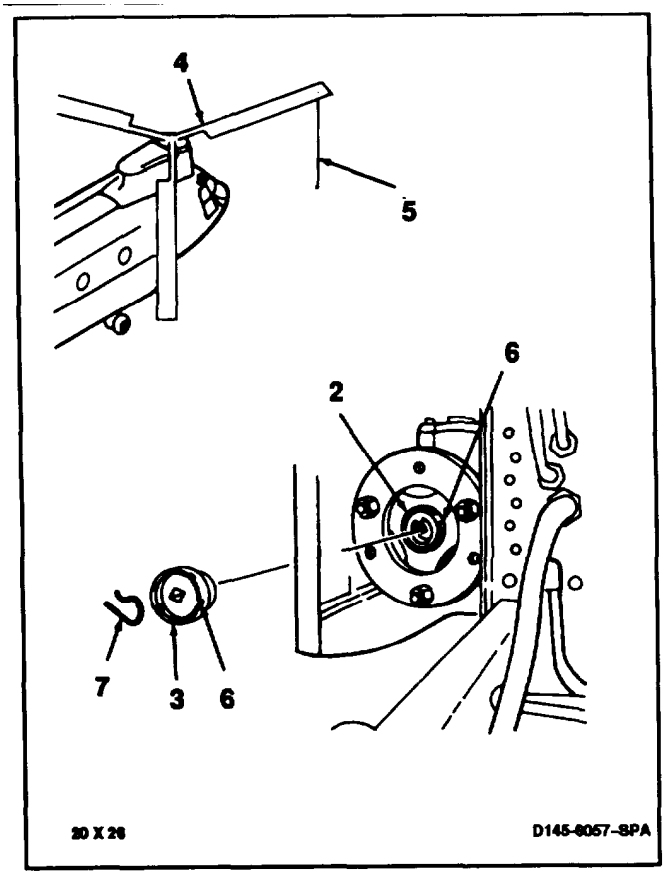


GO TO NEXT PAGE

6-24 INSTALL COMBINING TRANSMISSION AFT OUTPUT SHAFT ADAPTER ASSEMBLY (Continued) 6-24

4. **Coat thread of retainer (3) with grease (E190).**
5. Have helper hold rotor blade (4) in position with tiedown line (5).
6. **Install retainer (3)** in adapter assembly (2). **Torque retainer to 825 inch-pounds** continue torquing to align holes (6) in retainer (3) and adapter assembly (2).
7. **Install lockring (7).** Check that lockring protrudes through adapter assembly (2) at least 0.060-inch

INSPECT

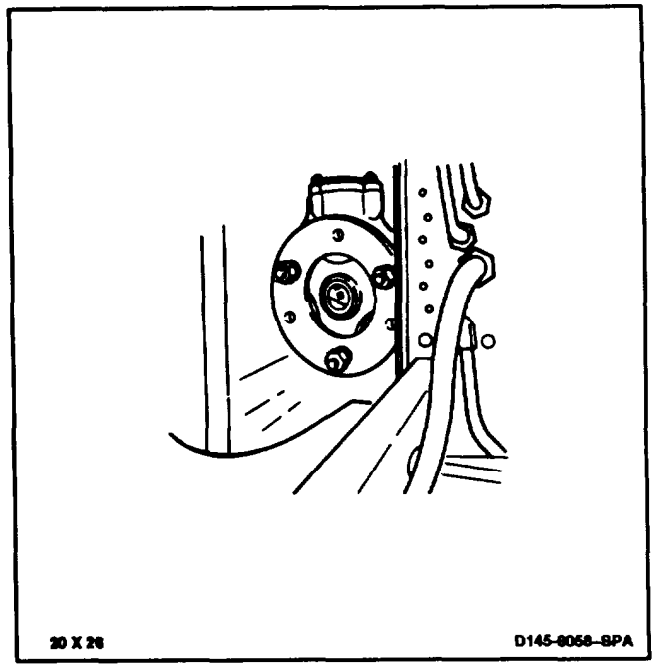


FOLLOW-ON MAINTENANCE:

Install aft drive shafting (Task 6-29).

Remove tiedown line from rotor blade (Task 1-26).

Perform ground run (TM 55-1520-240-10).



END OF TASK

6-25 INSTALL AFT TRANSMISSION ADAPTER ASSEMBLY

INITIAL SETUP

Applicable Configurations:
All

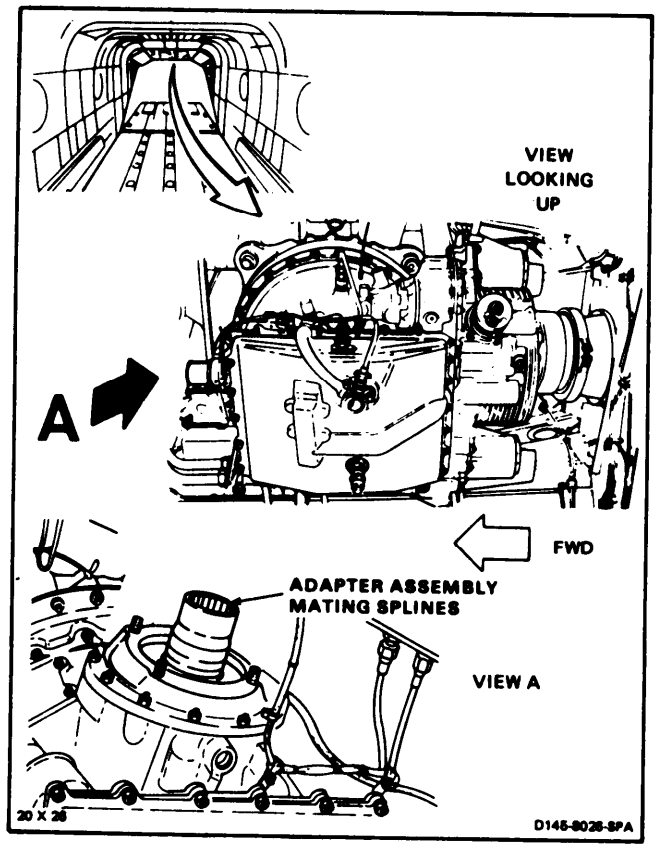
Tools:
Workstand

Materials:
Dry Cleaning Solvent (E162)
Grease (E190)
Cloths (E120)
Gloves (E186)

Parts:
Packing

Personnel Required:
67U10 Medium Helicopter Repairer
67U30 Inspector

References:
TM 55-1520-240-23P



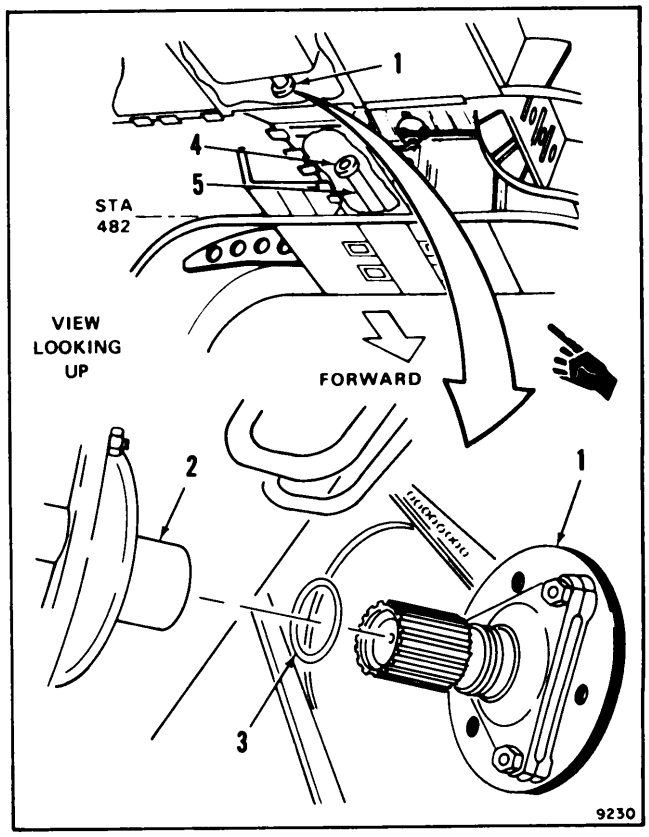
GO TO NEXT PAGE

6-25 INSTALL AFT TRANSMISSION ADAPTER ASSEMBLY (Continued) 6-25

WARNING

Dry cleaning solvent (E162) is flammable and toxic. It can irritate skin and cause burns. Use only in well-ventilated area, away from heat and open flame. In case of contact, immediately flush skin or eyes with plenty of water for at least 15 minutes. Get medical attention for eyes.

1. Clean splines of adapter assembly (1) and input shaft (2). Use dry cleaning solvent (E162) and clean cloths (E120). Use gloves (E186).
2. Coat packing (3) with grease (E190). **Install packing** on adapter assembly (1).
3. **Pack splines** of input shaft (2) and adapter assembly (1) **with grease (E190).**
4. Align adapter assembly (1) with adapter assembly (4) of No. 8 drive shaft (5). **Install adapter assembly** in input shaft (2). Make sure assembly is fully seated. Do not disturb position of input shaft (2) or No. 8 drive shaft.
5. Wipe off excess grease with cloths (E120).



FOLLOW-ON MAINTENANCE:

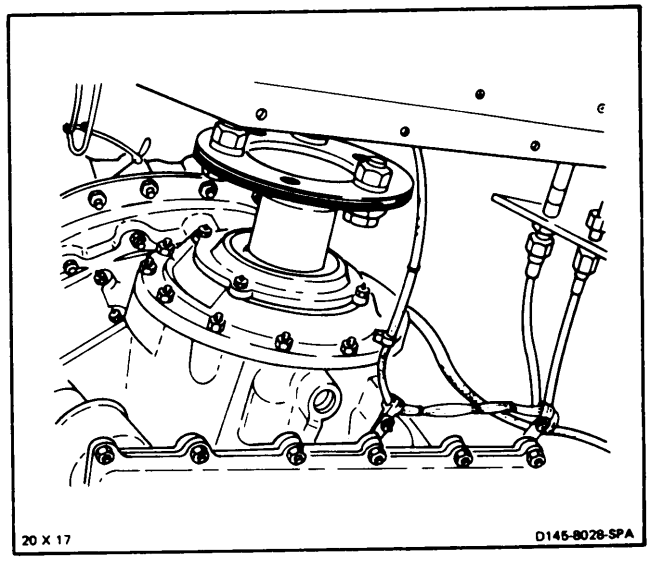
Phase rotor blades (Task 6-28).

Install No. 9 drive shaft (Task 6-29).

Install aft transmission drip tray (Task 2-3).

Close baffles under aft transmission (Task 2-2).

Close cargo ramp (TM 55-1520-240-T).



END OF TASK

6-26 REMOVE AFT DRIVE SHAFT MOUNT

INITIAL SETUP

Applicable Configurations:
All

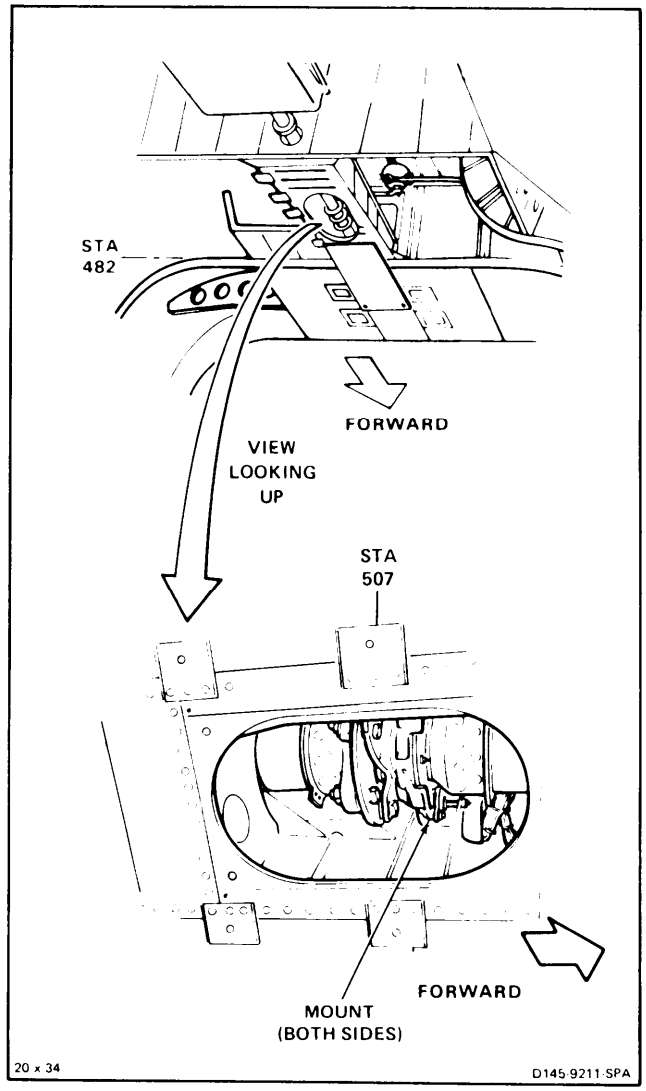
Tools:
Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692
Workstand

Materials:
None

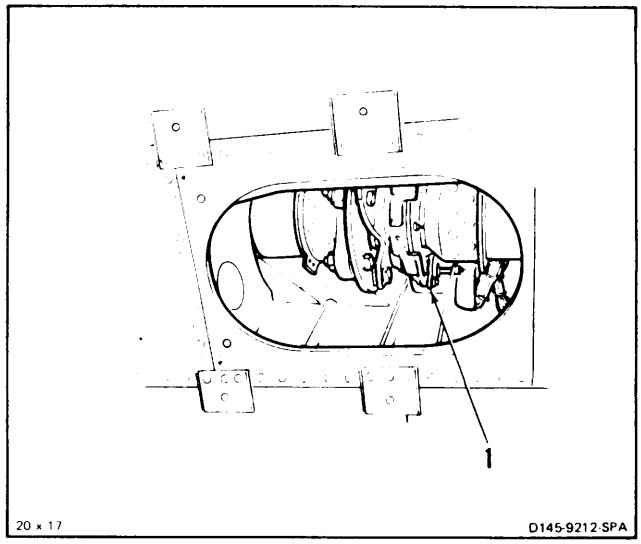
Personnel Required:
67U10 Medium Helicopter Repairer
67U20 Medium Helicopter Repairer

References:
Task 6-14

Equipment Condition:
Battery Disconnected (Task 1-39)
Electrical Power Off
Aft Drive Shaft Access Panel Open (Task 2-2)



1. Remove either mount (1) in same way as forward drive shaft mount (Task 6-14).



FOLLOW-ON MAINTENANCE:

None

END OF TASK

6-27 INSTALL AFT DRIVE SHAFT MOUNT 6-27

INITIAL SETUP

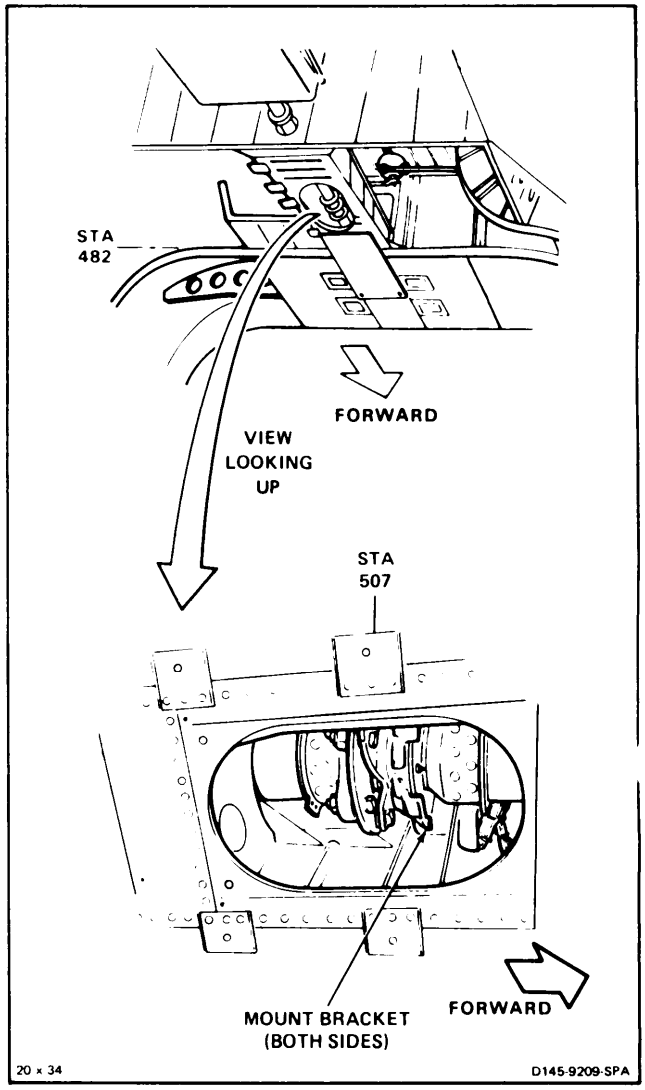
Applicable Configurations:
All

Tools:
Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692
Torque Wrench, 0 to 150 Inch Pounds
Torque Wrench, 100 to 750 Inch Pounds
Torque Wrench, 0 to 600 Foot Pounds
Workstand

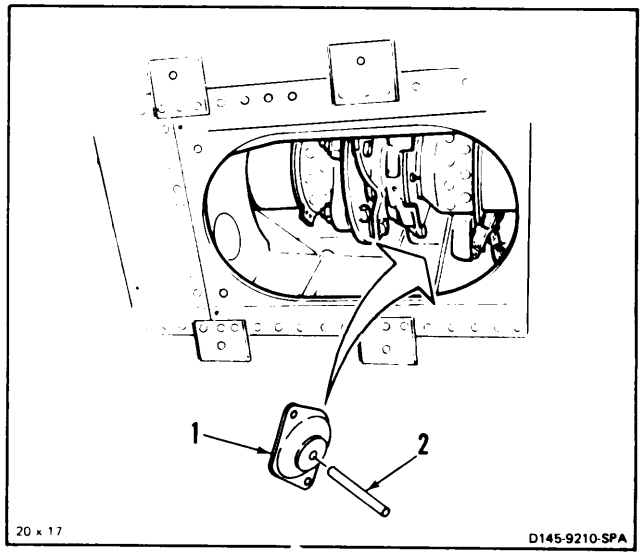
Materials:
None

Personnel Required:
67U10 Medium Helicopter Repairer
67U20 Medium Helicopter Repairer
67U30 Inspector

References:
Task 6-15



1. Install left or right mount (1), with bushing (2), in same way as forward drive shaft mount (Task 6-15).



FOLLOW-ON MAINTENANCE:

Close aft drive shaft access panel (Task 2-2).

END OF TASK

6-27.1 CHECK ROTARY-WING BLADE PHASING 6-27.1

INITIAL SETUP

Applicable Configurations:
All

Tools:
Aircraft Mechanic's Tool Kit.
NSN 5180-00-3234692
Phasing Block (2) (Appx E-5)

Materials:
None

Personnel Required:
Medium Helicopter Repairer (2)
Inspector

References:
None

Equipment Condition:
Forward Transmission Faking Left Work Platform open (Task 2-2).
Aft Pylon Right Work Platform Open (Task 2-2).
Tiedown Line Installed On One Forward and One Aft Blade (Task 1-26).

General Safety Instructions:

WARNING

Improper phasing can result in injury to personnel and serious damage to helicopter.

GO TO NEXT PAGE

6-27.1 CHECK ROTARY-WING BLADE PHASING (Continued) 6-27.1

CAUTION

Make sure foward and aft blades do not collide. Damage to blades can result.

1. **Rotate rotary wing heads (1 and 2) to position one blade forward on each head.**

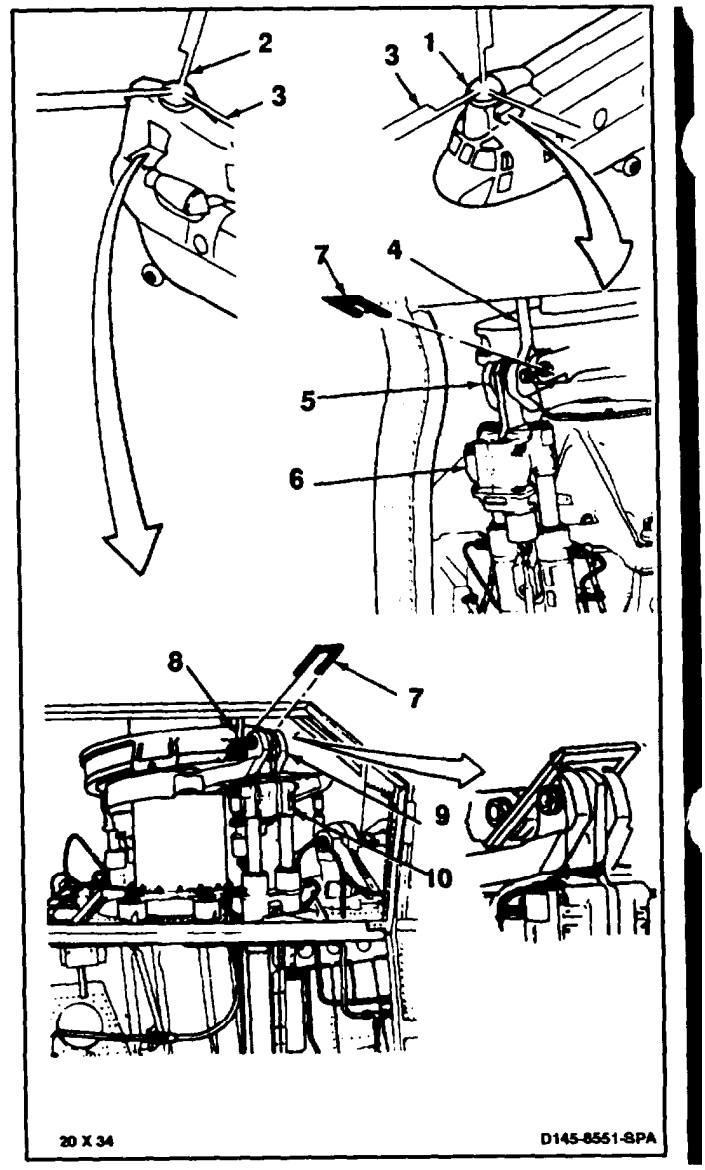
WARNING

Use only swiveling actuators to phase blades Do not use pivoting actuators. Improper phasing will result

NOTE

Swiveling actuator is on left side of forward head and right side of aft head.

2. Have helper rotate blades to **align one forward pitch link (4) with upper mounting lug (5) of swiveling actuator (6). Install phasing block (7)** around link and lug. Check that one blade (3) still points forward. Maintain forward phasing block in this position.
3. Install phasing block (7) around aft pitch link (8) and upper mounting lug (9) on swiveling actuator. Check that one blade (3) still points forward.
4. If you can not install both phasing blocks (7) aircraft rotor system must be re-phased (Task 6-28). lf both phasing blocks (7) are installed properly proceed to step 5.
5. **Remove two phasing blacks (7) foward and aft**
6. Rotate blades three complete revolutions in the leading direction. Check phasing by installing two phasing blocks as in steps 2. and 3. Remove



INSPECT

FOLLOW-ON MAINTENANCE:

Close forward transmission fairing left work platform (Task 2-2).
Close aft pylon work platform (Task 2-2).
Remove tiedown lines from rotary-wing blades (Task 1-26).

END OF TASK

6-28 PHASE ROTARY-WING BLADES

INITIAL SETUP

Applicable Configurations:
All

Tools:
Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692
Phasing Block (2) (Appx E-5)

Materials:
None

Personnel Required:
67U10 Medium Helicopter Repairer
67U20 Medium Helicopter Repairer
67U30 Inspector

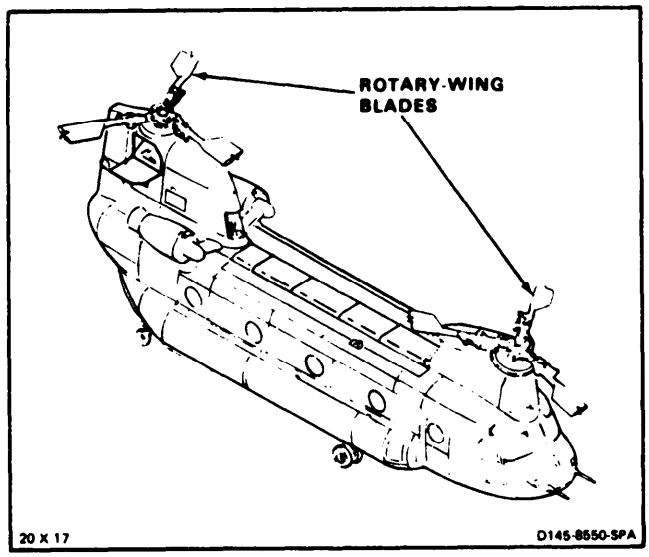
References:
Task 6-29

Equipment Condition:
Battery Disconnected (Task 1-39)
Electrical Power Off
No. 9 Drive Shaft Removed (Task 6-21)
Tiedown Line Installed on One Forward and One Aft Blade (Task 1-26)
Forward Transmission Fairing Left Work Platform Open (Task 2-2)
Aft Pylon Right Work Platform Open (Task 2-2)

General Safety Instructions:

WARNING

Improper phasing can result in injury to personnel and serious damage to helicopter.



GO TO NEXT PAGE

6-28 PHASE ROTARY-WING BLADES (Continued)

CAUTION

Make sure forward and aft blades do not collide. Damage to blades can result.

1. Rotate forward and aft rotary wing heads (1 and 2) to **position one blade (3) forward on each head.**

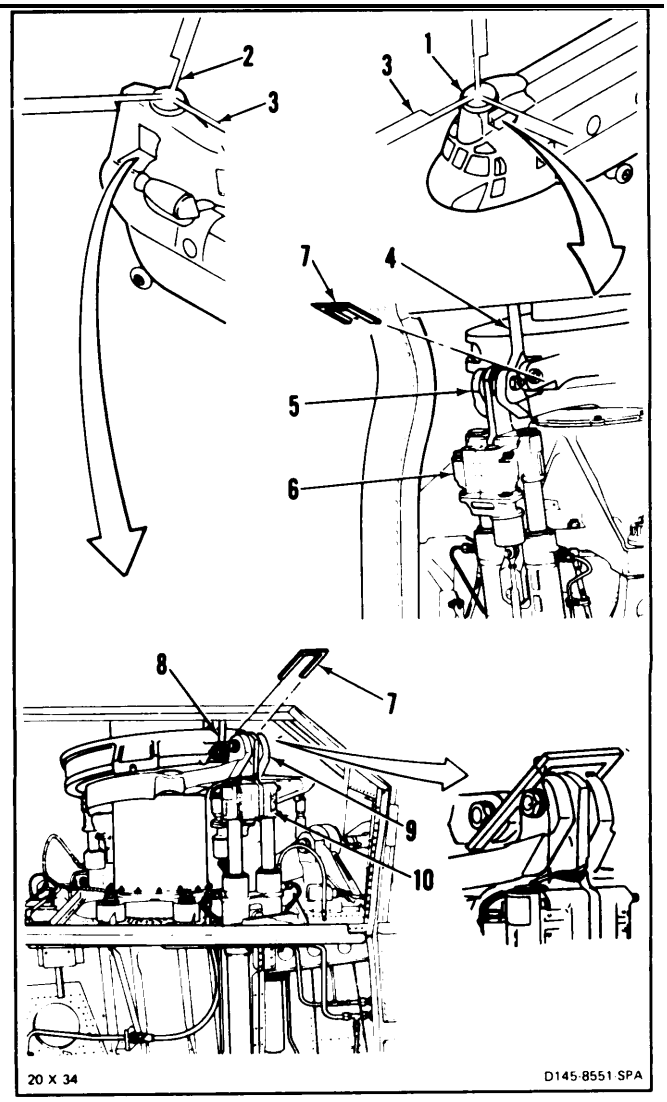
WARNING

Use only swiveling actuators to phase blades. Do not use pivoting actuators. Improper phasing will result.

NOTE

Swiveling actuator is on left side of forward head and right side of aft head.

2. Have helper rotate forward blades to **align one forward pitch link (4) with upper mounting lug (5) of swiveling actuator (6). Install phasing block (7)** around link and lug. Check that one blade (3) still points forward.
3. Have helper rotate aft blades to **align one aft pitch link (8) with upper mounting lug (9) of swiveling actuator (10). Install phasing block (7)** around link and lug. Check that one blade (3) still points forward.



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4. **Temporarily install No. 9 drive shaft as** follows:

   a. Have helper support shaft (11) between No. 8 shaft adapter assembly (12) and aft transmission adapter (13).

   b. Loosely install two bolts (14) and nuts (15) through adapter assembly (12) and forward end of shaft (11).

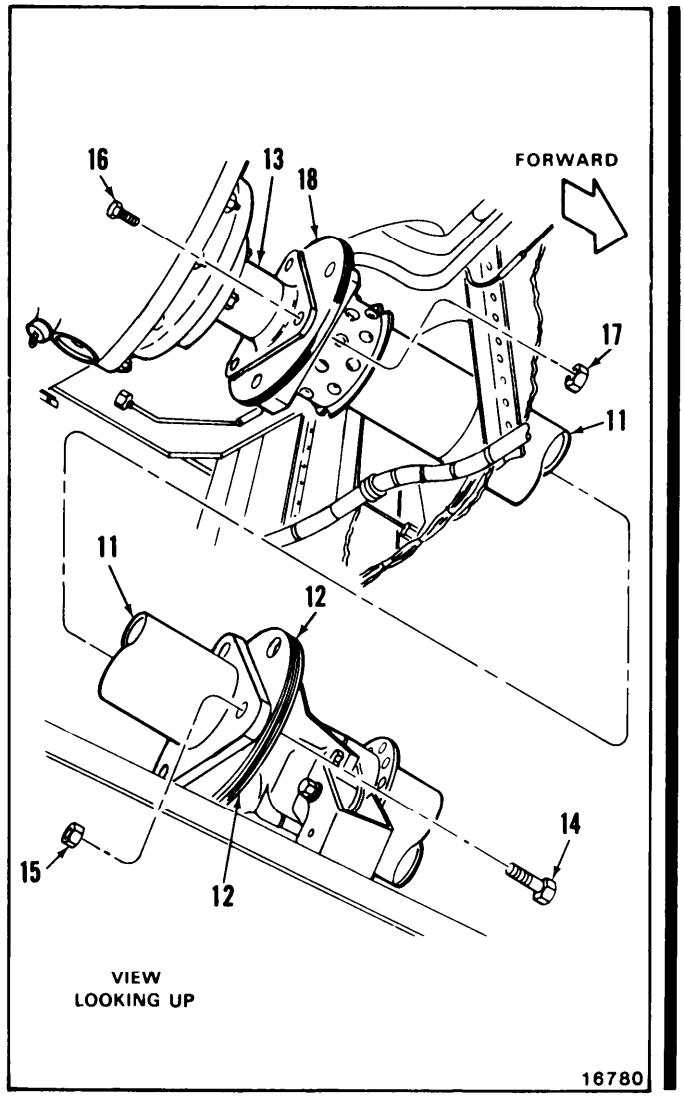
NOTE

If No. 9 shaft and aft transmission adapter do not line up, the adapter must be removed and rotated until alignment is obtained.

   c. Loosely install two bolts (16) and nuts (17) through adapter (13) and No. 9 shaft adapter (18).

5. **Remove two phasing blocks of step 2.**
6. Rotate blades three complete revolutions in the leading direction. Check phasing by installing two phasing blocks as in steps 2. and 3. Remove blocks.
7. Permanently install No. 9 drive shaft (Task 6-29).

INSPECT



FOLLOW-ON MAINTENANCE:

Close forward transmission fairing left work platform (Task 2-2).

Close aft pylon work platform (Task 2-2).

Remove tiedown lines from rotary-wing blades (Task 1-26).

END OF TASK

6-29 INSTALL AFT DRIVE SHAFTING

INITIAL SETUP

Applicable Configurations:
All

Tools:
Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692
Workstand (2)
Torque Wrench, 100 to 750 Inch-Pounds
Torque Wrench, 700 to 1600 Inch-Pounds

Materials:
Oil (E254)

Parts:
Washers

Personnel Required:
Medium Helicopter Repairer (2)
Inspector

References:
TM 55-1520-240-23P
Task 6-28

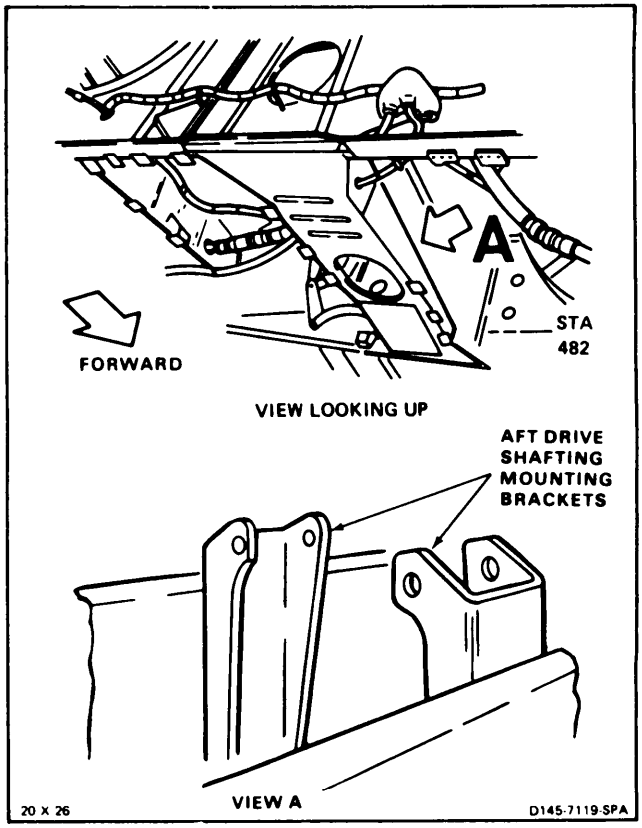
General Safety Instructions:

WARNING

Oil (E254) is a skin irritant. If oil gets on skin, wash thoroughly. If oil soaks into clothes, change clothes immediately.

WARNING

Oil (E254) gives off fumes that can cause injury to personnel. Use oil in a well-ventilated area.



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INSTALL NO. 8 SHAFT WITHOUT 48

1. **Position shaft (1)** against combining transmission adapter assembly (2). Position two bushings (3) in brackets (4). Check that grease fitting (5) points down.
2. Have helper support shaft (1). Coat thread of three bolts (6) with oil (E254). **Install bolts,** head forward, and special washers (7) through adapter assembly (2) and shaft. **Loosely install** three washers (8) and **nuts (9).**
3. Coat thread of two bushing bolts (10) with oil (E254). Turn adapter assembly (11) as needed to align holes (12) in adapter assembly with bushings (3). **Install two bolts (10)** and washers (13) through bushing on each side of shaft.
4. Install washers (13) and nuts (14) on two bolts (10). **Torque nuts to 155 inch-pounds** .

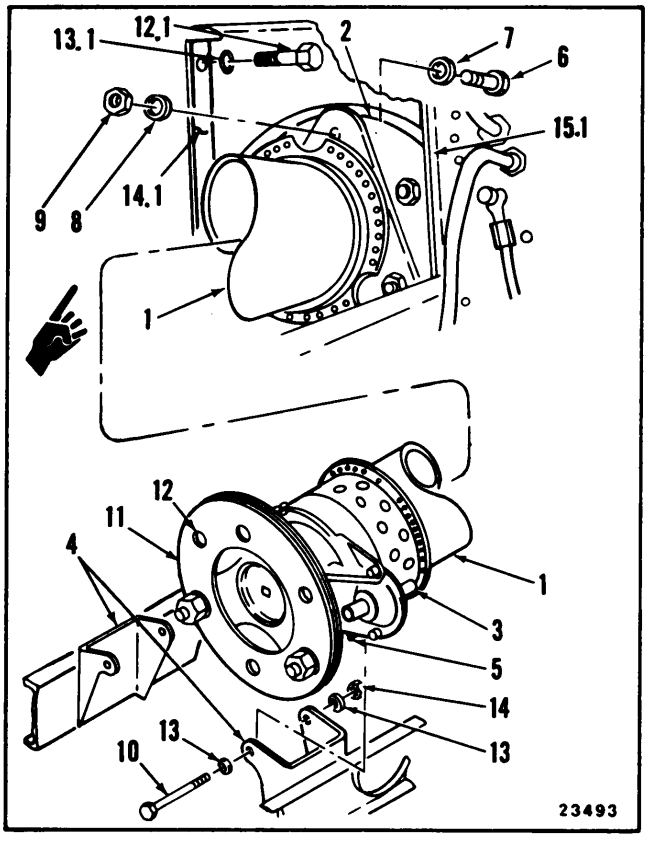
INSTALL NO. 8 SHAFT WITH 48

WARNING

Failure to install shielding baffle could cause debris generated as a result of a combiner transmission cooler fan/drive shaft failure becoming lodged between No. 8 or No. 9 drive shafts and adjacent structure causing damage to the shafts.

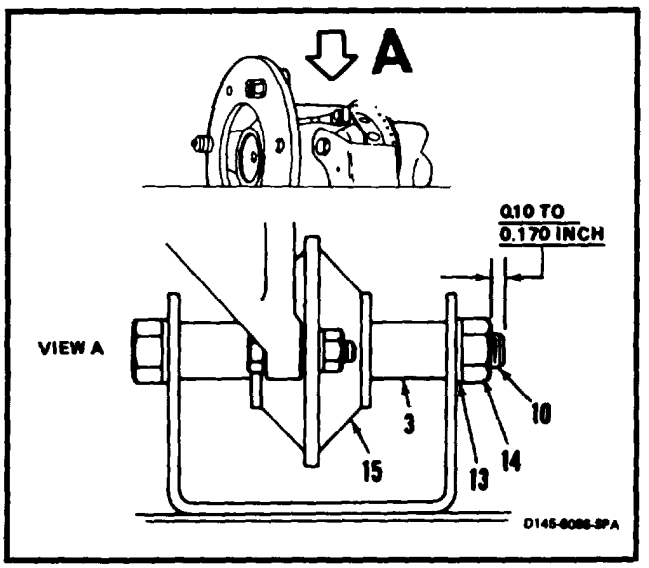
4.1. Position baffle assembly (14.1) against stiffeners (15.1). Install eight bolts (12.1) and washers (13.1). **Torque bolts to 25 inch-pounds.**

4.2. Ensure that a minimum of 1 inch clearance is between baffle assembly and drive shaft assembly.



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5. **Chock bolts (10).** There shall be **0.10 to 0.17 inch** of bolt threads extending through nut (14). Install another washer (13) or a thinner washer if needed.
6. **Chock mounts (15)** for freedom of motion on bushings (3). There shall be no binding of mounts on bushings.



CAUTION

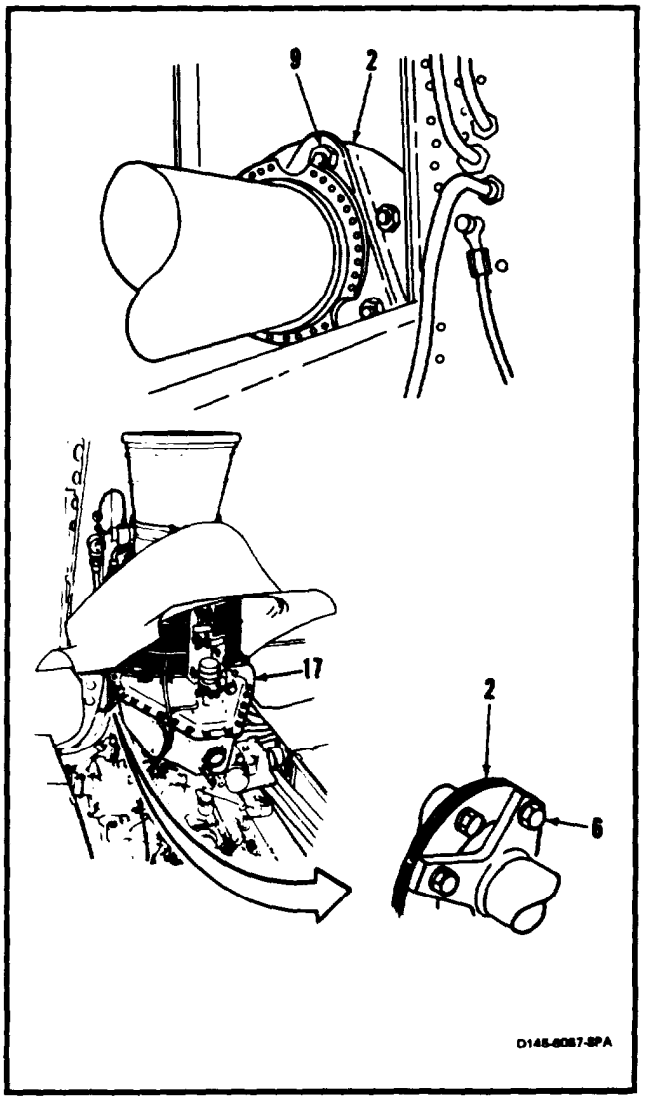
Do not allow bolts to turn when torquing nuts. If bolts turn, damage to bolts and plates can result.

NOTE

Helper reaches bolts from top of helicopter.

7. Have helper hold head of three bolts (6) at adapter assembly (2) aft of combining transmission (17) with wrench. **Check nuts for friction torque of at least 24 inch-pounds.**
8. **Torque nuts (9) to 1000 to 1100 inch-pounds.**

8.1. **Phase rotor blades** (Task 6-28).



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6-29 INSTALL AFT DRIVE SHAFTING (Continued) 6-29

INSTALL NO. 9 SHAFT

NOTE

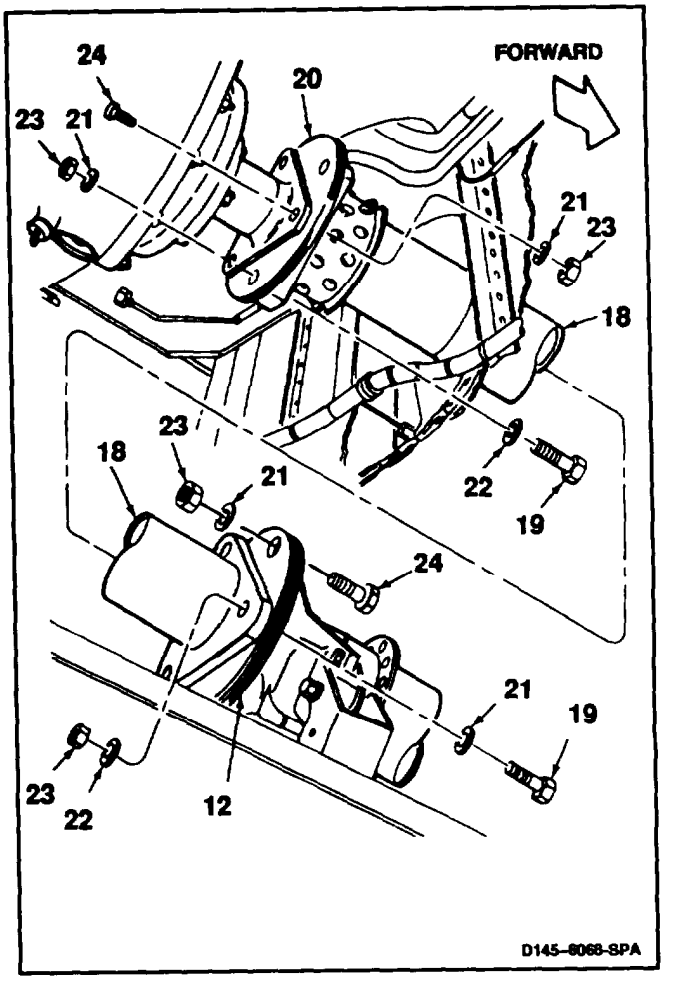
If position of adapter assemblies is changed, rotor blades will have to be phased again.

9. Have helper support No. 9 shaft (18). Remove two bolts (19) inserted during phasing. Do not disturb positions of adapter assemblies (12 and 20).
10. **Coat thread of six bolts** (19) with oil (E254). Install three bolts, heads forward, and special washers (21) **through adaptor assembly** (12) and shaft (18). **Install three bolts,** heads forward, and washers (22) **through shaft (18) and adapter assembly (20).**
11. Loosely install three washers (22) and nuts (23) on forward bolts (19). Loosely install three special washers (21) and nuts (23) on aft bolts.
12. Coat thread of two bolts (24) with oil (E254). **Install bolts,** heads away from each other, **through adapter assemblies (12 and 20).** Install special washer (21) and nut (23) on each bolt.

CAUTION

Do not let bolts turn. If bolts turn, damage to bolts and plates can result.

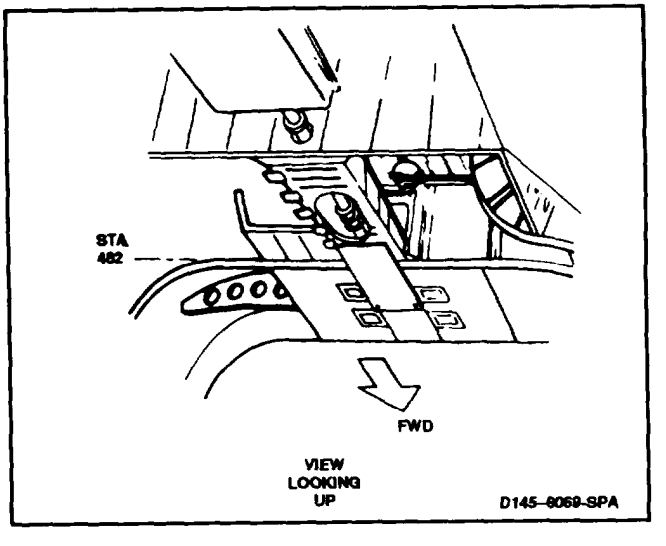
13. Have helper hold head of six bolts (19) and two bolts (24) with wrench. **Torque eight nuts (23) to 1000 to 1100 inch-pounds**



INSPECT

FOLLOW-ON MAINTENANCE:

Install aft transmission drip tray (Task 2-3).
close baffles under aft transmission (Task 2-2).
Close aft drive shaft access panel (Task 2-2).
Close aft pylon lower fairing (Task 2-2).
Close aft pylon doors (Task 2-2).
Close cargo ramp (TM 55-1520-240-T).
Perform a combining transmission oil cooler fan vibration check (Tasks 6-217 through 6-223, as applicable).
Perform ground run (TM 55-1520-240-10).
Perform vibration test.



END OF TASK

6-30 REMOVE ENGINE DRIVE SHAFT

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692

Materials:

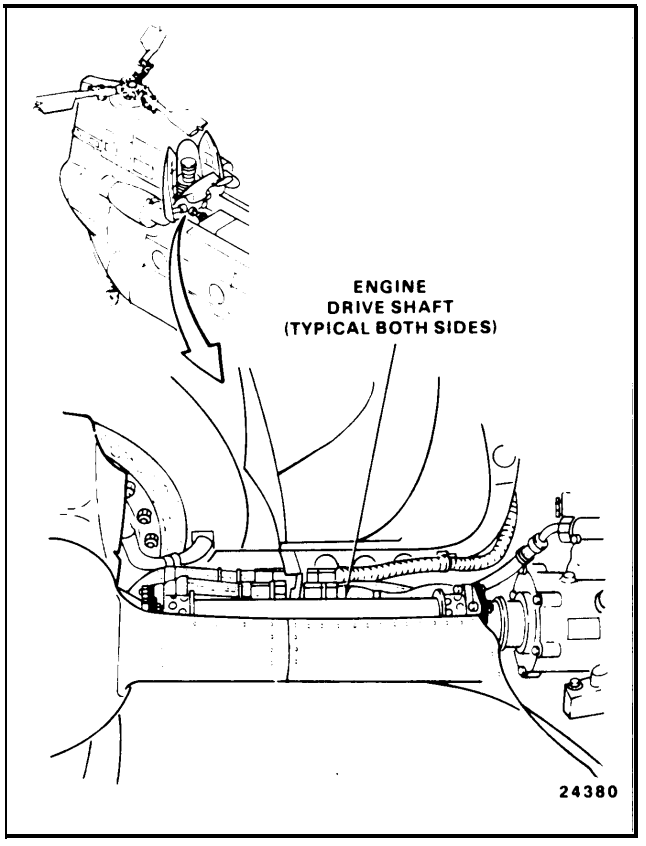
Cloths (E120)
Barrier Material (E80)

Personnel Required:

Medium Helicopter Repairer

Equipment Condition:

Battery Disconnected (Task 1-39)
Electrical Power Off
Pylon Hinged Fairing Open (Task 2-2)
Pylon Lower Fairing Raised (Task 2-2)
Engine Drive Shaft Access Cover Removed (Task 2-2)
Engine Air Inlet Screens Removed (Task 4-65)
Engine Transmission Fairing Access Cover Open (Task 2-2)



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NOTE

- Remove left or right engine drive shaft in same way. Right shaft shown here.
- Removal of one-piece and riveted shafts is similar. Differences are noted in text. Riveted shaft shown here.

REMOVE SHAFT

1. Support shaft (1) with pad (2) of barrier material (E80) or cloths (E120).

CAUTION

Do not allow bolts to turn. If bolts turn, bolts and plates can be damaged.

2. **Remove three nuts (3), washers (4), and bolts (5)** from each end of shaft (1). During removal, hold head of bolts with wrench.

CAUTION

Do not allow bolts to turn. If bolt turns, bolts and adapter assemblies can be damaged.

NOTE

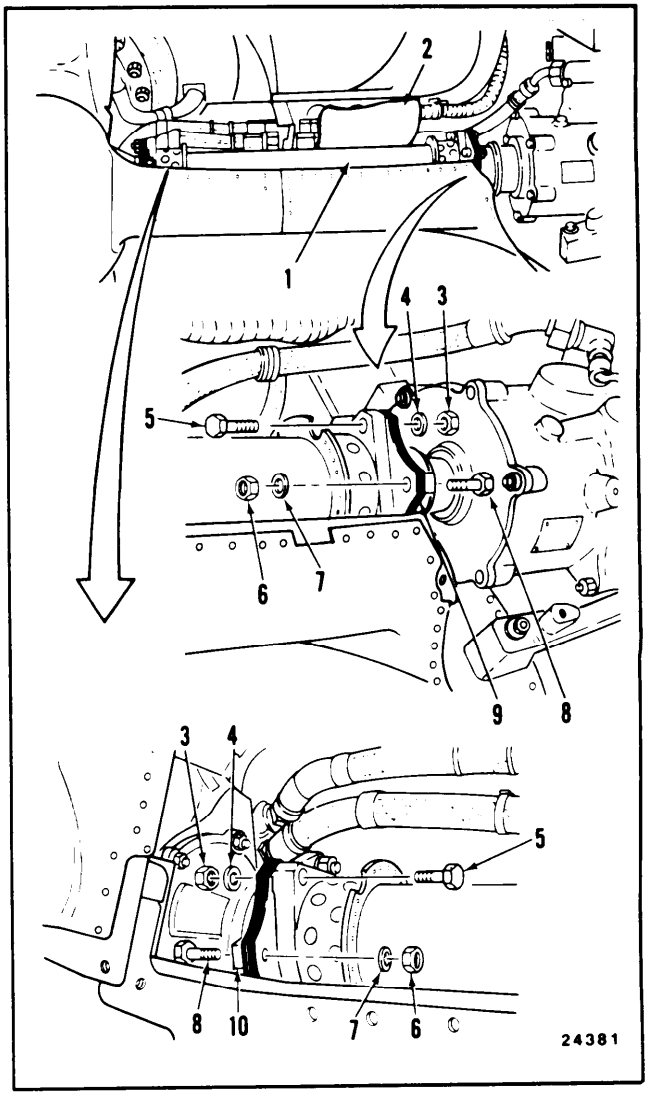
If more than one bolt is removed from each adapter assembly, assembly will have to be balanced.

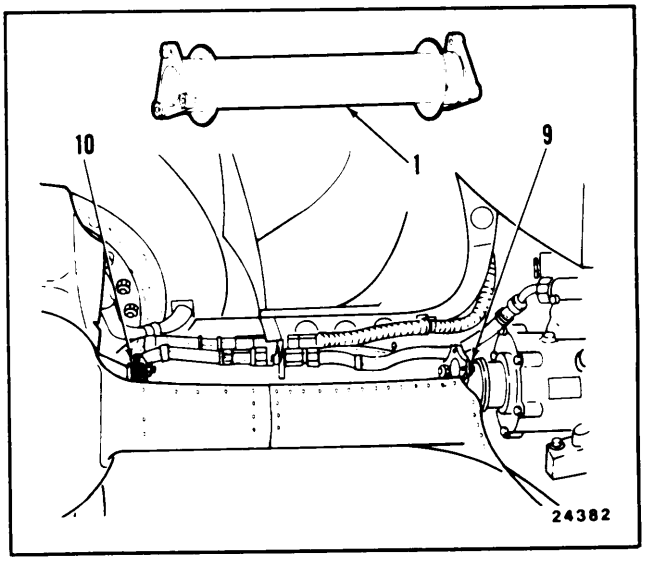
3. Remove one nut (6), washer (7), and bolt (8) from adapter assembly (9 and 10) at each end of shaft (1). During removal, hold head of bolts with wrench.

4. **Lift shaft (1)** from between adapter assemblies (9 and 10). Remove shaft.
5. If shaft (1) will be reinstalled, go to FOLLOW-ON MAINTENANCE. If a riveted shaft will be replaced, go to steps 6 and 7.

NOTE

A one-piece shaft can be replaced independently, without matching adapters.





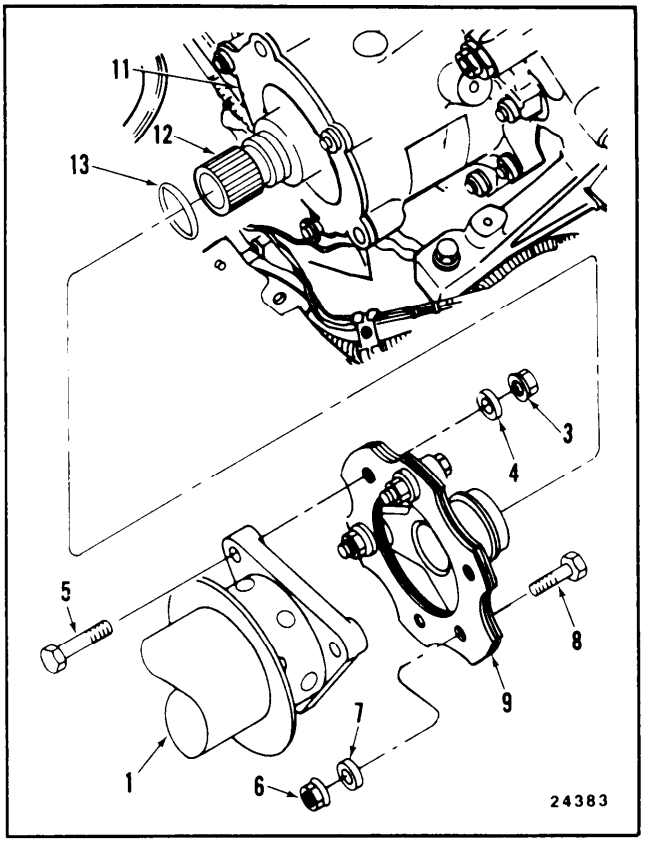
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REMOVE ADAPTER ASSEMBLIES

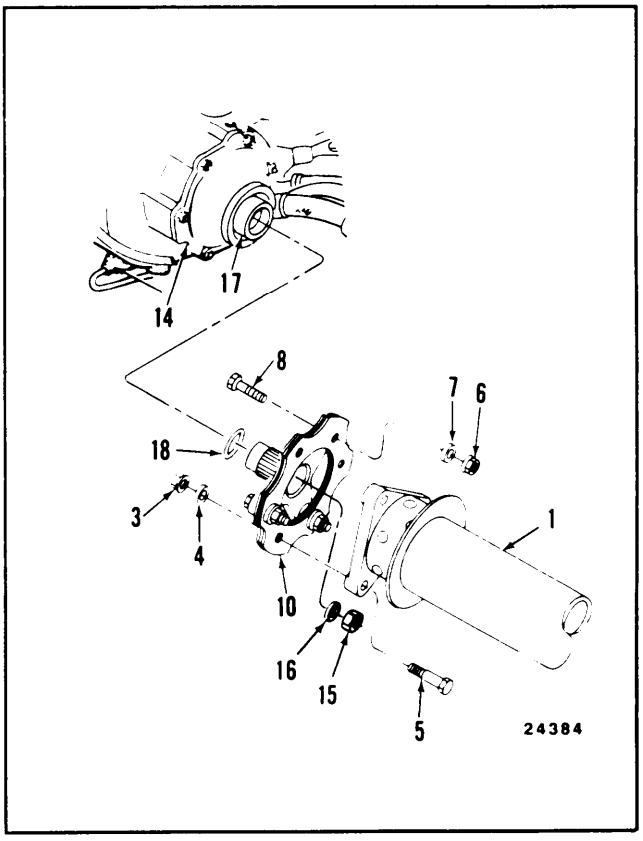
NOTE

On shafts without 51, shaft and adapter assemblies are balanced together and have the same serial number. If any one must be replaced, all three must be replaced as a unit. On shafts with 51, shaft and their adapters may be replaced individually.

6. **Remove adapter assembly (9)** from combining transmission (11) as follows:
   a. Pull adapter assembly (9) from splines of input shaft (12).
   b. Remove packing (13) from shaft (12).
   c. **Loosely install bolt (8),** washer (7), and nut (6) on adapter assembly (9).
   d. If a riveted shaft (1) has been removed, loosely **install adapter assembly (9) on drive shaft** with three bolts (5), washers (4), and nuts (3).



7. Remove adapter assembly (10) from engine transmission (14) as follows:
   a. **Remove nut (15) and washer (16).**
   b. **Pull adapter assembly (10) from splines** of output shaft (17). Remove packing (18) from adapter assembly.
   c. **Loosely install bolt (8),** washer (7), and nut (6) on adapter assembly (10).
   d. If a riveted shaft (1) has been removed, loosely **install adapter assembly (10) on drive shaft** with three bolts (5), washers (4), and nuts (3).



FOLLOW-ON MAINTENANCE:
None

END OF TASK

6-30.1 INSPECT RIVETED ENGINE DRIVE SHAFT (INSTALLED) 6-30.1

INITIAL SETUP

Applicable Configurations:

Without 51

Tools:

Technical Inspection Tool Kit,
NSN 5180-00-323-5114
Torque Wrench, 100 to 750 Inch-Pounds

Materials:

Cloths (E120)

Personnel Required:

Medium Helicopter Inspector

References:

TM 55-1500-335-23
Task 6-30
Task 6-31
Task 6-32

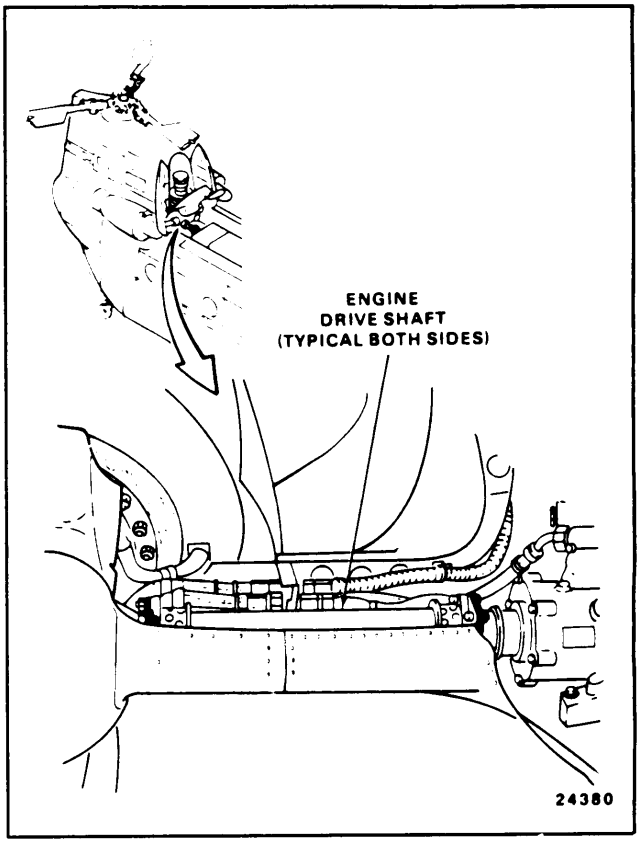
Equipment Condition:

Battery Disconnected (Task 1-39)
Electrical Power Off
Pylon Access Doors Open (Task 2-2)
Pylon Lower Fairing Open (Task 2-2)
Engine Drive Shaft Access Cover Removed (Task 2-2)
Engine Air Inlet Screens Removed (Task 4-65)
Engine Transmission Fairing Access Cover Open (Task 2-2)

General Safety Instructions:

WARNING

Keep clear of turning rotor blades when rotating drive shaft. Turning blades can injure personnel.



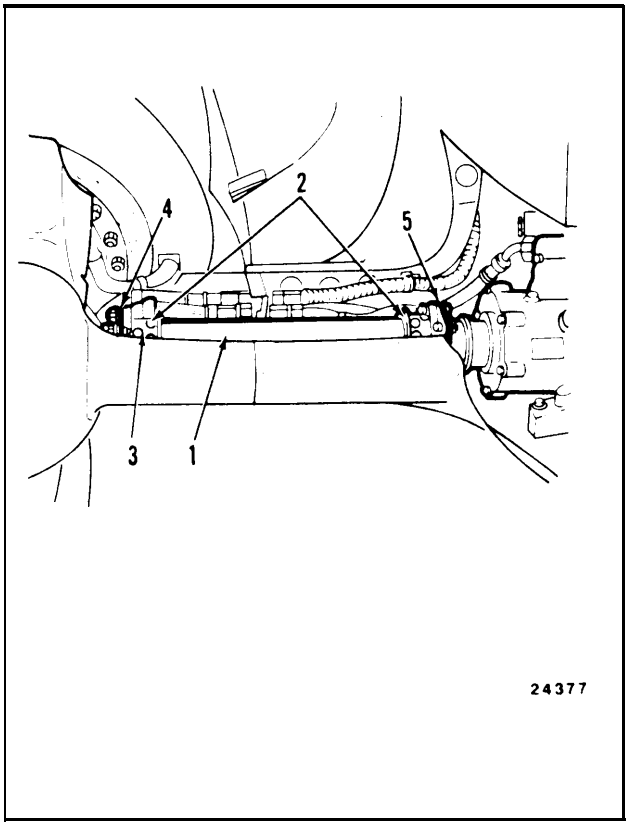
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6-30.1 INSPECT RIVETED ENGINE DRIVE SHAFT (INSTALLED) (Continued) 6-30.1

NOTE

- Inspect left or right drive shaft in same way. Right shaft shown.
- Rotate shaft as needed to do a complete check.
- Shaft and adapter assemblies are balanced together. If one is damaged, all must be replaced.

1. **Inspect for damage** listed below, There shall be no such damage.
   a. **Cracks in tube (1).**
   b. **Dents in tube (1) more than 0.5 inch diameter or 0.020 inch deep.**
   c. **Distance between any two dents less than 3.50 inches.**
   d. **More than one dent around tube (1) at any one station.**
   e. **Distance between end flange (2) and any dent less than 1 inch.**
   f. **Loose or cracked rivets (3) at ends of tube.**
   g. Use a 3X to 5X power magnifying glass and dye-penetrant kit to check for **cracks, nicks, scratches, or gouges in adapter assemblies (4 and 5)** that penetrate the primer. No sharp creased dents or bends are allowed on plates.
   h. **Replace any cracked adapter assemblies** (Tasks 6-30 and 6-32).
   i. **Remove any nicks, scratches, or gouges by polishing** (Task 6-31).



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j. **Cracks in plates (6).** Use a magnifying glass to check.

CAUTION

Do not allow bolts to turn. If bolts turn, the bolts and plates or adapter can be damaged. Only one bolt may be loose at a time or you lose balance.

k. Cracked or loose nuts (7) and bolts (8).

l. **Nicks on inside edge of plates (6).** Use a pointed scribe to check.

m. **Cracks, nicks, scratches, or gouges in dents in tube (1).** Use fluorescent penetrant inspection to check (TM 55-1500-335-23).

2. **Blended areas on face of plates (6) shall not be deeper than 0.001 inch.**

3. **Blended areas on tube (1) shall not be deeper than 0.010 inch. Blend radius shall be at least 0.5 inch.**

CAUTION

Do not allow bolts to turn. If bolts turn, the bolts and plates or adapter can be damaged.

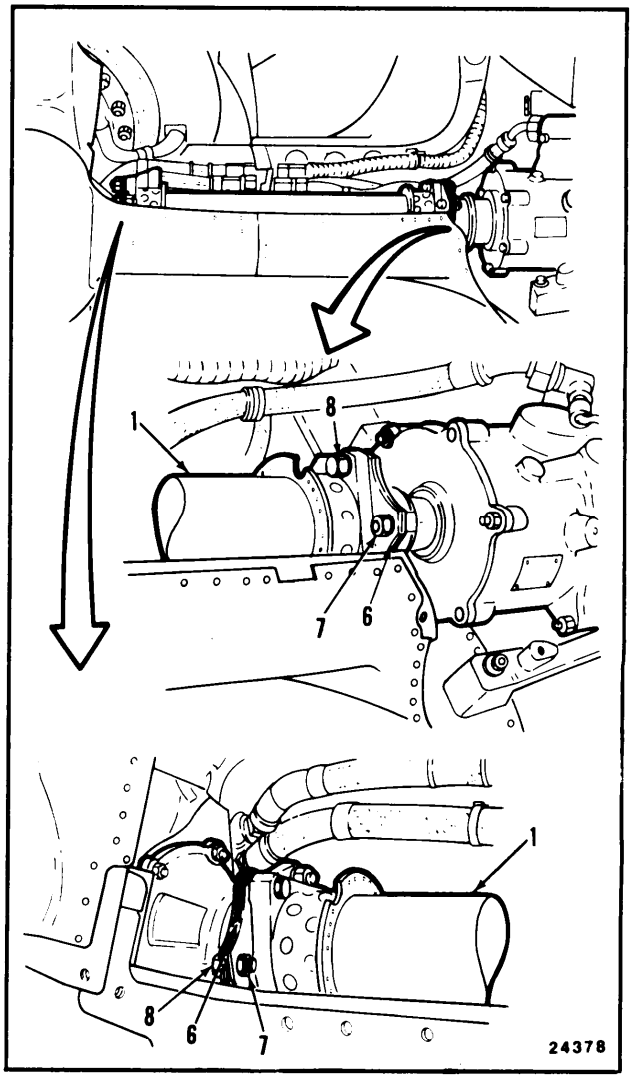
NOTE

Bolts 145DS303-3 installed in shaft assemblies 145D3500-12 require nondestructive inspection for cracks every 100 flight hours. Cracked or suspect bolts shall be replaced with new like bolts. Bolts 145 DS303-3 installed in shaft assemblies 145D3500-15 do not require inspection.

4. **Check torque on nuts (7)** at each end of shaft. **Torque shall be** at least **420 inch-pounds.**

a. If torque is less than 420 inch-pounds, check plates (6) in area of loose bolt (8) for cracks. If cracks are found, replace drive shaft assembly and attaching hardware, (Refer to tasks 6-30 and 6-32.) If plates are acceptable, torque the nut or nuts to 420 to 456 inch-pounds.

b. If a nut (7) or bolt (8) fails during retorque, replace drive shaft assembly and attaching hardware. (Refer to Tasks 6-30 and 6-32.)

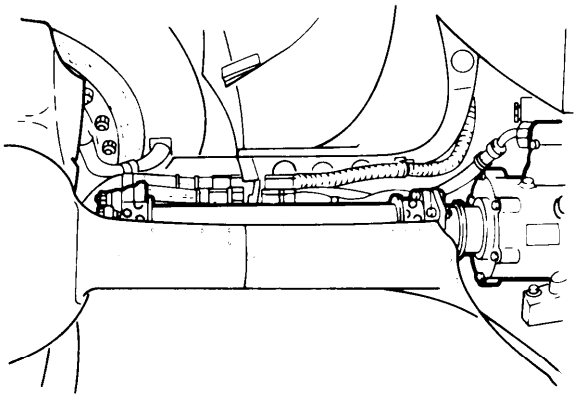


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6-30.1 INSPECT RIVETED ENGINE DRIVE SHAFT (INSTALLED) (Continued)

FOLLOW-ON MAINTENANCE:

Close engine transmission fairing access cover (Task 2-2).
Install engine drive shaft access cover (Task 2-2).
Close pylon lower fairing (Task 2-2).
Close pylon hinged fairing (Task 2-2).
Install engine air inlet screen (Task 4-76).



24379

END OF TASK

6-30.2 INSPECT ONE-PIECE ENGINE DRIVE SHAFT (INSTALLED) 6-30.2

INITIAL SETUP

Applicable Configurations:

With 51

Tools:

Technical Inspection Tool Kit,
NSN 5180-00-323-5114
Torque Wrench, 100 to 750 Inch-Pounds

Materials:

Cloths (E120)

Personnel Required:

Medium Helicopter Inspector

References:

TM 55-1500-335-23
Task 6-30
Task 6-31.1
Task 6-32

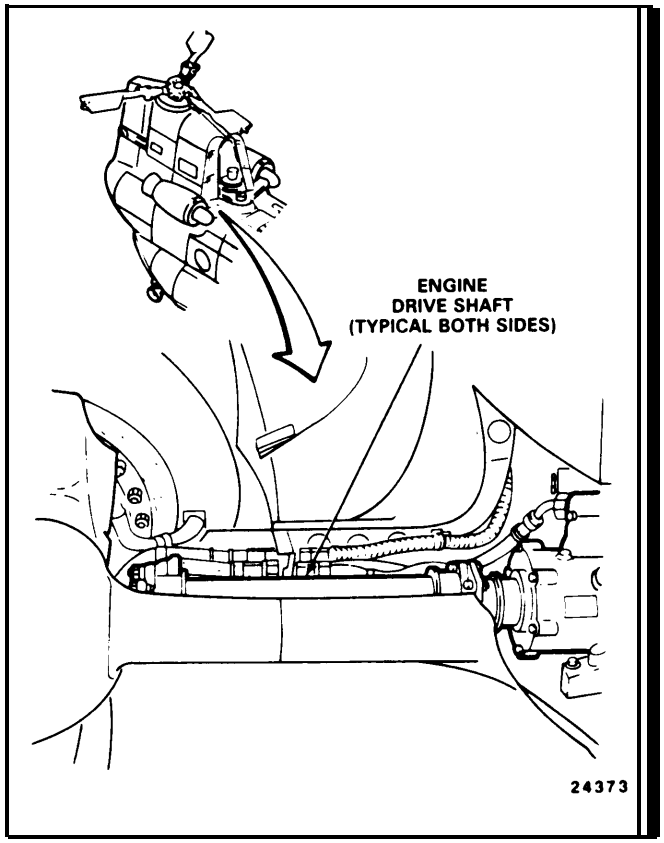
Equipment Condition:

Battery Disconnected (Task 1-39)
Electrical Power Off
Pylon Access Doors Open (Task 2-2)
Pylon Lower Fairing Open (Task 2-2)
Engine Drive Shaft Access Cover Removed (Task 2-2)
Engine Air Inlet Screens Removed (Task 4-65)
Engine Transmission Fairing Access Cover Open (Task 2-2)

General Safety Instructions:

WARNING

Keep clear of turning rotor blades when rotating drive shaft. Turning blades can injure personnel.

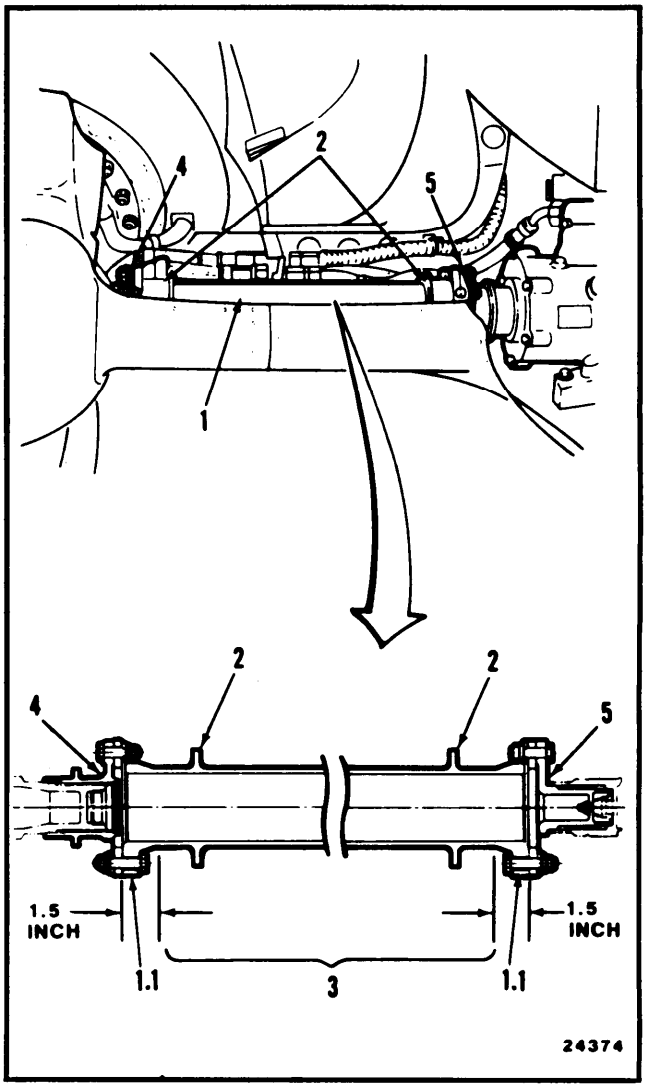


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NOTE

- Inspect left or right drive shaft in same way. Right shaft shown.
- Rotate shaft as needed to do a complete check
- Shaft and adapter assemblies are balanced separately. If any one is damaged, it may be replaced individually.

1. **Inspect for damage** listed below. Use visual examination. Use local dye-penetrant inspection (TM 55-1500-335-23) to verify any cracks found during visual examination.
   a. **Cracks or dents on any areas of shaft (1).** If cracks or dents are found, replace the shaft (Tasks 6-30 and 6-32).
   b. **Nicks, scratches, or gouges in outer 1.5 inches of each end of shaft.** If defects are found, replace the shaft, except as noted in stop 1c.
   c. **Nicks and gouges up to 0.025 inches on the outer diameter of the shaft lug ears (1.1).** Blend out defects (Task 6-31.1). If defects greater than 0.025 inches are found, replace the shaft.
   d. **Nicks, scratches, and gouges on center section (3) of shaft,** including balance flanges (2). Blend out defects (Task 6-31.1).
   e. **Cracks, nicks, scratches, or gouges in adapters (4 and 5).** Use a 3X to 5X power magnifying glass check. Replace any cracked adapter assemblies (Tasks 6-30 and 6-32). Remove any nicks, scratches or gouges by polishing (Task 6-31.1)



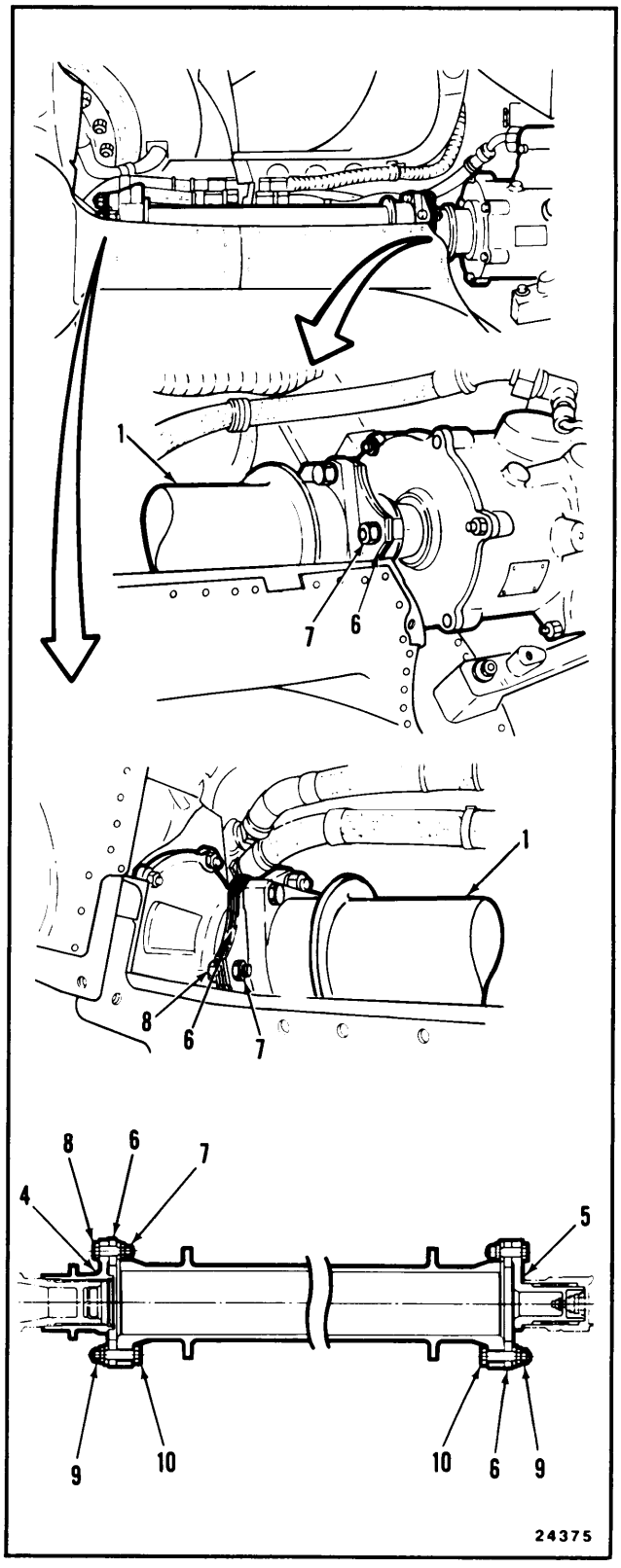
2. Inspect adapter areas for damage listed below:
   a. **Cracks, nicks, or gouges in visually accessible areas of plates (6).** Use a 3X to 5X power magnifying glass to check. Repair light scuffs, nicks, or scratches (Task 6-31.1). Replace adapter assemblies with cracks, nicks or gouges in plates deeper than 0.001 inch (Task 6-30 and 6-32).
   b. **Nicks on inside edges of plates (6).** Use a pointed scribe to check. If nicks are found, replace adapter assemblies.

CAUTION

Do not allow bolts to turn. If bolts turn, the bolts and plates or adapter can be damaged. Only one bolt may be loose at a time or you lose balance.

   c. **Cracked or loose nuts (7) and bolts (8). Cracked or loose nuts (9) and bolts (10).** Replace cracked nuts and bolts.

3. **Check torque on nuts (7) at each adapter assembly (4 and 5). Torque shall be at least 440 inch-pounds.**
   a. If torque is less than 440 inch-pounds in more than one location, replace the adapter assembly and attaching hardware (Tasks 6-30 and 6-32).
   b. If torque is less than 440 inch-pounds at only one location, check plates (6) in the area of loose bolt (8) for cracks. If cracks are found, replace adapter assembly and attaching hardware (Tasks 6-30 and 6-32). If plates are acceptable, torque nut to 440 inch-pounds.
   c. If a nut or bolt fails during torquing, replace the adapter assembly and attaching hardware (Tasks 6-30 and 6-32).



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CAUTION

Do not allow bolts to turn. If bolts turn, the bolts and plates or adapter can be damaged.

4. **Check torque on nuts (9) at each end of shaft (l). Torque shall be at least 440 inch-pounds.**
   a. If torque is less than 440 inch-pounds at any location, check plates (6) in the area of loose bolt (10) for cracks. If cracks are found, replace the affected adapter assembly and attaching hardware (Tasks 6-30 and 6-32). If plates are acceptable, torque the nut or nuts to 440 inch-pounds
   b. If a nut or bolt fails during torquing, replace thatnut and bolt (Tasks 6-30 and 6-32).

FOLLOW-ON MAINTENANCE:
Close engine transmission fairing access cover (Task 2-2).
Install engine drive shaft access cover (Task 2-2).
Close pylon lower fairing (Task 2-2).
Close pylon hinged fairing (Task 2-2).
Install engine air inlet screen (Task 4-76).

END OF TASK

6-30.3 INSPECT ONE-PIECE ENGINE DRIVE SHAFT (REMOVED)

INITIAL SETUP

Applicable Configurations:
With 51

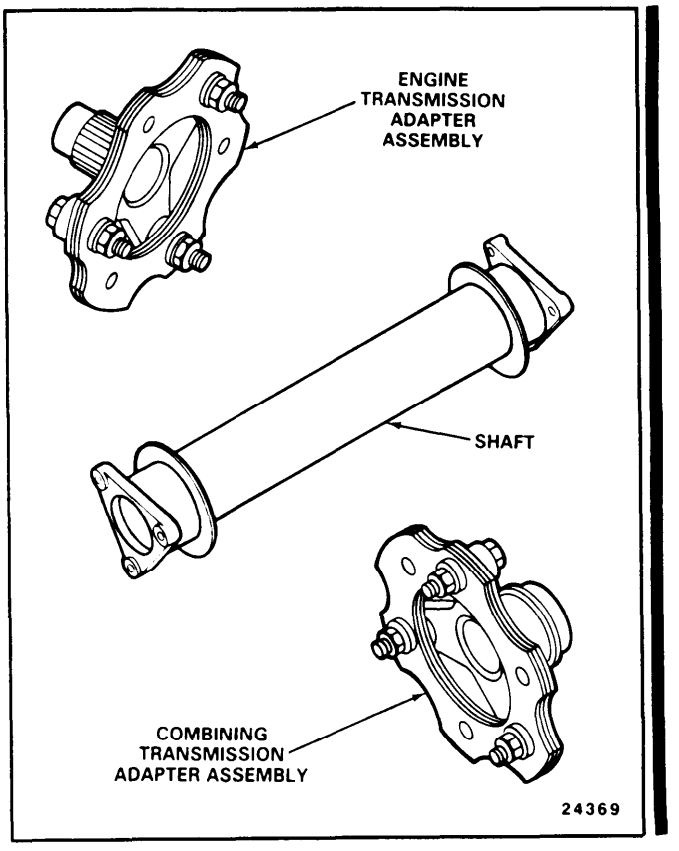
Tools:
Technical Inspection Tool Kit,
NSN 5180-00-323-5114
Torque Wrench, 100 to 750 Inch-Pounds

Materials:
Cloths (E120)

Personnel Required:
Medium Helicopter Inspector

References:
TM 55-1500-335-23
Task 6-30.2
Task 6-31.2

Equipment Condition:
Off-Helicopter Task

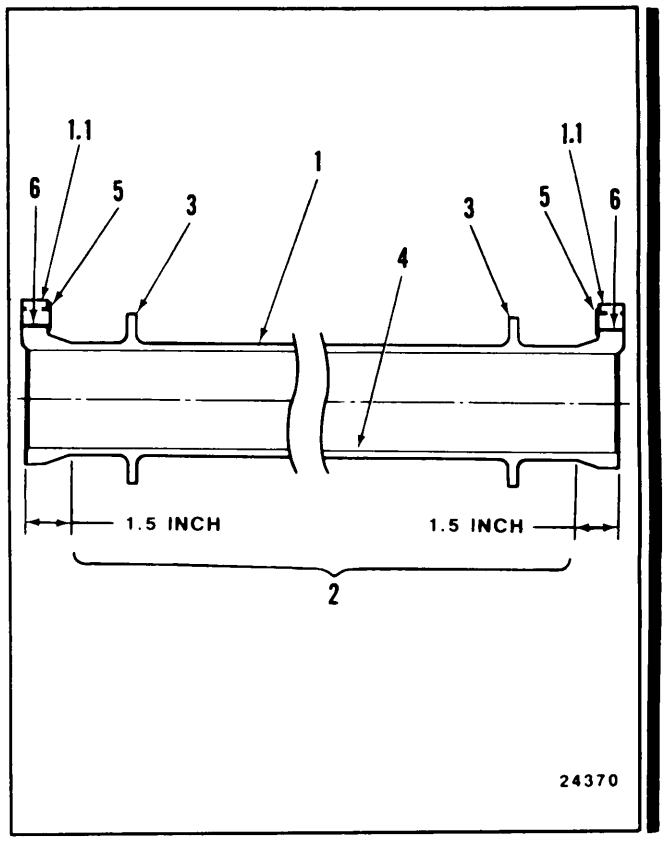


GO TO NEXT PAGE

NOTE

- Inspect left or right drive shaft in same way.
- Shaft and adapter assemblies are balanced separately. If any one is damaged, it may be replaced individually.

1. **Inspect shaft for damage** listed below. Use dye-penetrant inspection (TM 55-1500-335-23) and visual examination.
   a. **Cracks or dents on any areas of shaft (1).** If cracks or dents are found, replace the shaft.
   b. **Nicks, scratches, or gouges in outer 1.5 inches of each end of shaft.** If defects are found, replace the shaft, except as noted in step 1c.
   c. **Nicks and gouges up to 0.025 inches on the outer diameter of the shaft lug ears (1.1).** Blend out defects (Task 6-31 .2). If defects greater than **0.025 inches** are found, replace the shaft.
   d. **Nicks, scratches, and gouges on center section (2) of shaft,** including balance flanges (3). Blend out defects (Task 6-31.2).
2. **Check for corrosion or wear on inside surface (4) of shaft, lug bushings (5), and lug bores (6).** Replace a shaft with corrosion or wear in these areas.



GO TO NEXT PAGE

6-30.3 INSPECT ONE-PIECE ENGINE DRIVE SHAFT (REMOVED) (Continued) 6-30.3

3. **Inspect adapters (7 and 8) for cracks, nicks, scratches, or gouges.** Use a 3X to 5X power magnifying glass and local dye penetrant inspection to check. Replace any cracked adapter assemblies. Remove any nicks, scratches, or gouges by polishing (Task 6-31.2).

CAUTION

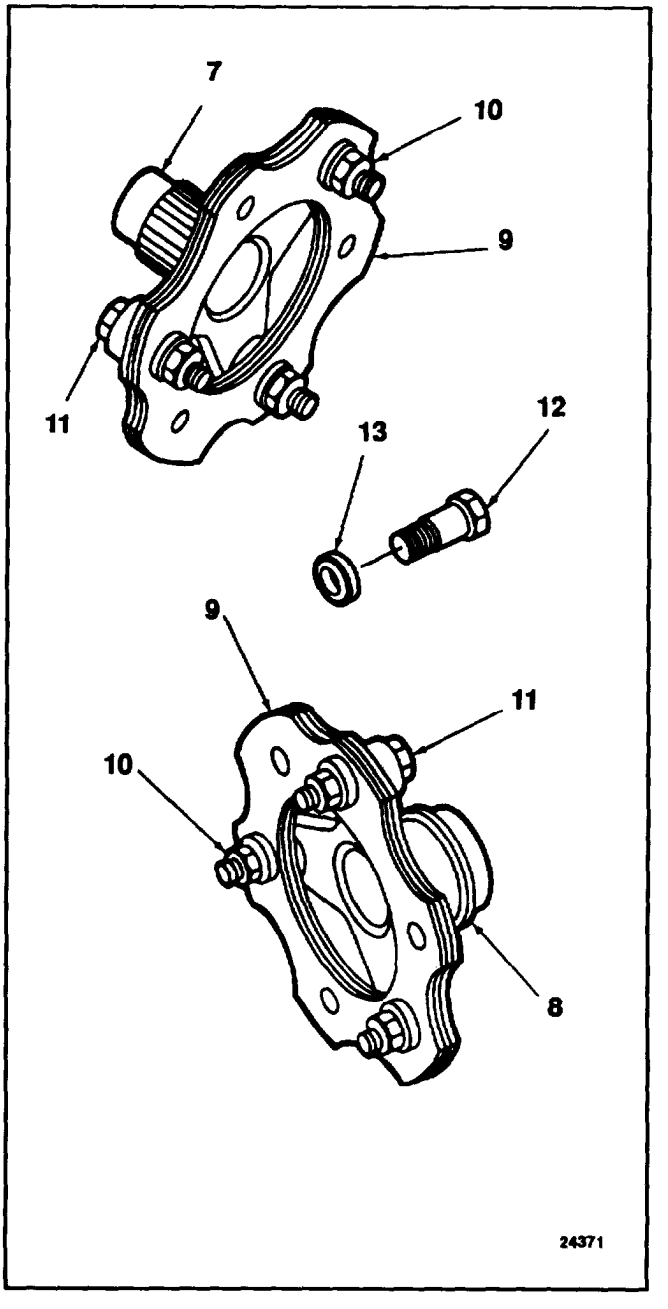
Do not loosen or remove more than one bolt from the adapters at the same time during Inspection. Adapters are balanced assemblies and requires replacement if more than one bolt is loosened or removed.

4. Inspect adapter plates and attaching hardware for damage listed below:
   a. **Cracks nicks or gouges in visually accessible areas of plates (9).** Use a 3X to 5X power magnifying glass to check. Give particular attention to surfaces at exposed bolt holes. Repair light scuffs, nicks, or scratches (Task 6-31.2). Normal adapter face or washer contact pattern is permissible. Replace adapter assemblies with any cracks. Replace adapter assemblies with scratches, nicks, or gouges in plates deeper than 0.001 inch.
   b. **Nicks on Inside edges of plates (9).** Use a pointed scribe to check. Replace nicked adapter assemblies.
   c. **Cracked nuts (10) and bolts (11).** Replace cracked nuts and bolts.

NOTE

Engine drive shaft bolts P/N 145DS303-3 requires nondestructive inspection for cracks, regardless of the results of the magnifying glass inspection

   d. **Thread damage, fretting, gouges, wear steps, and circumferential scoring on shaft attaching bolts (12).** If defects are found, refer to Task 6-31.2.
   e. **Nicks, gouges, and fretting on bevel washers (13).** If defects are found, refer to Task 6-31.2.



GO TO NEXT PAGE

6-30.3 INSPECT ONE-PIECE ENGINE DRIVE SHAFT (REMOVED) (Continued) 6-30.3

NOTE

One nut and bolt assembly (removed during shaft removal) will be loosely installed on each adapter assembly.

5. **Check torque on two torqued nuts (10)** at each adapter assembly (7 and 8). **Torque shall be at least 440 inch-pounds**

   a. **If toque is less than 440 inch-pounds at any of the checked locations,** replace that adapter assembly and attaching hardware.

   b. If a nut or bolt fails during the torque check, replace the adapter assembly and attaching hardware.

FOLLOW-ON MAINTENANCE:

None

END OF TASK

6-31 REPAIR RIVETED ENGINE DRIVE SHAFT

INIITIAL SETUP

Applicable Configurations:

Without 51

Tools:

Dial Indicating Depth Gage

Materials:

Cloths (E120)
Abrasive Pads (E2)
Epoxy Primer (E292) or (E293)
Gloves (E184.1)

Personnel Required:

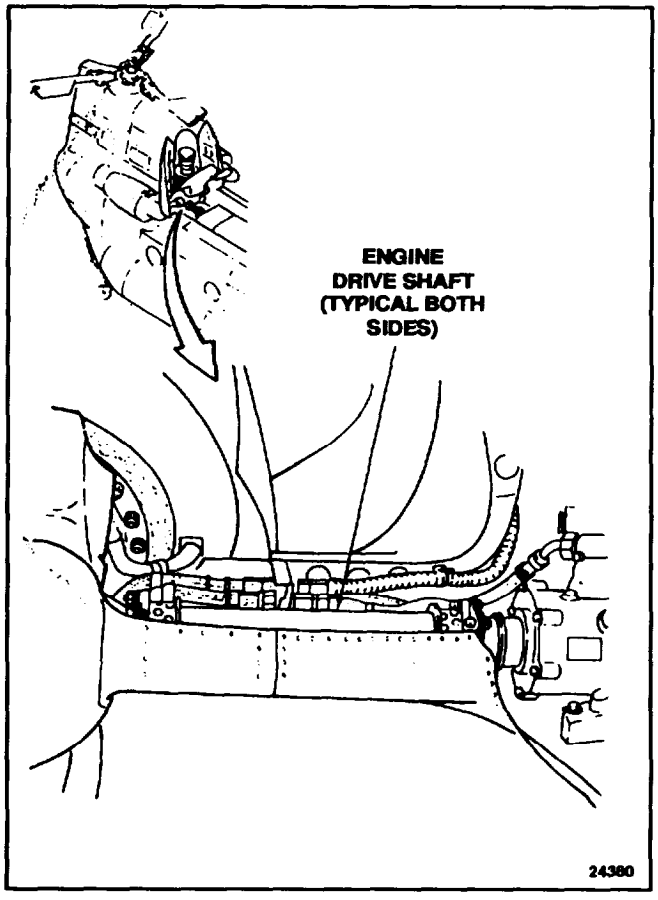
Medium Helicopter Repairer
Inspector

References:

TM 55-1520-240-23P

Equipment Condition:

Battery Disconnected (Task 1-39)
Electrical Power Off
Pylon Access Doors Open (Task 2-2)
Pylon Lower Fairing Open (Task 2-2)
Engine Drive Shaft Access Cover Removed (Task 2-2)
Engine Air Inlet Screens Removed (Task 4-65)
Engine Transmission Fairing Access Cover Open (Task 2-2)

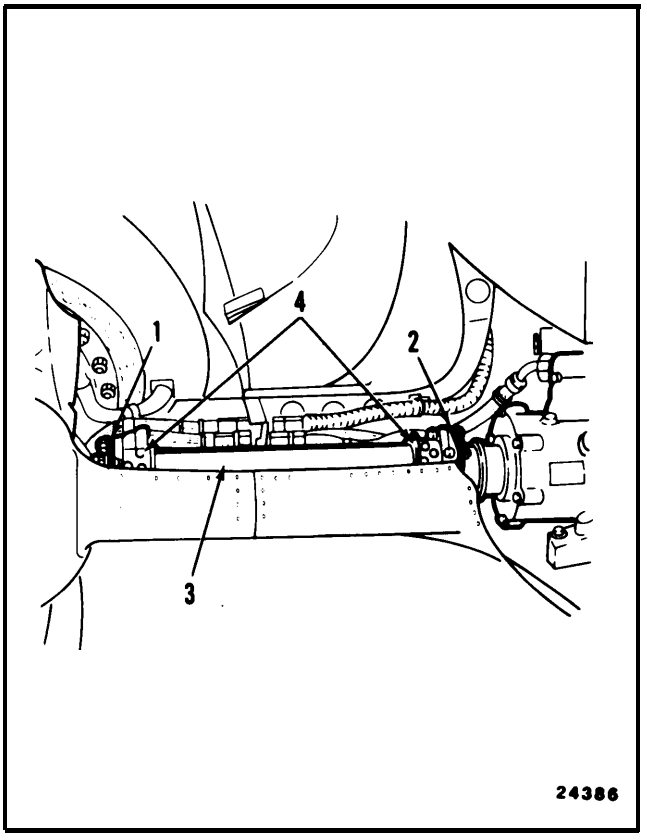


GO TO NEXT PAGE

NOTE

Repair a left or right engine drive shaft in same way. Right shaft shown.

1. **Remove light scratches, corrosion, and nicks from outside edge of plates (1 and 2). Do not go deeper than 0.001 inch.**
2. **Blend out nicks, scratches, and gouges on face of plates (1 and 2).** Use abrasive pads (E2). **Do not go deeper than 0.001 inch.**
3. **Blend out scratches, nicks, and gouges on tube (3)** with abrasive pads (E2). **Do not go deeper than 0.010 inch. Keep a blend radius of at least 0.5 inch,**
4. **Remove nicks, scratches, or gouges on adapters (4) by light hand polishing.** Use abrasive pads (E2). **Do not go deeper than 0.001 inch.** Reject shaft assemblies if defects cannot be removed by polishing,



INSPECT

WARNING

Epoxy primer (E292 or E293) is flammable and toxic. It can irritate skin and cause burns. Use only with adequate ventilation, away from heat or open flame. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.

5. Touch up tube (3) as needed with two coats of epoxy primer (E292 or E293). Touch up adapters (4) with epoxy primer (E292 or E293). Wear gloves (E184.1).

FOLLOW-ON MAINTENANCE:

Close engine transmission fairing access cover (Task 2-2).
Install engine air inlet screens (Task 4-79).
Install engine drive shaft access cover (Task 2-2).
Close pylon lower fairing (Task 2-2).
Close pylon access doors (Task 2-2).

END OF TASK

6-31.1 REPAIR ONE-PIECE ENGINE DRIVE SHAFT (INSTALLED) 6-31.1

INITIAL SETUP

Applicable Configurations:
With 51

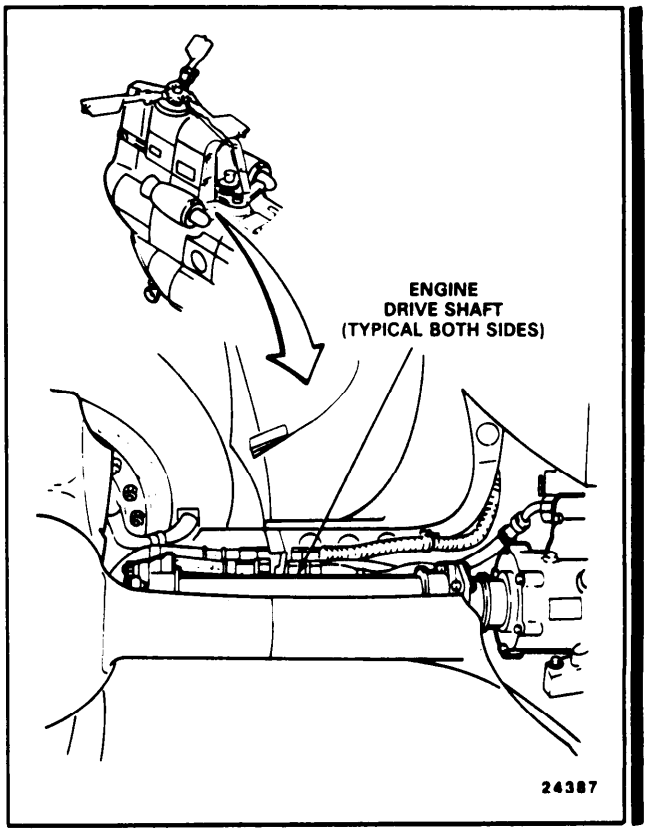
Tools:
Dial Indicating Depth Gauge

Materials:
Cloths (E120)
Abrasive Pads (E2)
Epoxy Primer (E292 or E293)
Epoxy Topcoat (E166)
Gloves (E186)
Emery Cloth (E125)

Personnel Required:
Medium Helicopter Repairer
Inspector

References:
TM 55-1520-240-23P

Equipment Condition:
Battery Disconnected (Task 1-39)
Electrical Power Off
Pylon Access Doors Open (Task 2-2)
Pylon Lower Fairing Open (Task 2-2)
Engine Drive Shaft Access Cover Removed (Task 2-2)
Engine Air Inlet Screens Removed (Task 4-65)
Engine Transmission Fairing Access Cover Open (Task 2-2)



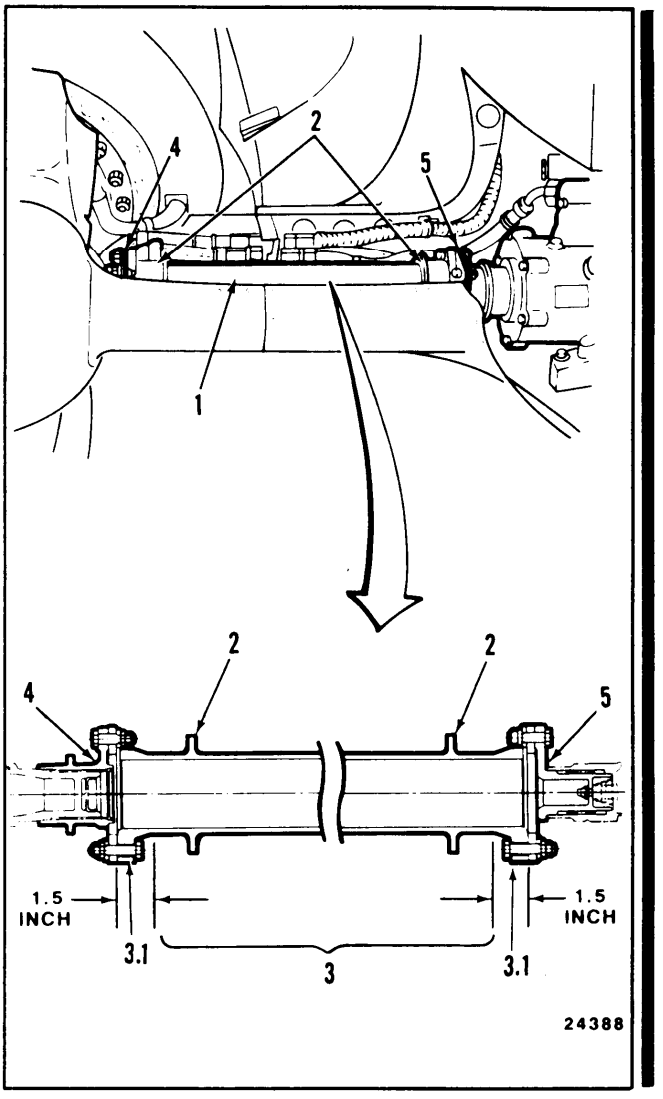
GO TO NEXT PAGE

6-31.1 REPAIR ONE-PIECE ENGINE DRIVE SHAFT (INSTALLED) (Continued) 6-31.1

NOTE

Repair left or right engine drive shaft in same way. Right shaft shown.

1. **Blend out nicks, scratches, and gouges on center section (3) of shaft (1), including balance flanges (2). Use abrasive pads (E2). Do not go deeper than 0.010 inch. Keep a blend radius of at least 0.5 inch. The blend area shall not exceed 3.14 square inches (the area of a 2 inch circle).**
2. **Blend out nicks, scratches, and gouges on outside diameter of lugs (3.1).** Use emery cloth (E125). **Do not go deeper than 0.025 inch.**
3. **Remove nicks, scratches, or gouges on adapters (4 and 5) by light hand polishing.** Use abrasive pads (E2). **Do not go deeper than 0.001 inch.** Replace adapter assemblies if defects cannot be removed by polishing.
4. **Remove light scratches, corrosion, and nicks from** outside edge and face of plates bolted to adapters (4 and 5). Use abrasive pads (E2). **Do not go deeper than 0.001 inch.**



INSPECT

WARNING

Epoxy primer (E292 or E293) is flammable and toxic. Avoid inhaling. Use only with adequate ventilation, away from heat or open flame. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.

5. **Touch up shaft (1)** as needed with two coats of epoxy primer (E292 or E293). **Touch up adapters (4 and 5)** with epoxy primer (E292 or E293) and epoxy topcoat (E166). Wear gloves (E186).

GO TO NEXT PAGE

6-31.1 REPAIR ONE-PIECE ENGINE DRIVE SHAFT (INSTALLED) (Continued) 6-31.1

FOLLOW-ON MAINTENANCE:

Close engine transmission fairing access cover (Task 2-2).
Install engine air inlet screens (Task 4-79).
Install engine drive shaft access cover (Task 2-2).
Close pylon lower fairing (Task 2-2).
Close pylon access doors (Task 2-2).

END OF TASK

6-31.2 REPAIR ONE-PIECE ENGINE DRIVE SHAFT (REMOVED)

INITIAL SETUP

Applicable Configurations:

With 51

Tools:

Dial Indicating Depth Gauge

Materials:

Cloths (E120)
Abrasive Pads (E2)
Epoxy Primer (E292 or E293)
Epoxy Topcoat (E166)
Gloves (E186)
Emery Cloth (E125)

Personnel Required:

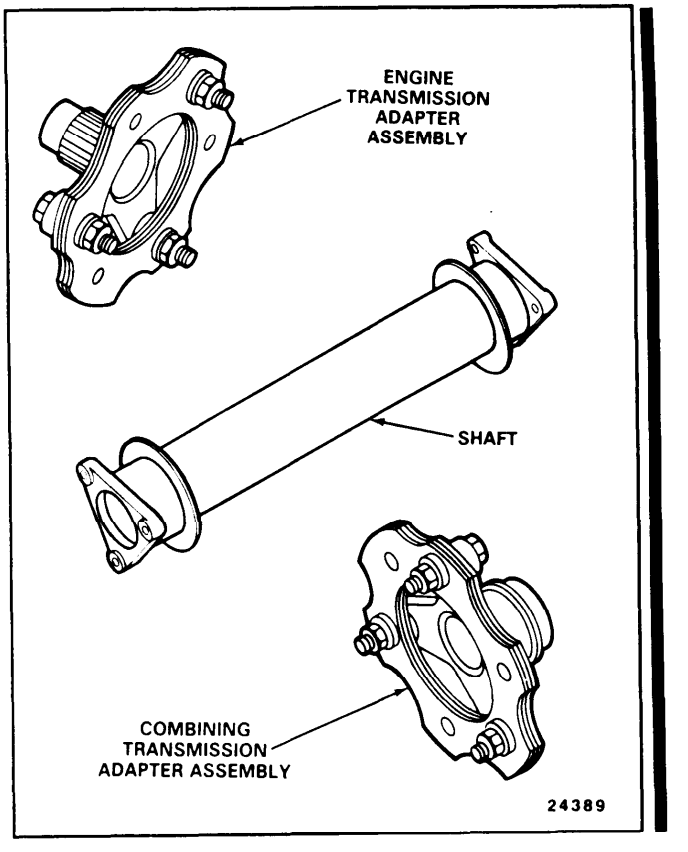
Medium Helicopter Repairer
Inspector

References:

TM 55-1520-240-23P

Equipment Condition:

Off-Helicopter Task



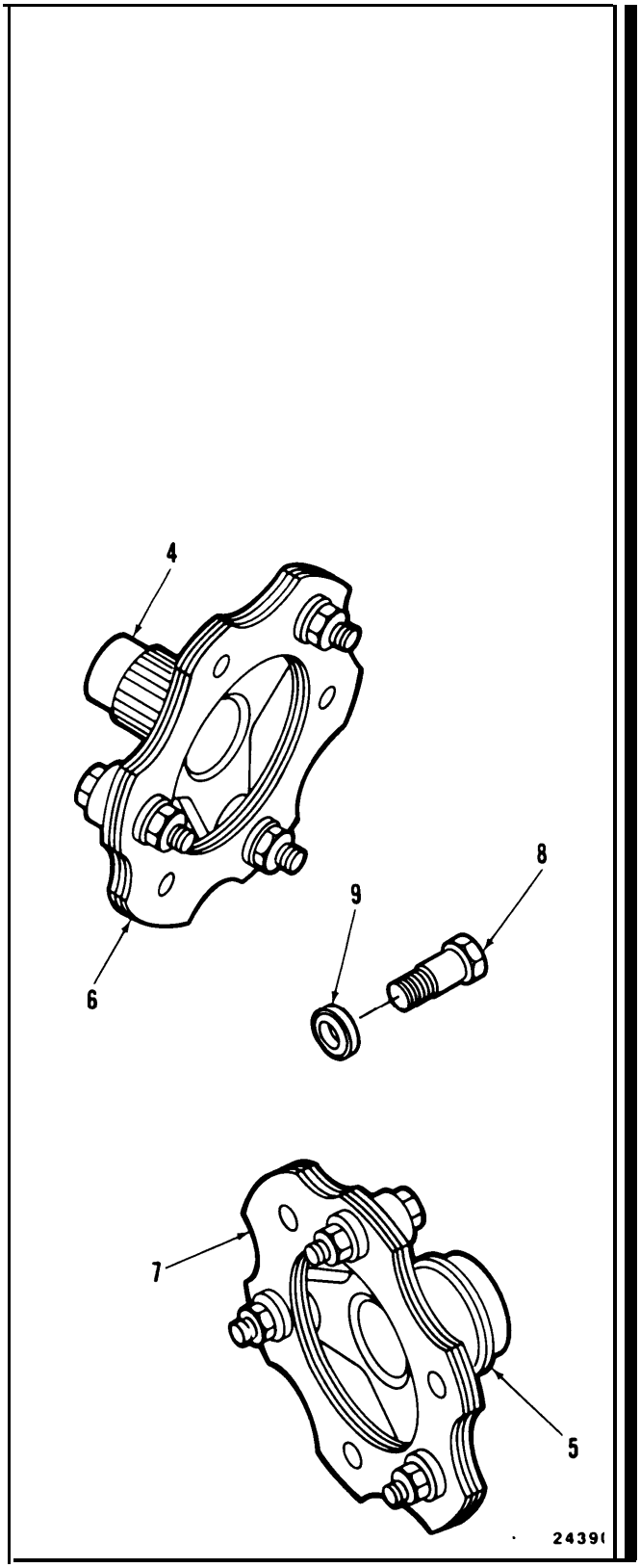
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6-31.2 REPAIR ONE-PIECE ENGINE DRIVE SHAFT (REMOVED) (Continued) 6-31.2

NOTE

Repair left or right engine drive shaft in same way.

1. **Blend out nicks, scratches, and gouges on center section (1) of shaft (2), including balance flanges (3). Use abrasive pads (E2). Do not go deeper than 0.010 inch. Keep a blend radius of at least 0.5 inch. Blend area shall not exceed 3.14 square inches (the area of a 2 inch circle).**
2. **Blend out nicks, scratches, and gouges on outside diameter of lugs (3.1).** Use emery cloth (E125). **Do not go deeper than 0.025 inch.**
3. **Remove nicks, scratches, or gouges on adapters (4 and 5) by light hand polishing.** Use abrasive pads (E2). **Do not go deeper than 0.001 inch.** Replace adapter assemblies if defects cannot be removed by polishing.
4. **Remove light scratches, corrosion, and nicks from outside edge and face of plates (6 and 7).** Use abrasive pads (E2). **Do not go deeper than 0.001 inch.**
5. **Remove thread damage, light fretting, gouges, wear steps, and scoring on bolts (8)** by light hand polishing. Use abrasive pads (E2). Replace bolts if defects cannot be removed by polishing.
6. **Remove nicks, gouges, and fretting on bevel washers (9) by light hand polishing.** Use abrasive pads (E2). Replace washers if defects cannot be removed by polishing.



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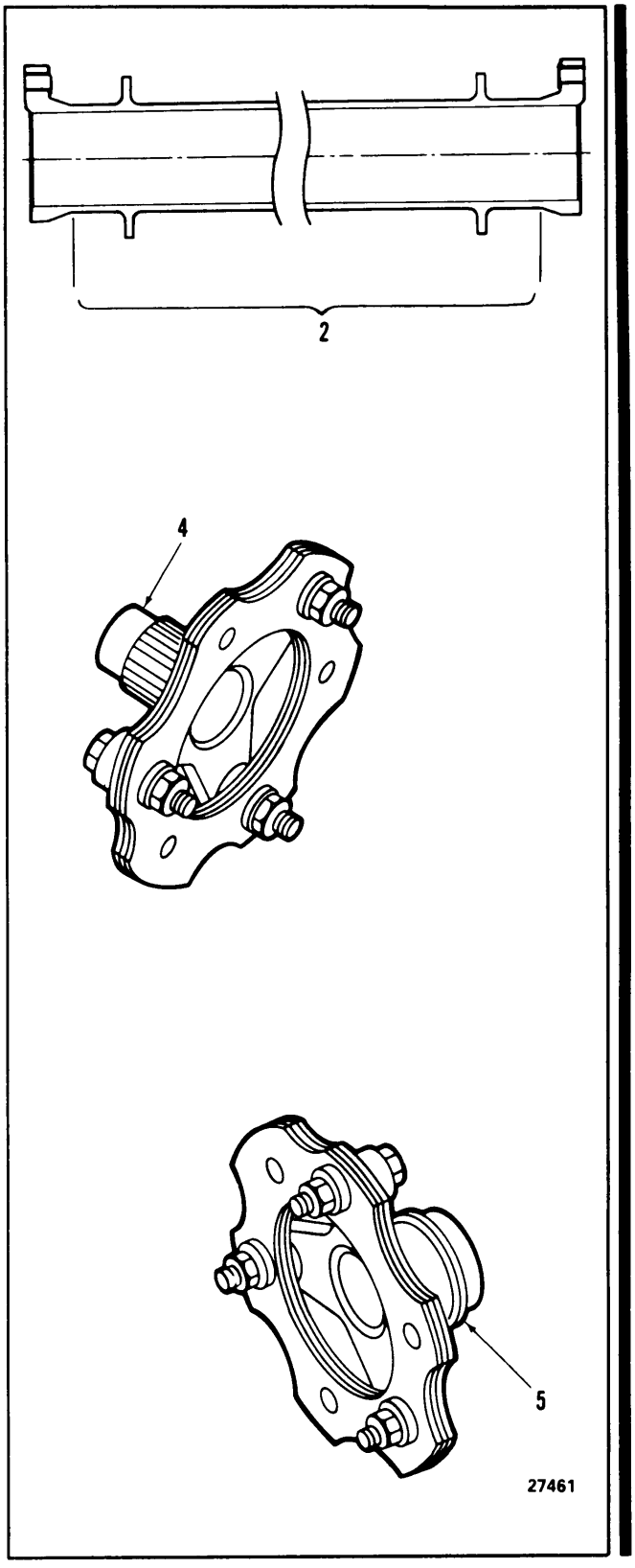
INSPECT

WARNING

Epoxy primer (E292 or 293) is flammable and toxic. Avoid inhaling. Use only with adequate ventilation, away from heat or open flame. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.

7. **Touch up shaft (2)** as needed with two coats of epoxy primer (E292 or E293). **Touch up adapters (4 and 5),** on polished areas only, with epoxy primer (E292 or E293) and epoxy topcoat (E166). Wear gloves (E186).

FOLLOW-ON MAINTENANCE:
None



END OF TASK

6-32 INSTALL ENGINE DRIVE SHAFT

INITIAL SETUP

Applicable Configurations:
All

Tools:
Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692
Torque Wrench, 30 to 150 Inch-Pounds
Torque Wrench, 100 to 750 Inch-Pounds

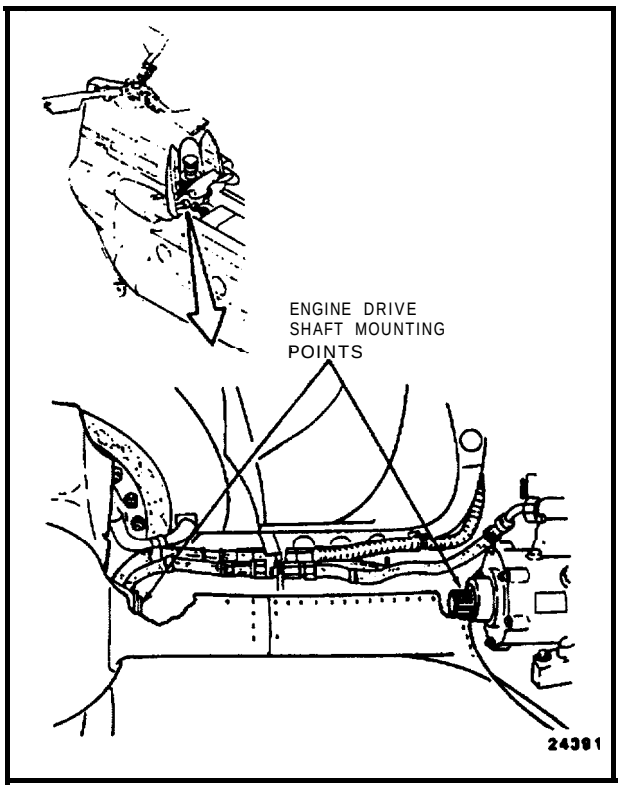
Materials:
Cloths (E120)
Grease (E190)
Oil (E254)
Gloves (E186)
Dry Cleaning Solvent (E162)

Parts:
Packing

Personnel Required:
Medium Helicopter Repairer (2)
Inspector

References:
TM 55-1 520-240-23P

General Safety Instructions:



WARNING

Oil (E254) is toxic. It can Irritate skin and cause bums. Use only with adequate ventilation. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes wlth water for at least 15 minutes. Get medical attention for eyes.

WARNING

Refer to Task 1-91 (notes F and G) to ensure certain serial numbered engine cross shaft adapter assemblies (PIN 145D5300-16 and 145D5300-17) have not exceeded finite life.

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6-32 INSTALL ENGINE DRIVE SHAFT (Continued) 6-32

NOTE

- Install left or right engine drive shaft in same way. Right shaft shown here.
- Installation of one-piece and riveted shafts is similar. Differences are noted in text. Riveted shaft shown here.

INSTALL ADAPTER ASSEMBLIES

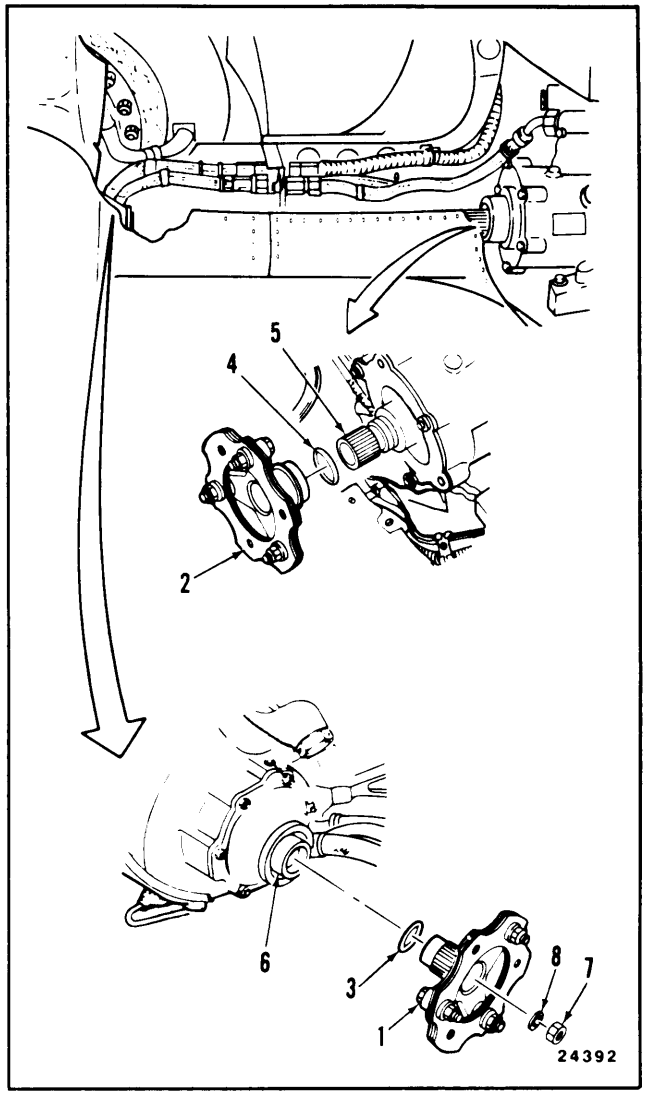
WARNING

Dry cleaning solvent (E162) is flammable and toxic. It can irritate skin and cause burns. Use only in well-ventilated area, away from heat and open flame. In case of contact, immediately flush skin or eyes with plenty of water for at least 15 minutes. Get medical attention for eyes.

NOTE

- On shafts without 51, shaft and adapter assemblies are balanced together and have the same serial number. If any one is replaced, all three must be replaced as a unit.
- On shafts with 51 shaft and adapter assemblies may be replaced individually.

1. Clean splines of adapter assemblies (1 and 2), combining transmission input shaft (5), and engine transmission output shaft (6). Use dry cleaning solvent (E162) and cloths (E120). Wear gloves (E186). **Pack all splines with grease (E190).**
2. Coat packing (4) with grease (E190). **Install packing on** combining transmission **input shaft (5).**
3. Coat packing (3) with grease (E190). **Install packing on adapter assembly (1).**
4. **Install adapter assembly (2)** on combining transmission input shaft (5). Wipe off excess grease with cloths (E120).



5. **Install adapter assembly (1)** in engine transmission output shaft (6). Wipe off excess grease with cloths (E120).

NOTE

If nut does not meet friction torque, nut must be replaced.

6. Coat thread of nut (7) with grease (E190). Wear gloves (E186). **Install washer (8) and nut** in adapter assembly (1). Check nut (7) for friction torque of a least 7 inch-pounds. **Torque nut to 120 inch-pounds.**

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INSTALL SHAFT

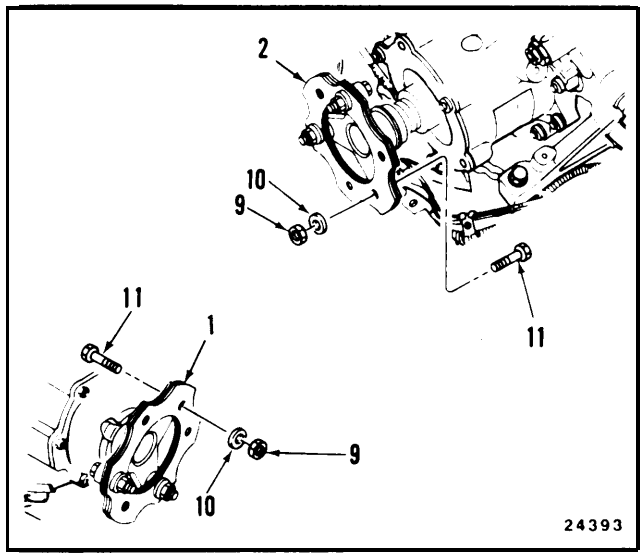
CAUTION

Do not allow bolt to turn. if bolt turns, bolt and adapter assembly can be damaged.

NOTE

If installing previously removed adapter assemblies, remove the loosely installed nut and bolt from each.

7. **Remove one nut (9), washer (10) and bolt (11)** from each of two adapter assemblies (1 and 2). During removal, hold head of bolt with wrench. **Do not let bolt turn when removing nut.**



8. Position shaft (12) between adapter assemblies (1 and 2). On shafts without 51, check that leg of shaft marked 2 is between legs of combining transmission adapter assembly (1) marked 1 and 3 and leg of shaft marked 5 is between legs of engine transmission adapter assembly (2) marked 4 and 6.
9. Coat thread of six bolts (13) with oil (E254). **Install three bolts, washers (14), and nuts (15)** at each end of shaft (12). Bolt heads shall face each other.
10. Coat thread of two bolts (11) with oil (E254). Install one bolt, washer (10), and nut (9) in each adapter assembly (1 and 2). Bolt heads shall face away from each other. Wear gloves (E186).

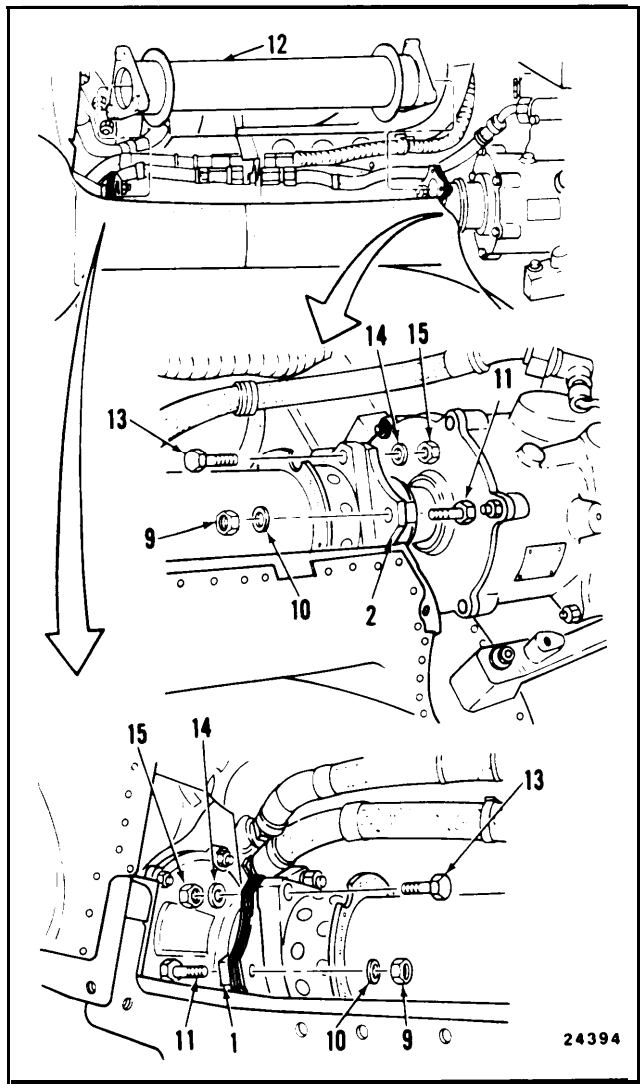
CAUTION

Do not allow bolts to turn. If bolts turn, bolts, plates, or adapter assembly can be damaged.

NOTE

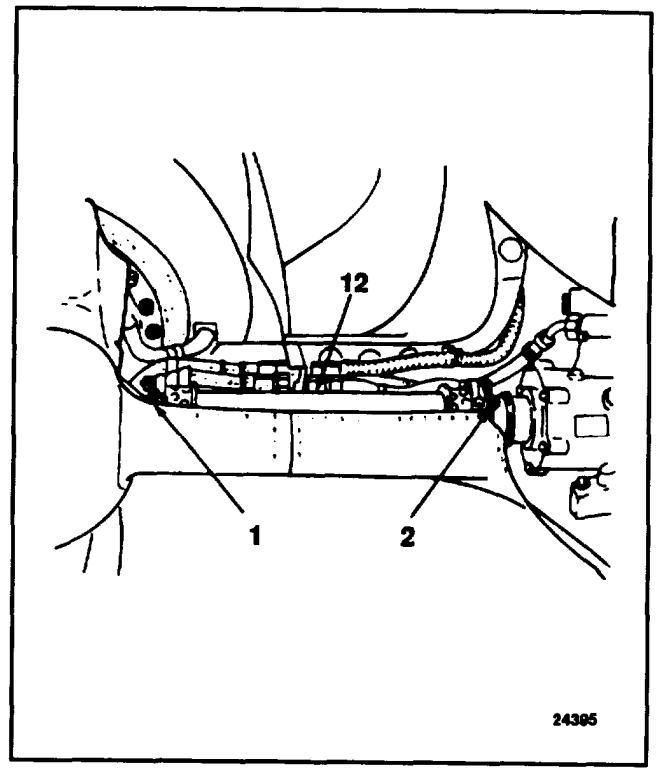
If nuts do not meet friction torque, they must be replaced.

11. Hold head of bolts (11 and 13) with wrench. **Check nuts (9 and 15) for friction torque of at least 10 inch-pounds. Torque nuts to 440 inch-Pounds.**



6-32 INSTALL ENGINE DRIVE SHAFT (Continued) 6-32

12. Have helper rotate blades to turn shaft (12) at least one full turn. Check that there is at least 0.125 inch clearance between shaft and adapters (1 and 2) and the surrounding structure. Check for at least 0.5 inch clearance to hoses and wires.



INSPECT

FOLLOW-ON MAINTENANCE:
- Close engine transmission fairing access cover (Task 2-2).
- Install engine drive shaft access cover (Task 2-2).
- Close pylon lower fairing (Task 2-2).
- Close pylon hinged fairing (Task 2-2).
- Install engine air inlet screen (Task 4-76).
- Perform acombining transmission oil cooler fan vibration check (Tasks 6-217 through 6-223, as applicable).
- Perform ground run (TM 55-1520-240-10).
- Check toque on all nuts after first flight (Task 6-30.1 or 6-30.2).
- Perform vibration test.

END OF TASK

SECTION III

FORWARD ROTARY-WING

DRIVE TRANSMISSION

6-33 REMOVE FORWARD TRANSMISSION SUMP

INITIAL SETUP

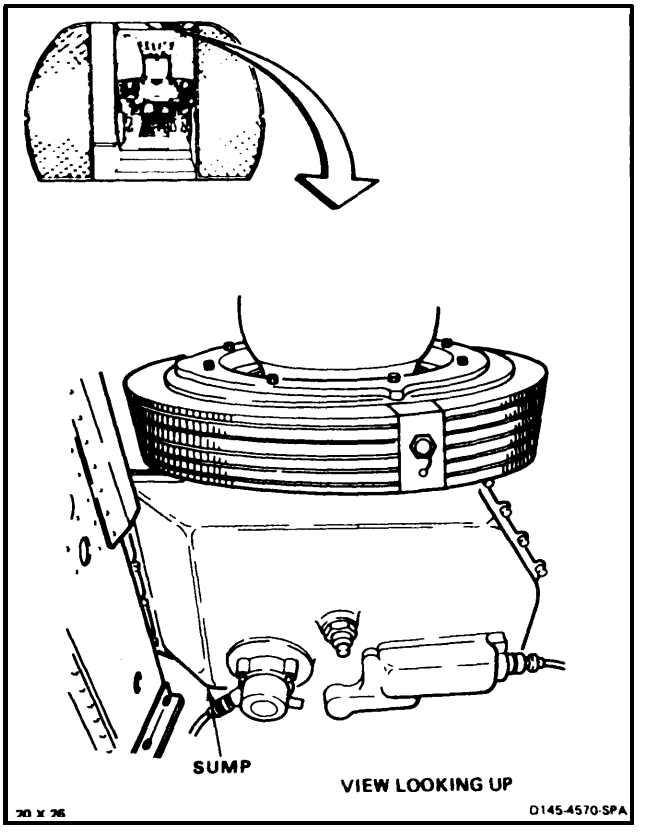
Applicable Configurations:
All

Tools:
Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692
Container, 14-Quart (2)

Materials:
None

Personnel Required:
67U10 Medium Helicopter Repairer

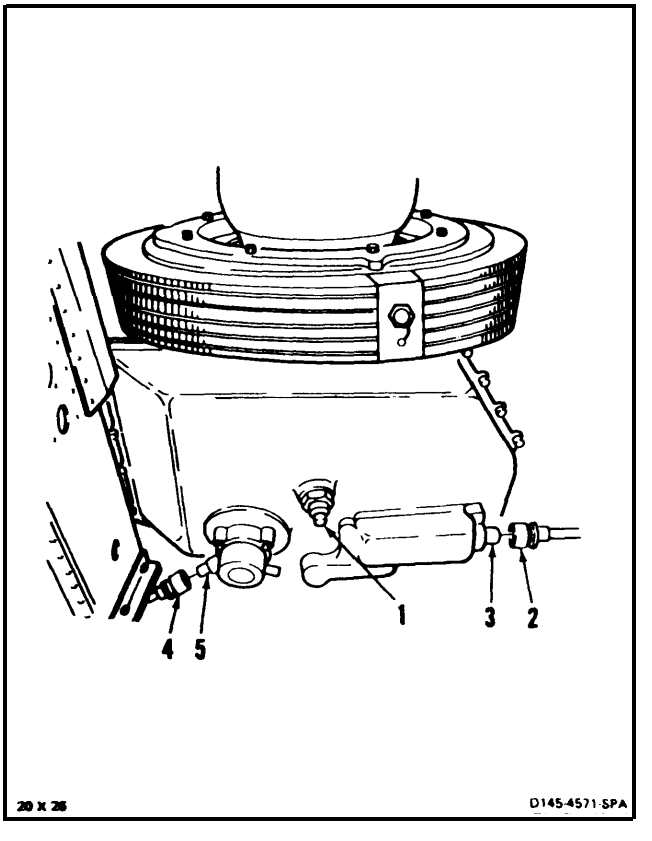
Equipment Condition:
Forward Transmission Drip Pan
Removed (Task 2-3)



NOTE

Sump holds about 23 quarts of oil.

1. Push in drain valve (1), twist, and pull. **Let oil drain** into containers. Push in valve and twist it to close.
2. **Disconnect connector (2)** from temperature bulb receptacle (3). **Disconnect connector (4)** from chip detector receptacle (5).



GO TO NEXT PAGE

6-33 REMOVE FORWARD TRANSMISSION SUMP (Continued)

3. **Remove 23 nuts (6)** and washers (7). **Remove seven bolts (8)** and washers (7).

CAUTION

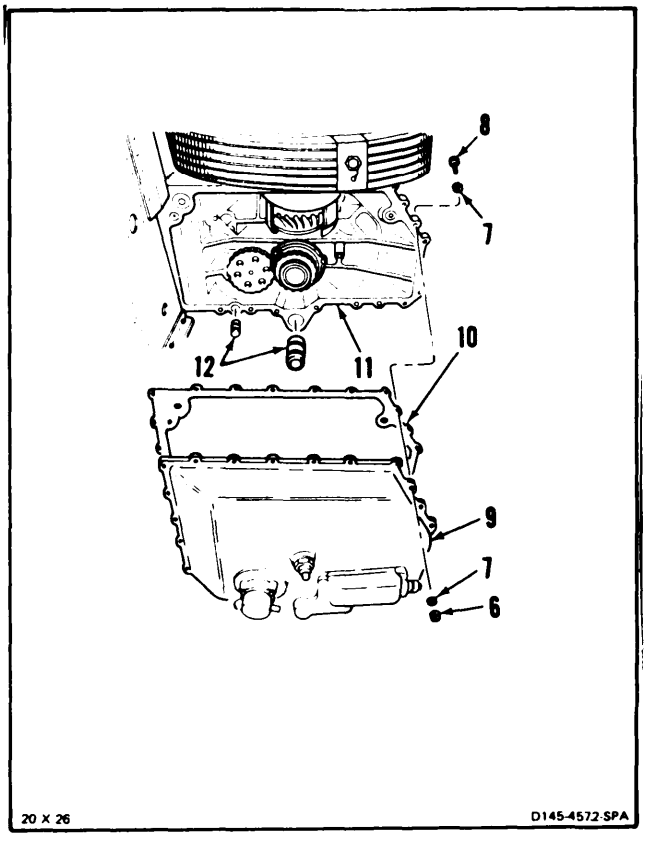
Be careful not to damage gasket seal when lowering sump.

4. **Lower and remove sump (9)** and gasket seal (10) from transmission (11).
5. Remove gasket seal from sump.

NOTE

Tubes may stay in sump or in transmission.

6. If two oil transfer tubes (12) are in transmission (10), remove them. Install tubes in sump (9).



FOLLOW-ON MAINTENANCE:

None

END OF TASK

6-34 DISASSEMBLE FORWARD TRANSMISSION SUMP

INITIAL SETUP

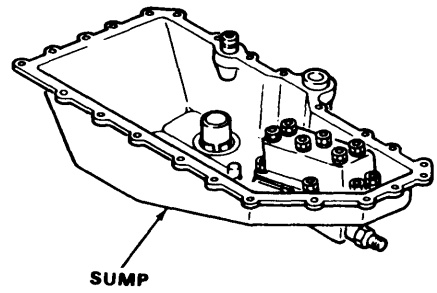
Applicable Configurations:
All

Tools:
Airframe Repairer's Tool Kit,
NSN 5180-00-323-4876
Open End Wrench, 1 3/8-inch

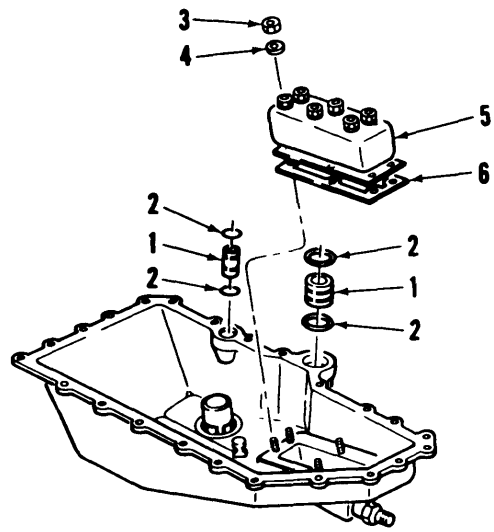
Materials:
None

Personnel Required:
Aircraft Structure Repairer

Equipment Condition:
Off Helicopter Task
Forward Transmission Sump Removed (Task 6-33)



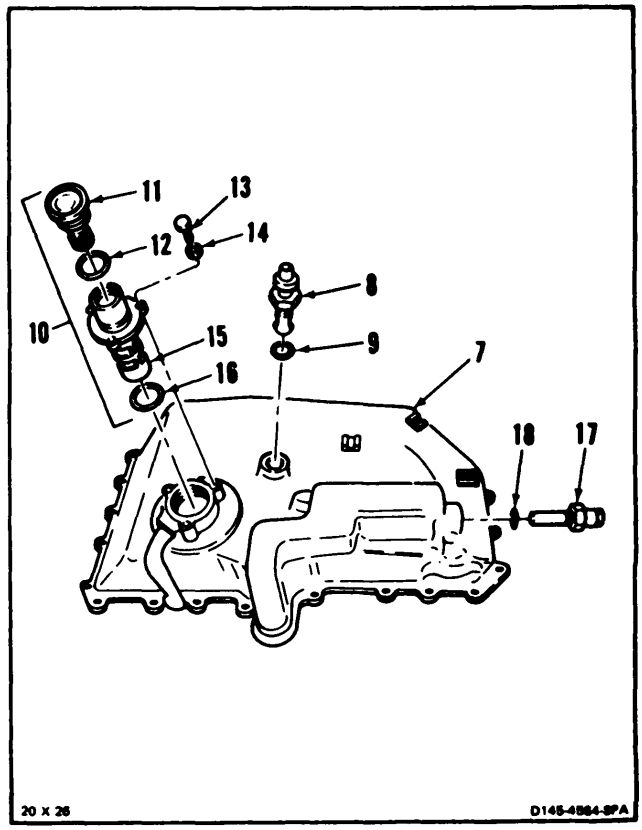
1. **Remove two oil transfer tubes (1)** and four packings (2).
2. Remove six nuts (3) and washers (4) from oil inlet screen (5). **Remove screen and gasket seal (6).**



GO TO NEXT PAGE

6-34 DISASSEMBLE FORWARD TRANSMISSION SUMP (Continued)

3. Turn sump (7) over 180 degrees Remove lockwire from drain valve (8). **Remove drain valve** and packing (9).
4. **Remove detection screen and chip detector (10)** as follows:
   a. Push in cap (11), twist to left, and pull to **remove cap** and packing (12).
   b. Remove lockwire from three bolts (13). **Remove bolts** and washers (14). **Remove housing (15)** and packing (16).
5. Remove lockwire from temperature bulb (17). **Remove temperature bulb** and packing (18).



FOLLOW-ON MAINTENANCE:

None

END OF TASK

INITIAL SETUP

Applicable Configurations:
All

Tools:
Airframe Repairer's Tool Kit, NSN 5180-00-323-4876
Shot Bags or Equivalent
Gram Scale, 100 Gram Capacity
Tee, 1/4-inch
Source of Vacuum
Infrared Lamp, 140 to 160°F

Materials:
Abrasive Paper, 120 Grit (E7)
Abrasive Paper, 280 Grit (E10)
Kevlar Fabric, Style 285 or 281 (E209)
Wood Spatula (E424)
Polyethylene Cup (E157)
Brush (E86)
Teflon Tape (E399)
Adhesive (E47)
Hardener (E192)
Gloves (E184.1)
Acetone (E20)
Peel Plv (E270)
Epoxy Primer (E292) or (E293)
Epoxy Coating (E137)
Methyl-Ethyl-Ketone (E244)
Black Lacquer (E462)
Polyurethane Paint (E285.1)
Cloths (E120)
Teflon Impregnated Fabric (E170)
Temperature Indicating Strips (E413)

Personnel Required:
Aircraft Structure Repairer
Inspector

Equipment Condition:
Off Helicopter Task

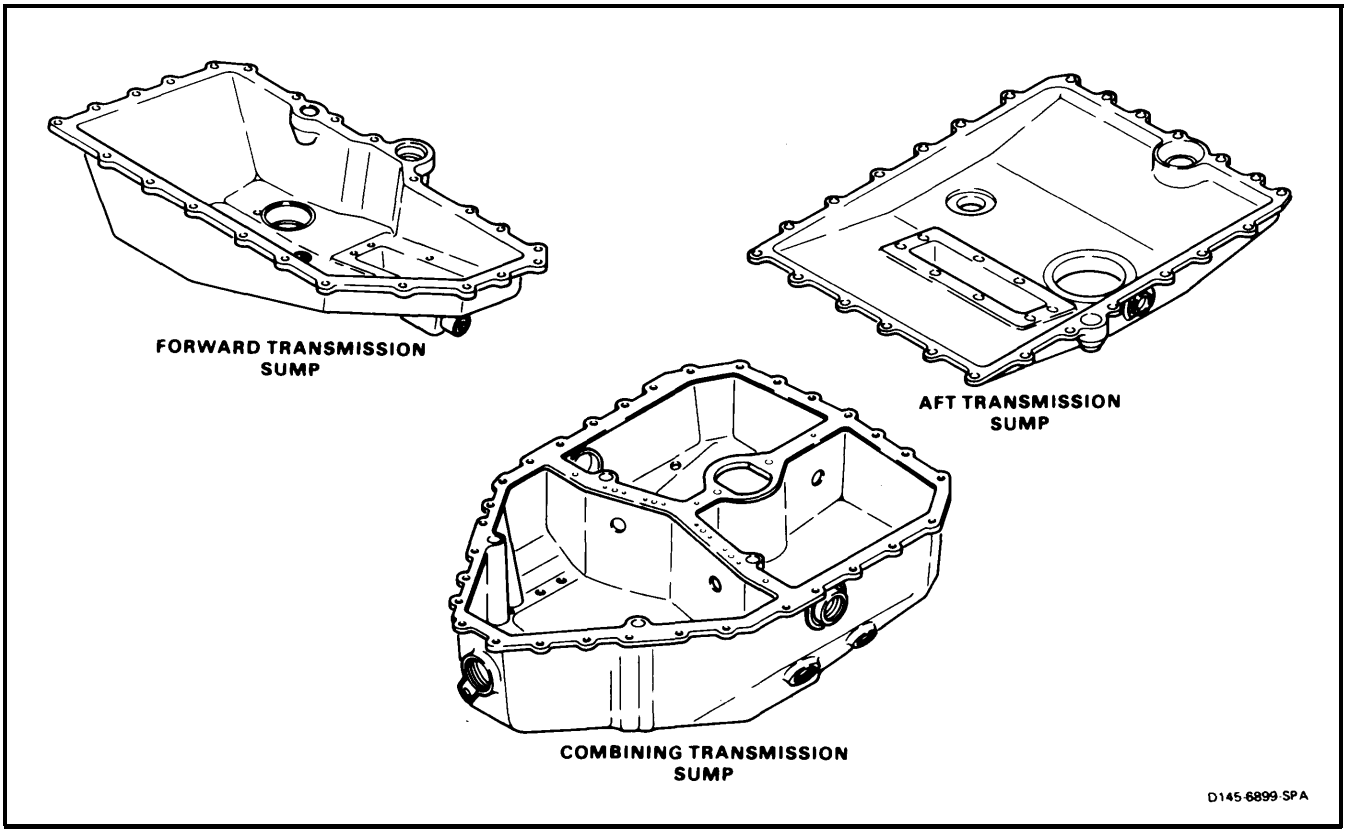
General Safety Instructions:

WARNING

Acetone (E20) is extremely flammable. It can be toxic. It can irritate skin and cause bums. Use only in a well-ventilated area, away from heat and open frame. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.

WARNING

Epoxy resin adhesive (E47) is toxic. It can irritate skin and cause burns. Avoid contact with skin, eyes, and clothing. Do not inhale. Use only with adequate ventilation. Keep away from heat, sparks, or open flame. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.



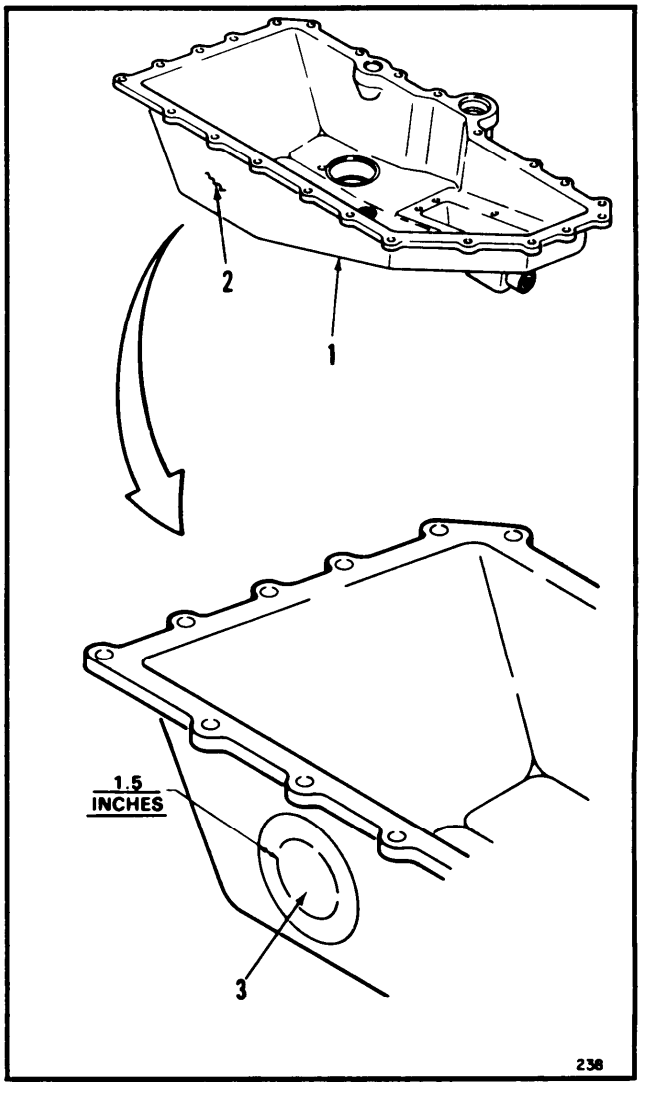
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6-35 REPAIR TRANSMISSION SUMP (AVIM) (Continued) 6-35

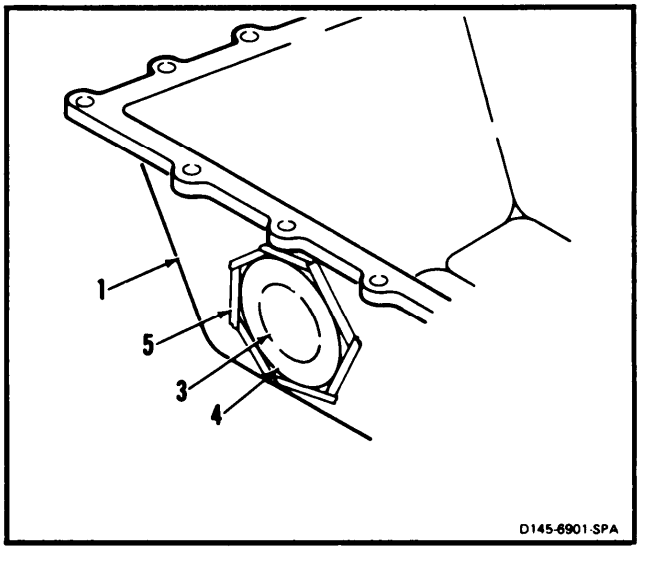
NOTE

Procedure is same to repair sump from forward, aft, or combining transmission. Typical repair of forward transmission sump shown here.

1. **Inspect sump (1)** for extent of damage. If damage is not through the sump, go to step 2. If damage goes through the sump, no repair is allowed.
2. Clean sump (1) for 3 inches beyond damage (2). Use acetone (E20) and cloths (E120). Wear gloves (E184.1).
3. **File or sand damage (2)** down to undamaged area with file or abrasive paper (E7). File or sand damaged area (3) to a round or oval shape. Taper depth of area to the outside surface of sump (1).
4. **Clean sump (1)** for 1.5 inches beyond damaged area (3). Use acetone (E20) and cloths (E120). Wear gloves (E184.1).
5. **Measure depth of damaged area (3).** Record depth to nearest 0.01 inch. If depth is more than 0.090 inch. no repair is allowed.

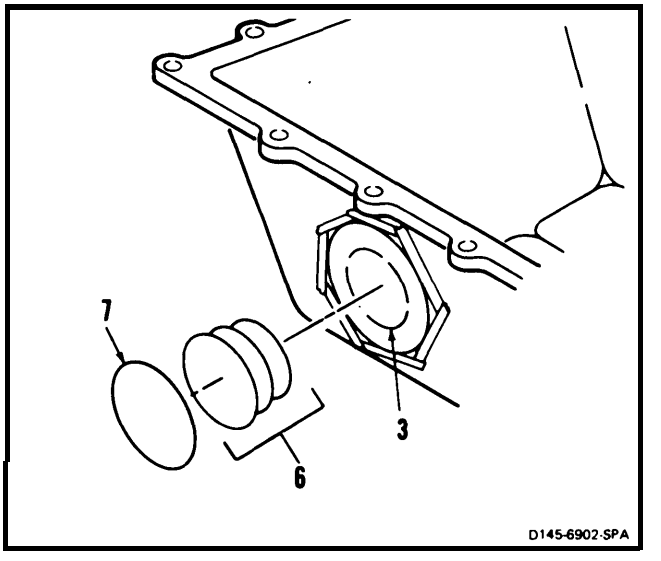


6. Cover sump (1) around cleaned area (4) with Teflon tape (E399) (5).



GO TO NEXT PAGE

7. **Cut one patch of Kevlar fabric (E209) (6) for each 0.01 inch** depth recorded in step 4. Cut to shape of damaged area (3). Cut pieces to overlap and match taper of shape. Cut an- **other piece (7) to extend beyond damaged area 1 inch** in all directions.
8. Place fabric patches (6) in damaged area (3). Trim to fit. Check that top piece (7) overlaps area 1 inch in all directions.
9. Remove pieces (6 and 7) from sump (1).



10. Measure 50 grams of resin (E47) and 6 grams of hardener (E192).

CAUTION

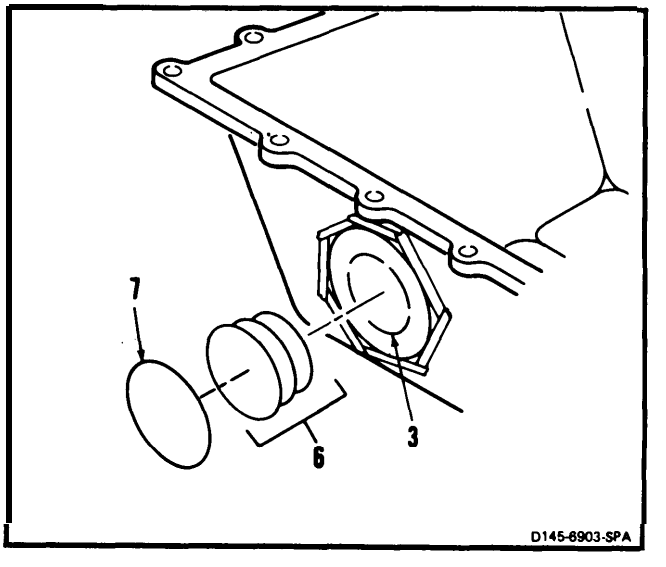
Do not use styrofoam cup. Resin melts styrofoam.

11. **Mix resin (E47) with hardener (E192).** Use polyethylene cup (E157) and wood spatula (E424). Wear gloves (E184.1).

NOTE

Working life of resin mixture is about 1 hour.

12. **Coat damaged area (3)** with resin mixture. Use brush (E86).
13. Beginning with smallest patch of fabric (6), **coat each patch with resin mixture and set it in damaged area (3).** Check that each patch overlaps the patch below. Last patch (7) shall overlap repair area 1 inch in all directions.



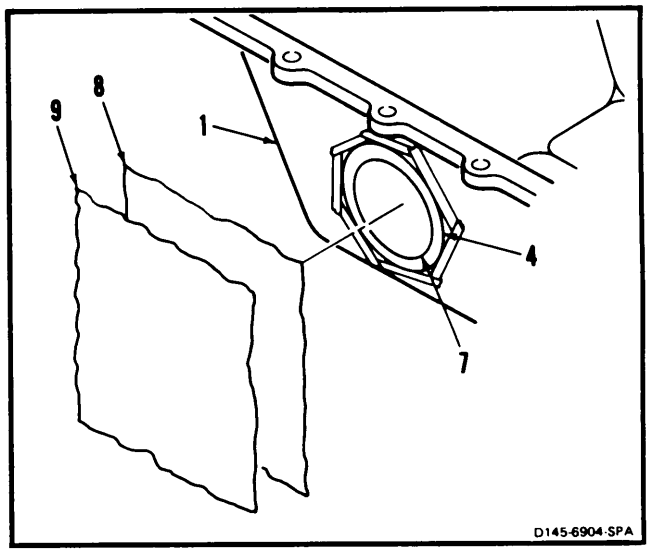
GO TO NEXT PAGE

14. Check that repair is slightly higher than surface of sump (1). Add more pieces of fabric under top patch (7), if needed.
15. **Cover repair** and cleaned area (4) with peel ply (E270) (8). Cover peel ply with Teflon-impregnated fabric (E170) (9).
16. **Place weight on repair area** to provide 2 to 3 psi pressure. Use shot bags or equivalent.

CAUTION

If temperature exceeds 180°F (80°C), sump can be damaged.

17. **Cure resin at 140 to 160°F (60° to 70°C) for 2 hours.** Use infrared lamp and temperature indicating strips (E413).

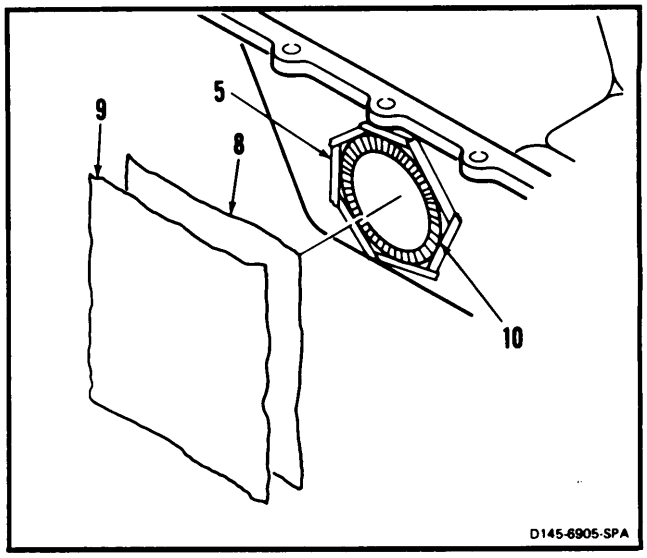


18. Remove weight, Teflon-impregnated fabric (9) and peel ply (8). Remove Teflon tape (5).
19. **Sand squeezeout (10)** until repair area is smooth. Use abrasive paper (E7).

WARNING

Protective gloves (E184.1) shall be worn during the remainder of this task. Otherwise, personal injury could result.

20. Clean the repair area with acetone (E20) and clean cloths (E120). Wear gloves (E184.1).
21. Sand the repair area with abrasive paper (E10). Clean the area with acetone (E20) and clean cloths (E120).
22. Apply one coat of epoxy primer (E292) or (293). Allow the primer to dry.



23. If the sump is from a forward or aft transmission, apply two coats of epoxy coating (E166). Allow the coating to dry.
24. If the sump is from a combining transmission, finish the repair area with two coats of black lacquer (E462) or polyurethane (E285.1), as determined by the following:
    a. Apply methyl-ethyl-ketone (MEK) (E244) to a small area of the topcoat near the area to be refinished. Use brush (E86).
    b. Wipe the area. If the topcoat wipes away, use lacquer (E462). If the topcoat is unaffected, use polyurethane (E285.1).

INSPECT

FOLLOW-ON MAINTENANCE:
None

END OF TASK

6-36 ASSEMBLE FORWARD TRANSMISSION SUMP 6-36

INITIAL SETUP

Applicable Configurations:
All

Tools:
Airframe Repairer's Tool Kit
NSN 5180-00-323-4876
Torque Wrench, 5 to 50 Inch-Pounds
Torque Wrench, 30 to 150 Inch-Pounds
Deep Socket, 1 3/8-inch
Source of Low-Pressure Compressed Air

Materials:
Lockwire (E231)
Dry Cleaning Solvent (E162)
Gloves (E186)
Cloths (E120)
Oil (E254)

Parts:
Packings

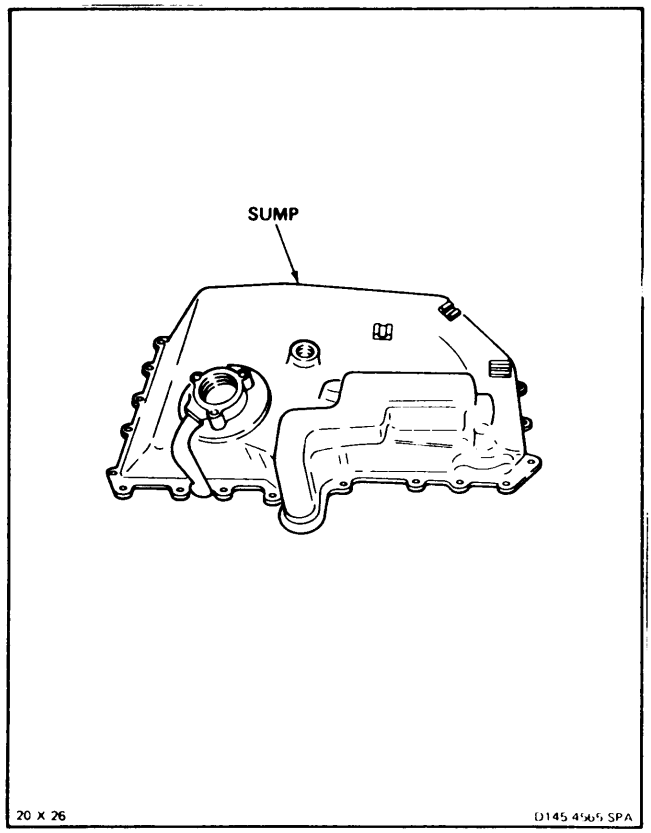
Personnel Required:
Aircraft Structure Repairer
Inspector

References:
TM 55-1520-240-23P

General Safety Instructions:

WARNING

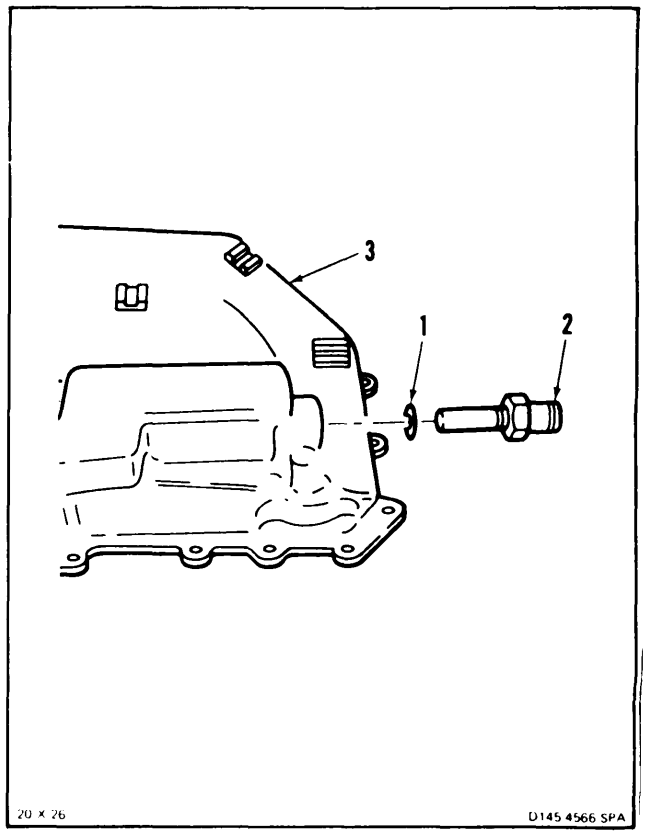
Dry cleaning solvent (E162) is flammable and toxic. It can irritate skin and cause burns. Use only in well-ventilated area, away from heat and open flame. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.



GO TO NEXT PAGE

6-36 ASSEMBLE FORWARD TRANSMISSION SUMP (Continued) 6-36

1. Install packing (1) on temperature probe (2). **Install probe in** sump (3). **Torque probe to 75 inch-pounds.**
2. Lockwire probe (2) to sump (3). Use lockwire (E231).



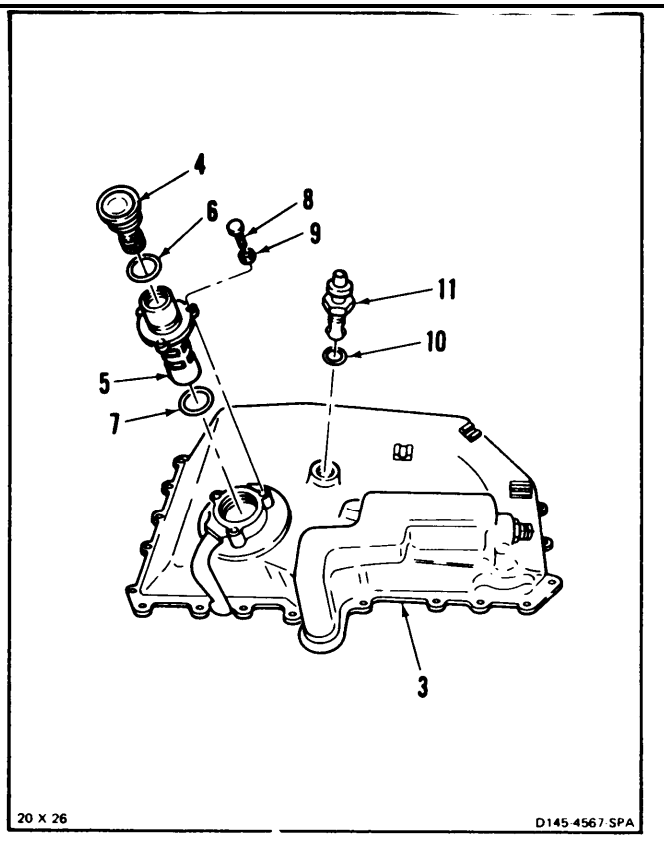
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3. If cap (4) and housing (5) are joined, push cap into housing, twist, and pull to remove cap from housing. Remove packing (6) from cap.

NOTE

If cap and housing are new, cleaning is not needed.

4. **Clean cap (4) and housing (5)** with solvent (E162) and clean cloths (E120). Wear gloves (E186).
5. Install packing (7) on housing (5). **Install housing** (5) in sump (3). Install three bolts (8) and washers (9). **Torque bolts to 60 inch-pounds.**
6. Lockwire three bolts (8) together. Use lockwire (E231).
7. Install packing (6) on cap (4).
8. Press center of cap (4) in and **install cap and packing (6) in housing (5).** Push in cap until center snaps out flush with outside of housing.



WARNING

Oil (E254) is a skin irritant. If oil gets on skin, wash thoroughly. If oil soaks into clothes, change clothes immediately.

WARNING

Oil (E254) gives off fumes that can cause injury to personnel. Use oil in a well-ventilated area.

9. Coat packing (10) and thread of drain valve (11) with oil (E254). Install packing on valve. **Install valve sump (3). Torque valve to 75 inch-pounds.**
10. Lockwire drain valve (11) to sump (3) with lockwire (E231).
11. Turn sump (3) over 180 degrees.

GO TO NEXT PAGE

NOTE

If screen is new, cleaning is not needed.

12. Clean inlet screen (13) as follows:

    a. Remove six nuts (14) and washers (15). Remove cap (16).

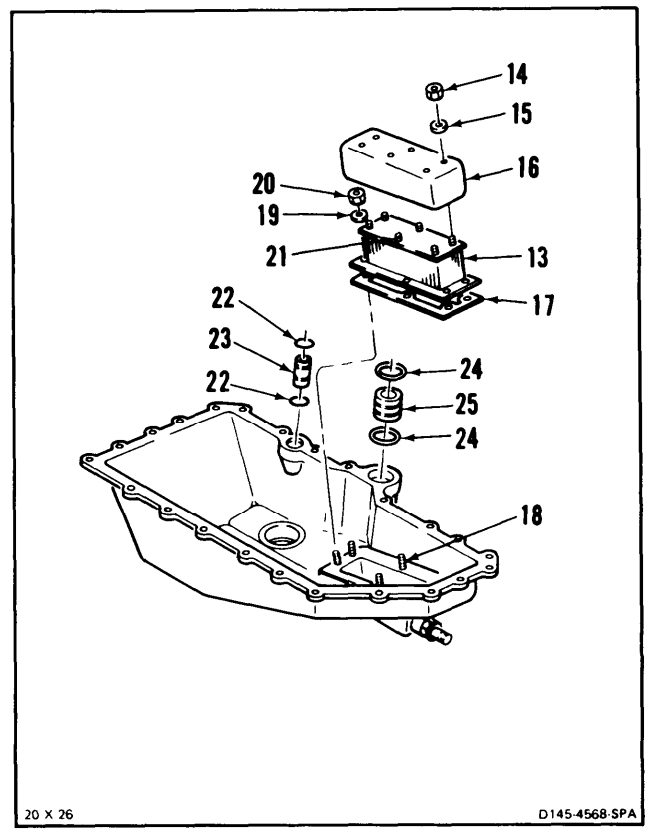
    b. Clean inlet screen (13) with solvent (E162) and clean cloths (E120). Dry screen with compressed air. Wear goggles.

13. **Install gasket seal (17) and inlet screen (13)** on six studs (18). Install six washers (19) and nuts (20). **Torque nuts to 20 inch-pounds.**

14. If cap (16) was removed, **install cap** on six studs (21). Install six washers (15) and nuts (14). **Torque nuts to 20 inch-pounds.**

15. **Install** two packings (22) on **transfer tube (23).** Install **transfer tube.**

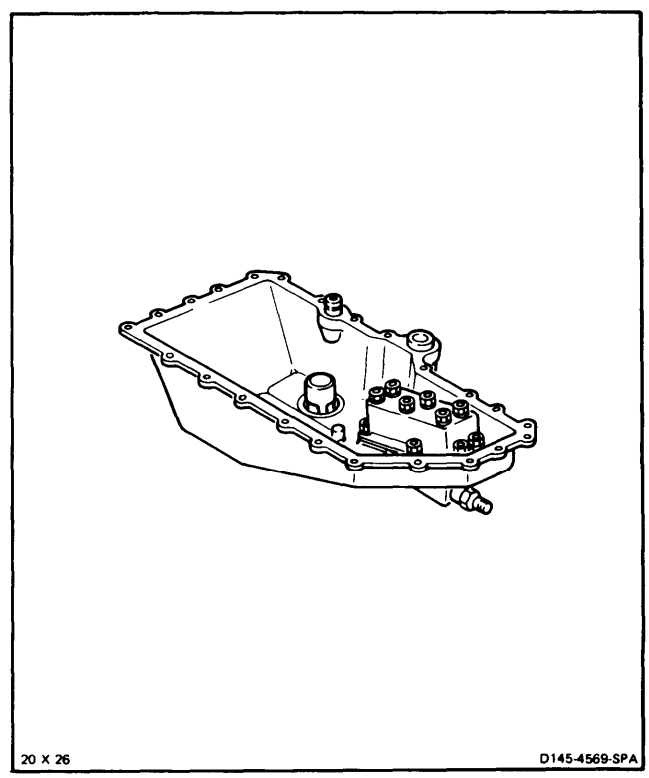
16. **Install** two packings (24) on **transfer tube (25).** Install **transfer tube.**



INSPECT

FOLLOW-ON MAINTENANCE:

None



END OF TASK

6-37 INSTALL FORWARD TRANSMISSION SUMP

INITIAL SETUP

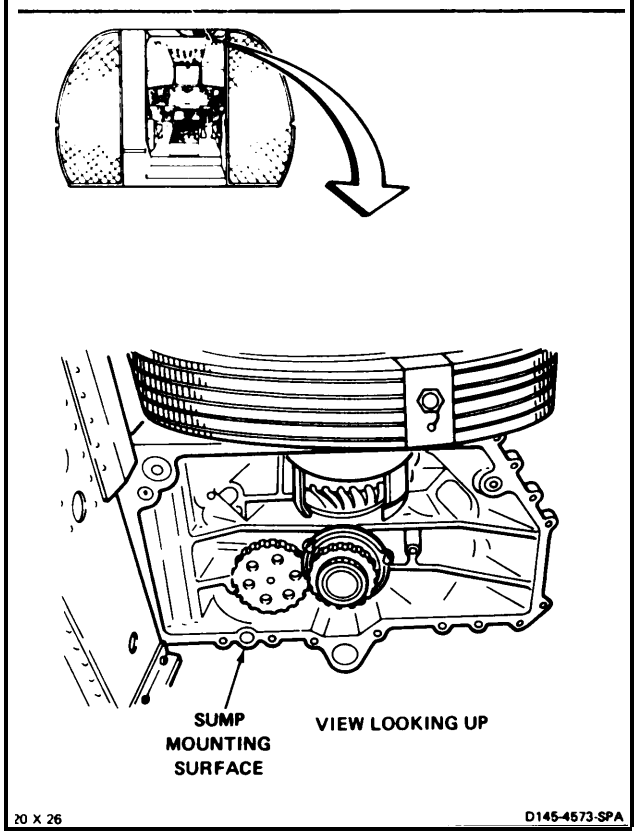
Applicable Configurations:
All

Tools:
Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692
Torque Wrench, 30 to 150 Inch-Pounds

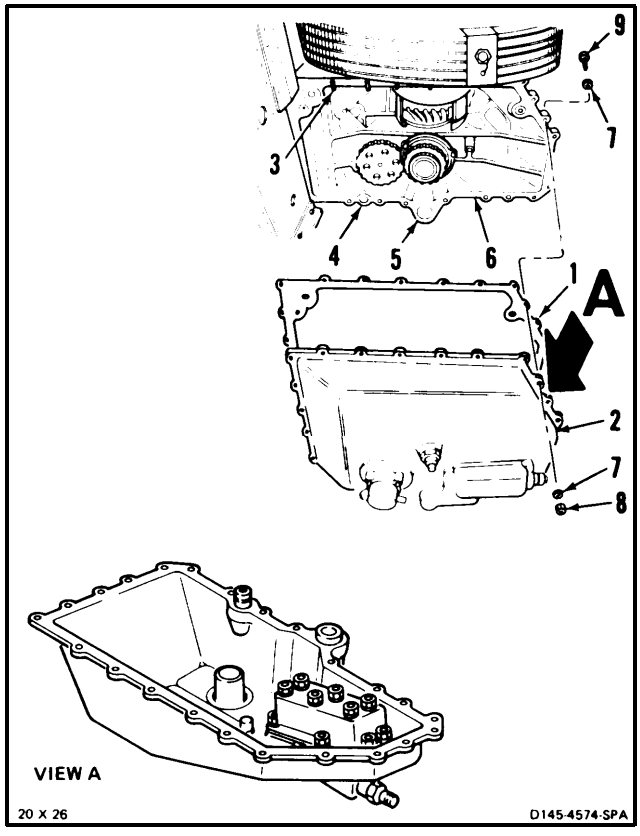
Materials:
None

Personnel Required:
67U10 Medium Helicopter Repairer
67U30 Inspector

References:
TM 55-1520-240-23P



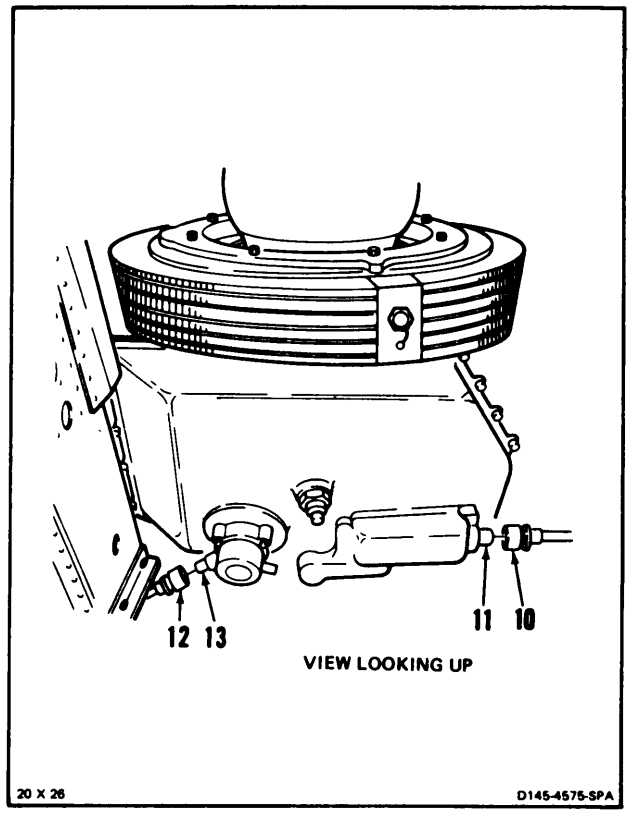
1. Position gasket seal (1) on sump (2).
2. Align sump (2) and gasket seal (1) with 16 studs (3) and two transfer tube ports (4 and 5).
3. **Position sump and seal against transmission (6). Install 16 washers (7) and nuts (8),** finger tight, on studs (3).
4. **Install seven bolts (9)** and washers (7) through transmission (1) and sump (2). **Install seven washers (7) and nuts (8)** on bolts.
5. **Torque 23 nuts (8) to 60 inch-pounds.**



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6. **Connect connector (10)** to temperature bulb receptacle (11). **Connect connector (12)** to chip detector receptacle (13).

INSPECT



FOLLOW-ON MAINTENANCE:

Service forward transmission (Task 1-54).

Perform ground run (TM 55-1520-240-10).

Install forward transmission drip pan (Task 2-3).

END OF TASK

6-37.1 CLEAN AND INSPECT FORWARD TRANSMISSION OIL FILLER SCREEN

INITIAL SETUP

Applicable Configurations:
All

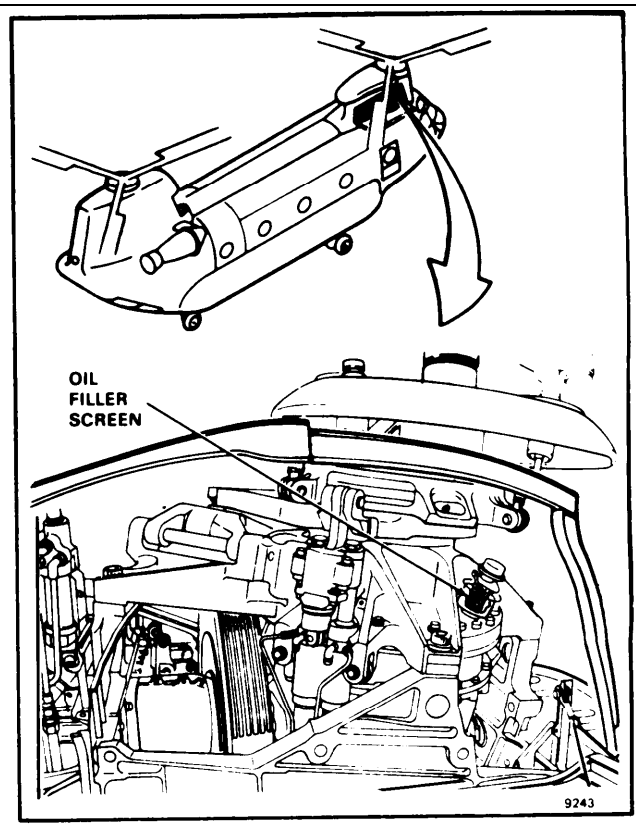
Tools:
Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692

Materials:
Dry Cleaning Solvent (E162)
Cloth (E120)
Brush (E86)
Gloves (E186)

Personnel Required:
Medium Helicopter Repairer
Inspector

References:
Task 6-108
TM 55-1520-240-23P

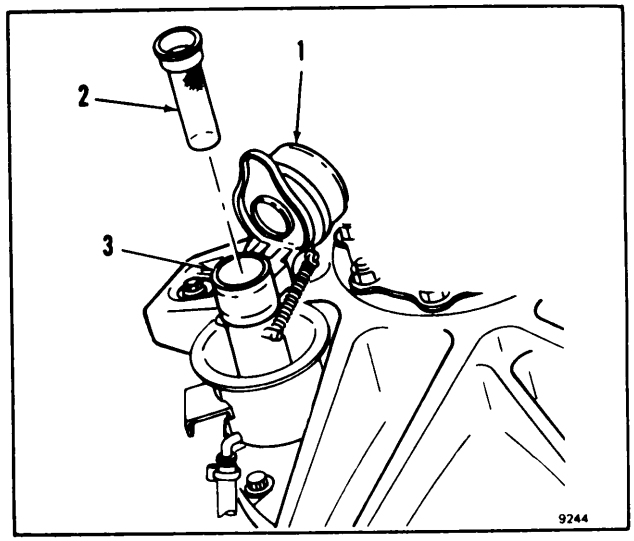
Equipment Condition:
Battery Disconnected (Task 1-39)
Electrical Power Off
Forward Transmission Fairing Right Work Platform Open (Task 2-2)



WARNING

Take precautions to ensure that the transmission is not serviced with the screen removed. Foreign matter could enter the oil system.

1. Open cap assembly (1). **Remove screen (2)** from neck of filler.
2. Close cap assembly (1).



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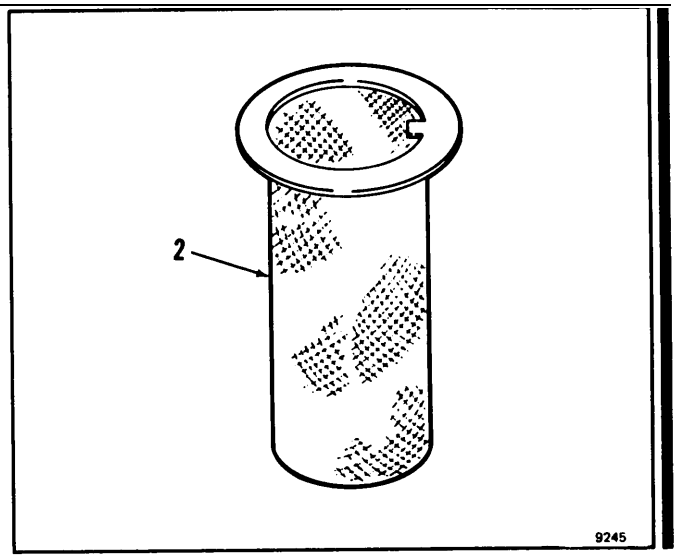
6-37.1 CLEAN AND INSPECT FORWARD TRANSMISSION OIL FILLER SCREEN (Continued)

3. **Check screen (2)** for bits of metal and other debris. Retain debris for contamination analysis (Task 6-108).

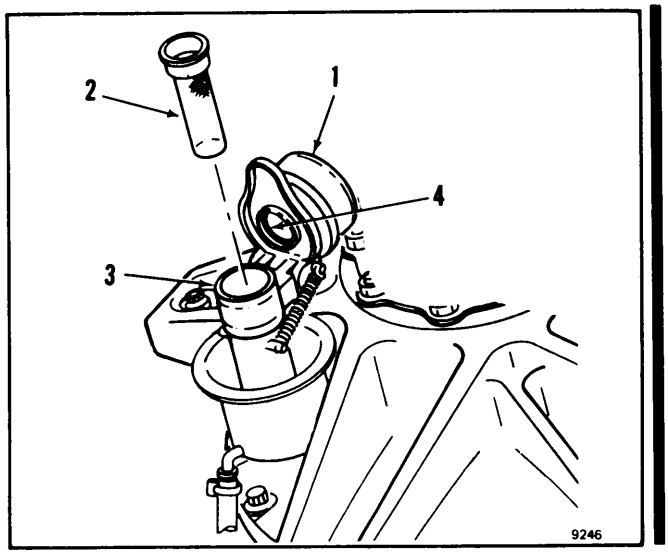
WARNING

Dry cleaning solvent (E162) is flammable and toxic. It can irritate skin and cause bums. Use only in well-ventilated area, away from heat and open flame. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.

4. Clean screen (2) with solvent (E162) and brush (E86). Wear gloves (E186) and goggles. Dry with cloth (E120) or let air dry.
5. **inspect screen (2)** for tears. There shall be no tears.



6. Open cap assembly (1). **Install screen (2)** in neck (3) of filler.
7. Check packing (4) on underside of cap assembly (1) for condition. There shall be no cuts or nicks.

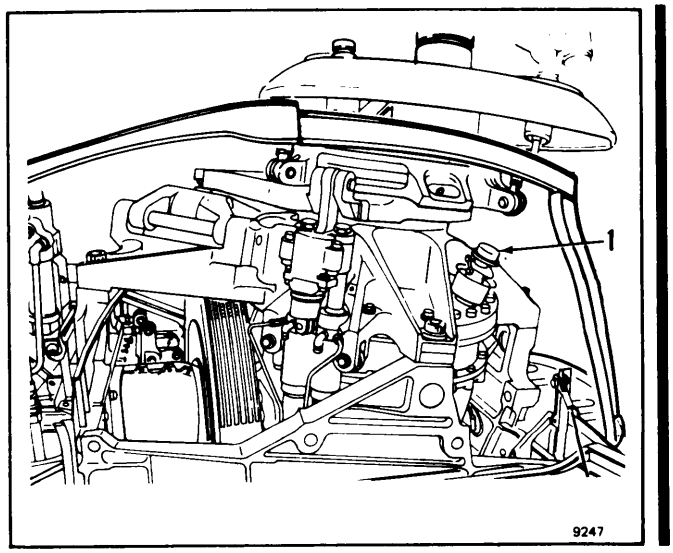


8. Close cap assembly (1).

INSPECT

FOLLOW-ON MAINTENANCE:

Close aft pylon doors (Task 2-2).



END OF TASK

6-37.2 REMOVE FORWARD TRANSMISSION OIL FILLER ASSEMBLY 6-37.2

INITIAL SETUP

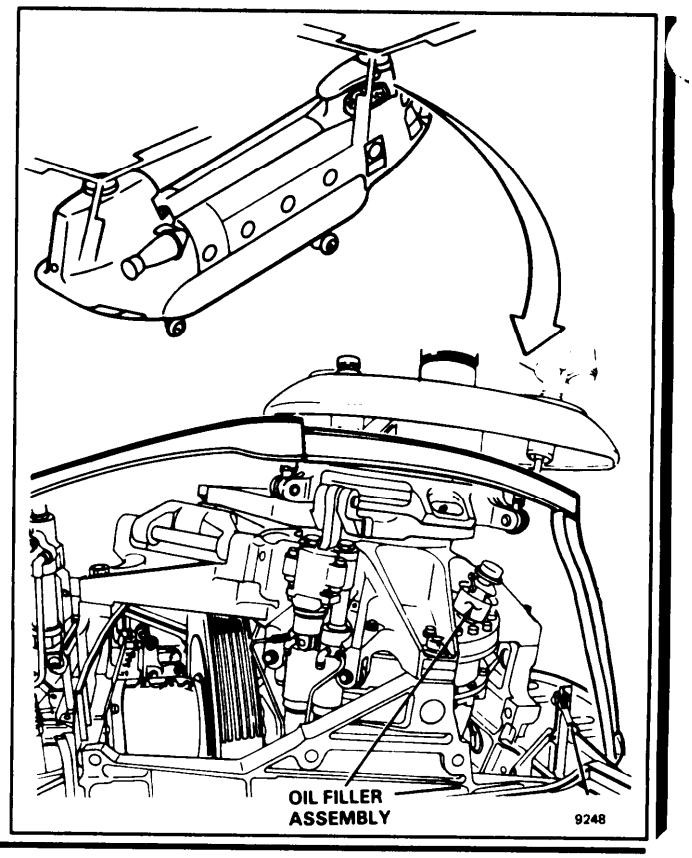
Applicable Configurations:
All

Tools:
Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692

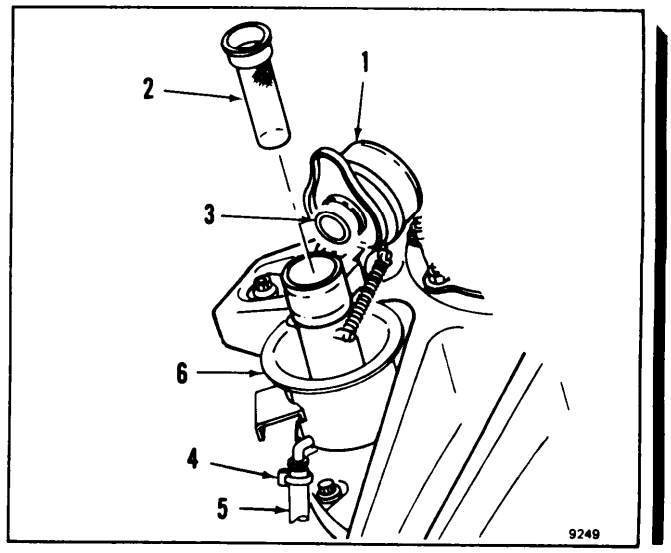
Materials:
Barrier Material (E80)
Masking Tape (E380)

Personnel Required:
Medium Helicopter Repairer

Equipment Condition:
Battery Disconnected (Task 1-39)
Electrical Power Off
Forward Transmission Fairing Right Work Platform Open (Task 2-2)



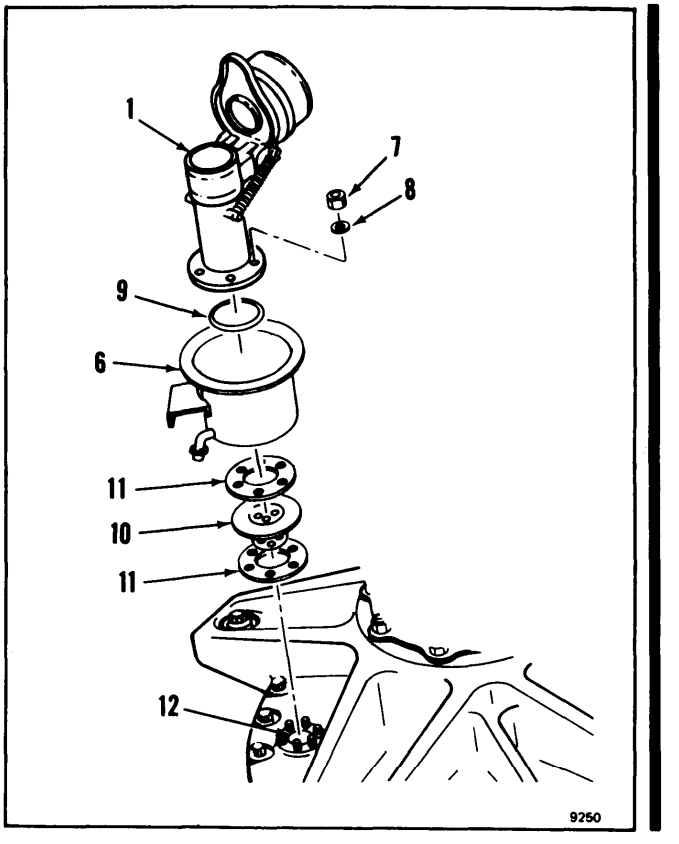
1. Open cap assembly (1). **Remove screen (2). Remove packing (3)** from underside of cap.
2. Loosen clamp (4). **Remove hose (5)** and clamp from cup (6).



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6-37.2 REMOVE FORWARD TRANSMISSION OIL FILLER ASSEMBLY 6-37.2 (Continued)

3. Remove six nuts (7) and washers (8) from inside cup (6). **Remove cap assembly (1)** and packing (9).
4. **Remove cup (6),** baffle (10), and two gaskets (11).
5. **Cover cavity (12)** with barrier material (E80) and masking tape (E380).



FOLLOW-ON MAINTENANCE:

None

END OF TASK

6-37.3 INSTALL FORWARD TRANSMISSION OIL FILLER ASSEMBLY 6-37.3

INITIAL SETUP

Applicable Configurations:
All

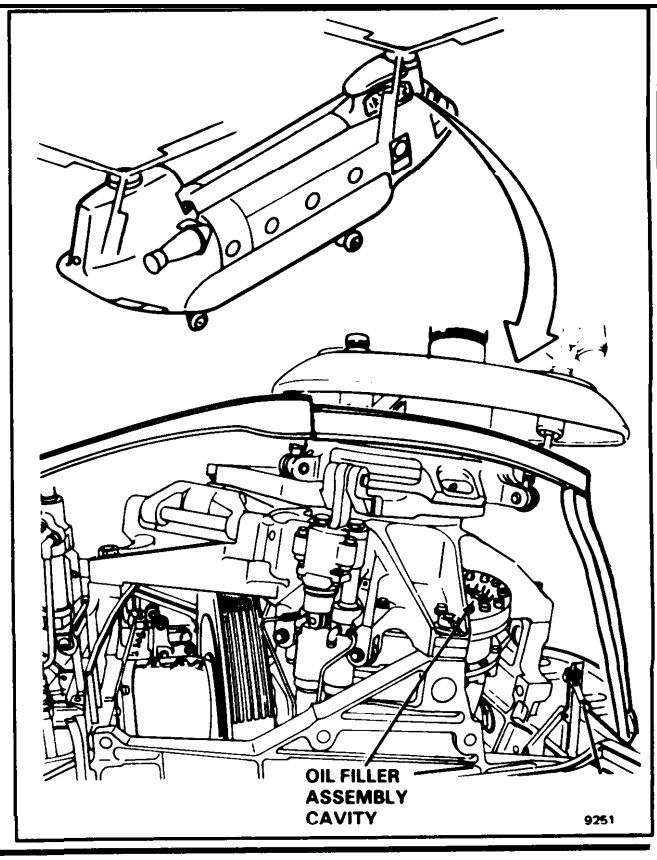
Tools:
Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692
Torque Wrench, 5 to 50 Inch-Pounds

Materials:
None

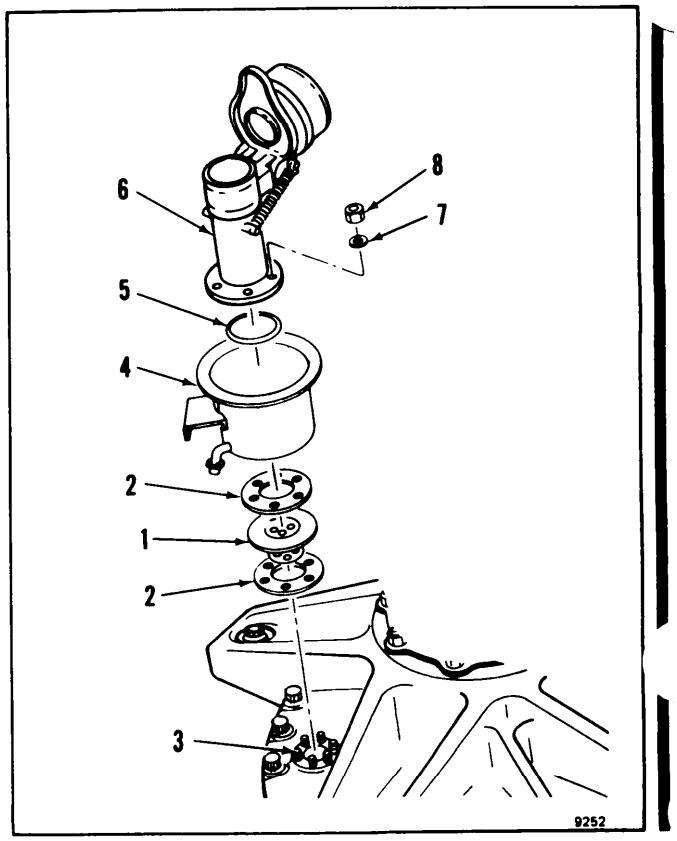
Parts:
Packing

Personnel Required:
Medium Helicopter Repairer
Inspector

References:
TM 55-1520-240-23P



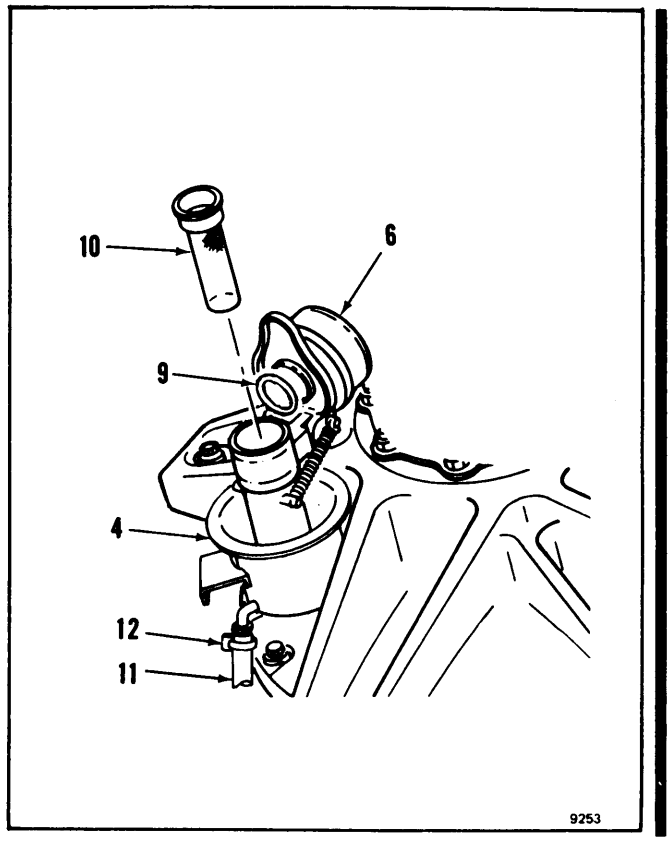
1. Place baffle (1), with flange up, between two gaskets (2). **Install baffle and gaskets on studs (3).**
2. **Install cup (4)** on studs (3).
3. **Install packing (5)** on bottom of cap assembly (6). **Install cap assembly,** with packing, on studs (3).
4. **Install six washers (7) and nuts (8)** on studs (3). **Torque nuts to <u>20 inch-pounds.</u>**



GO TO NEXT PAGE

6-37.3 INSTALL FORWARD TRANSMISSION OIL FILLER ASSEMBLY 6-37.3 (Continued)

5. Open cap assembly (6). **Install packing (9)** on bottom of cap.
6. **Install screen (10)** in neck of cap assembly (6).
7. **Install hose (11)** on cup (4). Tighten clamp (12).

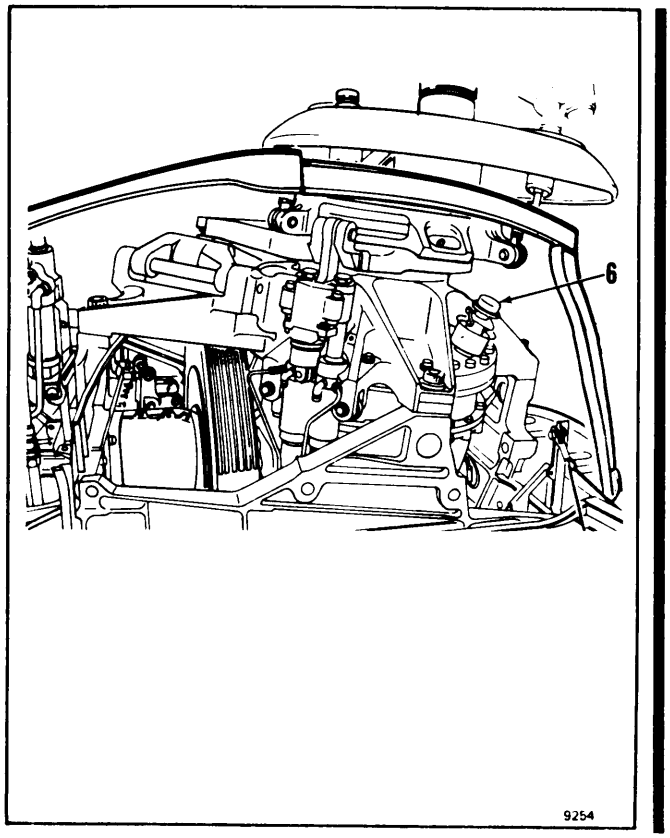


8. Close cap assembly (6).

INSPECT

FOLLOW-ON MAINTENANCE:

Close forward transmission right fairing (Task 2-2).



END OF TASK

6-38 REMOVE FORWARD TRANSMISSION SLIDER SHAFT

INITIAL SETUP

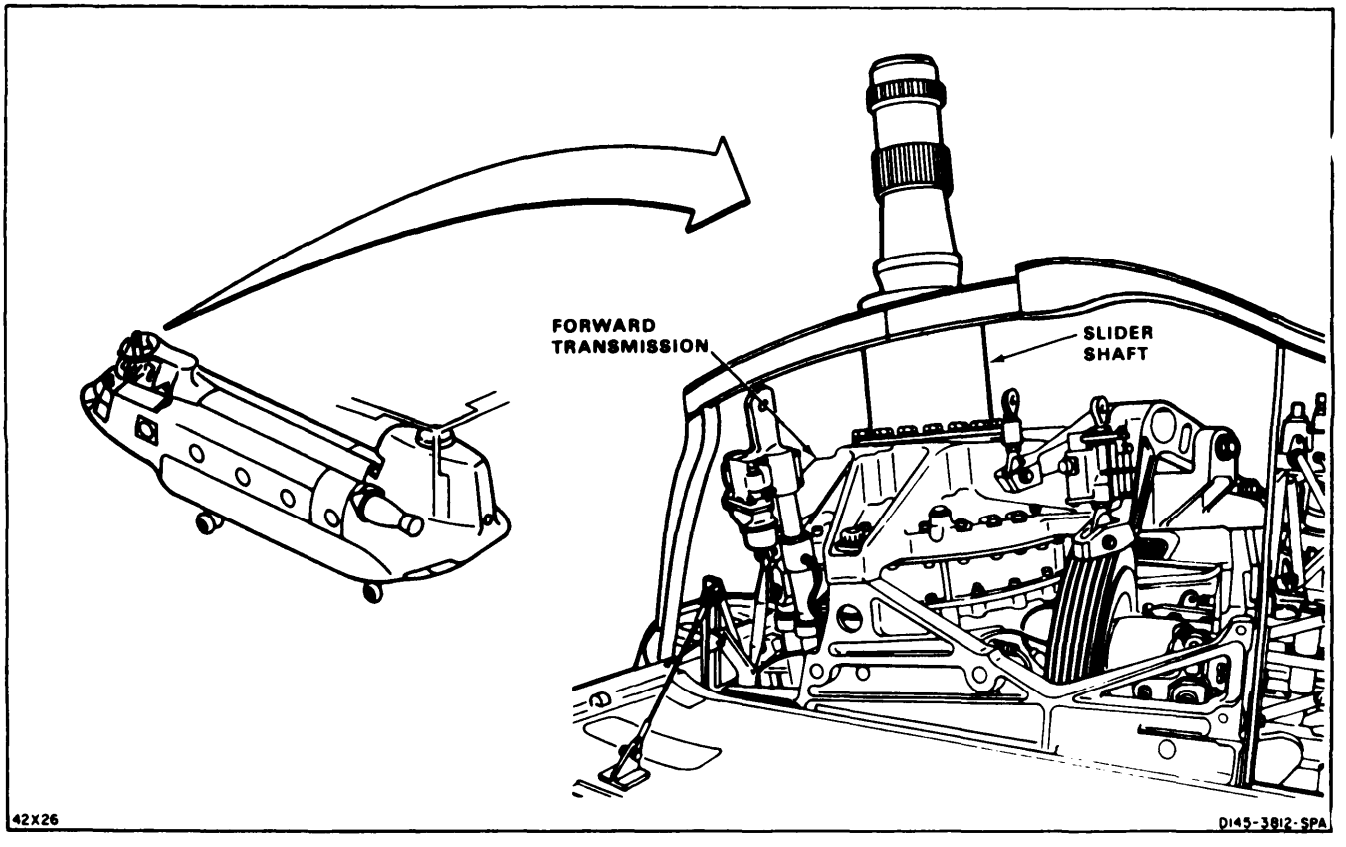
Applicable Configurations:
All

Tools:
Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692

Materials:
Barrier Material (E81)
Tape (E388)

Personnel Required:
67U10 Medium Helicopter Repairer

Equipment Condition:
Battery Disconnected (Task 1-39)
Electrical Power Off
Forward Rotary-Wing Blades Removed (Task 5-64)
Forward Rotary-Wing Head Removed (Task 5-8)
Forward Cover, Links, and Drive Arms Removed (Task 6-47)
Forward Swashplate Removed (Task 6-47)
Helicopter in Clean and Sheltered Area



GO TO NEXT PAGE

CAUTION

Removing slider shaft exposes transmission parts to contamination. Do this task only in a clean, sheltered area. Otherwise, transmission can be damaged.

1. **Remove 8 nuts (1)** and washers (2) from base of slider shaft (3).

CAUTION

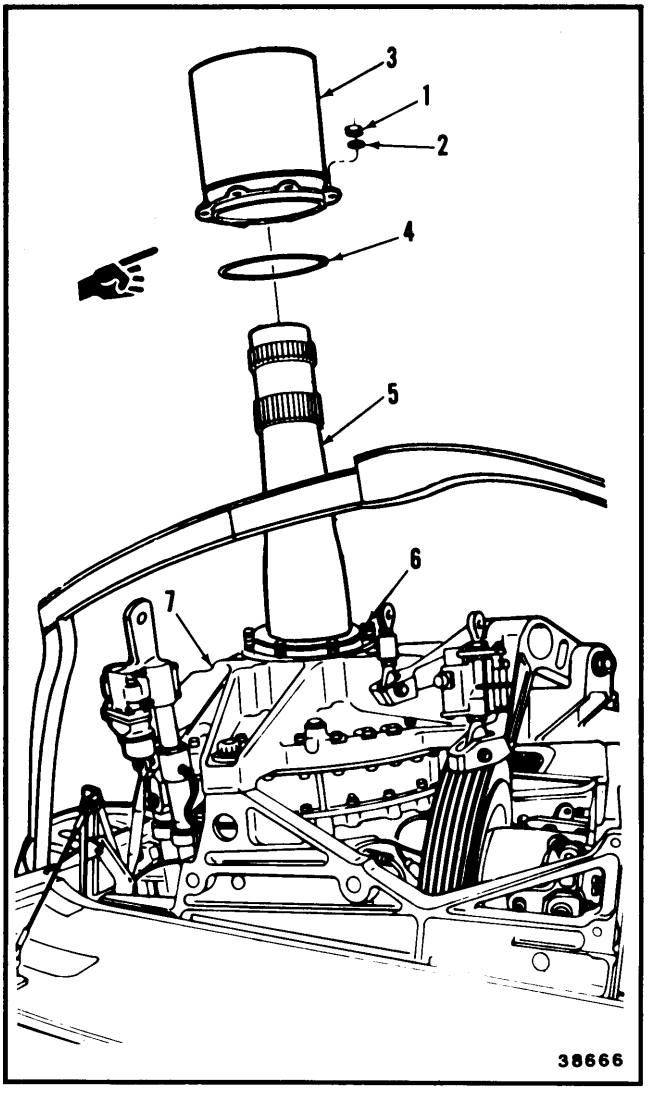
Do not scratch polished surface. Handle slider shaft carefully.

NOTE

Packing may come off with shaft or stay with transmission.

2. **Lift slider shaft (3),** with packing (4), from shaft (5).
3. **Cover opening (6)** into transmission (7). Use barrier material (E81) and tape (E388).

FOLLOW-ON MAINTENANCE:
None



END OF TASK

6-38.1 REPAIR FORWARD TRANSMISSION SLIDER SHAFT 6-38.1

INITIAL SETUP

Applicable Configurations:

All

Tools:

Dial Indicating Gage 643J

Materials:

Naphtha (E245)
Emery Cloth (E123)
Abrasive Paper (E13)
Crocus Cloth (E122)
Cloths (E120)
Gauze Sponges (E184)
Gloves (E184.1)
Acetic Acid (E21)
AIodine Powder (E65)
Epoxy Primer (E292) or (E293)

Personnel Required:

Aircraft Powertrain Repairer
Inspector

References:

TM 43-0103
MIL-C-5541

Equipment Condition:

Off Helicopter Task

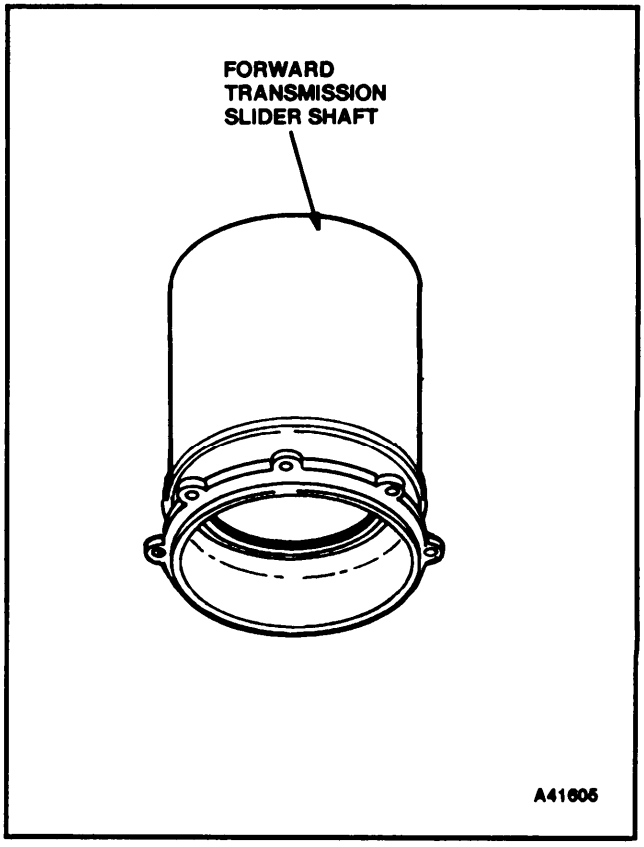
General Safety Instructions:

WARNING

Naphtha (E245) is combustible and toxic. It can irritate skin and cause burns. Use only with adequate ventilation, away from open flame. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.

CAUTION

Do not wear photogray glasses when fluorescent inspecting. They reduce ability to see cracks.



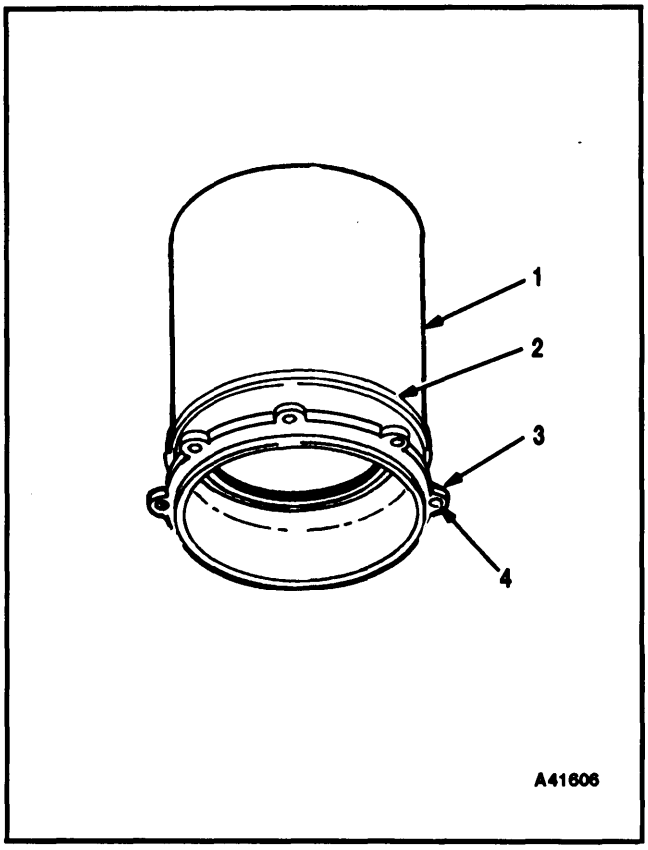
GO TO NEXT PAGE

1. **Clean** oil and grease from **slider shaft (1).** Use naphtha (E245) and clean cloths (E120). Wear gloves (E184.1).
2. **Inspect surface of slider shaft (1)** for nicks, scratches, and minor pitting or corrosion of coating. Observe the following definitions:
   a. Nick - A surface indentation with a sharp crease at the bottom. Surface finish is not broken. Caused by pressure or impact from a hard object with a sharp edge.
   b. Scratch - A light, narrow mark on the surface. Surface finish is broken, but not removed. Caused by a hard, sharp particle moving across the surface.
   c. Pit - A small irregular cavity where material is removed from the surface. Usually caused by corrosion. Pits are usually dark in appearance.
   d. Corrosion - A broken or pitted surface, discolored around the edge. Corrosion is caused by chemical action.
3. Note extent and location of damage:

NOTE

Limits in this step refer to depth of damage after rework.

   a. **Depth of damage above flange (2) (bearing surface) shall not be more than 0.020 inch. Depth of damage below flange shall not be more than 0.025 inch.**
   b. **Damage shall not extend from shaft surface to mounting flange (3).**
   c. **Damage on mounting flange (3) shall not be closer than 1.00 inch to any mounting hole (4).**



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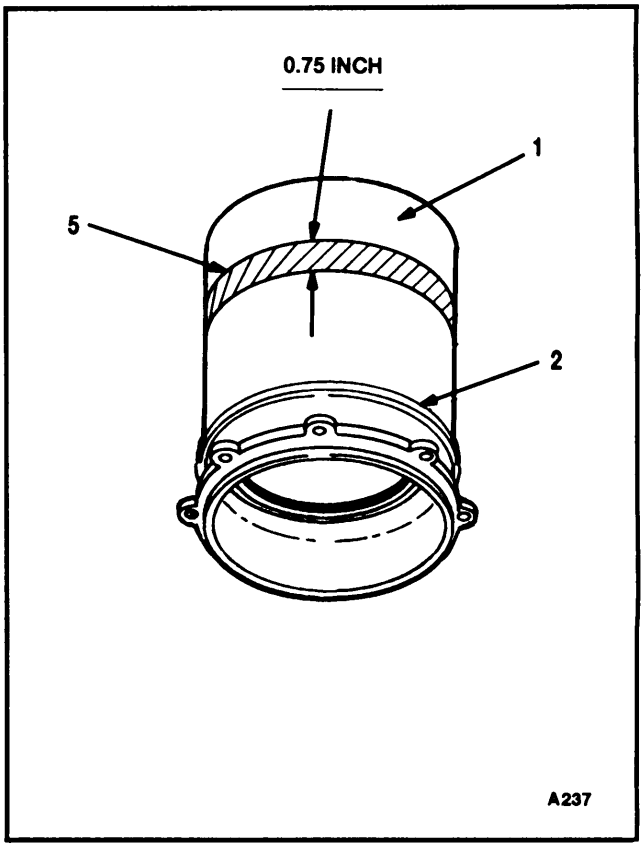
d. **The sum of length plus width of any one damaged area shall not be more than 1.25 inches.**

e. **Distance between two damaged areas shall not be less than half the length of the larger area.**

f. **In that part of shaft (1) above flange (2), there shall be no more than 20 damaged areas in any 0.75 inch wide band (5) around shaft (1). There shall be no more than five damaged areas in any quarter-section of the band. The total of length plus width of all five areas shall not be more than 5.5 inches.**

g. **There shall be no more than 75 damaged areas over entire shaft (1).**

h. **Damaged areas may exceed the above limits to include wear over the total surface of the slider above the flange provided maximum depth of damage does not exceed 0.008 inch.**



4. **Fluorescent inspect** damaged area to check for cracks. (Refer to TM 43-0103.) There shall be no cracks.

5. **Blend out damage** with emery cloth (E123) or abrasive paper (E13). Observe the limits of step 3.

6. **Smooth blended area** with crocus cloth (E122). Do not leave any sharp edges.

7. **Acid-etch the reworked area** as follows:

WARNING

Acetic acid (E21) is combustible and toxic. It can irritate skin and cause burns. Avoid inhaling. Use only with adequate ventilation, away from open flame. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eves with water for at least 15 minutes. Get medical attention for eyes.

a. **Prepare a solution of 3 parts acetic acid (E21) to 7 parts water.** Wear gloves (E184.1) and goggles.

b. **Swab the area with solution for 2 minutes.** Use gauze sponges (E184)

c. **Rinse** the area with cold water.

GO TO NEXT PAGE

8. **Fluorescent inspect** reworked area to check for cracks (TM 43-0103). There shall be no cracks.
9. Apply surface treatment to reworked area as follows:
   a. **Clean area with naphtha (E245)** and clean cloths (E120). Let the area air dry.

WARNING

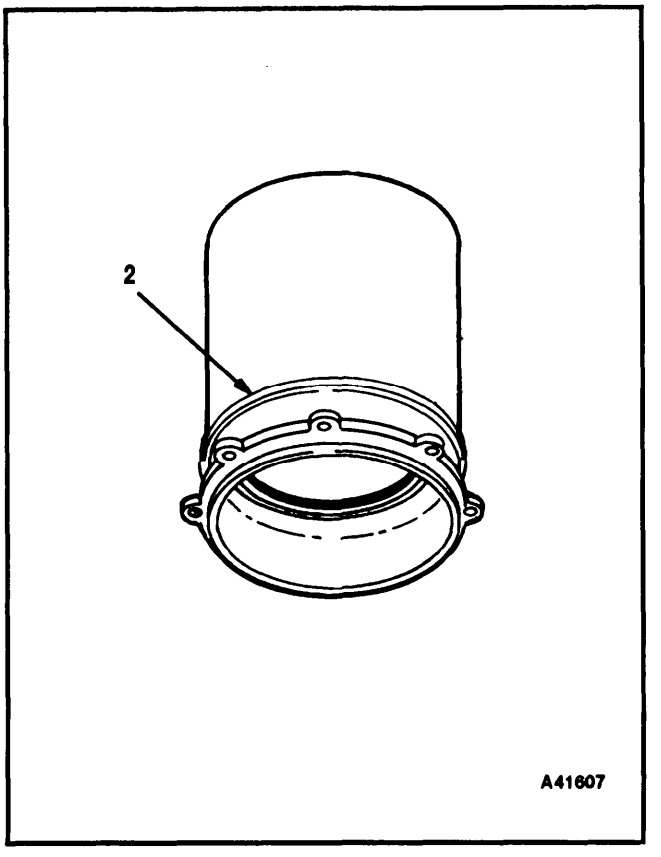
Alodine powder (E65) is an oxidizer. Discard cloths which contain this material in a separate container. If discarded with cloths contaminated with acetone, MEK, or other organic solvents, combustion can result. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.

   b. **Swab solution of alodine powder (E65) in water on area (MIL-C-5541). Swab for 2 to 5 minutes.** Use gauze sponges (E184).
   c. **Rinse** the area with cold water. Let air dry.

WARNING

Epoxy primer (E292) or (E293) is flammable and toxic. It can irritate skin and cause burns. Use only with adequate ventilation, away from heat or open flame. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.

   d. If reworked area is below flange (2), apply epoxy primer (E292) or (E293). Wear gloves (E184.1).



INSPECT

FOLLOW-ON MAINTENANCE:
None

END OF TASK

6-39 REMOVE FORWARD TRANSMISSION ROTOR SHAFT OIL SEAL

INITIAL SETUP

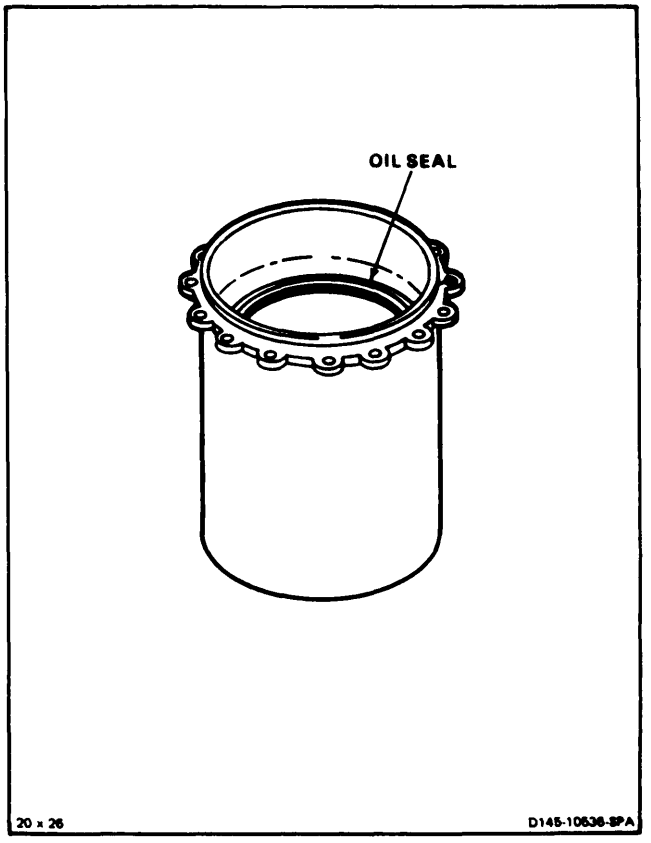
Applicable Configurations:
All

Tools:
Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692

Materials:
None

Personnel Required:
67U10 Medium Helicopter Repairer

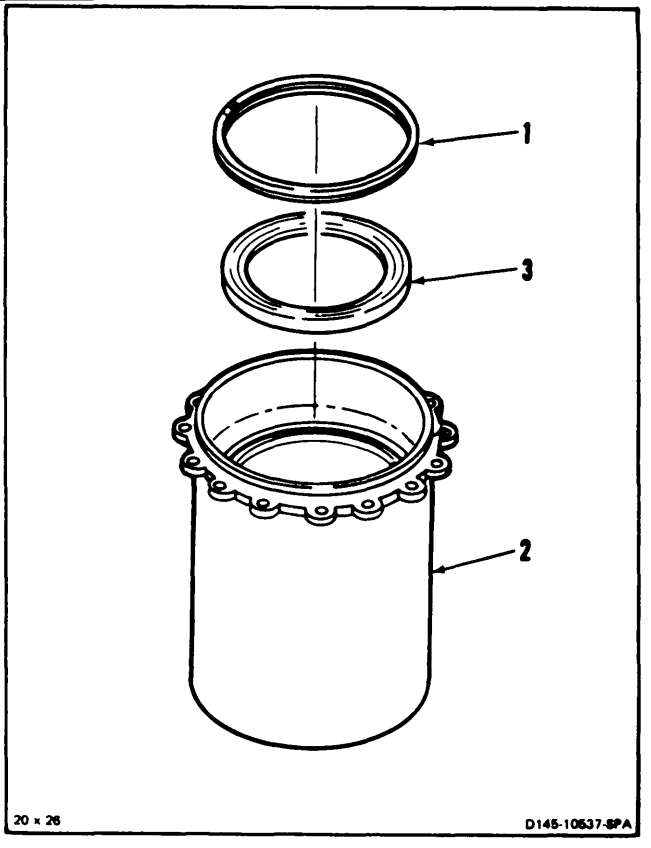
Equipment Condition:
Off Helicopter Task



1. **Remove retaining ring (1)** from inside slider shaft (2).
2. **Remove seal (3).**

FOLLOW-ON MAINTENANCE:

None



END OF TASK

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Aluminum Drift, 8 1/2-Inches OD, 1/4-inch Thick Wall
Gun Heater
Pyrometer
Kevlar Gloves (E187)

Materials:

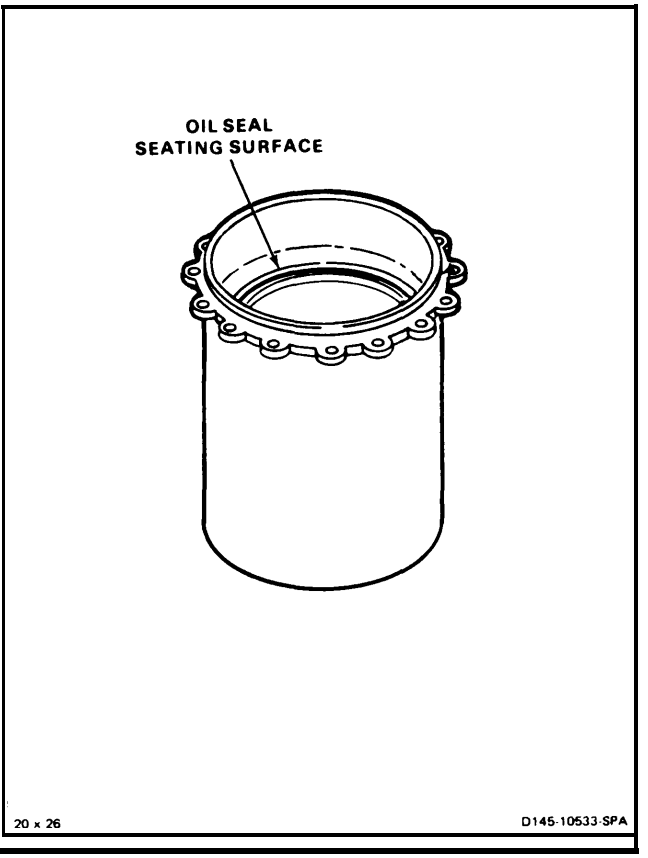
Acetone (E20)
Cloths (E120)
Gloves (E186)
Grease (E190)

Personnel Required:

Medium Helicopter Repairer
Inspector

References:

TM 55-1520-240-23P



WARNING

Acetone (E20) is flammable and toxic. It can irritate skin and cause burns. Use only in well-ventilated area, away from heat and open flame. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.

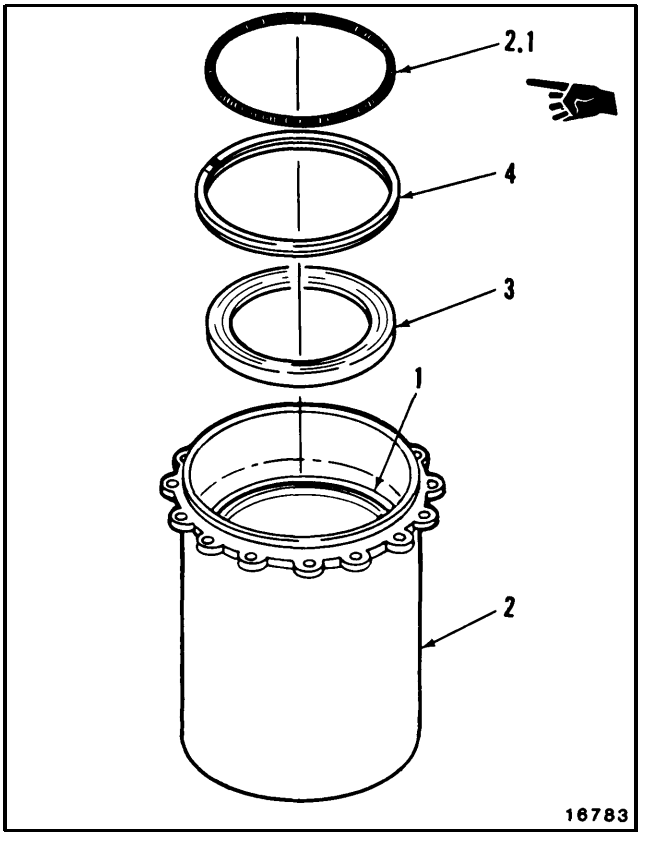
1. Clean seal seating surface (1) inside slider shaft (2). Use acetone (E20) and cloths (E120). Wear gloves (E186).

1.1 Remove and discard spring (2.1) from within seal (3).

WARNING

Wear Kevlar gloves when handling heated parts.

2. Heat seal seating surface (1) to 230 to 250ºF (110 to 120°C). Use a gun-type heater and a pyrometer. Wear Kevlar gloves (E187).
3. **Install seal (3)** in slider shaft (2), flat side down. Use drift.
4. **Install retaining ring (4).**

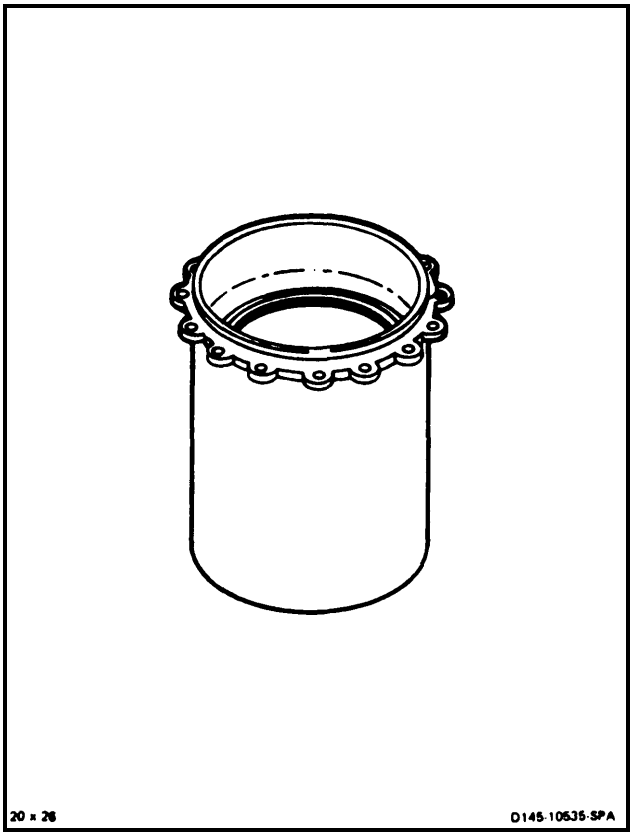


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6-40 INSTALL FORWARD TRANSMISSION ROTOR SHAFT OIL SEAL (Continued) 6-40

FOLLOW-ON MAINTENANCE:

None



END OF TASK

6-41 INSTALL FORWARD TRANSMISSION SLIDER SHAFT

INITIAL SETUP

Applicable Configurations:
All

Tools:
Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692
Torque Wrench, 30 to 150 Inch-Pounds

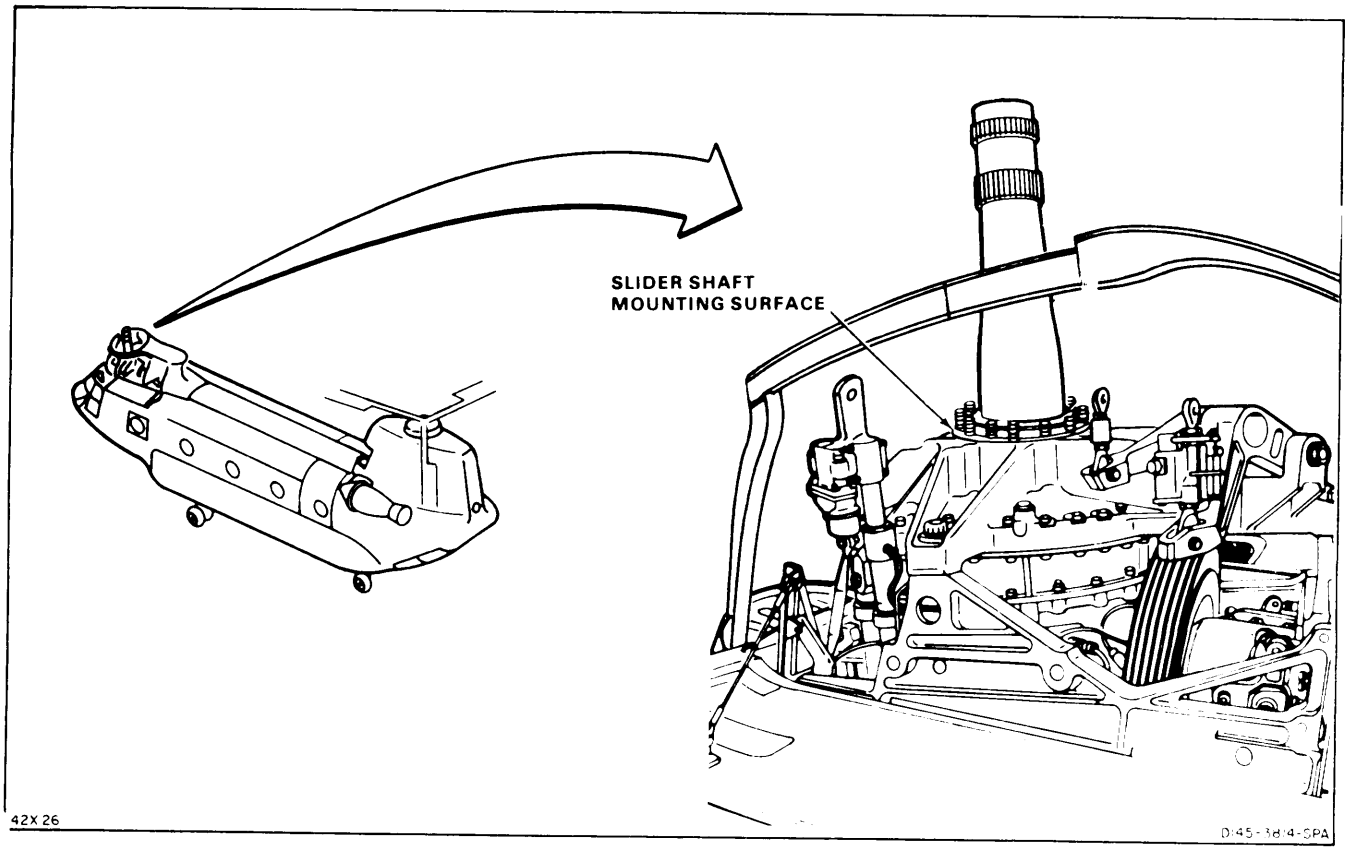
Materials:
Grease (E190)

Parts:
Packing

Personnel Required:
67U10 Medium Helicopter Repairer
67U30 Inspector

References:
TM 55-1520-240-23P

Equipment Condition:
Helicopter in Clean and Sheltered Work Area



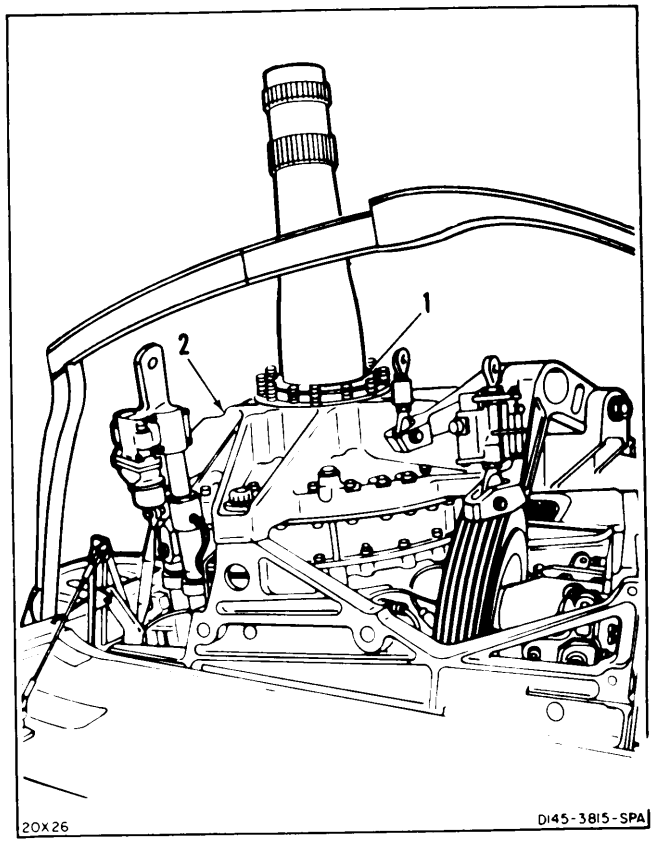
GO TO NEXT PAGE

6-41 INSTALL FORWARD TRANSMISSION SLIDER SHAFT (Continued)

CAUTION

Installing a slider shaft exposes transmission parts to contamination. Do this task only in a clean, sheltered area. Otherwise, transmission can be damaged.

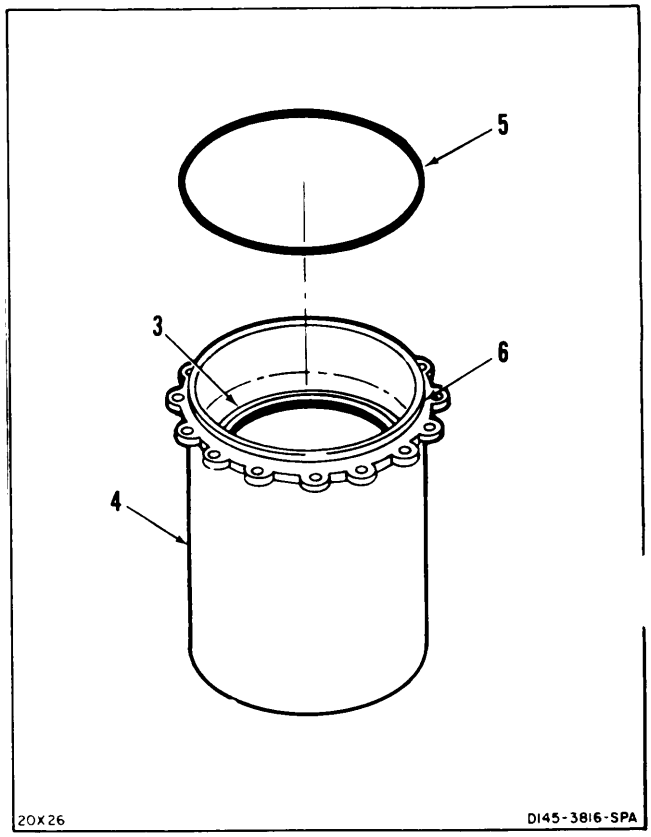
1. Remove barrier material from opening (1) in transmission (2).



CAUTION

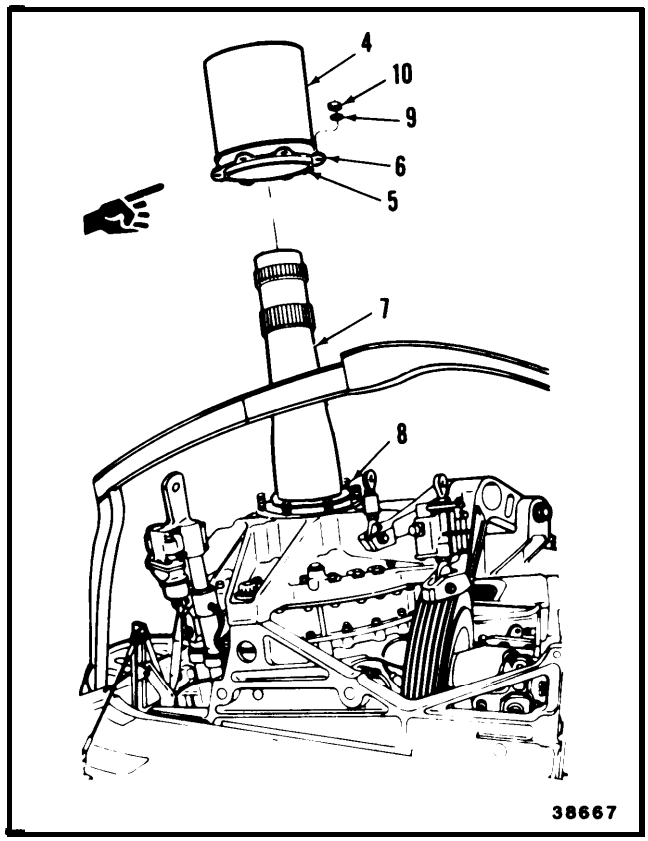
Do not scratch polished surface. Handle slider shaft carefully.

2. Pack grease (E190) between lips of seal (3) on inside of slider shaft (4).
3. Install packing (5) around flange (6).



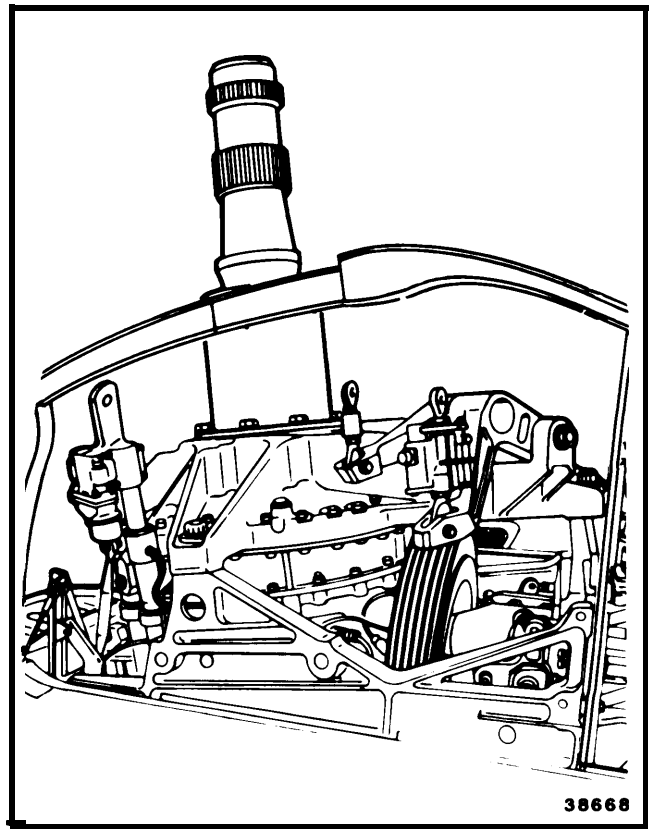
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4. **Apply** a light coat of **grease (E190) to** the thread of 8 **studs (8).**
5. **Lower slider shaft (4),** with flange (6) down, over rotor shaft (7). Position slider shaft on 8 studs (8). Make sure packing (5) stays on flange.
6. **Install 8** washers (9) **and nuts (10). Torque the nuts to 60 inch-pounds.**



INSPECT

FOLLOW-ON MAINTENANCE:
Install forward swashplate (Task 6-50).
Install forward cover, links, and drive arms (Task 6-50).
Install forward rotor head (Task 5-9).
Install forward rotor blades (Task 5-84).



END OF TASK

6-42 REMOVE FORWARD TRANSMISSION INPUT SHAFT SEAL 6-42

INITIAL SETUP

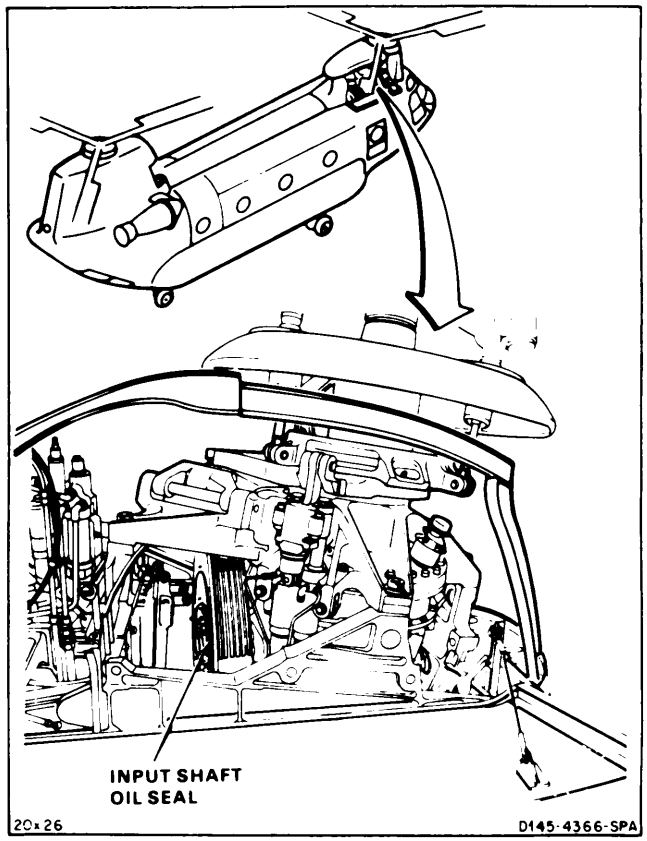
Applicable Configurations:
All

Tools:
Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
1/4-28 Bolt, At Least One Inch Long (3)

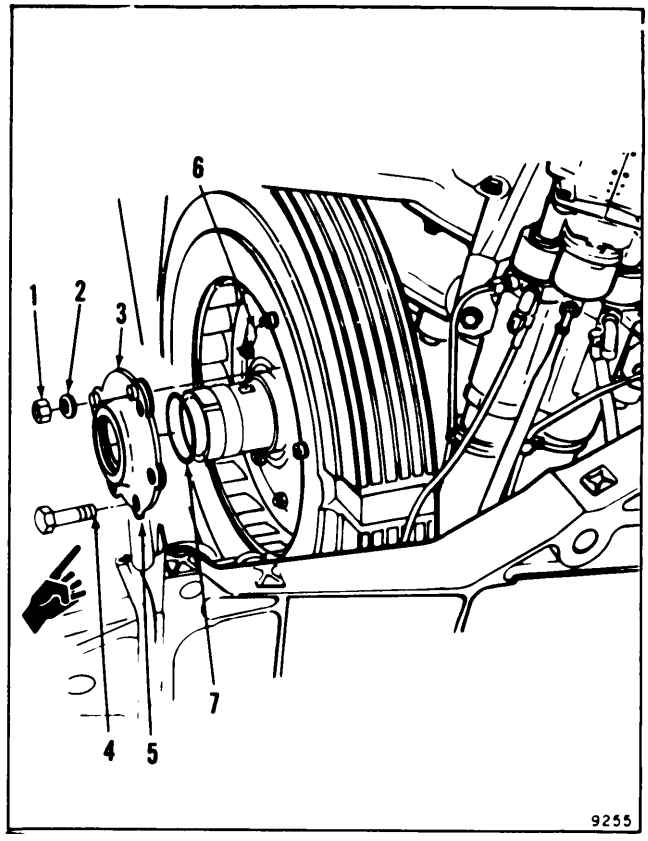
Materials:
None

Personnel Required:
Medium Helicopter Repairer

Equipment Condition:
Battery Disconnected (Task 1-39)
Electrical Power Off
Forward Transmission Fairing Opened (Task 2-2)
Oil Cooler Air Inlet Duct Removed (Task 6-121)
No. 1 and No. 2 Drive Shafts Removed (Task 6-2 and 6-3)
Oil Cooler Shroud Removed (Task 6-115)
Oil Cooler Impeller Removed (Task 6-117)



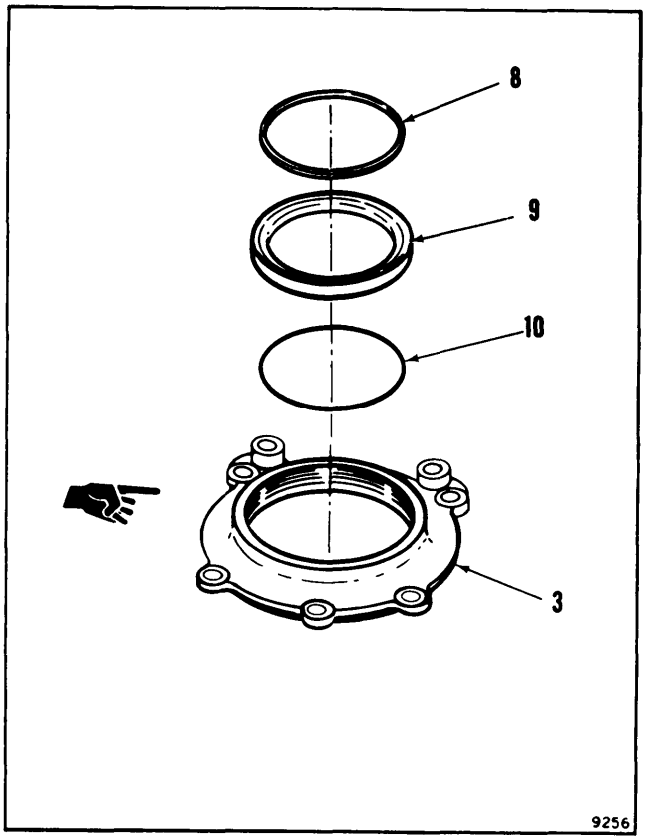
1. **Remove four nuts (1)** and washers (2) **from retainer (3).**
2. **Install** three 1/4-28 **bolts (4)** in threaded holes (5). **Turn bolts to back retainer (3) away** from transmission (6).
3. **Remove packing (7)** from retainer (3).



GO TO NEXT PAGE

6-42 REMOVE FORWARD TRANSMISSION INPUT SHAFT SEAL (Continued) 6-42

4. Remove retaining ring (8) from retainer (3). **Remove seal (9)** and packing (10).



FOLLOW-ON MAINTENANCE:

None

END OF TASK

6-43 INSTALL FORWARD TRANSMISSION INPUT SHAFT SEAL 6-43

INITIAL SETUP

Applicable Configurations:
All

Tools:
Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Aluminum Tube, 4 1/4-inch OD, 1/8-inch Wall Thickness, 1 to 6 Inches Long
Gun Heater
Pyrometer
Torque Wrench, 30 to 150 Inch-Pounds
Kevlar Gloves (E187)

Materials:
Gloves (E186)
Dry Cleaning Solvent (E162)
Cloths (E120)

Parts:
Packings

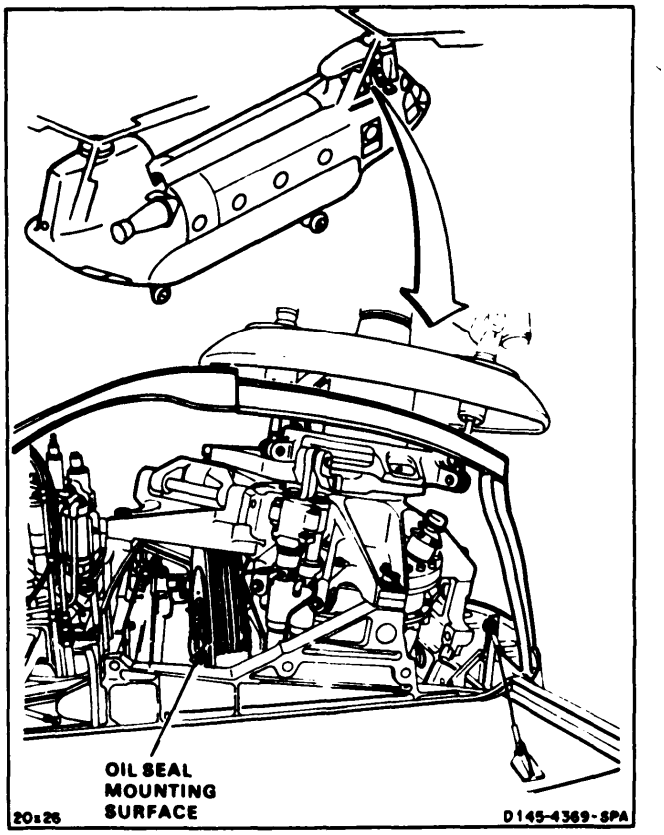
Personnel Required:
Medium Helicopter Repairer
Inspector

References:
TM 55-1520-240-23P

General Safety Instructions:

WARNING

Dry cleaning solvent (E162) is flammable and toxic. It can irritate skin and cause bums. Use only in well-ventilated area, away from heat and open flame. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.



GO TO NEXT PAGE

6-43 INSTALL FORWARD TRANSMISSION INPUT SHAFT SEAL (Continued) 6-43

1. Clean seal retainer (1). Use dry cleaning solvent (E162) and cloths (E120). Wear gloves (E186).

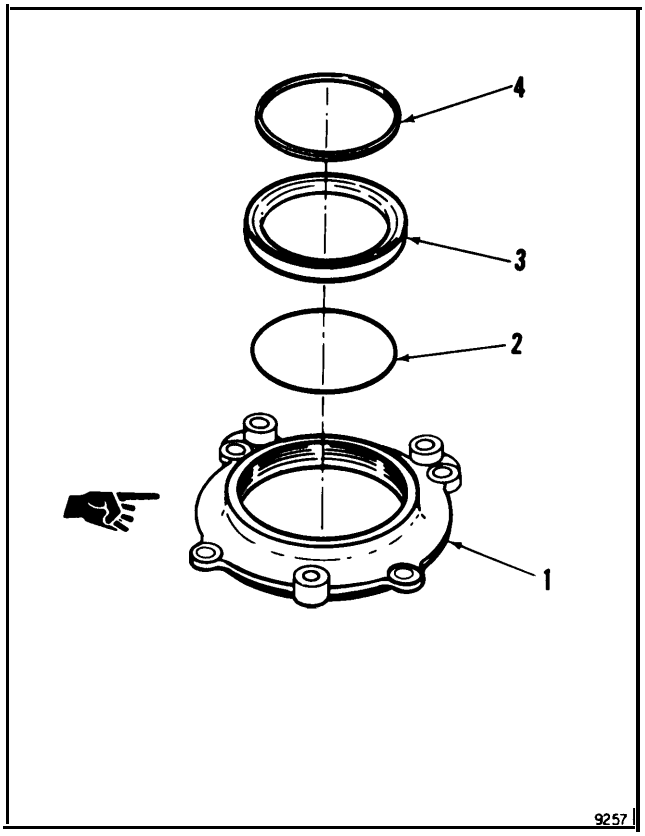
WARNING

Wear Kevlar gloves when handling hot retainer. Hot retainer can burn hands.

CAUTION

Do not heat retainer over 250 degrees F (120 degrees C) Damage can occur.

2. **Heat retainer (1) to 230 to 250 degrees F (110 to 120 degrees C) .** Use gun heater. Wear Kevlar gloves (E187). Measure temperature with pyrometer.
3. **Install packing (2)** in retainer (1).
4. **Install seal (3)** in retainer (1), flat side up. Use aluminum tube.
5. Install retaining ring (4) in retainer (1).



INSPECT

GO TO NEXT PAGE

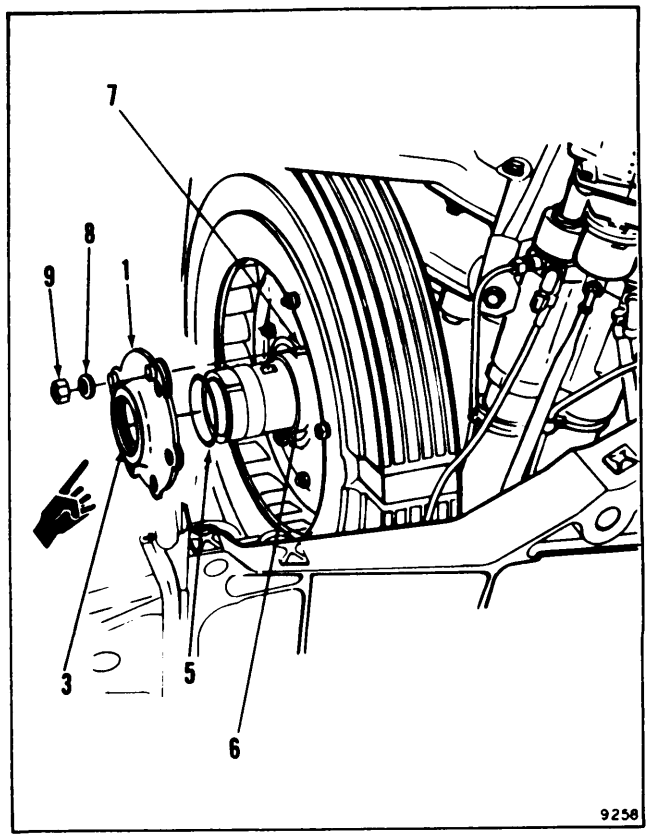
6. **Install packing (5)** in retainer (1).

CAUTION

If seal and shaft are not clean and dry, leakage can occur.

7. **Clean mating surface of shaft (6)** with dry cleaning solvent (E137). **Wipe seal (3)** with clean cloth (E120).
8. **Install retainer (1)** on four studs (7).
9. **Install four** washers (8) and **nuts (9). Torque nuts to 60 inch-pounds.**

INSPECT



FOLLOW-ON MAINTENANCE:

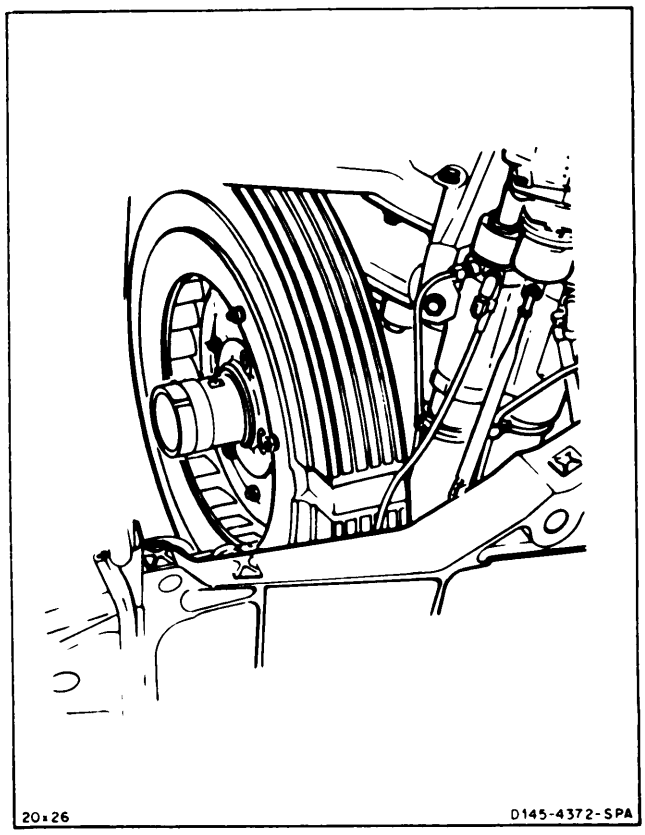
Install oil cooler impeller (Task 6-118).

Install oil cooler shroud (Task 6-116).

Install No. 1 and No. 2 drive shafts (Task 6-17 and 6-18).

Install oil cooler air inlet duct (Task 6-122).

Close forward transmission fairing (Task 2-2).



END OF TASK

6-44 REMOVE NO. 1 FLIGHT CONTROL HYDRAULIC PUMP DRIVE SHAFT SEAL

INITIAL SETUP

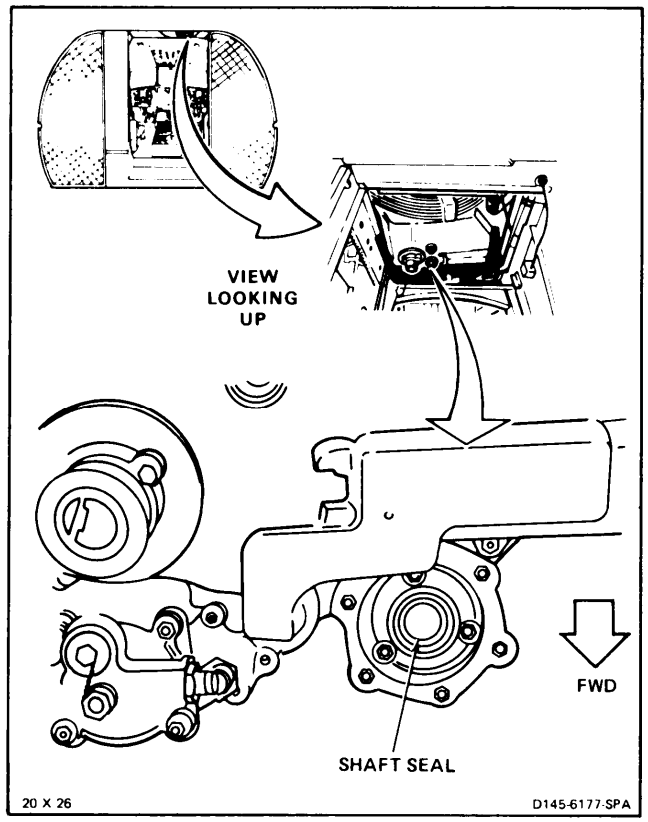
Applicable Configurations:
All

Tools:
Powertrain Repairer's Tool KIT,
NSN 5180-00-003-5267

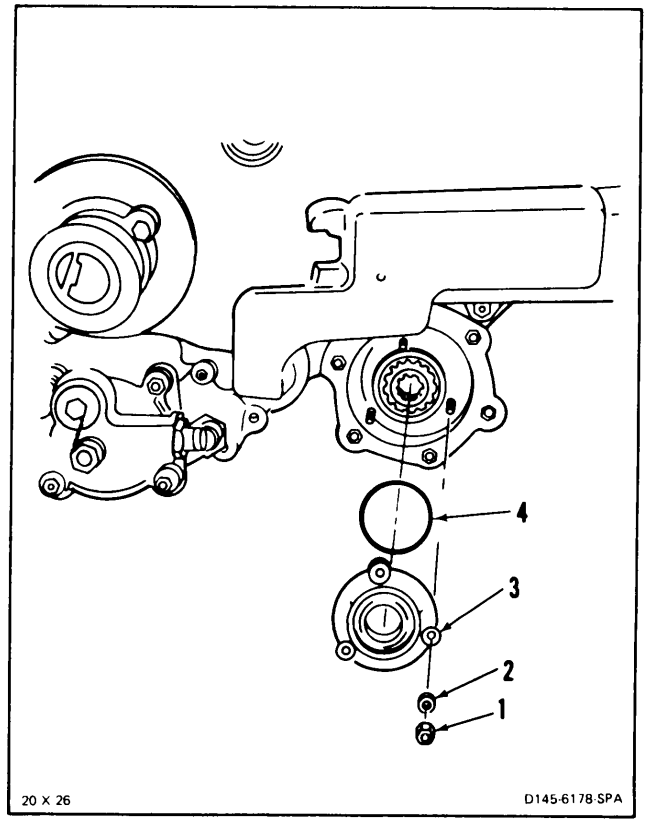
Materials:
None

Personnel Required:
68D20 Aircraft Powertrain Repairer

Equipment Condition:
Battery Disconnected (Task 1-39)
Electrical Power Off
Forward Transmission Drip Pan Removed (Task 2-3)
No. 1 Flight Control Hydraulic Pump Removed (Task 7-22)



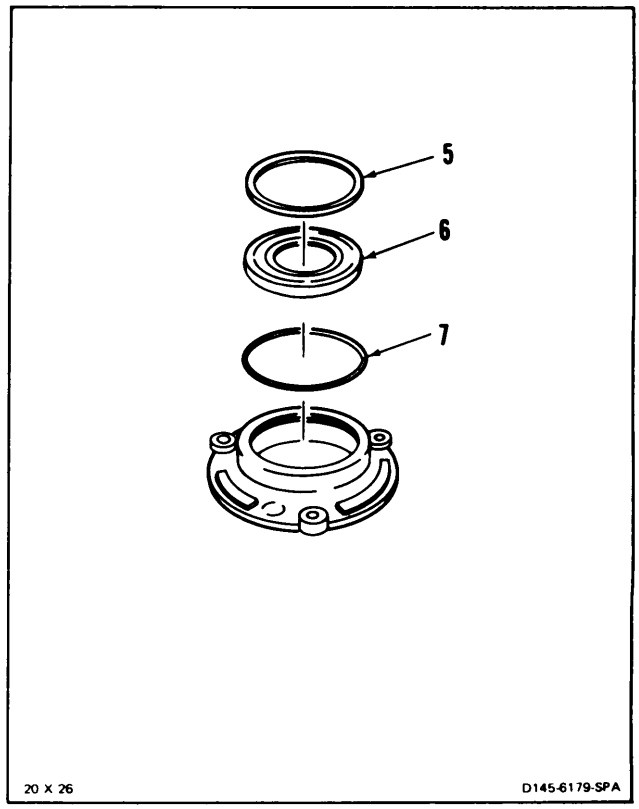
1. Remove three nuts (1) and washers (2) from retainer (3). **Remove retainer** and packing (4).



GO TO NEXT PAGE

6-44 REMOVE NO. 1 FLIGHT CONTROL HYDRAULIC PUMP DRiVE SHAFT SEAL (Continued)

2. Remove retaining ring (5). **Remove seal (6).**
3. Remove packing (7).



FOLLOW-ON MAINTENANCE:

None

END OF TASK

6-45 INSTALL NO. 1 FLIGHT CONTROL HYDRAULIC PUMP DRIVE SHAFT SEAL

INITIAL SETUP

Applicable Configurations:

All

Tools:

Powertrain Repairer's Tool Kit, NSN 5180-00-003-5267
Aluminum Tube, 2-inch 0D, 1/8-inch Wall Thickness, 1 to 6 Inches Long
Gun Heater
Pyrometer
Torque Wrench, 5 to 50 Inch-Pounds
Kevlar Gloves (E187)

Materials:

Dry Cleaning Solvent (E162)
Cloths (E120)
Oil (E254)
Grease (E190)
Gloves (E186)

Parts:

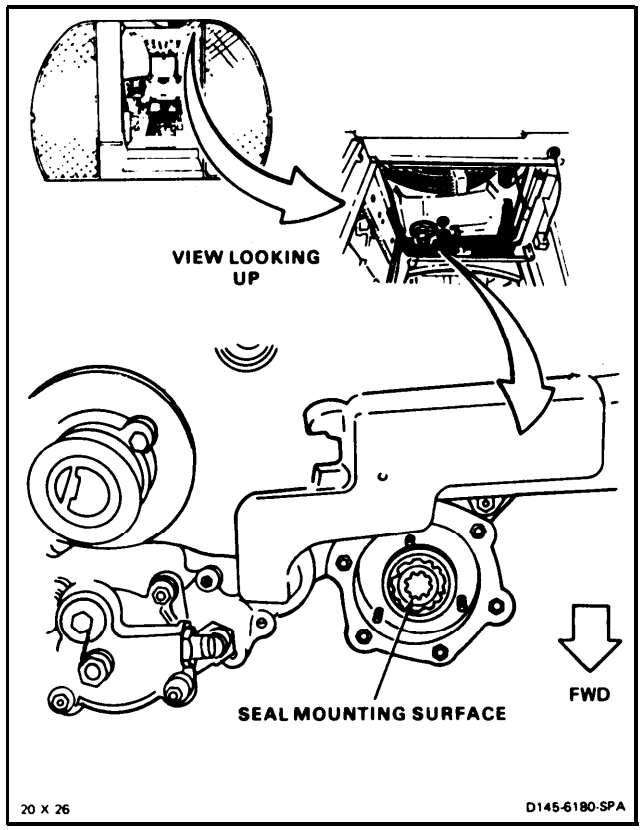
Packings

Personnel Required:

Aircraft Powertrain Repairer
Inspector

References:

TM 55-1520-240-23P



GO TO NEXT PAGE

6-45 INSTALL NO. 1 FLIGHT CONTROL HYDRAULIC PUMP DRIVE SHAFT SEAL (Continued)

WARNING

Dry cleaning solvent (E162) is flammable and toxic. It can irritate skin and cause burns. Use only in well-ventilated area, away from heat and open flame. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.

1. Clean seal retainer (1). Use dry cleaning solvent (E162) and cloths (E120). Wear gloves (E186).

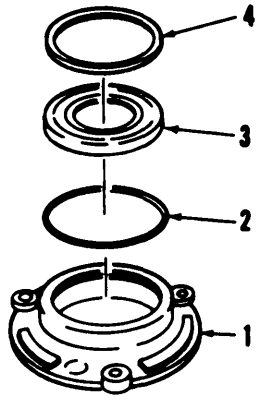
WARNING

Wear Kevlar gloves when handling hot retainer. Hot metal can burn hands.

CAUTION

Do not heat retainer over 250ºF (120ºC). Heat can damage metal.

2. Heat retainer (1) to **230 to 250ºF (110 to 120°C).** Use gun-type heater and pyrometer. Wear Kevlar gloves (E187).
3. Coat packing (2) with oil (E254). Install packing in retainer (1).
4. **Install seal (3)** in retainer (1), flat side up. Use aluminum tube.
5. **Install retaining ring (4).**

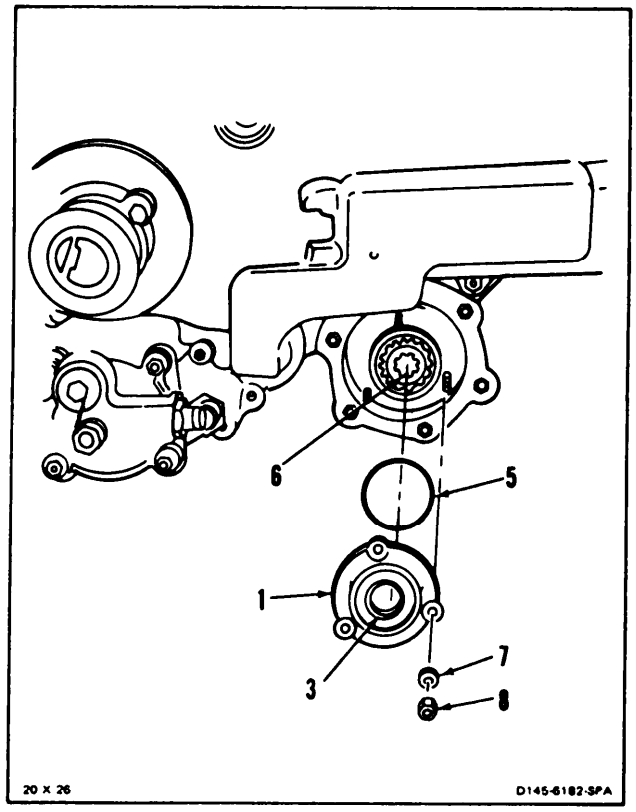


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6-45 INSTALL NO. 1 FLIGHT CONTROL HYDRAULIC PUMP DRIVE SHAFT SEAL (Continued)

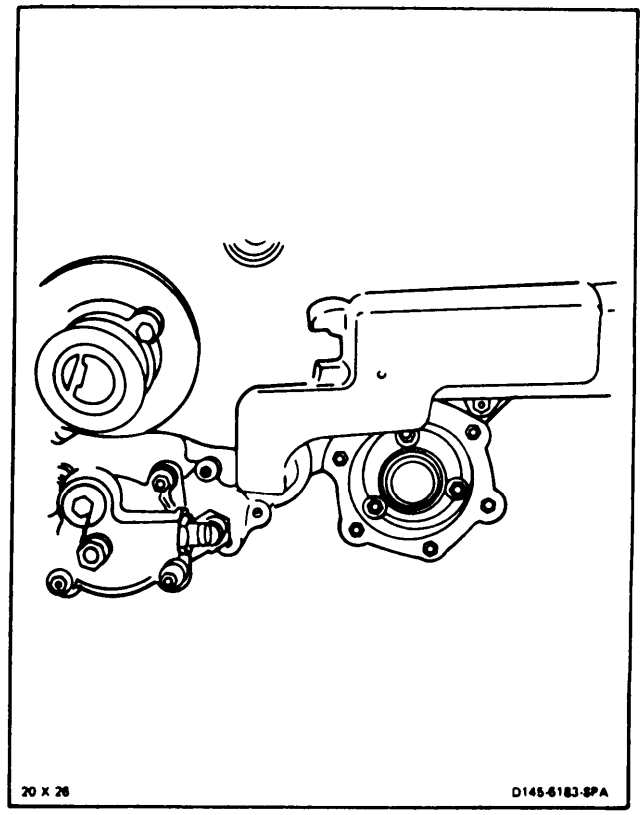
6. Coat packing (5) with oil (E254). Install packing on retainer (1).
7. Apply light coat of grease (E190) to lip of seal (3). Apply light coat of oil (E254) to surface of shaft (6). **Install retainer (1)** on shaft.
8. Install three washers (7) and nuts (8). **Torque nuts to 20 inch-pounds.**



FOLLOW-ON MAINTENANCE:

Install No. 1 flight control hydraulic pump (Task 7-27).

Install forward transmission drip pan (Task 2-3).



END OF TASK

INITIAL SETUP

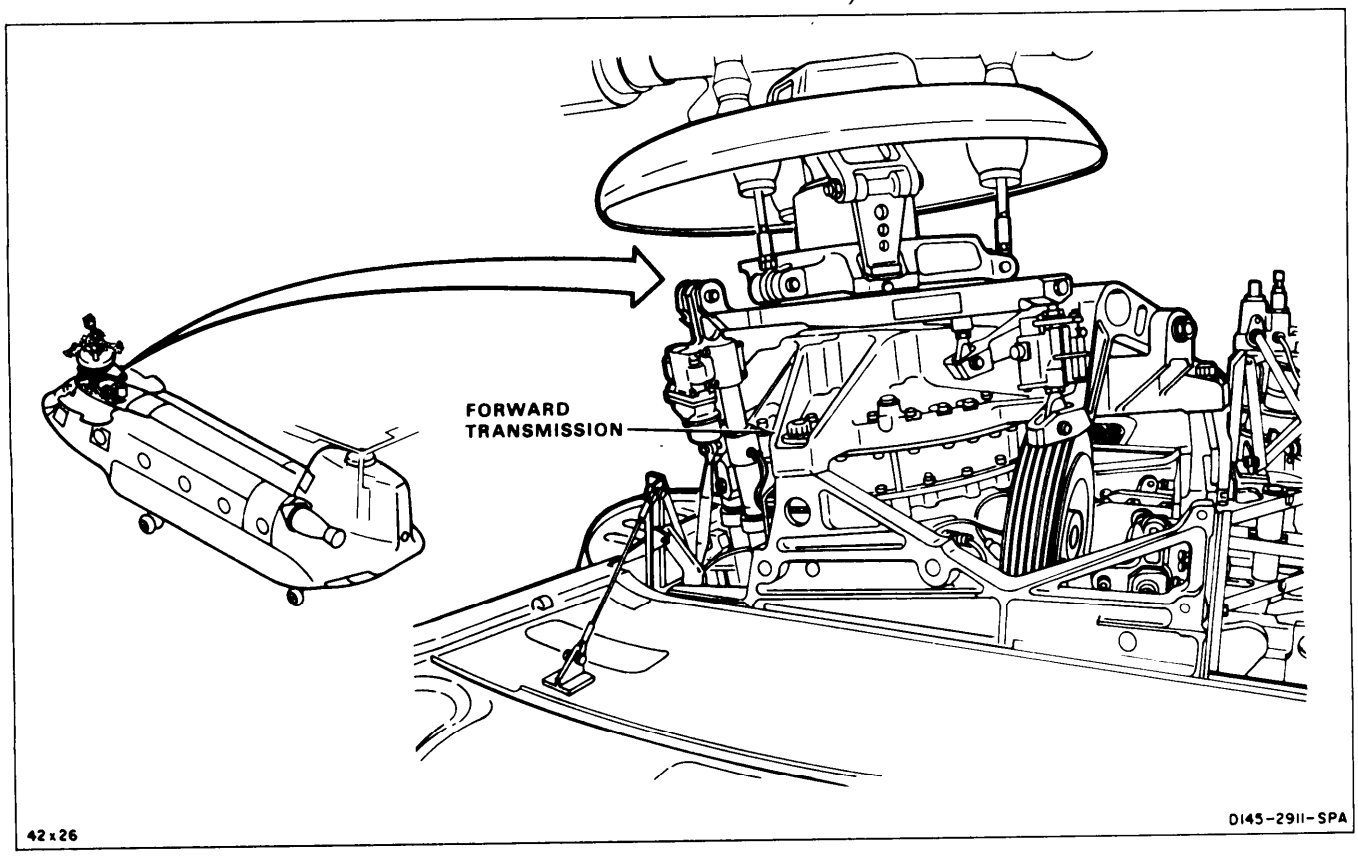
Applicable Configurations:
All

Tools:
Aircraft Mechanic Tool Kit, NSN 5180-00-323-4692
Open End Wrench, 1 Inch
Container, Two Quart
Work Hoist
Hoisting Eye (T32)
Torque Pack (T23) or
Torque Applicator Pack (T2)
Torque Reactor Assembly (T159)
Tee Handle (T161)
Socket Adapter (T93) (Used With T2)
Transportation Trailer 2000
Roller Adapter 2550 (4)
Forward Transmission Adapter (T15)
Rope Guide Lines

Materials:
Dry Cleaning Solvent (E162)
Cloths (E120)
Gloves (E186)
Paper Tags (E264)

Personnel Required:
Medium Helicopter Repairer (3)

Equipment Condition:
Battery Disconnected (Task 1-39)
Electrical Power Off
Hydraulic Power Off Forward Transmission Drip Pan Removed (Task 2-3)
Forward Rotary-Wing Blades Removed (Task 5-64)
Forward Transmission Fairing Removed (Task 2-62 and 2-63)
Forward Transmission Oil Cooler Air Inlet Duct Removed (Task 6-121)
No. 1 and No. 2 Drive Shafts Removed (Task 6-2 and 6-3)
Forward Transmission Adapter Assembly Removed (Task 6-5)
Both Forward Connecting Links Removed (Task 11-194)

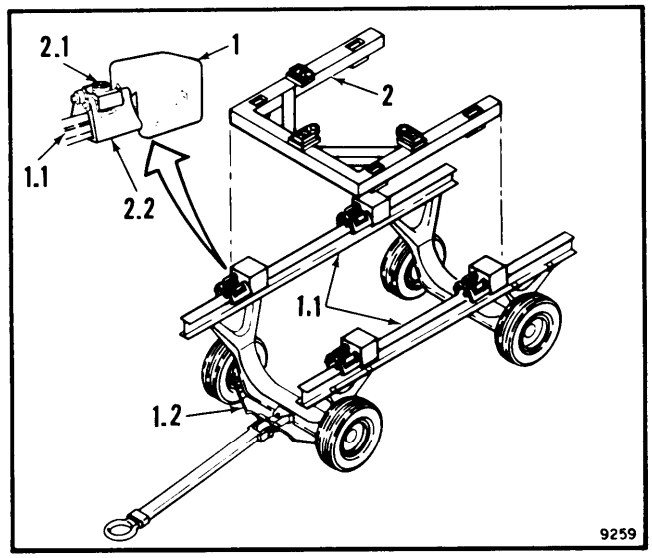


GO TO NEXT PAGE

1. **Fit four roller adapters (1)** on two rails (1.1) of trailer (1.2).

1.1 With aid of helper, **position adapter (2) on roller adapters (1).**

1.2 **Turn fitting (2.1)** of each roller adapter (1) clockwise until clamp (2.2) fits tightly against rail (1.1).

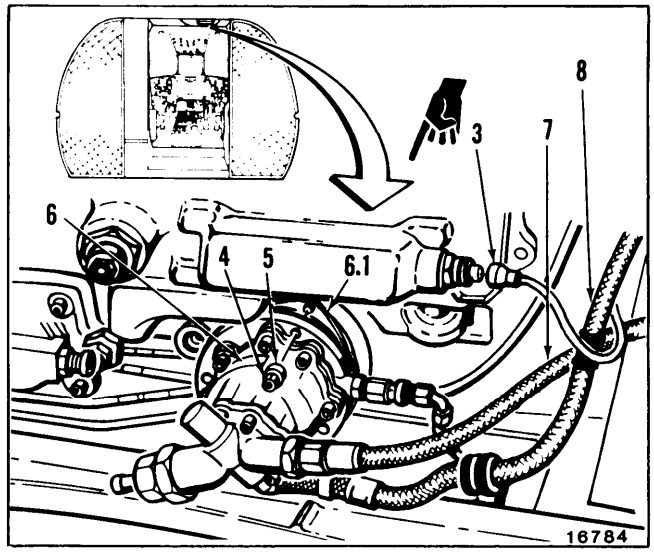


DISCONNECT LOWER POINTS

2. **Disconnect oil temperature connector (3).**

3. **Remove four mounting nuts (4)** and washers (5) from hydraulic pump (6).

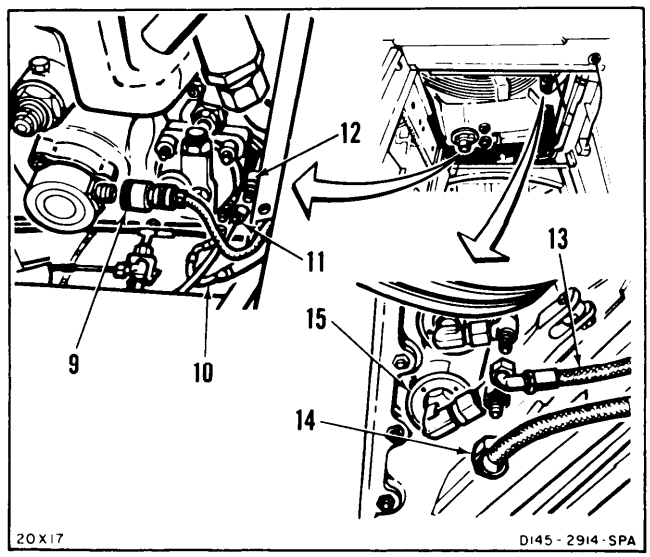
4. **Disconnect pump (6),** with gasket (6.1), by pulling pump straight down. Pump shall hang by hoses (7 and 8).



5. **Disconnect chip detector plug (9).**

6. **Disconnect hoses (10 and 11)** from left servocylinder (12). Let fluid drain into container.

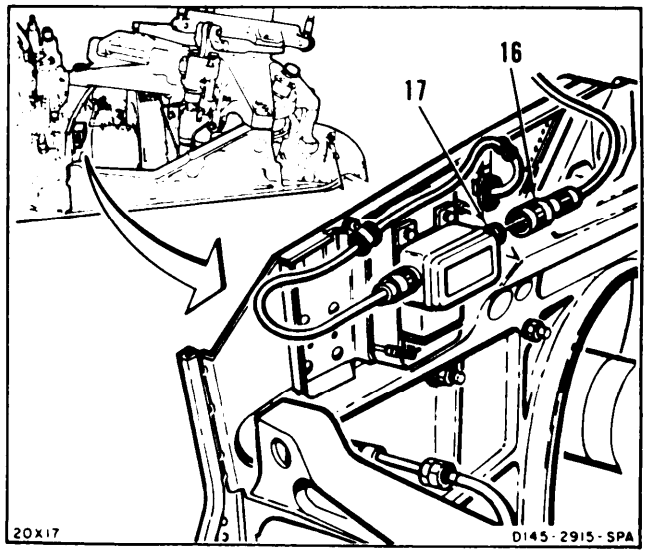
7. **Disconnect hoses (13 and 14)** from right servocylinder (15). Drain fluid into container.



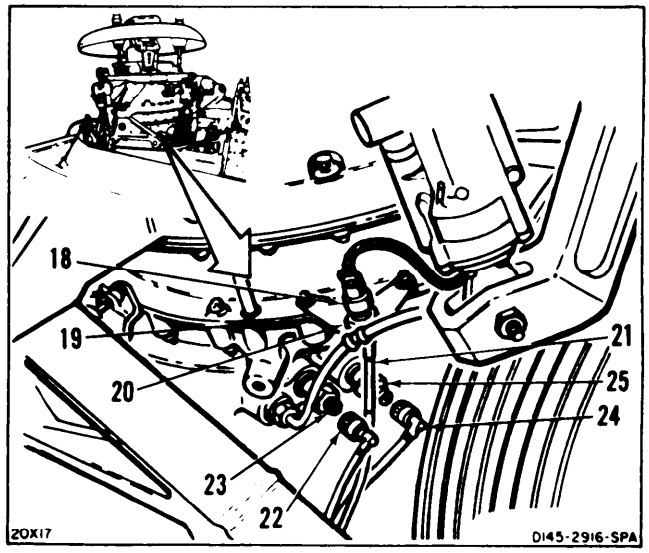
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DISCONNECT UPPER POINTS

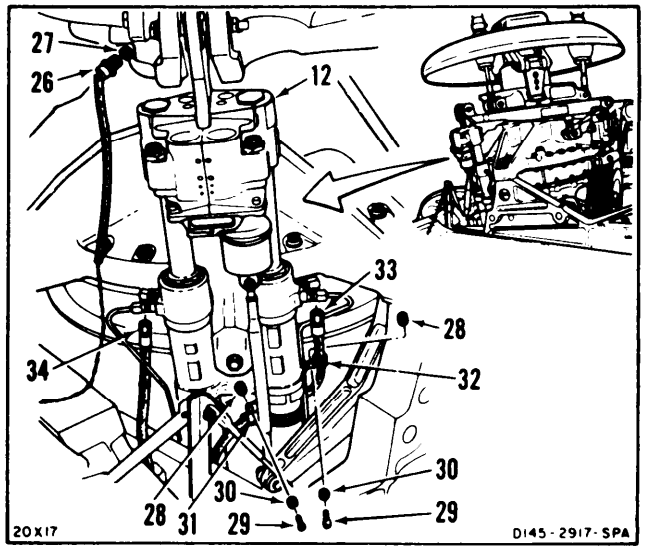
8. **Disconnect connector (16)** from signal conditioner (17).



9. **Disconnect connector (18)** at bracket (19).
10. Remove nut (20). **Remove electrical connecter (21)** from bracket (19).
11. Tag and **disconnect electrical connector (22)** from MAIN PRESS. SW (23).
12. Tag and **disconnect electrical connecter (24)** from AUX PRESS. SW (25).

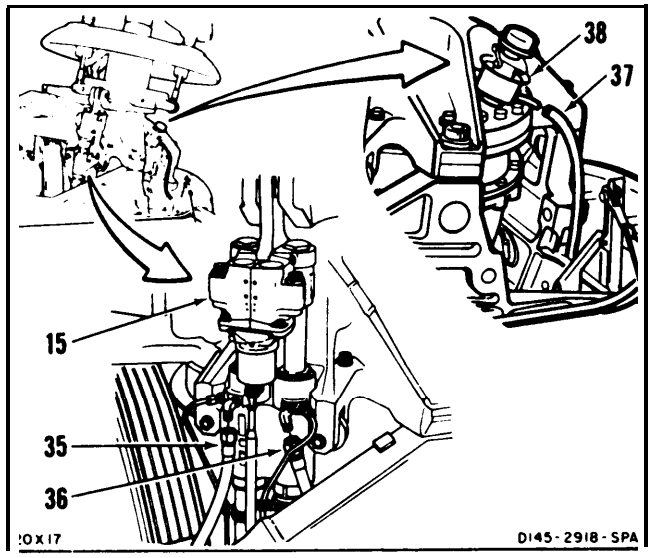


13. Remove lockwire from electrical connector (26). **Disconnect connecter** from phase detector (27).
14. Remove nut (28), screw (29) and washer (30) from clamps (31 and 32) on hose (33) at left servocylinder (12).
15. **Disconnect hoses (33 and 34)** from servocylinder (12).



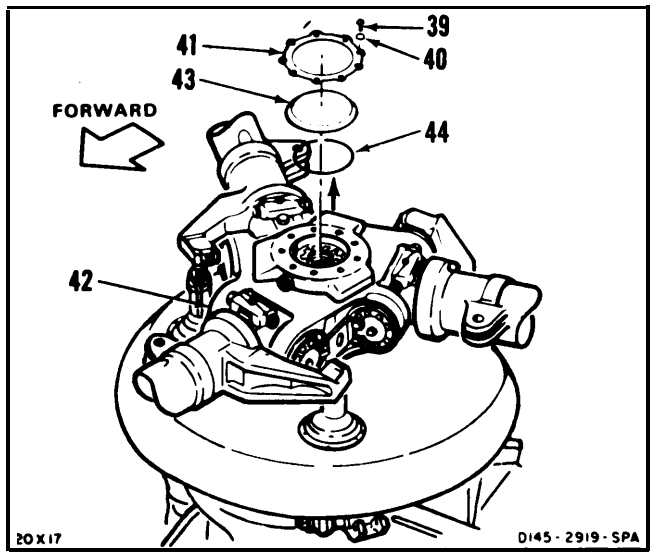
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16. **Disconnect hoses (35 and 36)** from right servocylinder (15). Drain fluid into container.
17. **Disconnect hose (37)** from oil drain cup (38).



CONNECT HOIST

18. Remove nine screws (39) and washers (40) from retainer (41) on rotary-wing head (42). **Remove retainer, cover (43),** and packing (44).



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WARNING

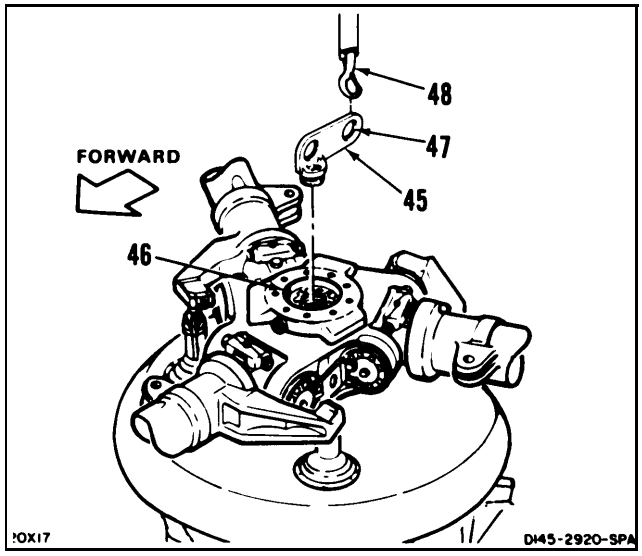
Dry cleaning solvent (E162) is flammable and toxic. It can irritate skin and cause burns. Use only in well-ventilated area, away from heat and open flame. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.

19. Check thread of hoisting eye (T32) (45) and shaft (46). Threads shall be clean and undamaged. If needed, clean with dry cleaning solvent (E162) and cloths (E120). Wear gloves (E186).

NOTE

Hoisting eye (T32) must trail aft to keep transmission at proper angle during hoisting.

20. **Install hoisting eye (T32) (45)** on shaft (46) so that FWD XMSN hole (47) trails aft.
21. **Connect work hoist hook (48)** to FWD XMSN hole (47) of hoisting eye (T32) (45). Raise hoist to **take up slack in chain.** Do not apply tension.



REMOVE BOLTS

NOTE

- Socket assembly, torque applicator and reactor are part of torque reactor assembly (T159).
- Whenever one or more forward transmission mounting bolts are removed, **all four** bolts must be removed and reinstalled (Task 6-51).

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22. Loosen left bolt (49) as follows:

a. **Install socket assembly (49.1)** on left bolt (49).

b. **Install torque applicator (50)** over square drive of socket assembly (49.1) **with large hole aft** of assembly. Note THIS SIDE UP on applicator.

c. **Install sleeve (50.1) on aft end of applicator (50).** Insert two pins (50.2) through sleeve and adapter.

d. **Install** aft end of **sleeve (50.1) in center block (50.3) of reactor (51). Install socket** at end of reactor on aft bolt (51.1).

e. **Install pin (51.2)** through center block (50.3) and applicator (50).

f. **Set selector (51.3)** at bottom of torque pack (T23) (52) **to NUT OFF.**

g. **Install torque pack (T23) (52)** on square drive of socket assembly (49.1). Turn pack so that two pins (52.1) on bottom fit holes (52.2) in applicator (50). Use tee handle (T161) (52.3) if necessary.

WARNING

Be sure handle is fully seated and ratchet selector on torque pack is properly set before applying torque. Moving selector with load on torque pack can damage unit and injure personnel.

CAUTION

If handle cannot be turned, and torque indicator needle enters red zone, do not continue. Torque is beyond limits of torque pack. Use alternate method to remove bolt.

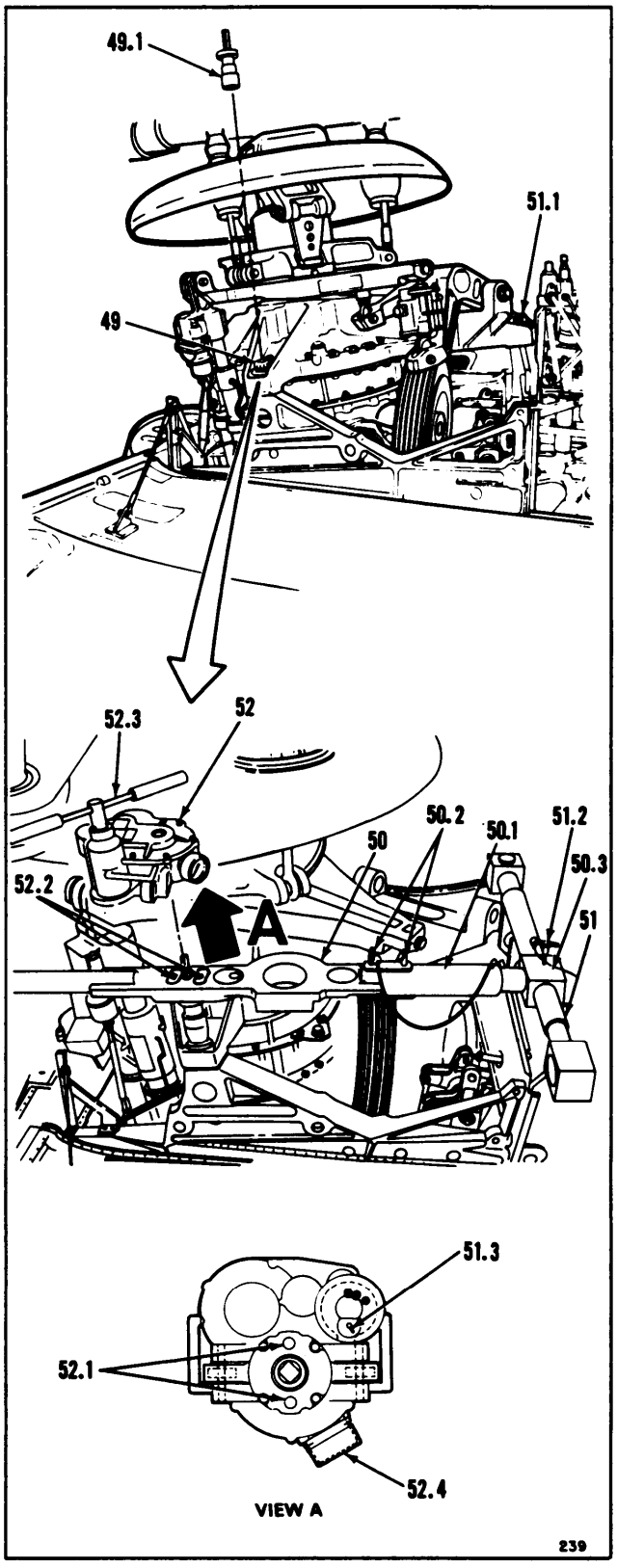
h. Set selector switch on tee handle (T161) (52.3) to OFF. Install handle on torque pack (T23) (52). Turn handle counterclockwise until torque is broken.

i. Set switch on handle (T161) (52.3) to ON. Turn handle clockwise until indicator (52.4) reads 0 and torque pack is loose.

j. Remove torque pack (52) and torque reactor assembly (T159).

k. Take sleeve (50.1) off applicator (50).

l. Do not remove left bolt (49).



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22.1. Loosen aft bolt (51.1) as follows:

a. **Install socket assembly (49.1)** on aft bolt (51.1).

b. **Install torque applicator (50)** over square drive of socket assembly (49.1) **with large hole at left** of assembly. Observe THIS SIDE UP stamping on applicator.

c. **Install** left end **of applicator (50) in end block of reactor (51). Install socket** at end of reactor on left bolt (49).

d. **Install pin (51.2)** through end of reactor (51) and applicator (50).

WARNING

Make sure ratchet selector is properly set before applying torque. Moving selector with load on torque pack can damage unit and injure personnel.

e. **Check that ratchet selector (51.3)** at bottom of torque pack (T23) (52) **is set to NUT OFF.**

f. **Install torque pack (T23) (S2)** on square drive of socket assembly (49.1). Rotate pack so that two pins (52.1) on bottom fit into holes (52.2) in applicator (50). Use tee handle (T161) (52.3) if necessary.

CAUTION

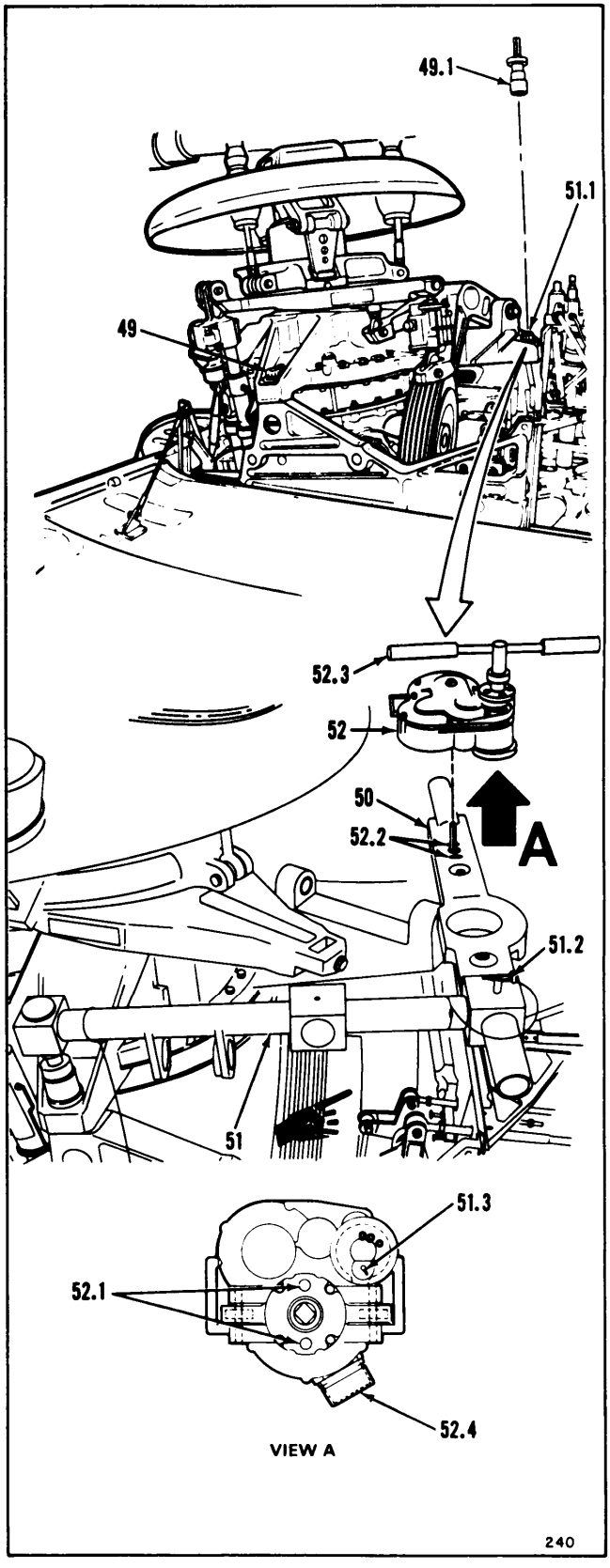
If handle cannot be turned, and torque indicator needle enters red zone, do not continue. Torque is beyond limits of torque pack. Use alternate method to remove bolt.

g. Set selector switch on tee handle (Tl61) (52.3) to OFF. Install handle on torque pack (T23) (52). Turn handle counterclockwise until torque is broken.

h. Set selector switch on tee handle (T161) (52.3) to ON. Turn handle clockwise until torque indicator (52.4) reads 0 and torque pack is loose.

i. Remove torque pack (52) and torque reactor assembly (T159).

j. Do not remove aft bolt (51.1).



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22.2. Loosen right bolt (52.5) as follows:

a. Install socket assembly (49.1) on right bolt (52.5).

b. Install torque applicator (50) over square drive of socket assembly (49.1) with large hole forward of assembly. Observe THIS SIDE UP stamping on applicator.

c. Install forward end of applicator (50) in center block (50.1) of reactor (51). install socket at end of reactor on forward bolt (52.6).

d. Install pin (51.2) through center block (50.1) and applicator (50).

WARNING

Make sure ratchet selector is properly set before applying torque. Moving selector with load on torque pack can damage unit and injure personnel.

e. Check that ratchet selector (51.3) at bottom of torque pack (T23) (52) is set to NUT OFF.

f. Install torque pack (T23) (52) on square drive of socket assembly (49.1). Rotate pack so that two pins (52.1) on bottom fit into holes (52.2) in applicator (50). Use tee handle (T161) (52.3).

CAUTION

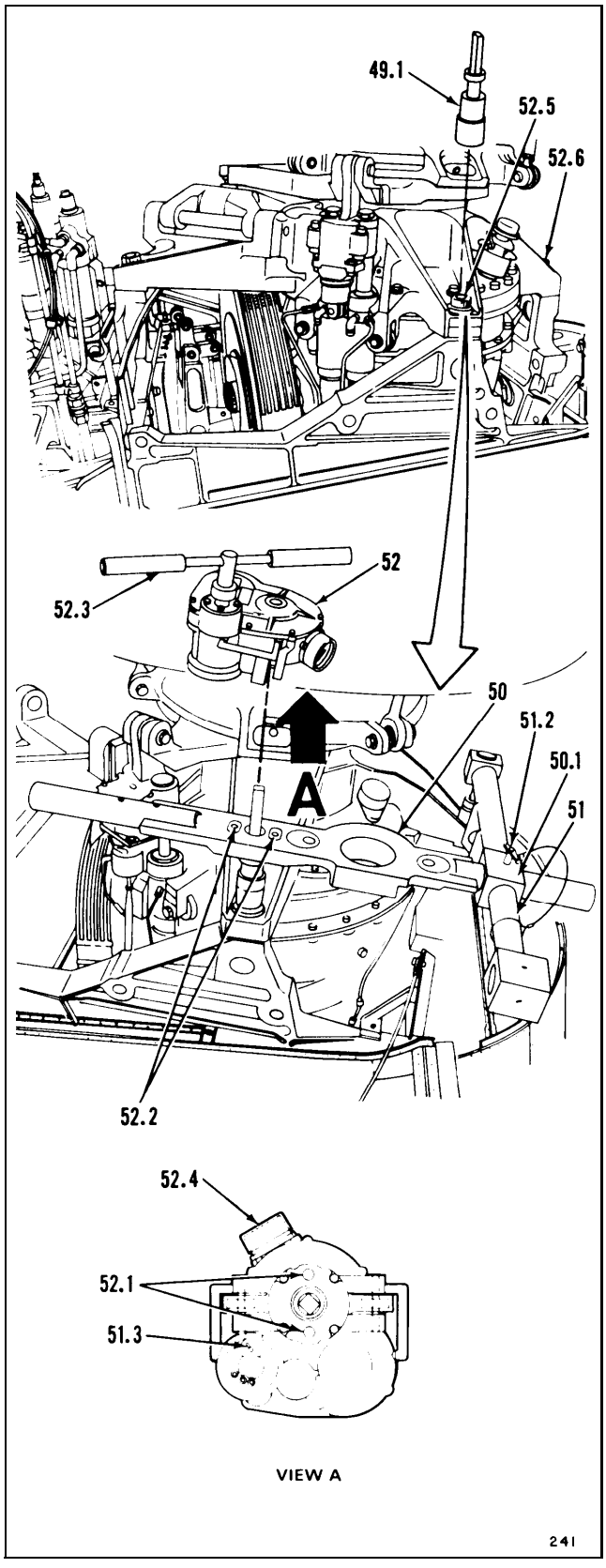
If handle cannot be turned, and torque indicator needle enters red zone, do not continue. Torque is beyond limits of torque pack. Use alternate method to remove bolt.

g. Set selector switch on tee handle (T161) (52.3) to OFF. Turn handle counterclockwise until torque is broken.

h. Set selector switch on tee handle (T161) (52.3) to ON. Turn handle clockwise until indicator (52.4) reads 0 and torque pack is loose.

i. Remove torque pack (52) and torque reactor assembly (T159).

j. Do not remove right bolt (52.5).



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22.3. Loosen forward bolt (52.6) as follows:

a. install socket assembly (49.1) on forward bolt (52.6).

b. Install torque applicator (50) over square drive of socket assembly (49.1) with large hole at right of assembly. Observe THIS SIDE UP stamping on applicator.

c. Install right end of applicator (50) in center block (50.1) of reactor (51). Install socket at end of reactor on right bolt (52.5).

d. Install pin (51.2) through center block (50.1) and applicator (50).

WARNING

Make sure ratchet selector is properly set before applying torque. Moving selector with load on torque pack can damage unit and injure personnel.

e. Check that ratchet selector (51.3) at bottom of torque pack (T23) (52) is set to NUT OFF.

f. Install torque pack (T23) (52) on square drive of socket assembly (49.1). Rotate pack so that two pins (52.1) on bottom fit into holes (52.2) in applicator (50). Use tee handle (T161) (52.3) if necessary.

CAUTION

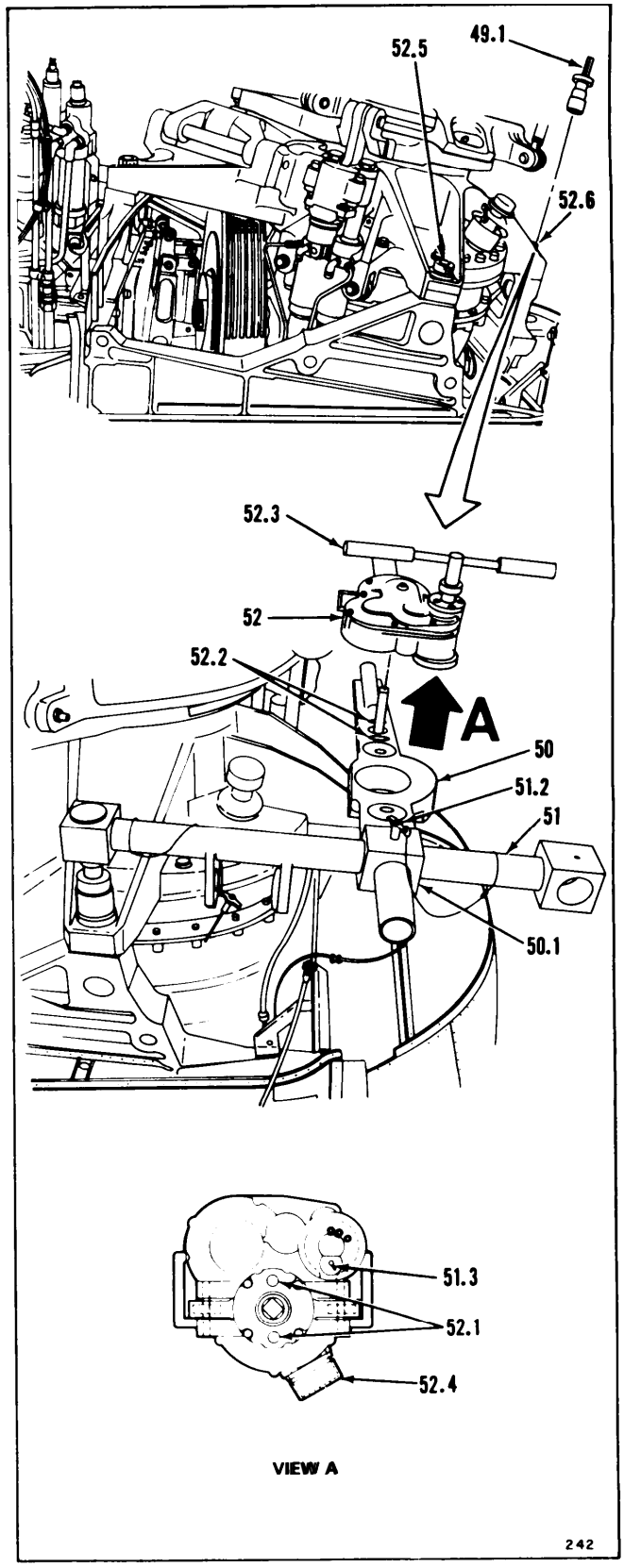
If handle cannot be turned, and torque indicator needle enters red zone, do not continue. Torque is beyond limits of torque pack. Use alternate method to remove bolt.

g. Set selector switch on tee handle (T161) (52.3) to OFF. Turn handle counterclockwise until torque is broken.

h. Set selector switch on tee handle (T161) (52.3) to ON. Turn handle clockwise until torque indicator (52.4) reads 0 and torque pack is loose.

i. Remove torque pack (52) and torque reactor assembly (T159).

j. Go to step 22.8.



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REMOVE BOLTS (ALTERNATE METHOD)

NOTE

Torque applicator and reactor are part of torque reactor assembly (T159).

22.4. Loosen left bolt (49) as follows:

a. **Install socket adapter (T93) (52.7)** on left bolt (49).

b. **Install torque applicator (50)** with large hole over drive of socket adapter (T93) (52.7). Observe THIS SIDE UP stamping on applicator.

c. **Install sleeve (50.1) on aft end of applicator (50).** Insert two pins (50.2) through sleeve and adapter.

d. **Install** aft end of **sleeve (50.1) in center block (50.3) of reactor (51). Install socket** at end of reactor on aft bolt (51.1).

e. **Install pin (51.2)** through center block (50.3) and applicator (50).

f. **Install torque applicator pack** (T2) (52.8) on drive of socket adapter (52.7). Rotate pack so that two pins on bottom fit into holes (52.9) in applicator (50). Use socket wrench speed handle.

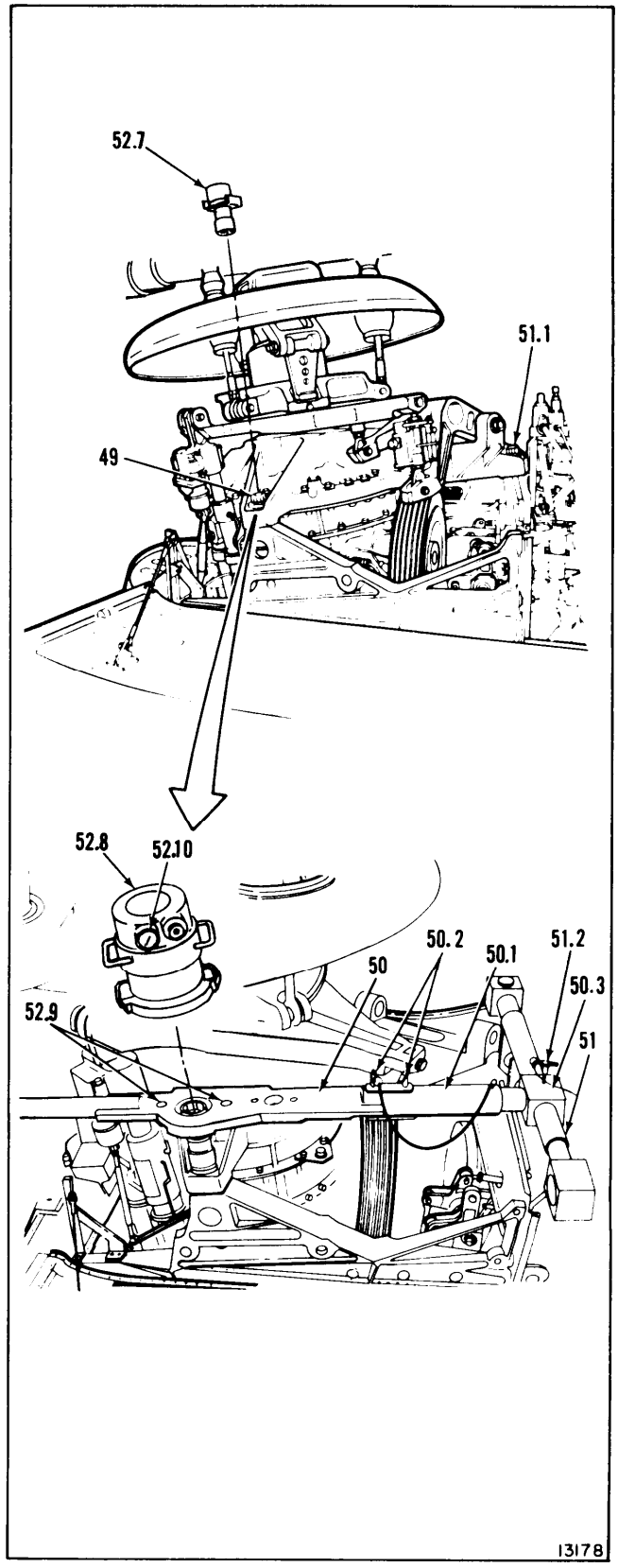
g. Install speed handle on torque pack (T2) (52.8). Turn handle counterclockwise until torque is broken.

h. Turn speed handle clockwise until torque indicator (52.10) reads 0 and torque pack is loose.

i. Remove torque pack (52.8) and torque reactor assembly (T159).

j. Remove sleeve (50.1) from applicator (50).

k. Do not remove left bolt (49).



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22.5. Loosen aft bolt (51.1) as follows:

a. **Install socket adapter (T93) (52.7)** on aft bolt (51.1).

b. **Install torque applicator (50) with large hole** over drive of socket adapter (52.7). Observe THIS SIDE UP stamping on applicator.

c. **Install** left end of **applicator (50) in end block of reactor (51). Install socket** at end of reactor on right bolt (52.5).

d. **Install pin** (51.2) through end block of reactor (51) and applicator (50).

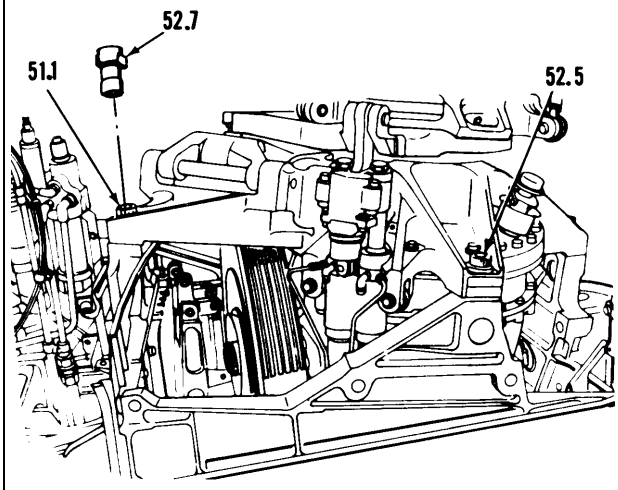
e. **Install torque applicator pack (T2) (52.8)** on drive of socket adapter (T93) (52.7). Rotate pack so that two pins on bottom fit into holes (52.9) in applicator (50). Use socket wrench speed handle.

f. Install speed handle on torque pack (T2) (52.8). Turn handle counterclockwise until torque is broken.

g. Turn speed handle clockwise until torque indicator (52.10) reads 0 and torque pack is loose.

h. Remove torque pack (52.8) and torque reactor assembly (T159).

i. Do not remove aft bolt (51.1).



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22.6. Loosen right bolt (52.5) as follows:

a. Install socket adapter (T93) (52.7) on right bolt (52.5).

b. Install torque applicator (50) over square drive of socket adapter (T93) (52.7). Observe THIS SIDE UP stamping on applicator.

c. Install forward end of applicator (50) in center block (50.1) of reactor (51). install socket at end of reactor on forward bolt (52.6).

d. Install pin (51.2) through center block (50.1) and applicator (50).

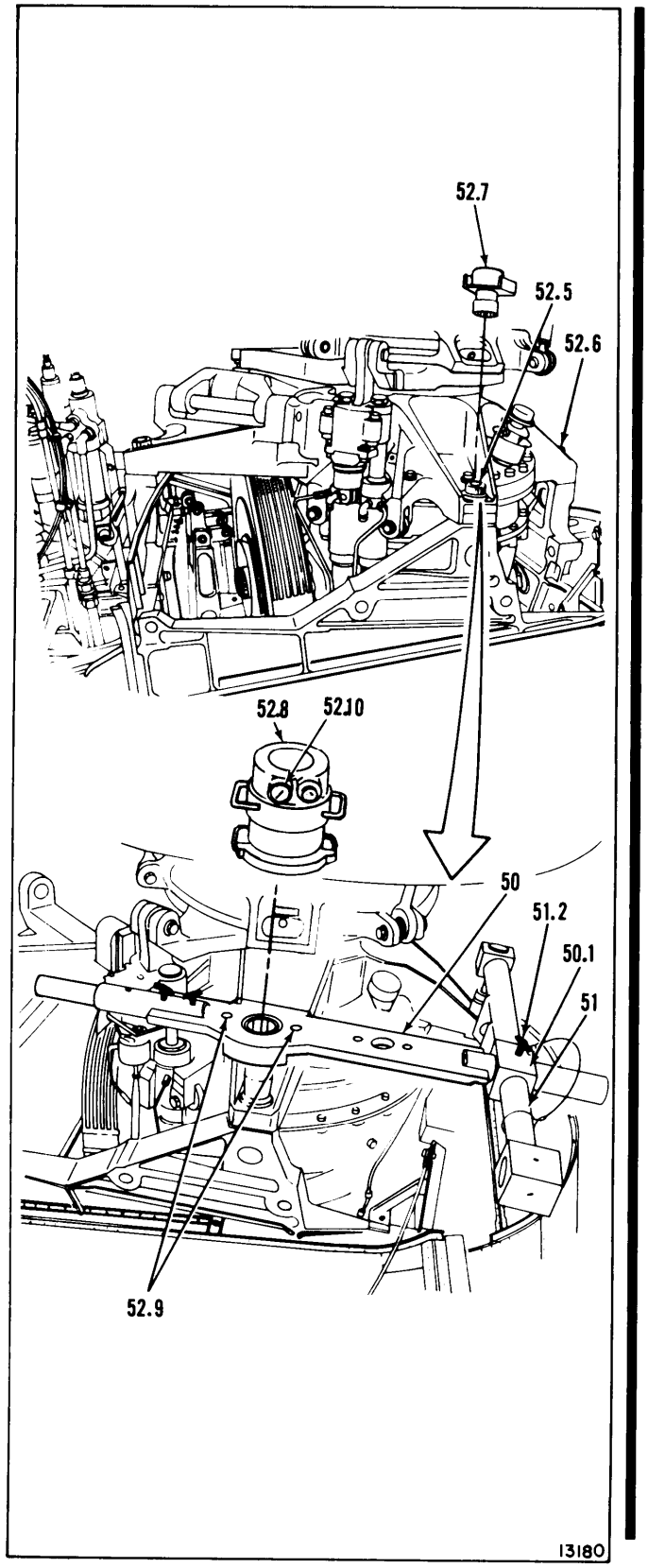
e. Install torque applicator pack (T2) (52.8) on drive of socket adapter (52.7). Rotate pack so that two pins (52.1) on bottom fit into holes (52.9) in applicator (50). Use socket wrench speed handle.

f. Turn speed handle counterclockwise until torque is broken.

g. Turn speed handle clockwise until indicator (52.10) reads 0 and torque pack is loose.

h. Remove torque pack (52.8) and torque reactor assembly (T159).

i. Do not remove right bolt (52.5).



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6-46 REMOVE FORWARD TRANSMISSION PACKAGE (Continued)

22.7. Loosen forward bolt (52.6) as follows:

a. Install socket adapter (T93) (52.7) on forward bolt (52.6).

b. Install torque applicator (50) with large hole over drive of socket adapter (52.7). Observe THIS SIDE UP stamping on applicator.

c. Install right end of applicator (50) in center block (50.1) of reactor (51). install socket at end of reactor on left bolt (49).

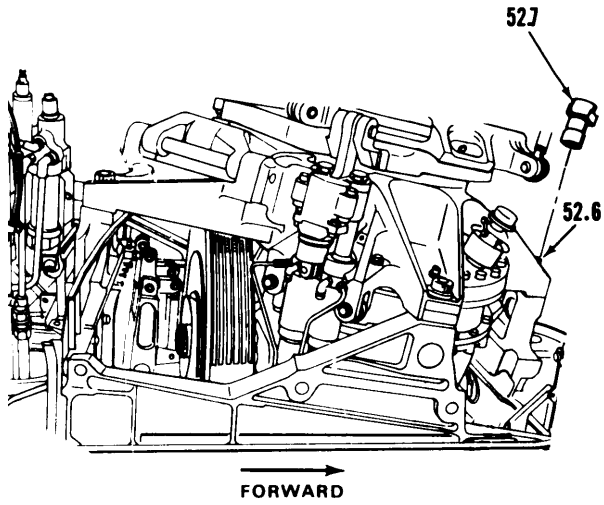
d. Install pin (51.2) through center block (50.1) and applicator (50).

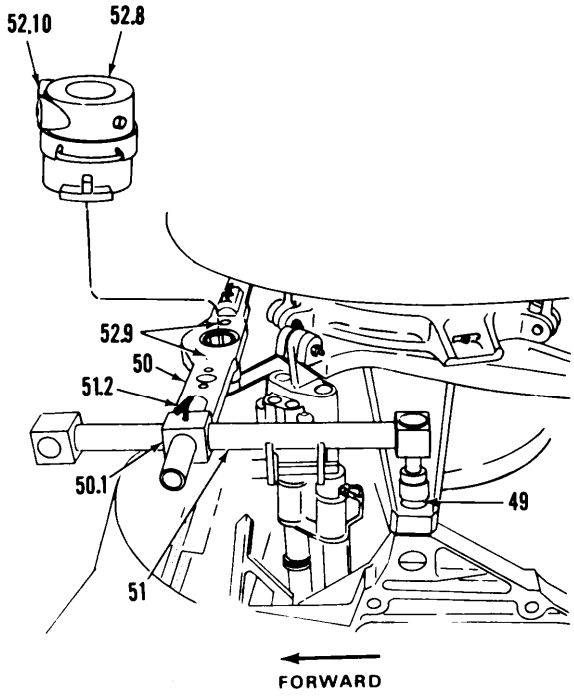
e. install torque pack (T23) (52) on drive of socket adapter (52.7). Rotate pack so that two pins on bottom fit into holes (52.9) in applicator (50). Use socket wrench speed handle.

f. Turn speed handle counterclockwise until torque is broken.

g. Turn speed handle clockwise until torque indicator (52. 10) reads 0 and torque pack is loose.

h. Remove torque pack (52.8) and torque reactor assembly (T 159).

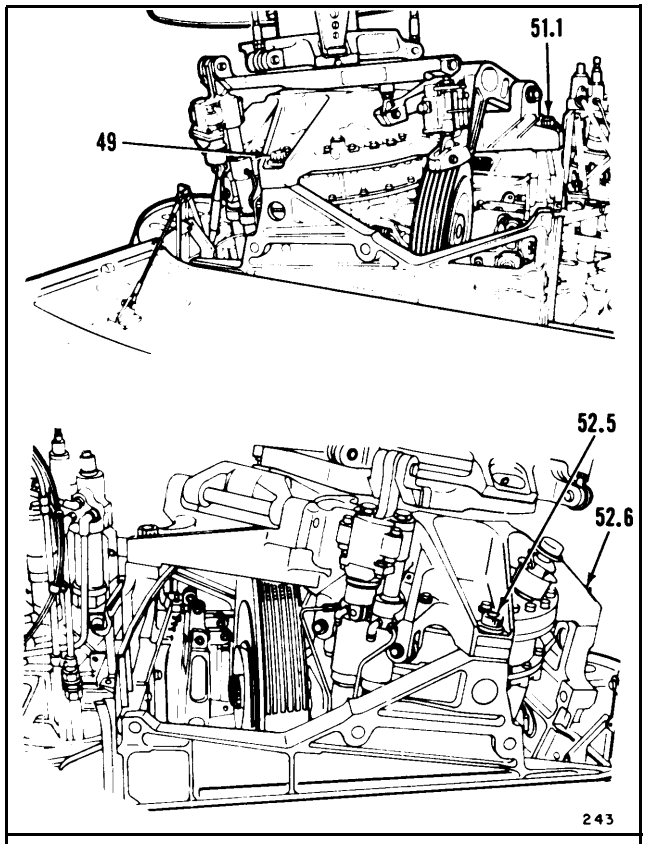




1318

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22.8. Remove bolts (49, 51,1, 52.5, and 52.6).



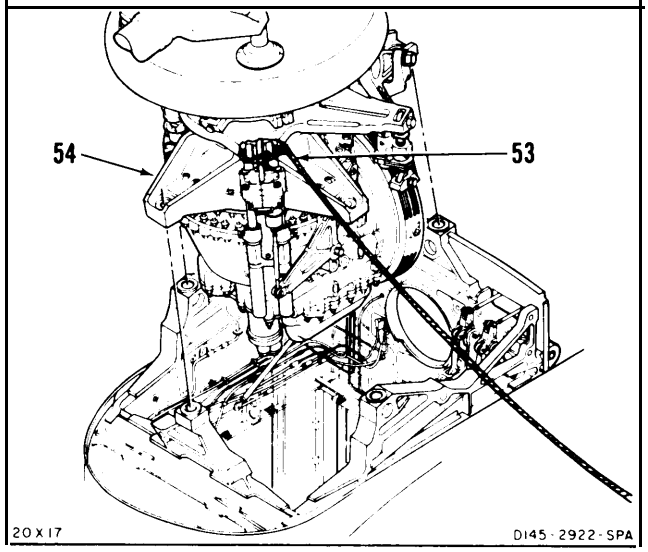
23. Attach a rope guide line (53 to each side of transmission (54).

WARNING

Transmission is heavy and can injure personnel if it drops. Transmission must be supported by hoist and moved carefully to prevent injury to personnel.

24. **Slowly raise transmission (54) about 1-inch .** Check that all wires, hoses, and links between transmission and helicopter have been disconnected.

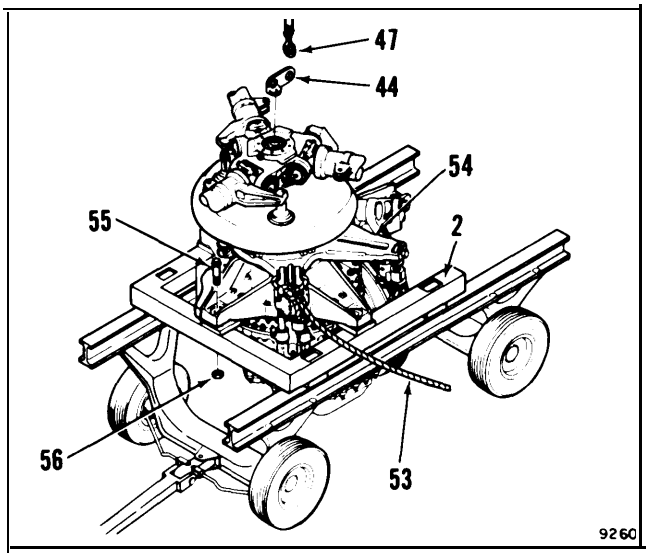
25. **Lift transmission (54)** out of helicopter. Have helpers guide transmission with rope guide lines (53).



GO TO NEXT PAGE

6-46 REMOVE FORWARD TRANSMISSION PACKAGE (Continued) 6-46

26. **Lower and position transmission (54) onto adapter (T15) (2).** Install three bolts (55) and nuts (56).
27. Remove rope guide lines (53).
28. Remove work hoist hook (47) from hoisting eye (44). Remove eye.



FOLLOW-ON MAINTENANCE:

None

END OF TASK

6-47 DISASSEMBLE FORWARD TRANSMISSION PACKAGE

INITIAL SETUP

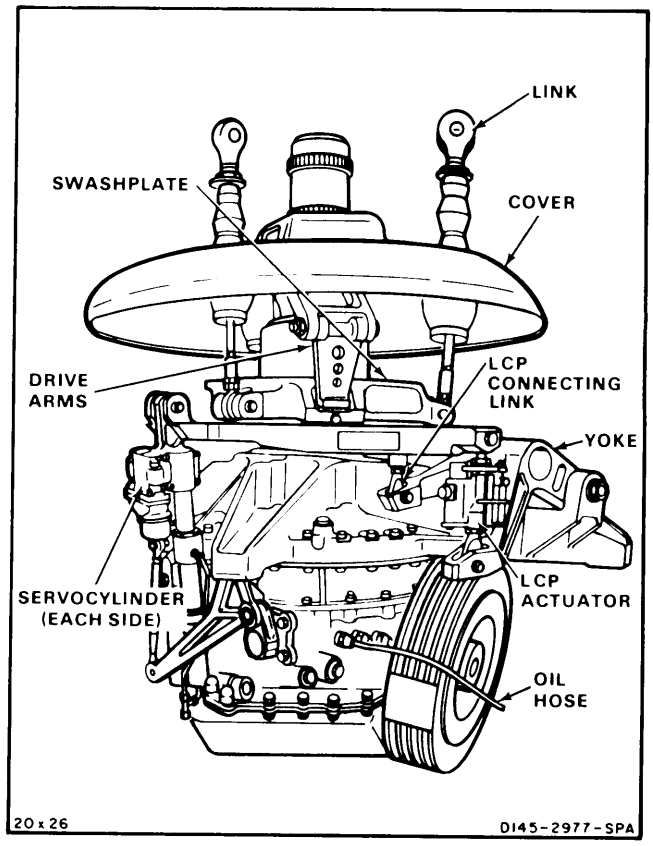
Applicable Configurations:
All

Tools:
Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692
Rotor Head Controls Sling (T14)
Hoist
Wrench, 1 1/16-inch
Wrench, 1 7/16-inch
Aluminum Bar, 1/2-inch Diameter x 17 Inches Long

Materials:
Tape (388)
Lockwire (E231)

Personnel Required:
67U10 Medium Helicopter Repairer (2)
67U20 Medium Helicopter Repairer

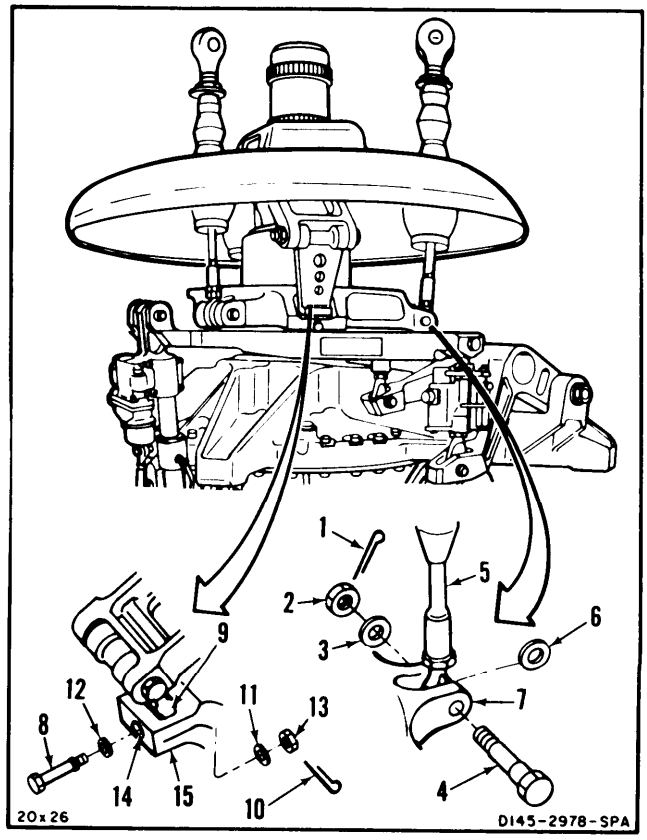
Equipment Condition:
Off Helicopter Task
Rotary-Wing Head Removed (Task 5-8)



REMOVE COVER, LINKS, AND DRIVE ARMS

1. Remove cotter pin (1), nut (2), washer (3), and bolt (4) from each of three pitch links (5). **Remove three links and limiters (6) from** swashplate lugs (7).

2. Remove lockwire from bolt (8) in lower drive arm (9). **Remove** cotter pin (10), **bolt,** washers (11 and 12) and nut (13). Check that bushing (14) remains in swashplate lug (15). Keep bushing in lug with lockwire (E231).



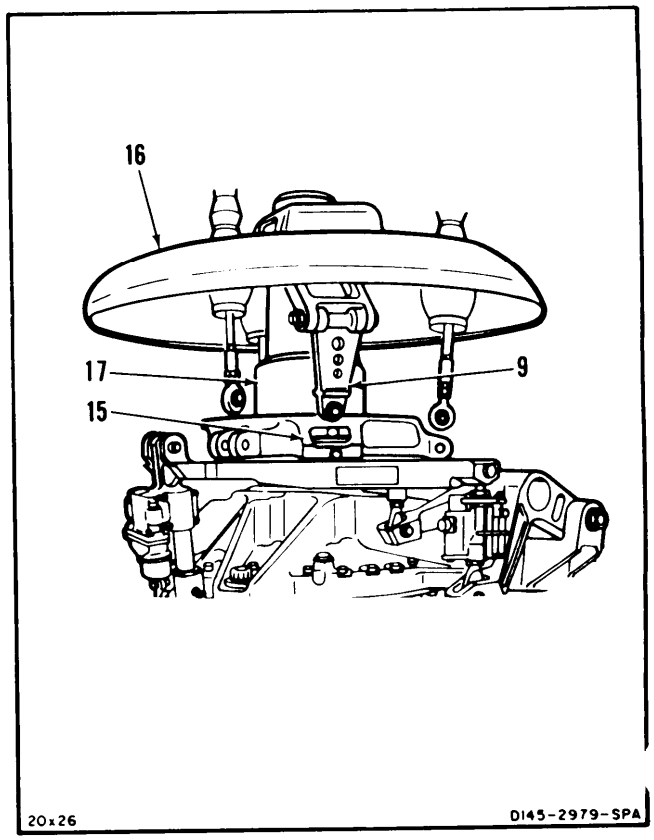
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6-47 DISASSEMBLE FORWARD TRANSMISSION PACKAGE (Continued)

CAUTION

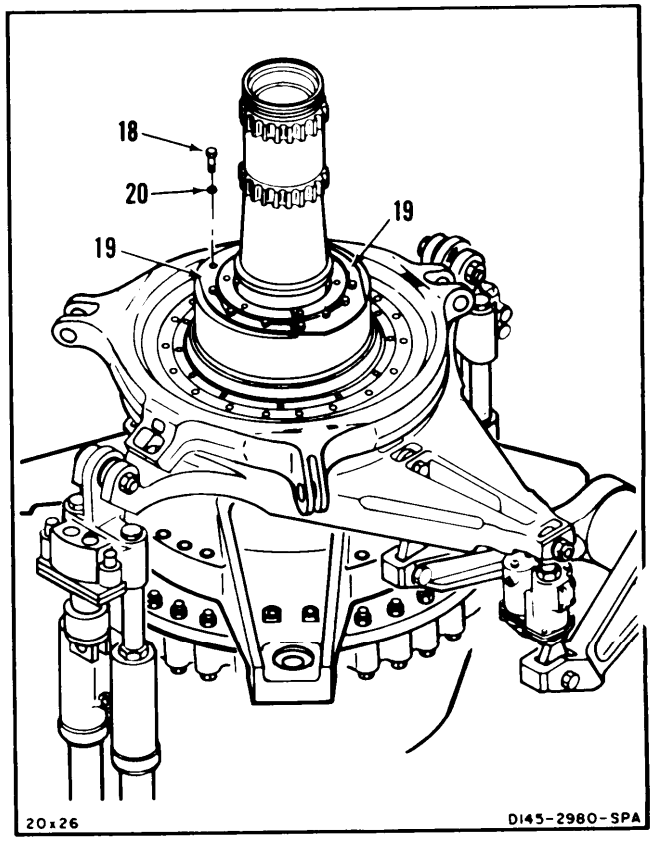
If arm hits slider shaft, shaft can be damaged.

3. Have two helpers **slowly lift cover (16).** As cover is lifted, **pull lower drive arm (9)** out of swashplate lug (15). Hold arm to keep it from hitting slider shaft **(17).**



REMOVE SWASHPLATE

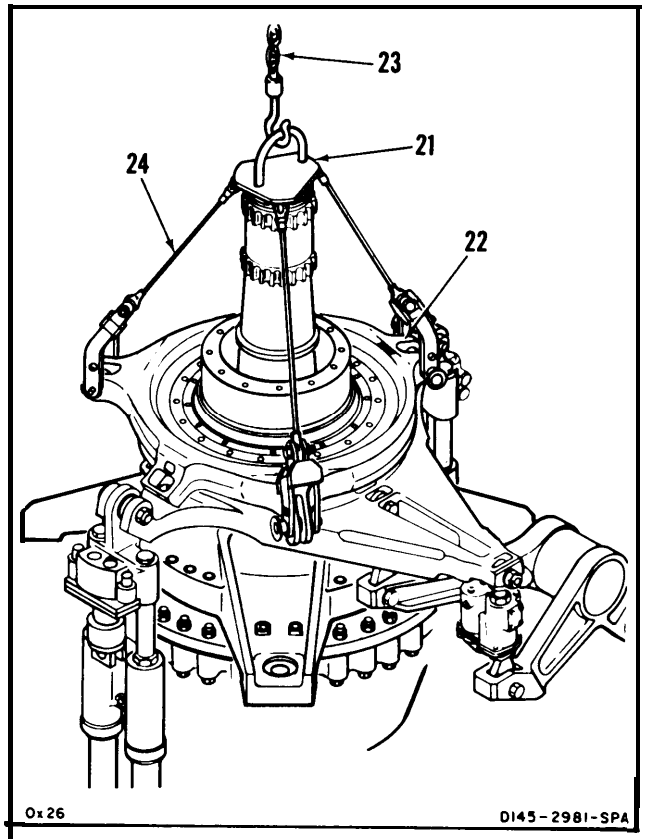
4. Remove lockwire from six bolts (18) on each half of seal (19). Remove 12 bolts and washers (20). **Remove both halves of seal.**



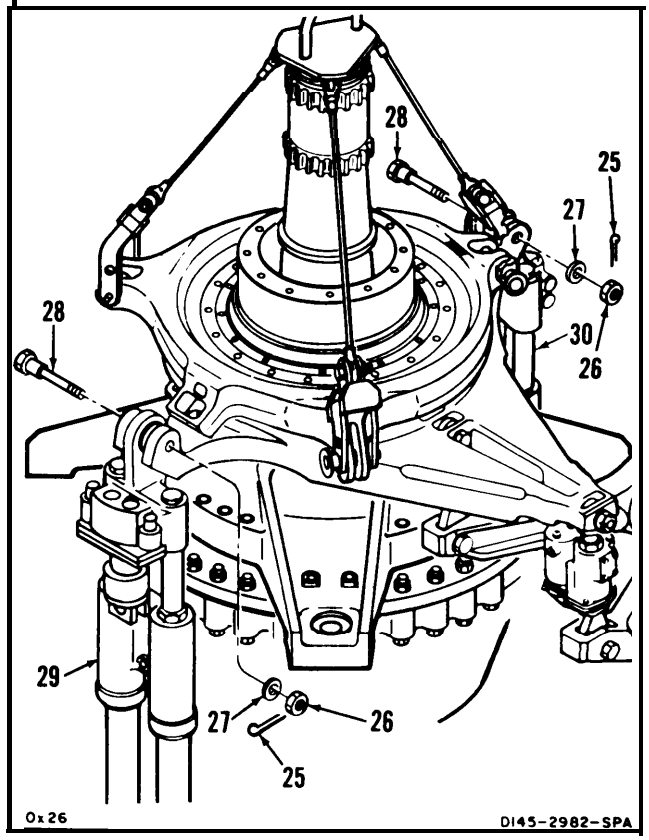
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6-47 DISASSEMBLE FORWARD TRANSMISSION PACKAGE (Continued)

5. **Attach sling (T14) (21)** to three lugs (22). **Attach work hoist chain (23)** to sling. Raise hoist to take up slack from sling cables (24). Do not put tension on sling.



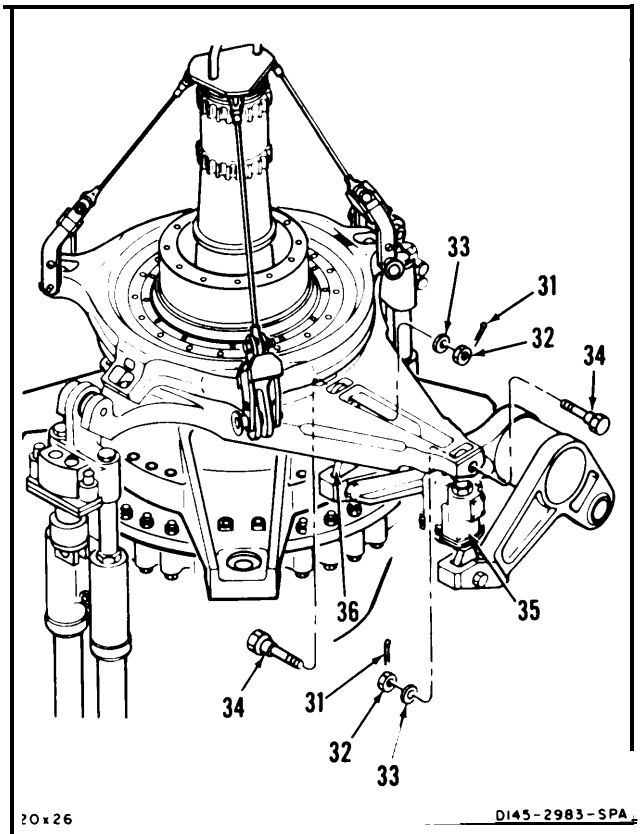
6. **Remove** cotter pin (25), nut (26), washer (27), and **bolt (28)** from upper end of both servocylinders (29 and 30).



GO TO NEXT PAGE

6-47 DISASSEMBLE FORWARD TRANSMISSION PACKAGE (Continued)

7. **Remove** cotter pins (31), nuts (32). washers (33), and **bolts (34) from** actuator (35) and link (36).



WARNING

Swashplate is heavy and can injure personnel if it drops. Swashplate must be supported by hoist and moved carefully to prevent injury to personnel.

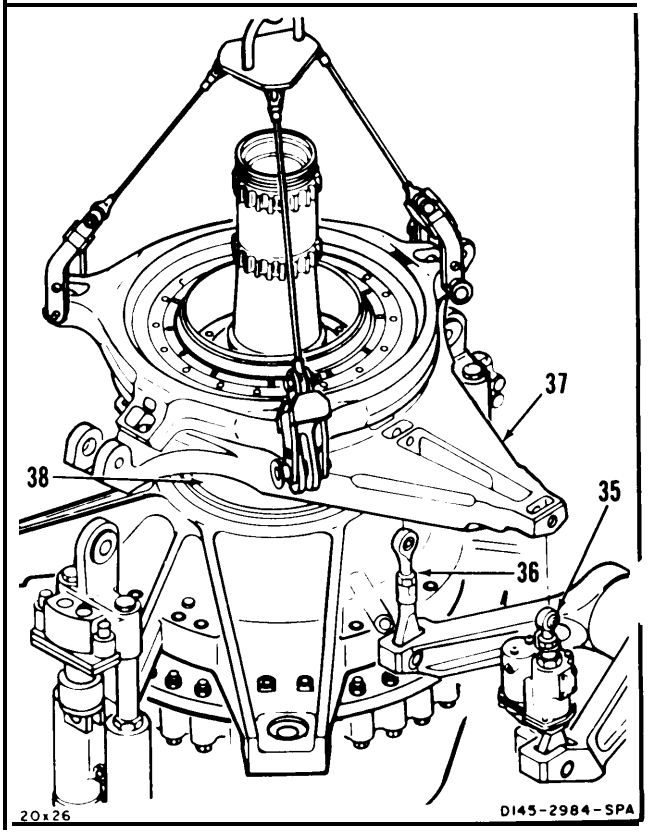
CAUTION

If actuator or link twist or fall, they can be damaged or cause damage to other components.

CAUTION

If bearing hits or binds on slider shaft, bearing surfaces can be damaged.

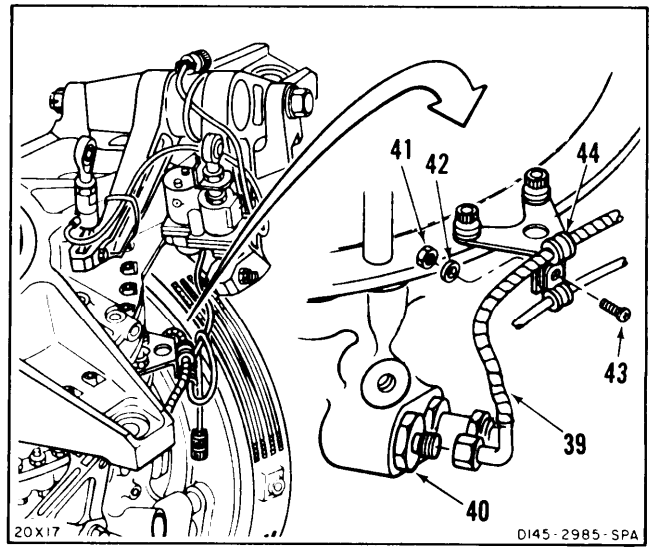
8. **Lift swashplate (37)** from shaft (38) Do not let actuator (35) or link (36) twist or fall fall. Do not let swashplate hit or bind on shaft.



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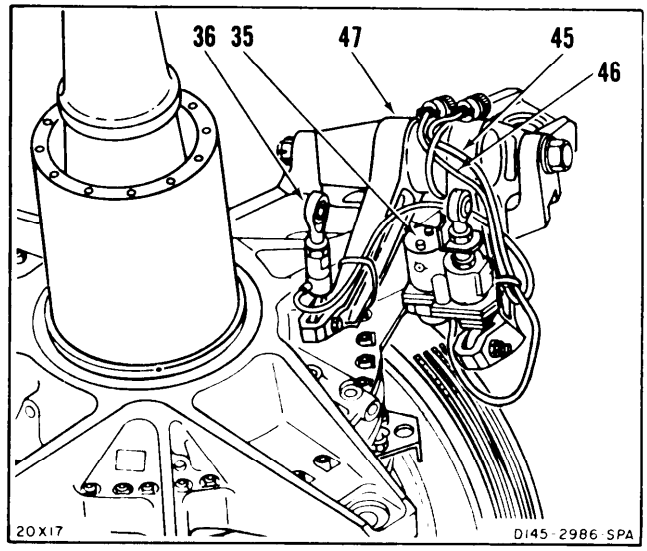
REMOVE TRANSDUCER OIL HOSE

9. Disconnect oil hose (39) from reducer (40).
10. Remove nut (41), washer (42), and screw (43) from clamp (44).
11. **Remove hose (39) with clamp (44).**



REMOVE YOKE

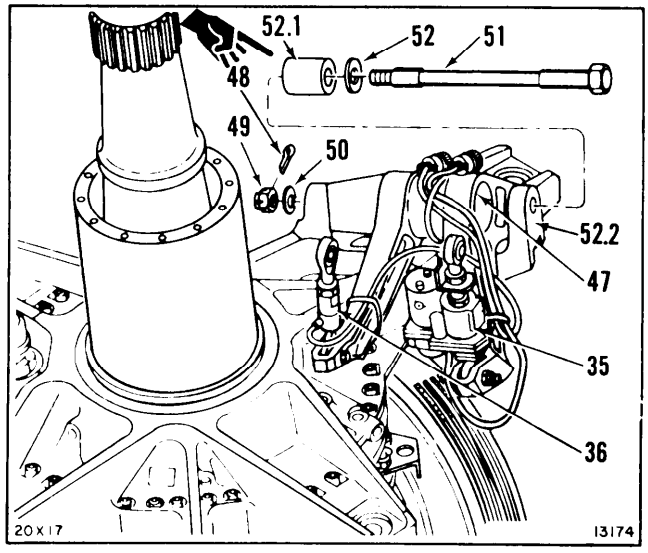
12. Secure cables (45 and 46) away from actuator (35) and link (36). Tape them to yoke (47). Use tape (E388).



13. Remove cotter pin (48), nut (49), and washer (50) from shaft (51).
14. **Remove shaft (51)** and washer (52). Use an aluminum bar. Do not pry on shaft.

14.1. **Remove slider bushing (52.1)** from lug (52.2)

15. **Remove yoke (47)** with actuator (35) and link (36).



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6-47 DISASSEMBLE FORWARD TRANSMISSION PACKAGE (Continued)

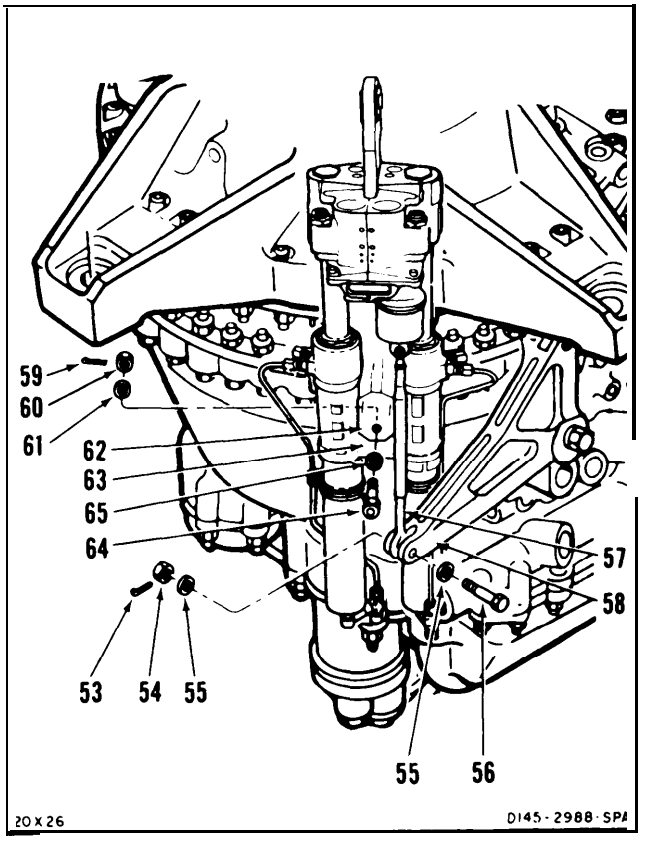
REMOVE SWIVELING SERVOCYLINDER

16. Remove cotter pin (53), nut (54), two washers (55), and bolt (56) from lower end of link (57).
17. **Disconnect link (57)** from bellcrank (58).

CAUTION

Do not bend tubes on servocylinder during removal.

18. Remove cotter pin (59), nut (60), and washer (61) from back of lug (62).
19. Have helper support servocyllnder (63). **Remove bolt (64)** and washer (65). **Lower and remove servocylinder** from lug (62).



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6-47 DISASSEMBLE FORWARD TRANSMISSION PACKAGE (Continued) 6-47

REMOVE PIVOTING SERVO CYLINDER

20. **Remove** cotter pin (66), nut (67), two washers (68), and **bolt (69)** from lower end of link (70).
21. **Disconnect link (70)** from bellcrank (71).

NOTE

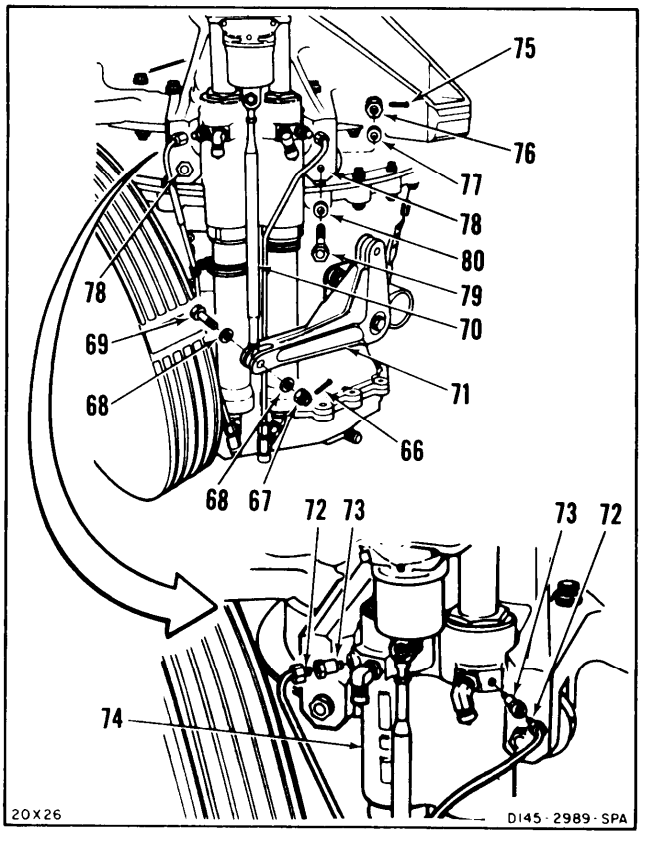
Check valves must be removed for clearance.

22. **Disconnect two tubes (72)** from check valves (73).
23. **Remove check valves (73)** from servocylinder (74).

CAUTION

Do not bend tubes on servocylinder during removal.

24. Remove cotter pins (75), nuts (76) and washers (77) from back of two lugs (78).
25. Have helper support servocylinder (74). **Remove bolts (79)** and washers (80). **Lower and remove servocylinder** from lugs (78).
26. **Install check valves (73)** in servocylinder (74). Connect tubes (72) to check valves.

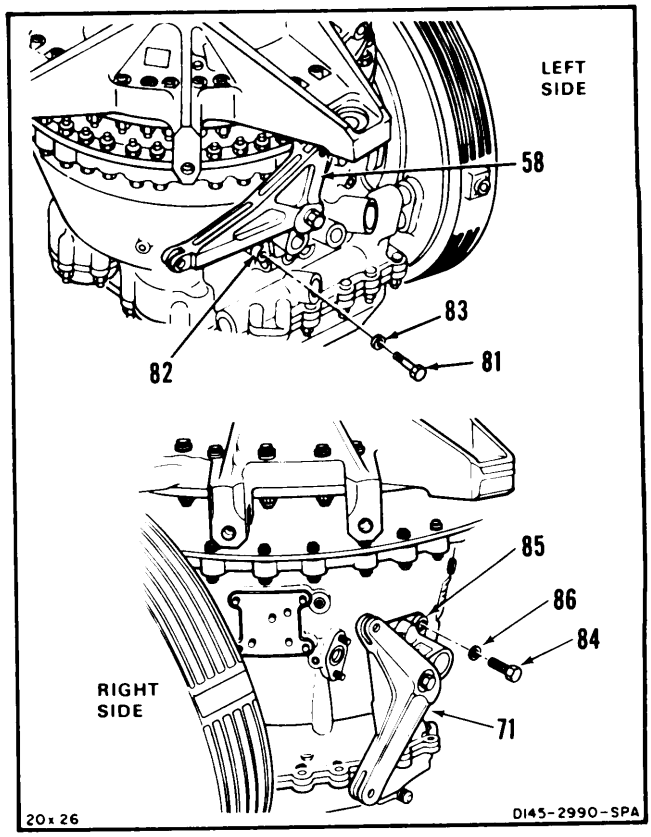


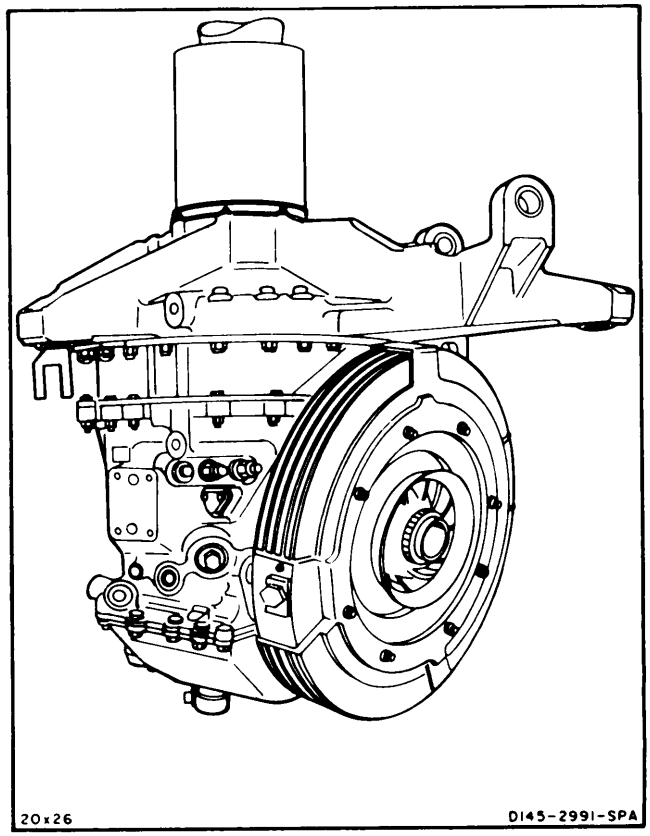
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REMOVE BELL CRANKS

27. Remove lockwire from four bolts (81) on left bellcrank support (82). Remove bolts and washers (83). **Remove support and bellcrank (58).**

28. Remove lockwire from four bolts (84) on right bellcrank support (85). Remove bolts and washers (86). **Remove support and bellcrank (71).**





FOLLOW-ON MAINTENANCE:

None

END OF TASK

6-47.1 REPAIR FORWARD TRANSMISSION OUTSIDE SURFACE 6-47.1

INITIAL SETUP

Applicable Configurations:

All

Tools:

Dial Indicating Depth Gage 643J

Materials:

Naphtha (E245)
Emery Cloth (E123) or
Abrasive Paper (E13)
Crocus Cloth (E122)
Cloths (E120)
Gauze Sponges (E184)
Barrier Material (E80)
Masking Tape (E388)
Gloves (E184.1)
Acetic Acid (E21)
Alodine Powder (E65)
Chromic Acid (E114)
Calcium Sulphate (E91)
Epoxy Primer (E292) or (E293)
Epoxy Topcoat (E166)

Personnel Required:

Aircraft Powertrain Repairer
Inspector

References:

TM 43-0103
MIL-C-5541
MIL-M-3171, Type VI
MIL-C-22751

Equipment Condition:

Off Helicopter Task

General Safety Instructions:

WARNING

Naphtha (E245) is flammable and toxic. It can irritate skin and cause bums. Use only with adequate ventilation, away from heat or open flame. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.

WARNING

Acetic acid (E21) is combustible and toxic. Chromic acid (E114) is extremely toxic. Both can irritate skin and cause bums. Avoid inhaling. Use only with adequate ventilation, away from open flame. Avoid contact with skin, eyes or clothing. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.

WARNING

Alodine powder (E65) is an oxidizer. Discard cloths which contain this material in a separate container. If discarded with cloths contaminated with acetone, MEK or other organic solvents, combustion can result. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.

WARNING

Epoxy primer (E292) or (E293) is flammable and toxic. It can irritate skin and cause bums. Use only with adequate ventilation, away from heat or open flame. Avoid contact with skin, eyes, or clothing. In case or contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.

CAUTION

Do not wear photogray glasses when fluorescent inspecting. They reduce ability to see cracks.

GO TO NEXT PAGE

6-47.1 REPAIR FORWARD TRANSMISSION OUTSIDE SURFACE (Continued) 6-47.1

NOTE

Reparable damage is limited to scratches, nicks, gouges, and minor corrosion.

1. **Clean** oil and grease from **the damaged area.** Use naphtha (E245) and clean cloths (E120). Wear gloves (E184.1).
2. **Check** extent and location of **damage on** cover (1) and housing (2):

NOTE

Refer to Task 6-35 for repairs to the sump.

NOTE

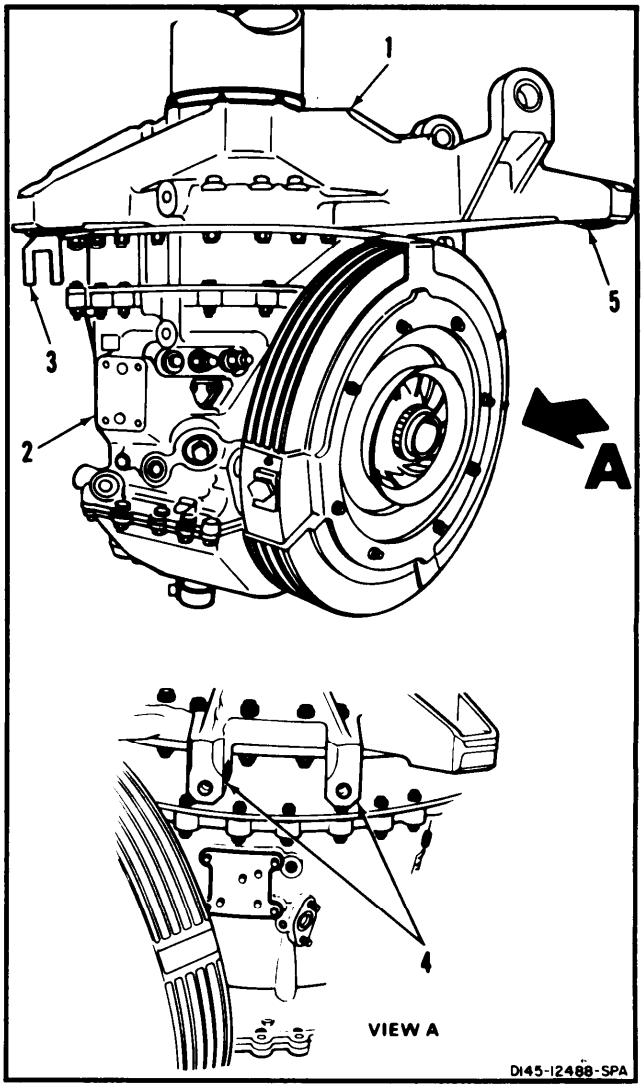
Limits in this step refer to extent of damage after rework.

   a. **Depth of damage shall not be more than 0.025 inch. Depth of damage on actuator lugs (3 and 4) shall not be more than 0.015 inch.**

   b. **Damage shall not extend over more than one surface or enter any radius.**

   c. **Damage shall not be closer than 1.00 inch to any mounting hole (5).**

3. **Fluorescent inspect** damaged area to check for cracks. (Refer to TM 43-0103.) **There shall be no cracks.**
4. Cover moving parts near damaged area to keep out abrasive grit. Use barrier material (E80) and tape (E388).
5. **Blend out damage** with emery cloth (E123) or abrasive paper (E13). Observe the limits of step 2.
6. **Smooth the blended area** with crocus cloth (E122). Do not leave any sharp edges.

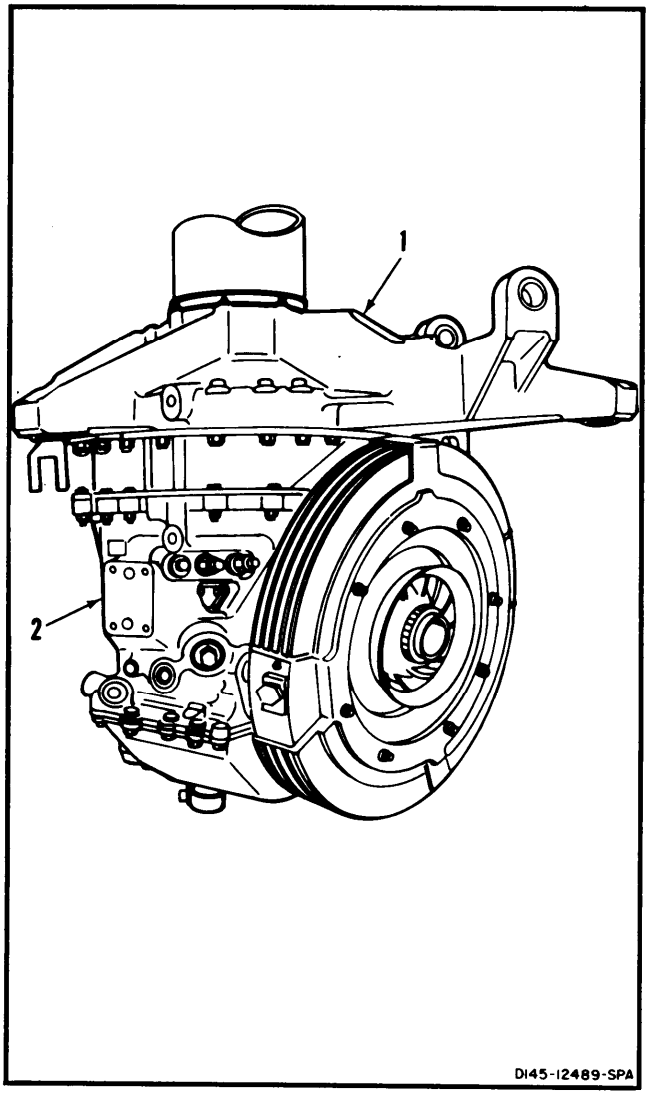


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WARNING

Gloves (E184.1) shall be worn during the remainder of this task. Otherwise, personal injury could result.

7. **Acid etch the reworked area as follows:**
   a. Prepare a solution of 3 parts acetic acid (E21) in 7 parts water. Wear gloves (E184.1) and goggles.
   b. Swab the area with solution for 2 minutes. Use gauze sponges (E184).
   c. Rinse the area with cold water.
8. **Fluorescent inspect** reworked area to check for cracks (TM 43-0103). **There shall be no cracks.**
9. Apply surface treatment to the reworked area as follows:
   a. **Clean the area with naphtha (E245)** and clean cloths. Let the area air dry.
   b. **If the area is on cover (1), swab solution of alodine powder (E65) in water on area (MIL-C-5541). Swab for 2 to 5 minutes.** Use gauze sponges (E184). Wear gloves (E184.1). **Rinse** the area with cold water and let air dry.
   c. **If the area is on housing (2), swab on solution of chromic acid (E114) and calcium sulphate (E91) (MIL-L-3171, type VI). Swab until metal becomes dull gold to brown.** Use gauze sponges (E184). **Rinse** the area with cold water and let air dry.
10. **Apply epoxy primer (E292) or (E293) to** the reworked area. Let air dry for 2 hours.
11. **Apply epoxy topcoat (E166) (MIL-C-22751).**



INSPECT

FOLLOW-ON MAINTENANCE:
None

END OF TASK

6-48 PREPARE FORWARD TRANSMISSION FOR SHIPMENT OR STORAGE

INITIAL SETUP

Applicable Configurations:
All

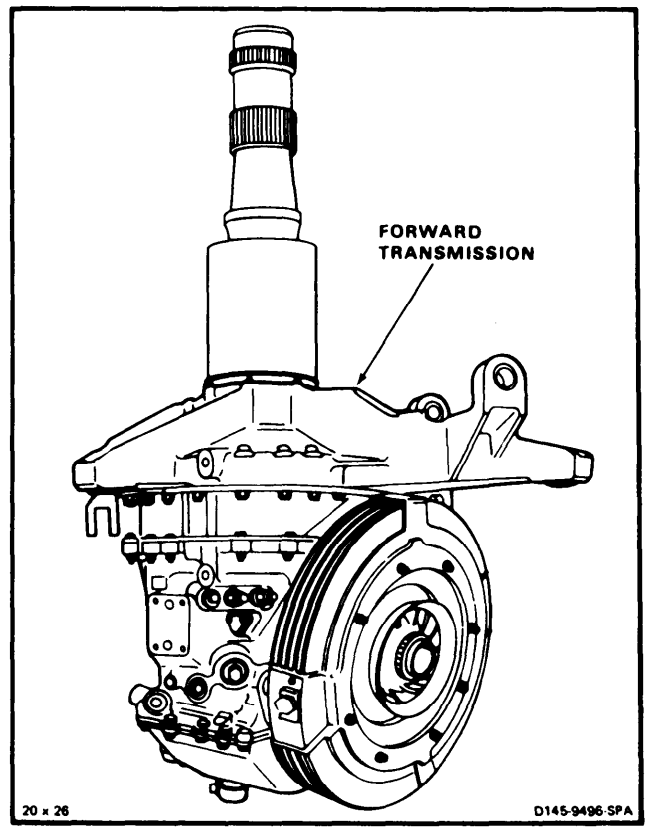
Tools:
Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Hoisting Eye (T32)
Work Hoist
Shipping Container (T74)
Container, 14-Quart (2)
Torque Wrench, 30 to 150 Foot-Pounds

Materials:
Fingerprint Remover (E175)
Cloths (E120)
Dry Cleaning Solvent (E162)
Gloves (E186)
Swabbing Brush (E86)
Corrosion Preventive Compound (E153 or E154)
Desiccant (E160), 16-Unit Bag (8)
Barrier Material (E81)
Tape (E388)

Personnel Required:
67U10 Medium Helicopter Repairer (2)
67U30 Inspector

References:
TB 55-8100-200-25
TM 38-750
TB 750-126

Equipment Condition:
Off Helicopter Task
Forward Transmission Disassembled (Task 6-47)



General Safety Instructions:

WARNING

Dry cleaning solvent (E162), fingerprint remover (E175) and corrosion-preventive compound (E153 or E154) are flammable and toxic. They can irritate skin and cause burns. Use only in well-ventilated area, away from heat and open flame. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.

GO TO NEXT PAGE

6-48 PREPARE FORWARD TRANSMISSION FOR SHIPMENT OR STORAGE (Continued)

NOTE

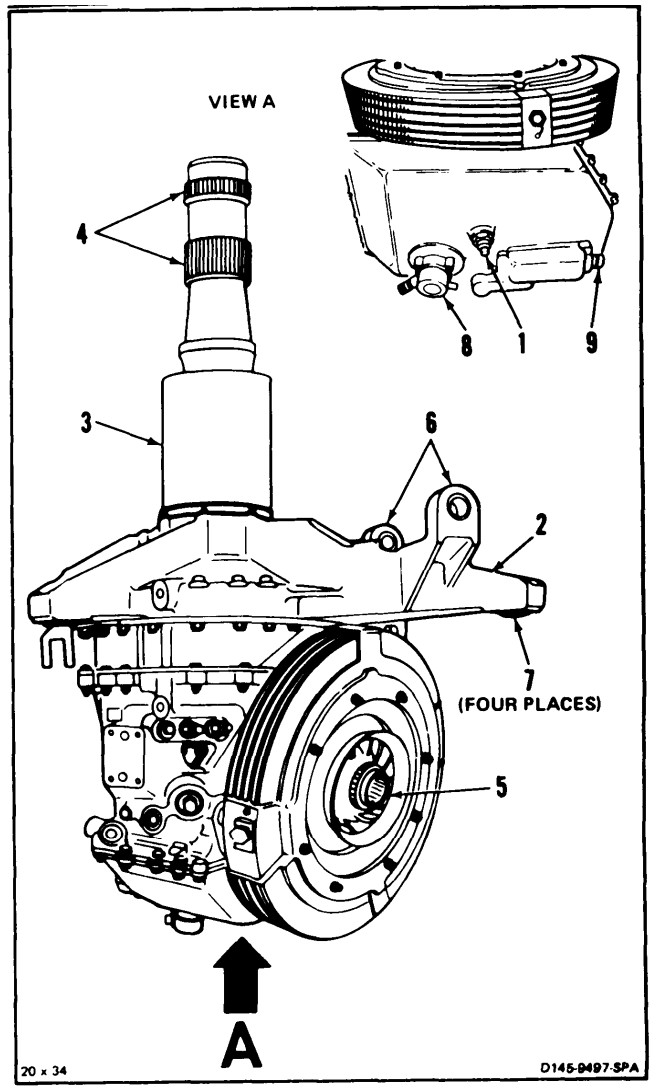
Sump holds about 28 quarts of oil.

1. Push in drain valve (1), twist it, and pull. **Let oil drain** into containers. Push in valve, twist it, and pull down to close.
2. Clean all surfaces of transmission (2). Use dry cleaning solvent (E162) and clean cloths (E120). Wear goggles.
3. **Clean slider shaft (3),** rotor shaft **splines (4),** input shaft **splines (5) and bushings (6 and 7).** Use fingerprint remover (E175) and clean cloths (E120).

CAUTION

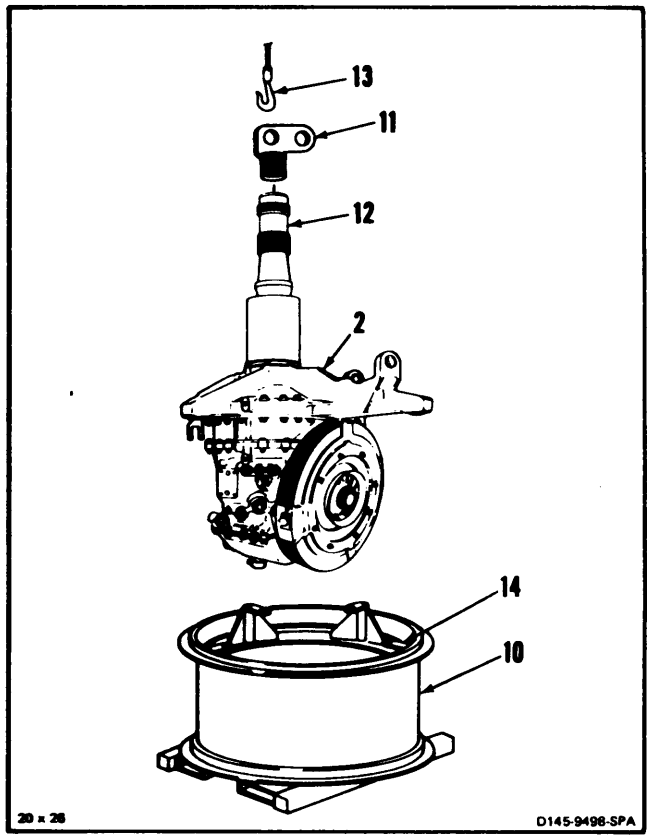
Touching unpainted surfaces with bare fingers can cause corrosion.

4. Put on gloves (E186). Gloves shall be worn for the rest of this task.
5. Wipe surfaces cleaned with fingerprint remover with dry cleaning solvent (E162) and clean cloths (E120).
6. **Coat slider shaft (3),** rotor shaft **splines (4),** input shaft **splines (5), and bushings (6 and 7)** with corrosion-preventive compound (E153 or E154). Use cloth (E120) to coat shaft. Use swabbing brush (E86) to coat splines and bushings.
7. **Cover slider shaft (3), splines (4 and 5), and bushings (6 and 7)** with barrier material (E81) and tape (E388).
8. **Cover indicating screen (8), electrical connectors (9) and drain valve (1)** with barrier material (E81) and tape (E388).



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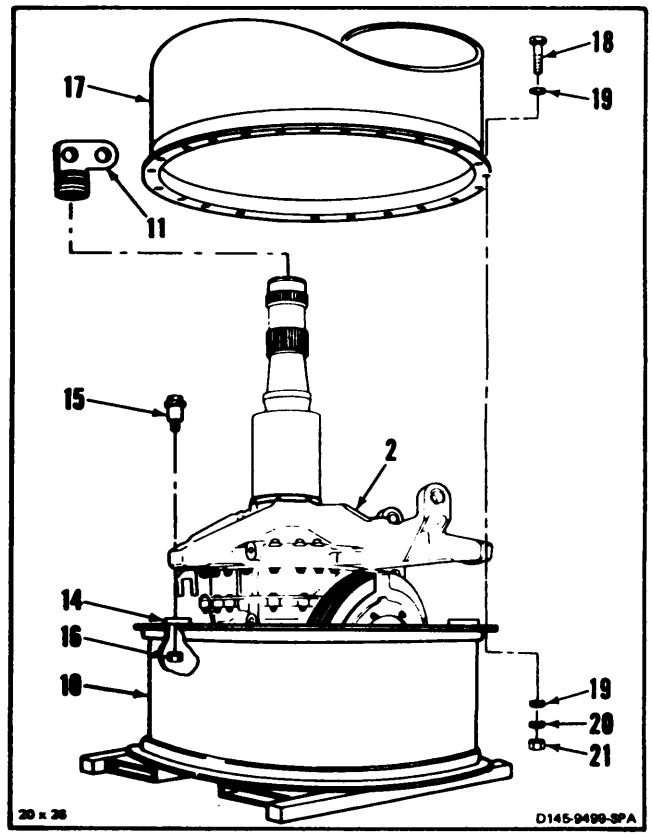
9. Install transmission (2) in shipping container (T74) (10) as follows:
   a. Inspect and prepare container (10) (TB 55-8100-200-25).
   b. Install hoisting eye (T32) (11) in top of shaft (12). Connect work hoist hook (13) to eye marked AFT SHAFT.
   c. With aid of helper, **place transmission (2) in container (T74) (10).** Align it with four mounting brackets (14).



   d. Remove hoisting eye (11) from transmission (2).
   e. **Secure transmission (2)** to container mounting brackets (14) with four bolts (15) and nuts (16). **Torque nuts to 55 foot-pounds.**
   f. Prepare required maintenance forms and records (TM 38-750 and TB 750-126).
   g. Put eight 16-unit bags of desiccant (E160) into container (10).

INSPECT

   h. Install cover (17) on container (10). install bolts (18), washers (19), split washers (20), and nuts (21) at 24 places.
   i. **Tighten nuts (21) at 3, 6, 9, and 12 o'clock. Tighten nuts at 2, 4, 8, and 10 o'clock. Tighten remaining nuts.**



GO TO NEXT PAGE

10. **Remove plug (22)** from cover (17).
11. **connect air test line (23)** to cover (17).

CAUTION

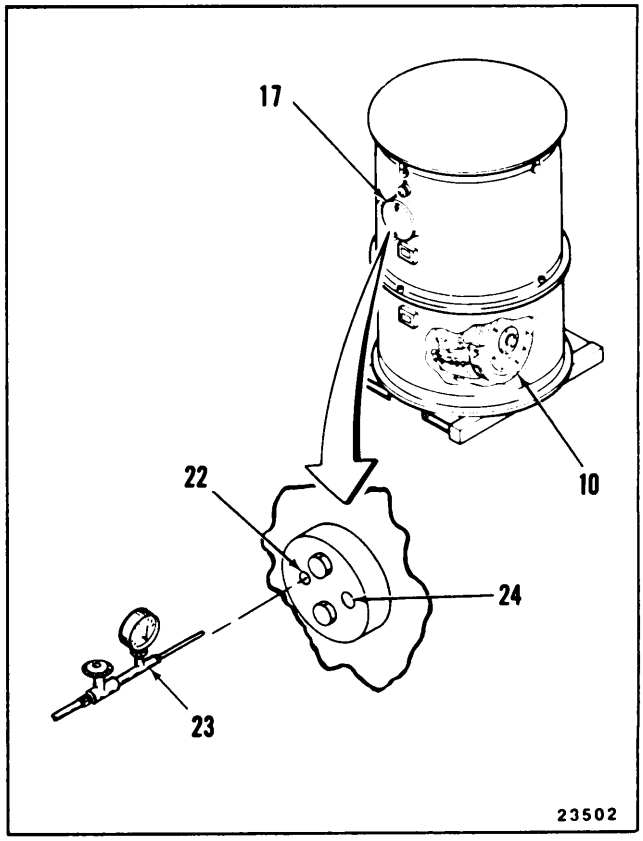
Low pressure air supply must be used. Exceeding test pressure can damage container.

12. **Pressurize container (10)** to **3 psi max.** **Check container for leaks. Container must hold 3 psi** for 1 hour.

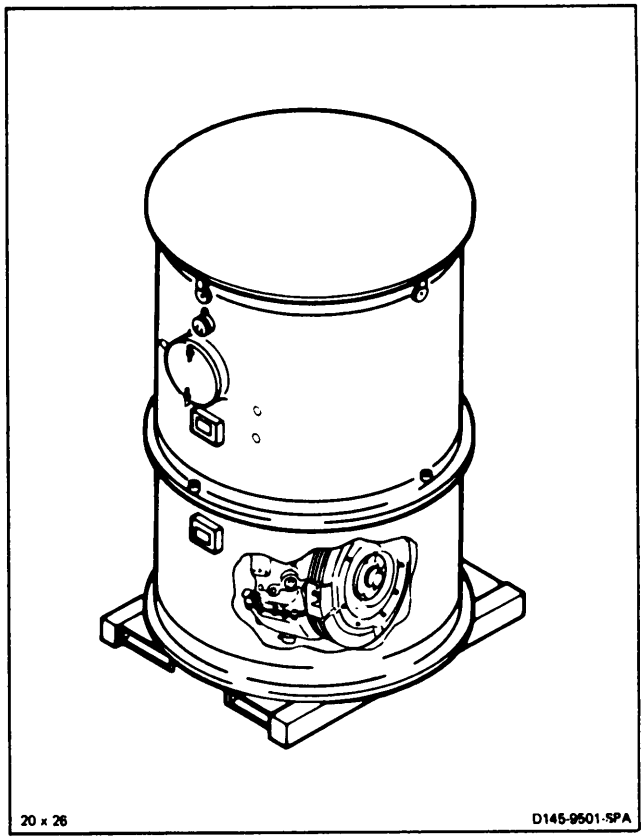
WARNING

Be careful when releasing air under pressure, wear goggles. Personal injury can result.

13. **Push pressure relief valve (24)** until pressure in container (10) is **0 psi.**
14. **Disconnect air line (23)** from cover (17).
15. **Install plug (22)** in cover (17).



FOLLOW-ON MAINTENANCE:
None



END OF TASK

6-49 REMOVE FORWARD TRANSMISSION FROM STORAGE

INITIAL SETUP

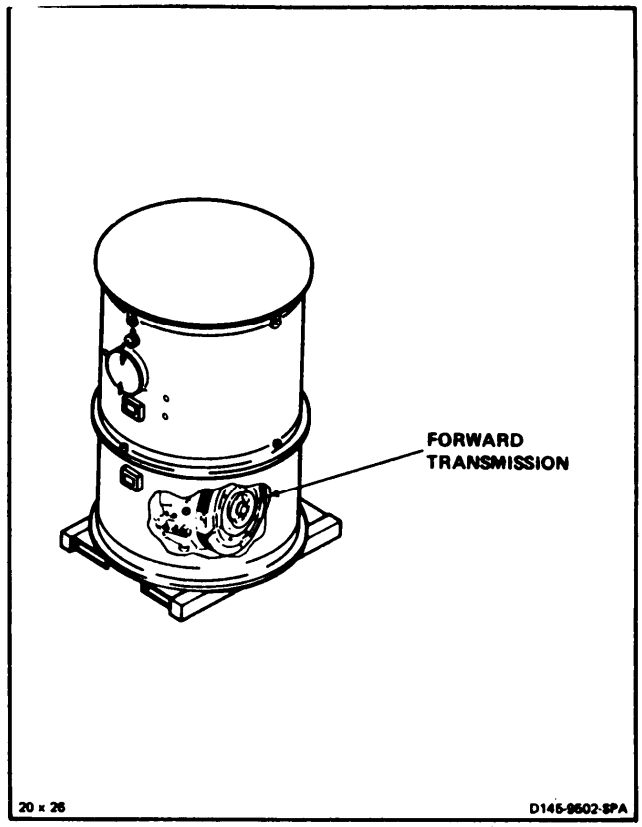
Applicable Configurations:
All

Tools:
Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692
Hoisting Eye (T32)
Work Hoist
Container, 14-Quart

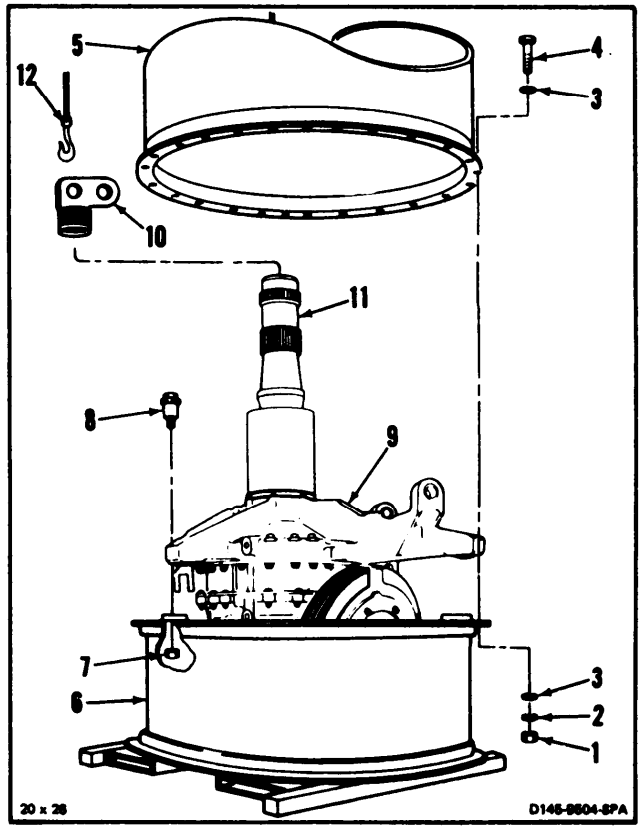
Materials:
Dry Cleaning Solvent (E162)
Cloths (E120)
Gloves (E186)

Personnel Required
67U10 Medium Helicopter Repairer (2)
67U30 Inspector

Equipment Condition:
Off Helicopter Task



1. **Remove 24 nuts (1) washers (2 and 3) and bolts (4)** from cover (5). Remove cover.
2. Remove and discard desiccant bags from container (6).
3. **Remove four nuts (7) and bolts (8)** from transmission (9).
4. **Install hoisting eye (T32) (10)** in rotor shaft (11). **Connect work hoist hook (12)** to eye marked AFT SHAFT.
5. With aid of helper, lift transmission (9) from container (6).
6. Set transmission (9) down on bench or workstand. Remove hoisting eye (T32) (10).
7. Install four bolts (8) and nuts (7) in container (6).
8. Install cover (5). Install 24 bolts (4), washers (3), split washers (2) and nuts (1).



GO TO NEXT PAGE

9. Remove all tape and barrier material from transmission (9).

WARNING

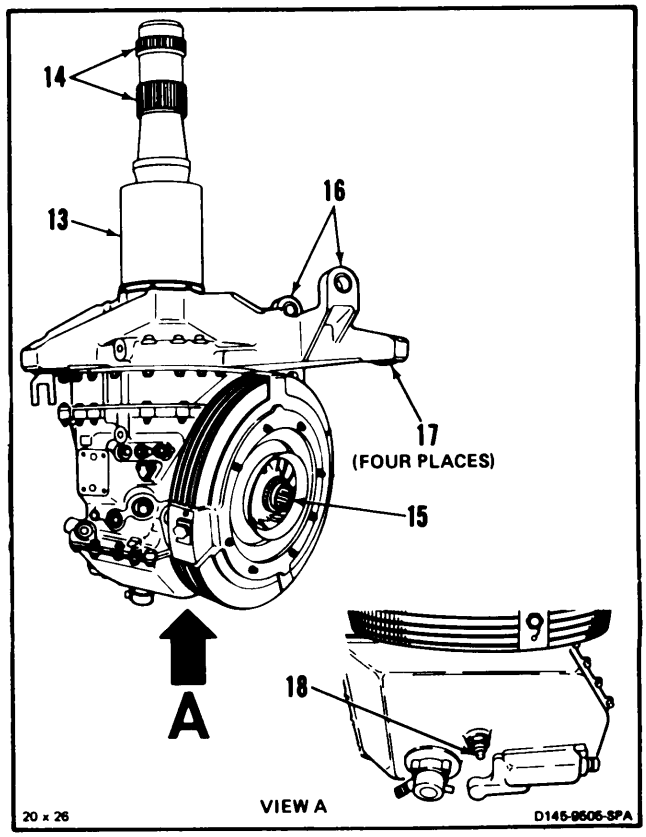
Dry cleaning solvent (E162) is flammable and toxic. It can irritate skin and cause bums. Use only in well-ventilated area, away from heat and open flame. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.

CAUTION

Touching splines with bare fingers can cause corrosion.

10. **Remove corrosion preventive compound from slider shaft (13),** rotor shaft **splines (14),** input shaft **splines (15), and bushings (16 and 17).** Use dry cleaning solvent (E162) and clean cloths (E 120). Wear gloves (E186) and goggles.

11. **Push in drain valve (18), twist it, and pull.** Let residual oil drain into container. **Push in valve, twist it, and pull down to close.**



INSPECT

FOLLOW-ON MAINTENANCE:

Assemble forward transmission (Task 6-50).

END OF TASK

6-50 ASSEMBLE FORWARD TRANSMISSION PACKAGE

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692
Rotor Head Controls Sling (T14)
Work Hoist
Wrench, 1-1/16 Inch
Wrench, 1-7/16 Inch
Torque Wrench, 5 to 50 Inch-Pounds
Torque Wrench, 30 to 150 Inch-Pounds
Torque Wrench, 150 to 750 Inch-Pounds

Materials:

Lockwire (E231)
Antiseize Compound (E75)
Grease (E190)
Brush (E86)
Cloth (E120)
Dry Cleaning Solvent (E162)
Oil (E253), (E254), or (E254.1)

Parts:

Cotter Pins

Personnel Required:

Medium Helicopter Repairer (3)
Inspector

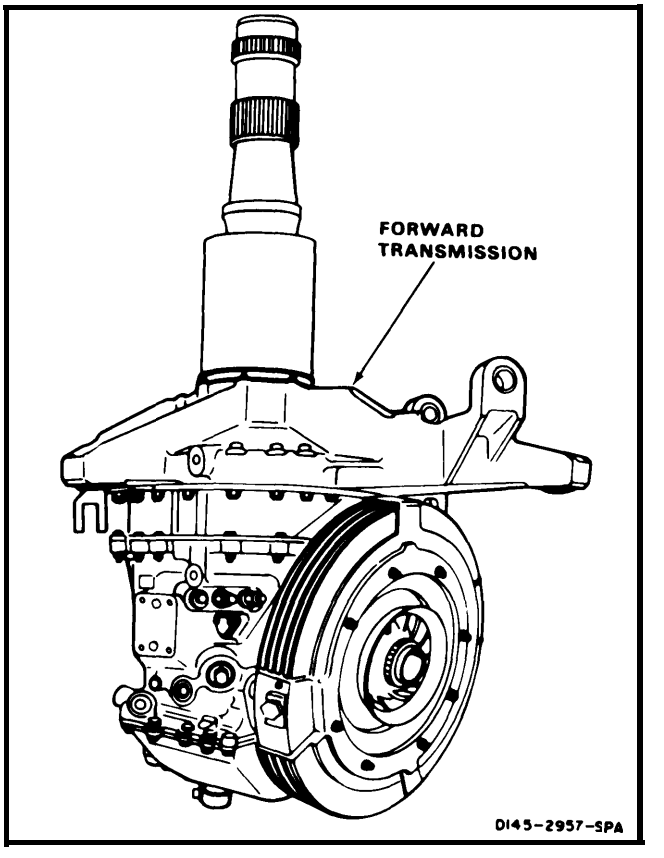
References:

TM 55-1520-240-23P
TM 1-1500-204-23
Task 11-212
Task 6-129

General Safety Instructions:

WARNING

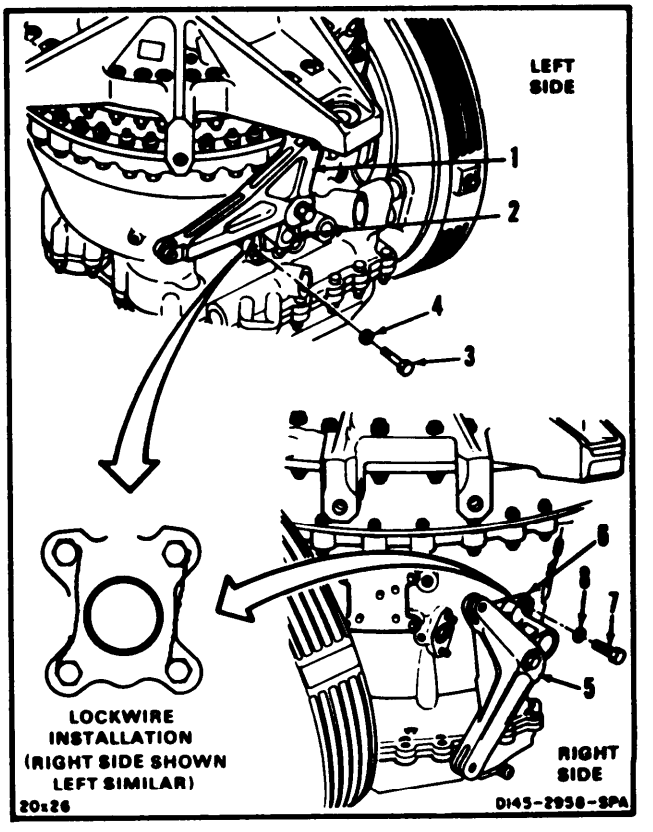
Antiseize compound (E75) can form toxic vapors if exposed to flame. Use only with adequate ventilation, away from open flame. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.



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INSTALL BELLCRANKS

1. **Position loft bellcrank (1)** and support (2).
2. **Install four bolts (3)** and washers (4). **Toque bolts to 190 inch-pounds.** Lockwire bolts on each side of support in pairs. Use lockwire (E231).
3. **Position right bellcrank (5)** and support (6).
4. **Install four bolts (7)** and washers (8). **Torque bolts to 190 inch-pounds.** Lockwire bolts on each side of support in pairs. Use lockwire (E231).



INSTALL PIVOTING SERVOCYLINDER

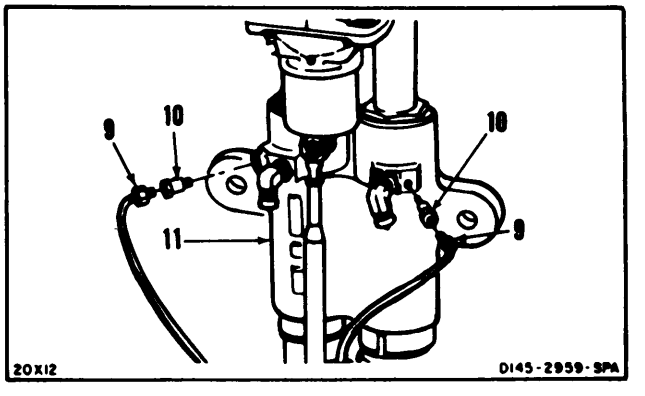
CAUTION

Do not band tubes on servo-cylinder during removal of chock valves.

NOTE

Check valves must be removed for clearance.

5. **Disconnect two tubes (9)** from check valves (10). **Remove check valves** from servocylinder (11).



WARNING

If bushings are not installed, loss of helicopter, personal injury or loss of life can result.

6. **Check that bushings (12) are securely installed in both inboard and outboard lugs (13). Check that bushings in outboard lugs do not protrude beyond inner or outer faces of lugs. If either on. does, do not use transmission.**

GO TO NEXT PAGE

6-50 ASSEMBLE FORWARD TRANSMISSION PACKAGE (Continued) 6-50

7. Have helper **position servocylinder (11) between lugs (13).**

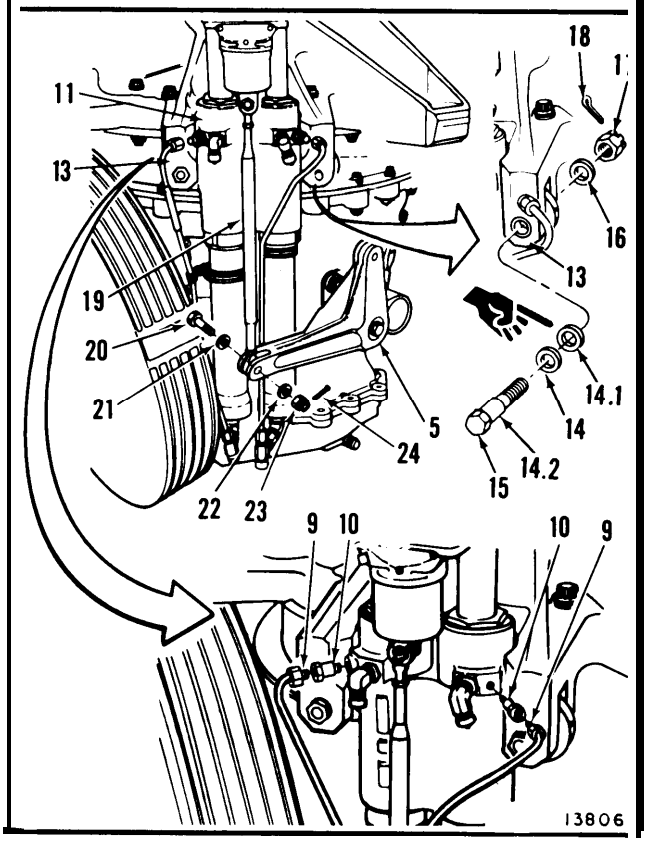
WARNING

Make sure slip fit bushings are installed on shanks of bolts. Otherwise, personal injury, loss of life, or loss of helicopter can result.

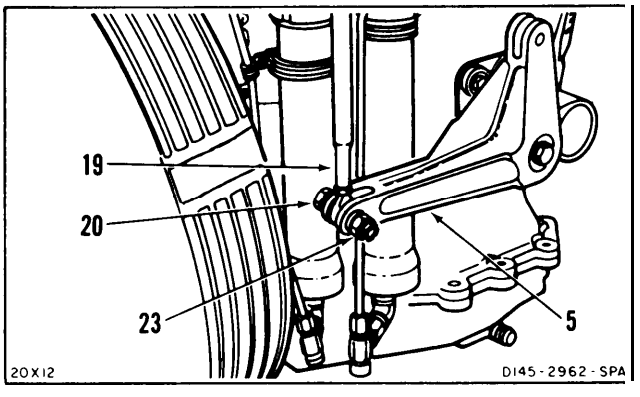
NOTE

- Install countersunk washers with countersink against bolthead.
- Two washers may be used under nut to install cotter pin.

8. **Check that countersunk washer (14), washer (14.1) and slip fit bushing (14.2) are installed** on shank of each bolt (15). **Install bolts** through lugs (13). **Install** one or two washers (16) and **nut (17)** on each bolt.
9. **Torque bolts (15) to 320 to 720 inch-pounds.** Install cotter pins (18).
10. **Install two check valves (10). Connect tubes (9)** to valves.
11. **Position link (19)** in bellcrank (5).
12. **Install bolt (20),** head inboard, steel washer (21) under bolt head, aluminum washer (22), and nut (23). **Torque nut to 30 to 45 inch-pounds.** Install cotter pin (24).



13. **Check link (19) and bellcrank (5).** There shall be no axial looseness between them.
14. **Check bolt (20) and nut (23). Torque needed to turn bolt and nut shall be at least 10 inch-pounds.**



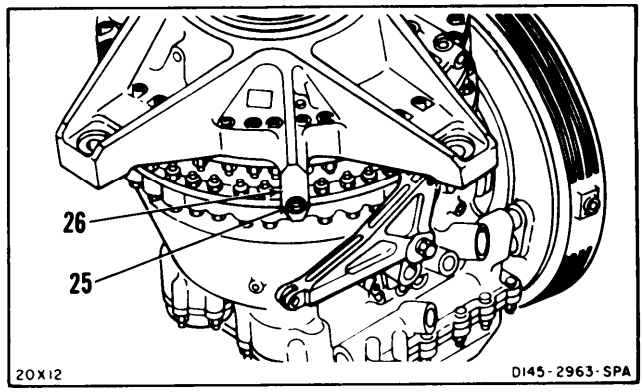
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INSTALL SWIVELING SERVOCYLINDER

WARNING

If slip bushing is not installed, loss of helicopter, personal injury or loss of life can result.

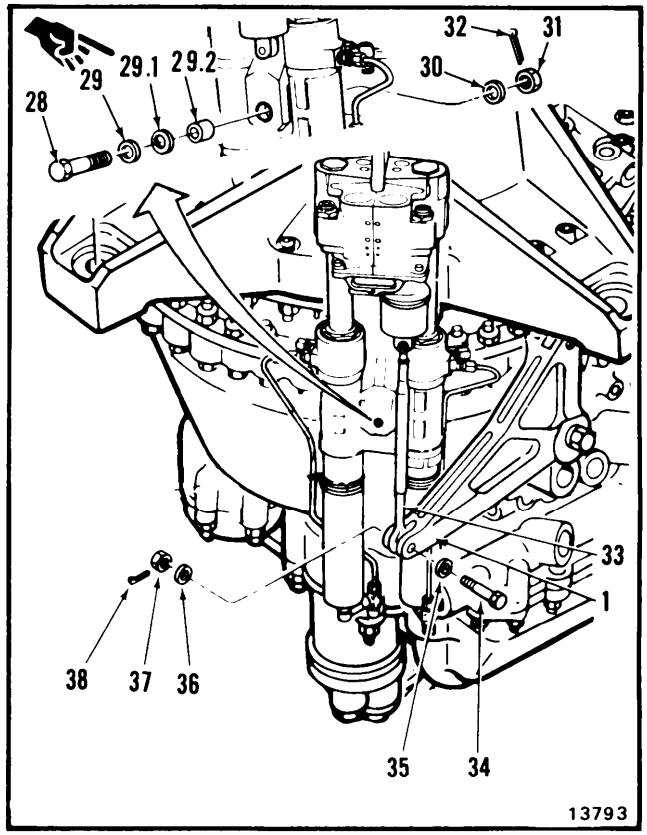
15. **Check that bushings (25) are installed in lugs (26).**



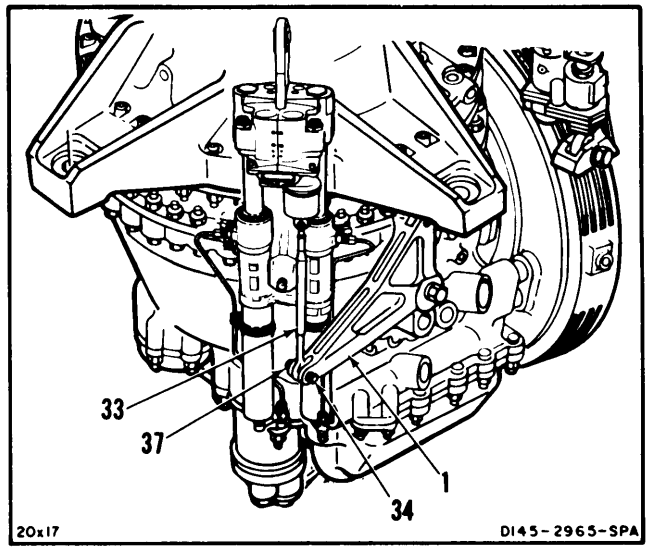
NOTE

- Two washers may be installed under nut to allow for cotter pin installation.
- Install countersunk washers with countersink against bolthead.

16. Have helper **position servocylinder (27)** in lug (26).
17. **Install bolt (28) with countersunk washer (29), washer (29.1) and slip bushing (29.2)** through lugs (26). Install one or two washers (30) and nut (31) on bolt.
17.1. **Torque bolt (28) to 320 to 720 inch-pounds.** Install cotter pin (32).
18. **Position link (33)** in bellcrank (1).
19. **Install bolt (34),** head outboard, steel washer (35) under bolthead, aluminum washer (36), and nut (37). **Torque nut to 30 to 45 inch-pounds.** Install cotter pin (38).

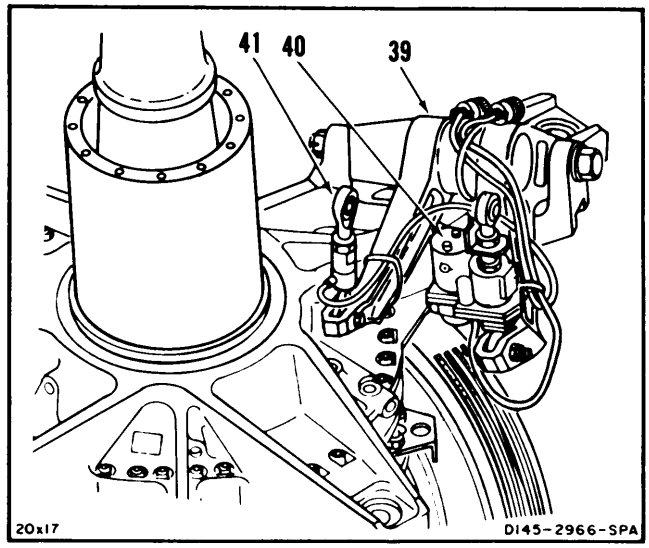


20. **Check link (33) and bellcrank (1).** There shall be no axial looseness between them.
21. **Check bolt (34) and nut (37). Torque needed to turn bolt and nut shall be at least 10 inch-pounds.**



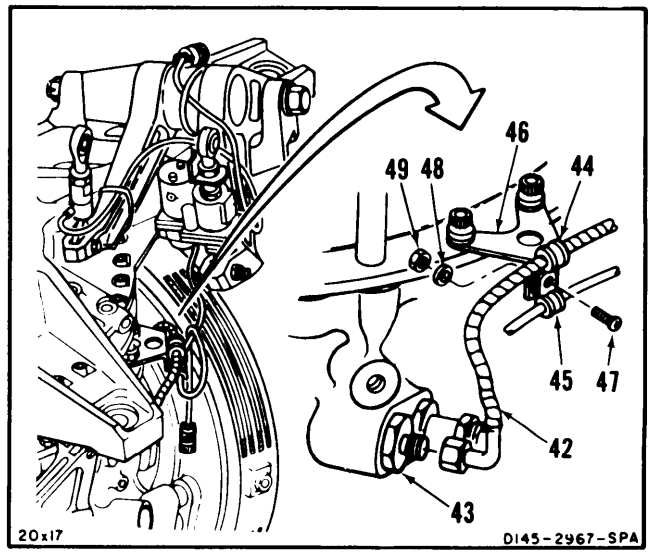
INSTALL YOKE

22. **Install yoke (39)** with actuator (40) and link (41) (Task 11-217).



INSTALL TRANSDUCER OIL HOSE

23. **Connect oil hose (42)** to reducer (43).
24. **Connect hose clamp (44) and cable clamp (45)** to bracket (46). Install screw (47), washer (48), and nut (49).

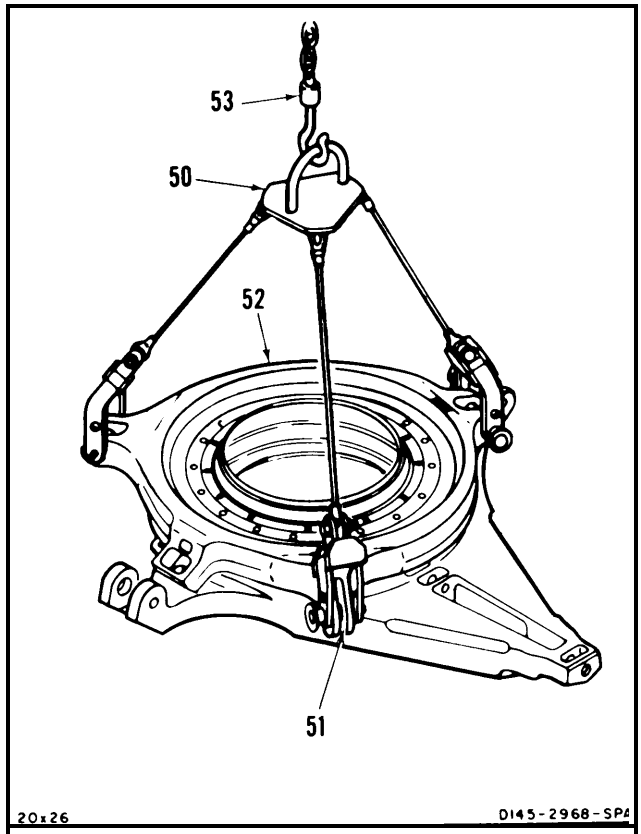


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6-50 ASSEMBLE FORWARD TRANSMISSION PACKAGE (Continued)

INSTALL SWASHPLATE

25. **Attach sling (T14) (50)** to three lugs (51) on swashplate (52). **Attach work hoist chain (53)** to sling (T14).



WARNING

Swashplate is heavy and can injure personnel if it drops. Swashplate must be supported by hoist and moved carefully to prevent injury to personnel.

CAUTION

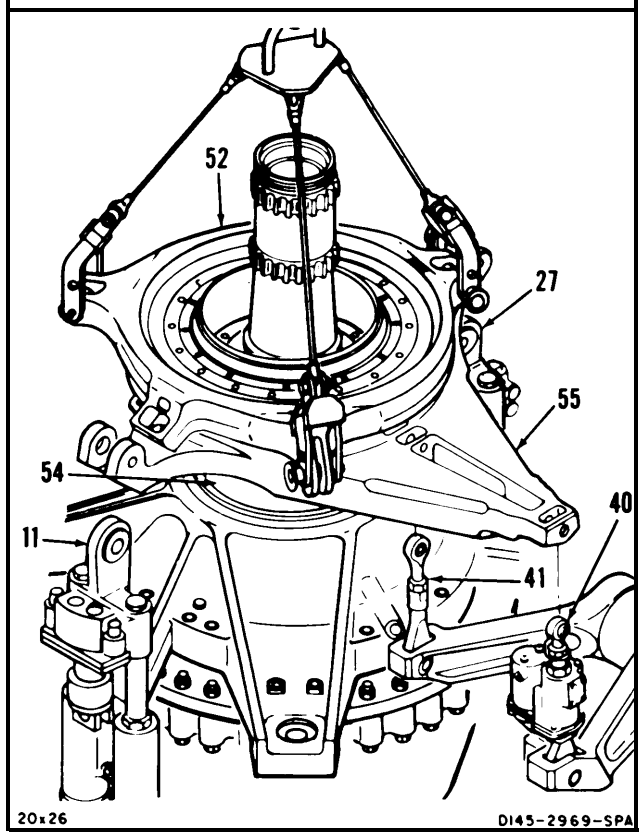
If swashplate hits or binds on slider shaft, shaft or swashplate bearings can be damaged.

26. **Have helper lower swashplate** (52) over slider shaft (54) Do not let swashplate hit or bind on shaft

CAUTION

If actuator or link are twisted, they can be damaged.

27. **Align lower ring (55)** with actuator (40), link (41), and two servocylinders (11 and 27) Do not twist actuator or link.



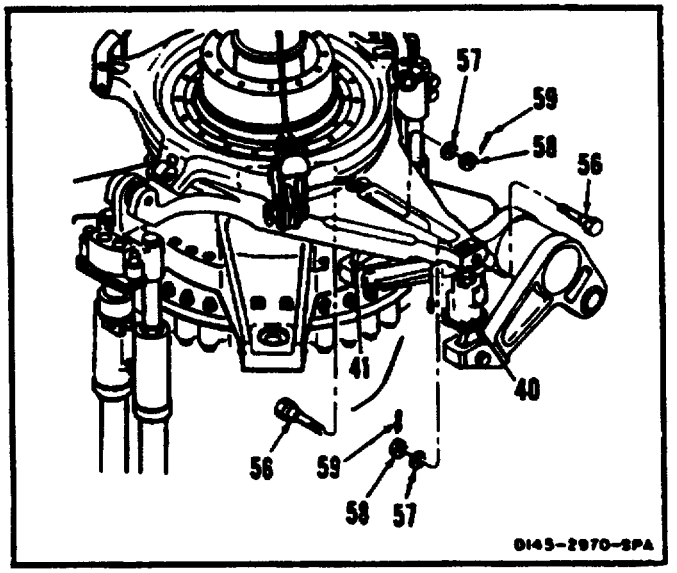
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CAUTION

Using standard bolts could result in bolt failure. Damage to parts can result.

28. **Coat bushing of special bolts (56)** with antiseize compound (E75). Do not coat thread.

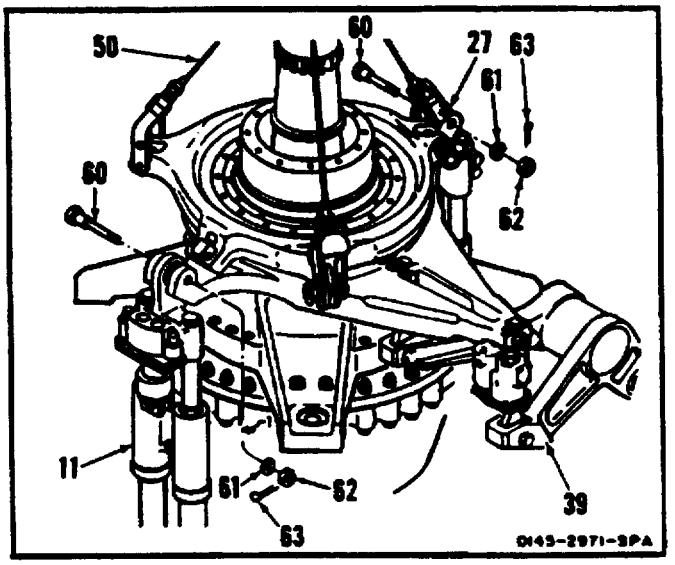
29. **Install two special bolts (56),** with heads away from each other, washers (57), and nuts (58) through upper ends of actuator (40) and link (41). **Torque the nuts to 400 to 660 inch-pounds.** Install cotter pin (59). Add a thin washer under the nut if needed to install the cotter pin.



30. **Coat bushing of special bolts (60)** with antisieze compound (E75). Do not coat thread.

31. **Install two special bolts (60), heads away from yoke (39), washers (61), and nuts (62)** in servocylinders (11 and 27). **Torque the nuts to 400 to 660 inch-pounds.** Install cotter pin (63). Add a thin washer under the nut if needed to install the cotter pin.

32. Remove sling (T14) (50).

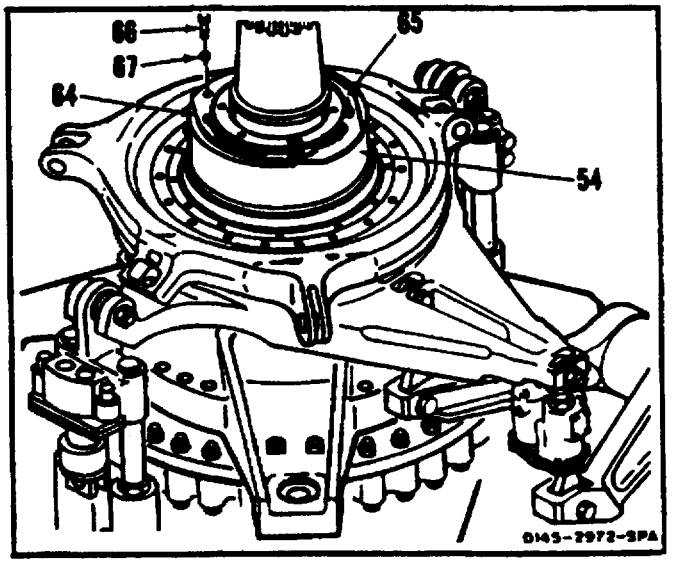


WARNING

Oil (E253), (E254), or (E254.1) is toxic. It can irritate skin and cause burns. Avoid inhaling. Use only with adequate ventilation. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.

33. **Position seal halves (64 and 65)** on shaft (54). **Apply** a light coat of **oil (E253), (E254), or (E254.1) to the thread of 12 bolts (66). Install the bolts** and washers (67). Ensure that a minimum clearance of 0.050 inch exists between the rubber seal and the surface of the rotor shaft. If a minimum clearance does not exist, move seal (64) or (65) radially as far away from the shaft as possible and recheck clearance. **Torque the bolts to 60 inch-pounds.**

34. **Lockwire six bolts (66)** on each half of seal (64) in two groups of three bolts each. Use lockwire (E231).



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INSTALL COVER, LINKS, AND DRIVE ARMS

WARNING

Dry cleaning solvent (E162) is flammable and toxic. It can irritate skin and cause burns Use only in well-ventilated area, away from heat and open flame. In case of contact, immediately flush skin or eyes with water for at least 15 minutes Get medical attention for eyes.

34.1. Clean splines (67.1 and 67.2) of drive collar (67.3) and shaft (67.4). Use solvent (E162) and cloths (E120).

34.2. Apply a thick coat of grease (E190) to splines (67.1 and 67.2). Use brush (E86). Make sure splines are full of grease.

CAUTION

If arm hits slider shaft, shaft can be damaged.

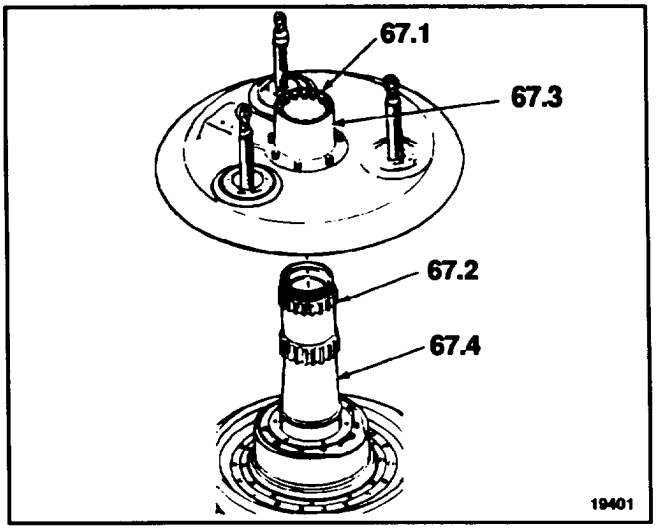
35. Have two helpers **lower cover (68),** with lower drive arm (69) and three links (70) attached, **over rotor shaft (71).** Do not let drive arm hit slider shaft (54).

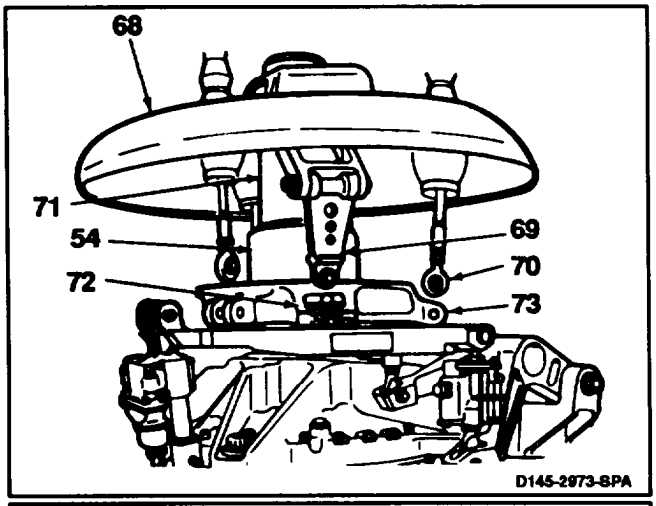
36. **Position drive arm (69)** in swashplate lug (72) marked FWD ROTOR. **Position three links (70)** in lugs (73).

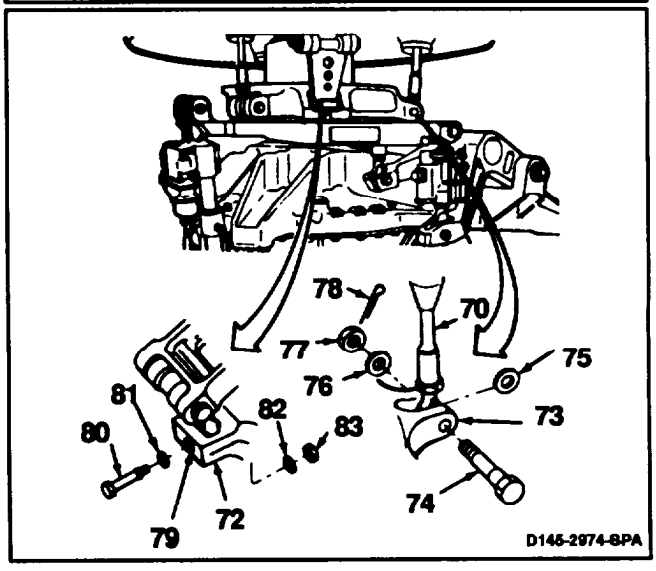
37. **Install each of three links (70)** as follows:
   a. Coat bushing of bolt (74) with antiseize compound (E75). Do not coat thread.
   b. Install limiter (75) between link (70) and lug (73), flat side against lug.
   c. Install bolt (74), washer (76), and nut (77). **Torque nut to 400 to 660 inch-pounds** Install cotter pin (78).

38. **Check that bushing (79) is installed in lug (72).**

39. **Install bolt (80),** thin washer (81), washer (62) and nut (83). **Torque bolt to 190 to 270 inch-pounds as needed for cotter pin alignments**



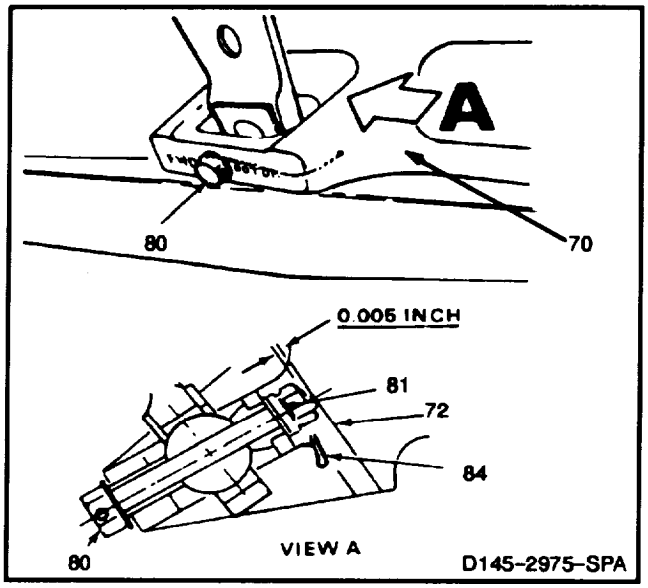




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6-50 ASSEMBLE FORWARD TRANSMISSION PACKAGE (Continued) 6-50

40. **Check clearance between end of bolt (80) and inside of lug (72).** Clearance shall be at least 0.005 inch Add washers (81) under bolthead as needed.
41. Install cotter pin (84) in bolt (80). Lockwire bolt to hole in right side of lug (72). Use lockwire (E231).



RETOROUE AUXILIARY OIL FILTER

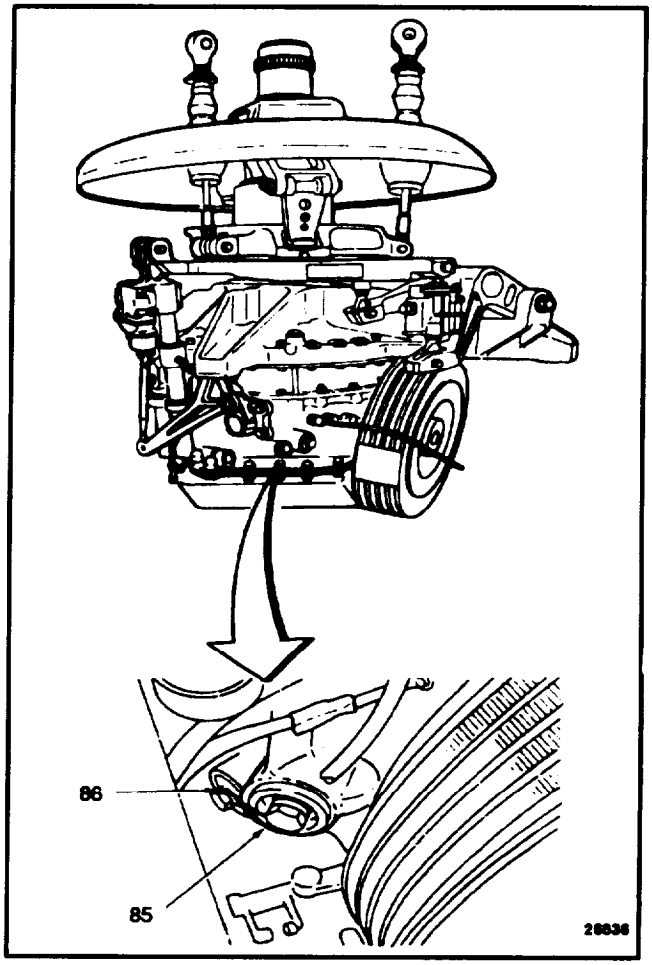
42. Remove lockwire from auxiliary oil filter (85).

NOTE

Do not remove filter.

43. **Check wrenching flats** on filter (85). If they are damaged, replace filter (Task 6-129).
44. **Loosen filter (85)** one-half-turn. **Torque filter to 80 inch-pounds**
45. **Lockwire filter (85)** to inlet screen (86). Use lockwire (E231).

INSPECT



FOLLOW-ON MAINTENANCE:

Inspect servocylinders (Task 7-123).

Install rotary-wing head (Task 5-9).

Inspect forward and aft rotor shaft splines (Task 6-68).

END OF TASK

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic Tool Kit,
NSN 5180-00-323-4692
Hoisting Eye (T32)
Work Hoist
Torque Pack (T23)
Torque Reactor Assembly (T159)
Tee Handle (T161)
Open End Wrench, 1 inch
Rope Guide Lines
Torque Wrench, 5 to 50 Inch-Pounds
Torque Wrench, 30 to 150 Inch-Pounds

Materials:

Lockwire (E229)
Grease (E190)
Crocus Cloth (E122)

Personnel Required:

Medium Helicopter Repairer (3)
Inspector

References:

TM 55-1520-240-23P

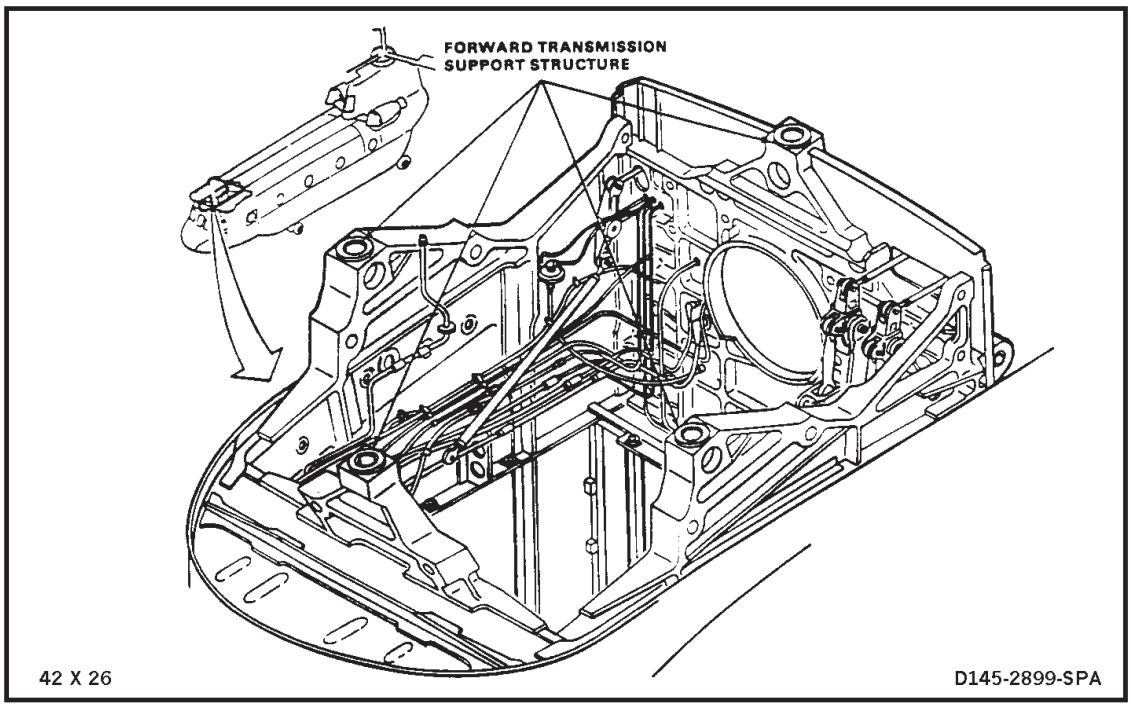
General Safety Instructions:

WARNING

Make sure ratchet selector on torque pack is set to NUT ON before applying torque. Changing ratchet setting with torque applied can damage unit and can cause injury to personnel.

WARNING

Do not install pumps with serial numbers V534 through V598. ASAM 96-08 directed removal of these pumps. If found, these pumps are to be removed from service and returned for rework.



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MOUNT TRANSMISSION

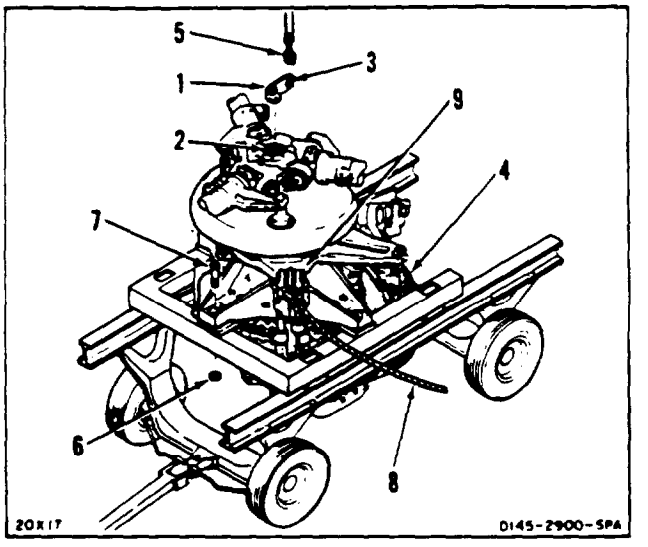
CAUTION

Check the forward or aft transmission Serial numbers for a "MG". A "RIG" after the serial number is required on the toward and aft transmissions for non restrictive flight.

NOTE

Hoisting eye must trail aft to keep transmission at proper angle for installation.

1. **Install hoisting eye (T32) (1)** in shaft (2) so that FWD XMSN hole (3) points toward oil cooler (4).
2. **Connect work hoist (5)** to FWD XMSN hole (3) of hoisting eye (T32) (11.
3. Remove three nuts (6) and bolts (7).
4. Attach two rope guide lines (8) to transmission (9).



GO TO NEXT PAGE

WARNING

Transmission is heavy and can injure personnel if it drops. Transmission must be supported by hoist and moved carefully to prevent injury to personnel.

5. Raise transmission (9) and center it over support structure (10). Check that hoisting eye (T32) (1) points aft. Have helpers guide transmission with guide lines (8).

NOTE

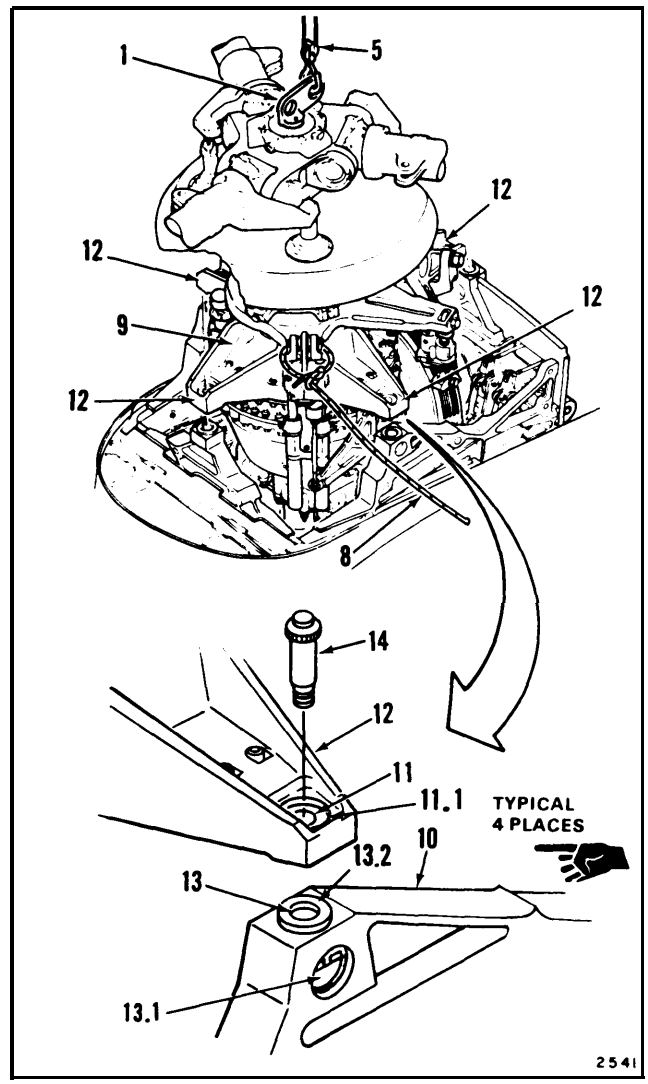
While lowering transmission, turn it as needed for clearance.

6. Carefully lower transmission (9). Have helpers **align mounting hole (11)** in each of four lugs (12) with hole (13) in structure (10). Keep lugs about 1 inch off structure.

NOTE

- Refer to task 1-13, para 8, for re-use of barrel nuts.
- Before installing the forward transmission assembly in the aircraft, inspect the four mounting bolts (14) for skip or continuous spiral score marks on the bolt shank outside diameters. Scoring is acceptable provided that the score marks are not greater than **0.005 inch deep and/or no wider than 0.060 inch wide.** Any raised material must be lightly polished. Use crocus cloth (E122) to remove the material from the bolt shanks. Also inspect the four bushings (11.1) in the transmission cover and the four bushings (13.2) in the structure for score marks and burrs. Lightly polish, use crocus cloth (E122) to remove any raised material.

7. Coat shank and thread of four mounting bolts (14) with grease (E190). **Install four mounting bolts** in mounting holes (11). Use bolts as guide pins to center holes (11) in lugs (12) with holes (13) and barrel nut (13.1) in structure (10).



CAUTION

Do not force bolts. If bolts cannot be installed by hand, transmission and structure are not aligned. Bolts can be damaged.

8. Have helpers **tighten each bolt (14) at least 7 turns** by hand while slowly lowering transmission (9). Shift transmission as needed for alignment. When bolts are tight, relax tension on hoist (5). Remove lines (8).

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TORQUE BOLTS

NOTE

Socket assembly, torque applicator, and reactor are part of torque reactor assembly (T159).

9. **Torque left bolt (14) as follows:**
   a. **Install socket assembly (14.1)** on left bolt (14).
   b. **Install torque applicator (15)** over square drive of socket assembly (14,1) **with large hole aft** of assembly. Observe THIS SIDE UP stamping on applicator.
   c. **Install sleeve (15.1) on aft end of applicator (15).** Insert two pins (15.2) through sleeve and adapter.
   d. **Install aft end of sleeve (15.1) in center block (15.3)** of reactor (16). **Install socket** at end of reactor on aft bolt (16.1).
   e. **Install pin (16.2)** through center block (15.3) and applicator (15).
   f. **Set ratchet selector (16.3)** at bottom of torque pack (T23) (16.4) **to NUT ON.**
   g. Install torque pack (T23) (16.4) on square drive of socket assembly (14.1). Rotate pack so that two pins (1 6.5) on bottom fit into two holes (16.6) in applicator (15). Use tee handle (T161) (16.7).

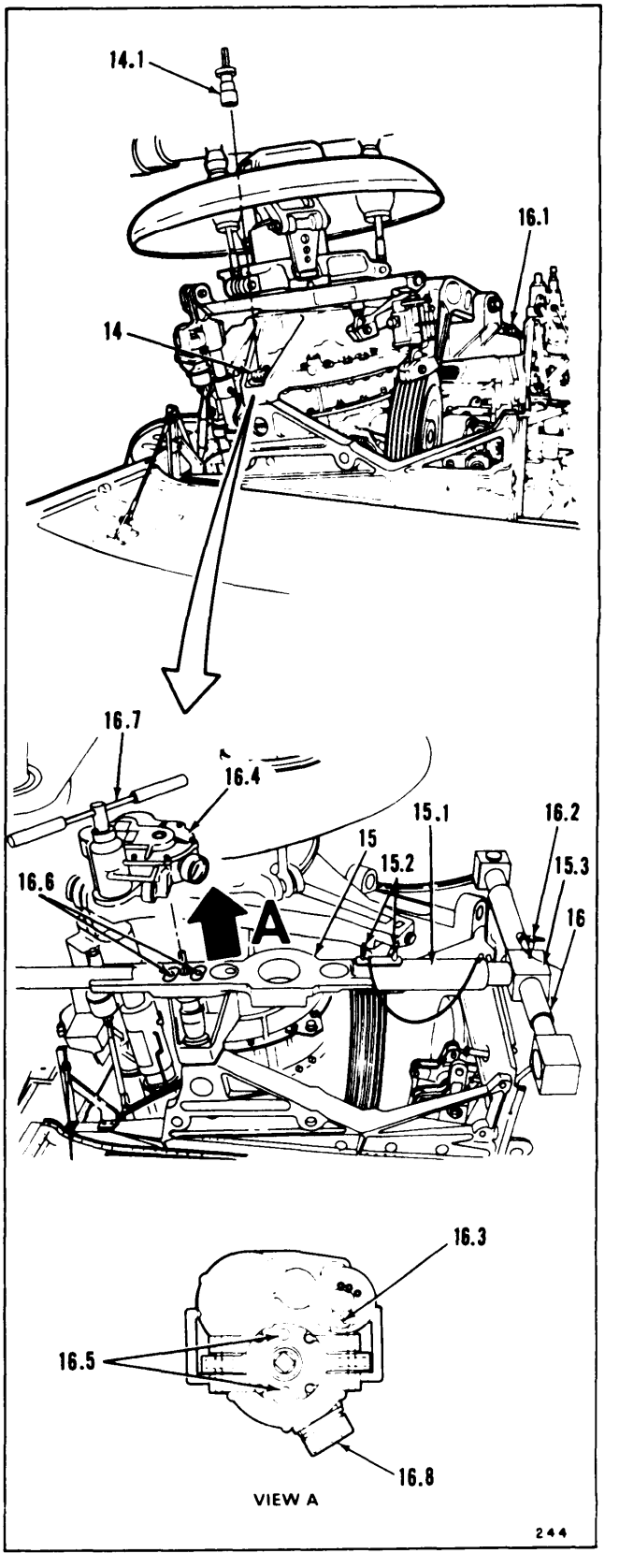
WARNING

Be sure handle is fully seated and ratchet selector on torque pack is properly set before applying torque. Moving selector with load on torque pack can damage unit and injure personnel.

NOTE

Input force must be maintained at handle to obtain accurate torque reading on torque pack indicator.

   h. Set tee handle (T161) (16.7) to ON. Turn handle clockwise until indicator (16.8) reads 885 foot-pounds.
   i. Set tee handle (T161) (16.7) to OFF. Turn handle counterclockwise until indicator (16.8) reads 0. Check that torque pack (T23) (16.4) is loose on bolt (14).
   j. Remove torque pack (16.4) and torque reactor assembly (T 159).
   k. Remove sleeve (15.1) from applicator (15).



GO TO NEXT PAGE

9.1. Torque aft bolt (16.1) as follows:

a. **Install socket assembly (14.1)** on aft bolt (16.1).

b. **Install torque applicator (15)** over square drive of socket assembly (14.1) **with large hole at left of assembly.** Observe THIS SIDE UP stamping on applicator.

c. **Install left end of applicator (15) in end block (16.9) of reactor (16). Install socket** at end of reactor **on left bolt (14).**

d. **Install pin (16.2)** through end block (16.9) and applicator (15).

e. **Check that ratchet selector (15.4)** on torque pack (T23) (16.4) **is set to NUT ON.**

f. **Install torque pack (T23) (16.4)** on square drive of socket assembly (14.1). Rotate pack so that two pins (16.5) on bottom fit into holes (16.6) in applicator (15). Use handle (T161) (16.7).

WARNING

Be sure handle is fully seated and ratchet selector on torque pack is properly set before applying torque. Moving selector with load on torque pack can damage unit and injure personnel.

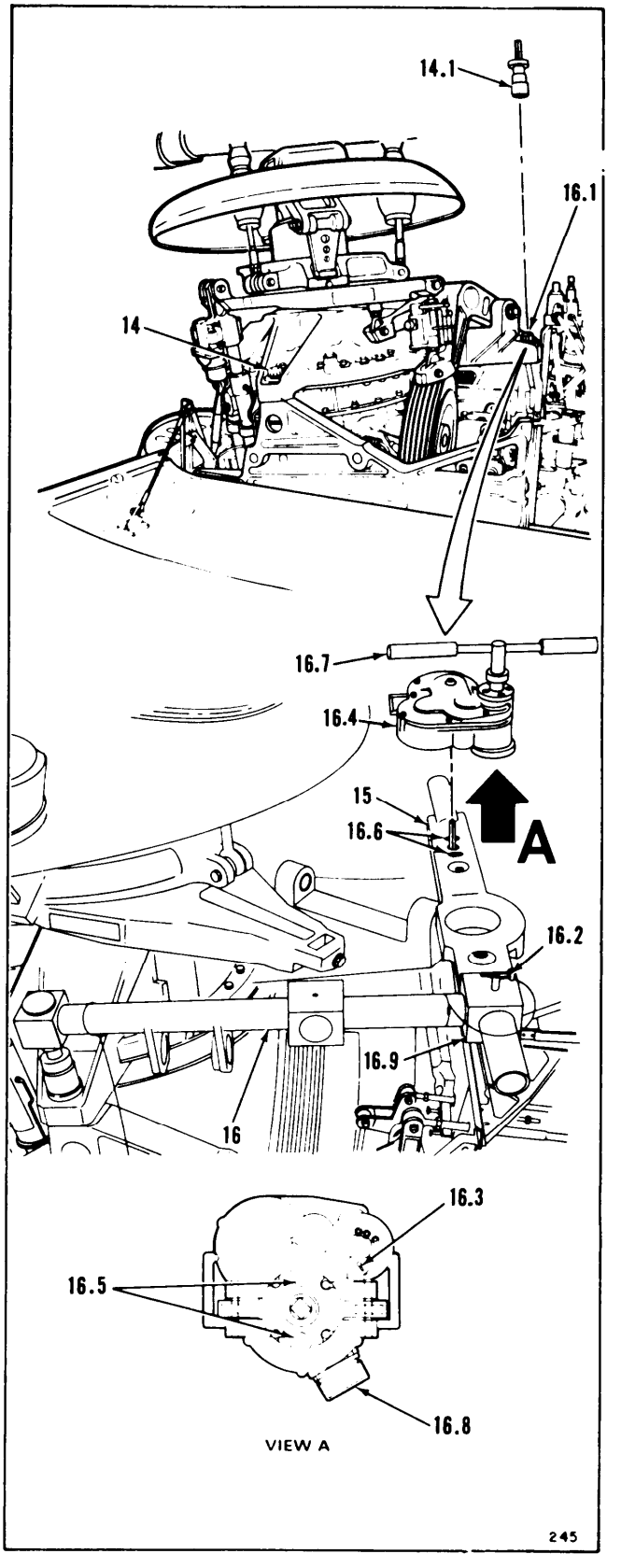
NOTE

Input force must be maintained at handle to obtain accurate torque reading on torque pack indicator.

g. Set tee handle (T161) (16.7) to ON. **Turn handle clockwise until indicator (16.8) reads 885 foot-pounds.**

h. Set tee handle (T161) (16.7) to OFF. **Turn handle (16.7) counterclockwise until indicator (16.8) reads 0.** Check that torque pack (T23) (16.4) is loose on bolt (16.1).

i. Remove torque pack (16.4) and torque reactor assembly (T159).



GO TO NEXT PAGE

9.2. Torque right bolt (17) as follows:

a. **Install socket assembly (14.1)** on right bolt (17).

b. **Install torque applicator (15)** over square drive of socket assembly (14.1) **with large hole forward of assembly.** Observe THIS SIDE UP stamping on applicator.

c. **Install forward end of applicator (15) in center block (15.3) of reactor (16). Install socket at** end of reactor **on forward bolt (18).**

d. **Install pin (16.2)** through center block (15.3) and applicator (15).

e. **Check that ratchet selector (16.3)** on torque pack (T23) (16.4) **is set to NUT ON.**

f. **Install torque pack (T23) (16.4)** on square drive of socket assembly (14.1). Rotate pack so that two pins (16.5) on bottom fit into holes (16.6) in applicator (15). Use tee handle (T161) (16.7).

WARNING

Be sure handle is fully seated and ratchet selector on torque pack is properly set before applying torque. Moving selector with load on torque pack can damage unit and injure personnel.

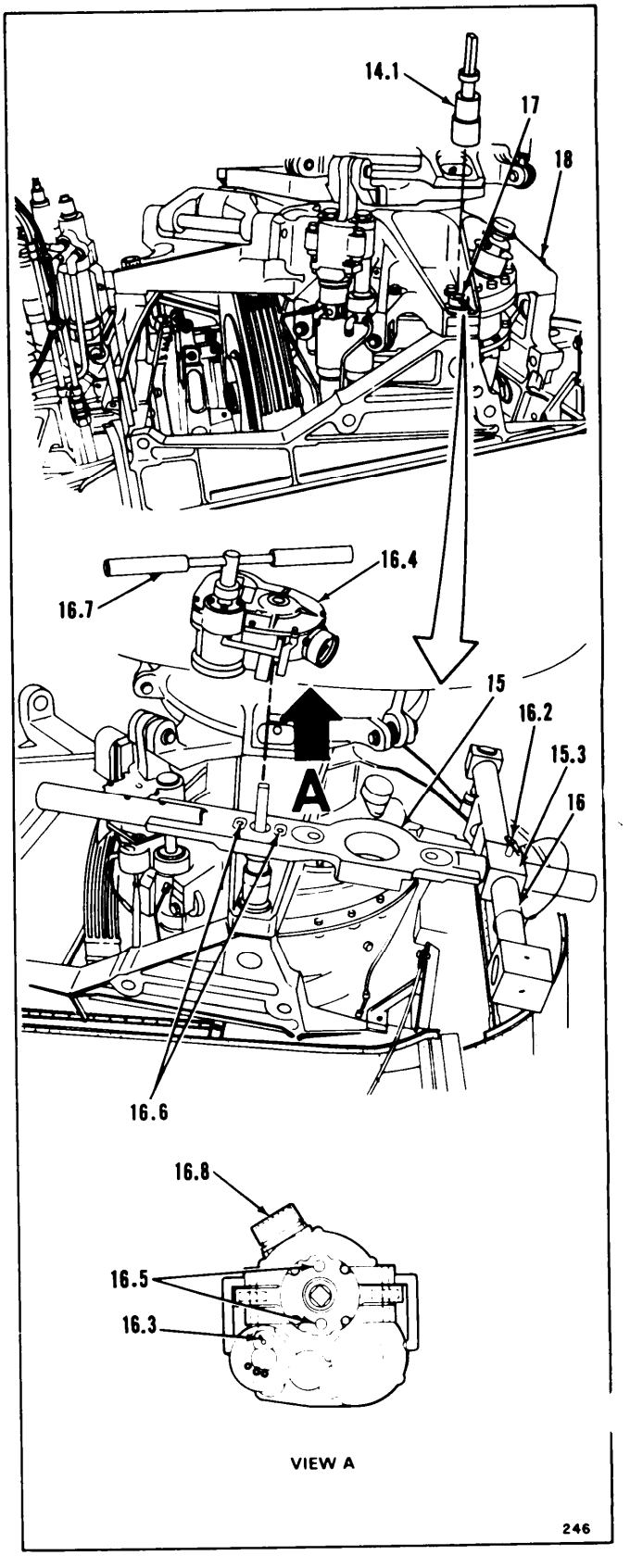
NOTE

Input force must be maintained at handle to obtain accurate torque reading on torque pack indicator.

g. Set tee handle (T161) (16.7) to ON. **Turn handle clockwise until indicator (16.8) reads 885 foot-pounds.**

h. Set tee handle (T161) (16.7) to OFF. **Turn handle counterclockwise until indicator (16.8) reads 0.** Check that torque pack (T23) (16.4) is loose on bolt (17).

i. Remove torque pack (16.4) and torque reactor assembly (T159).



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9.3. Torque forward bolt (18) as follows:

a. **Install socket assembly (14.1)** on forward bolt (18).

b. **Install torque applicator (15)** over square drive of socket assembly (14.1) **with large hole at right of assembly.** Observe THIS SIDE UP stamping on applicator.

c. **Install right end of applicator (15) in center block (15.1) of reactor (16). Install socket** at end of reactor **on right bolt (17).**

d. **Install pin (16.2)** through center block (15.3) and applicator (15).

e. **Check that ratchet selector (16.3)** on torque pack (T23) (16.4) **is set to NUT ON.**

f. **Install torque pack (T23) (16.4)** on square drive of socket assembly (14.1). Rotate pack so that two pins (16.5) on bottom fit into holes (16.6) in applicator (15). Use tee handle (T161) (16.7).

WARNING

Be sure handle is fully seated and ratchet selector on torque pack is properly set before applying torque. Moving selector with load on torque pack can damage unit and injure personnel.

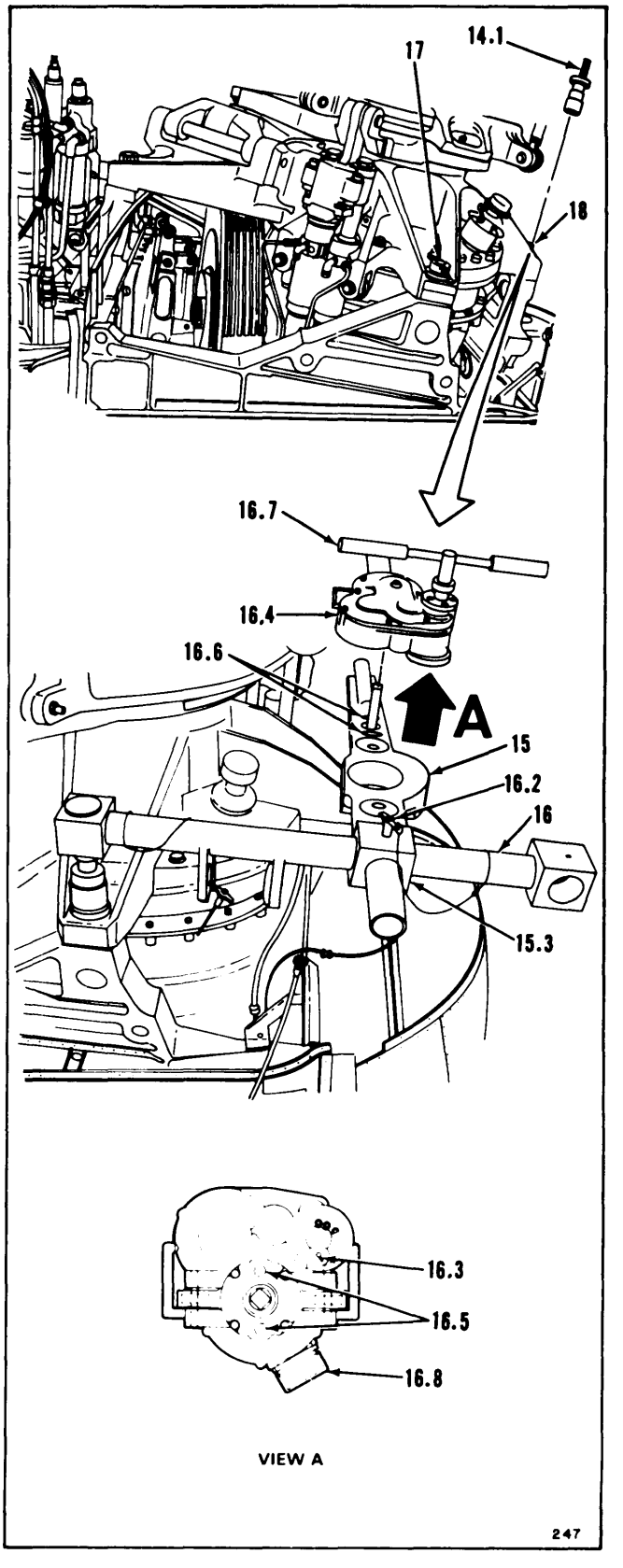
NOTE

Input force must be maintained at handle to obtain accurate torque reading on torque pack indicator.

g. Set tee handle (T161) (16.7) to ON. **Turn handle clockwise until indicator (16.8) reads 885 foot-pounds.**

h. Set tee handle (T161) (16.7) to OFF. **Turn handle counterclockwise until indicator (16.8) reads 0.** Check that torque pack (T23) (16.4) is loose on bolt (18).

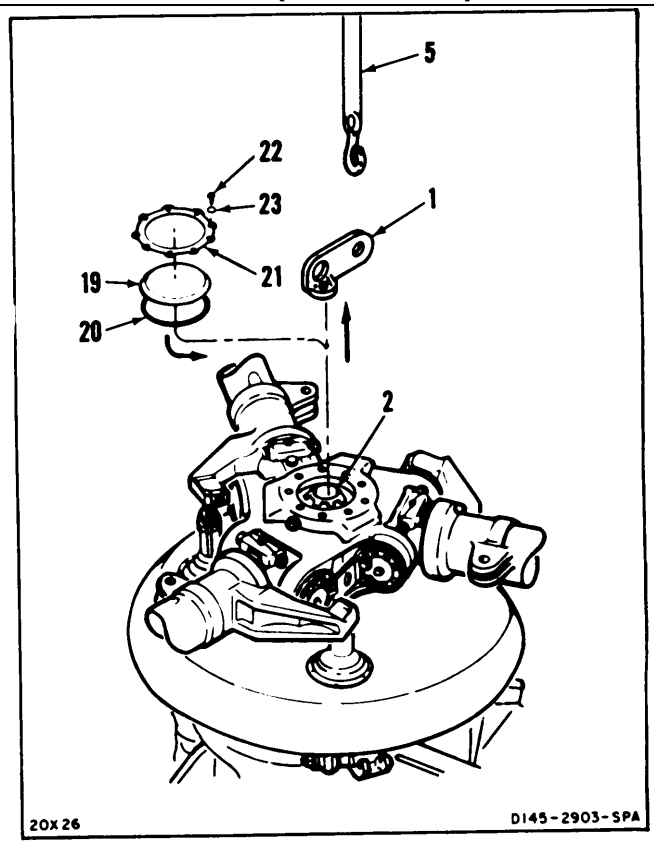
i. Remove torque pack (16.4) and torque reactor assembly (T159).



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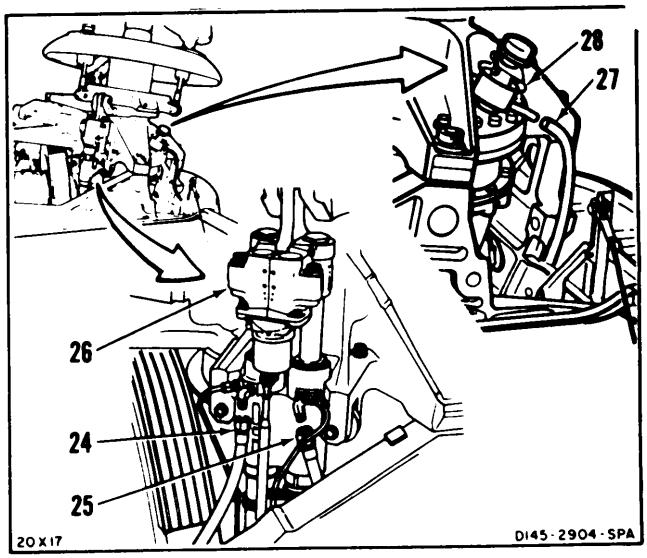
6-51 INSTALL FORWARD TRANSMISSION PACKAGE (Continued)

10. Remove work hoist hook (5) from hoisting eye (T32) (1). Remove eye.
11. **Position hub nut cover (19),** packing (20) and retainer (21) over shaft (2). **Install nine screws (22)** and washers (23). **Torque screws to 20 inch-pounds.**



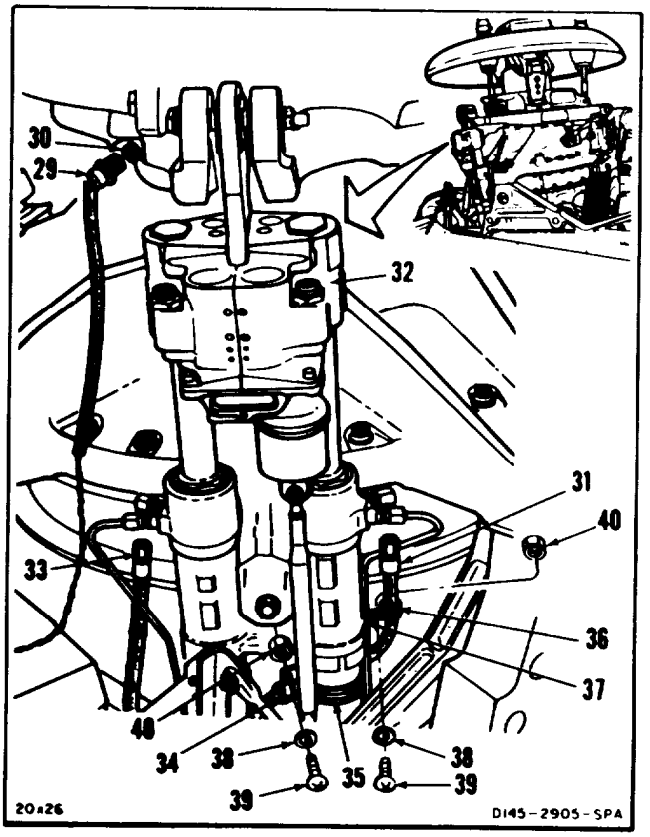
CONNECT UPPER POINTS

12. **Connect hoses (24 and 25)** to right servocylinder (26).
13. **Connect hose (27)** to oil drain cup (28).

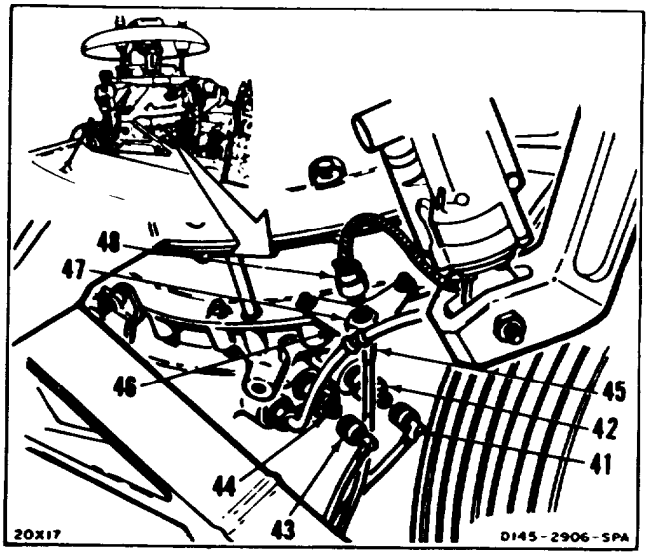


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14. Connect electrical connector (29) to phase detector (30). Lockwire connector to detector. Use lockwire (E229).
15. Pass hose (31) behind right side of left servocylinder (32) as shown. **Connect hoses (31 end 33) to left servocylinder.**
16. **Clamp hose (31)** to servocylinder (32) by connecting clamp (34) to clamp (35) and clamp (36) to clamp (37). Use two screws (38), washers (39). and nuts (40).

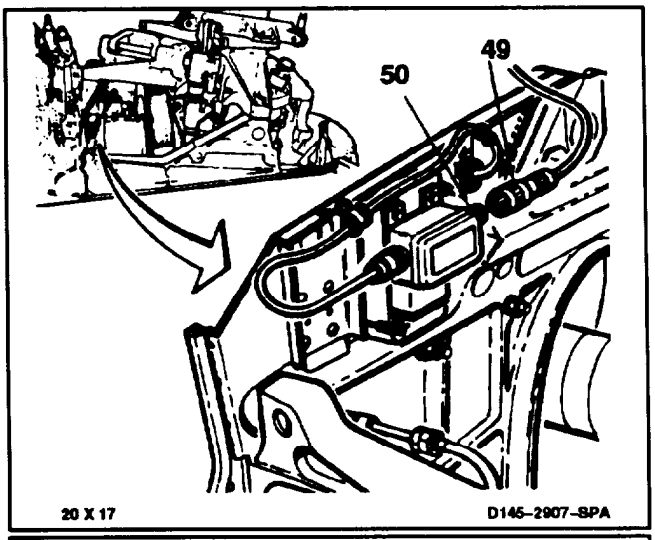


17. **Connect electrical connector (41) to** AUX PRESS SW (42). Remove tag.
18. **Connect electrical connector (43) to** MAIN PRESS SW (44). Remove tag.
19. **Install electrical connector (45) on** bracket (46) from underneath. Secure with nut (47). Lockwire nut to bracket with lockwire (E229).
20. **Connect electrical connector (48) to** connector (45) at bracket (46).



GO TO NEXT PAGE

21. **Connect electrical connector (49)** to signal Conditioner (50).



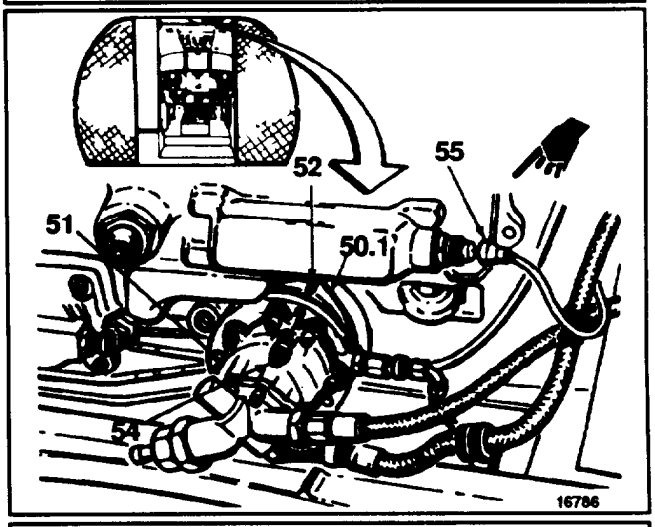
CONNECT LOWER POINTS

22. **Install gasket (50.1) and pump (51)** over studs (52) and nuts (54).
23. **Torque nuts (54) to 85 inch-pounds.**

NOTE

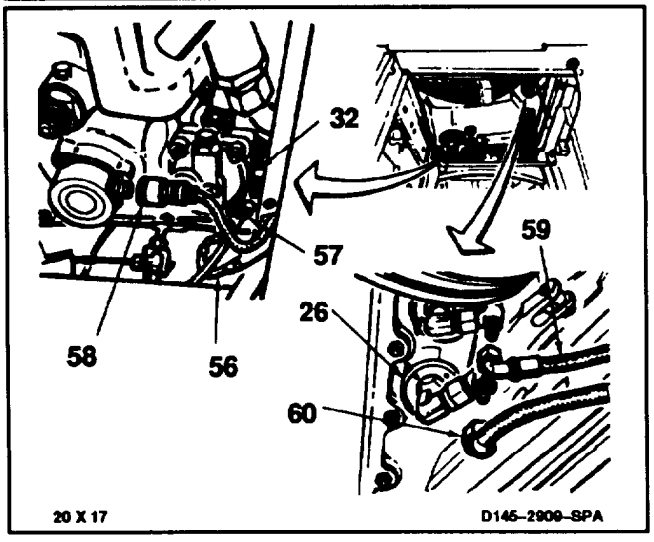
Torque on nuts (54) must be checked for 85 inch-pounds after the first flight Do not back off nuts before torquing.

24. **Connect oil temperature connector (55).**



25. **Connect hoses (56 and 57)** to left servocylinder (32).
26. **Connect chip detector connector (58).**
27. **Connect hoses (59 and 60)** to right servocylinder (26).

INSPECT



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FOLLOW-ON MAINTENANCE:

Install forward connecting links (Task 11-195).

Install forward transmission adapter assembly (Task 6-8).

Install No. 1 and No. 2 drive shafts (Task 6-17 and 6-18).

Install forward transmission oil cooler air inlet duct (Task 6-122).

Install forward transmission fairing (Task 2-67 and 2-68).

Install rotary-wing blades (Task 5-84).

Service transmission (Task 1-54).

Perform ground run (TM 55-1520-240-10).

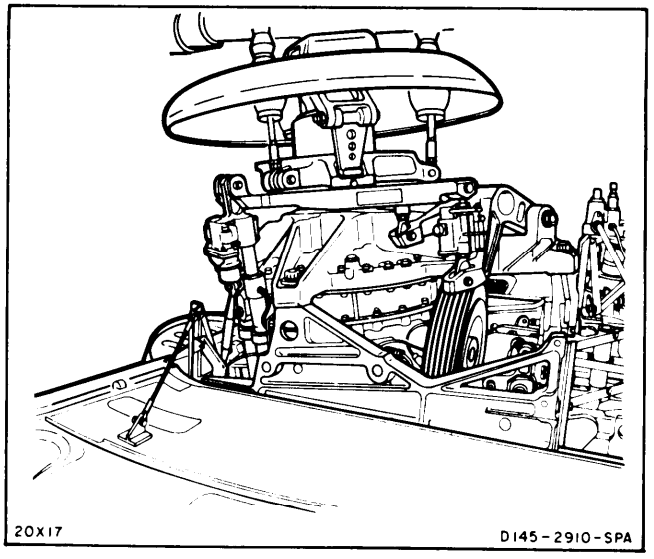
Install forward transmission drip pan (Task 2-3).

Perform neutral rig check (Task 11-33).

Bleed flight control hydraulic system (Task 7-16).

Perform after-maintenance special inspection (Task 1-92).

Check torque on hydraulic pump mounting nuts after first flight (Step 23).



END OF TASK

SECTION IV
AFT ROTARY-WING DRIVE SHAFT

6-52 REMOVE AFT SLIDER SHAFT

INITIAL SETUP

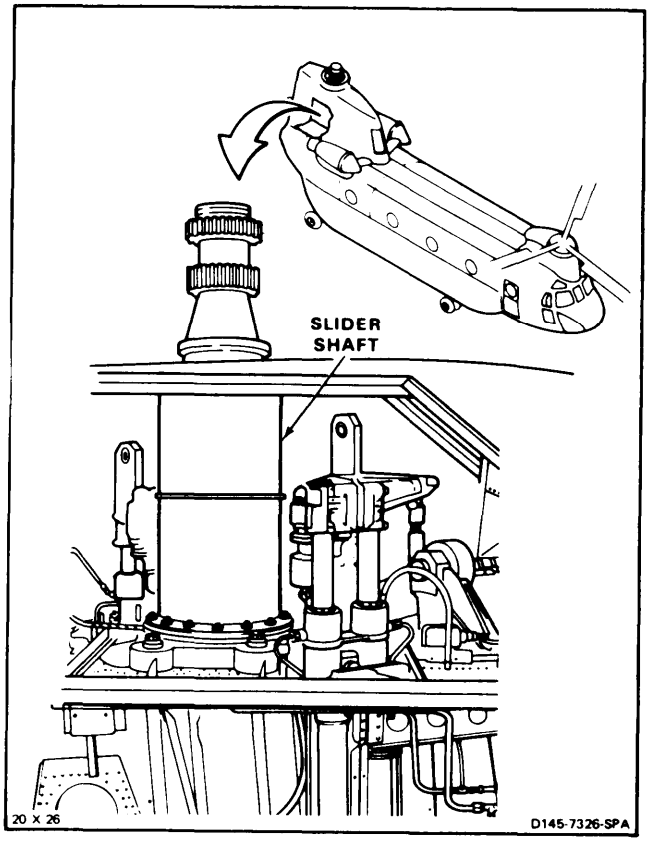
Applicable Configurations:
All

Tools:
Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692

Materials:
Barrier Material (E81)
Tape (E388)

Personnel Required
Medium Helicopter Repair

Equipment Condition:
Battery Disconnected (Task 1-39)
Electrical Power Off
Aft Pylon Work Platforms Open (Task 2-2)
Aft Rotary-Wing Blades Removed (Task 5-64)
Aft Rotary-Wing Head Removed (Task 5-8)
Aft Weather-Protective Cover Removed (Task 5-136)
Aft Drive Collar Removed (Task 5-100)
Aft Drive Arms Removed (Task 5-101)
Aft Swashplate Removed (Task 5-117)



1. **Remove 16 nuts (1)** and washers (2) from base of slider shaft **(3).**

CAUTION

Handle slider shaft carefully. Polishsd surface is easily damaged.

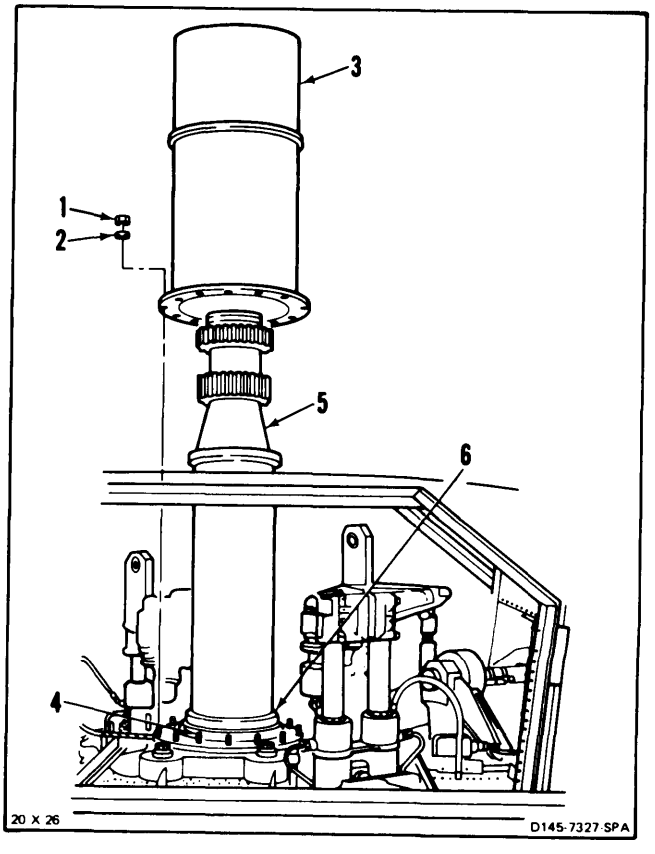
2. Lift slider shaft (3) from support (4). Strike side of slider shaft with hand or soft-faced mallet while lifting as needed to loosen shaft. **Remove shaft** from aft rotor shaft (5).

3. Cover exposed seal (6) with barrier material (E81) and tape (E388).

FOLLOW-ON MAINTENANCE:

None

END OF TASK



6-52.1 REPAIR AFT SLIDER SHAFT

INITIAL SETUP

Applicable Configurations:

All

Tools:

Dial Indicating Gage 643J

Materials:

Naphtha (E245)
Emery Cloth (E123) or
Abrasive Paper (E13)
Crocus Cloth (E122)
Cloths (E120)
Gauze Sponges (E184)
Gloves (E184.1)
Acetic Acid (E21)
Alodine Power (E65)
Epoxy Primer (E292) or (E293)

Personnel Required:

Aircraft Powertrain Repairer
Inspector

References:

TM 43-0103
MIL-C-5541

Equipment Condition:

Off Helicopter Task

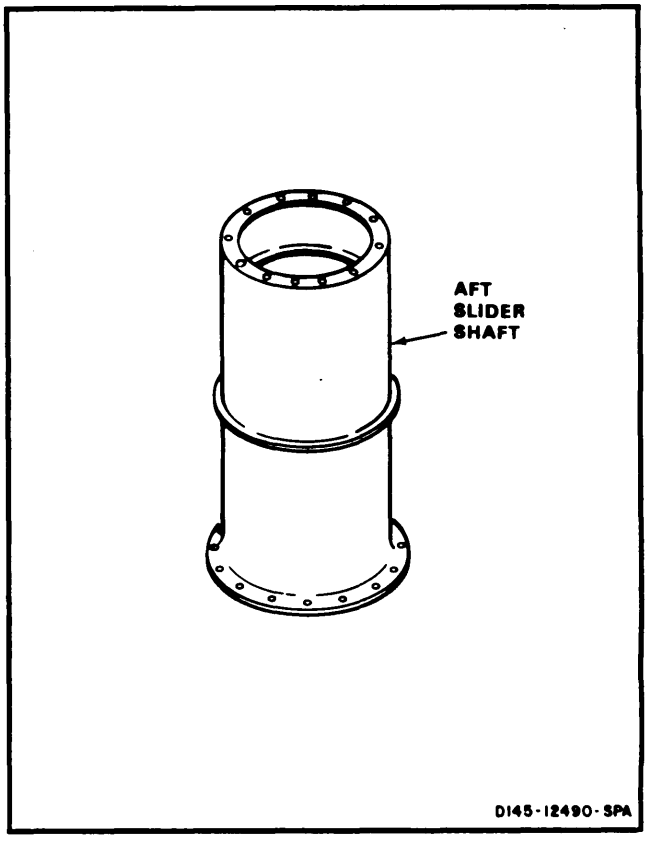
General Safety Instructions:

WARNING

Naphtha (E245) is flammable and toxic. It can irritate skin and cause burns. Use only with adequate ventilation, away from open flame. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.

CAUTION

Do not wear photogray glasses when fluorescent inspecting. They reduce ability to see cracks.



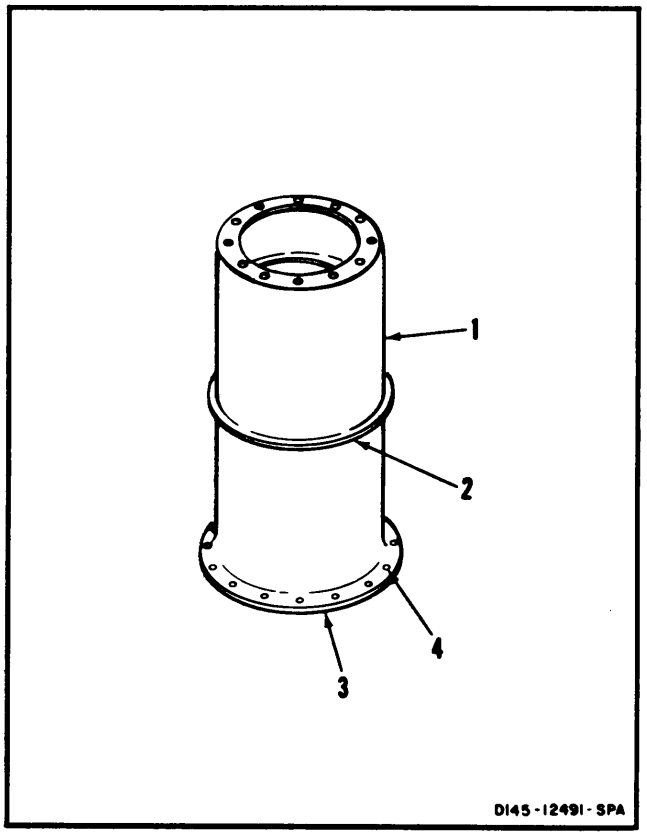
GO TO NEXT PAGE

1. **Clean** oil and grease from **slider shaft (1).** Use naphtha (E245) and clean cloths (E120). Wear gloves (E184.1).
2. **Inspect surface of slider shaft (1)** for nicks, scratches, and minor pitting or corrosion of coating. Observe the following definitions:
   a. Nick–A surface indentation with a sharp crease at the bottom. Surface finish is not broken. Caused by pressure or impact from a hard object with a sharp edge.
   b. Scratch –A light, narrow mark on the surface. Surface finish is broken, but not removed. Caused by a hard, sharp particle moving across the surface.
   c. Pit–A small irregular cavity where material is removed from the surface. Usually caused by corrosion. Pits are usually dark in appearance.
   d. Corrosion –A broken or pitted surface, discolored around the edge. Corrosion is caused by chemical action.
3. Note extent and location of damage:

NOTE

Limits in this step refer to depth of damage after rework.

   a. **Depth of damage above flange (2) (bearing surface) shall not be more than 0.020 inch. Depth of damage below flange shall not be more than 0.025 inch.**
   b. **Damage shall not extend from shaft surface to mounting flange (3).**
   c. **Damage on mounting flange (3) shall not be closer than 1.00 inch to any mounting hole (4).**



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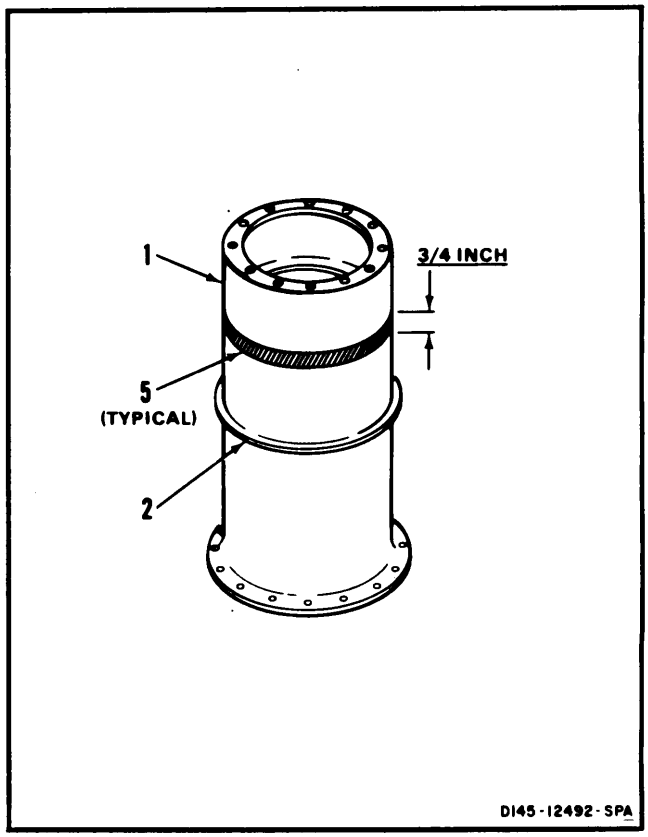
d. **Sum of length plus width of any one damaged area shall not be more than 1 1/4 inches.**

e. **Distance between two damaged areas shall not be less than half the length of the larger area.**

f. **In that part of shaft (1) above flange (2), there shall be no more than 20 damaged areas in any 3/4 inch wide band (5) around shaft (1). There shall be no more than five damaged areas in any quarter-section of the band. The total of length plus width of all five areas shall not be more than 5 1/2 inches.**

There shall be no more than 75 damaged areas over entire shaft (1).

Damaged areas may exceed the above limits to include wear over the total surface of the slider above the flange provided maximum depth of damage does not exceed 0.008 inch.



4. **Fluorescent inspect** damaged area to check for cracks. (Refer to TM 43-0103.) **There shall be no cracks.**
5. **Blend out damage** with emery cloth (E123) or abrasive paper (E13). Observe the limits of step 3.
6. **Smooth blended area** with crocus cloth (E122). Do not leave any sharp edges.
7. **Acid-etch the reworked area** as follows:

WARNING

Acetic acid (E21) is combustible and toxic. It can irritate skin and cause burns. Avoid inhaling. Use only with adequate ventilation, away from open flame. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.

a. **Prepare a solution of 3 parts acetic acid (E21) to 7 parts water.** Wear gloves (E184.1) and goggles.

b. **Swab the area with solution for 2 minutes.** Use gauze sponges (E184).

c. **Rinse** the area with cold water.

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6-52.1 REPAIR AFT SLIDER SHAFT (Continued) 6-52.1

8. **Fluorescent inspect** the reworked area to check for cracks (TM 43-0103). **There shall be no cracks.**
9. Apply surface treatment to the reworked area as follows:
   a. Clean the area with naphtha (E245) and clean cloths (E120). Let the area air dry. Wear gloves (E184.1).

WARNING

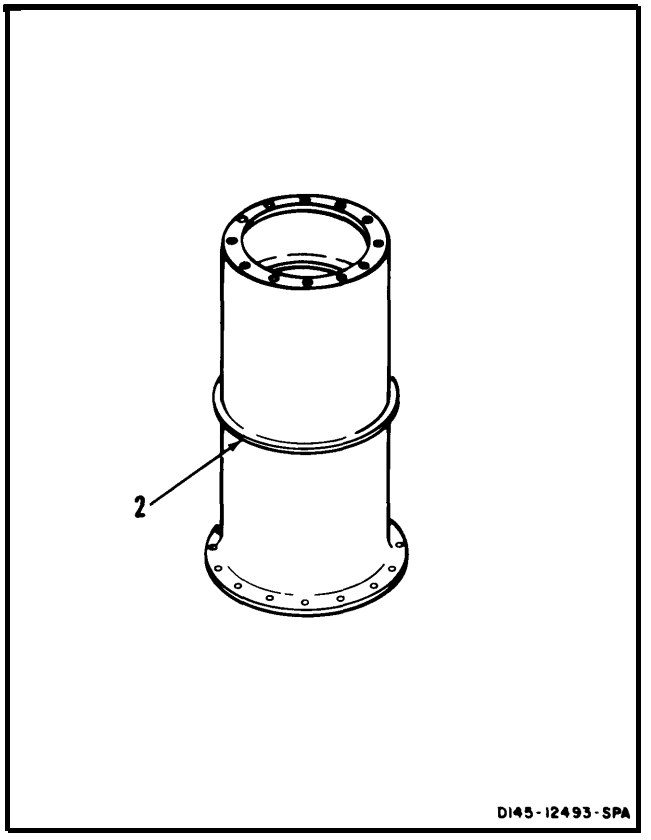
Alodine powder (E65) is an oxidizer. Discard cloths which contain this material in a separate container. If discarded with cloths contaminated with acetone, MEK, or other organic solvents, combustion can result. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.

   b. **Swab solution of alodine powder (E65) in water on the area (MIL-C-5541). Swab for 2 to 5 minutes.** Use gauze sponges (E184). Wear gloves (E184.1).
   c. **Rinse** the area with cold water Let air dry.

WARNING

Epoxy primer (E292) and (E293) is flammable and toxic. It can irritate skin and cause burns. Use only with adequate ventilation, away from heat or open flame. Avoid contact with skin, eyes, or clothing. in case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.

   d. If the reworked area is below flange (2), apply epoxy primer (E292) or (E293). Wear gloves (E184.1).



INSPECT

FOLLOW-ON MAINTENANCE:
None

END OF TASK

6-53 REMOVE AFT ROTOR SHAFT UPPER SEAL (AVIM) 6-53

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692
Work Hoist
Hoisting Eye (T32)
Wood Plank, 2 Inches x 4 Inches x 36 Inches
Phenolic Wedge
Gun Heater
Pyrometer

Materials:

Cloths (E120)
Dry Cleaning Solvent (E162)
Gloves (E184.1)
Kevlar Gloves (E187)

Personnel Required:

Medium Helicopter Repairer
Aircraft Powertrain Repairer

Equipment Condition:

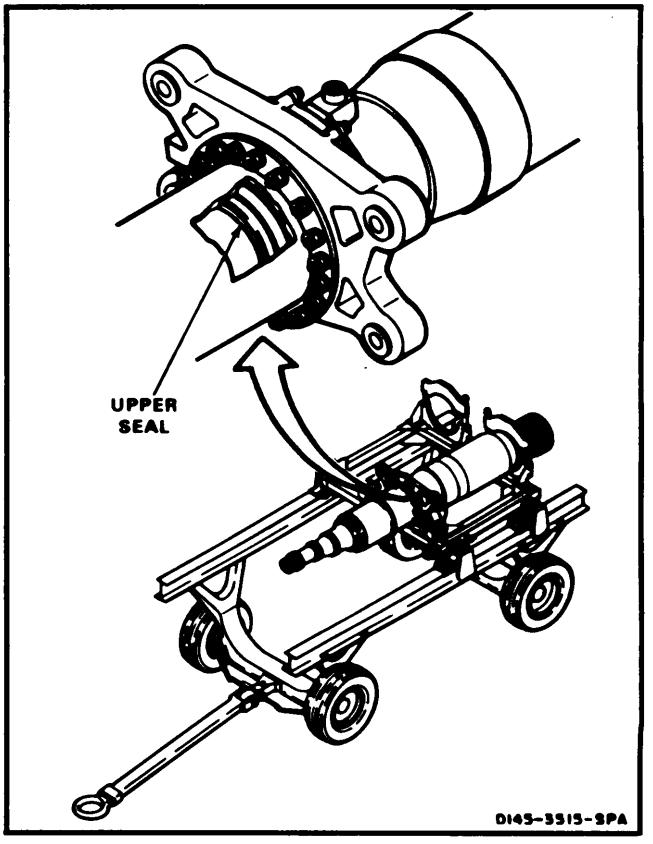
Off Helicopter Task
Aft Rotor Shaft Installed Horizontally In Adapter (T18)

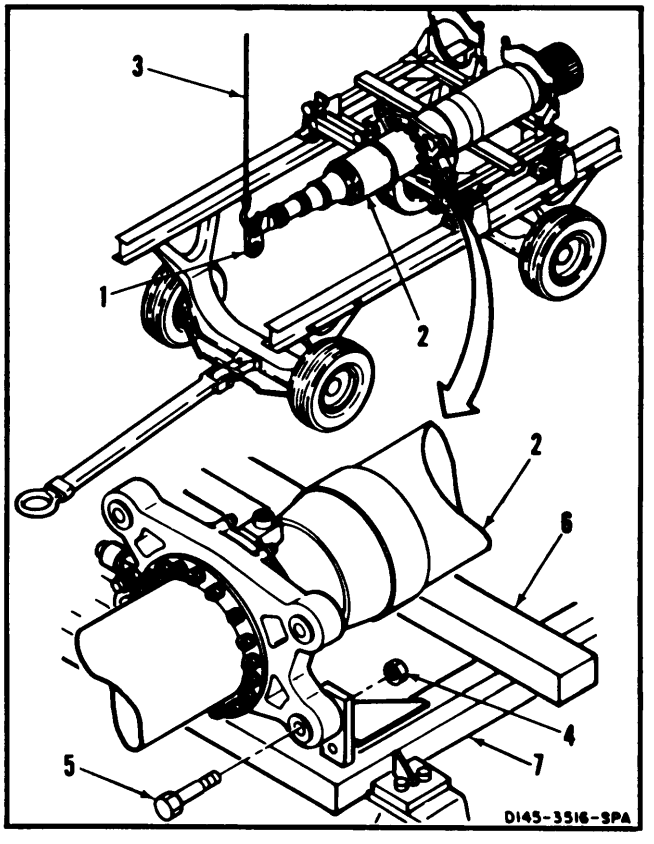
General Safety Instructions:

WARNING

Wear Kevlar gloves (E187) when handling heated parts.

1. **Install hoisting eye (T32) (1)** in shaft (2).
2. **Connect hoist cable (3)** to eye of hoisting eye (T32) (1) marked AFT SHAFT. Have helper raise hoist to remove slack from cable.
3. **Remove two** nuts (4) and **bolts (5).**
4. Have helper lift shaft (2) enough to **insert wood plank (6) between shaft and adapter (T18) (7).**
5. Have helper lower shaft (2) on plank (6).
6. Remove hoist cable (3) and hoisting eye (T32) (1).



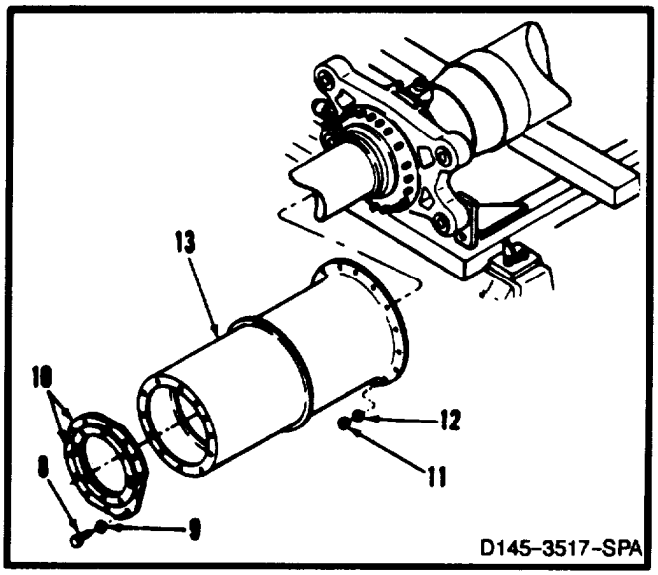


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6-53 REMOVE AFT ROTOR SHAFT UPPER SEAL (AVIM) (Continued) 6-53

REMOVE SLIDER SHAFT

7. Remove lockwire, from 12 bolts (8). **Remove bolts** end washers (9).
8. Remove both halves of seal (10).
9. Remove 16 nuts (11) and washers (12).
10. **Remove slider shaft (13).** If needed, heat base of slider shaft to 230 to 250°F (110 to 120°C). Use a heat gun and measure temperature with a pyrometer. If needed, use a phenolic wedge to lift the shaft.



REMOVE SEAL

11. Remove 10 nuts (14) and washers (15) from bearing retainer (16). Pull retainer and packing (17) away from support (18).
12. **Remove support (18) from bearing (19).** Use a soft-faced mallet. If needed, heat support to 230 to 250°F (110 to 120°C). Use a heat gun and measure temperature with pyrometer.
13. **Slide support (18) from shaft (2).**

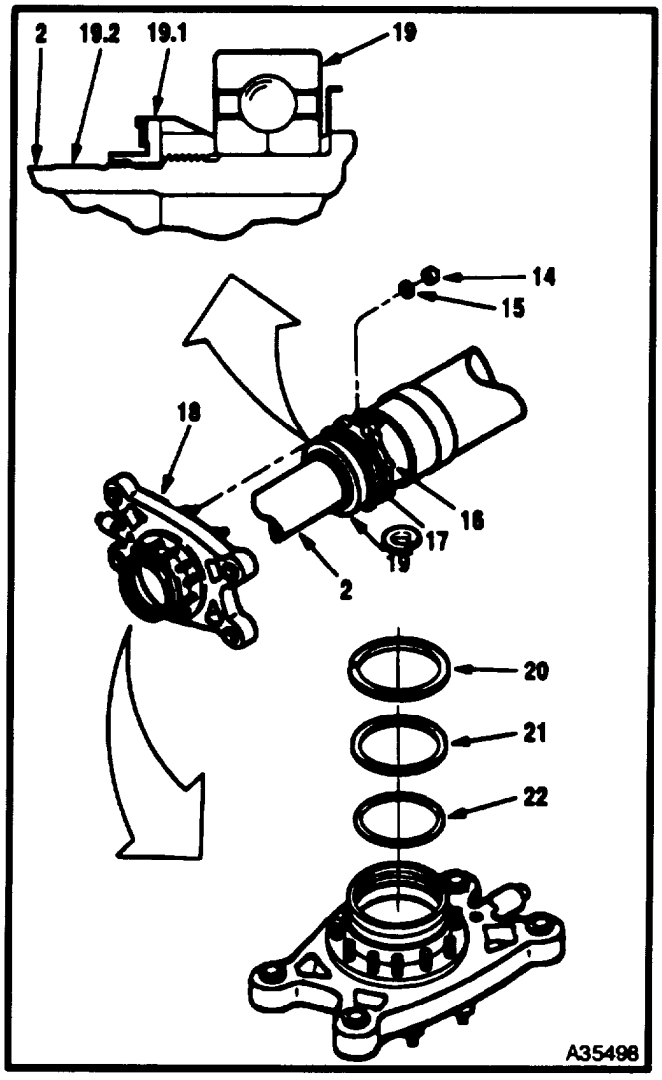
WARNING

Dry cleaning solvent (E162) is combustible and toxic. It can irritate skin and cause bums. Use only with adequate ventilation, away from open flame. In case of contact, immediately flush skin or eyes with water for at least 15 minutes Get medical attention for eyes.

13.1. **Clean shaft (2)** in the area above bearing locknut (19.1). Use cloths (E120) and dry cleaning solvent (E162). Wear gloves (E184.1).

13.2. **Examine shaft (2) In the area of seal contact** for a wear groove (19.2). If there is a groove deeper than 0.005 inch, reject the shaft.

14. Remove retaining ring (20).
15. **Remove seal (21).**
16. Remove packing (22).



FOLLOW-ON MAINTENANCE:

None

END OF TASK

6-54 INSTALL AFT ROTOR SHAFT UPPER SEAL (AVIM)

INITIAL SETUP

Applicable Configurations:
All

Tools:
Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Oven (250°F) or Gun-Type Heater
Pyrometer
Kevlar Gloves (E187)
Brass or Aluminum Drift
Hoisting Eye (T32)
Work Hoist
Source of Low Pressure Compressed Air
Container, Two Quart
Adapter (T18)
Torque Wrench, 30 to 150 Inch-Pounds
Torque Wrench, 150 to 750 Inch-Pounds
Stop Watch

Materials:
Gloves (E186)
Oil (E254)
Dry Cleaning Solvent (E162)
Cloths (E120)
Lockwire (E231)

Parts:
Packings
Seal

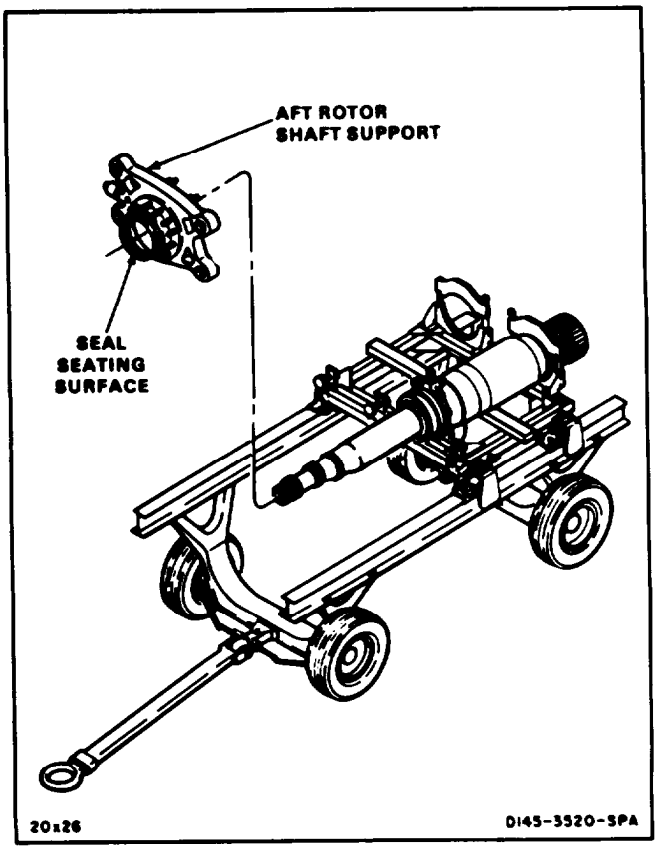
Personnel Required:
Medium Helicopter Repairer
Aircraft Powertrain Repairer
Inspector

References:
TM 55-1520-240-23P

General Safety Instructions:

WARNING

Wear Kevlar glows when handling heated parts.



6-54 INSTALL AFT ROTOR SHAFT UPPER SEAL (AVIM) (Continued)

INSTALL SEAL

WARNING

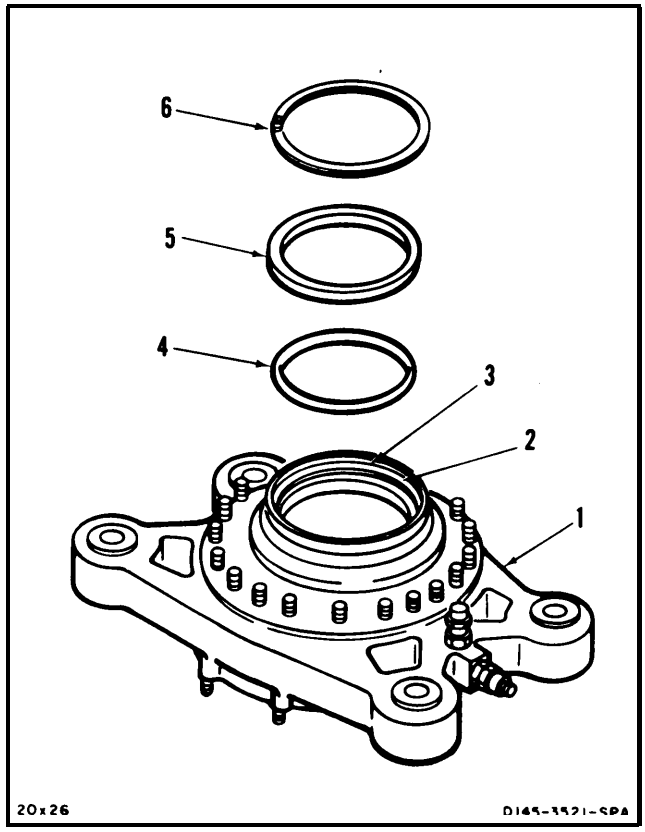
Dry cleaning solvent (E162) is flammable and toxic. It can irritate skin and cause burns. Use only in well-ventilated area, away from heat and open flame. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.

1. Clean support (1) with dry cleaning solvent (E162) and cloths (E120). Make sure seal seat (2) and packing groove (3) are clean. Use goggles and wear gloves (E186).

CAUTION

Do not heat support over 250° F (120° C). Damage to support can occur.

2. **Heat seal seat (2) to 230 to 250° F (110 to 120° C). Use heat gun and measure temperature with pyrometer.**
3. Coat packing (4) with oil (E254). Install packing in support (1).
4. Coat outside of seal (5) with oil (E254). **Install seal,** seal side up, in support (1). Use drift.
5. Install retaining ring (6).



GO TO NEXT PAGE

6-54 INSTALL AFT ROTOR SHAFT UPPER SEAL (AVIM) (Continued) 6-54

INSTALL SUPPORT

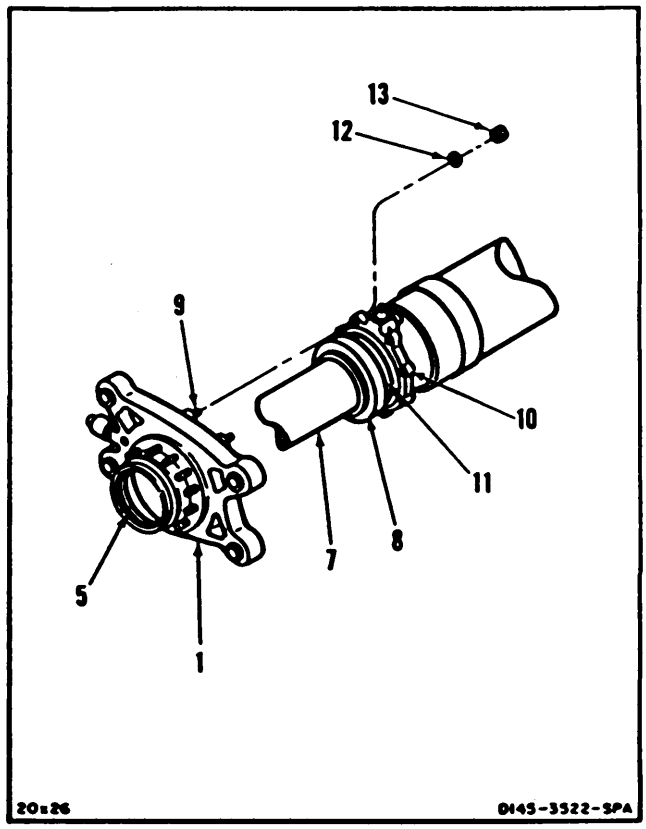
6. Lubricate packing (11) with oil (E254) and install on bearing retainer (10).

6.1. Coat lip of seal (5) with oil (E254). **Install support (1)** over rotor shaft (7) and on bearing (8). Use soft-faced mallet.

7. Coat thread of 10 studs (9) on support (1) with oil (E254).

8. Coat shaft (7) between bearing (8) and bearing retainer (10) with oil (E254).

9. **Position bearing retainer** (10) and packing (11) on support (1). Install 10 washers (12) and nuts (13). **Torque nuts to <u>175 inch-pounds.</u>**



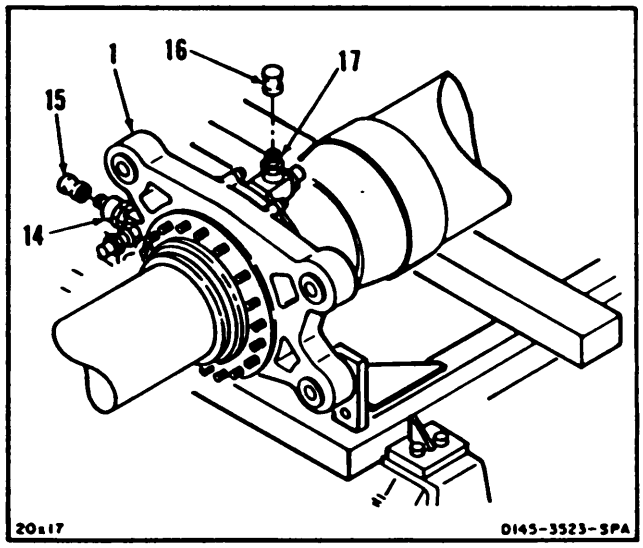
CHECK SEAL

10. Turn support (1) to position filter (14) as high as possible.

11. Remove cap (15) from filter (14). Remove cap (16) from drain port (17).

12. **Add oil (E2S4) through drain port (17)** until oil flows from filter (14).

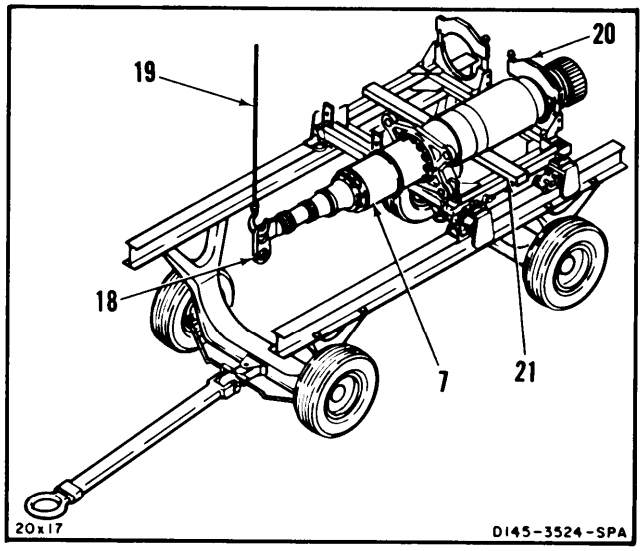
13. Install cap (15) on filter (14). Install cap (16) on drain port (17).



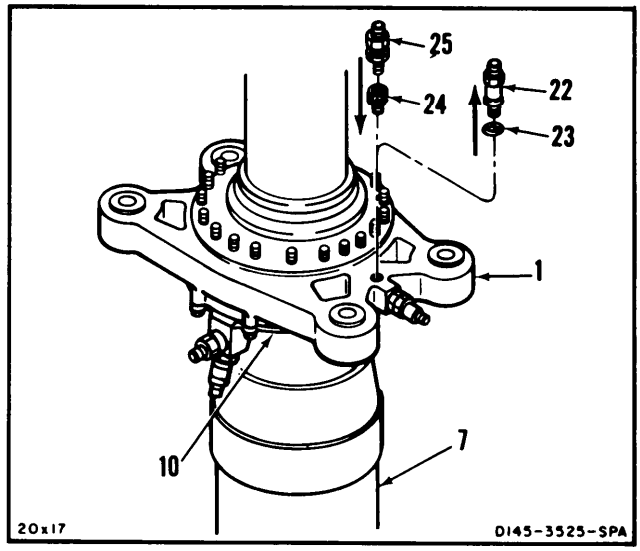
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6-54 INSTALL AFT ROTOR SHAFT UPPER SEAL (AVIM) (Continued)

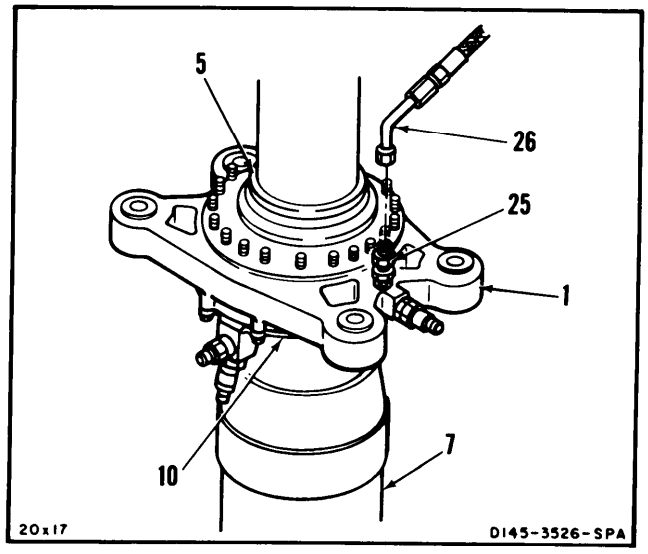
14. **Install hoisting eye (T32) (18)** on shaft (7).
15. **Connect hoist cable (19)** to eye of hoisting eye (T32) (18) marked AFT SHAFT. Have helper raise hoist to remove slack from cable.
16. **Release clamp (20).** Remove plank (21).



17. **Have helper raise shaft (7) to vertical. After 5 minutes, check bottom of bearing retainer (10) for leaks.** There shall be no leaks.
18. Remove lockwire from pressure switch (22). **Remove pressure switch** and packing (23).
19. Install adapter (24) in housing (1). Install air charging valve (25) in adapter.



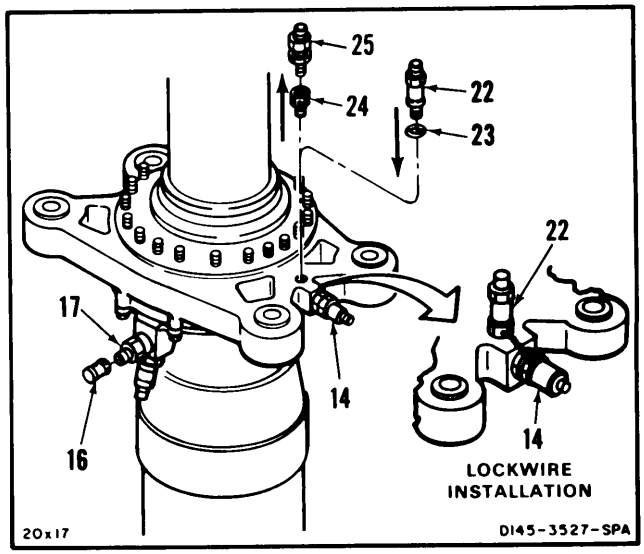
20. Connect air chuck (26) to valve (25). **Apply 3 psi air pressure to valve.** Hold support (1) and **turn shaft (7) one full turn. Wait 5 minutes.**
21. **Turn shaft (7) another full turn. Wait 5 minutes.**
22. **Check bottom of bearing retainer (10) for leaks.** There shall be no leaks,
23. **Check air pressure in support (1). If pressure drops from 3 psi, check seal (5) installation.**



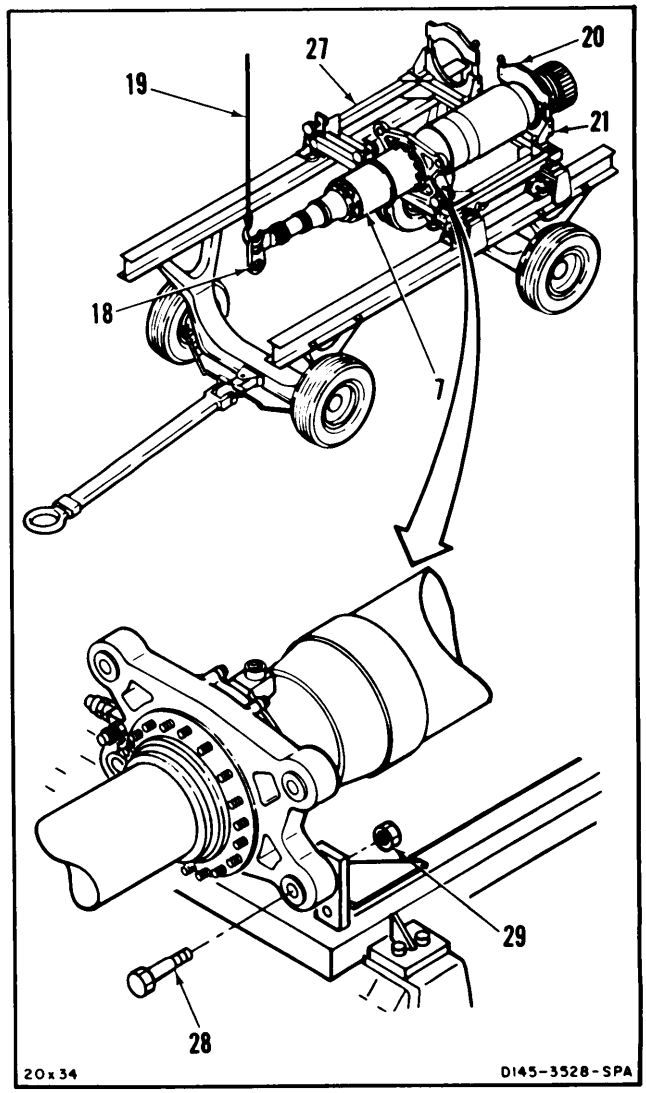
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6-54 INSTALL AFT ROTOR SHAFT UPPER SEAL (AVIM) (Continued)

24. Remove air charging valve (25) and adapter (24).
25. Remove cap (16) from drain port (1 7). Let 011 drain. Use container for 011. Install cap.
26. Coat packing (23) and thread Of Pressure switch (22) with oil (E254). **Install** packing and **switch.**
27. **Torque switch (22) to 75 inch-pounds.** Lockwire switch to filter (1 4). Use lockwire (E231).



28. **Install shaft (7) in adapter (T18) (27).** Tighten clamp (20).
29. **Install two bolts (28) and nuts (29).**
30. Remove hoist cable (19) and hoisting eye (T32) (18).



INSPECT

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INSTALL SLIDER SHAFT

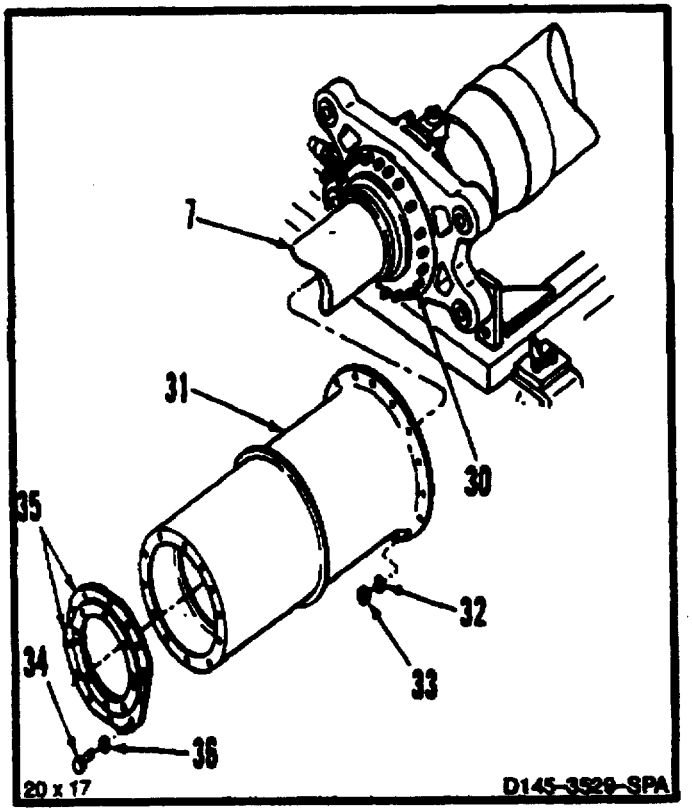
31. Coat 16 studs (30) with oil (E254).

32. **Install slider shaft (31)** over rotor shaft (7) and on studs (30). If needed, heat base of slider shaft to 230 to 250°F (110 to 120°C). Use heat gun and measure temperature with pyrometer.

33. Install 16 washers (32) and nuts (33). **Torque nuts to 120 inch-pounds.**

34. Coat 12 bolts (34) with oil (E254).

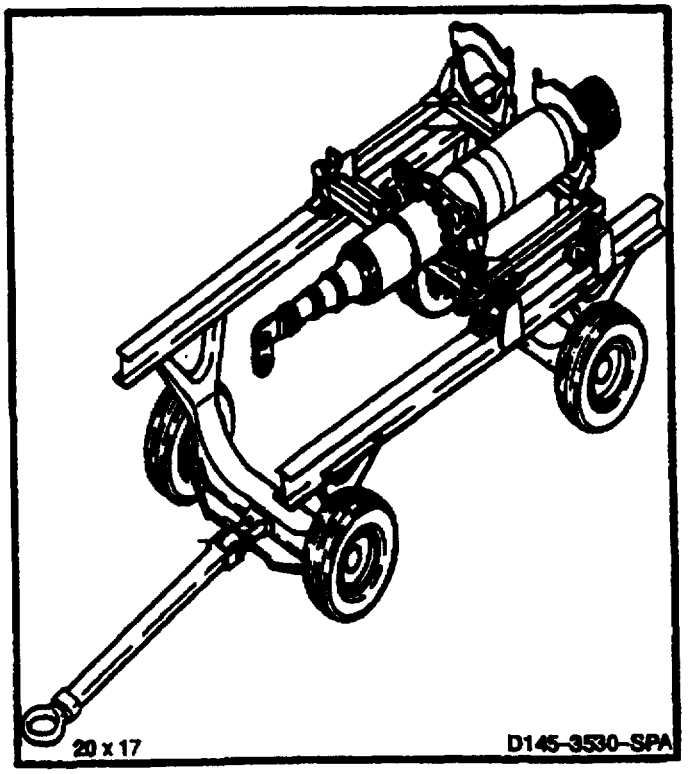
35. Position two halves of seal (35) on shaft (31). Install 12 washers (36) and bolts (34). Ensure that a minimum clearance of 0.050 inch exists between the rubber seal (35) and the surface of the rotor shaft (31). If a minimum clearance does not exist, move seal (35) radially as far away from the shaft (31) as possible and recheck clearance. Torque bolts to 60 inch-pounds. Lockwire bolts (34). Use lockwire (E278).



INSPECT

FOLLOW-ON MAINTENANCE:

None



END OF TASK

INITIAL SETUP

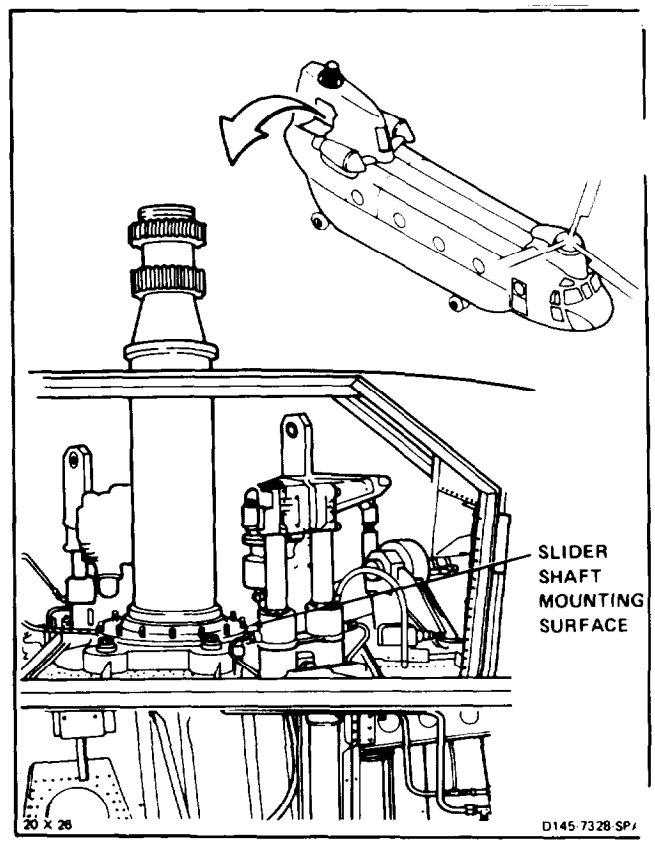
Applicable Configurations:
All

Tools:
Aircraft Mechanic Tool Kit,
NSN 5180-00-323-4692
Torque Wrench, 30 to 150 Inch-Pounds

Materials:
Oil (E254)

Personnel Required:
Medium Helicopter Repairer
Inspector

References:
TM 55-1520-240-23P

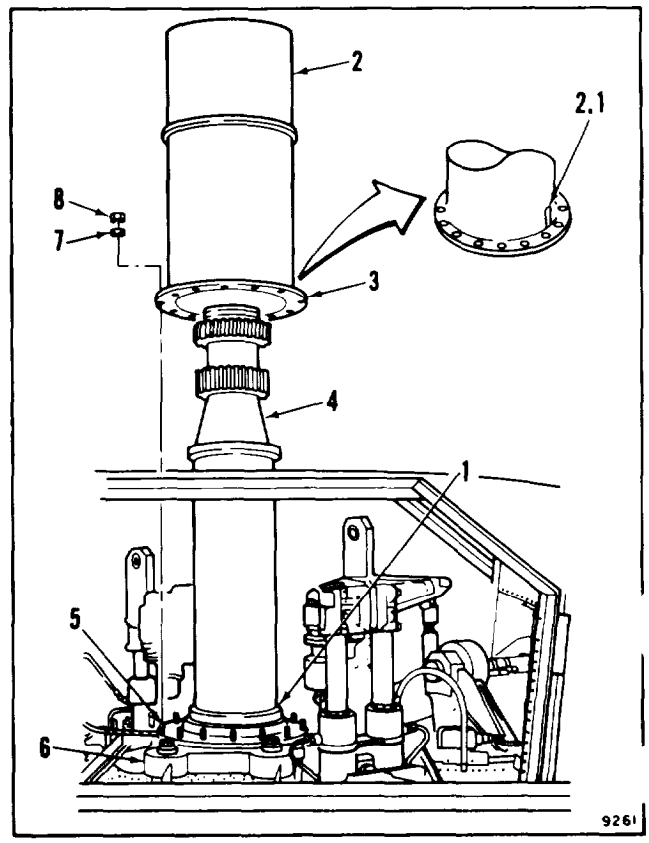


1. Remove tape and barrier material from around seal (1).

CAUTION

Handle aft slider shaft carefully Polished surface is easily damaged.

2. **Position slider shaft (2) with drain hole. (2.1) forward.** Lower slider shaft, flange (3) down, over rotor shaft (4). **Position slider shaft on 16 studs (5).** Top of slider shaft with soft-faced mallet as needed to seat shaft on housing (6).
3. Coat studs (5) with oil (E254). **Install four washers (7) and nuts (8)** 90 degrees apart. **Tighten nuts evenly** to seat shaft (2). Do not torque nuts.
4. **Install remaining 12 washer (7)** and **nuts (8). Torque all 16 nuts to 120 inch-pounds.**



6-55 INSTALL AFT SLIDER SHAFT (Continued)

INSPECT

FOLLOW-ON MAINTENANCE:

Install aft swashplate (Task 5-133).

Install aft drive arms (Task 5-112).

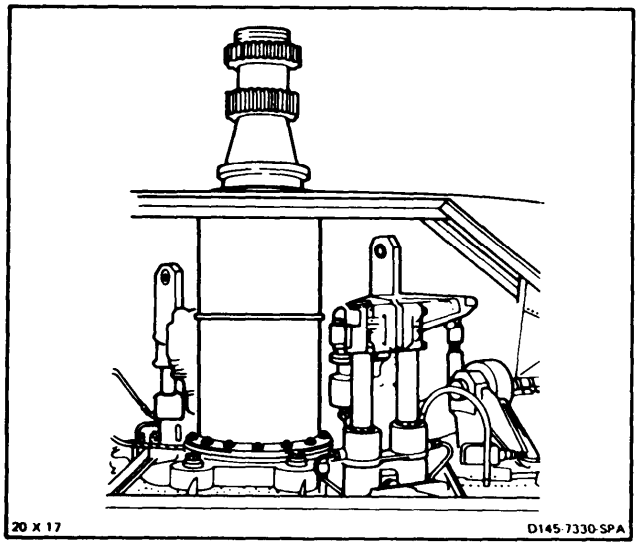
Install aft drive collar (Task 5-111).

Install aft weather-protective cover (Task 5-138).

Install aft rotary-wing head (Task 5-9).

Install aft rotary-wing blades (Task 5-84).

Close aft pylon work platforms (Task 2-2).



END OF TASK

6-56 REMOVE AFT ROTOR SHAFT THROUGH TOP OF PYLON

INITIAL SETUP

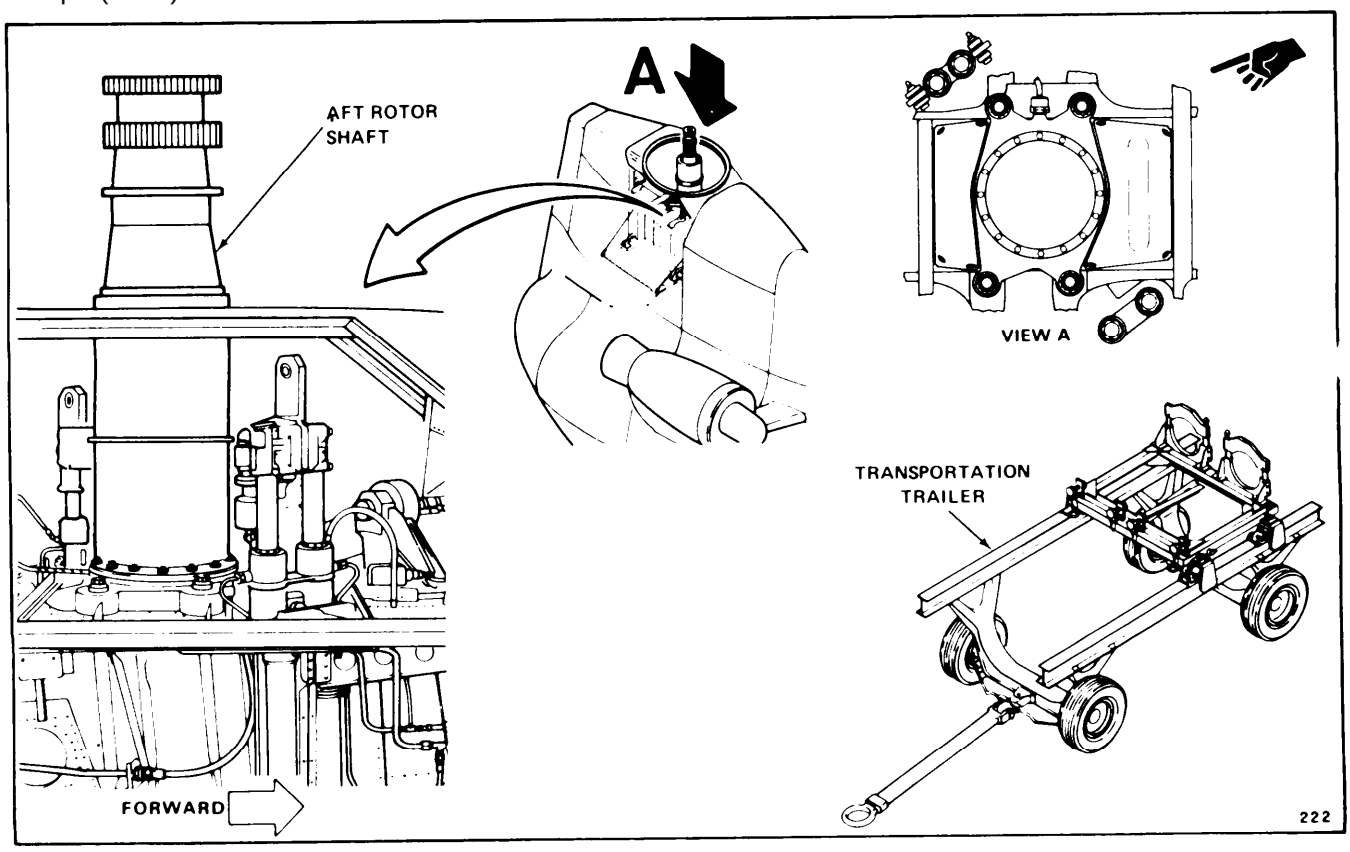
Applicable Configurations:
All

Tools:
Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Hoist Capable of Lifting 500 Pounds
Hoisting Eye (T32)
Socket, 1-Inch, 3/4-inch Drive
Breaker Bar, 3/4-inch Drive

Materials:
Barrier Material (E81)
Tape (E388)

Personnel Required:
Medium Helicopter Repairer (3)

Equipment Condition:
Pylon Work Platforms Open (Task 2-2)
Rotary-Wing Blades Removed (Task 5-64)
Rotary-Wing Head Removed (Task 5-8)
Weather-Protective Cover Removed (Task 5-136)
Drive Collar Removed (Task 5-100)
Drive Arms Removed (Task 5-101)
Swashplate Removed (Task 5-116)
Adapter (T18) Installed on Transportation Trailer 2000



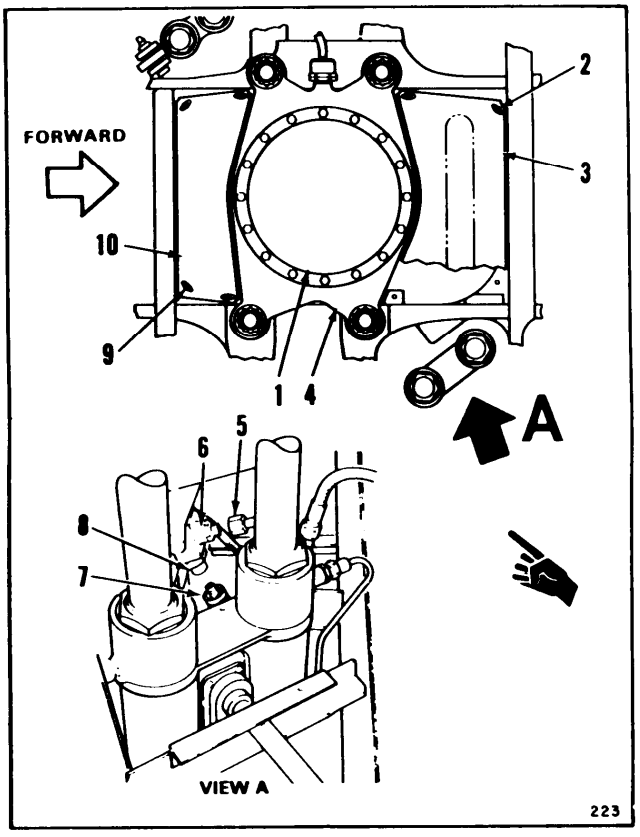
GO TO NEXT PAGE

6-56 REMOVE AFT ROTOR SHAFT THROUGH TOP OF PYLON (Continued)

NOTE

If there is not enough overhead clearance or hoist height, lower shaft through pylon (Task 6-57).

1. Cover slider shaft (1) with barrier material (E81) and tape (E388).
2. Loosen four turnlock fasteners (2) on access panel (3) forward of bearing support (4). **Remove panel.**
3. **Disconnect hose (5)** from union (6). **Disconnect connector** (7) from chip detector (8).
4. Loosen four turnlock fasteners (9) on access panel (10) aft of bearing support (4). **Remove panel.**



5. **Disconnect hose (11)** from filter (12). **Disconnect connector (13)** from pressure transmitter (14).
6. **Install hoisting eye (T32) (15)** in top of rotor shaft (16).

NOTE

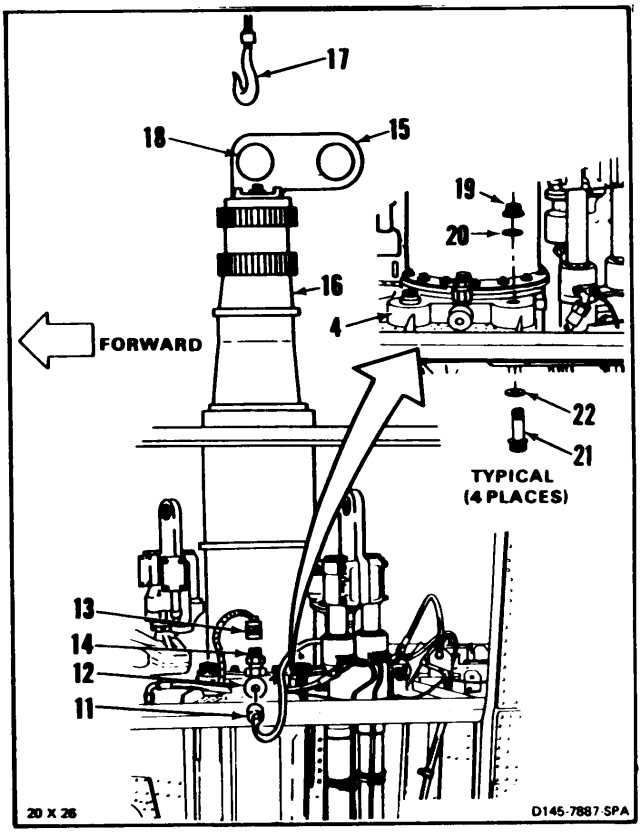
AFT SHAFT hole must be used for proper shaft alignment during removal.

7. **Connect hoist hook (17)** to AFT SHAFT hole (18) of hoisting eye (T32) (15). Raise hoist to **take up slack.** Do not apply tension.

CAUTION

If bolts are not removed, thread can be damaged and bolt holes scored during shaft removal.

8. Remove nuts (19) and washers (20) from four bolts (21) on bearing support (4). **Remove bolts and washers (22).**



GO TO NEXT PAGE

6-56 REMOVE AFT ROTOR SHAFT THROUGH TOP OF PYLON (Continued)

9. Tie rope guide line (23) around rotor shaft (16).

WARNING

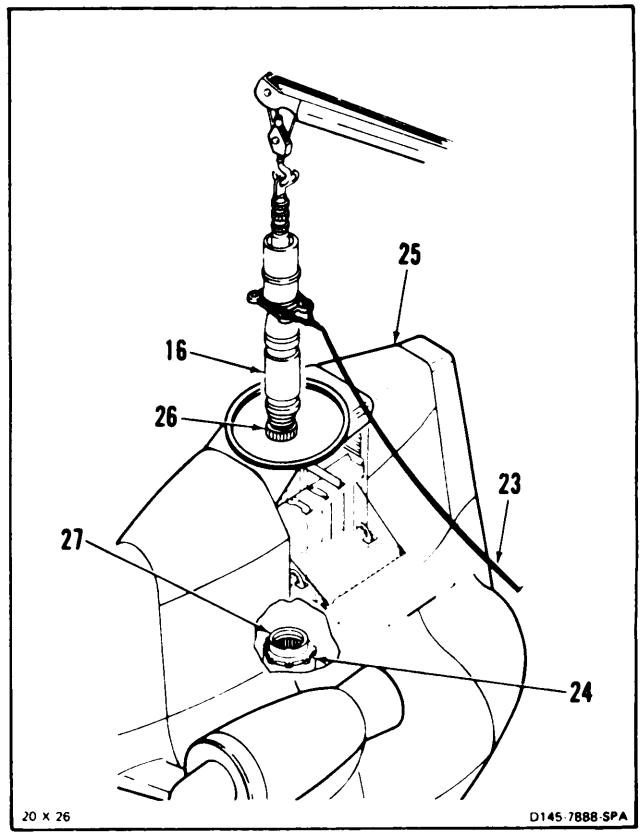
Rotor shaft is heavy and can injure personnel if it drops. Shaft must be supported by hoist and moved carefully to prevent injury to personnel.

CAUTION

If rotor shaft is not lifted straight out of transmission, shaft splines can damage seal in transmission.

10. **Lift rotor shaft (16)** straight up and out of transmission (24) and pylon (25). Cover splines (26) with barrier material (E81) and tape (E388).

11. Cover opening (27) in top of aft transmission (28). Use barrier material (E81) and tape (E388).



12. Lower rotor shaft (16) to adapter (T18) (28). **Install shaft in adapter** as follows:

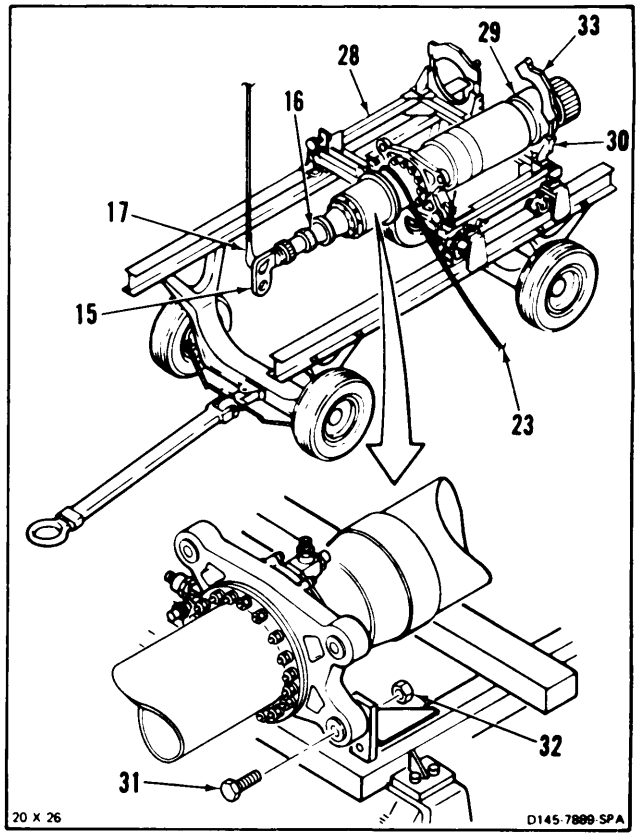
    a. Align lower ring (29) with plate (30). Lower shaft (4) to position ring in plate.

    b. Continue lowering shaft (16) to adapter (T18) (28). Install two bolts (31) and nuts (32).

    c. Install clamp (33) over ring (29).

13. Remove hoist hook (17) from hoisting eye (T32) (15). Remove eye.

14. Remove rope guide line (23).



FOLLOW-ON MAINTENANCE:

None

END OF TASK

6-57 REMOVE AFT ROTOR SHAFT THROUGH CABIN

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Hoist Capable of Lifting 500 Pounds
Hoisting Eye (T32)
Socket, 1-inch, 3/4-inch Drive
Breaker Bar, 3/4-inch Drive

Materials:

Barrier Material (E81)
Tape (E388)

Personnel Required:

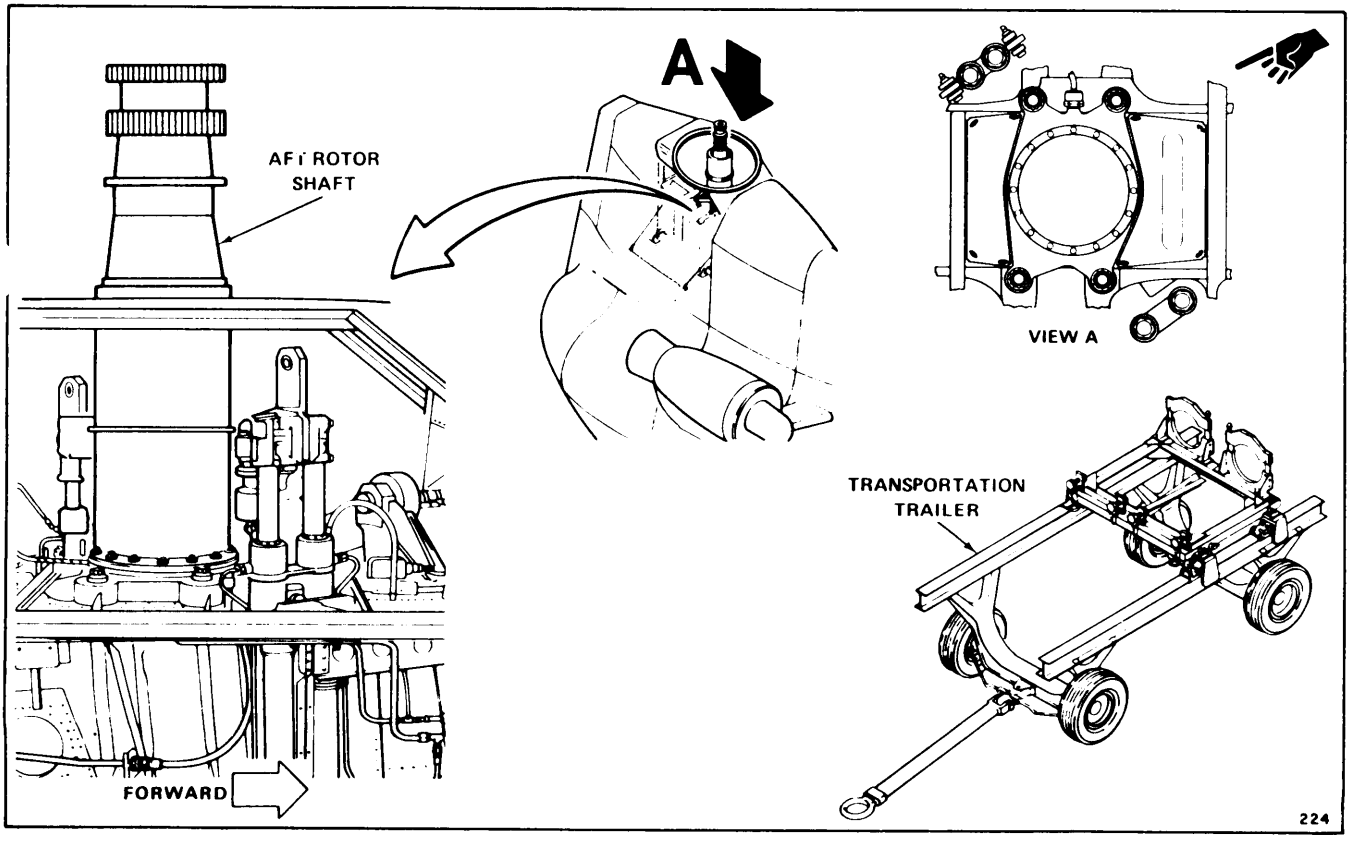
Medium Helicopter Repairer (3)

References:

TM 55-1520-240-10

Equipment Condition:

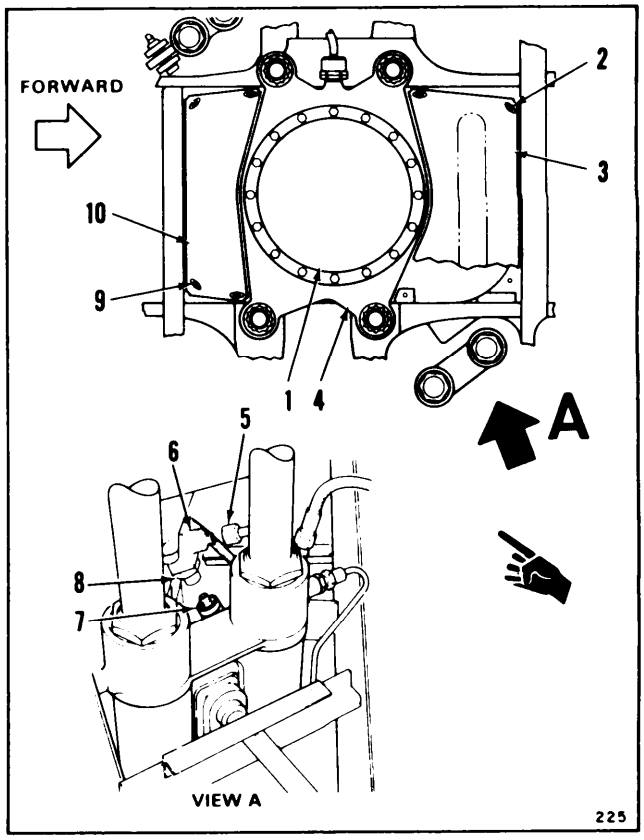
Pylon Work Platforms Open (Task 2-2)
Rotary-Wing Blades Removed (Task 5-64)
Rotary-Wing Head Removed (Task 5-8)
Weather-Protective Cover Removed (Task 5-136)
Aft Drive Collar Removed (Task 5-100)
Aft Drive Arms Removed (Task 5-101)
Aft Swashplate Removed (Task 5-116)
Aft Transmission Removed (Task 6-92)
Adapter (T18) Installed on Transportation Trailer 2000
Cargo Ramp Open (TM 55-1520-240-T)



GO TO NEXT PAGE

6-57 REMOVE AFT ROTOR SHAFT THROUGH CABIN (Continued) 6-57

1. Cover slider shaft (1) with barrier material (E81) and tape (E388).
2. Loosen four turnlock fasteners (2) on access panel (3) forward of bearing support (4). **Remove panel.**
3. **Disconnect hose (5)** from union (6). **Disconnect connector (7)** from chip detector (8).
4. Loosen four turnlock fasteners (9) on access panel (10) aft of bearing support (4). **Remove panel.**



5. **Disconnect hose (11)** from filter (12). **Disconnect connector (13)** from pressure transmitter (14).
6. **Install hoisting eye (T32) (15)** in top of rotor shaft (16).

NOTE

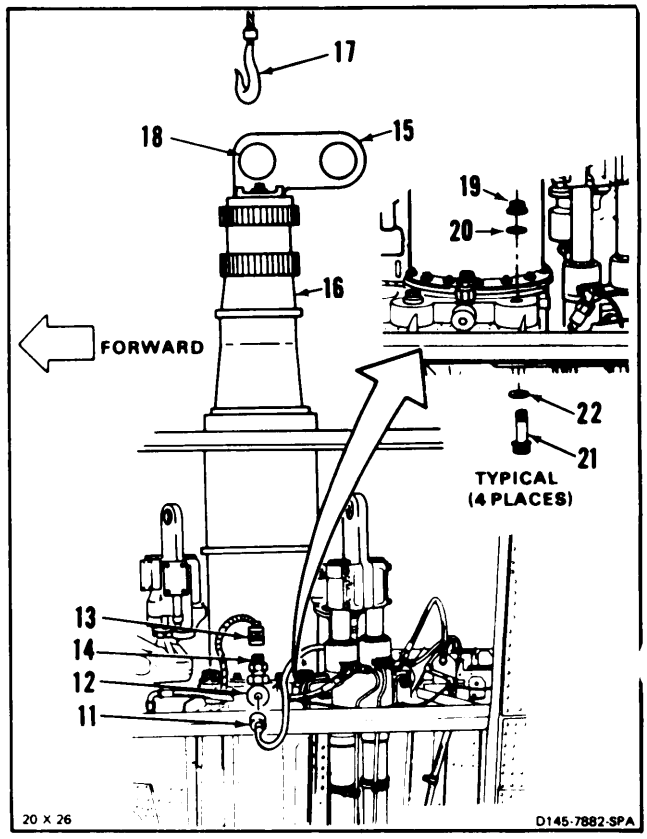
AFT SHAFT hole must be used for proper shaft alignment during removal.

7. **Connect hoist hook (17)** to AFT SHAFT hole (18) of hoisting eye (T32) (15). Raise hoist to **take up slack.** Do not apply tension.

CAUTION

If bolts are not removed, thread can be damaged and bolt holes scored during shaft removal.

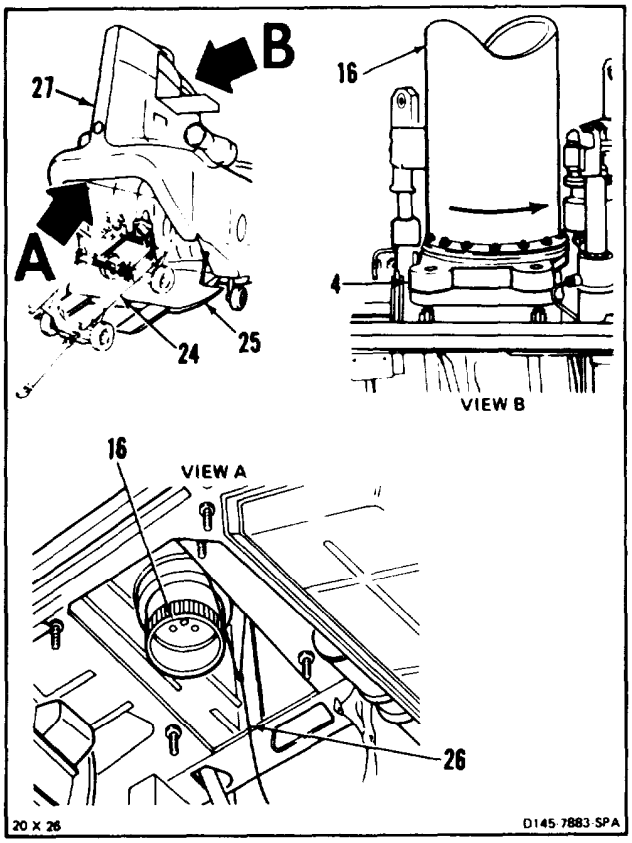
8. Remove nuts (19) and washers (20) from four bolts (21) on bearing support (4). **Remove bolts and washers (22).**



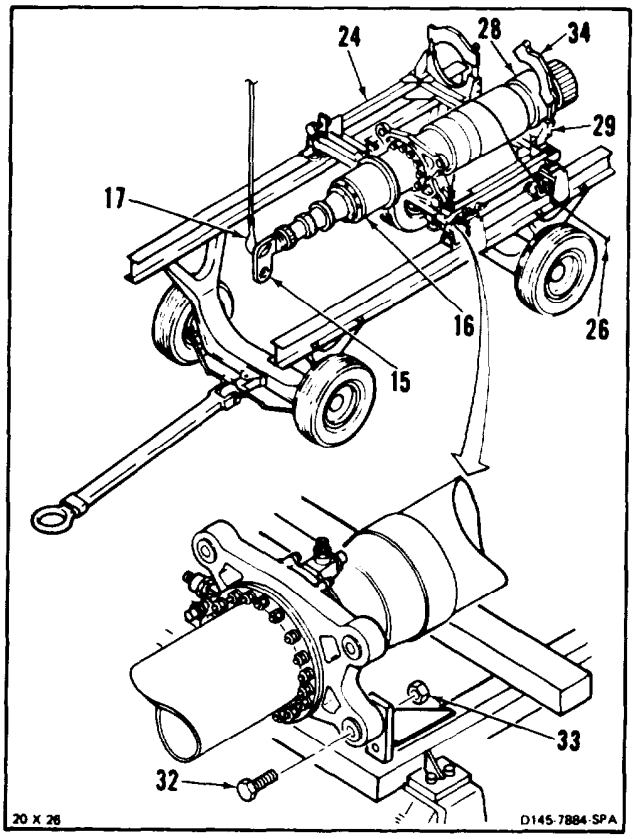
GO TO NEXT PAGE

6-57 REMOVE AFT ROTOR SHAFTTHROUGH CABIN (Continued)

9. Position transportation trailer 2000 (23) with adapter (T18) (24) on cargo ramp (25). Raise ramp to level with hand pump (TM 55-1520-240-T).
10. Tie rope guide line (26) around bottom of shaft (16).
11. Raise shaft (16) about 2 inches. **Rotate bearing support (4)** 90 degrees.
12. **Lower shaft (16)** through pylon (27) to adapter (T18) (24).



13. **Install rotor shaft (16) in adaptor (T18) (24)** as follows:
    a. Align lower ring (28) with plate (29). Lower shaft (16) to position ring in plate.
    b. Continue lowering shaft (16) to adapter (T18) (24). Install two bolts (30) and nuts (31).
    c. Install clamp (32) over ring (28).
14. Remove hoist hook (17) from hoisting eye (T32) (15). Remove eye.
15. Remove rope guide line (26). Lower cargo ramp (25) to ground with hand pump (TM 55-1520-240-T).
16. Remove shaft (16) from helicopter.



FOLLOW-ON MAINTENANCE:

None

END OF TASK

6-58 INSPECT AFT ROTOR SHAFT (Continued) 6-58

INITIAL SETUP

Applicable Configurations:
All

Tools:
None

Materials:
Cloth (E135)
Acetone (E19)
Cloth, Emery (E141)
Oil (E299) or Equiv.

Personnel Required:
Inspector

References:
Task 6-52.1

Equipment Condition:
As required

1. **Check splines (2)** for damage. **There shall be no damage.**
2. **Check splines (1)** for damage as follows: (These inspections apply to the forward and aft rotor shaft splines).

WARNING

Acetone is extremely flammable. It can be toxic. Avoid inhaling. Use only with adquate ventilation. Avoid contact with skin, eyes, or clothing. Keep away from heat, sparkes, or open flames. In case of contact, immediately flush skin or eyes with water for at least 15 minutes Get medical attention for eyes.

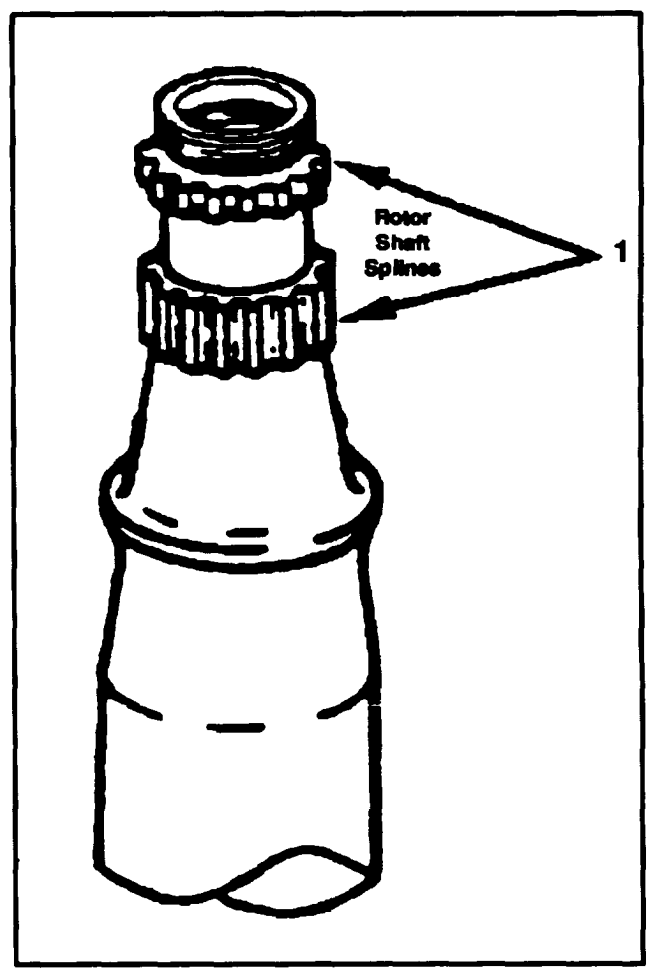
a. Clean the forward and/or aft rotor shaft splines and adjacent surfaces, using a dean cloth (E135) moistened with acetone (E19)

b. Visually examine the forward and/or aft rotor shaft external splines for damage paused by wear, scoring, nicks, gouges, dings, scratches, and corrosion to the following criteria:

(1) Cadmium plate depletion. Any amount of cadmium plating missing is allowable and is not cause for removal from service.

(2) Light surface corrosion. Light surface corrosion over any amount of the spline surfaces may be removed by lightly hand poliching with 500 or higher grit paper (E141) wet with oil (E299 or equiv.).

(3) Nicks, scratches, dings, wear steps, and pitting corrosion. When evaluating the above defects, the location of the condition on the spline teeth must be considered prior to any polishing and/or removal.



GO TO NEXT PAGE

6-58 INSPECT AFT ROTOR SHAFT (Continued) 6-58

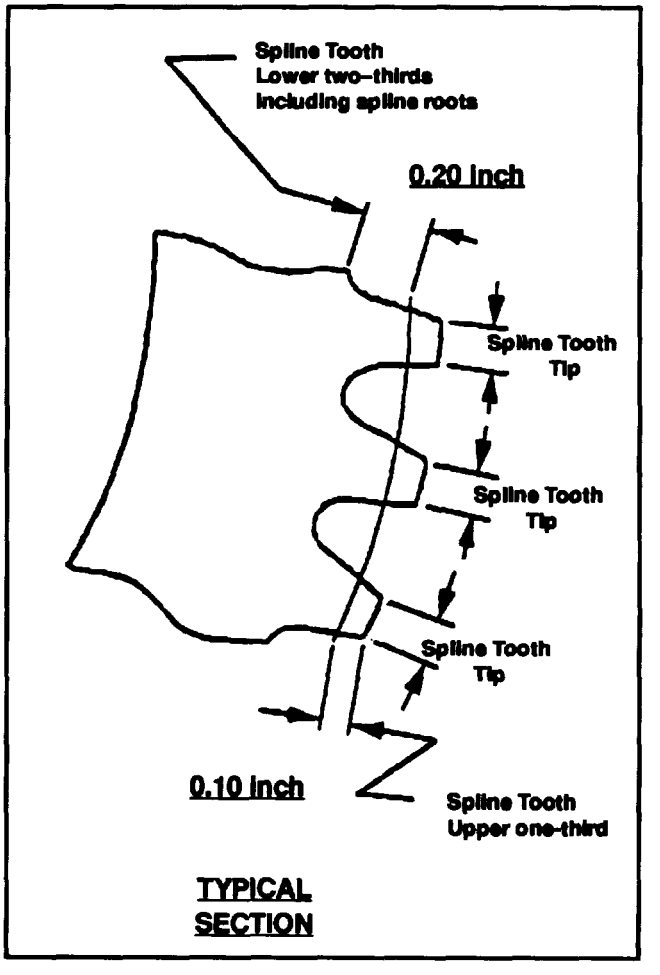
NOTE

The sensitivity to damage of the spline teeth differs among the three areas. The spline tooth lower two thirds, including spline roots, is the highest loaded and most sensitive of the three areas. The spline tooth upper one third is less sensitive than the lower two thirds. The spline tooth tips are the least sensitive of the three areas.

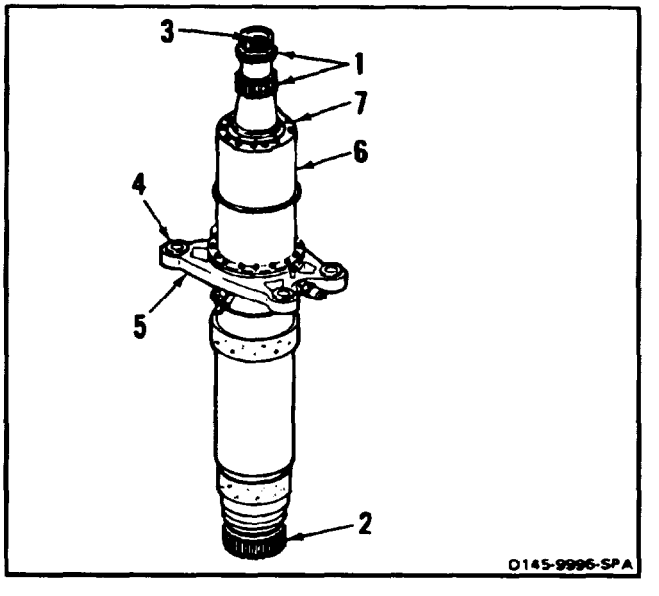
(a) Spline tooth lower two thirds including spline roots (reference 0.20 inch). No pitting corrosion, nicks or scratches are allowed in this area. A light visual indication of wear or wear step is permitted provided it does not exceed 0.0010 inch depth.

(b) Spline tooth upper one third (reference 0.10 inch). Nicks, dings, or scratches are allowed in this area up to a depth of 0.0020 inch. No pitting corrosion is allowed that exceeds 0.0010 inch. Lightly blend nicks, dings, scratches, and pitting corrosion.

(c) Spline tooth tips. Pitting corrosion, nicks, dings, or scratches are allowed in this area up to a depth of 0.010 inch. Lightly blend and polish Tip. Remove any sharp edges from nicks, dings, and scratches.



3. **Check thread (3)** for damage. **There shall be no damage.**
4. **Inspect bushings (4)** at top and bottom of four mounting holes in support (5). **There shall be no** cracks, wear, or other **damage.**
5. **Check support (5)** for oil leakage. **There shall be no oil.**
6. **Inspect slider shaft (6)** for damage. **Damage shall not exceed the limits specified in (Task 6-52.1).**
7. **Inspect seal (7). There shall be no damage.**



FOLLOW-ON MAINTENANCE:

None

END OF TASK

INITIAL SETUP

Applicable Configurations:
All

Tools:
Dial Indicating Depth Gage 643J

Materials:
Crocus Cloth (E122)
Cloths (E120)

Personnel Required:
Medium Helicopter Repairer
Inspector

References:
TM 1-1500-204-23

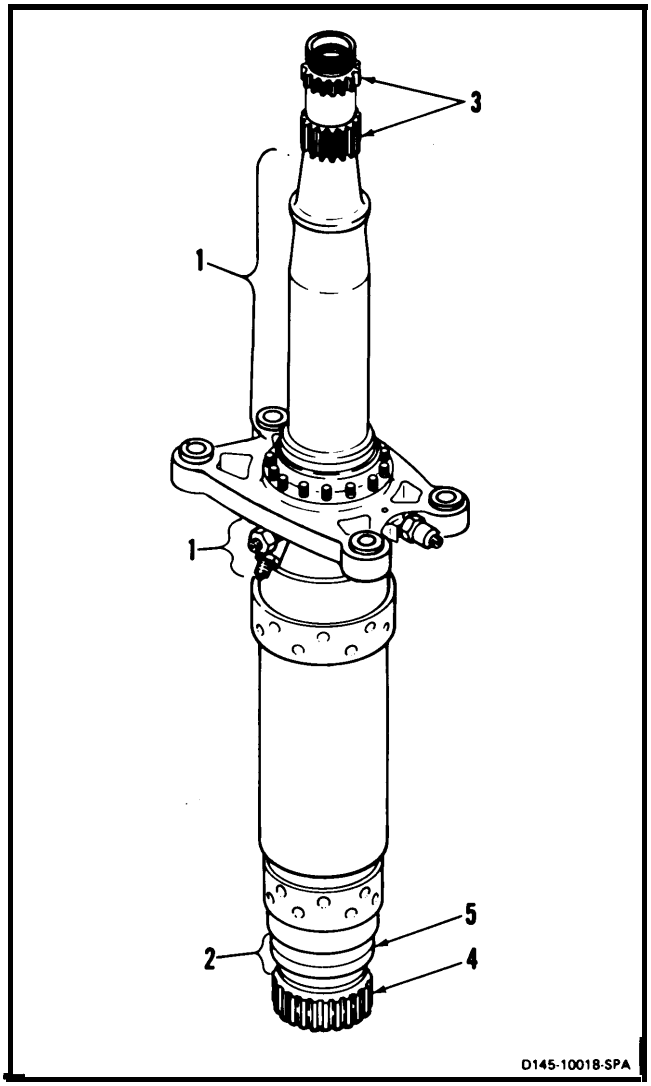
Equipment Condition:
Off Helicopter Task
Slider Shaft Removed (Task 6-53)

1. **Remove nicks and scratches** on rotor shaft with crocus cloth (E122). Observe the following limits on upper shaft (1) and lower shaft (2):

NOTE
Limits for center section of shaft are in step 3.

a. Blending shall not be more than 0.040 inch deep.
b. Blending shall clear fasteners by a distance at least equal to fastener diameter.
c. Blending shall not extend into a radius.
d. Blending shall not be done to splines (3 and 4).
e. No blending is allowed on seal mating surface (5).

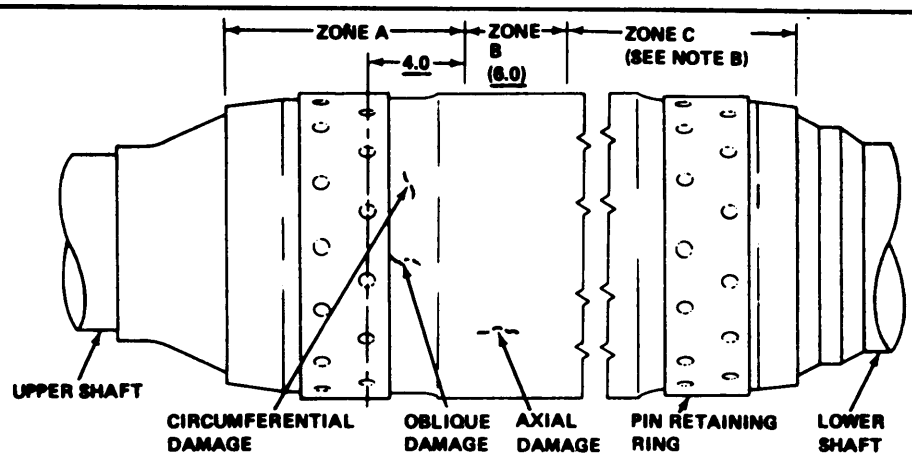
2. **Remove corrosion on splines (3 and 4)** (TM 1-1500-204-23).



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6-59 REPAIR AFT ROTOR SHAFT (Continued) 6-59

3. **Blend out damage to enter section** as shown.



DAMAGE LIMITATIONS FOR ZONE A

	CIRCUMFERENTIAL AND OBLIQUE DAMAGE	AXIAL DAMAGE
MAXIMUM DEPTH AFTER BLENDING	0.005	0.010
MINIMUM WIDTH AFTER BLENDING	0.10	0.14
MAXIMUM WIDTH AFTER BLENDING	0.30	0.50
MINIMUM BLEND RADIUS	0.25	0.25

DAMAGE LIMITATIONS FOR ZONE B

	CIRCUMFERENTIAL AND OBLIQUE DAMAGE	AXIAL DAMAGE
MAXIMUM DEPTH AFTER BLENDING	0.010	0.015
MINIMUM WIDTH AFTER BLENDING	0.14	0.17
MAXIMUM WIDTH AFTER BLENDING	0.5	0.5
MINIMUM BLEND RADIUS	0.25	0.25

NOTES

A. ALL DIMENSIONS ARE IN INCHES
B. DAMAGE IN ZONE C MUST NOT EXCEED A DEPTH OF 0.040 AFTER BLENDING

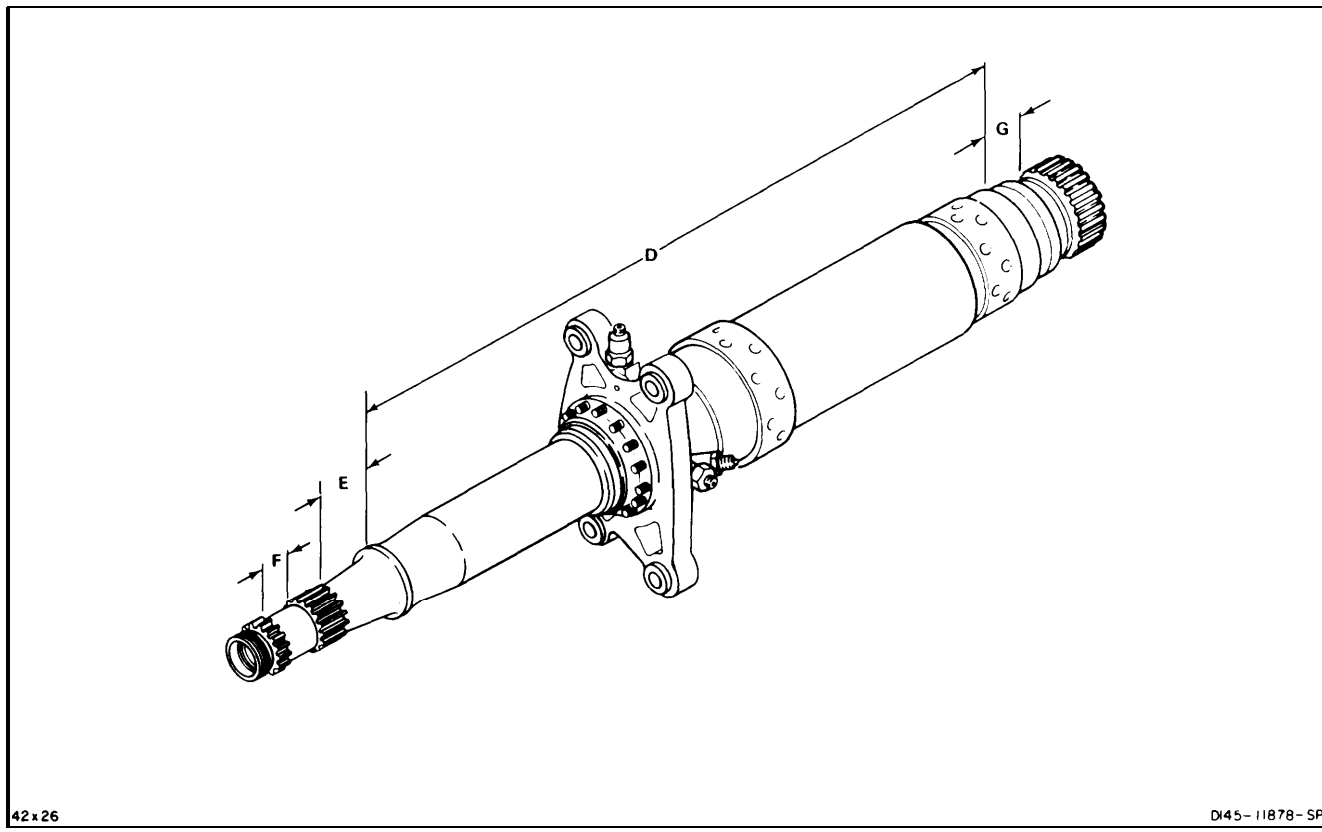
42 X 34

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6-59 REPAIR AFT ROTOR SHAFT (Continued) 6-59

4. Touch up blended areas as shown:



BLEND AREA	MATERIAL	REFERENCE INSTRUCTIONS
D	One coat wash primer (E302)	MIL-C-8507
	Two coats zinc chromate primer (E291)	MIL-P-6808
E and F	Cadmium plate	MIL-STD-865 Bake at 260 to 290ºF (125 to 145ºC) for 23 hours within 2 hours after plating
	One coat wash primer (E302)	MIL-C-8507
	Two coats epoxy primer (E291)	MIL-C-22751
	One coat epoxy top coat, color #16081, engine gray (E166)	MIL-C-22751
G	Instant gun blue, Formula 44-40 (E457)	Manufacturer's Instructions

INSPECT

FOLLOW-ON MAINTENANCE:
None

END OF TASK

INITIAL SETUP

Applicable Configurations:

All

Tools:

Dial Indicating Depth Gage 643J

Materiais:

Naphtha (E245)
Emery Cloth (E123) or Abrasive Paper (E13)
Crocus Cloth (E122)
Cloths (E120)
Gauze Sponges (E184)
Barrier Material (E80)
Masking Tape (E388)
Gloves (E184.1)
Acetic Acid (E21)
Alodine Powder (E65)
Epoxy Primer (E292) or (E293)
Chromic Acid (E114)
Calcium Sulphate (E91)

Personnel Required:

Aircraft Powertrain Repairer
Inspector

References:

TM 43-0103
MIL-C-3171

Equipment Condition:

Off Helicopter Task

General Safety Instructions:

WARNING

Naphtha (E245) is combustible and toxic. It can irritate skin and cause burns. Use only with adequate ventilation, away from open flame. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.

WARNING

Acetic acid (E21) is combustible and toxic. Chromic acid (E114) is extremely toxic. Both can irritate skin and cause bums. Avoid inhaling. Use only with adequate ventilation, away from open flame. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.

WARNING

Epoxy primer (E292) or (E293) is flammable and toxic. It can irritate skin and cause bums. Use only with adequate ventilation, away from heat-or open flame. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.

CAUTION

Do not wear photogray glasses when fluorescent inspecting. They reduce ability to see cracks.

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NOTE

Reparable damage is limited to scratches, nicks, gouges, and minor corrosion.

1. **Clean** oil and grease from **damaged area.** Use naphtha (E245) and clean cloths (E120). Wear gloves (E184.1).
2. **Check** extent and location of **damage** on support (1).

NOTE

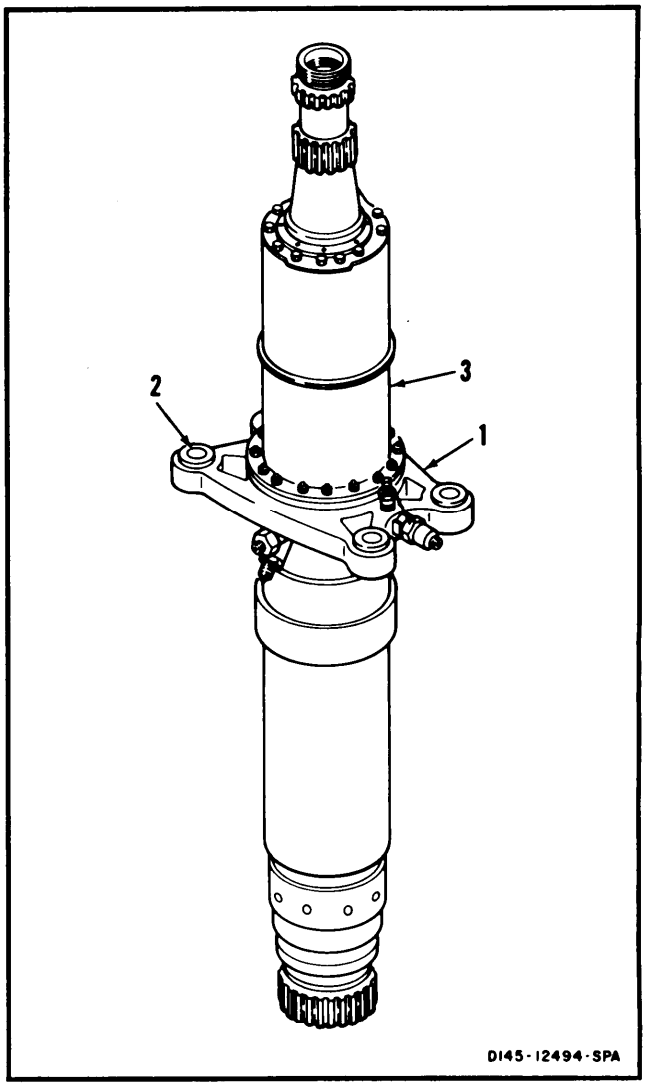
Limits in this step refer to the extent of damage after rework.

a. **Depth of damage shall not be more than 0.025 inch.**

b. **Damage shall not extend over more than one surface or enter any radius.**

c. **Damage shall not be closer than 1.00 inch to any mounting hole.**

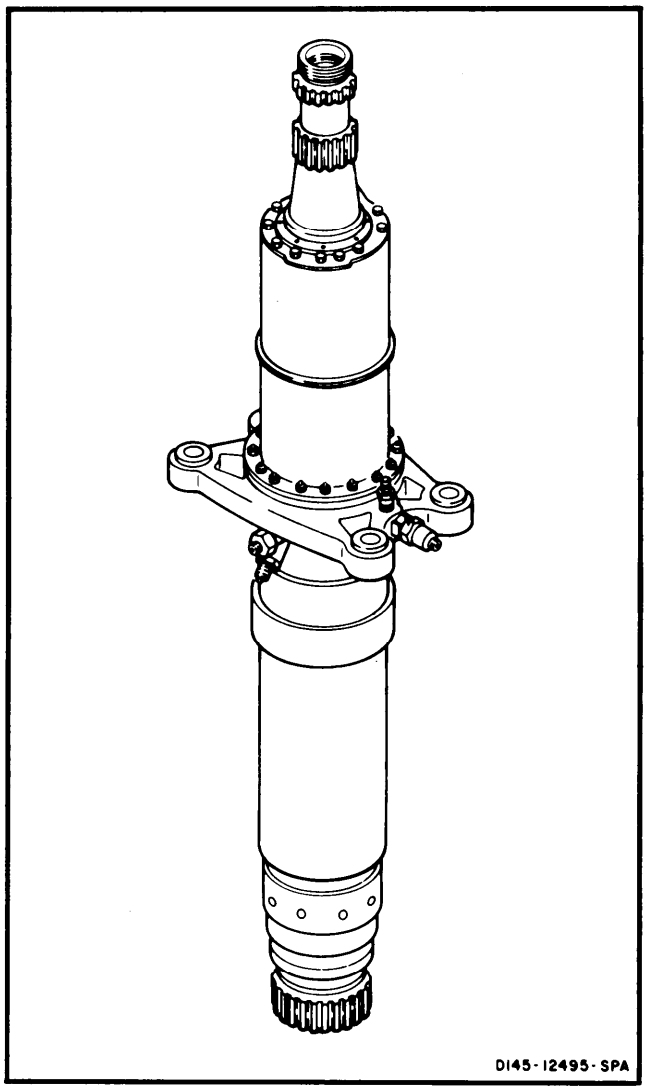
3. **Fluorescent inspect** the damaged area to check for cracks (TM 43-0103). **There shall be no cracks.**
4. Protect slider shaft (3) near the damaged area from abrasive grit. Use barrier material (E80) and tape (E388).
5. **Blend out damage** with emery cloth (E123) or abrasive paper (E13). Observe the limits of step 2.
6. **Smooth the blended area** with crocus cloth (E122). Do not leave any sharp edges.



WARNING

Protective gloves (E184.1) shall be worn for the remainder of the task. Otherwise, personal injury could occur.

7. **Acid etch the reworked area as follows:**
   a. Prepare a solution of 3 parts acetic acid (E21) in 7 parts water. Wear gloves (E184.1) and goggles.
   b. Swab the area with solution for 2 minutes. Use gauze sponges (E184).
   c. Rinse the area with cold water.
8. **Fluorescent inspect** the reworked area to check for cracks (TM 43-0103). **There shall be no cracks.**
9. Apply surface treatment to the reworked area as follows:
   a. **Clean the area with naphtha (E245)** and clean cloths. Let the area air dry.
   b. **Swab on solution of chromic acid**
   c. **(E114) and calcium sulphate (E91) (MIL-L-3171, type VI). Swab until metal becomes dull gold to brown.** Use gauze sponges (E184). **Rinse** the area with cold water and let air dry.
10. **Apply epoxy primer (E292) or (E293)** to the reworked area.



INSPECT

FOLLOW-ON MAINTENANCE:
None

END OF TASK

6-60 PREPARE AFT ROTOR SHAFT FOR SHIPMENT OR STORAGE

INITIAL SETUP

Applicable Configurations:
All

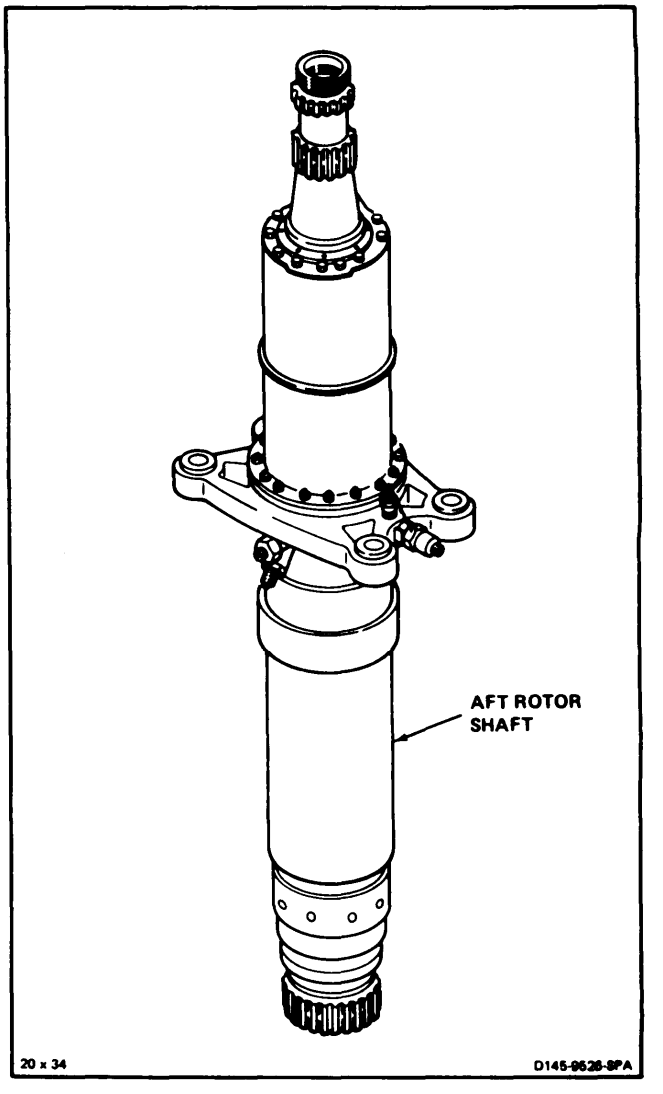
Tools:
Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Hoisting Eye (T32)
Work Hoist
Shipping Container (T1)
Container, Two Quart

Materials:
Fingerprint Remover (E175)
Cloths (E120)
Dry Cleaning Solvent (E162)
Gloves (E186)
Swabbing Brush (E86)
Corrosion Preventive Compound (E153 or E154)
Oil (E255)
Barrier Material (E81)
Masking Tape (E388)
Desiccant (E160); 16-Unit Bag

Personnel Required:
67U10 Medium Helicopter Repairer (2)
67U30 Inspector

References:
TB 55-8100-200-25

Equipment Condition:
Off Helicopter Task



General Safety Instructions:

WARNING

Dry cleaning solvent (E162), fingerprint remover (E175) and corrosion-preventive compound (E153 or E154) are flammable and toxic. They can irritate skin and cause burns. Use only in well-ventilated area, away from heat and open flames. In case of contact, immediately flush skin or eyes with water for at least 15 minutas. Get medical attention for eyes.

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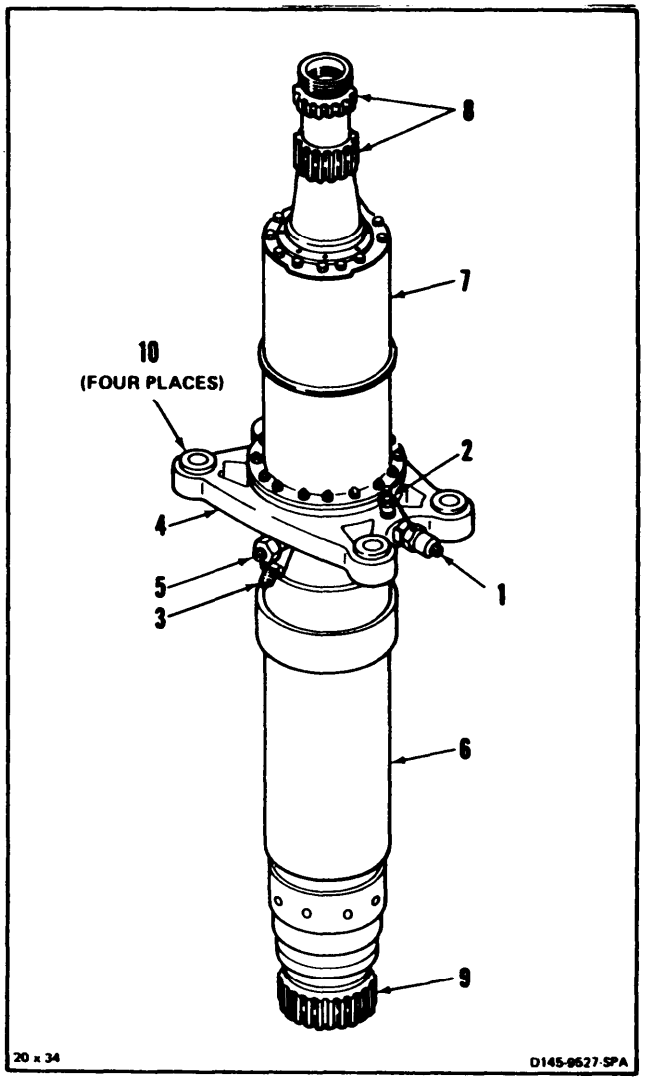
6-60 PREPARE AFT ROTOR SHAFT FOR SHIPMENT OR STORAGE (Continued) 6-60

1. **Install caps on filter (1), pressure switch (2), and chip detector (3).**
2. **Fill support housing (4) with oil (E255) through union (5). cap union.**
   a. Rotate housing (4) around shaft (6) three times to spread oil inside housing.
   b. Remove cap from union (5). Drain oil from housing (4). Install cap on union.
3. **Clean all surfaces** of rotor shaft (6). Use dry cleaning solvent (E162) and clean cloths (E120). Wear gloves (E186) and goggles. Wear gloves for the rest of this task.
4. **Clean slider shaft (7),** rotor head **splines (8),** transmission **splines (9) and four bushings (10).** Use fingerprint remover (E175) and clean cloths (E120).

CAUTION

Touching unpainted surfaces with bare fingers can cause corrosion.

5. Put on gloves (E186). Gloves shall be worn for the rest of this task.
6. Wipe surfaces cleaned with fingerprint remover with dry cleaning solvent (E162) and clean cloths (E120).
7. **Coat slider shaft (7), splines (8 and 9), and bushings (10) with corrosion-preventive compound (E153 or E154).** Use cloth (E120) to coat shaft. Use swabbing brush (E86) to coat splines and bushings.
8. **Cover slider shaft (7), splines (8 and 9), and four bushings (10) with barrier material (E81) and tape (E388).**
9. **Cover filter (1), pressure switch (2), and chip detector (3), with barrier material (ES1) and tap (E388).**



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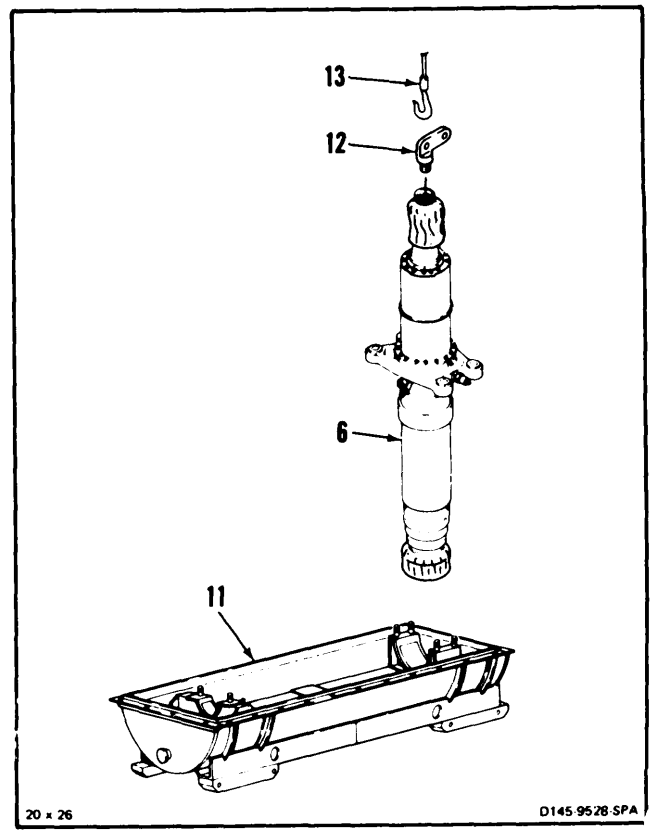
6-60 PREPARE AFT ROTOR SHAFT FOR SHIPMENT OR STORAGE (Continued) 6-60

10. Install rotor shaft (6) in shipping container (T1) (11) as follows:

    a. Inspect and prepare container (11) (TB 55-8100-200-25).

    b. Install hoisting eye (12) in top of shaft (6). Connect work hoist hook (13) to eye marked AFT SHAFT.

    c. With aid of helper, **lower shaft (6) into container (T1) (11).**



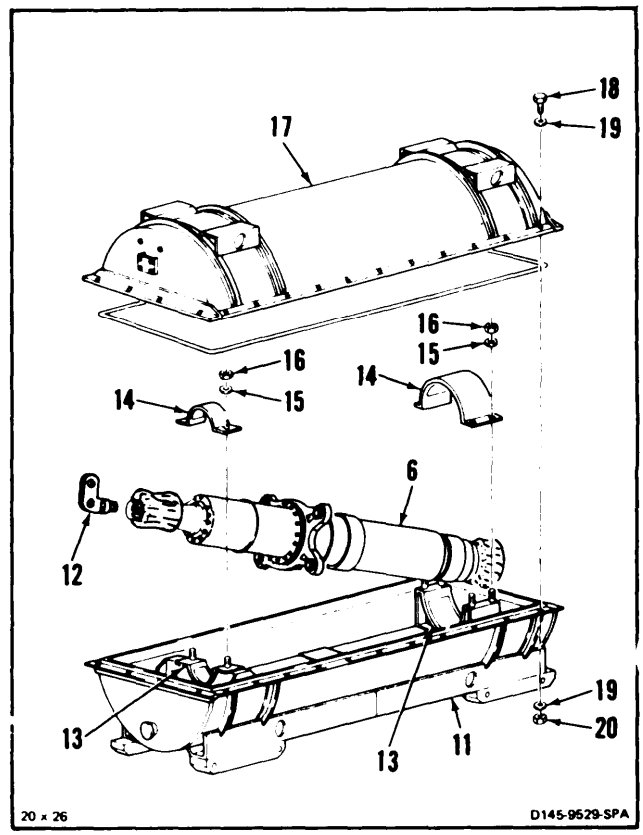
    d. Remove hoisting eye (12) from shaft (6). With aid of helper, lower shaft into two pads (13).

    e. Install two clamps (14) over shaft (6). Install six washers (15) and nuts (16).

    f. Prepare required maintenance forms and records (TM 38-750 and TB 750-126).

    g. Put four 16-unit bags of desiccant (E160) into container (T1) (11).

    h. Install cover (17) on container (T1) (11). Install bolt (18), two washers (19), and nut (20) at 30 places.



GO TO NEXT PAGE

6-60 PREPARE AFT ROTOR SHAFT FOR SHIPMENT OR STORAGE (Continued)

11. **Remove plug (21)** from cover (17).
12. **Connect air test line (22)** to cover (17).

CAUTION

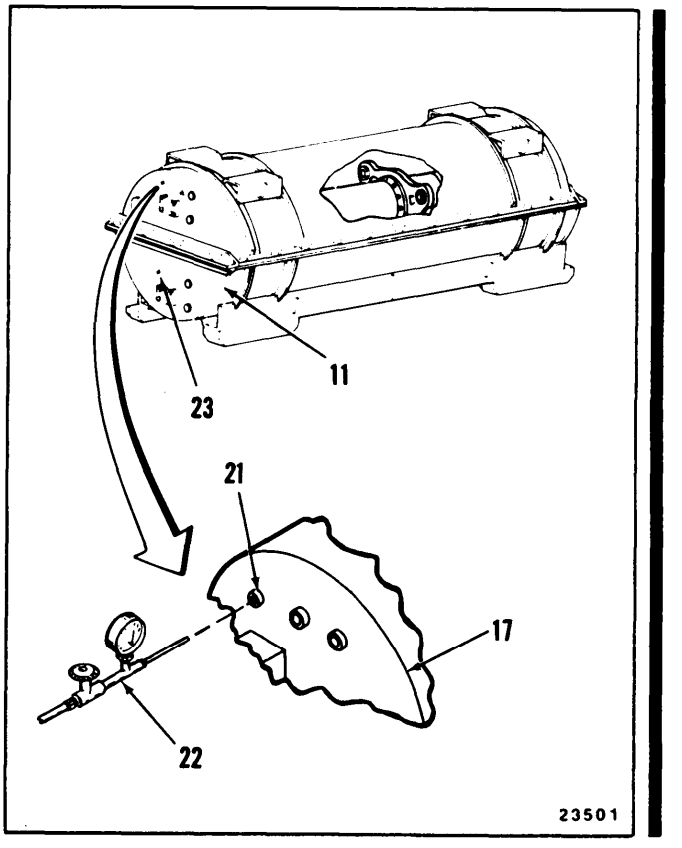
Low pressure air supply must be used. Exceeding test pressure can damage container.

13. **Pressurize container (11)** to **3 psi max.** Check container for leaks. Container must hold **3 psi** for 1 hour.

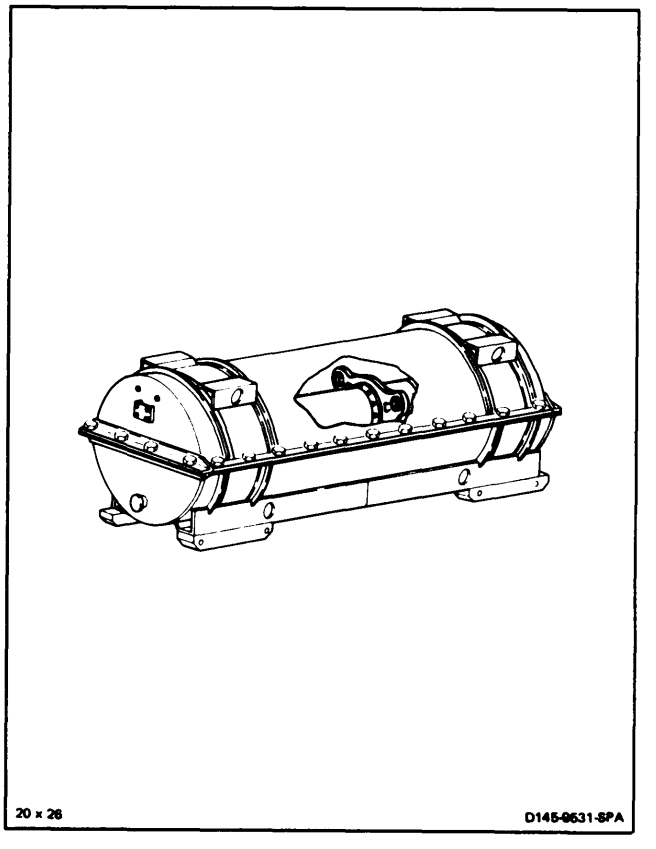
WARNING

Be careful when releasing air under pressure, wear goggles. Personal injury can result.

14. **Push pressure relief valve (23)** until pressure in container (11) is **0 psi.**
15. **Disconnect air line (22)** from cover (17).
16. **Install plug (21)** in cover (17).



FOLLOW-ON MAINTENANCE:
None



END OF TASK

6-61 REMOVE AFT ROTOR SHAFT FROM STORAGE

INITIAL SETUP

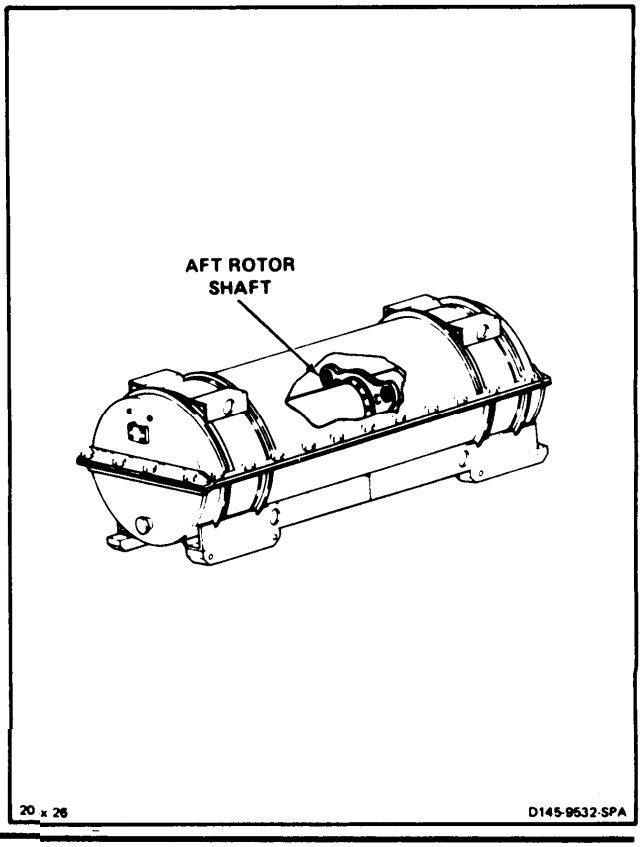
Applicable Configurations:
All

Tools:
Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Hoisting Eye (T32)
Work Hoist

Materials:
Dry Cleaning Solvent (E162)
Cloths (E120)
Gloves (E186)

Personnel Required:
Medium Helicopter Repairer (2)
Inspector

Equipment Condition:
Off Helicopter Task

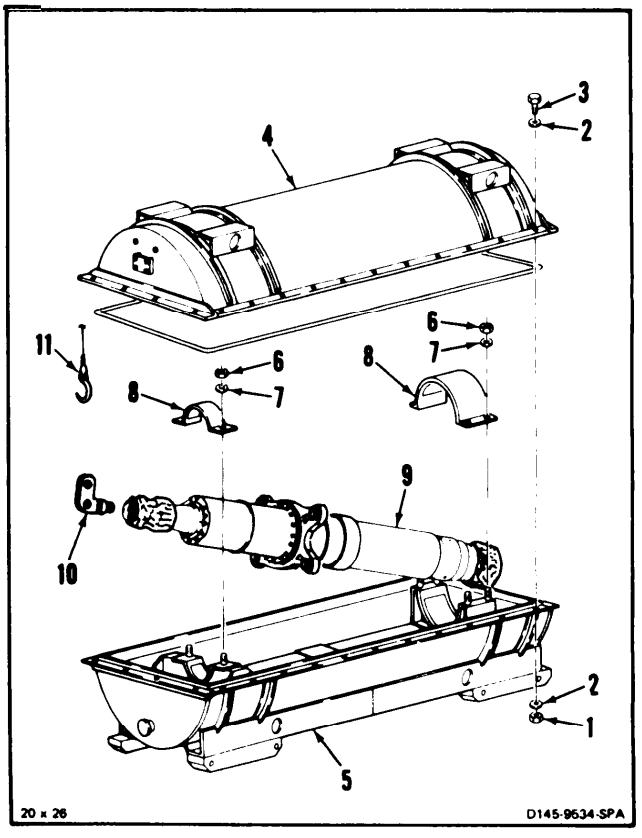


1. Remove nut (1), two washers (2), and bolt (3) from 30 places around cover (4).
2. Remove and discard desiccant bags from inside container (5).
3. Remove six nuts (6) and washers (7) from two clamps (8). **Remove clamps.**
4. With aid of helper, raise top end of shaft (9) from container (5). **Install hoisting eye (T32) (10)** in shaft.

CAUTION

If bottom of shaft hits container, covered splines can be damaged.

5. Connect work hoist hook (11) to eye of hoisting eye (10) marked AFT SHAFT. **Lift shaft** from container. Do not let bottom of shaft (9) hit container (5).
6. Set shaft (9) down on bench or workstand. Remove hoisting eye (T32) (3).
7. Install two clamps (8) in container (5). Install six washers (7) and nuts (6).
8. Install cover (4). Install bolt (3), two washers (2), and nut (1) at 30 places around cover.



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6-61 REMOVE AFT ROTOR SHAFT FROM STORAGE (Continued)

9. **Remove all tape and barrier material** from shaft (9).

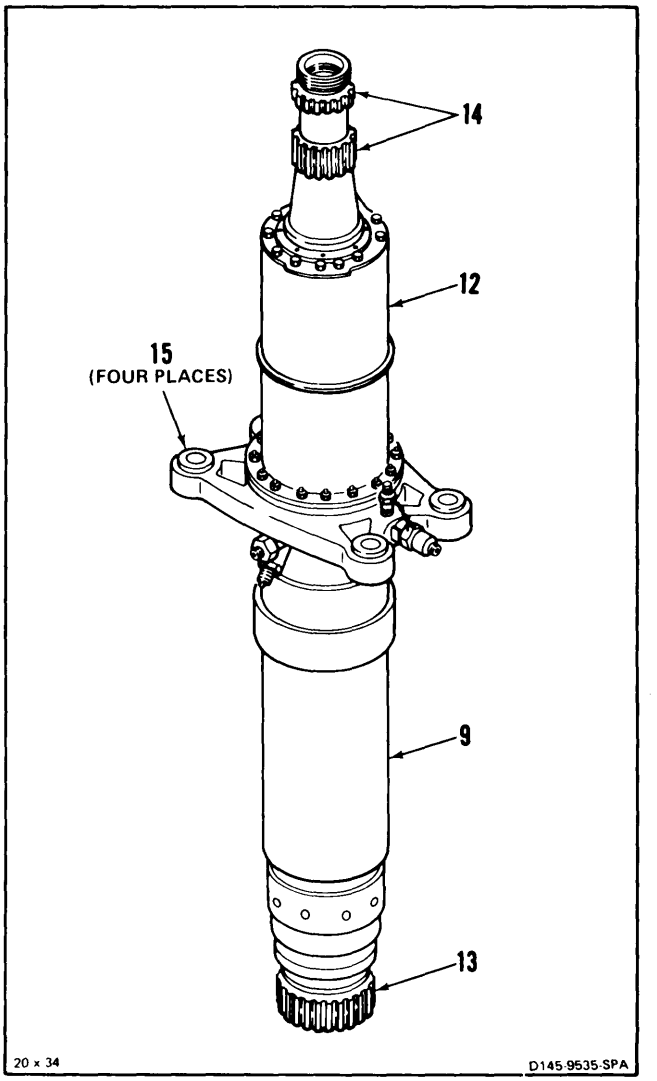
WARNING

Dry cleaning solvent (E162) is flammable and toxic. It can irritate skin and cause burns. Use only in well-ventilated area, away from heat and open flame. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.

CAUTION

Touching splines with bare fingers can cause corrosion.

10. **Remove corrosion-preventive compound from slider shaft (12),** transmission splines (13), rotor head **splines (14), and four bushings (15).** Use dry cleaning solvent (E162) and clean cloths (E120). Wear gloves (E186) and goggles.



INSPECT

FOLLOW-ON MAINTENANCE:
None

END OF TASK

6-62 INSTALL AFT ROTOR SHAFT THROUGH TOP OF PYLON

INITIAL SETUP

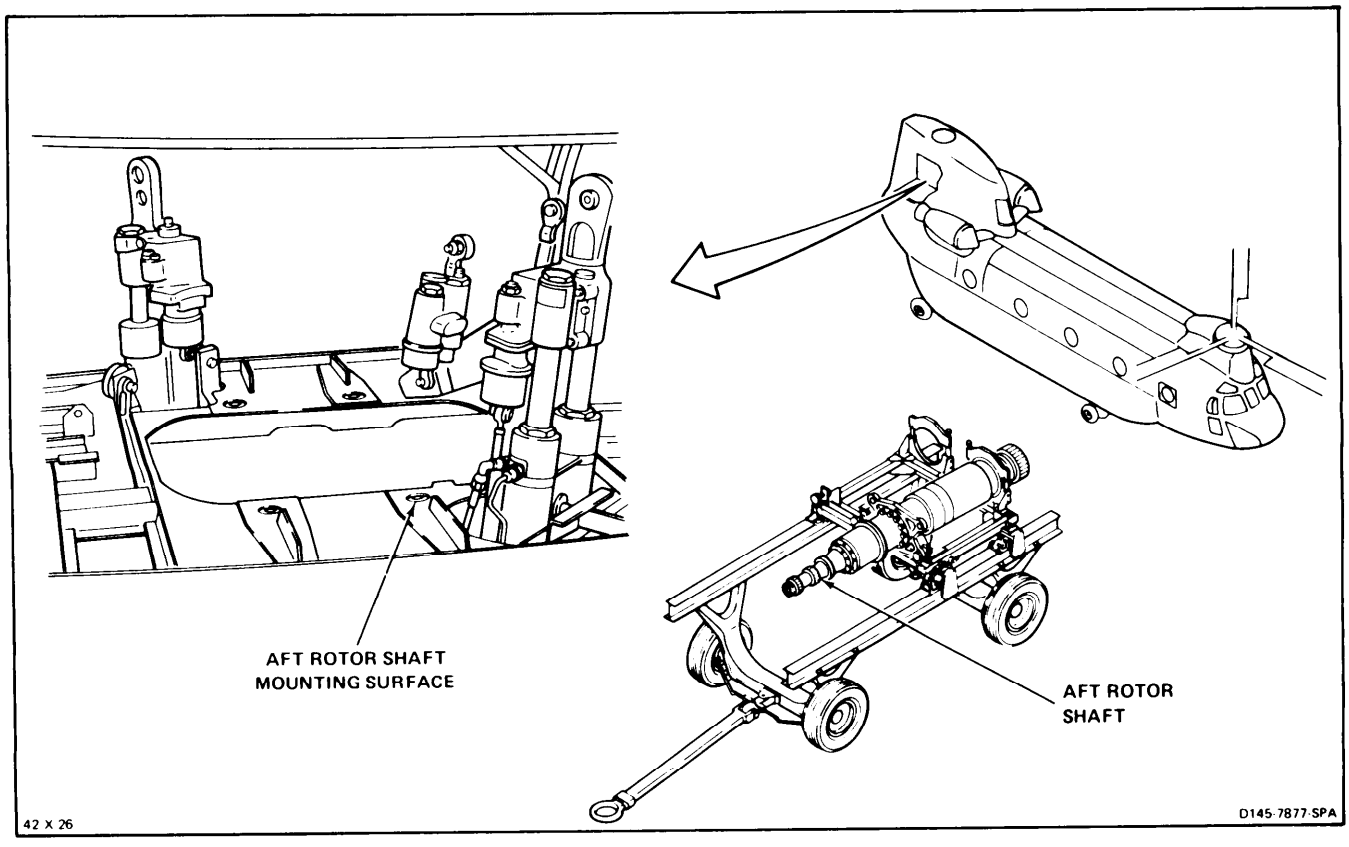
Applicable Configurations:
All

Tools:
Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692
Hoisting Eye (T32)
Hoist Capable of Lifting 500 Pounds
Socket, 1-Inch, 3/4-inch Drive
Torque Wrench, 100 to 750 Foot-Pounds
Torque Wrench, 30 to 150 Inch-Pounds

Materials:
Oil (E254)

Personnel Required:
67U10 Medium Helicopter Repairer (2)
67U20 Medium Helicopter Repairer
67U30 Inspector

References:
TM55-1520-240-23P



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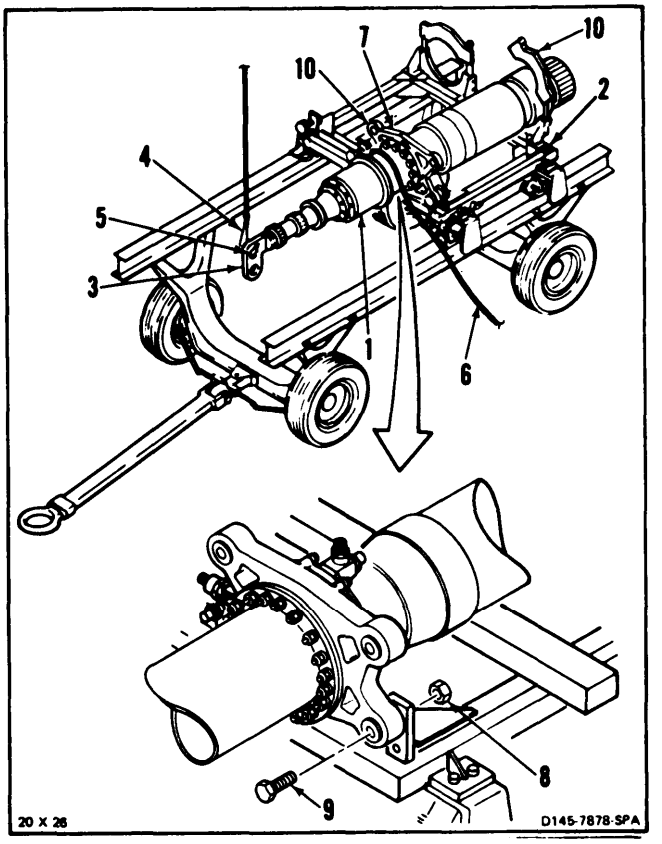
6-62 INSTALL AFT ROTOR SHAFT THROUGH TOP OF PYLON (Continued)

1. Remove rotor shaft (1) from adapter (2) as follows:
   a. **Install hoisting eye (T32) (3)** in top of shaft (1).

NOTE

AFT SHAFT hole must be used for proper shaft alignment during installation.

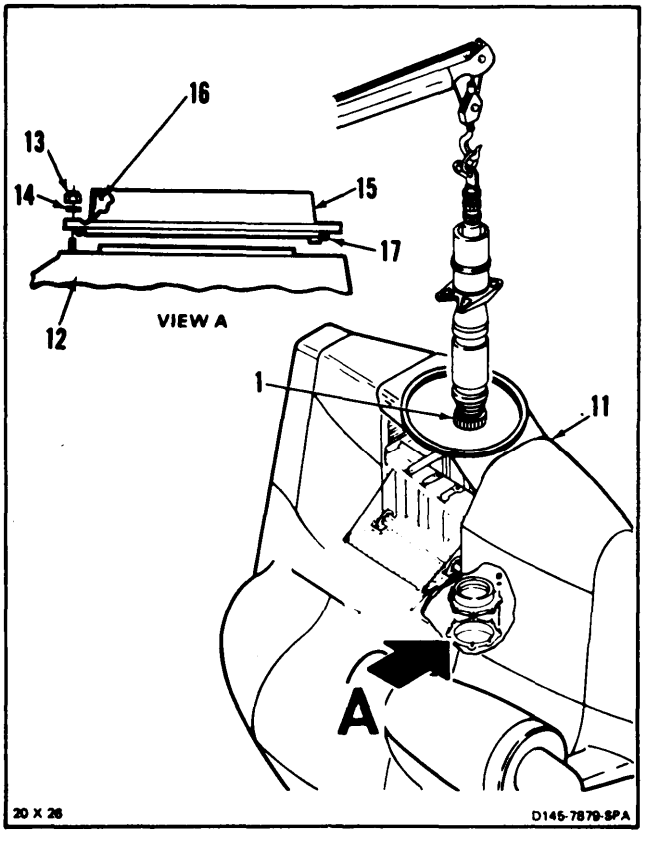
   b. **Connect hoist hook (4) to AFT SHAFT hole (5)** of hoisting eye (T32) (3). Raise hoist to **take up slack.** Do not apply tension.
   c. Attach rope guide line (6) to shaft (1), above bearing support (7).
   d. Remove two nuts (8) and bolts (9). Release clamp (10). Raise hoist to **lift shaft (1) out of adaptor (2).**



WARNING

Rotor shaft is heavy and can injure personnel if it drops. Shaft must be supported by hoist and moved carefully to prevent injury to personnel.

2. **Position shaft (1) above center of pylon (11).**
3. Remove tape and barrier material from top of aft transmission (12). Remove ten nuts (13) and washers (14) from seal retainer (15). **Remove seal retainer.**
4. Check seal retainer (15), seal (16), and packing (17) for damage. There shall be no damage.
5. If applied, remove tape and barrier material from bottom of shaft (1).
6. **Coat seal (16) and mating surface of shaft (1) with oil (E254).**



GO TO NEXT PAGE

6-62 INSTALL AFT ROTOR SHAFT THROUGH TOP OF PYLON (Continued)

CAUTION

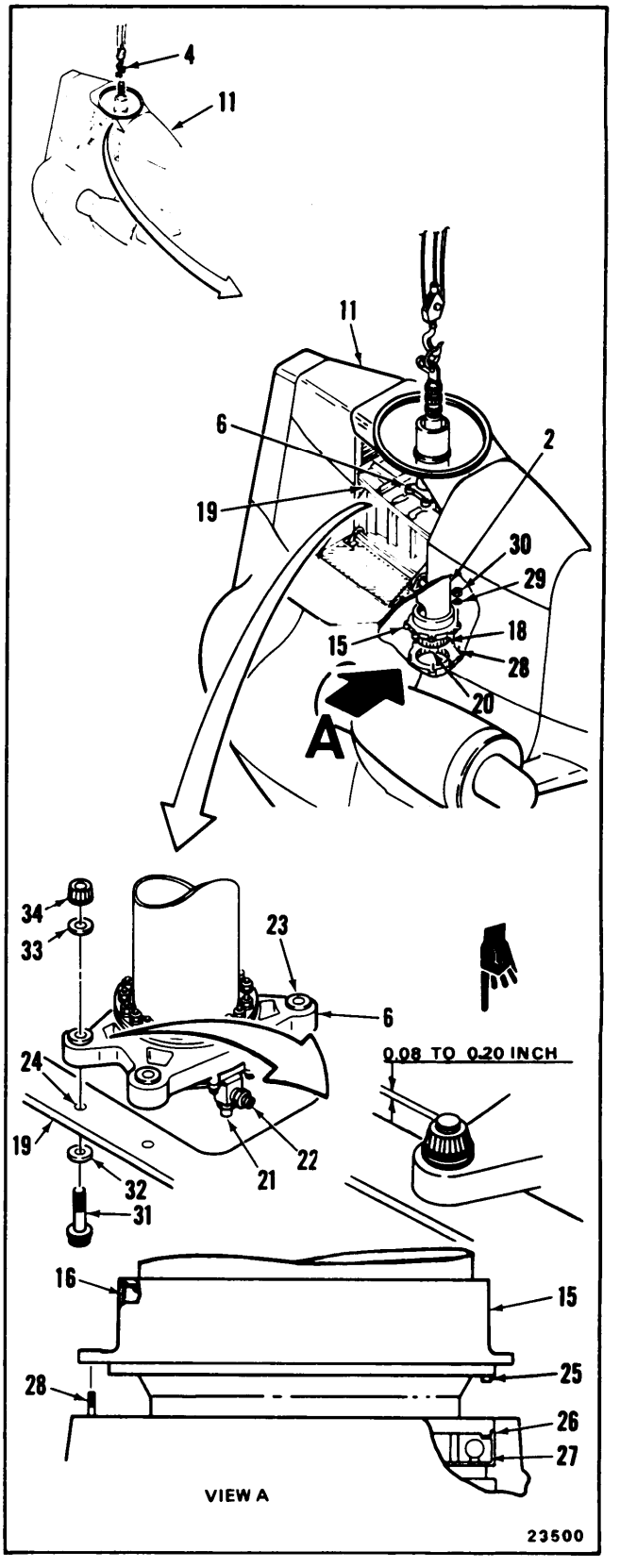
Be careful when handling seal. Seal is easy to damage.

7. **Install seal retainer (15)** on bottom of shaft (2).
8. **Coat splines (18) with oil (E254).**
9. **Lower shaft (2)** through pylon (11) and structure (19). **Align shaft splines (18)** with transmission splines (20).
10. Turn bearing support (6) so that chip detector (21) and union (22) point forward. **Align four mounting holes (23)** in support with holes (24) in structure (19).
11. **Align tab (25)** on retainer **(15) with slot (26)** on bearing outer race (27). Align retainer with ten studs (28) on transmission (12).
12. **Lower shaft (2) into transmission (12)** until retainer (15) is seated on top of transmission. Install ten washers (29) and nuts (30) on studs (28). **Torque nuts to 60 inch-pounds.**
13. Coat thread of four mounting bolts (31) with oil (E254). Install countersunk washer (32) on each bolt, with countersink against bolt head.

NOTE

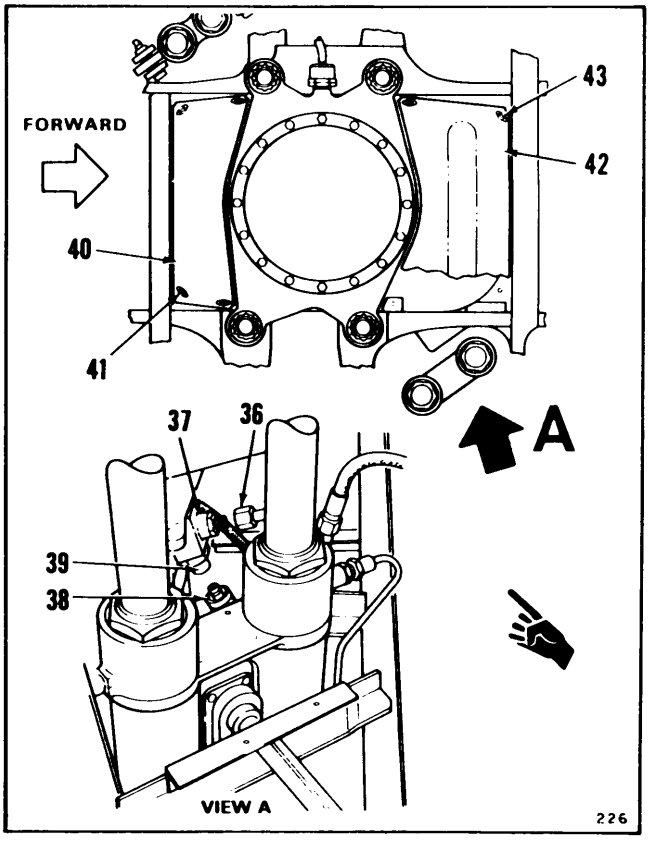
Refer to Task 1-13, para 8, for re-use of self-locking nuts.

14. **Install four bolts (31),** from bottom, through structure (19) and bearing support (6). **Install four washers (33) and nuts (34).** When nuts are installed at least three turns, release tension on hook (4).
15. **Torque four nuts (34) to 375 foot-pounds.** Check each bolt (31). **Bolts shall extend 0.08 to 0.20 inch** through nuts (34). Use washers (33) of different thicknesses, as needed.



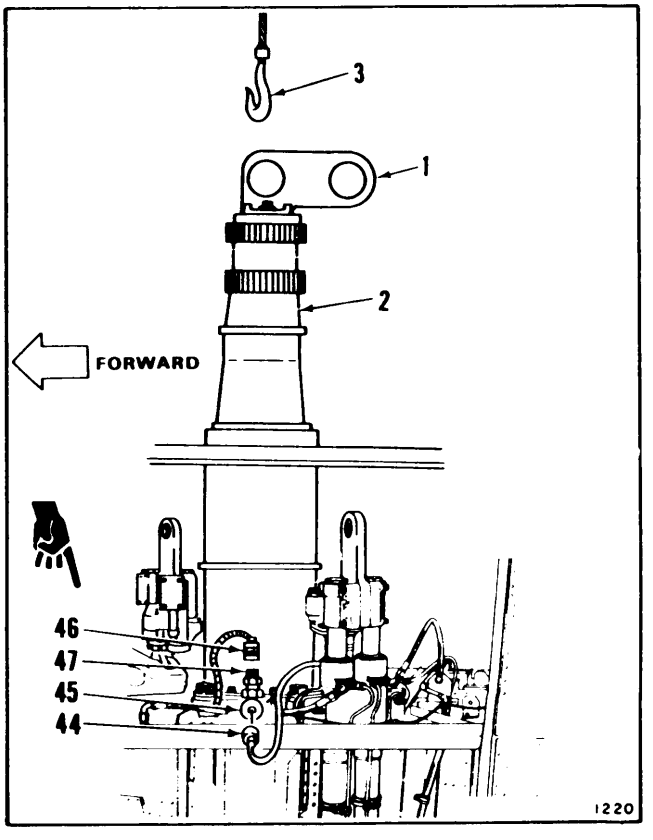
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16. **Connect drain hose (36)** to union (37). **Connect connector (38)** to chip detector (39).
17. **Install access panel (40).** Tighten four turn lock fasteners (41). Install access panel (42). Tighten four turnlock fasteners (43).



18. **Connect pressure hose (44)** to filter (45). **Connect connector (46)** to oil pressure switch (47).
19. Remove hook (3) and hoisting eye (1) from top of shaft (2).

INSPECT



GO TO NEXT PAGE

6-62 INSTALL AFT ROTOR SHAFT THROUGH TOP OF PYLON (Continued) 6-62

FOLLOW-ON MAINTENANCE:

Install swashplate (Task 5-133).

Install drive arms (Task 5-112).

Install drive collar (Task 5-111).

Install weather-protective cover (Task 5-138).

Install rotary-wing head (Task 5-9).

Check vertical pin angle (Task 11-58).

Install rotary-wing blades (Task 5-84).

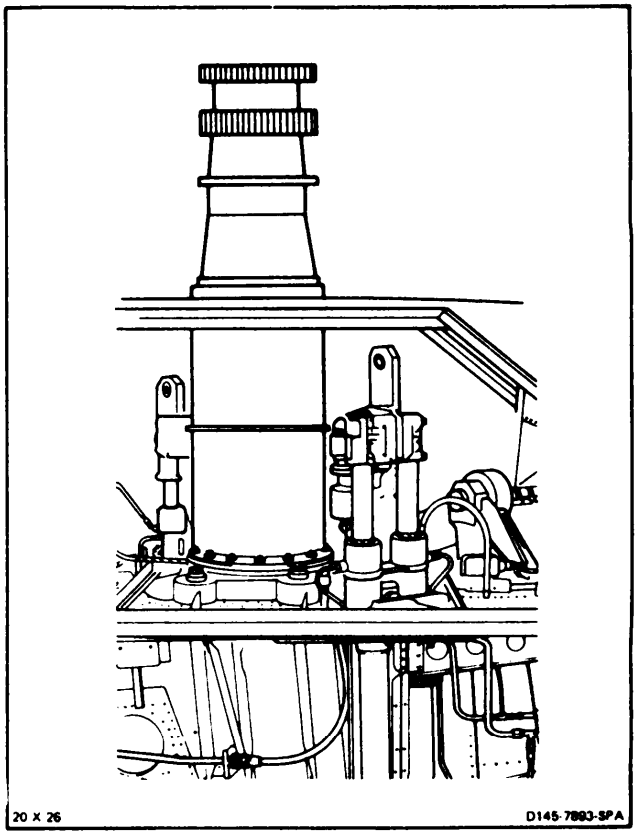
Phase rotary-wing system (Task 6-28).

Perform operational check of aft rotor shaft chip detector (TM 55-1520-240-T).

Close pylon work platforms (Task 2-2).

Service aft transmission with oil (Task 1-54).

Perform a ground run (TM 55-1520-240-10).



END OF TASK

6-63 INSTALL AFT ROTOR SHAFT THROUGH CABIN 6-63

INITIAL SETUP

Applicable Configurations:
All

Tools:
Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692
Hoisting Eye (T32)
Hoist Capable of Lifting 500 Pounds
Socket, 1-Inch, 3/4-inch Drive
Torque Wrench, 100 to 750 Foot-Pounds
Torque Wrench, 30 to 150 Inch-Pounds

Materials:
Oil (E254)

Personnel Required:
67U10 Medium Helicopter Repairer (2)
67U20 Medium Helicopter Repairer
67U30 Inspector

References:
TM 55-1520-240-23P
TM 55-1520-240-T

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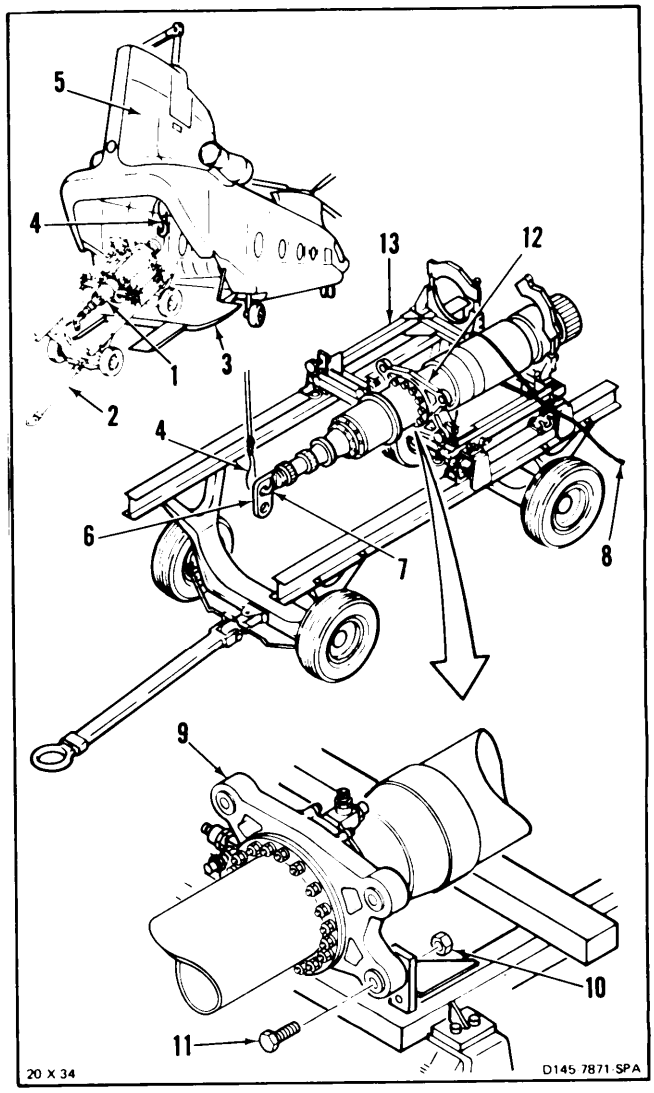
6-63 INSTALL AFT ROTOR SHAFT THROUGH CABIN (Continued)

1. Position rotor shaft (1), in transportation trailer 2000 (2), on cargo ramp (3). Raise cargo ramp to level (TM 55-1520-240-T).
2. Lower work hoist hook (4) through pylon (5) to rotor shaft (1).
3. Install hoisting eye (T32) (6) in top of shaft (1).

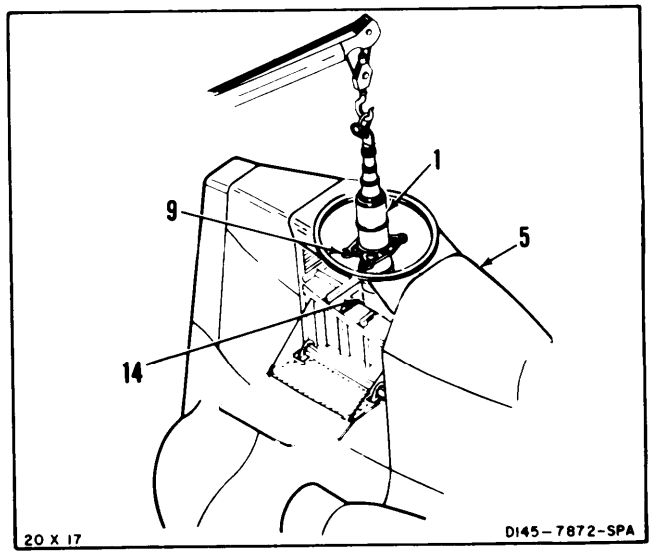
NOTE

AFT SHAFT hole must be used for proper shaft alignment during installation.

4. **Connect hoist hook (4) to AFT SHAFT hole (7)** of hoisting eye (T32) (6). Raise hoist to **take up slack.** Do not apply tension.
5. Attach rope guide line (8) to shaft (1) below bearing support (9).
6. Remove two nuts (10) and bolts (11). Release clamp (12). Raise hoist to **lift shaft (1)** out of adapter (13).

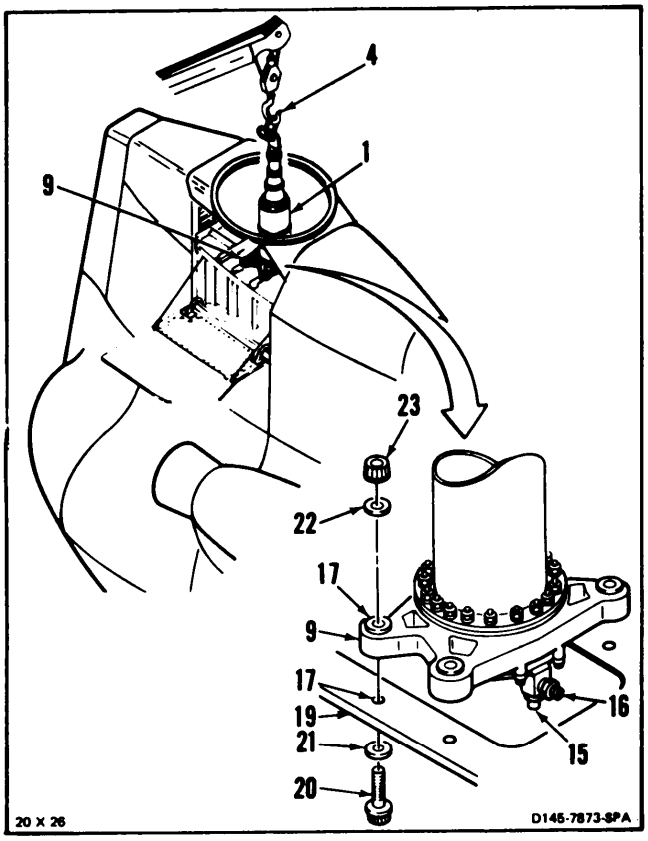


7. **Turn bearing support (9)** so that it fits through hole (14) in pylon (5).
8. **Raise shaft (1) so that bearing support (9) is above hole (14).**

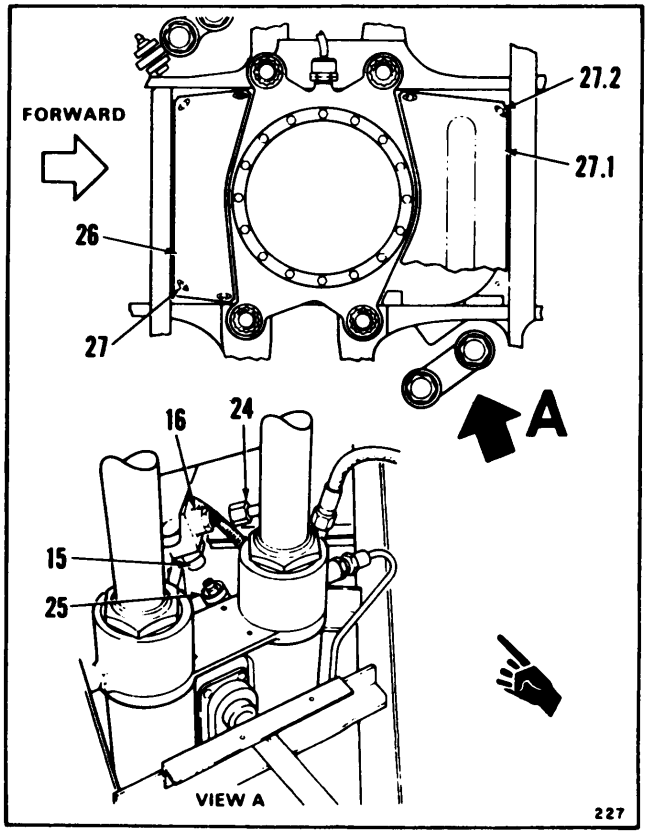


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9. **Turn bearing support (9)** so that chip detector (15) and union (16) point forward. **Align four mounting holes (17)** in support (9) with holes (18) in structure (19).
10. **Lower shaft (1)** until bearing support (9) rests on structure (19).
11. Coat thread of four mounting bolts (20) with oil (E254). Install countersunk washer (21) on each bolt, with countersink against bolt head.
12. **Install four bolts (20),** from bottom, through structure (19) and bearing support (9). **Install four washers (22) and nuts (23).** When nuts are installed at least three turns, release tension on hook (4).
13. **Torque four nuts (23) to 375 foot-pounds.** Check each bolt (20). **Bolts shall extend 0.08 to 0.20 inch** through nuts (23). Use washers (22) of different thickness as needed.

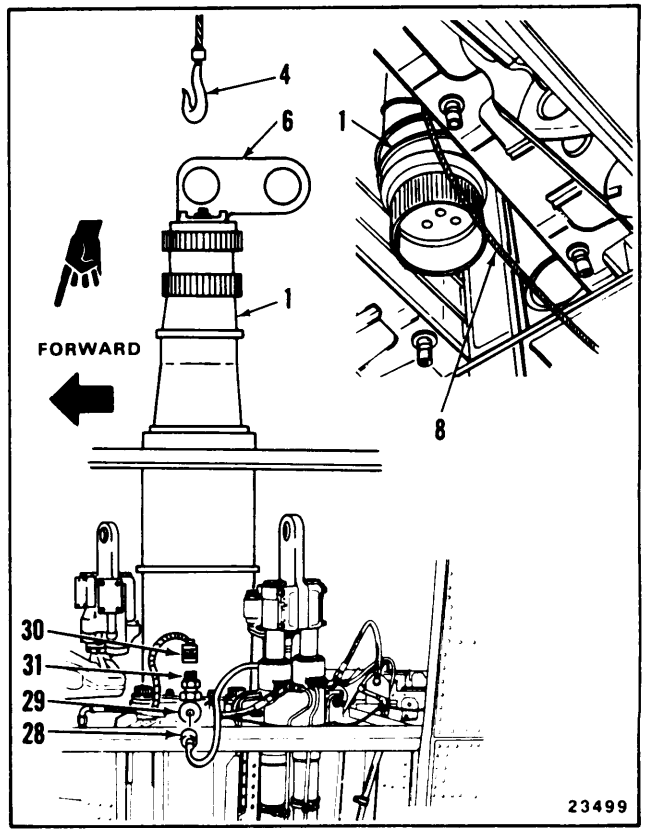


14. **Connect drain hose (24)** to union (16). **Connect connector (25)** to chip detector (15).
15. **Install access panel (26).** Tighten four turnlock fasteners (27). Install access panel (27. 1). Tighten four turnlock fasteners (27.2).



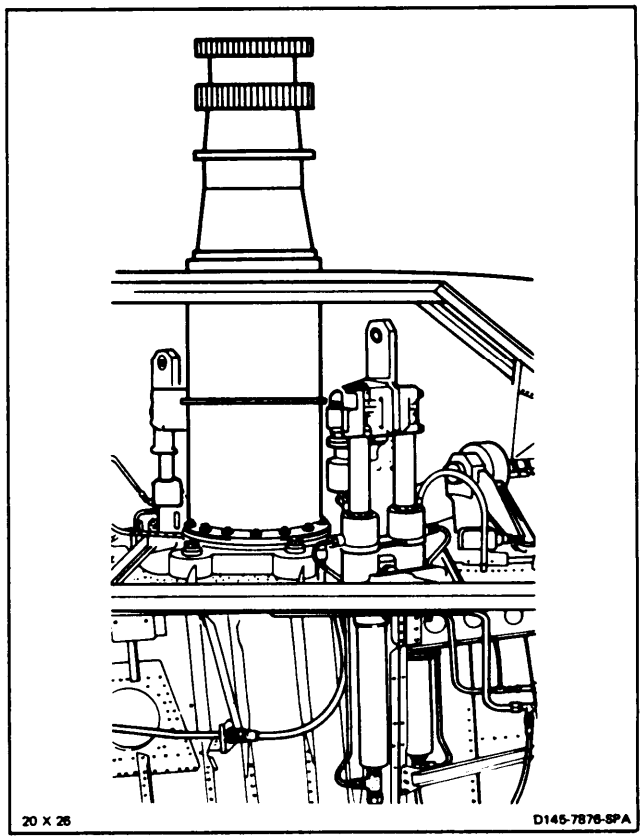
GO TO NEXT PAGE

16. **Connect pressure hose (28)** to filter (29). **Connect connector (30)** to oil pressure switch (31).
17. Remove hook (4) and hoisting eye (6) from top of shaft (l).
18. Remove rope guide line (8) from around bottom of rotor shaft (1).



INSPECT

FOLLOW-ON MAINTENANCE:
Install aft transmission (Task 6-97).
Service aft transmission with oil (Task 1-54).
Install swashplate (Task 5-133).
Install drive arms (Task 5-112).
Install drive collar (Task 5-111).
Install weather-protective cover (Task 5-138).
Install rotary-wing head (Task 5-9).
Check vertical pin angle (Task 11-58).
Install rotary-wing blades (Task 5-84).
Phase rotary-wing system (Task 6-28).
Perform operational check of aft rotor shaft chip detector (TM 55-1520-240-T).
Close pylon work platforms (Task 2-2).
Perform a ground run (TM 55-1520-240-10).



END OF TASK

SECTION V
ENGINE COMBINING TRANSMISSION

6-64 REMOVE COMBINING TRANSMISSION INPUT SHAFT OIL SEAL 6-64

INITIAL SETUP

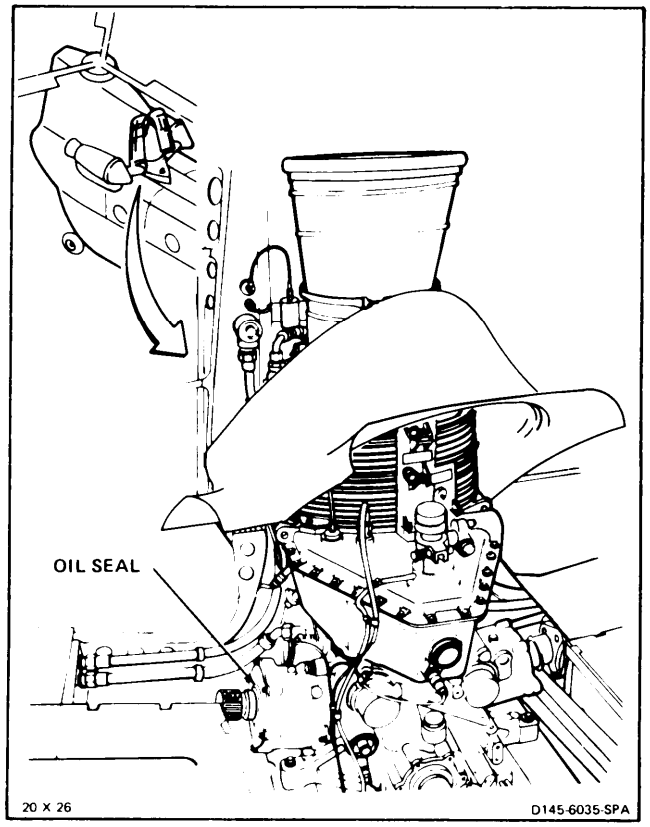
Applicable Configurations:
All

Tools:
Powertrain Repairer's Tool Kit,
NSN 5180-00-003-5267
1/4-28 Bolt, At Least One-inch Long (3)

Materials:
None

Personnel Required:
68020 Aircraft Powertrain Repairer

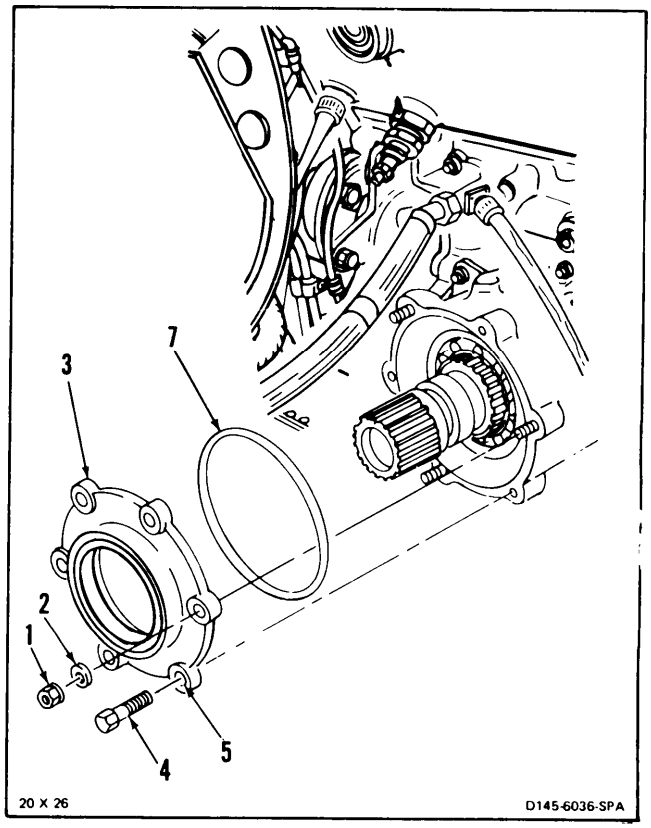
Equipment Condition:
Battery Disconnected (Task 1-39)
Electrical Power Off
Pylon Hinged Fairing Open (Task 2-2)
Pylon Lower Fairing Open (Task 2-2)
Engine Drive Shaft and Combining Transmission Adapter Assembly Removed (Task 6-30)



NOTE

Procedure is same to remove seal from left or right input shaft. Removal of left shaft seal is shown here.

1. Remove three nuts (1) and washers (2) from retainer (3).
2. Install three 1/4-28 bolts (4) in holes (5). Turn bolts to jack retainer (3) off transmission (6).
3. Remove packing (7) from retainer (3).



GO TO NEXT PAGE

6-64 REMOVE COMBINING TRANSMISSION INPUT SHAFT OIL SEAL (Continued)

4. Remove retaining ring (8) from retainer (3). **Remove seal (9)** and packing (10).

FOLLOW-ON MAINTENANCE:

None

END OF TASK

INITIAL SETUP

Applicable Configurations:
All

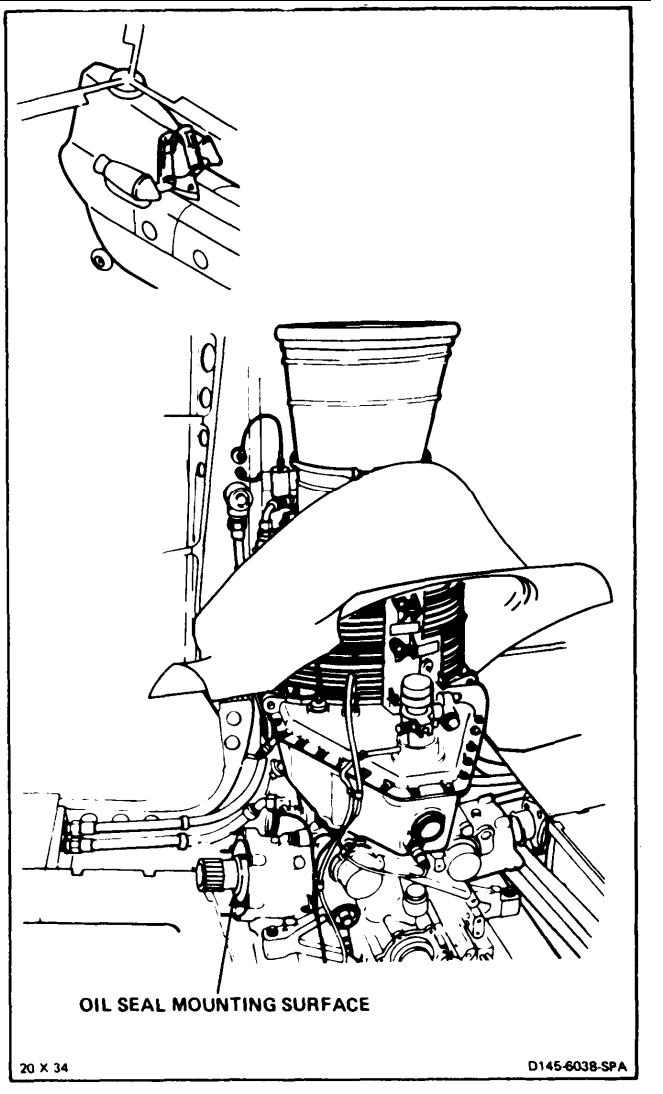
Tools:
Powertrain Repairer's Tool Kit, NSN 5180-00-003-5267
Gun Heater
Pyrometer
Aluminum Tube, 3-inch OD, 1/8-Inch-Thick Wall, 1 to 6-inches Long
Torque Wrench, 30 to 150 Inch-Pounds
Kevlar Gloves (E187)

Materials:
Gloves (E186)
Dry Cleaning Solvent (E162)
Cloths (E 120)
Oil (E254)

Parts:
Packings

Personnel Required:
Aircraft Powertrain Repairer
Inspector

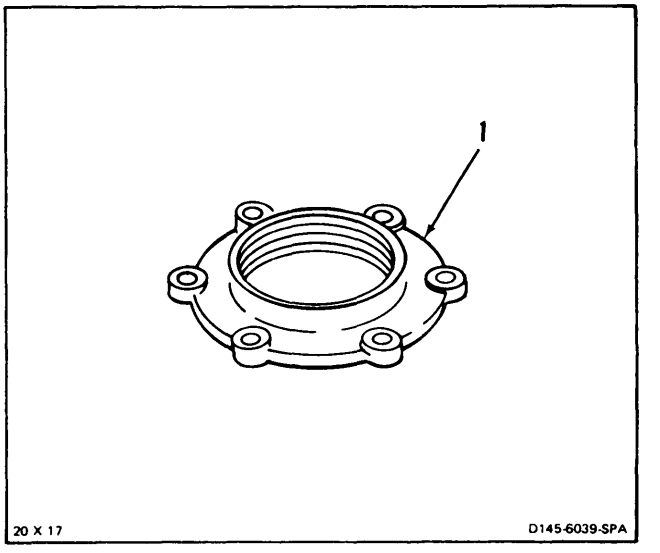
References:
TM 55-1520-240-23P



WARNING

Dry cleaning solvent (E162) is flammable and toxic. It can irritate skin and cause burns. Use only in well-ventilated area, away from heat and open flame. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.

1. Clean seal retainer (1). Use dry cleaning solvent (E 162) and cloths (E120). Wear gloves (E186).



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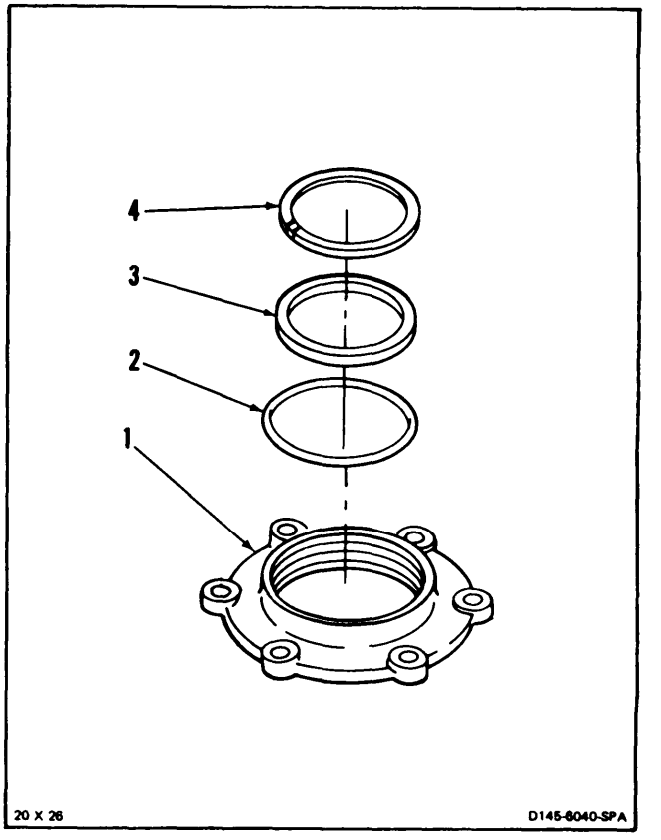
WARNING

Wear Kevlar gloves when handling hot retainer. Hot retainer can cause burns.

CAUTION

Do not heat retainer over 250°F (120°C). Metal can be damaged.

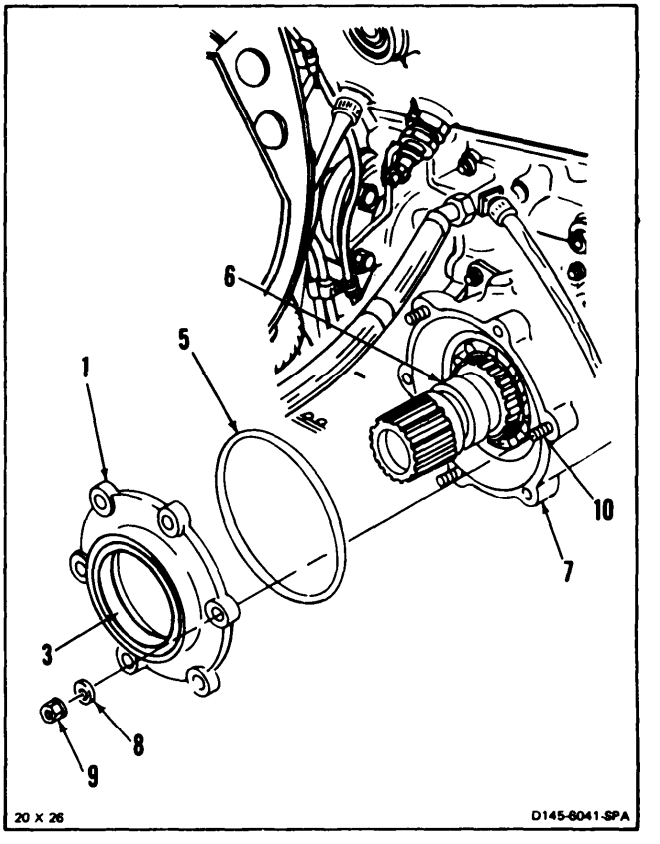
2. **Heat retainer (1)** to 230° to 250°F (110° to 120°C). Use gun-type heater. Check temperature with pyrometer.
3. Install packing (2) in retainer (1).
4. **Install seal (3)** in retainer (1), flat side up. Use aluminum tube.
5. Install retaining ring (4).



NOTE

Procedure is same to install retainer on left or right input shaft. Installation on left shaft is shown here.

6. Coat packing (5) with oil (E254). Install packing on retainer (1).
7. Apply light coat of grease (E190) to lip of seal (3). Apply light coat of oil (E254) to surface of shaft (6). **Install retainer (1)** on transmission (7).
8. **Install** six washers (8) and **nuts (9)** on studs (10). **Torque nuts to 60 inch-pounds.**



INSPECT

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6-65 INSTALL COMBINING TRANSMISSION INPUT SHAFT OIL SEAL (Continued) 6-65

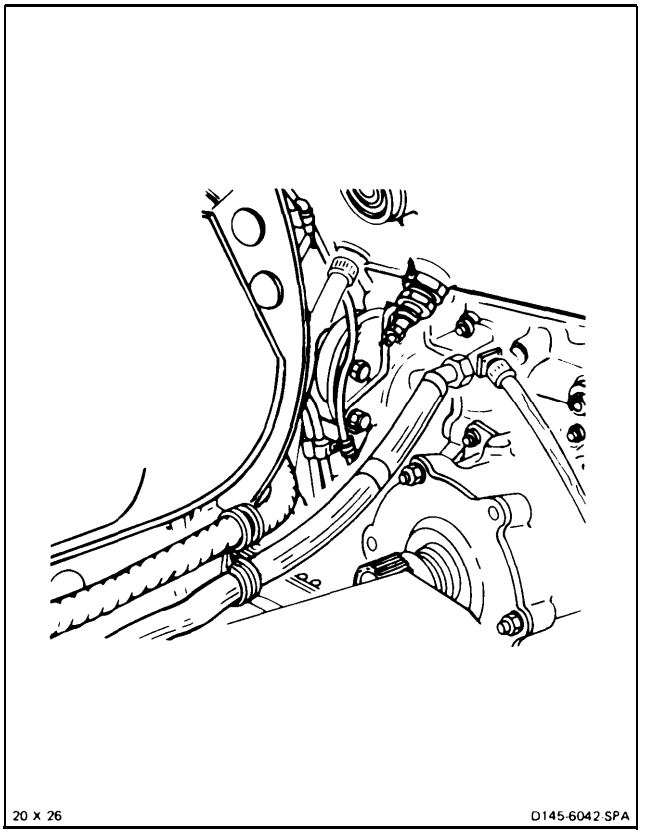
FOLLOW-ON MAINTENANCE:

Install combining transmission adapter assembly and engine drive shaft (Task 6-32).

Close pylon lower fairing (Task 2-2).

Close pylon hinged fairing (Task 2-2).

Perform ground run (TM 55-1520-240-10).



END OF TASK

6-66 REMOVE COMBINING TRANSMISSION FORWARD OUTPUT SHAFT OIL SEAL

INITIAL SETUP

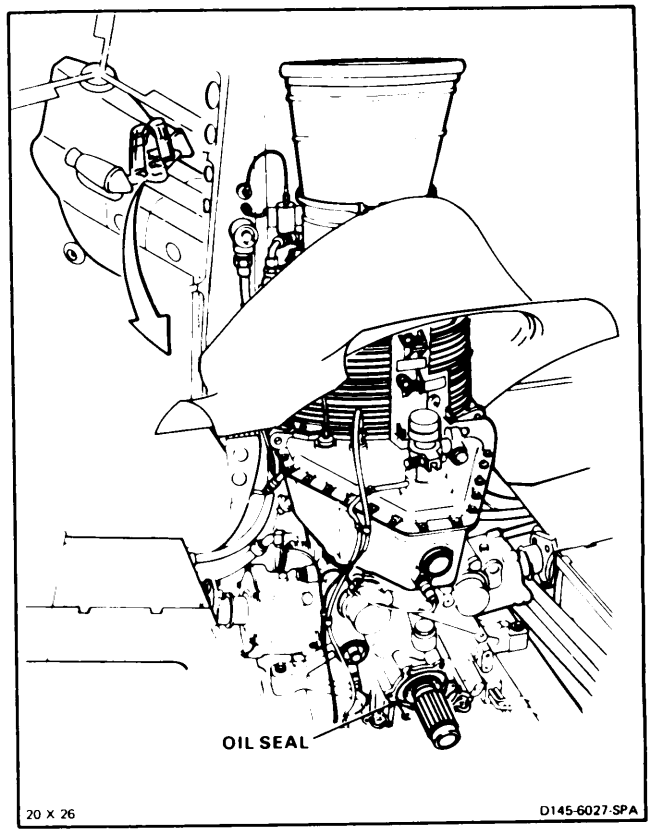
Applicable Configurations:
All

Tools:
Powertrain Repairer's Tool Kit,
NSN 5180-00-003-5267
1/4-28 Bolt, At Least One-Inch Long (2)

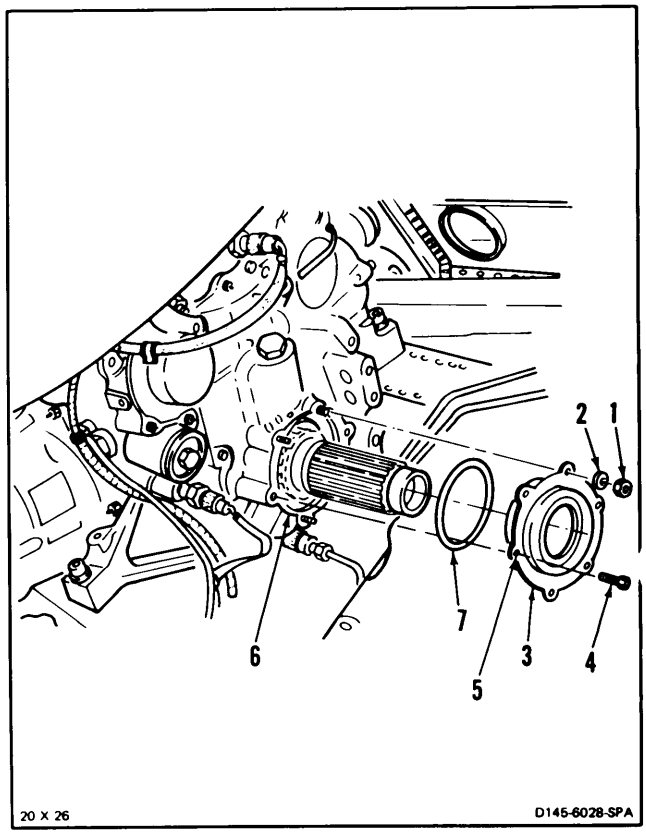
Materials:
None

Personnel Required:
68D20 Aircraft Powertrain Repairer

Equipment Condition:
Battery Disconnected (Task 1-39)
Electrical Power Off
Aft Pylon Doors Open (Task 2-2)
Aft Pylon Lower Fairing Open (Task 2-2)
No. 7 Drive Shaft Removed (Task 6-4)
Combining Transmission Forward Adapter Assembly Removed (Task 6-5)



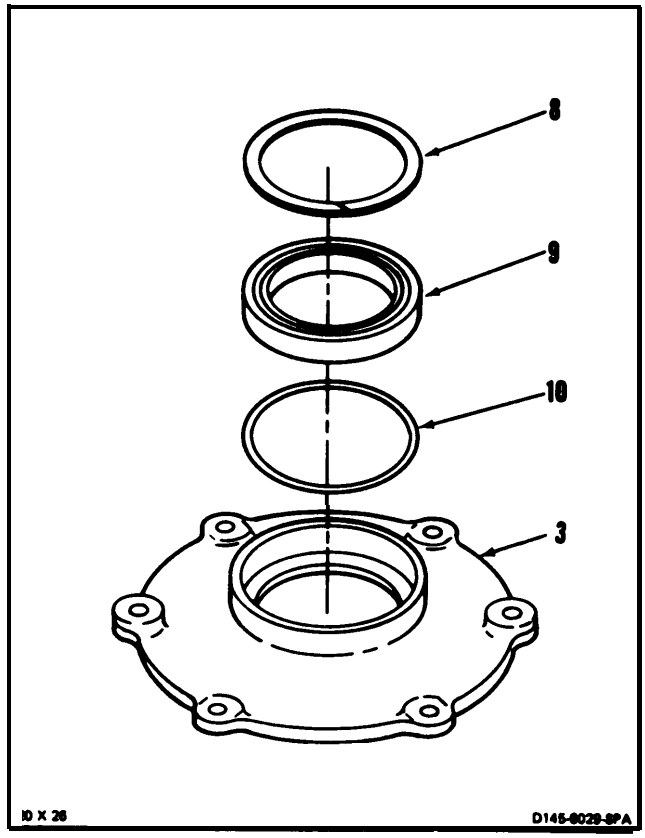
1. Remove four nuts (1) and washers (2) from retainer (3).
2. Install two 1/4-28 bolts (4) in holes (5). Turn bolts to jack retainer (3) off transmission (6).
3. Remove packing (7) from retainer (3).



GO TO NEXT PAGE

6-66 REMOVE COMBINING TRANSMISSION FORWARD OUTPUT SHAFT OIL SEAL (Continued) 6-66

4. Remove retaining ring (8) from retainer (3). **Remove seal (9)** and packing (10).



FOLLOW-ON MAINTENANCE:

None

END OF TASK

6-67 INSTALL COMBINING TRANSMISSION FORWARD OUTPUT SHAFT OIL SEAL

INITIAL SETUP

Applicable Configurations:
All

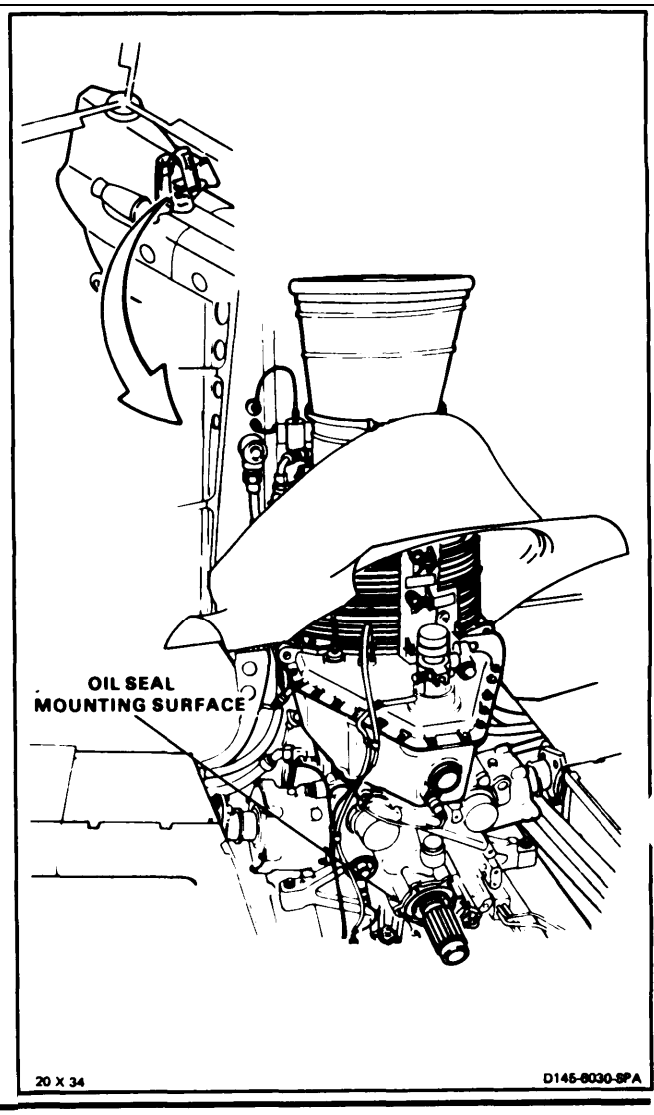
Tools:
Powertrain Repairer's Tool Kit, NSN 5180-00-003-5267
Gun Heater
Pyrometer
Aluminum Tube, 3 1/2-inch OD, 1/8-Inch-Thick Wall, 1 to 6 Inches Long
Torque Wrench, 30 to 150 Inch-Pounds
Kevlar Gloves (E187)

Materials:
Gloves (E186)
Dry Cleaning Solvent (E162)
Cloths (E120)
Oil (E254)

Parts:
Packings

Personnel Required:
Aircraft Powertrain Repairer
Inspector

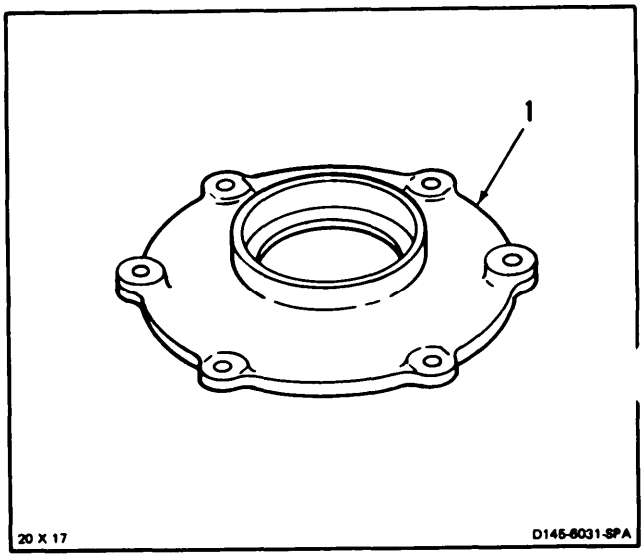
References:
TM 55-1520-240-23P



WARNING

Dry cleaning solvent (E162) is flammable and toxic. It can irritate skin and cause bums. Use only in well-ventilated area, away from heat and open flame. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.

1. Clean seal retainer (1). Use dry cleaning solvent (E162) and cloths (E120). Wear gloves (E186).



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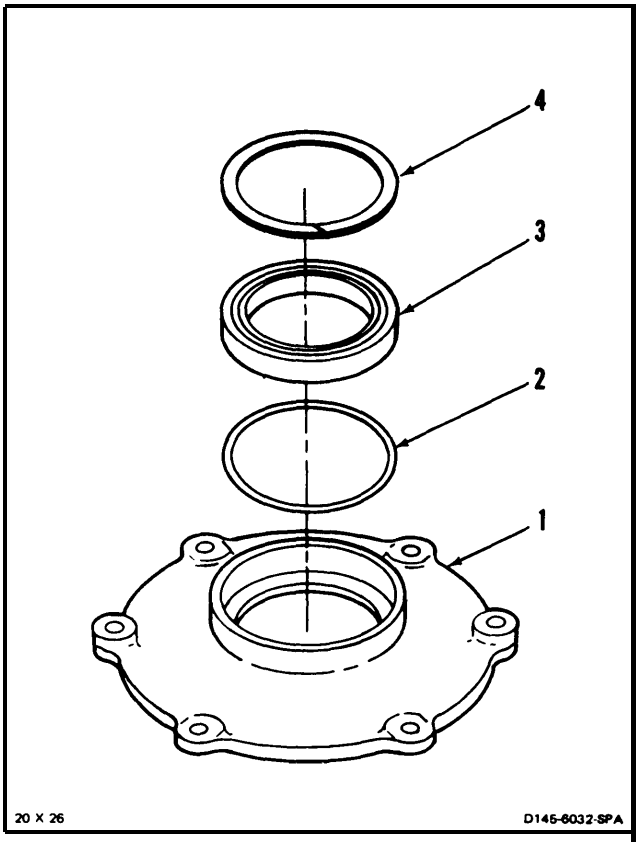
WARNING

Wear Kevlar gloves when handling hot retainer. Hot retainer can cause burns.

CAUTION

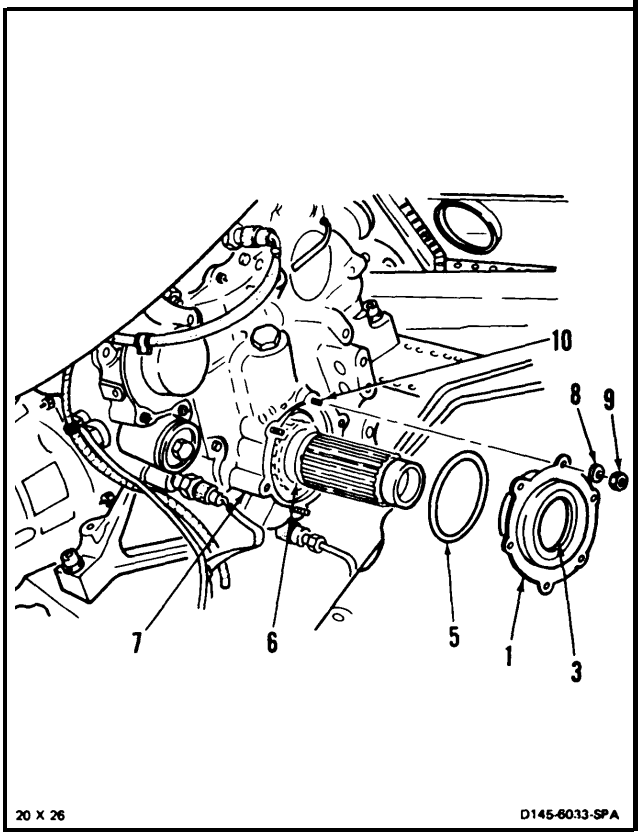
Do not heat retainer over 250ºF (120ºC). Metal can be damaged.

2. **Heat retainer (1)** to 230º to 250ºF (110º to 120ºC). Use gun-type heater. Check temperature with pyrometer.
3. Install packing (2) in retainer (1).
4. **Install seal (3)** in retainer (1), flat side up. Use aluminum tube.
5. Install retaining ring (4).



6. Coat packing (5) with oil (E254). Install packing on retainer (1).
7. Apply light coat of grease (E190) to lip of seal (3). Apply light coat of oil (E254) to surface of shaft (6). **Install retainer (1)** on transmission (7).
8. **Install** four washers (8) and **nuts (9)** on studs (10). **Torque nuts to 60 inch-pounds.**

INSPECT



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6-67 INSTALL COMBINING TRANSMISSION FORWARD OUTPUT SHAFT OIL SEAL (Continued)

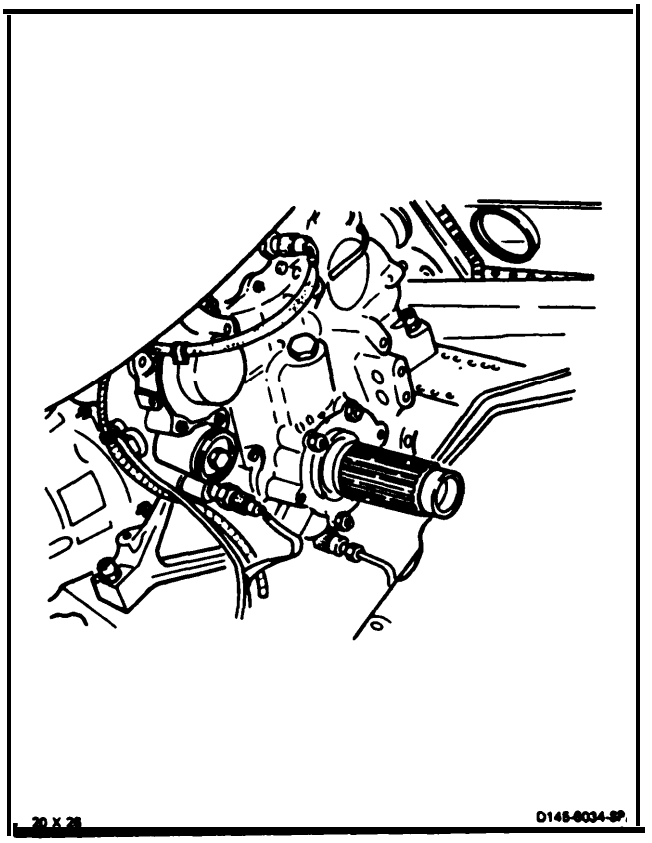
FOLLOW-ON MAINTENANCE:

Install combining transmission forward adapter assembly (Task 6-8).

Install No. 7 drive shaft (Task 6-19).

Close aft pylon lower fairing (Task 2-2).

Perform ground run (TM 55-1520-240-10).



END OF TASK

6-68 REMOVE COMBINING TRANSMISSION AFT OUTPUT SHAFT OIL SEAL

INITIAL SETUP

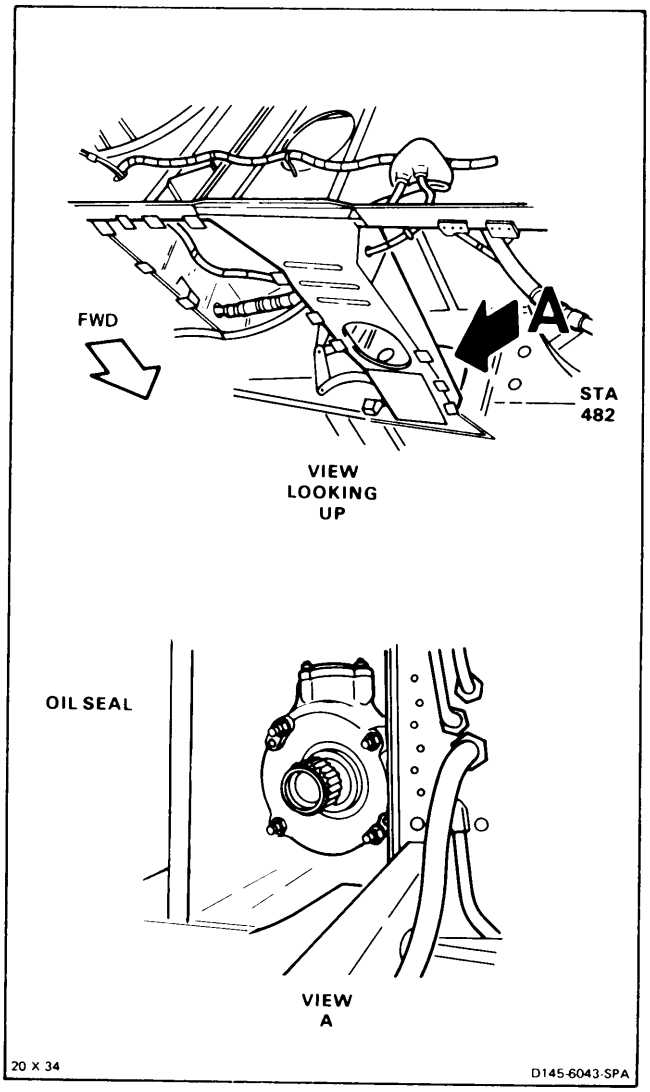
Applicable Configurations:
All

Tools:
Powertrain Repairer's Tool Kit,
NSN 5180-00-003-5267
1/4-28 Bolt, At Least One-Inch Long (2)

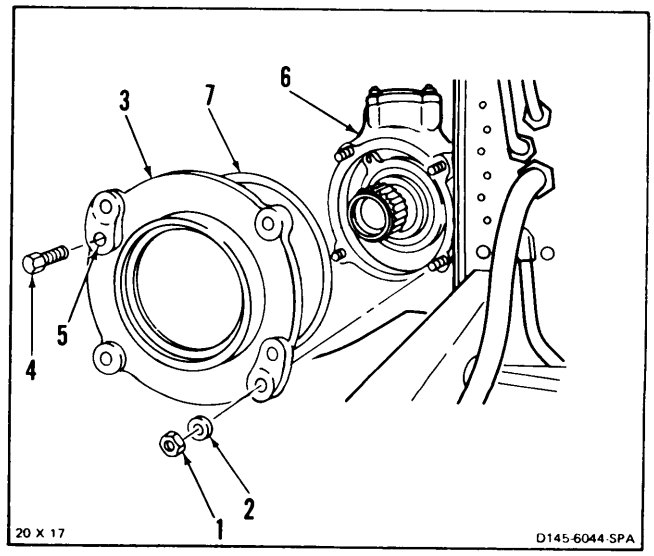
Materials:
None

Personnel Required:
68D20 Aircraft Powertrain Repairer

Equipment Condition:
Battery Disconnected (Task 1-39)
Electrical Power Off
Aft Drive Shafting Removed (Task 6-21)
Combining Transmission Aft Adapter Assembly Removed (Task 6-22)



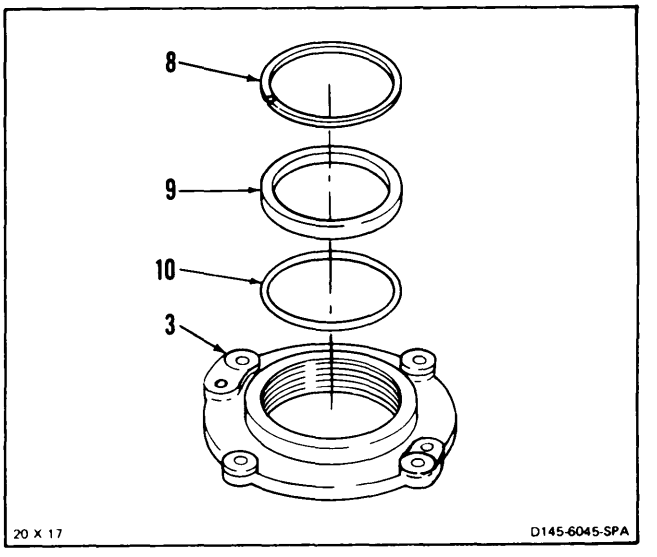
1. Remove four nuts (1) and washers (2) from retainer (3).
2. Install two 1/4-28 bolts (4) in holes (5). Turn bolts to jack retainer (3) off transmission (6).
3. Remove packing (7) from retainer (3).



GO TO NEXT PAGE

6-68 REMOVE COMBINING TRANSMISSION AFT OUTPUT SHAFT OIL SEAL (Continued)

4 Remove retaining ring (8) from retainer (3). **Remove seal (9) and packing (10).**



FOLLOW-ON MAINTENANCE:

None

END OF TASK

6-69 INSTALL COMBINING TRANSMISSION AFT OUTPUT SHAFT OIL SEAL 6-69

INITIAL SETUP

Applicable Configurations:
All

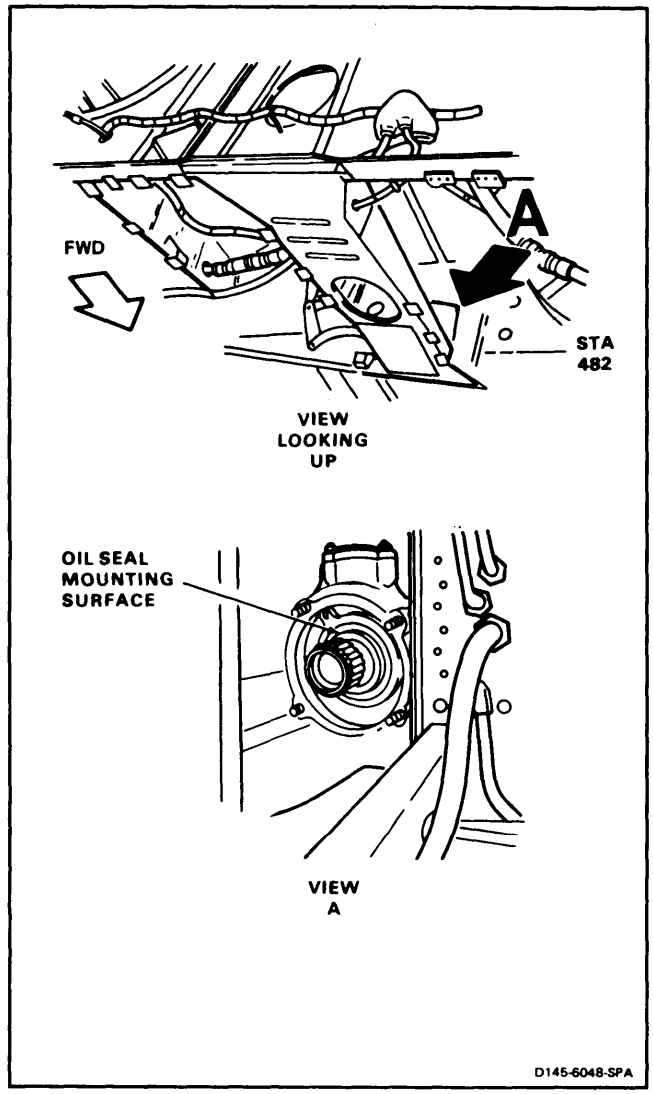
Tools:
Powertrain Repairer's Tool Kit, NSN 5180-00-003-5267
Gun Heater
Pyrometer
Aluminum Tube, 3 1/2-Inch OD, 1/8-Inch-Thick Wall, 1 to 6 Inches Long
Torque Wrench, 30 to 150 Inch-Pounds
Kevlar Gloves (E187)

Materials:
Gloves (E186)
Dry Cleaning Solvent (E162)
Cloths (E120)
Oil (E254)

Parts:
Packings

Personnel Required:
Aircraft Powertrain Repairer
Inspector

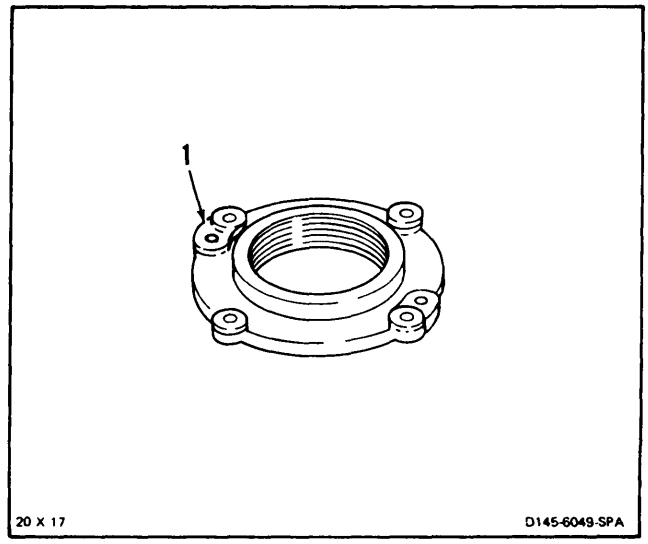
References:
TM 55-1520-240-23P



WARNING

Dry cleaning solvent (E162) is flammable and toxic. It can irritate skin and cause bums. Use only in well-ventilated area, away from heat and open flame. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.

1. Clean seal retainer (1). Use dry cleaning solvent (E162) and cloths (E120). Wear gloves (E186) and goggles.



GO TO NEXT PAGE

6-69 INSTALL COMBINING TRANSMISSION AFT OUTPUT SHAFT Ohm 6-69 SEAL (Continued)

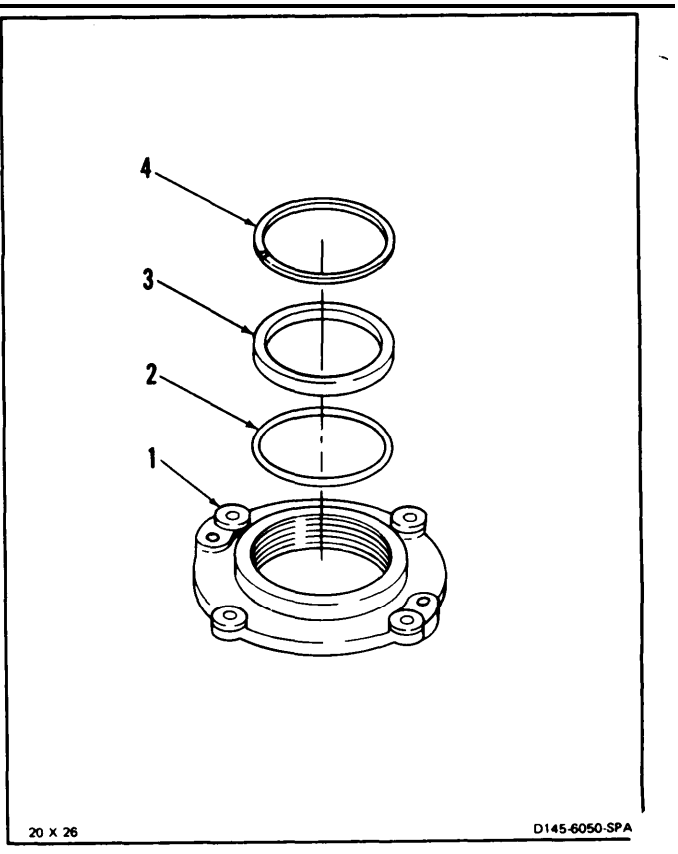
WARNING

Wear Kevlar gloves when handling hot retainer. Injury to hands can occur.

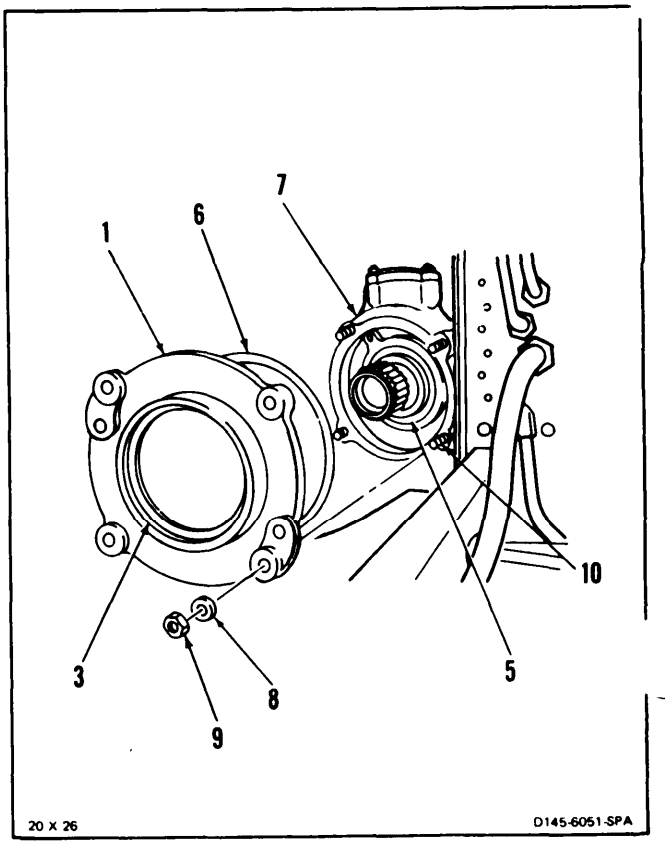
CAUTION

Do not heat retainer over 250°F (120°C). Metal can be damaged.

2. Heat retainer (1) to 230 to 250ºF (110 to 120ºC). Use gun-type heater. Check temperature with pyrometer.
3. Install packing (2) in retainer (1).
4. **Install seal (3)** in retainer (1), flat side up. Use aluminum tube.
5. Install retaining ring (4).



6. Coat packing (5) with oil (E254). Install packing on retainer (1).
7. Apply light coat of grease (E190) to lip of seal (3). Apply light coat of oil (E254) to surface of shaft (6). **Install retainer (1)** on transmission (7).
8. Install four washers (8) and nuts (9) on studs (10). **Torque nuts to 60-inch-pounds.**



INSPECT

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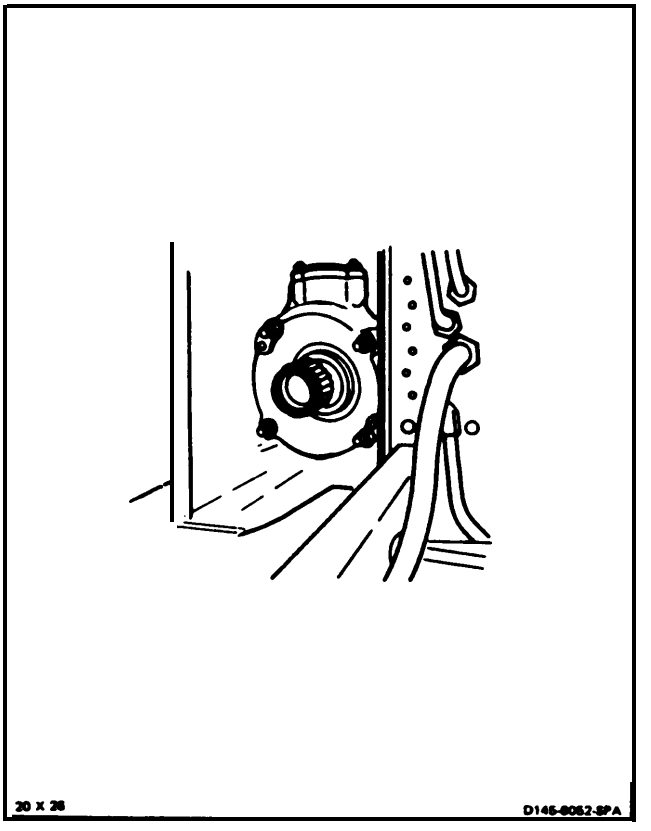
6-69 INSTALL COMBINING TRANSMISSION AFT OUTPUT SHAFT OIL SEAL (Continued) 6-69

FOLLOW-ON MAINTENANCE:

Install combining transmission aft adapter assembly (Task 6-24).

Install aft drive shafting (Task 6-29).

Perform ground run (TM 55-1520-240-10).



END OF TASK

6-70 REMOVE COMBINING TRANSMISSION OIL COOLER FAN DRIVE SHAFT SEAL 6-70

INITIAL SETUP

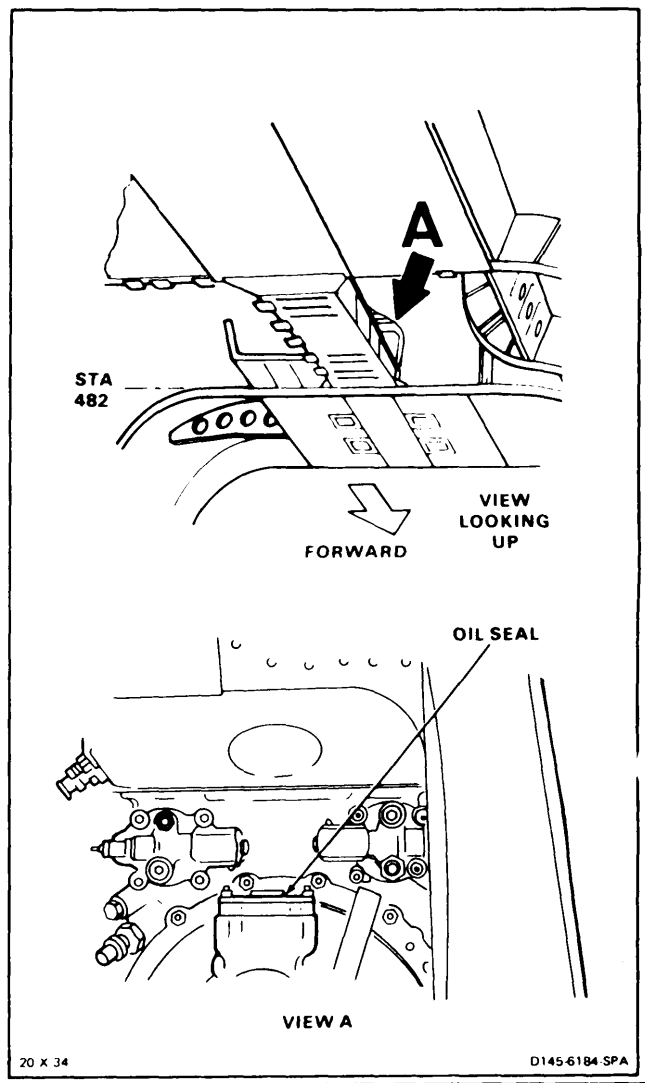
Applicable Configurations:
All

Tools:
Powertrain Repairer's Tool Kit, NSN 5180-00-003-5267
Workstand

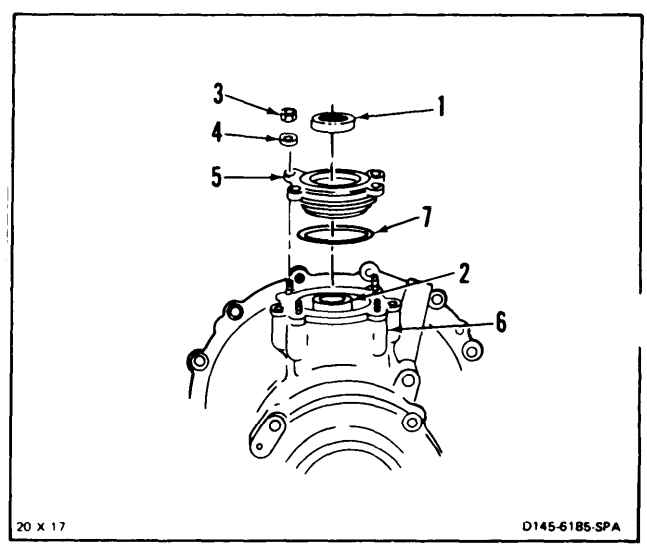
Materials:
None

Personnel Required:
Aircraft Powertrain Repairer

Equipment Condition:
Battery Disconnected (Task 1 -39)
Electrical Power Off
Oil Cooler, Fan and Drive Shaft Removed (Task 6-182)
Cargo Ramp Open and Level (TM 55-1520-240-T)



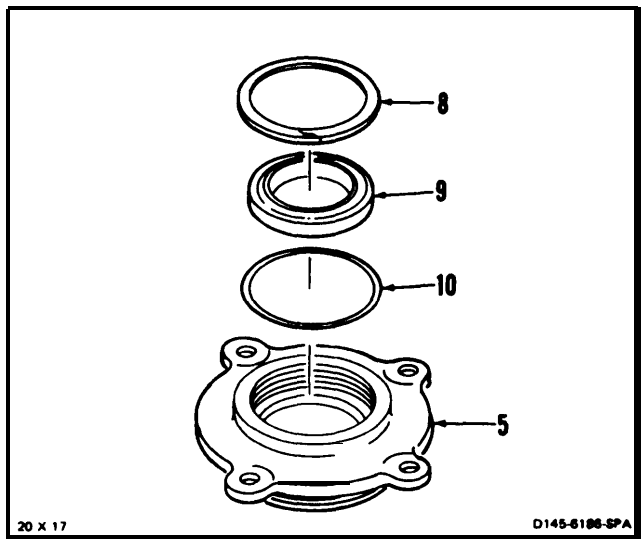
1. Remove snubber (1) from end of shaft (2).
2. Remove four nuts (3) and washers (4) from seal retainer (5). **Pry retainer** off transmission (6).
3. Remove packing (7 from retainer (5).



GO TO NEXT PAGE

6-70 REMOVE COMBINING TRANSMISSION OIL COOLER FAN DRIVE SHAFT SEAL (Continued)

4. Remove retaining ring (8) from retainer (5). **Remove seal (9)** and packing (10).



FOLLOW-ON MAINTENANCE:

None

END OF TASK

6-71 INSTALL COMBINING TRANSMISSION OIL COOLER FAN DRIVE SHAFT SEAL

INITIAL SETUP

Applicable Configurations:
All

Tools:
Powertrain Repairer's Tool Kit, NSN 5180-00-003-5267
Gun Heater
Pyrometer
Aluminum Tube, 2-inch OD, 1/8-Inch-Thick Wall, 1 to 6 Inches Long
Torque Wrench, 30 to 150 Inch-Pounds
Kevlar Gloves (E187)
Workstand

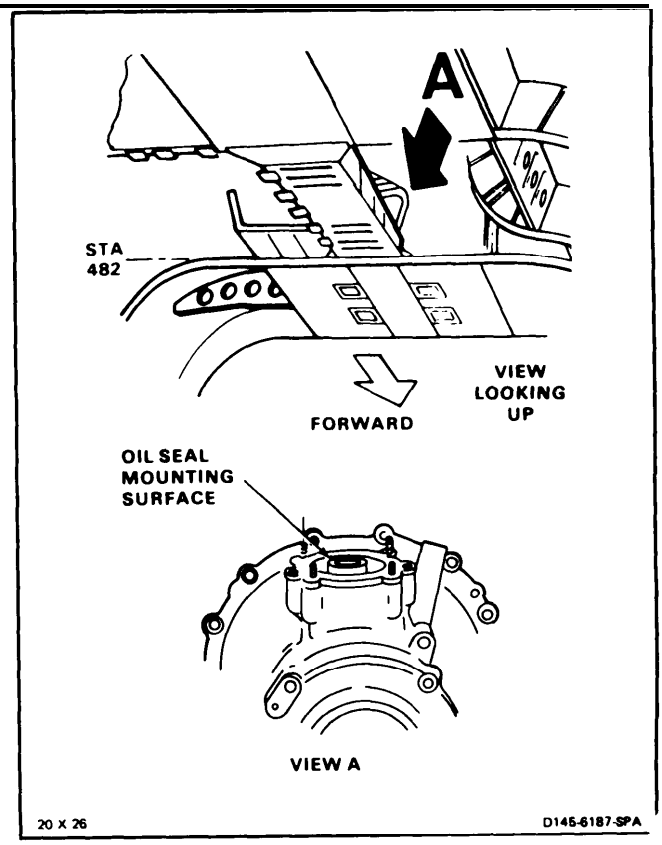
Materials:
Gloves (E186)
Dry Cleaning Solvent (E162)
Cloths (E120)
Oil (E254)
Grease (E190)

Parts:
Packing

Personnel Required:
Aircraft Powertrain Repairer
Inspector

References:
TM 55-1520-240-23P

Equipment Condition:
Inspect Snubber (Task 6-185)



GO TO NEXT PAGE

6-71 INSTALL COMBINING TRANSMISSION OIL COOLER FAN DRIVE SHAFT SEAL (Continued) 6-71

WARNING

Dry cleaning solvent (E162) is flammable and toxic. It can irritate skin and cause bums. Use only in well-ventilated area, away from heat and open flame. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.

1. Clean seal retainer (1). Use dry cleaning solvent (E162) and cloths (E120). Wear gloves (E186).

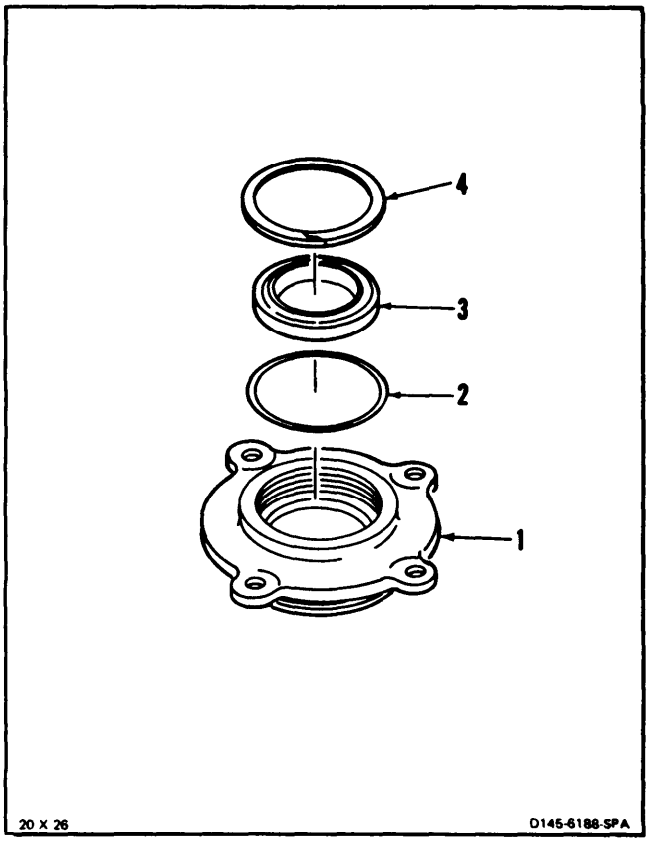
WARNING

Wear Kevlar gloves when handling hot retainer. Hot metal can burn hands.

CAUTION

Do not heat retainer over 250°F (120°C). Metal can be damaged.

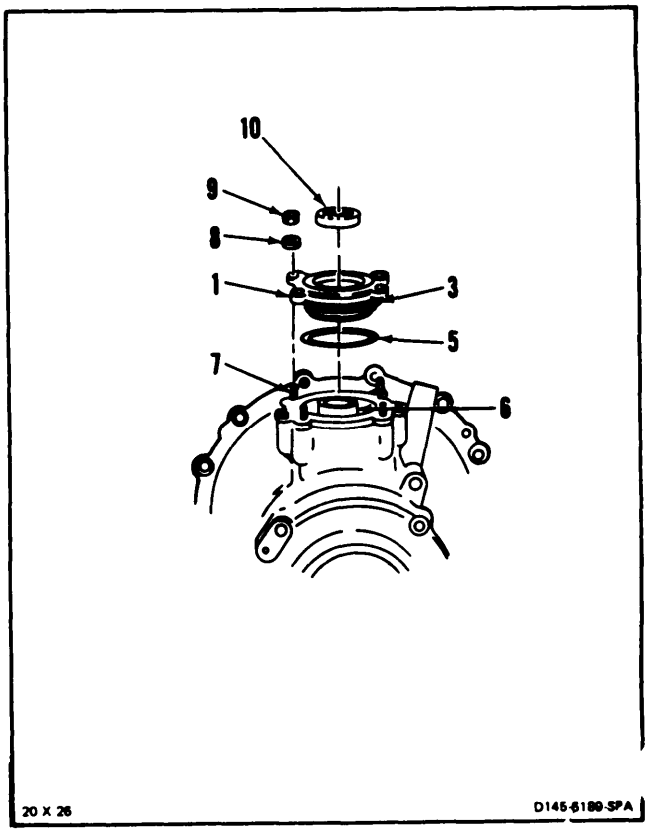
2. **Heat retainer (1)** to 230 to 250°F (110 to 120°C). Use gun-type heater and pyrometer.
3. Install packing (2) in retainer (1).
4. **Install seal (3)** in retainer (1), flat side up. Use aluminum tube to seat seal.
5. **Install retaining ring (4).**



GO TO NEXT PAGE

6-71 INSTALL COMBINING TRANSMISSION OIL COOLER FAN DRIVE SHAFT SEAL (Continued)

6. Coat packing (5) with oil (E254). Install packing (5) on retainer (1).
7. Apply light coat of grease (E190) to lip of seal (3). Apply light coat of oil (E254) to surface of shaft (6). **Install retainer** (1) on four studs (7).
8. Install four washers (8) and nuts (9) on studs (7). **Torque nuts to 60 inch-pounds.**
9. Install snubber (10) on end of shaft (6).

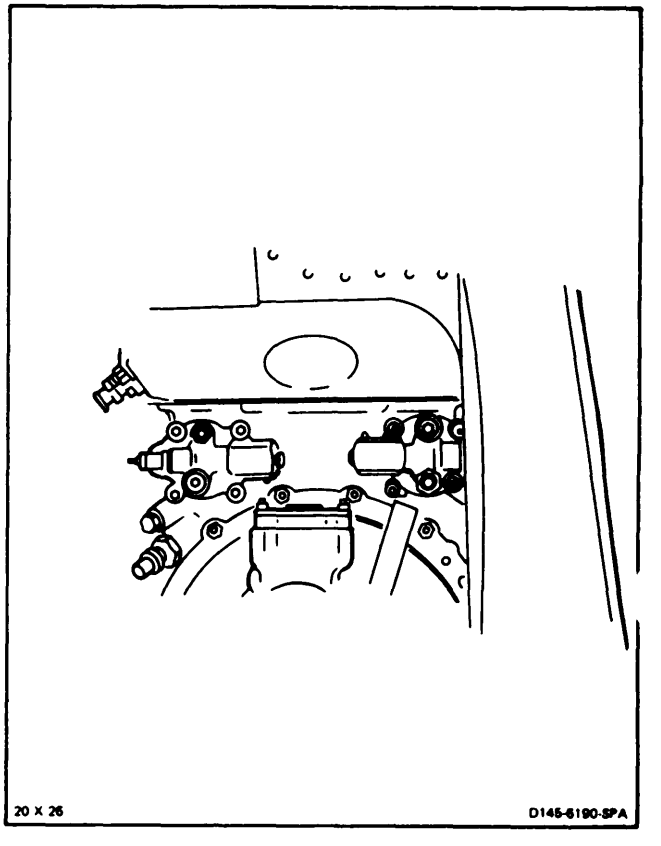


INSPECT

FOLLOW-ON MAINTENANCE:

Install oil cooler fan and drive shaft (Task 6-186).

Close cargo ramp (TM 55-1520-240-T).



END OF TASK

6-71.1 CLEAN AND INSPECT COMBINING TRANSMISSION OIL FILLER SCREEN

INITIAL SETUP

Applicable Configurations:
All

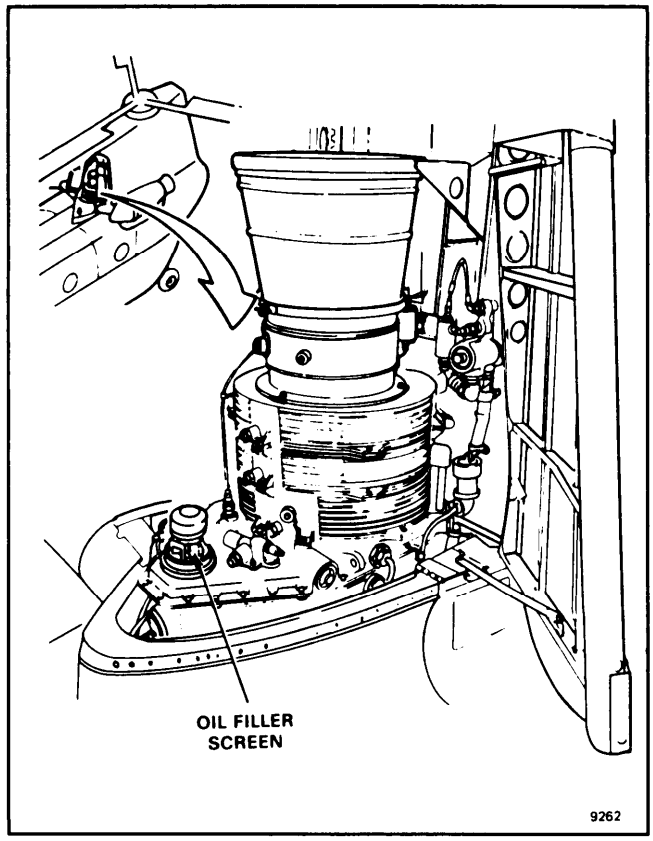
Tools:
Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692

Materials:
Dry Cleaning Solvent (E162)
Cloth (E120)
Brush (E86)
Gloves (E186)

Personnel Required:
Medium Helicopter Repairer
Inspector

References:
Task 6-108
TM 55-1520-240-23P

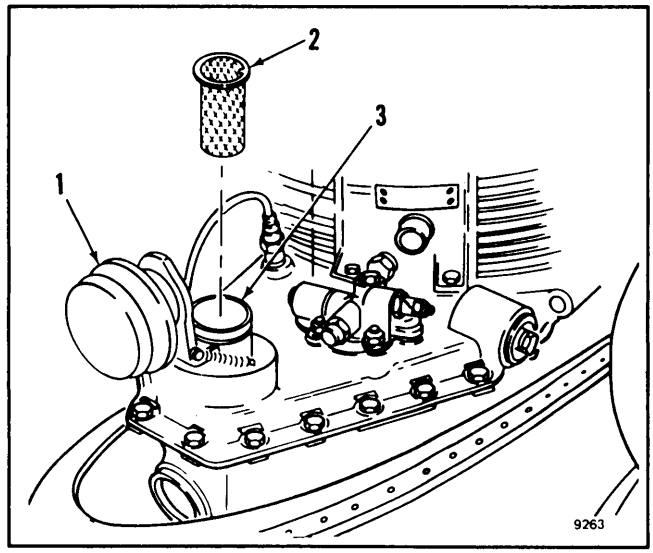
Equipment Condition:
Battery Disconnected (Task 1-39)
Electrical Power Off
Aft Pylon Access Doors Open (Task 2-2)



WARNING

Take precautions to ensure that the transmission is not serviced with the screen removed. Foreign matter could enter the oil system.

1. Open cap assembly (1). **Remove screen (2)** from neck (3) of filler.
2. Close cap assembly (1).



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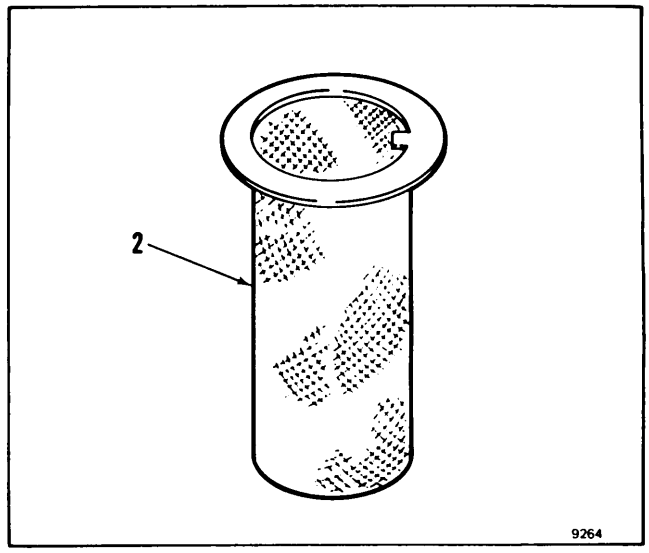
6-71.1 CLEAN AND INSPECT COMBINING TRANSMISSION OIL FILLER SCREEN (Continued) 6-71.1

3. **Check screen (2)** for bits of metal and other debris. Retain debris for contamination analysis (Task 6-108).

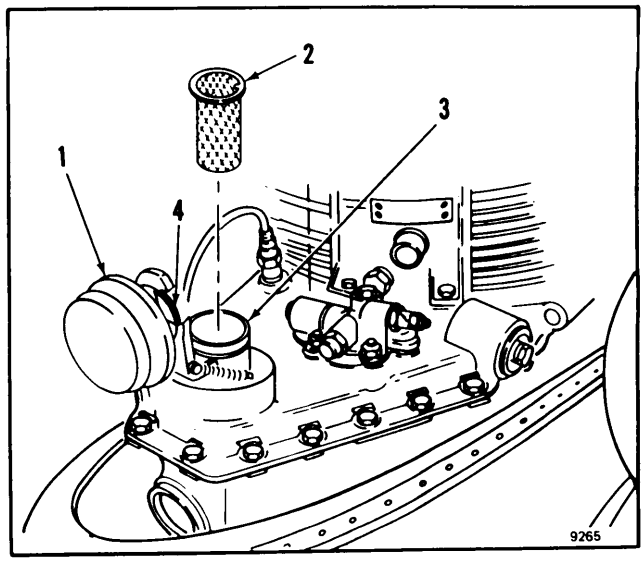
WARNING

Dry cleaning solvent (E162) is flammable and toxic. It can irritate skin and cause burns. Use only in well-ventilated area, away from heat and open flame. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.

4. Clean screen (2) with solvent (E162) and brush (E86). Wear gloves (E186) and goggles. Dry with cloth (E120) or let air dry.
5. **Inspect screen (2)** for tears. There shall be no tears.



6. Open cap assembly (1). **Install screen (2)** in neck (3) of filler.
7. Check packing (4) on underside of cap assembly (1) for condition. There shall be no cuts or nicks.

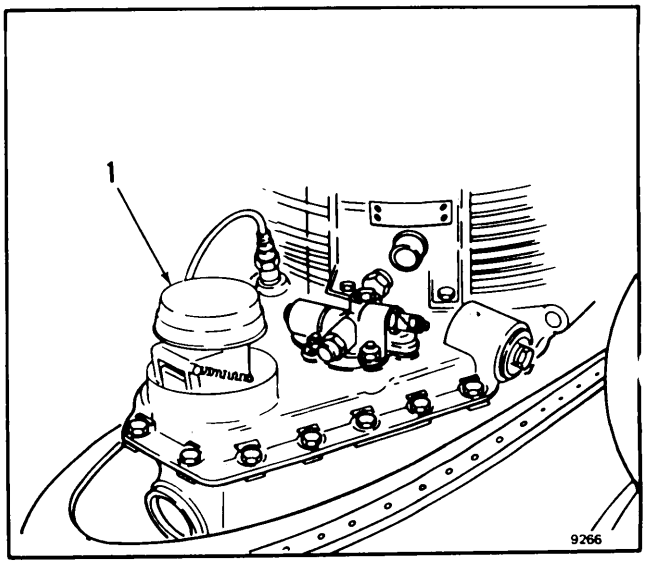


8. Close cap assembly (1).

INSPECT

FOLLOW-ON MAINTENANCE:

Close aft pylon doors (Task 2-2).



END OF TASK

6-71.2 REMOVE COMBINING TRANSMISSION OIL FILLER ASSEMBLY

INITIAL SETUP

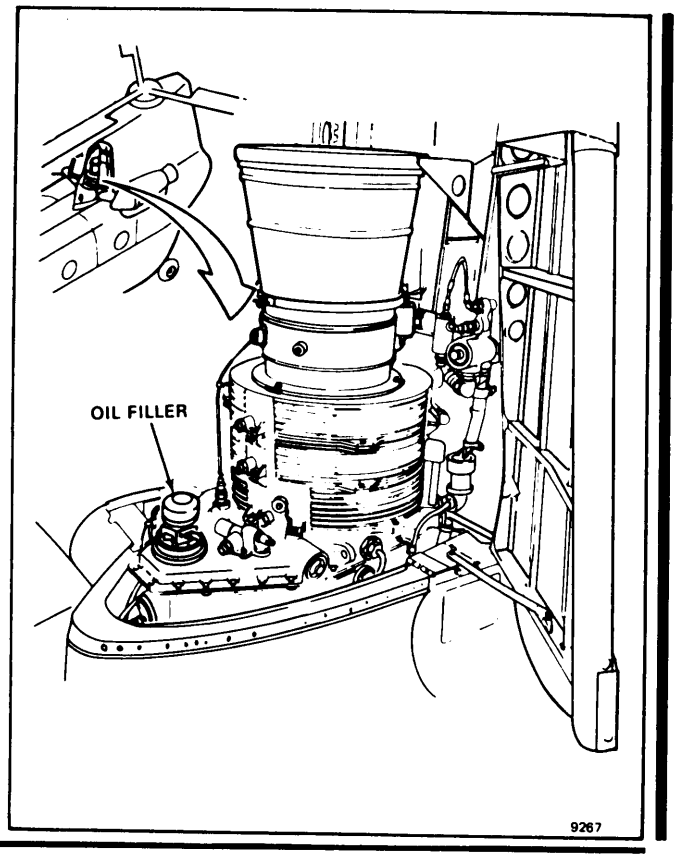
Applicable Configurations:
All

Tools:
Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692

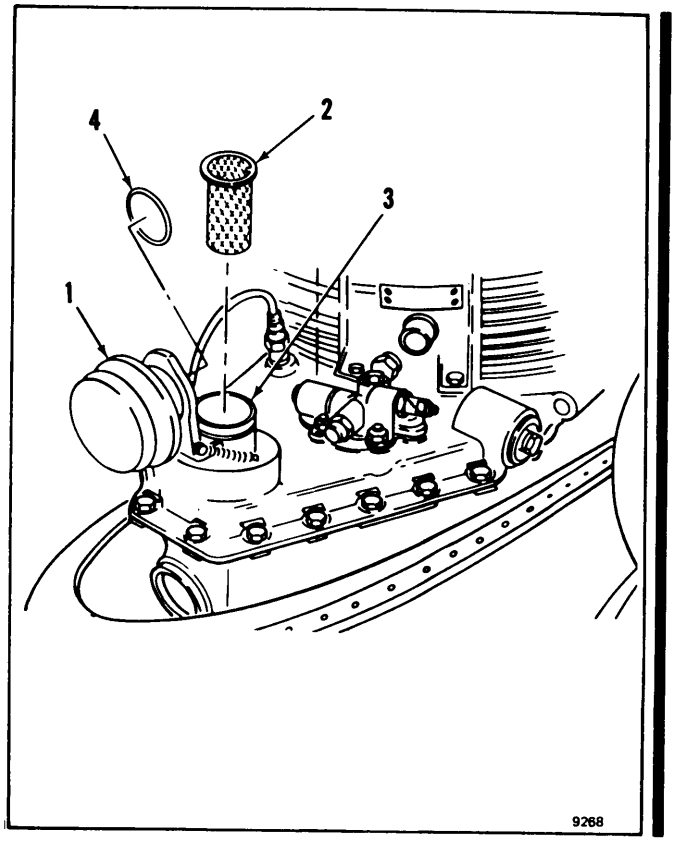
Materials:
Barrier Material (E80)
Masking Tape (E388)

Personnel Required:
Medium Helicopter Repairer

Equipment Condition:
Battery Disconnected (Task 1-39)
Electrical Power Off
Aft Pylon Access Doors Open (Task 2-2)



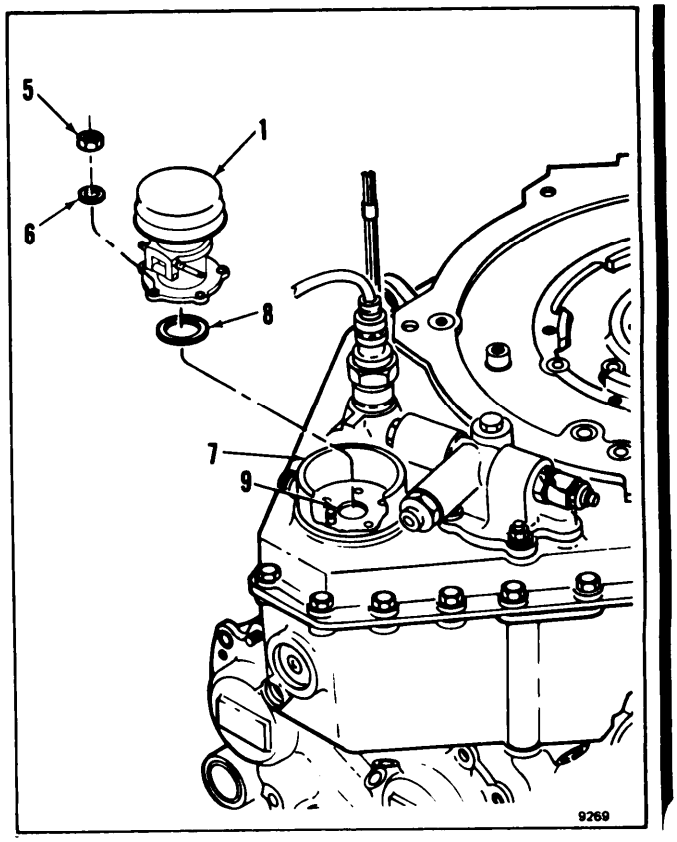
1. Open cap assembly (1). **Remove screen (2)** from neck (3). **Remove packing (4)** from underside of cap assembly.



GO TO NEXT PAGE

6-71.2 REMOVE COMBINING TRANSMISSION OIL FILLER ASSEMBLY (Continued)

2. Remove five nuts (5) and washers (6) from inside scupper (7). **Remove cap assembly (1)** and packing (8).
3. **Cover cavity (9)** with barrier material (E80) and masking tape (E388).



FOLLOW-ON MAINTENANCE:

None

END OF TASK

6-71.3 INSTALL COMBINING TRANSMISSION OIL FILLER ASSEMBLY

INITIAL SETUP

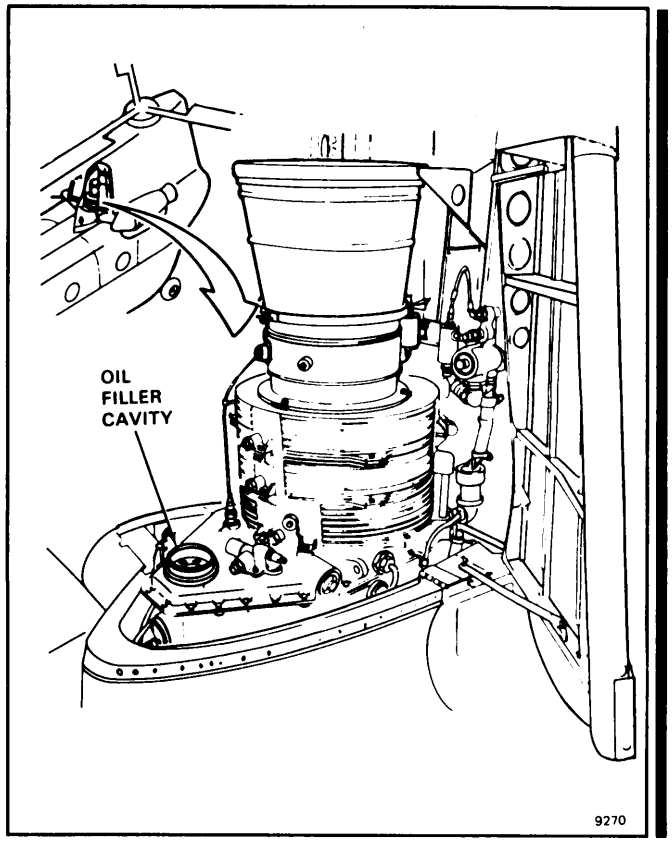
Applicable Configurations:
All

Tools:
Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692
Torque Wrench, 30 to 150 Inch-Pounds

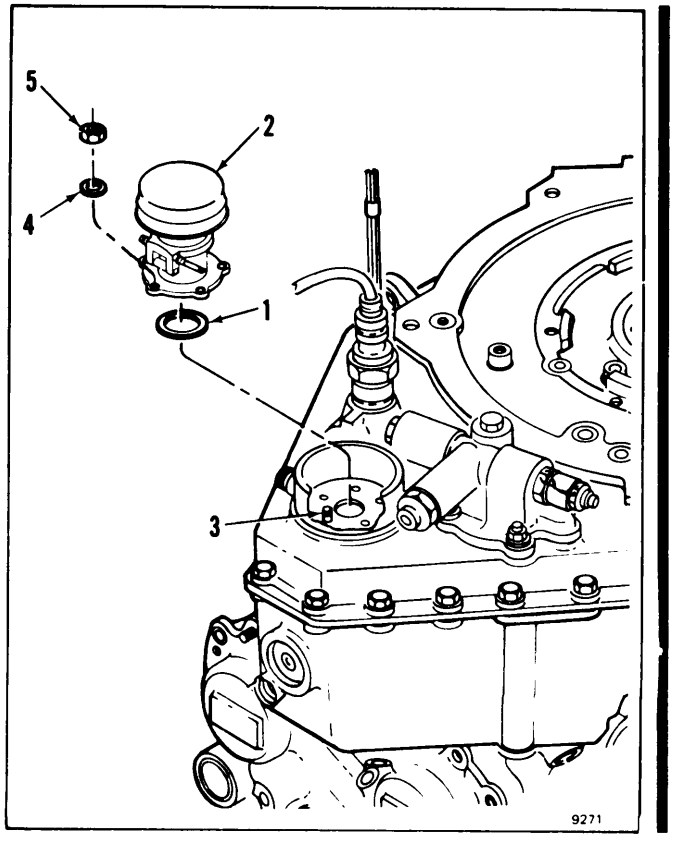
Materials:
None

Personnel Required:
Medium Helicopter Repairer
Inspector

References:
TM 55-1520-240-23P



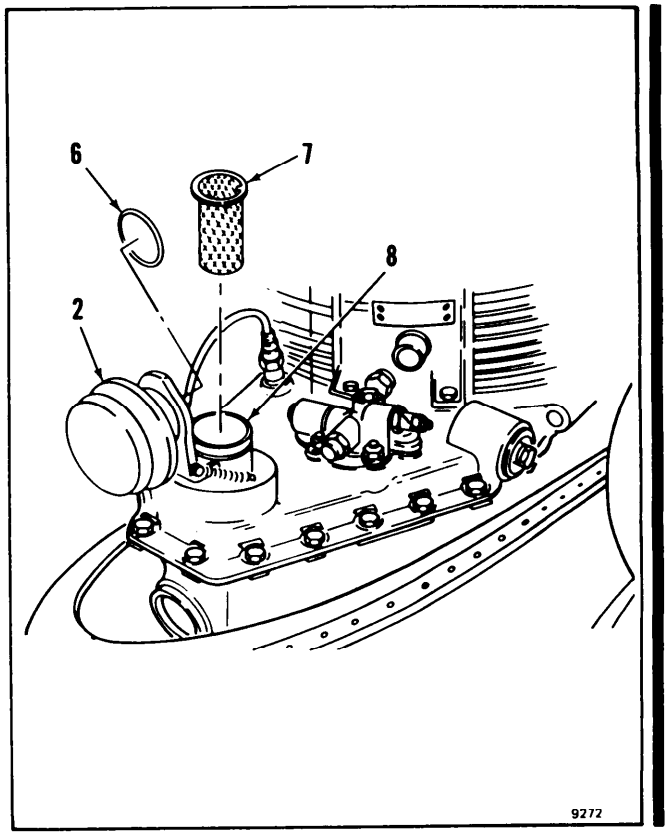
1. **Install packing (1)** on bottom of cap assembly (2). **Install cap assembly,** with packing, on studs (3).
2. **Install** five washers (4) and **nuts (5). Torque nuts to 60 inch-pounds.**



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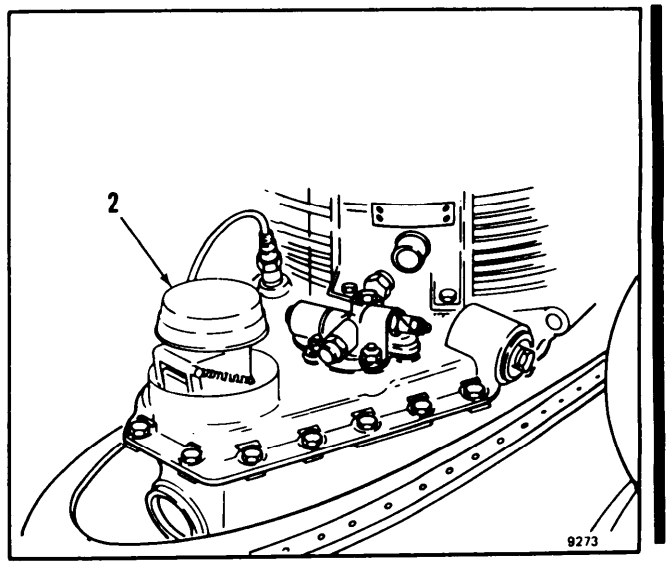
6-71.3 INSTALL COMBINING TRANSMISSION OIL FILLER ASSEMBLY (Continued)

3. Open cap assembly (2). **Install packing (6)** on bottom of cap.
4. **Install screen (7)** in neck (8).



5. Close cap assembly (2).

INSPECT



FOLLOW-ON MAINTENANCE:

Close aft pylon doors (Task 2-2).

END OF TASK

6-72 REMOVE COMBINING TRANSMISSION

INITIAL SETUP

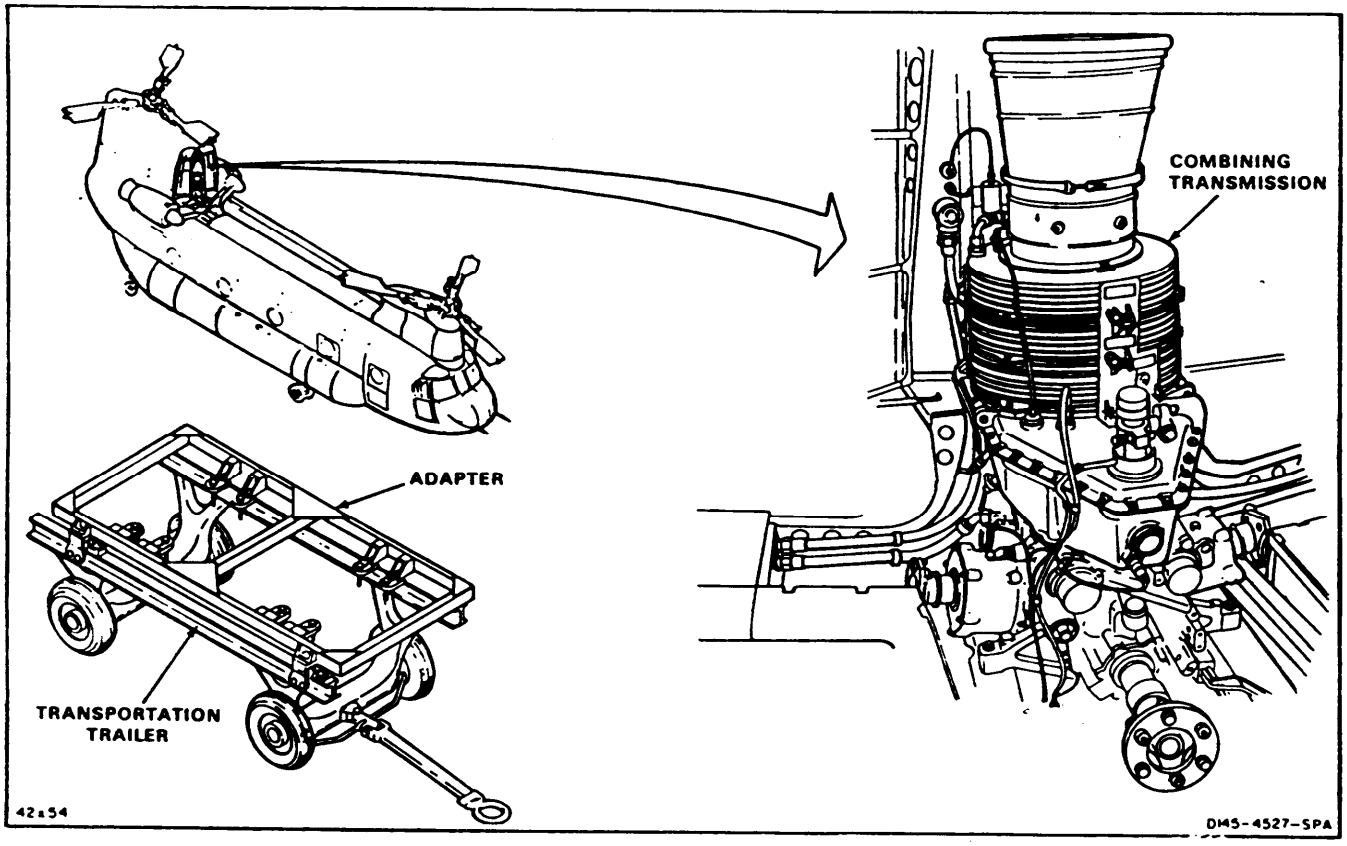
Applicable Configurations:
All

Tools:
Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692
Container, Two Quart
Open End Wrench, 1 1/2-inch
Open End Wrench, 1 1/8-inch
Work Hoist, 2000 Pound Capacity
Sling (T34)
Rope Guide Line (2)

Materials:
Paper Tags (E264)

Personnel Required:
67U10 Medium Helicopter Repairer
67U20 Medium Helicopter Repairer

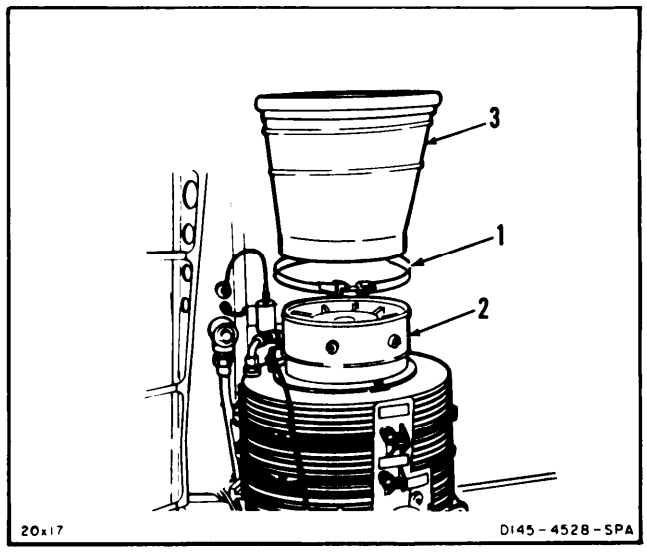
Equipment Condition:
Battery Disconnected (Task 1-39)
Electrical Power Off
Hydraulic Power Off
Aft Pylon Door Open (Task 2-2)
Aft Pylon Lower Fairing Removed (Task 2-284)
Left and Right Transmission Shafts and
Combining Transmission Adapter Assembly
Removed (Task 6-30)
No. 7 Forward Drive Shaft Removed (Task 6-4)
Adapter (T20) Installed on Transportation
Trailer 2000 (Task 2-140)



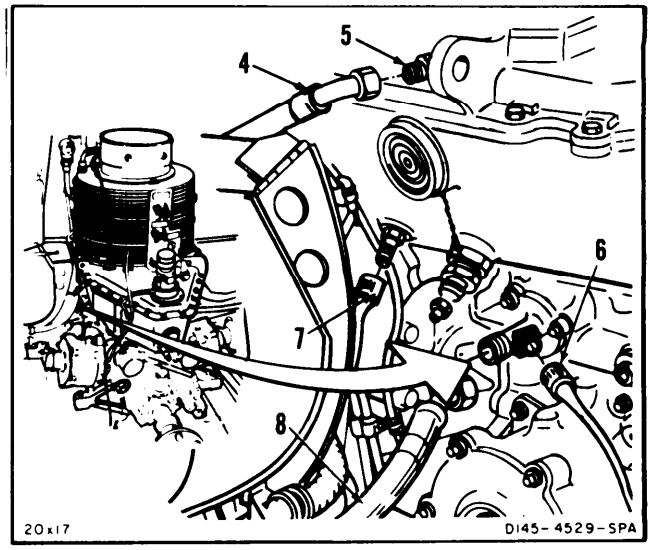
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6-72 REMOVE COMBINING TRANSMISSION (Continued)

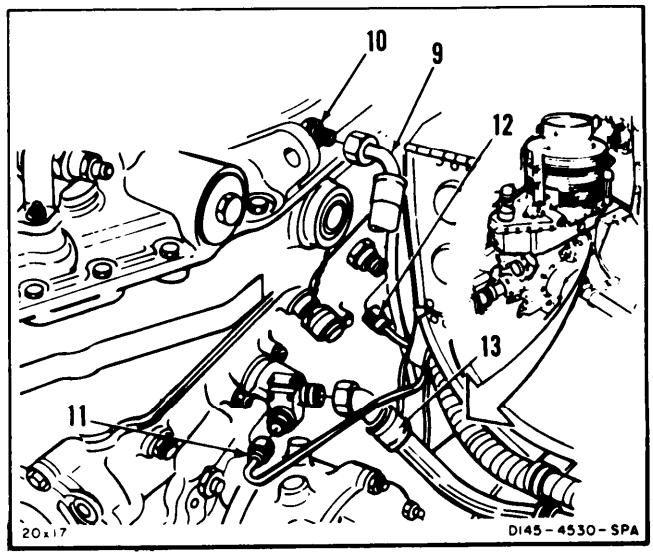
1. Loosen clamp (1) around fan (2) and duct (3). **Remove duct.**



2. Remove breather hose (4) from reducer (5).
3. Tag and **disconnect connector (6).** Tag and **disconnect connector (7).**
4. **Disconnect oil hose (8).** Cap hose quickly to prevent oil loss. Use container to catch spilled oil.

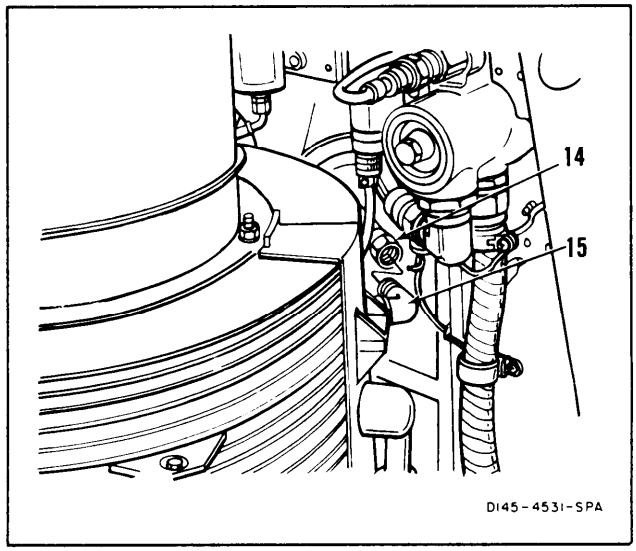


5. Remove breather hose (9) from reducer (10).
6. Tag and **disconnect connector (11).** Tag and **disconnect connector (12).**
7. **Disconnect oil hose (13).** Cap hose quickly to prevent oil loss. Use container to catch spilled oil.

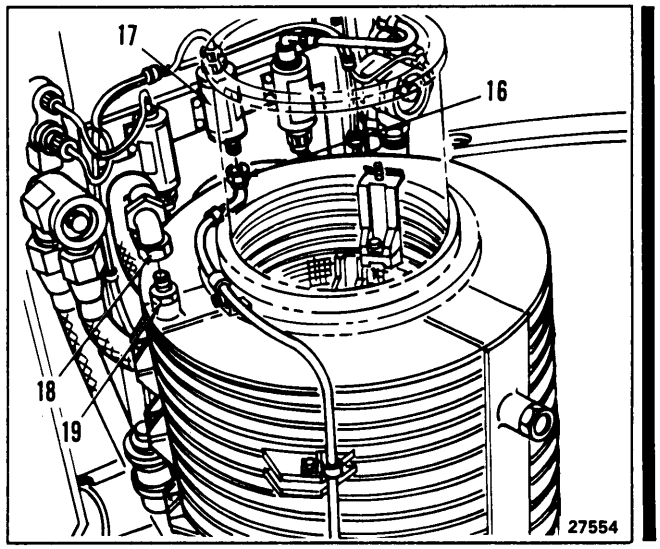


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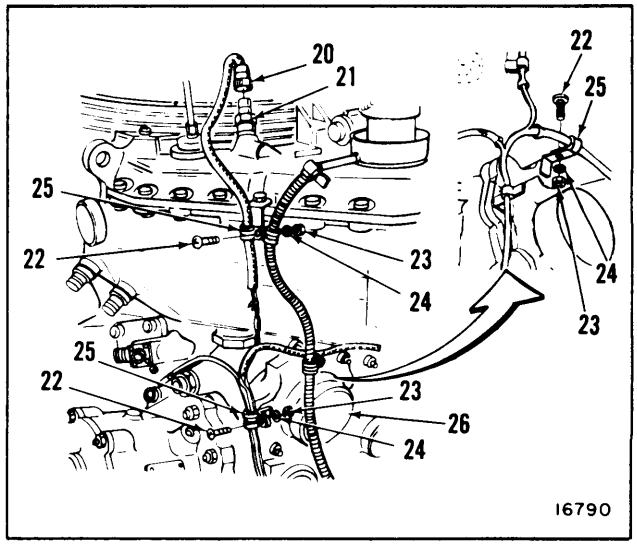
8. Tag and **disconnect oil hose (14)** from elbow (15).



9. **Disconnect oil hose (16)** from transducer (17).
10. Tag and **disconnect oil hose (18)** from reducer (19).



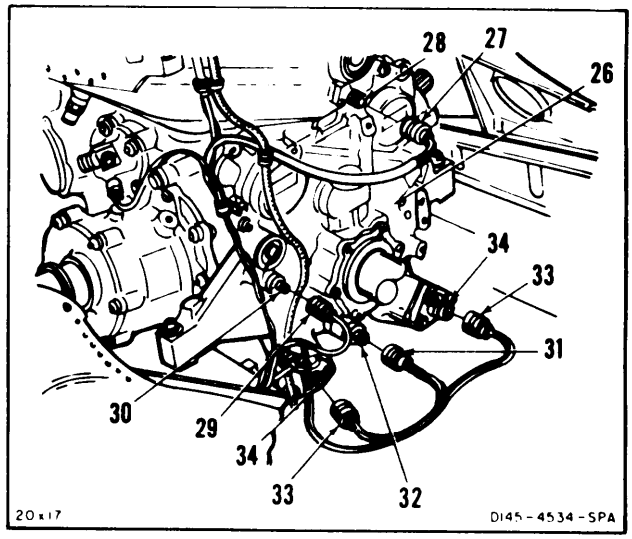
11. Tag and **disconnect connector (20)** from COMB PRESS SWITCH – MAIN receptacle (21).
12. **Remove screws (22),** nuts (23), and washers (24) from clamps (25) at 3 places. **Disconnect clamps from transmission (26).**
13. Loosely install screws (22), washers (24), and nuts (23) on the clamps (25).



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6-72 REMOVE COMBINING TRANSMISSION (Continued) 6-72

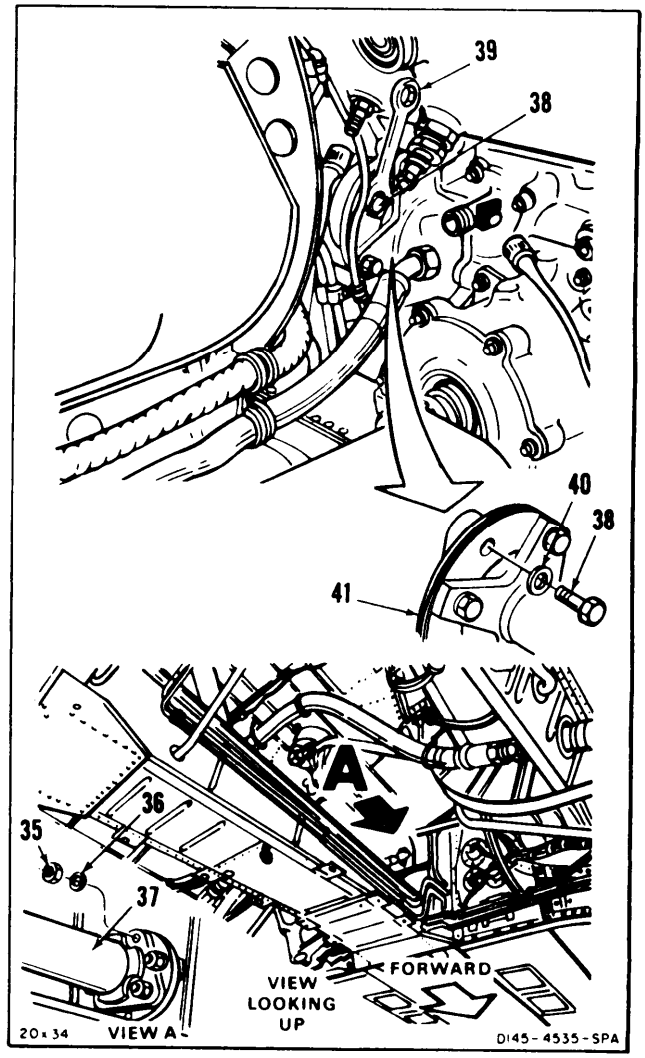
14. Tag and **disconnect connector (27) from COMB XMSN TEMP BULB receptacle (28) at front of transmission (26).**
15. Tag and **disconnect connector (29)** from COMB PRESS SWITCH — AUX receptacle (30).
16. Tag and **disconnect connector (31)** from COM CHIP DETECTOR receptacle (32).
17. Tag and **disconnect connectors (33)** from COMB DEBRIS SCREEN receptacles (34).



CAUTION

If bolt turns, it can damage adapter assembly.

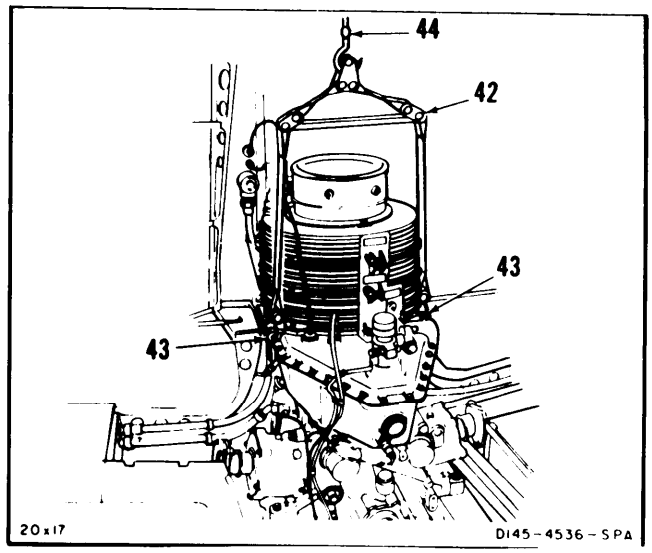
18. Hold bolts (38) with wrench (39) to keep bolts from turning. Remove three nuts (35) and washers (36) from aft drive shaft (37) inside helicopter.
19. **Remove three bolts (38)** and special washers (40) from adapter assembly (41).



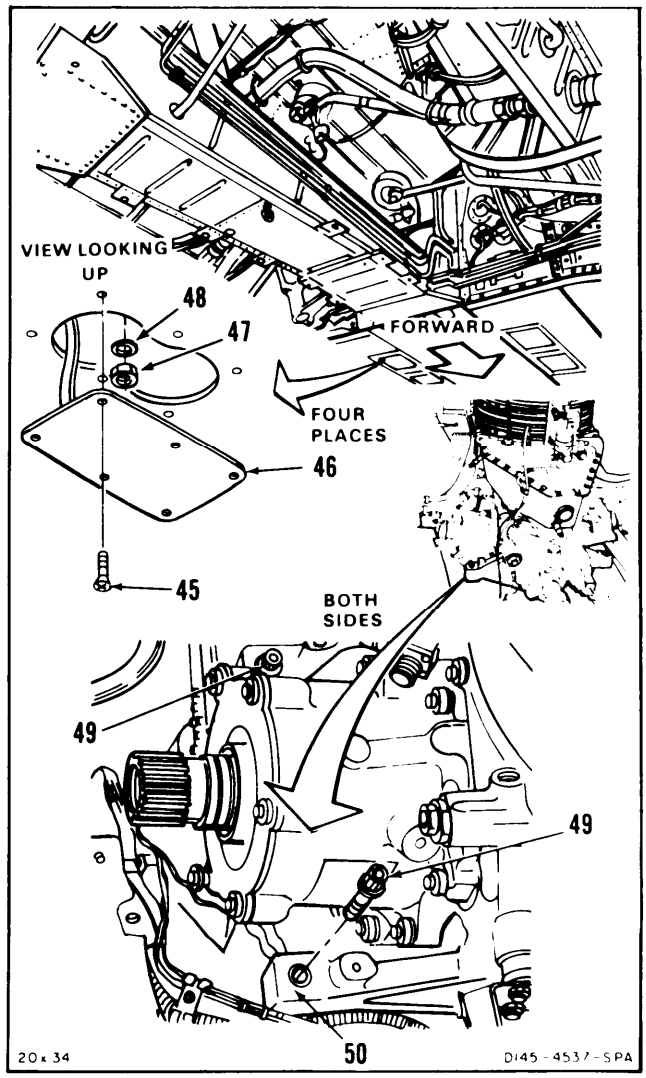
GO TO NEXT PAGE

6-72 REMOVE COMBINING TRANSMISSION (Continued) 6-72

20. **Connect sling (T34) (42)** to two hoisting eyes (43). **Connect hoist hook (44)** to sling.
21. Raise hoist hook (44) to remove slack from sling (T34) 42). Do not put tension on sling.



22. Remove 24 screws (45) and four access panels (46) from cabin ceiling.
23. Remove four mounting nuts (47) and washers (48).
24. **Remove four bolts (49)** from mounting lugs (50).



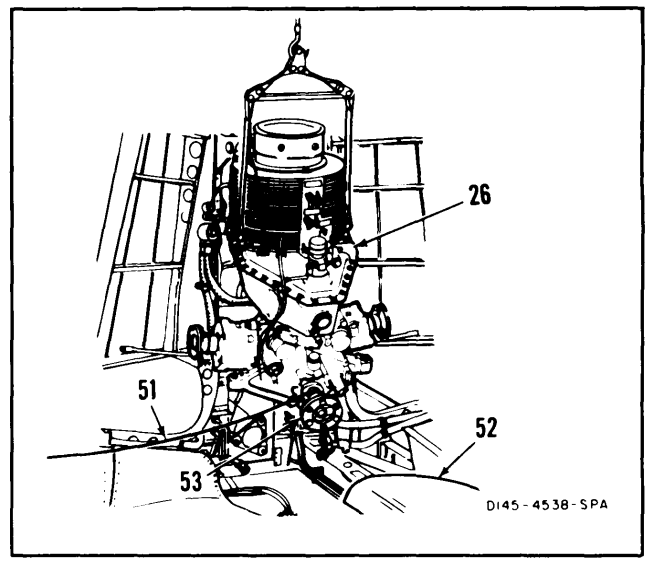
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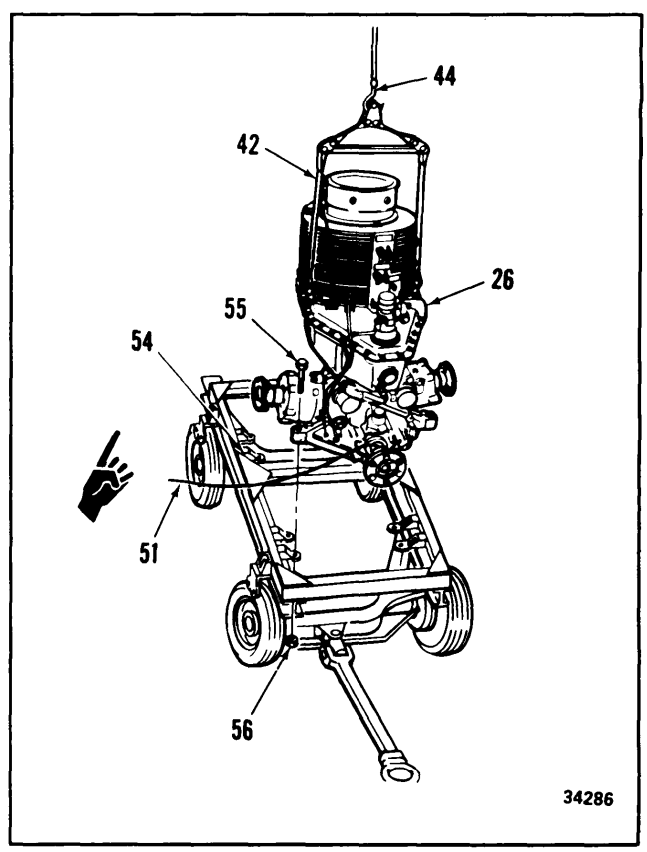
25. **Slowly raise transmission (26) 1 inch. Check that all wires and hoses between transmission and helicopter have been disconnected.**
26. Attach rope guide line (51) to each side of transmission (26).

WARNING

Transmission is heavy and can injure personnel if it drops. Transmission must be supported by hoist and moved carefully to prevent injury to personnel.

27. With aid of helper, **raise transmission (26) up and away from helicopter.** Turn transmission as needed for clearance. Raise and lower access door (52) as needed to clear adapter assembly (53).
28. **Lower transmission (26) onto adapter (T20) (54).** Install four bolts (55) and nuts (56).
29. Remove hoist cable (44) and sling (42). Remove guide lines (51).





FOLLOW-ON MAINTENANCE:
None

END OF TASK

INITIAL SETUP

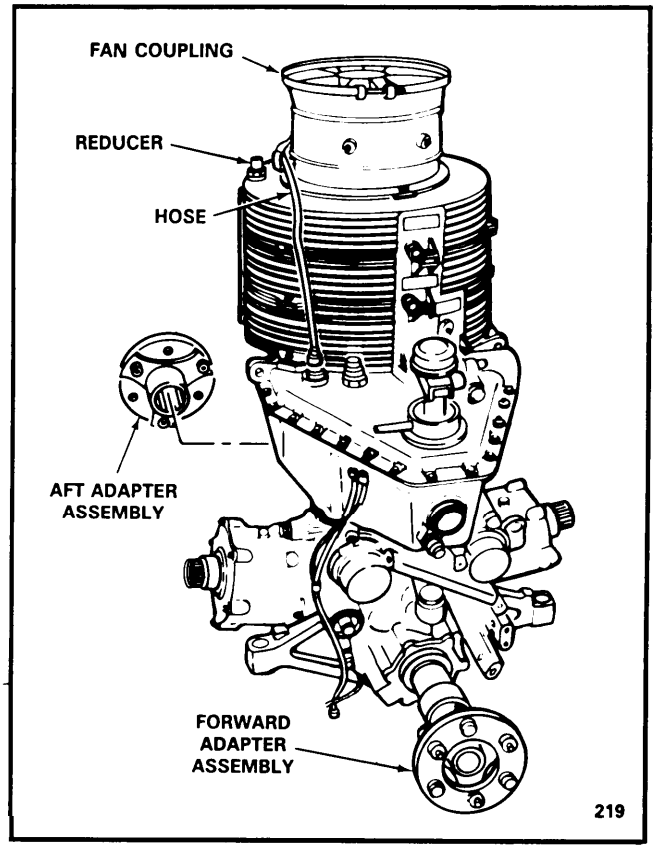
Applicable Configurations:
All

Tools:
Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692
Wood Dowel, 1-inch x 18-Inches

Materials:
None

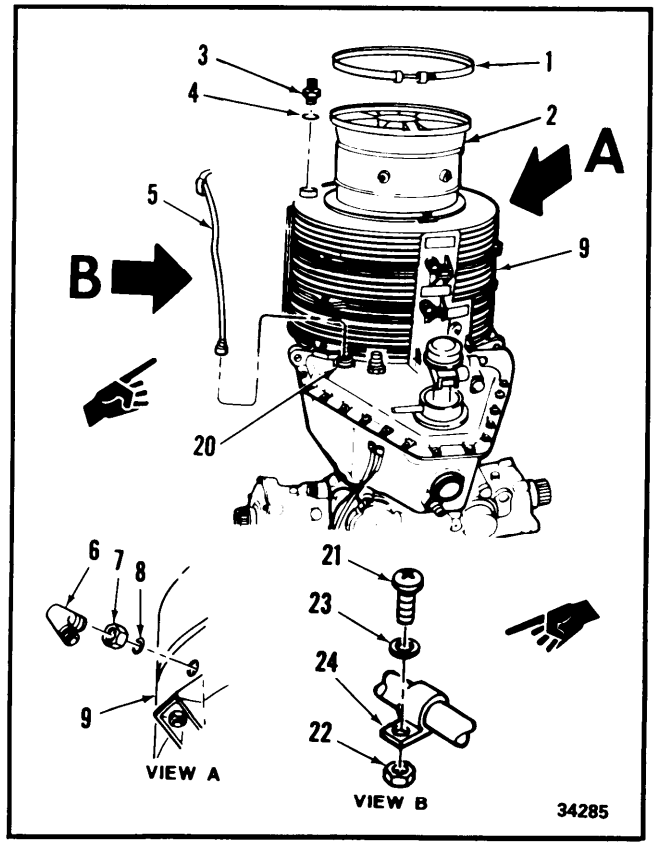
Personnel Required:
Medium Helicopter Repairer (2)

Equipment Condition:
Off Helicopter Task



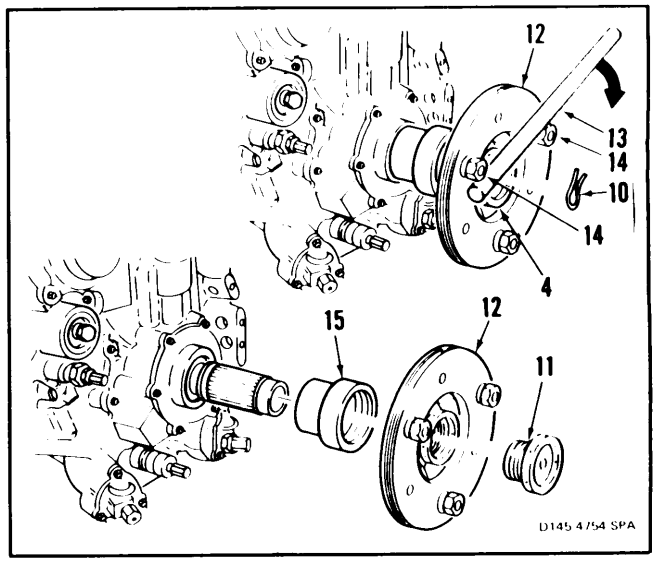
1. **Remove coupling (1)** from around top of fan (2).
2. **Remove reducer (3)** and packing (4) from oil cooler (9).
3. **Remove elbow (6),** nut (7), and packing (8) from oil cooler (9).

3.1. **Disconnect oil hose (5)** from reducer (20).
3.2. **Remove screws (21),** nuts (22), and washers (23) from clamps (24), at two places.
3.3. **Disconnect clamps** (24) from oil cooler (9).
3.4. **Loosely install screws (21),** washers (23), and nuts (13) on clamps (24).

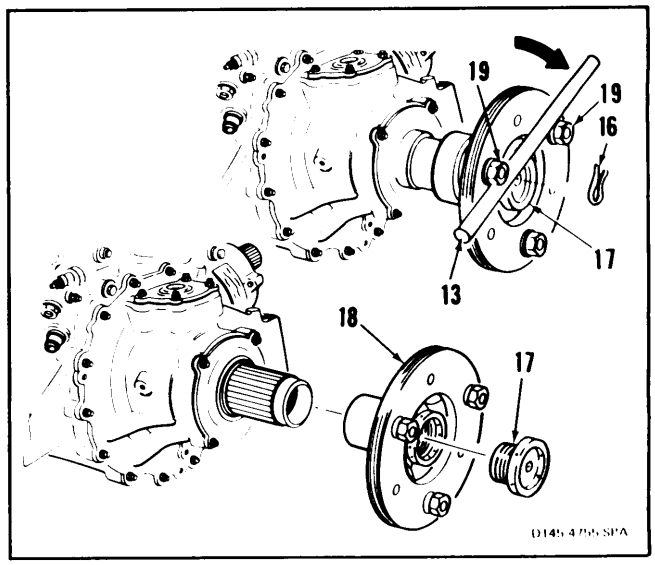


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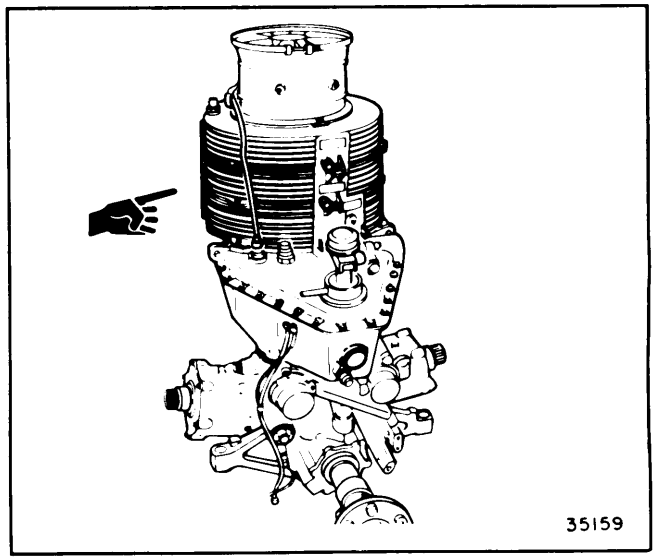
4. **Remove lockring (10)** from retainer (11) at forward output shaft adapter assembly (12).
5. Place wood dowel (13) across nuts (14) as shown. Hold dowel to keep adapter assembly (12) from turning. **Remove retainer (11).**
6. Remove adapter **assembly (12) and retainer (15).**



7. **Remove lockring (16)** from retainer (17) at aft output shaft adapter assembly (18).
8. Place wood dowel (13) across nuts (19) as shown. Hold dowel to keep adapter assembly (18) from turning. **Remove retainer (17).**
9. Remove adapter assembly (18).



FOLLOW-ON MAINTENANCE:
None



END OF TASK

INITIAL SETUP

Applicable Configurations:

All

Tools:

Dial Indicating Depth Gage 643J
Goggles

Materials:

Naphtha (E245)
Emery Cloth (E123) or
Abrasive Paper (E13)
Crocus Cloth (E122)
Cloths (E120)
Gauze Sponges (E184)
Barrier Material (E80)
Masking Tape (E388)
Brush (E86)
Gloves (E184.1)
Acetic Acid (E21)
Chromic Acid (E114)
Calcium Sulphate (E91)
Methyl-Ethyl-Ketone (E244)
Epoxy Primer (E292) or (E293)
Black Polyurethane Paint (E285.1)
Black Lacquer Topcoat (E462)

Personnel Required:

Aircraft Powertrain Repairer
Inspector

References:

TM 43-0103
MIL-M-3171, Type VI
MIL-C-53072

Equipment Condition:

Off Helicopter Task

General Safety Instructions:

WARNING

Naphtha (E245) is combustible and toxic. It can irritate skin and cause burns. Use only with adequate ventilation, away from open flame. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.

WARNING

Acetic acid (E21) is combustible and toxic. Chromic acid (El 14) is extremely toxic. Both can irritate skin and cause bums. Avoid inhaling. Use only with adequate ventilation, away from open flame. Avoid contact with skin, eyes, or clothing. In case of contact, Immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.

WARNING

Epoxy primer (E292) or (E293) is flammable and toxic. It can irritate skin and cause burns. Use only with adequate ventilation, away from heat or open flame. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.

CAUTION

Do not wear photogray glasses when fluorescent inspecting. They reduce ability to see cracks.

GO TO NEXT PAGE

6-73.1 REPAIR COMBINING TRANSMISSION OUTSIDE SURFACE 6-73.1 (Continued)

NOTE

Reparable damage is limited to scratches, nicks, gouges, and minor corrosion.

1. **Clean** oil and grease from **damaged area.** Use naphtha (E245) and clean cloths (E120). Wear gloves (E1 84.1).
2. **Check** the extent and location of **damage** on housing (1) and sump cover (2).

NOTE

Refer to Task 6-35 for repairs to sump.

NOTE

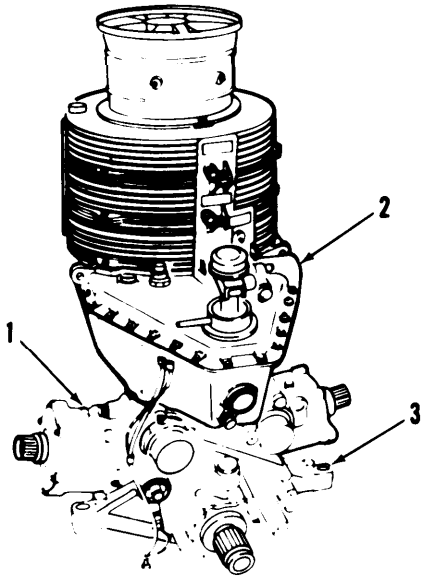
Limits in this step refer to the extent of damage after rework.

a. **Depth of damage shall not be more than 0.025 inch.**

b. **Damage shall not extend over more than one surface or enter any radius.**

c. **Damage shall not be closer than 1.00 inch to any mounting hole (3).**

3. **Fluorescent inspect** damaged area to check for cracks. (Refer to TM 43-0103.) **There shall be no cracks.**
4. **Cover moving parts** near the damaged area to keep out abrasive grit. Use barrier material (E80) and tape (E388).
5. **Blend out damage** with emery cloth (E123) or abrasive paper (E13). Observe the limits of step 2.
6. **Smooth the blended area** with crocus cloth (E122). Do not leave any sharp edges.



DI45-12496-SPA

GO TO NEXT PAGE

WARNING

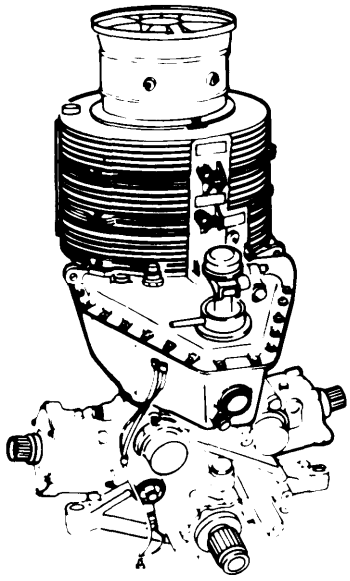
Protective gloves (E184.1) shall be worn for the remainder of this task. Otherwise, personal injury could occur.

7. **Acid etch the reworked area as follows:**
   a. Prepare a solution of 3 parts acetic acid (E21) in 7 parts water. Wear gloves (E184.1) and goggles.
   b. Swab area with solution for 2 minutes. Use gauze sponges (E184).
   c. Rinse the area with cold water.
8. **Fluorescent inspect** reworked area to check for cracks (TM 43-0103). **There shall be no cracks.**
9. Apply surface treatment to reworked area as follows:
   a. **Clean the area with naphtha (E245)** and clean cloths. Let the area air dry.
   b. **Swab on solution of chromic acid (E114) and calcium sulphate (E91) (MIL-L-3171, Type VI). Swab until metal becomes dull gold to brown.** Use gauze sponges (E184). Rinse the area with cold water and let air dry.

NOTE

Priming and painting shall be done per MIL-C-53072.

10. **Apply** one coat of **epoxy primer (E292) or (E293)** to the reworked area. Let air dry for 2 hours.
11. **Finish** the reworked area **with two coats of black lacquer (E462) or polyurethane (E285.1) as determined by the following:**
    a. Apply methyl-ethyl-ketone (MEK) (E244) to a small area of the existing topcoat near the area to be finished. Use brush (E86).
    b. Wipe the area. If the topcoat wipes away, use lacquer (E462). If the topcoat is unaffected, use polyurethane (E285.1).



D145-12497-SPA

INSPECT

FOLLOW-ON MAINTENANCE:
None

END OF TASK

6-74 PREPARE COMBINING TRANSMISSION FOR SHIPMENT OR STORAGE

INITIAL SETUP

Applicable Configurations:
All

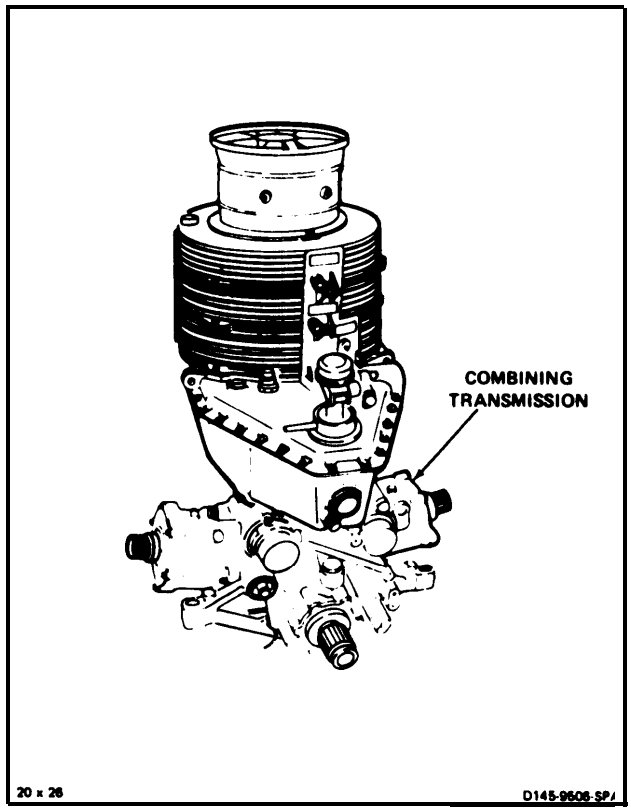
Tools:
Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Sling (T34)
Work Hoist
Shipping Container (T36)
Container, 14-Quart (3)
Torque Wrench, 0 to 500 Foot-Pounds
Hose, 3/4-inch ID, 24 Inches Long

Materials:
Fingerprint Remover (E175)
Cloths (E120)
Dry Cleaning Solvent (E162)
Gloves (E186)
Swabbing Brush (E86)
Corrosion Preventive Compound (E153 or E154)
Barrier Material (E81)
Masking Tape (E388)
Dessicant (E160), 16-Unit Bag (2)

Personnel Required:
Medium Helicopter Repairer (2)
Inspector

References:
TB 55-8100-200-25
TM 38-750
TB 750-126

Equipment Condition:
Off Helicopter Task
Combining Transmission Disassembled (Task 6-73)



General Safety Instructions:

WARNING

Dry cleaning solvent (E162), fingerprint remover (E175) and corrosion-preventive compound (E153 or E154) are flammable and toxic. They can irritate skin and cause burns. Use only in well-ventilated area, away from heat and open flame. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.

GO TO NEXT PAGE

6-74 PREPARE COMBINING TRANSMISSION FOR SHIPMENT OR STORAGE (Continued)

1. **Drain oil** from each of three compartments of sump (1) as follows:

NOTE

Sump holds a total of about 33 quarts of oil.

a. Install hose on drain valve (2 or 3). Push in drain valve, twist it, and pull. Let oil drain into containers.

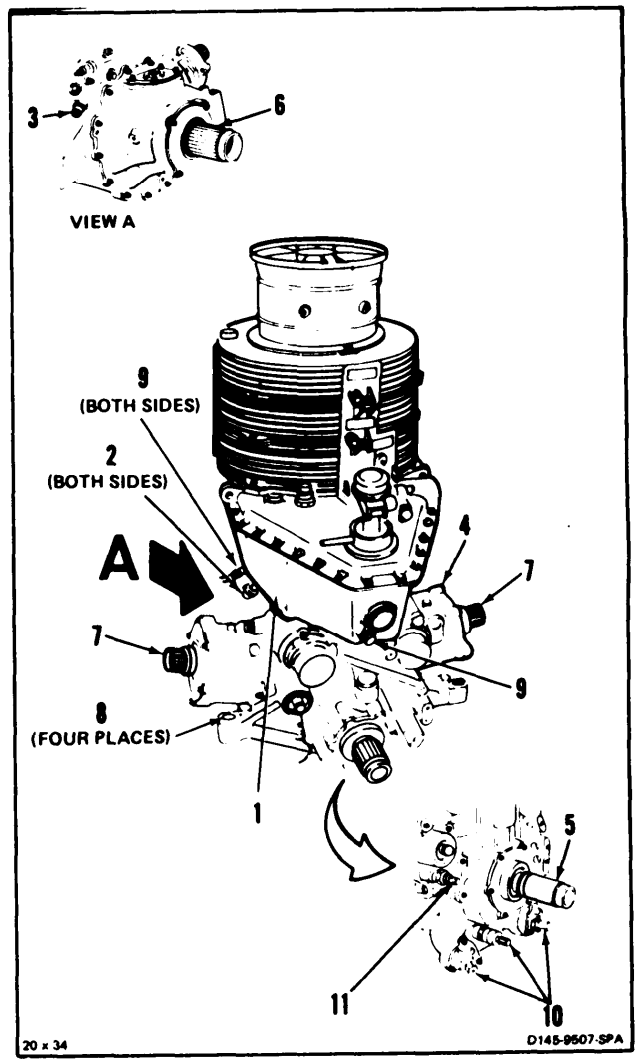
b. Push in valve (2 or 3), twist it, and pull to close. Remove hose.

2. Put on gloves (E186). Gloves shall be worn for the rest of this task.
3. Clean all surfaces of transmission (4). Use dry cleaning solvent (E162) and clean cloths (E120). Wear goggles.
4. **Clean** forward output shaft **splines (5),** aft output shaft **splines (6),** input shaft **splines (7), and four bushings (8).** Use fingerprint remover (E175) and clean cloths (E120).

CAUTION

Touching unpainted surfaces with bare fingers can cause corrosion.

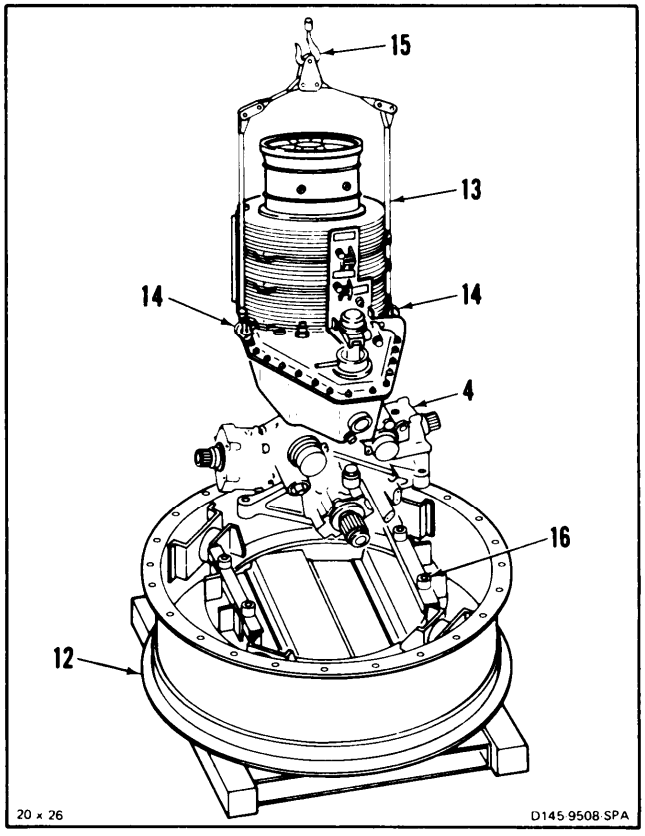
5. Wipe surfaces cleaned with fingerprint remover with dry cleaning solvent (E162) and clean cloths (E120).
6. **Coat splines (5, 6, and 7) and four bushings (8)** with corrosion-preventive compound (E153 or E154). Use swabbing brush (E67).
7. Cover splines (5, 6, and 7) and bushings (8) with barrier material (E81) and tape (E388).
8. **Cover three drain valves (2 and 3), three temperature probes (9), and electrical connectors (10 and 11)** with barrier material (E81) and tape (E388).



GO TO NEXT PAGE

6-74 PREPARE COMBINING TRANSMISSION FOR SHIPMENT OR STORAGE (Continued)

9. Install transmission (4) in shipping container (T36) (12) as follows:
   a. Inspect and prepare container (T36) (12) (TB 55-8100-200-25).
   b. Connect sling (T34) (13) to two lifting lugs (14). Connect work hoist hook (15 to sling.
   c. With aid of helper, **lift transmission (4) into container (T36) (12). Align with four mounting brackets (16).**
   d. Remove sling (T34) (13).

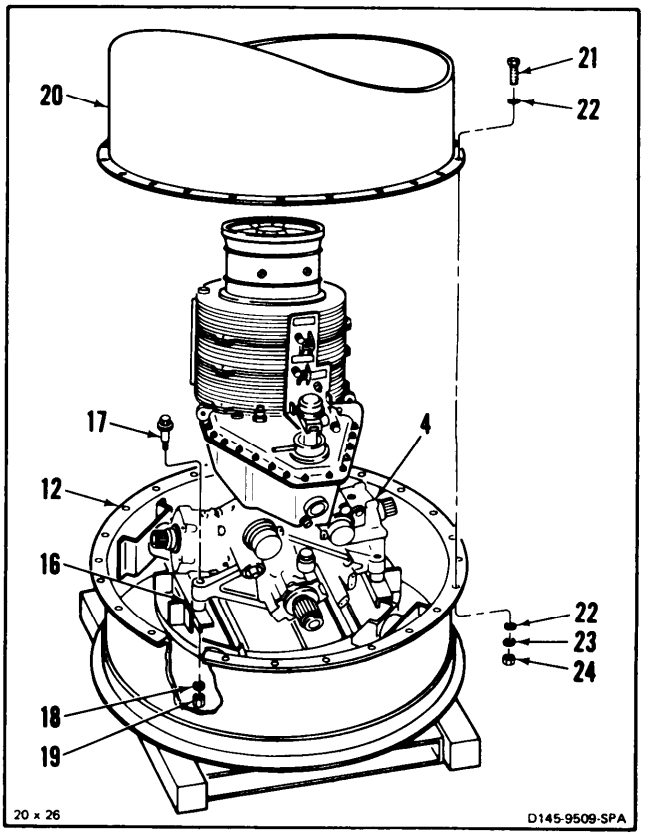


   e. **Secure transmission (4)** to container mounting brackets (16) **with four bolts (17), washers (18), and nuts (19). Torque nuts to 55 foot-pounds.**
   f. Prepare required maintenance forms and reports (TM 38-750 and TB 750-126).
   g. Put two 16-unit bags of desiccant (E160) into containers (T36) (12).

INSPECT

   h. Install cover (20) on container (T36) (12). Install bolts (21), washers (22), split washer (23), and nut (24) at 24 places.
   i. **Torque nuts (24) at 3, 6, 9, and 12 o'clock to 275 inch-pounds. Torque nuts at 2, 4, 8, and 12 o'clock to 275, inch-pounds. Torque remaining nuts to 275 inch-pounds.**

INSPECT



GO TO NEXT PAGE

10. **Remove plug (25)** from cover (20).
11. **Connect air test line (26)** to cover (20).

CAUTION

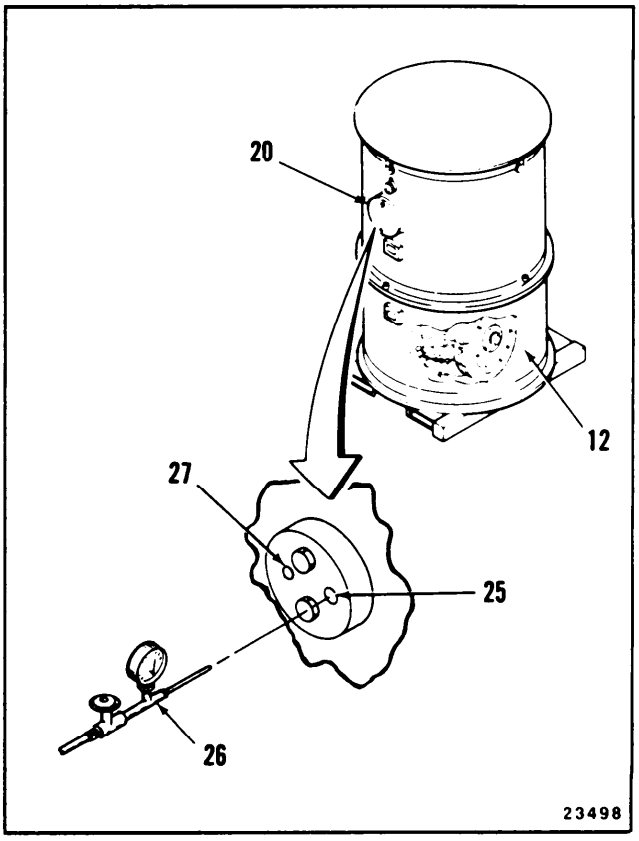
Low pressure air supply must be used. Exceeding test pressure can damage container.

12. **Pressurize container (12)** to **3 psi max.** Check container for leaks. Container must hold **3 psi** for 1 hour.

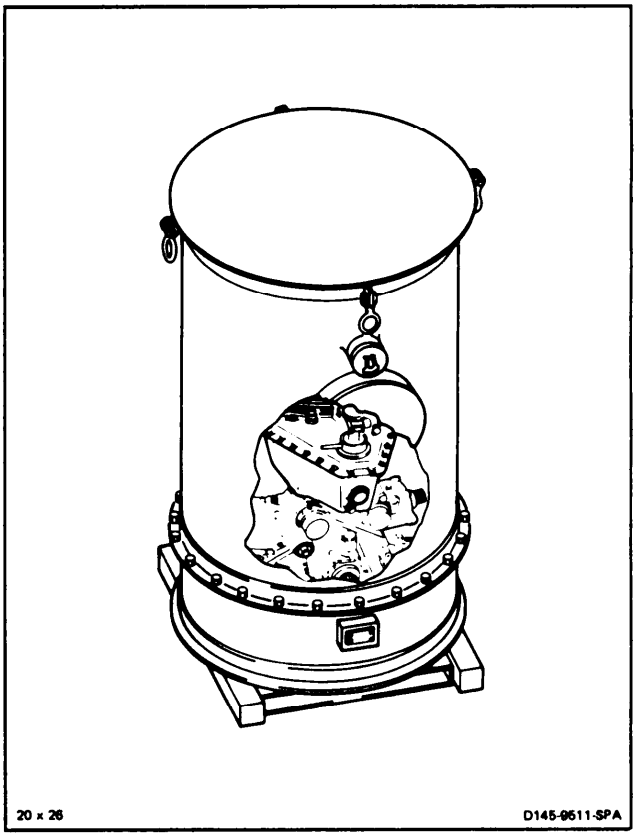
WARNING

Be careful when releasing air under pressure, wear goggles. Personal injury can result.

13. **Push pressure relief valve (27)** until pressure in container (12) is **0 psi.**
14. **Disconnect air line (26)** from cover (20).
15. **Install plug (25)** in cover (20).



FOLLOW-ON MAINTENANCE:
None



END OF TASK

6-75 REMOVE COMBINING TRANSMISSION FROM STORAGE 6-75

INITIAL SETUP

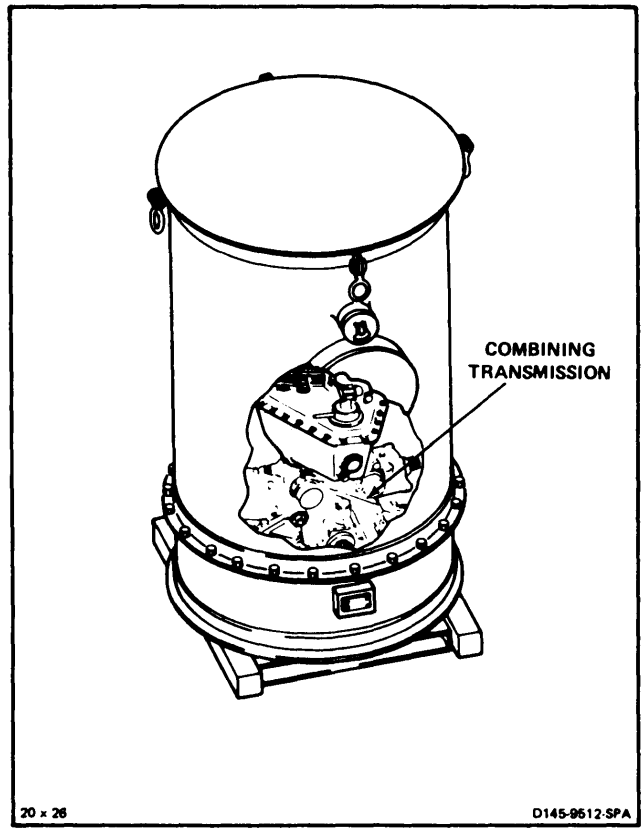
Applicable Configurations:
All

Tools:
Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Sling (T34)
Work Hoist
Container, Two Quart
Workstand (T20)

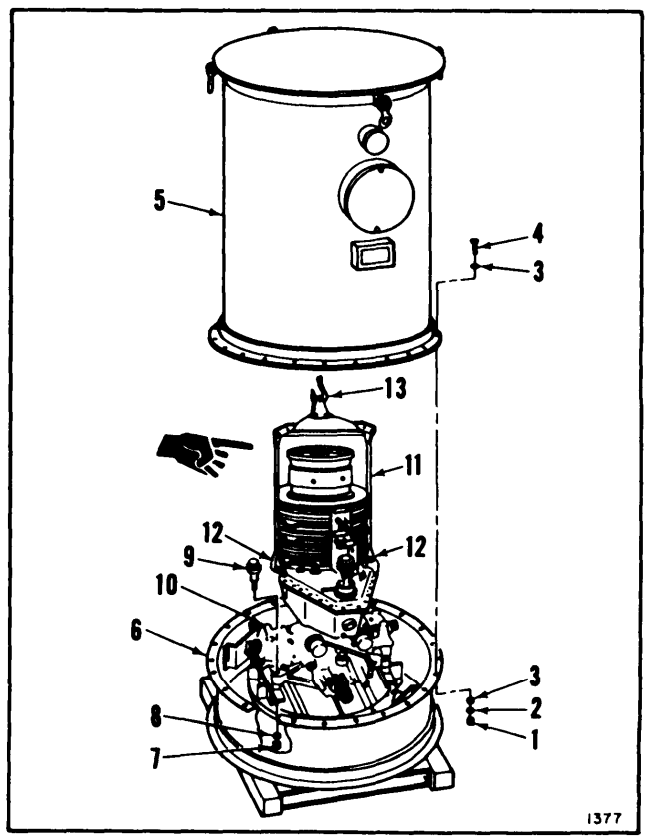
Materials:
Dry Cleaning Solvent (E162)
Cloths (E120)
Gloves (E186)

Personnel Required:
Medium Helicopter Repairer (2)
Inspector

Equipment Condition:
Off Helicopter Task



1. Remove 24 nuts (1), washers (2 and 3), and bolts (4) from cover (5). Remove cover.
2. Remove and discard desiccant bags from container (6).
3. Remove four nuts (7), washers (8), and bolts (9) from transmission (10).
4. **Connect sling (134) (11)** to two lugs (12). **Connect work hoist (13)** to sling.
5. With aid of helper, carefully **lift transmission (10)** from container (6).
6. Set transmission (10) down on workstand (T20). Remove sling (T34) (11).
7. Install four bolts (9), washers (8), and nuts (7) in container (6).
8. Install cover (5). Install 24 bolts (4), washers (3), split washers (2) and nuts (1).



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9. Remove all tape and barrier material from transmission (10).

WARNING

Dry cleaning solvent (E162) is flammable and toxic. It can irritate skin and cause burns. Use only in well-ventilated area, away from heat and open flame. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.

CAUTION

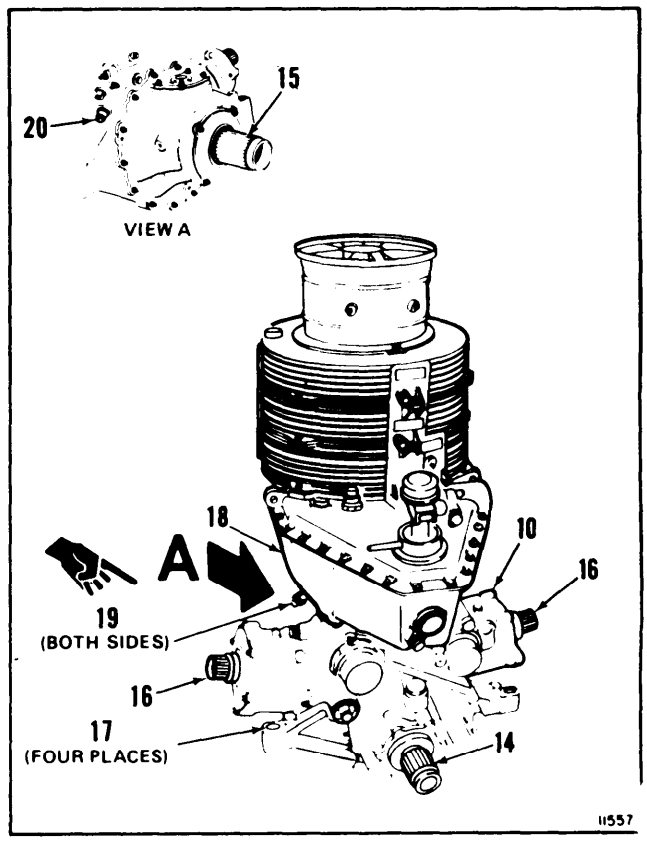
Touching splines with bare fingers can cause corrosion.

10. **Remove corrosion preventive compound from** forward output shaft **splines (14),** aft output shaft **splines (15),** input shaft **splines (16) and four bushings (17).** Use dry cleaning solvent (E162) and clean cloths (E120). Wear goggles and gloves (E186).

11. **Drain residual oil** from each of three compartments of sump (18) as follows:

a. Install hose on drain valve (19 or 20). Push in drain valve, twist it, and pull. Let oil drain into container.

b. Push in valve (19 or 20), twist it, and pull to close.



INSPECT

FOLLOW-ON MAINTENANCE:

Assemble combining transmission (Task 6-76).

END OF TASK

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692
Torque Wrench, 700 to 1600 Inch-Pounds
Wood Dowel, 1-Inch x 18 Inches

Materials:

Dry Cleaning Solvent (E162)
Cloths (E120)
Grease (E190)
Gloves (E186)

Parts:

Packings

Personnel Required:

Medium Helicopter Repairer (2)
Inspector

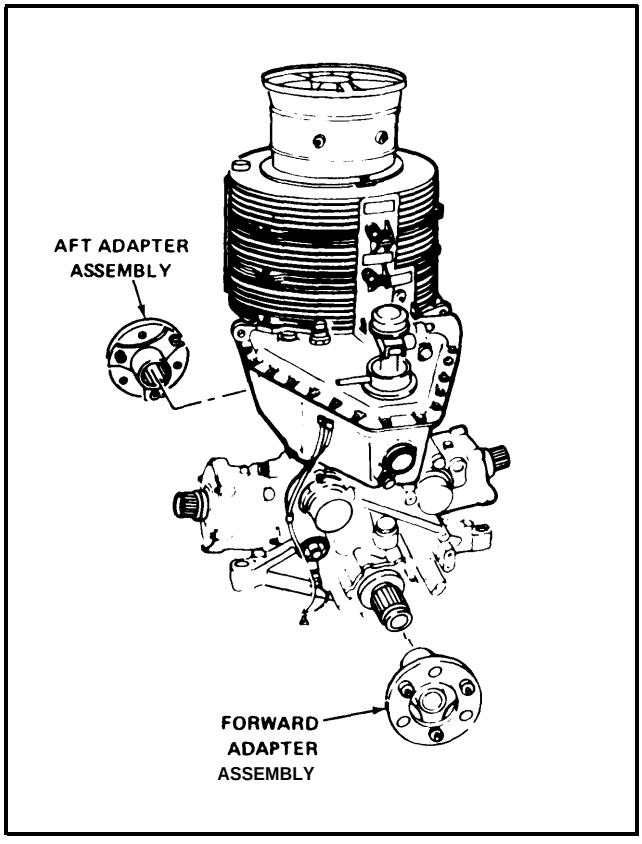
References:

TM 55-1520-240-23P

General Safety Instructions:

WARNING

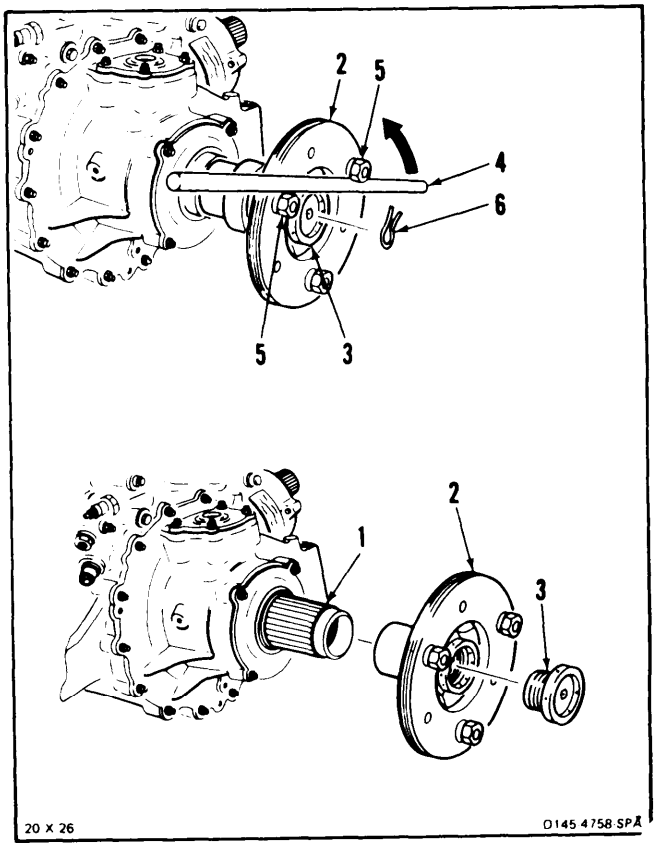
Dry cleaning solvent (E162) is flammable and toxic. It can irritate skin and cause bums. Use only in well-ventilated area, away from heat and open flame. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.



GO TO NEXT PAGE

6-76 ASSEMBLE COMBINING TRANSMISSION (Continued) 6-76

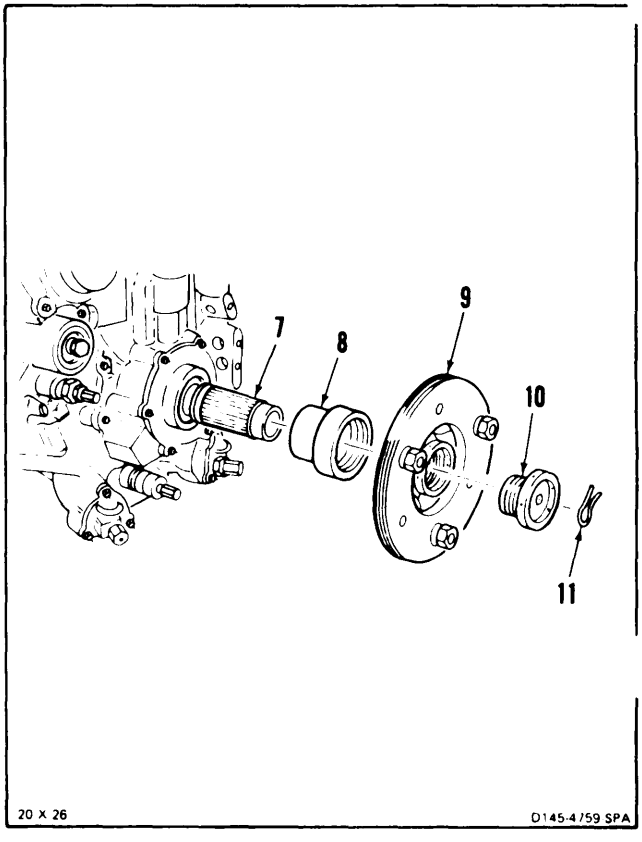
1. Clean splines on aft output shaft (1) and adapter assembly (2). Use dry cleaning solvent (E162) and clean cloths (E120). Wear gloves (E186) and goggles.
2. Pack splines on output shaft (1) and adapter assembly (2) with grease (E190).
3. **Install adapter assembly (2)** on output shaft (1). Wipe off excess grease with cloths (E120).
4. Coat thread of retainer (3) with grease (E190). **Install retainer.**
5. Place wood dowel (4) across nuts (5) as shown. Hold dowel to keep adapter assembly (2) from turning. **Torque retainer (3) to 825 inch-pounds.** Continue tightening to align holes in retainer and adapter assembly.
6. **Install lockring (6).** Check that lockring protrudes through adapter assembly (2) at least 0.060 inch.



7. Clean splines on forward output shaft (7), retainer (8), and adapter assembly (9). Use solvent (E162) and clean cloths (E120). Wear gloves (E186) and goggles.
8. Pack splines on shaft (7), retainer (8), and adapter assembly (9) with grease (E190).
9. **Install retainer (8) and adapter assembly (9)** on shaft (7). Wipe off excess grease with cloths (E120).
10. **Loosely install retainer (10)** to align holes in retainer and adapter assembly (9). **Install lockring (11).**

NOTE

Adapter assembly is adjusted and torqued during sync shaft installation.



GO TO NEXT PAGE

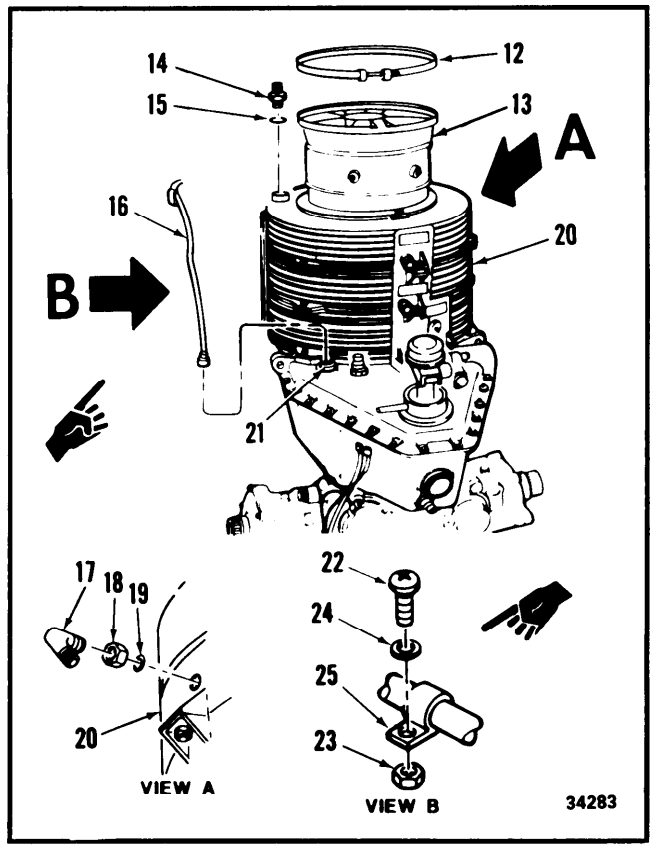
11. **Install coupling (12)** around top of fan (13).
12. **Install reducer (14)** and packing (15) in oil cooler (20).
13. **Install elbow (17),** nut (18), and packing (19) on oil cooler (20). Elbow shall point down and aft.

13.1. **Connect oil hose (16)** to transducer (21).

13.2. **Install clamps (25)** on oil hose (16).

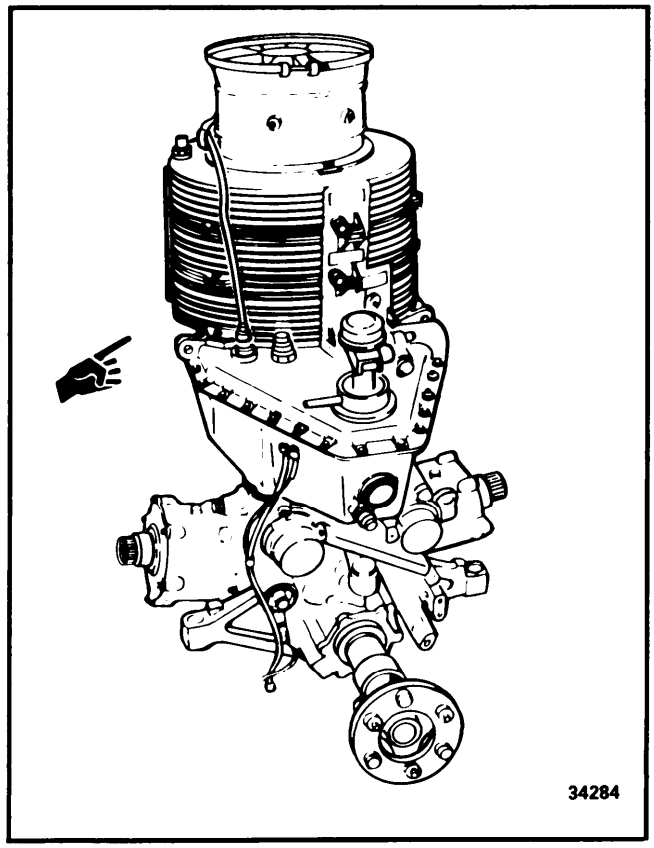
13.3. **Install screws (22),** nuts (23), and washers (24) in clamps (25) at two places.

13.4. **Connect clamps (25)** to oil cooler (20).



INSPECT

FOLLOW-ON MAINTENANCE:
None



END OF TASK

6-77 INSTALL COMBINING TRANSMISSION 6-77

INITIAL SETUP

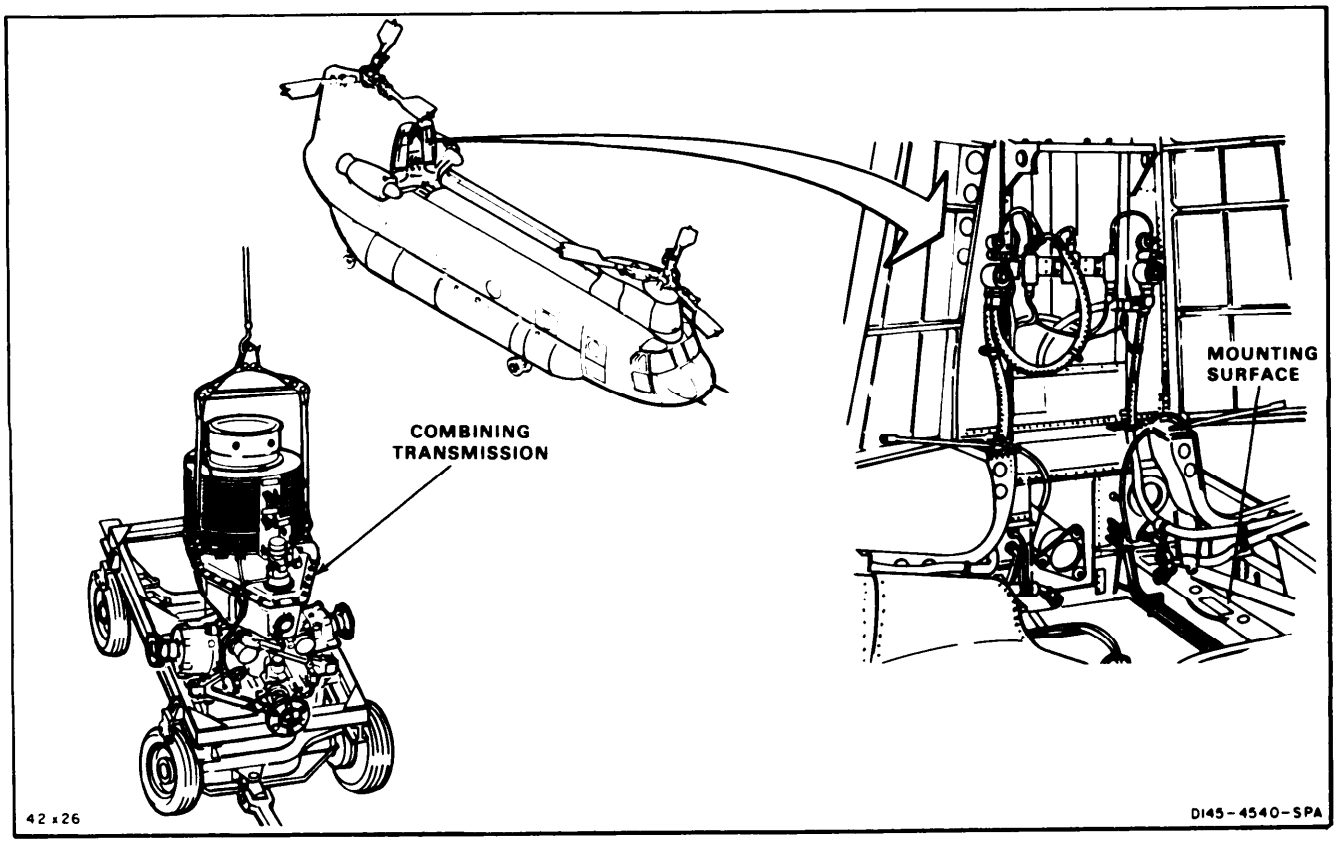
Applicable Configurations:
All

Tools:
Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692
Open End Wrench, 1 1/2-inch
Open End Wrench, 1 1/4-inch
Container, Two Quart
Hoist, 2000 Pound Capacity
Sling (T34)
Torque Wrench, 30 to 150 Inch-Pounds
Torque Wrench, 700 to 1600 Inch-Pounds
Rope Guide Lines (2)

Materials:
Sealant (336)
Oil (254)
Cloths (E120)
Gloves (E186)

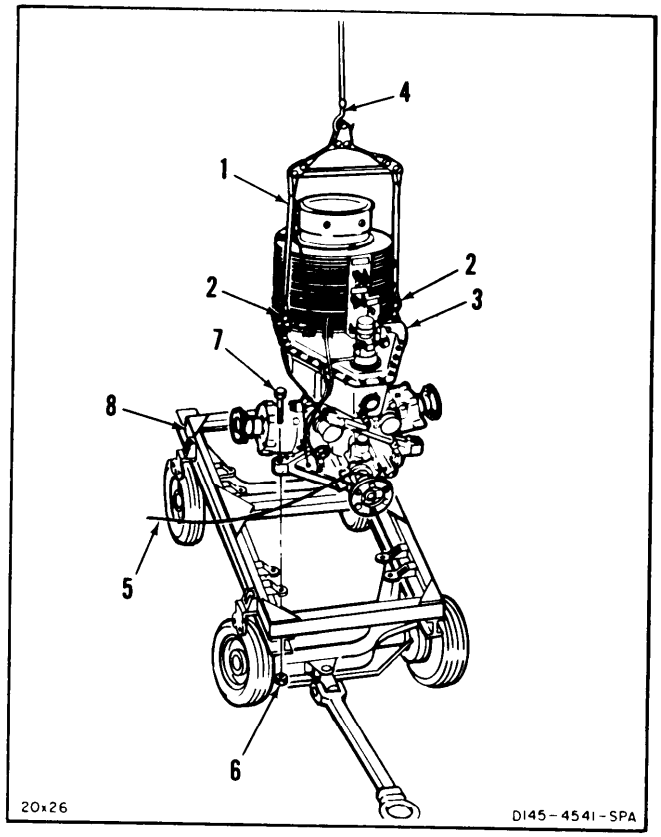
Personnel Required:
67U10 Medium Helicopter Repairer
67U20 Medium Helicopter Repairer
67U30 Inspector

References:
TM 55-1520-240-23P



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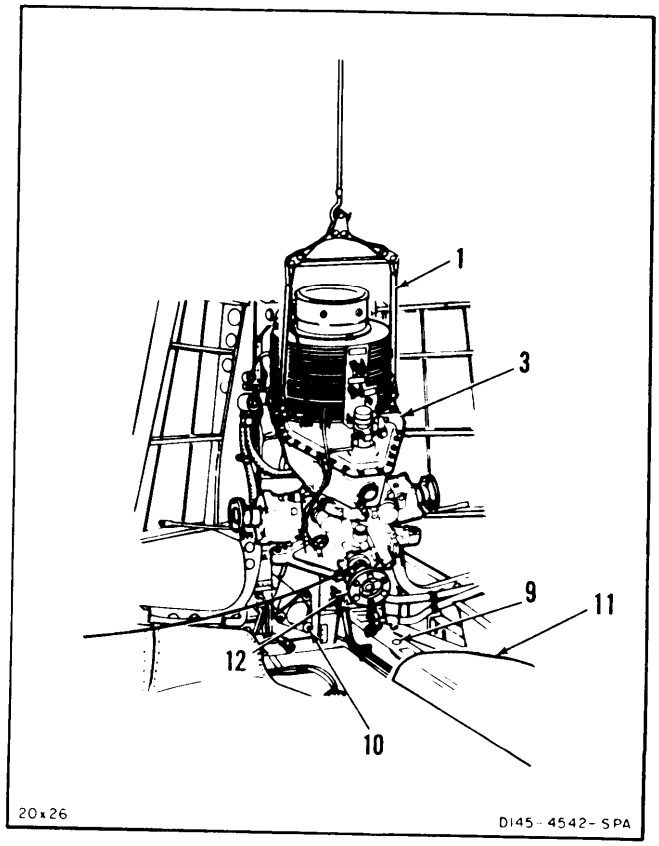
1. **Connect sling (T34) (1)** to two hoisting eyes (2) on transmission (3). **Connect hoist hook (4)** to sling (T34).
2. Attach rope guide line (5) to each side of transmission (3).
3. Remove four nuts (6) and bolts (7). **Raise transmission (3) from adapter (8).**



WARNING

Transmission is heavy and can injure personnel if it drops. Transmission must be supported by hoist and moved carefully to prevent injury to personnel.

4. Raise transmission (3) to helicopter. Align it with four mounting holes (9) and aft shaft (10).
5. With aid of helper, **lower transmission (3)** to four mounting holes (9). Raise and lower access door (11) as needed to clear adapter assembly (12). Keep tension on sling (T34) (1).



GO TO NEXT PAGE

6. Coat four bolts (13) with oil (E254). **Install bolts in mounting lugs (14).**

NOTE

Refer to Task 1-13, para 8, for re-use of self-locking nuts.

7. **Install four washers (15) and nuts (16)** at cabin ceiling. When nuts are installed at least three turns, release tension from sling (T34) (1).

CAUTION

Do not over torque nuts. Too much torque can damage nuts or bolts.

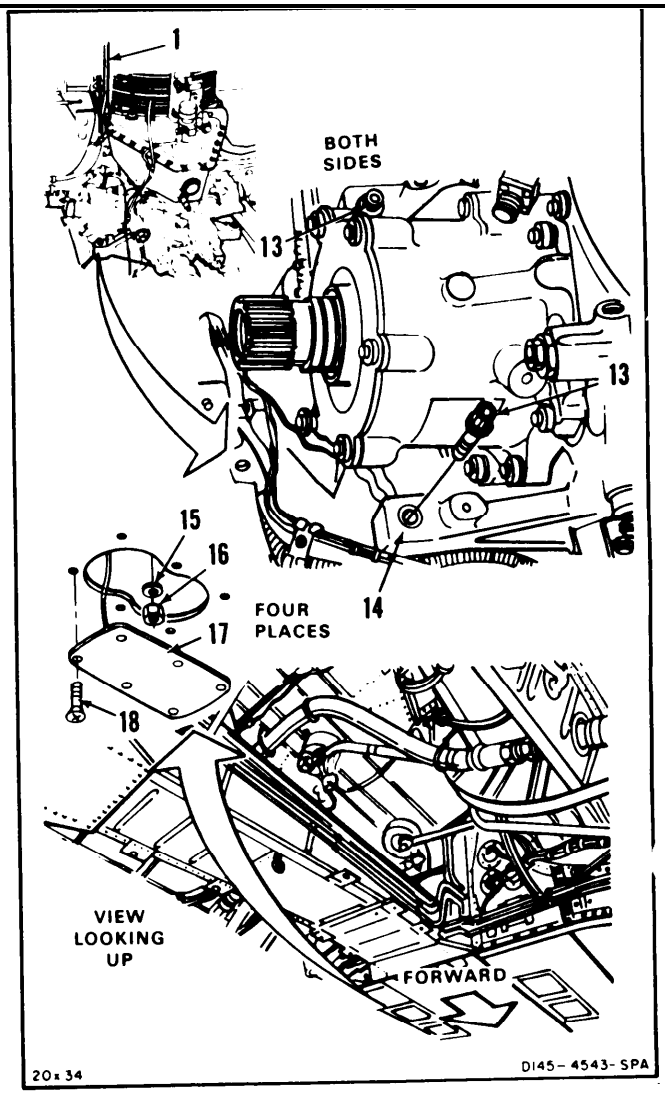
8. **Torque four nuts (16) to 725 inch-pounds.** Check each bolt (13). Bolt shall extend 0.08 to 0.12 inch through nut. Use washers (15) of different thickness as needed.

INSPECT

WARNING

Sealant (E336) can irritate skin and cause burns. Avoid contact with skin, eyes, and clothing. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.

9. From inside, **install four access panels (17)** and 24 screws (18). Seal panels with sealant (E336). Wear gloves (E186) and goggles.



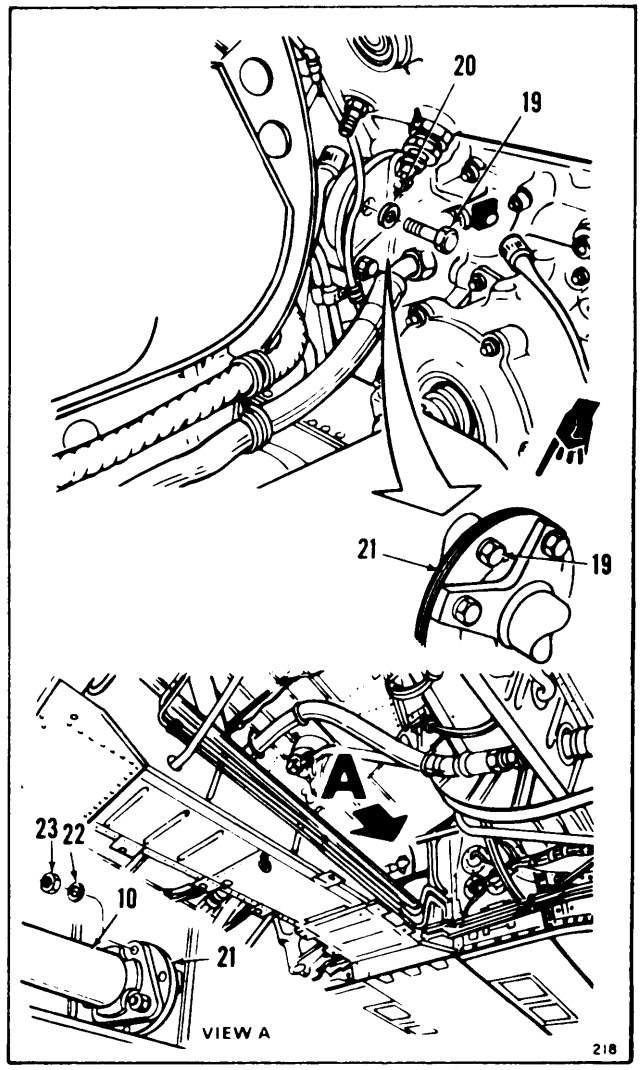
GO TO NEXT PAGE

10. Coat three bolts (19) with oil (E254). **Install three bolts** and special washers (20) through aft adapter assembly (21) and shaft (10). **Install** three washers (22) and **nuts (23).**

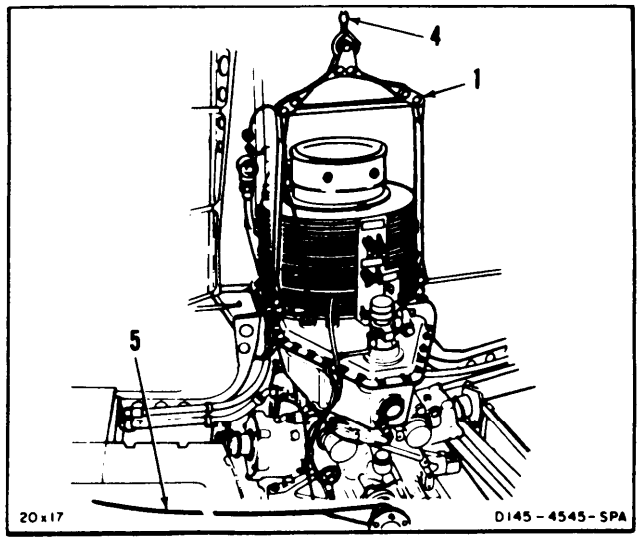
CAUTION

Do not allow bolt to turn. If bolt turns, it can damage bolt and plates.

11. Hold bolts (19) to keep bolts from turning. **Torque nuts (23) to 1050 inch-pounds.**

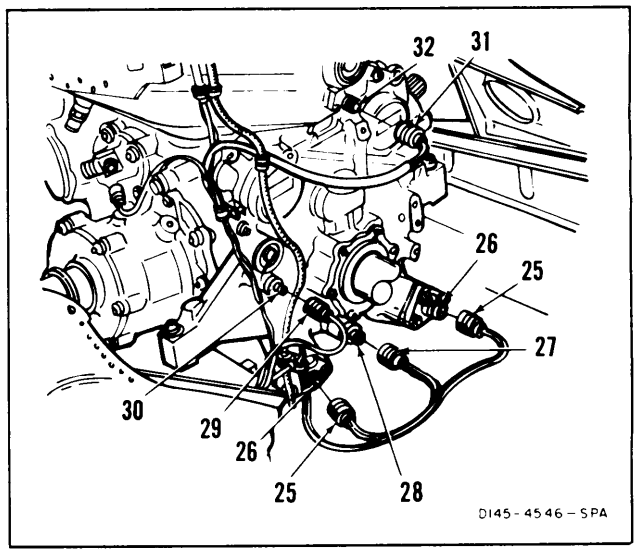


12. Remove hoist hook (4) and sling (1). Remove two rope guide lines (5).

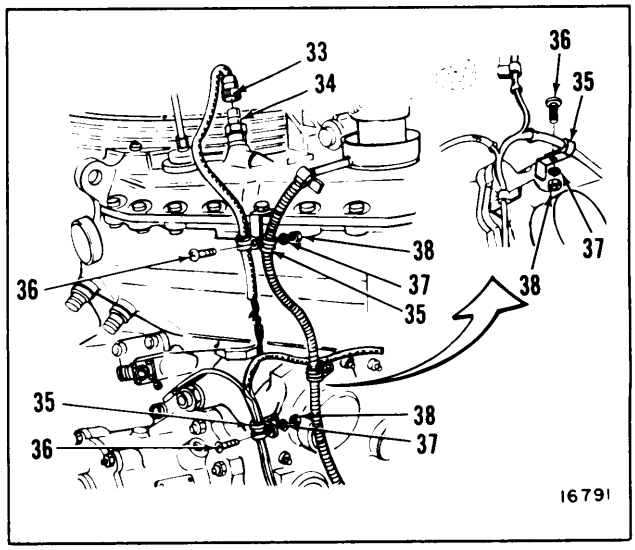


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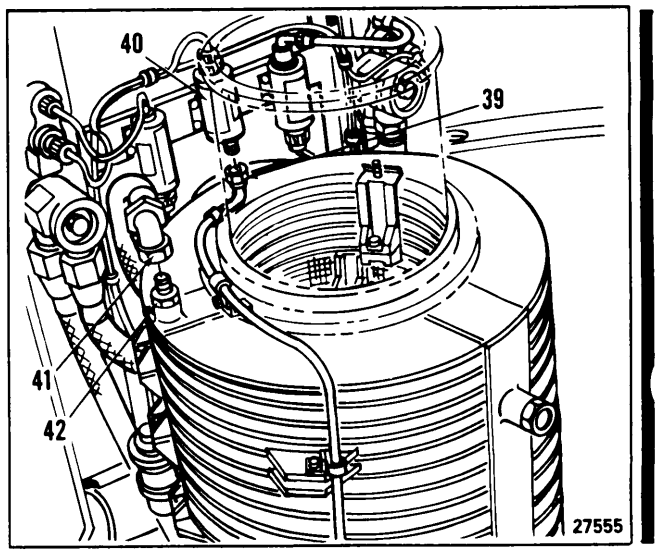
13. **Connect two connectors (25)** to COMB DEBRIS SCREEN receptacles (26).
14. **Connect connector (27)** to COMP CHIP DETECTOR receptacle (28).
15. **Connect connector (29)** to COMB PRESS SWITCH-AUX receptacle (30).
16. **Connect connector (31)** to COMB XMSN TEMP BULB receptacle (32).



17. **Connect electrical connector (33)** to COMB PRESS SWITCH-MAIN receptacle (34).
18. **Connect clamps (35)** with screws (36), washers (37), and nuts (38) **at three places.**

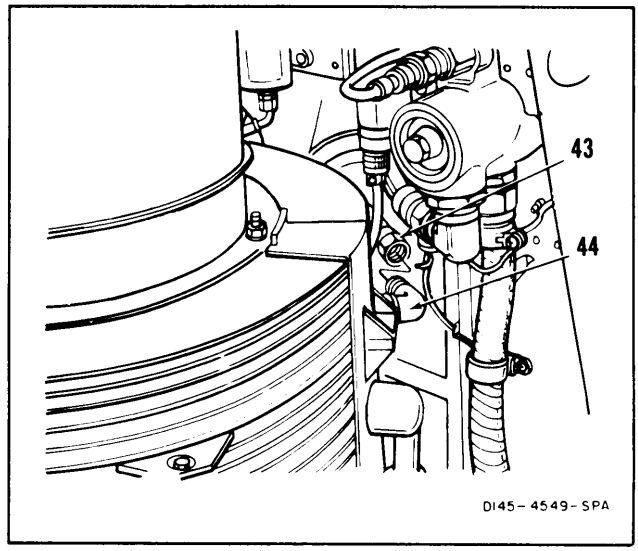


19. **Connect oil hose (39)** to transducer (40).
20. **Connect oil hose (41)** to reducer (42). Remove and discard tag.



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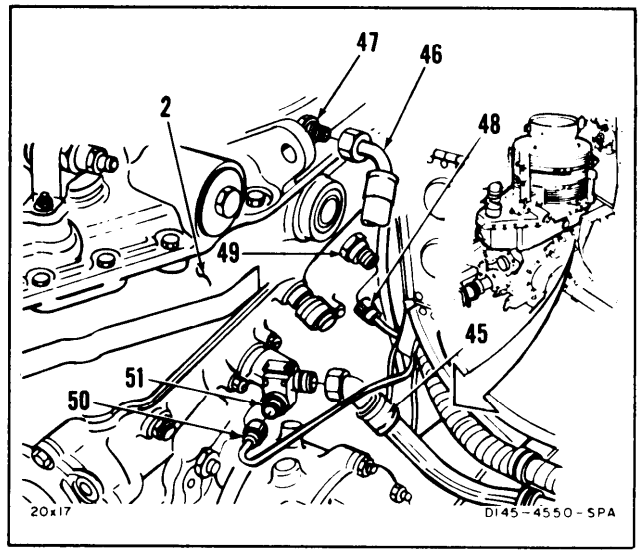
21. **Connect oil hose (43)** to elbow (44). Remove and discard tag.



NOTE

Connect hose quickly to prevent oil loss.

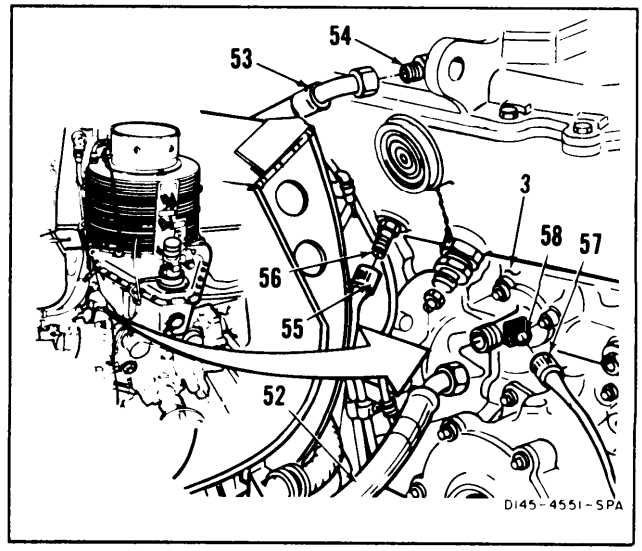
22. Remove cap and **connect oil hose (45)** to left side of transmission (2). Use container to catch spilled oil,
23. **Connect breather hose (46)** to reducer (47).
24. **Connect connector (48)** to LH ENGINE XMSN TEMP BULB receptacle (49). **Connect connector (50)** to LH ENG XMSN INDICATING SCREEN receptacle (51).



NOTE

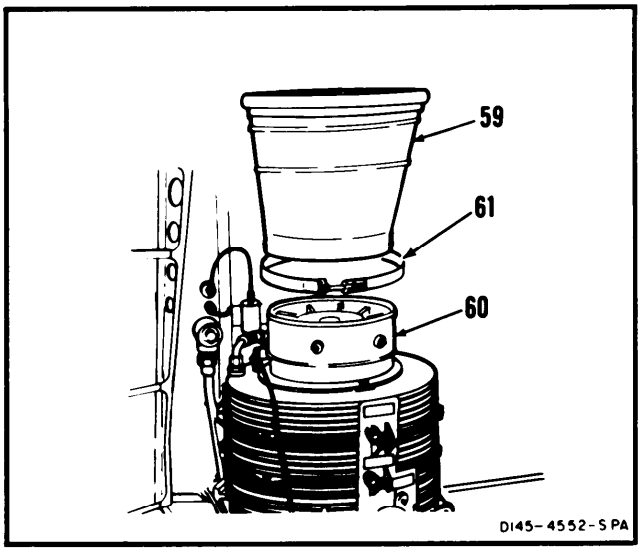
Connect hose quickly to prevent oil loss.

25. Remove cap and **connect oil hose (52)** to right side of transmission (3). Use container to catch spilled oil.
26. **Connect breather hose (53)** to reducer (54).
27. **Connect connector (55)** to RH ENGINE XMSN TEMP BULB receptacle (56). **Connect connector (57)** to RH ENG XMSN INDICATING SCREEN receptacle (58).



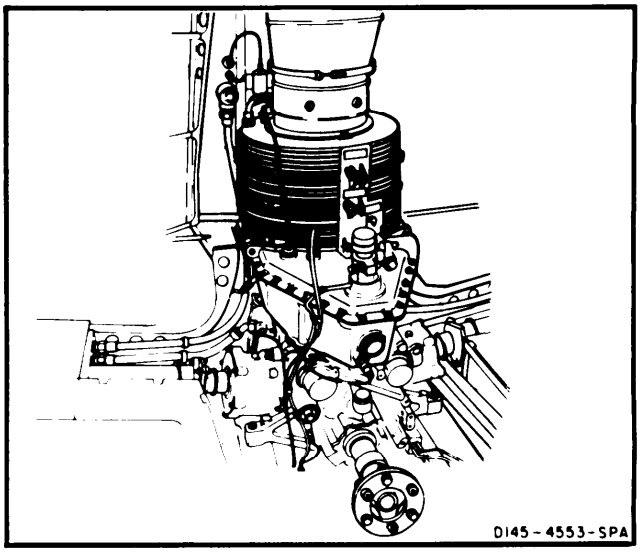
GO TO NEXT PAGE

28. **Install duct (59)** on fan (60).
29. Coat thread of clamp (61) with oil (E254). **Install clamp** around duct (59) and fan (60). **Torque clamp to 35 inch-pounds.**



INSPECT

FOLLOW-ON MAINTENANCE:
Install aft drive shafting (Task 6-29).
Align forward drive shafting (Task 6-20).
Phase rotary-wing blades (Task 6-28).
Install left and right engine shaft and combining transmission adapter assembly (Task 6-32).
Install aft pylon lower fairing (Task 2-2).
Remove, inspect, and install debris detection screens (Tasks 6-174, 6-175, and 6-176).
Service transmission (Task 1-54).
Close aft pylon doors (Task 2-2).
Perform a combining transmission oil cooler fan vibration check (Tasks 6-217 through 6-223, as applicable).
Perform ground run (TM 55-1520-240-10).



END OF TASK

SECTION VI
AFT ROTARY-WING DRIVE TRANSMISSION

6-78 REMOVE AFT TRANSMISSION SUMP

INITIAL SETUP

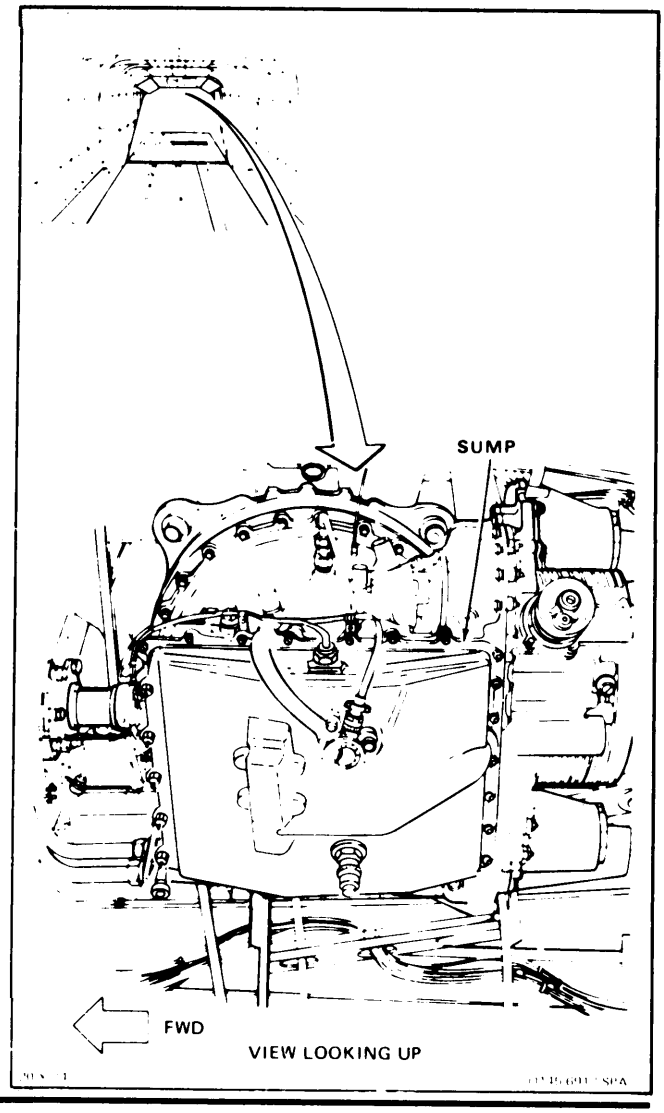
Applicable Configurations:
All

Tools:
Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Container, 14-Quart (3)

Materials:
None

Personnel Required:
Medium Helicopter Repairer

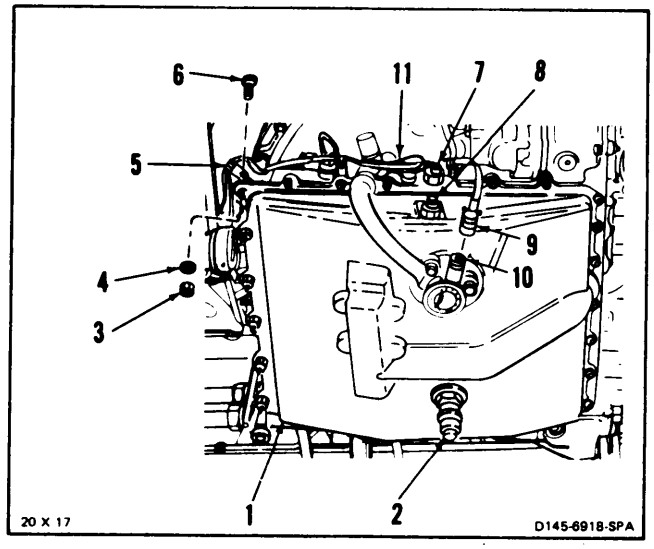
Equipment Condition:
Battery Disconnected (Task 1-39)
Electrical Power Off
Baffles Under Aft Transmission Open (Task 2-2)
Aft Transmission Drip Tray Removed (Task 2-3)
Cargo Ramp Open and Level (TM 55-1520-240-T)



NOTE

Sump holds about 30 quarts of oil.

1. Position container under sump (1).
2. Push in drain valve (2), twist it, and pull. **Let oil drain into container.** Push in valve, twist it, and pull down to close.
3. **Remove** nuts (3), washers (4), **wire clamp plates (5), and bolts (6)** from three places at left and forward edges of sump (1).
4. **Disconnect connector (7)** from temperature probe receptacle (8). **Disconnect connector (9)** from chip detector receptacle (10). Secure wires (11) above sump (1).



GO TO NEXT PAGE

6-78 REMOVE AFT TRANSMISSION SUMP (Continued)

5. **Remove 21 nuts (3)** and washers (4) from around sump (1). **Remove 14 bolts (6)** and washers (12).

CAUTION

Be careful not to damage gasket seal when lowering sump.

NOTE

Do not tilt sump. Oil can spill.

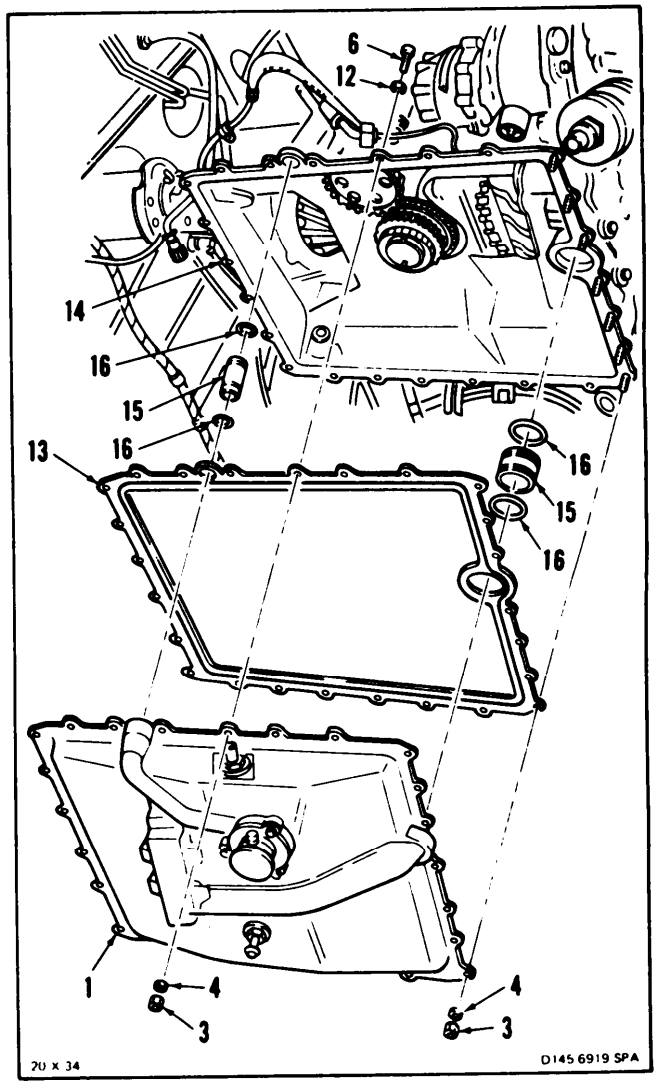
6. Lower and **remove sump (1) and gasket seal (13)** from transmission (14).

NOTE

Tubes may stay in sump or transmission.

7. If two oil transfer tubes (15) and packings (16) remain in transmission (14), remove them. Install in sump (1).

8. Drain oil from sump (1).



FOLLOW-ON MAINTENANCE:

None

END OF TASK

6-79 DISASSEMBLE AFT TRANSMISSION SUMP

INITIAL SETUP

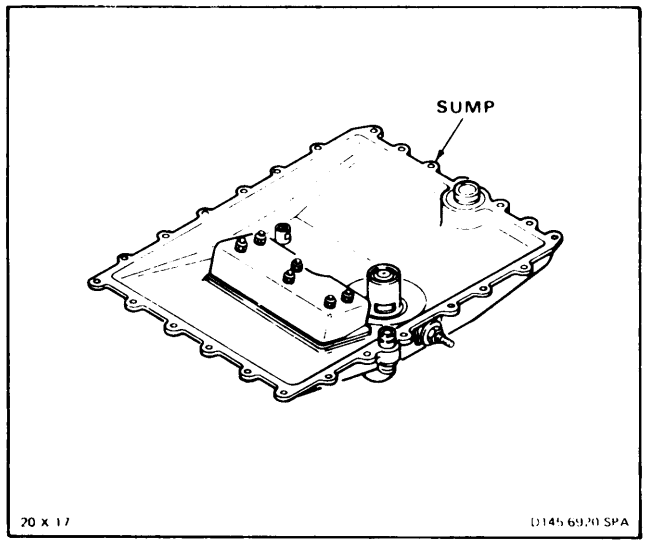
Applicable Configurations:
All

Tools:
Airframe Repairer's Tool Kit,
NSN 5180-00-323-4876
Open End Wrench, 1 3/8-Inch

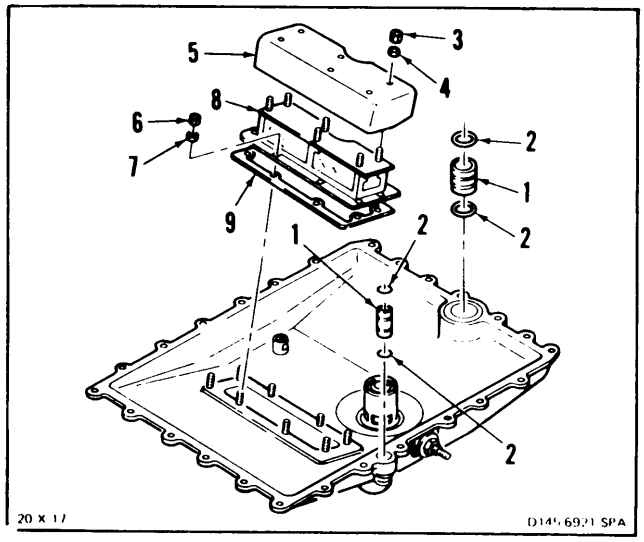
Materials:
None

Personnel
Aircraft Structure Repairer

Equipment Condition:
Off Helicopter Task



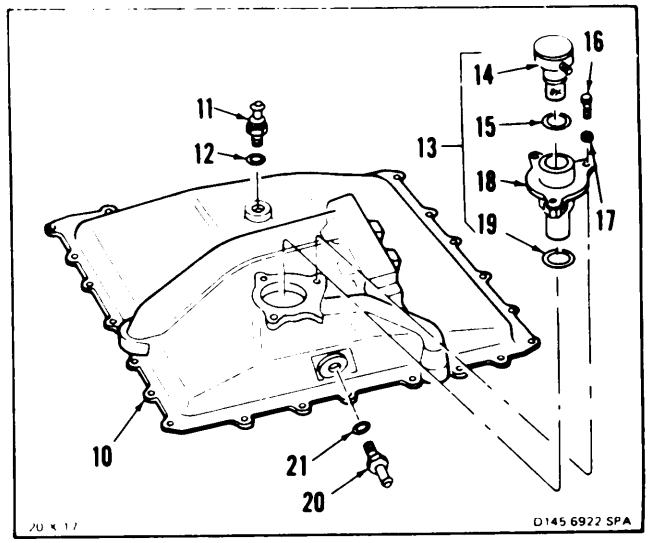
1. **Remove two oil transfer tubes** (1) and four packings (2).
2. Remove six nuts (3) and washers (4) from screen cap (5). **Remove cap.**
3. Remove eight nuts (6) and washers (7) from inlet screen (8). **Remove screen and gasket seal (9).**



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6-79 DISASSEMBLE AFT TRANSMISSION SUMP (Continued 6-79

4. Turn sump (10) over 180 degrees. Remove lockwire from drain valve (11). **Remove drain valve** and packing (12).
5. **Remove detection screen and chip detector (13)** as follows:
   a. Push in cap (14), twist to left, and pull to remove cap and packing (15).
   b. Remove lockwire from three bolts (16). Remove bolts and washers (17).
   c. Remove housing (18) and packing (19).
6. Remove lockwire from temperature probe (20). **Remove temperature probe** and packing (21).



FOLLOW-ON MAINTENANCE:

None

END OF TASK

INITIAL SETUP

Applicable Configurations:

All

Tools:

Airframe Repairer's Tool Kit,
NSN 5180-00-323-4876
Deep Socket, 1 3/8-inch
Torque Wrench, 5 to 50 Inch-Pounds
Torque Wrench, 30 to 150 Inch-Pounds
Source of Low-Pressure Compressed Air

Materials:

Lockwire (E231)
Dry Cleaning Solvent (E162)
Gloves (E186)
Cloths (E120)
Oil (E254)

Parts:

Packings

Personnel Required:

Aircraft Structure Repairer
Inspector

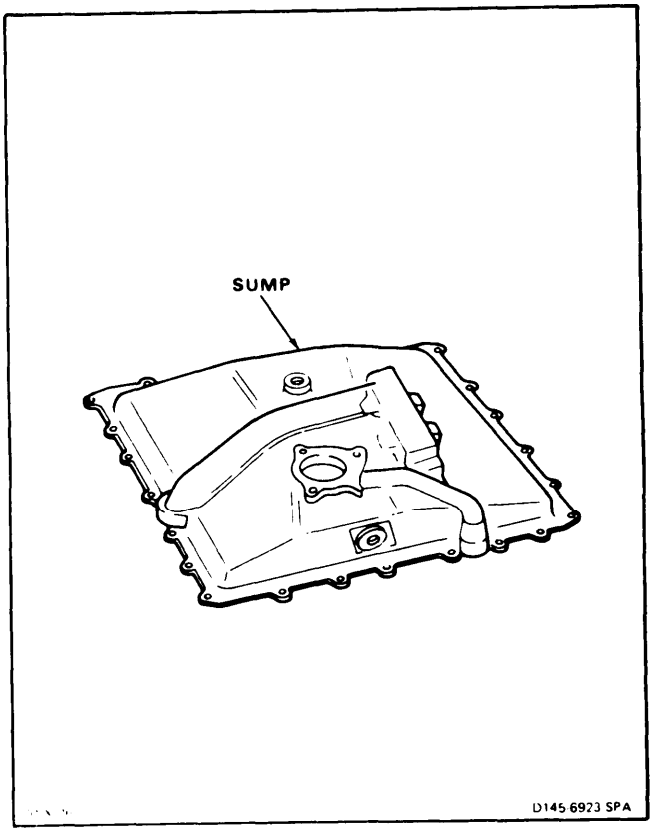
References:

TM 55-1520-240-23P

General Safety Instructions:

WARNING

Dry cleaning solvent (E162) is flammable and toxic. It can irritate skin and cause burns. Use only in well-ventilated area, away from heat and open flame. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes. Use goggles when using low pressure compressed air.



GO TO NEXT PAGE

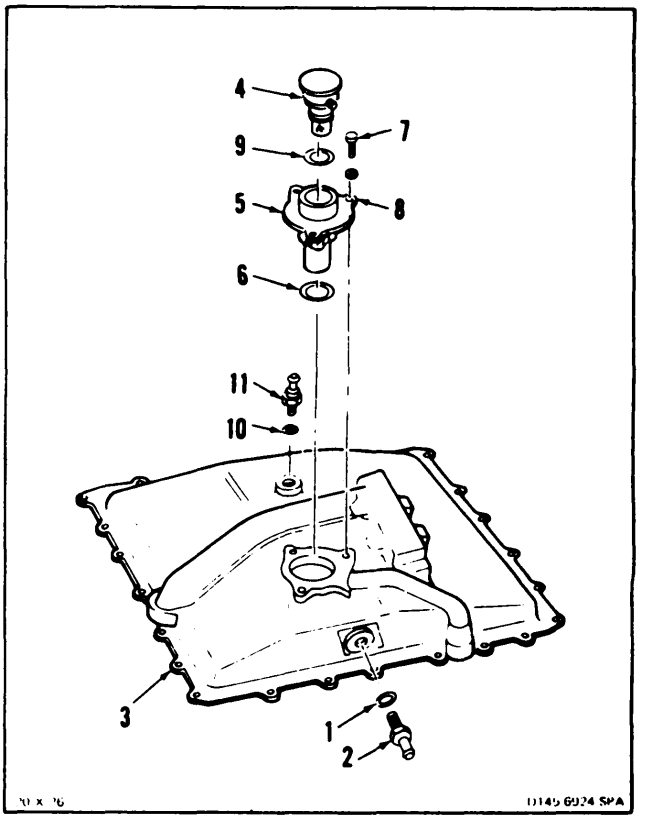
6-80 ASSEMBLE AFT TRANSMISSION SUMP (Continued) 6-80

1. Coat packing (1) and thread of temperature probe (2) with oil (E254) Install packing on probe. **Install temperature probe** in sump (3) **Torque probe to 75 inch-pounds.**
2. Lockwire probe (2) to sump (3). Use Iockwire (E231)
3. If cap (4) and housing (5) are joined, push cap into housing, twist, and pull. Remove cap from housing

NOTE

If cap and housing are new, cleaning is not needed.

4. Clean cap (4) and housing (5). Use dry cleaning solvent (E162) and cloths (E120). Wear gloves (E186).
5. Install packing (6) on housing (5). **Install housing in sump (3). Install three bolts (7) and washers (8). Torque bolts to 60 inch-pounds.**
6. Lockwire three bolts (7) together. Use Iockwire (E231).
7. Press center of cap (4) in. **Install cap** and packing (9) in housing (5) Push in cap until center snaps out flush with outside of housing.
8. Coat packing (10) and thread of drain valve (11) with oil (E254). Install packing on valve. **Install drain valve** in sump (3). **Torque valve to 75 inch-pounds.**
9. Lockwire drain valve (11) to sump (3). Use Iockwire (E231).



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6-80 ASSEMBLE AFT TRANSMISSION SUMP (Continued) 6-80

INSPECT

10. Turn sump (3) over 180 degrees.

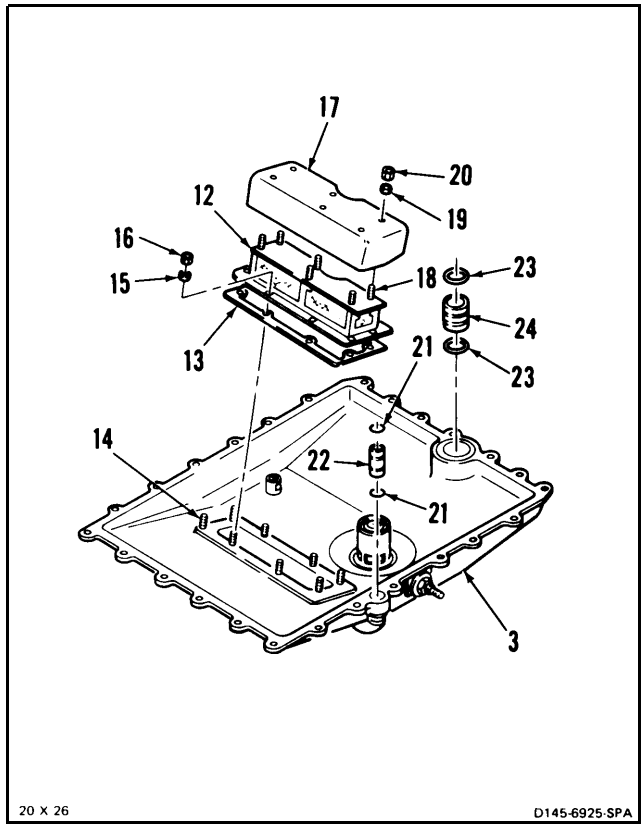
WARNING

Do not use more than 30 psi compressed air for cleaning. Debris propelled under pressure can cause injury to eyes. Use source of compressed air under 30 psi and eye protection to prevent injury to personnel.

NOTE

If screen is new, cleaning is not needed.

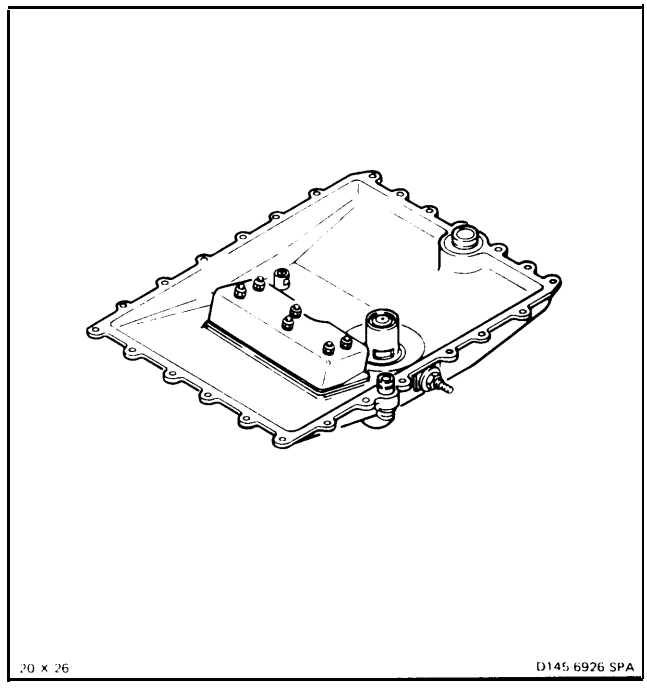
11. Clean inlet screen (12) with dry cleaning solvent (E162) and cloths (E120). Dry screen with compressed air. Wear gloves (E186) and goggles.
12. **Install gasket seal (13) and inlet screen (12)** on eight studs (14). Install eight washers (15) and nuts (16). **Torque nuts to 20 inch-pounds.**
13. **Install screen cap (17)** on six studs (18). Install six washers (19) and nuts (20). **Torque nuts to 20 inch-pounds.**
14. Install two packings (21) on transfer tube (22). **Install transfer tube in sump (3).**
15. Install two packings (23) on transfer tube (24). **Install transfer tube in sump (3).**



INSPECT

FOLLOW-ON MAINTENANCE:

None



END OF TASK

6-81 INSTALL AFT TRANSMISSION SUMP

INITIAL SETUP

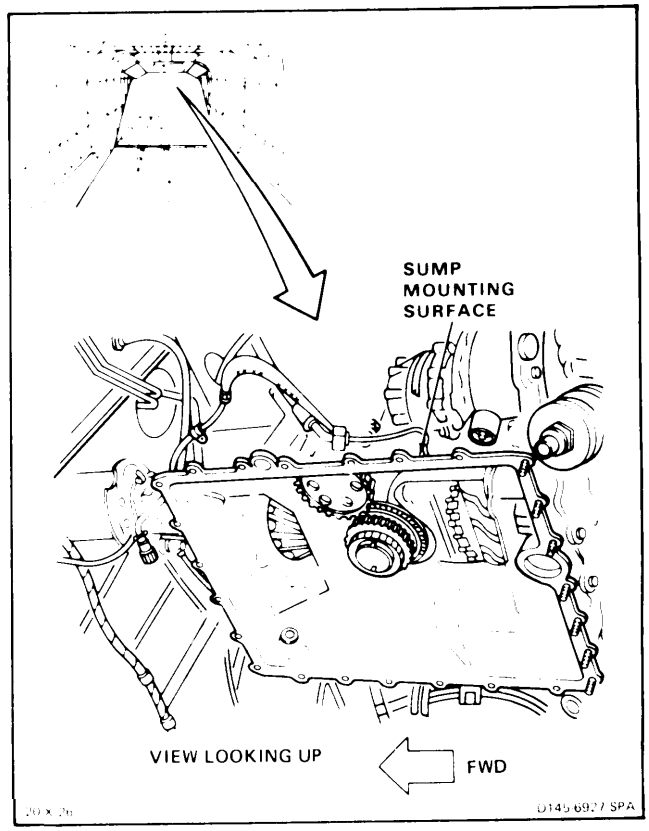
Applicable Configurations:
All

Tools:
Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692
Torque Wrench, 30 to 150 Inch-Pounds

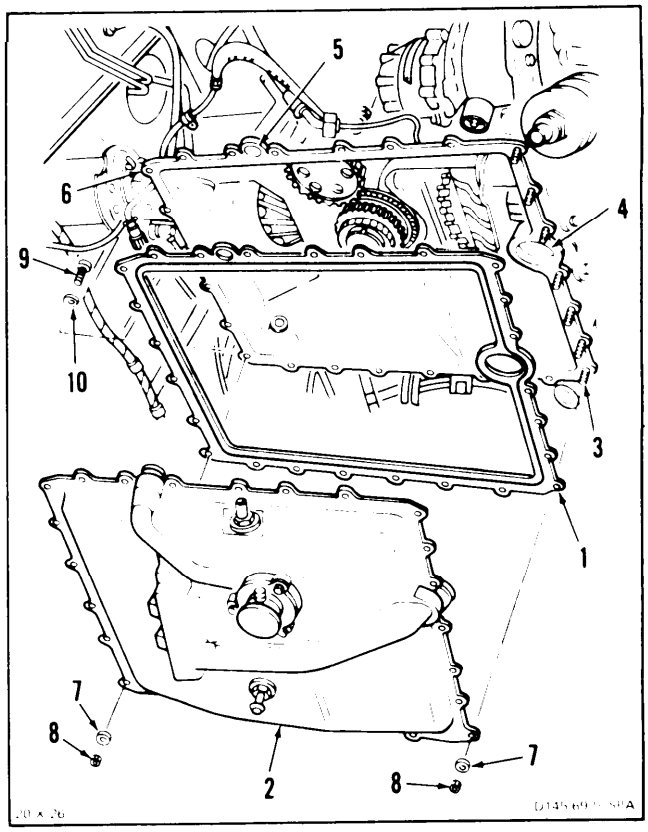
Materials:
None

Personnel Required:
67U10 Medium Helicopter Repairer (2)
67U30 Inspector

References:
TM 55-1520-240-23P



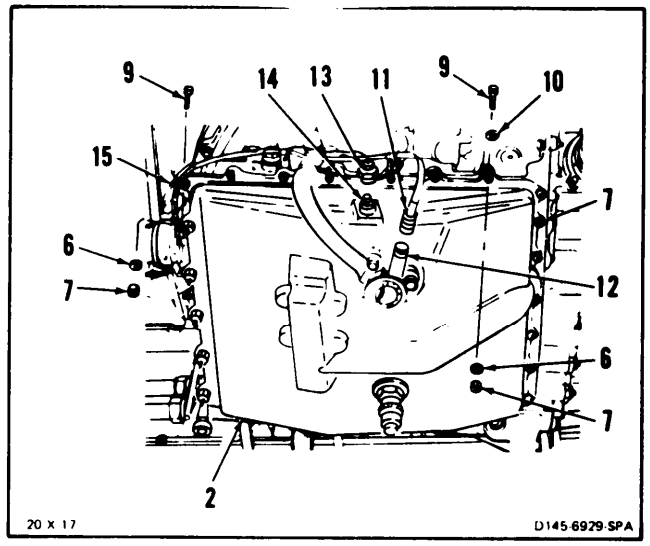
1. Position gasket seal (1) on sump (2).
2. Align sump (2) and gasket seal (1) with seven studs (3) and two transfer tube ports (4 and 5).
3. **Position sump (2) and seal (1) against transmission (6). Install** seven washers (7) and **nuts (8) finger-tight** on studs (3). **Install bolt (9), washers (10 and 7) and nut (8) finger-tight** at right forward corner of sump.



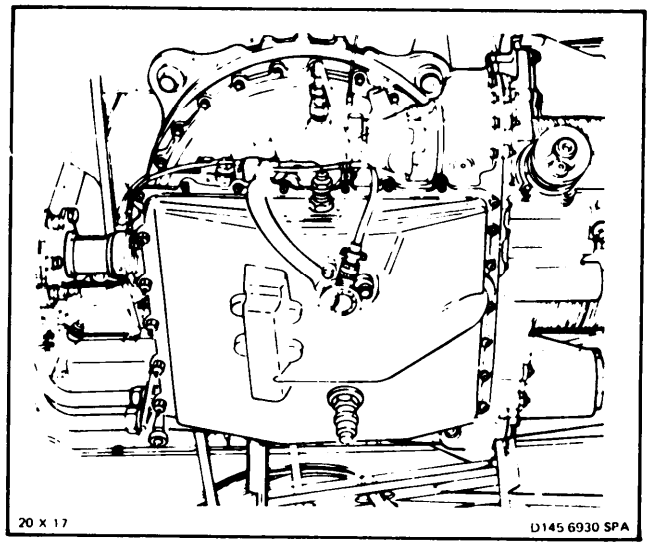
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6-81 INSTALL AFT TRANSMISSION SUMP (Continued)

4. **Connect connector (11)** to chip detector receptacle (12). **Connect connector (13)** to temperature probe receptacle (14).
5. **Install bolts (9), wire clamp plates (15),** washers (6) and nuts (7) at three places at forward and left edges of sump (2).
6. **Install bolts (9),** Washers (10 and 6) and nuts (7) at 13 places around sump (2).
7. **Torque 24 nuts (7) to 60 inch-pounds.**



INSPECT



FOLLOW-ON MAINTENANCE:

Service aft transmission (Task 1-54).

Perform ground run (TM 55-1520-240-10).

Install aft transmission drip tray (Task 2-3).

Close baffles under aft transmission (Task 2-2).

Close cargo ramp (TM 55-1520-240-T).

END OF TASK

6-81.1 CLEAN AND INSPECT AFT TRANSMISSION OIL FILLER SCREEN

INITIAL SETUP

Applicable Configurations:
All

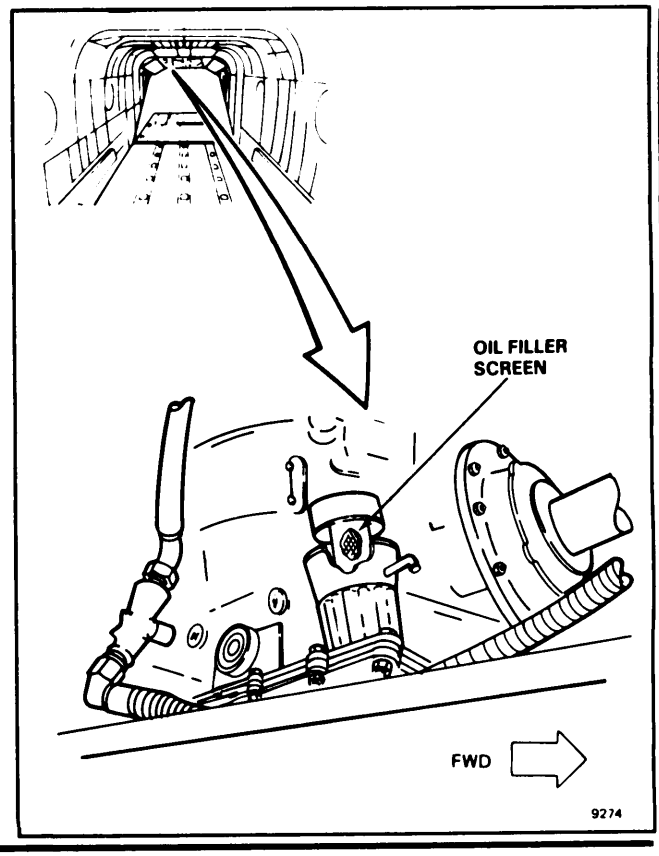
Tools:
Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692

Materials:
Dry Cleaning Solvent (E162)
Cloth (E120)
Brush (E86)
Gloves (E186)

Personnel Required:
Medium Helicopter Repairer
Inspector

References:
Task 6-108
TM 55-1520-240-23P

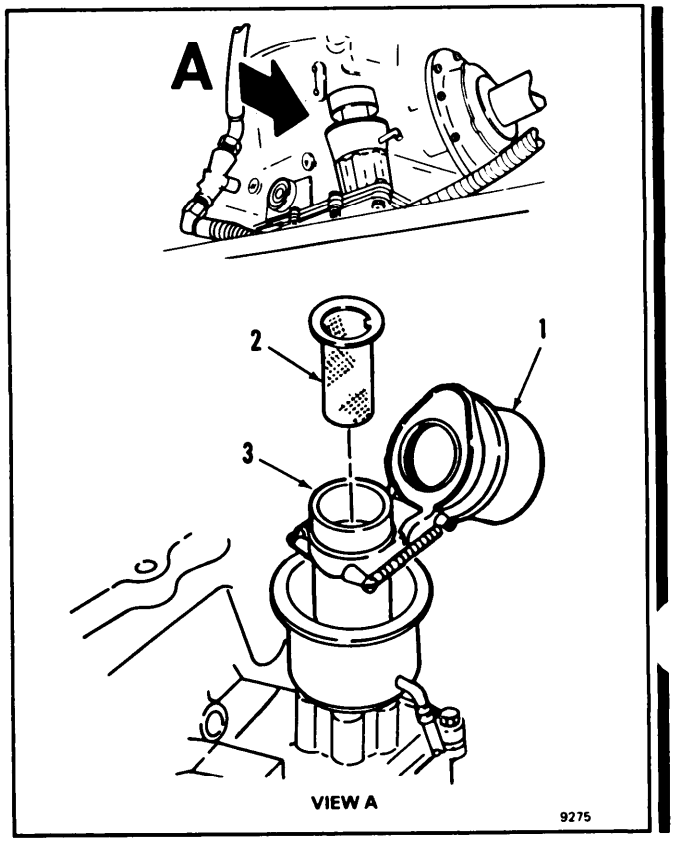
Equipment Condition:
Battery Disconnected (Task 1-39)
Electrical Power Off
Right Baffle Under Aft Transmission Open (Task 2-2)
Cargo Ramp Open and Level (TM 55-1520-240-T)



WARNING

Take precautions to ensure that the transmission is not serviced with the screen removed. Foreign matter could enter the oil system.

1. Open cap **assembly (1).** (2) from neck (3).
2. Close cap assembly (1).



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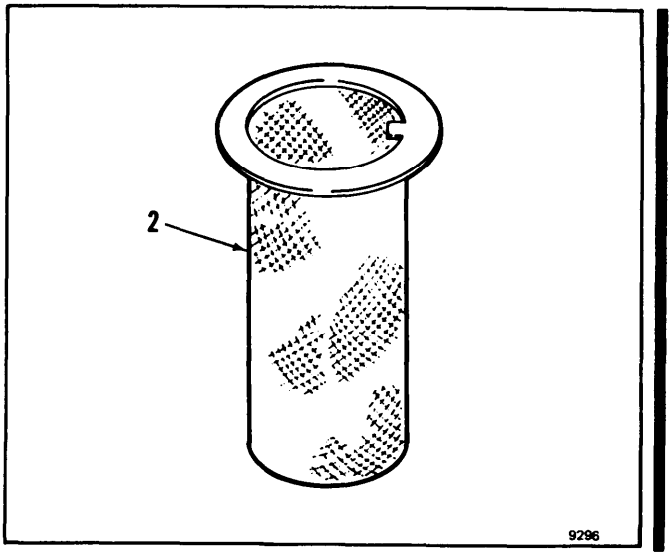
6-81.1 CLEAN AND INSPECT AFT TRANSMISSION OIL FILLER SCREEN (Continued)

3. **Check screen (2)** for bits of metal and other debris. Retain debris for contamination analysis (Task 6-108).

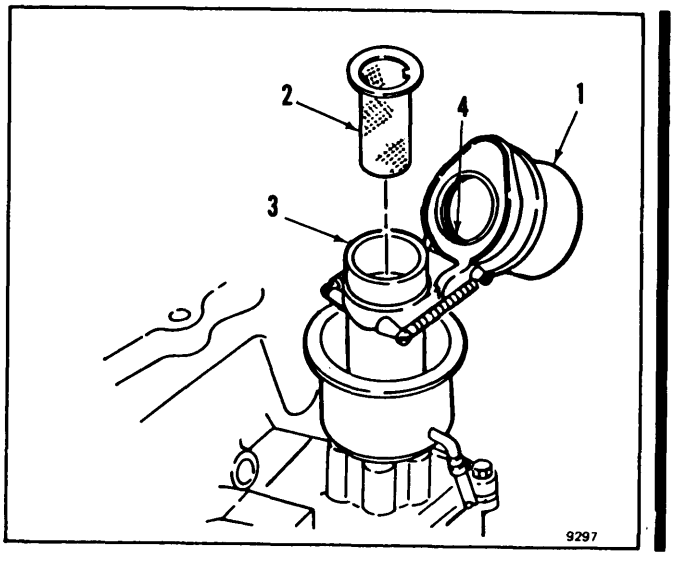
WARNING

Dry cleaning solvent (E162) is flammable and toxic. It can irritate skin and cause burns. Use only in well-ventilated area, away from heat and open flame. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention tor eyes.

4. Clean screen (2) with solvent (E162) and brush (E86). Wear gloves (E186) and goggles. Dry with cloth (E120) or let air dry.
5. **Inspect screen (2)** for tears. There shall be no tears.



6. Open cap assembly (1). **Install screen (2)** in neck (3) of filler.
7. Check packing (4) on underside of cap assembly (1) for condition. There shall be no cuts or nicks.



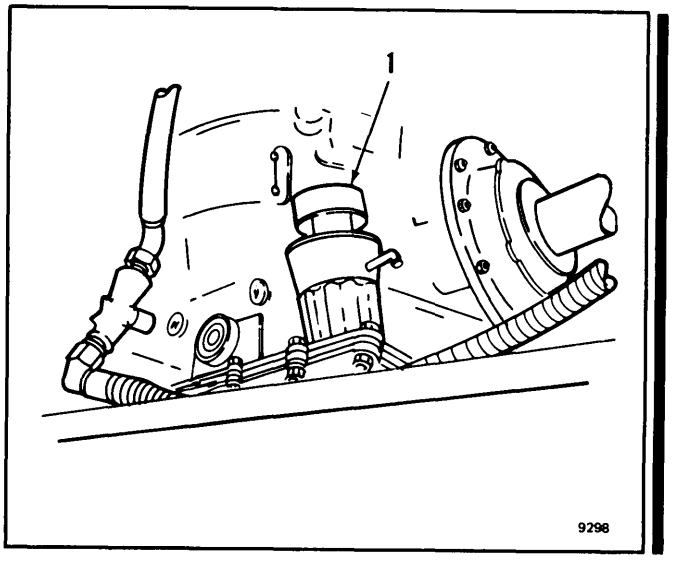
8. Close cap assembly (1).

INSPECT

FOLLOW-ON MAINTENANCE:

Close right baffle under aft transmission (Task 2-2).

Close cargo ramp (TM 55-1520-240-T).



END OF TASK

6-81.2 REMOVE AFT TRANSMISSION OIL FILLER ASSEMBLY 6-81.2

INITIAL SETUP

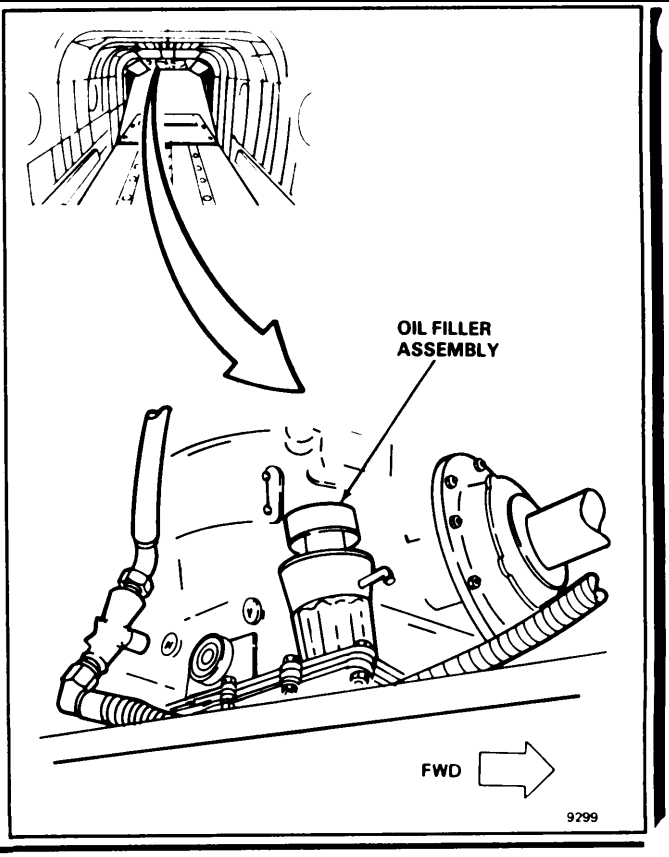
Applicable Configurations:
All

Tools:
Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Workstand

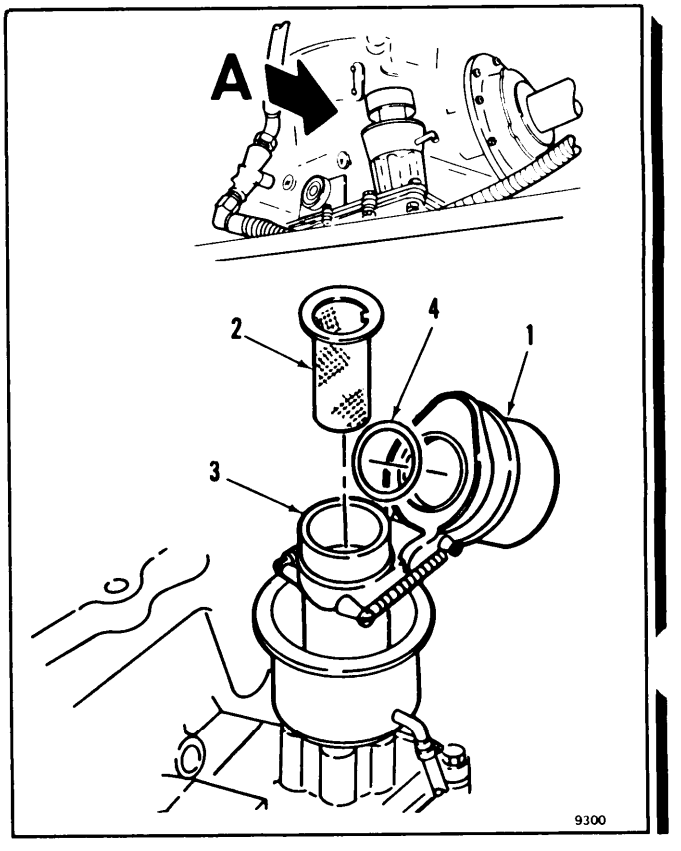
Materials:
Barrier Material (E80)
Masking Tape (E388)

Personnel Required:
Medium Helicopter Repairer

Equipment Condition:
Battery Disconnected (Task 1-39)
Electrical Power Off
Right Baffle Under Aft Transmission Open (Task 2-2)
Cargo Ramp Open and Level (TM 55-1520-240-T)



1. Open cap assembly (1). **Remove screen (2)** from neck (3). **Remove packing (4)** from underside of cap.



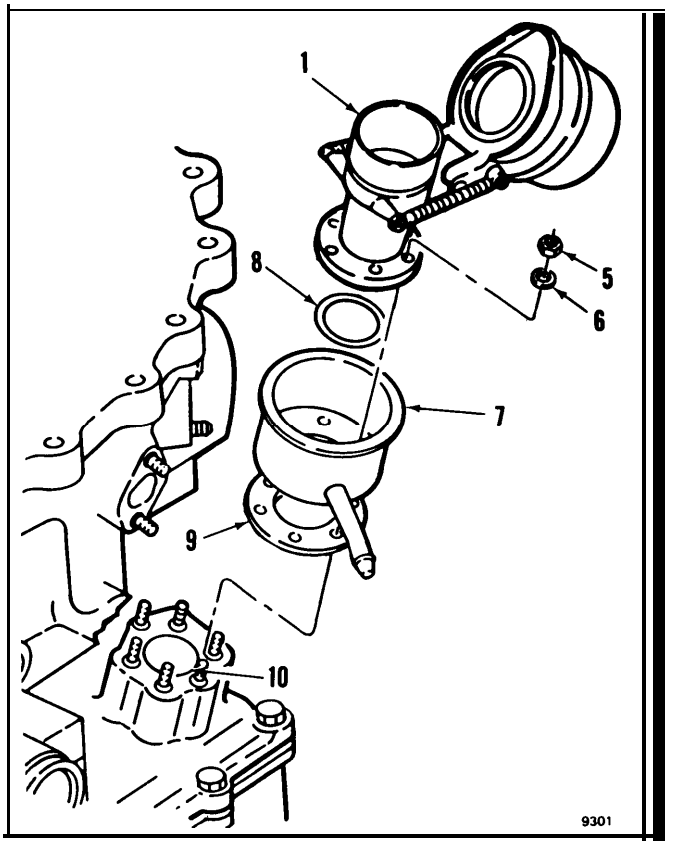
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6-81.2 REMOVE AFT TRANSMISSION OIL FILLER ASSEMBLY (Continued)

2. Remove six nuts (5) and washers (6) from inside cup (7). **Remove cap assembly (1)** and packing (8).
3. **Remove cup and gasket (9).**
4. **Cover cavity (10)** with barrier material (E80) and masking tape (E388).

FOLLOW-ON MAINTENANCE:

None



END OF TASK

5-81.3 INSTALL AFT TRANSMISSION OIL FILLER ASSEMBLY

INITIAL SETUP

Applicable Configurations:
All

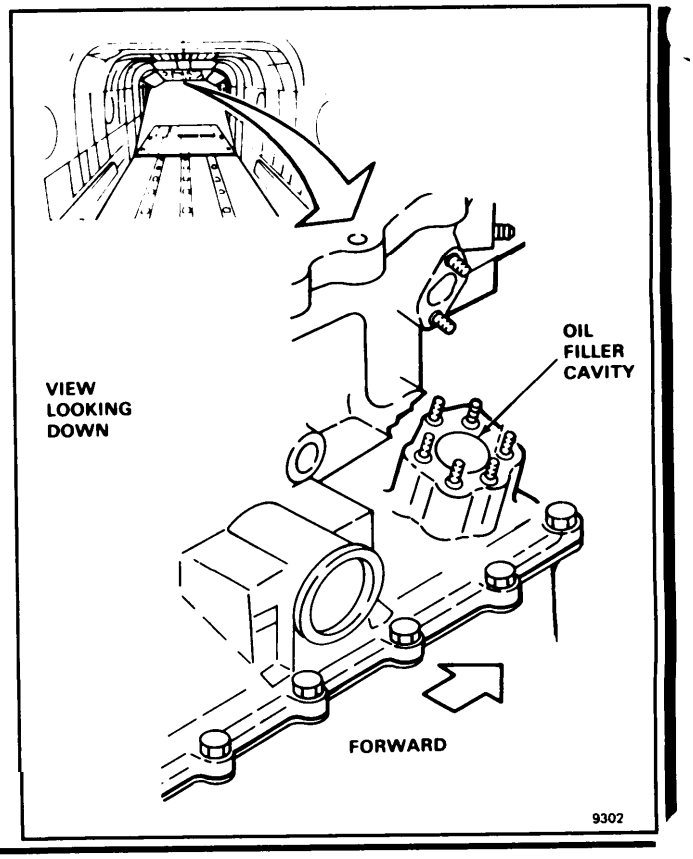
Tools:
Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692
Torque Wrench, 5 to 50 Inch-Pounds
Workstand

Materials:
None

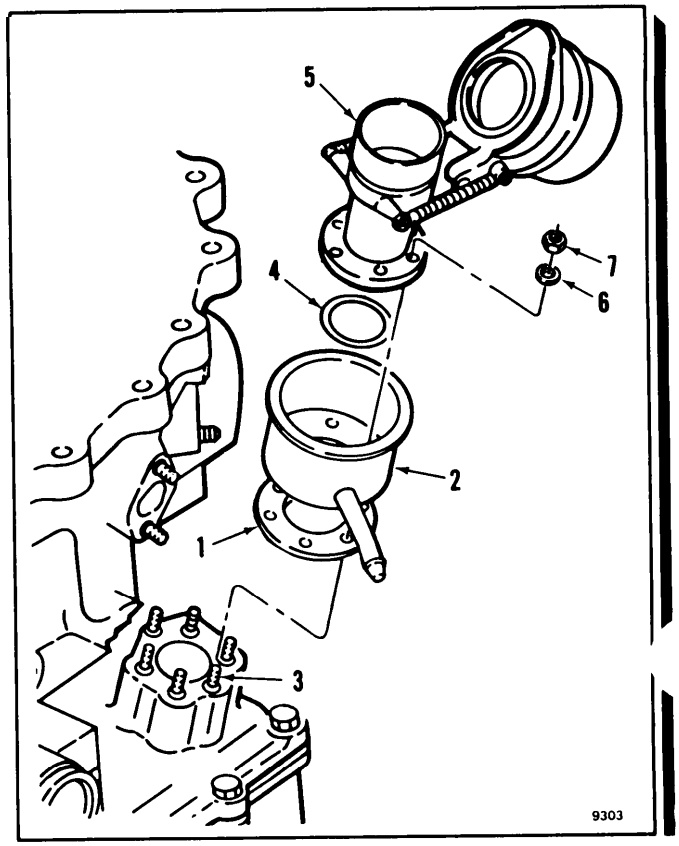
Parts:
Packing

Personnel Required:
Medium Helicopter Repairer
Inspector

References:
TM 55-1520-240-23P



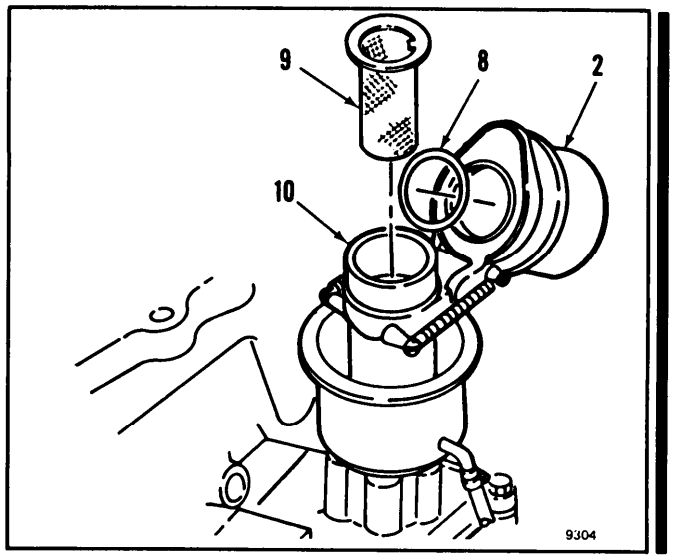
1. **Install gasket (1) and cup (2)** on six studs (3).
2. **Install packing (4)** on bottom of cap assembly (5). **Install cap** assembly on studs (3).
3. Install six washers (6) and nuts (7) on studs (3). **Torque nuts to <u>20 inch-pounds.</u>**



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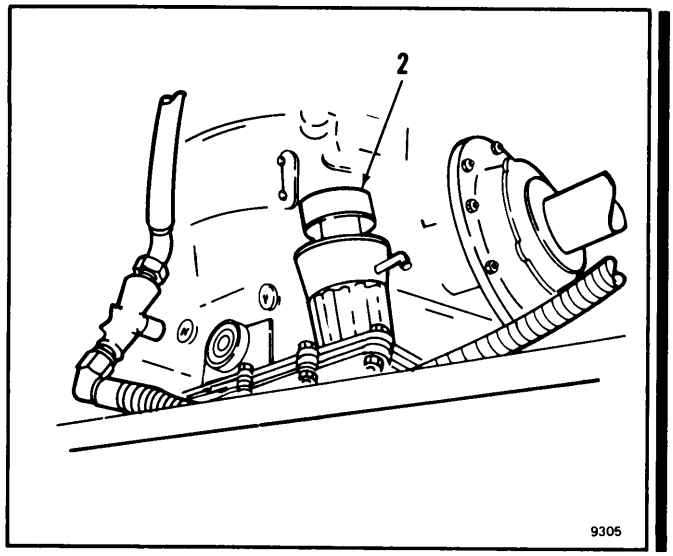
6-81.3 INSTALL AFT TRANSMISSION OIL FILLER ASSEMBLY (Continued) 6-81.3

4. Open cap assembly (5). **Install packing (8) on bottom of cap,**
5. **Install screen (9)** in neck (10).



6. **Close cap** assembly (5).

INSPECT



FOLLOW-ON MAINTENANCE:

Close right baffle under aft transmission (Task 2-2).

Close cargo ramp (TM 55-1520-240-T).

END OF TASK

6-82 REMOVE AFT TRANSMISSION INPUT SHAFT SEAL

INITIAL SETUP

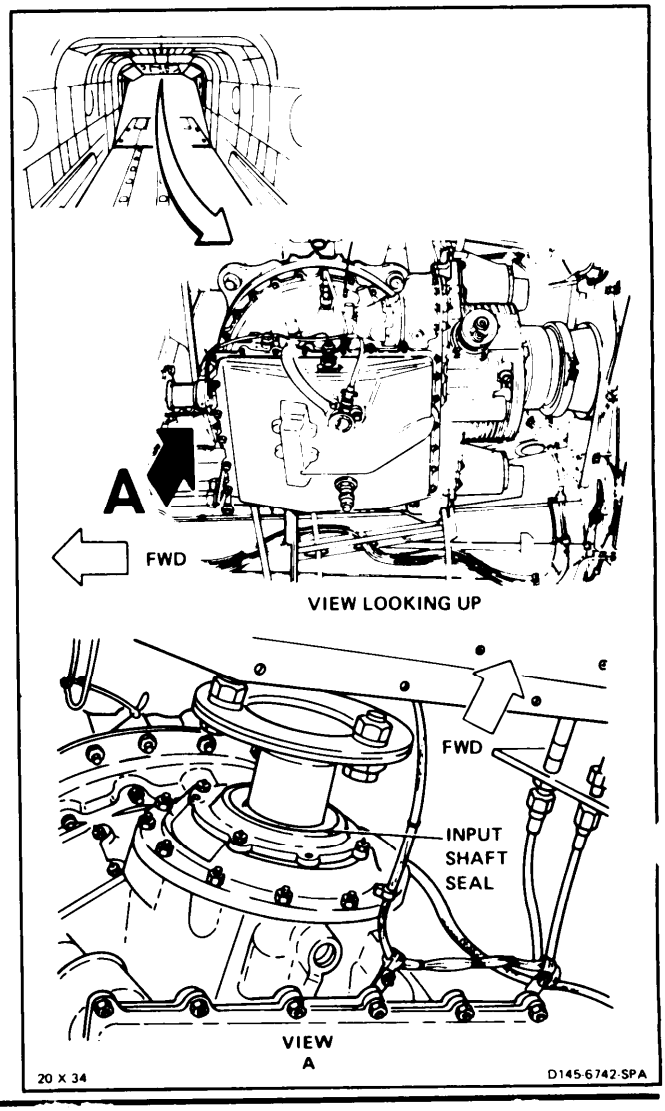
Applicable Configurations:
All

Tools:
Powertrain Repairer's Tool Kit,
NSN 5180-00-003-5267
Workstand
1/4-28 Bolt, At Least One Inch Long (3)

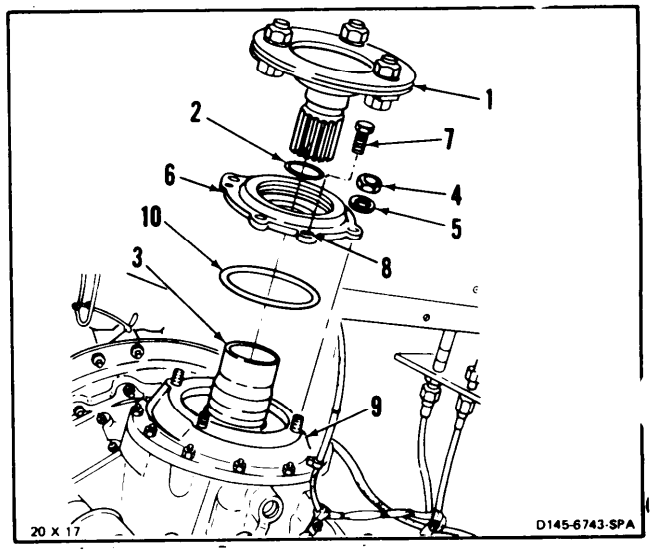
Materials:
None

Personnel Required:
Aircraft Powertrain Repairer

Equipment Condition:
Battery Disconnected (Task 1-39)
Electrical Power Off
Cargo Ramp Open and Level (TM 55-1520-240-T)
Baffles Under Aft Transmission Open (Task 2-2)
Aft Transmission Drip Tray Removed (Task 2-3)
No. 9 Drive Shaft Removed (Task 6-21)



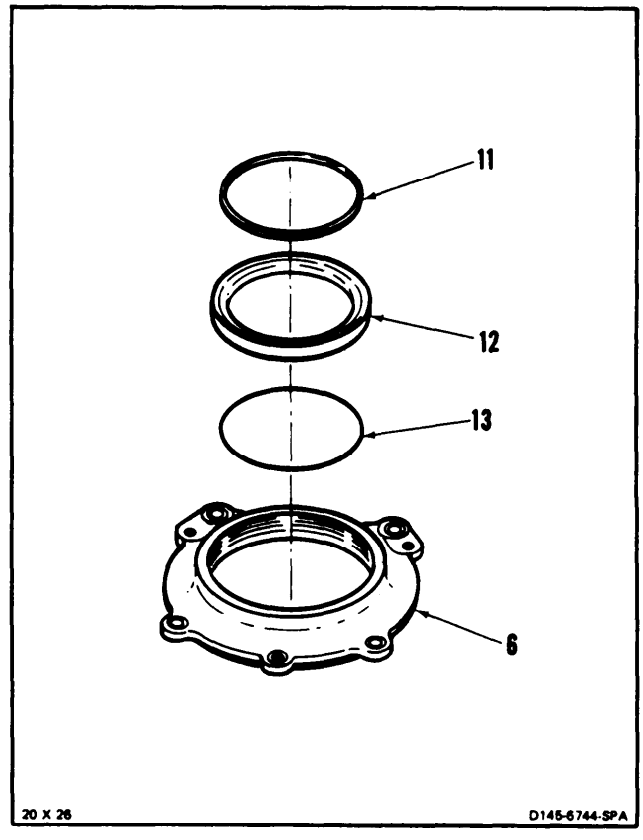
1. **Remove adapter assembly** (1) and packing (2) from input shaft (3). Do not disturb position of input shaft.
2. Remove four nuts (4) and washers (5) from retainer (6).
3. Install three 1/4-28 bolts (7) in threaded holes (8). Turn bolts to **jack retainer (6) off transmission (9).**
4. Remove packing (10) from retainer (6).



GO TO NEXT PAGE

6-62 REMOVE AFT TRANSMISSION INPUT SHAFT SEAL (Continued)

5. Remove retaining ring (11) from retainer (6). **Remove seal** (12) and packing (13).



FOLLOW-ON MAINTENANCE:

None

END OF TASK

6-83 INSTALL AFT TRANSMISSION INPUT SHAFT SEAL

INITIAL SETUP

Applicable Configurations:

All

Tools:

Power train Repairer's Tool Kit,
NSN 5180-00-003-5267
Gun Heater
Pyrometer
Aluminum Tube, 4 1/2-Inch OD, 1/4-inch Wall Thickness, 1 to 6 Inches Long
Torque Wrench, 30 to 150 Inch-Pounds
Kevlar Gloves (E187)
Workstand

Materials:

Gloves (E186)
Dry Cleaning Solvent (E162)
Cloths (E120)
Oil (E254)

Parts:

Packings

Personnel Required:

Aircraft Powertrain Repairer
Inspector

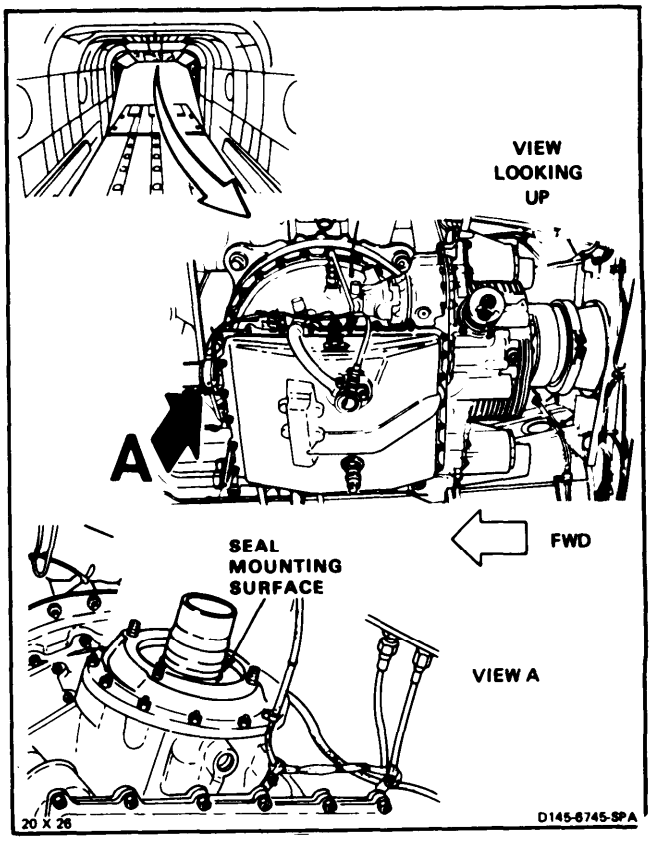
References:

TM 55-1520-240-23P

General Safety Instructions:

WARNING

Dry cleaning solvent (E162) is flammable and toxic. It can irritate skin and cause burns. Use only in well-ventilated area, away from heat and open flame. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.



GO TO NEXT PAGE

6-83 INSTALL AFT TRANSMISSION INPUT SHAFT SEAL (Continued) 6-83

1. Clean seal retainer (1). Use dry cleaning solvent (E162) and clean cloths (E120). Wear gloves (E186).

WARNING

Wear Kevlar gloves when handling hot retainer. Hot metal can bum hands.

CAUTION

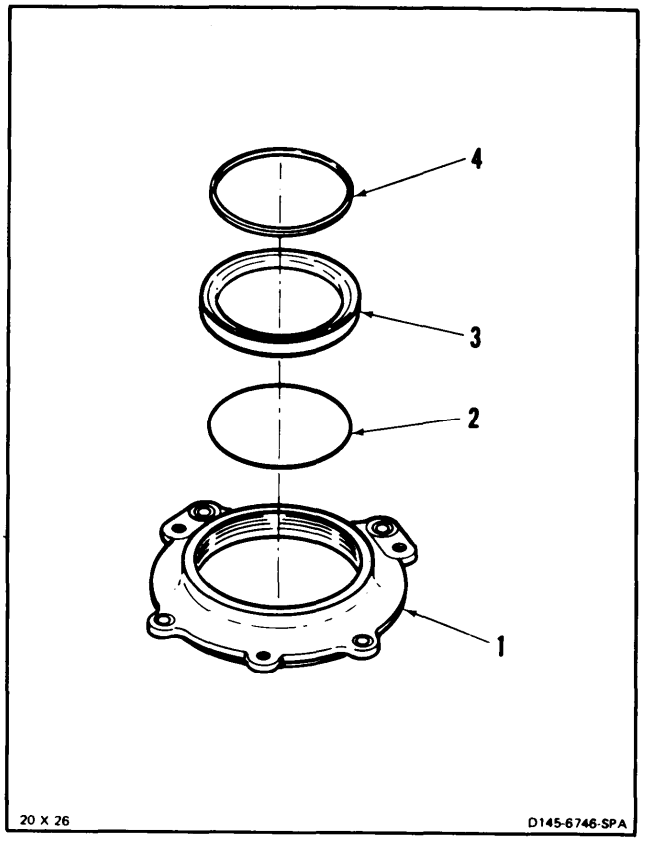
Do not heat retainer over 250°F (120°C). Damage to metal can occur.

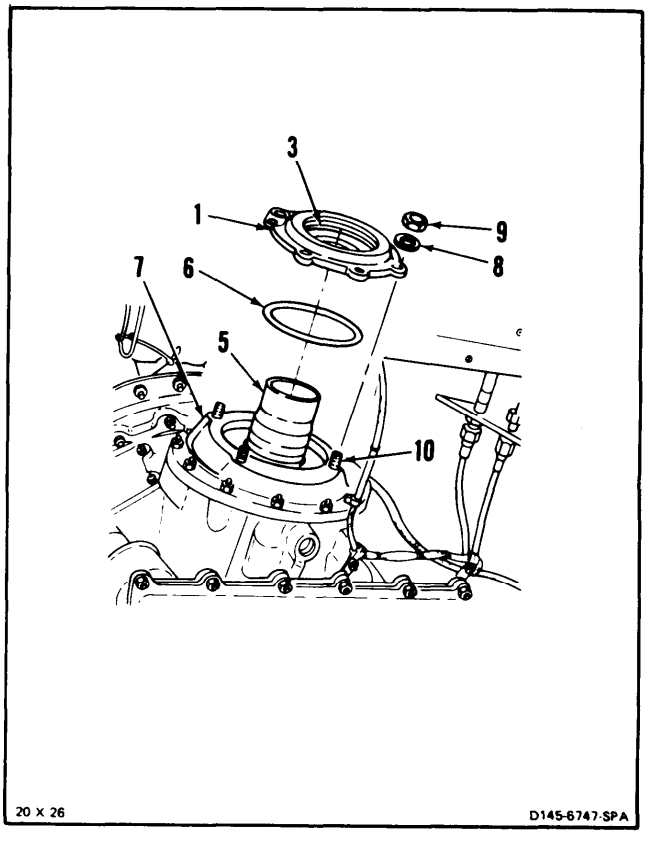
2. **Heat retainer (1) to 230 to 250°F (110 to 120°C).** Wear Kevlar gloves (E187). Use gun-type heater. Check temperature with pyrometer.
3. Install packing (2) in retainer (1).
4. **Install seal (3)** in retainer (1), flat side up. Use aluminum tube to seat seal.
5. Install retaining ring (4).
6. Install packing (5) on retainer (1).

NOTE

If seal and shaft are not clean and dry, leakage can occur.

7. Clean seal mating surface of shaft (6) with dry cleaning solvent (E162). Wipe seal (3) with clean cloth (E120). Wear gloves (E186).
8. Install retainer (1) on transmission (7). Do not disturb position of input shaft (5).
9. **Install four washers (8) and nuts (9)** on studs (10). **Torque nuts to 60 inch-pounds** .

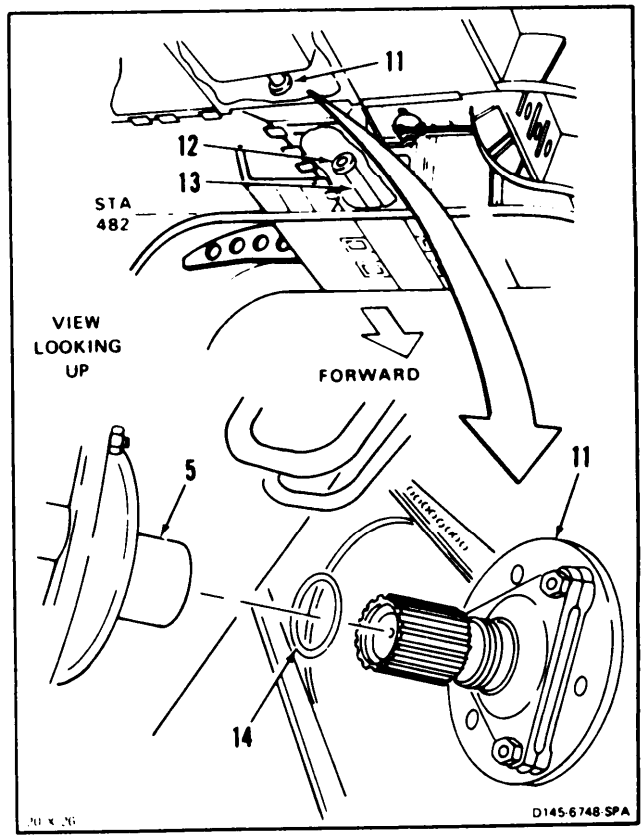




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6-83 INSTALL AFT TRANSMISSION INPUT SHAFT SEAL (Continued)

10. Align adapter assembly (11) with adapter assembly (12) of No. 8 drive shaft (13). **Install adaptor assembly (11)** and packing (14) on input shaft (5). Do not disturb position of input shaft or No. 8 drive shaft.



INSPECT

FOLLOW-ON MAINTENANCE:

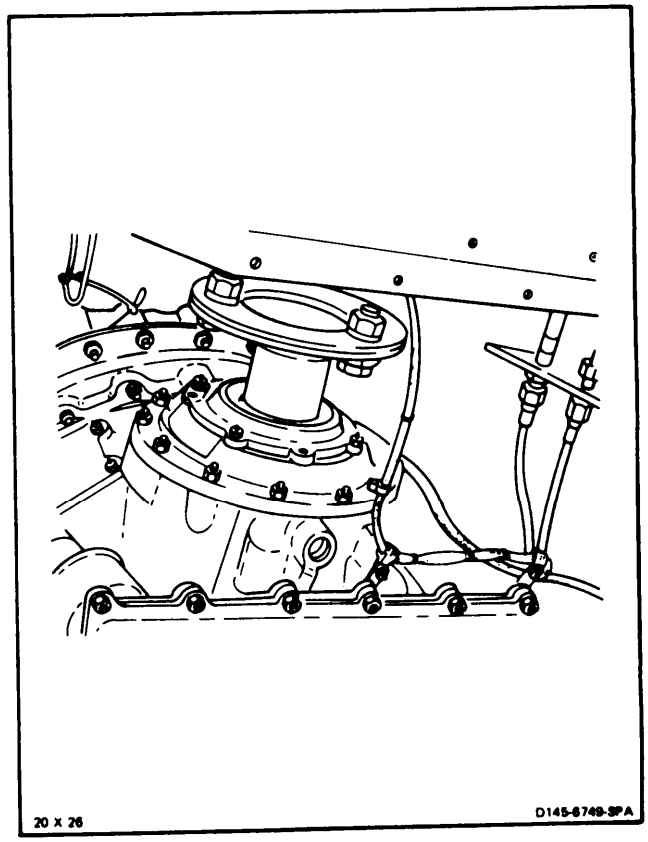
Install No. 9 drive shaft (Task 6-29).

Perform ground run (TM 55-1520-240-10).

Install aft transmission drip tray (Task 2-3).

Close baffles under aft transmission (Task 2-2).

Close cargo ramp (TM 55-1520-240-T).



END OF TASK

6-84 REMOVE HYDRAULIC PUMP DRIVE SHAFT SEAL FROM AFT TRANSMISSION

INITIAL SETUP

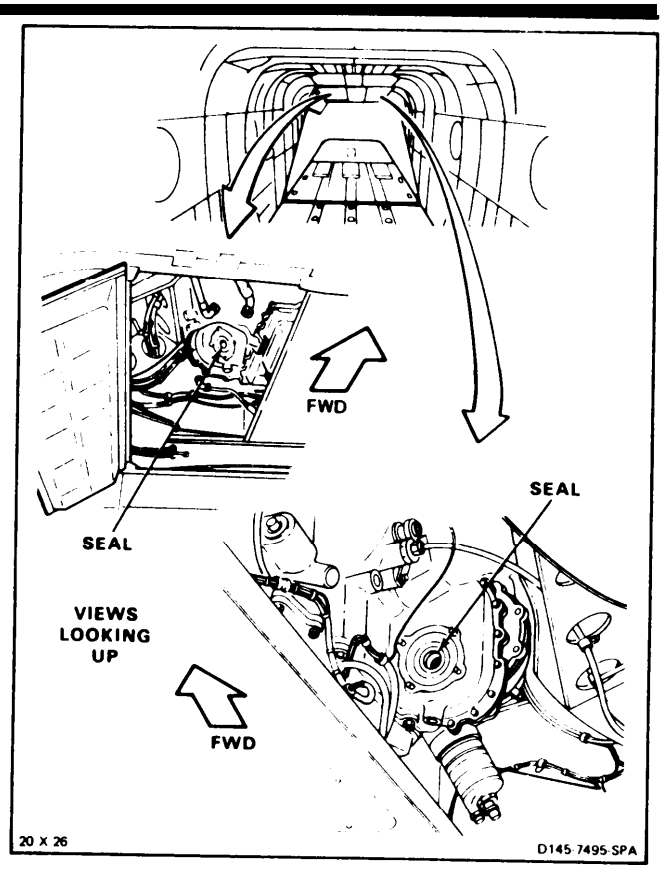
Applicable Configurations:
All

Tools:
Aircraft Powertrain Tool Kit, NSN 5180-00-003-5267
Awl
Workstand
Self-Tapping Screw, No. 6 (2)

Materials:
Lockwire (E232)

Personnel Required:
Aircraft Powertrain Repairer

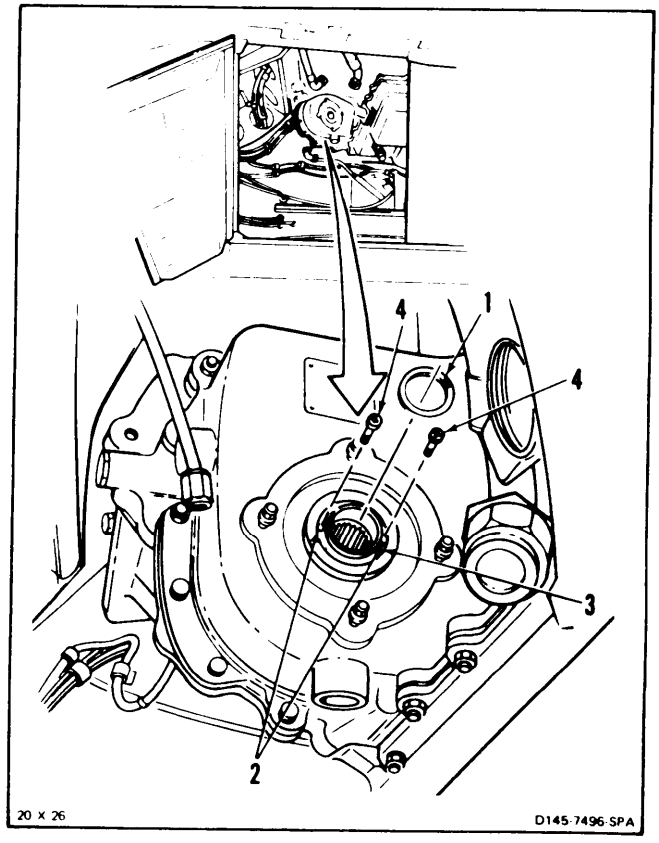
Equipment Condition:
Battery Disconnected (Task 1-39)
Electrical Power Off
Cargo Ramp Open and Level (TM 55-1520-240-T)
Left or Right Baffle Under Aft Transmission Open (Task 2-2)
Flight Control Hydraulic System Pump (Left Side) or Utility Hydraulic System (Right Side) Removed (Task 7-22 or 7-150)



NOTE

Remove pump drive shaft seal from left or right side of transmission in same way. Right side shown here.

1. **Remove retaining ring (1).**
2. **Punch two holes (2),** 180 degrees apart, in metal casing of seal (3). Use an awl.
3. **Screw a No. 6 self-tapping screw (4) securely in each of two holes (2).** Do not tighten head of screw against seal (3).



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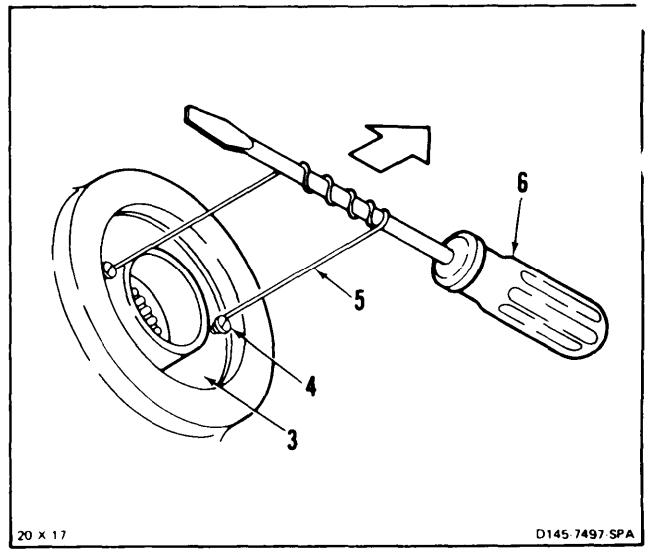
6-84 REMOVE HYDRAULIC PUMP DRIVE SHAFT SEAL FROM AFT TRANSMISSION (Continued)

4. Cut a piece of lockwire (5) about 24 inches long. Use lockwire (E232). **Wrap ends of lockwire under heads of two screws (4).**

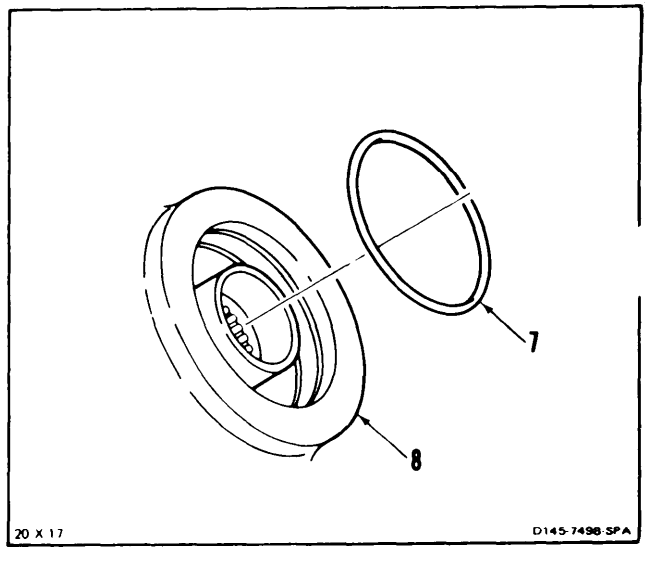
CAUTION

Prying against transmission or drive shaft will cause damage.

5. **Loop lockwire around a tool (6),** such as screwdriver or wrench extension. **Remove seal (3)** by pulling straight out on tool. Do not pry against transmission or drive shaft.



6. **Remove packing (7)** from transmission (8).



FOLLOW-ON MAINTENANCE:

None

END OF TASK

6-85 INSTALL HYDRAULIC PUMP DRIVE SHAFT SEAL ON AFT TRANSMISSION

INITIAL SETUP

Applicable Configurations:
All

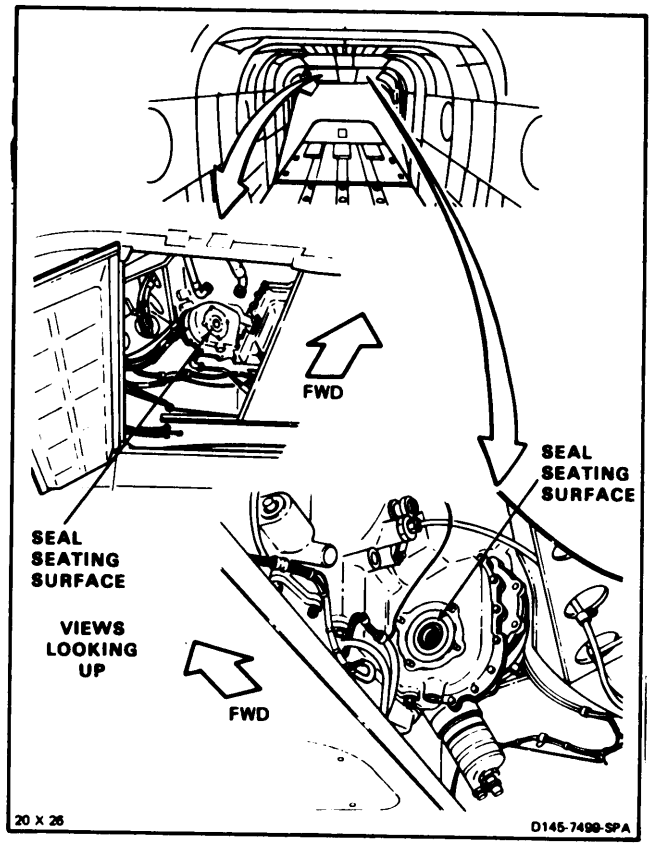
Tools:
Aircraft Powertrain Tool Kit, NSN 5180-00-003-5267
Gun Heater
Pyrometer
Aluminum Tube, 2-Inch OD, 1/8-inch Thick Wall, 1 to 6 Inches Long
Kevlar Gloves (E187)
Workstand

Materials:
Gloves (E186)
Dry Cleaning Solvent (E162)
Cloths (E120)
Oil (E254)

Parts:
Packing

Personnel Required:
Aircraft Powertrain Repairer
Inspector

References:
TM 55-1520-240-23P



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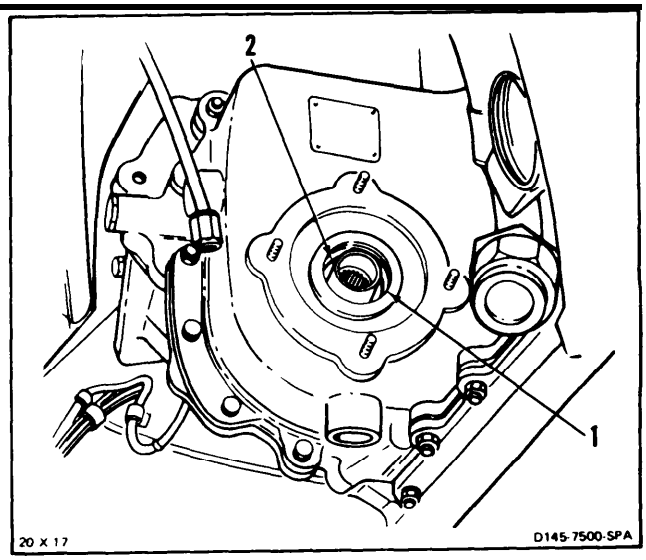
6-85 INSTALL HYDRAULIC PUMP DRIVE SHAFT SEAL ON AFT TRANSMISSION (Continued)

WARNING

Dry cleaning solvent (E162) is flammable and toxic. It can irritate skin and cause bums. Use only in well-ventilated area, away from heat and open flame. In case of contact, immediately flush skin or eyes with water for at least 15 minutes . Get medical attention for eyes.

NOTE

Install pump drive shaft seal on left or right side of transmission in same way. Right side shown here.



1. **Clean seal seating area** of transmission (1) and packing groove (2). Use dry cleaning solvent (E162) and clean cloths (E120). Wear gloves (E186).

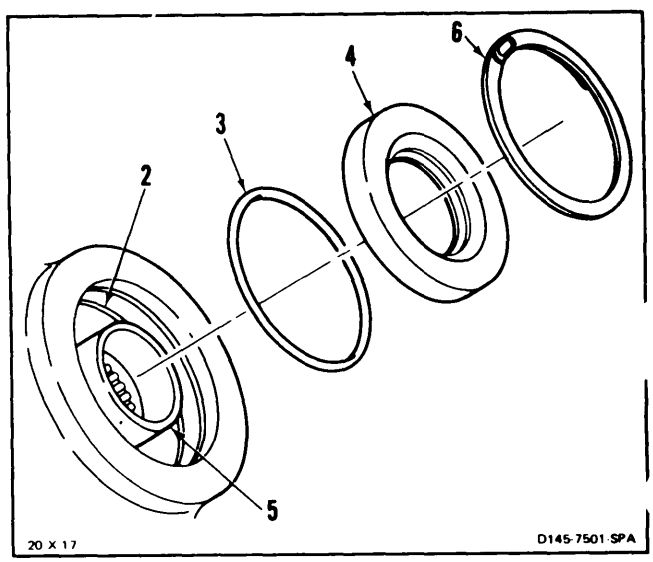
WARNING

Wear Kevlar gloves when working around heated area. Hot metal can burn hands.

CAUTION

Do not heat transmission over 250°F (120°C). Metal can be damaged.

2. **Heat seal seating area (1)** to 230° to 250°F (110° to 120°C). Use gun-type heater. Wear Kevlar gloves (E187). Check temperature with pyrometer.



3. Coat packing (3) with oil (E254). **Install packing** in groove (2).
4. Coat lip of seal (4) and sealing surface of drive shaft (5) with oil (E254). **Install seal** or drive shaft, flat side out. Use aluminum tube to seat seal.
5. **Install retaining ring (6).**

GO TO NEXT PAGE

6-85 INSTALL HYDRAULIC PUMP DRIVE SHAFT SEAL ON AFT TRANSMISSION (Continued)

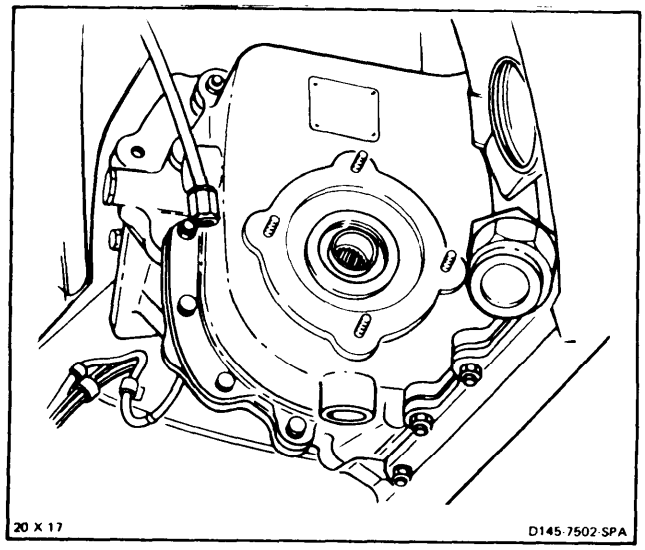
INSPECT

FOLLOW-ON MAINTENANCE:

Install flight control hydraulic pump (left side) or utility system hydraulic pump (right side) (Task 7-27 or 7-151).

Close left or right baffle under aft transmission (Task 2-2).

Close cargo ramp (TM 55-1520-240-T).



END OF TASK

6-86 REMOVE GENERATOR DRIVE SHAFT SEAL FROM AFT TRANSMISSION

INITIAL SETUP

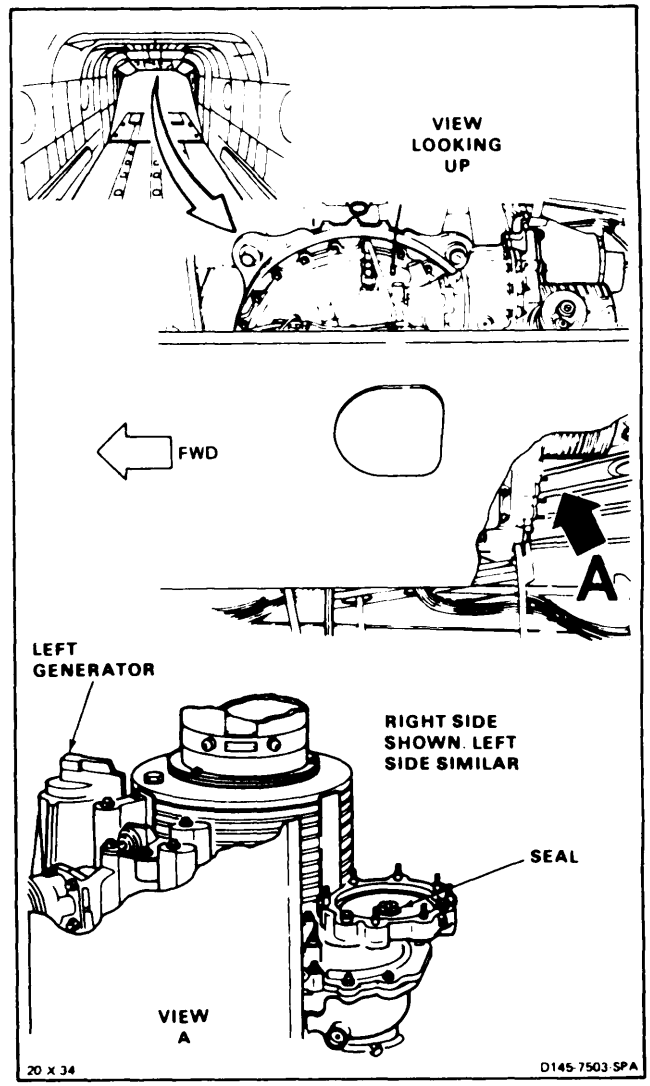
Applicable Configurations:
All

Tools:
Aircraft Powertrain Tool Kit,
NSN 5180-00-003-5267
Awl
Workstand
Self-Tapping Screw, No. 6 (2)

Materials:
Lockwire (E232)

Personnel Required:
68D20 Aircraft Powertrain Repairer

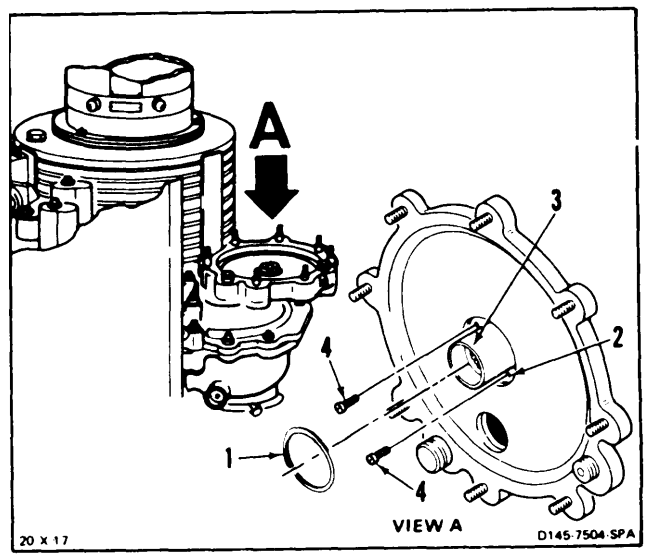
Equipment Condition:
Battery Disconnected (Task 1-39)
Electrical Power Off
Cargo Ramp Open and Level (TM 55-1520-240-T)
Left or Right Baffle Under Aft Transmission Open (Task 2-2)
Left or Right Generator Removed (Task 9-31)



NOTE

Remove generator drive shaft from left or right side of transmission [n same way. Right side shown here

1. **Remove retaining ring (1).**
2. **Punch two holes (2),** 180 degrees apart, in metal casing of seal (3) Use an awl
3. **Screw a No. 6 self-tapping screw (4) securely in each of two holes (2).** Do not tighten head of screw against seal (3)



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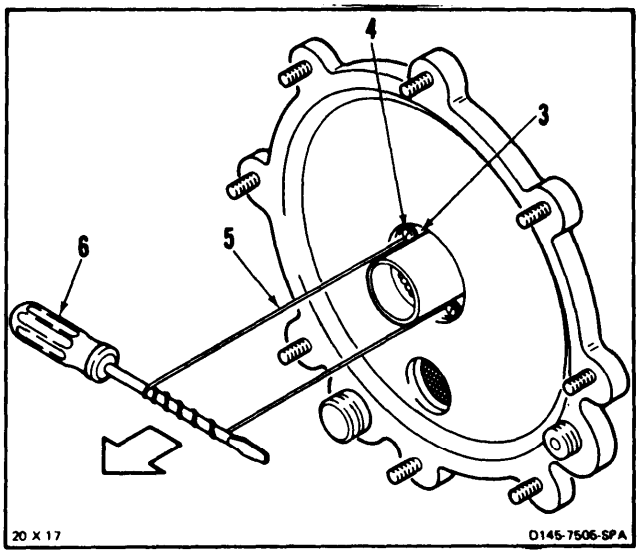
6-86 REMOVE GENERATOR DRIVE SHAFT SEAL FROM AFT TRANSMISSION (Continued) 6-86

4. Cut a piece of lockwire (E232) (5) about 24 inches long. **Wrap ends of lockwire under heads of two screws (4).**

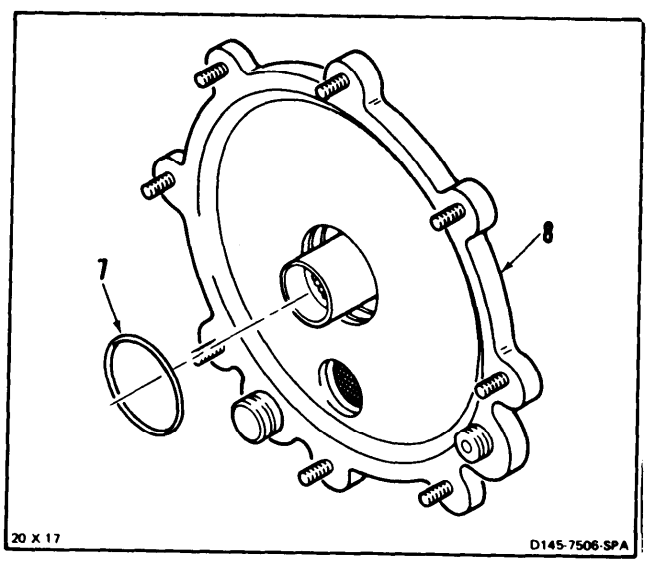
CAUTION

Prying against transmission or drive shaft will cause damage.

5. **Loop lockwire around a tool (6),** such as screwdriver or wrench extension. **Remove seal (3)** by pulling straight out on tool. Do not pry against transmission or drive shaft.



6. **Remove packing** (7) from transmission (8).



FOLLOW-ON MAINTENANCE:

None

END OF TASK

6-87 INSTALL GENERATOR DRIVE SHAFT SEAL ON AFT TRANSMISSION

INITIAL SETUP

Applicable Configurations:
All

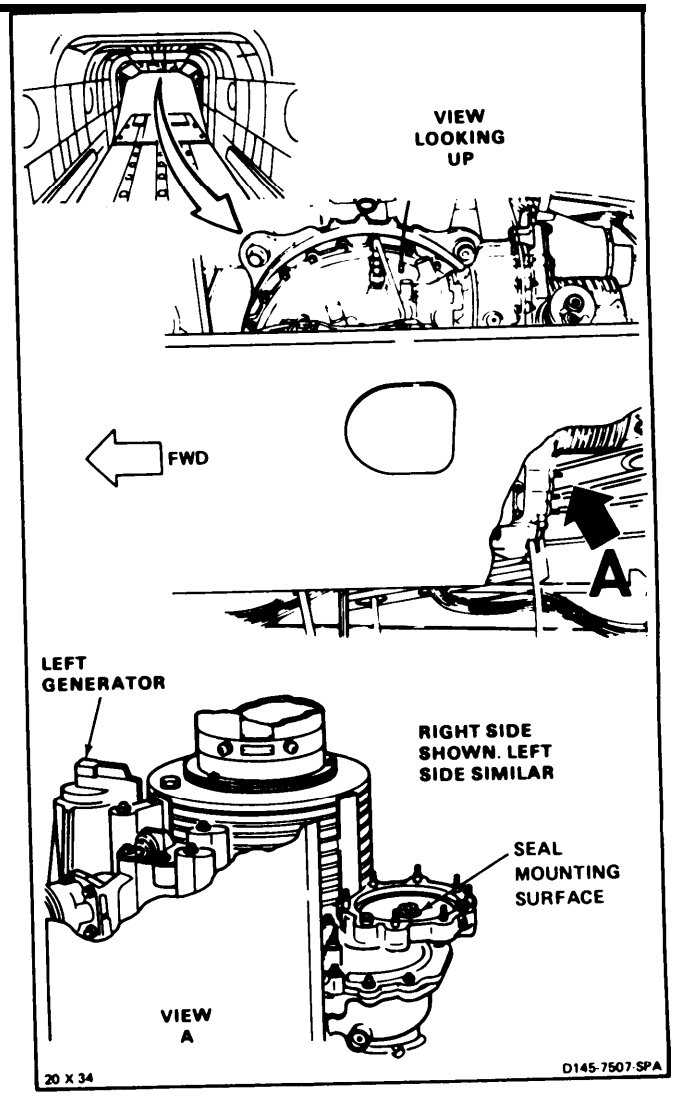
Tools:
Aircraft Powertrain Tool Kit, NSN 5180-00-003-5267
Gun Heater
Pyrometer
Aluminum Tube, 2-inch OD, 1/8-Inch Thick Wall, 1 to 6 Inches Long
Kevlar Gloves (E187)
Workstand

Materials:
Gloves (E186)
Dry Cleaning Solvent (E162)
Cloths (E120)
Oil (E254)

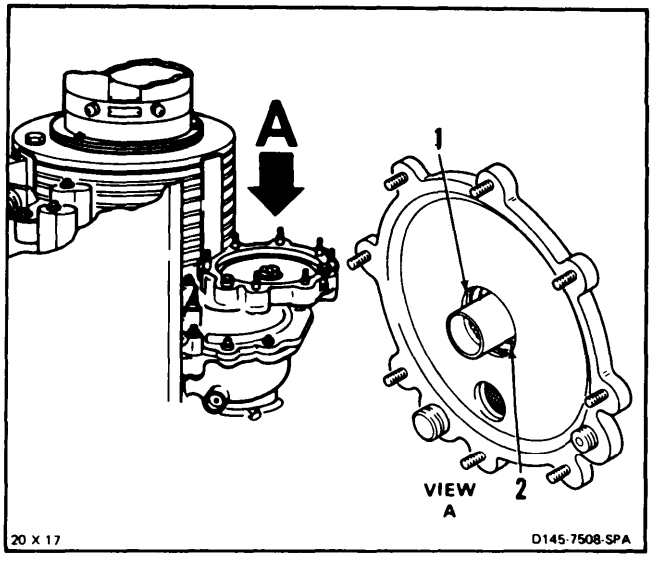
Parts:
Packing

Personnel Required:
Aircraft Powertrain Repairer
Inspector

References:
TM 55-1520-240-23P



GO TO NEXT PAGE



WARNING

Dry cleaning solvent (E162) is flammable and toxic. It can irritate skin and cause burns. Use only in well-ventilated area, away from heat and open flame. In case of contact, immediately flush skin or eyes with water for at least 15 minutes . Get medical attention for eyes.

NOTE

Install generator drive shaft seal on left or right side of transmission in same way. Right side shown here.

1. **Clean seal seating area** of transmission (1) and packing groove (2). Use dry cleaning solvent (E162) and clean cloths (E120). Wear gloves (E186).

WARNING

Wear Kevlar gloves when working around heated area. Hot metal can burn hands.

CAUTION

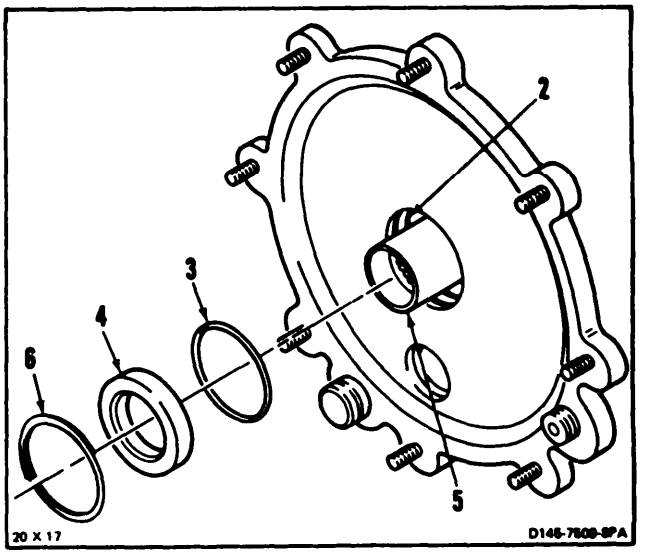
Do not heat transmission over 250°F (120°C). Metal can be damaged.

2. **Heat seal seating area (1)** to 230° to 250°F (110° to 12&C). Use gun-type heater. Wear Kevlar gloves (E187). Check temperature with pyrometer.

GO TO NEXT PAGE

6-87 INSTALL GENERATOR DRIVE SHAFT SEAL ON AFT TRANSMISSION (Continued)

3. Coat packing (3) with oil (E254). **Install packing** in groove (2).
4. Coat lip of seal (4) and sealing surface of drive shaft (5) with oil (E254). **Install seal** on drive shaft, seal side out. Use aluminum tube to seat seal.
5. **Install retaining ring (6).**



INSPECT

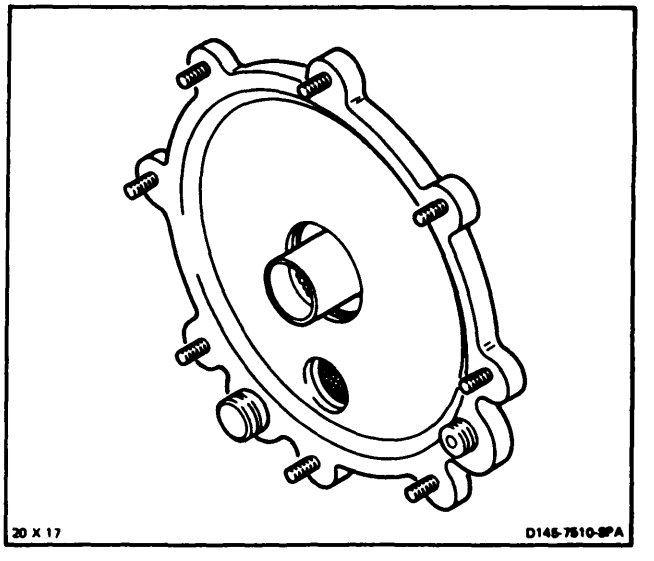
FOLLOW-ON MAINTENANCE:

Install left or right generator (Task 9-32).

Service aft transmission (Task 1-54).

Close left or right baffle under aft transmission (Task 2-2).

Close cargo ramp (TM 55-1520-240-T).



END OF TASK

6-88 REMOVE AFT TRANSMISSION FAN DRIVE SHAFT SEAL

INITIAL SETUP

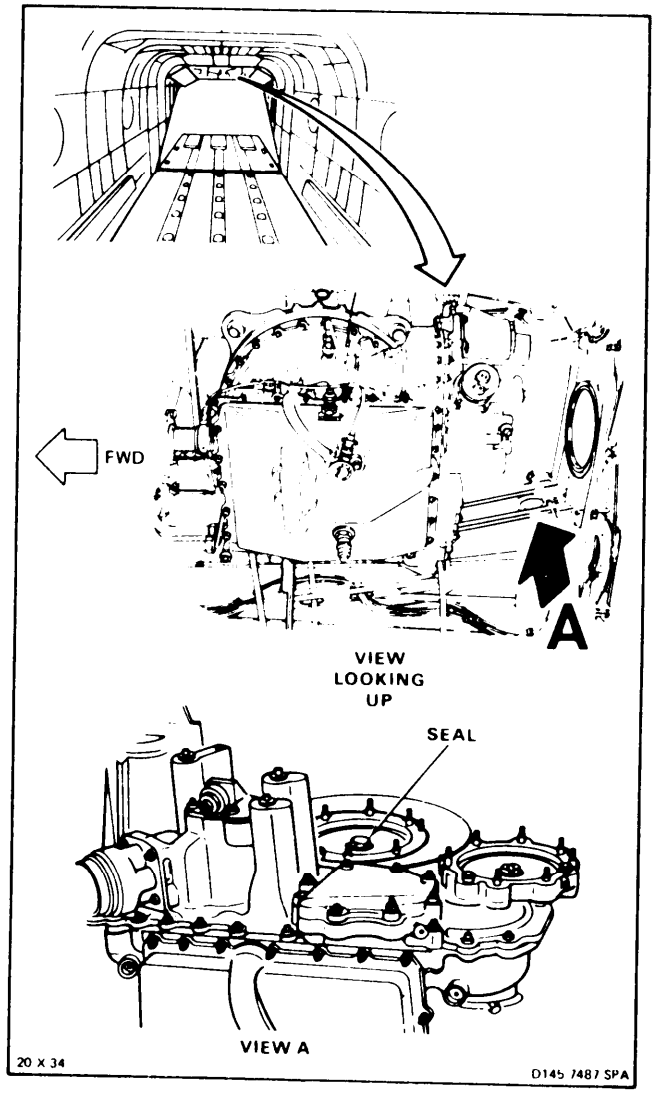
Applicable Configurations:
All

Tools:
Aircraft Powertrain Tool Kit,
NSN 5180-00-003-5267
Awl
Workstand
Self-Tapping Screw, No. 6 (2)

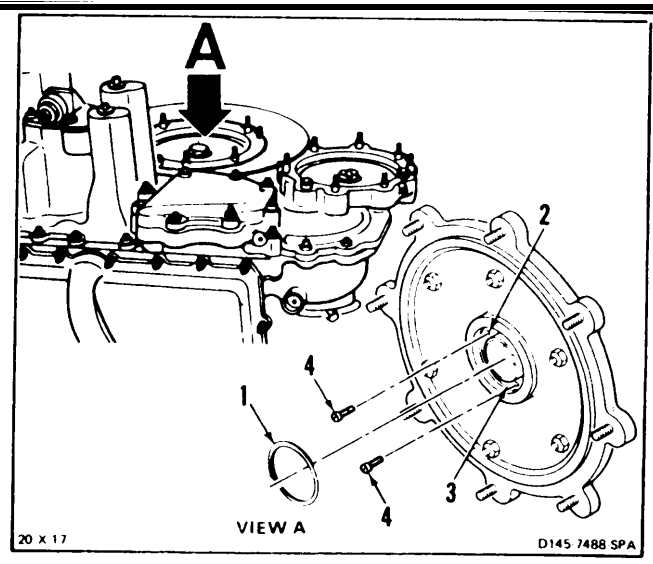
Materials:
Lockwire (E232)

Personnel Required:
68D20 Aircraft Powertrain Repairer

Equipment Condition:
Battery Disconnected (Task 1-39)
Electrical Power Off
Cargo Ramp Open and Level
Baffles Under Aft Transmission Open (Task 2-2)
Aft Transmission Drip Tray Removed (Task 2-3)
Aft Transmission Oil Cooler Removed (Task 6-145)



1. **Remove retaining ring (1).**
2. **Punch two holes (2),** 180 degrees apart, In metal casing of seal (3). Use an awl.
3. **Screw a No. 6 self-tapping screw (4) securely in each of two holes (2).** Do not tighten head of screw against seal (3).



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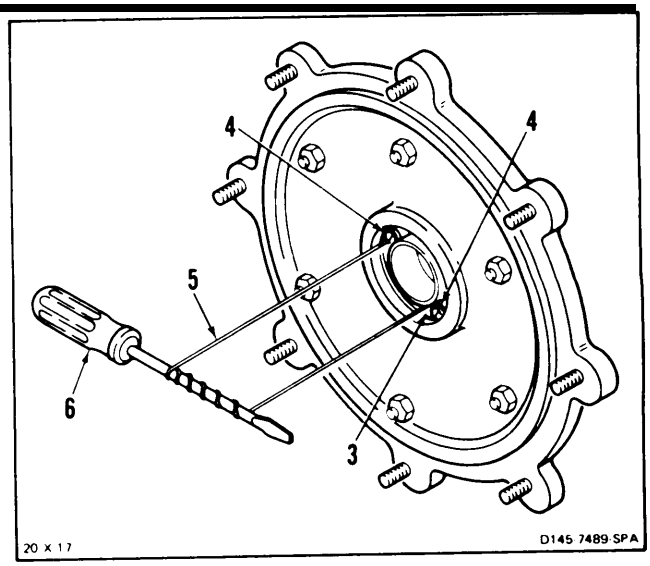
6-88 REMOVE AFT TRANSMISSION FAN DRIVE SHAFT SEAL (Continued)

4. Cut a piece of lockwire (5) about 24 inches long. Use lockwire (E232). **Wrap ends of lockwire under heads of two screws (4).**

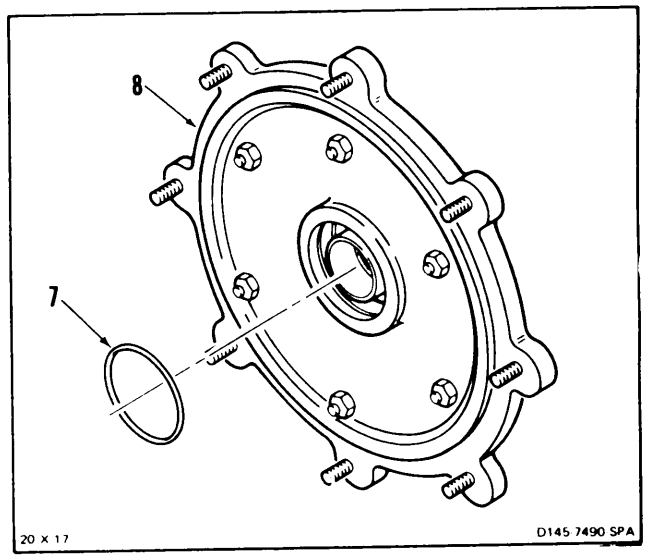
CAUTION

Prying against transmission or drive shaft will cause damage.

5. **Loop lockwire around a tool (6),** such as screwdriver or wrench extension. **Remove seal (3)** by pulling straight out on tool. Do not pry against transmission or drive shaft.



6. **Remove packing (7)** from transmission (8).



FOLLOW-ON MAINTENANCE:

None

END OF TASK

6-89 INSTALL AFT TRANSMISSION FAN DRIVE SHAFT SEAL 6-89

INITIAL SETUP

Applicable Configurations:
All

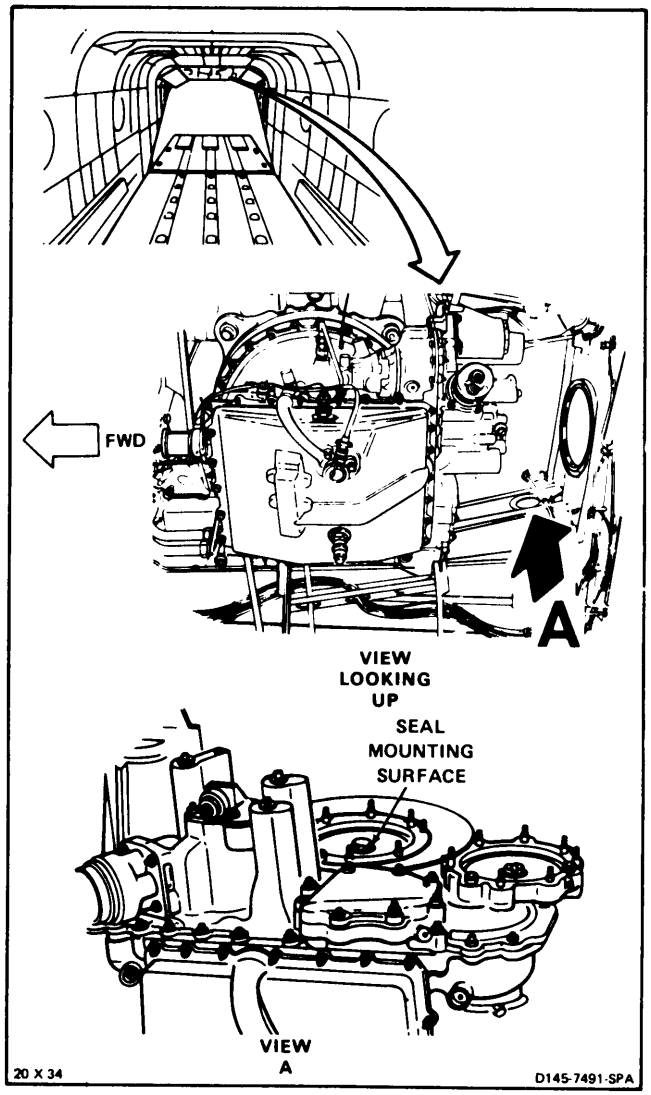
Tools:
Aircraft Powertrain Tool Kit, NSN 5180-00-003-5267
Gun Heater
Pyrometer
Aluminum Tube, 2-inch OD, 1/8-inch Thick Wall, 1 to 6 Inches Long
Kevlar Gloves (E187)
Workstand

Materials:
Gloves (E186)
Dry Cleaning Solvent (E162)
Cloths (E120)
Oil (E254)

Parts:
Packing

Personnel Required:
Aircraft Powertrain Repairer
Inspector

References:
TM 55-1520-240-23P



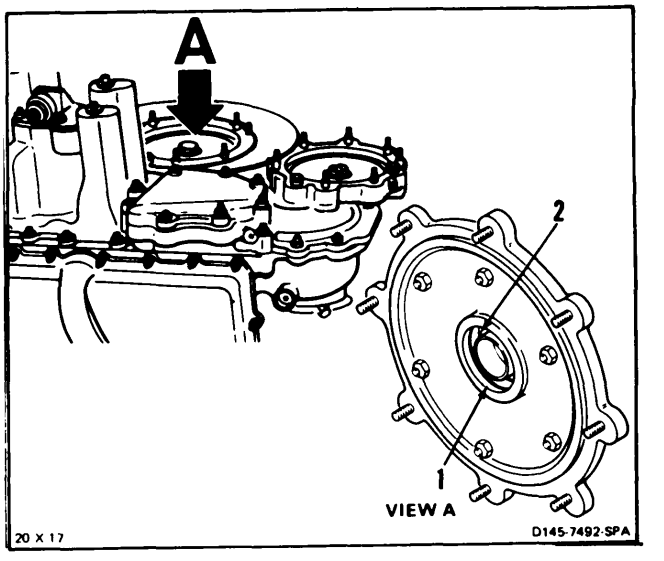
GO TO NEXT PAGE

6-89 INSTALL AFT TRANSMISSION FAN DRIVE SHAFT SEAL (Continued) 6-89

WARNING

Dry cleaning solvent (E162) is flammable and toxic. It can irritate skin and cause burns. Use only in well-ventilated area, away from heat and open flame. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.

1. **Clean seal seating area** of transmission (1) and packing groove (2). Use dry cleaning solvent (E162) and clean cloths (E120). Wear gloves (E186) and goggles.



WARNING

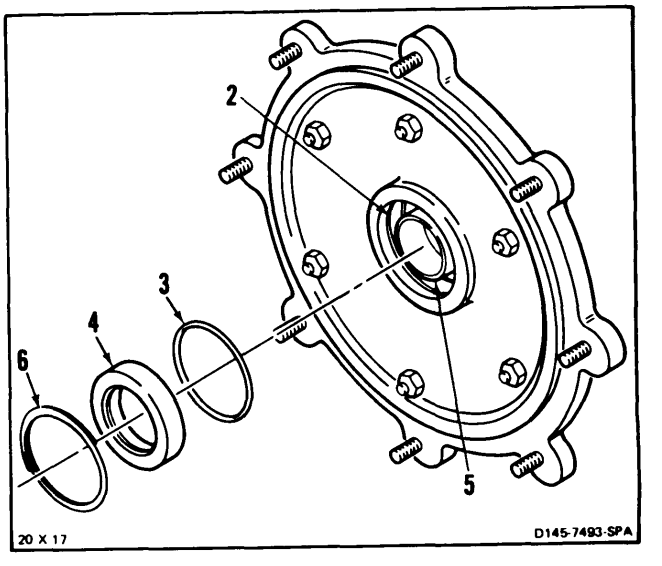
Wear Kevlar gloves when working around heated area. Hot metal can burn hands.

CAUTION

Do not heat transmission over 250°F (120°C). Metal can be damaged.

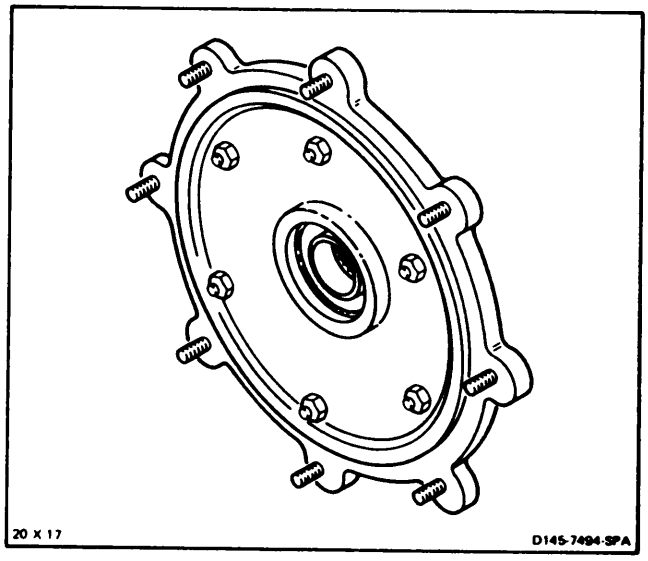
2. **Heat seal seating area (1)** to 230° to 250°F (110° to 120°C). Use gun-type heater. Wear Kevlar gloves (E187). Check temperature with pyrometer.

3. Coat packing (3) with oil (E254). **Install packing** in groove (2).
4. Coat lip of seal (4) and sealing surface of drive shaft (5) with oil (E254). **Install seal** on drive shaft, seal side out. Use aluminum tube to seat seal.
5. **Install retaining ring (6).**



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6-89 INSTALL AFT TRANSMISSION FAN DRIVE SHAFT SEAL (Continued)



INSPECT

FOLLOW-ON MAINTENANCE:

Install aft transmission oil cooler (Task 6-146).

Service aft transmission (Task 1-54).

Install aft transmission drip tray (Task 2-3).

Close baffles under aft transmission (Task 2-2).

END OF TASK

6-90 REMOVE AFT TRANSMISSION ROTOR SHAFT SEAL

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Powertrain Tool Kit, NSN 5180-00-003-5267

Hoist Kit (T3)

Materials:

Barrier Material (E81)

Tape (E388)

Personnel Required:

Aircraft Powertrain Repairer

References:

Task 6-92

Equipment Condition:

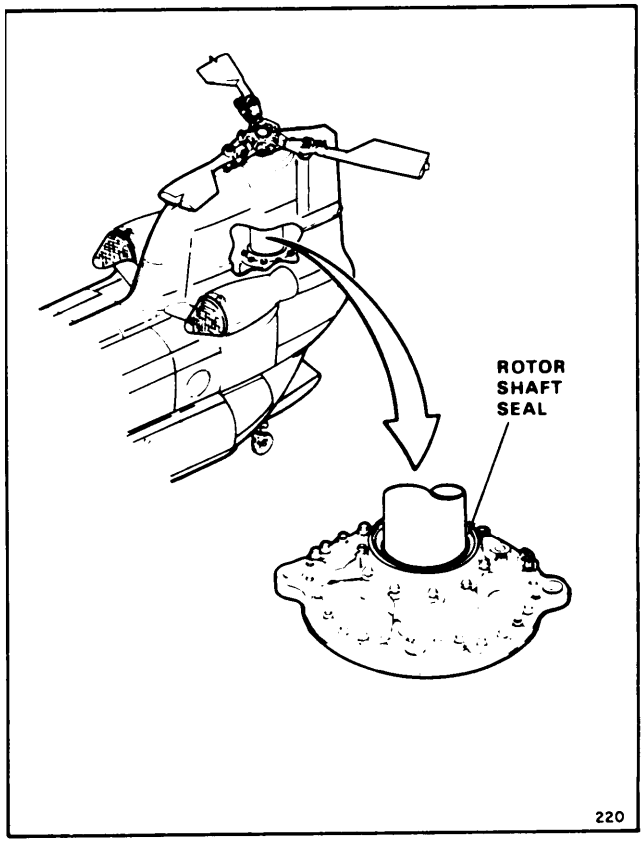
Battery Disconnected (Task 1-39)

Electrical Power Off

Baffles Under Aft Transmission Open (Task 2-2)

Aft Transmission Drip Tray Removed (Task 2-3)

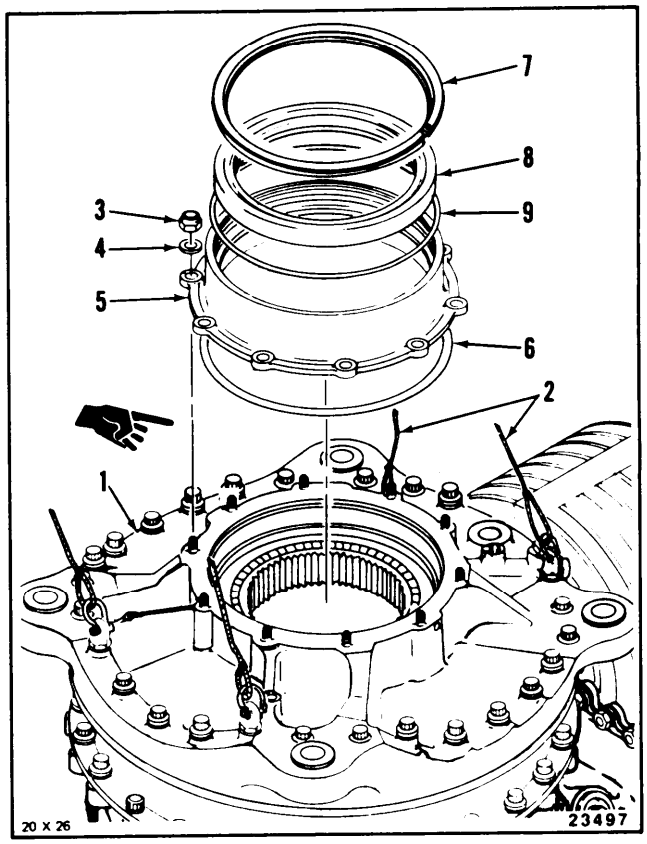
Cargo Ramp Open and Level (TM 55-1520-240-T)



1. **Lower aft transmission (1)** into cabin with hoist kit (T3) (Task 6-92, steps 1 thru 31). Keep tension on four cables (2).
2. **Remove 10 nuts (3)** and washers (4) from seal retainer (5).
3. **Remove seal retainer (5)** and packing (6).
4. Cover opening into transmission (1). Use barrier material (E81) and tape (E388).
5. Remove retaining ring (7) from sea retainer (5).
6. **Remove seal (8)** and packing (9).

FOLLOW-ON MAINTENANCE:

None



END OF TASK

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Powertrain Tool Kit,
NSN 5180-00-003-5267
Gun Heater
Pyrometer
Wood Plank, 2 Inches x 4 Inches x 12 Inches
Torque Wrench, 30 to 150 Inch-Pounds

Materials:

Acetone (E20)
Epoxy Primer (E292) or (E292.1)
Thinner (E415) or (E419)
Dry Cleaning Solvent (E162)
Sealant (E336)
Cloths (E120)
Oil (E253), (E254), or (E254.1)
Grease (E190)
Gloves (E184.1)
Kevlar Gloves (E187)

Parts:

Packings

Personnel Required:

Aircraft Powertrain Repairer
Inspector

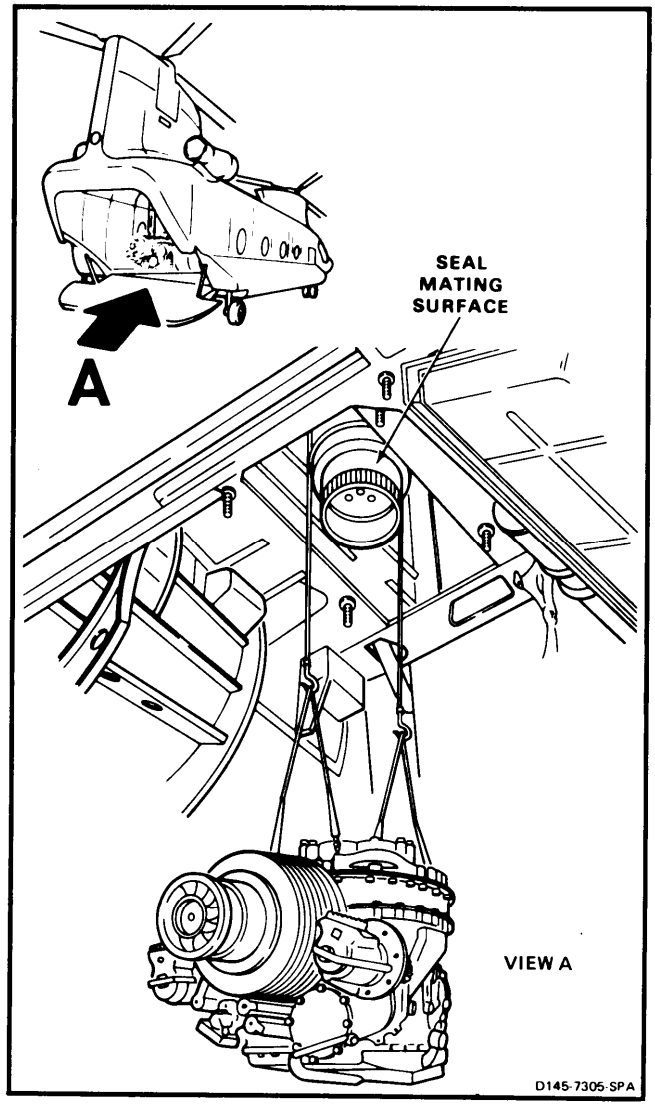
References:

TM 55-1520-240-23P
Task 6-97

General Safety Instructions:

WARNING

Oil (E253), (E254), or (E254.1) is toxic. It can irritate skin and cause burns. Avoid inhaling. Use only with adequate ventilation. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.



GO TO NEXT PAGE

1. **Finish seal retainer (1), the metal part of seal (2), and retaining ring (3) as follows:**

WARNING

The materials used in this step are flammable and toxic. They can irritate skin and cause bums. Use only in wall-ventilated area, away from heat and open flame. In case of contact, Immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.

NOTE

If refinishing materials are not available, seal the retainer installation after assembly as in step 6.

a. Clean parts with acetone (E20) and cloths (E120). Wear gloves (E184.1).

b. Wet aged primed surfaces with thinner (E415) or (E419). Allow to air dry for no more than four hours.

c. Apply two coats of epoxy primer (E292) or (E292.1). Allow to dry.

d. Apply two coats of epoxy topcoat (E166).

WARNING

Wear Kevlar gloves (E187) when handling hot retainer. Hot metal can burn hands.

CAUTION

Do not heat retainer over 250°F (120°C). Metal can be damaged.

2. **Heat retainer (1)** to 230° to 250°F (110° to 120°C). Use a gun-type heater and pyrometer. Wear gloves (E187).
3. Install packing (4) in retainer (1).
4. **Install seal** (2) in retainer (1), flat side up. Use a wood plank and mallet to seat the seal.
5. Install retaining ring (3).
6. **If retainer installation components were not finished in step 1, seal the installation as follows:**

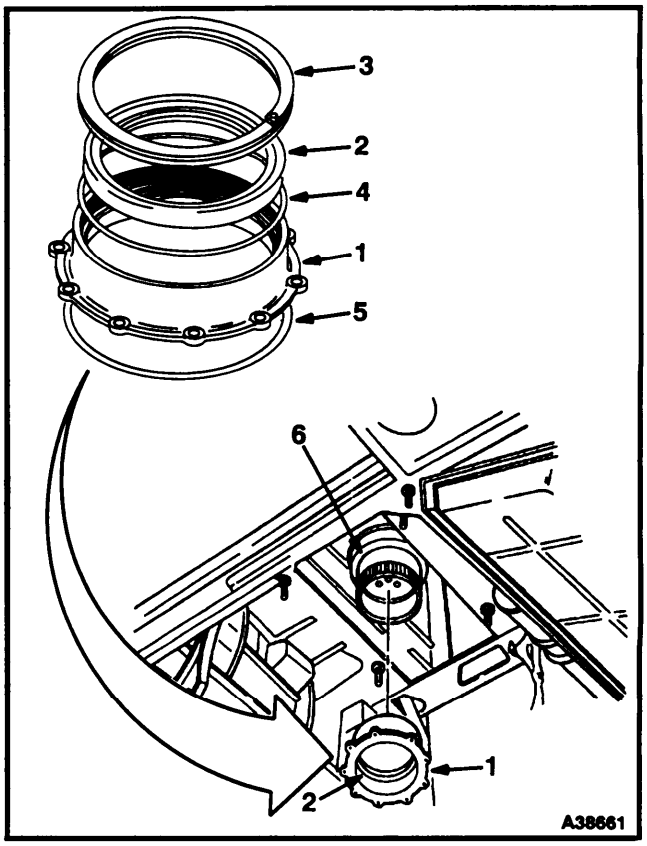
WARNING

Dry cleaning solvent (E162) is combustible and toxic. It can irritate skin and cause burns. Use only with adequate ventilation, away from open flame. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.

a. Clean exposed top surfaces of the retainer (1), seal (2) and retaining ring (3). Use dry cleaning solvent (E162) and cloths (E120). Wear gloves (E184.1).

b. Cover retaining ring (3) with a heavy bead of sealant (E336) from the upper edge of retainer (1) to the upper surface of seal (2).

7. **Install packing (5)** on bottom of retainer (1).
8. Lightly coat lip of seal (2) with grease (E190) to prevent corrosion.
9. Lightly coat the mating surface of rotor shaft (6) with oil (E253), (E254), or (E254.1).
10. **Install seal retainer (1)** on rotor shaft (6). Be careful not to damage seal (2).



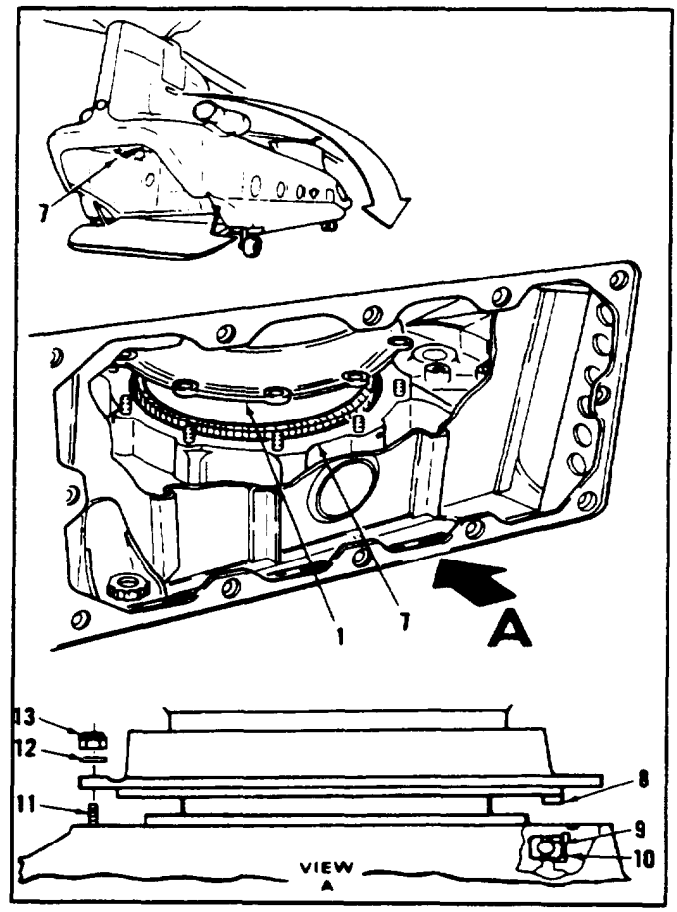
GO TO NEXT PAGE

11. Remove tape and barrier material from aft transmission (7). Install aft transmission (Task 6-97).

NOTE

Reach the seal retainer through open aft transmission access doors on each side of the aft pylon.

12. Align tab (8) on seal retainer (1) with slot (9) in outer race of bearing (10) in aft transmission (7). Install seal retainer on 10 studs (11).
13. Apply a light coat of oil (E253), (E254), or (E254.1) to the thread of studs (11). Install 10 washers (11) and nuts (12). Torque the nuts to 70 to 85 inch-pounds (wet).

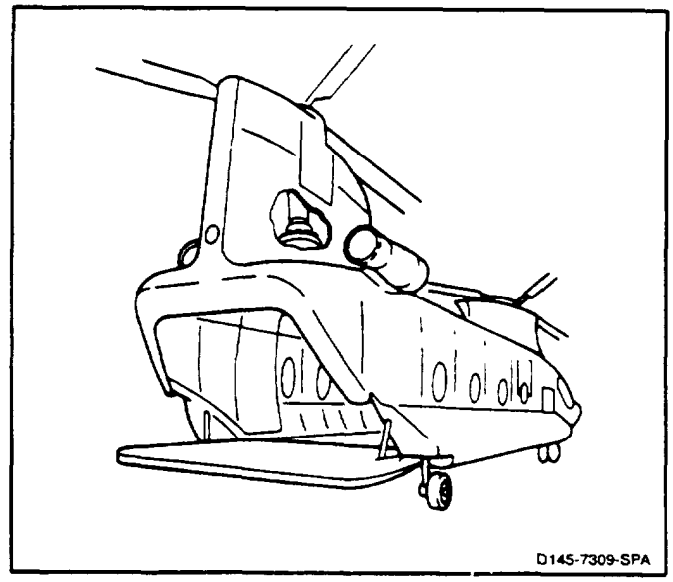


D145-7308-SPA

INSPECT

FOLLOW-ON MAINTENANCE:

Perform a ground run (TM 55-1520-240-10).
Install transmission access doors on aft pylon (both sides) (Task 2-2).
Install aft transmission drip tray (Task 2-3).
Close baffles under aft transmission (Task 2-2).
Close cargo ramp (TM 55-1520-240-10).



D145-7309-SPA

END OF TASK

INITIAL SETUP

Applicable Configurations:
All

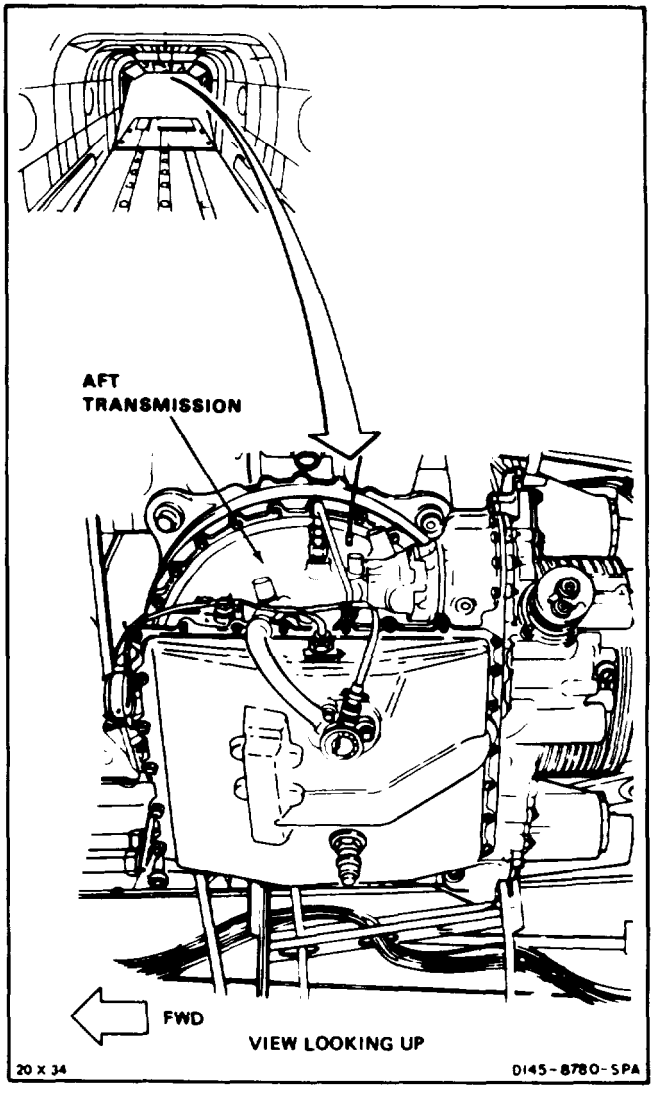
Tools:
Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Aft Rotor Shaft Securing Device (T50)
Hoist Kit (T85)
Handling Sling (T163) (Used with (T85) as Alternate Sling)
Socket, 1 5/16-Inch
Aft Transmission Torque Adapter (T160)
Torque Pack (T23)
Tee Handle (T161)
Aft Transmission Adapter (T17)
Transportation Trailer 2000
Roller Adapter 2550 (4)
Workstand (2)

Materials:
Twine (E433)
Barrier Material (E80)
Masking Tape (E388)
Paper Tags (E264)

Personnel Required:
Medium Helicopter Repairer (5)

References:
TM 55-1520-240-T
Task 2-2

Equipment Condition:
Battery Disconnected (Task 1-39)
Electrical Power Off
Cargo Ramp Open (TM 55-1520-240-T)
Baffles Under Aft Transmission Open (Task 2-2)
Aft Transmission Drip Tray Removed (Task 2-3)
Aft Pylon Access Doors to Generators and Transmission Removed (Both Sides) (Task 2-2)
No. 9 Aft Drive Shaft Removed (Task 6-21)
Aft Transmission Adapter Assembly Removed (Task 6-23)
Aft Rotor Pitch Links Disconnected (Task 5-97)
Aft Servocylinder Safety Blocks Installed (Task 11-28)

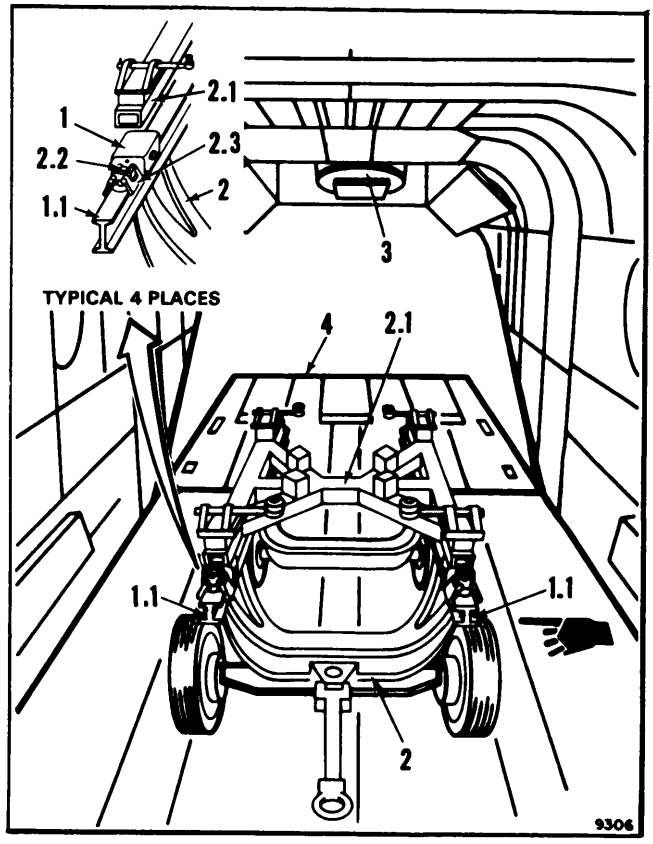


1. **Fit four roller adapters (1)** over two rails (1.1) of trailer (2).

   1.1 With aid of helper, **position adapter (2.1) on roller adapters (1).**

   1.2 **Turn fitting (2.2)** of each roller adapter (1) clockwise **until clamp (2.3) fits tightly** against rail (1.1).

2. Position trailer (2) in cabin forward of aft transmission (3).
3. Raise cargo ramp (4) to level (TM 55-1520-240-T).



INSTALL AFT ROTOR SHAFT SECURING DEVICE

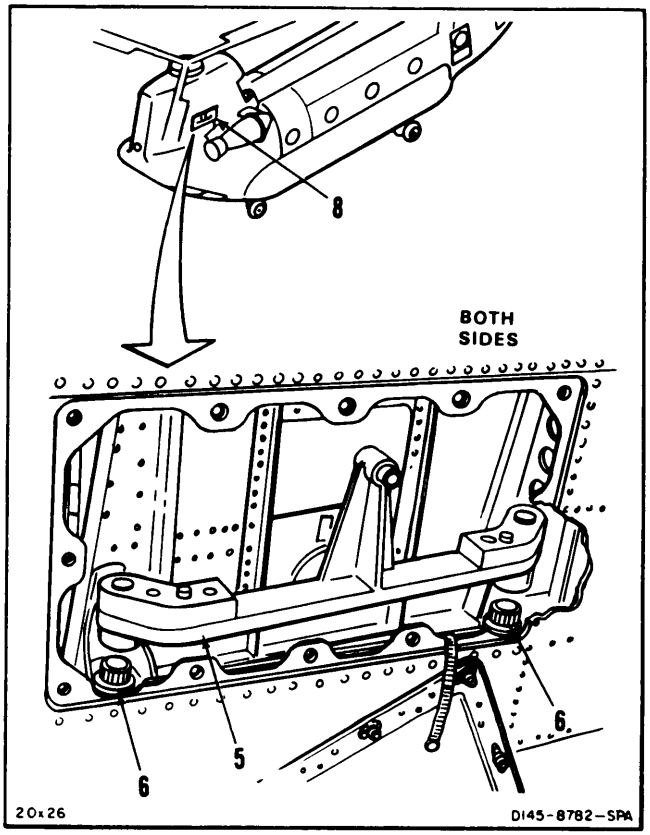
CAUTION

Do not turn rotor blades while securing device is installed. Rotor shaft can be damaged.

NOTE

- Install securing device with aid of helper through transmission access holes in pylon.
- Adapter bars are marked LEFT SIDE and RIGHT SIDE. They are not interchangeable.

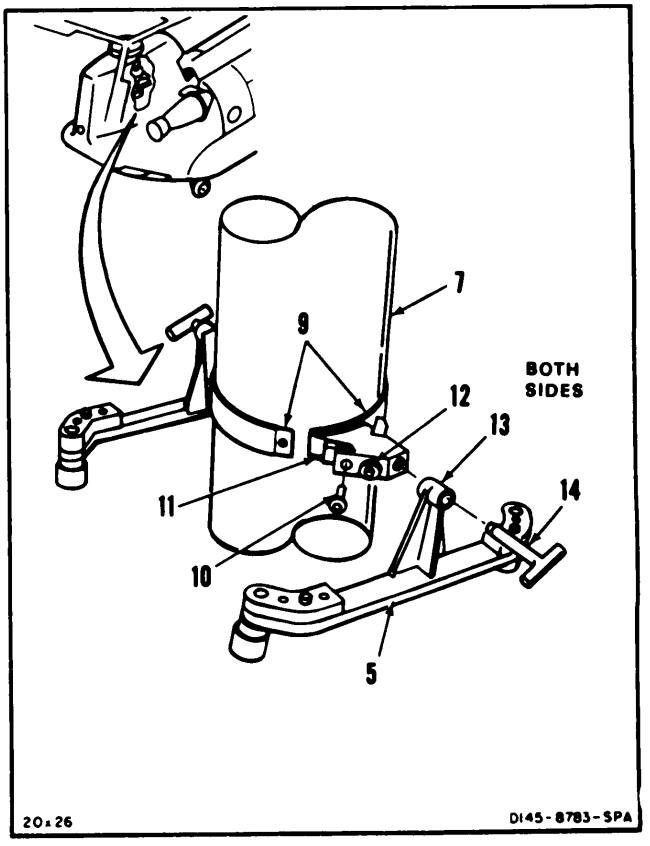
4. **Install two adapter bars (5)** on transmission mounting nuts (6) at each side of rotor shaft (7). Work through access hole (8) at each side of helicopter.



GO TO NEXT PAGE

6-92 REMOVE AFT TRANSMISSION (Continued)

5. **Install two clamps (9)** around rotor shaft (7). Secure them to each other with pins (10) through plates (11).
6. With aid of helper, **loosely secure dam- (9) to shaft (7)** by tightening two knobs (12). Slide clamp assemblies down shaft to align with uprights (13) on two adapter bars (5). Install pins (14) through uprights and plates (11).
7. **Tighten clamps (9)** around shaft (7) with two knobs (12).



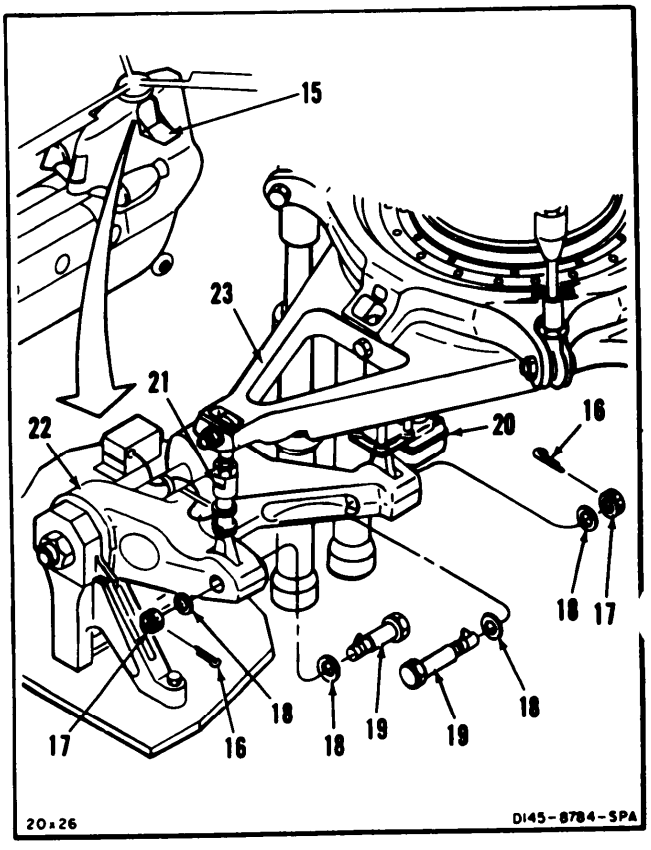
INSTALL HOIST KIT

8. Open aft pylon left and right work platforms (15) (Task 2-2).

NOTE

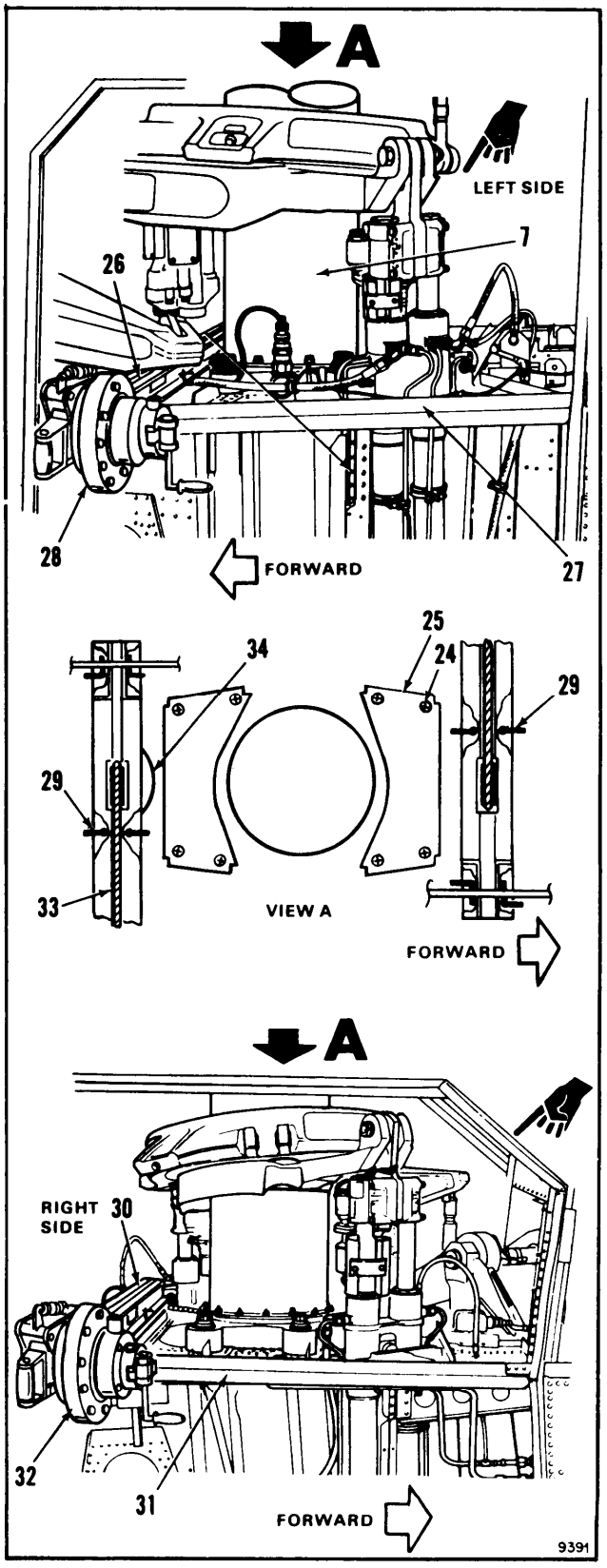
Yoke must be disconnected for forward hoist and beam assembly clearance.

9. Remove cotter pins (16), nuts (17), washers (18), and bolts (19) from lower end of actuator (20) and link (21). **Disconnect actuator and link from yoke (22). Remove actuator from swashplate yoke (23).**
10. Tie yoke (22) to swashplate yoke (23). Use twine (E433).



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11. Release four fasteners (24) on plate (25). Remove plate.
12. **Install beam assembly (26)** on aft pylon structure (27) forward of rotor shaft (7), with hoist (28) at left. Install four pins (29) through beam and structure.
13. **Install beam assembly (30)** on aft pylon structure (31) aft of rotor shaft (7), with hoist (32) at right. Install four pins (29) through beam and structure. Lower cable (33) through hole (34).
14. With aid of helper, operate two hoists (28 and 32) to **lower cables (33) to top of transmission (3).**



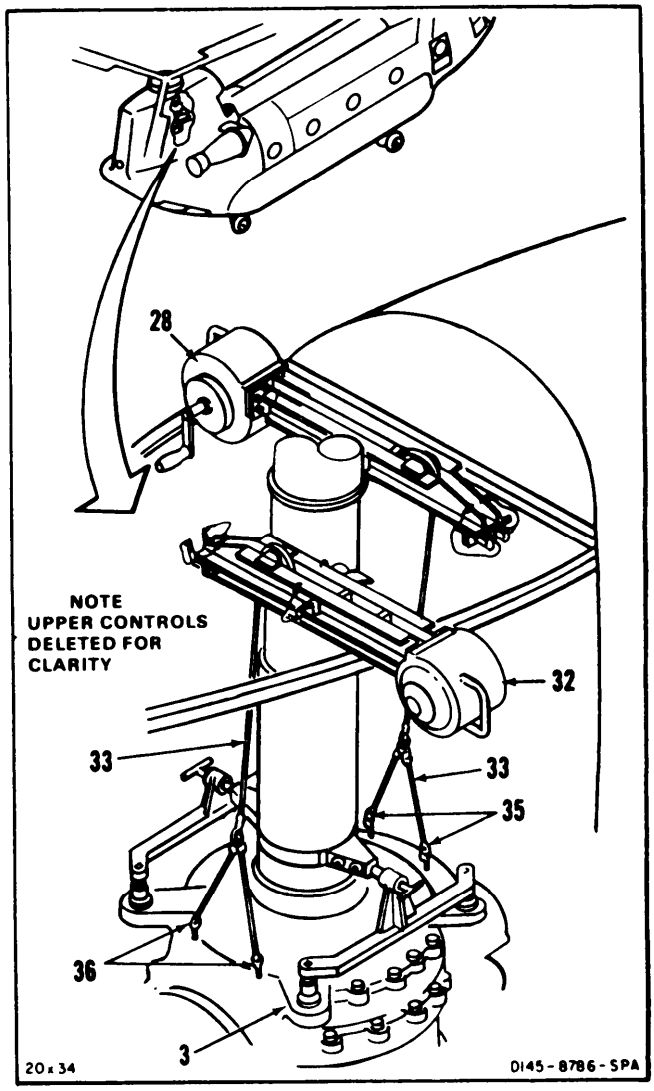
GO TO NEXT PAGE

6-92 REMOVE AFT TRANSMISSION (Continued) 6-92

NOTE

Reach forward hoist eyes from cabin. Reach aft hoist eyes from generator access holes on each side of pylon.

15. **Connect cables (33)** of forward hoist (28) to two forward hoist eyes (35) on transmission (3). Connect cables of aft hoist (32) to two aft hoist eyes (36) on transmission.
16. Operate hoists (28 and 32) to **remove slack from cables (33).** Do not apply tension.



DISCONNECT TRANSMISSION

NOTE

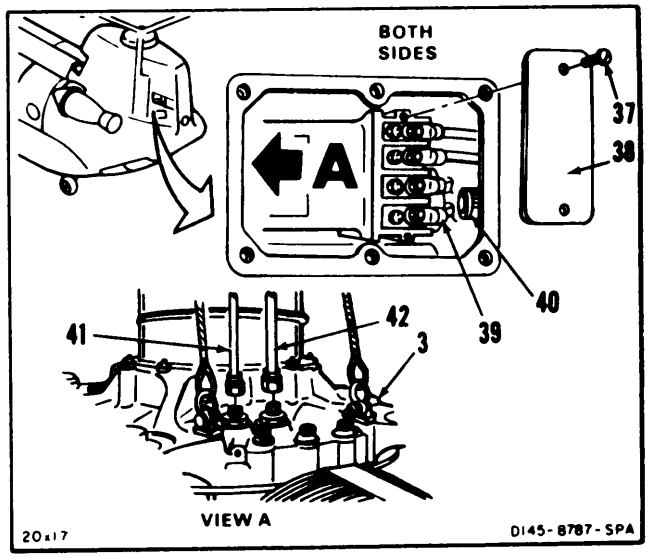
Disconnect wires from two generators in same way. Reach generator connections through access holes on each side of pylon.

17. Remove two screws (37) from cover plate (38). Remove plate.
18. Tag and **disconnect four wires (39) and connector (40).**

NOTE

Reach oil hoses through generator access holes.

19. **Disconnect two oil hoses (41 and 42)** from top of transmission (3).

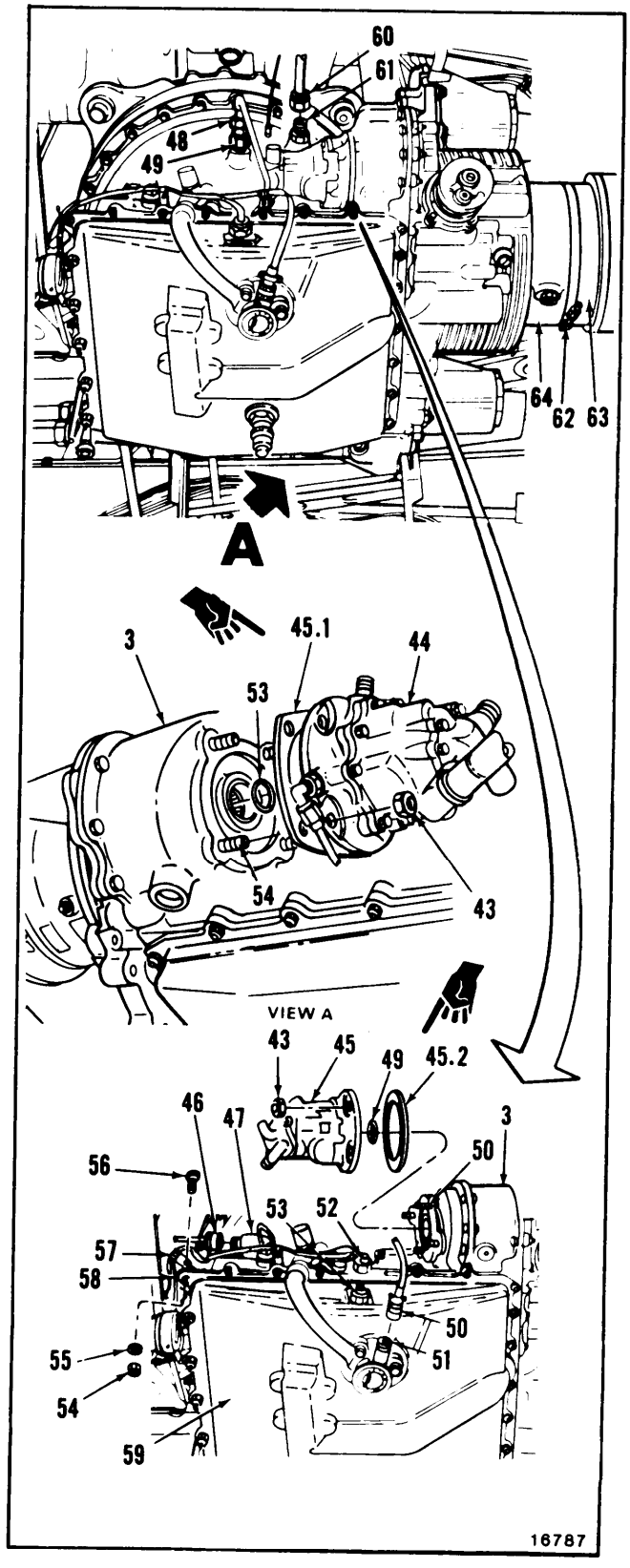


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CAUTION

Do not kink hoses when handling pumps.

20. Remove four nuts (43) from two hydraulic pumps (44 and 45). **Remove pumps, with gaskets (45.1 and 45.2), from transmission (3).** Tie pumps to each side of cabin with twine (E433).
21. Tag and **disconnect electrical connector (46)** from auxiliary oil pressure switch (47). Tag and **disconnect electrical connector (48)** from main oil pressure switch (49).
22. Tag and **disconnect electrical connector (50)** from indicating screen and chip detector (51). **Tag and disconnect electrical connector (52)** from temperature bulb (53).
23. Remove nuts (54), washers (55), and screws (56) from four clamps (57). **Tie wires (58) away from sump (59).**
24. **Disconnect oil hose (60)** from adapter (61).
25. **Loosen clamp (62)** at duct (63). **Slide clamp and duct aft,** away from oil cooler fan (64).



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REMOVE NUTS

NOTE

- Torque shaft and torque adapter are part of torque adapter assembly (T160).
- To avoid binding during transmission removal, centerline of adapter shall be directly under or slightly left of transmission centerline.

26. **Install torque adapter (65)** between structure (66) at sta 534 and structure (67) at sta 594. Flat side of base (68) shall face aft. Center adapter under transmission (3) and tighten four hand knobs (69). Make sure centerline of adapter is not right of transmission centerline.

WARNING

Make sure ratchet selector on torque pack is set to NUT OFF before applying torque. Changing ratchet settings with torque applied can damage unit and cause injury to personnel.

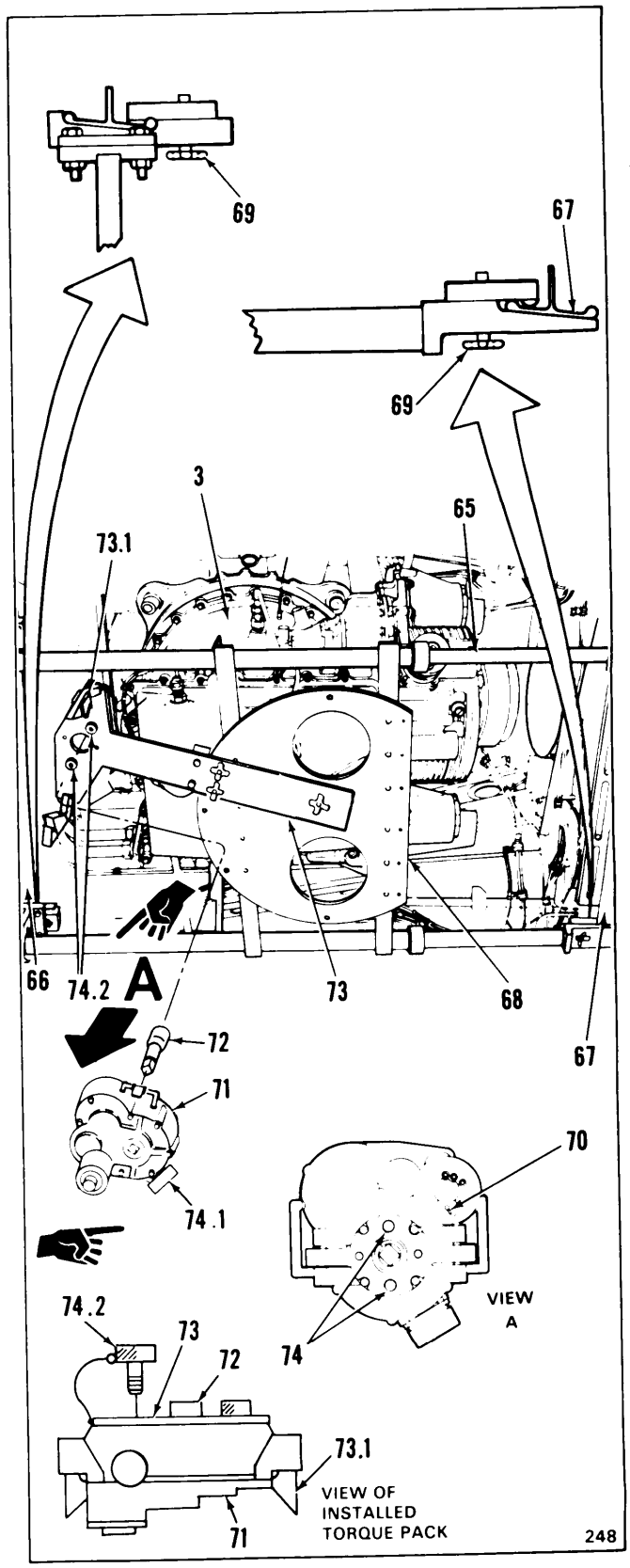
27. **Set ratchet selector (70) on torque pack (T23) (71) to NUT OFF.**

NOTE

Adapter is part of torque pack (T23).

28. **Install adapter (72)** in torque pack (T23) (71). **Install torque pack** on support (73) with two hooks (73.1). Make sure two pins (74) on bottom of torque pack engage holes in support. Check that torque indicator (74.1) faces aft and inboard.

28.1. **Secure torque pack (71) to support (73).** Use two thumb screws (74.2).



29. **Loosen** each of four transmission **mounting nuts (75)** as follows:

NOTE

Removal of forward left nut shown here.

a. Loosen knob (75.1).

b. If loosening a forward nut (75), position support (73) directly under nut to be loosened. If loosening an aft nut, position support straight out to side of nut to be loosened. Install and tighten two knob assemblies (76) through support and base plate (68).

c. Tighten knob (75.1).

NOTE

Torque shaft is spring-loaded and compresses for installation.

d. **Place one end of torque shaft (77) on nut (75).** Place other end on adapter shaft (72).

WARNING

Be sure handle is fully seated and ratchet selector on torque pack is properly set before applying torque. Moving selector with load on torque pack can damage unit and injure personnel.

e. Set selector switch on tee handle (T161) (78) to OFF. Install tee handle on torque pack (T23) (71). Turn handle counterclockwise until torque is broken.

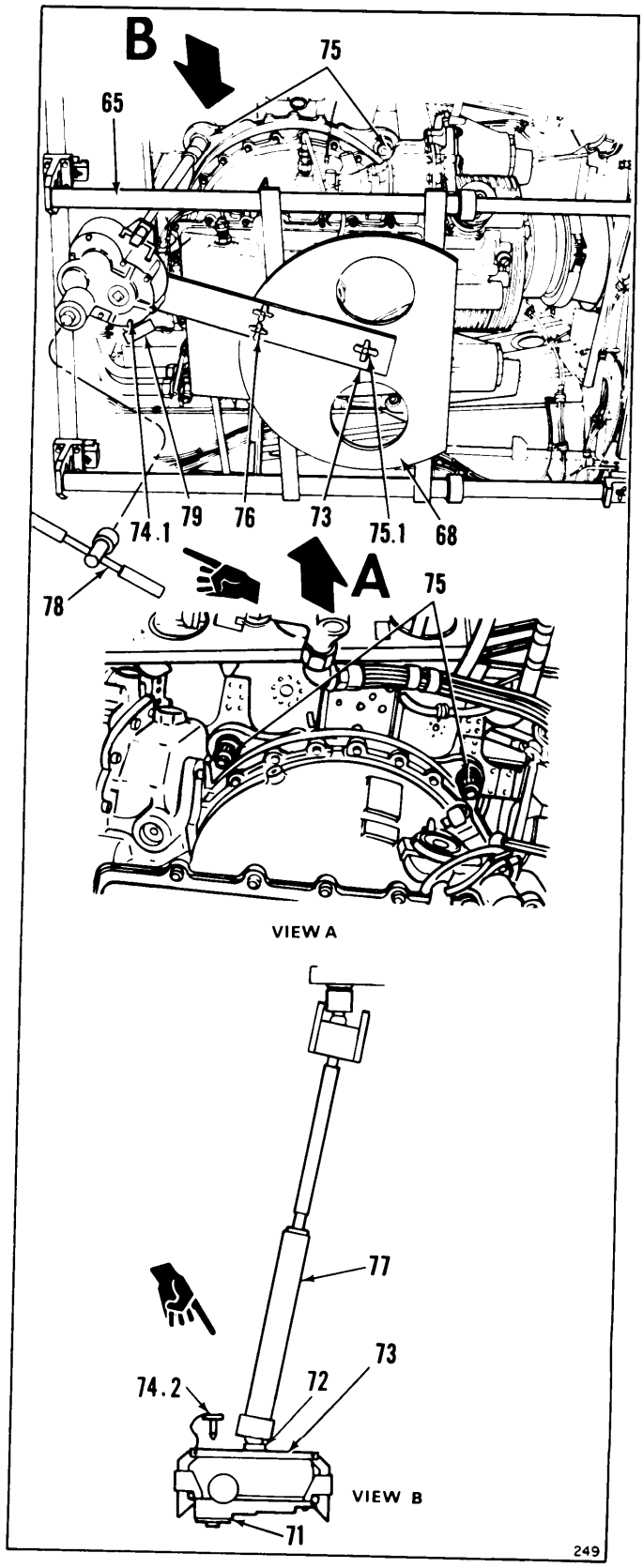
f. Set selector switch on tee handle (78) to ON. Turn handle clockwise until torque indicator (74.1) reads 0 and torque pack (71) is loose.

g. Remove torque shaft (77).

29.1. Loosen thumb screws (74.2) and release hooks (73.1). Remove torque pack (71) from support (73).

29.2. Remove torque adapter (65) from helicopter structure.

29.3. Remove four nuts (75).



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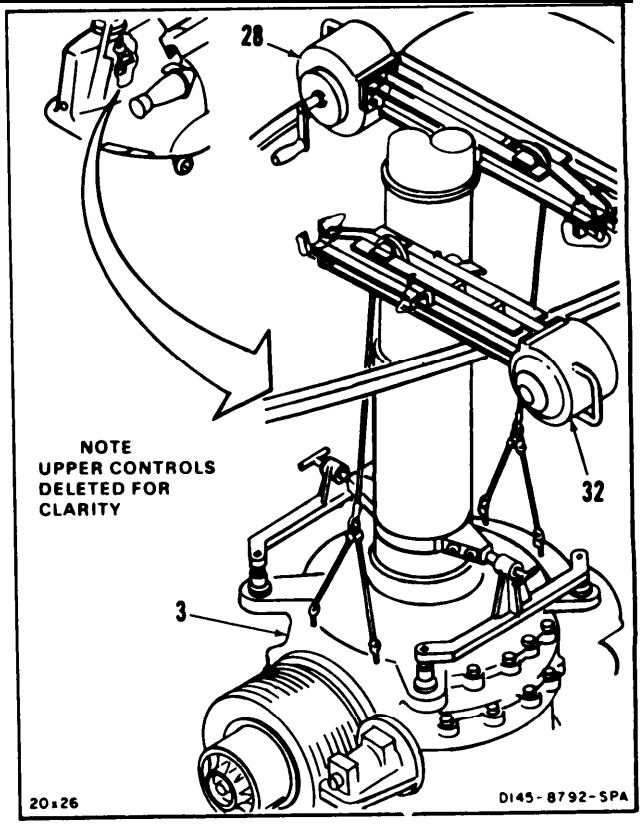
REMOVE TRANSMISSION

30. Station helpers in cabin to guide transmission (3).

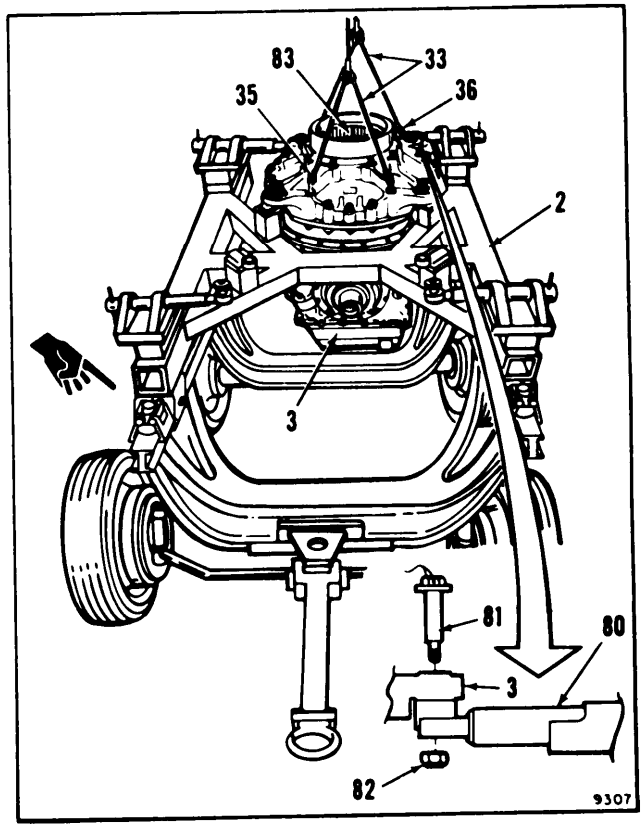
CAUTION

If transmission is not kept tilted forward 4 degrees , rotor shaft splines can bind within transmission. Damage can result.

31. Have helpers operate two hoists (28 and 32) to slowly **lower transmission (3). Keep transmission tilted forward 4 degrees** during lowering.



32. Slide back two mount arms (80) on adapter (2). **Lower transmission (3) on adapter.** Extend two arms.
33. Install four bolts (81) in transmission (3) and adapter. Install nuts (82).
34. Disconnect cables (33) from hoist eyes (35 and 36).
35. Cover transmission cavity (83) with barrier material (E80) and tape (E388).
36. **Remove transmission (3)** from helicopter.

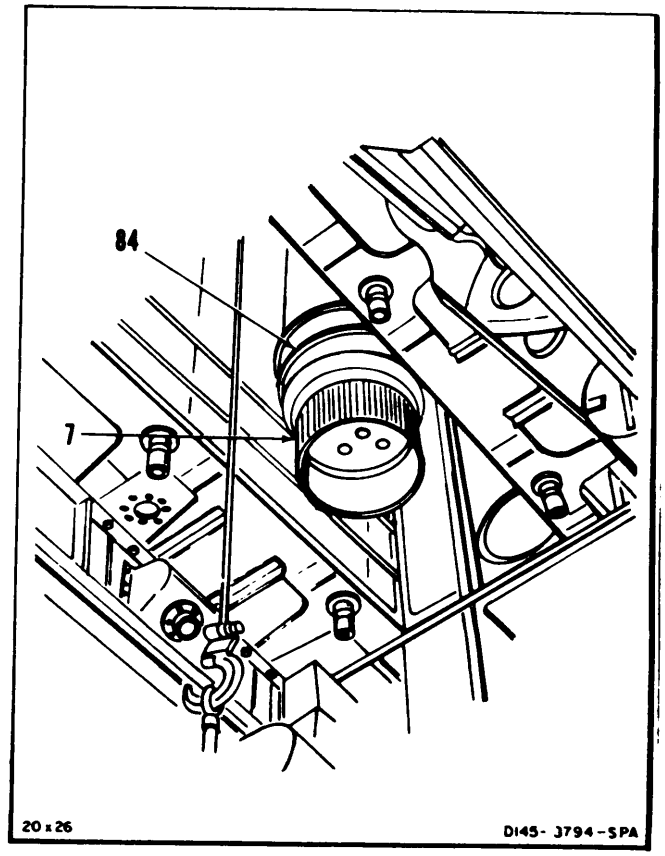


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37. **Cover splines (84)** of rotor shaft (7) with barrier material (E80) and tape (E388).

FOLLOW-ON MAINTENANCE:

None



END OF TASK

6-93 DISASSEMBLE (TEAR DOWN) AFT TRANSMISSION

INITIAL SETUP

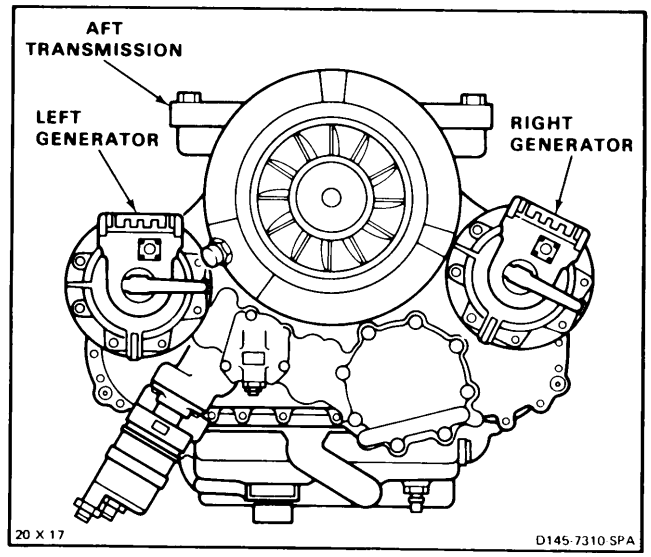
Applicable Configurations:
All

Tools:
Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692

Materials:
Barrier Material (E81)
Tape (E388)

Personnel Required:
67U10 Medium Helicopter Repairer

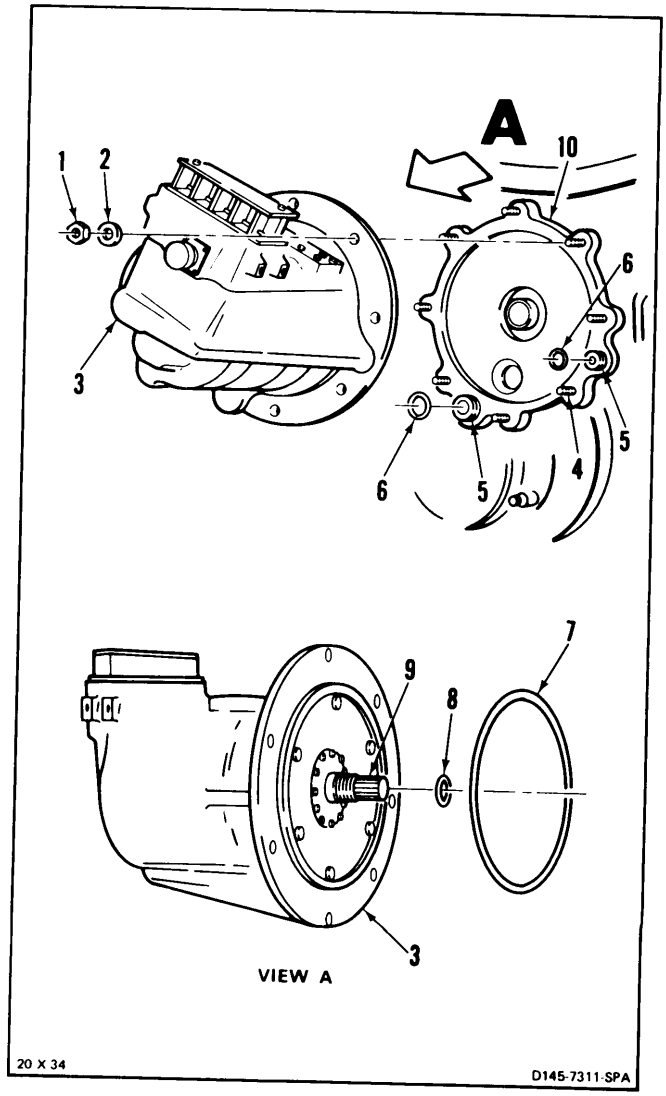
Equipment Condition:
Off Helicopter Task



NOTE

Remove left and right generator from aft transmission in same way. Right generator shown here.

1. **Remove eight nuts (1)** and washers (2) from generator (3).
2. Pull generator (3) from eight studs (4) and two transfer tubes (5). **Remove generator.**
3. Remove packings (6) from two oil transfer tubes (5). Remove packing (7) from generator (3). Remove packing (8) from generator drive shaft (9).
4. Cover mounting pad (10), including two transfer tubes (5), with barrier material (E81) and tape (E388).
5. Repeat steps 1 thru 4 for left generator.



FOLLOW-ON MAINTENANCE:

None

END OF TASK

INITIAL SETUP

Applicable Configurations:
All

Tools:
Dial Indicating Depth Gage 643J
Goggles

Materials:
Naphtha (E245)
Emery Cloth (E123) or
Abrasive Paper (E13)
Crocus Cloth (E122)
Cloths (E120)
Gauze Sponges (E184)
Barrier Material (E80)
Masking Tape (E388)
Gloves (E186)
Acetic Acid (E21)
Alodine Powder (E65)
Chromic Acid (E114)
Calcium Sulphate (E91)
Epoxy Primer (E293)
Epoxy Topcoat (E166)

Personnel Required:
Aircraft Powertrain Repairer
Inspector

References:
TM 55-1500-323-23
MIL-C-5541
MIL-M-3171, Type VI
MIL-C-22751

Equipment Condition:
Off Helicopter Task

General Safety Instructions:

WARNING

Naphtha (E245) is combustible and toxic. It can irritate skin and cause burns. Use only with adequate ventilation, away from open flame. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.

WARNING

Acetic acid (E21) is combustible and toxic. Chromic acid (E114) is extremely toxic. Both can cause burns. Avoid inhaling. Use only with adequate ventilation, away from open flame. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.

WARNING

Alodine powder (E65) is an oxidizer. Discard cloths which contain this material in a separate container. If discarded with cloths contaminated with acetone, MEK, or other organic solvents, combustion can result. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.

WARNING

Epoxy primer (E293) is flammable and toxic. It can irritate skin and cause burns. Use only with adequate ventilation, away from heat or open flame. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.

CAUTION

Do not wear photogray glasses when fluorescent inspecting. They reduce ability to see cracks.

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6-93.1 REPAIR AFT TRANSMISSION OUTSIDE SURFACE 6-93.1 (Continued]

NOTE

Reparable damage is limited to scratches, nicks, gouges, and minor corrosion.

1. **Clean** oil and grease from **damaged area.** Use naphtha (E245) and clean cloths (E120). Wear gloves (E186).
2. **Check** extent and location of **damage** on cover (1) and housing (2).

NOTE

Refer to Task 6-35 for repairs to sump.

NOTE

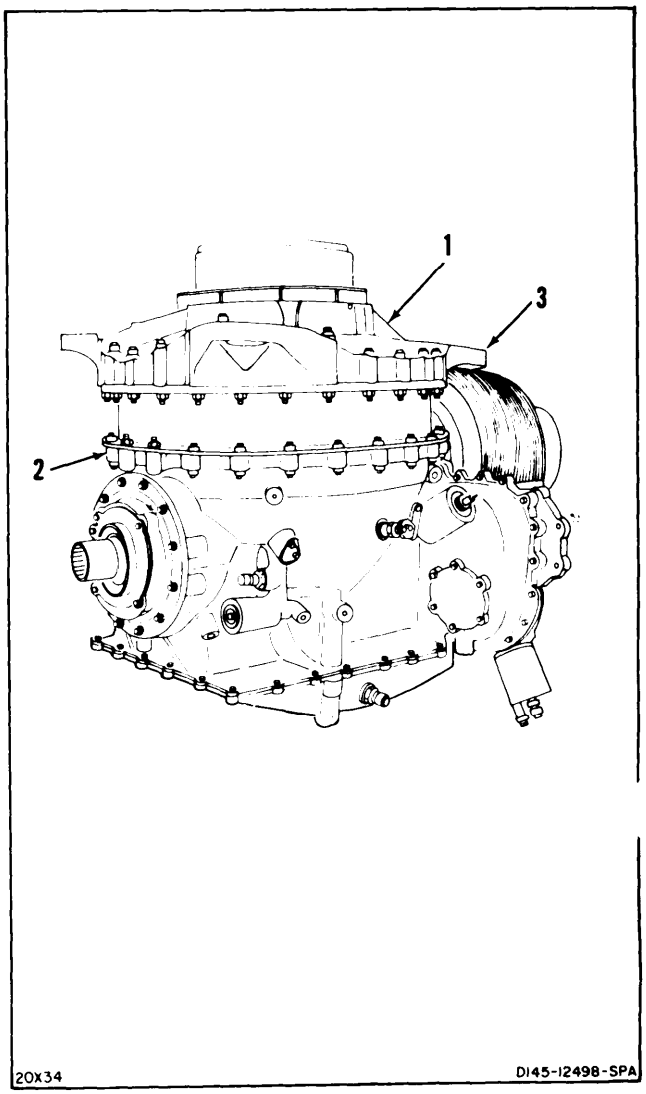
Limits in this step refer to extent of damage after rework.

a. **Depth of damage shall not be more than 0.025 inch.**

b. **Damage shall not extend over more than one surface or enter any radius.**

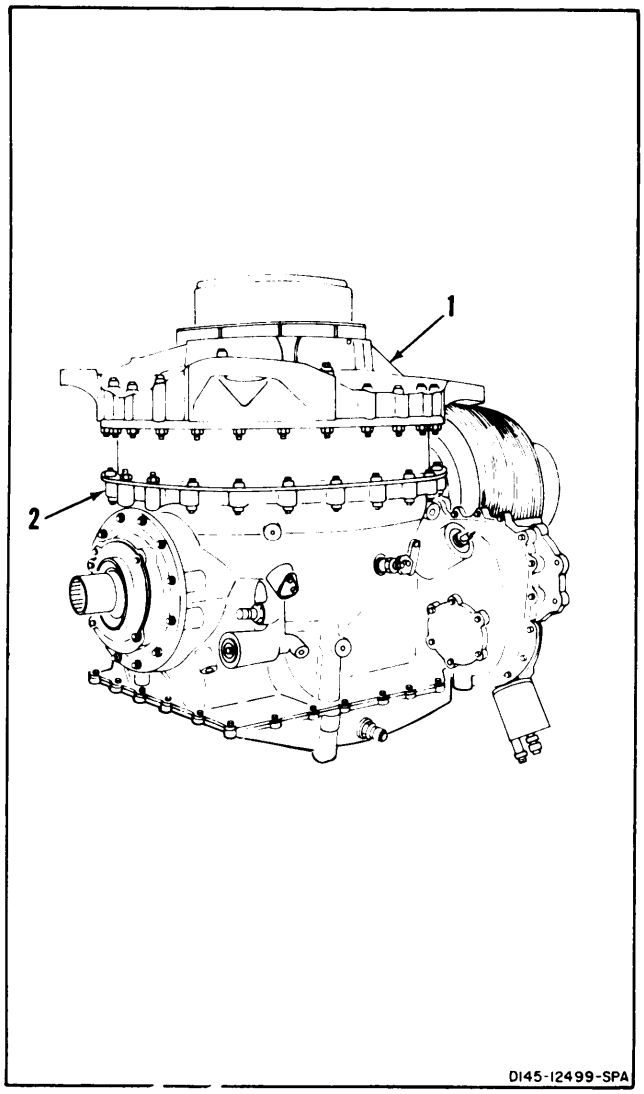
c. **Damage shall not be closer than 1.00 inch to any mounting hole (3).**

3. **Fluorescent inspect** damaged area to check for cracks (TM 55-1500-323-23). **There shall be no cracks.**
4. Cover moving parts near damaged area to keep out abrasive grit. Use barrier material (E80) and tape (E388).
5. **Blend out damage** with emery cloth (E123) or abrasive paper (E13). Observe limits of step 2.



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6. Smooth blended area with crocus cloth (E122). Do not leave any sharp edges.
7. **Acid etch reworked area** as follows:
   a. Prepare a solution of 3 parts acetic acid (E21) in 7 parts water. Wear gloves (E186) and goggles.
   b. Swab area with solution for 2 minutes. Use gauze sponges (E184).
   c. Rinse area with cold water.
8. **Fluorescent inspect** reworked area to check for cracks (TM 55-1500-323-23). **There shall be no cracks.**
9. Apply surface treatment to reworked area as follows:
   a. **Clean area with naphtha (E245)** and clean cloths. Wear gloves (E186). Let area air dry.
   b. **If area is on cover (1), swab solution of alodine powder (E65) in water on area (MIL-C-5541). Swab for 2 to 5 minutes.** Use gauze sponges (E184). **Rinse** area with cold water and let air dry. Wear gloves (E186).
   c. **If area is on housing (2), swab on solution of chromic acid (E114) and calcium sulphate (E91) (MIL-L-3171, Type W). Swab until metal becomes dull gold to brown.** Use gauze sponges (E184). **Rinse** area with cold water and let air dry. Wear gloves (E186).
10. **Apply epoxy primer (E293)** to reworked area. Let air dry for 2 hours. Wear gloves (E186).
11. **Apply epoxy topcoat (E166)** (MIL-C-22751). Wear gloves (E186).



INSPECT

FOLLOW-ON MAINTENANCE:

None

END OF TASK

6-94 PREPARE AFT TRANSMISSION FOR SHIPMENT OR STORAGE

INITIAL SETUP

Applicable Configurations:
All

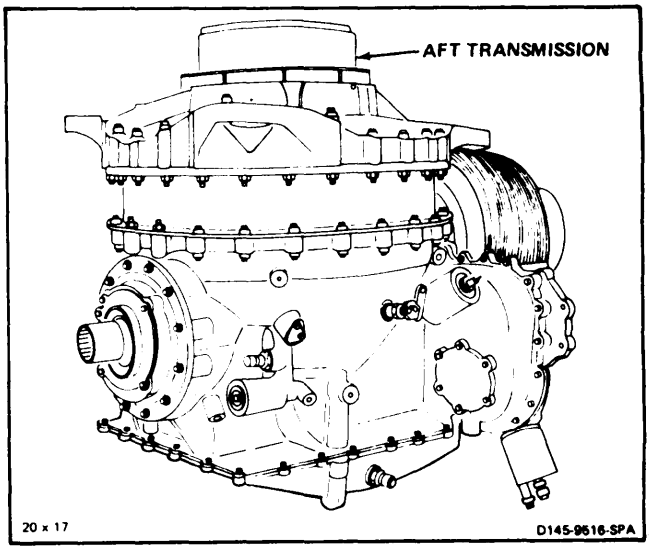
Tools:
Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Sling 114E5119-2 (p/o T3)
Work Hoist
Shipping Container (T37)
Container, 14-Quart (3)
Torque Wrench, 0 to 500 Foot-Pounds

Materials:
Fingerprint Remover (E175)
Cloths (E120)
Dry Cleaning Solvent (E162)
Gloves (E186)
Swabbing Brush (E86)
Corrosion Preventive Compound (E153 or E154)
Barrier Material (E81)
Masking Tape (E388)
Desiccant (E160), 16-Unit Bag (5)
Tarpaulin (E410) or Plastic Sheet (E279)

Personnel Required:
67U10 Medium Helicopter Repairer (2)
67U30 Inspector

References:
TB 55-8100-200-25
TM 38-750
TB 750-126

Equipment Condition:
Off Helicopter Task
Aft Transmission Disassembled (Task 6-93)



General Safety Instructions:

WARNING

Dry cleaning solvent (E162), fingerprint remover (E175) and corroaion-preventive compound (E153 or E154 are flammable and toxic. They can irritate skin and cause burns. Use only in well-ventilated area, away from heat and open flame. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.

GO TO NEXT PAGE

6-94 PREPARE AFT TRANSMISSION FOR SHIPMENT OR STORAGE (Continued)

NOTE

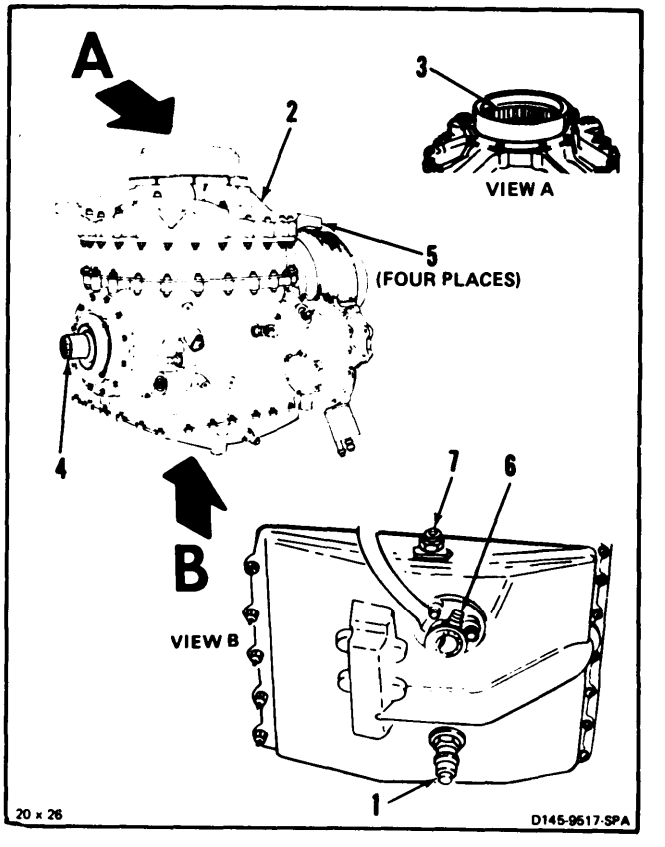
Sump holds about 30 quarts of oil.

1. Push in drain valve (1), twist it, and pull. **Let oil drain** into containers. Push in valve, twist it, and pull down to close.
2. Clean all surfaces of transmission (2). Use dry cleaning solvent (E162) and clean cloths (E120). Wear goggles.
3. **Clean** rotor shaft **splines (3),** input shaft **splines (4) and four bushings (5).** Use fingerprint remover (E175) and clean cloths (E120).

CAUTION

Touching unpainted surfaces with bare fingers can cause corrosion.

4. Put on gloves (E186). Gloves shall be worn for the rest of this task.
5. Wipe surfaces cleaned with fingerprint remover with dry cleaning solvent (E162) and clean cloths (E120).
6. **Coat** rotor shaft **splines (3),** input shaft **splines (4), and four bushings (5)** with corrosion preventive compound (E153 or E154).
7. **Cover splines (3 and 4) and bushings (5)** with barrier material (E81) and tape (E388).
8. **Cover indicating screen (6), electrical connector (7) and drain valve (1)** with barrier material (E81) and tape (E388).



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9. Install transmission (2) in shipping container (T37) (8) as follows:

   a. Inspect and prepare container (8) (TB 55-8100-200-25).

   b. Connect sling (T163) (9) to four lugs (10). Connect work hoist chain (11) to sling.

   c. Remove two nuts (12) and bolts (13) from support bar (14). Remove support bar from container (8).

   d. With aid of helper, **lift transmission (2) into container (137) (8).** Align it with two mounting brackets (15).

   e. Install support bar (14) on container (8) over transmission (2). Install two bolts (13) and nuts (12). **Torque nuts to 55 foot-pounds.**

   f. **Install two bolts (16) and nuts (17)** through brackets (15) of forward end of transmission. **Install two bolts (18) and nuts (19)** through support bar (14) at aft end of transmission (2). **Torque all nuts to 55 foot-pounds.**

   g. Remove sling (T163) (9) from transmission (2).

   h. Install two bolts (13) and nuts (12) through support bar (14). Torque nuts to 55 foot-pounds.

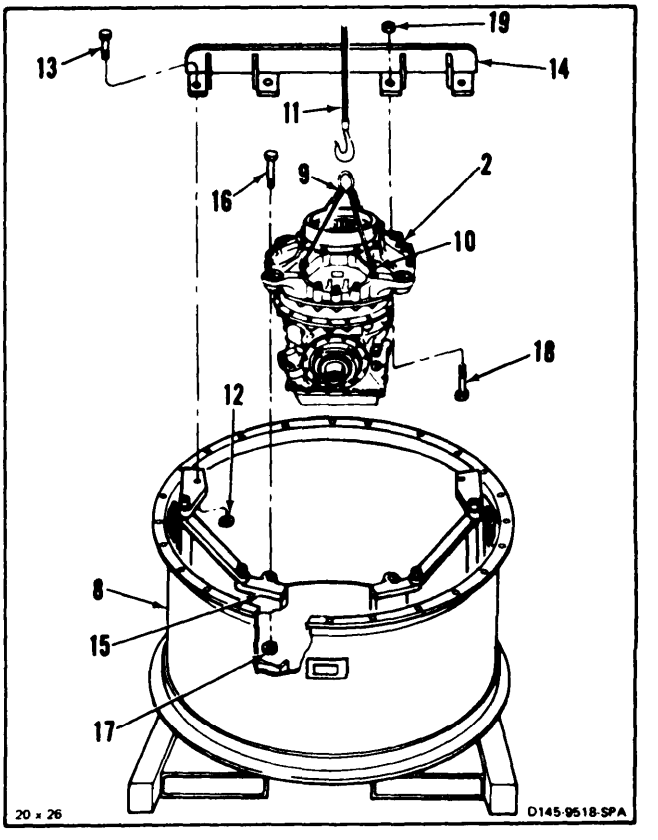
   i. Prepare required maintenance forms and reports (TM 38-750 and TB 750-126).

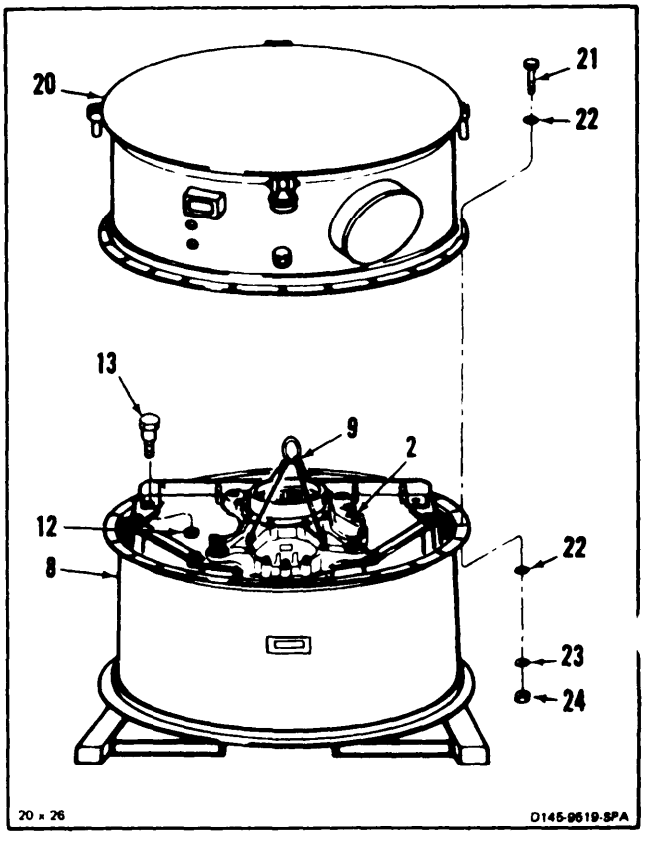
   j. Put five 16-unit bags of desiccant (E160) into container (T37) (8).

INSPECT

   k. **Install cover (20)** on container (T37) (8). Install bolt (21), two washers (22), split washer (23), and nut (24) at 24 places.

   l. **Torque nuts (19) at <u>3, 6, 9, and 12 o'clock</u> to <u>275 inch-pounds.</u> Torque nuts at <u>2, 4, 8, and 12 o'clock.</u> Torque remaining nuts.**





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10. **Remove plug (25)** from cover (20).
11. **Connect air test line (26)** to cover (20).

CAUTION

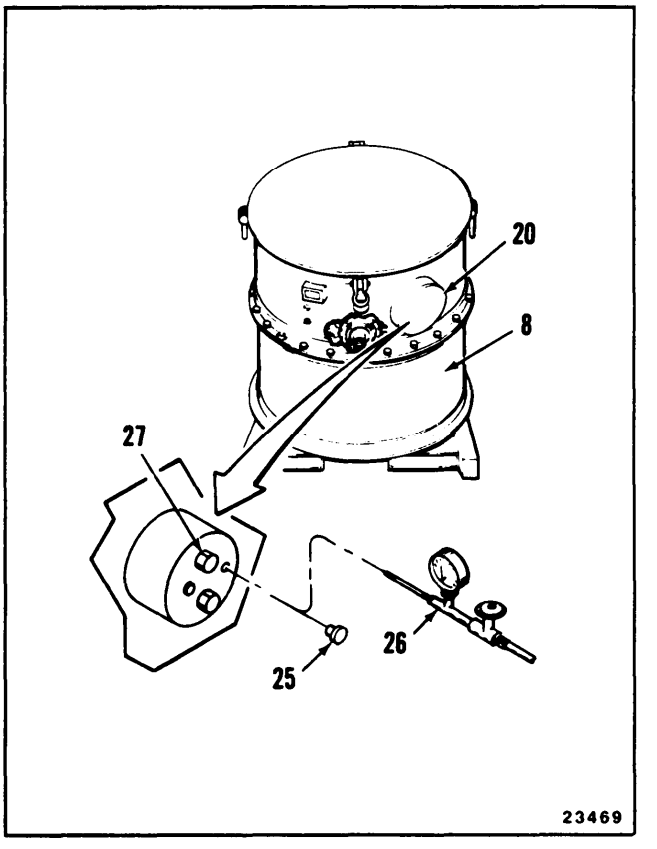
Low pressure air supply must be used. Exceeding test pressure can damage container.

12. **Pressurize container (8)** to **3 psi max.** Check container for leaks. Container must hold **3 psi** for **1 hour.**

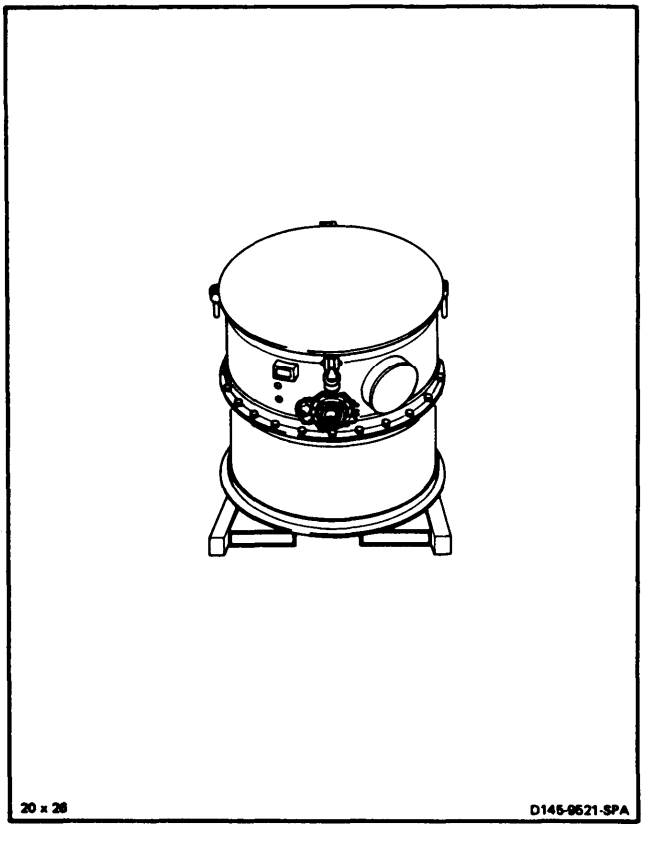
WARNING

Be careful when releasing air under pressure, wear goggles. Personal injury can result.

13. **Push pressure relief valve (27)** until pressure in container (8) is **0 psi.**
14. **Disconnect air line (26)** from cover (20).
15. **Install plug** (25) in cover (20).



FOLLOW-ON MAINTENANCE:
None



END OF TASK

6-95 REMOVE AFT TRANSMISSION FROM STORAGE

INITIAL SETUP

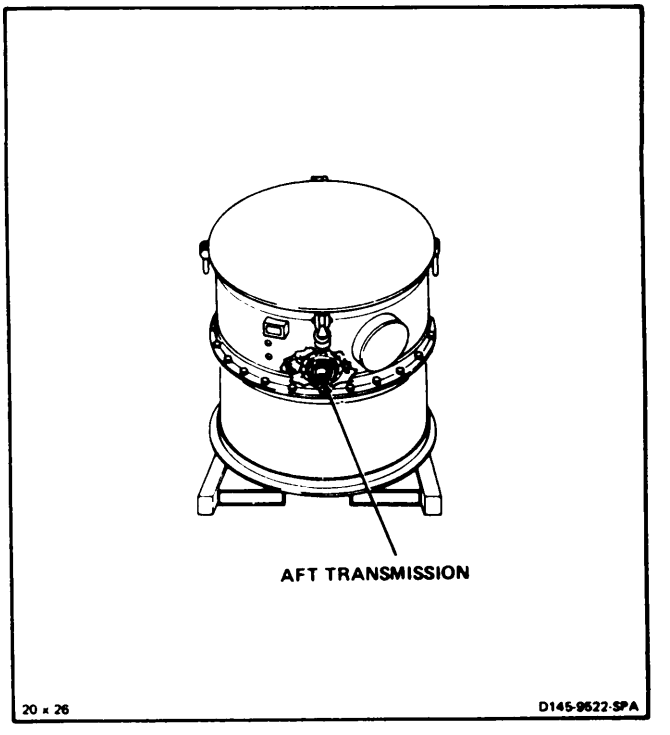
Applicable Configurations:
All

Tools:
Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Sling (T163)
Work Hoist
Container, 14-Quart

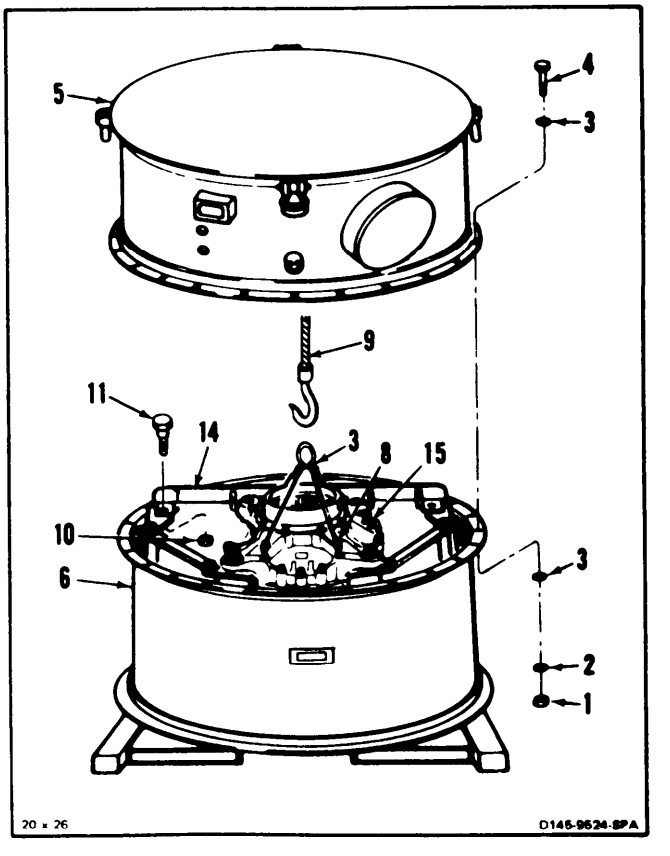
Materials:
Dry Cleaning Solvent (E162)
Cloths (E120)
Gloves (E186)

Personnel Required:
Medium Helicopter Repairer (4)
Inspector

Equipment Condition:
Off Helicopter Task



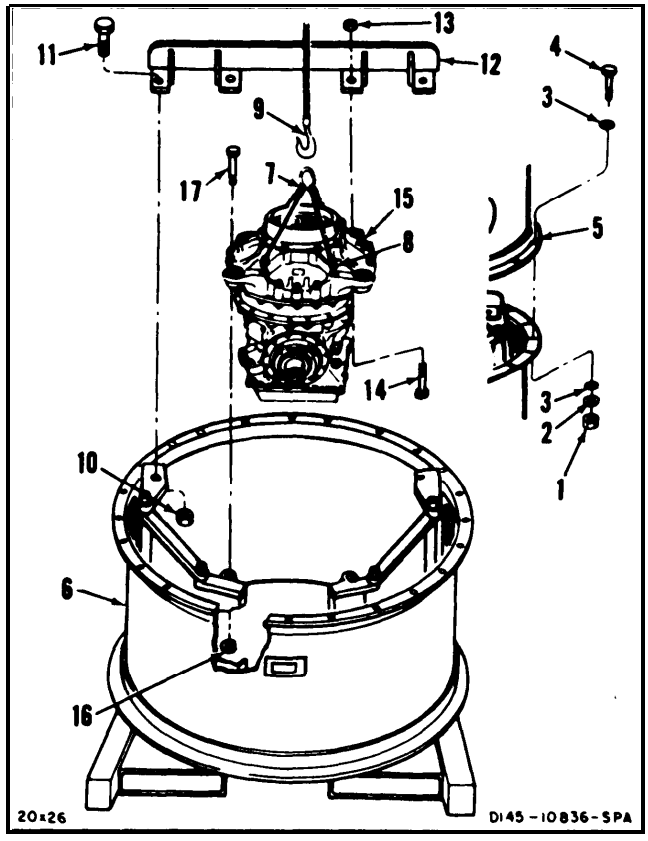
1. **Remove 24 nuts (1), washers (2 and 3), and bolts (4)** from cover (5). Remove cover.
2. Remove and discard desiccant bags from container (6).
3. **Connect sling T163) (7)** to four lugs (8). **Connect work hoist hook (9)** to sling.
4. **Remove** two nuts (10) and **bolts (11)** from support bar (12).



GO TO NEXT PAGE

6-95 REMOVE AFT TRANSMISSION FROM STORAGE (Continued)

5. **Remove** two nuts (13) and **bolts (14)** from transmission (15) and support bar (12). **Remove support bar.**
6. **Remove** two nuts (16) and **bolts (17)** from forward end of transmission (15).
7. With aid of helper, carefully **lift transmission (15)** from container (6).
8. Set transmission (15) down on bench or workstand. Remove work hoist hook (9) and sling (7).
9. **Install support bar (12)** on container (6) with bolts (11) and nuts (10). Install bolts (14) and nuts (13) in bar,
10. Install cover (5). Install bolts (4), washers (3), split washers (2), and nuts (1) at 24 places.



GO TO NEXT PAGE

6-95 REMOVE AFT TRANSMISSION FROM STORAGE (Continued) 6-95

11. Remove all tape and barrier material from transmission (15).

WARNING

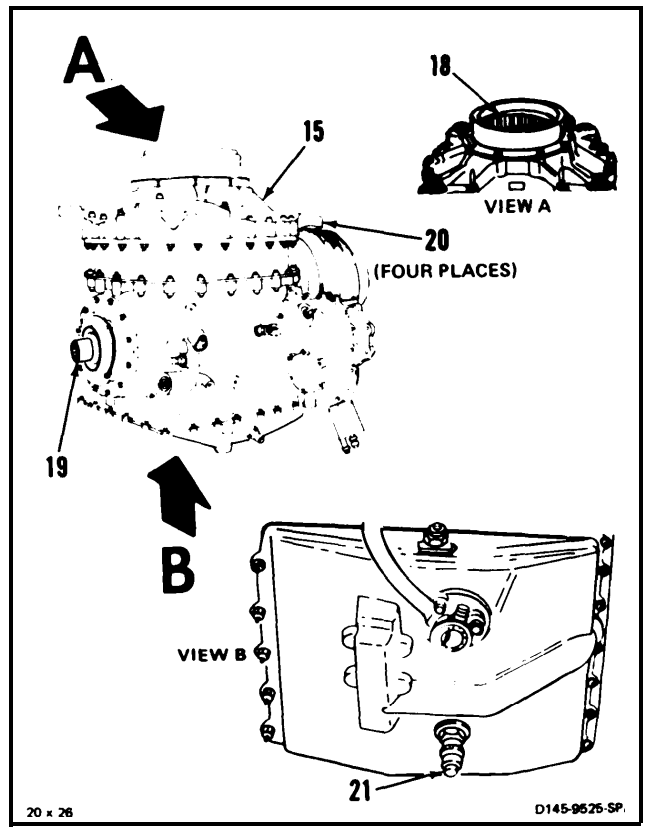
Dry cleaning solvent (E162) is flammable and toxic. It can irritate skin and cause burns. Use only in well-ventilated area, away from heat and open flames. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.

CAUTION

Touching splines with bare fingers can cause corrosion.

12. **Remove corrosion preventive compound** from rotor shaft **splines (18),** input shaft **splines (19), and four bushings (20).** Use dry cleaning solvent (E162) and clean cloths (E120). Wear gloves (E186) and goggles.

13. Push in drain valve (21), twist it, and pull. **Let residual oil drain** into container. Push in valve, twist it, and pull down to close.



INSPECT

FOLLOW-ON MAINTENANCE:

Assemble aft transmission (Task 6-96).

END OF TASK

6-96 ASSEMBLE (BUILD UP) AFT TRANSMISSION 6-96

INITIAL SETUP

Applicable Configurations:
All

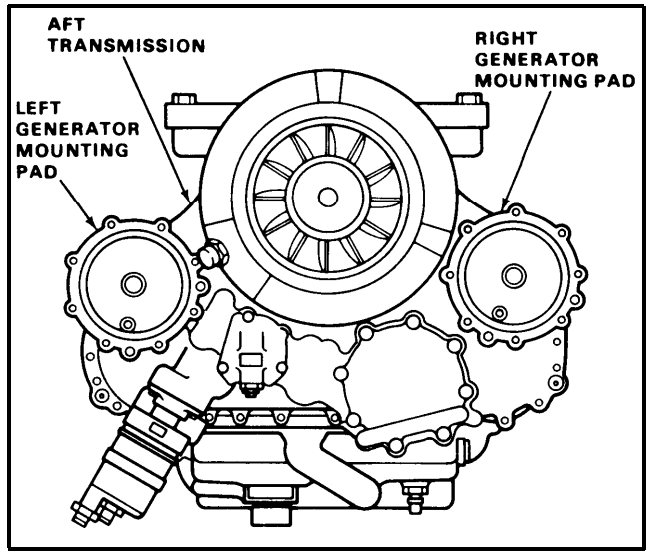
Tools:
Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Torque Wrench, 30 to 150 Inch-Pounds

Materials:
Oil (E254)
Lockwire (E231)

Parts:
Packings

Personnel Required:
Medium Helicopter Repairer
Inspector

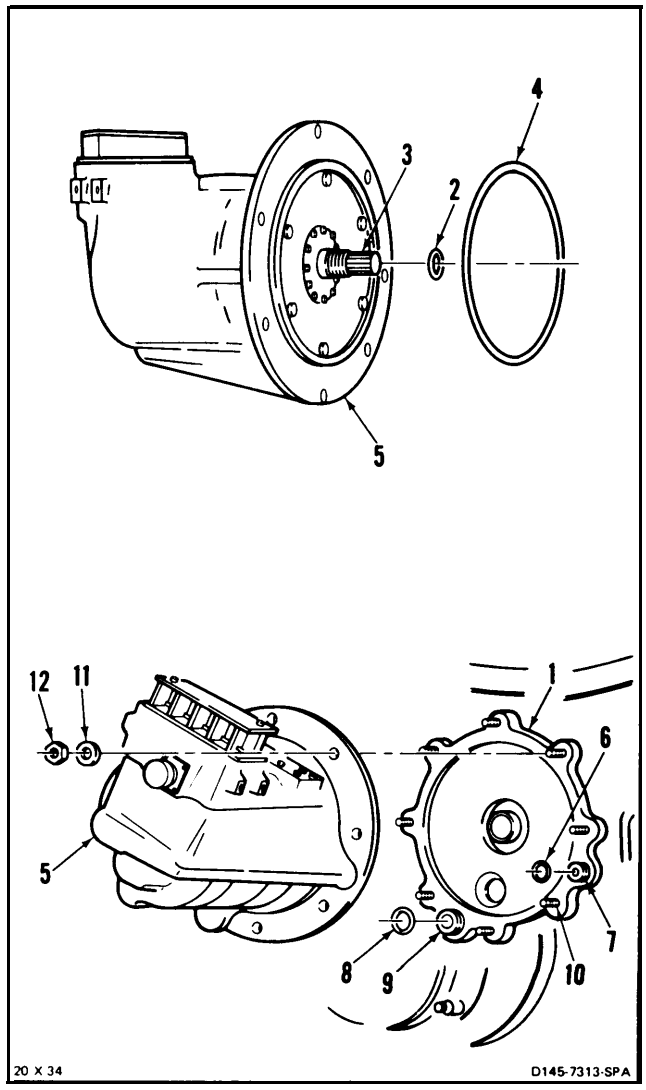
References:
TM 55-1520-240-23P
Task 6-154



NOTE

- Install left and right generator from aft transmission in same way. Right generator shown here.
- New transmissions have cover plates over mounting pads.

1. If applied, remove tape and barrier material from mounting pad (1).
2. **Install packing (2)** on generator drive shaft (3). **Install packing (4)** on generator (5). **Install packing (6)** on transfer tube (7). Install packing (8) on transfer tube (9).
3. Coat eight studs (10) with oil (E254). Align generator (5) with eight studs and two transfer tubes (7 and 9). **Install generator** on mounting pad (1).
4. **Install eight** washers (11) and **nuts (2). Torque nuts to <u>120 inch-pounds.</u>**
5. Repeat steps 1 through 4 for left generator.



GO TO NEXT PAGE

6. Retorque auxiliary oil filter (13) as follows:

   a. Remove lockwire from filter (13).

   NOTE

   Do not remove filter.

   b. **Check wrenching flats** on filter (13). If they are damaged, replace filter (Task 6-154).

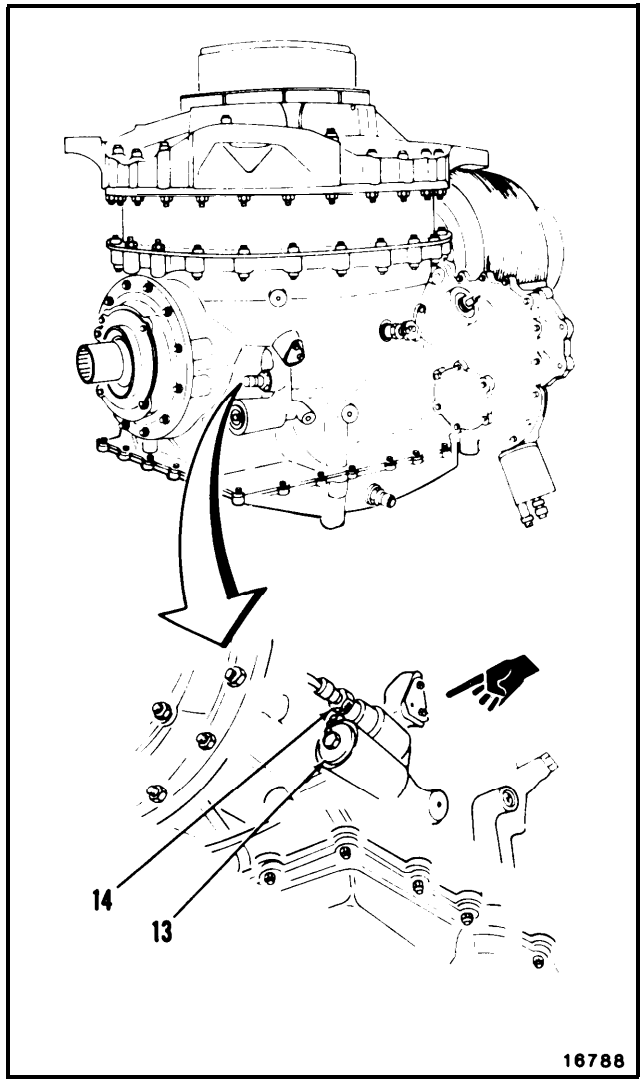
   c. **Loosen filter (13)** one-half turn. **Torque filter** to 80 inch-pounds.

   d. **Lockwire filter (13)** to auxiliary oil pressure switch (14). Use lockwire (E231).

INSPECT

FOLLOW-ON MAINTENANCE:

None



END OF TASK

INITIAL SETUP

Applicable Configurations:
All

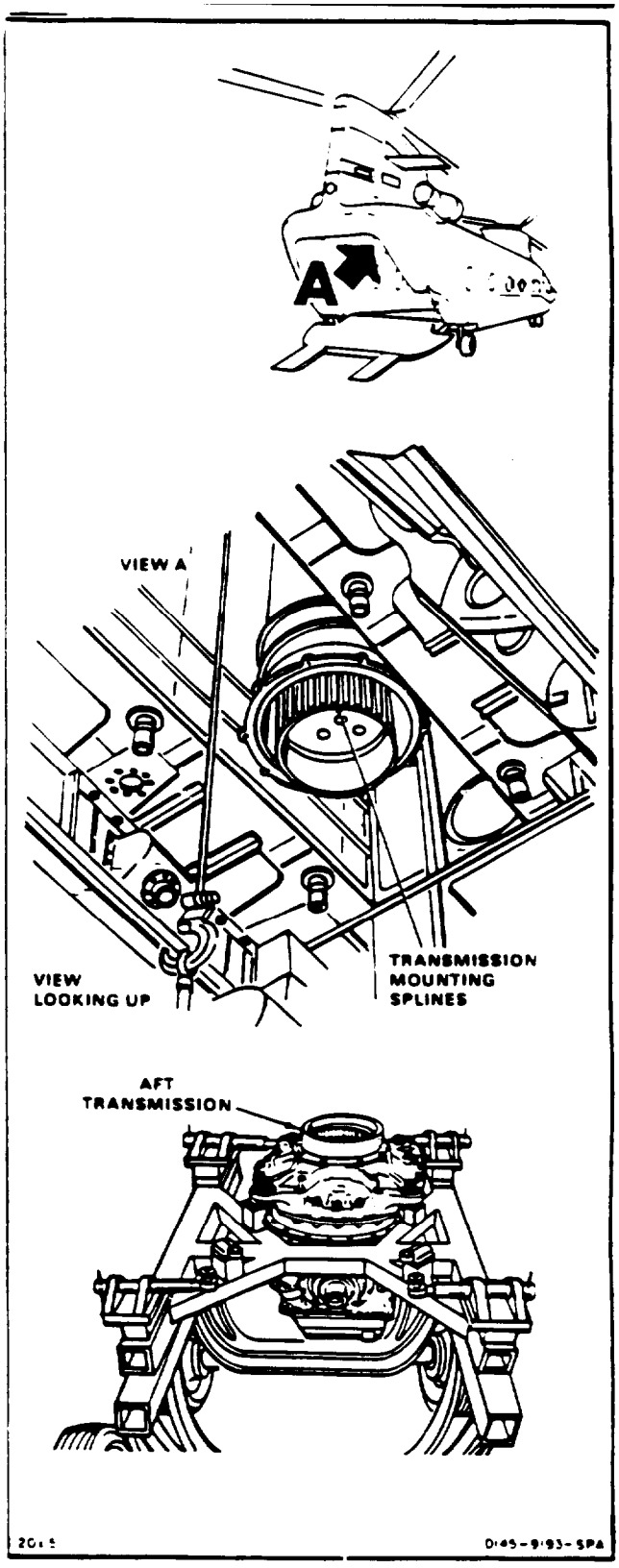
Tools:
Aircraft Mechanic s Tool Kit.
NSN 5180-00-323-4692
Socket, 15/16-inch
Aft Transmission Torque Adapter (T160)
Torque Pack (T23)
Tee Handle (T161)
Torque Wrench. 700 to 1600 inch-Pounds
Torque Wrench, 30 to 150 inch-Pounds
Workstand (2)

Materials:
Oil (E254)
Grease (E 190)
Barrier Matenial (EBO)

Parts:
Nuts (4)

Personnel Required:
Meadium Helicopter Repaver (5)
Inspector

References:
TM 55-1520-240-T
Task 2-2



CAUTION

Inspect the Aft Transmission serial number prior to installation, for the following serial numbers: A9-129FC and A9-132. Those serial numbered transmissions were improperly shimmed. If located, please notify the CH-47 PM Office, Logistics Division, at DSN 897-4289/4690 or Commercial (258)313-4289/4690 for disposition instructions.

CAUTION

Check the forward or aft transmission Serial numbers for a "MG". A "MG" after the serial number is required on the forward and aft transmissions for non restrictive flight.

GO TO NEXT PAGE

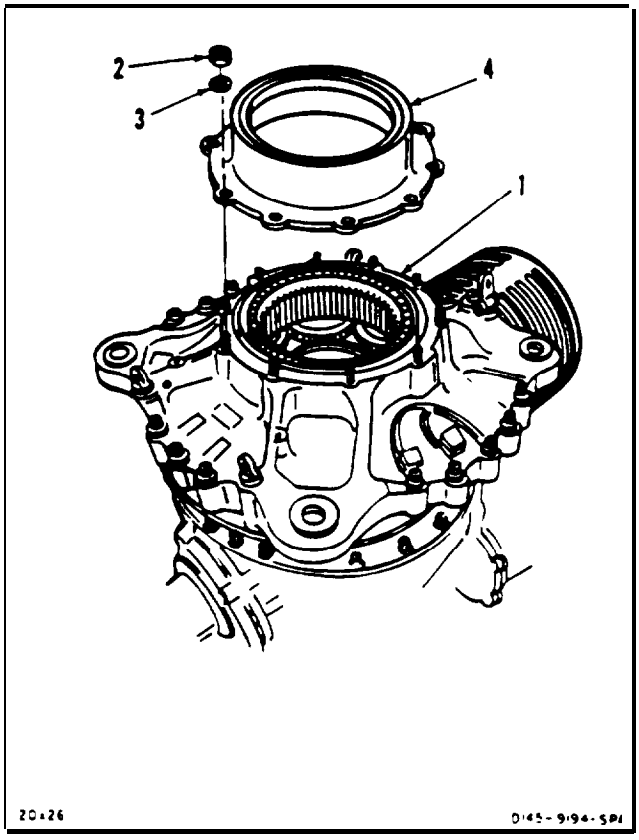
INSTALL TRANSMISSION

1 Position transmission (1) in cabin of heli. copter. Raise cargo ramp level with ground (TM 55-1520-240-T).

CAUTION

If debris enter transmission, damage can result.

2. **Romove** ten nuts (2) and washers (3) from **seal retainer (4).** Remove retainer. Cover opening in transmission (1) with barrier material (E80)

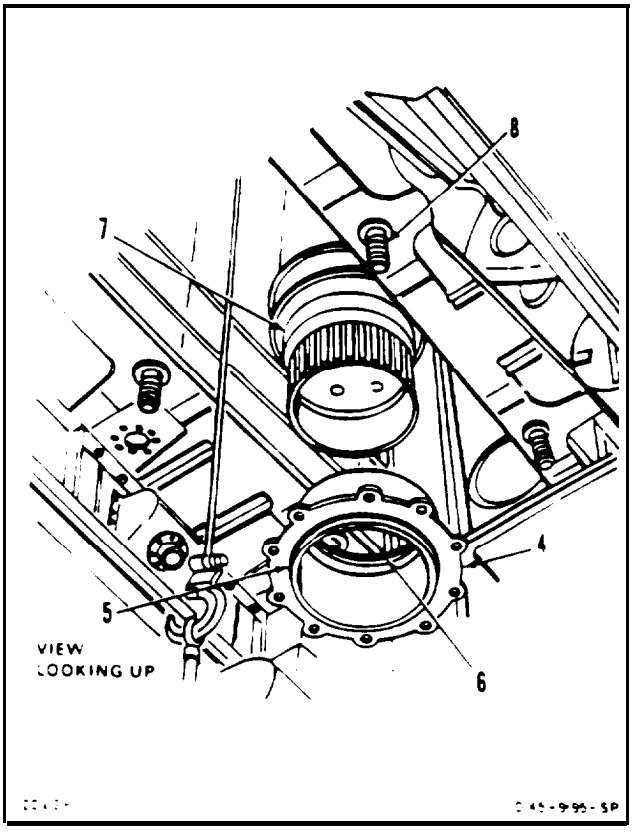


3. Check packing (5) around bottom of retainer (4) for cuts It shall have no cuts.

4. Coat lip of seal (6) and mating surface of rotor shaft (7) with oil (E254). Coat splines of shaft with 011 (E254).

5. **Install seal retainer (4) on rotor shaft (7).** Be careful not to damage seal (6).

6 Coat thread of four bolts (8) with oil (E254).



GO 70 NEXT PAGE

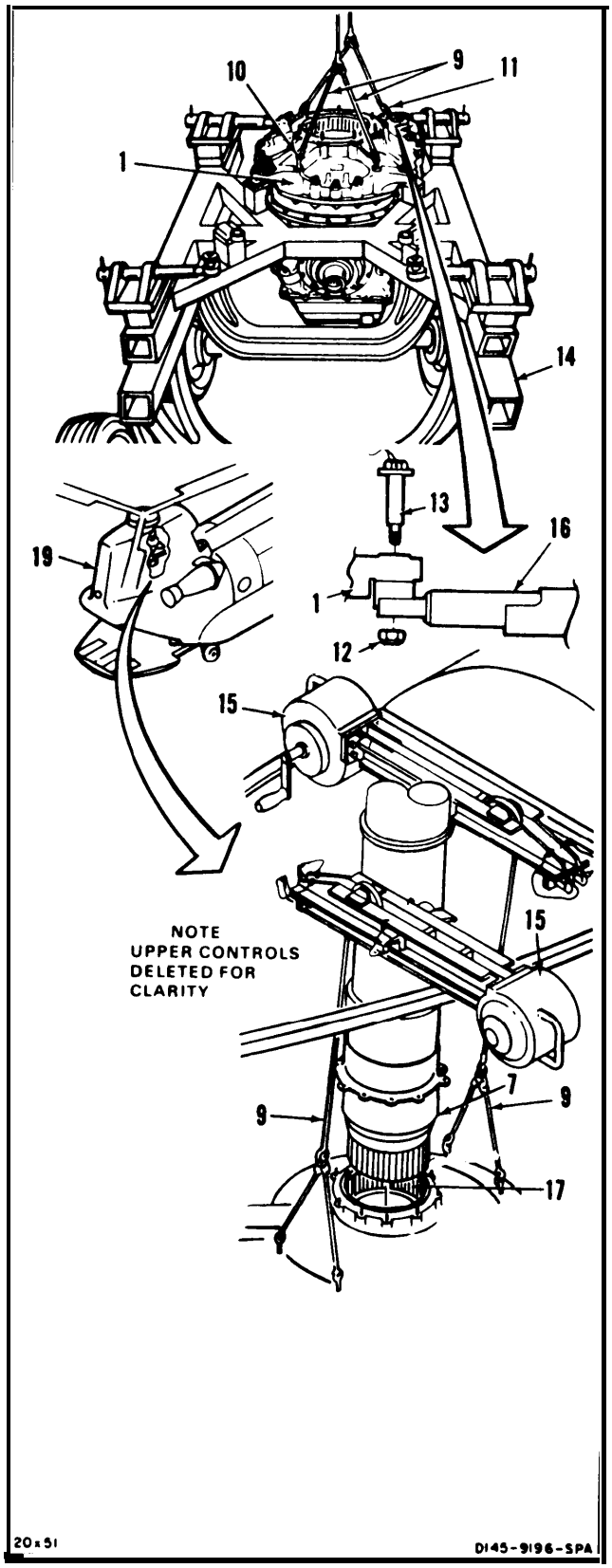
6-97 INSTALL AFT TRANSMISSION (Continued)

7. **Connect** two forward **sling cables** (9) to forward lifting lugs (10) on transmission (1). Connect two aft sling cables to aft lugs (11).
8. Remove barrier material from top of transmission (1). Remove four nuts (12) and bolts (13) holding transmission (1) to adapter (14).
9. Have helpers operate two hoists (15) to lift transmission (1) off adapter (14).
10. Push back two mount assemblies (16) on adapter.

CAUTION

If transmission is not kept at 4 degee angle, rotor shaft splines can bind in transmission. Damage can result.

11. Have helpers operate two hoists (15) to **lift transmission (1) to rotor shaft (7).** Keep transmission at 4 degree forward tilt angle.
12. **Mate** transmission **splines (17)** with splines of rotor shaft (7).



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6-97 INSTALL AFT TRANSMISSION (Continued)

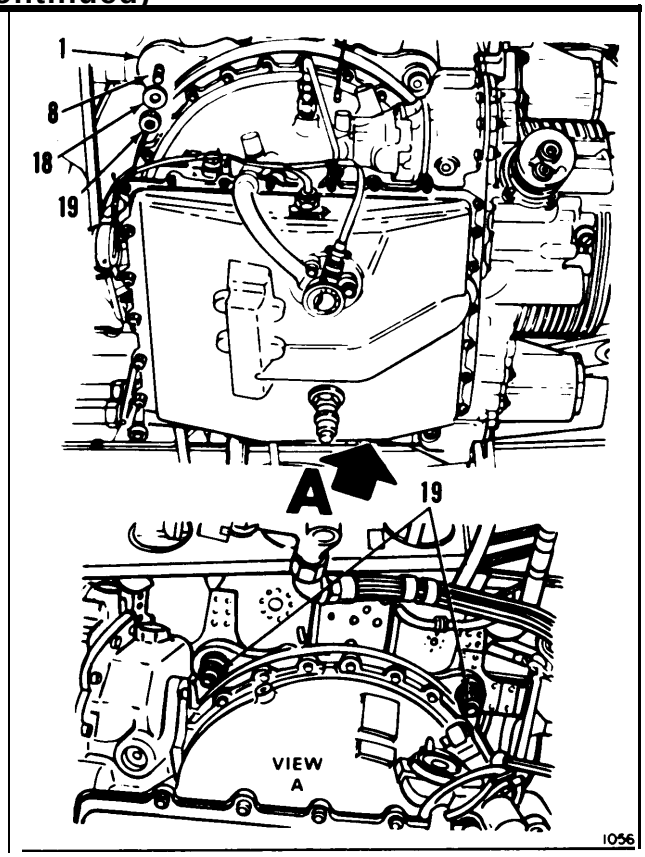
INSTALL NUTS

13. Align four mounting holes in transmission (1) with bolts (8). Have helpers raise transmission over bolts.

NOTE

Refer to Task 1-13, para 8, for re-use of self-locking nuts.

14. Install four chamfered washers (18) and new nuts (19) on bolts (8). Tighten nuts as much as possible with socket wrench handle.



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TORQUE NUTS

NOTE

Torque shaft and torque adapter are part of torque adapter assembly (T160).

To avoid binding during transmission installation, centerline of adapter shall be directly under or slightly left of transmission centerline.

15. **Install torque adapter (19)** between structure (20) at sta 534 and structure (20.1) at sta 594. Flat side of base plate (21) shall face aft. Center adapter under transmission (1) and tighten four hand knobs (21.1). Make sure centerline of adapter is not right of transmission centerline.

WARNING

Make sure ratchet selector on torque pack is set to NUT ON before applying torque. Changing ratchet settings with torque applied can damage unit and cause injury to personnel.

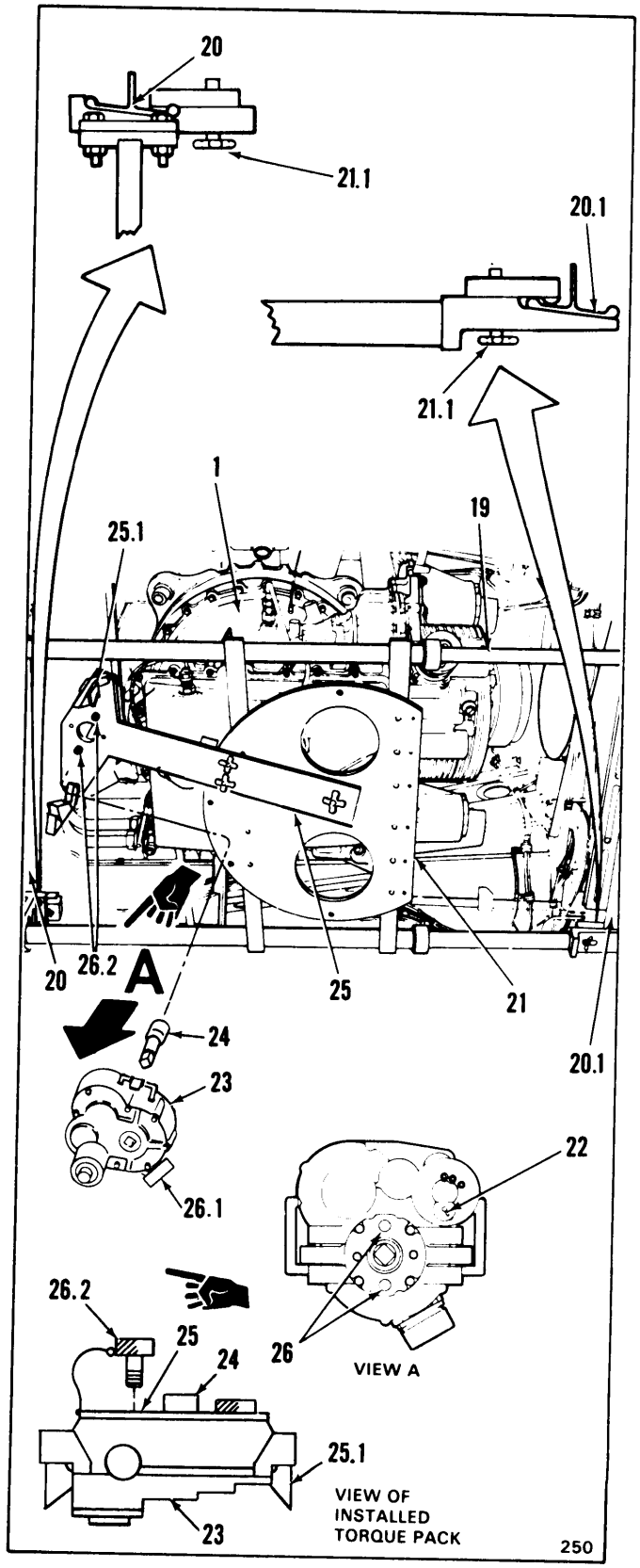
15.1. **Set ratchet selector (22) on torque pack (T23) (23) to NUT ON.**

NOTE

Adapter is part of torque pack (23).

15.2. **Install adapter (24)** in torque pack (T23) (23). **Install torque pack** on support (25) with two hooks (25.1). Make sure two pins (26) on bottom of torque pack engage holes in support. Check that torque indicator (26.1) faces aft and inboard.

15.3. **Secure torque pack (23) to support (25).** Use two thumb screws (26.2).



GO TO NEXT PAGE

6-97 INSTALL AFT TRANSMISSION (Continued)

16. Torque each of four transmission mounting nuts (27) as follows:

NOTE

Torquing of forward left nut shown here.

a. Loosen knob (27.1)

b. If torquing a forward nut (27), position support (25) directly under nut to be torqued. If torquing an aft nut, position support straight out to side of nut to be torqued. Install and tighten two knob assemblies (28) through support (25) and base plate (21).

c. Tighten knob (27.1).

NOTE

Torque shaft is spring-loaded and compresses for installation.

d. Place one end of torque shaft (28.1) on adapter shaft (24). Place other end on nut (27).

WARNING

Be sure handle is fully seated and ratchet selector on torque pack is properly set before applying torque. Moving selector with load on torque pack can damage unit and injure personnel.

NOTE

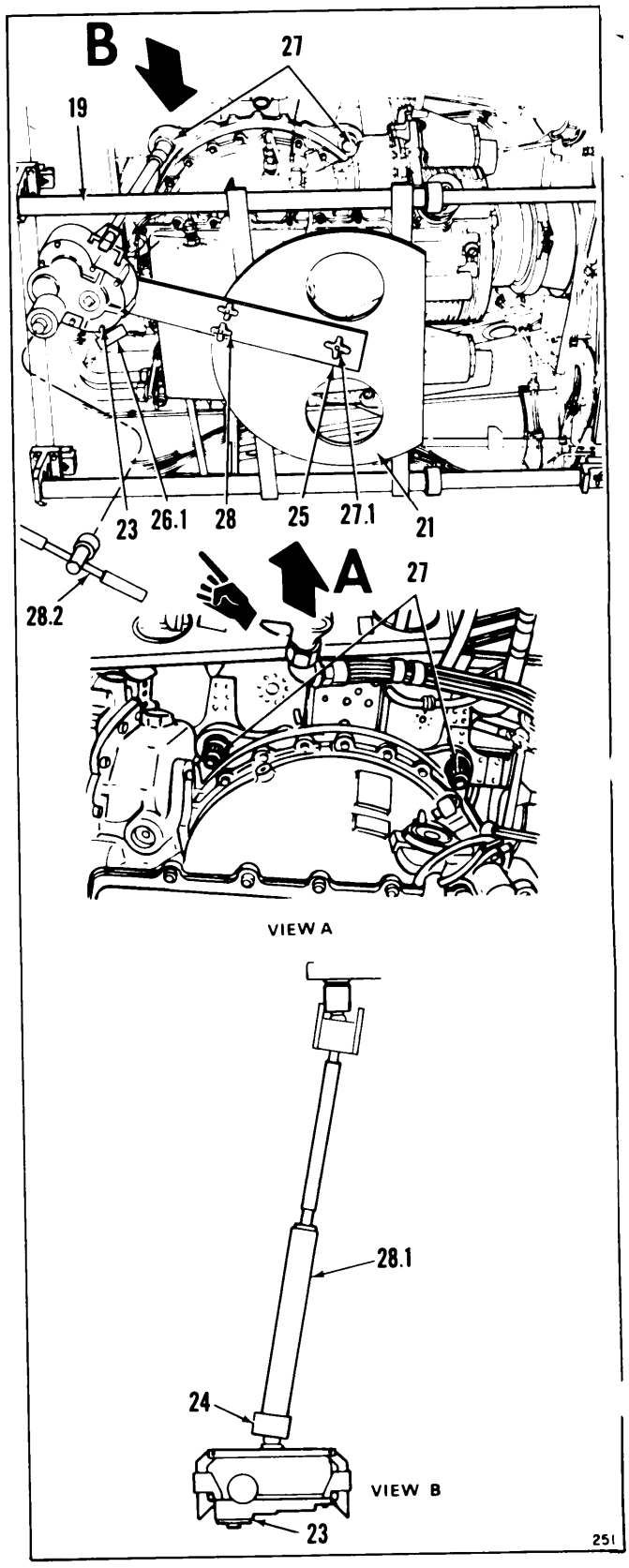
Input force must be maintained at handle to obtain accurate torque reading on torque pack indicator.

e. Set tee handle (T161) (28.2) to ON. Install handle on torque pack (T23) (23). Turn handle clockwise until indicator (26.1) reads 620 foot-pounds. Set tee handle to OFF. Turn handle counterclockwise until torque Indicator reads 0 and torque pack (23) is loose.

f. Remove torque shaft (28.1).

16.1. Remove torque pack (23) from support (25).

16.2. Remove torque adapter (19) from helicopter structure.



6-97 INSTALL AFT TRANSMISSION (Continued) 6-97

CONNECT TRANSMISSION

17. Slide exhaust duct (29) forward against fan (30). Coat thread of clamp (31) with oil (E254). **Install clamp around duct and fan. Torque clamp to 35 inch-pounds.**
18. **Connect oil hose (32)** to adapter (33).
19. **Connect electrical connector (34)** to indicating screen and chip detector (35). **Connect electrical connector (36)** to temperature bulb (37). **Install four clamps (38)** to clips (39) on sump (40) with screws (41), washers (42), and nuts (43).
20. **Connect electrical connector (44)** to main oil pressure switch (45). **Connect electrical connector (46)** to auxiliary oil pressure switch (47).

CAUTION

Do not kink hoses when handling pump.

21. Pack splines of flight control hydraulic pump (48) and mating splines in transmission (1) with grease (E190). **Install pump,** with packing (49), and gasket (49.1), on four studs (50). Install nuts (51). **Torque nuts to 85 inch-pounds** .

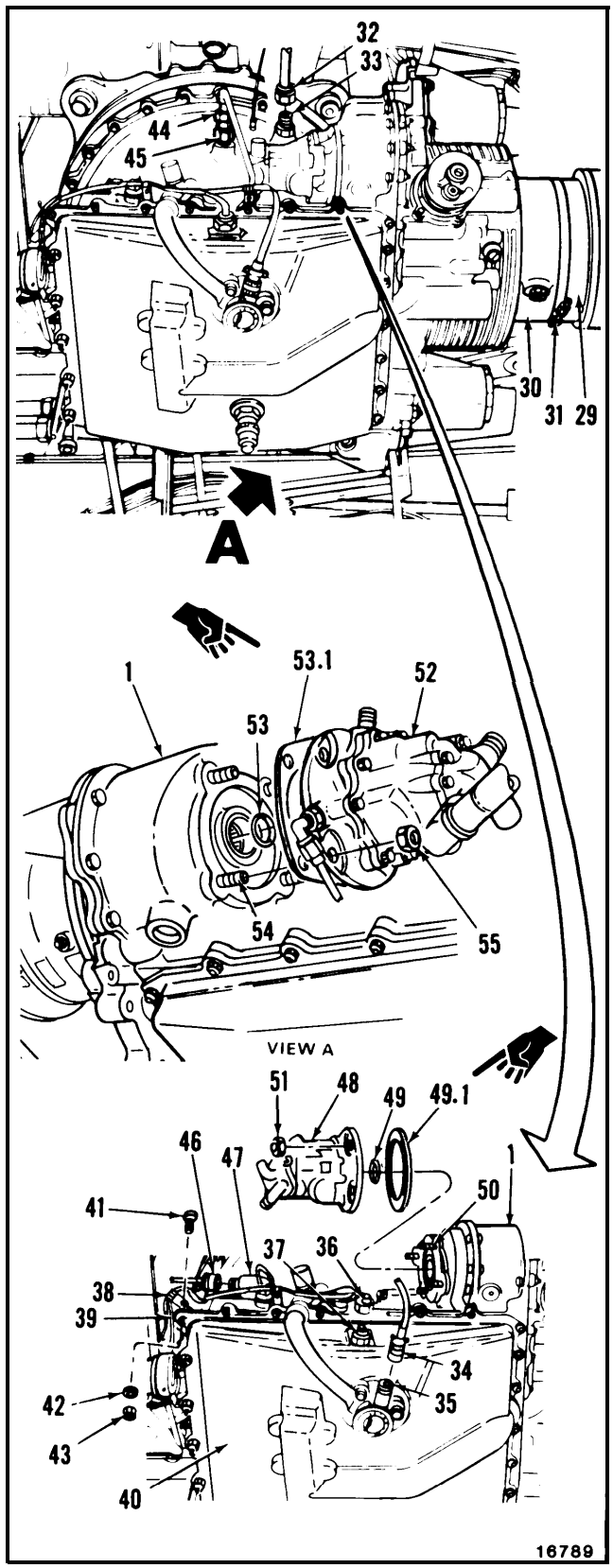
CAUTION

Do not kink hoses when handling pump.

22. Pack splines of utility hydraulic system pump (52) and mating splines in transmission (1) with grease (E190). **Install pump,** with packing (53) and gasket (53.1), on four studs (54). Install nuts (55). **Torque nuts to 85 inch-nounds.**

NOTE

Torque on nuts (51 and 55) must be checked for 85 inch-pounds after the first flight. Do not back off nuts before checking torque.



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6-97 INSTALL AFT TRANSMISSION (Continued) 6-97

NOTE

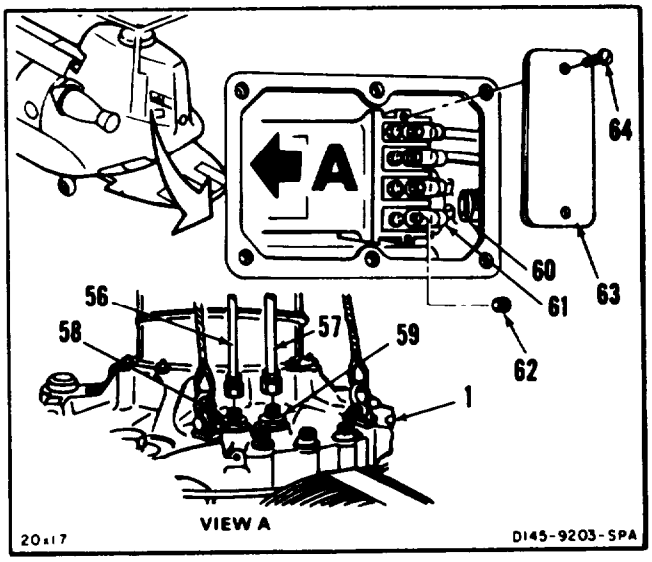
Oil hoses are reached through generator access holes on each side of pylon.

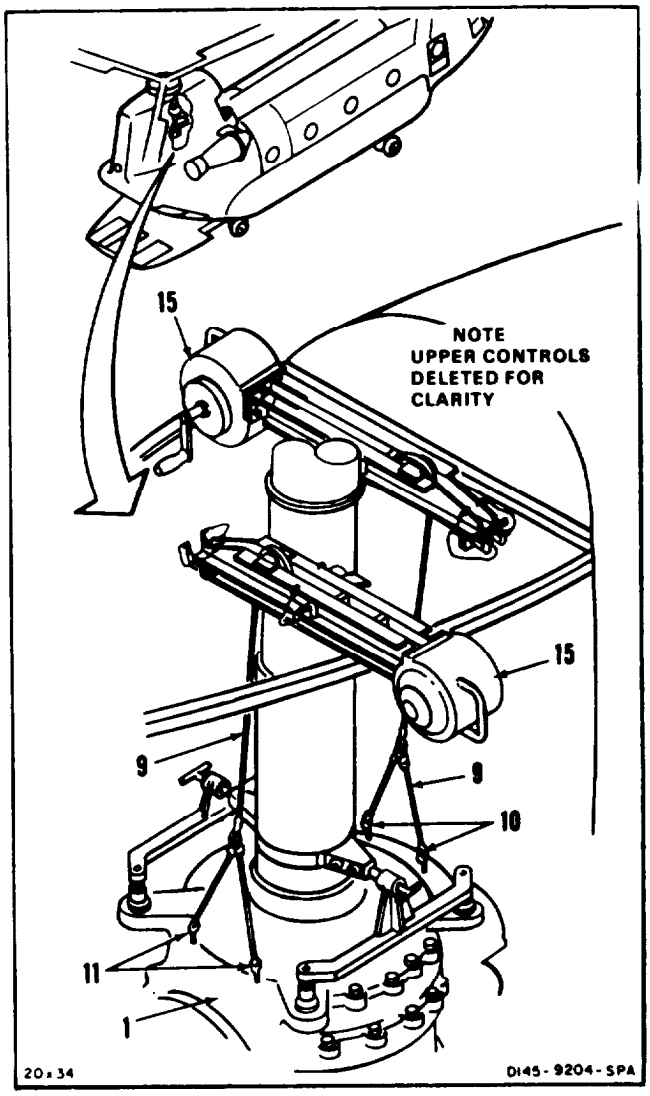
23. **Connect two oil hoses (99 and 57)** to reducers (58 and 59) on top of transmission (1).

NOTE

Connect wires to left and right generator in same way. Connections are reached through access holes on each side of pylon.

24. **Connect electrical connector (60)** to generator. **Connect four wires (61)** to generator with nuts (62). Install cover plate (63) with two screws (64).





REMOVE HOIST KIT

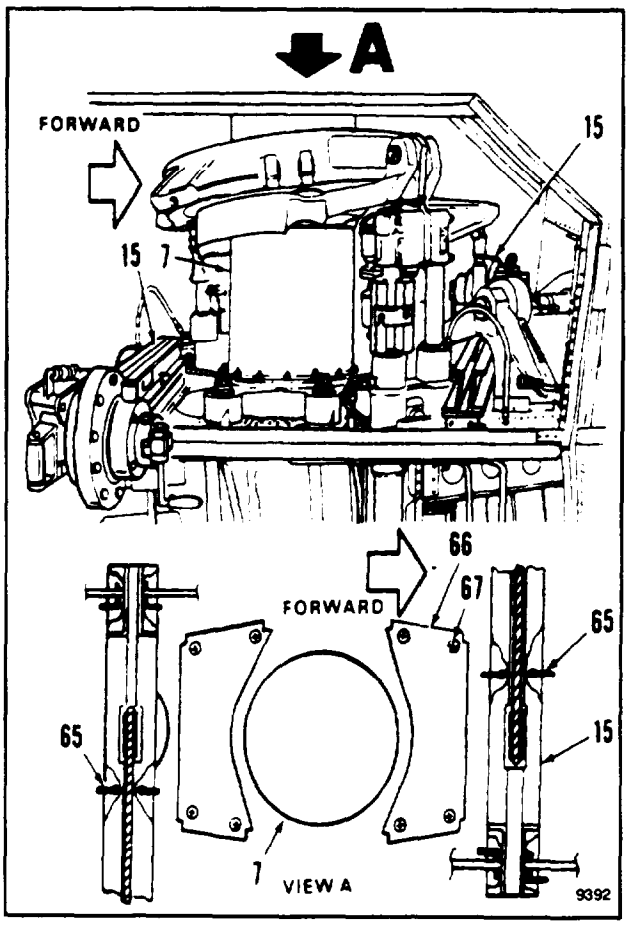
25. Working from cabin, **disconnect cables** (9) of forward hoist (15) from two forward lifting lugs (10) on transmission (1). Working from side of pylon, disconnect cables of aft hoist from two aft lifting lugs (11) on transmission (1).

26. Have helpers operate two hoists (15) to **raise cables (9).**

GO TO NEXT PAGE

27. **Release** four pins (65) from each hoist (15). **Remove two hoists.**

28. **Install cover plate** (66) forward of rotor shaft (7). lighten four turnlock fasteners (67).



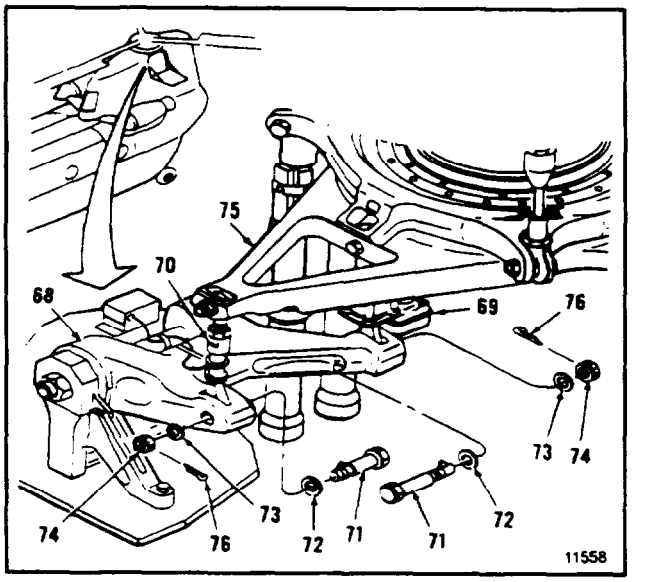
NOTE

Long bolt goes through fixed link.

29. Untie yoke **(68). Install actuator (69) and link (70) in yoke.** Install two bolts (71), heads facing each other, recessed washers (72), with recess toward bolt head, washers (73), and nuts (74).

30. install actuator (69) in swashplate yoke (75).

31. **Torque nuts (74) to 660 to 780 inch-pounds. Do not exceed** 1400 **inch-pounds for cotter pin** alignment. Install cotter pins (76).



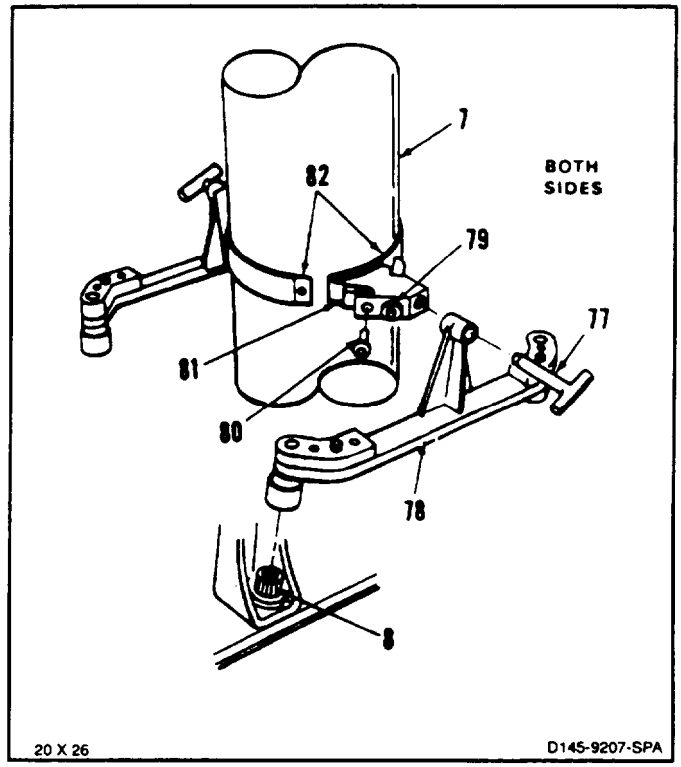
GO TO NEXT PAGE

REMOVE AFT ROTOR SHAFT SECURING DEVICE

NOTE

Securing device is removed with aid of helper through access holes in pylon.

32. Remove pins (77) from each side of rotor shaft (7). **Remove two adapter bars (78)** from bolts (8).
33. Loosen two knobs (79). Remove pins (80) from plates (81). **Remove two clamps (82).**

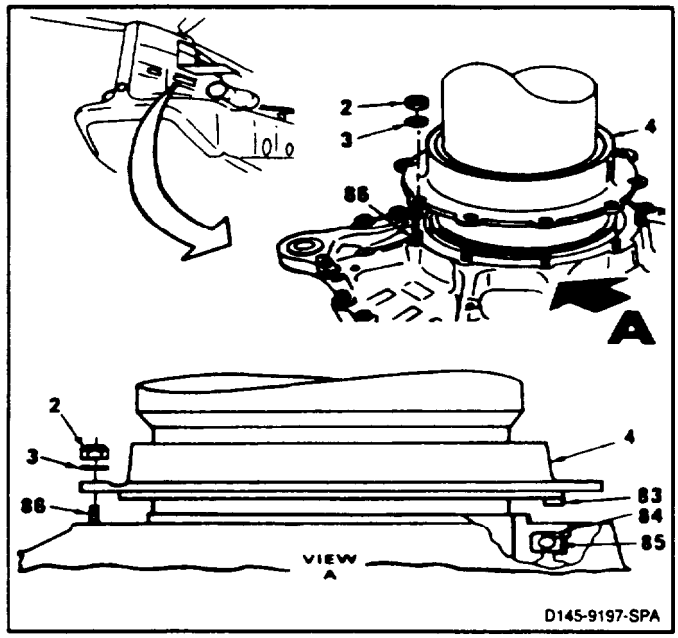


INSTALL SEAL RETAINER

NOTE

Seal retainer is reached through open aft transmission access doors on each side of aft pylon.

34. **Align tab (83)** on seal retainer (4) with slot (84) in outer race of bearing (85). Install seal retainer on studs (86).
35. Install 10 washers (3) and nuts (2). **Torque nuts to 70 to 85 inch-pound (wet).**



GO TO NEXT PAGE

INSPECT

FOLLOW-ON MAINTENANCE:

Remove aft servocylinder safety blocks (Task 11-29).

Connect aft rotor pitch links (Task 5-99).

Install aft transmission adapter assembly (Task 6-25).

Phase rotary-wing blades (Task 6-28).

Install No. 9 drive shaft (Task 6-29).

Install aft pylon access doors to generators and transmission (Task 2-2).

Service aft transmission (Task 1-54).

Close aft pylon left and right work platforms (Task 2-2).

Install aft transmission drip tray (Task 2-3).

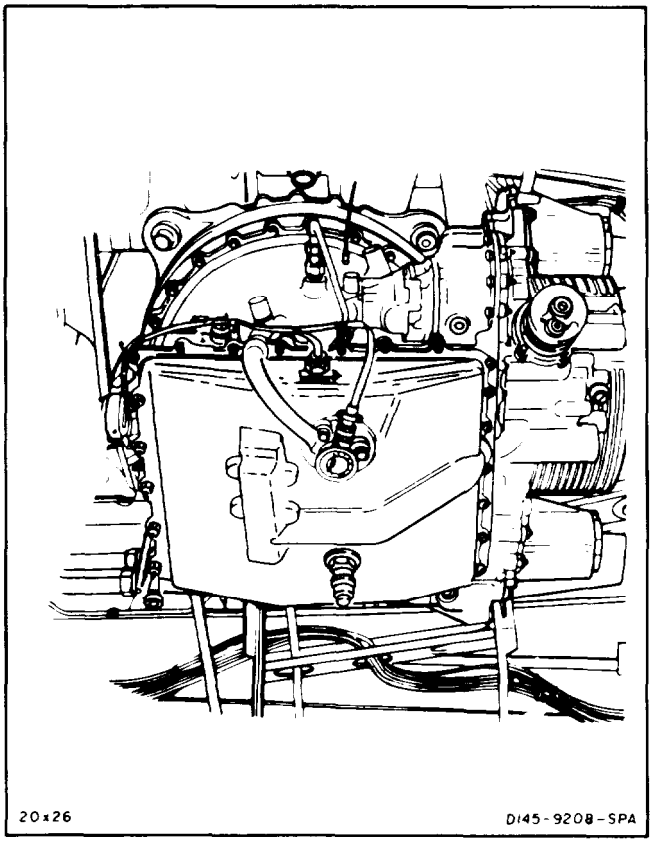
Close baffles under aft transmission (Task 2-2).

Close cargo ramp (TM 55-1520-240-T).

Perform ground run (TM 55-1520-240-10).

Retorque hydraulic pump mounting nuts after first flight (step 22).

Retorque transmission mounting nuts after 25 flight hours.



END OF TASK

SECTION VII
ENGINE TRANSMISSION

INITIAL SETUP

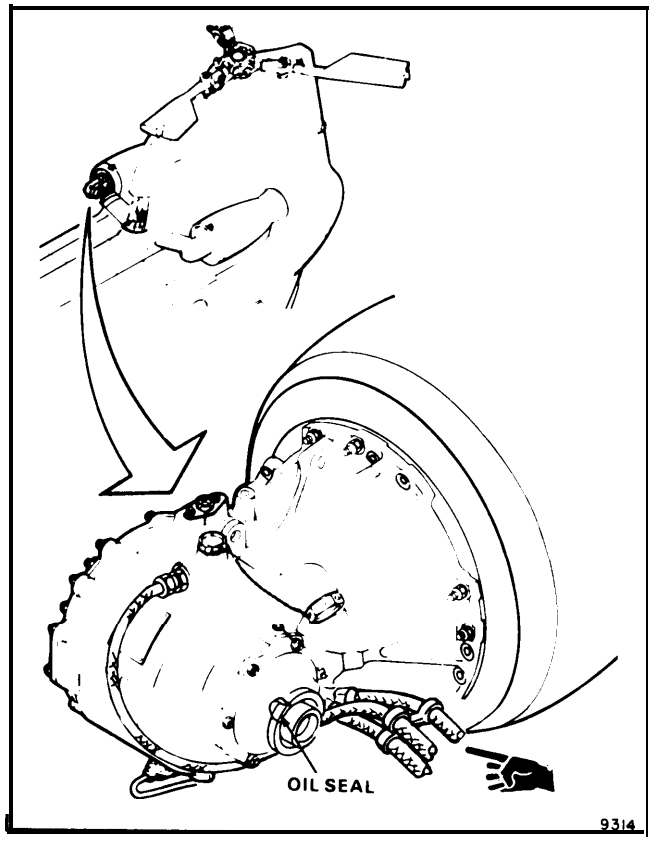
Applicable Configurations:
All

Tools:
Powertrain Repairer Tool Kit,
NSN 5180-00-003-5267

Materials:
None

Personnel Required:
Aircraft Powertrain Repairer

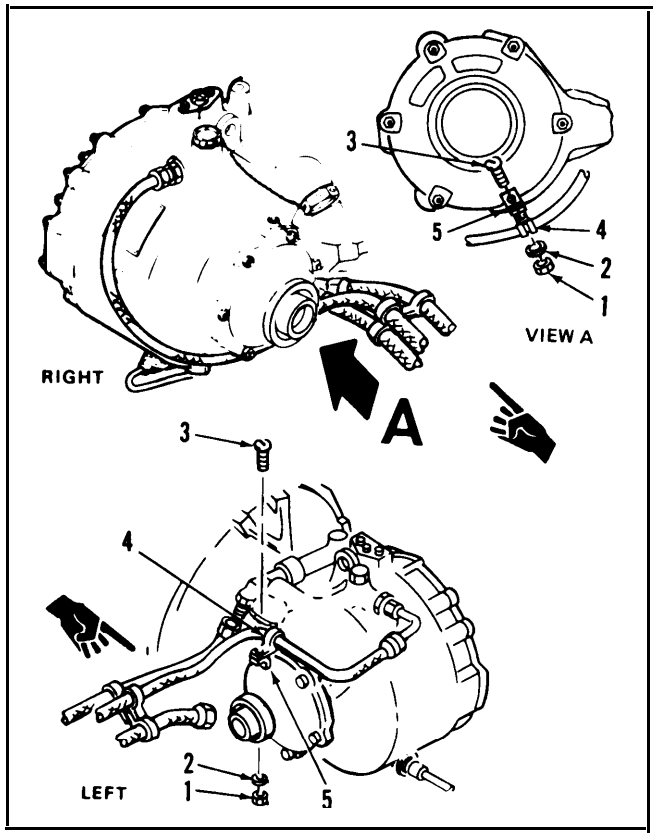
Equipment Condition:
Battery Disconnected (Task 1-39)
Electrical Power Off
Engine Air Inlet Screen Removed (Task 4-65)
Engine Transmission Fairing Removed (Task 4-70)
Pylon Hinged Fairing Open (Task 2-2)
Pylon Lower Fairing Open (Task 2-2)
Engine Drive Shaft and Engine Transmission Adapter Assembly Removed (Task 6-30)



NOTE

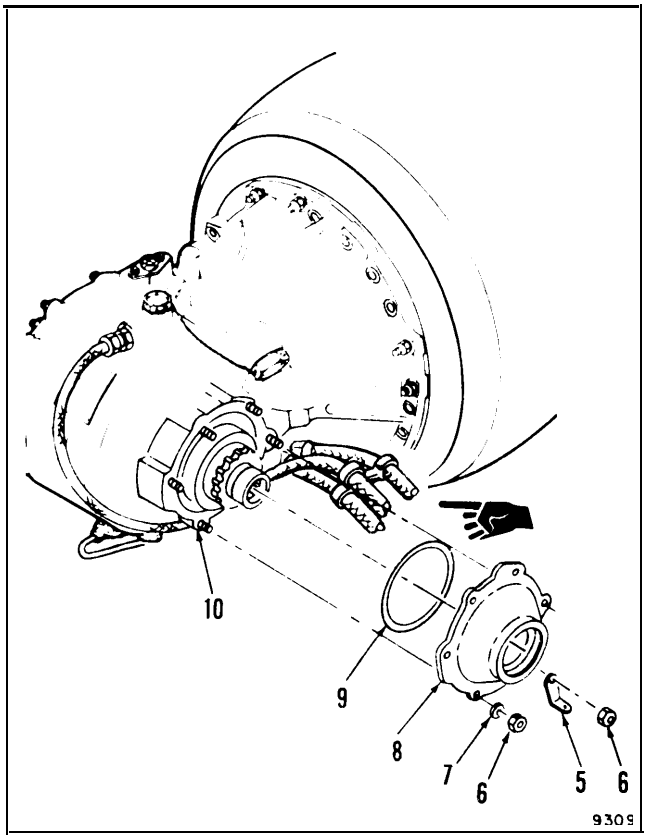
- Procedure is similar to remove seal from left or right transmission. Removal of right transmission seal is shown here.
- Breather hose on left transmission is held by one clamp. Hose on right transmission is held by two clamps.

1. **Remove** nut (1), washer (2), screw (3), and **hose clamp (4)** from clip (5).

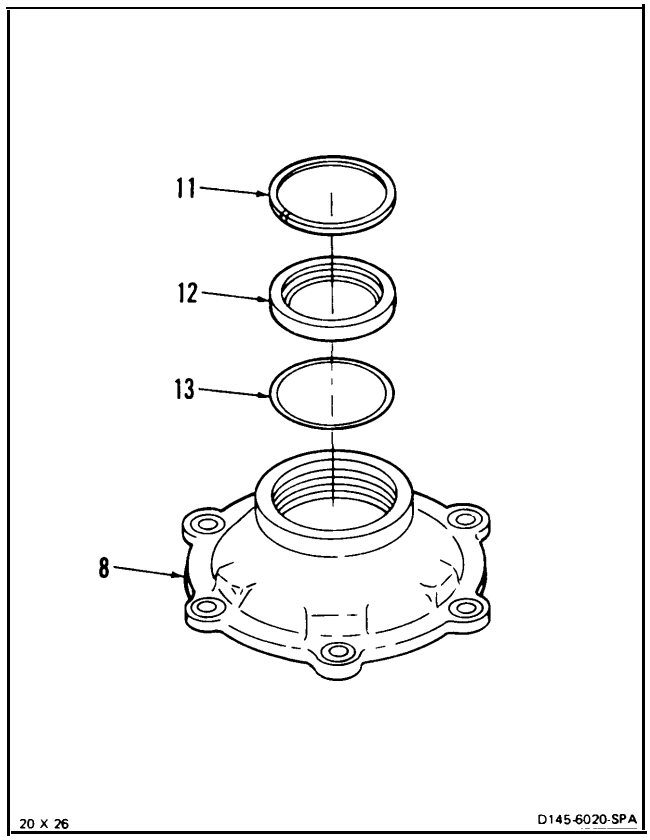


GO TO NEXT PAGE

2. Remove six nuts (6), five washers (7), and clip (5) from retainer (8).
3. **Remove retainer (8)** and packing (9) from transmission (10).



4. Remove retaining ring (11). **Remove seal (12)** and packing (13) from retainer (8).



FOLLOW-ON MAINTENANCE:
None

END OF TASK

6-99 INSTALL ENGINE TRANSMISSION OUTPUT SHAFT OIL SEAL 6-99

INITIAL SETUP

Applicable Configurations:

All

Tools:

Powertrain Repairer Tool Kit,
NSN 5180-00-003-5267
Gun-Type Heater
Pyrometer
Aluminum Tube, 3-inch OD, 1/8-inch-Thick Wall, 1 to 6 Inches Long
Torque Wrench, 30 to 150 Inch-Pounds
Kevlar Gloves (E187)

Materials:

Gloves (E186)
Dry Cleaning Solvent (E162)
Cloths (E120)
Oil (E254)

Parts:

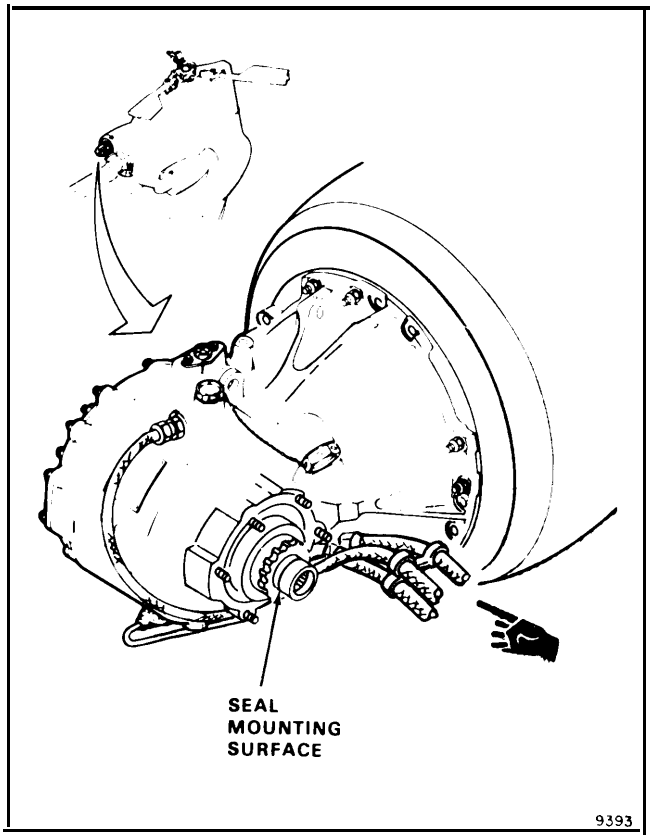
Packings

Personnel Required:

Aircraft Powertrain Repairer
Inspector

References:

TM 55-1520-240-23P



GO TO NEXT PAGE

6-99 INSTALL ENGINE TRANSMISSION OUTPUT SHAFT OIL SEAL (Continued) 6-99

WARNING

Dry cleaning solvent (E162) is flammable and toxic. It can irritate skin and cause bums. Use only in well-ventilated area, away from heat and open flame. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.

1. Clean seal retainer (1). Use dry cleaning solvent (E162) and cloths (E120). Wear gloves (E186).

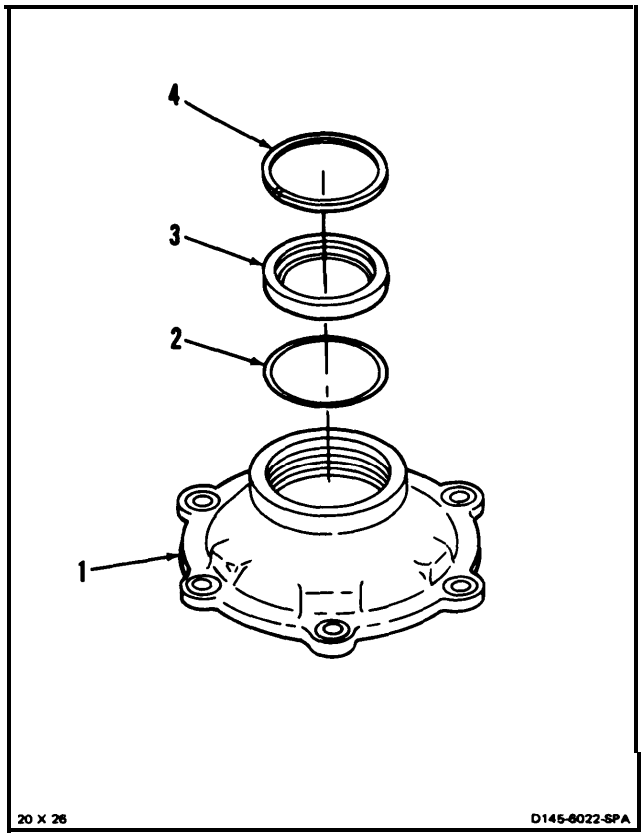
WARNING

Wear Kevlar gloves (187) when handling hot retainer.

CAUTION

Do not heat retainer over 250°F to (120°C).

2. **Heat retainer (1) to 230° to 250°F (110° to 120°C).** Use gun-type heater. Wear gloves (E187). Check temperature with pyrometer.
3. Install packing (2) in retainer (1).
4. **Install seal (3)** in retainer (1), flat side up. Use aluminum tube.
5. Install retaining ring (4).

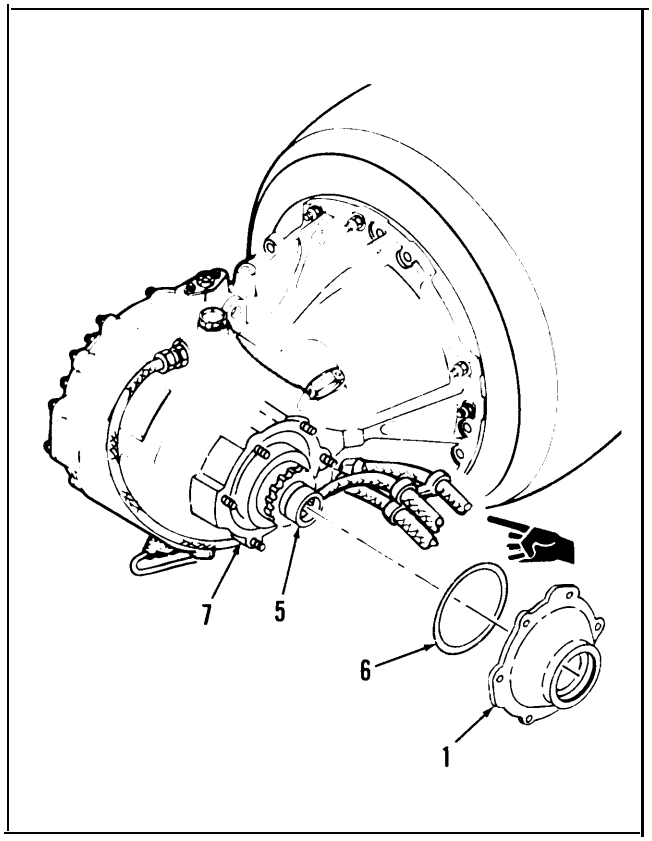


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NOTE

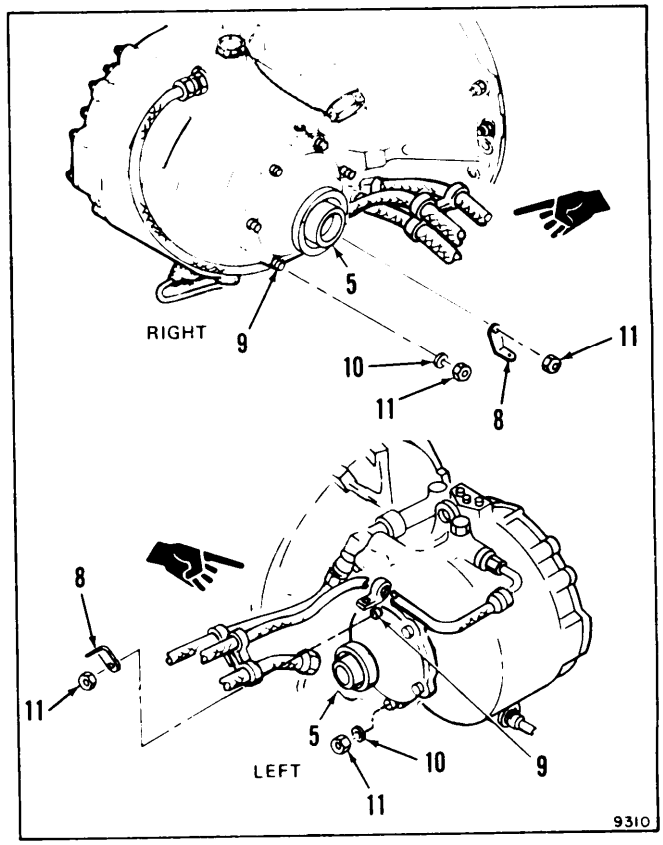
Procedure is similar to install retainer on left or right transmission. Installation on right transmission is shown here. Differences are noted in steps.

6. Apply light coat of grease (E190) to lip of seal (3). Apply light coat of oil (E254) to surface of shaft (5). **Install retainer (1)** and packing (6) on transmission (7).

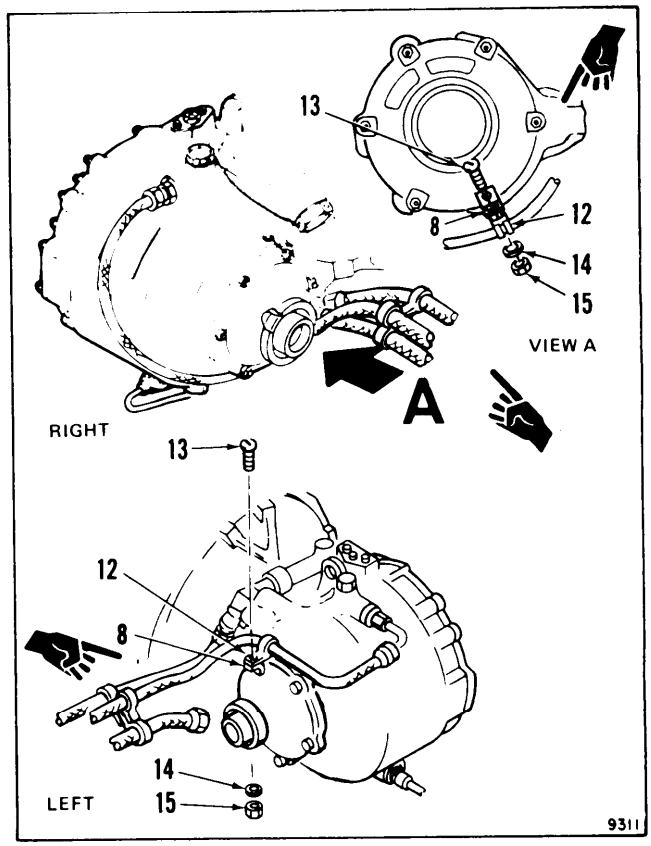


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7. **Install clip (8)** on stud (9). On left transmission, install clip at 11 o'clock position. On right transmissions, install clip at 5 o'clock position.
8. Install five washers (10) on studs (9) that have no clip (8).
9. **Install six nuts (11).** Check that clips (8) point away from center of shaft (5). **Torque nuts to 60 inch-pounds.**



10. **Install hose clamp (12)** on clip (8). Install screw (13), washer (14), and nut (1 5).

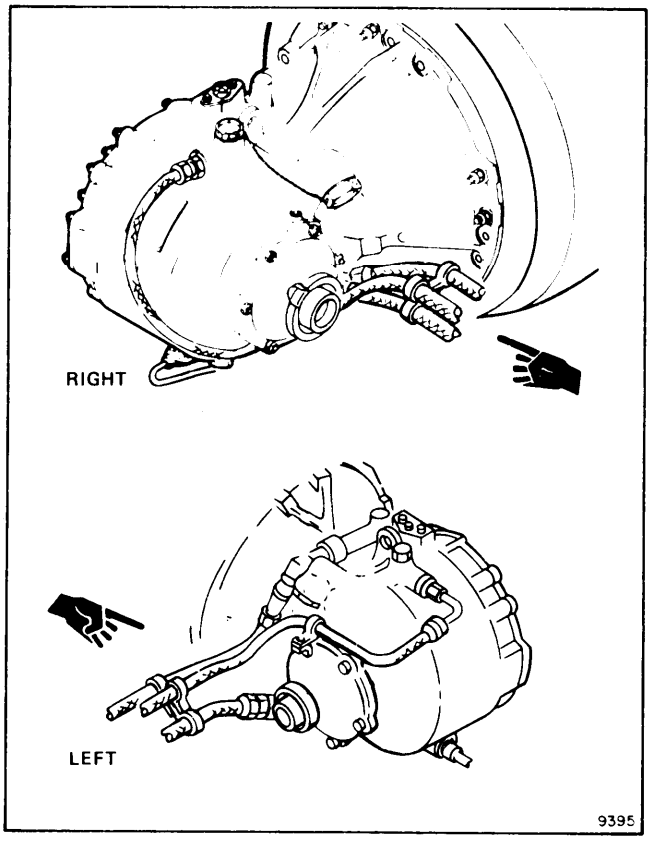


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INSPECT

FOLLOW-ON MAINTENANCE:

Install engine transmission adapter assembly and engine drive shaft (Task 6-32).
Close pylon lower fairing (Task 2-2).
Close pylon hinged fairing (Task 2-2).
Install engine transmission fairing (Task 4-73).
Install engine air inlet screen (Task 4-76).



END OF TASK

6-99.1 REMOVE ENGINE TRANSMISSION BREATHER HOSE ASSEMBLIES

INITIAL SETUP

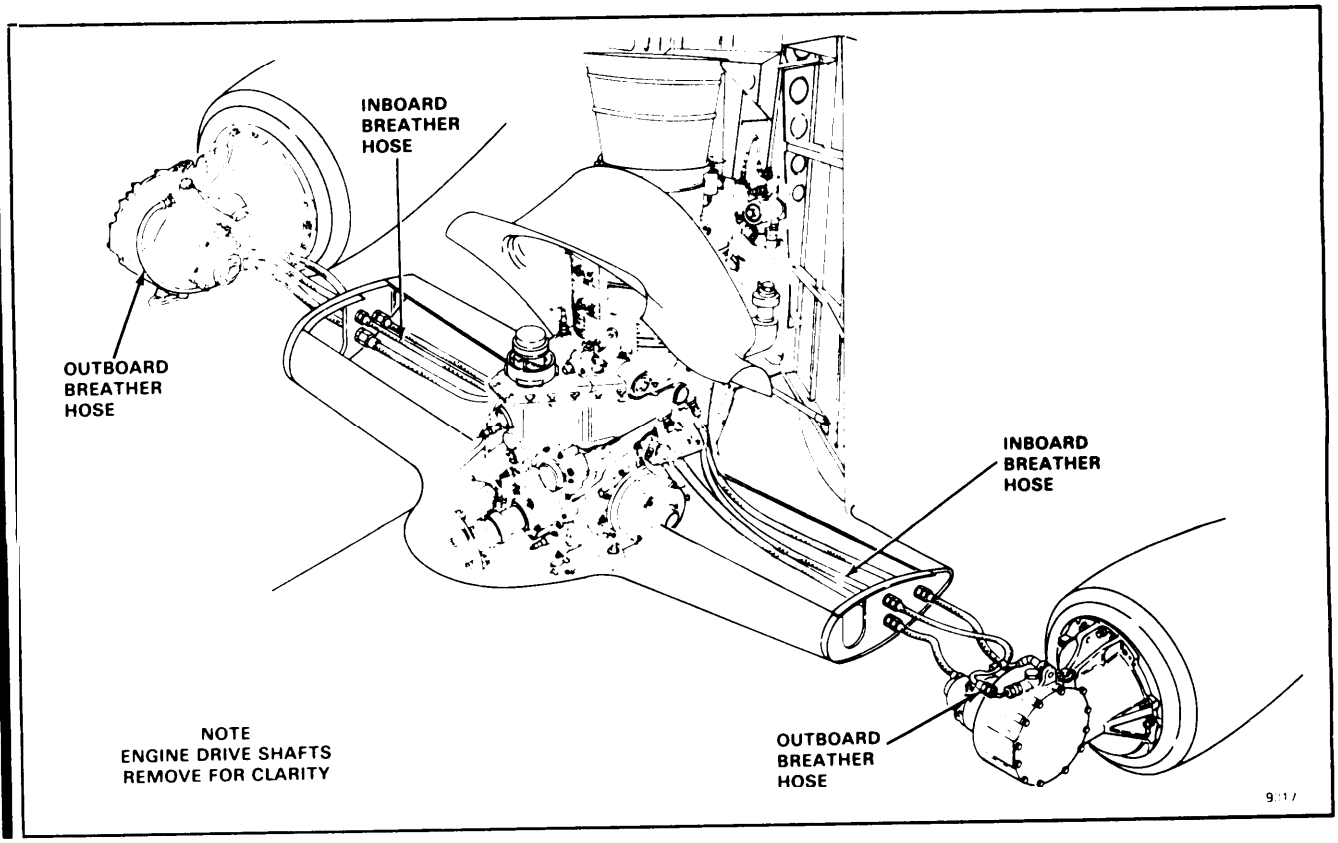
Applicable Configurations:
All

Tools:
Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692

Materials:
None

Personnel Required:
Medium Helicopter Repairer

Equipment Condition:
Battery Disconnected (Task 1-39)
Electrical Power Off
Pylon Access Doors Open (Task 2-2)
Pylon Lower Fairing Open (Task 2-2
Engine Drive Shaft Access Cover Removed (Task 2-2)
Engine Air Inlet Screens Removed (Task 4-65)
Engine Transmission Fairing Removed (Task 4-70)



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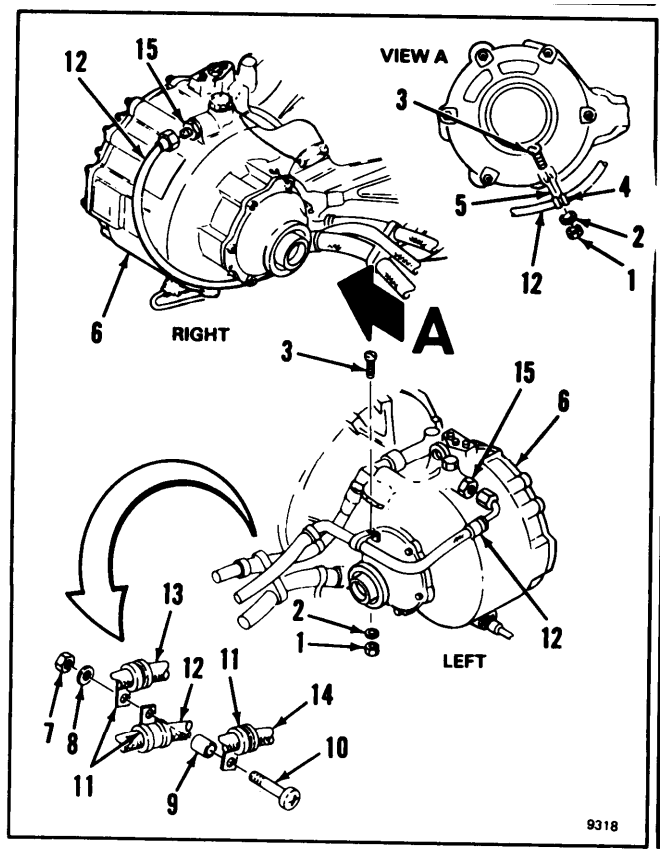
6-99.1 REMOVE ENGINE TRANSMISSION BREATHER HOSE ASSEMBLIES (Continued)

NOTE

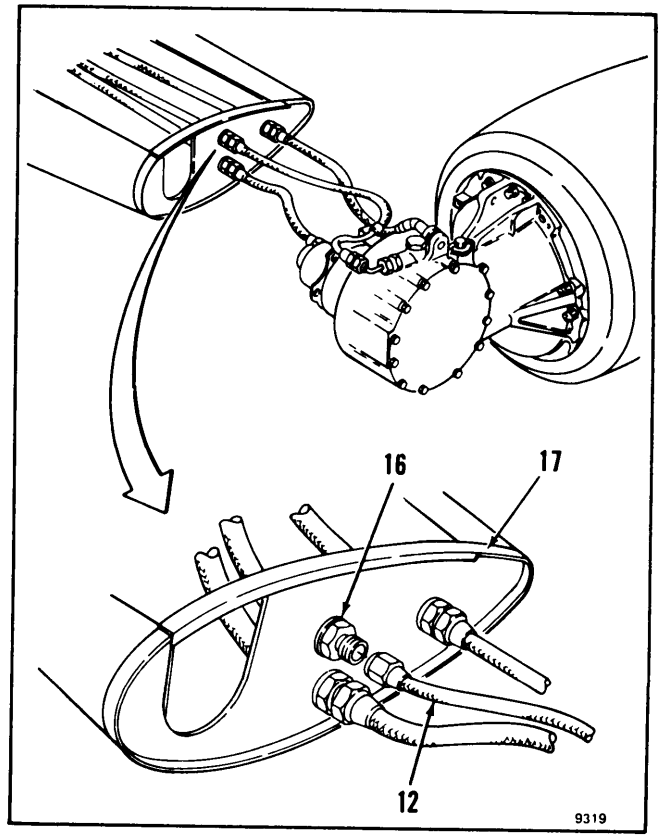
Removal of left or right hose assemblies is similar.

REMOVE OUTBOARD HOSE

1. Remove nut (1), washer (2) and screw (3) from clamp (4). **Remove clamp from clip (5)** on engine transmission (6).
2. **Remove** nut (7), washer (8), spacer (9) and **screw (10) from clamps (11). Lift breather hose (12)** clear of hoses (13 and 14).
3. **Disconnect hose (12) from reducer** (15) at engine transmission (6).



4. **Disconnect hose (12) from union (16)** at bulkhead (17).
5. Remove hose (12).



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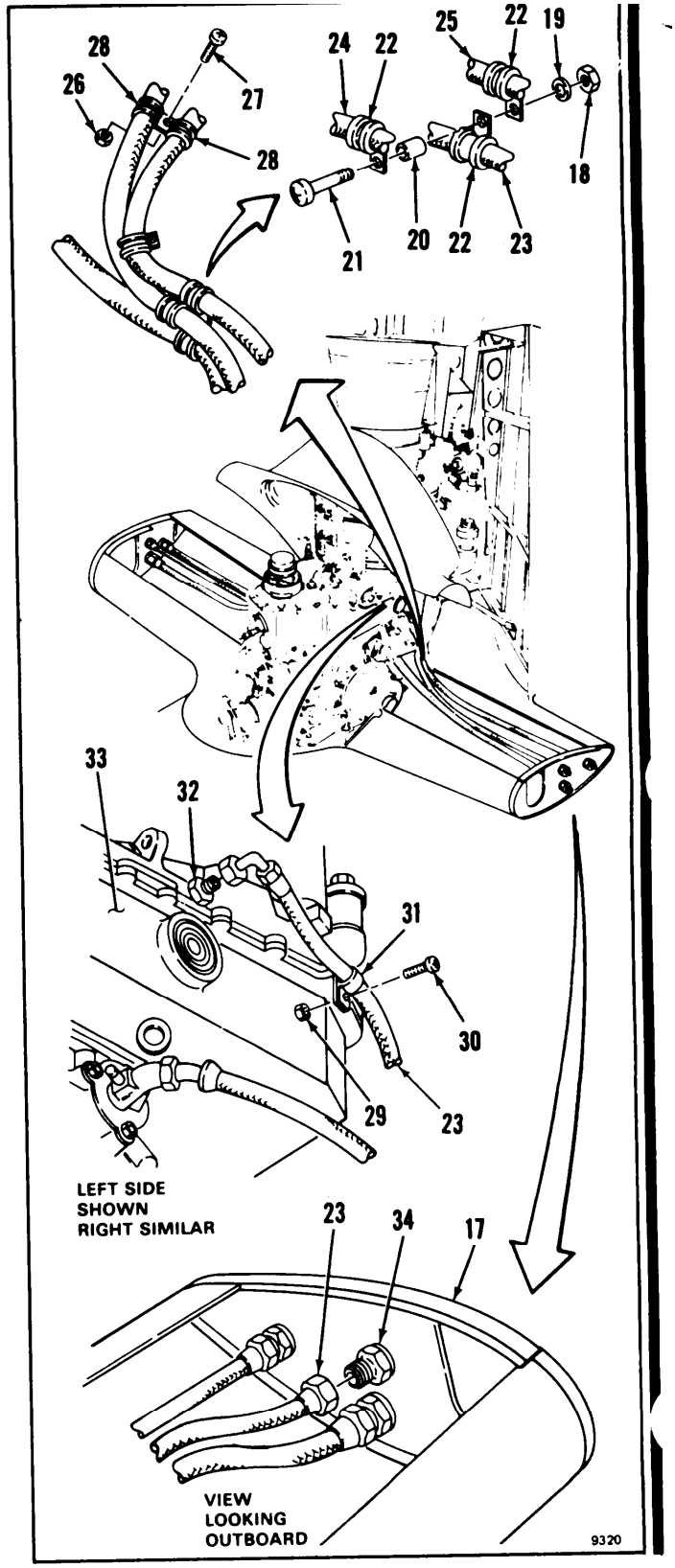
6-99.1 REMOVE ENGINE TRANSMISSION BREATHER HOSE ASSEMBLIES (Continued)

REMOVE INBOARD HOSE

6. **Remove** nut (18), washer (19), spacer (20) and **screw (21)** from clamps (22). Lift breather hose (23) clear of hoses (24 and 25).
7. **Remove** nut (26) and **screw (27)** from clamps (28).
8. **Remove** nut (29) ANd **screw (30)** from clamp (31).
9. **Disconnect hose (23) from reducer (32)** at combining transmission (33).
10. **Disconnect hose (23) from union (34)** at bulkhead (17).
11. Remove hose (23).

FOLLOW-ON MAINTENANCE:

None



END OF TASK

6-99.2 INSTALL ENGINE TRANSMISSION BREATHER HOSE ASSEMBLIES

INITIAL SETUP

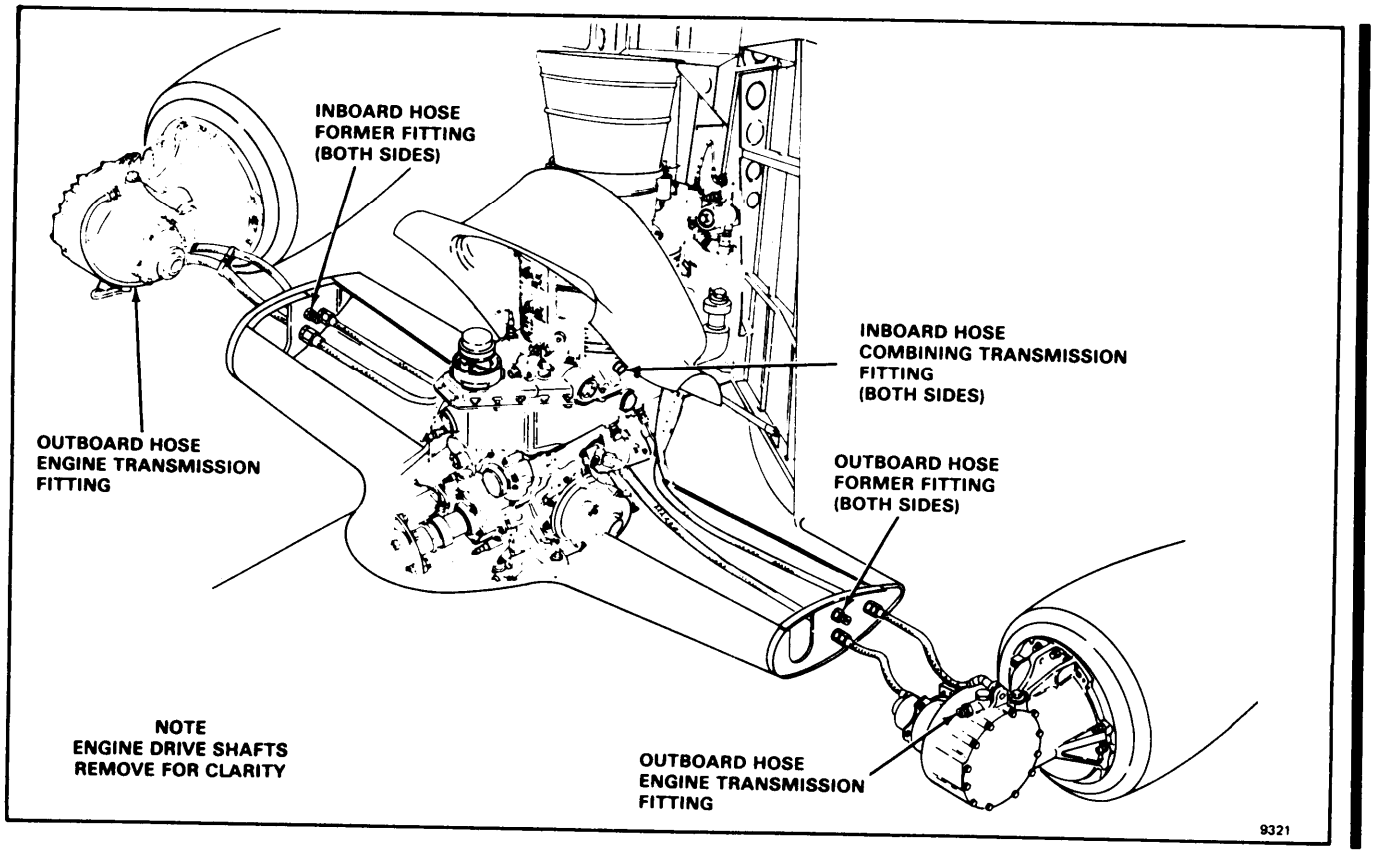
Applicable Configurations:
All

Tools:
Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692

Materials:
Oil (E253 or E254)

Personnel Required:
Medium Helicopter Repairer
Inspector

References:
TM 55-1520-240-23P



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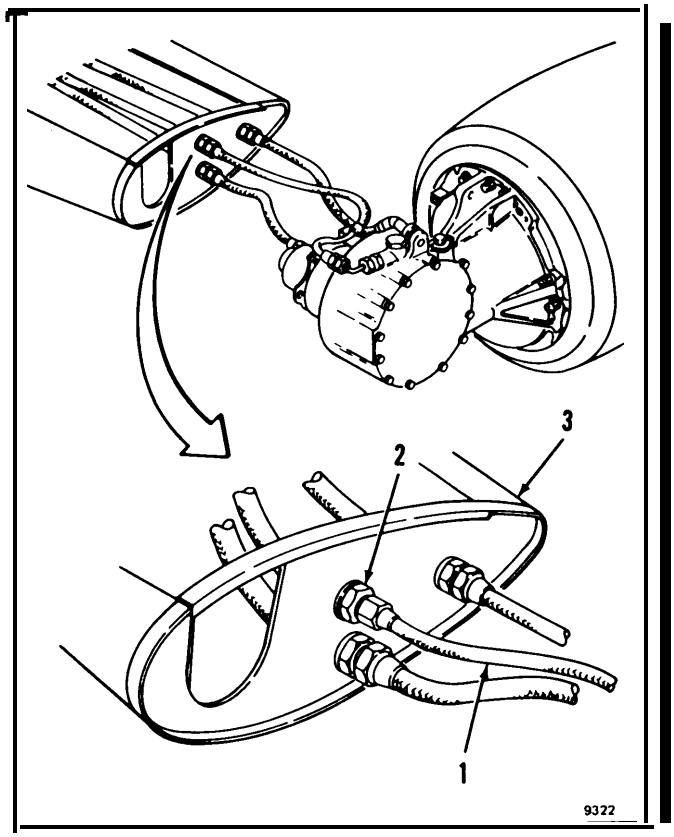
6-99.2 INSTALL ENGINE TRANSMISSI1ON BREATHER HOSE ASSEMBLIES (Continued)

NOTE

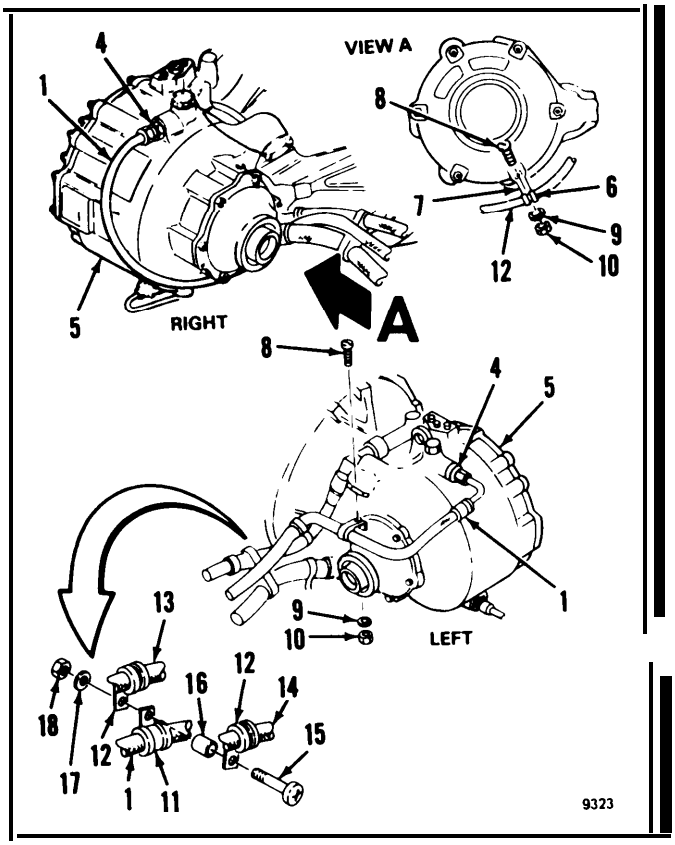
Installation of left or right hose assemblies is similar.

INSTALL OUTBOARD HOSE

1. **Coat thread** at ends of hose (2) **with oil (E253 or E254).**
2. **Connect hose (1) to union (2)** at bulkhead (3).



3. **Connect hose (1) to reducer (4)** at engine transmission (5).
4. **Align clamp (6) with clip (7)** on engine transmission (5). **Install screw (8),** washer (9), and nut (10).
5. **Align clamp (11)** on breather hose (1) **with clamps (12)** on hoses (13 and 14). **Install screw (15),** spacer (16), washer (17), and nut (18).

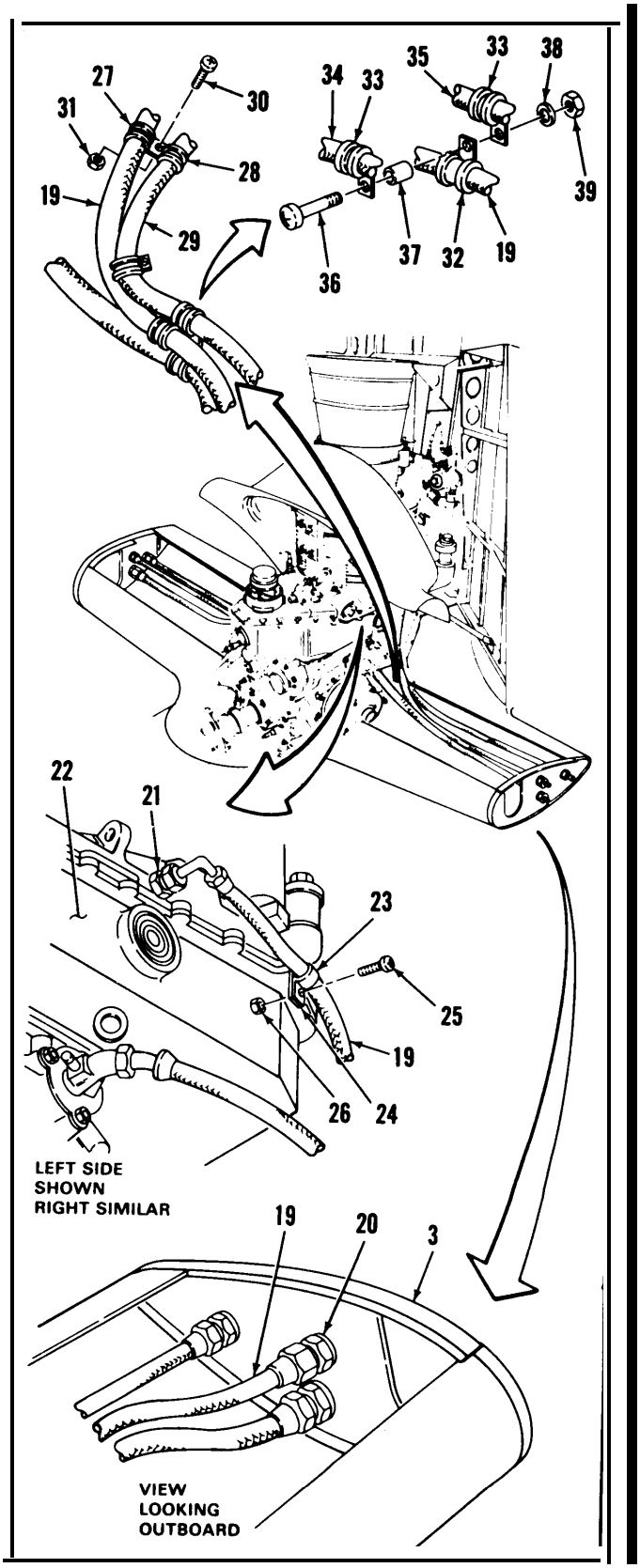


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6-99.2 INSTALL ENGINE TRANSMISSION BREATHER HOSE ASSEMBLIES (Continued)

INSTALL INBOARD HOSE

6. **Coat thread** at ends of hose (19) **with oil (E253 or E254).**
7. **Connect hose (19) to union (20)** at bulkhead (3).
8. **Connect hose (19) to reducer (21)** at combining transmission (22).
9. **Align clamp (23) with clip (24)** on combining transmission (22). **Install screw (25)** and nut (26).
10. **Align clamp (27)** on breather hose (19) **with clamp (28)** on hose (29). **Install screw (30)** and nut (31).
11. **Align clamp (32)** on breather hose (19) **with clamps (33)** on hoses (34 and 35). **Install screw (36),** spacer (37), washer (38), and nut (39).



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6-99.2 INSTALL ENGINE TRANSMISSION BREATHER HOSE ASSEMBLIES (Continued)

FOLLOW-ON MAINTENANCE:

Close pylon lower fairing (Task 2-2).

Install engine transmission fairing (Task 4-73).

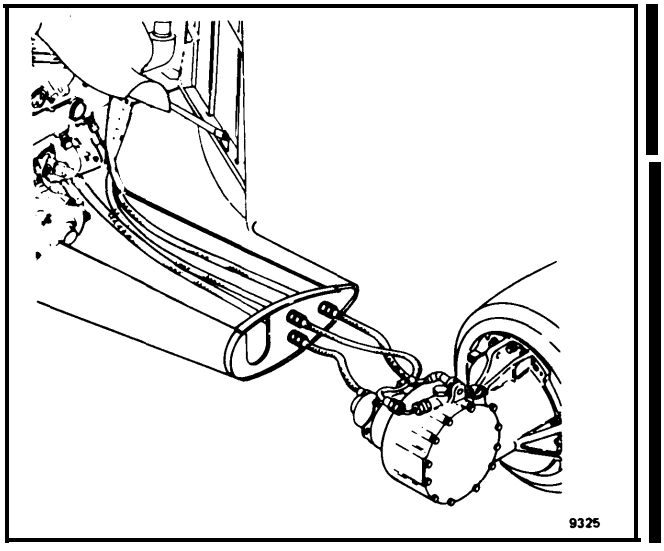
Install engine air inlet screen (Task 4-76).

Close engine drive shaft access cover (Task 2-2).

Service engine transmission (Task 1-54).

Close pylon access doors (Task 2-2).

Perform ground run (TM 55-1520-240- 10).



END OF TASK

6-99.3 REMOVE ENGINE TRANSMISSION PRESSURE HOSE ASSEMBLIES

INITIAL SETUP

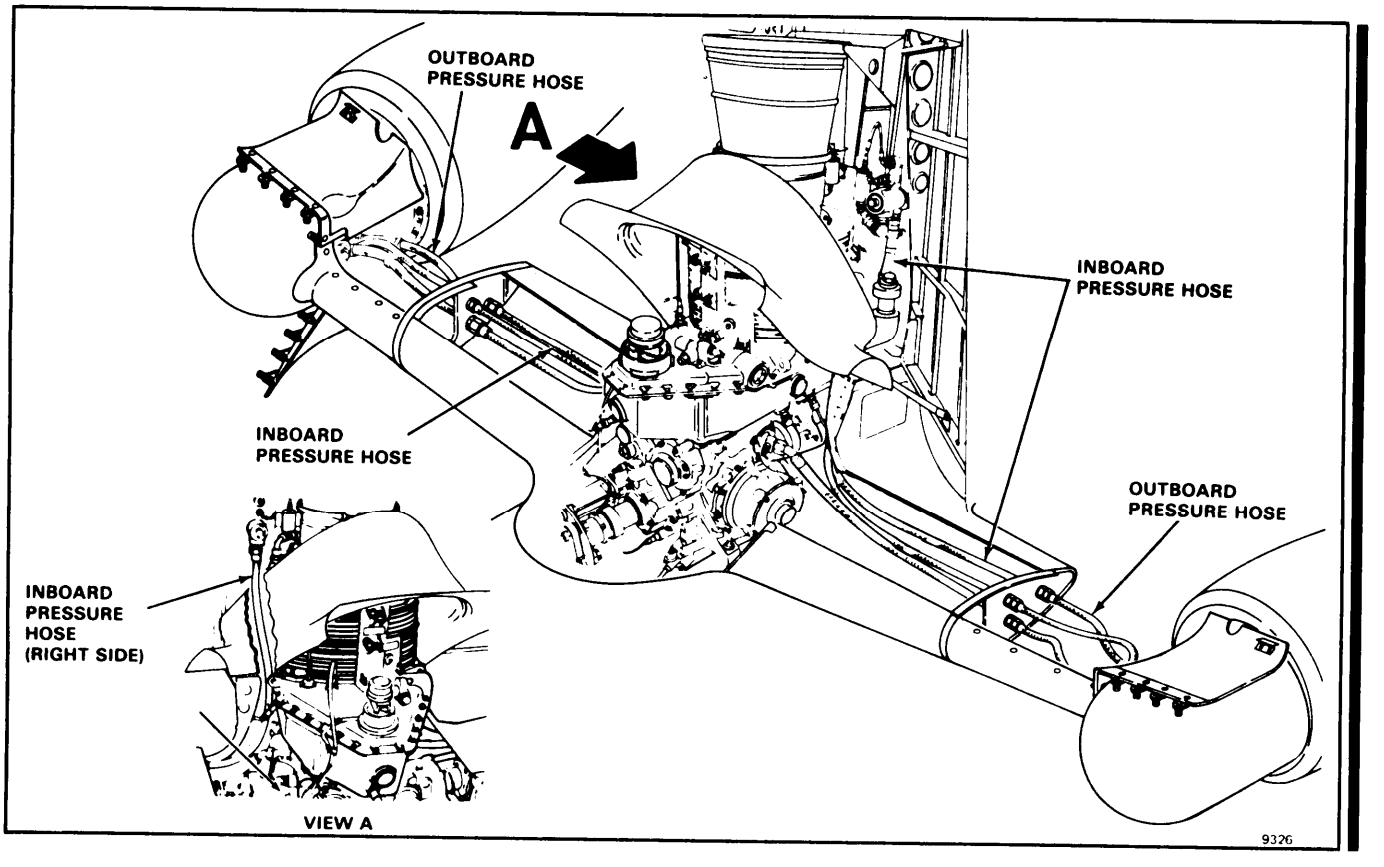
Applicable Configurations:
Ail

Tools:
Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Open End Wrench, 1 1/2-Inch
Open End Wrench, 1 1/8-Inch
Container, Two-Quart

Materials:
None

Personnel Required:
Medium Helicopter Repairer

Equipment Condition:
Battery Disconnected (Task 1-39)
Electrical Power Off
Pylon Access Doors Open (Task 2-2)
Pylon Lower Fairing Open (Task 2-2)
Engine Drive Shaft Access Cover Removed (Task 2-2)
Engine Air Inlet Screen Removed (Task 4-65)
Engine Transmission Fairing Access Cover Open (Task 2-2)



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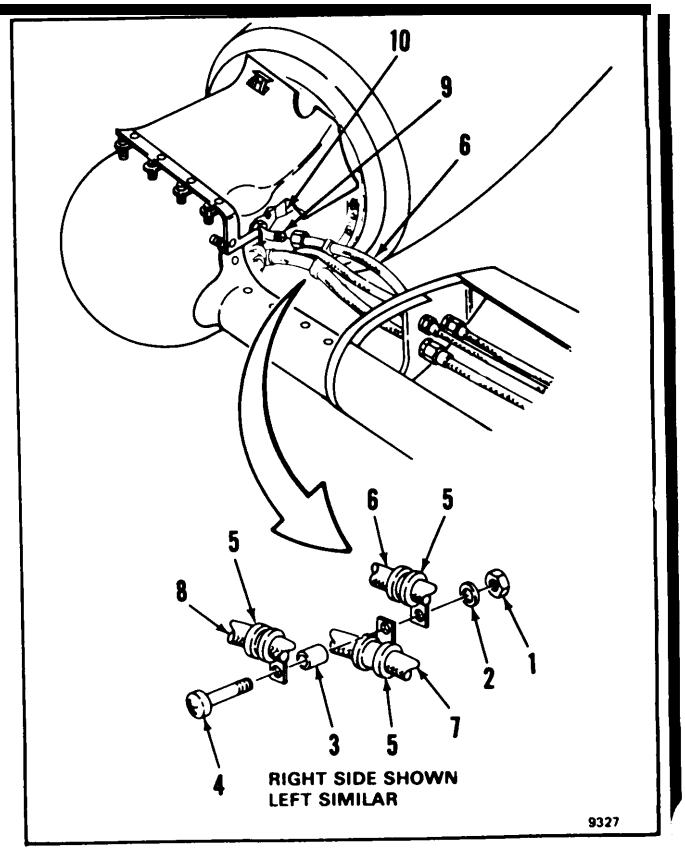
6-99.3 REMOVE ENGINE TRANSMISSION PRESSURE HOSE ASSEMBLIES (Continued)

NOTE

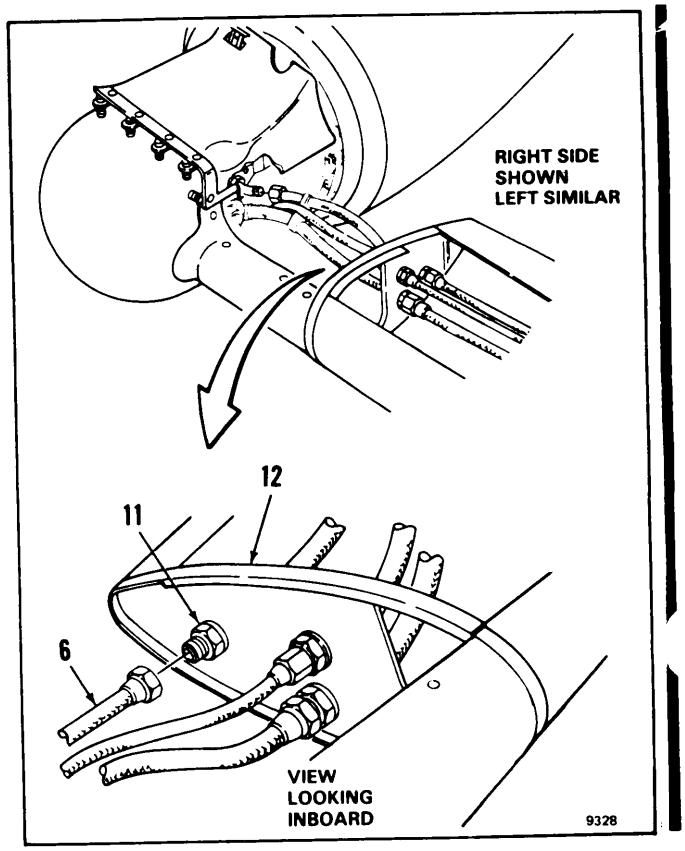
Removal of left or right hose assemblies is similar.

REMOVE OUTBOARD HOSE

1. **Remove** nut (1), washer (2), spacer (3), and **screw (4)** from clamps (5). Lift pressure hose (6) clear of hoses (7 and 8).
2. **Disconnect pressure hose (6) from reducer (9)** at engine transmission (10). Support **hose** to prevent oil spillage.



3. **Disconnect pressure hose (6) from union (11)** at bulkhead (12). **Drain** oil into container.
4. **Remove hose (6).**

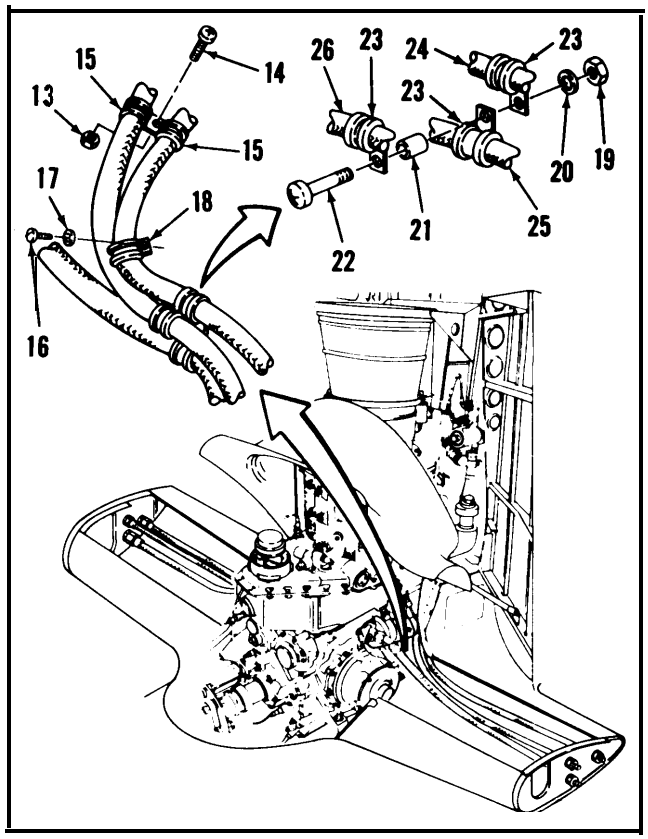


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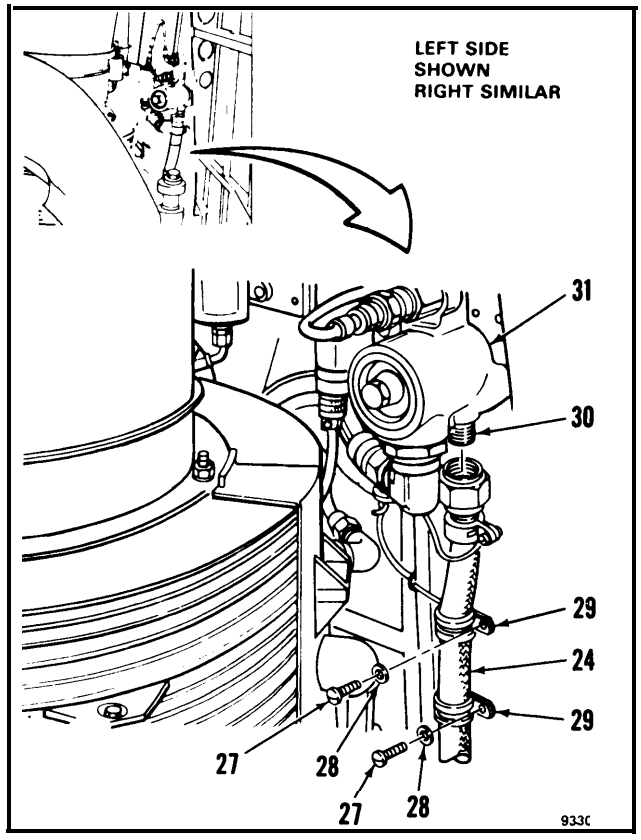
6-99.3 REMOVE ENGINE TRANSMISSION PRESSURE HOSE ASSEMBLIES (Continued)

REMOVE INBOARD HOSES

5. **Remove** nut (13) and **screw (14)** from clamps (15).
6. **Remove screw (16)** and washer (17) from clamp (18).
7. **Remove** nut (19), washer (20), spacer (21), and **screw (22)** from clamps (23). **Lift pressure hose (24) clear** of hoses (25 and 26).



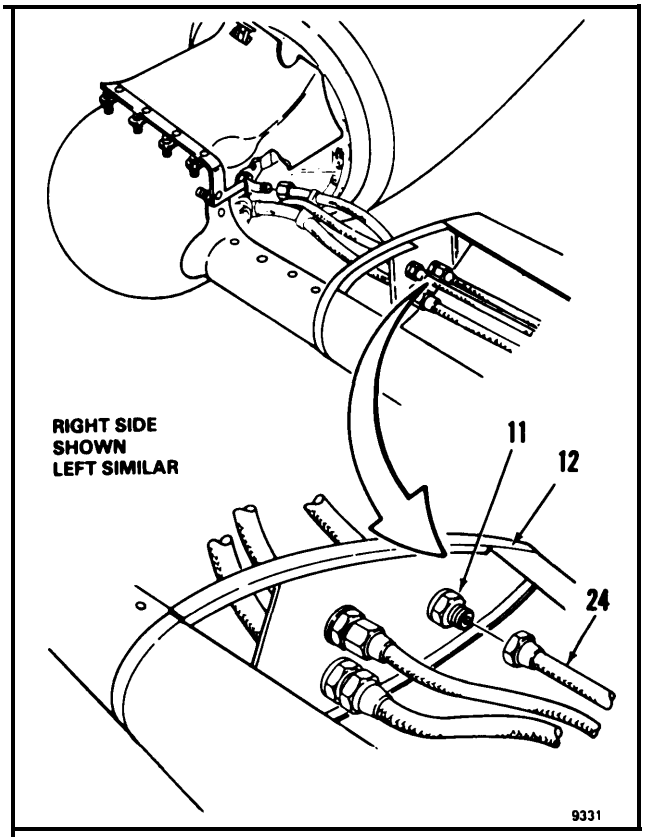
8. **Remove screws (27)** and washers (28) from two clamps (29).
9. **Disconnect hose (24) from reducer (30)** at pressure transmitter (31). **Support hose** to prevent oil spillage.



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6-99.3 REMOVE ENGINE TRANSMISSION PRESSURE HOSE ASSEMBLIES (Continued)

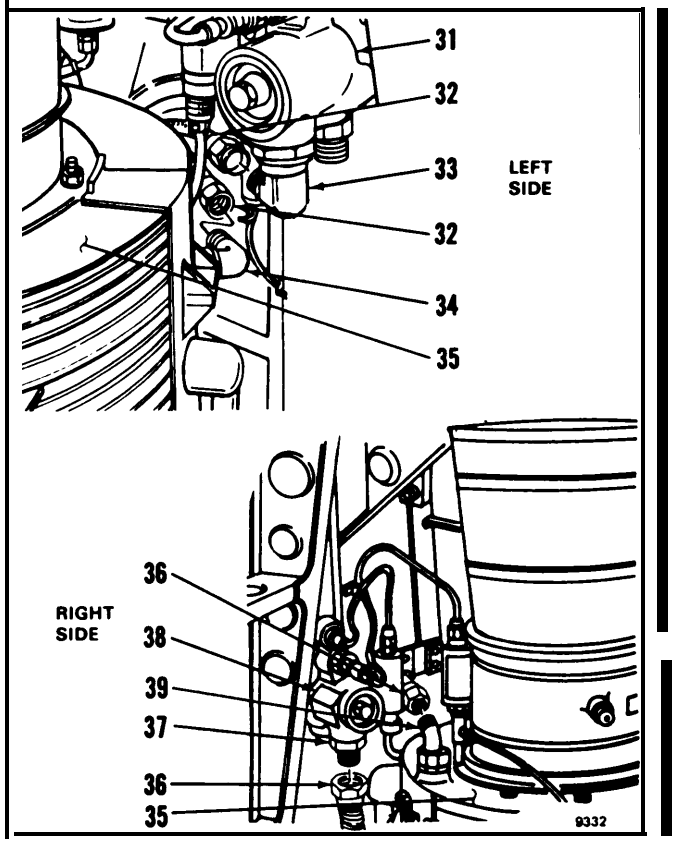
10. **Disconnect hose (24) from union (11)** at bulkhead (12). **Drain oil into** container.
11. Remove hose (24).



12. On left side, disconnect hose (32) from elbow (33) at pressure transmitter (31). Support hose to prevent oil spillage.
13. Disconnect hose (32) from elbow (34) at oil cooler assembly (35). Drain oil into container.
14. Remove hose (32).
15. On right side, disconnect hose (36) from reducer (37) at pressure transmitter (38). Support hose to prevent oil spillage.
16. Disconnect hose (36) from reducer (39) at oil cooler assembly (35). Drain oil into container.
17. Remove hose (36).

FOLLOW-ON MAINTENANCE:

None



END OF TASK

6-99.4 INSTALL ENGINE TRANSMISSION PRESSURE HOSE Assemblies

INITIAL SETUP

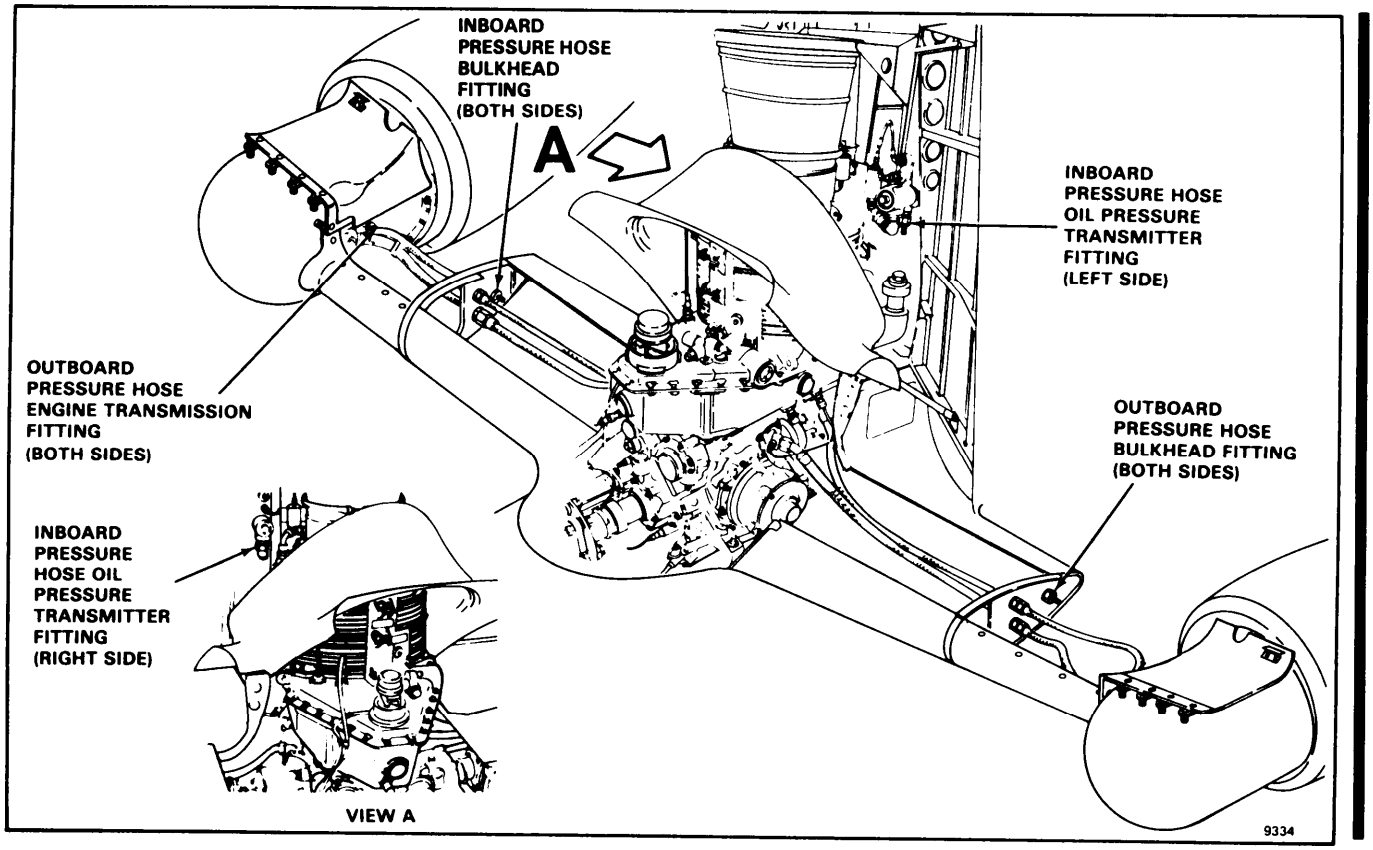
Applicable Configurations:
All

Tools:
Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Open End Wrench, 1 1/2-Inch
Open End Wrench, 1 1/8-Inch

Materials:
Oil (E253 or E254)

Personnel Required:
Medium Helicopter Repairer
Inspector

References:
TM 55-1520-240-23P



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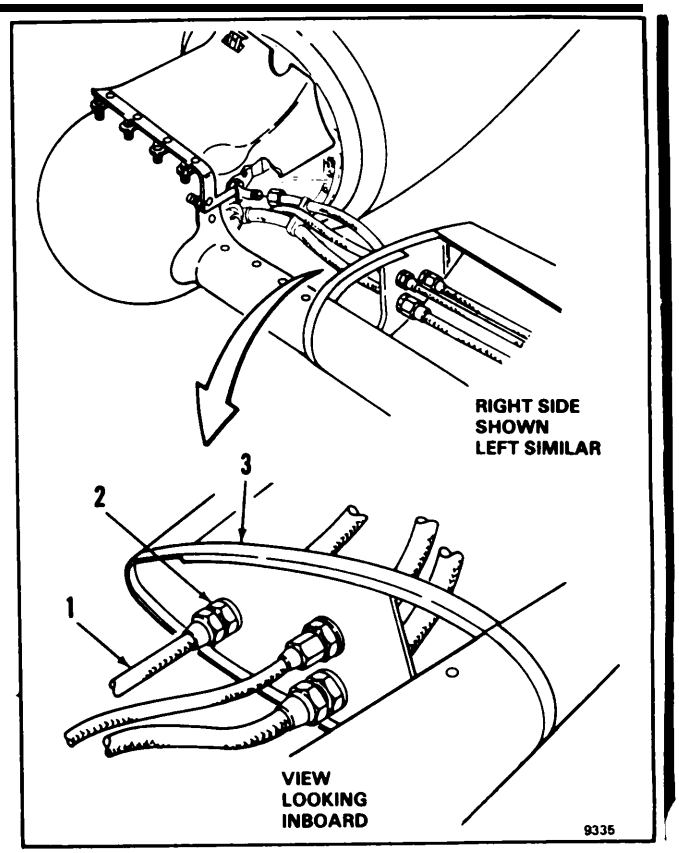
6-99.4 INSTALL ENGINE TRANSMISSION PRESSURE HOSE ASSEMBLIES (Continued)

NOTE

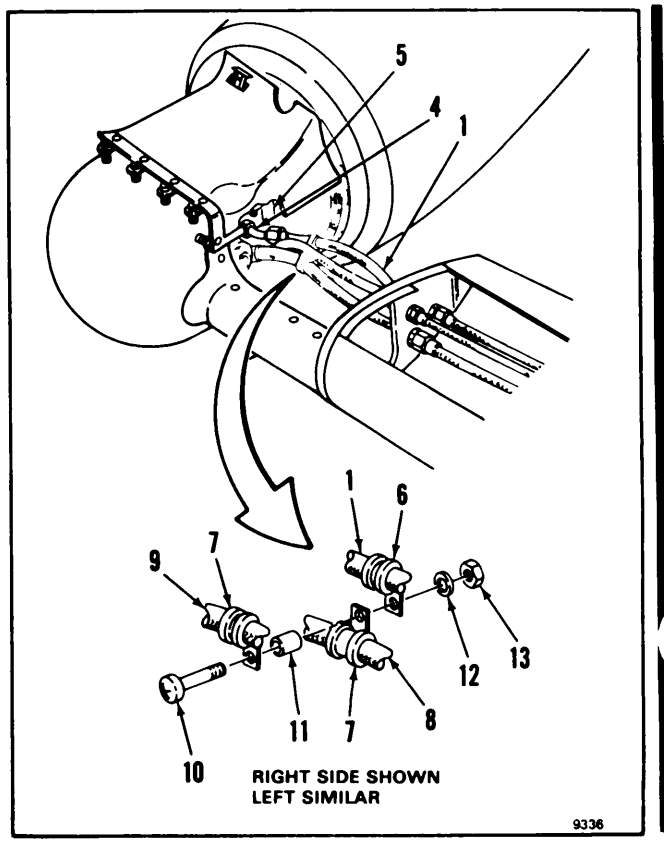
Installation of left or right hose assemblies is similar.

INSTALL OUTBOARD HOSE

1. **Coat thread** at ends of hose (1) **with oil (E253 or E254).**
2. **Connect hose (1) to union (2)** at bulkhead (3).



3. **Connect hose (1) to reducer (4)** at engine transmission (5).
4. **Align clamp (6)** on pressure hose (1) **with clamp (7)** on hoses (8 and 9). Install **screw (10),** spacer (11), washer (12), and nut (13).

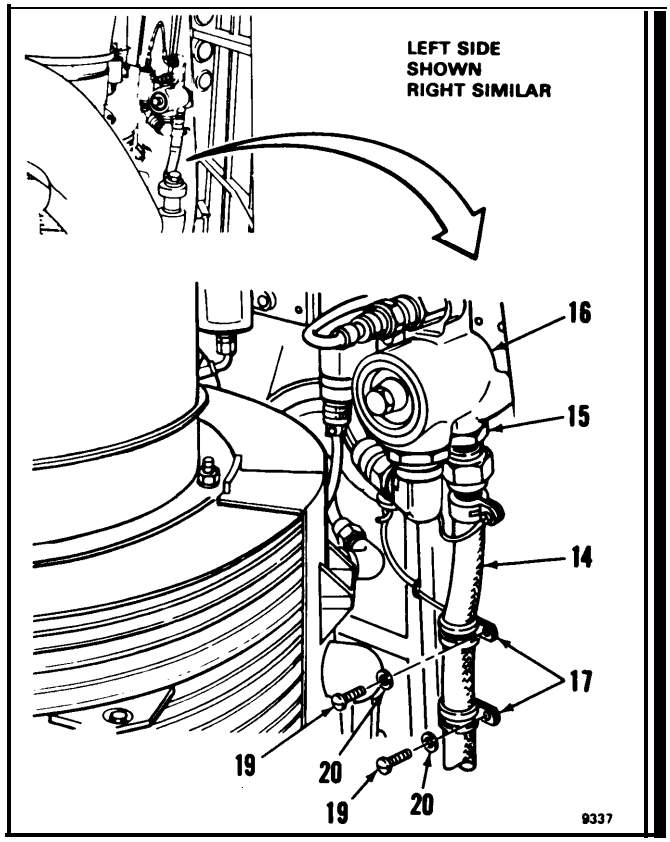


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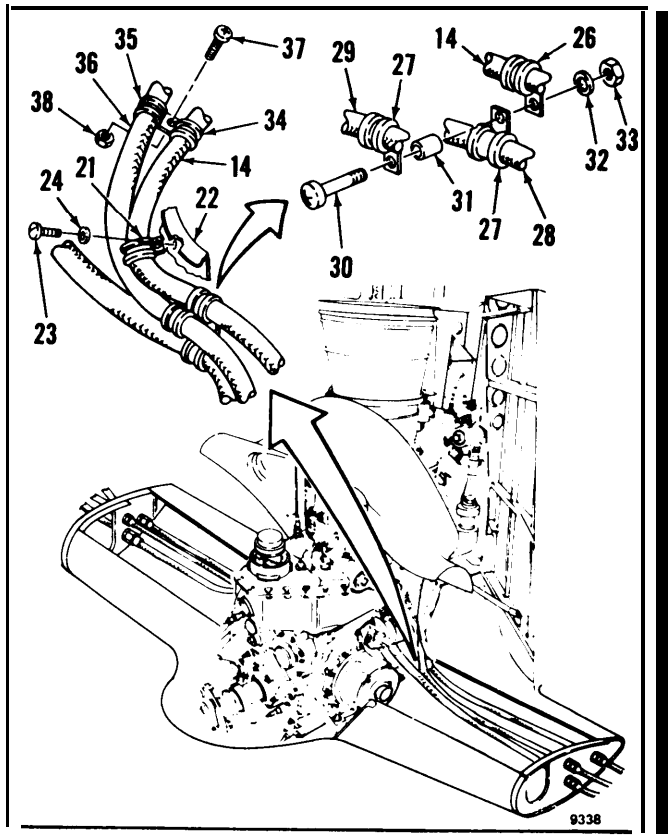
6-99.4 INSTALL ENGINE TRANSMISSION PRESSURE HOSE ASSEMBLIES (Continued]

INSTALL INBOARD HOSES

5. **Coat thread** at ends of hose (14) **with oil (E253 or E254).**
6. **Connect hose (14) to reducer (15)** at pressure transmitter (16).
7. **Align two clamps (17)** on pressure hose (14) **with airframe structure (18). Install screws (19)** and washers (20).



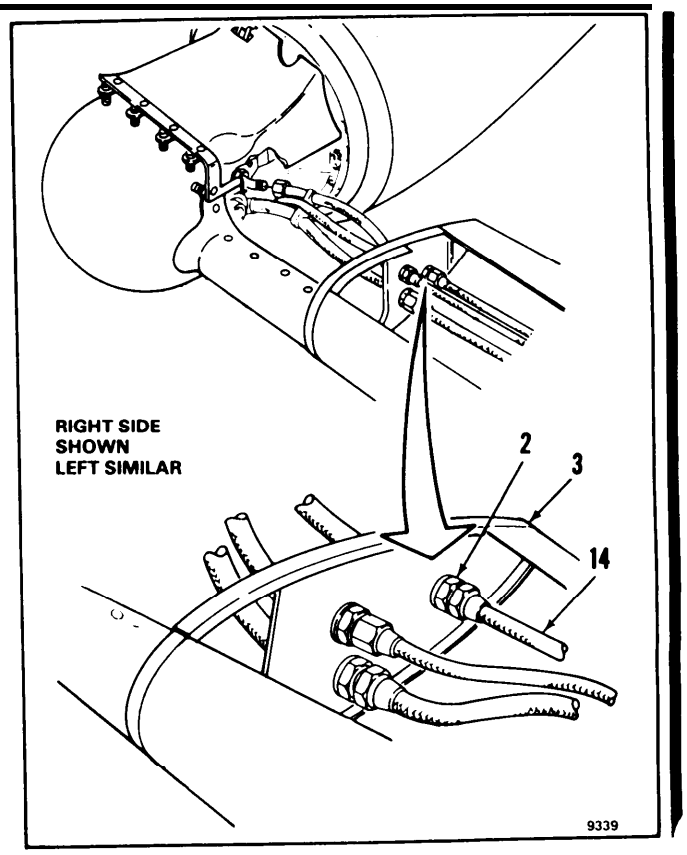
8. **Align clamp (21) on** pressure hose (14) with airframe structure (22). Install screw (23) and washer (24).
9. **Align clamp (26)** on pressure hose (14) **with clamps (27)** on hoses (28 and 29). Install screw (30), spacer (31), washer (32), and nut (33).
10. **Align clamp (34)** on pressure hose (14) **with clamp (35)** on hose (36). **Install screw (37)** and nut (38).



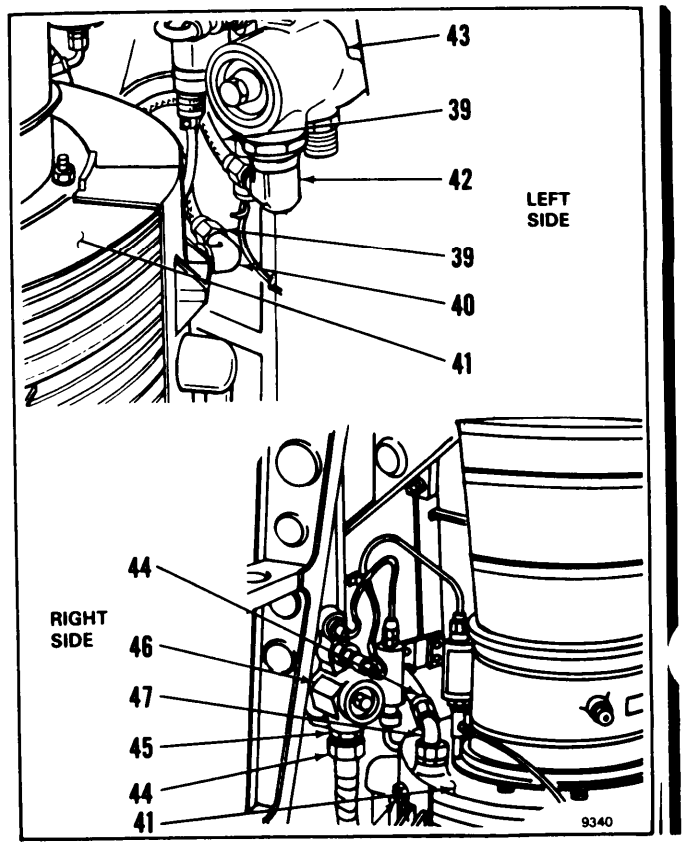
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6-99.4 INSTALL ENGINE TRANSMISSION PRESSURE HOSE ASSEMBLIES (Continued)

11. **Connect hose (14) to union (2)** at bulkhead (3).



12. On left side, **connect hose (39) to elbow (40)** at oil cooler assembly (41). **Connect hose to elbow (42)** at pressure transmitter (43)
13. On right side, **connect hose (44) to reducer (45)** at pressure transmitter (46). **Connect hose to reducer (47)** at oil cooler assembly (41).



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6-99.4 INSTALL ENGINE TRANSMISSION PRESSURE HOSE ASSEMBLIES (Continued)

FOLLOW-ON MAINTENANCE:

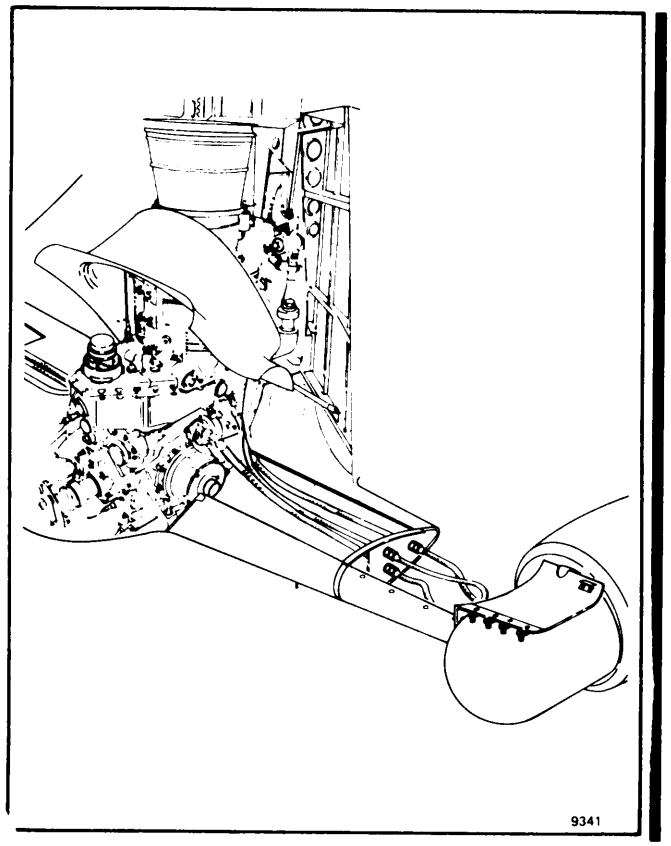
Close engine transmission fairing covers (Task 2-2).

Install engine air inlet screen (Task 4-76).

Install engine drive shaft access cover (Task 2-2).

Close pylon lower fairing (Task 2-2).

Close pylon access doors (Task 2-2).



END OF TASK

6-99.5 REMOVE ENGINE TRANSMISSION SUCTION HOSE ASSEMBLIES

INITIAL SETUP

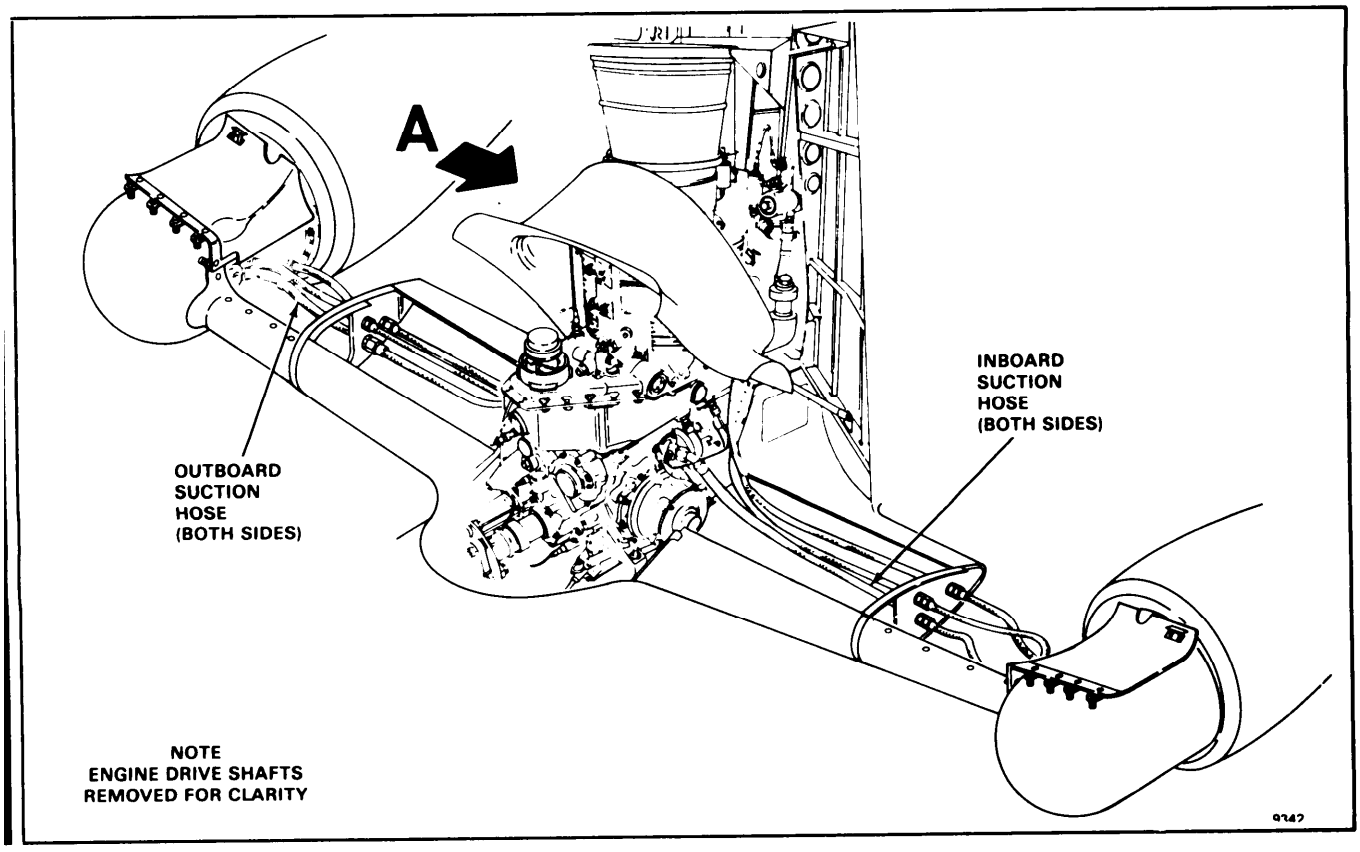
Applicable Configurations:
All

Tools:
Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Open End Wrench, 1 1/8-Inch
Open End Wrench, 1 1/2-Inch
Container, Two-Quart

Materials:
None

Personnel Required:
Medium Helicopter Repairer

Equipment Condition:
Battery Disconnected (Task 1-39)
Electrical Power Off
Pylon Access Doors Open (Task 2-2)
Pylon Lower Fairing Open (Task 2-2)
Engine Drive Shaft Access Cover Removed (Task 2-2)
Engine Air Inlet Screens Removed (Task 4-65)
Engine Transmission Fairing Access Cover Open (Task 2-2)



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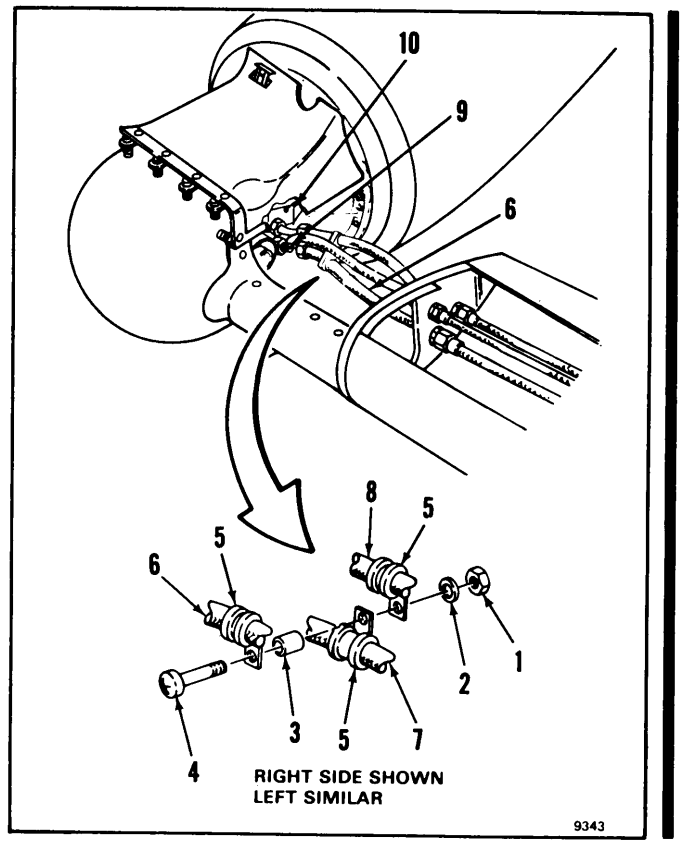
6-99.5 REMOVE ENGINE TRANSMISSION SUCTION HOSE ASSEMBLIES (Continued)

NOTE

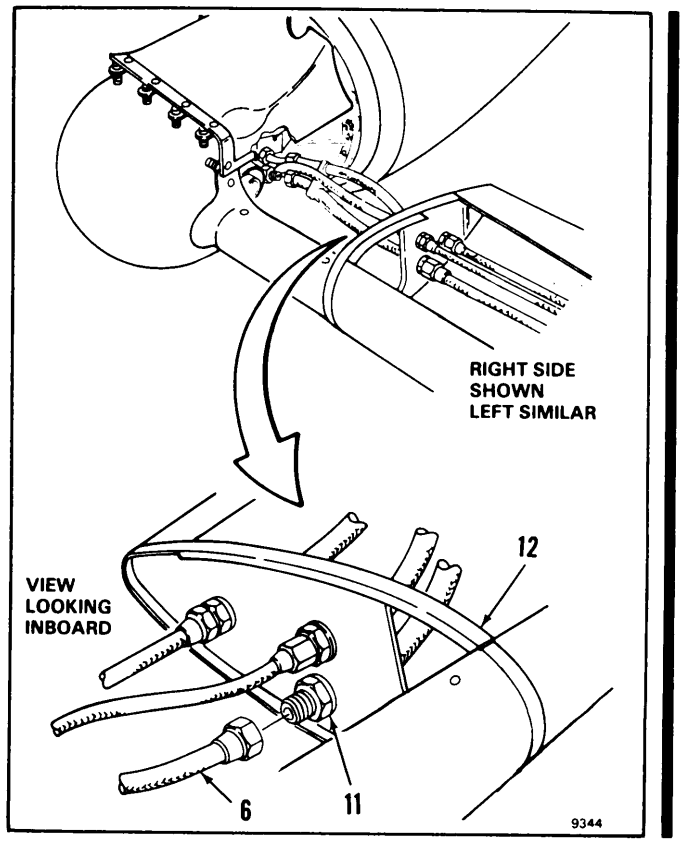
Removal of left or right hose assembly is similar.

REMOVE OUTBOARD HOSE

1. **Remove** nut (1), washer (2), spacer (3), and screw (4) from **clamp (5). Lift suction hose (6) clear of hoses (7 and 8).**
2. **Disconnect suction hose (6) from reducer (9)** at engine transmission (10). Support hose to prevent oil spillage.



3. **Disconnect suction hose (6) from union (11)** at bulkhead (12). Drain oil into container.
4. Remove hose (6).



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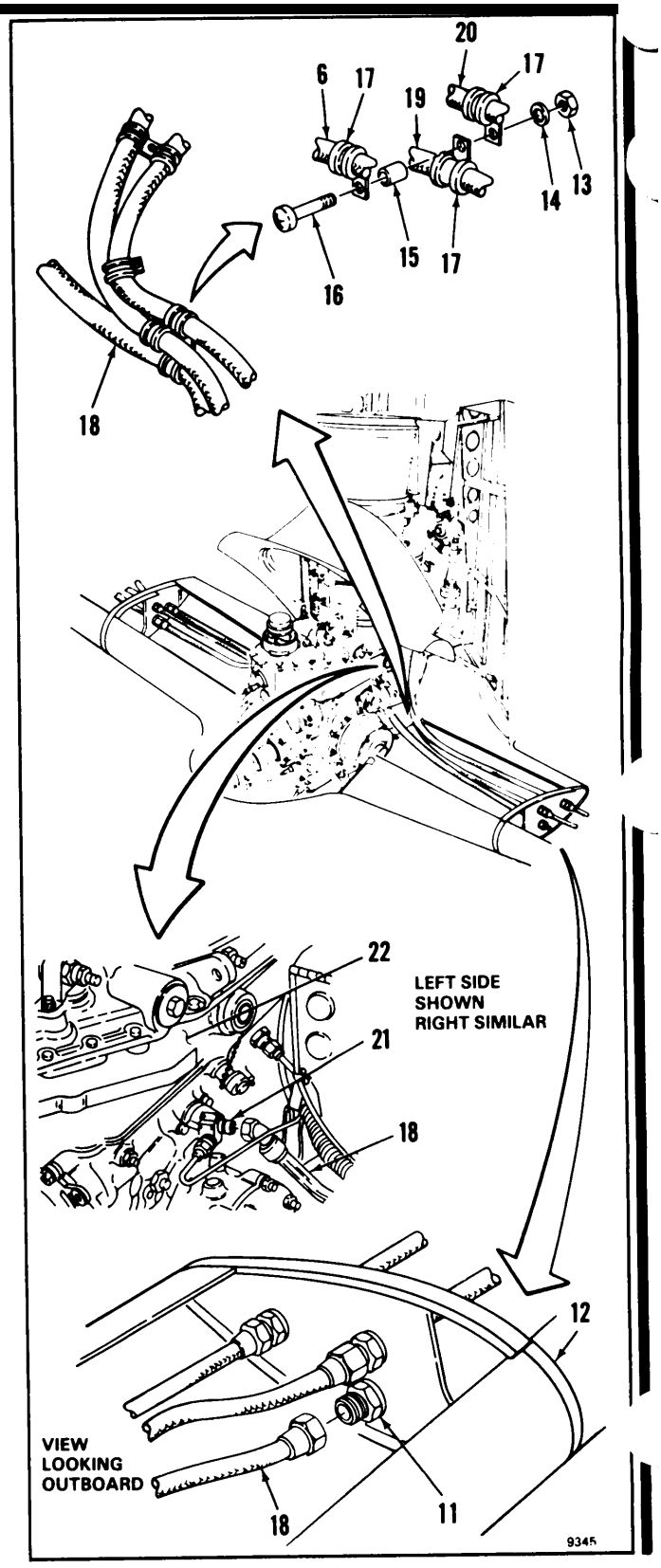
6-99.5 REMOVE ENGINE TRANSMISSION SUCTION HOSE ASSEMBLIES (Continued)

REMOVE INBOARD HOSE

5. **Remove** nut (13), washer (14), spacer (15) and **screw (16)** from clamps (17). Lift suction hose (18) clear of hoses (19 and 20).
6. **Disconnect hose (18) from debris detection screen (21)** at combining transmission (22).
7. **Disconnect hose (18) from union (11)** at bulkhead (12).
8. **Remove hose (18).**

FOLLOW-ON MAINTENANCE:

None



END OF TASK

6-99.6 INSTALL ENGINE TRANSMISSION SUCTION HOSE ASSEMBLIES

INITIAL SETUP

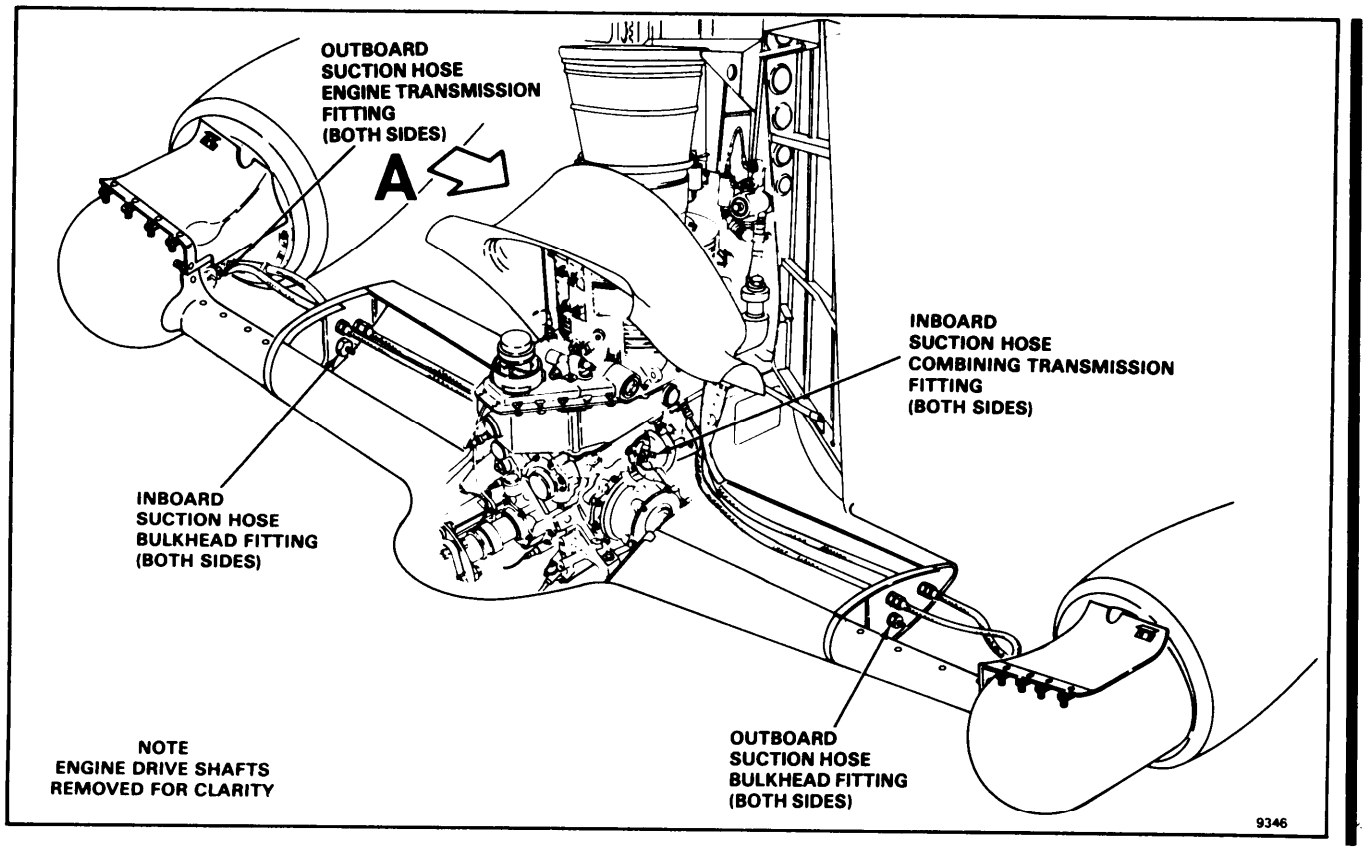
Applicable Configurations:
All

Tools:
Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Open End Wrench, 1 1/8-Inch
Open End Wrench, 1 1/2-Inch

Materials:
Oil (E253 or E254)

Personnel Required:
Medium Helicopter Repairer
Inspector

References:
TM 55-1520-240-23P



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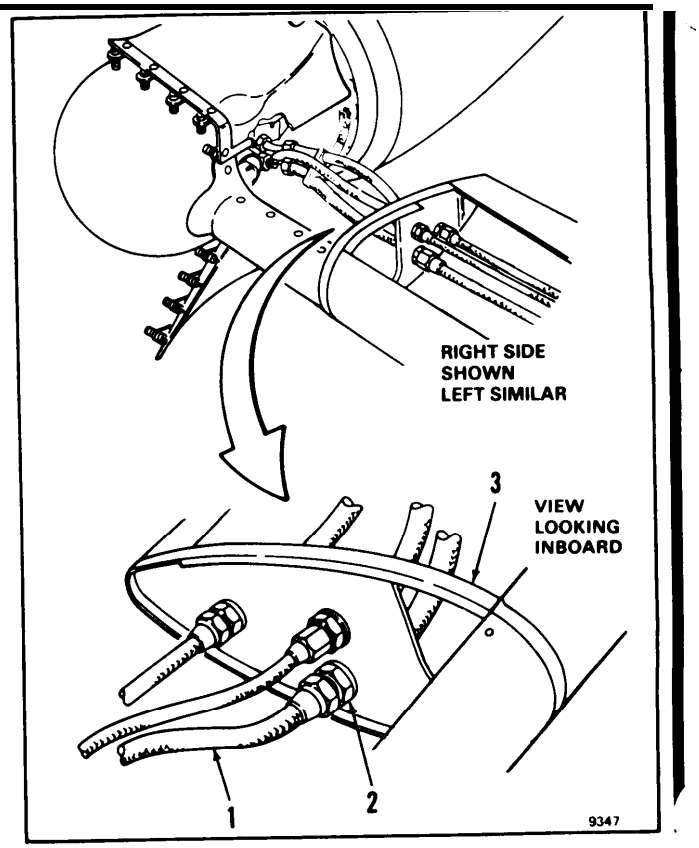
6-99.6 INSTALL ENGINE TRANSMISSION SUCTION HOSE ASSEMBLIES (Continued)

NOTE

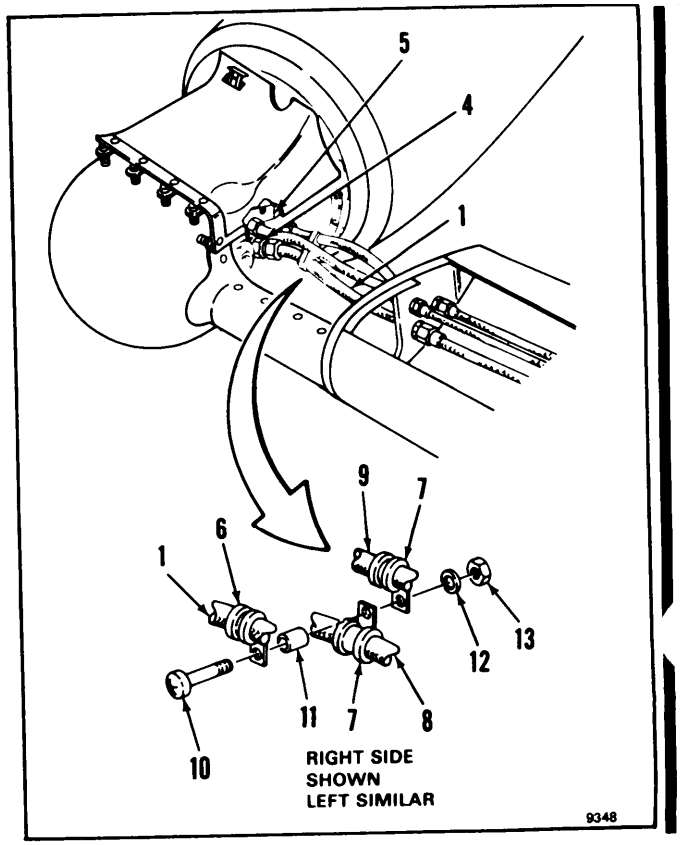
Installation of left or right hose assemblies is similar.

INSTALL OUTBOARD HOSE

1. **Coat thread at ends of hose (1) with oil (E253 or E254).**
2. **Connect hose (1) to union (2)** at bulkhead (3).



3. **Connect hose (1) to reducer (4)** at engine transmission (5).
4. **Align clamp (6)** on suction hose (1) **with clamps (7)** on hoses (8 and 9). **Install screw (10),** spacer (11), washer (12) and nut (13).



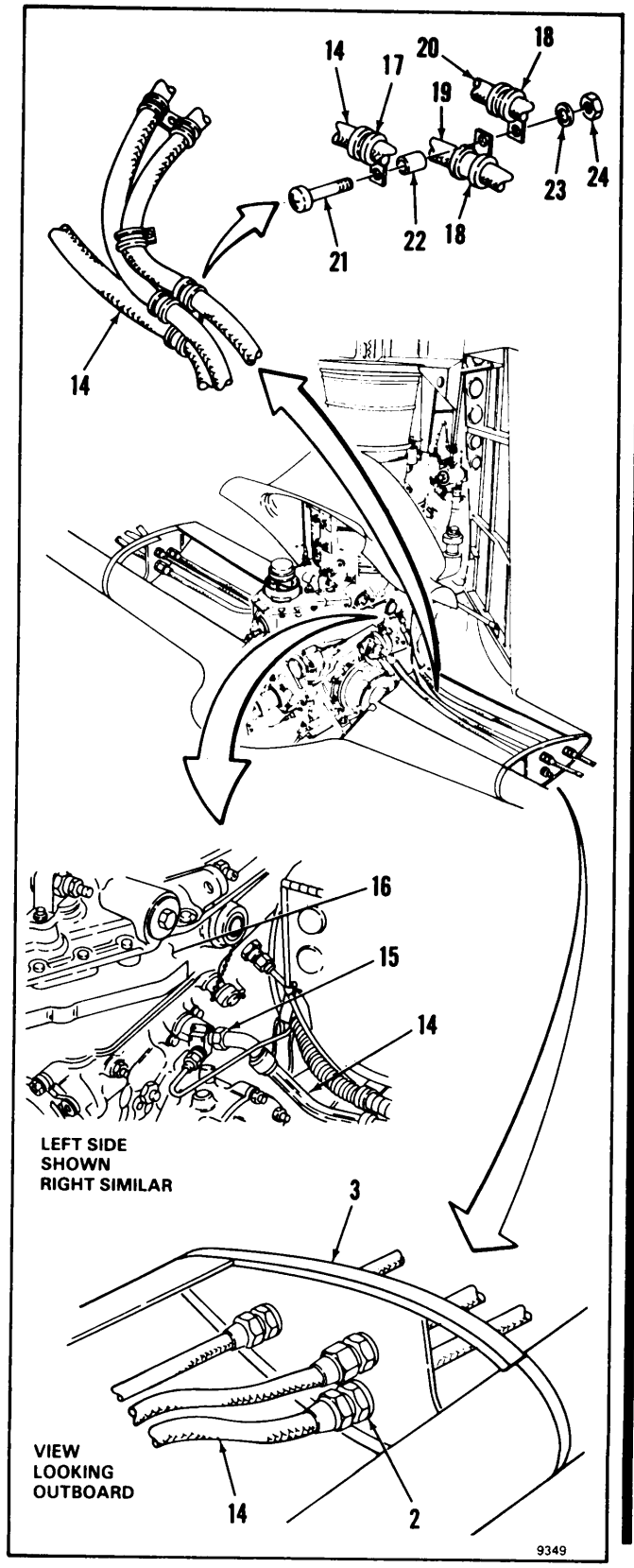
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6-99.6 INSTALL ENGINE TRANSMISSION SUCTION HOSE ASSEMBLIES (Continued)

INSTALL INBOARD HOSE

5. **Coat thread at ends of hose (14) with oil (E253 or E254).**
6. **Connect hose (14) to union (2)** at bulkhead (3).
7. **Connect hose (14) to debris detection screen (15)** at combining transmission (16).
8. **Align clamp (17)** on suction hose (14) **with clamps (18)** on hoses (19 and 20). **Install screw (21),** spacer (22), washer (23), and nut (24).

INSPECT



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6-99.6 INSTALL ENGINE TRANSMISSION SUCTION HOSE ASSEMBLIES (Continued)

FOLLOW-ON MAINTENANCE:

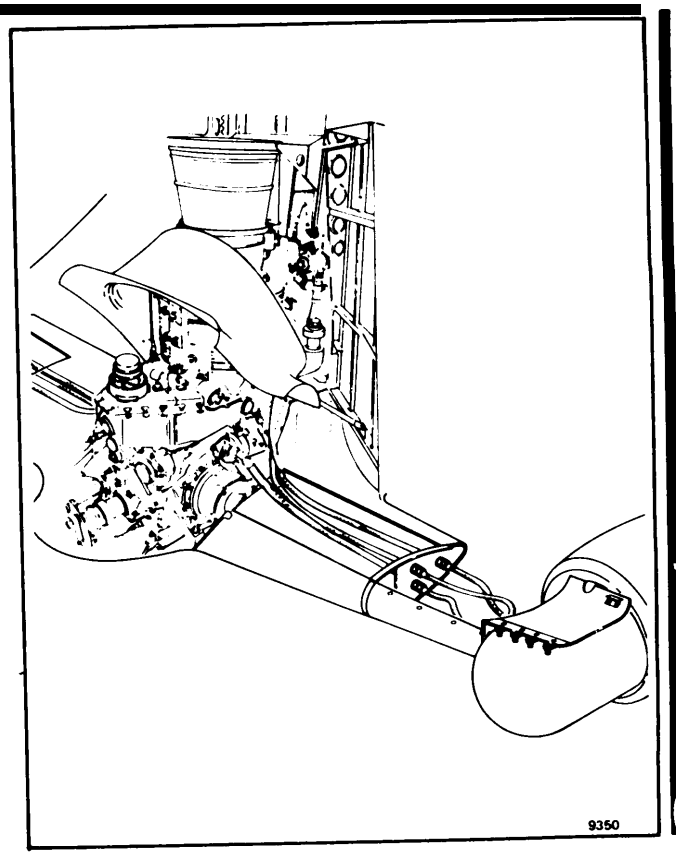
Close engine transmission fairing access cover (Task 2-2).

Install engine air inlet screen (Task 4-76).

Install engine drive shaft access cover (Task 2-2).

Close pylon lower fairing (Task 2-2).

Close pylon access doors (Task 2-2).



END OF TASK

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic Tool Kit, NSN 5180-00-323-4692
Container, Two Quart
Sling (T3)
Hoist
Open End Wrench, 1-1/4 Inch
Open End Wrench, 1-1/2 Inch
Rope Guide Line
Padded Support

Materials:

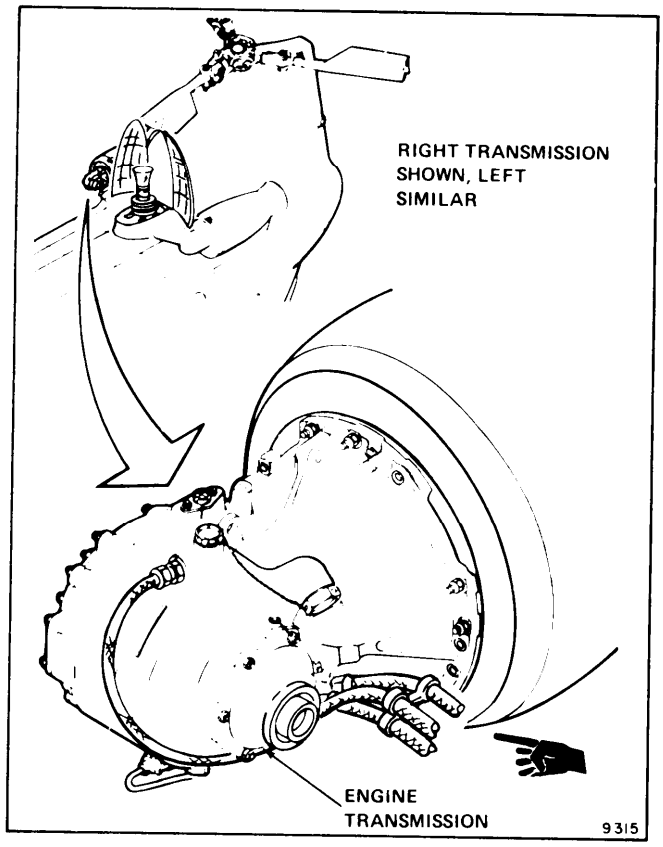
Cloths (E 120)

Personnel Required:

Medium Helicopter Repairer (2)

Equipment Condition:

Battery Disconnected (Task 1-39)
Electrical Power Off
Engine Air Inlet Screen Removed (Task 4-65)
Engine Transmission Fairing Removed (Task 4-70)
Pylon Hinged Fairing Open (Task 2-2)
Engine Drive Shaft and Engine Transmission Adapter Assembly Removed (Task 6-30)



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NOTE

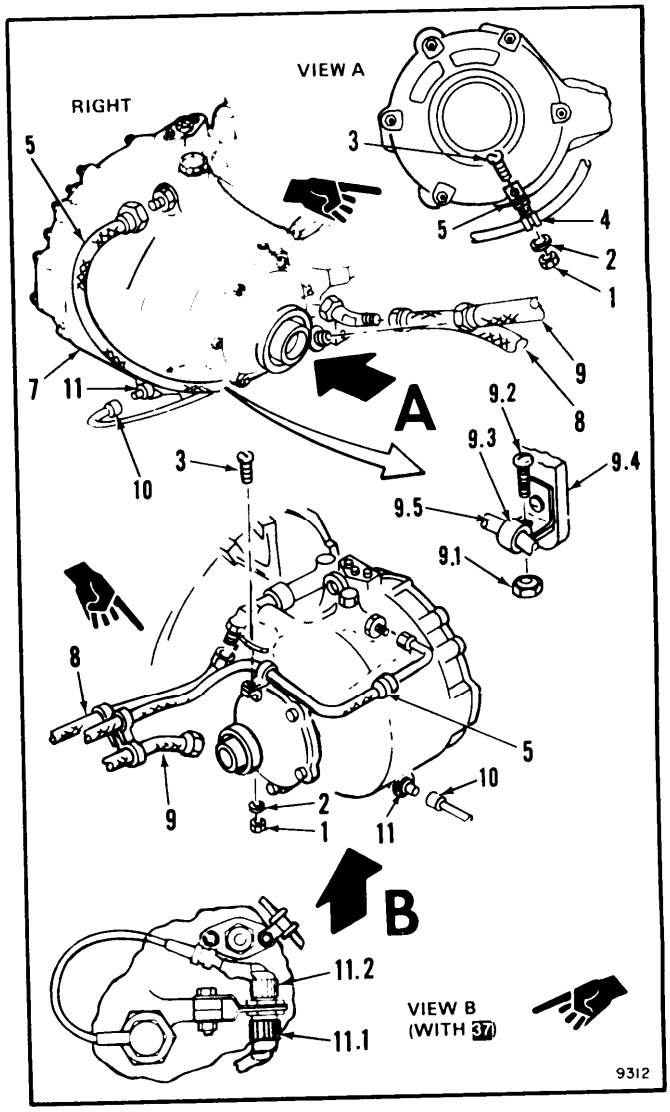
Procedure is similar to remove left or right transmission. Right transmission is shown here. Differences are noted in steps.

1. **Remove** nut (1), washers (2), and screw (3) from **clamp (4)** connecting hose (5) to clip (6).
2. **Disconnect hose (5)** from transmission (7).
3. **Disconnect two oil hoses (8 and 9)** from transmission (7). Drain oil into container.

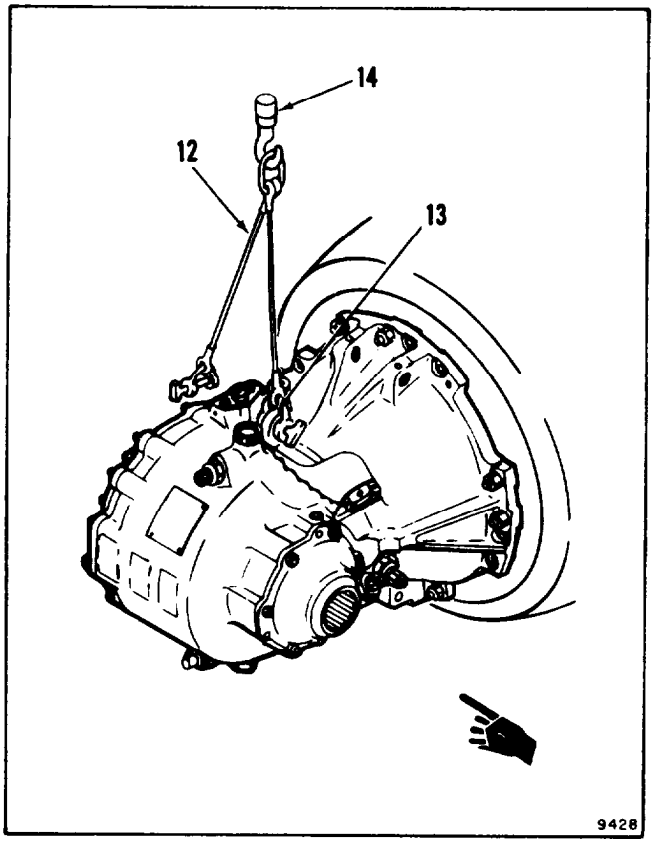
3.1. Remove nut (9.1) and screw (9.2) from clamp (9.3) at lower lifting lug (9.4). Release temperature and chip detector wire (9.5).

4. **Disconnect connector (10)** from temperature and chip detector (11).

4.1. With 37, disconnect connector (11.1) from chip detector connector (11.2).



5. **Connect sling (T3) (12)** to lifting lug (13). Connect hoist hook (14) to sling (T3).
6. Have helper raise hoist hook (14) to **take up slack in sling (T3) (12).** Do not apply tension to sling.



7. Attach guide line (15) around transmission (7).
8. Remove eight nuts (16) and washers (17) from studs (18). Discard nuts.

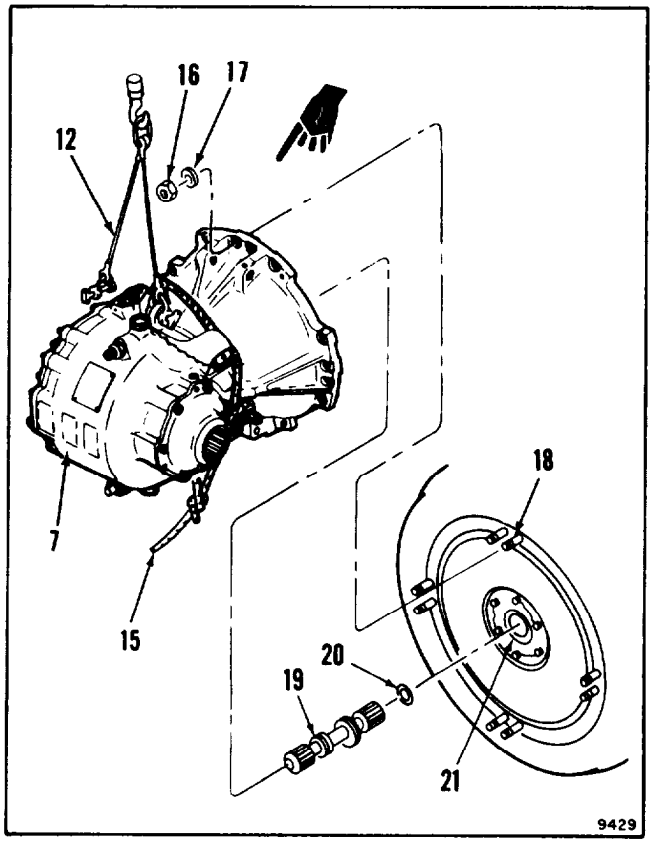
WARNING

Transmission is heavy and can injure personnel if it drops. Transmission must be supported by hoist and moved carefully to prevent injury to personnel.

9. **Remove transmission (7)** from studs (18) and quill shaft (19). Lower transmission to padded support. Remove sling (T3) (12).
10. **Remove quill shaft (19).** Remove packing (20) from engine (21).
11. Wipe up spilled oil. Use cloths (E120).

FOLLOW-ON MAINTENANCE:

None



END OF TASK

6-101 INSPECT ENGINE TRANSMISSION QUILL SHAFT 6-101

INITIAL SETUP

Applicable Configurations:
All

Tools:
None

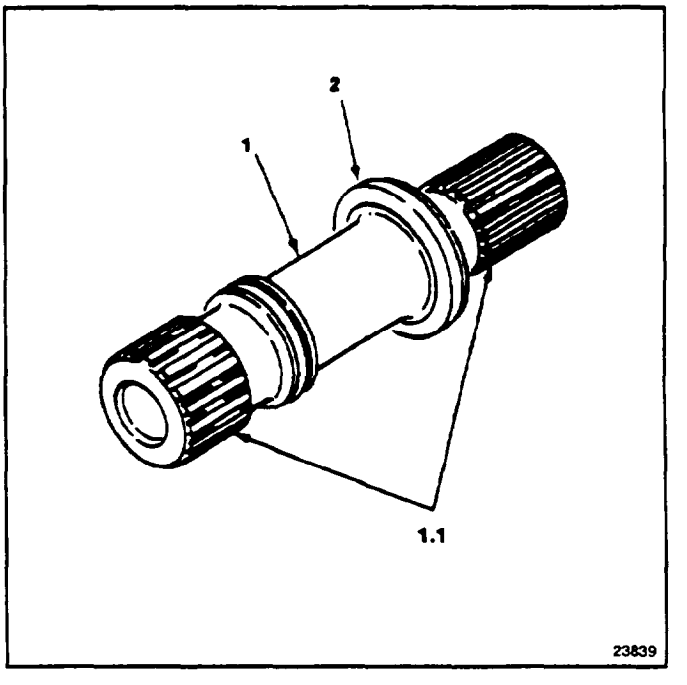
Materials:
None

Personnel Required:
Inspector

Reference:
TM 55-1520-240-23P

Equipment Condition:
Off Helicopter Task

1. Visually check quill shaft for:
   a. CRACKS AND/OR DISTORTION. There shall be no such damage.
   b. LOSS OF SILIVER PLATING. Acceptable, except if loose silver plate is present, lightly polish with scotch brite (E2) or equivalent to remove, no touch-up required.
   C. SCRATCHES, NICKS, DENTS -
      (1) Deeper than .010 inch into steel. There shall be no such damage.
      (2) .010 inch or less into steel. Polish and blend with oil (E254.1) and abrasive paper (E11) (no coarser than 320 paper) to remove any sharp edges and polish bottom to a smooth surface.
2. Visually check quill shaft splines (1.1) as follows:
   a. CRACKS AND/OR DISTORTION. There shall be no such damage.
   b. LOSS OF SILIVER PLATING. Acceptable, except if loose silver plate is present, lightly polish with scotch brite (E2) or equivalent to remove, no touch-up required.
   C. CHECK FOR WEAR STEP. Replace if worn more than .010 inch.
   d. LOCAL DAMAGE TO TOP LANDS AND EDGES (CHIPPING, DENTS) FROM INSTALLATION AND/OR REMOVAL OF ENGINE TRANSMISSIONS.
      (1) Deeper than .010 inch into steel. There shall be no such damage.
      (2) .010 inch or less into steel. Polish and blend with oil (E254.1) and abrasive paper (E11) (no coarser than 320 paper) to remove any sharp edges and polish bottom to a smooth surface.
3. Visually check snubber (2) for cracks, missing pieces, and/or distortion. There shall be no such damage.



FOLLOW-ON MAINTENANCE:
None

END OF TASK

INITIAL SETUP

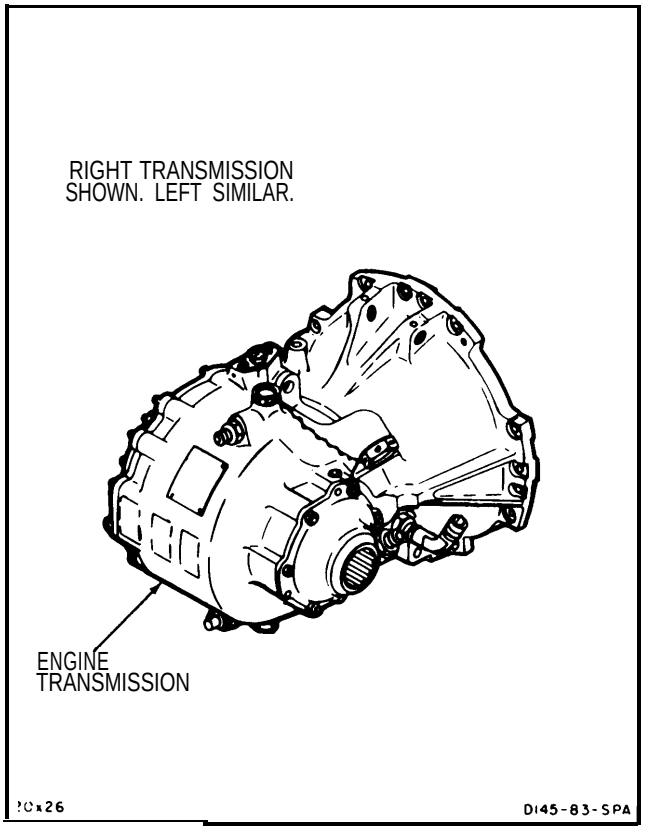
Applicable Configurations:
All

Tools:
Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692

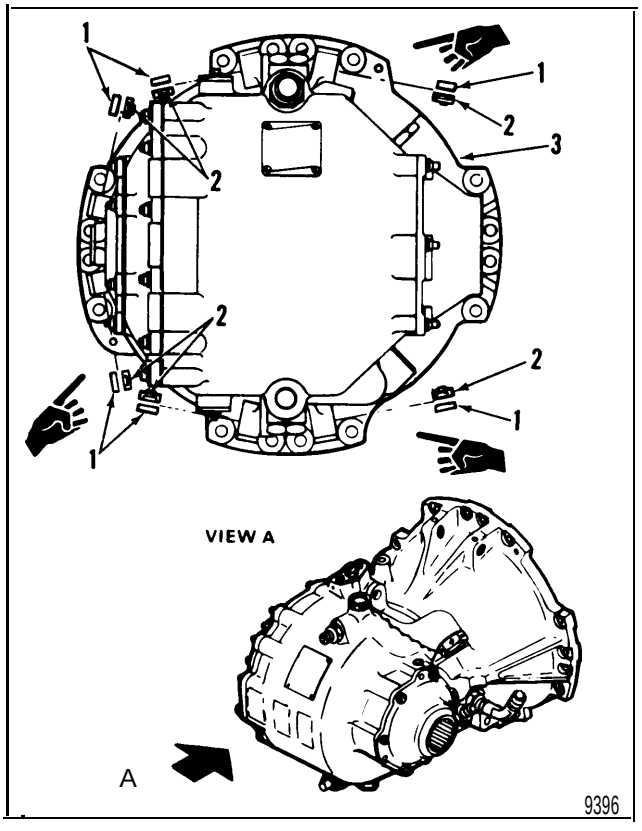
Materials:
None

Personnel Required:
Medium Helicopter Repairer

Equipment Condition:
Off Helicopter Task

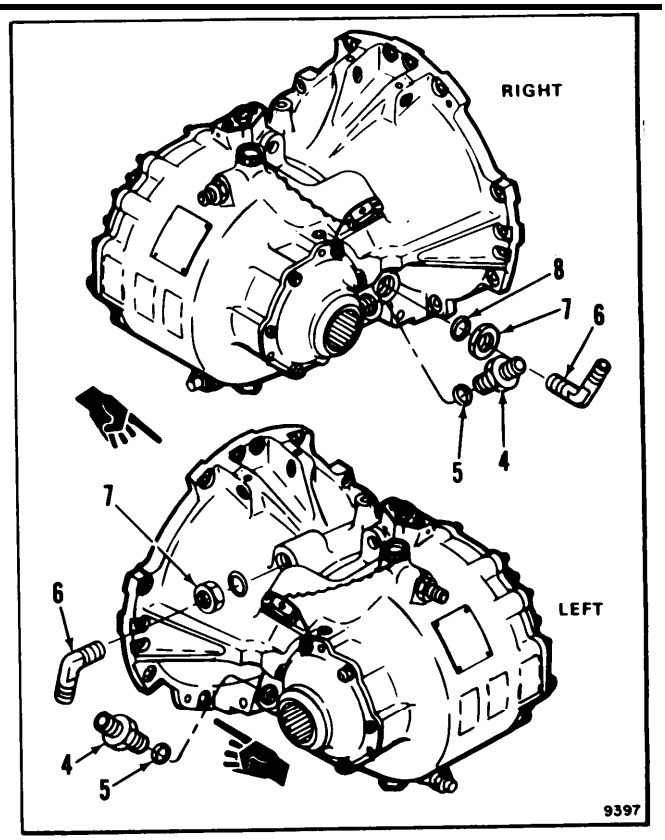


1. **Check that six barrel nuts (1) and retainers (2) are secure in transmission (3) and properly aligned.**



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2. **Remove union (4)** and packing (5).
3. **Remove elbow (6),** nut (7), and packing (8).



FOLLOW-ON MAINTENANCE:

None

END OF TASK

6-102.1 REPAIR ENGINE TRANSMISSION OUTSIDE SURFACE

INITIAL SETUP

Applicable Configurations:
All

Tools:
Dial Indicating Depth Gage 643J
Goggles

Materials:
Naphtha (E245)
Emery Cloth (E123) or
Abrasive Paper (E13)
Crocus Cloth (E122)
Cloths (E120)
Gauze Sponges (E184)
Barrier Material (E80)
Masking Tape (E388)
Gloves (E186)
Acetic Acid (E21)
Chromic Acid (E114)
Calcium Sulphate (E91)
Epoxy Primer (E293)
Epoxy Topcoat (E166).

Personnel Required:
68D20 Aircraft Powertrain Repairer
68D30 Inspector

References:
TM 43-0103
MIL-M-3171, Type VI
MIL-C-22751

Equipment Condition:
Off Helicopter Task

General Safety Instructions:

WARNING

Naphtha (E245) is combustible and toxic. It can irritate skin and cause burns. Use only with adequate ventilation, away from open flame. In case of contact, immediately Flush akin or eyes with water for at least 15 minutes. Got medical attention for eyes.

WARNING

Acetic acid (E21) is combustible and toxic. Chromic acid (E114) is extremely toxic. Both can cause burns. Avoid inhaling. Use only with adequate ventilation, away from open flame. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.

WARNING

Epoxy primer (E293) is flammable and toxic. It can irritate skin and cause burns. Use only with adequate ventilation, away from heat or open flame Avoid contact with akin, l yes, or clothing. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.

CAUTION

Do not wear photogrey glasses when fluorescent inspecting. They reduce ability to see cracks.

GO TO NEXT PAGE

6-102.1 REPAIR ENGINE TRANSMISSION OUTSIDE SURFACE (Continued) 6-102.1

NOTE

Reparable damage is limited to scratches, nicks, gouges, and minor corrosion.

1. Clean oil and grease from damaged area. Use naphtha (E245) and clean cloths (E120). Wear gloves (E186).
2. Check extent and location of damage on housing (1).

NOTE

Limits in this step refer to extent of damage after rework.

a. Depth of damage shall not be more than 0.025 inch

b. Damage shall not extend over more than one surface or enter any radius.

C. Damage shall not be closer than 1.00 inch to any mounting hole (2).

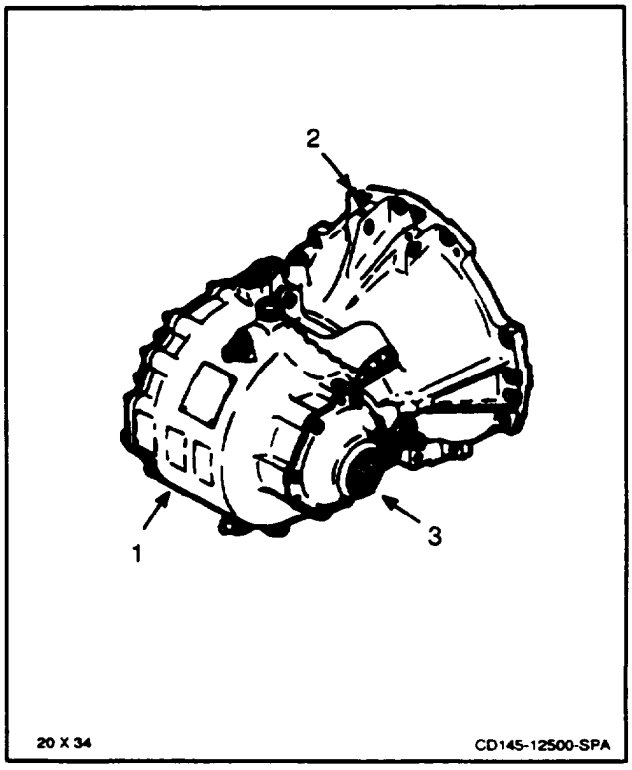
d. Check mounting flange (4) as follows:

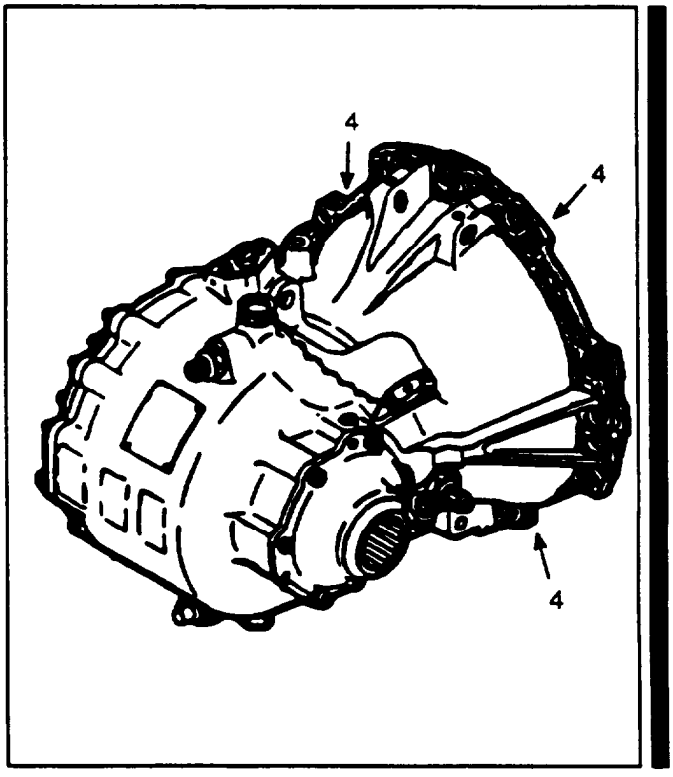
(1) Damage shall not exceed 0.060 inch in the flanged area (4) of the mounting holes.

(2) Damage cannot extend over more than one surface.

(3) Damage can exist anywhere on the mounting flange, except inside any of the mounting holes or in recessed area for the mounting washers.

3. Fluorescent inspect damaged area to check for cracks (TM 43-0103). There shall be no cracks.
4. Cover output splines (3) near damaged area to keep out abrasive grit. Use barrier material (E80) and tape (E388).
5. Blend out damage with emery cloth (E123) or abrasive paper (E13). Observe limits of step 2.

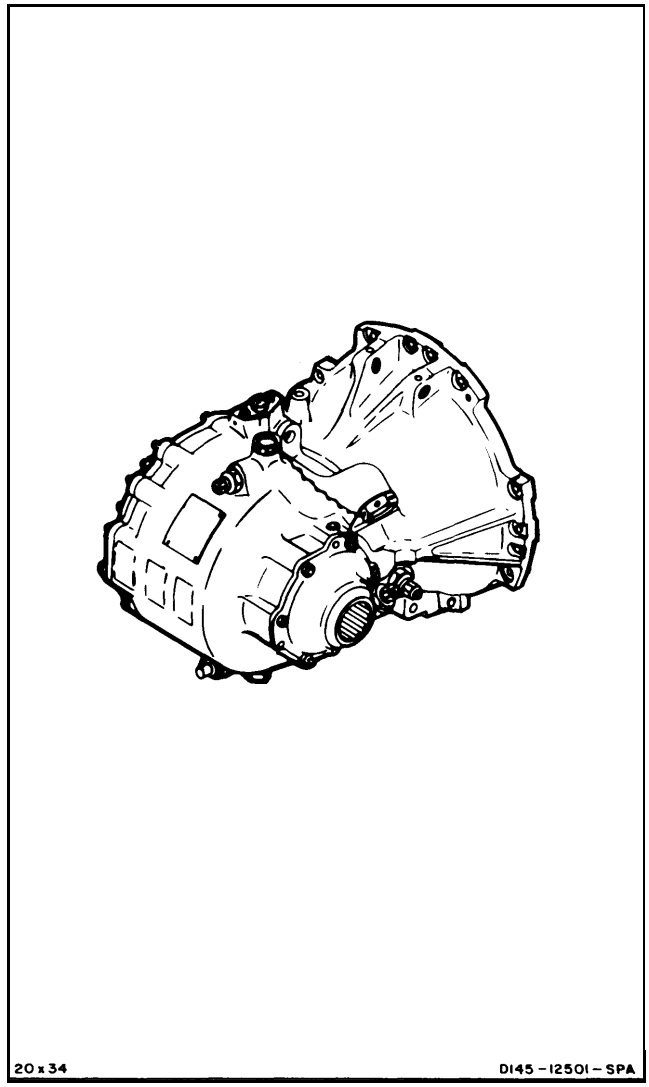




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6-102.1 REPAIR ENGINE TRANSMISSION OUTSIDE SURFACE (Continued)

6. Smooth blended area with crocus cloth (E122). Do not leave any sharp edges.
7. **Acid etch reworked area** as follows:
   a. Prepare a solution of 3 parts acetic acid (E21) in 7 parts water. Wear gloves (E186) and goggles.
   b. Swab area with solution for 2 minutes. Use gauze sponges (E184).
   c. Rinse area with cold water.
8. **Fluorescent inspect** reworked area to check for cracks (TM 43-0103). **There shall be no cracks.**
9. Apply surface treatment to reworked area as follows:
   a. **Clean area with naphtha (E245)** and clean cloths. Wear gloves (E186). Let area air dry.
   b. **Swab on solution of chromic acid (E114) and calcium sulphate (E91) (MIL-L-3171, type VI). Swab until metal becomes dull gold to brown.** Use gauze sponges (E184). **Rinse** area with cold water and let air dry.
10. **Apply epoxy primer (E293)** to reworked area. Let air dry for 2 hours.
11. **Apply epoxy topcoat (E166)** (MIL-C-22751).



INSPECT

FOLLOW-ON MAINTENANCE:

None

END OF TASK

6-103 PREPARE ENGINE TRANSMISSION FOR SHIPMENT OR STORAGE

INITIAL SETUP

Applicable Configurations:
All

Tools:
Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692
Handling Sling (T3)
Work Hoist
Shipping Container (T38)

Materials:
Fingerprint Remover (E175)
Cloths (E120)
Dry Cleaning Solvent (E162)
Gloves (E186)
Swabbing Brush (E86)
Corrosion Preventive Compound (E153 or E154)
Barrier Material (E81)
Masking Tape (E388)
Desiccant (E160), 16-Unit Bag (9)
Tarpaulin (E410) or Plastic Sheet (E279)

Personnel Required:
Medium Helicopter Repairer (2)
Inspector

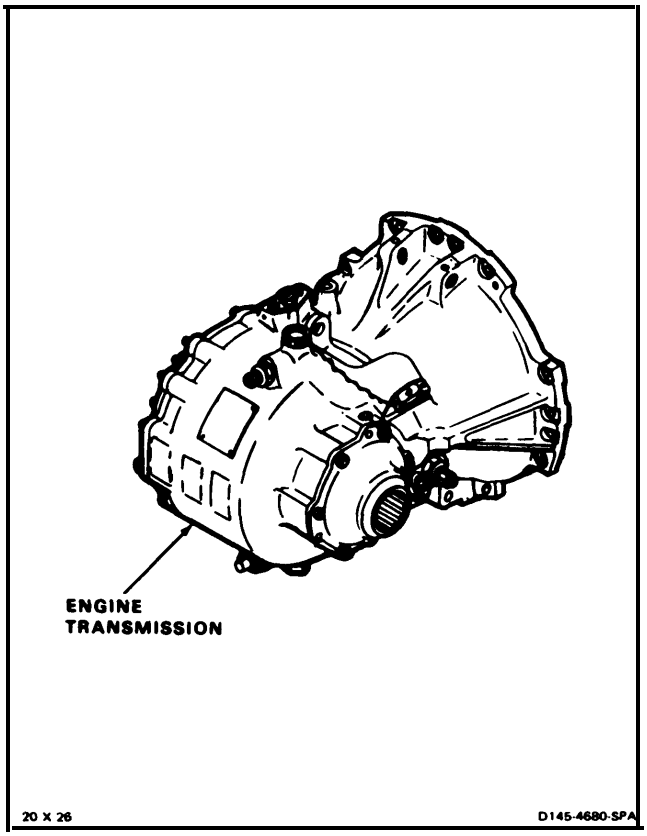
References:
TB 55-8100-200-25

Equipment Condition:
Off Helicopter Task
Transmission Disassembled (Task 6-102)

General Safty Instructions:

WARNING

Dry cleaning solvent (E162), fingerprint remover (E175) and corrosion-preventive compound (E153 or E154) are flammable and toxic. They can irritate skin and cause bums. Use only in well-ventilated area, away from heat and open flame. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eves.



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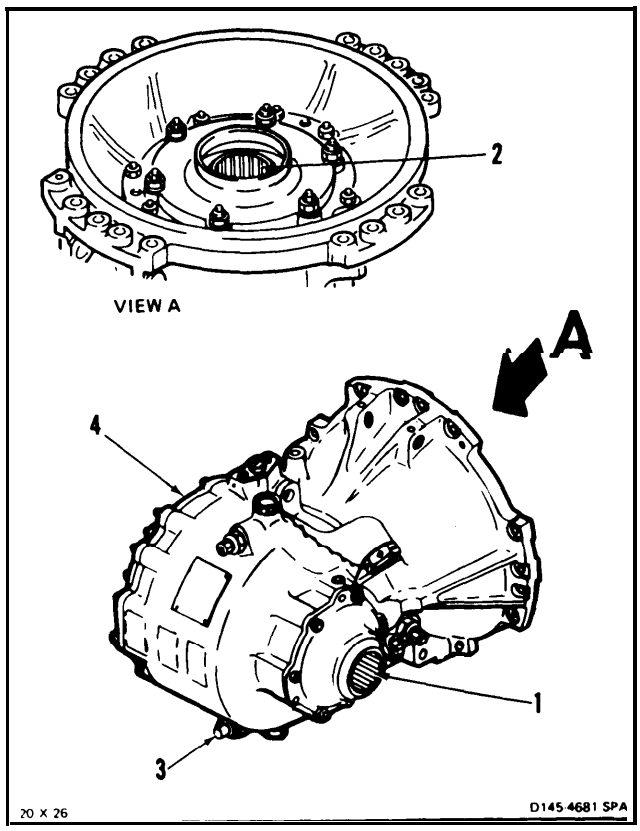
6-103 PREPARE ENGINE TRANSMISSION FOR SHIPMENT OR STORAGE (Continued) 6-103

1. **Clean splines (1 and 2).** Use clean cloths (E 120) damp with fingerprint remover (E175). Wear gloves (E186).
2. **Remove film** left by fingerprint remover with clean cloths (E120) damp with solvent (E162). Use goggles for eyes. Dry splines with clean dry cloths.

CAUTION

Touching splines with bare fingers can cause corrosion.

3. **Coat splines (1 and 2)** with corrosion preventive compound (E153) or E154). Wear gloves (E186) and use swabbing brush (E86).
4. **Cover splines (1 and 2) and electrical receptacle (3).** Use barrier material (E81) and tape (E388).
5. **Clean outside of transmission (4).** Use dry cleaning solvent (E162) and clean cloths (E120). Wear gloves (E186) and goggles.



NOTE

If shipping container is not available, go to step 7.

6. **Install transmission in shipping container (T38) (5)** as follows:

   a. Inspect and prepare container (T38) (5) (TB 55-8100-200-25)

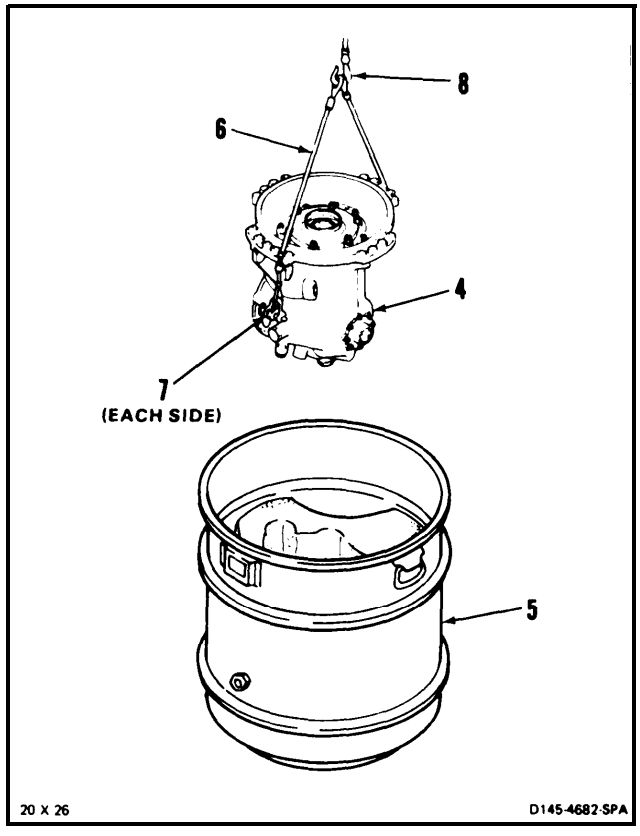
   b. Install sling (T3) (6) on lugs (7). Connect hoist (8) to sling.

NOTE

Have helper guide transmission into container.

   c. Lift transmission (4) into container (T38) (5). Remove sling (6).

   d. Put nine 16-qnit bags of desiccant (E160) in container (T38) (5).



GO TO NEXT PAGE

NOTE

Transmission is supported in container by molded cushioning. No mounting bolts are needed.

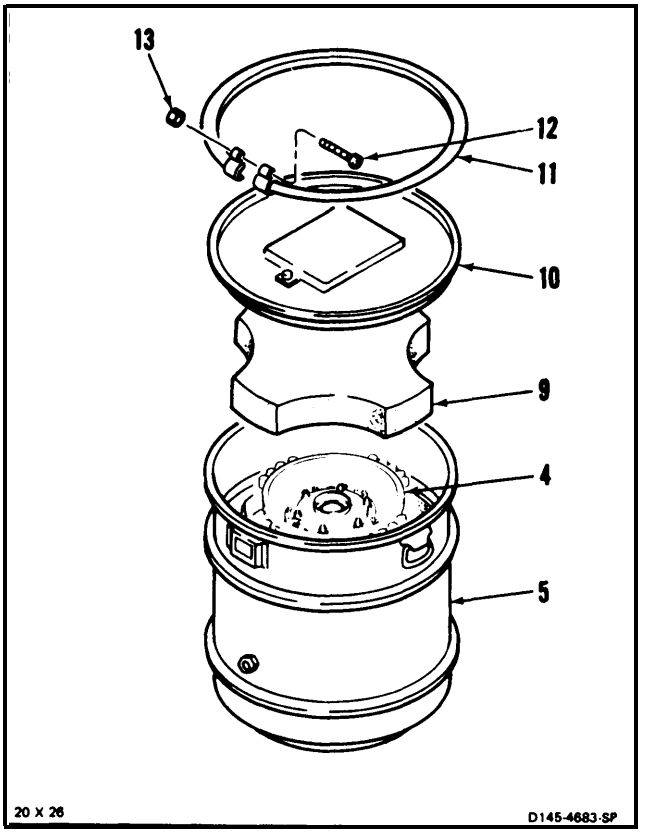
e. Install cushioning material (9) over transmission (4) in container (T38) (5).

f. Install cover (10) and ring (11). Secure with bolt (12) and nut (13).

g. Go to FOLLOW-ON MAINTENANCE.

NOTE

Bag is only for short-term storage. install transmission in shipping container (T38) as soon as possible.



7. If shipping container (T38) is not available, make storage bag (14). Use barrier material (E81) and tape (E388). Make bag about 40 inches high and 60 inches around.

8. Install sling (T3) (6) on lugs (7). Connect hoist (8) to sling.

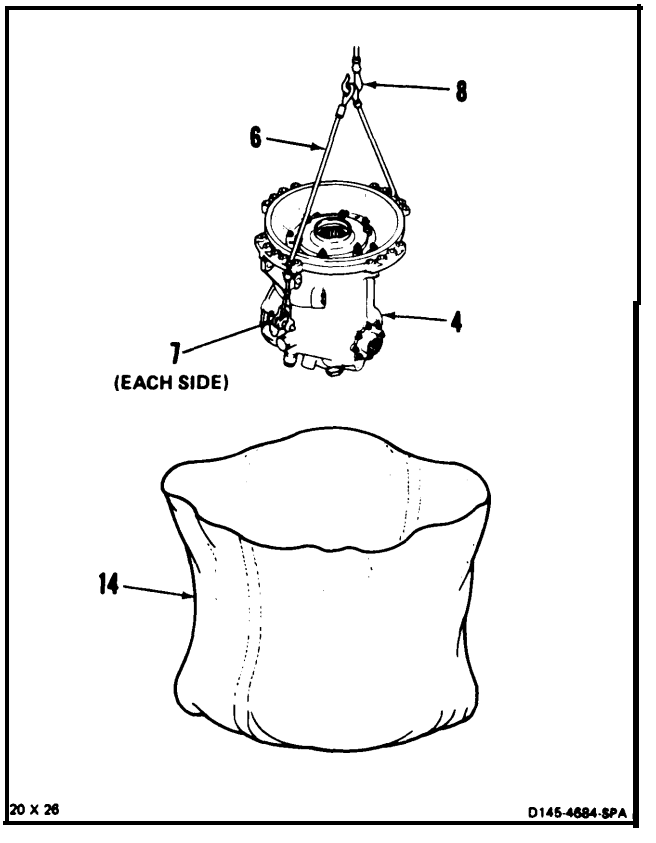
NOTE

Have helper guide transmission into bag.

9. Lift transmission (4) into bag (14). Remove sling (6).

10. Put **nine 16-unit bags of desiccant (E160) in bag (14).** Seal bag with tape (E388).

11. Store transmission (4) indoors, if possible. If stored outdoors, keep transmission off ground. Cover with tarpaulin (E410) or plastic sheet (E279)



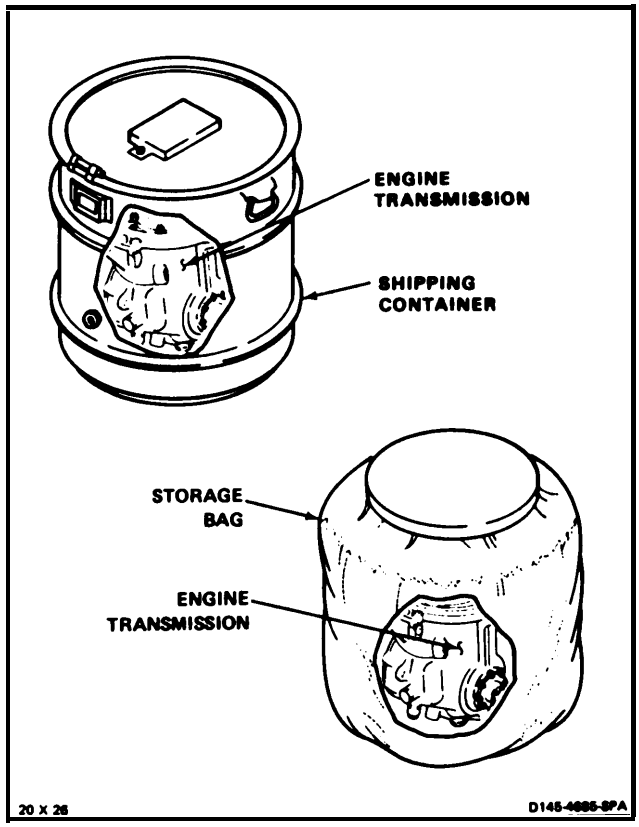
GO TO NEXT PAGE

6-103 PREPARE ENGINE TRANSMISSION FOR SHIPMENT OR STORAGE (Continued)

INSPECT

FOLLOW-ON MAINTENANCE:

None



END OF TASK

6-104 REMOVE ENGINE TRANSMISSION FROM STORAGE 6-104

INITIAL SETUP

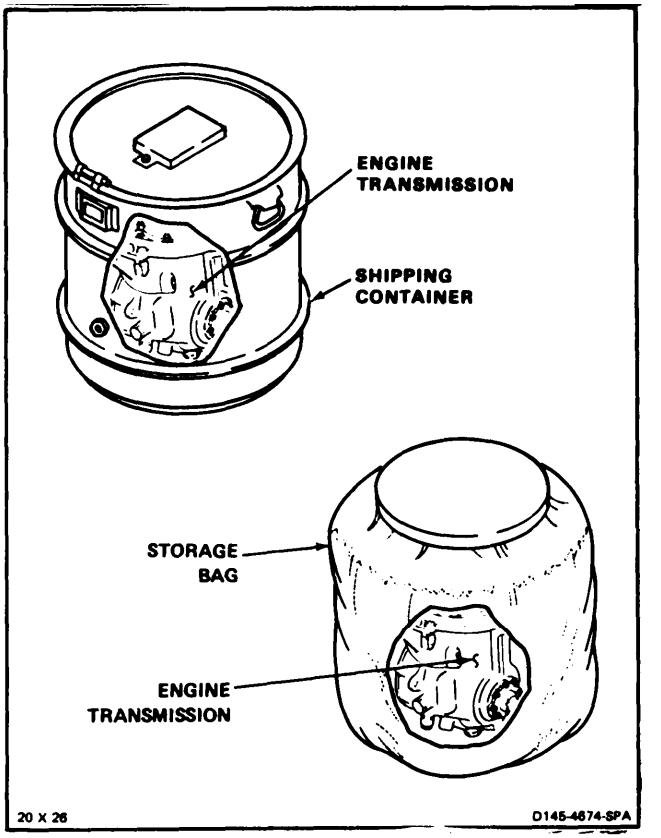
Applicable Configurations:
All

Tools:
Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4962
Handling Sling (T3)
Work Hoist

Materials:
Dry Cleaning Solvent (E162)
Cloths (E120)
Gloves (E186)

Personnel Required:
Medium Helicopter Repairer (2)
Inspector

Equipment Condition:
Off Helicopter Task
Engine Transmission Prepared for Shipment or Storage (Task 6-103)



NOTE

If transmission is stored in storage bag, do steps 1, 3, and 4. If transmission is stored in shipping container, do steps 2 thru 4.

1. **Remove transmission (1) from storage bag (2)** as follows:

   a. **Cut open bag (2).** Remove and discard desiccant bags.

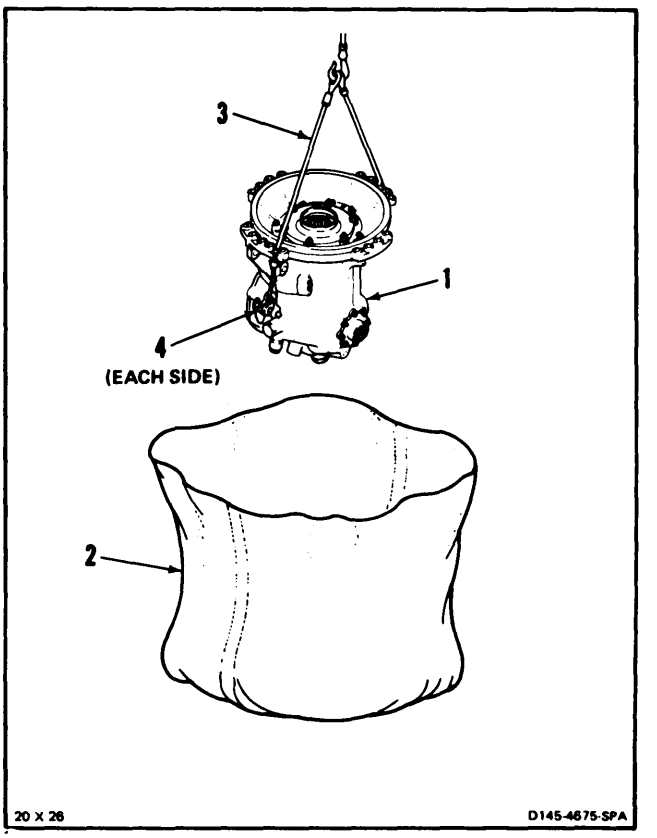
   b. **Install sling (T3)** (3) on lugs (4). Using work hoist, carefully lift transmission (1) from bag (2).

NOTE

Have helper guide transmission when removing from bag.

   c. Set transmission (1) down on bench or workstand. Remove sling (3) from lugs (4).

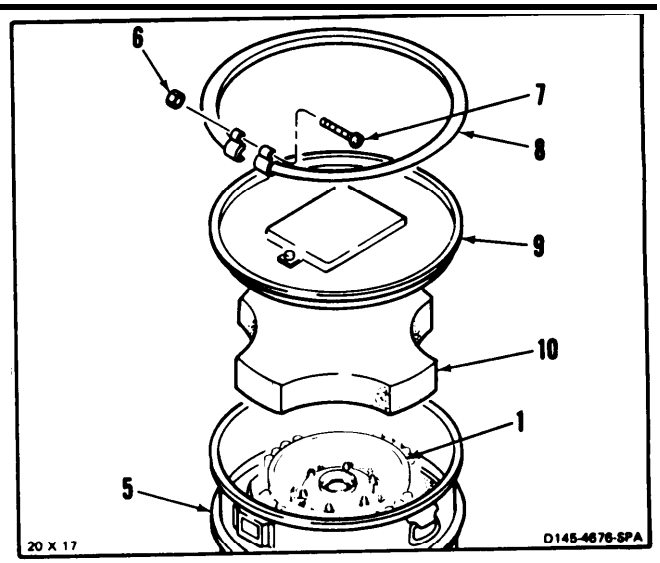
   d. Go to step 3.



GO TO NEXT PAGE

2. **Remove transmission (1) from shipping container (T38) (5)** as follows:

   a. Remove nut (6) and bolt (7) from ring (8). Remove ring and cover (9) from container (5).
   b. Remove cushioning material (10).
   c. Remove and discard desiccant bags.



NOTE

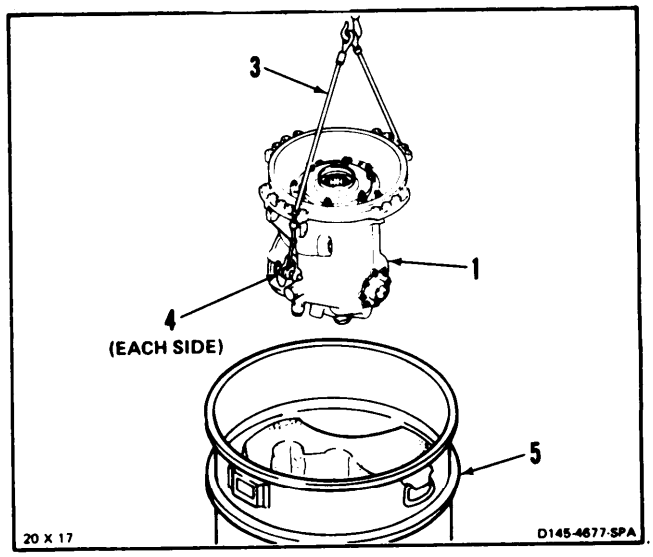
Have helper guide transmission when removing from storage.

d. Install sling (T3) (3) on lugs (4). Using work hoist, carefully lift transmission (1) from container (T38) (5).

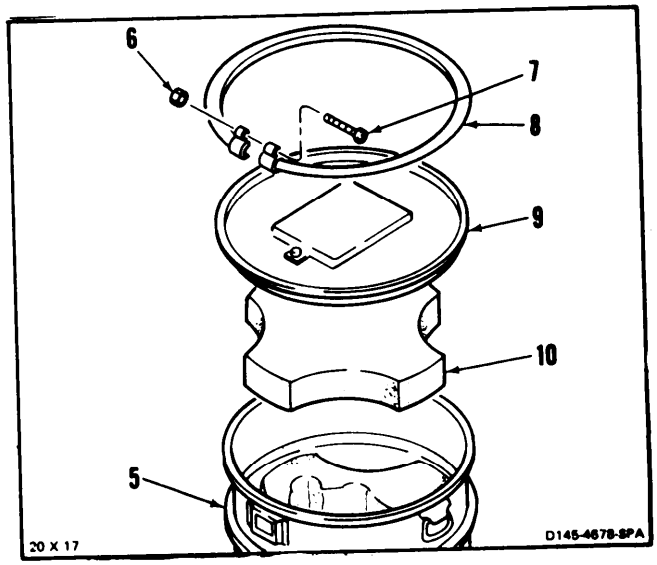
NOTE

Have helper guide transmission when removing from storage.

e. Set transmission down on bench or workstand. Remove sling (3) from lugs (4).



f. Insert cushioning material (10) in container (T38) (5).
g. Install cover (9) and ring (8). Secure with bolt (7) and nut (6).



GO TO NEXT PAGE

6-104 REMOVE ENGINE TRANSMISSION FROM STORAGE (Continued)

3. Remove barrier material from splines (11 and 12) and electrical connector (13).

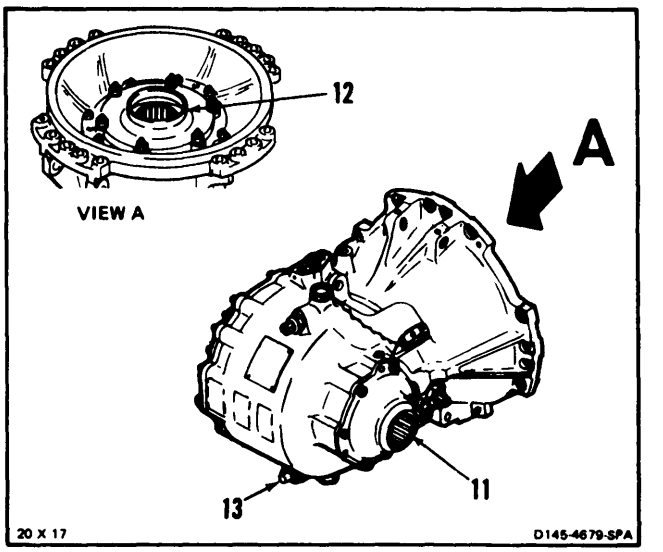
WARNING

Dry cleaning solvent (E162) is flammabla and toxic. It can irritate skin and cause burns. Use only in well-ventilated area, away from heat and open flame. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.

CAUTION

Touching splines with bare fingersa can cause corrosion.

4. **Remove corrosion-preventive compound** from splines (11 and 12). Use cloth (E120) damp with solvent (E162), Wear gloves (E186) and goggles.



INSPECT

FOLLOW-ON MAINTENANCE:

Assemble (build up) transmission (Task 6-105 or 6-106).

END OF TASK

6-105 ASSEMBLE (BUILD UP) LEFT ENGINE TRANSMISSION 6-105

INITIAL SETUP

Applicable Configurations:
All

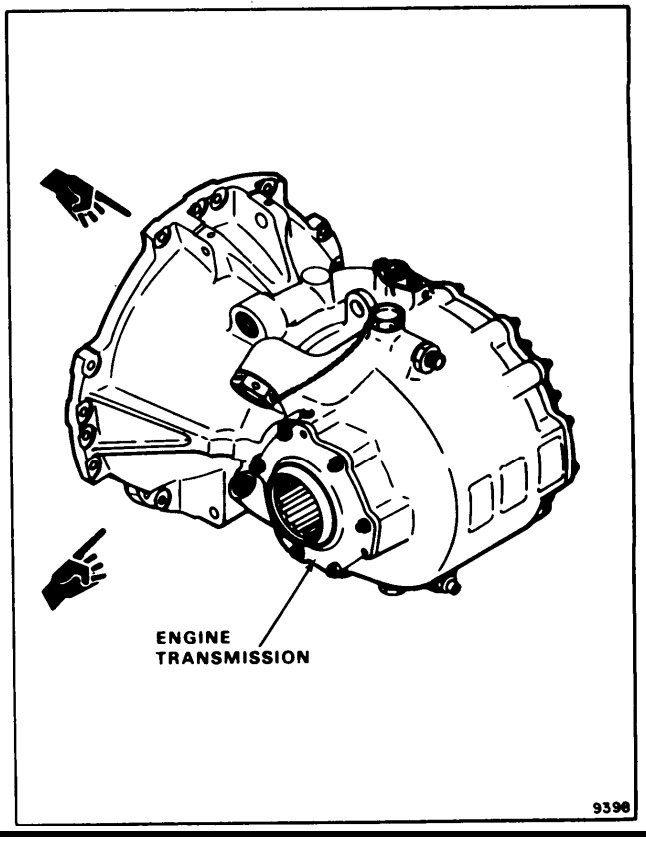
Tools:
Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692
Source of Low-Pressure Compressed Air

Materials:
Dry Cleaning Solvent (E162)
Cloths (E120)
Gloves (E186)

Parts:
Preformed Packings

Personnel Required:
Medium Helicopter Repairer
Inspector

References:
TM 55-1520-240-23P

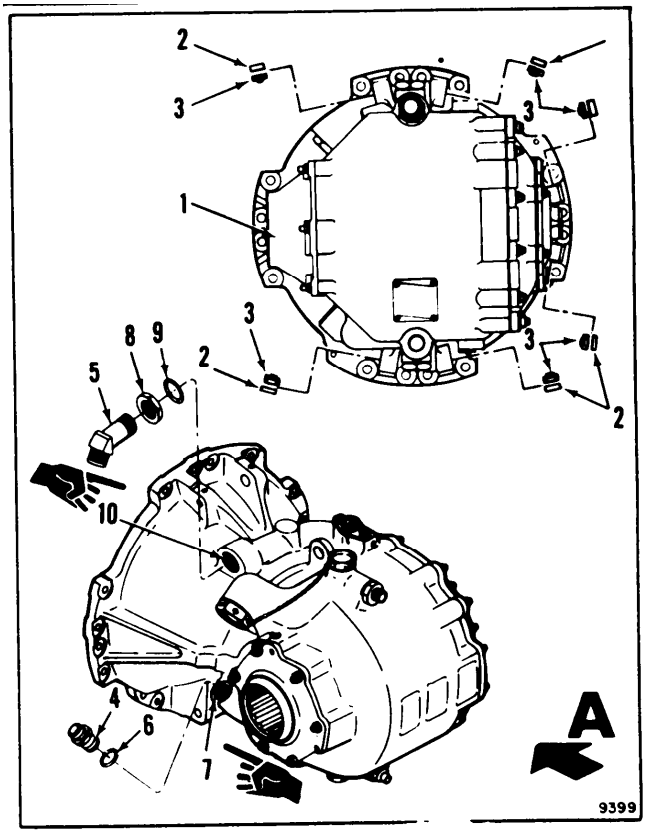


1. Position transmission with output shaft (1) facing left.
2. **Check that barrel nuts (2) and retainers (3) are securely installed.**

WARNING

Dry cleaning solvent (E162) is flammable and gives off toxic fumes. It may irritate skin and cause burns. Use only in well-ventilated area away from heat and open flame. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.

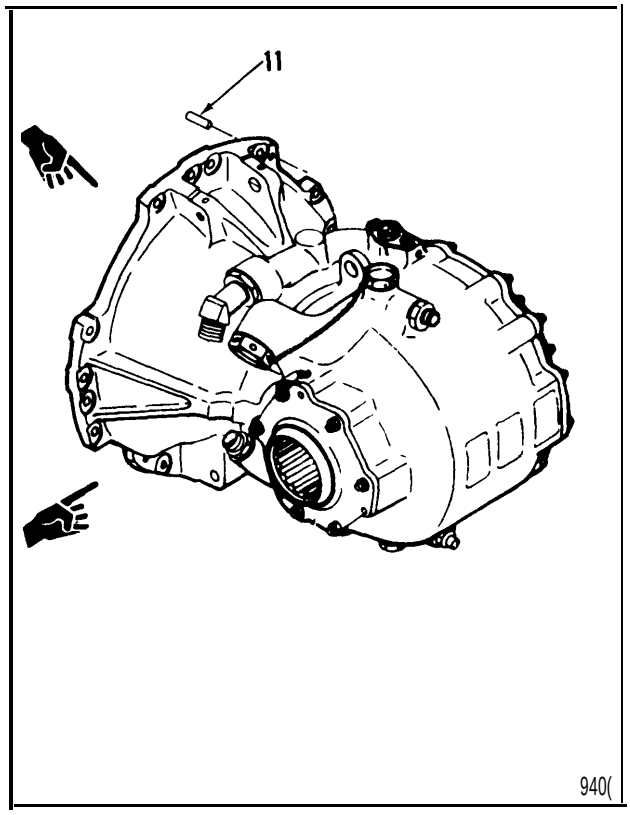
3. Clean union (4) and elbow (5). Use dry cleaning solvent (E162) and cloths (E120). Wear gloves (E186). Dry with low pressure compressed air.
4. **Install union (4)** and packing (6) in port (7).
5. Install nut (8) on elbow (5). **Install elbow** and packing (9) in port (10), with elbow pointing down.



GO TO NEXT PAGE

6. Install dowel pin (11).

INSPECT



FOLLOW-ON MAINTENANCE:

None

END OF TASK

6-106 ASSEMBLE (BUILD UP) RIGHT ENGINE TRANSMISSION

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic Tool Kit,
NSN 5180-00-323-4692
Torque Wrench, 30 to 150 Inch-Pounds
Source of Low Pressure Compressed Air
Modified Socket (Appx E)

Materials:

Dry Cleaning Solvent (E162)
Cloths (E120)
Lockwire (E231)
Gloves (E186)

Parts:

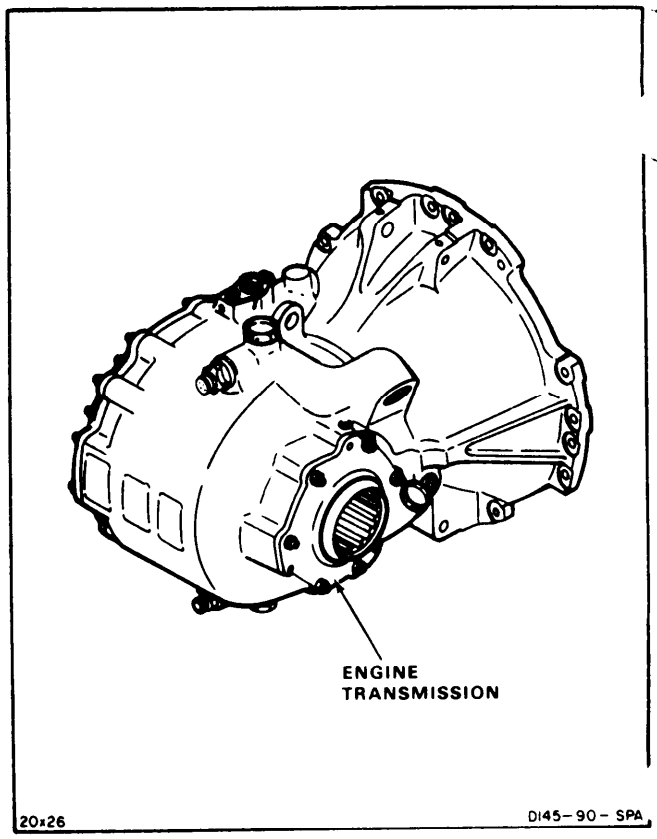
Preformed Packings

Personnel Required:

Medium Helicopter Repairer
Inspector

References:

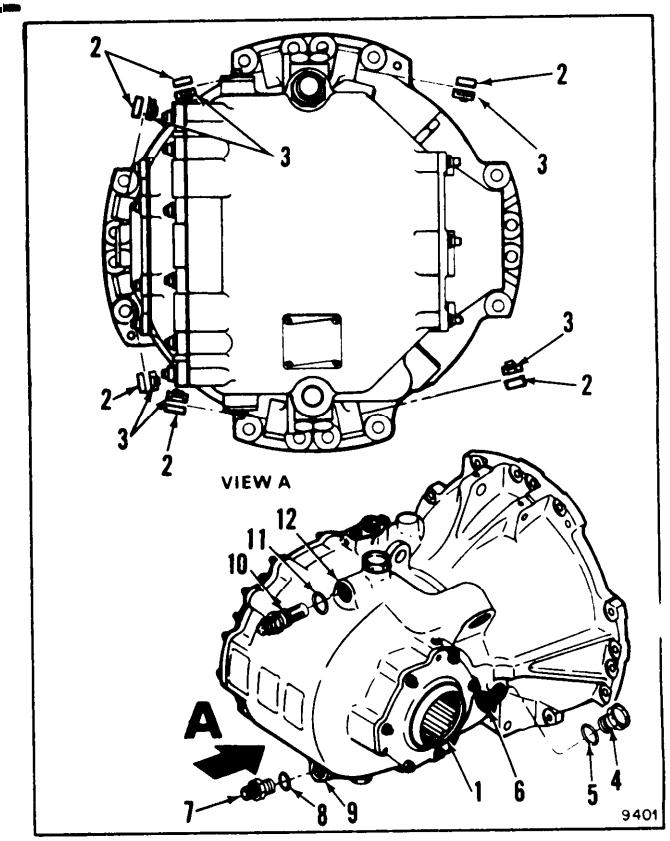
TM 55-1520-240-23P
Task 6-208.1
Task 6-208.2



NOTE

New or rebuilt transmissions are received as left. If a left transmission is received, but a right transmission is being installed, perform steps 1. thru 5. Otherwise begin with step 6.

1. Position transmission with output shaft (1) facing right.
2. **Check that barrel nuts (2) and retainers (3) are securely installed.**
3. Remove lockwire from plug (4). **Remove** plug and packing (5) from port (6).
4. **Remove union (7)** and packing (8) from port (9) at bottom of transmission.
5. **Remove chip detector/temperature sensor (10)** and packing (11) from port (12) at top of transmission. Use modified socket (Appx E).



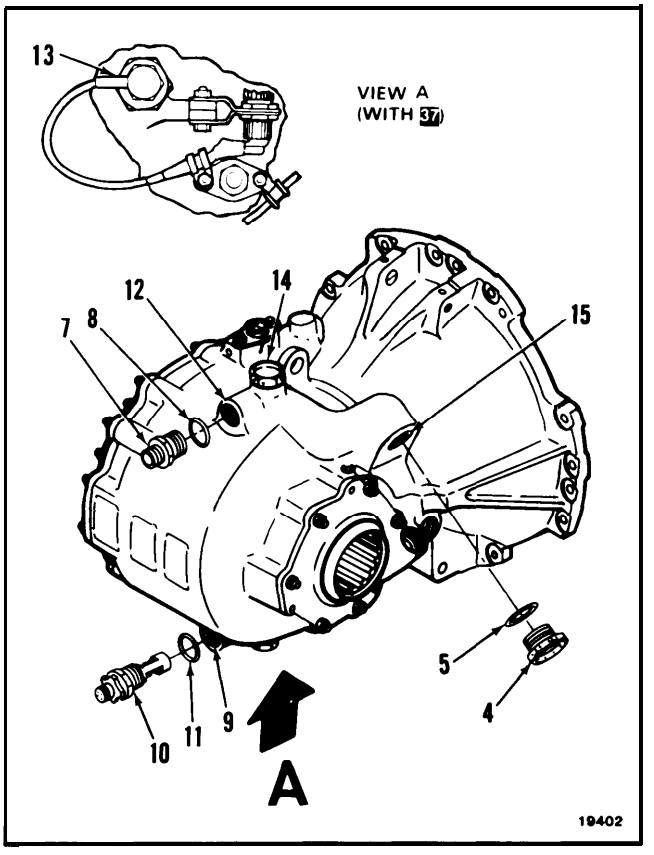
GO TO NEXT PAGE

6. **Install reducer (7)** and packing (8) in port (12). **Torque reducer to 90 inch-pounds.**

6.1. With 37, **remove chip detector assembly (13)** from top of transmission (Task 6-208.1). **Install assembly in place of drain plug (14)** (Task 6-208.2). **Install drain plug at top of transmission.** Torque to 90 inch-pounds.

7. **Install chip detector/temperature sensor (10)** and packing (11) in port (9). Use modified socket (Appx-E57). **Torque chip detector to 90 inch-pounds.** Lockwire chip detector to plug (14) with lockwire (E231).

8. **Install plug (4)** and packing (5) in port (15). Lockwire plug (4) to plug (14) with lockwire (E231).



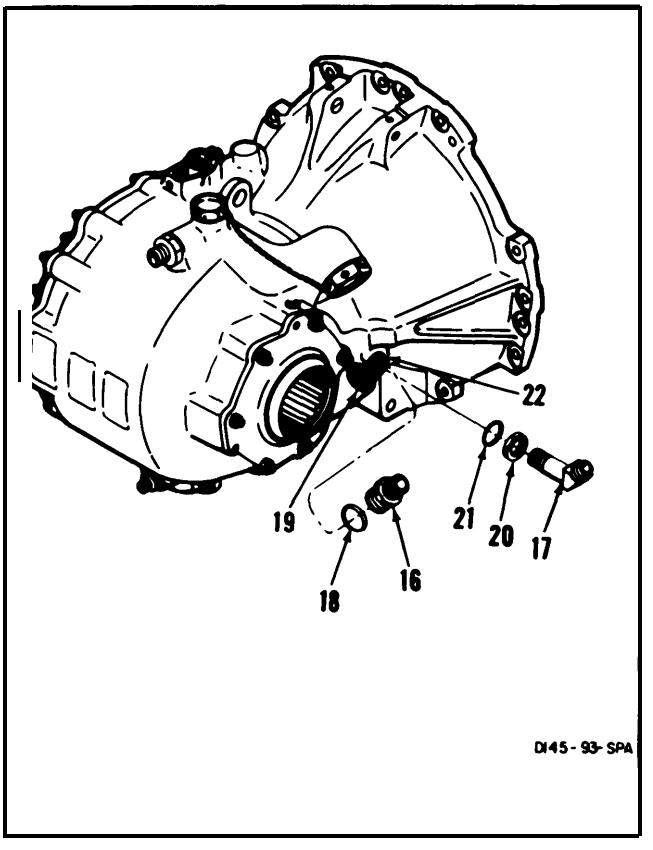
WARNING

Dry cleaning solvent (E162) is flammable and gives off toxic fumes. It may irritate skin and cause burns. Use only in well-ventilated area away from heat and open flame. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.

9. Clean union (16) and elbow (17). Use dry cleaning solvent (E162) and cloths (E120). Wear gloves (E186). Dry with low pressure compressed air.

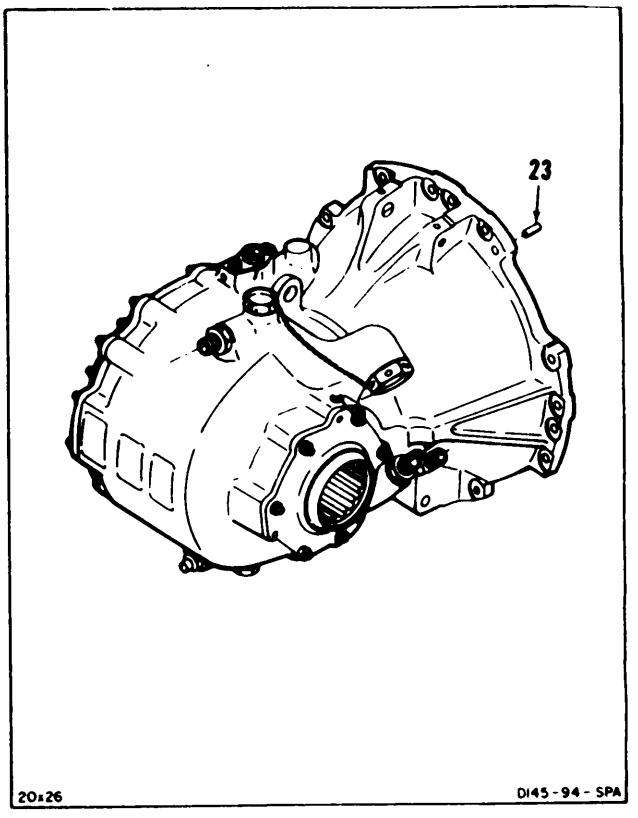
10. **Install union (16)** and packing (18) in port (19).

11. Install nut (20) on elbow (17). **Install elbow** and packing (21) in port (22) with elbow pointing up.



GO TO NEXT PAGE

12. **Install pin (23).**



INSPECT

FOLLOW-ON MAINTENANCE:

None

END OF TASK

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic Tool Kit
NSN 5180-00-323-4692
Torque Wrench, 100 to 750 Inch-Pounds
Sling (T34)
Hoist
Open End Wrench, 1-1/4 inches
Open End Wrench, 1-1/2 inches
Rope Guide Line

Materials:

Oil (E254)
Epoxy Primer (E292)

Parts:

Packing

Personnel Required:

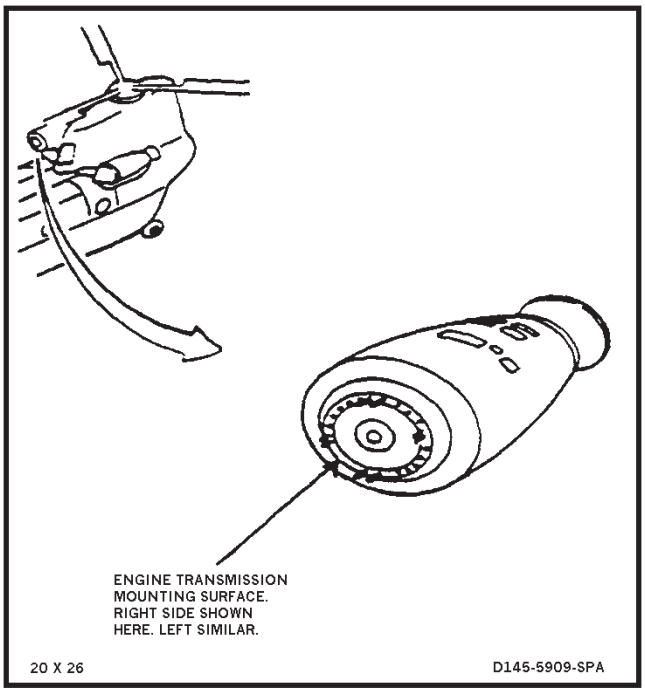
Medium Helicopter Repairer (2)
Inspector

References:

TM 55-1520-240-23P

Equipment Condition:

Engine Transmission Quill Shaft Inspected (Task 6-101)



CAUTION

Do not install engine transmissions serial numbers A11-747 or A11-791.

CAUTION

Do not install engine transmissions that have a prefix letter of 'P' in the input pinion spiral bevel gearshaft (145D6301) and spiral bevel gearshaft (145D6302) serial numbers. These transmissions are considered unserviceable.

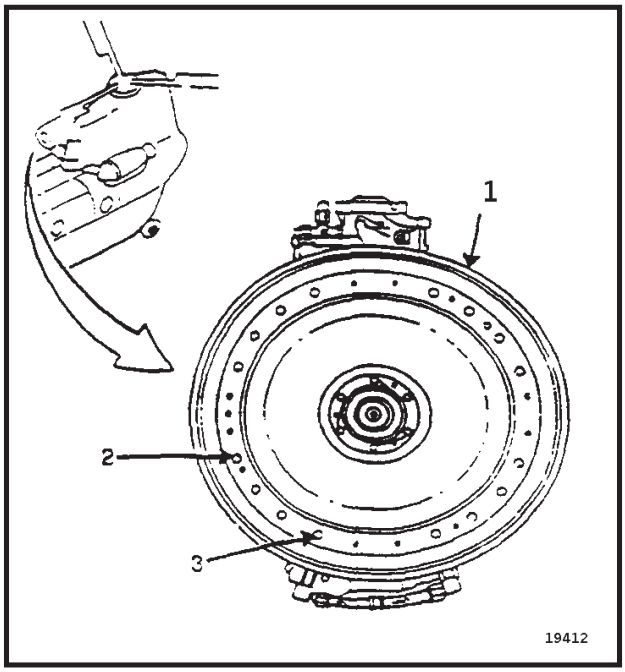
CAUTION

If bolts are not removed from locations (2) or (3) on engine, damage to components can result. Modified engines have cover plates or internal wrenching plugs installed at locations (2) and (3).

NOTE

Procedure is similar to install left or right transmission. Right transmission is shown here. Differences are notes in steps.

Ensure there is a coating of Epoxy Primer (E292) between the mounting holes of the engine transmission and the mounting hardware (8 studs and washers). A coating of Epoxy Primer (E292) shall exist in the mounting holes and the recessed washer area of the engine transmission, over the surface of the eight washers and over the unthreaded surface of the studs. No parts shall be installed while primer is wet.



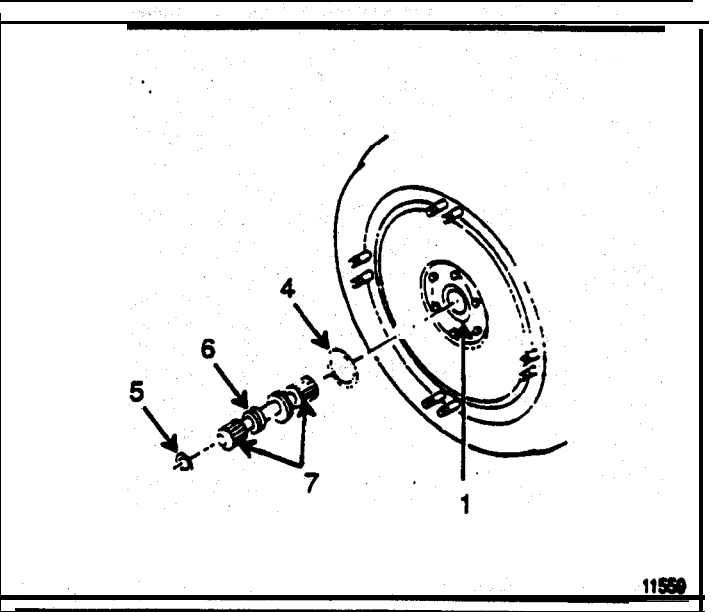
GO TO NEXT PAGE

1. Check to see if there are bolts installed on engine (1) at locations (2) and (3). if so, remove bolt at (2) for right installation. Remove bolt at (3) for left installation.
2. install packing (4) on engine (1).
3. Coat packing (5) with oil (E254). Install packing on quill shaft (6).

CAUTION

Do not use grease on quill shaft spiines. Grease will contaminate transmission oil.

4. Coat splines (7) on both ends of quill shaft (6) with oil (E254). install shaft in engine (1).



11559

5. Connect sling (T34) (8) to lifting lug (9). Connect work hoist hook (10) to sling (T34).

WARNING

Transmission is heavy and can injure personnel if it drops. Transmission must be supported by hoist and moved carefully to prevent injury to personnel.

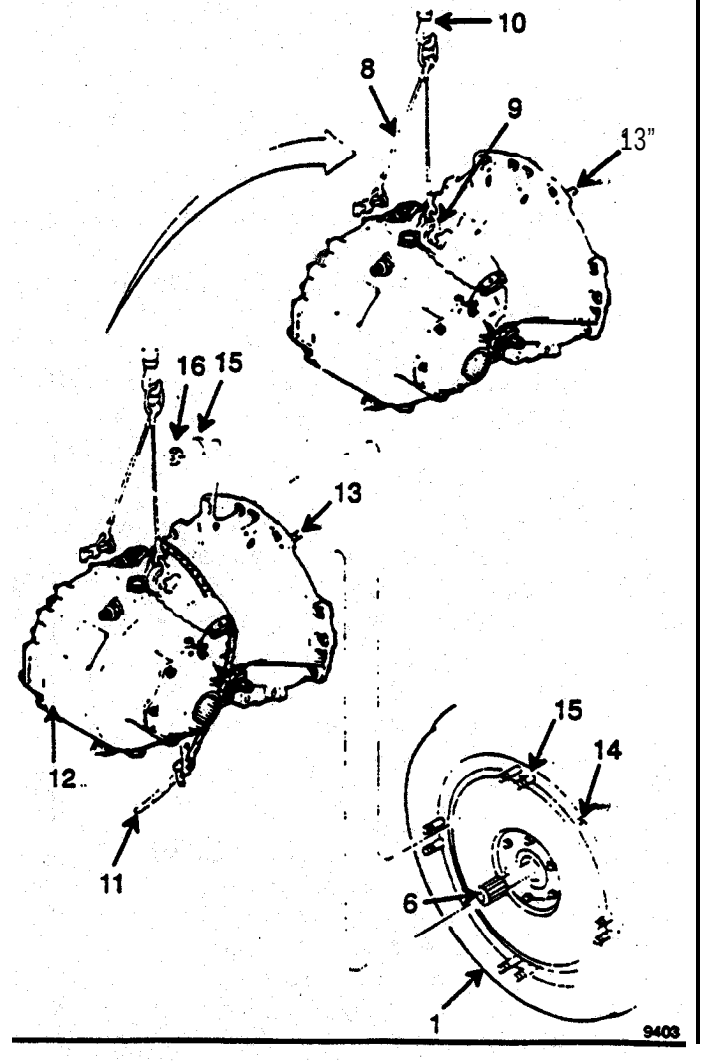
6. Attach guide line (11) to transmission (12).
7. Have helper raise hoist hook (10) to align transmission (12) with engine (1). Use guide line (11) to guide transmission. Align dowel pin (13) with hole (14) in engine.

NOTE

Dowel pin hole is at 1 o'clock position on engine.

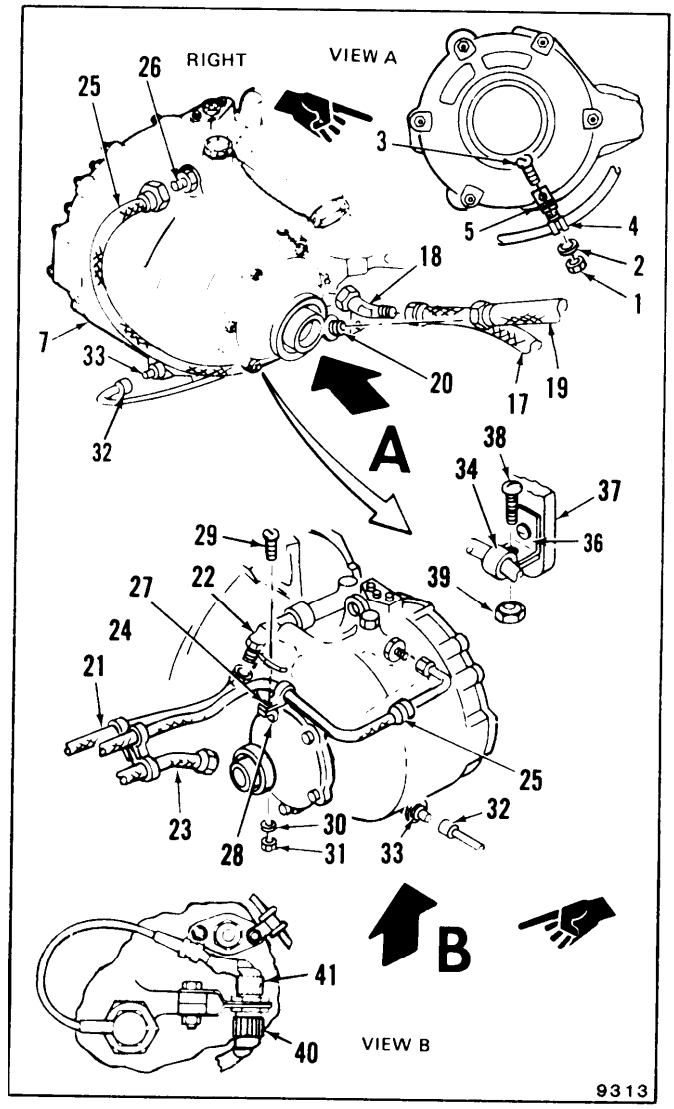
8. install transmission (12) on quill shaft (6) and 8 studs (15). Make sure dowel pin (13) aligns in engine hole (14).
9. Install eight washers (15) and nuts (16). Torque nuts to 315 inch-pound.
10. Remove work hoist hook (10) from sling (T34) (8). Remove sling from lifting lug (9). Remove guide line (11).

GO TO NEXT PAGE



9403

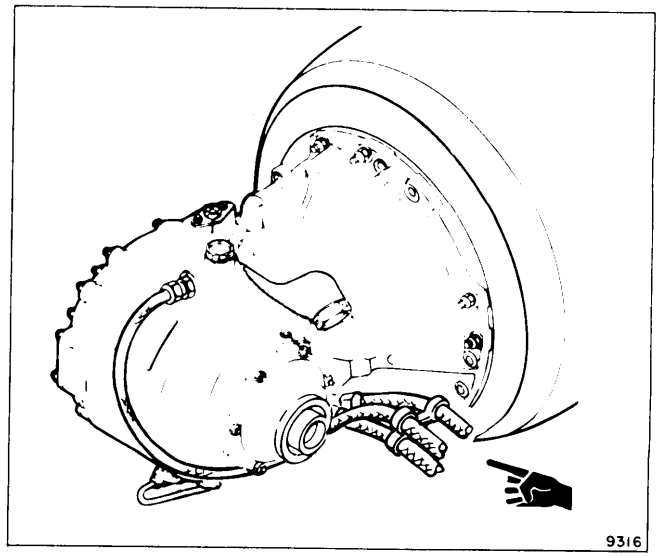
11. **On right installation, connect hose (17)** to elbow (18). **Connect hose (19)** to reducer (20)
12. **On left installation, connect hose (21)** to elbow (22). **Connect hose (23)** to reducer (24).
13. Connect breather hose (25) to reducer (26). Torque to 75 inch-pounds.
14. Install breather hose clamp (27) on clip (28) with screw (29), washer (30), and nut (31).
15. **Connect connector (32)** to temperature and chip detector (33).
16. Position clamp (34) with temperature and chip detector wiring (35) against clip (36) on lower lifting lug (37). Install screw (38) and nut (39).
17. With 37, connect connector (40) to chip detector connector (41).



INSPECT

FOLLOW-ON MAINTENANCE:

Install engine transmission adapter assembly and engine drive shaft (Task 6-32).
Close pylon hinged fairing (Task 2-2).
Install engine transmission fairing (Task 4-73).
Install engine air inlet screen (Task 4-76).
Service engine transmission (Task 1-54).
Perform ground run (TM 55-1520-240-10).



END OF TASK

SECTION VIII
OIL SYSTEMS

6-108 CONTAMINATION ANALYSIS OF FORWARD TRANSMISSION OIL

INITIL SETUP

Applicable Configurations:
All

Tools:
Magnet
Magnifying Glass, 12-Power

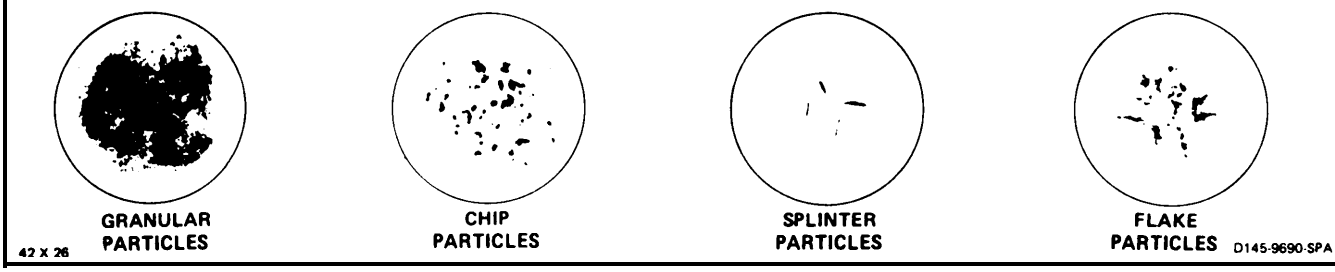
Materials:
None

Personnel Required:
67U30 Inspector

Equipment Condition:
Off Helicopter Task

1. Solid particles found in the transmission oil system may be steel, magnesium, aluminum, silver, copper, bronze, or fiberglass. Examine particles as follows:
   a. Separate steel particles. Use a magnet.
   b. Identify and separate remaining particles by visual inspection.
   c. Examine particles with a magnifying glass to determine shape and condition. Look for marks or discoloration that may indicate shearing, burning, or fatigue.

MATERIAL	DESCRIPTION	ACTION REQUIRED
steel	Fine, hair-like fuzz particles	Normal wear. No action required
	Limited amount of splinters, flakes, or or granular particles	Possible failure. Perform serviceability check (Task 6-112)
	Thin flakes up to 1/16-inch in diameter and 1/4-inch long, maximum of 10 flakes	Perform serviceability check (Task 6-112)
	Massive amount of splinters, flakes, or granular particles	Failure. Replace transmission (Task 6-46 and 6-51)
Aluminum or magnesium	Granular particles	Perform serviceability check (Task 6-112)
Copper, bronze, or silver	Limited amount of granular particles	Possible indication of bearing cage wear. Perform serviceability check (Task 6-112)
	Massive amount of granular particles or chip particles	Failure. Replace transmission (Task 6-46 and 6-51)
Fiberglass	Granular or fibrous particles	Perform serviceability check (Task 6-112)



FOLLOW-ON MAINTENANCE:
None

END OF TASK

6-109 FORWARD TRANSMISSION OIL SYSTEM ALLOWABLE LEAKAGE

INITIAL SETUP

Applicable Configurations:
All

Tools:
Flashlight

Materials:
None

Personnel Required:
Medium Helicopter Repairer

Equipment Condition:
Battery Disconnected (Task 1-39)
Electrical Power Off
Helicopter on Level Surface

WARNING

Prolonged oil leakage can damage finish and create a work hazard by making the fuselage slippery. It can also affect other systems in the helicopter. Therefore, good judgment must be used when determining allowable leakage.

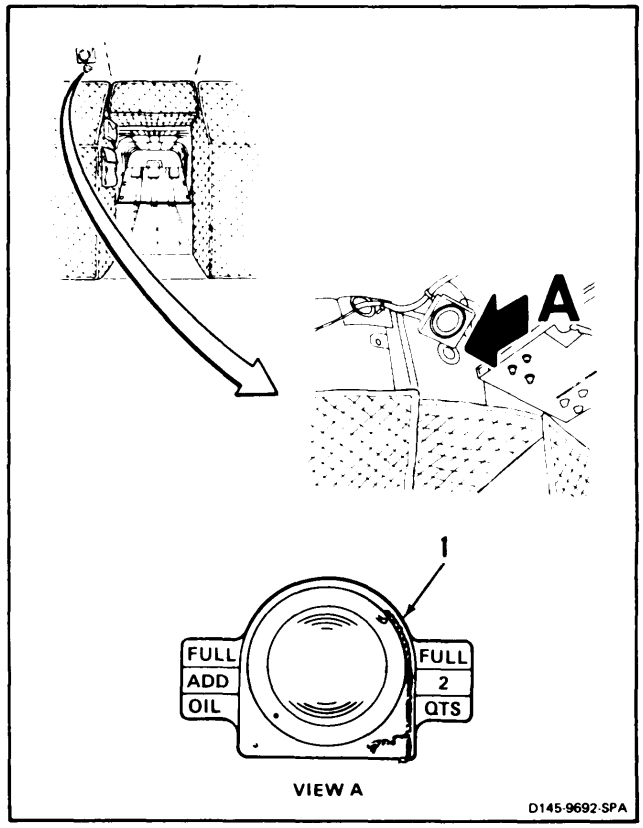
CAUTION

The maximum allowable leakage rate, static or dynamic, from any oil seal in the transmission is 20 drops (one cubic centimeter) per hour. If this limit is exceeded, the cause of the leakage shall be corrected by repair or replacement.

NOTE

If engines have not been operated within the past 30 minutes, perform a 5-minute ground run (TM 55-1520-240-10).

Check sight gage (1) from cockpit to determine oil level. **Oil level shall be between the FULL and ADD OIL lines after a 2 hour flight.**



FOLLOW-ON MAINTENANCE:

Service forward transmission, if needed (Task 1-54).

END OF TASK

6-110 DRAIN FORWARD TRANSMISSION OIL

INITIAL SETUP

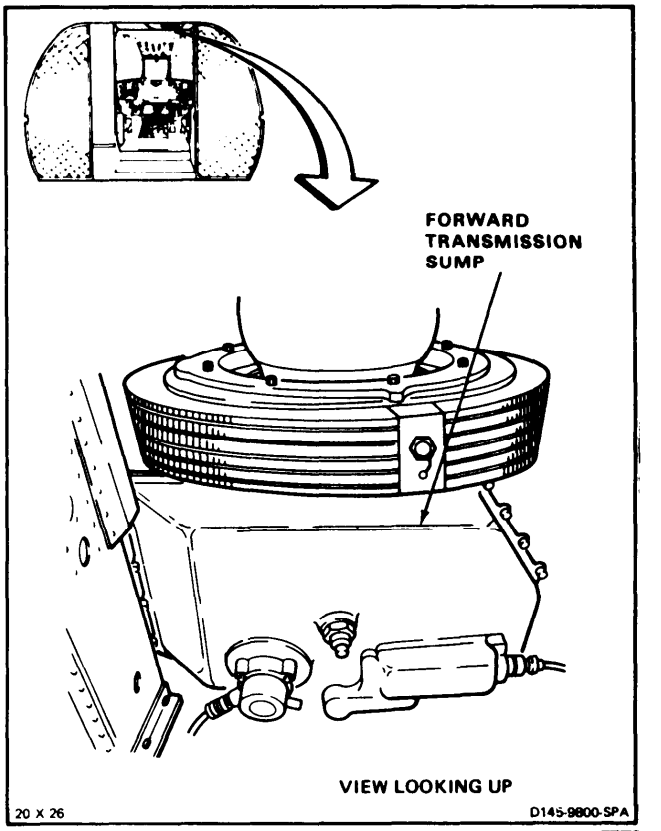
Applicable Configurations:
All

Tools:
Container, 14-Quart (2)
Hose, 3/4-inch ID, 36 Inches Long

Materials:
None

Personnel Required:
Medium Helicopter Repairer

Equipment Condition:
Battery Disconnected (Task 1-39)
Electrical Power Off
Forward Transmission Drip Pan Removed (Task 2-3)



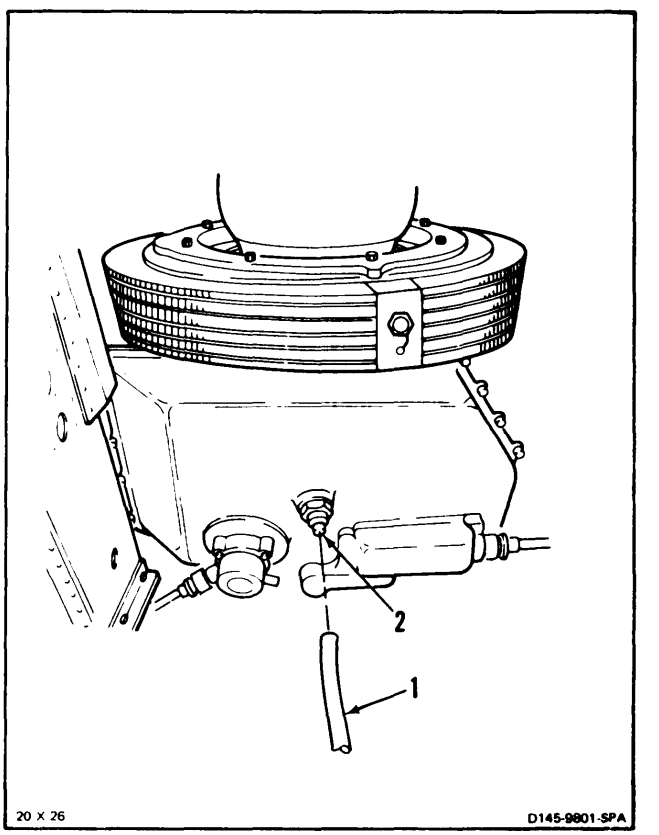
NOTE

Sump holds about 23 quarts of oil.

1. **Connect hose (1)** to drain valve (2). Direct end of hose into container.
2. Push in drain valve (2), twist it, and pull. **Let oil drain** into container.
3. Push in drain valve (2), twist it, and pull down to close. Remove hose (1) from valve.

FOLLOW-ON MAINTENANCE:

Install forward transmission drip pan (Task 2-2).



END OF TASK

6-111 FLUSH FORWARD TRANSMISSION OIL SYSTEM

INITIAL SETUP

Applicable Configurations:
All

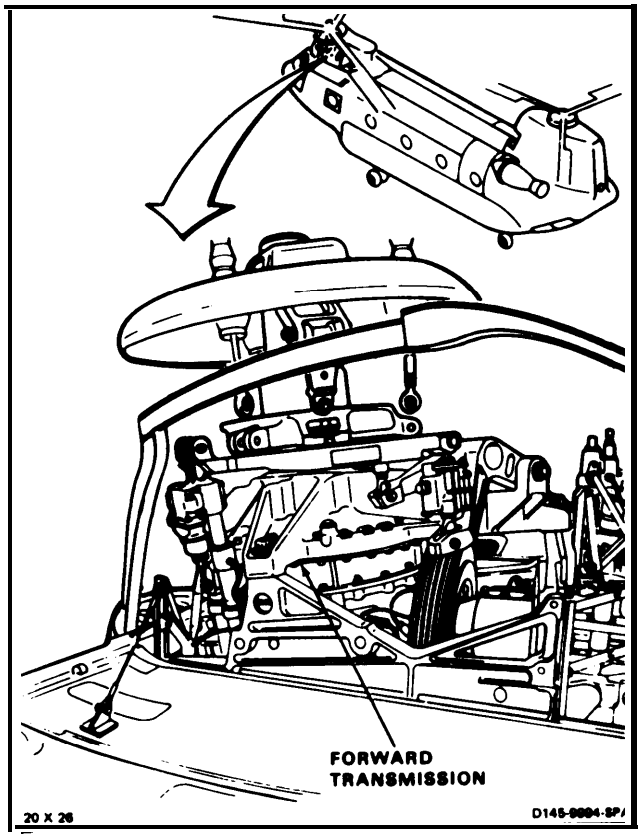
Tools:
Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692

Materials:
None

Personnel Required:
67U10 Medium Helicopter Repairer
100CO Rotary-Wing Aviator (2)

References:
Task 1-54
Task 6-110
Task 6-123
Task 6-129
Task 6-130
Task 6-132
Task 6-133
Task 6-134
TM 55-1520-240-10

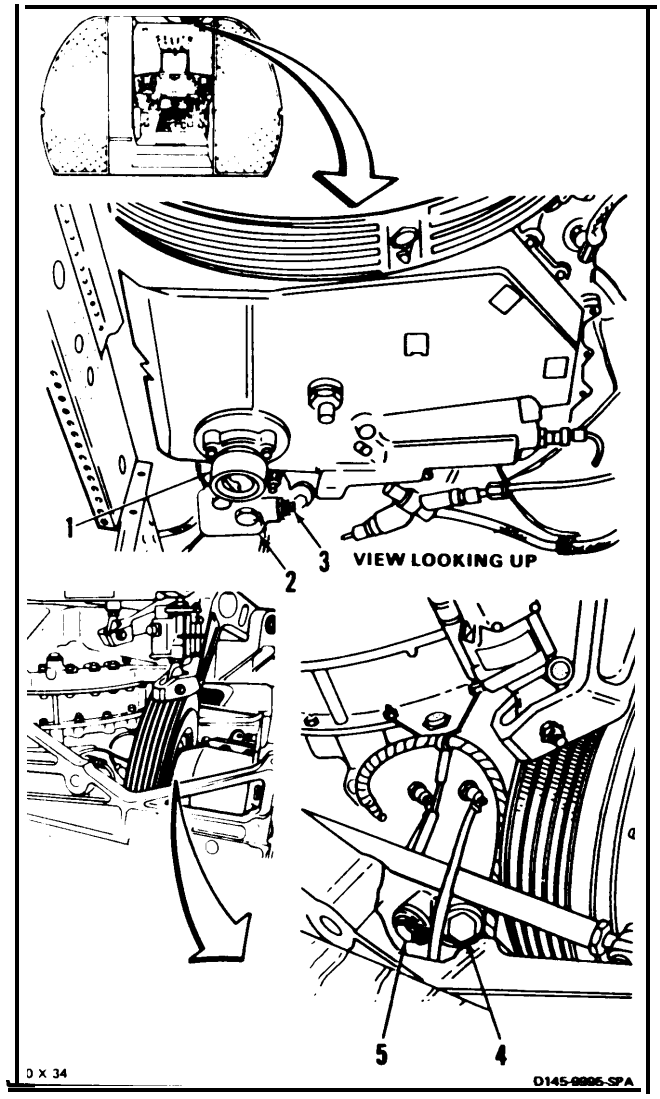
Equipment Condition:
Battery Disconnected (Task 1-39)
Electrical Power Off
Forward Transmission Drip Pan Removed (Task 2-3)



GO TO NEXT PAGE

6-111 FLUSH FORWARD TRANSMISSION OIL SYSTEM (Continued)

1. **Drain** oil from forward transmission (Task 6-110).
2. Remove and **clean debris detection screen** cap (1) (Task 6-133). Install cap (Task 6-1 34).
3. **Replace main oil filter element (2).** Task 6-123). Note position of indicator button (3).
4. If indicator button (3) was extended, **replace inlet screen (4)** (Task 6-130 and 6-132).
5. **Replace auxiliary oil filter (5)** (Task 6-129).
6. **Service forward transmission** with oil (Task 1-54).
7. Have pilot perform ground run (TM 55-1520-240-10). When forward transmission oil temperature stabilizes at normal, have pilot shut down helicopter.
8. **Repeat steps 1 through 6.**



FOLLOW-ON MAINTENANCE:

Install forward transmission drip pan (Task 2-3).

END OF TASK

6-112 FORWARD TRANSMISSION SERVICEABILITY CHECK 6-112

INITIAL SETUP

Applicable Configurations:
All

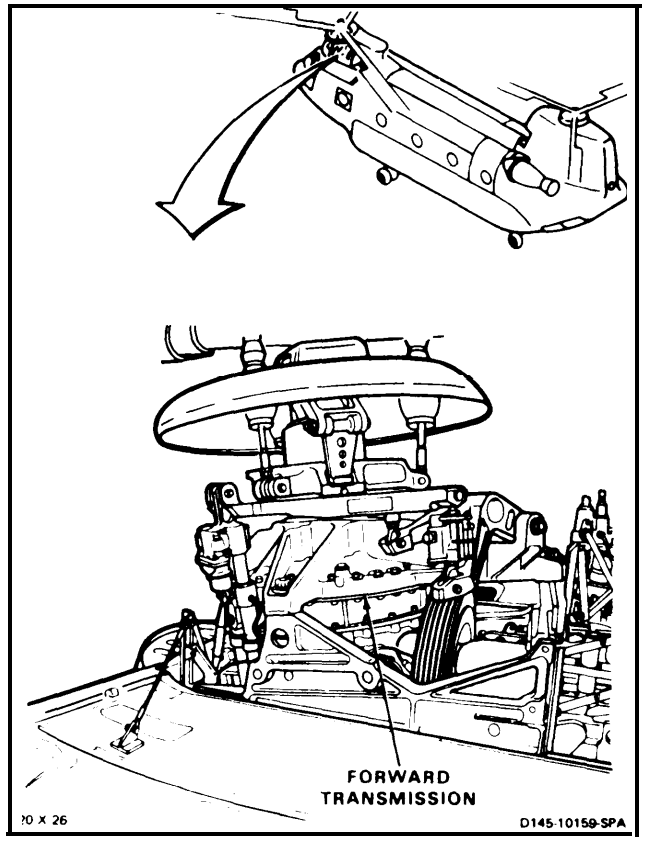
Tools:
Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692

Materials:
Cheesecloth (E112)

Personnel Required:
67U20 Medium Helicopter Repairer
100CO Rotary-Wing Aviator (2)

References:
Task 1-5
Task 6-110
Task 6-111
Task 6-123
Task 6-129
Task 6-130
Task 6-131
Task 6-132
Task 6-133
Task 6-134
Task 6-46
Task 6-51
TM 55-1520-240-10

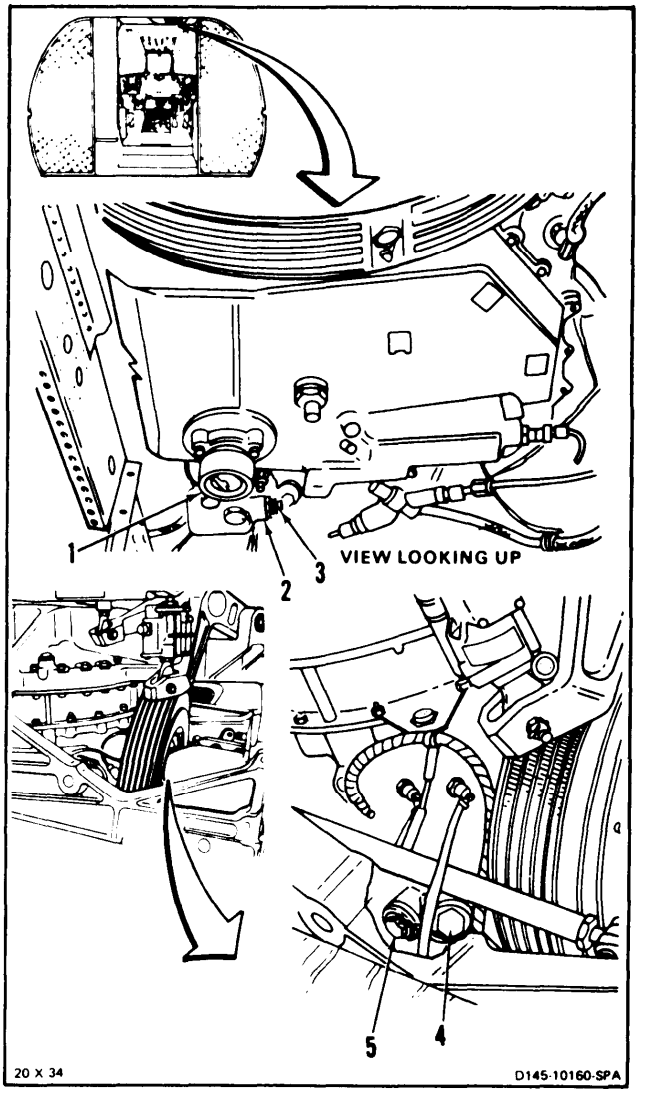
Equipment Condition:
Battery Disconnected (Task 1-39)
Electrical Power Off
Forward Transmission Drip pan Removed (Task 2-3)
Forward Transmission Fairing Left Work Platform Open (Task 2-2)



GO TO NEXT PAGE

6-112 FORWARD TRANSMISSION SERVICEABILITY CHECK (Continued) 6-112

1. **Drain oil through cheesecloth (E112)** or similar filter material (Task 6-110). **Check for debris.**
2. Remove and **clean debris detection screen cap (1)** (Task 6-133). **Install cap** (Task 6-134).
3. **Replace element in main oil filter (2)** (Task 6-123). Note position of indicator button (3). **If button is extended, remove and inspect inlet screen (4)** (Task 6-130 and 6-131). Install screen (6-132).
4. **Replace auxiliary oil filter (5)** (Task 6-129).
5. **Service transmission** (Task 1-54).
6. Have pilot **perform ground run for 1 hour** at normal rotor rpm (TM 55-1520-240-10). If forward transmission oil pressure or temperature changes abnormally or if debris screen or chip detector light comes on, have pilot shut down helicopter. Check for cause.
7. **Drain oil** through cheesecloth (E112) or similar filter material (Task 6-110). **Check for debris.**
8. Remove, inspect, and **clean debris screen cap (1)** (Task 6-133). **Install cap** (Task 6-134).
9. **Remove element in main oil filter (2). If** element contains **debris or** filter **button (3)** was **extended, replace** with new **element** (Task 6-123).
10. **If** element in filter (2) contains **debris and** filter **button (3)** was also **extended,** remove, **inspect,** and install **inlet screen (4)** (Task 6-130, 6-131, and 6-132),
11. **Replace auxiliary oil filter (5)** (Task 6-129).
2. **If** quantity and size of **particles** obtained from oil filters (2 and 4) and cap (1) have not **decreased by at least 30 percent** from original amount, **replace forward transmission** (Task 6-46 and 6-51).



13. If quantity and size of **particles** obtained from oil filters (2 and 4) and cap (1) **have decreased by 30 percent or more, repeat steps 1 thru 11.** If any debris is obtained, replace forward transmission (Task 6-46 and 6-51),

FOLLOW-ON MAINTENANCE:

Close forward transmission fairing left work platform (Task 2-2).

Install forward transmission drip pan (Task 2-3).

END OF TASK

6-112.1 REPLACE FORWARD TRANSMISSION OIL COOLER BYPASS VALVE

INITIAL SETUP

Applicable Configurations:
All

Tools:
Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Container, 2-Quart
Socket, 1 1/2-inch

Materials:
Lockwire (E231)
Oil (E254)
Cloths (E120)

Parts:
Packings (2)

Personnel Required:
Medium Helicopter Repairer
Inspector

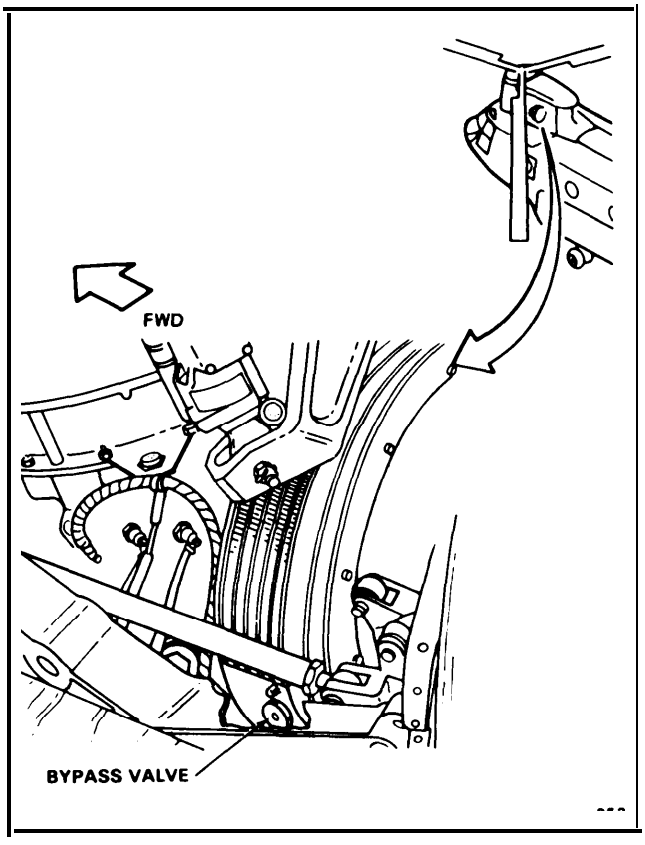
References:
TM 55-1520-240-23P

Equipment Condition:
Battery Disconnected (Task 1-39)
Electrical Power Off
Left Forward Transmission Fairing **Open (Task 2-2)**
Forward Transmission Drip Pan **Removed (Task 2-3)**

General Safety Instructions:

WARNING

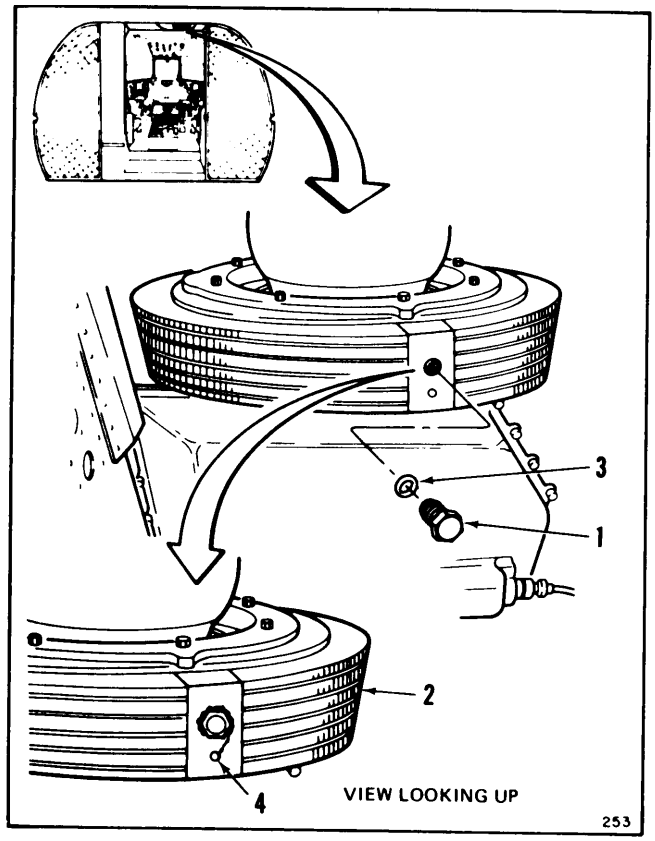
- **Oil (E254) is a skin irritant. If oil gets on skin, wash thoroughly. If oil soaks into clothes, change clothes immediately.**
- **Oil (E254) gives off fumes that can cause injury to personnel. Use oil in a well-ventilated area.**



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DRAIN OIL COOLER

1. Remove lockwire from drain plug (1). Remove plug from oil cooler (2). Drain oil into container.
2. Remove packing (3) from plug (1).
3. Install packing (3) on drain plug (1). **Install drain plug.** Lockwire plug to nipple (4). Use lockwire (E231).

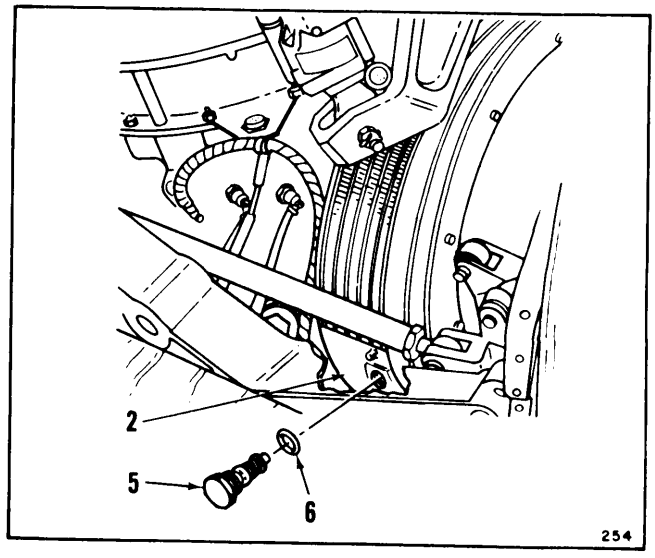


REMOVE VALVE

NOTE

Do not let oil spill on fins of oil cooler. Spilled oil will spray from cooler during transmission operation.

4. Remove lockwire from bypass valve (5). **Remove** valve from oil cooler (2). Use cloths (E120) to absorb oil spillage.
5. Remove packing (6) from valve (5).

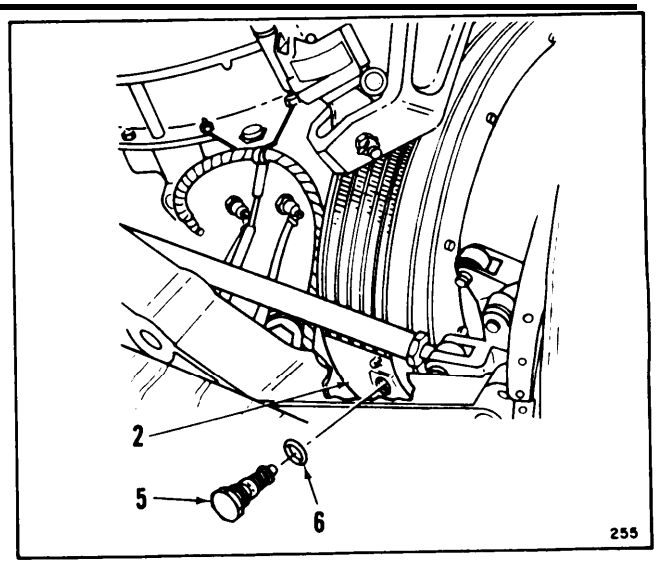


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6-112.1 REPLACE FORWARD TRANSMISSION OIL COOLER BYPASS VALVE (Continued)

INSTALL VALVE

6. Coat packing (6) and thread of bypass valve (5) with oil (E254). **Install packing** on valve.
7. **Install valve (5)** in oil cooler (2). **Torque valve to 80 inch-pounds.**



8. Lockwire valve (5) to nipple (7). Use lockwire (E231).

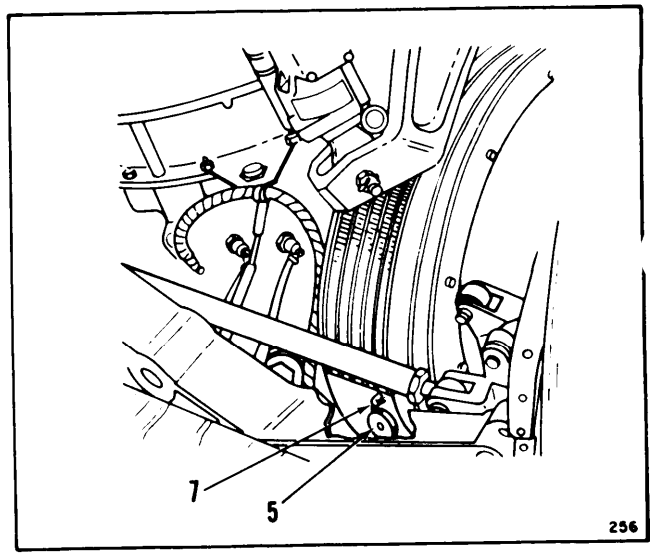
INSPECT

FOLLOW-ON MAINTENANCE:

Install forward transmission drip pan (Task 2-3).

Close left forward transmission fairing (Task 2-2).

Service forward transmission (Task 1-54).



END OF TASK

6-113 REMOVE FORWARD TRANSMISSION OIL COOLER

INITIAL SETUP

Applicable Configurations:
All

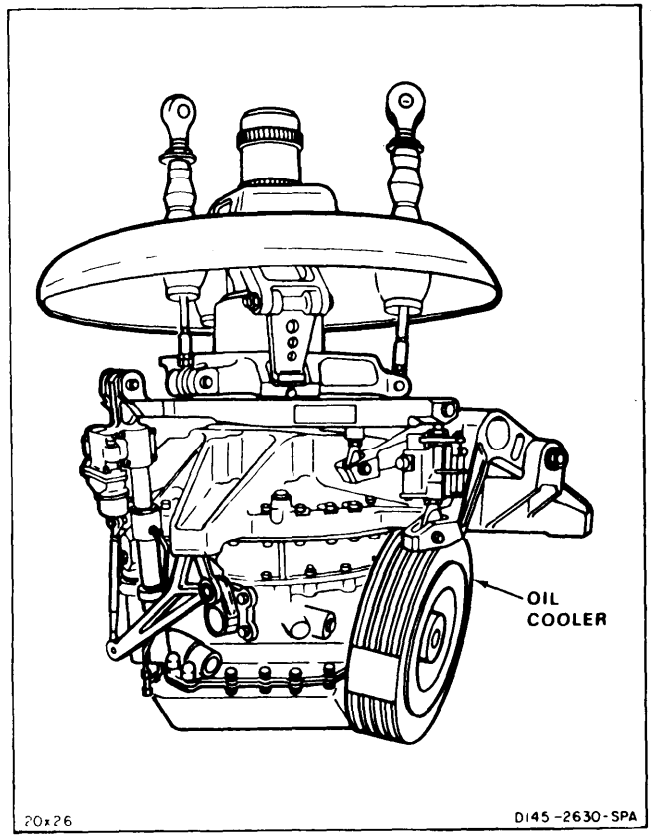
Tools:
Aircraft Mechanic's Tool Kit, NSN 5180-00-323
Container, Two Quart
Wrench, 1 Inch
Rawhide Mallet

Materials:
None

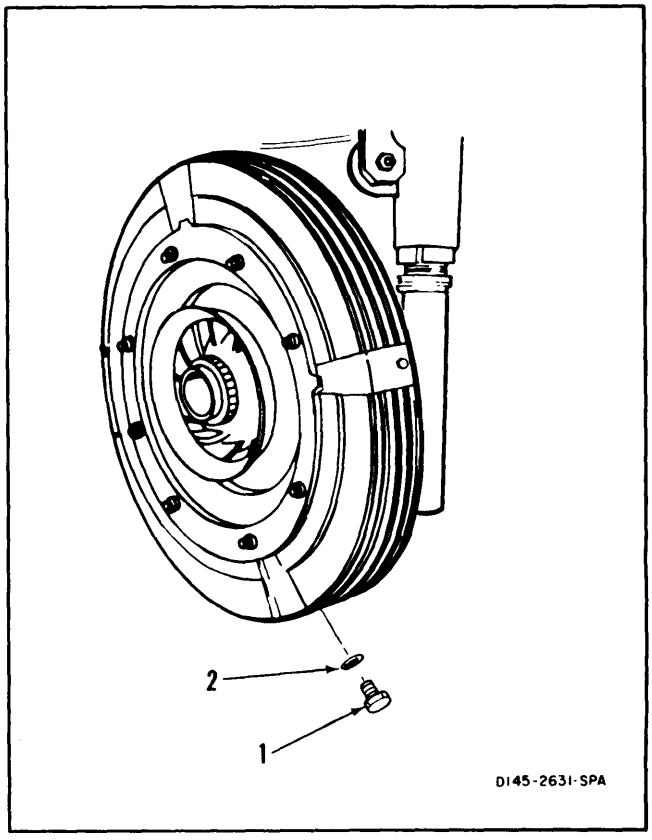
Parts:
Packing

Personnel Required:
Medium Helicopter Repairer (2)

Equipment Condition:
Off Helicopter Task
Forward Transmission Removed (Task 6-46)



1. Remove lockwire from drain plug (1). Remove plug and packing (2). **Drain oil** into container.
2. Install plug (1) and packing (2). **Torque plug** to **80 inch-pounds.**



GO TO NEXT PAGE

6-113 REMOVE FORWARD TRANSMISSION OIL COOLER (Continued)

3. **Remove eight nuts (3)** and washers 4) from studs (5).

CAUTION

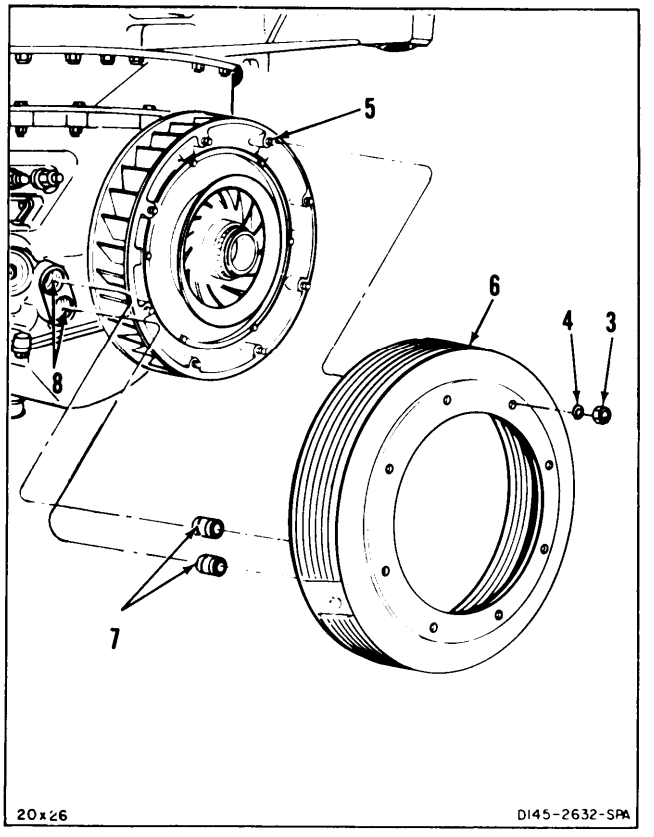
Do not damage oil transfer tubes when removing cooler.

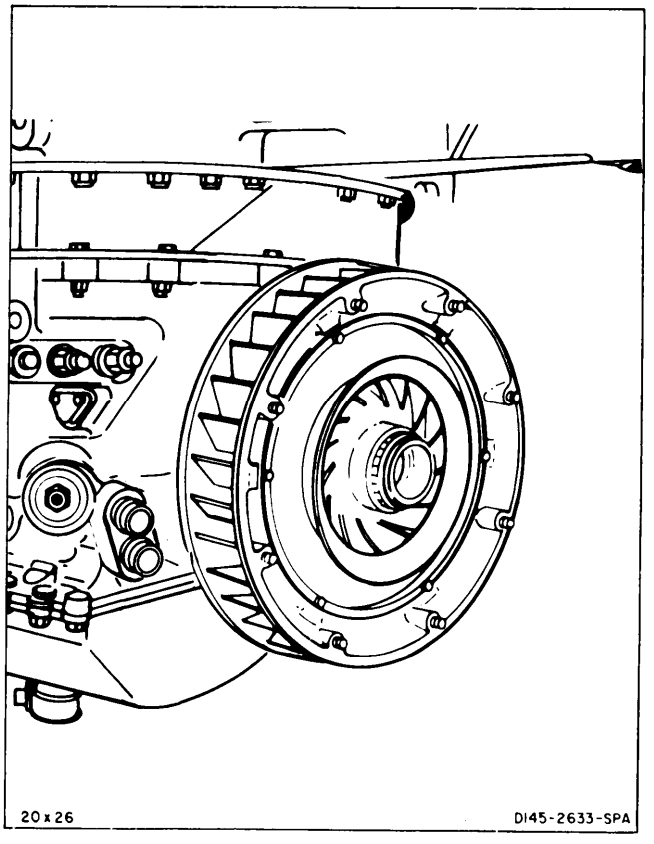
NOTE

Transfer tubes may come off with cooler or stay in transmission.

4. Loosen cooler (6) with rawhide mallet. With aid of helper, **pull cooler straight back** from studs (5). Drain oil into container.

5. If tubes (7) come out with cooler (6), remove tubes from cooler. **Install tubes in transmission ports (8).**





FOLLOW-ON MAINTENANCE:

None

END OF TASK

6-113.1 REPAIR FORWARD TRANSMISSION OIL COOLER OUTSIDE SURFACE

INITIAL SETUP

Applicable Configurations:
All

Tools:
Dial Indicating Depth Gage 643J
Goggles

Materials:
Naphtha (E245)
Emery Cloth (E13) or
Abrasive Paper (E13)
Crocus Cloth (E122)
Cloths (E120)
Gauze Sponges (E184)
Gloves (E186)
Acetic Acid (E21)
Alodine Powder (E65)
Epoxy Primer (E293)
Epoxy Topcoat (E166)

Personnel Required
68D20 Aircraft Powertrain Repairer
68030 Inspector

References:
TM 43-0103
MIL-C-5541
MIL-C-22751

Equipment Condition:
Off Helicopter Task

General Safety Instructions:

WARNING

Naphtha (E245) is combustible and toxic. It can irritate skin and cause burns. Use only with adequate ventilation, away from open flame. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Got medical attention for eyes.

WARNING

Acetic acid (E21) is combustible and toxic. It can irritate skin and cause burns. Avoid inhaling. Use only with adequate ventilation, away from open flame. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.

WARNING

Alodine powder (E65) is an oxidizer. Discard cloths which contain this material in a separate container. If discarded with cloths contaminated with acetone, reek, or other organic solvents, combustion can result. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.

WARNING

Epoxy primer (E293) is flammable and toxic. It can irritate skin and cause burns. Use only with adequate ventilation, away from heat or open flame. Avoid contact with skin, eyes, or clothing. In case of contact, immadiately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.

CAUTION

Do not wear photogray glasses when fluorescent inspecting. They reduce ability to see cracks.

6-113.1 REPAIR FORWARD TRANSMISSION OIL COOLER OUTSIDE SURFACE (Continued] 6-113.1

NOTE

Reparable damage is limited to scratches, nicks, gouges, minor corrosion, and bent fins.

1. **Clean** oil and grease from **damaged area.** Use naphtha (E245) and clean cloths (E120). Wear gloves (E186).
2. **Check** extent and location of **damage** on cooler (1).

NOTE

Dimensions in this step refer to extent of damage after rework.

a. **Depth of damage shall not be more than 0.025 inch.**

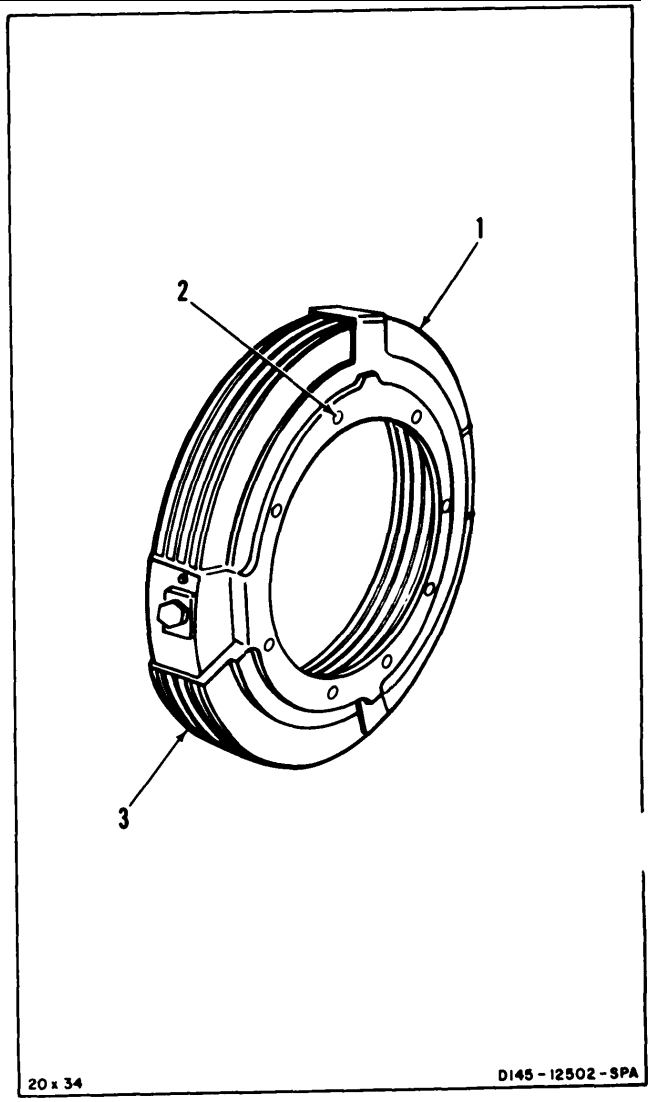
b. **Damage shall not extend over more than one surface or enter any radius.**

c. **Damage shall not be closer than 1.00 inch to any mounting hole (2).**

d. **More than 3 inches of fins (3) shall not be crushed beyond straightening.**

e. **If any fin (3) is bent more than 30 degrees, straighten it.**

3. **Fluorescent inspect** damaged area to check for cracks (TM 43-0103). **There shall be no cracks.**
4. **Blend out damage** with emery cloth (E123) or abrasive paper (E13). Observe limits of step 2.
5. **Smooth blended area** with crocus cloth (E122). Do not leave any sharp edges.



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6-113.1 REPAIR FORWARD TRANSMISSION OIL COOLER OUTS IDE SURFACE (Continued) 6-113.1

6. Acid-etch reworked area as follows:

   a. **Prepare solution of 3 parts acetic acid (E21) in 7 parts water. Wear gloves (E186) and goggles.**

   b. **Swab area with solution for 2 minutes. Use gauze sponges (E184).**

   c. **Rinse area with cold water.**

7. **Fluorescent inspect** reworked area to check for cracks (TM 43-0103). **There shall be no cracks.**

8. **Clean reworked area with naphtha (E245)** and clean cloths (E120). Wear gloves (E186). Let area air dry.

9. **Swab on solution of alodine powder (E65) and water (MIL-C-5541). Use gauze sponges (E184). Swab for 2 to 5 minutes. Rinse area** with cold water and let air dry.

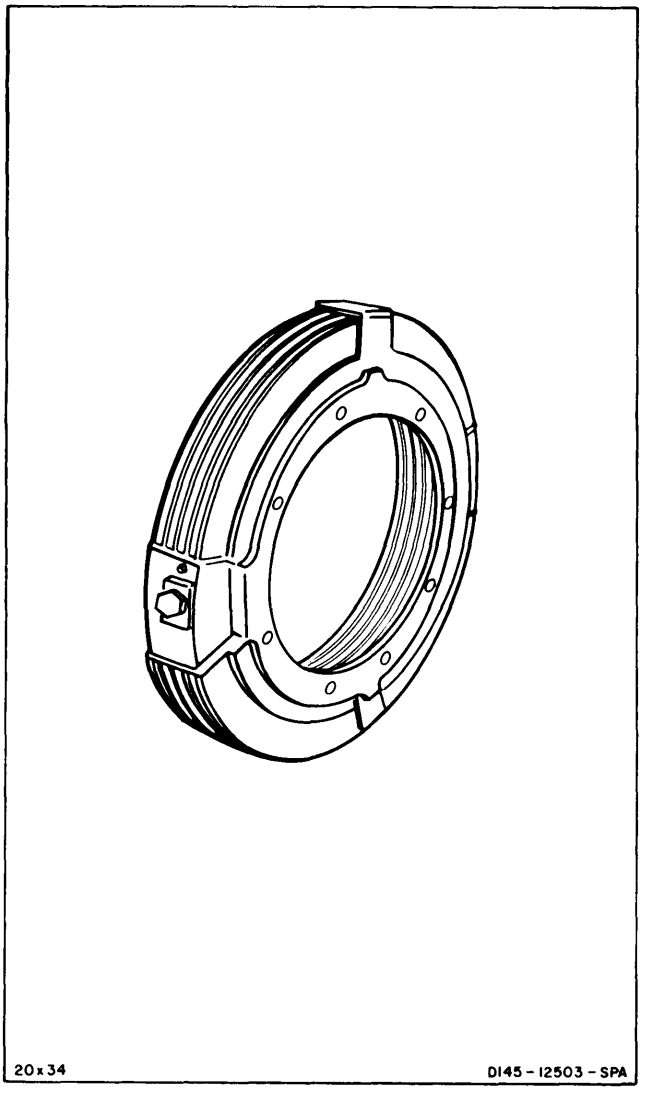
10. **Apply epoxy primer (E293)** to reworked area. Let air dry for 2 hours.

11. **Apply epoxy topcoat (E166)** (MIL-C-22751),

INSPECT

FOLLOW-ON MAINTENANCE:

None



END OF TASK

6-114 INSTALL FORWARD TRANSMISSION OIL COOLER

INITIAL SETUP

Applicable Configurations:
All

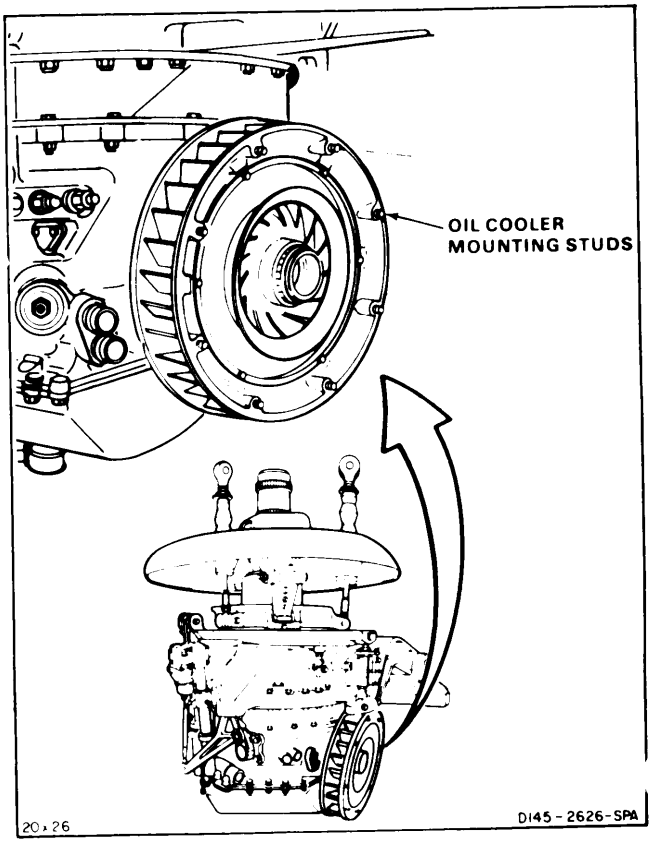
Tools:
Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692
Torque Wrench, 30 to 150 Inch-Pounds
Rawhide Mallet

Materials:
Dry Cleaning Solvent (El 62)
Cloths (E 120)
Gloves (El 86)
Lockwire (E230)

Parts:
Packings

Personnel Required:
67U10 Medium Helicopter Repairer
67U20 Medium Helicopter Repairer
67U30 Inspector

References:
TM 55-1520-240-23P

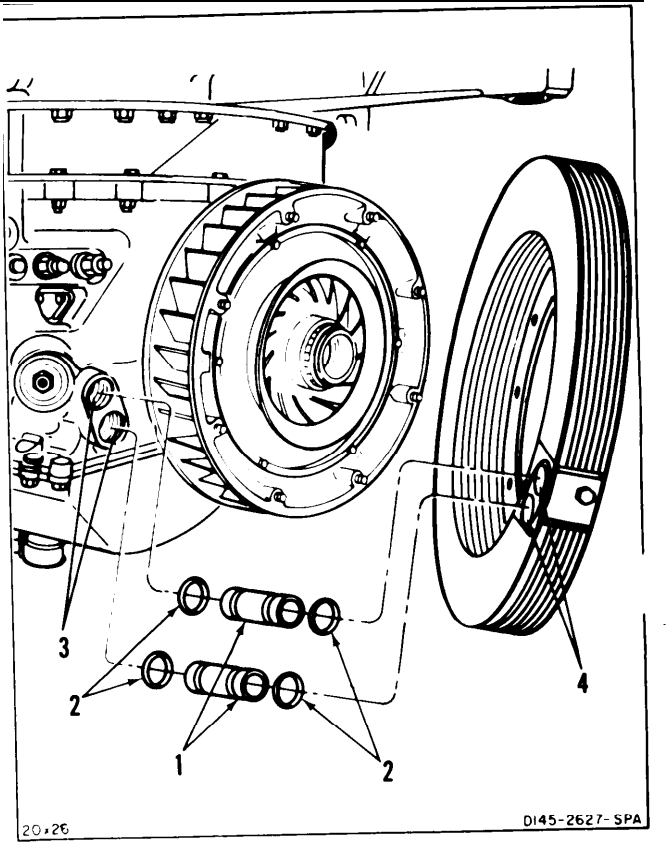


1. **Remove two oil transfer tubes (1) and four packings (2)** from transmission ports (3).

WARNING

Dry cleaning solvent (E162) is flammable and toxic. It can irritate skin and cause burns. Use only in well-ventilated area, away from heat and open flame. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.

2. Clean transmission ports (3) and Cooler ports (4). Use solvent (E162) and cloths (E120). Wear gloves (E186).
3. **Install transfer tubes (1)** and packings (2) in transmission ports (3).



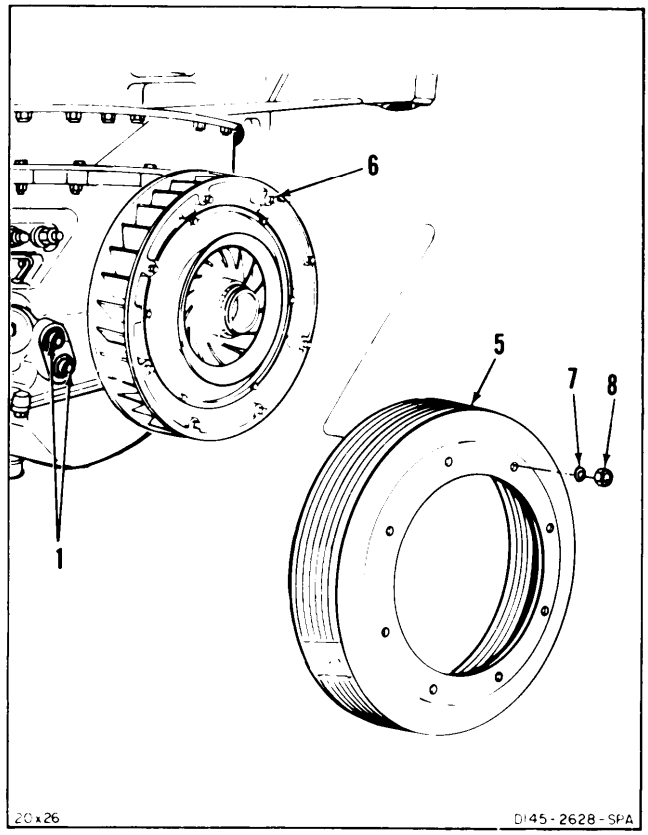
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6-114 INSTALL FORWARD TRANSMISSION OIL COOLER (Continued)

CAUTION

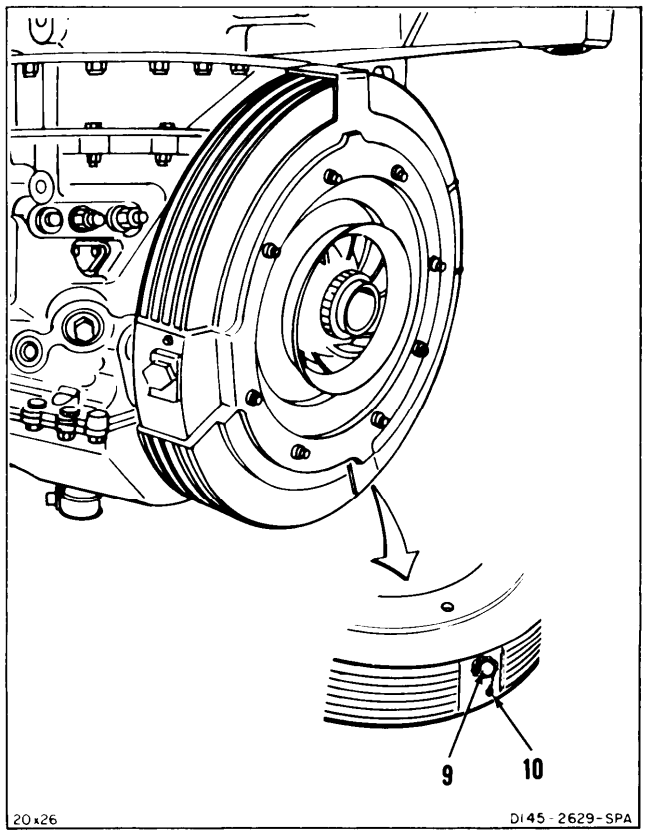
Transfer tubes can be damaged if cooler is not aligned.

4. Align cooler (5) with eight studs (6) and two transfer tubes (1). **Install cooler** on studs and tubes. Use rawhide mallet.
5. Install eight washers (7) and nuts (8) on studs (6). **Torque nuts to 60 inch-pounds.**



6. Lockwire drain plug (9) to nipple (10), if required. Use lockwire (E230).

INSPECT



FOLLOW-ON MAINTENANCE:

None

END OF TASK

6-114.1 REPAIR FORWARD TRANSMISSION OIL COOLER FAN ASSEMBLY

INITIAL SETUP

Applicable Configurations:
All

Tools:
Dial Indicating Depth Gage 643J
Goggles

Materials:
Naphtha (E245)
Emery Cloth (E123) or
Abrasive Paper (E13)
Crocus Cloth (E122)
Cloths (E120)
Gauze Sponges (E184)
Barrier Material (E80)
Masking Tape (E388)
Gloves (E186)
Acetic Acid (E21)
Chromic Acid (E114)
Calcium Sulphate (E91)
Epoxy Primer (E293)
Epoxy Topcoat (E166)

Personnel Required:
68D20 Aircraft Powertrain Repairer
68D30 Inspector

References:
TM 43-0103
MIL-M-3171, Type Vl
MIL-C-22751

Equipment Condition:
Off Helicopter Task

General Safety Instructions:

WARNING

Naphtha (E245) is combustible and toxic. It can irritate skin and cause burns. Use only with adequate ventilation, away from open flame. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.

WARNING

Acetic acid (E21) is combustible and toxic. Chromic acid (E114) is extremely toxic. Both can irritate skin and cause burns. Avoid inhaling. Use only with adequate ventilation, away from open flame. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.

WARNING

Epoxy primer (E293) is flammable and toxic. It can irritate skin and cause burns. Use only with adequate ventilation, away from heat or open flame. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.

CAUTION

Do not wear photogrey glasses when fluorescent inspecting. They reduce ability to see cracks.

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6-114.1 REPAIR FORWARD TRANSMISSION OIL COOLER FAN ASSEMBLY (Continued)

NOTE

Reparable damage is limited to scratches, nicks, gouges and minor corrosion.

1. **Clean** oil and grease from **damaged area.** Use naphtha (E245) and clean cloths (E120). Wear gloves (E186).
2. **Check** location and extent of **damage** on fan parts.

NOTE

Dimensions in this step refer to extent of damage after rework.

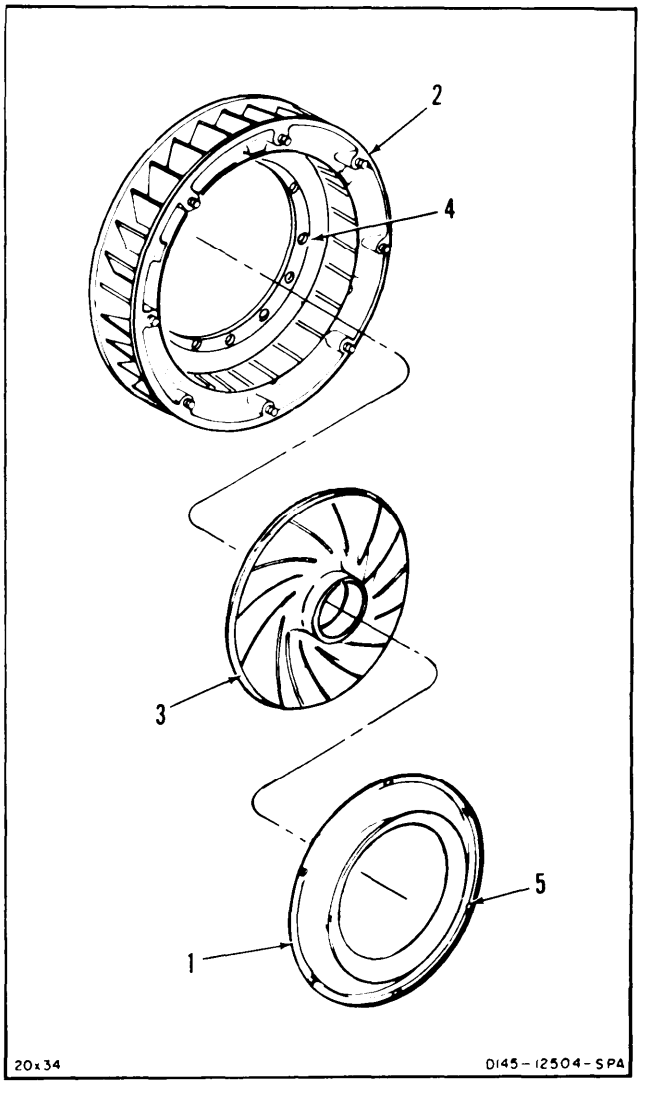
a. **Depth of damage on shroud (1) and diffuser (2) shall not be more than 0.025 inch.**

b. **Depth of damage on impeller (3) shall not be more than 0.015 inch. There shall be no more than four damaged areas on one impeller blade.**

c. **Damage shall not extend over more than one surface or enter any radius.**

d. **Damage shall not be closer than 1.00 inch to any mounting hole (4).**

3. **Fluorescent inspect damaged area** to check for cracks (TM 43-0103). **There shall be no cracks.**
4. **Blend out damage** with emery cloth (E123) or abrasive paper (E13). Observe limits of step 2.
5. **Smooth blended area** with crocus cloth (E122). Do not leave any sharp edges.



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6-114.1 REPAIR FORWARD TRANSMISSION OIL COOLER FAN ASSEMBLY (Continued)

6. Acid-etch reworked area as follows:

   a. **Prepare solution of 3 parts acetic acid (E21) in 7 parts water. Wear gloves (E186) and goggles.**

   b. **Swab area with solution for 3 minutes. Use gauze sponges (E184).**

   c. **Rinse area with cold water.**

7. **Fluorescent inspect** reworked area to check for cracks (TM 43-0103). **There shall be no cracks.**

8. **Clean** reworked area **with naphtha (E246)** and clean cloths (E120). Wear gloves (E186). Let area air dry.

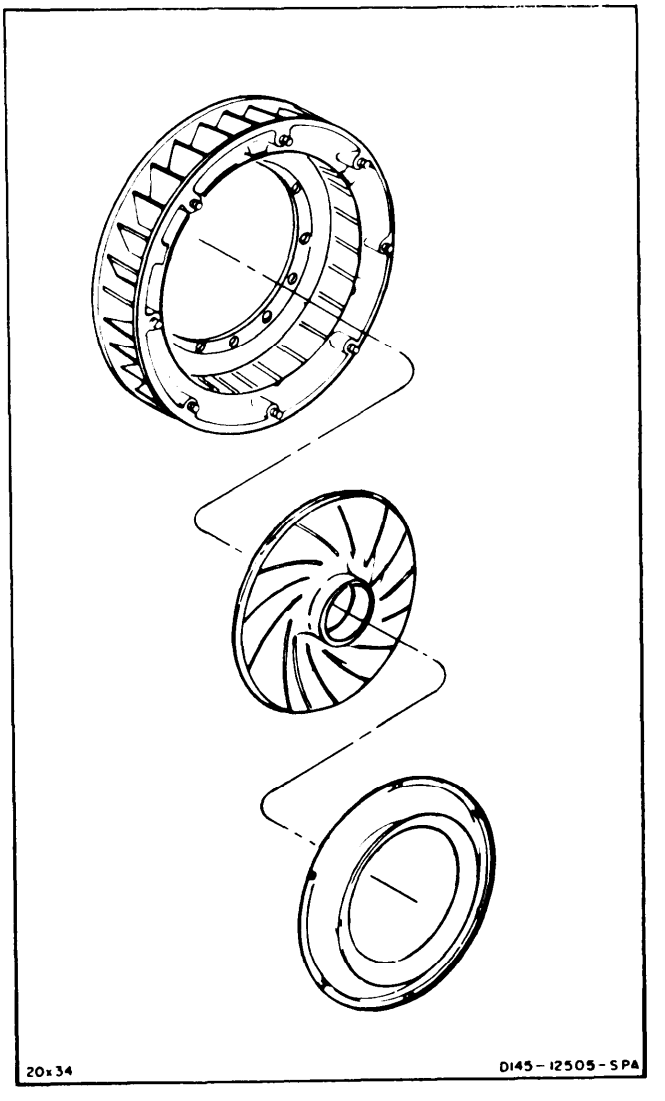
9. **Swab on solution of chromic acid (E114) and calcium sulphate (E191) (MIL-L-3171, Type W). Swab until metal becomes dull gold to brown. Use gauze sponges (E184). Rinse area with cold water and let air dry.**

10. **Apply epoxy primer (E293)** to reworked area. Let air dry for 12 hours.

11. **Apply epoxy topcoat (E166)** (MIL-C-22751).

FOLLOW-ON MAINTENANCE:

None



END OF TASK

6-115 REMOVE FORWARD TRANSMISSION OIL COOLER SHROUD

INITIAL SETUP

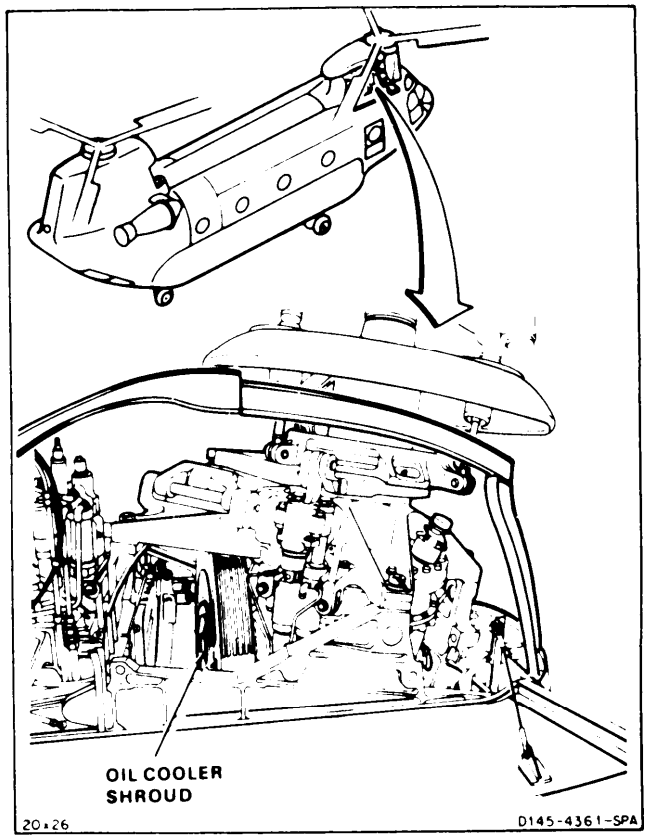
Applicable Configurations:
All

Tools:
Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692

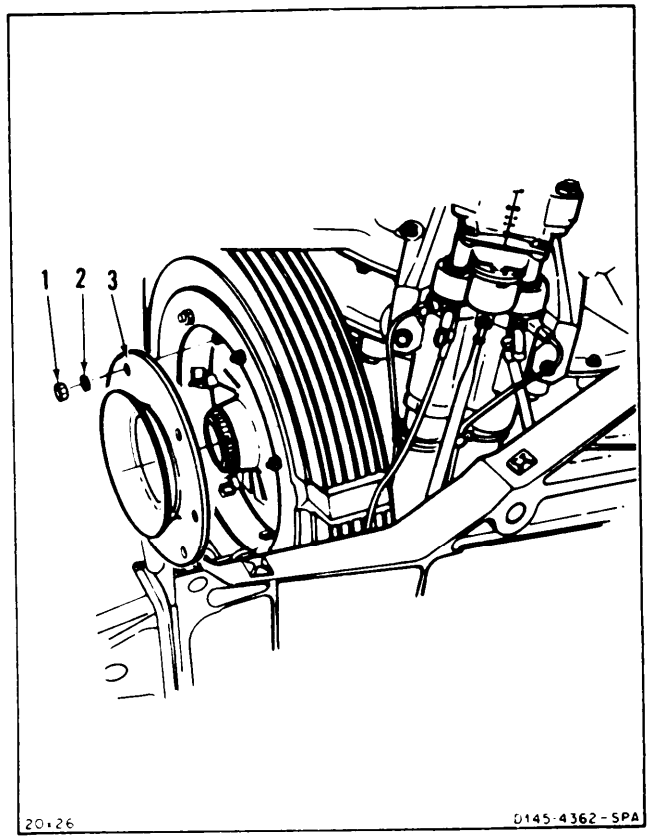
Materials:
None

Personnel Required:
67U10 Medium Helicopter Repairer

Equipment Condition:
Battery Disconnected (Task 1-39)
Electrical Power Off
Forward Transmission Fairing Open (Task 2-2)
Oil Cooler Air Inlet Duct Removed (Task 6-121)
No. 1 and No. 2 Drive Shafts Removed (Task 6-2 and 6-3)



1. Remove SIX nuts (1) and washers (2) from around shroud (3).
2. **Remove shroud (3).**



FOLLOW-ON MAINTENANCE

None

END OF TASK

6-116 INSTALL FORWARD TRANSMISSION OIL COOLER SHROUD

INITIAL SETUP

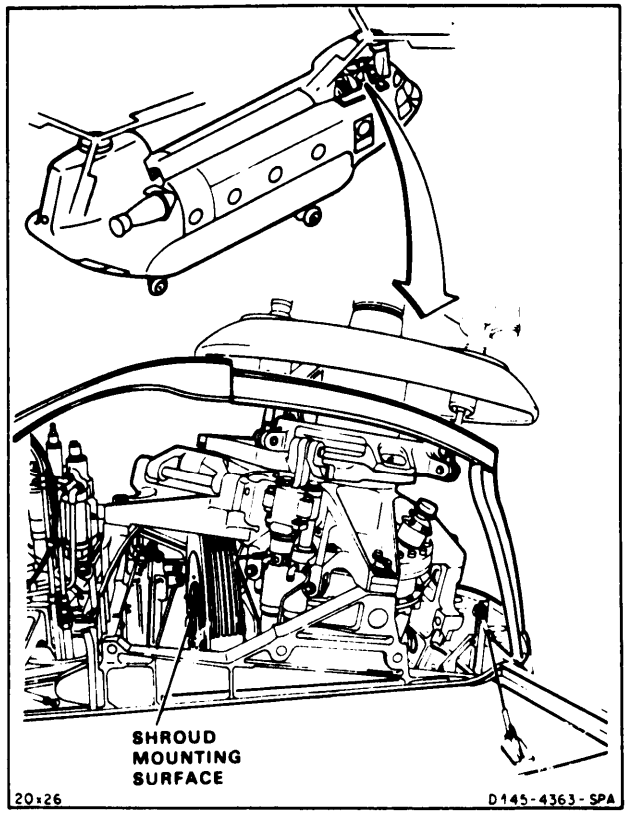
Applicable Configurations:
All

Tools:
Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692
Torque Wrench, 30 to 150 Inch-Pounds

Materials:
None

Personnel Required:
67U10 Medium Helicopter Repairer
67U30 Inspector

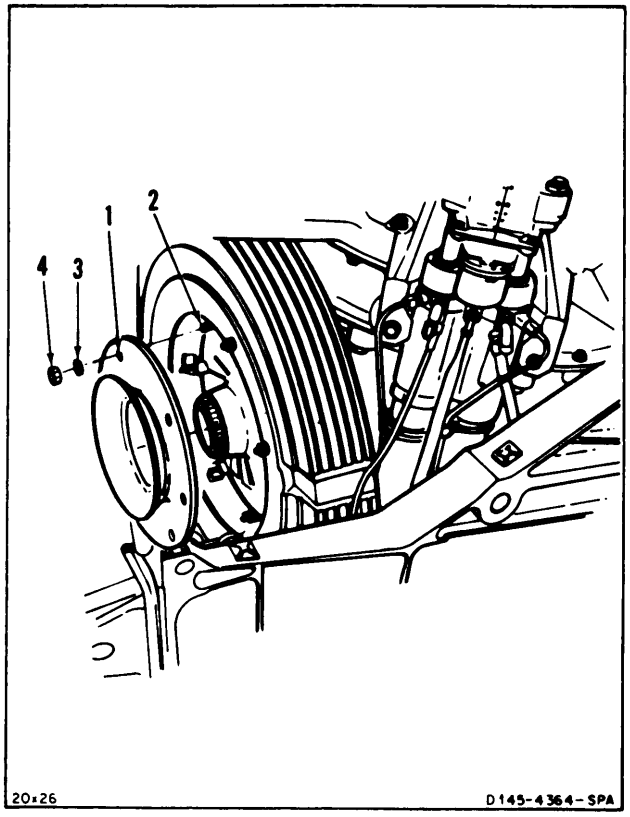
References:
TM 55-1520-240-23P



NOTE

Fan set shroud P/N 145DS106-7 (723104A), impeller P/N 145DS106-8 (723102A), and diffuser P/N 145DS106-9 (730737) manufactured by Sundstrand must be used as a set and the parts are not individually interchangeable with the equivalent fan set shroud P/N 145DS106-11 (40926-1), impeller P/N 145DS106-12 (40927-1), and diffuser P/N 145DS106-13 (40928-1) manufactured by Noah Howden.

1. **Install shroud (1)** on six studs (2).
2. **Install six** washers (3) and **nuts, (4). Torque nuts to 60 inch-pounds.**



INSPECT

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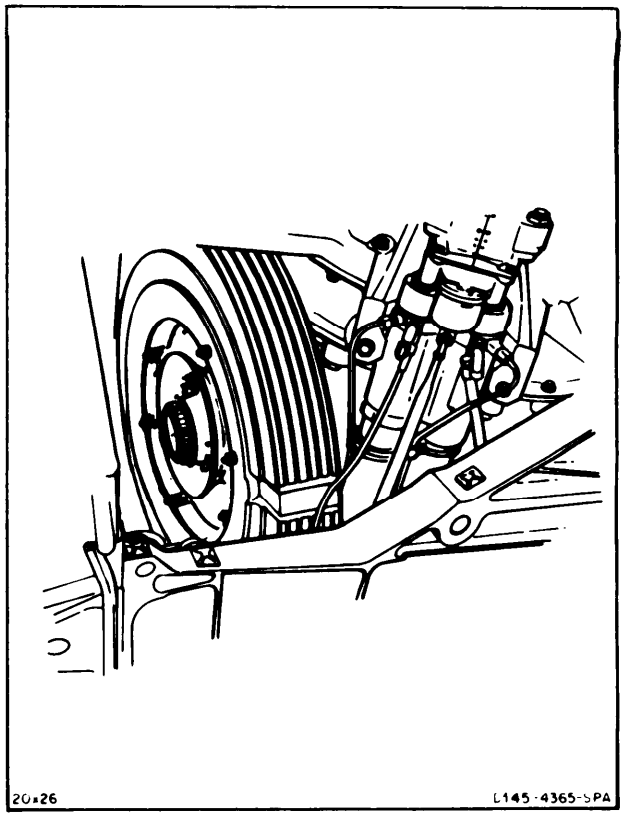
6-116 INSTALL FORWARD TRANSMISSION OIL COOLER SHROUD (Continued)

FOLLOW-ON MAINTENANCE:

Install No. 1 and No. 2 drive shafts (Task 6-17 and 6-18).

Install oil cooler air inlet duct (Task 6-122).

Close forward transmission fairing (Task 2-2).



END OF TASK

6-117 REMOVE FORWARD TRANSMISSION OIL COOLER IMPELLER

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Spanner Wrench
Wood Plank, 2 Inches x 4 Inches x 36 Inches
Forward Transmission Input Shaft Adapter Assembly

Materials:

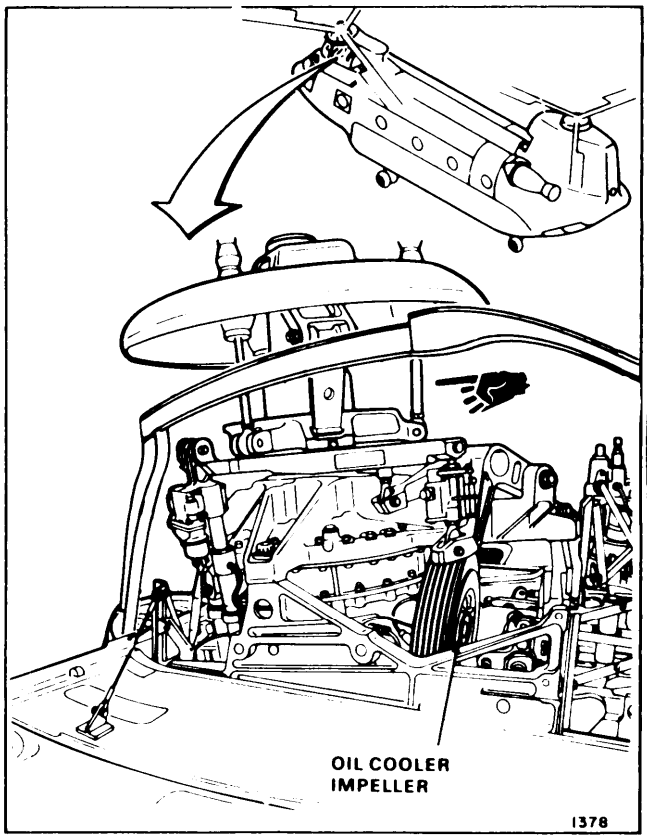
None

Personnel Required:

Medium Helicopter Repairer (2)

Equipment Condition:

Battery Disconnected (Task 1-39)
Electrical Power Off
Forward Transmission Fairings Open (Task 2-2)
Oil Cooler Air Inlet Duct Removed (Task 6-121)
Oil Cooler Fan Shroud Removed (Task 6-115)
Forward Transmission Adapter Assembly Removed (Task 6-5)

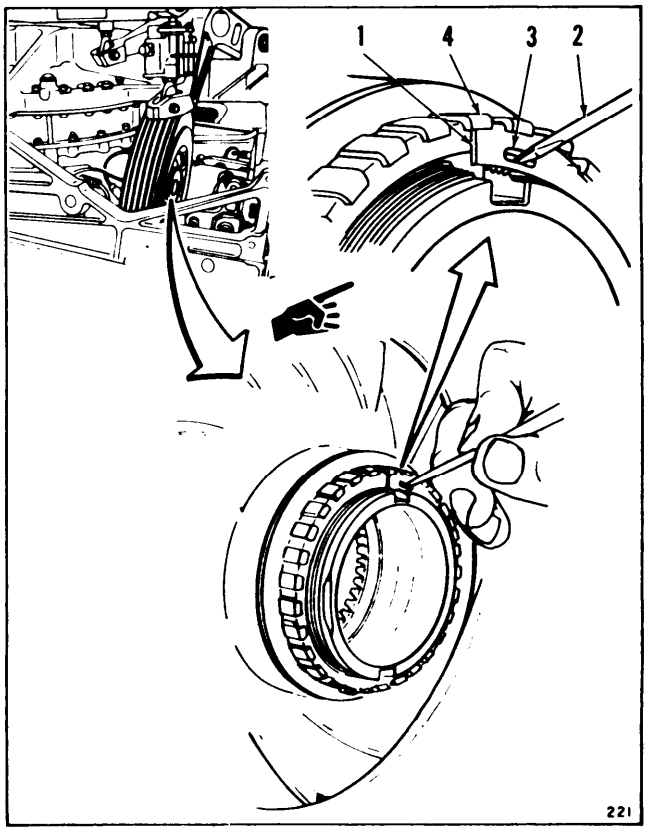


1. **Remove retaining ring (1)** as follows:

   a. Insert screwdriver (2) in slot (3).

   b. Pull down on ring (1) to free it from teeth of locknut (4).

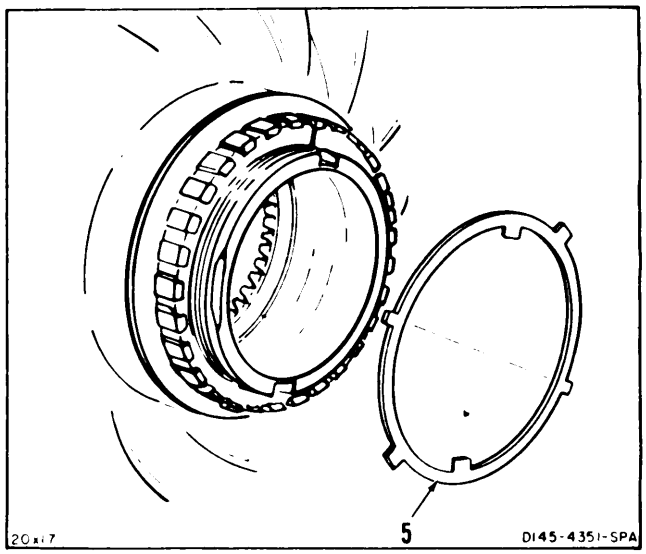
   c. Peel entire length of ring (1) from under locknut (4).



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6-117 REMOVE FORWARD TRANSMISSION OIL COOLER IMPELLER (Continued)

2. **Remove tangwasher (5).**



3. **Loosen locknut (6)** as follows:

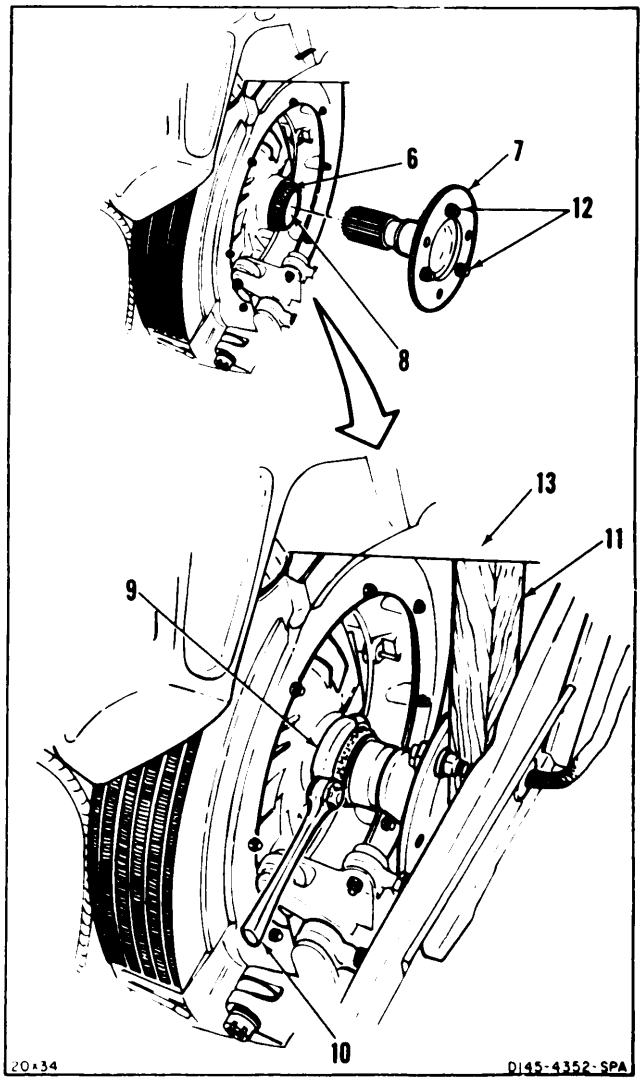
   a. Install adapter assembly (7) in input shaft (8).

   b. Install spanner wrench (9) and socket drive (10) on locknut (6).

   c. Have helper place wood plank (11) across nuts (12) as shown.

   d. Have helper brace plank (11) against transmission lug (13) to keep adapter assembly (7) from turning. Loosen locknut (6).

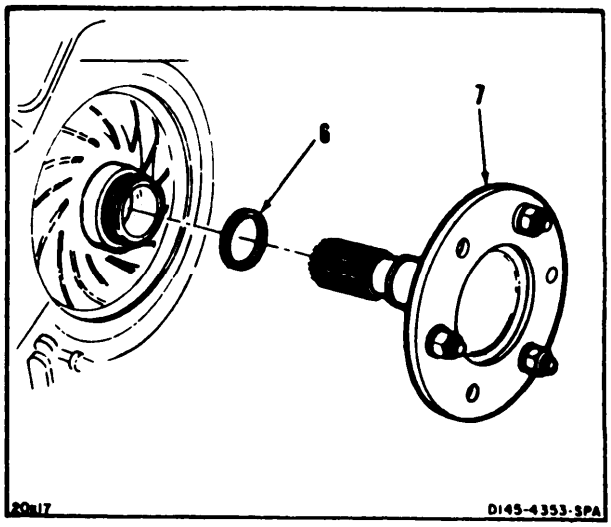
   e. Remove spanner wrench (9), socket drive (10), and wood plank (11).



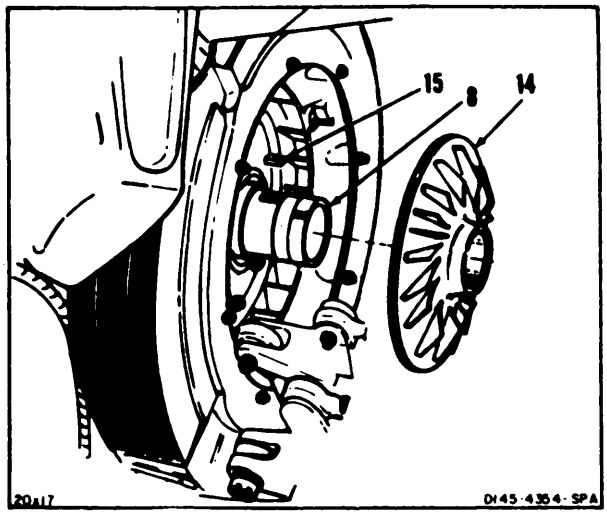
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6-117 REMOVE FORWARD TRANSMISSION OIL COOLER IMPELLER (Continued)

4. Remove adapter assembly (7). **Remove locknut (6).**



5. **Pull and remove impeller (14)** from shaft (8). Remove key (15) from shaft.



FOLLOW-ON MAINTENANCE:

None

END OF TASK

6-117.1 INSPECT FORWARD TRANSMISSION OIL COOLER IMPELLER 6-117.1

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692
Technical Inspection Tool Kit,
NSN 5180-00-323-5114
Torque Wrench, 100 to 500 foot-pounds

Materials:

None

Personnel Required:

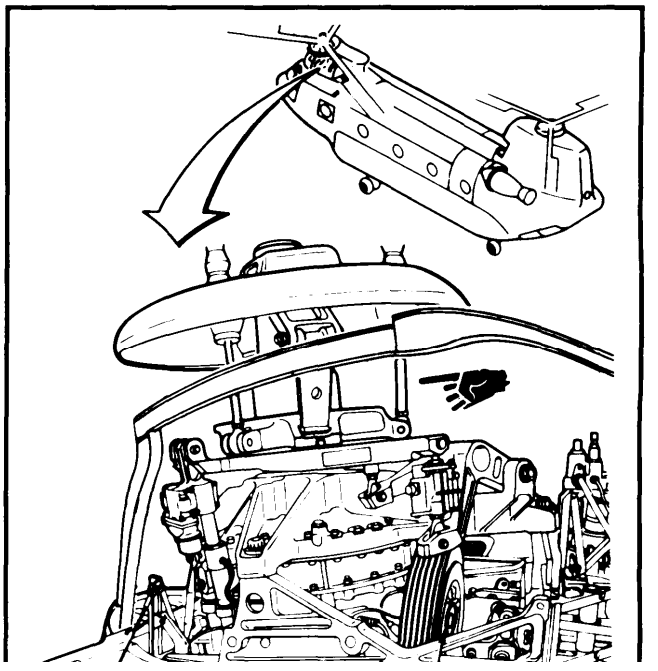
Medium Helicopter Repairer (2)
Inspector

References:

Task 6-117
Task 6-118

Equipment Condition:

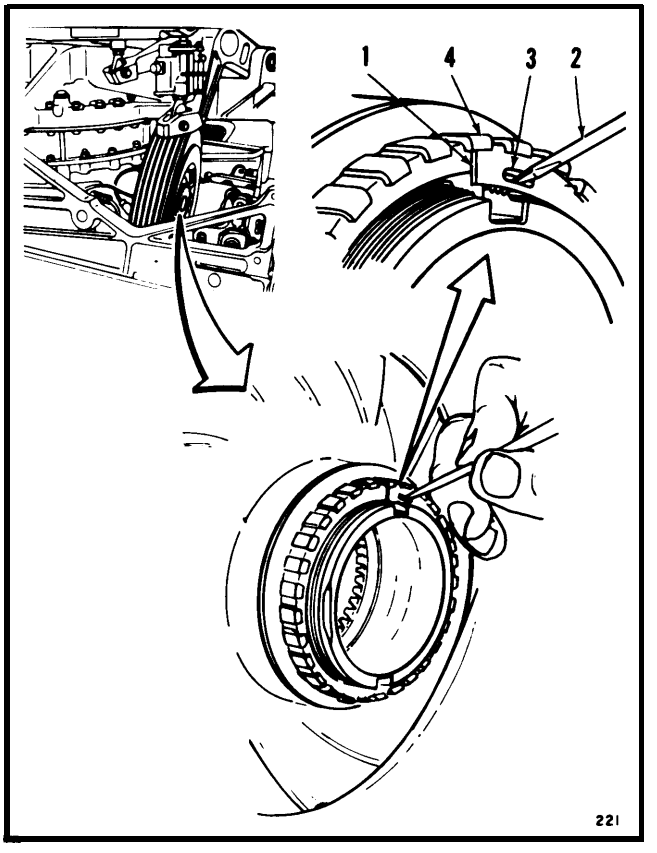
Battery Disconnected (Task 1-39)
Electrical Power Off
Forward Transmission Fairings Open (Task 2-2)
Oil Cooler Air Inlet Duct Removed (Task 6-121)
Oil Cooler Fan Shroud Removed (Task 6-115)
Forward Transmission Adapter Assembly Removed (Task 6-5)



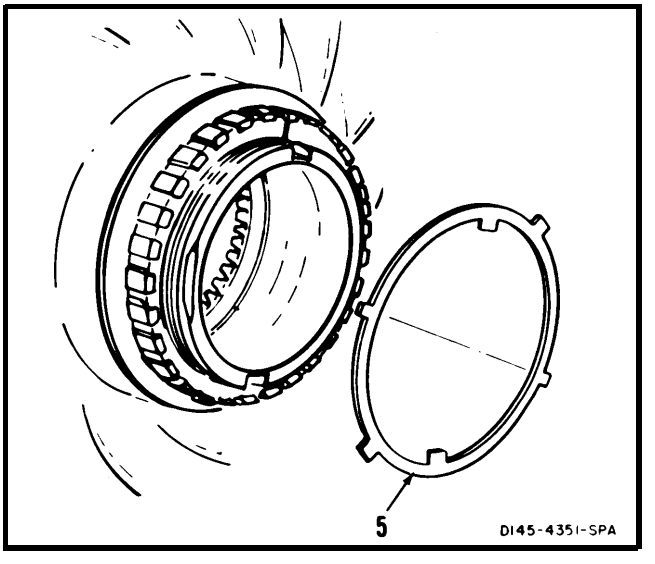
GO TO NEXT PAGE

6-117.1 INSPECT FORWARD TRANSMISSION OIL COOLER IMPELLER 6-117.1 (Continued)

1. **Remove retaining ring (1) as follows:**
   a. **Insert screwdriver (2)** in slot (3).
   b. **Pull down on retaining ring (1)** to free it from teeth of locknut (4).
   c. **Peel entire length of retaining ring (1)** from under locknut (4).



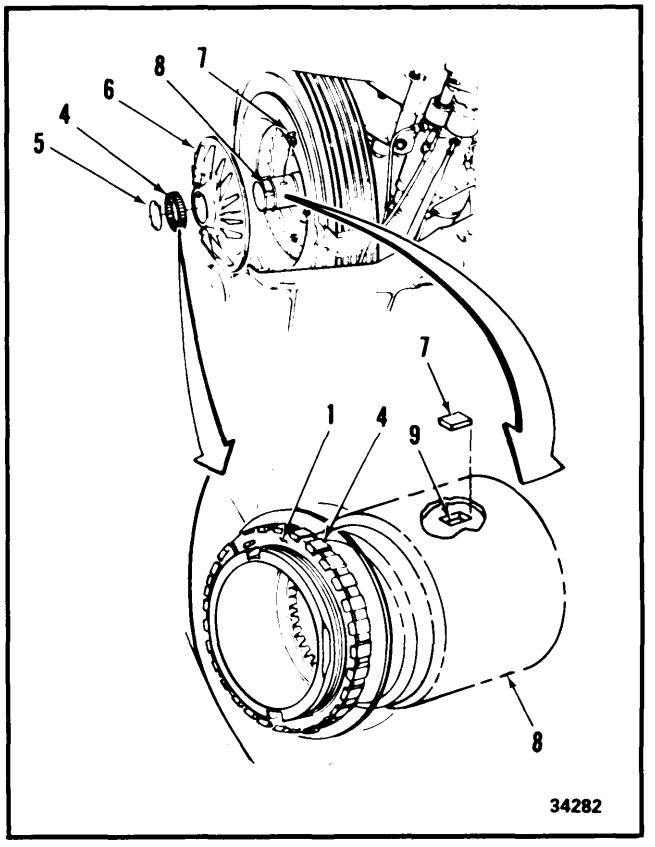
2. **Remove tangwasher (5).**



GO TO NEXT PAGE

16-117.1 INSPECT FORWARD TRANSMISSION OIL COOLER IMPELLER 6-117.1 (Continued)

3. **Inspect locknut (4) as follows:**
   a. **Grasp the locknut (4) and check it for hand tightness in the off direction.**
   b. **If locknut (4) cannot be turned by hand, torque nut to 180 to 230 foot-pounds and install tangwasher (5) and retaining ring (1), (Refer to steps 4 and 5, Task 6-118).**
   c. **If locknut can be turned by hand, remove locknut (4), impeller (6) and key (7) from shaft (8) (Task 6-117).**
   d. **Inspect key (7), locknut (4), tangwasher (5), impeller key slot (9), and face of the impeller (6) that contacts the locknut (4) for wear. If wear exceeds 0.005 inch, replace affected items.**
   e. **Inspect the impeller key slot (9) in the shaft for wear. If wear exceeds 0.010 inch, replace the transmission.**



FOLLOW-ON MAINTENANCE:
Install forward transmission adapter assembly (Task 6-8)
Install oil cooler fan shroud (Task 6-116)
Install oil cooler air inlet duct (Task 6-122)
Close forward transmission fairings (Task 2-2)

END OF TASK

6-118 INSTALL FORWARD TRANSMISSION OIL COOLER IMPELLER 6-118

INITIAL SETUP

Applicable Configurations:
All

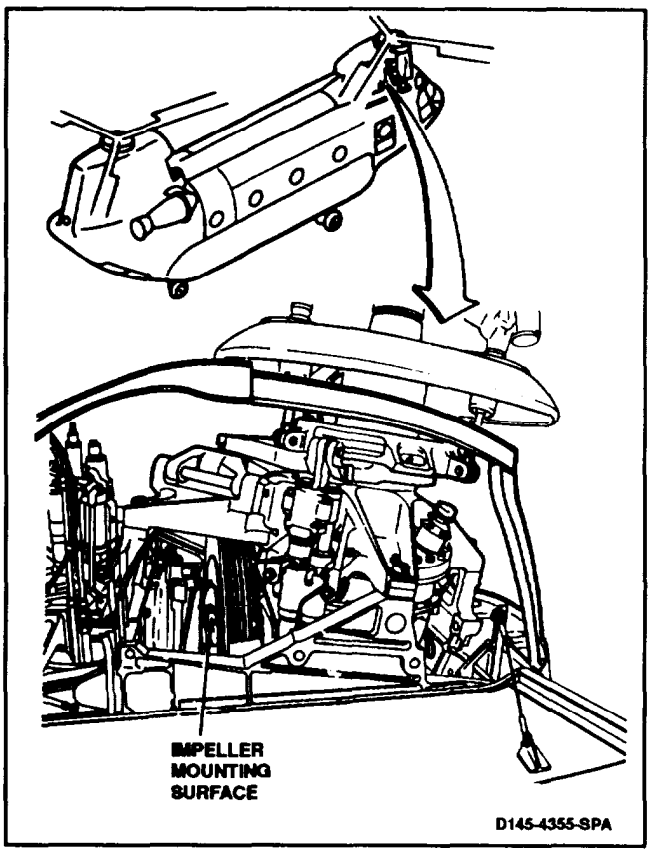
Tools:
Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Spanner Wrench
Torque Wrench, 0 to 600 Foot-Pounds
Socket Wrench Adapter, 1/2-inch Sq Male End, 3/4-inch Sq Female End
wood Plank, 2 Inches x 4 Inches x 36 inches
Forward Transmission Input Shaft Adapter Assembly
Rawhide Mallet

Materials:
Oil (E254)

Personnel Required:
Medium Helicopter Repairer (2)
Inspector

References:
TM 55-1520-240-23P

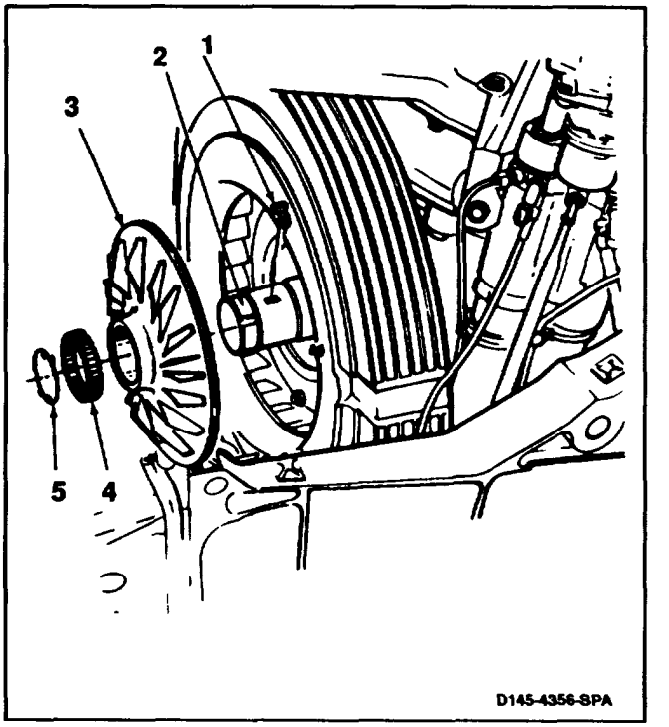
General Safety Instructions:



NOTE

Fan set shroud P/N 145DS106-7 723104A), impeller P/N 145DS106-8 (723104A), and diffuser P/N 145DS106-9 (730737) manufactured by Sundstrand must be used as a set and the parts are not individually interchangeable with the equivalent fan set shroud P/N 145DS106-11 (40926-1), impeller P/N 145DS106-13 (40927-1), and diffuser P/N 145DS106-12 (40928-1) manufactured by Noah Howden.

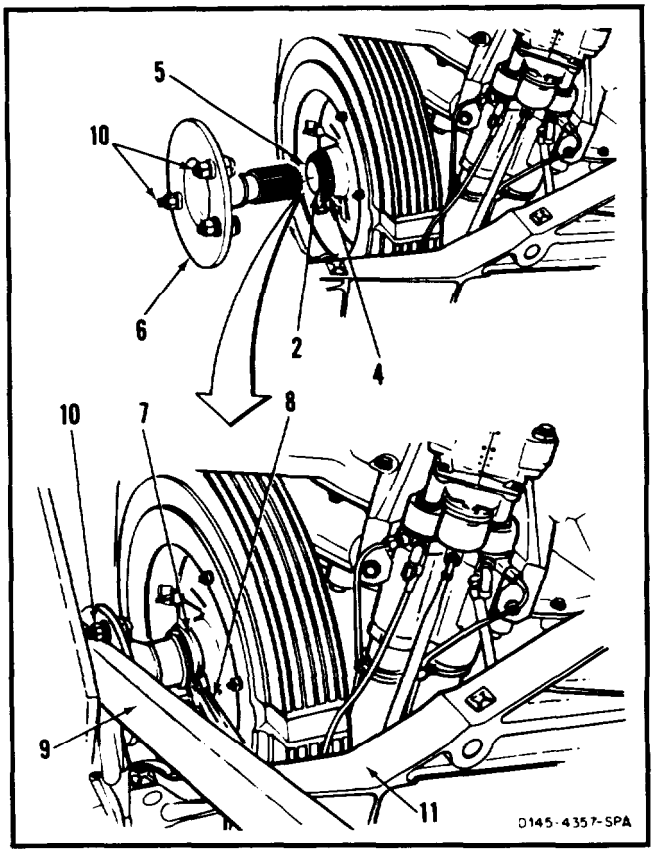
1. Coat bore of impeller (3), key (I), and input shaft (2) with oil (E254). Install key in shaft. Align impeller with key. Install impeller on shaft. Use mallet.
2. Apply light coat of oil (E254) to thread of locknut (4). **Install locknut loosely** on shaft (2). DO NOT USE GREASE.
3. Position tangwasher (5) over shaft (2).



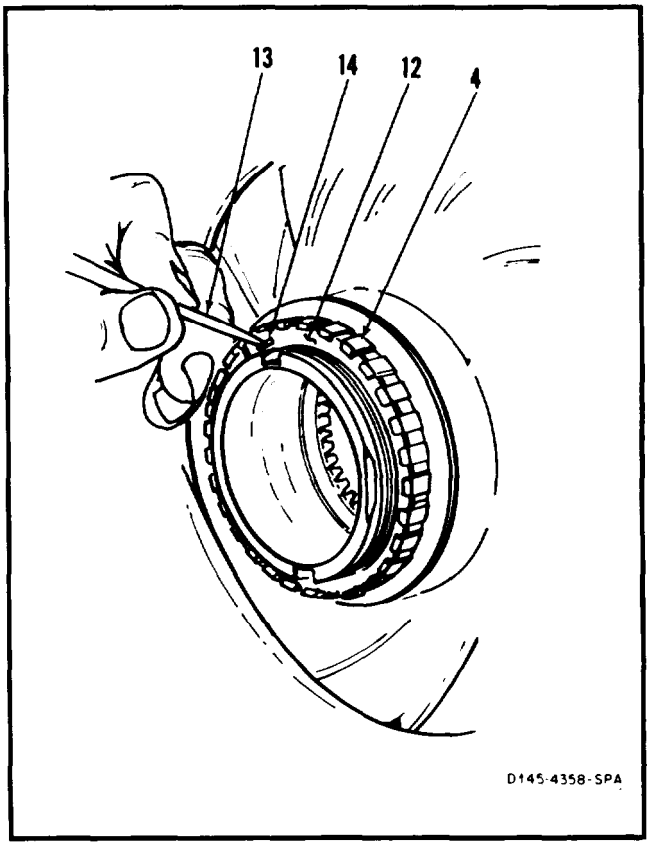
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6-118 INSTALL FORWARD TRANSMISSION OIL COOLER IMPELLER 6-118 (Continued)

4. **Torque locknut (4) and install tangwasher (5)** as follows:
   a. Install adapter assembly (6) in input shaft (2).
   b. Install spanner wrench (7) and torque wrench (8) on locknut (4).
   c. Have helper place wood plank (9) across nuts (10) as shown.
   d. Have helper brace plank (9) against structure (11) to keep adapter assembly (6) from turning. **Torque locknut (4) to 180 foot-pounds.**
   e. Install tangwasher (5) on locknut (4). If tangs do not align with slots in nut, rotate tangwasher 180 degrees and install.
   f. If tangs do not align, increase torque on locknut (4) in small steps until tangs align. **Do not torque over 230 foot-pounds.**
   g. Remove adapter assembly (6), spanner wrench (7), torque wrench (8) and wood plank (9).



5. **Install retaining ring (12)** as follows:
   a. Install end of retaining ring (12) under teeth of locknut (4).
   b. Install entire length of retaining ring (12) under teeth of locknut (4). Compress end of ring as needed to install under locknut. Use thin screwdriver (13) inserted in slot (14).
   c. Insert edge of screwdriver (13) in slot (14) and push retaining ring (12) clockwise. Ring shall expand under teeth of locknut (4) to lock.



INSPECT

FOLLOW-ON MAINTENANCE:
Install oil cooler fan shroud (Task 6-116).
Install forward transmission adapter assembly (Task 6-8).
Install No. 1 and No. 2 drive shaft (Task 6-17 and 6-18).
Install oil cooler air inlet duct (Task 6-122).
Close forward transmission fairings (Task 2-2).

END OF TASK

6-119 REMOVE FORWARD TRANSMISSION DIFFUSER

INITIAL SETUP

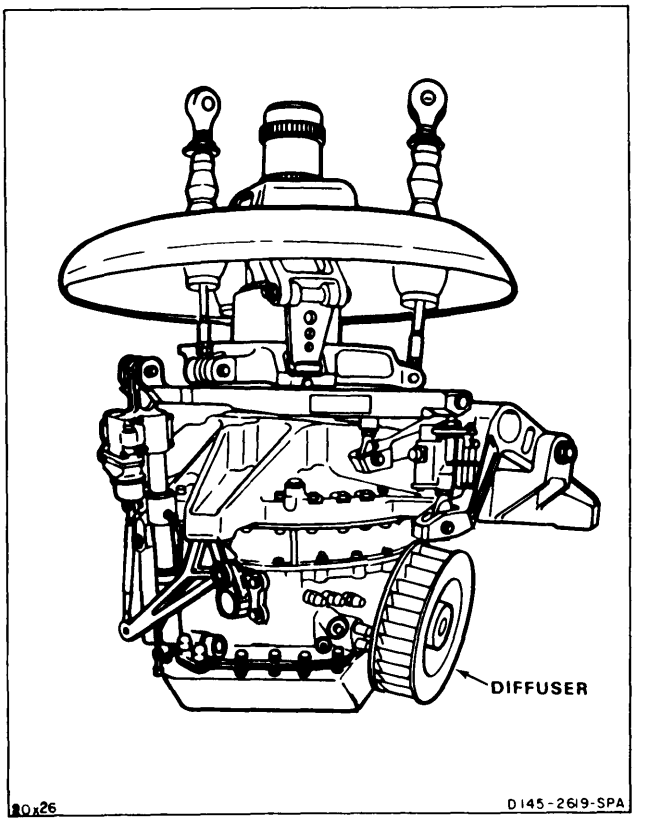
Applicable Configurations:
All

Tools:
Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692
Spanner Wrench
Wood Plank, 2 Inches x 4 Inches x 36 Inches
Forward Transmission Input Shaft Adapter Assembly

Materials:
None

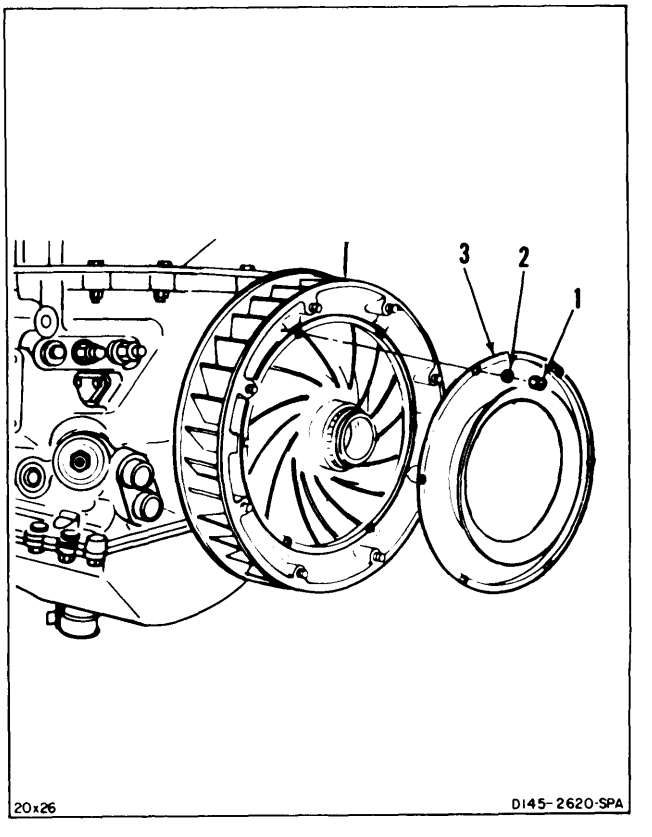
Personnel Required:
67U10 Medium Helicopter Repairer
67U20 Medium Helicopter Repairer

Equipment Condition:
Off Helicopter Task
Oil Cooler Removed (Task 6-113)



REMOVE SHROUD

1. Remove six nuts (1) and washers (2) from around shroud (3). **Remove shroud.**

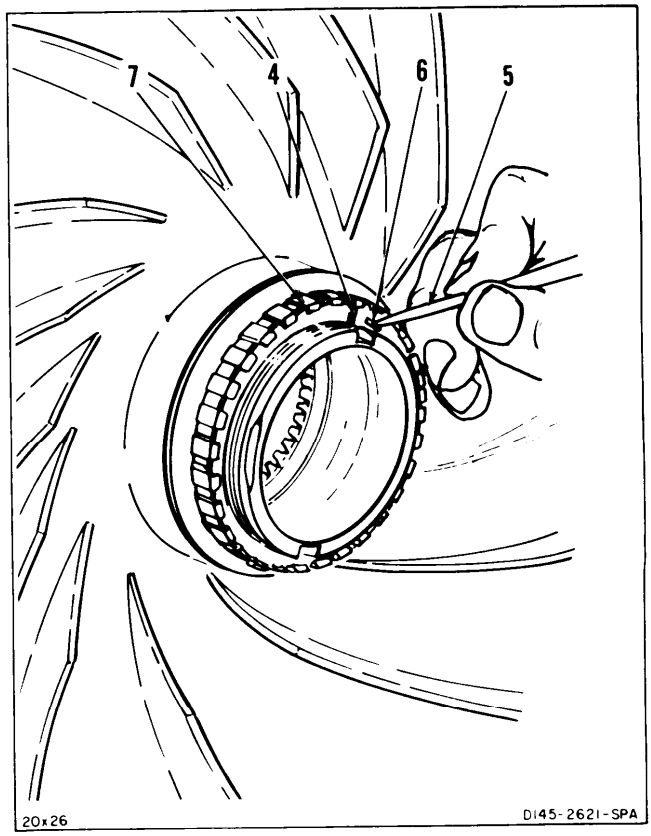


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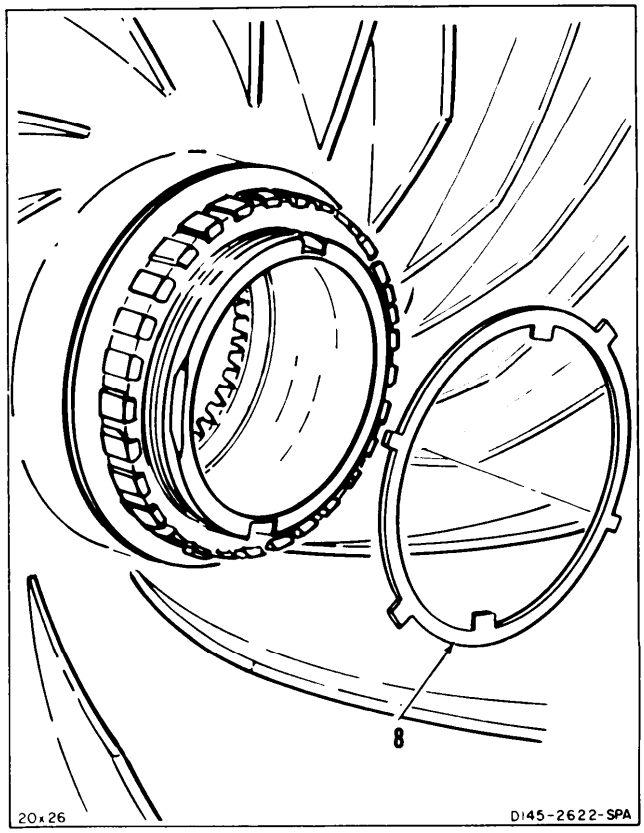
6-119 REMOVE FORWARD TRANSMISSION DIFFUSER (Continued)

REMOVE IMPELLER

2. **Remove retaining ring (4)** as follows:
   a. Insert screwdriver (5) in slot (6).
   b. Pull down on ring (4) to free it from teeth of locknut (7).
   c. peel entire length of ring (4) from under locknut (7).



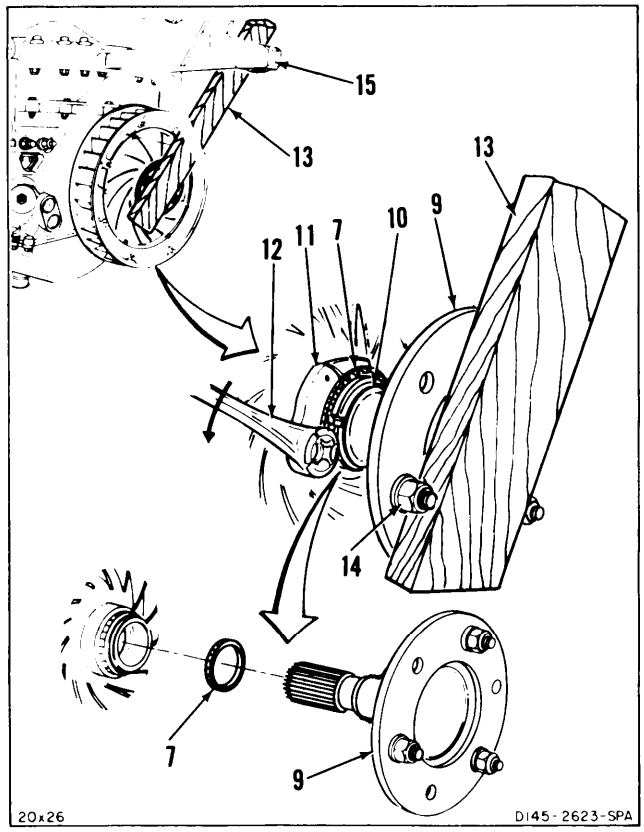
3. **Remove tangwasher (8).**



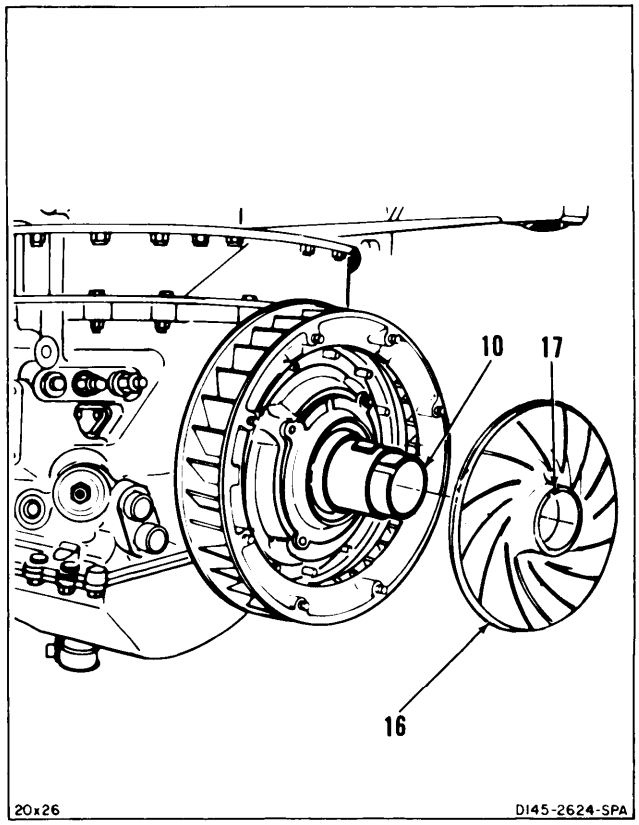
GO TO NEXT PAGE

6-119 REMOVE FORWARD TRANSMISSION DIFFUSER (Continued)

4. **Remove locknut (7)** as follows:
   a. Install adapter assembly (9) in input shaft (10).
   b. Install spanner (11) and socket drive (12) on locknut (7).
   c. Place wood plank (13) across nuts (14) as shown.
   d. Brace plank (13) against transmission lug (15) to keep adapter assembly (9) from turning. Loosen locknut (7).
   e. Remove adapter assembly (9) and locknut (7).



5. Rotate impeller (16) so that slot (17) is at top of shaft (10). **Remove impeller.**

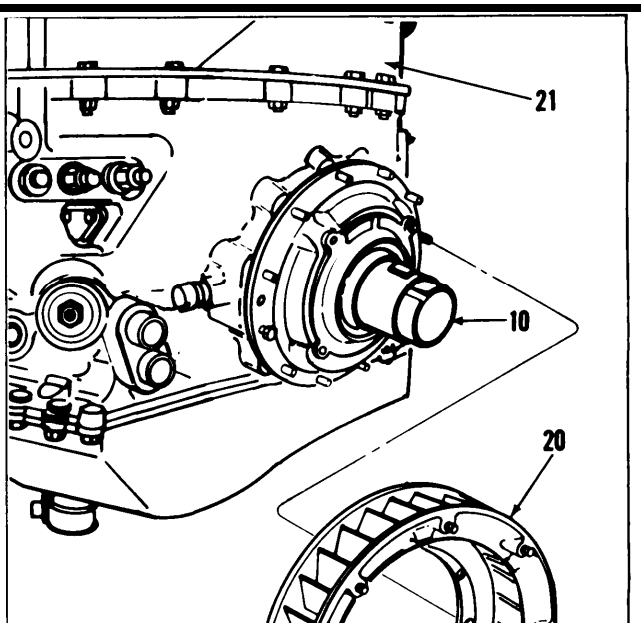


GO TO NEXT PAGE

6-119 REMOVE FORWARD TRANSMISSION DIFFUSER (Continued)

REMOVE DIFFUSER

6. Remove 12 nuts (18) and washers (19 from diffuser (20). **Remove diffuser.**



CAUTION

Input shaft can fall out if washer and nut are not installed. Damage to input shaft will result.

7. Install at least one washer (19) and nut (18) to hold input shaft (10) in transmission (21).

FOLLOW-ON MAINTENANCE:

None

END OF TASK

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Spanner Wrench
Torque Wrench, 30 to 150 Inch-Pounds
Torque Wrench, 150 to 750 Inch-Pounds
Torque Wrench, 0 to 600 Foot-Pounds
Wood Plank, 2 Inches x 4 Inches x 36 Inches
Forward Transmission Input Shaft Adapter Assembly
Rawhide Mallet

Materials:

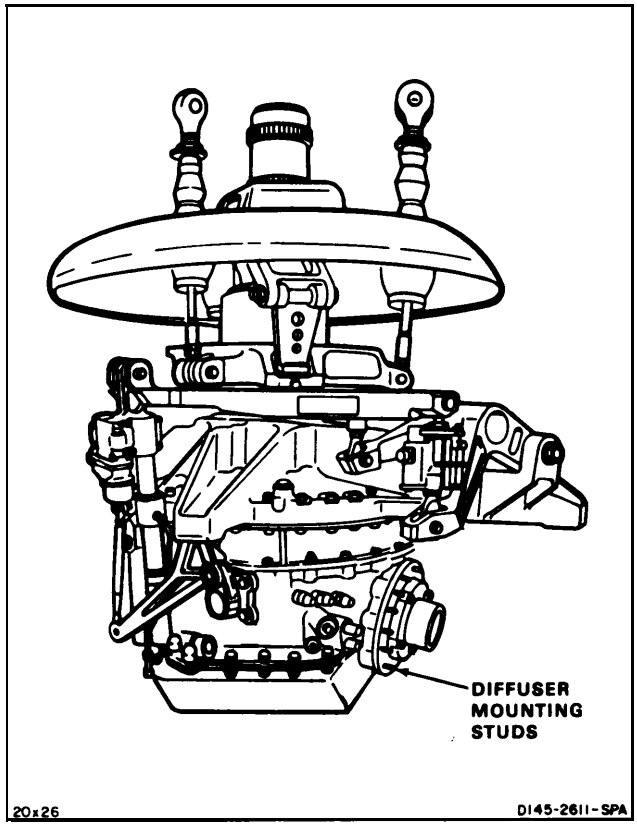
Grease (E190)
Oil (E254)
Gloves (E186)

Personnel Required:

Medium Helicopter Repairer
Medium Helicopter Repairer
Inspector

References:

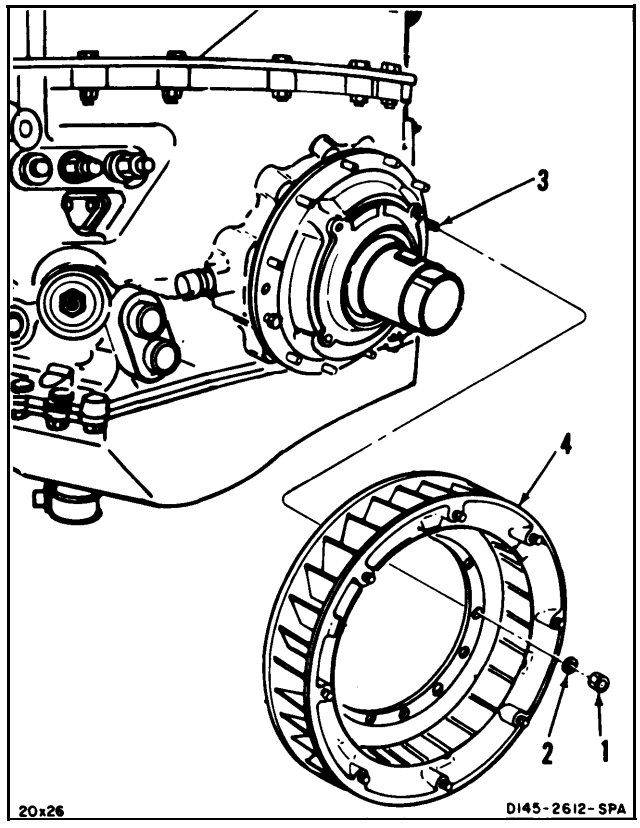
TM 55-1520-240-23P



INSTALL DIFFUSER

NOTE

Fan set shroud P/N 145DS106-7 (723104A), impeller P/N 145DS106-9 (730737), and diffuser P/N 145DS106-8 (723102A) manufactured by Sundstrand must be used as a set and the parts are not individually interchangeable with the equivalent fan set shroud P/N 145DS106-11 (40926-1), impeller P/N 145DS106-13 (40928-1) and diffuser P/N 145DS106-12 (40927-1) manufactured by Noah Howden.



1. Remove nuts (1) and washers (2) from studs (3).

NOTE

Studs are not equally spaced. Diffuser fits on studs only one way.

2. Install diffuser (4) on studs (3). Install 12 washers (2) and nuts (1). **Torque nuts to 170 inch-pounds.**

INSPECT

GO TO NEXT PAGE

INSTALL IMPELLER

3. Coat bore of impeller (5), key (6), and input shaft (7) with oil (E254). Align impeller with key. **Install impeller** over input shaft. Use mallet.

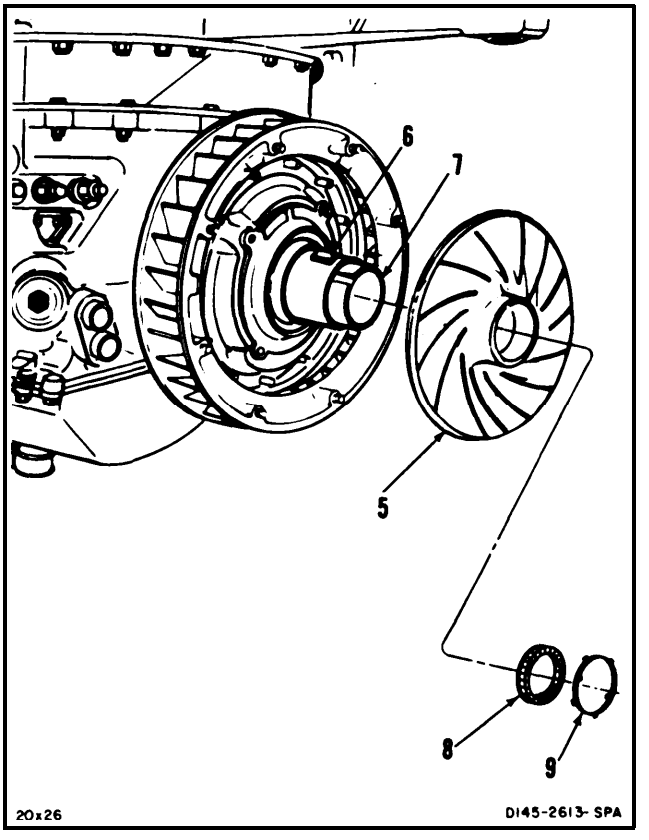
WARNING

Oil (E254) is toxic. It can irritate skin and cause burns. Avoid inhaling. Use only with adequate ventilation. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.

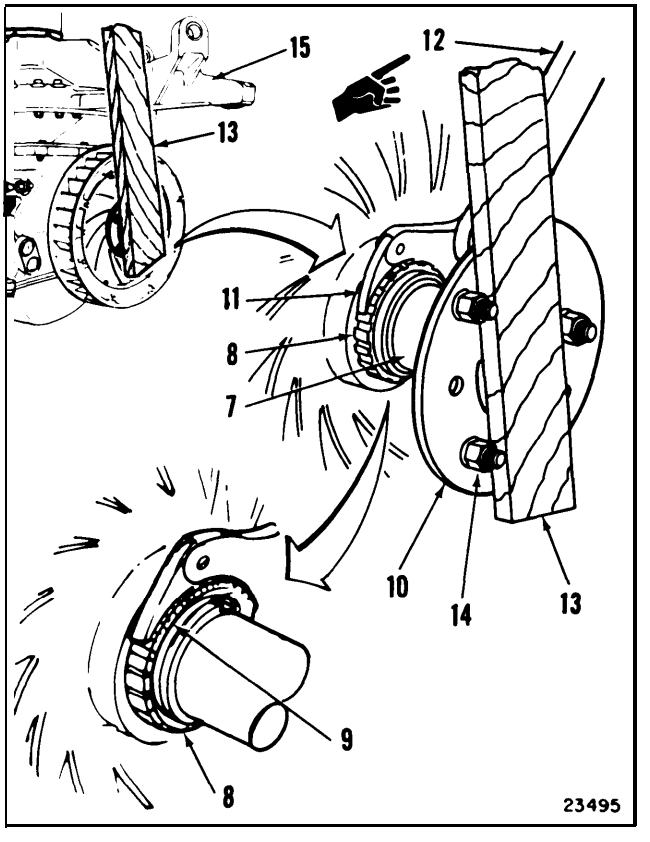
NOTE

Use only oil (E254) on locknut thread. Do not use grease.

4. Apply light coat of oil (E254) to thread of locknut (8). Wear gloves (E186). Loosely install locknut on shaft (7). DO NOT USE GREASE.
5. **Position tangwasher (9)** over shaft (7).



6. **Torque locknut (8) and install tangwasher (9)** as follows:
   a. Install adapter assembly (10) in input shaft (7).
   b. Install spanner (11) and torque wrench (12) on locknut (8).
   c. Place wood plank (13) across nuts (14) as shown.
   d. Brace plank (13) against transmission lug (15) to keep adapter assembly (10) from turning. **Torque locknut (8) to 180 foot-pounds.**
   e. Install tangwasher (9) on locknut (8). If tangs do not align with slots in nut, rotate tangwasher 180 degrees and install.
   f. If tangs do not align, increase torque on locknut (8) in small steps until tangs align. **Do not torque over 230 foot-pounds.**
   g. Remove adapter and plate assembly (10).

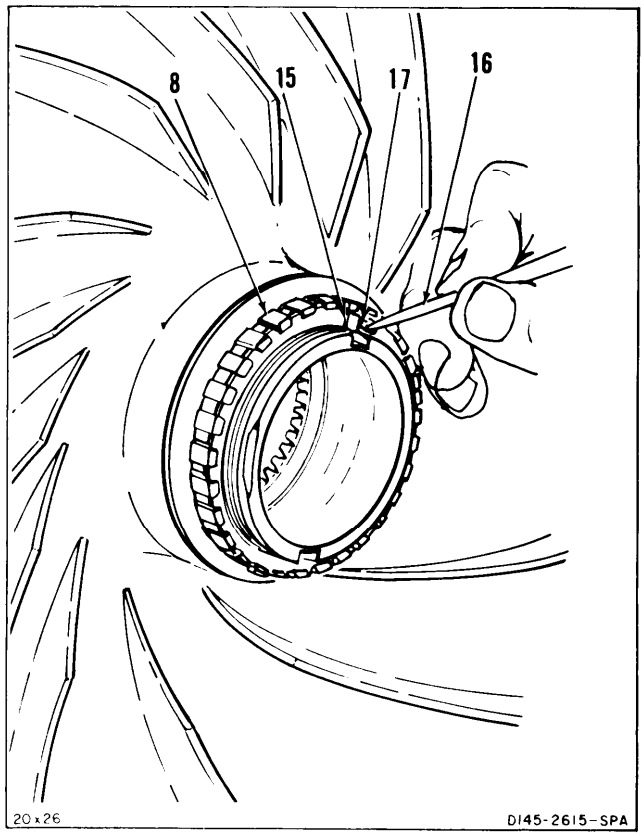


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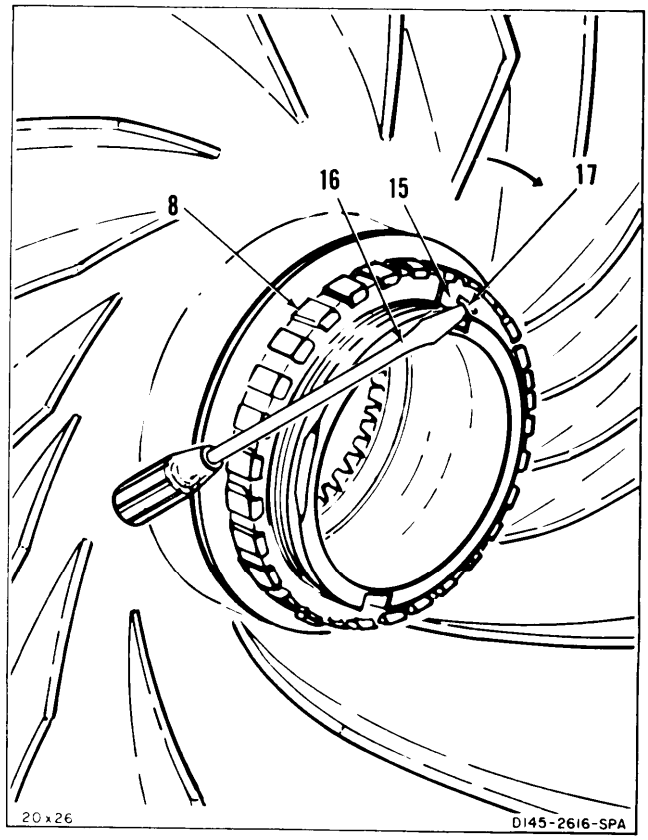
7. **Install retaining ring (15)** as follows:

   a. Install end of retaining ring (15) under teeth of locknut (8).

   b. Install entire length of retaining ring (15) under teeth of locknut (8). Compress end of ring as needed to install under locknut. Use thin screwdriver (16) inserted in slot (17).



   c. Install edge of screwdriver (16) in slot (17) and push retaining ring (15) clockwise. Ring shall expand under teeth of locknut (8) to lock.



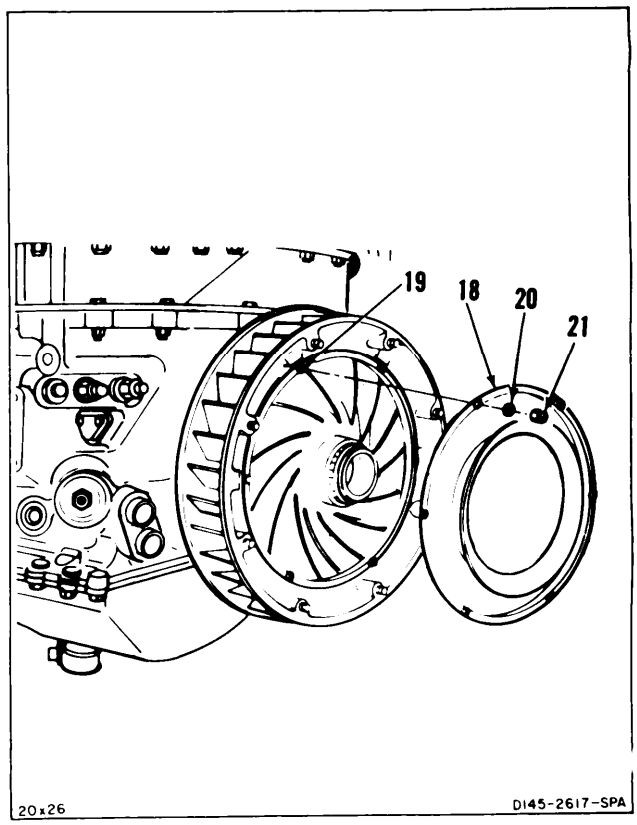
INSPECT

GO TO NEXT PAGE

6-120 INSTALL FORWARD TRANSMISSION DIFFUSER (Continued)

INSTALL SHROUD

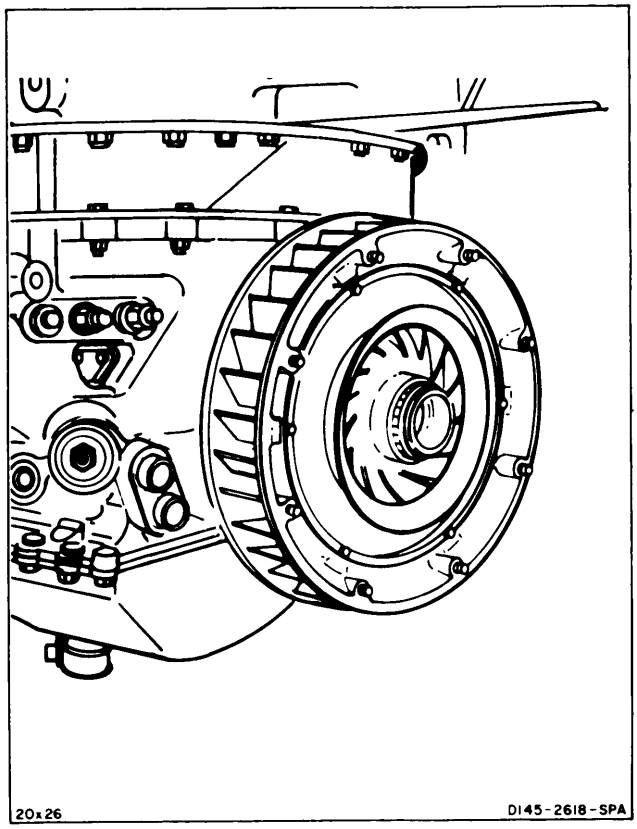
8. **Install shroud (18)** on six studs (19). Install six washers (20) and nuts (21). **Torque nuts to 60 inch-pounds.**



INSPECT

FOLLOW-ON MAINTENANCE:

Install oil cooler (Task 6-114).



END OF TASK

6-121 REMOVE FORWARD TRANSMISSION OIL COOLER AIR INLET DUCT

INITIAL SETUP

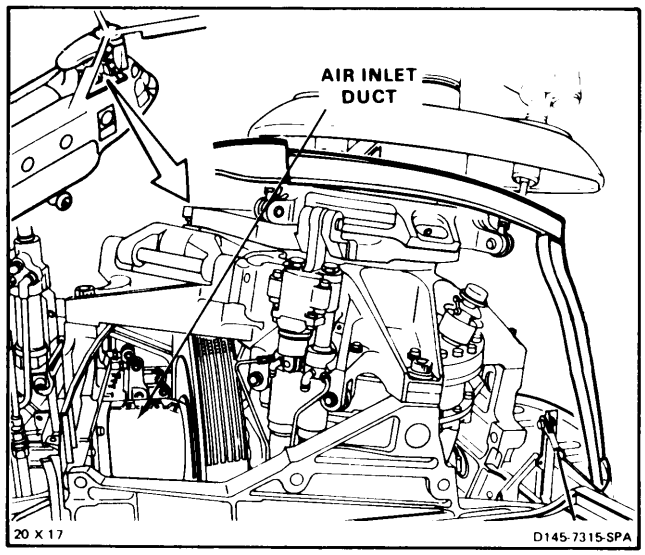
Applicable Configurations:
All

Tools:
Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692

Materials:
None

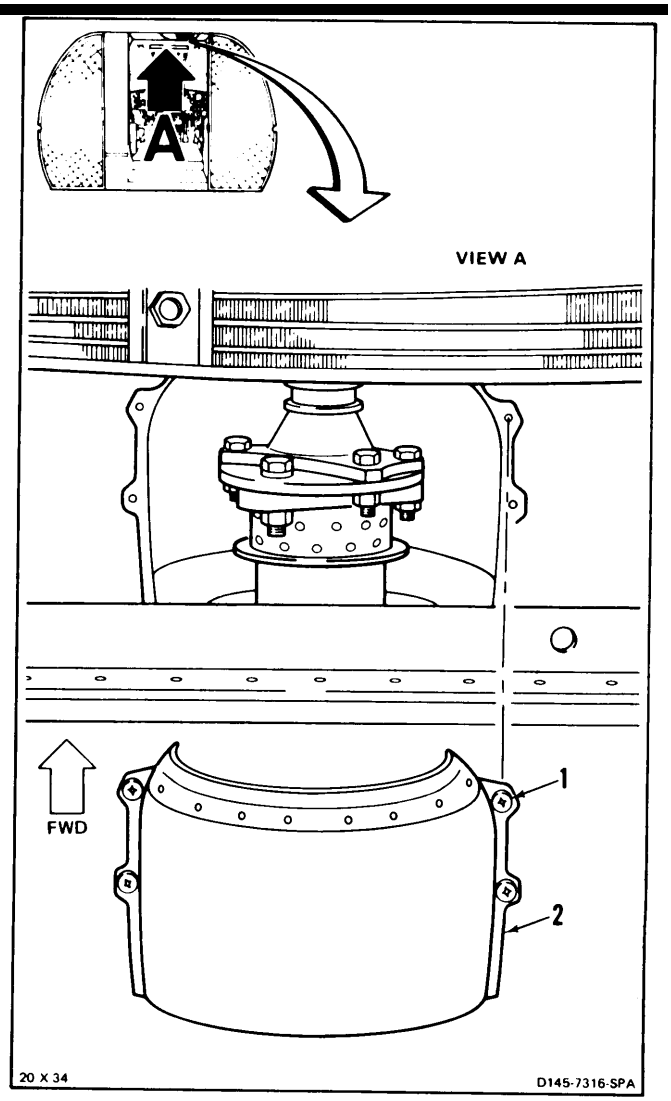
Personnel Required:
67U10 Medium Helicopter Repairer

Equipment Condition:
Battery Disconnected (Task 1-39)
Electrical Power Off
Forward Transmission Drip Pan Removed (Task 2-3)
Forward Transmission Fairing Work Platforms Open (Task 2-2)



REMOVE BOTTOM SEGMENT

1. Loosen two turnlock fasteners (1) at each side of bottom segment (2).
2. **Remove segment (2).**

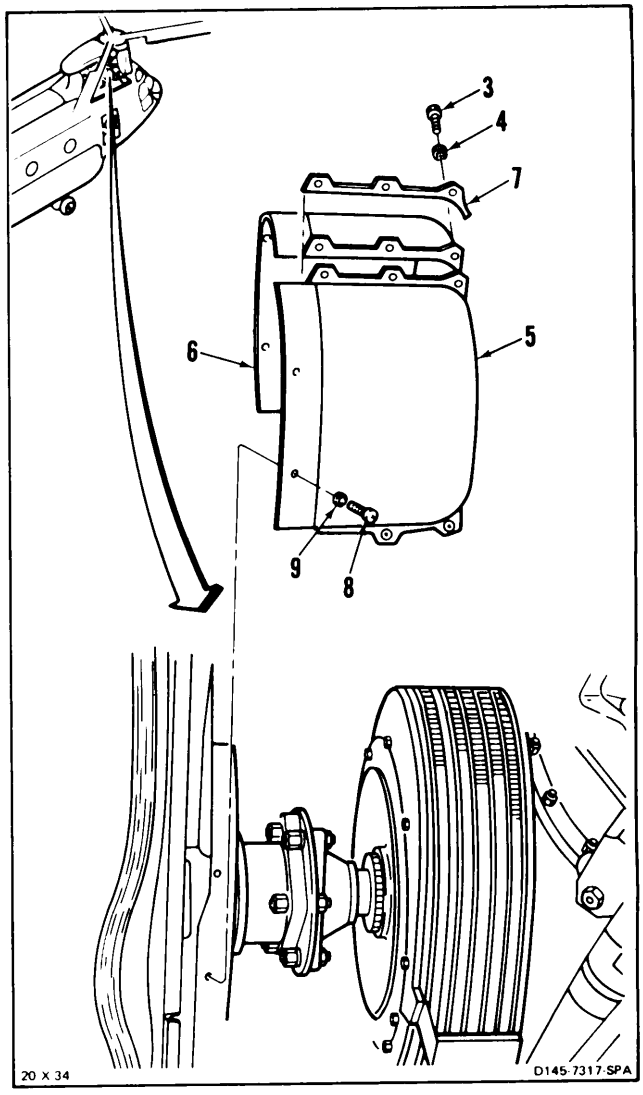


GO TO NEXT PAGE

6-121 REMOVE FORWARD TRANSMISSION OIL COOLER AIR INLET DUCT (Continued)

REMOVE TOP SEGMENTS

3. **Remove three bolts (3)** and Washers (4) connecting right segment (5) and left segment (6). **Remove shims (7).**
4. **Remove four bolts (8)** and Washers (9) from aft end of segments (5 and 6).
5. **Remove segments (5 and 6).**



FOLLOW-ON MAINTENANCE:

None

END OF TASK

6-122 INSTALL FORWARD TRANSMISSION OIL COOLER AIR INLET DUCT

INITIAL SETUP

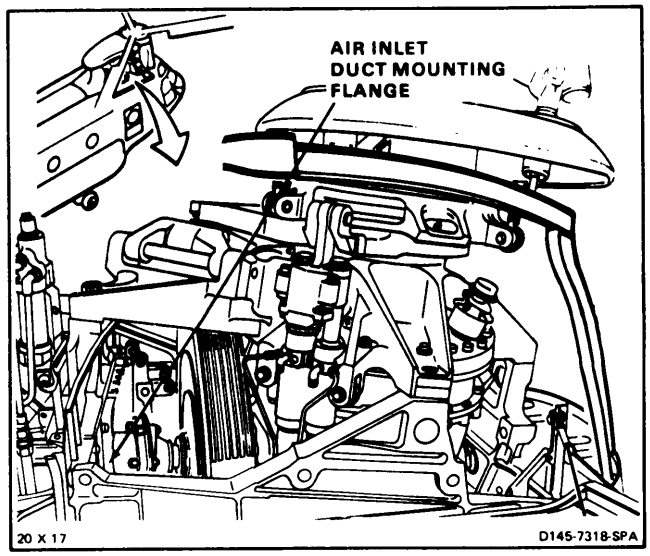
Applicable Configurations:
All

Tools:
Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Drill Motor
Twist Drill, 7/32-Inch

Materials:
Marking Pencil (E271)

Personnel Required:
67U10Medium Helicopter Repairer
67U30 Inspector
68G10 Aircraft Structural Repairer

References:
TM 55-1520-240-23P



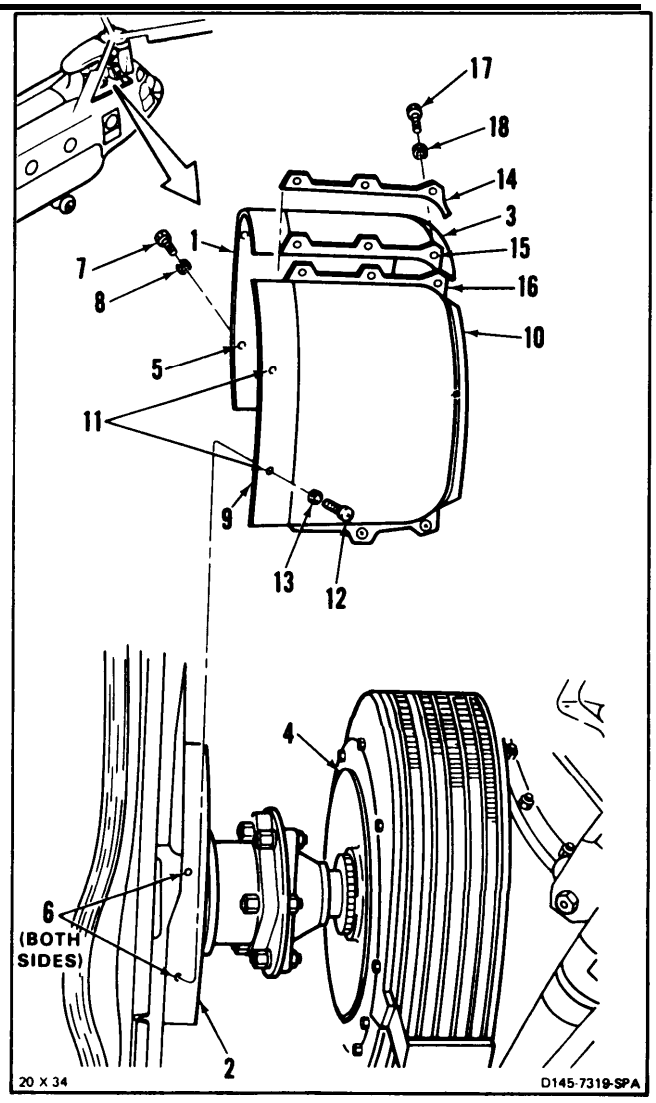
NOTE

If installing a new duct, go to step 7.

INSTALL REMOVED TOP SEGMENTS

1. **Position top left segment (1)** on airframe mounting flange (2) with seal (3) against shroud (4). **Align two holes** (5) in segment with holes (6) on left side of flange (2). **Loosely install two bolts (7)** and washers (8).
2. **Position top right segment (9)** on airframe mounting flange (2) with seal (10) against shroud (4). **Align two holes (11)** in segment with holes (6) on right side of flange (2). **Loosely install two bolts (12)** and washers (13).
3. **Install shims (14)** between mating flanges (15 and 16). **Install three bolts (17)** and washers (18).
4. **Tighten four bolts (7 and 12).**

INSPECT



GO TO NEXT PAGE

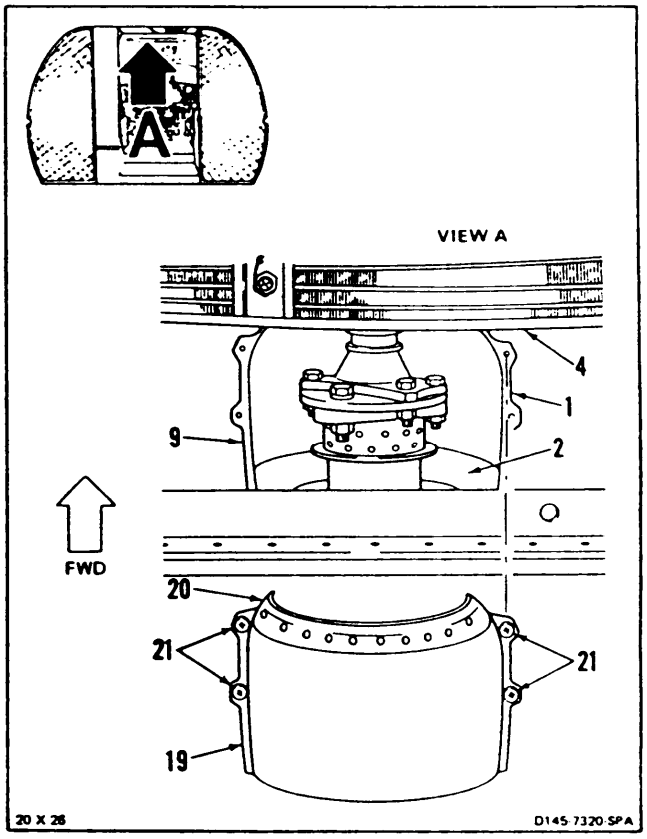
6-122 INSTALL FORWARD TRANSMISSION OIL COOLER AIR INLET DUCT (Continued)

INSTALL REMOVED DUCT BOTTOM SEGMENT

CAUTION

Failure to install the duct around the airframe mounting flange may cause damage to the duct, oil cooler, or drive shafting.

5. **Position bottom segment (19)** around airframe mounting flange (2) with seal (20) against shroud (4). Install segment on top left segment (1) and top right segment (9) **with four fasteners (21).**

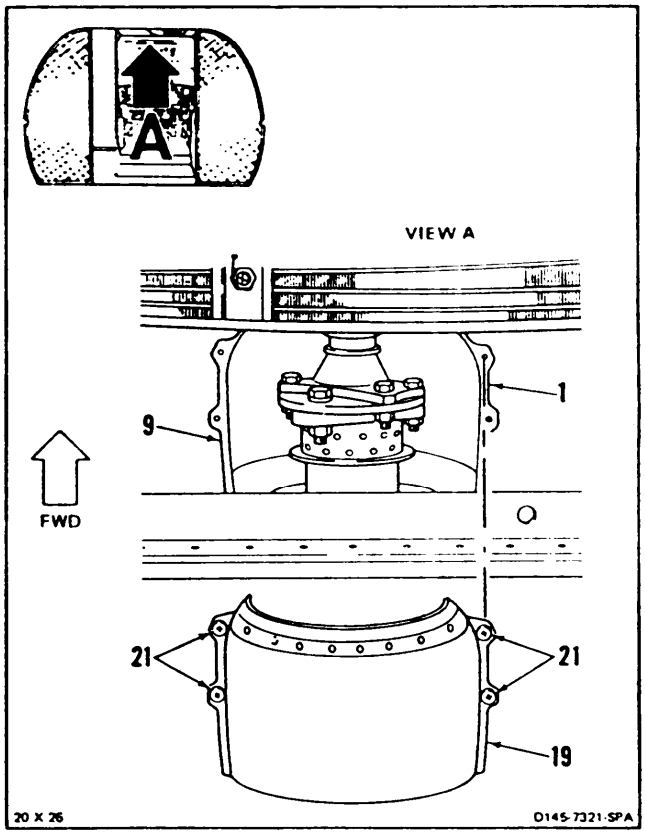


INSPECT

6. Go to FOLLOW-ON MAINTENANCE.

INSTALL NEW DUCT

7. Loosely assemble three segments (1, 9, and 19) around airframe mounting flange (2). **Install bottom segment (19) on top segments (1 and 9) with four fasteners (21).**



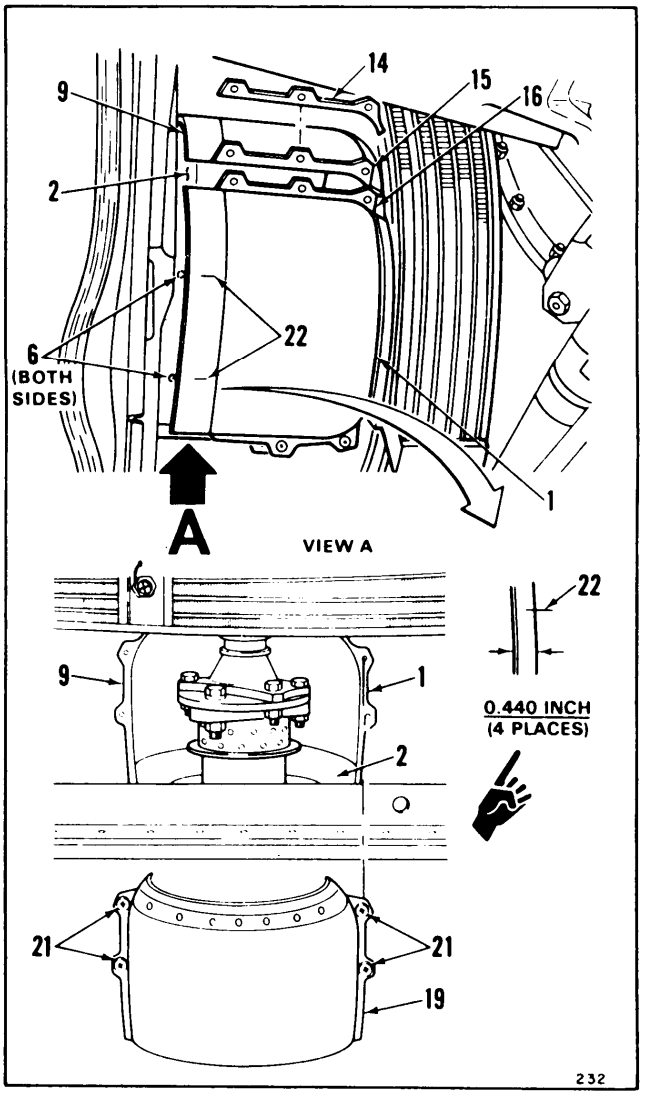
GO TO NEXT PAGE

8. Position three segments (1, 9, and 19) so that flanges (15 and 16) of segments (1 and 9) point straight up. **Install** enough **shims (14)** between flanges to give a snug fit of three segments against mounting flange (2).

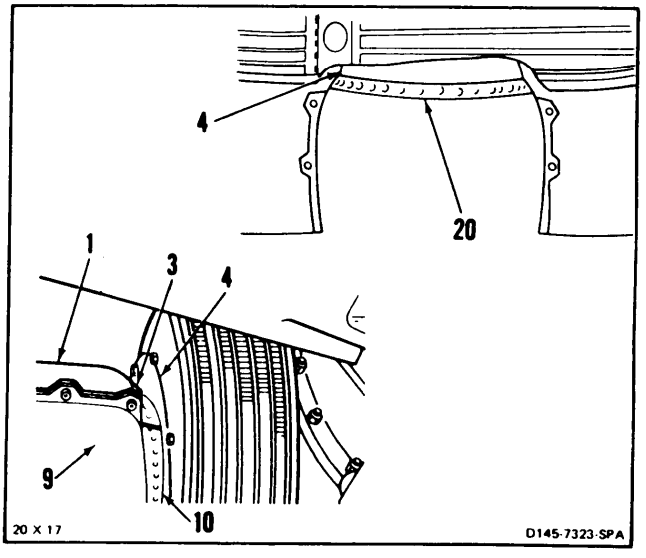
NOTE

About five shims are needed for snug fit.

9. Move three segments (1, 9, and 19) forward just enough to **uncover four mounting holes (6)** in mounting flange (2). Make sure flanges (15 and 16) point straight up. **Mark centerline (22) of four holes on segments (1 and 9)** with pencil (E271).
10. Release four fasteners (21). **Remove three segments (1, 9, and 19).**
11. **Measure 0.440 inch in** from edge of two top sections (1 and 9) at each pencil mark (22). **Drill one 0.220 inch hole** at that point on each mark.
12. Position three segments (1, 9, and 19) around mounting flange (2). **Fasten bottom segment (19) to two top segments (1 and 9)** with four fasteners (21).



13. **Check** that **seals (3, 10, and 20)** at forward end of three segments (1, 9 and 19) fit against shroud (4) and do not overlap. **Trim seals as needed. Gap between seals shall not exceed 0.06 inch.**

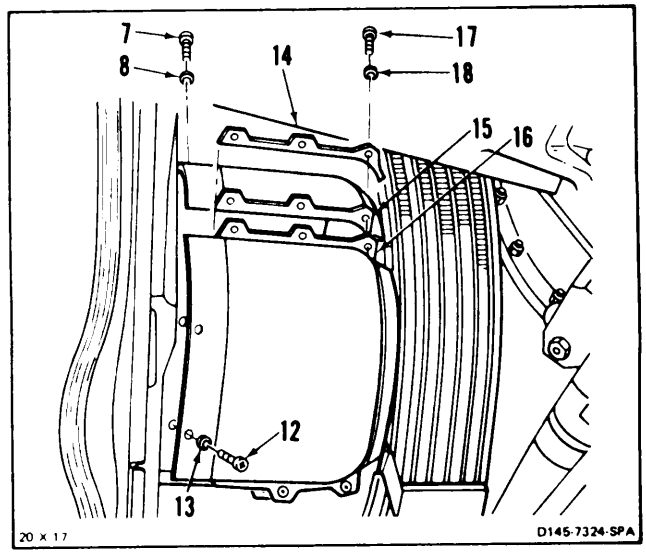


GO TO NEXT PAGE

6-122 INSTALL FORWARD TRANSMISSION OIL COOLER AIR INLET DUCT (Continued)

14. **Install shims (14)** between flanges (15 and 16). **Install three bolts (17)** and washers (18).
15. **Install two bolts (7)** and washers (8). **Install two bolts (12)** and washers (13).

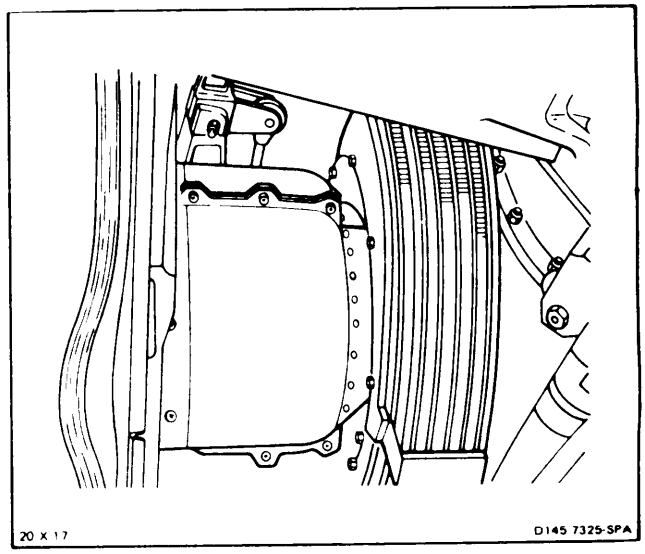
INSPECT



FOLLOW-ON MAINTENANCE.

Close forward transmission fairing work platforms (Task 2-2).

Install forward transmission drip pan (Task 2-3).



END OF TASK

6-123 REPLACE FORWARD TRANSMISSION MAIN OIL FILTER ELEMENT 6-123

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4962
Container, 2-Quart
Torque Wrench, 30 to 150 Inch-Pounds

Materials:

Lockwire (E230)
Dry Cleaning Solvent (E162)
Cloths (E120)
Gloves (E186)
Lubricating Oil (E253, E254 or E254.1)

Parts:

Packings
Filter Element

Personnel Required:

Medium Helicopter Repairer
Inspector

References:

TM 55-1520-240-23P

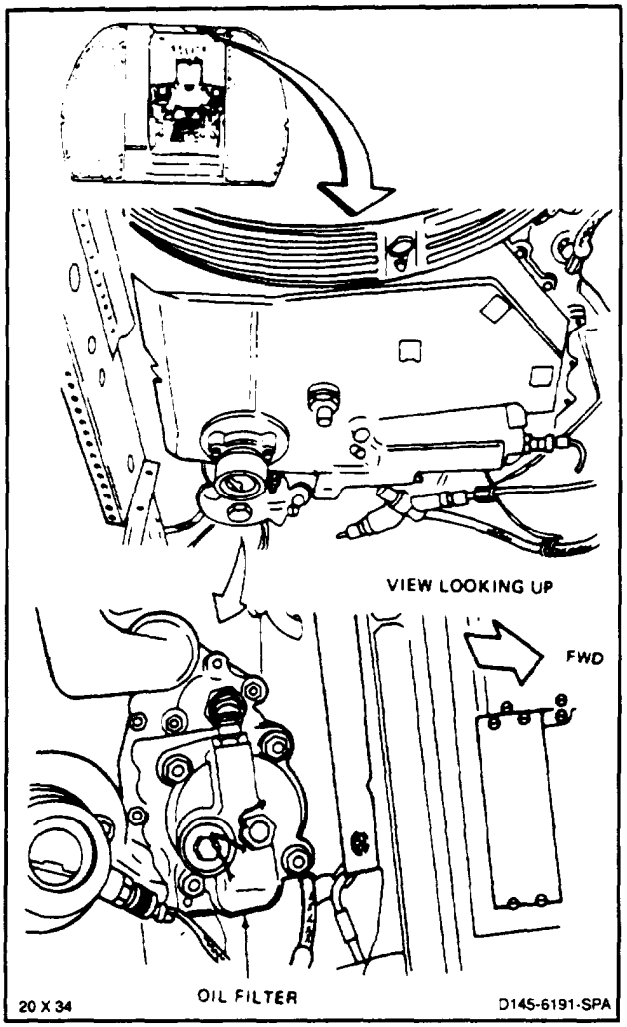
Equipment Condition:

Battery Disconnected (Task 1-39)
Electrical Power Off
Forward Transmission Drip Pan Removed (Task 2-3)

General Safety Instructions:

WARNING

Oil (E253, E254 or E254.1) is toxic. It can irritate skin and cause burns. Avoid inhaling. Use only with adequate ventilation. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.

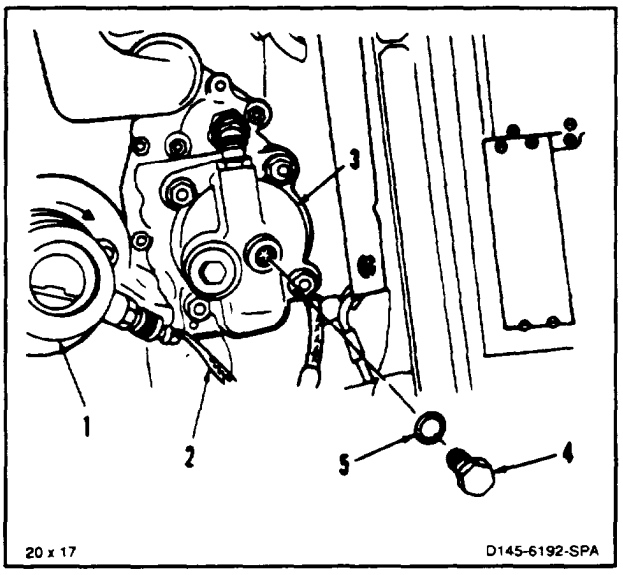


REMOVE ELEMENT

NOTE

Filter housing holds about 1 pint.

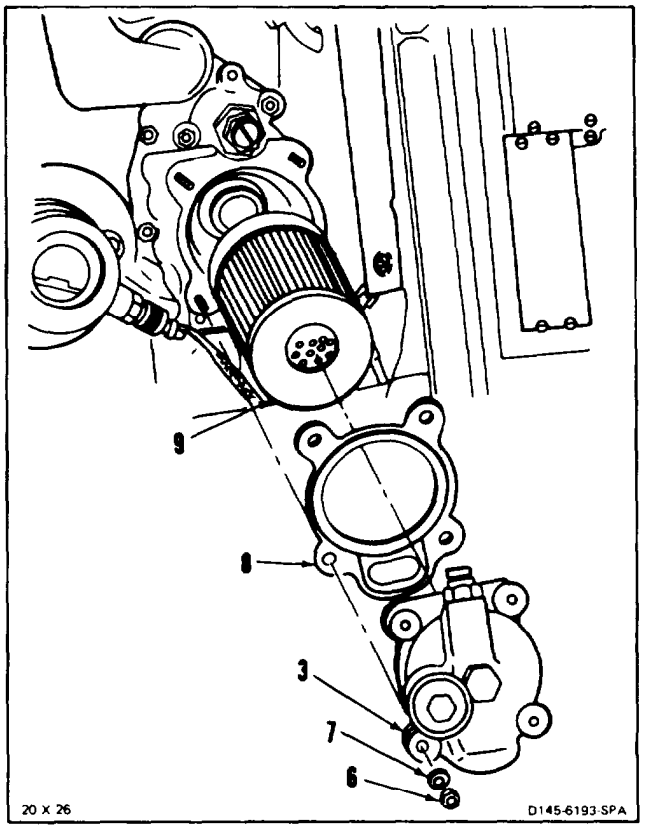
1. Turn detection screen cap (1) to move wire (2) away from filter housing (3).
2. Remove lockwire from drain plug (4). Remove plug and packing (5). Drain oil. Use container to catch oil.
3. Loosely install drain plug (4) and packing (5) in housing (3).



GO TO NEXT PAGE

6-123 REPLACE FORWARD TRANSMISSION MAIN OIL FILTER ELEMENT (Continued) 6-123

4. Remove four nuts (6) and washers (7). **Remove** housing (3). gasket seal (8). and **element (9).**
5. Check outside of element (9) for debris. If there is debris, perform a serviceability check of the forward transmission (Task 6-112).

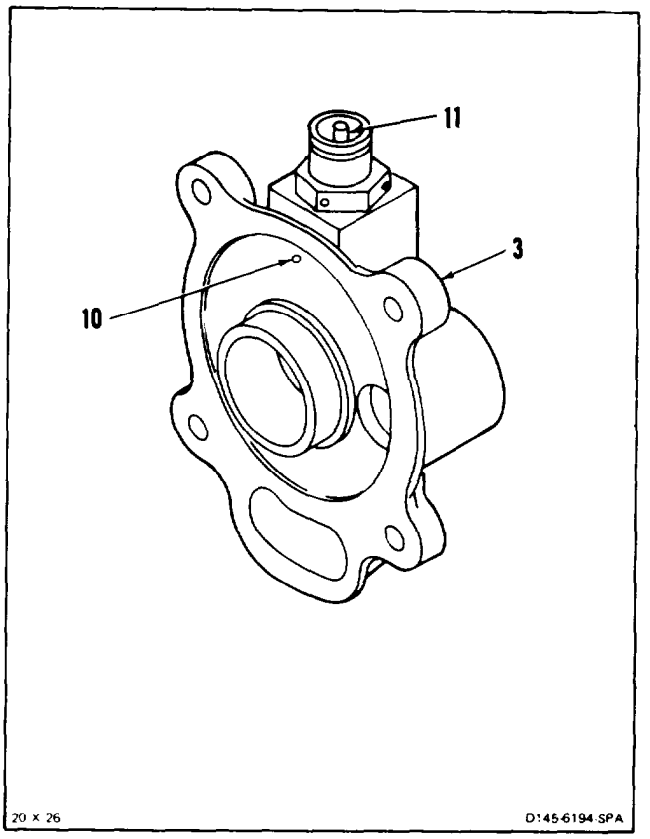


INSTALL ELEMENT

WARNING

Dry cleaning solvent (E162) is flammable and toxic. It can irritate skin and cause burns. Use only in well-ventilated area, away from heat and open flame. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Got medical attention for eyes.

6. Clean inside of housing (3) with solvent (E162) and clean cloths (E120). Wear gloves (E186). Check that hole (10) is free of debris.
7. Hold housing (3) so that indicating button (11) points straight up. **Push in button** to lock it down.



GO TO NEXT PAGE

6-123 REPLACE FORWARD TRANSMISSION MAIN OIL FILTER ELEMENT (Continued)

NOTE

Packings are supplied with element. Do not reuse removed element.

NOTE

Lubricate threads of self-locking nuts prior to torquing and lubricate packings prior to installation. Use oil (E253, E254, or E254.1).

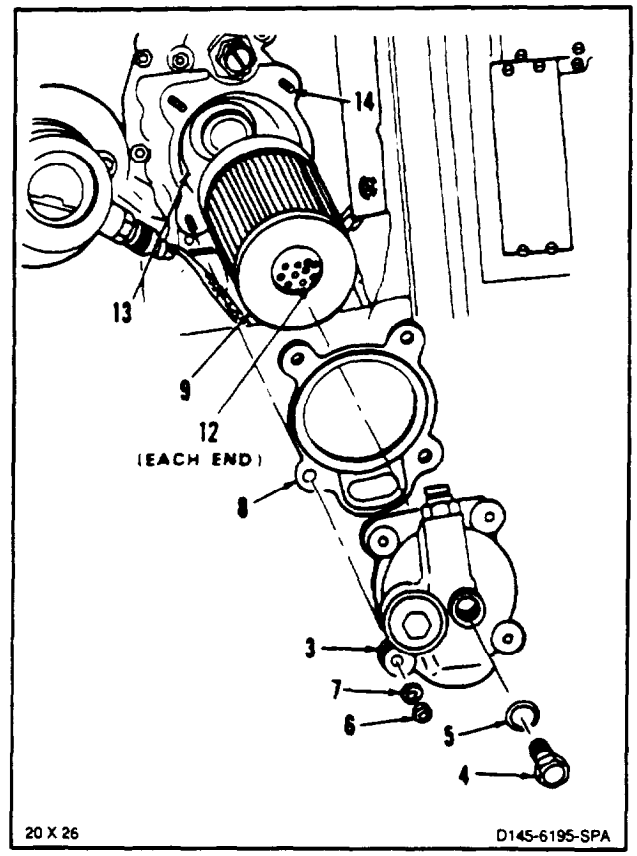
8. Install element (9), with packings (12), in pump (13).
9. Install gasket seal (8) and housing (3) on four studs (14). Install four washers (7) and nuts (6). Torque nuts to 70 to 85 inch-pounds (wet).
10. If housing (3) is not a replacement, remove drain plug (4) and packing (5). Install plug and new packing. Lockwireplug to housing (3). Use lockwire (E230).

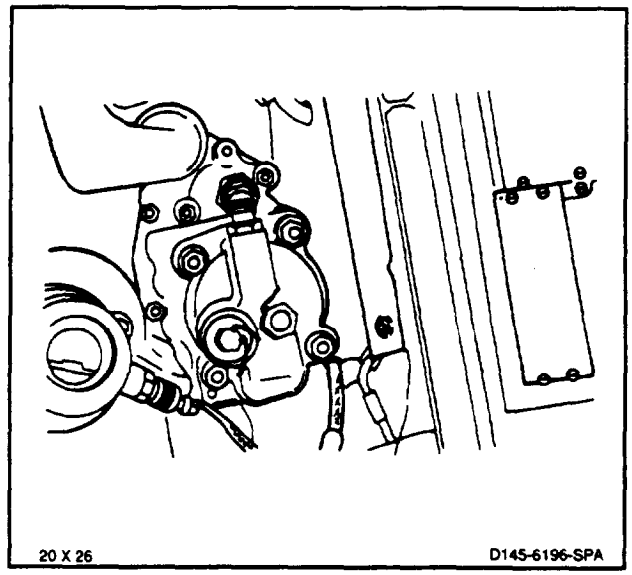
INSPECT

FOLLOW-ON MAINTENANCE:

Service forward transmission (Task 1-54).

Install forward transmission drip pan (Task 2-3).





END OF TASK

6-123.1 REPLACE FORWARD TRANSMISSION MAIN OIL FILTER PRESSURE DIFFERENTIAL INDICATOR 6-123.1

INITIAL SETUP

Applicable Configurations:
All

Tools:
Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Container, Two-Quart

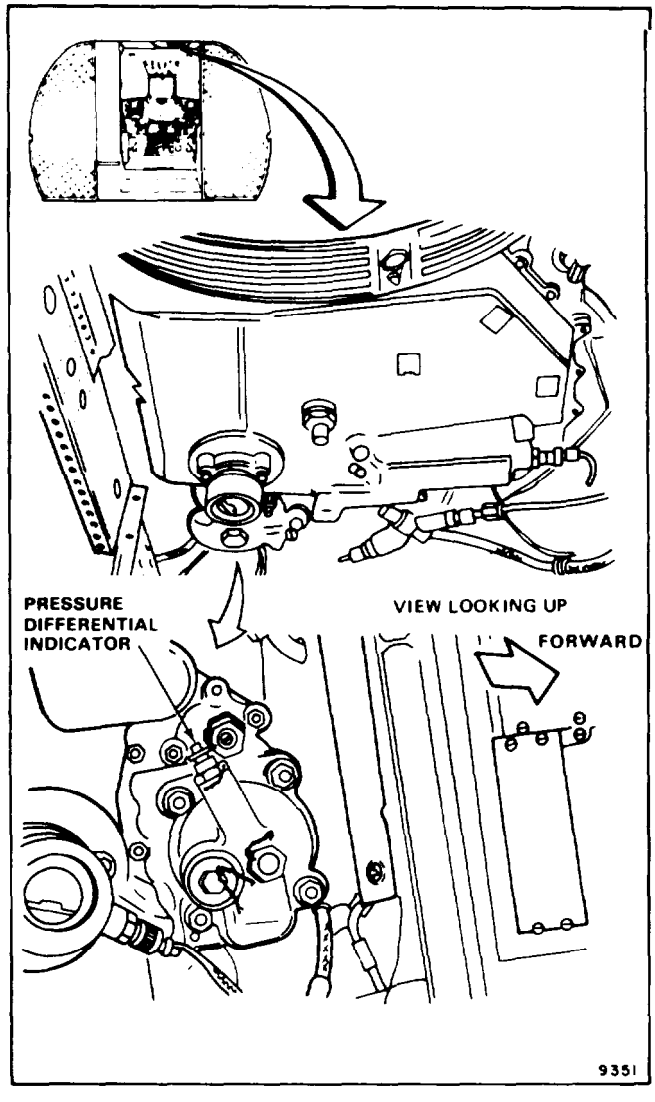
Materials:
Lockwire (E231)

Parts:
Packings

Personnel Required:
Medium Helicopter Repairer
Inspector

References:
TM 55-1520-240-23P

Equipment Condition:
Battery Disconnected (Task 1-39)
Electrical Power Off
Forward Transmission Drip Pan Removed (Task 2-3)

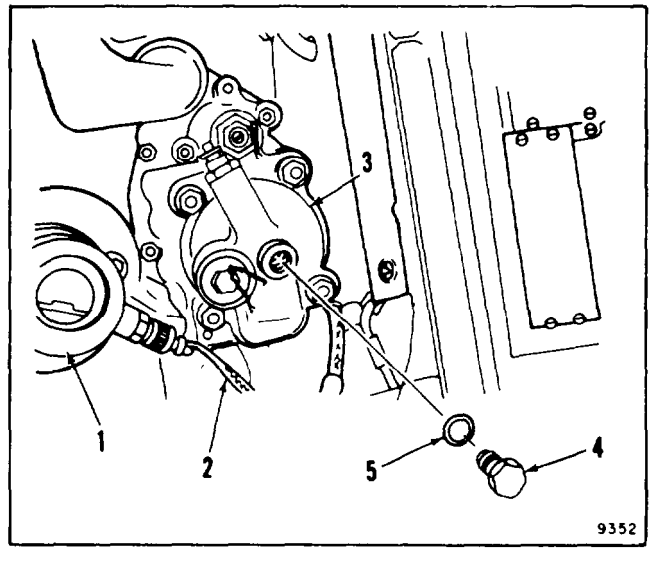


DRAIN OIL

NOTE

Filter housing holds about 1 pint.

1. Turn detection screen cap (1) to move wire (2) away from filter housing (3).
2. Remove lockwire from drain plug (4). Remove plug and packing (5). Drain oil. Use container to catch oil.
3. Install drain plug (4) and packing (5) in housing (3). Torque to 80 inch-pounds. Lockwire plug to housing. Use lockwire (E231).



GO TO NEXT PAGE

6-123.1 REPLACE FORWARD TRANSMISSION MAIN OIL FILTER PRESSURE DIFFERENTIAL INDICATOR (Continued) 6-123.1

4. Lockwire plug (4) to housing (3). Use lockwire (E231).

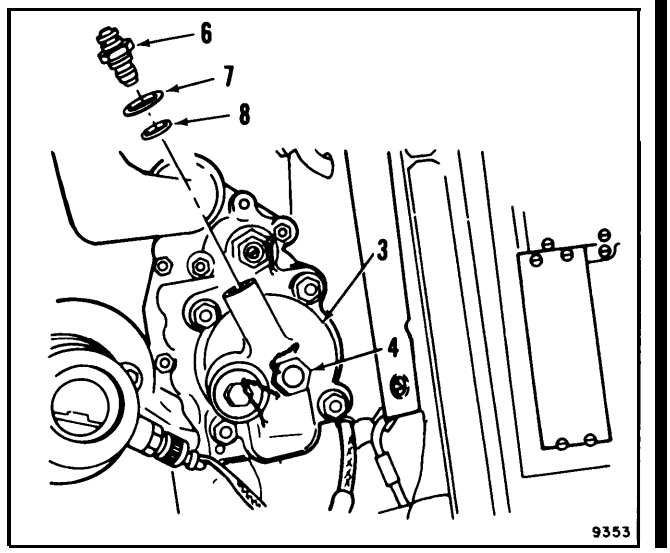
REMOVE INDICATOR

5. Remove lockwire from pressure differential indicator (6). **Remove indicator** from housing (3).
6. **Remove two packings (7 and 8)** from indicator (6).

INSTALL INDICATOR

7. **Install two packings (7 and 8)** on indicator (6).
8. Hold indicator (6) so that button (9) points up. **Check that button is pushed in** and locked.
9. **Install indicator (6)** in housing (3).
10. Lockwire indicator (6) to housing (3). Use lockwire (E231).

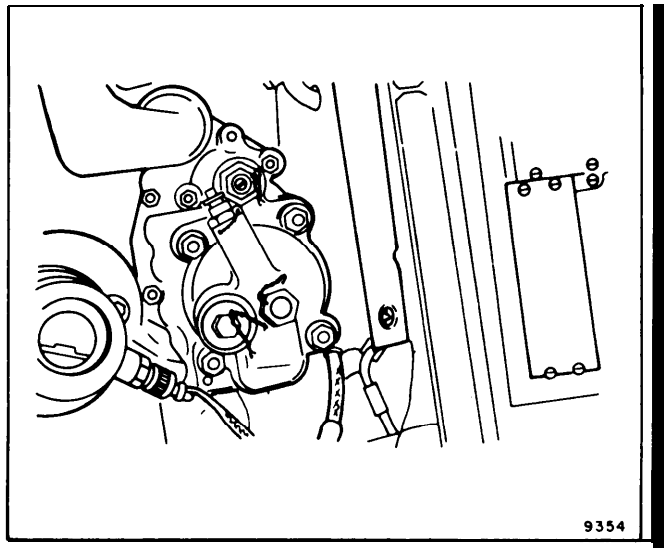
INSPECT



FOLLOW-ON MAINTENANCE:

Service forward transmission (Task 1-54).

Install forward transmission drip pan (Task 2-3).



END OF TASK

6-124 REMOVE FORWARD TRANSMISSION MAIN OIL PUMP 6-124

INITIAL SETUP

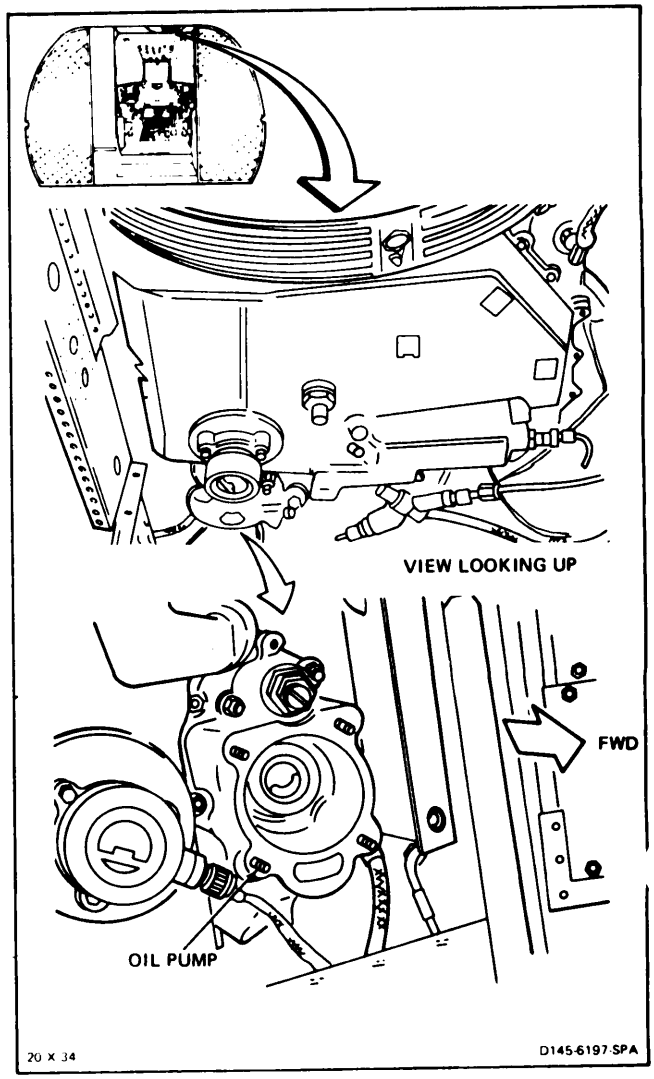
Applicable Configurations:
All

Tools:
AircrafT Mechanic's Tool Kit,
NSN 5180-00-323-4692
Bolt, 1/4-24, 1 1/4-inch Thread Length (2)

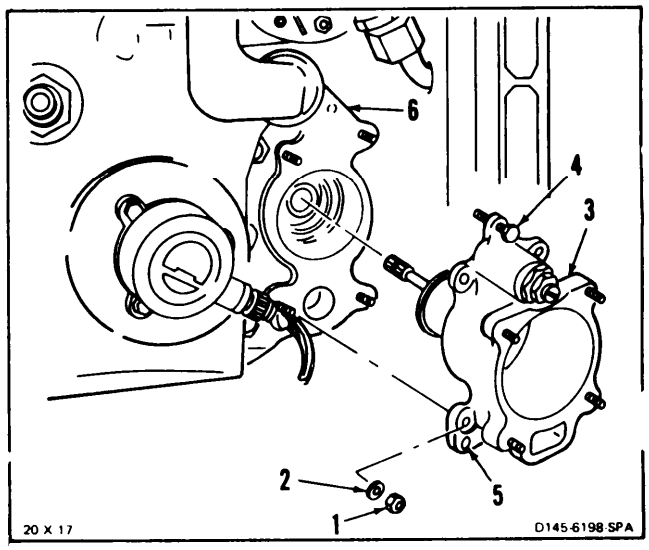
Materials:
None

Personnel Required:
Medium Helicopter Repairer

Equipment Condition:
Battery Disconnected (Task 1-39)
Electrical Power Off
Forward Transmission Drip Pan Removed (Task 2-3)
Oil Filter Element Removed (Task 6-123)



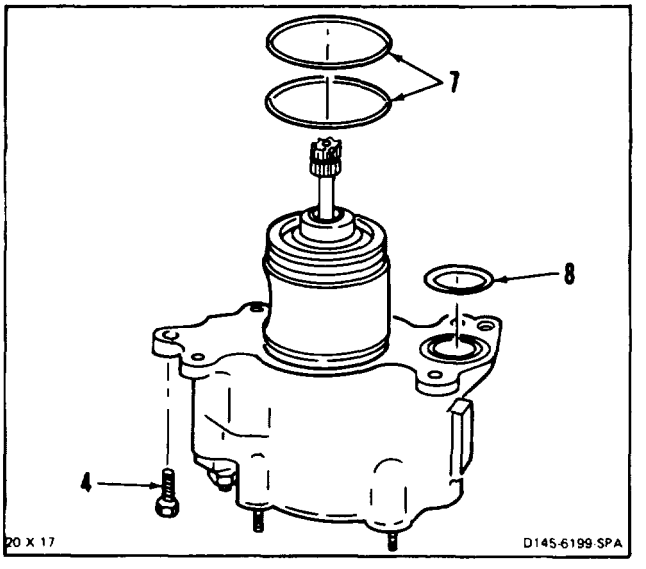
1. **Remove four nuts (1)** and washers (2) from pump (3).
2. Install two 1/4-24 bolts (4) in two mounting flange holes (5). Turn bolts to jack pump out of transmission (6). **Remove pump.**



GO TO NEXT PAGE

6-124 REMOVE FORWARD TRANSMISSION MAIN OIL PUMP (Continued)

3. Remove two bolts (4). Remove two packings (7) and packing (8).



FOLLOW-ON MAINTENANCE:

None

END OF TASK

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692
Torque Wrench, 30 to 150 Inch-Pounds

Materials:

Lubricating Oil (E253, E254 or E254.1)

Parts:

Packings

Personnel Required:

Medium Helicopter Repairer (2)
Inspector

References:

TM 55-1520-240-23P

Equipment Condition:

Tiedown Line Installed on One Forward Blade (Task 1-26)

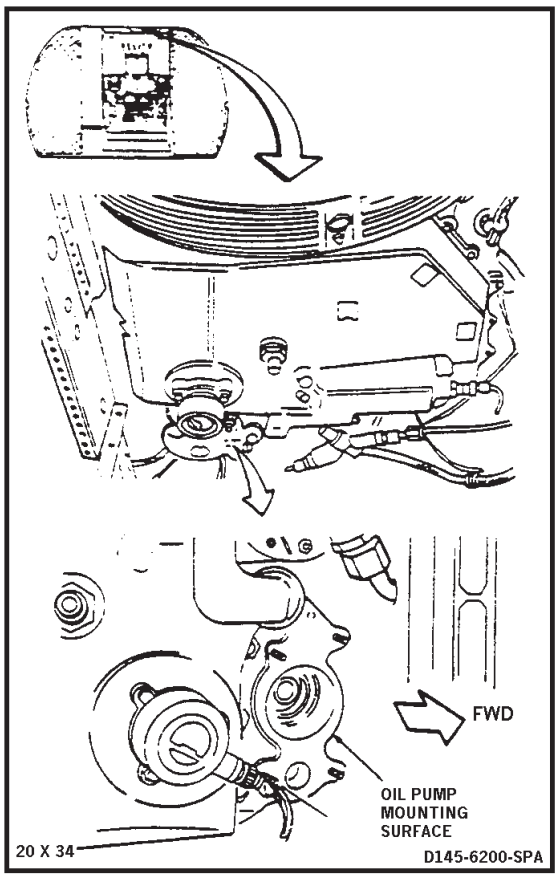
General Safety Instructions:

WARNING

Oil (E253, E254 or E254.1) is toxic. It can irritate skin and cause burns. Avoid inhaling. Use only with adequate ventilation. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.

WARNING

Do not install pumps with serial numbers V534 through V598. ASAM 96-08 directed removal of these pumps. If found, these pumps are to be removed from service and returned for rework.

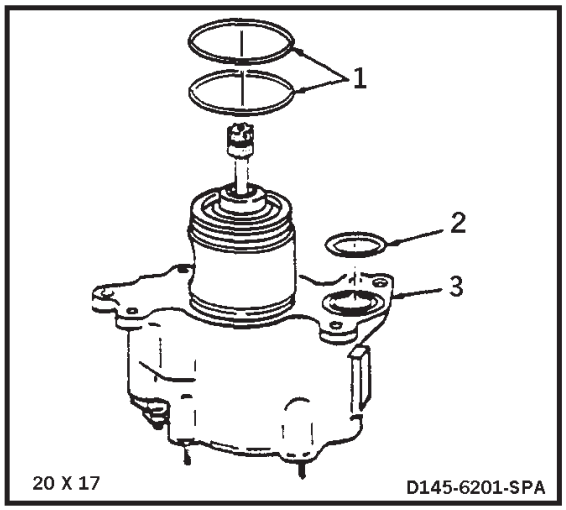


INSTALL PUMP

NOTE

Lubricate threads of self-locking nuts prior to torquing and lubricate packings prior to installation. Use oil (E253, E254, or E254.1).

1. Install two packings (1) and packing (2) in pump (3).



GO TO NEXT PAGE

6-125 INSTALL FORWARD TRANSMISSION MAIN OIL PUMP (Continued)

NOTE

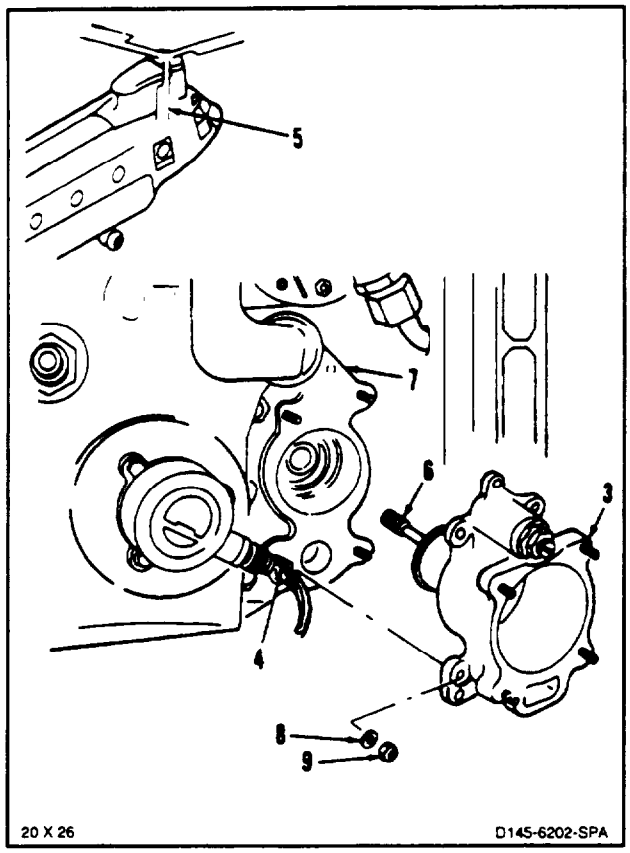
If pump binds during installation, it may be necessary to remove it and start again. Use soft-faced mallet to release a binding pump.

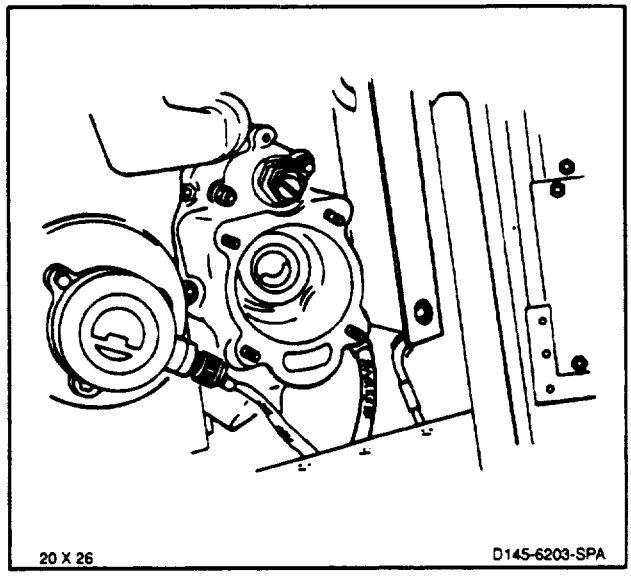
2. **Install pump (3)** slowly and carefully on four studs (4). Have helper turn blade (5) as needed during installation so that splined shaft (6) can be installed in transmission (7).

NOTE

If may be necessary to draw pump against transmission with nuts before installing washers and nuts.

3. Install four washers (8) and nuts **(9). Torque nuts to 70 to 85 inch-pounds (wet)**





INSPECT

FOLLOW-ON MAINTENANCE:

Install oil filter element (Task 6-123).

Service forward transmission (Task 1-54).

Perform ground run (TM 55-1520-240-10).

Install forward transmission drip pan (Task 2-3).

END OF TASK

6-126 ADJUST FORWARD TRANSMISSION MAIN OIL PUMP 6-126

INITIAL SETUP

Applicable Configurations:
All

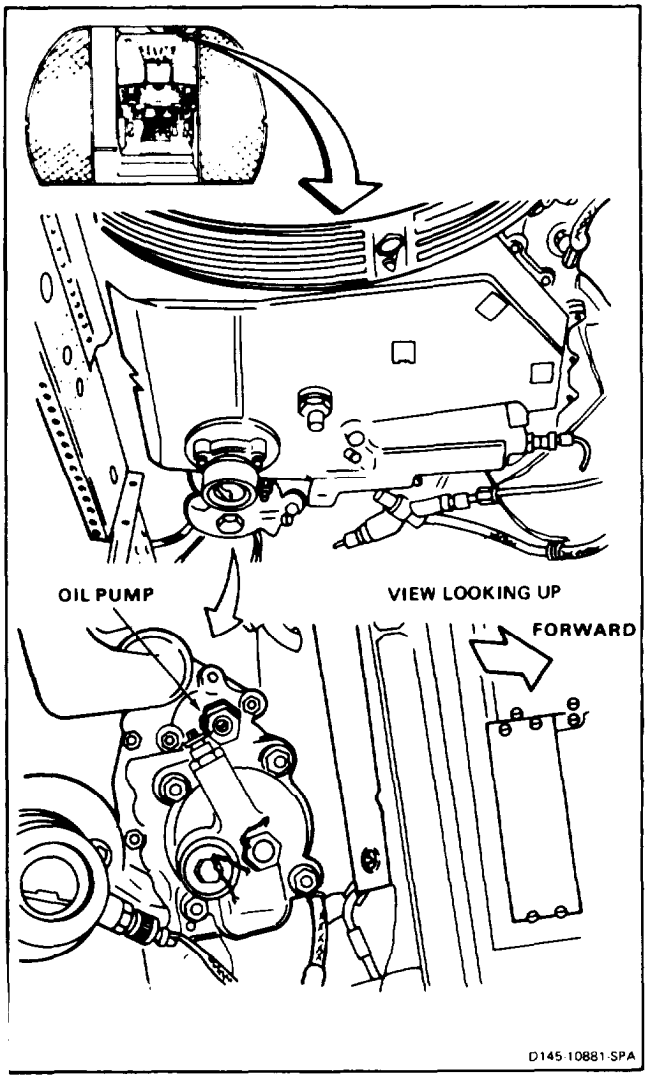
Tools:
Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692

Materials:
Lockwire (E230)

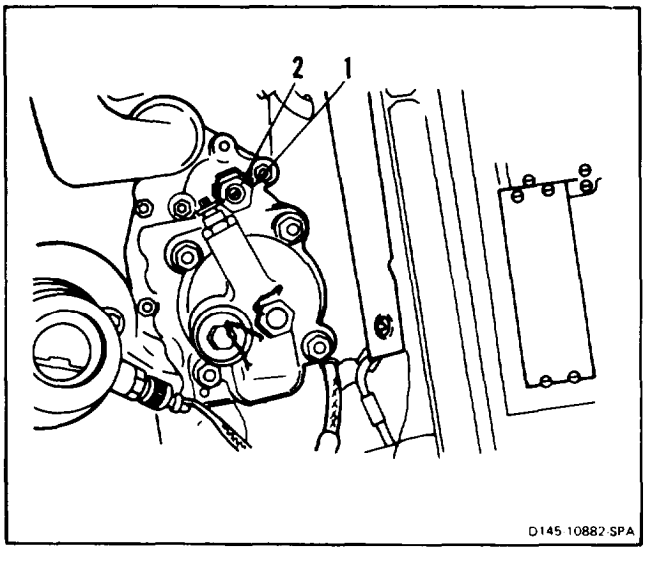
Personnel Required:
Medium Helicopter Repairer
Inspector
Army Rotary-Wing Aviator (2)

References:
TM 55-1520-240-10

Equipment Condition:
Battery Disconnected (Task 1-39)
Electrical Power Off
Forward Transmission Drip Pan Removed (Task 2-3)



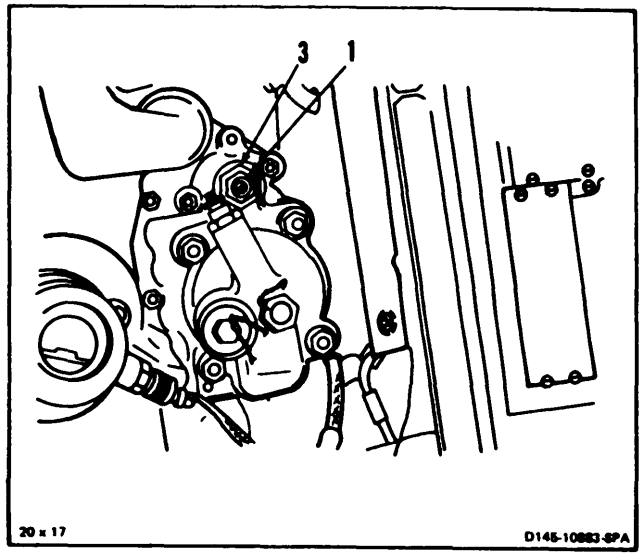
1. Remove lockwire from locknut (1). Hold setscrew (2) from turning and **loosen locknut.**
2. **Turn setscrew (2) no more than <u>1/4 turn</u> to adjust** transmission oil pressure. Turn setscrew clockwise to increase pressure. Turn setscrew counterclockwise to decrease pressure. **Required gage pressure is <u>40 to 70 psi.</u>**
3. Hold setscrew (2). **Torque locknut (1) to <u>60 inch-pounds</u>**



GO TO NEXT PAGE

6-126 ADJUST FORWARD TRANSMISSION MAIN OIL PUMP (Continued)

4. Have pilot perform ground run at 100 percent rotor rpm until transmission temperature and pressure stabilize. **Record forward transmission oil pressure.**
5. If oil pressure is 40 to 70 psi, go to step 6. **If oil pressure is not 40 to 70 psi, repeat task.**
6. Lockwire locknut (1) to retaining nut (3). Use lockwire (E230).



INSPECT

FOLLOW-ON MAINTENANCE:

Install forward transmission drip pan (Task 2-3).

END OF TASK

6-127 REMOVE FORWARD TRANSMISSION AUXILIARY OIL PUMP 6-127

INITIAL SETUP

Applicable Configurations:

All

Tools:

Powertrain Tool Kit,
NSN 5180-00-323-5267
Bolt, 1/4-28, 3-inches Long (2)

Materials:

None

Personnel Required:

Aircraft Powertrain Repairer (2)

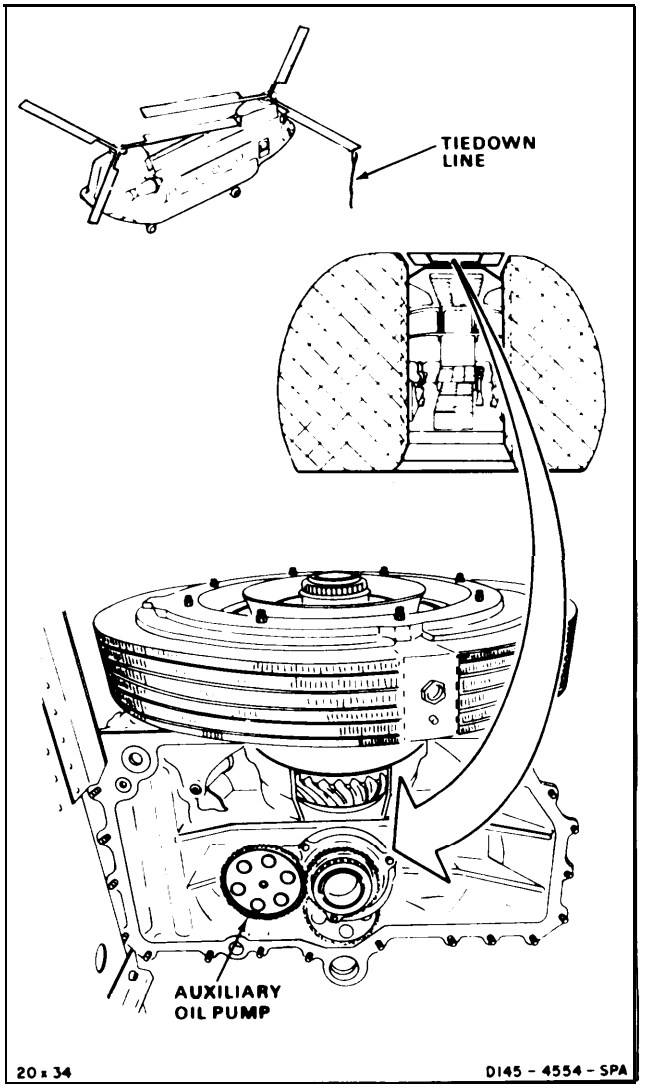
Equipment Condition:

Battery disconnected (Task 1-39)
Electrical Power Off
Forward Transmission Drip Pan Removed (Task 2-3).
Forward Transmission Sump Removed (Task 6-33)
Tiedown Line Installed On One Forward Blade (Task 1-26)

General Safety Instructions:

WARNING

Rotary-wing blades can seriously injure personnel. Make sure area around helicopter is clear of personnel before turning blades.



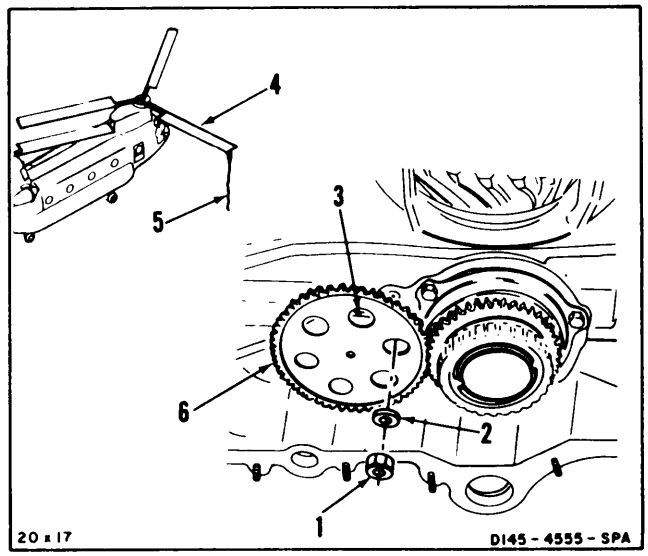
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6-127 REMOVE FORWARD TRANSMISSION AUXILIARY OIL PUMP (Continued)

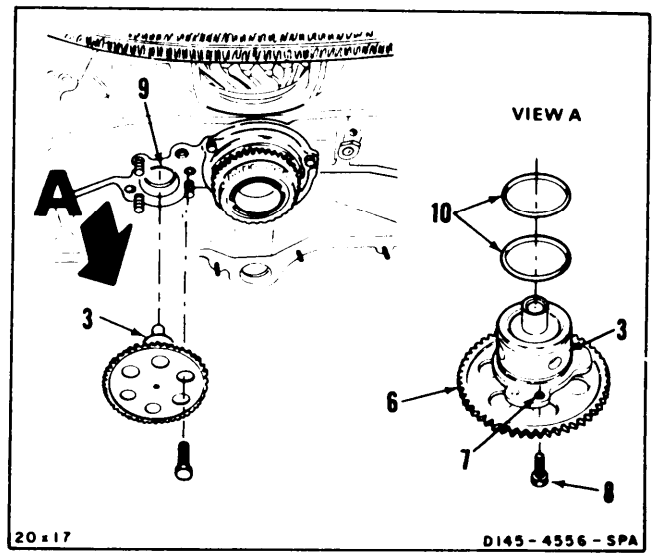
WARNING

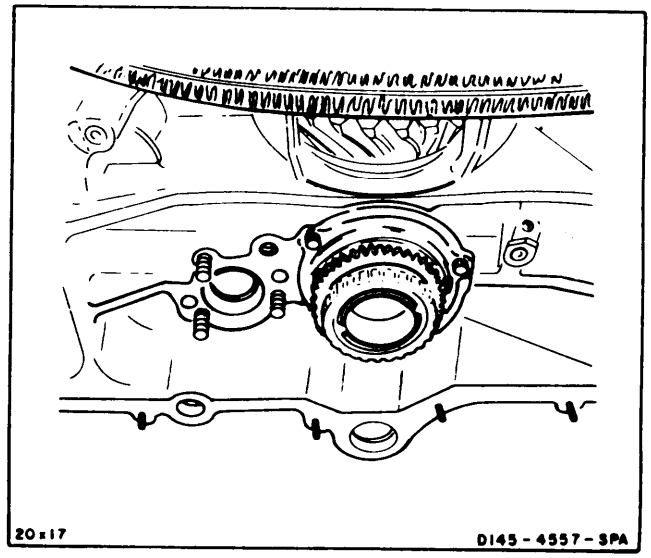
Keep fingers away from drive gear as blades are turned. Turning gear can cause injury to personnel.

1. **Remove three nuts (1)** and washers (2) from pump (3). Have helper pull blade (4) around with tiedown line (5) as needed to align access holes in drive gear (6) with nuts.



2. Align access holes in drive gear (6) with two threaded holes (7) in pump (3). **Install** 1/4-28 **bolt (8)** in each hole. Threaded length of bolts shall be at least 2 1/2-inches.
3. Turn bolts (8) until they bottom against transmission (9). Continue turning bolts one turn at a time to jack pump (3) out of transmission. Remove pump.
4. Remove two bolts (8) and packings (10) from pump (3).





FOLLOW-ON MAINTENANCE:

None

END OF TASK

6-128 INSTALL FORWARD TRANSMISSION AUXILIARY OIL PUMP 6-128

INITIAL SETUP

Applicable Configurations:
All

Tools:
Powertrain Tool Kit,
NSN 5180-00-323-5267
Torque Wrench, 30 to 150 Inch-Pounds

Materials:
None

P aris:
Packings

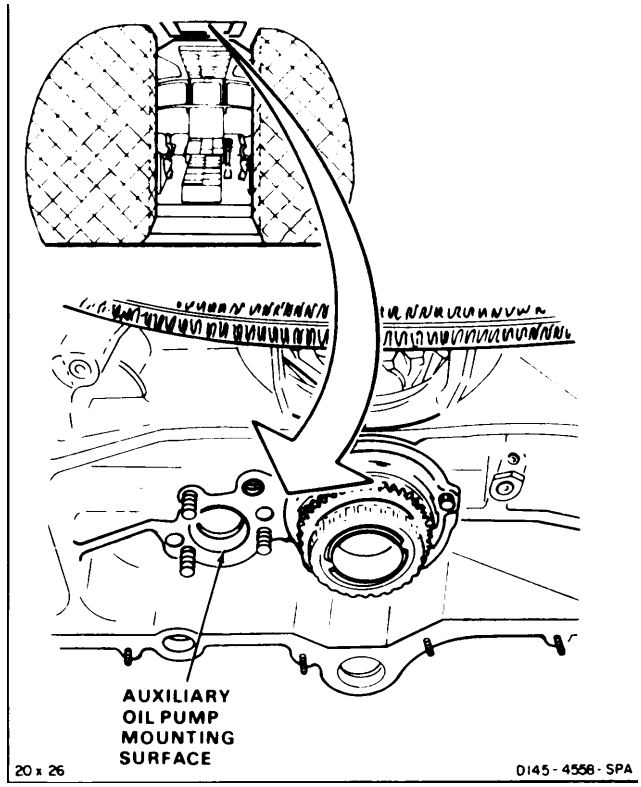
Personnel Required:
Aircraft Powertrain Repairer (2)
Inspector

References:
TM 55-1520-240-23P

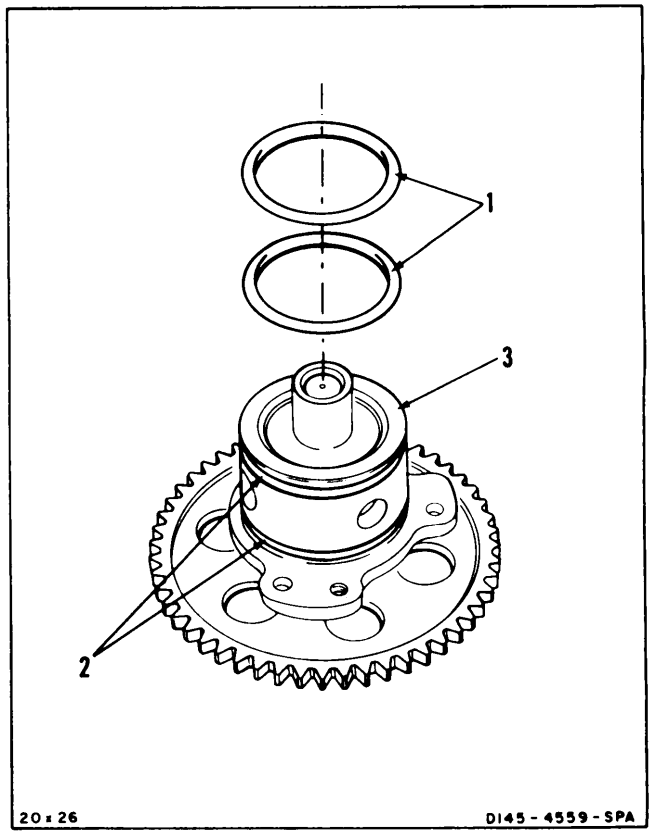
General Safety Instructions:

WARNING

Rotary-wing blades can seriously injure personnel. Make sure area around helicopter is clear of personnel before turning blades.



1. Install packings (1) in grooves (2) of pump (3).



GO TO NEXT PAGE

6-128 INSTALL FORWARD TRANSMISSION AUXILIARY OIL PUMP (Continued) 6-128

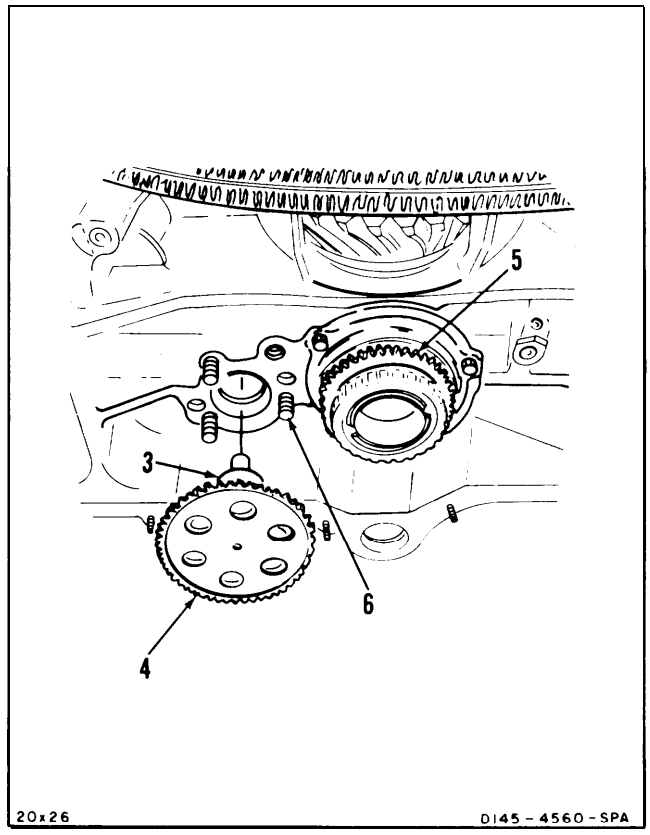
WARNING

Keep fingers away from drive gear if blades are turned. Turning gear can cause injury to personnel.

CAUTION

If drive gear teeth do not align with drive gear, pump can be damaged.

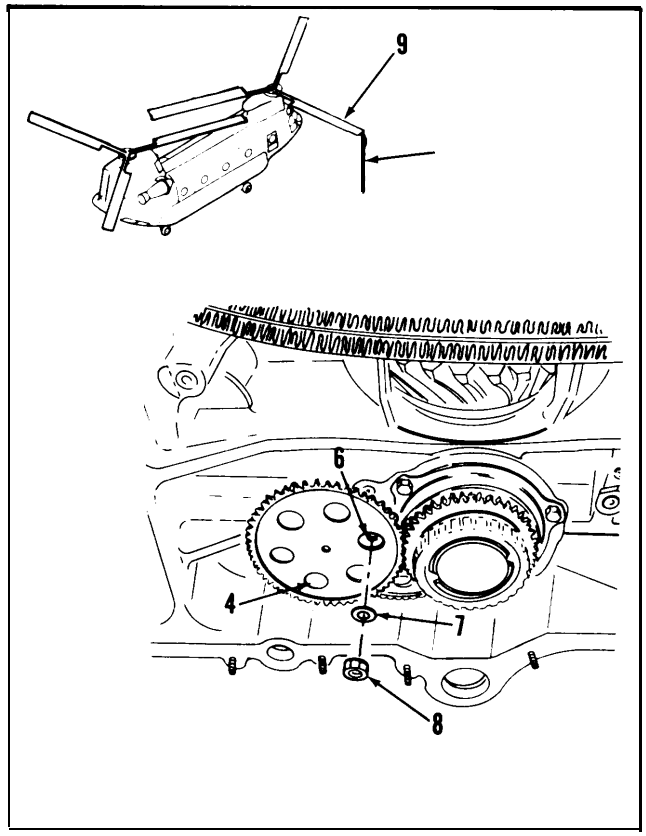
2. **Align teeth** of pump drive gear (4) with teeth of transmission drive gear (5). **Install pump (3)** on three studs (6).



WARNING

Keep fingers away from drive gear as blades are turned. Turning gear can cause injury to personnel.

3. **Install three** washers (7) and **nuts (8).** Have helper pull blade (9) around with tie-down line (10) as needed to align access holes in drive gear (4) with studs (6). **Torque nuts to 60 inch-pounds.**



INSPECT

FOLLOW-ON MAINTENANCE:

Install forward transmission sump (Task 6-37).

Install forward transmission drip pan (Task 2-3).

Service forward transmission (Task 1-54.)

Remove tiedown line from forward blade (Task 1-26).

Perform operational check (TM 55-1520-240-10).

END OF TASK

6-129 REPLACE FORWARD TRANSMISSION AUXILIARY OIL FILTER 6-129

INITIAL SETUP

Applicable Configurations:
All

Tools:
Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Container, Two Quart
Torque MVrench, 30 to 150 Inch-Pounds

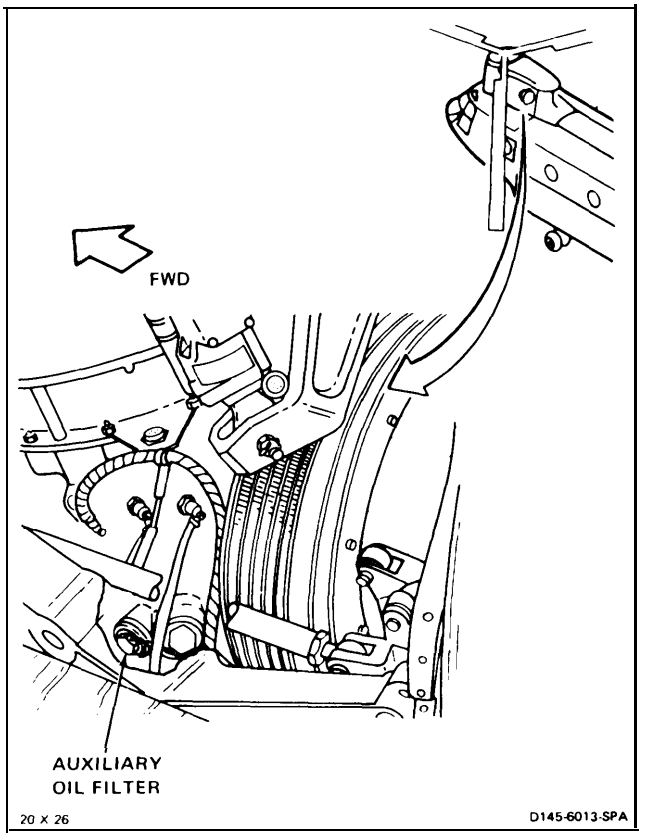
Materials:
Lockwire (E231)
Oil (E254)

Parts:
Packing
Filter

Personnel Required:
67U10 Medium Helicopter Repairer
67U30 Inspector

References:
TM 55-1520-240-23P

Equipment Condition:
Battery Disconnected (Task 1-39)
Electrical Power Off
Left Forward Transmission Fairing Open (Task 2-2)



REMOVE FILTER

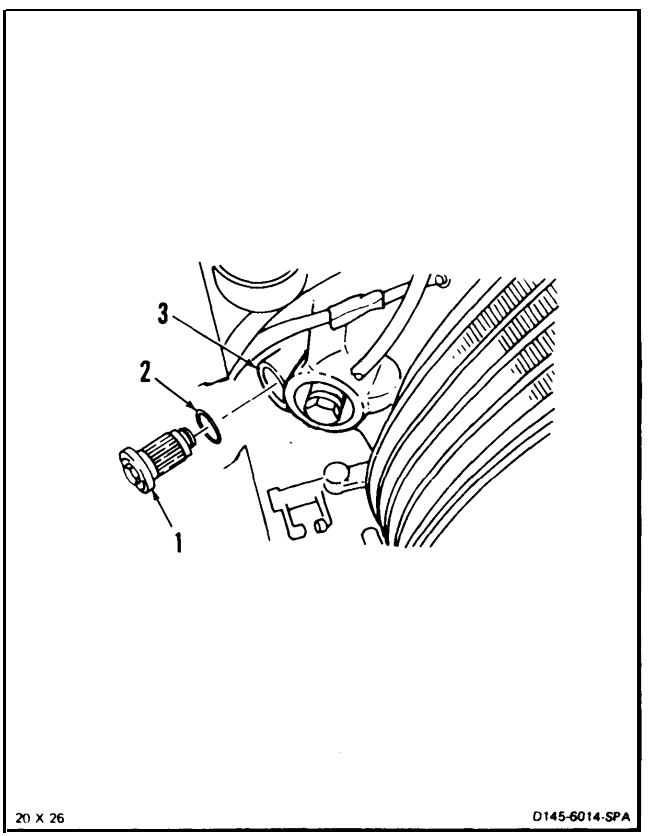
1. Remove lockwlre from filter (1).

CAUTION

Do not let debris enter transmission cavity. Damage can result.

2. **Remove filter (1)** and packing (2) from transmission (3). Catch spilled oil in container.

3. Check outside of filter (1) for debris If there is debris, perform a serviceability check of the forward transmission (Task 6-112).



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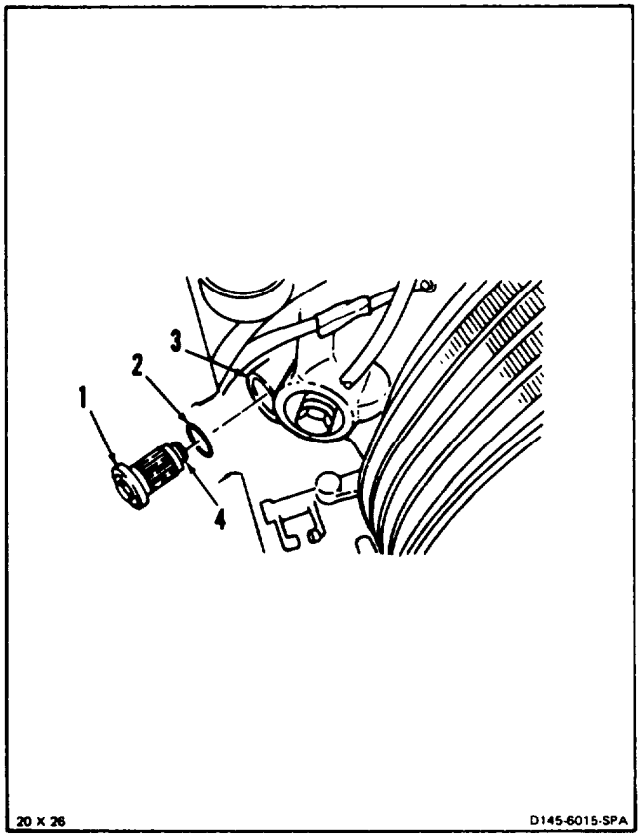
6-129 REPLACE FORWARD TRANSMISSION AUXILIARY OIL FILTER (Continued)

INSTALL FILTER

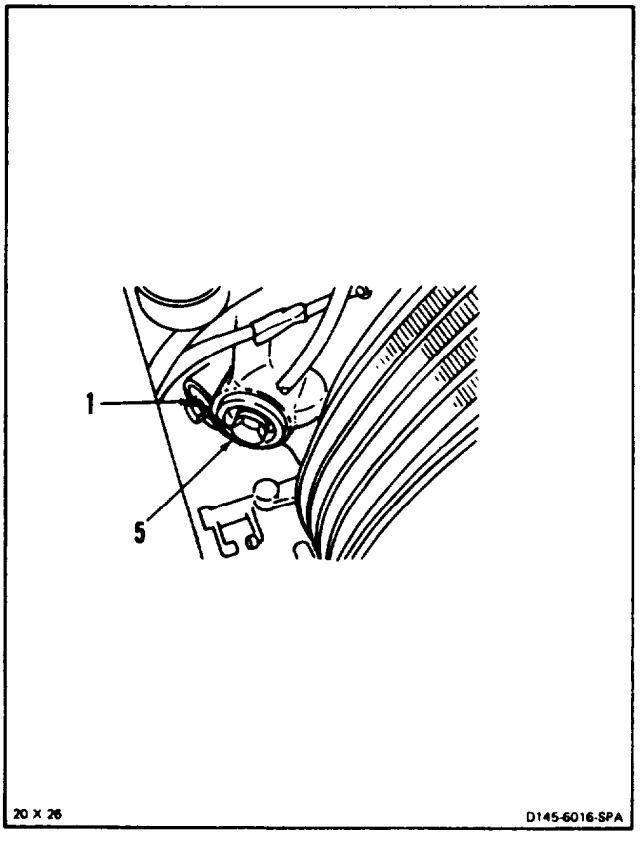
NOTE

Do not reuse removed filter. Filter is supplied with one packing installed.

4. Coat packings (2 and 4) and thread of new filter (1) with oil (E254).
5. **Install filter (1)** and packing (2) in transmission (3). **Torque filter to 80 inch-pounds.**



6. **Lockwire filter (1)** to inlet screen (5). Use lockwire (E230).



INSPECT

FOLLOW-ON MAINTENANCE:

Close left forward transmission fairing (Task 2-2).

END OF TASK

6-130 REMOVE FORWARD TRANSMISSION INLET SCREEN 6-130

INITIAL SETUP

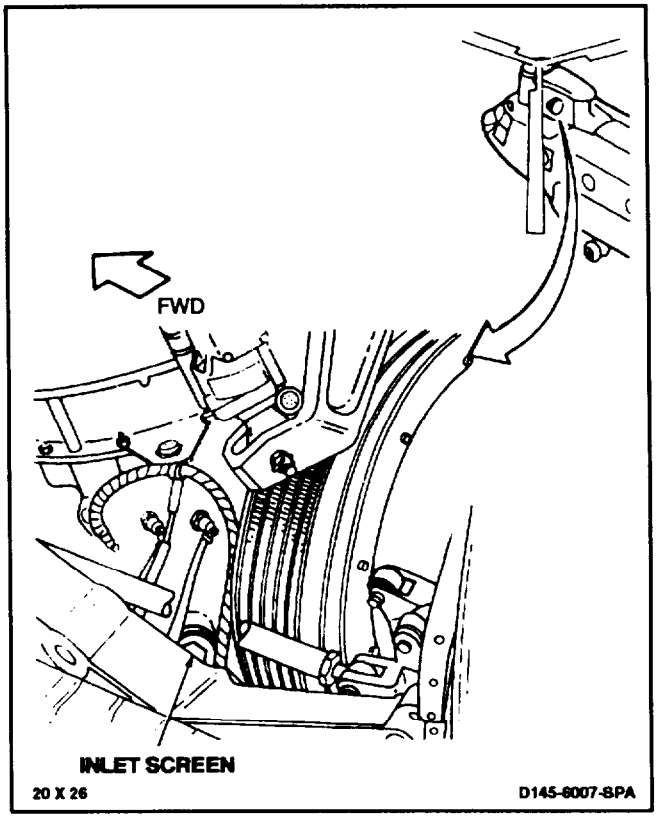
Applicable Configurations:
All

Tools:
Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692
Socket, 1-inch
Container, 2-Quart

Materials:
Barrier Material (E80)
Tape (E388)
Cloths (E120)

Personnel Required:
Medium Helicopter Repairer

Equipment Condition:
Battery Disconnected (Task 1-39)
Electrical Power Off
Left Forward Transmission Fairing Open (Task 2-2)

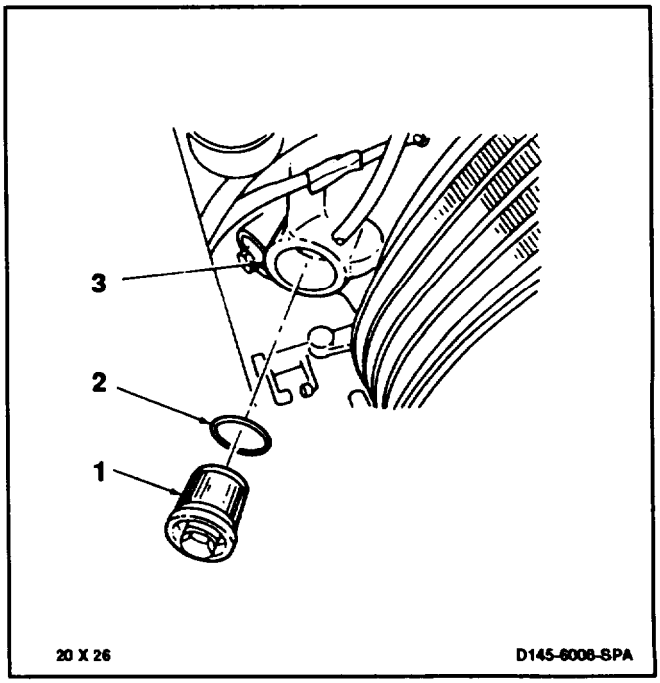


1. Remove lockwire from inlet screen (1).

CAUTION

Do not let debris enter transmission. Damage can result.

2. **Remove screen (1)** and packing (2) from transmission cavity (3). Catch spilled oil in container. Use cloths (E120) for spilled fluid.
3. Check outside of screen (1) for debris. If there is debris, perform a serviceability check of the forward transmission (Task 6-112).
4. Make sure no debris remains within cavity (3). Cover cavity with barrier material (E80) and tape (E388).



FOLLOW-ON MAINTENANCE:

None

END OF TASK

6-131 INSPECT FORWARD TRANSMISSION INLET SCREEN 6-131

INITIAL SETUP

Applicable Configurations:
All

Tools:
None

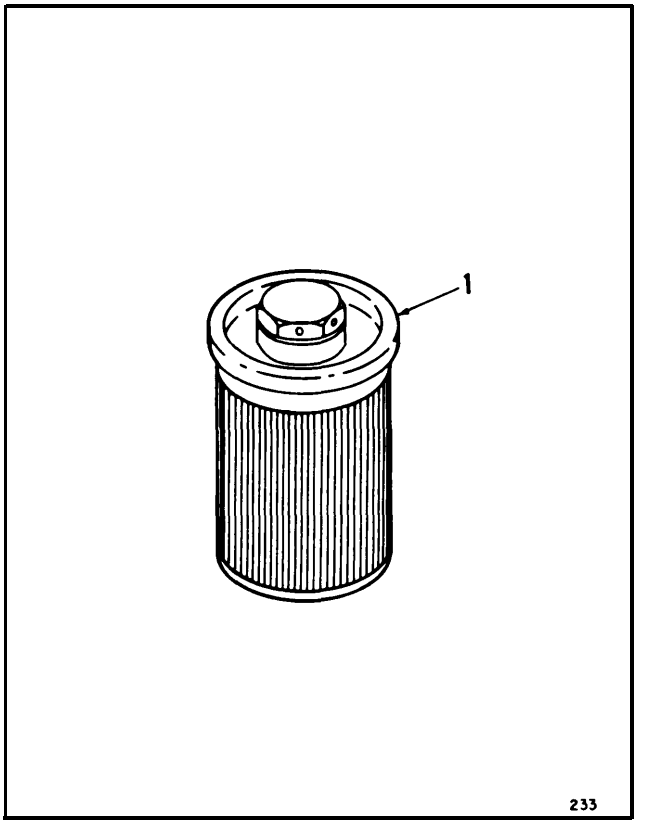
Materials:
Brush (E86)

Personnel Required:
Medium Helicopter Repairer

Retbrences:
Task 6-108

Equipment Condition:
Off Helicopter Task

1. **Check screen (1) for bits of metal and other debris. If debris is found, reject screen. Retain all debris for contamination analysis (Task 6-108).**
2. **Inspect screen (1) for tears.** There shall be no tears.



FOLLOW-ON MAINTENANCE:

None

END OF TASK

6-132 INSTALL FORWARD TRANSMISSION INLET SCREEN 6-132

INITIAL SETUP

Applicable Configurations:
All

Tools:
Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692
Torque Wrench, 30 to 150 Inch-Pounds
Socket, 1-Inch

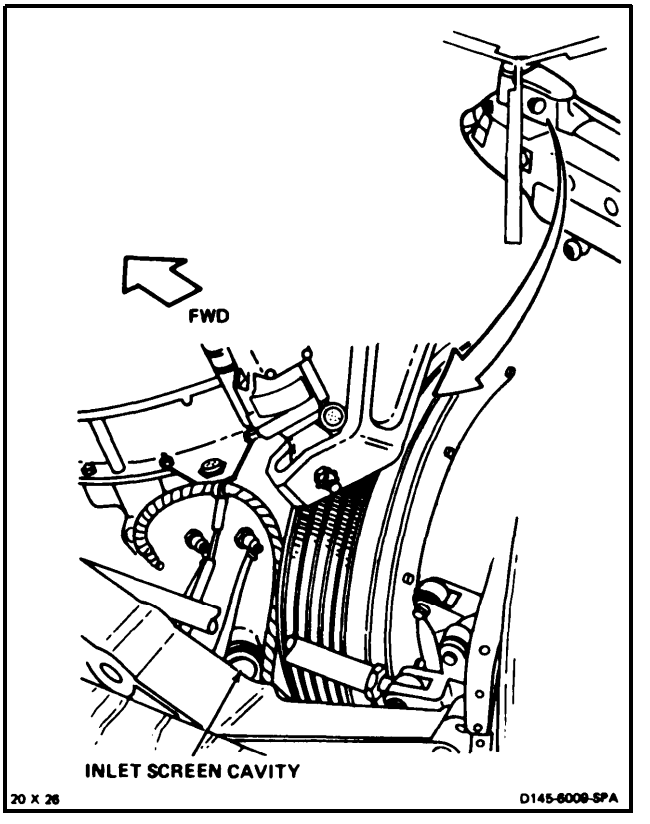
Materials:
Oil (E254)
Lockwire (E232)

Parts:
Packing

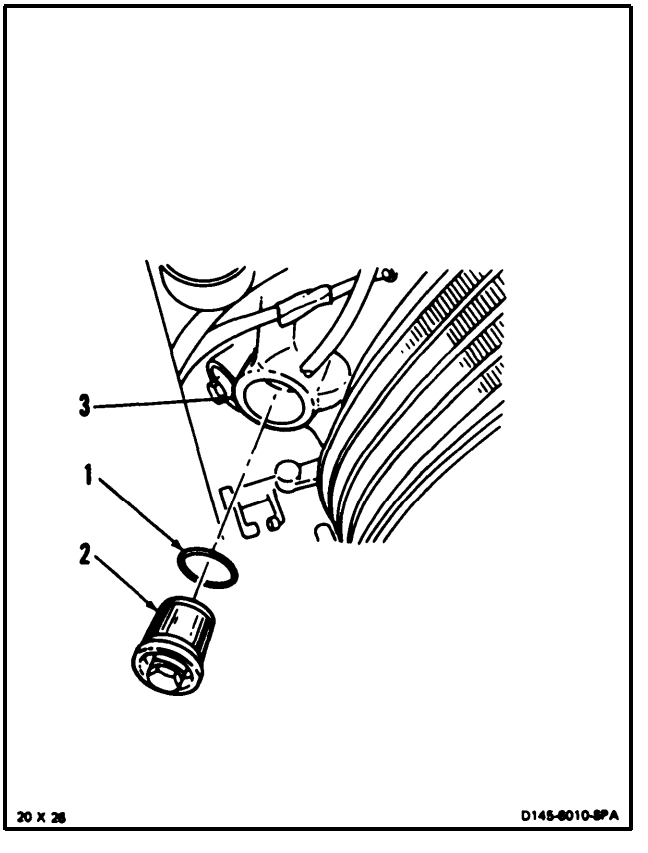
Porsonnel Required:
67U10 Medium Helicopter Repairer
67U30 Inspector

References:
TM 55-1520-240-23P

Equipment Condition:
Inlet Screen Inspected (Task 6-131)



1. Coat packing (1) and thread of screen (2) with oil (E254).
2. **Install screen (2)** and packing (1) in transmission cavity (3). **Torque screen to <u>80 inch-pounds.</u>**



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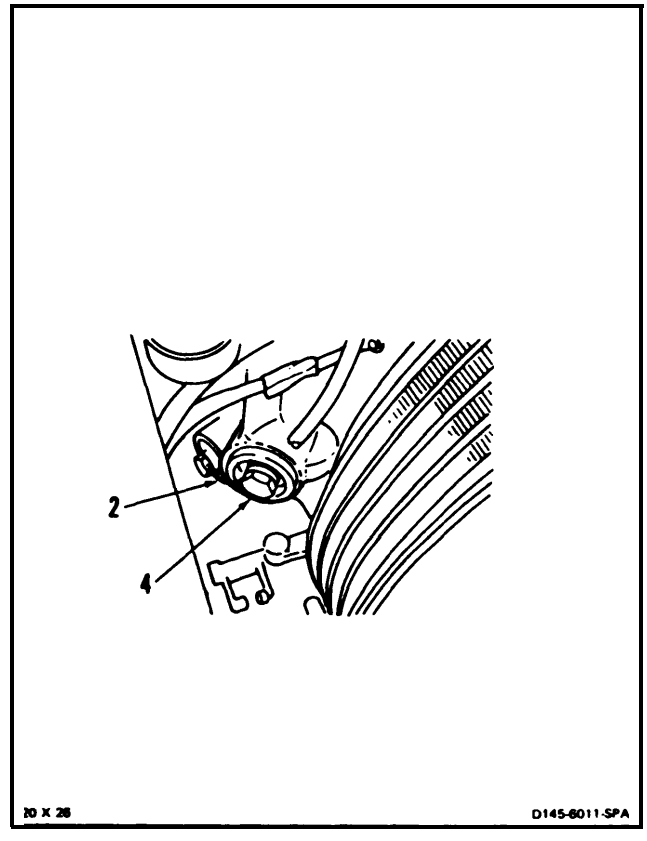
6-132 INSTALL FORWARD TRANSMISSI0N INLET SCREEN (Continued)

3. Lockwire screen (2) to auxiliary oil filter (4). Use Iockwire (E232).

INSPECT

FOLLOW-ON MAINTENANCE:

Close left fonuard transmission fairing (Task 2-2).



END OF TASK

6-133 REMOVE FORWARD TRANSMISSION DEBRIS DETECTION SCREEN

INITIAL SETUP

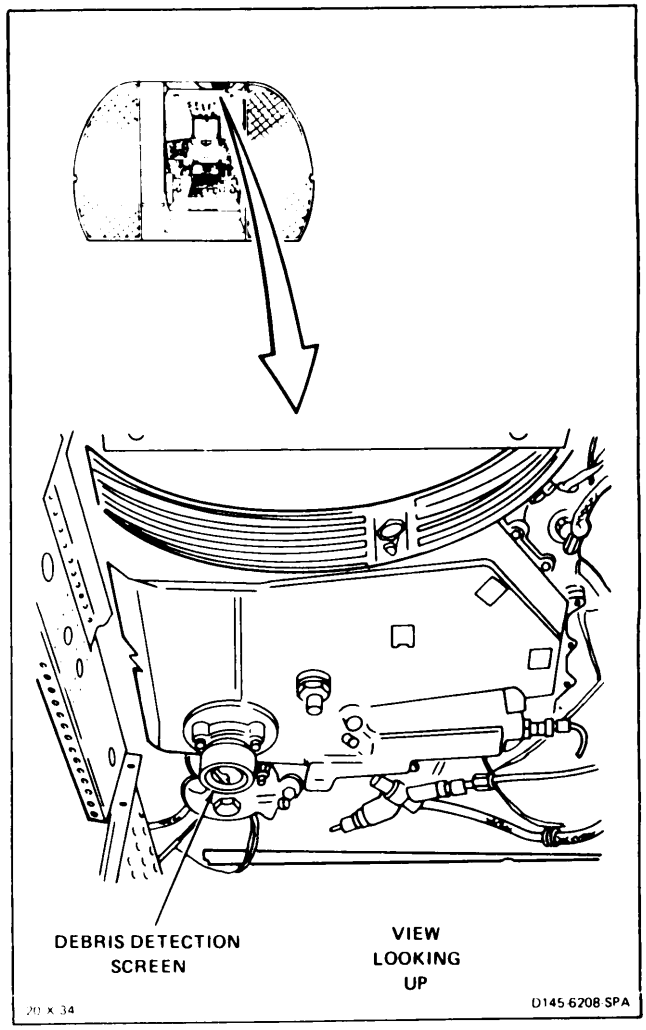
Applicable Configurations:
All

Tools:
Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692
Container, 2-Quart (Cap Removal Only)
Container, 14-Quart (Cap and Housing Removal)

Materials:
Cloths (E 120)

Personnel Required:
Medium Helicopter Repairer

Equipment Condition:
Battery Disconnected (Task 1-39)
Electrical Power Off
Forward Transmission
Drip Pan Access Cover Removed (Cap Removal Only) (Task 2-3)
Forward Transmission Drip Pan Removed (Cap and Housing Removal) (Task 2-3)



REMOVE CAP

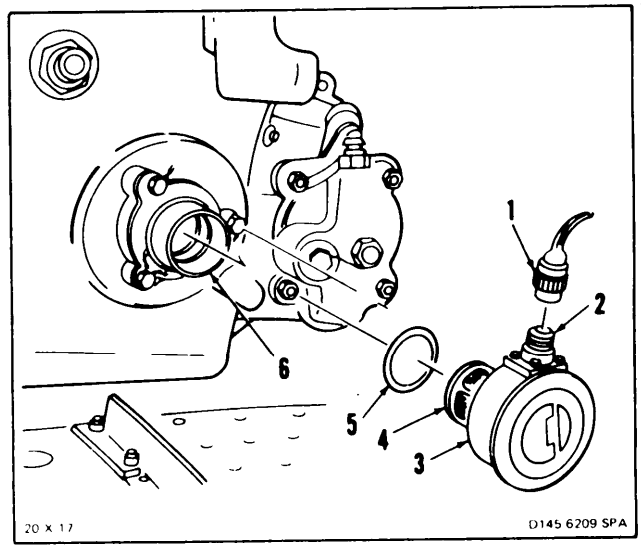
1. Disconnect connector (1) from cap receptacle (2).

NOTE
Cap holds 2 to 3 ounces of oil.

2. Hold container under can (3). Push in center of cap and **pull down cap** to **remove cap screen (4)** and packing (5). Drain oil. Use container to catch oil.

NOTE
Screen is part of cap.

3. Filter drained oil through cloth (E 120). **Check cloth and screen (4) for debris.** Retain debris for contamination analysis (Task 6- 108).
4. If housing (6) will not be removed, omit steps 5. thru 7.



GO TO NEXT PAGE

6-133 REMOVE FORWARD TRANSMISSION DEBRIS DETECTION SCREEN (Continued)

REMOVE HOUSING

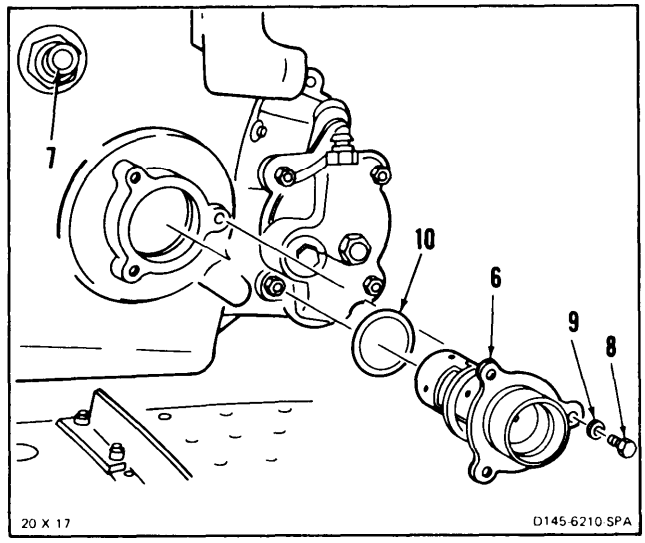
NOTE

Sump holds about 28 quarts of oil.

5. **Push in drain valve (7),** twist and pull. **Drain oil.** Use container to catch oil. Push in valve and twist to close.
6. Remove lockwire from three bolts (8). **Remove thrEe bolts** and washers (9).
7. **Remove housing (6)** and packing (10).

FOLLOW-ON MAINTENANCE:

None



END OF TASK

6-134 INSTALL FORWARD TRANSMISSION DEBRIS DETECTION SCREEN

INITIAL SETUP

Applicable Configurations:
All

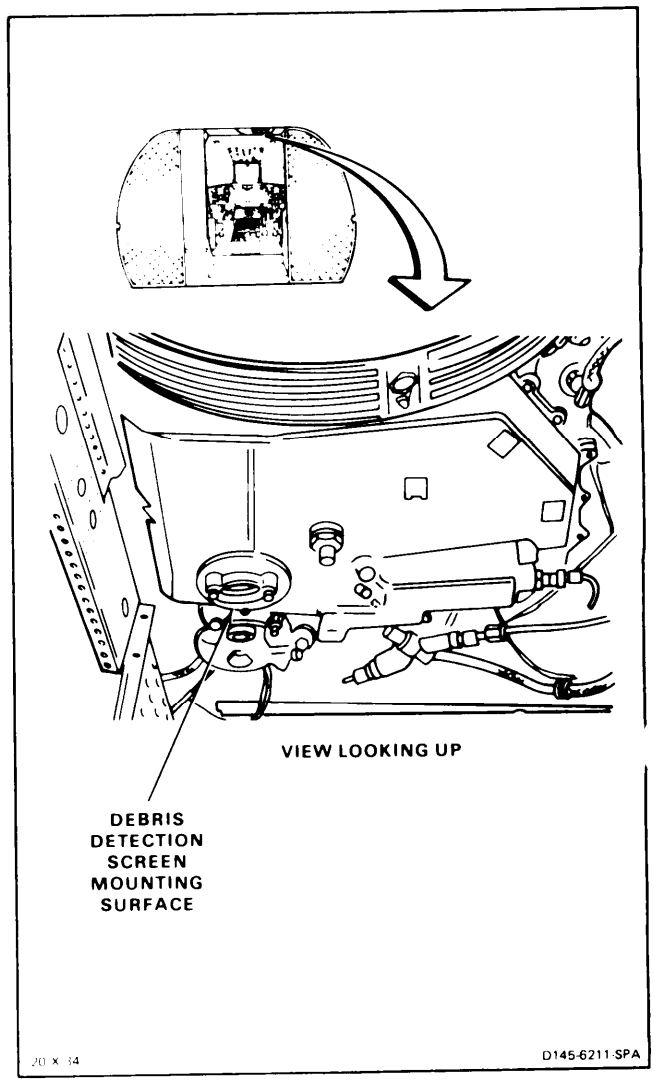
Tools:
Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692
Torque Wrench, 30 to 150 Inch-Pounds

Materials:
Lockwire (E231)

Parts:
Packings

Personnel Required:
67LJ10 Medium Helicopter Repairer
67U30 Inspector

References:
TM 55-1520-240-23P
TM 55-1520-240-T



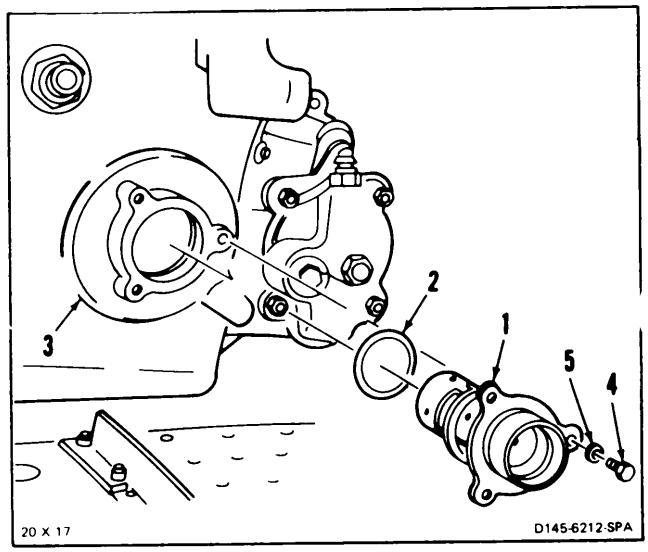
NOTE

If only cap is being installed, go to step 4.

INSTALL HOUSING

1. **Install housing (1)** and packing (2) n sump (3).
2. **Install three bolts (4)** and washers (5) **Torque bolts to <u>60 inch-pounds.</u>**
3. Lockwire three bolts (4) together. Use lockwire (E231).

INSPECT



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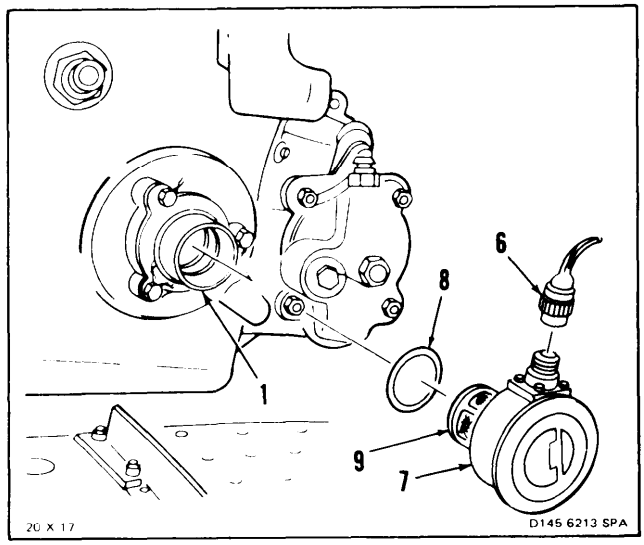
6-134 INSTALL FORWARD TRANSMISSION DEBRIS DETECTION SCREEN (Continued)

INSTALL CAP

NOTE

Screen is part of cap.

4. **Connect electrical connector (6)** to cap (7).
5. **Perform operational check** of forward transmission debris detection system (TM 55-1520-240-T).
6. Install packing (8) on screen (9).
7. Press in center of cap (7). Install cap and screen (9) in housing (1).



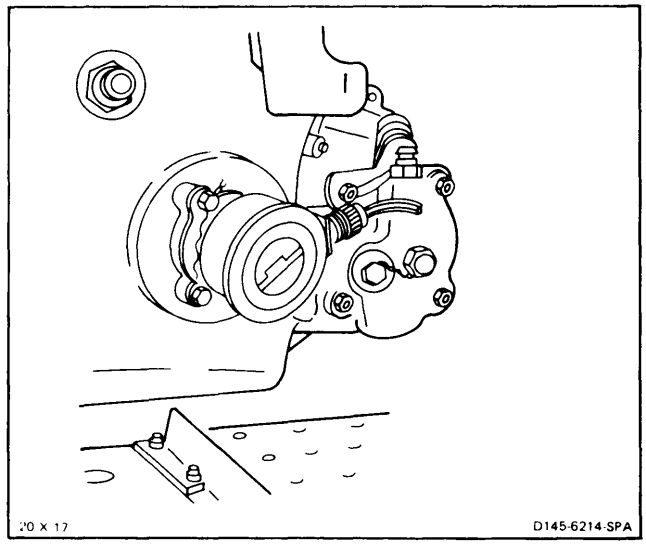
INSPECT

FOLLOW-ON MAINTENANCE:

Install forward transmission drip pan access cover (cap only installed) (Task 2-2).

Install forward transmission drip pan (cap and housing installed) (Task 2-3).

Service forward transmission (Task 1-54).



END OF TASK

6-135 REPLACE FORWARD TRANSMISSION SIGHT GAGE 6-135

INITIAL SETUP

Applicable Configurations:
All

Tools:
Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692
Spanner Wrench
Container, 14 Quart (3)
Torque Wrench, 30 to 150 Inch-Pounds

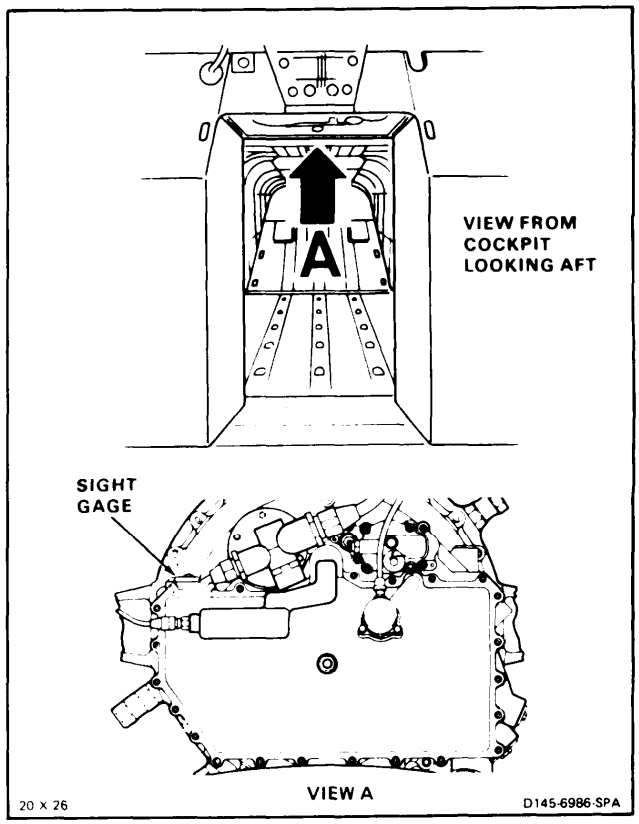
Materials:
Oil (E254)
Lockwire (E231)

Parts:
Packing

Personnel Required:
67U10 Medium Helicopter Repairer
67U30 Inspector

References:
TM 55-1520-240-23P

Equipment Condition:
Battery Disconnected (Task 1-39)
Electrical Power Off
Hydraulic Power Off
Forward Transmission Drip Pan Removed (Task 2-3)

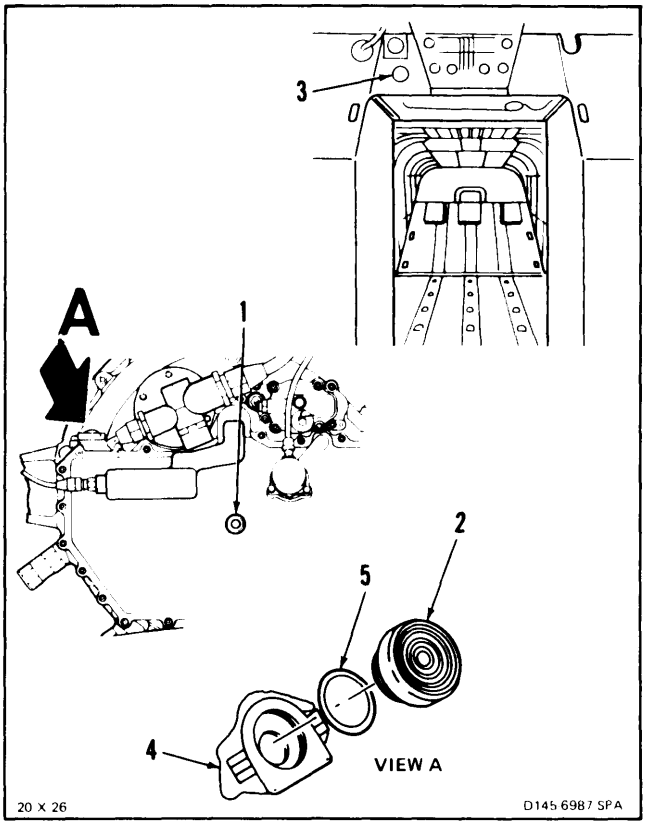


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6-135 REPLACE FORWARD TRANSMISSION SIGHT GAGE (Continued)

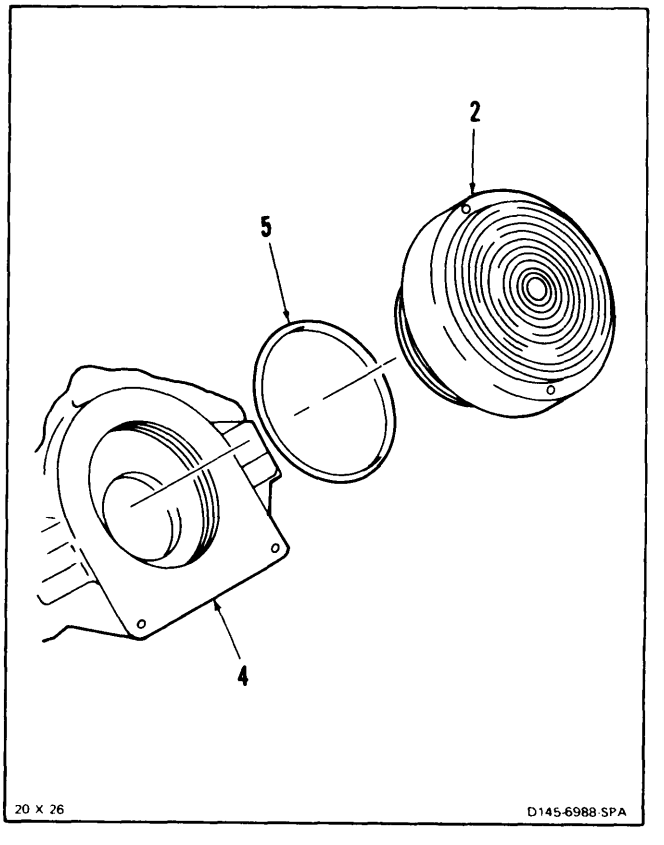
REMOVE SIGHT GAGE

1. Position containers under sump drain valve (1).
2. Push in drain valve (1), twist, and Pull. **Drain oil** into container **until oil level is below sight gage (2).** View oil level from cockpit through access hole (3).
3. Close drain valve (1) by pushing it in and twisting it.
4. Remove lockwire from sight gage (2). **Remove gage** from transmission (4). Use spanner wrench.
5. Remove packing (5) from sight gage (2).



INSTALL SIGHT GAGE

6. Coat packing (5) and thread of sight gage (2) with oil (E254). Install packing on gage.
7. **Install sight gage (2)** in transmission (4). Use spanner wrench. **Torque gage to 80 inch-pounds.**

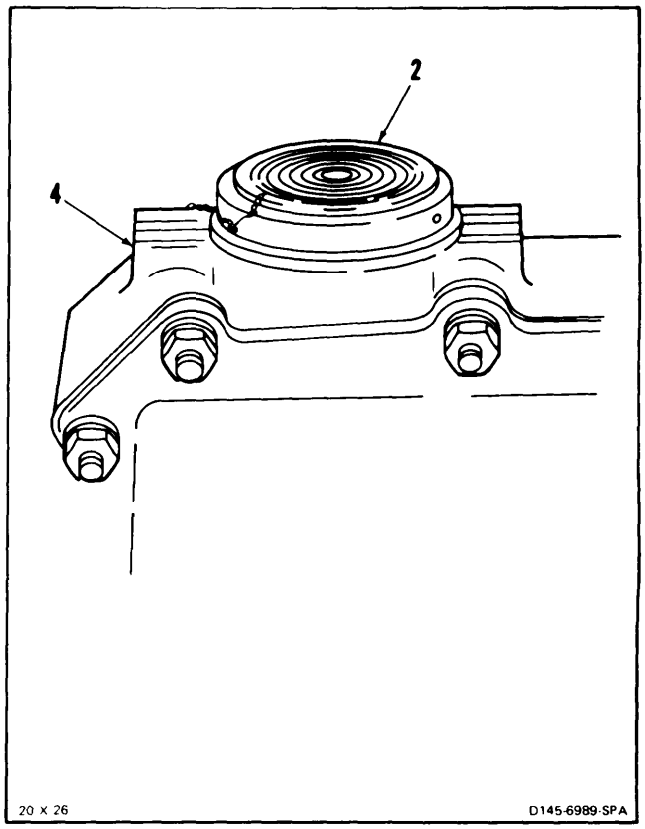


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6-135 REPLACE FORWARD TRANSMISSION SIGHT GAGE (Continued) 6-135

8. Lockwire sight gage (2) to transmission (4). Use lockwire (E231).

INSPECT



FOLLOW-ON MAINTENANCE:

Service forward transmission (Task 1-54).

Install forward transmission drip pan (Task 2-3).

END OF TASK

6-136 CONTAMINATION ANALYSIS OF AFT TRANSMISSION OIL

INITIAL SETUP

Applicable Configurations:
All

Tools:
Magnet
Magnifying Glass, 1 2-Power

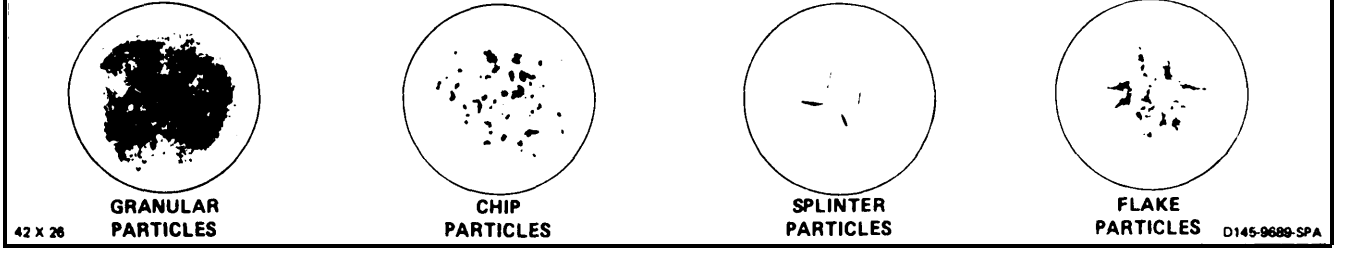
Materials:
None

Personnel Required:
67U30 Inspector

Equipment Condition:
Off Helicopter Task

1. Solid particles found in the transmission oil system may be steel, magnesium, aluminum, silver, copper, bronze, or fiberglass. Examine particles as follows:
   a. Separate steel particles. Use a magnet.
   b. Identify and separate remaining particles by visual inspection.
   c. Examine particles with a magnifying glass to determine shape and condition. Look for marks or discoloration that may indicate shearing, burning, or fatigue.

MATERIAL	DESCRIPTION	ACTION REQUIRED
Steel	Fine, hair-like fuzz particles	Normal wear. No action required
	Limited amount of splinters, flakes, or or granular particles	Possible failure. Perform serviceability check (Task 6- 140)
	Thin flakes up to 1/16-inch in diameter and 1/4-inch long, maximum of 10 flakes	Perform serviceability check (Task 6-140)
	Massive amount of splinters, flakes, or granular particles	Failure. Replace transmission (Task 6-92 and 6-97) or aft rotor shaft (Task 6-56 and 6-62)
Aluminum or magnesium	Granular particles	Perform serviceability check (Task 6-140)
Copper, bronze, or silver	Limited amount of granular particles	Possible indication of bearing cage wear. Perform serviceability check (Task 6-1 40)
	Massive amount of granular particles or chip particles	Failure. Replace transmission (Task 6-92 and 6-97) or aft rotor shaft (6-56 and 6-62)
Fiberglass	Granular or fibrous particles	Perform serviceability check (Task 6-140)



FOLLOW-ON MAINTENANCE:
None

END OF TASK

6-137 AFT TRANSMISSION OIL SYSTEM ALLOWABLE LEAKAGE 6-137

INITIAL SETUP

Applicable Configurations:
All

Tools:
Flashlight
Workstand

Materials:
None

Personnel Required:
Medium Helicopter Repairer

Equipment Condition:
Battery Disconnected (Task 1-39)
Electrical Power Off
Helicopter On Level Surface
Right Baffle Under Aft Transmission Open (Task 1-2)

WARNING

Prolonged oil leakage can damage finish and create a work hazard by making the fuselage slippery. It can also affect other systems in the helicopter. Therefore, good judgment must be used when determining allowable leakage.

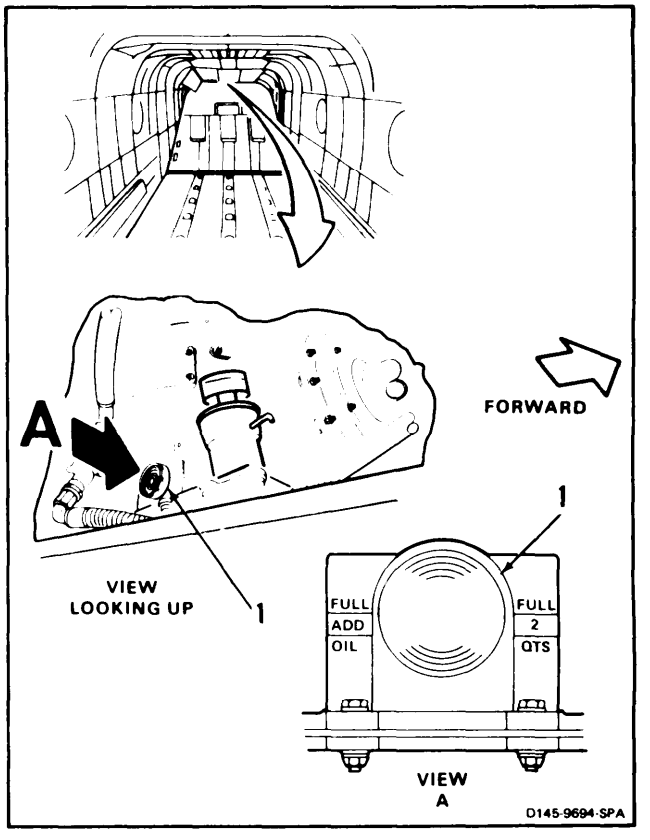
CAUTION

The maximum allowable leakage rate, static or dynamic, from any oil seal in the transmission is 20 drops (one cubic centimeter) per hour. If this limit is exceeded, the cause of the leakage shall be corrected by repair or replacement.

NOTE

If engines have not been operated for 30 minutes or more, perform a 5-minute ground run (TM 55-1520-240-10).

1. **Check sight gage (1)** to determine oil level. **Oil level shall be between the FULL and ADD OIL lines after a 2 hour flight.**



FOLLOW-ON MAINTENANCE:

Service aft transmission (Task 1-54).

Close baffle under aft transmission (Task 2-2).

END OF TASK

INITIAL SETUP

Applicable Configurations:

All

Tools:

Container, 14-Quart (3)
Hose, 1-Inch ID, 36 Inches Long

Materials:

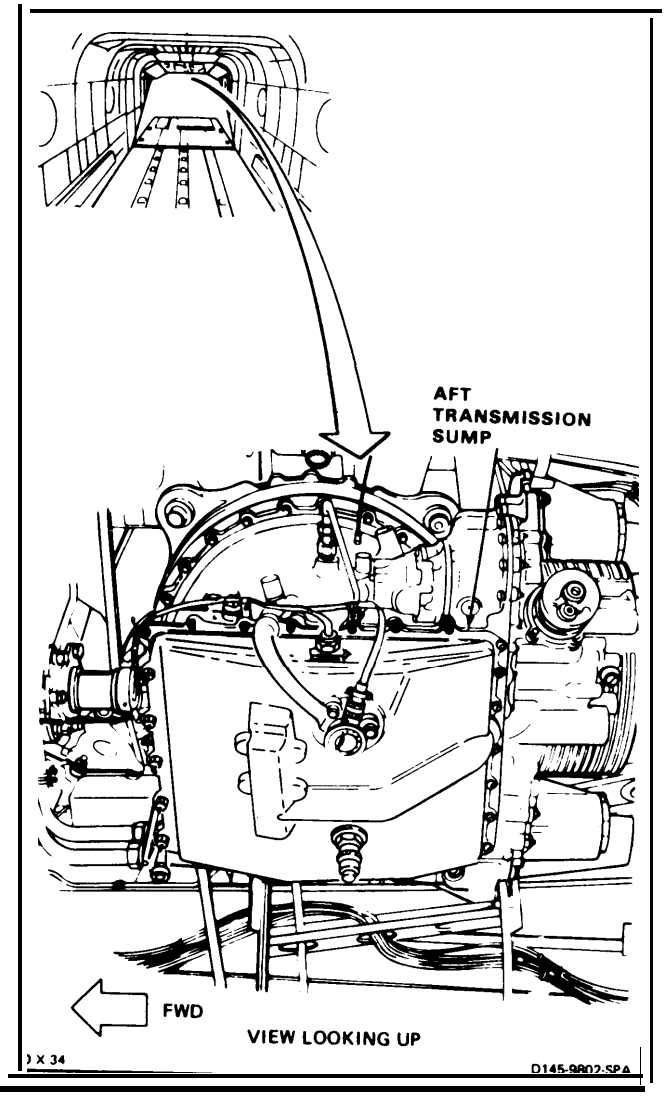
None

Personnel Required:

Medium Helicopter Repairer

Equipment Condition:

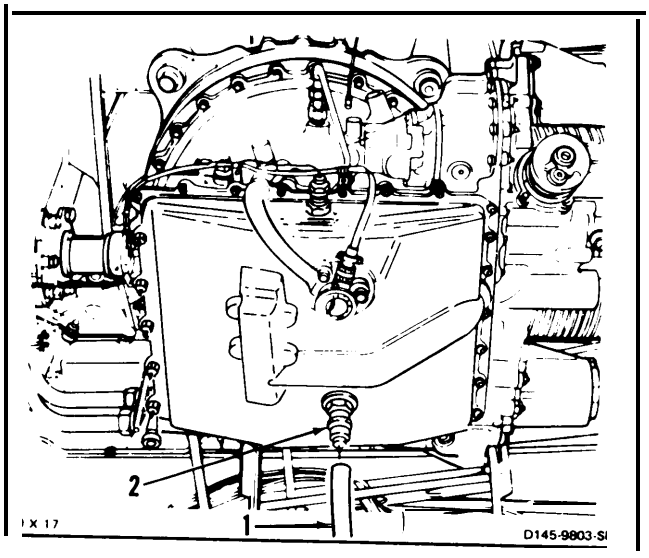
Battery Disconnected (Task 1-39)
Electrical Power Off
Baffles Under Aft Transmission Open (Task 2-2)
Aft Transmission Drip Tray Removed (Task 2-3)
Cargo Ramp Open and Level (TM 55-1520-240-T)



NOTE

Sump holds about 30 quarts of oil.

1. **Connect hose (1)** to drain valve (2). Direct end of hose into container.
2. Push in drain valve (2), twist it, and pull. **Let oil drain** into container.
3. Push in drain valve (2), twist it, and pull down, Remove hose (1) from valve.



GO TO NEXT PAGE

6-138 DRAIN AFT TRANSMISSION OIL (Continued) 6-138

FOLLOW-ON MAINTENANCE:

Install aft transmission drip tray (Task 2-3).

Close baffles under aft transmission (Task 2-2).

Close cargo ramp (TM 55-1520-240-T).

END OF TASK

6-139 FLUSH AFT TRANSMISSION OIL SYSTEM

INITIAL SETUP

Applicable Configurations:
All

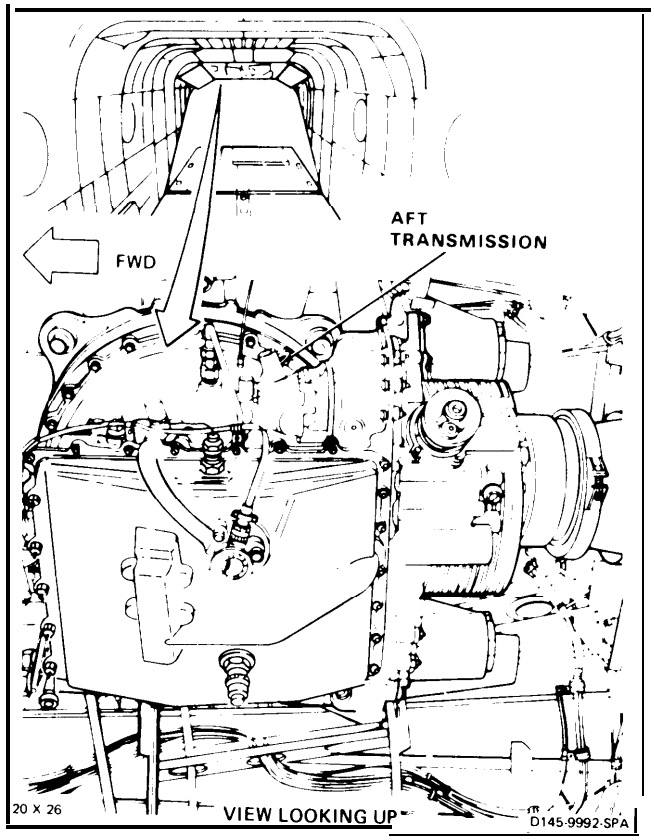
Tools:
Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692

Materials:
None

Personnel Required:
67U10 Medium Helicopter Repairer
100C0 Rotary-Wing Aviator (2)

References:
Task 1-54
Task 6-138
Task 6-148
Task 6-154
Task 6-155
Task 6-156
Task 6-157
Task 6-158
TM 55-1520-240-10

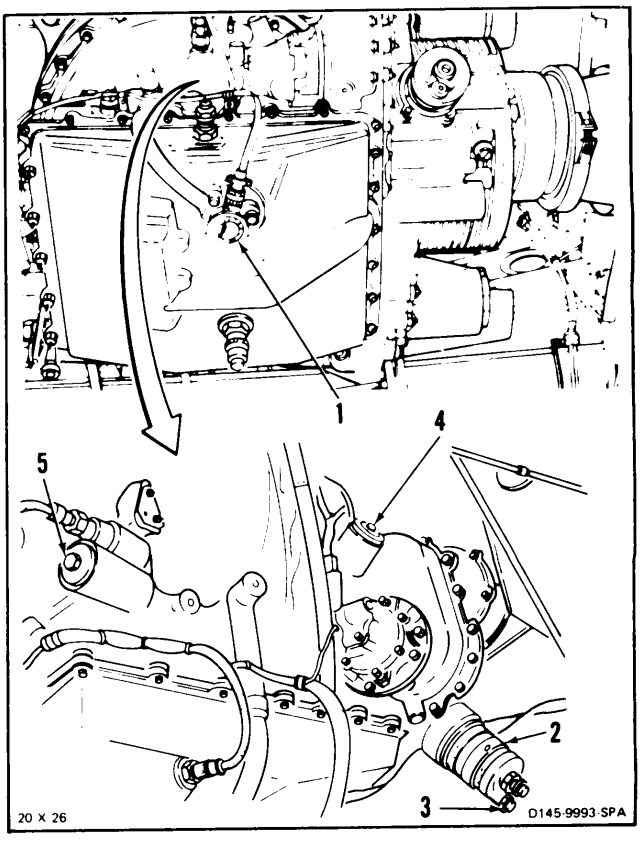
Equipment Condition:
Battery Disconnected (Task 1-39)
Electrical Power Off
Baffles Under Aft Transmission Open (Task 2-2)
Aft Transmission Drip Tray Removed (Task 2-3)
Cargo Ramp Open and Level (TM 55-1520-240-T)



GO TO NEXT PAGE

6-139 FLUSH AFT TRANSMISSION OIL SYSTEM (Continued)

1. **Drain oil** from aft transmission (Task 6-138).
2. Remove and **clean debris detection screen** cap (1) (Task 6-157). Install cap (Task 6-158).
3. **Replace main oil filter element (2)** (Task 6-148). Note position of indicator button (3).
4. If indicator button (3) was extended, **replace inlet screens (4)** (Task 6-155 and 6-156).
5. **Replace auxiliary oil filter (5)** (Task 6-154).
6. **Service aft transmission** with oil (Task 1-54).
7. Have pilot **perform ground run** (TM 55-1520-240-10). When aft transmission oil temperature stabilizes at normal, have pilot shut down helicopter.
8. **Repeat steps 1 thru 6.**



FOLLOW-ON MAINTENANCE:

Install aft transmission drip tray (Task 2-3)

Close baffles under aft transmission (Task 2-2).

Close cargo ramp (TM 55-1520-240-T).

END OF TASK

6-140 AFT TRANSMISSION SERVICEABILITY CHECK

INITIAL SETUP

Applicable Configurations:
All

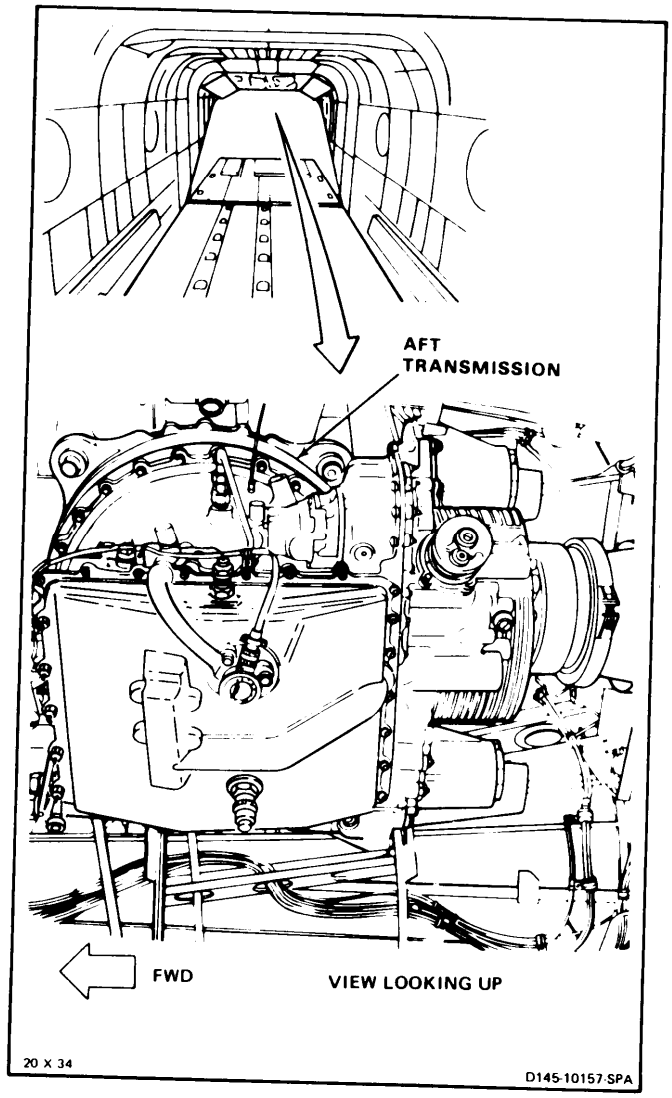
Tools:
Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692

Materials:
Cheesecloth (E112)

Personnel Required:
67U20 Medium Helicopter Repairer
100C0 Rotary-Wing Aviator (2)

References:
Task 1-54
Task 6-131
Task 6-138
Task 6-148
Task 6-154
Task 6-155
Task 6-156
Task 6-157
Task 6-158
Task 6-92
Task 6-97
TM 55-1520-240-10

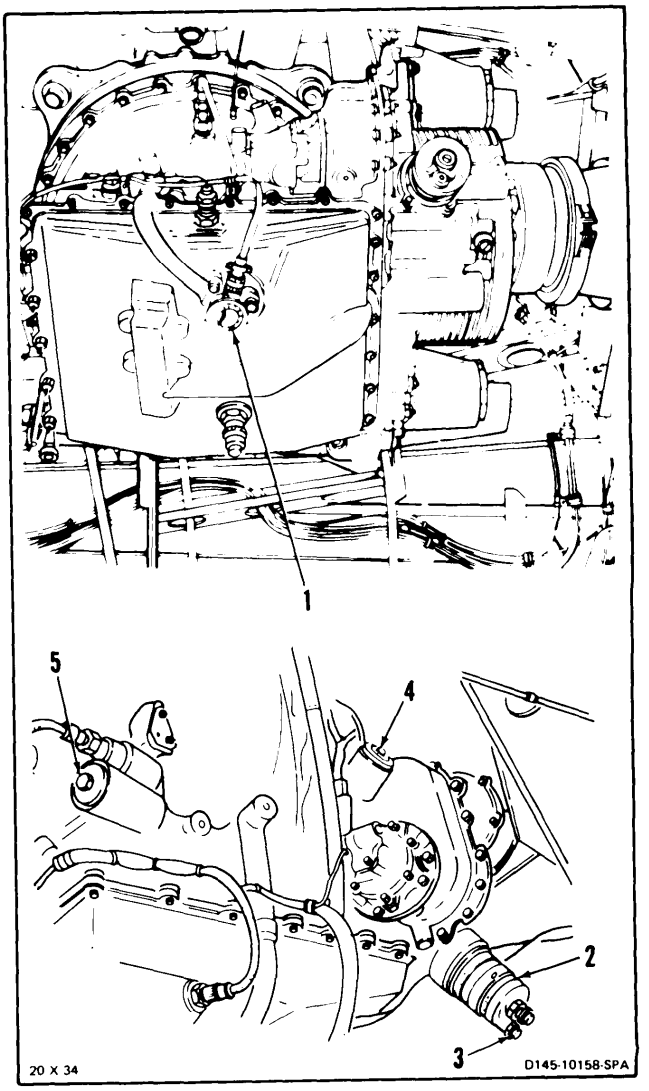
Equipment Condition:
Battery Disconnected (Task 1-39)
Electrical Power Off
Baffles Under Aft Transmission Open (Task 2-2)
Aft Transmission Drip Tray Removed (Task 2-3)
Cargo Ramp Open and Level (TM 55-1520-240-T)



GO TO NEXT PAGE

6-140 AFT TRANSMISSION SERVICEABILITY CHECK (Continued) 6-140

1. **Drain oil through cheesecloth (E112)** or similar filter material (Task 6-138). **Check for debris.**
2. Remove and **clean debris detection screen cap (1)** (Task 6-157). **Install cap** (Task 6-158).
3. **Replace element in main oil filter (2)** (Task 6-148). Note position of indicator button (3). **If button is extended,** remove and inspect inlet screen (4) (Task 6-157 and 6-131). install screen (6-156).
4. **Replace auxiliary oil filter (5).**
5. **Service transmission** (Task 1-54).
6. Have pilot **perform ground run for 1 hour** at normal rotor rpm (TM 55-1520-240-10). If forward transmission oil pressure or temperature changes abnormally or if debris screen or chip detector light comes on, have pilot shut down helicopter. Check for cause.
7. **Drain oil** through cheesecloth (E112) or similar filter material (6-138). **Check for debris.**
8. Remove, inspect, and **clean debris screen cap (1)** (Task 6-157). **Install cap** (6-158).
9. **Remove element in main oil filter (2). If** element contains **debris or** filter **button (3)** was **extended, replace** with new **element** (Task 6-148).
10. **If** element in filter (2) contains **debris and** filter **button (3)** was **also extend.** remove, **inspect,** and install **inlet screen (4)** (Task 6-155, 6-131, and 6-156).
11. **Replace auxiliary oil filter (5)** (Task 6-154).
12. **If** quantity and size of **particles** obtained from oil filters (2 and 5) and cap (1) **have not decreased by at least 30 percent** from original amount, **replace aft transmission** (Task 6-92 and 6-97).



13. **If** quantity and size of **particles** obtained from oil filters (2 and 5) and cap (1) **have decreased by 30 percent or more, repeat steps 1 thru 11.** If any debris is obtained replace aft transmission (Task 6-92 and 6-97).

FOLLOW-ON MAINTENANCE:

Close cargo ramp (TM 55-1520-240-T).

Install aft transmission drip tray (Task 2-3).

Close baffles under aft transmission (Task 2-2).

END OF TASK

6-141 REMOVE AFT TRANSMISSION OIL COOLER FAN

INITIAL SETUP

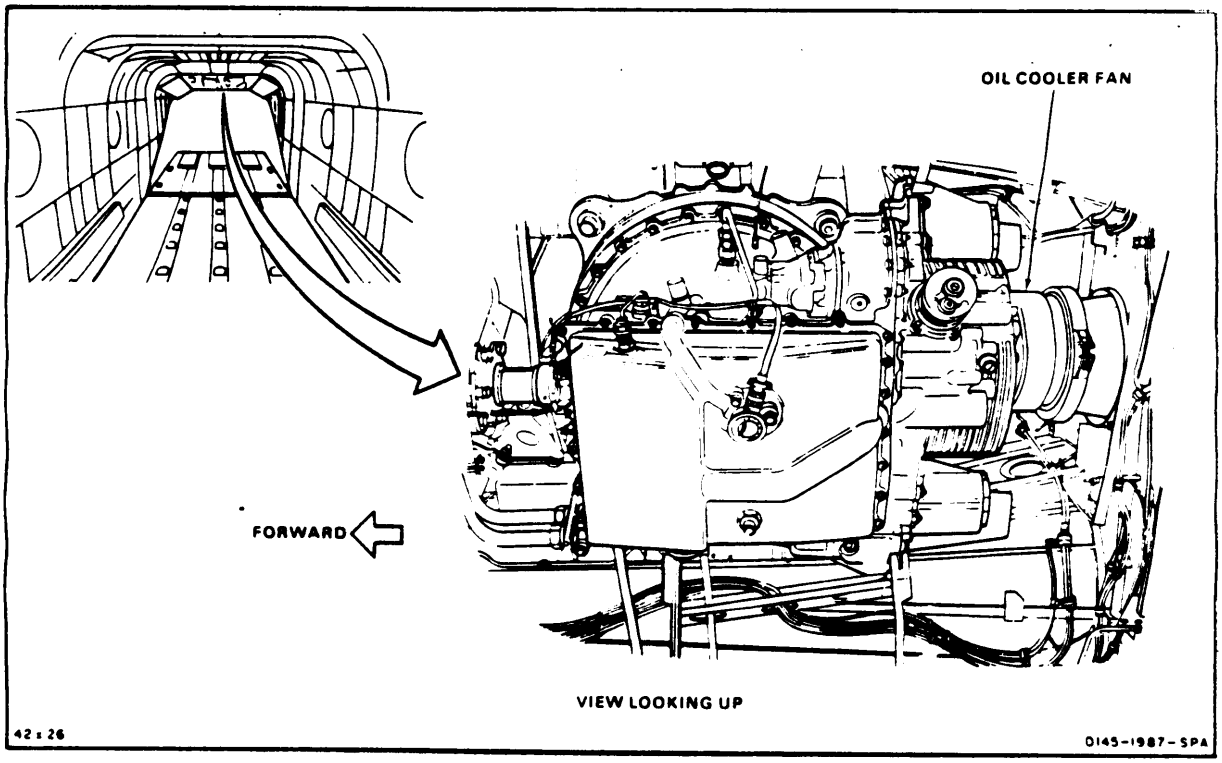
Applicable Configurations:
All

Tools:
Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692

Materials:
None

Personnel Required:
67U10 Medium Helicopter Repairer

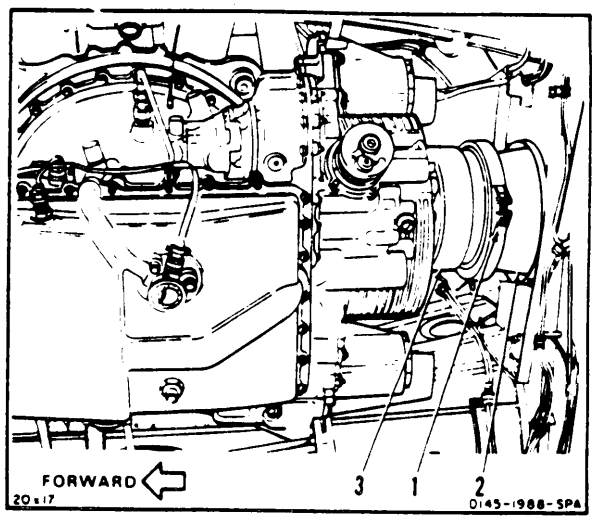
Equipment Condition:
Battery Disconnected (Task 1-39)
Electrical Power Off
Cargo Ramp Open and Level (TM 55-1520-240-T)
Baffles Under Aft Transmission Open (Task 2-2)
Aft Transmission Drip Tray Removed (Task 2-3)



GO TO NEXT PAGE

6-141 REMOVE AFT TRANSMISSION OIL COOLER FAN (Continued)

1. **Loosen clamp (1)** securing duct (2) to fan (3). **Slide duct and clamp aft,** off fan.

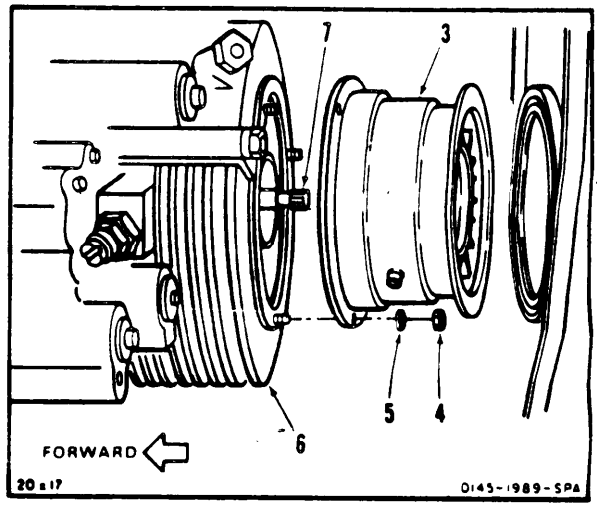


2. **Remove four nuts (4) and washers (5)** from fan (3), Pull fan (3) away from cooler (6) until shaft (7) can be seen.

NOTE

Fan cannot be removed if shaft comes out with fan.

3. **Remove fan (3)** from shaft (7). **Make sure shaft does not come out** with fan. If needed, push shaft back into cooler (6).



FOLLOW-ON MAINTENANCE:

None

TASKS 6-142, 6-142.1 AND 6-143 INCLUDING PAGES 6-393 THRU 6-401 DELETED

END OF TASK

6-144 INSTALL AFT TRANSMISSION OIL COOLER FAN 6-144

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit
NSN 5180-00-323-4692
Hand Lubricating Gun
Torque Wrench, 5 to 50 Inch-Pounds
Torque Wrench, 30 to 150 Inch-Pounds
Torque Wrench, 150-750 Inch-Pounds

Materials:

Dry Cleaning Solvent (E162)
Cloths (E120)
Grease (E190)
Grease (E190.1)
Oil (E254)
Gloves (E186)

Parts:

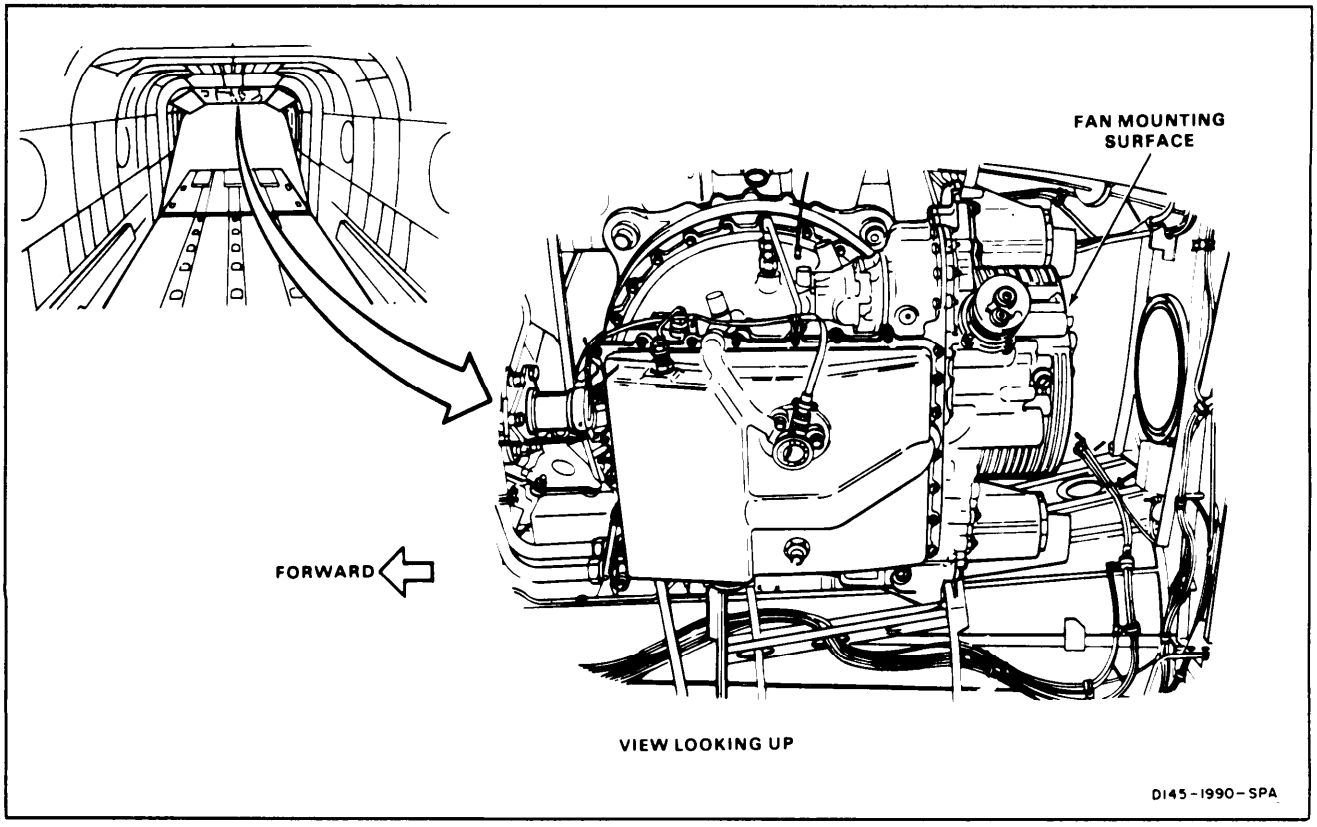
Packings

Personnel Required:

Medium Helicopter Repairer
Inspector

References:

TM 55-1520-240-23P



GO TO NEXT PAGE

1. Check the torque of the fan retaining nut (1). **Torque nut to 400 inch-pounds.**

CAUTION

Do not overgrease. Do not block vent fitting (3). Stop grease application as soon as clean grease comes out of vent fitting.

1.1. Apply grease (E190) to fan (1.1) at fitting (2) until clean grease comes out vent (3). Use hand lubricating gun.

2. **Remove drive shaft (4)** from oil cooler (5). Remove packings (6) from each end of shaft,

WARNING

Dry cleaning solvent (E162) is flammable end toxic. It can irritate skin and cause burns. Use only in well-ventilated area, awry from heat and open flame. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.

3. Clean splines (7) at both ends of shaft (4). Use solvent (E162) and clean cloths (E120). Wear gloves (E186).

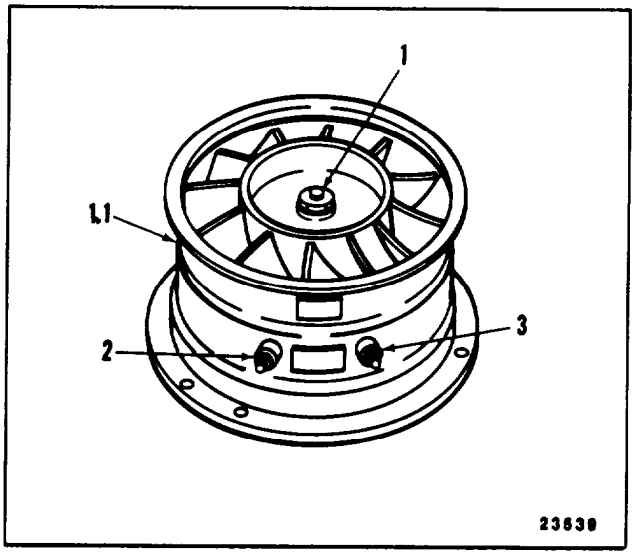
3.1, Inspect splines (7) on drive shaft (4) for wear. If splines are worn, proceed as follows:

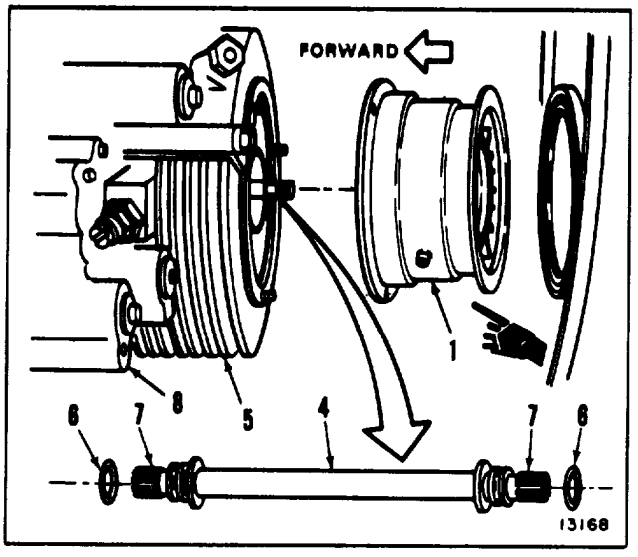
a. Place a 6 inch metal ruler or equivalent straightedge along the length of splines (7), with ruler spanning worn area.

b. Measure the depth of wear below the face of the spline. Use a feeler gage.

c. If spline wear at fan end exceeds 0.010 inch, replace drive shaft (4) and fan (1.1).

d. If spline wear at transmission end exceeds 0.010 inch, perform steps 6. thru 9. Replace aft transmission (8). (Refer to Tasks 6-92 and 6-97.)





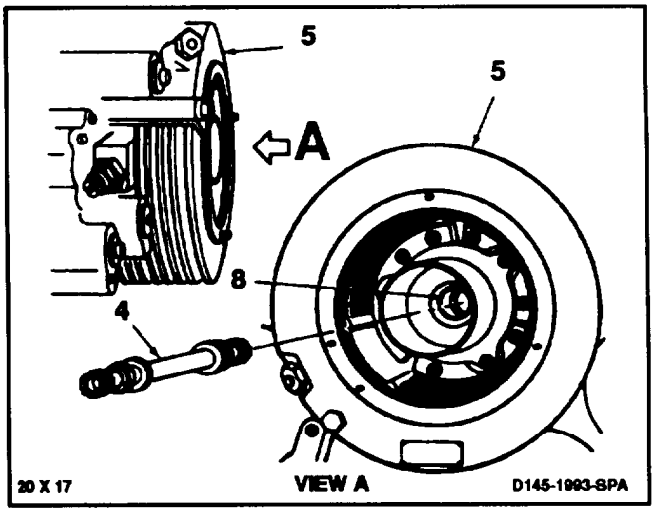
e. If wear is less than 0.010 inch, all parts are satisfactory for continued use.

4. Install packings (6) on each end of shaft (4).

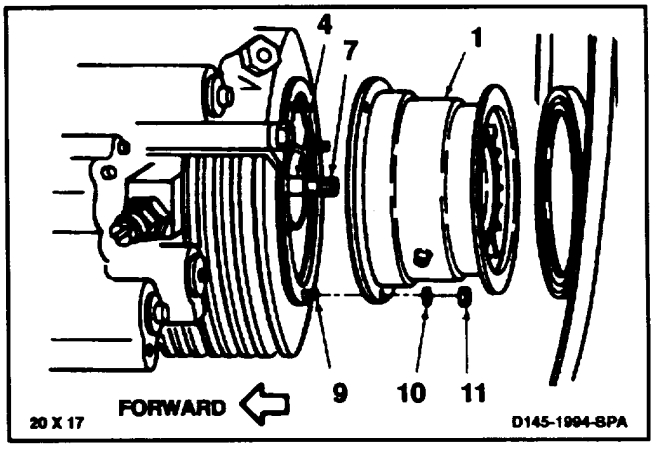
5. Pack splines (7) and mating splines in transmission (8) and fan (1.1) with grease (E190.1).

GO TO NEXT PAGE

6. **Install shaft (4)** in transmission splines (8) within oil cooler (5).



7. **Install fan (1) on splines (7)** of shaft (4).
8. Rotate fan (1) to align mounting holes with fur mounting studs (9). **Install fan on studs**
9. Install four washers (10) and nuts (11). **Toque nuts to 80 inch-pounds**

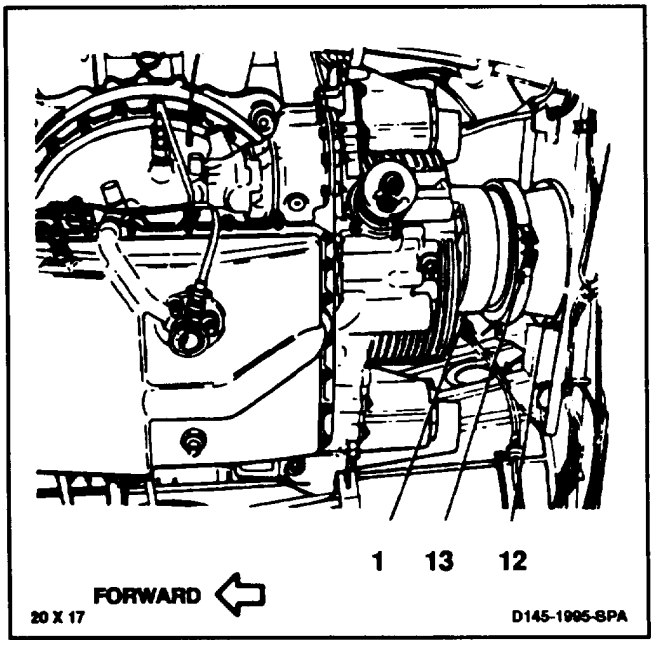


10. Slide exhaust (12) forward against fan (1).

WARNING

Oil (E254) is toxic. It can irritate skin and cause burns. Avoid Inhaling. Use only with adequate ventilation. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.

11. Coat thread of clamp (13) with oil (E254). Install clamp around dud (12) and fan (1). Torque clamp to 35 inch-pounds



INSPECT

FOLLOW-ON MAINTENANCE:

Perform aft transmission fan vibration analysis (Task 6-225).

Perform vibration test

END OF TASK

6-144.1 REPLACE AFT TRANSMISSION OIL COOLER BYPASS VALVE

INITIAL SETUP

Applicable Configurations:
All

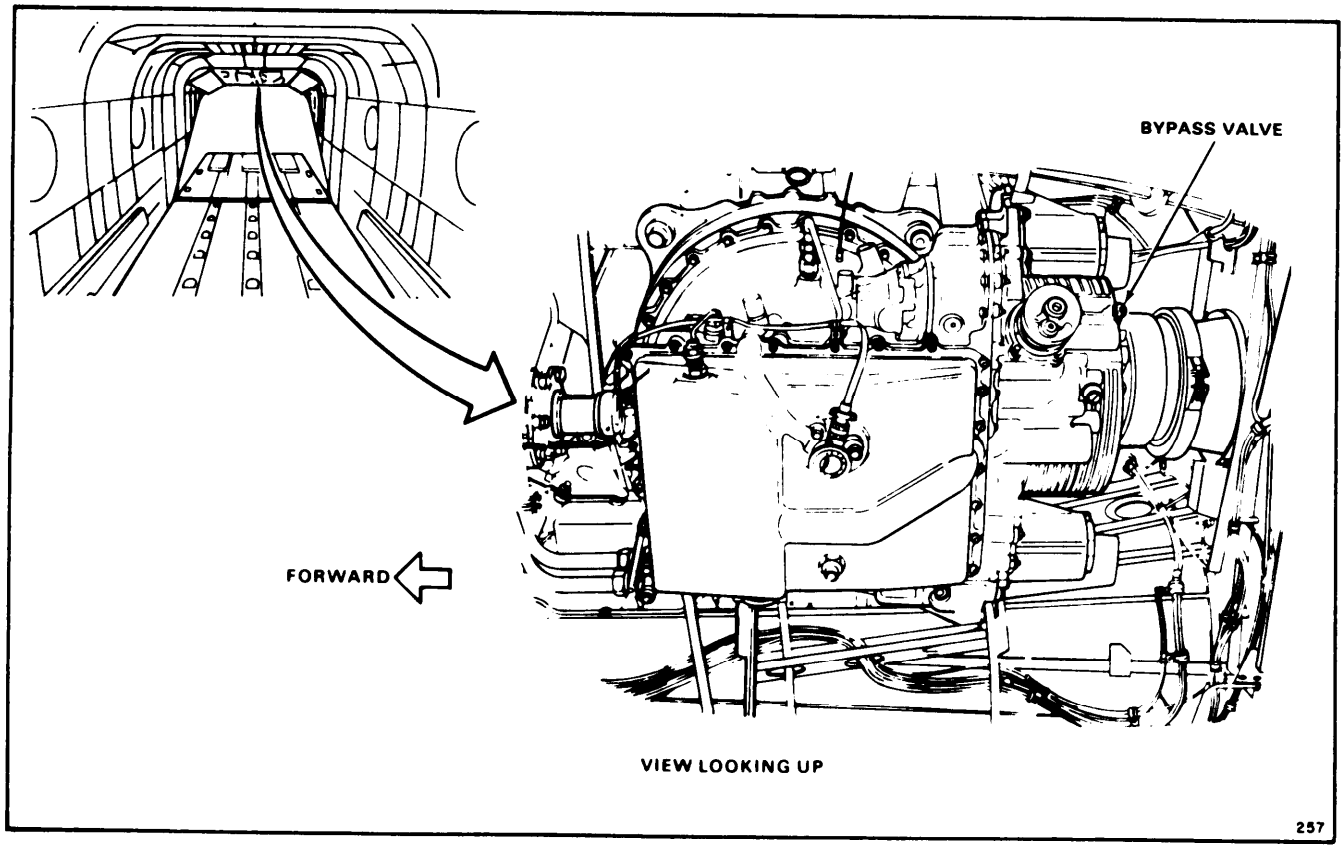
Tools:
Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Container, 14-Quart
Socket, 1 1/24nch

Materials:
Lockwire (E231)
Oil (E254)
Cloths (E120)

Parts:
Packing (2)

Personnel Required,:
Medium Helicopter Repairer
Inspector

Equipment Condition:
Battery Disconnected (Task 1-39)
Electrical Power Off
Cargo Ramp Open and Level (TM 55-1520-240-T)
Baffles Under Aft Transmission Open (Task 2-2)
Aft Transmission Drip Tray Removed (Task 2-3)



GO TO NEXT PAGE

6-144.1 REPLACE AFT TRANSMISSION OIL COOLER BYPASS VALVE (Continued)

DRAIN OIL COOLER

1. Remove lockwire from drain plug (1) and bypass valve (2). **Remove drain plug** from oil cooler (3). Drain oil into container.
2. Remove packing (4) from drain plug (1).
3. Install packing (4) on drain plug (1). Install plug in cooler (3). **Torque plug to 80 inch-pounds.**

REMOVE VALVE

NOTE

Do not let oil spill on fins of oil cooler. Spilled oil will spray from cooler during transmission operation.

4. Remove bypass valve (2) from oil cooler (3). Use cloths (E120) to absorb oil spillage.
5. Remove packing (5) from valve (2).

INSTALL VALVE

WARNING

Oil (254) is a skin irritant. If oil gets on skin, wash thoroughly. If oil soaks into clothes, change clothes immediately.

WARNING

Oil (E254) gives off fumes that can cause injury to personnel. Use oil in a well-ventilated area.

6. Coat packing (5) and thread of bypass valve (2) with oil (E254). **Install packing** on valve.
7. Install valve (2) in oil cooler (3). **Torque valve to 80 inch-pounds.**
8. Lockwire valve (2) to drain plug (1). Use lockwire (E231).

INSPECT

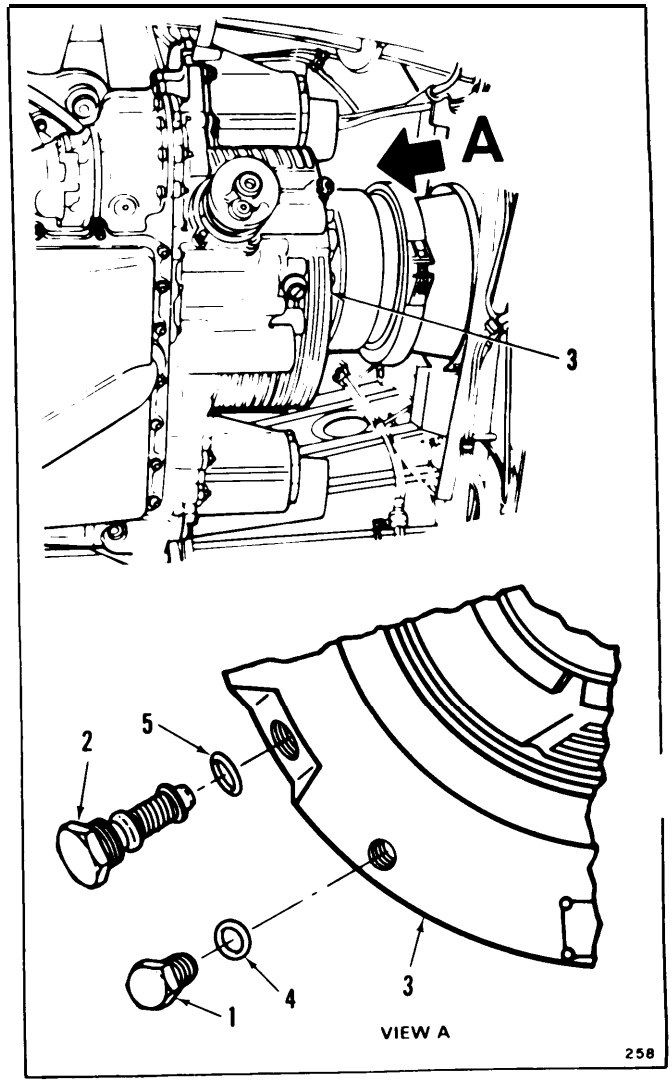
FOLLOW-ON MAINTENANCE:

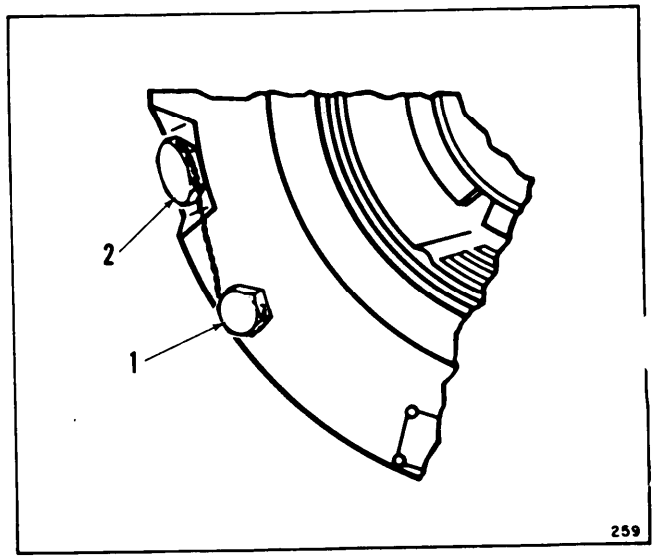
Service aft transmission (Task 1-54).

Install aft transmission drip tray (Task 2-3)

Close baffles under aft transmission (Task 2-2).

Close cargo ramp (TM 55-1520-240-T).





END OF TASK

6-145 REMOVE AFT TRANSMISSION OIL COOLER

INITIAL SETUP

Applicable Configurations:
All

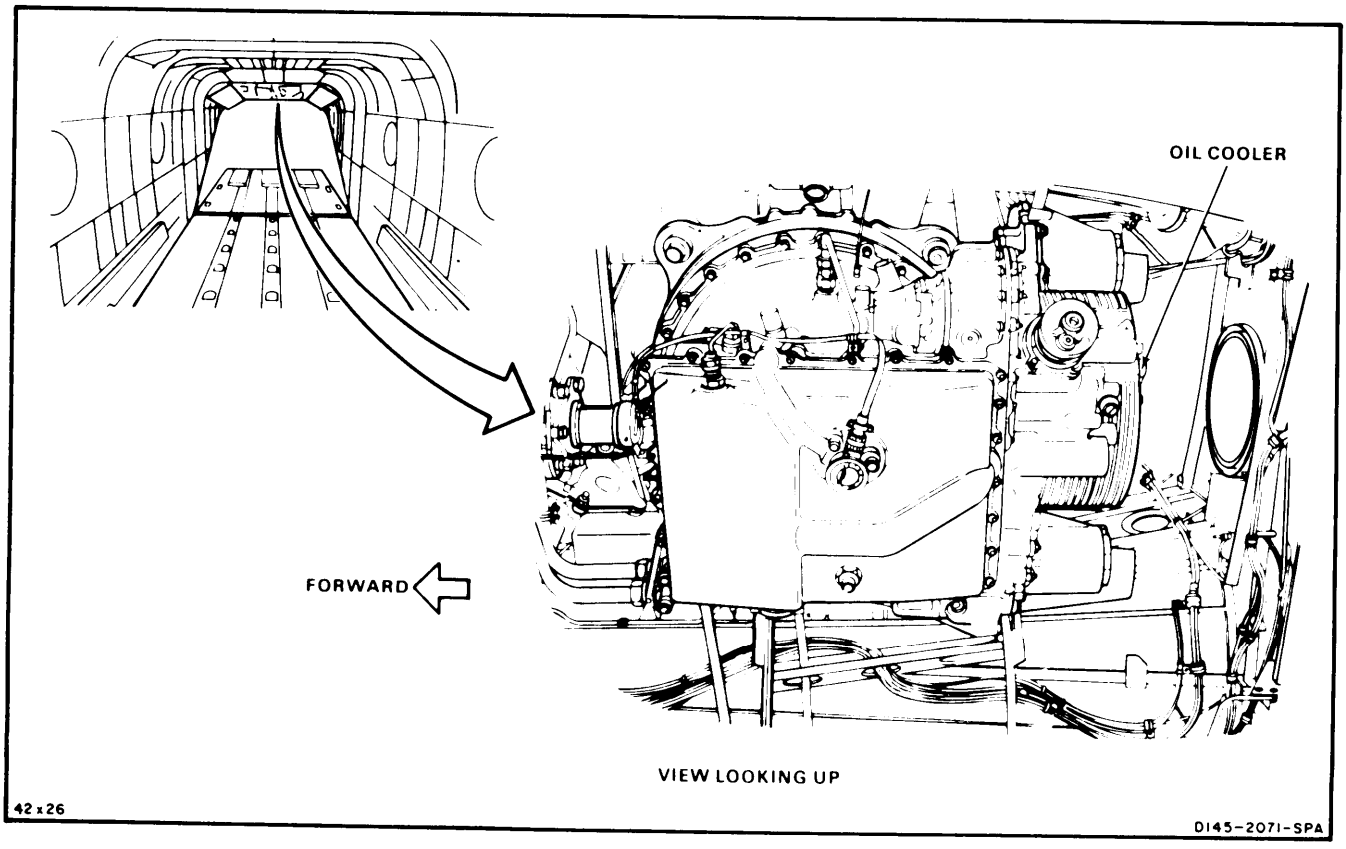
Tools:
Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Container, 2-Quart
Wrench, 1 Inch

Materials:
Marking Pencil (E271)
Twine (E433)

Parts:
Packing

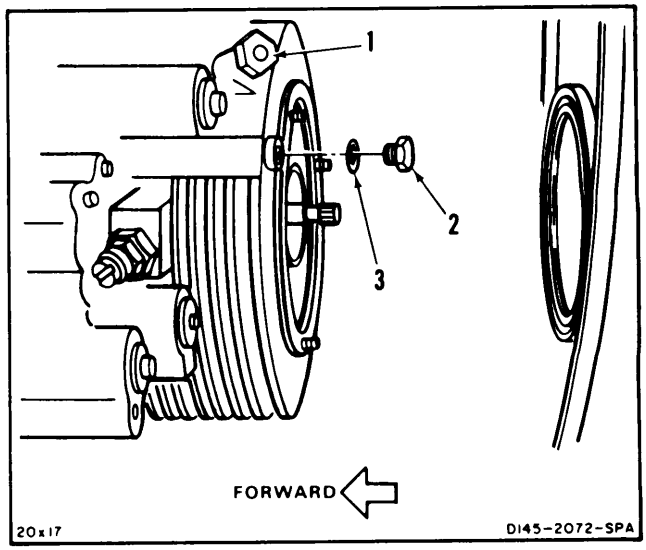
Personnel Required:
67U10 Medium Helicopter Repairer (2)

Equipment Condition:
Battery Disconnected (Task 1-39)
Electrical Power Off
Aft Transmission Oil Cooler Fan Removed (Task 6-141)



GO TO NEXT PAGE

1. Remove lockwire from plug (1) and drain plug (2). Remove drain plug and packing (3). **Drain oil** into container.
2. Install plug (2) and packing (3).

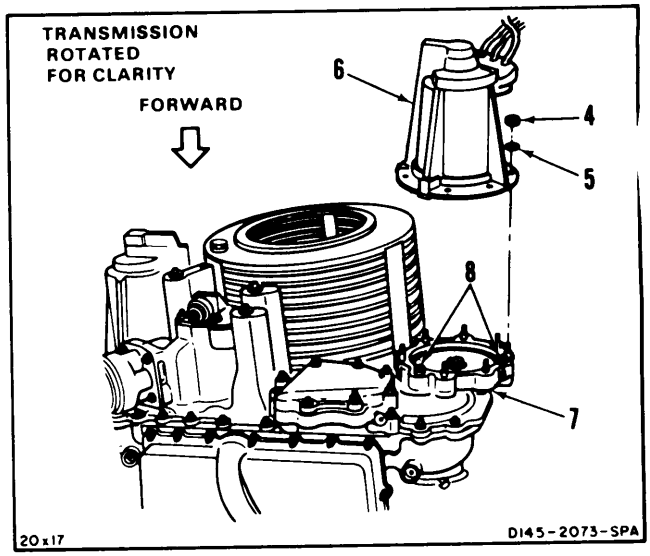


3. Remove eight nuts (4) and washers (5) from No. 2 ac generator (6).

CAUTION

Do not damage oil transfer tubas when removing generator.

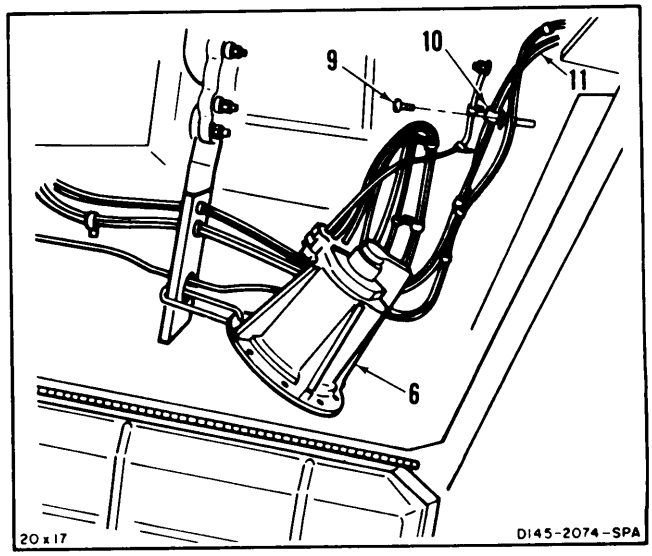
4. **Pull genarator (6) straight back from transmission** (7) and two oil transfer tubes (8).



CAUTION

Wiring can be damaged if gemrator is not supported.

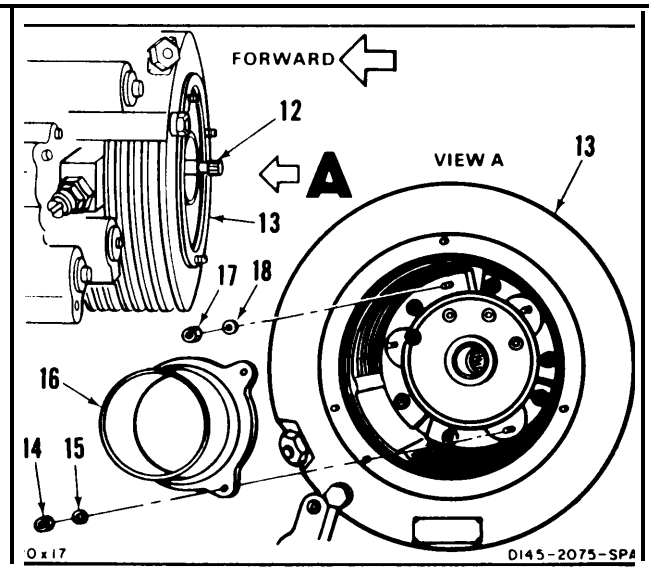
5. Tie generator (6) to structure at side of helicopter. Use twine (E433).
6. Remove screw (9). **Disconnect clamp (10). Move bundle (11) back for clearance.**



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6-145 REMOVE AFT TRANSMISSION OIL COOLER (Continued)

7. **Remove fan drive shaft (12)** from oil cooler (13).
8. Remove three nuts (14) and washers (15) from baffle (16). **Remove baffle.**
9. Remove seven nuts (17) and washers (18).



10. If cooler (13) will be reinstalled, draw an alignment mark (19) on cooler and transmission (8). Use marking pencil (E271).

CAUTION

Transfer tubes can be damaged if oil cooler is not supported during removal. Cooler weighs 35 pounds.

11. With aid of helper, **pull cooler (13) straight back from transmission (8)** to clear oil transfer tubes (20). Cap tubes or plug ports as needed to contain oil in cooler.

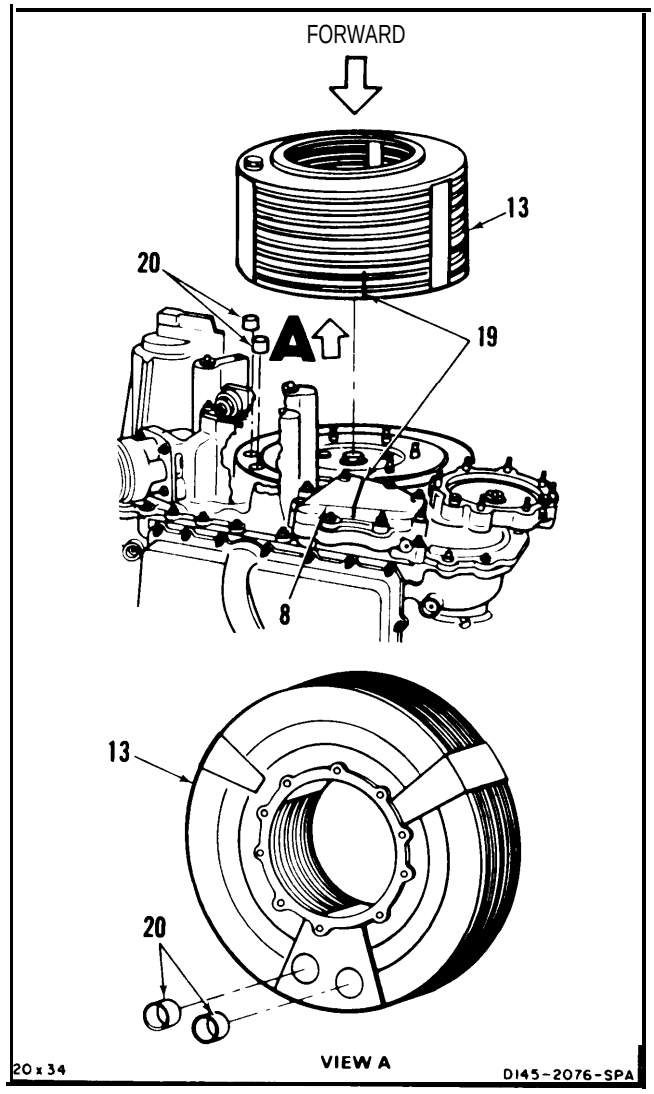
NOTE

Tubes may stay in cooler or transmission.

12. Guide cooler (13) aft and to right, away from transmission (8).
13. If tubes (20) remained in transmission (8), remove them. Install tubes in cooler (13).

FOLLOW-ON MAINTENANCE:

None



END OF TASK

6-145.1 REPAIR AFT TRANSMISSION OIL COOLER OUTSIDE SURFACE

INITIAL SETUP

Applicable Configurations:

All

Tools:

Dial Indicating Depth Gage 643J
Goggles

Materials:

Naphtha (E245)
Emery Cloth (E123) or
Abrasive Paper (E13) or
Crocus Cloth (E122)
Cloths (E120)
Gauze Sponges (E184)
Gloves (E184.1)
Acetic Acid (E21)
Alodine Powder (E65)
Epoxy Primer (E292) or (E293)
Epoxy Coating (E166)

Personnel Required:

Aircraft Powertrain Repairer
Inspector

References:

TM 43-0103
MIL-C-5541
MIL-C-22751

Equipment Condition:

Off Helicopter Task

General Safety Instructions:

WARNING

Naphtha (E245) is combustible and toxic. It can irritate skin and cause burns. Use only with adequate ventilation, away from open flame. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.

WARNING

Acetic acid (E21) is combustible and toxic. It can irritate skin and cause burns. Avoid inhaling. Use only with adequate ventilation, away from open flame. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.

WARNING

Alodine powder (E65) is an oxidizer. Discard cloths which contain this material in a separate container. If discarded with cloths contaminated with acetone, MEK, or other organic solvents, combustion can result. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.

WARNING

Epoxy primer (E292) or (E293) and epoxy coating (E166) are flammable and toxic. They can irritate skin and cause bums. Use only with adequate ventilation, away from heat or open flame. Avoid contact with skin, eyes, or clothing. In case of contact, immediately fhsh skin or eyes with water for at least 15 minutes. Get medical attention for eyes.

CAUTION

Do not wear photogrey glasses when fluorescent inspecting. They reduce ability to see cracks.

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6-145.1 REPAIR AFT TRANSMISSION OIL COOLER OUTSIDE SURFACE (Continued)

NOTE

Reparable damage is limited to scratches, nicks, gouges, minor corrosion, and bent fins.

1. **Clean** oil and grease from **the damaged area.** Use naphtha (E245) and clean cloths (E120). Wear gloves (E184.1).
2. **Check** extent and location of **damage** on cooler (1).

NOTE

Dimensions in this step refer to extent of **damage after rework.**

a. **Depth of damage shall not be more than 0.025 inch.**

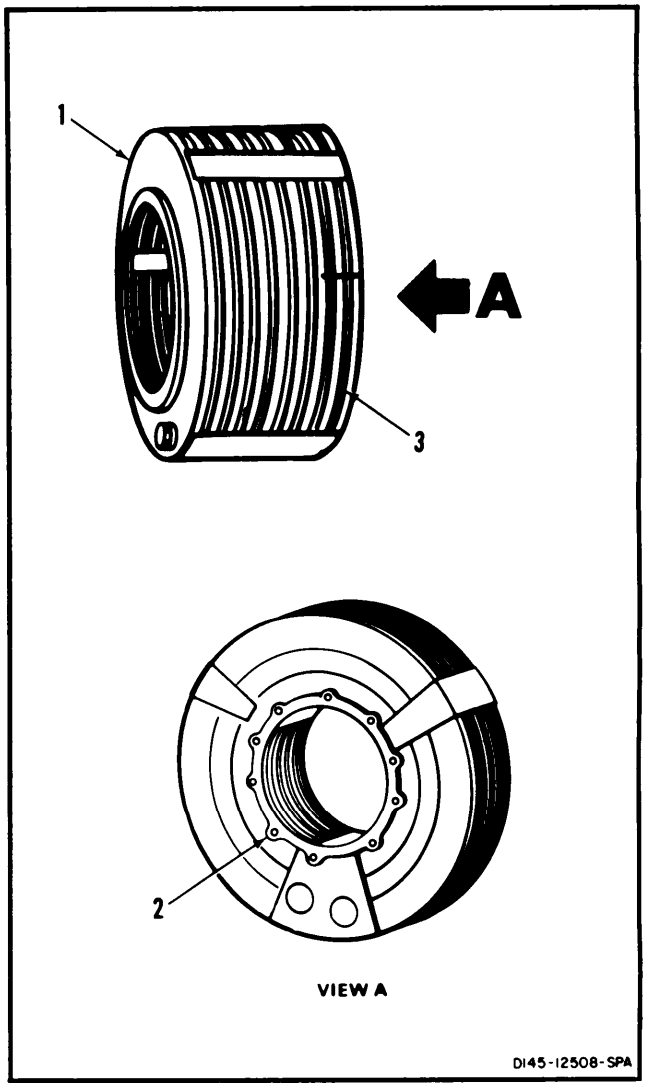
b. **Damage shall not extend over more than one surface or enter any radius.**

c. **Damage shall not be closer than 1.00 inch to any mounting hole (2).**

d. **More than 3 inches of fins (3) shall not be crushed beyond straightening.**

e. **If any fin is bent more than 30 degrees, straighten it.**

3. **Fluorescent inspect** damaged area to check for cracks (TM 43-0103). **There shall be no cracks.**
4. **Blend out damage** with emery cloth (E123) or abrasive paper (E13). Observe the limits of step 2.
5. **Smooth the blended area** with crocus cloth (E122). Do not leave any sharp edges.



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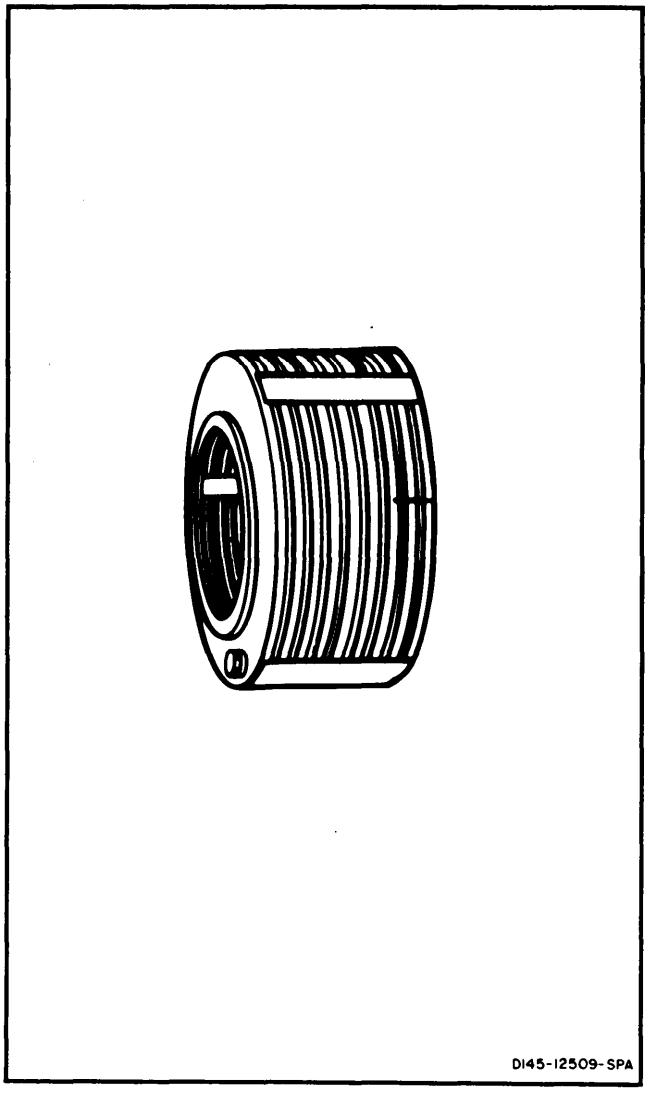
WARNING

Wear gloves (E184.1) during the remainder of this task. Otherwise, personal injury could result.

6. Acid-etch the reworked area as follows:
   a. **Prepare a solution of 3 parts acetic acid (E21) in 7 parts water. Wear gloves (E184.1) and goggles.**
   b. **Swab the area with solution for 2 minutes. Use gauze sponges (E184).**
   c. **Rinse the area with cold water.**
7. **Fluorescent inspect** reworked area to check for cracks (TM 43-0103). **There shall be no cracks.**
8. **Clean** the reworked area **with naphtha (E245)** and clean cloths (E120). Let the area air dry.
9. **Swab on solution of alodine powder (E65) and water (MIL-C-5541). Use gauze sponges (E184). Swab for 2 to 5 minutes. Rinse the area** with cold water and let air dry.
10. **Apply epoxy primer (E292) or (E293)** to the reworked area, Let air dry for 2 hours,
11. **Apply epoxy topcoat (E166)** (MIL-C-22751).

INSPECT

FOLLOW-ON MAINTENANCE:
None



END OF TASK

6-146 INSTALL AFT TRANSMISSION OIL COOLER 6-146

INITIAL SETUP

Applicable Configurations:
All

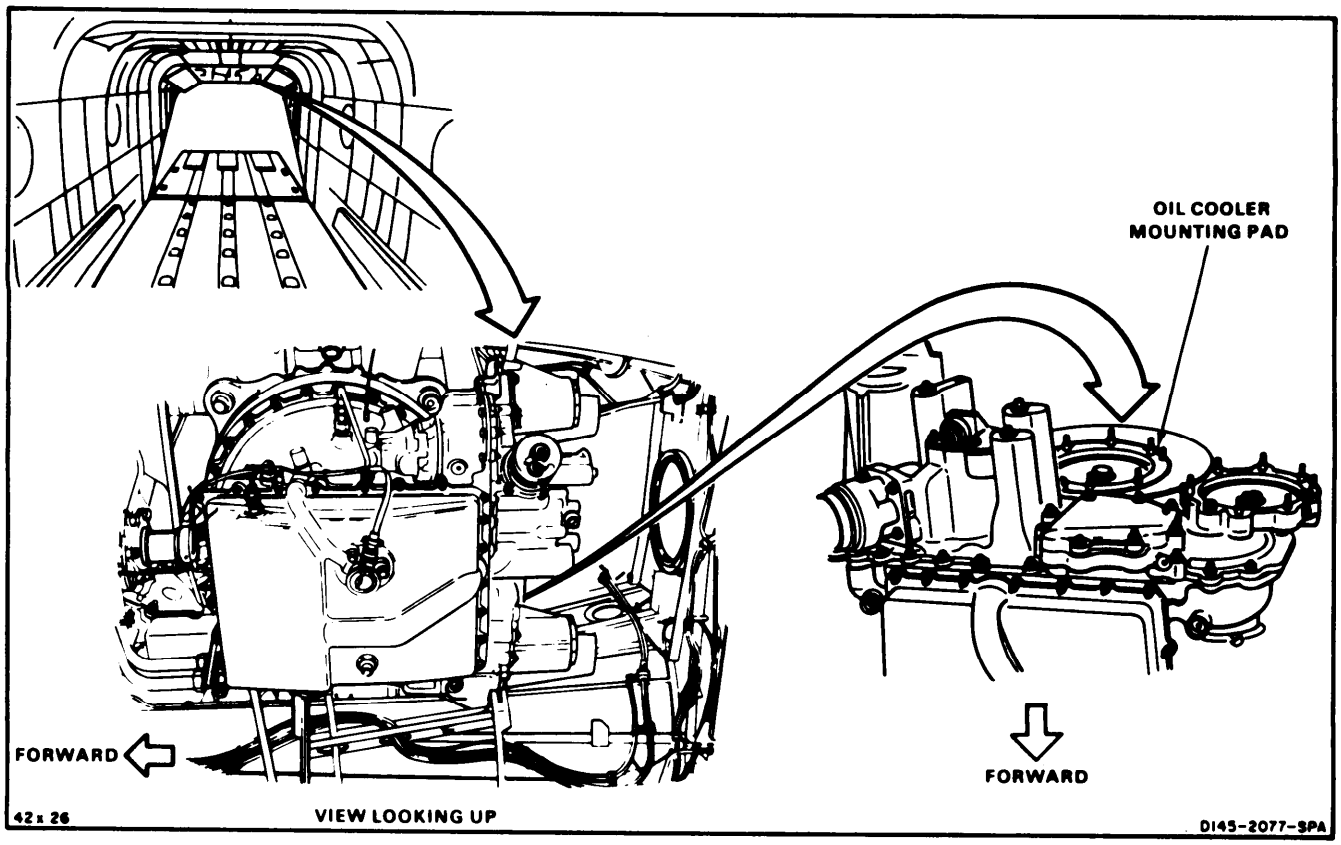
Tools:
Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692
Torque Wrench, 30 to 150 Inch-Pounds

Materials:
Lockwire (E231)

Parts:
Packings

Personnel Required:
67U10 Medium Helicopter
67U30 Inspector

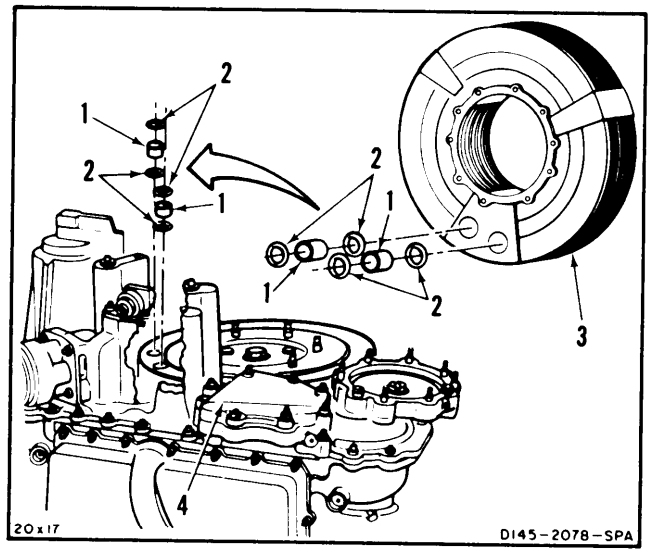
References:
TM 55-1520-240-23P



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6-146 INSTALL AFT TRANSMISSION OIL COOLER (Continued)

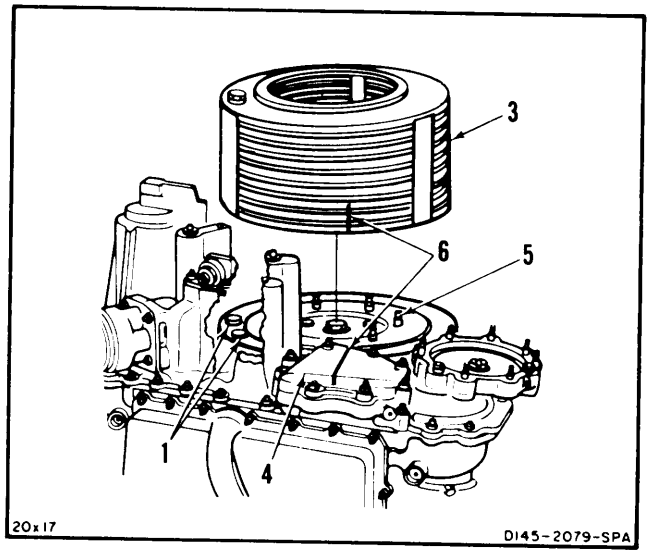
1. Remove two oil transfer tubes (1) and packings (2) from cooler (3). **Install two oil transfer tubes and packings transmission (4).**



CAUTION

Transfer tubes can be damaged if cooler is not aligned.

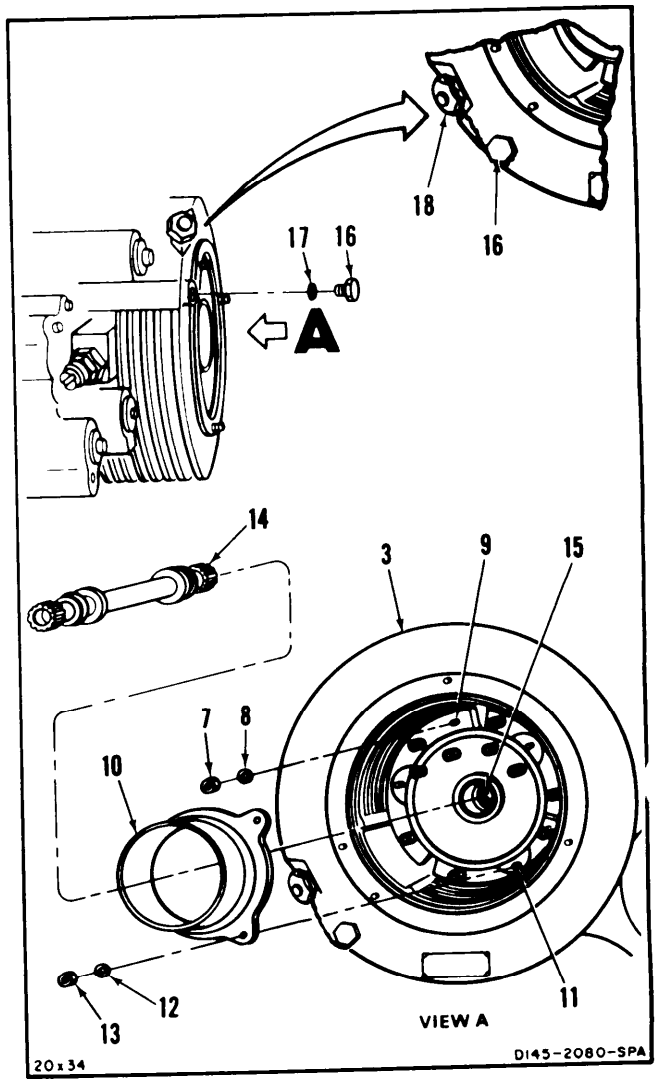
2. Position cooler (3) against transmission (4) with aid of helper. Align cooler with tubes (1), studs (5), and alignment marks (6) (if applied). **Install cooler** on studs and tubes.



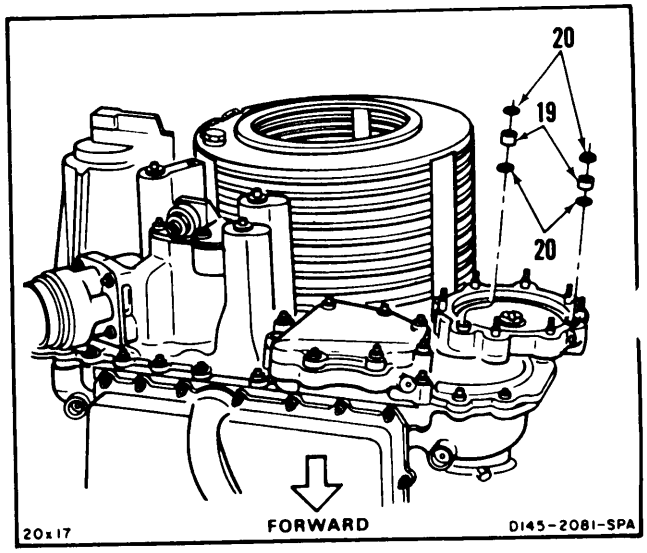
GO TO NEXT PAGE

6-146 INSTALL AFT TRANSMISSION OIL COOLER (Continued)

3. Install seven washers (7) and nuts (8) on short studs (9). **Torque nuts to 60 inch pounds.**
4. **Install baffle (10)** on three long studs (11). Install washers (12) and **nuts (13)** on studs. **Torque nuts to 60 inch-pounds.**
5. **Install fan drive shaft (14)** in transmission splines (15).
6. If cooler (3) is not a replacement remove drain plug (16) and packing (17) **Install plug and new packing.** Lockwire drain plug to plug (18) with lockwire (E231)

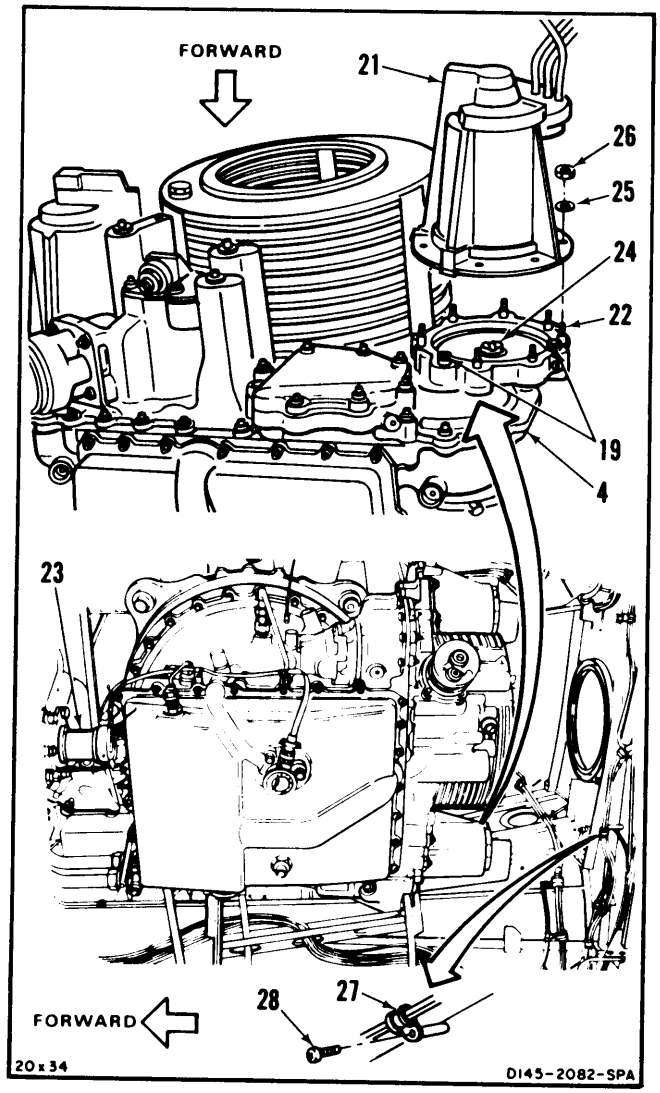


7. Remove two oil transfer tubes (19) and four packings (20). **Install tubes** and new packings.



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8. Release generator (21) from stowed position. Align generator with studs (22) and transfer tubes (19). **Position generator** on transmission (4).
9. If needed, turn adapter and plate assembly (23) to align splines (24) with generator (21).
10. **Install eight** washers (25) and **nuts (26). Torque nuts to 120 inch-pounds.**
11. **Connect clamp (27)** with screw (28).



INSPECT

FOLLOW-ON MAINTENANCE:

Install aft transmission oil cooler fan (Task 6-144).

Service aft transmission (Task 1-54).

END OF TASK

6-147 REPLACE AFT TRANSMISSION OIL COOLER FAN DUCT

INITIAL SETUP

Applicable Configurations:
All

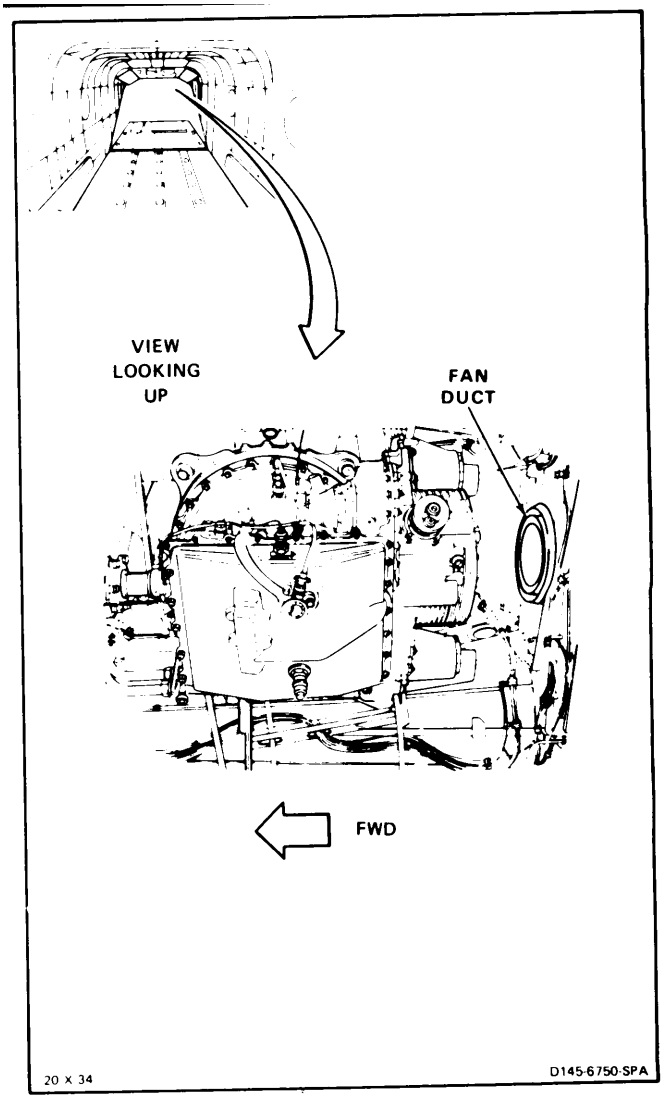
Tools:
Workstand

Materials:
None

Personnel Required:
67U10 Medium Helicopter Repairer

References:
TM 55-1520-240-23P

Equipment Condition:
Battery Disconnected (Task 1-39)
Electrical Power Off
Cargo Ramp Open and Level (TM 55-1520-240-T)
Baffles Under Aft Transmission Open (Task 2-2)
Aft Transmission Drip Pan Removed (Task 2-3)
Aft Transmission Oil Cooler Fan Removed (Task 6-141)

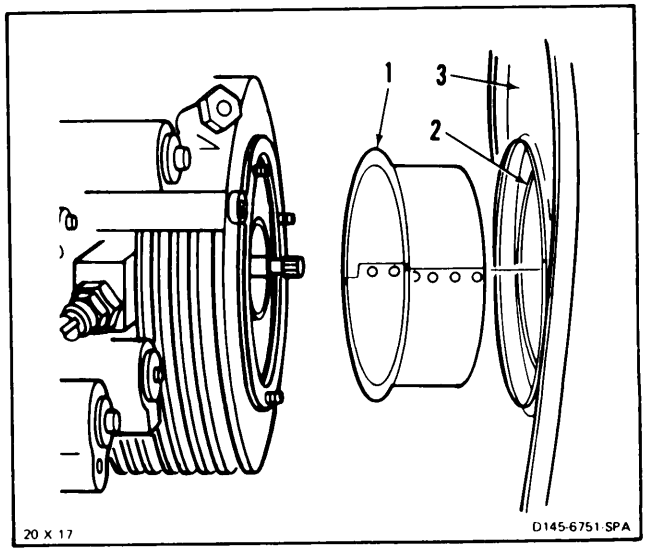


REMOVE DUCT

1. PUII duct (1) out of seal (2) at bulkhead (3) **Remove duct.**

INSTALL DUCT

2. **Install duct (1),** flared end forward, into seal (2) until flared end is against seal.



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6-147 REPLACE AFT TRANSMISSION OIL COOLER FAN DUCT (Continued)

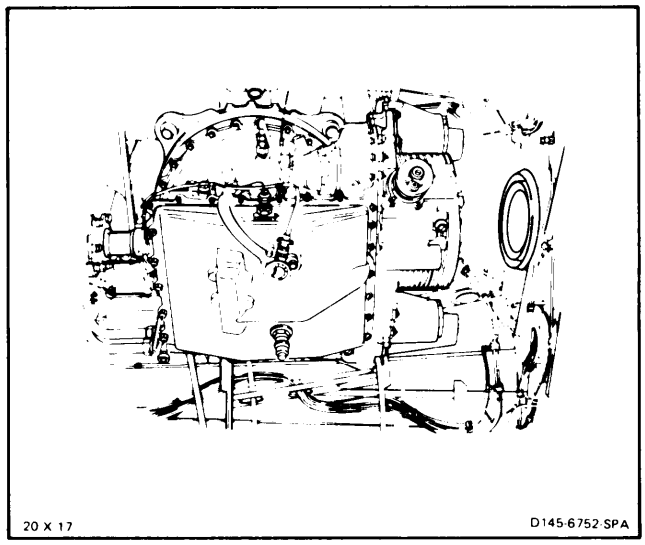
FOLLOW-ON MAINTENANCE:

Install oil cooler fan (Task 6-144).

install aft transmission drip tray (Task 2-3).

Close baffles under aft transmission (Task 2-2).

Close cargo ramp (TM 55-1520-240-T).



END OF TASK

6-148 REPLACE AFT TRANSMISSION MAIN OIL FILTER 6-148

INITIAL SETUP

Applicable Configurations:
All

Tools:
Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Container, Two Quart

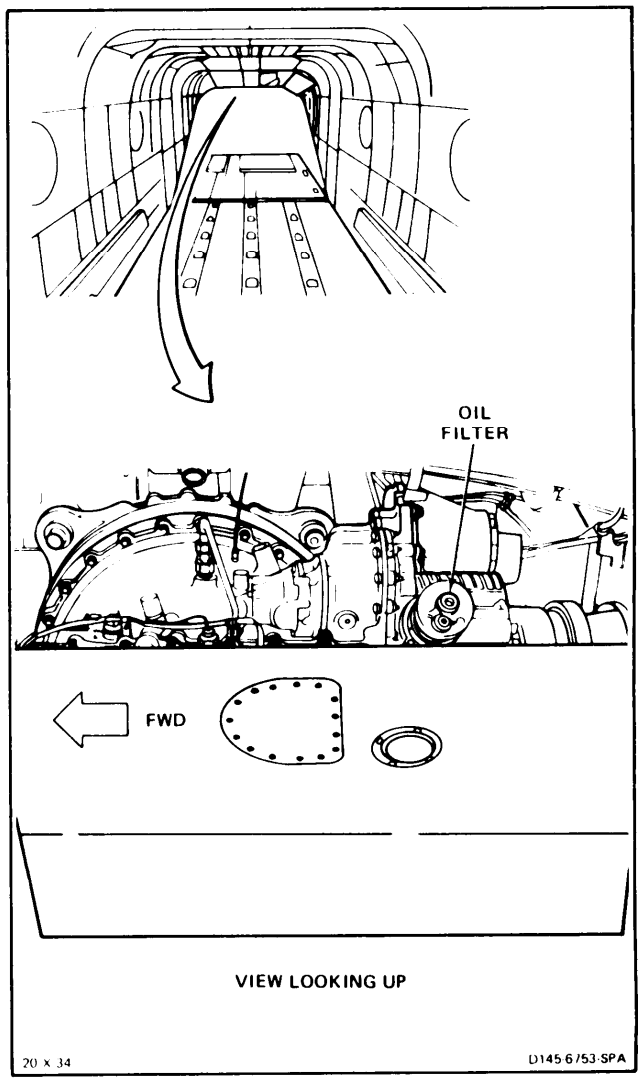
Materials:
Dry Cleaning Solvent (E162)
Cloths (E120)
Oil (E254)
Lockwire (E231)
Gloves (E186)

Parts:
Packings
Filter

Personnel Required:
67U10 Medium Helicopter Repairer
67U30 Inspector

References:
TM 55-1520-240-23P

Equipment Condition:
Battery Disconnected (Task 1-39)
Electrical Power Off
Cargo Ramp Open and Level (TM 55-1520-240-T)
Left Baffle Under Aft Transmission Open (Task 2-2)



General Safety Instructions:

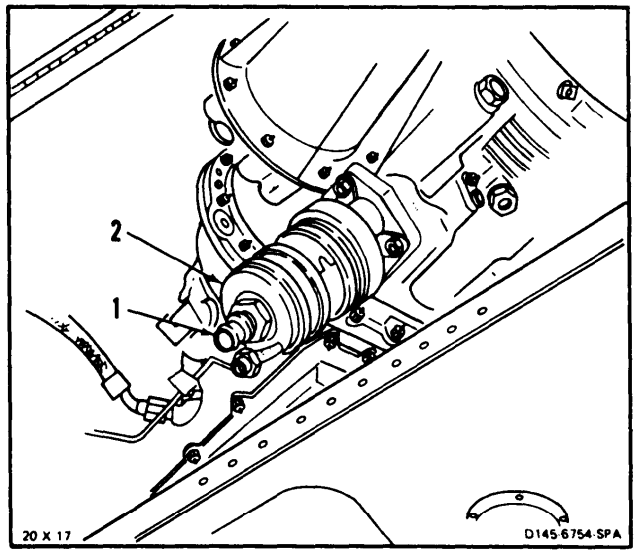
WARNING

Dry cleaning solvent (E162) is flammable and toxic. It can irritate skin and cause burns. Use only in well-ventilated area, away from heat and open flame. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.

GO TO NEXT PAGE

6-148 REPLACE AFT TRANSMISSION MAIN OIL FILTER (Continued)

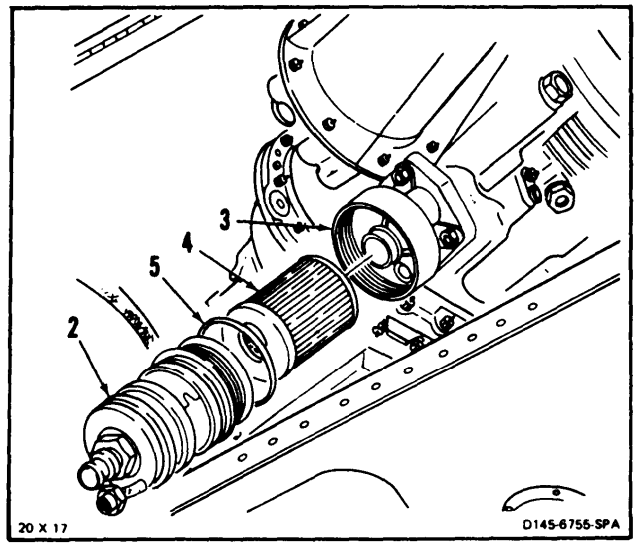
REMOVE FILTER



NOTE

Filter bowl holds about 1 pint of oil.

1. Hold container under drain valve (1) of filter bowl (2). Push in and twist drain valve. **Drain oil** into container.



2. Remove lockwire from filter bowl (2). **Remove bowl** from housing (3).

NOTE

Filter may come out with bowl or stay in housing,

3. **Remove filter (4)** from bowl (2) or housing (3). Inspect filter for debris. If debris is found, perform a contamination analysis (Task 6-108).
4. Remove packing (5) from bowl (2).
5. Wipe inside of housing (3) clean. Use cloth (E120) damp with dry cleaning solvent (E162). Wear gloves (E186) and goggles,
6. Pour out any oil from bowl (2). **Check bottom of bowl.** If bowl contains deposits, go to step 7. If there is only a film of oil, with no deposits, go to step 11.

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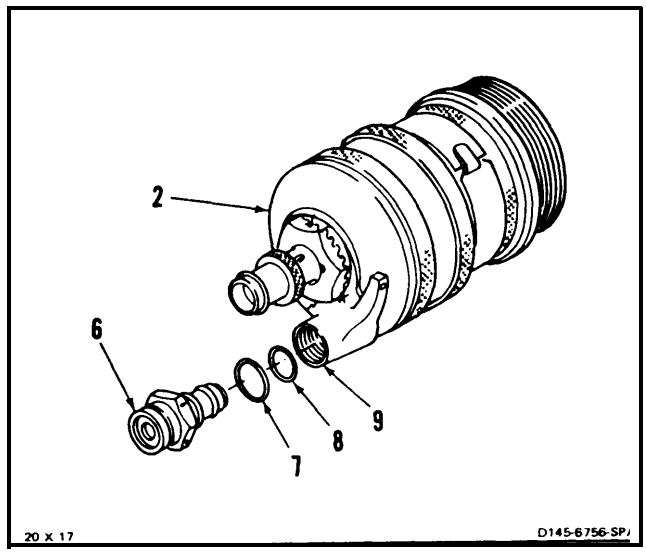
CLEAN BOWL

7. Remove lockwire from pressure differential indicator (6). **Remove indicator.** Remove two packings (7 and 8) from indicator.
8. Flush bowl (2) with dry cleaning solvent (E162). Remove deposits with cloth (E120) damp with solvent (E162). Wear gloves (E186) and goggles.

CAUTION

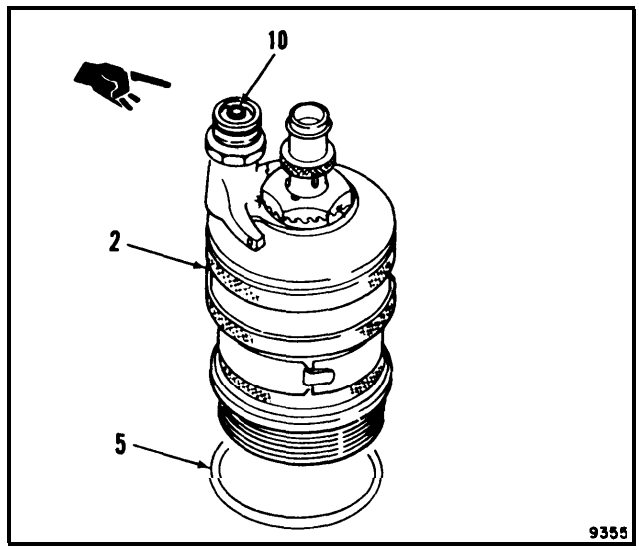
Rigid tool could break and block holes.

9. **Check that two holes in wall of indicator cavity (9) are clear.** Use lockwire (E231). Do not use a rigid tool such as a drill bit.
10. Install two packings (7 and 8) on indicator (6). **Install indicator in bowl (2).** Lockwire indicator to bowl. Use lockwire (E231).



INSTALL FILTER

11. Position bowl (2) so that indicator button (10) points straight up. **Push in button to lock it down.**
12. Install packing (5) on bowl (2).



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NOTE

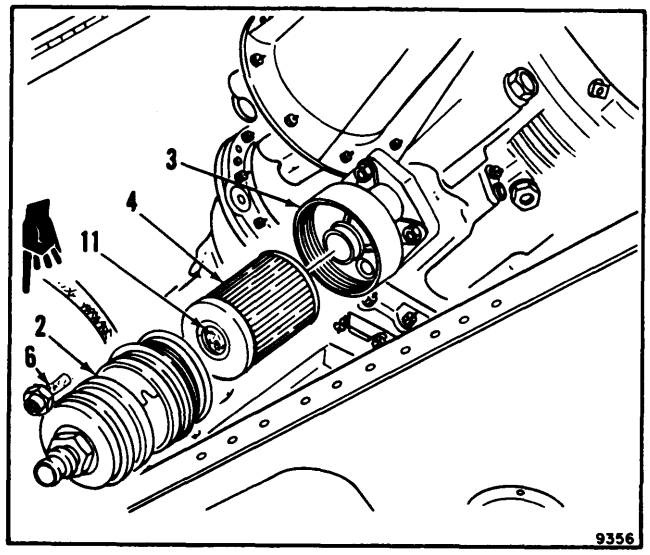
Do not install a used filter,

13. Check for packing (11) at each end of filter (4), Install new filter in bowl (2).

NOTE

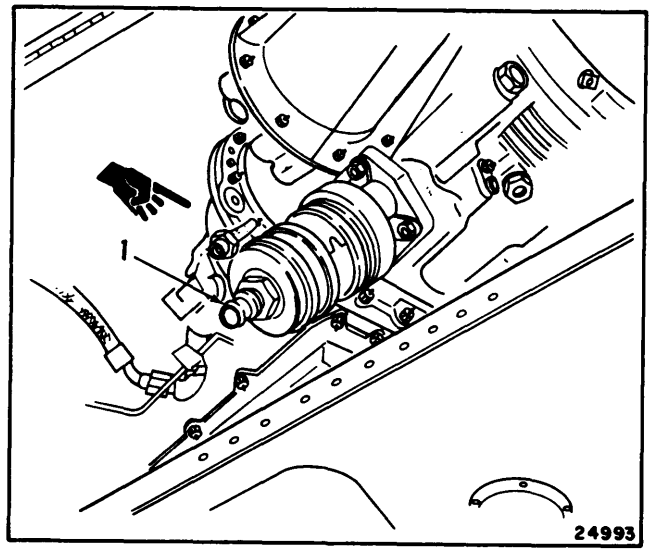
Make sure indicator is within 30 degrees of 12:00 o'clock (top) position of filter bowl after tightening.

14. **Install bowl (2) and filter (4)** in housing (3). Tighten bowl by hand until it bottoms. Check that indicator (6) is within **30 degrees** of 12:00 O'clock (top) position of filter bowl. Lockwire bowl to housing. Use lockwire (E231).



15. Make sure drain valve (1) is closed.

INSPECT



FOLLOW-ON MAINTENANCE:

Service aft transmission (Task 1-54).
Perform ground run (TM 55-1520-240-10).
Close left baffle under aft transmission (Task 2-2).
Close cargo ramp (TM 55-1520-240-23).

END OF TASK

6-148.1 REPLACE AFT TRANSMISSION MAIN OIL FILTER PRESSURE DIFFERENTIAL INDICATOR 6-148.1

INITIAL SETUP

Applicable Configurations:
All

Tools:
Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Container, Two-Quart

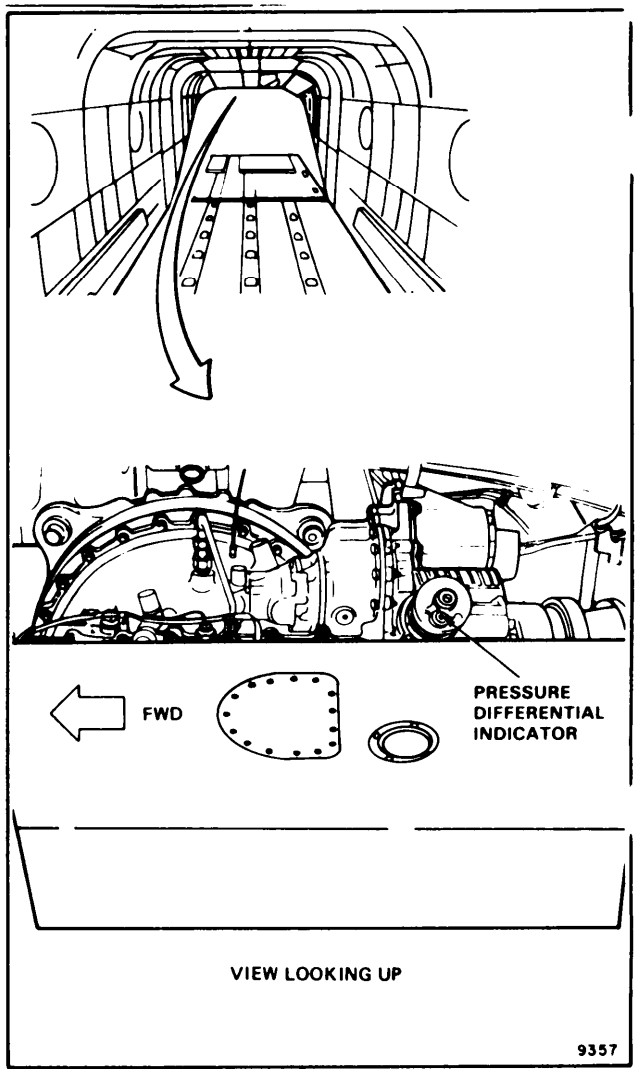
Materials:
Lockwire (E231)

Parts:
Packings

Personnel Required:
Medium Helicopter Repairer
Inspector

References:
TM 55-1520-240-23P

Equipment Condition:
Battery Disconnected (Task 1-39)
Electrical Power Off
Cargo Ramp Open and Level (TM 55-1520-240-T)
Left Baffle Under Aft Transmission Open (Task 2-2)

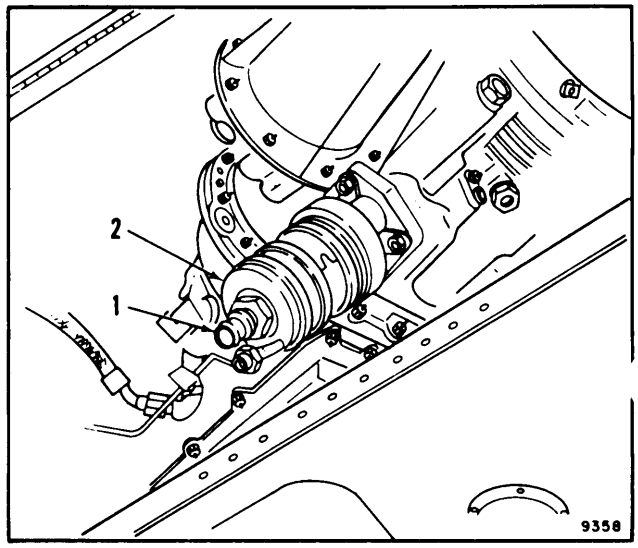


DRAIN OIL

NOTE

Filter bowl holds about 1 pint of oil.

1. Hold container under drain valve (1) of filter bowl (2). Push in and twist drain valve. **Drain oil** into container.
2. Close drain valve (1).



GO TO NEXT PAGE

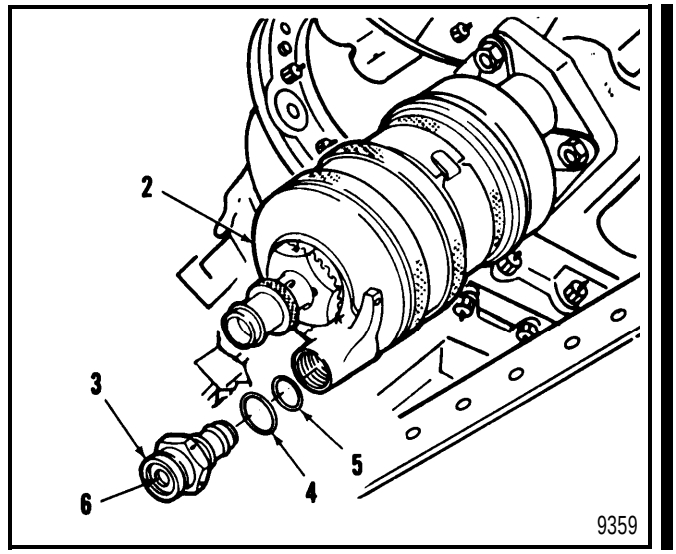
6-148.1 REPLACE AFT TRANSMISSION MAIN OIL FILTER PRESSURE DIFFERENTIAL INDICATOR (Continued)

REMOVE INDICATOR

3. Remove lockwire from pressure differential indicator (3). **Remove indicator** from filter bowl (2).
4. Remove two packings (4 and 5) from indicator (3).

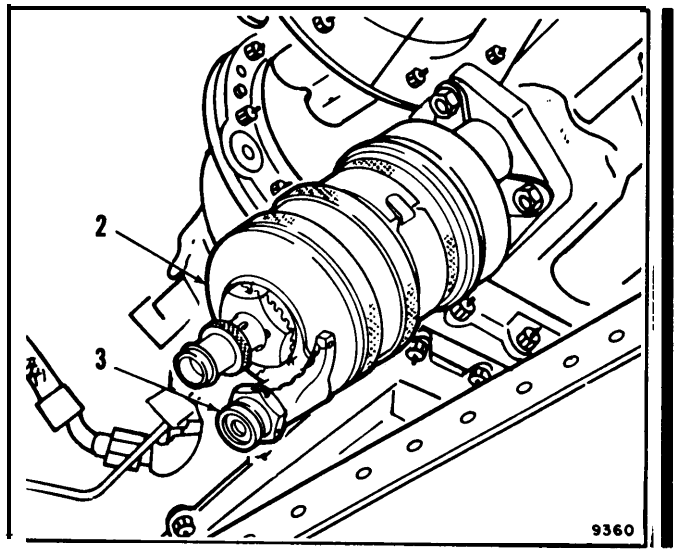
INSTALL INDICATOR

5. **Install two packings (4 and 5)** on indicator (3).
6. Hold indicator (3) so that button (6) points up. **Check that button is pushed in** and locked.
7. Install indicator (3) in bowl (2).



8. Lockwire indicator (3) to filter bowl (2). Use lockwire (E231).

INSPECT



FOLLOW-ON MAINTENANCE:

Service aft transmission (Task 1-54).

Close left baffle under aft transmission (Task 2-2).

Close cargo ramp (TM 55-1520-240-T).

END OF TASK

6-149 REMOVE AFT TRANSMISSION MAIN OIL PUMP

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Bolt, 1/4-28, 3 Inches Long, 1 1/2-inch Thread Length (2)
Workstand
Container, Two-Quart

Materials:

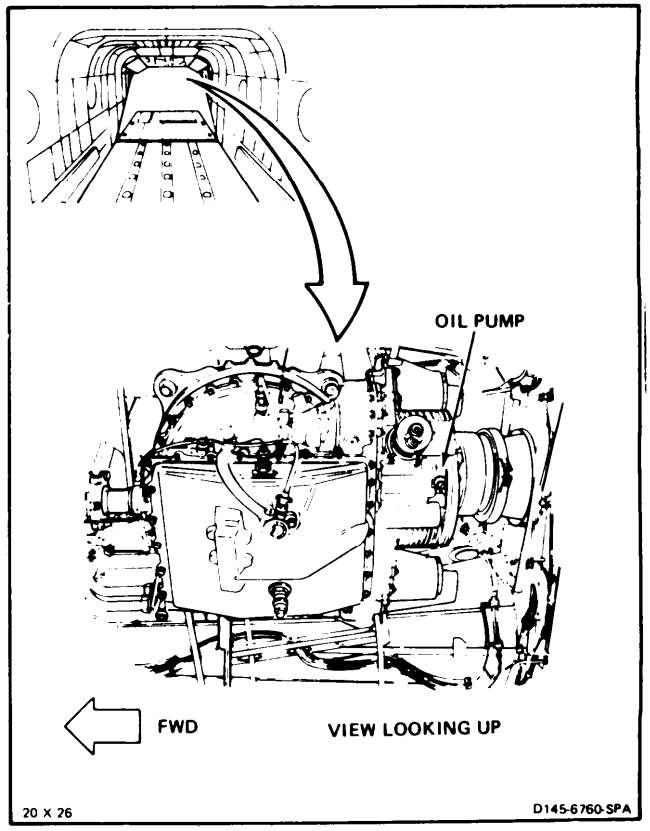
None

Personnel Required:

Medium Helicopter Repairer (2)

Equipment Condition:

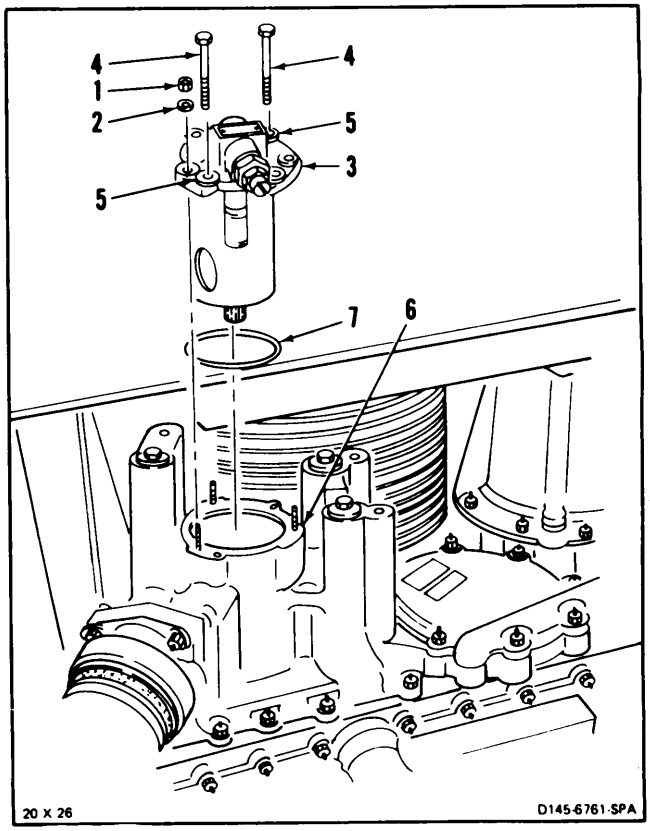
Battery Disconnected (Task 1-39)
Electrical Power Off
Baffles Under Aft Transmission Open (Task 2-2)
Aft Transmission Drip Tray Removed (Task 2-3)
Cargo Ramp Open and Level (TM 55-1520-240-T)



1. Remove three nuts (1) and washers (2) from pump (3).
2. Install two 1/4-28 bolts (4) in holes (5) in end of pump (3). Threaded length of bolts shall be at least 1 1/2-inches.
3. Turn bolts (4) to jack pump (3) out of transmission (6). Remove pump. Use container to catch spilled oil.
4. Remove bolts (4) and packing (7) from pump (3).

FOLLOW-ON MAINTENANCE:

None



END OF TASK

6-150 INSTALL AFT TRANSMISSION MAIN OIL PUMP

INITIAL SETUP

Applicable Configurations:
All

Tools:
Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692
Torque Wrench, 30 to 150 Inch-Pounds
Workstand

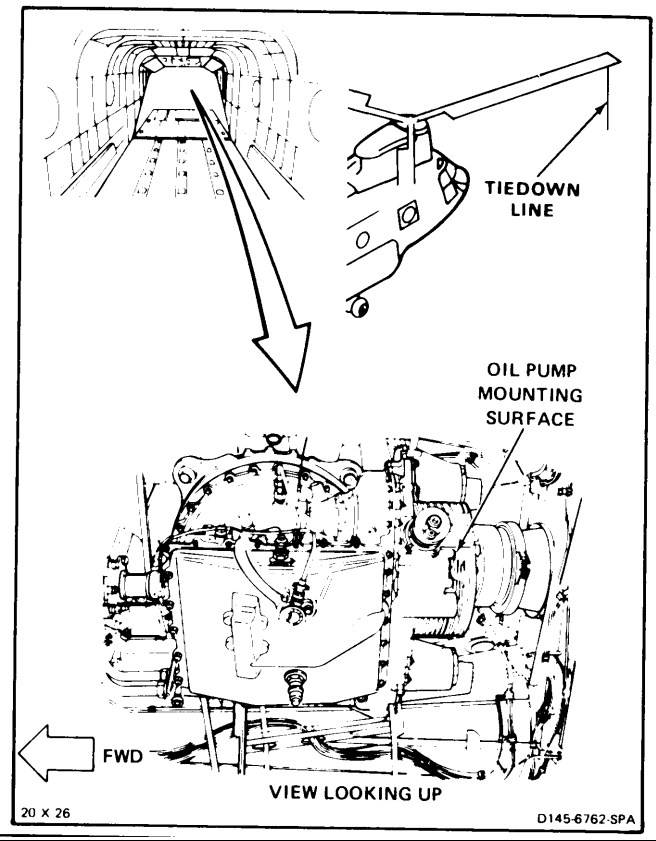
Materials:
None

Parits:
Packing

Personnel Required:
67U10 Medium Helicopter Repairer
67U20 Medium Helicopter Repairer
67U30 Inspector

References:
TM 55-1520-240-23P

Equipment Condition:
Tiedown Line Installed On One Forward Blade (Task 1-26)



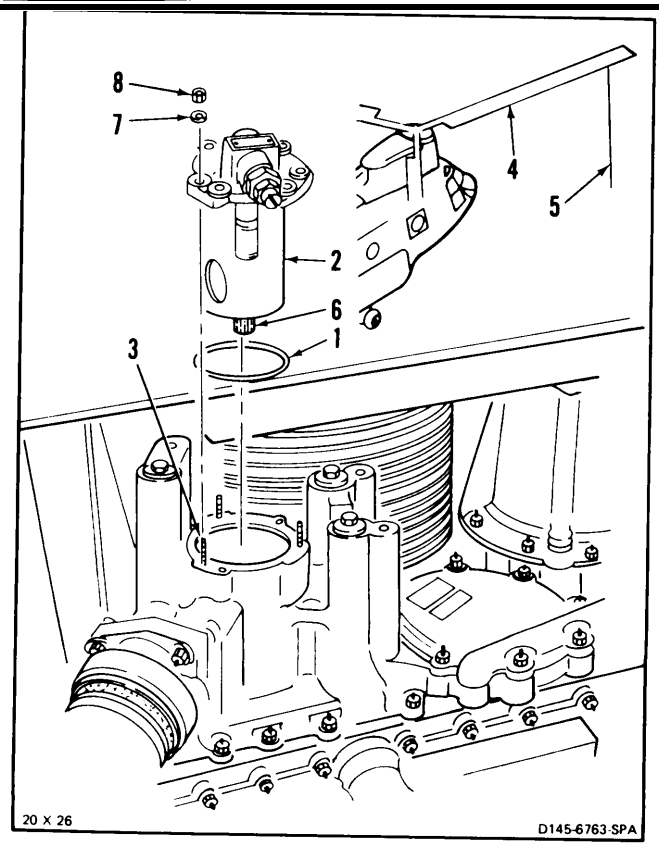
1. Install packing (1) on pump (2).

WARNING

Rotary-wing **blades can seriously injure personnel. Make sure area around helicopter is clear of personnel before turning blades.**

2. **Install pump (2)** slowly and carefully on three studs (3). Have helper pull blade (4) around with tiedown line (5) as needed to align splines in transmission with splines of pump drive shaft (6).

3. **Install three** washers (7) and **nuts (8)** on studs (3). **Torque nuts to <u>80 inch-pounds.</u>**



INSPECT

GO TO NEXT PAGE

6-150 INSTALL AFT TRANSMISSION MAIN OIL PUMP (Continued)

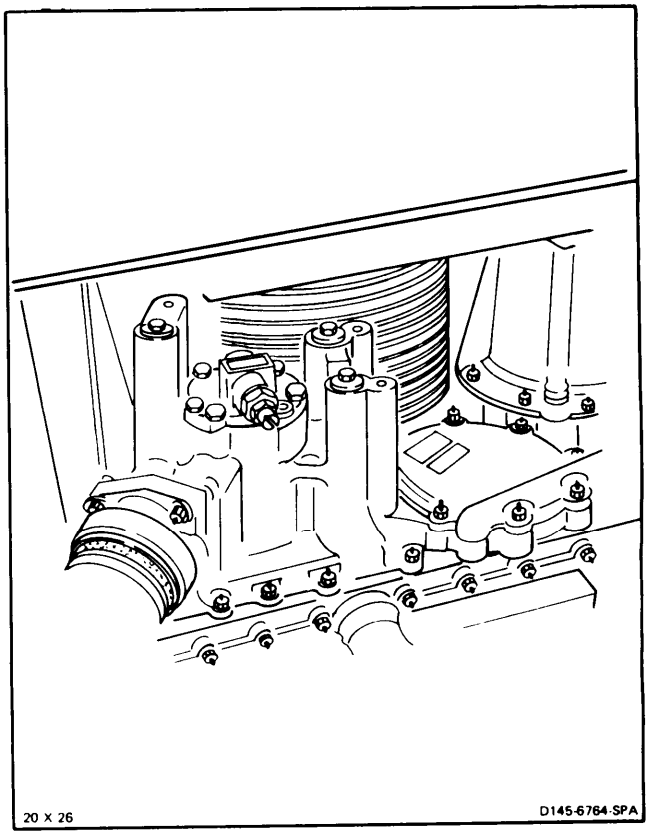
FOLLOW-ON MAINTENANCE:

Service aft transmission with oil (Task 1-54).

Install aft transmission drip tray (Task 2-3).

Close baffles under aft transmission (Task 2-2).

Close cargo ramp (TM 55-1520-240-T).



END OF TASK

6-151 ADJUST AFT TRANSMISSION MAIN OIL PUMP 6-151

INITIAL SETUP

Applicable Configurations:
All

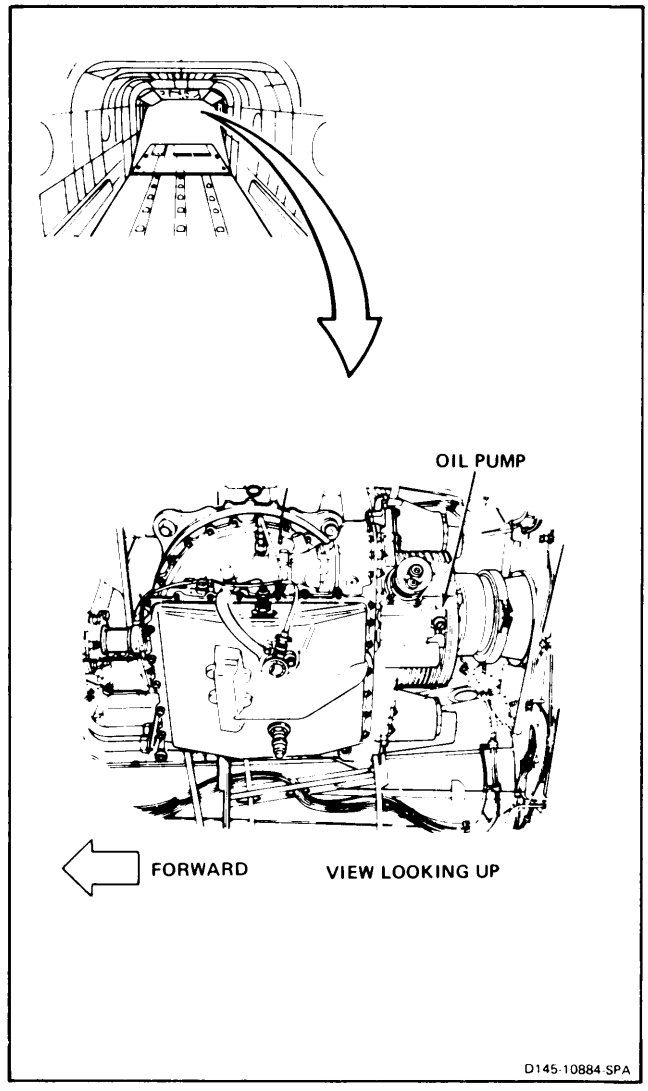
Tools:
Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692

Materials:
Lockwire (E230)

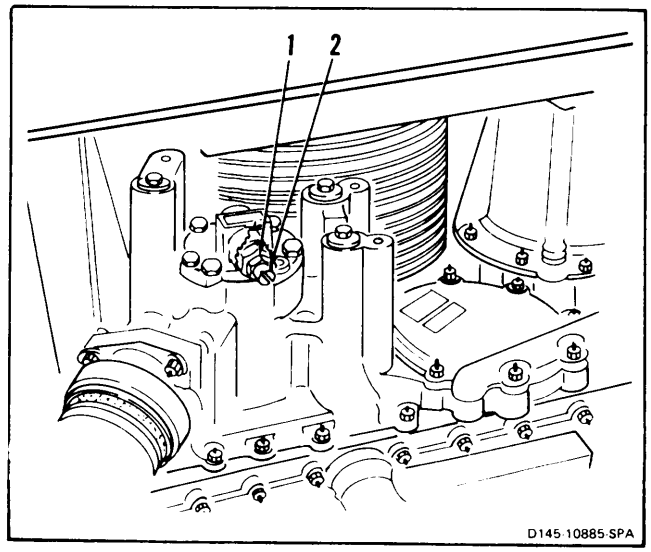
Personnel Required:
Medium Helicopter Repairer Inspector
Army Rotary-Wing Aviator (2)

References:
TM 55-1520-240-10

Equipment Condition:
Battery Disconnected (Task 1-39)
Electrical Power Off
Baffles Under Aft Transmission Open (Task 2-2)
Aft Transmission Drip Tray Removed (Task 2-3)
Cargo Ramp Open and Level (TM 55-1520-240-T)



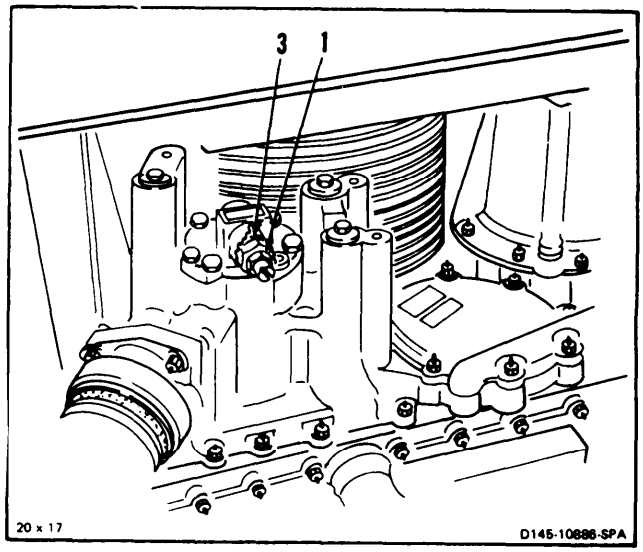
1. Remove lockwire from locknut (1). Hold setscrew (2) and **loosen locknut.**
2. **Turn setscrew (2) no more than 1/4 turn to adjust** transmission oil pressure. Turn setscrew clockwise to increase pressure. Turn setscrew counterclockwise to decrease pressure. Required gage pressure is 40 to 70 psi.
3. Hold setscrew (2). **Torque locknut (1) to 60 inch-pounds.**



GO TO NEXT PAGE

6-151 ADJUST AFT TRANSMISSION MAIN OIL PUMP (Continued)

4. Have pilot perform ground run at 100 percent rotor rpm until transmission temperature and pressure stabilize. **Record aft transmission oil pressure.**
5. If oil pressure IS 40 to 70 psi, go to step 6. **If pressure is not 40 to 70 psi, repeat task.**
6. Lockwire locknut (1) to retaining nut (3). Use lockwire (E230).



INSPECT

FOLLOW-ON MAINTENANCE:

Install aft transmission drip tray (Task 2-3).

Close baffles under aft transmission (Task 2-2).

Close cargo ramp (TM 55-1520-240-T).

END OF TASK

6-152 REMOVE AFT TRANSMISSION AUXILIARY OIL PUMP

INITIAL SETUP

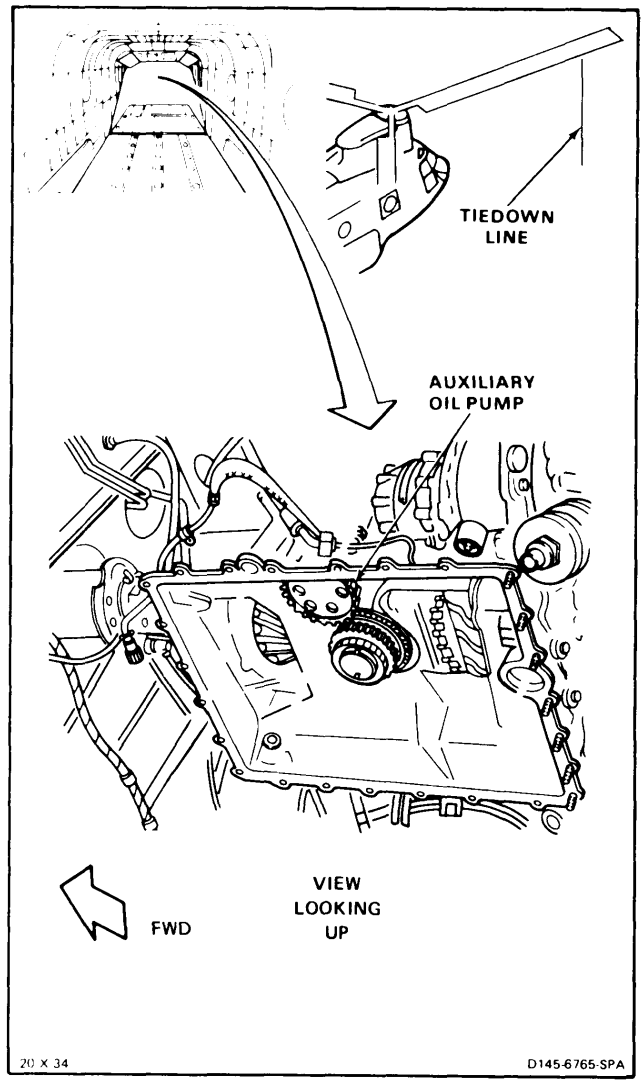
Applicable Configurations:
All

Tools:
Powertrain Tool Kit,
NSN 5180-00-323-5267
1/4-28 Bolt, 3-Inches Long, 1 1/2-inch Thread Length (2)

Materials:
None

Personnel Required:
67U10 Medium Helicopter Repairer
68D20 Powertrain Repairer

Equipment Condition:
Battery Disconnected (Task 1-39)
Electrical Power Off
Cargo Ramp Open and Level (TM 55-1520 240-T)
Baffles Under Aft Transmission Open (Task 2-2)
Aft Transmission Drip Tray Removed (Task 2-3)
Aft Transmission Sump Removed (Task 6-78)
Tiedown Line Installed On One Forward Blade (Task 1-26)



General Safety Instructions:

WARNING

Rotary-wing blades can seriously injure personnel. Make sure area around helicopter is clear of personnel before turning blades.

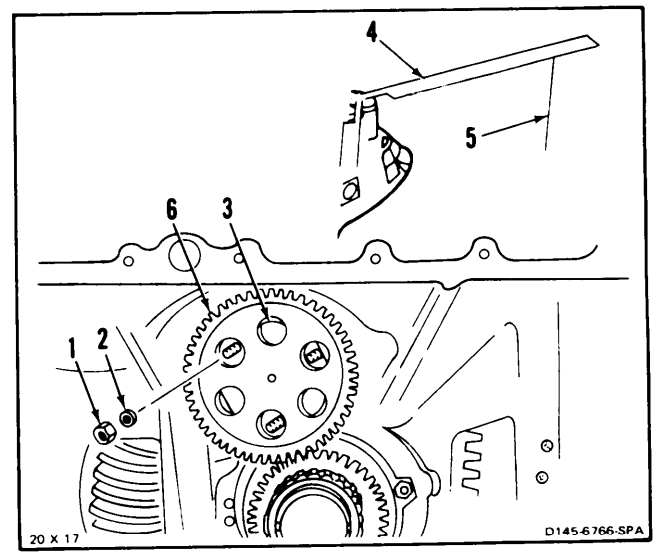
WARNING

Keep fingers away from drive gear as blades are turned. Turning gear can cause injury to personnel.

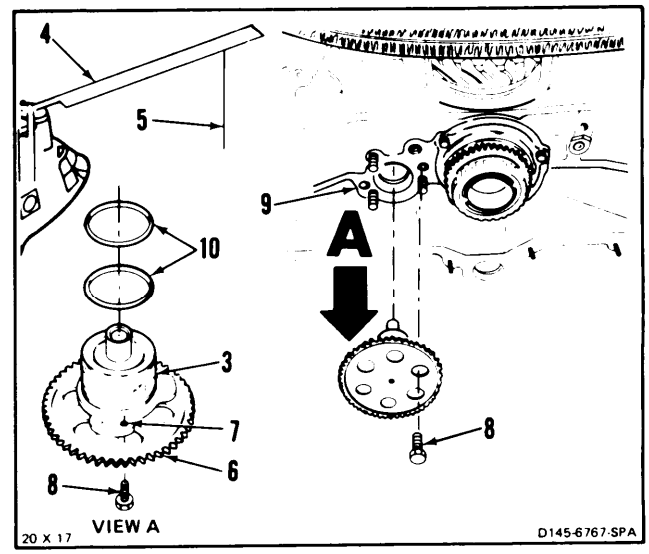
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6-152 REMOVE AFT TRANSMISSION AUXILIARY OIL PUMP (Continued)

1. **Remove three nuts (1)** and washers (2) from pump (3). Have helper pull blade (4) around with tiedown line (5) as needed to align access holes in drive gear (6) with nuts.



2. Have helper pull blade (4) around with tie-down line (5) as needed to align access holes in drive gear (6) with two extra holes (7) in pump (3). **Install 1/4-28 bolt (8) in each hole.** Threaded length of bolts shall be at least 1 1/2 inches.
3. Turn bolts (8) to jack pump (3) out of transmission (9). **Remove pump.**
4. Remove two bolts (8) and two packings (10) from pump (3).



FOLLOW-ON MAINTENANCE:

None

END OF TASK

6-153 INSTALL AFT TRANSMISSION AUXILIARY OIL PUMP

INITIAL SETUP

Applicable Configurations:
All

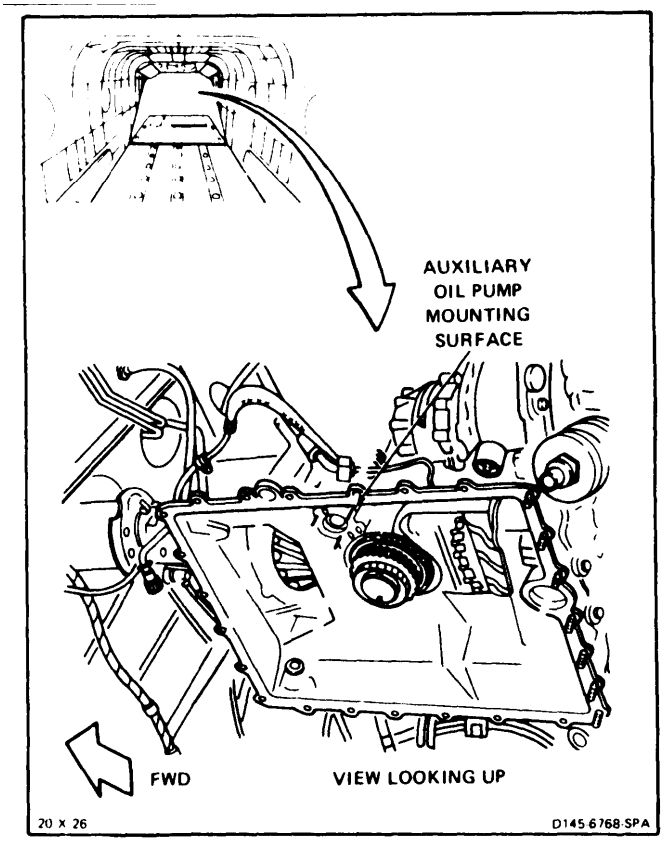
Tools:
Powertrain Tool Kit,
NSN 5180-00-323-5267
Torque Wrench, 30 to 150 Inch-Pounds

Materials:
None

Parts:
Packings

Personnel Required:
67U10 Medium Helicopter Repairer (2)
68D20 Powertrain Repairer
67U30 Inspector

References:
TM 55-1520-240-23P

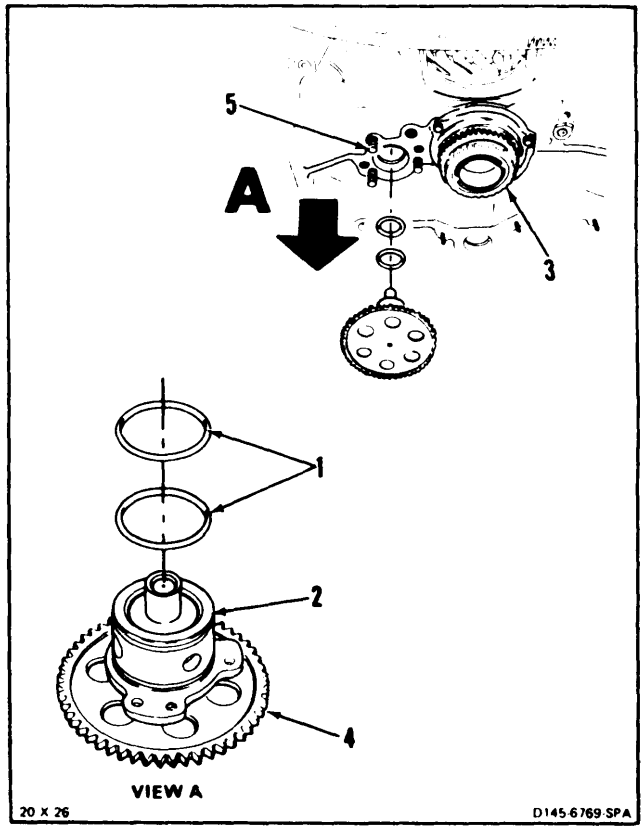


1. Install two packings (1) on pump (2)

CAUTION

If drive gear teeth do not align with drive gear, pump can be damaged.

2. **Align teeth** of pump drive gear (3) with teeth of transmission drive gear (4). **Install pump (2)** on three studs (5).



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6-153 INSTALL AFT TRANSMISSION AUXILIARY OIL PUMP (Continued)

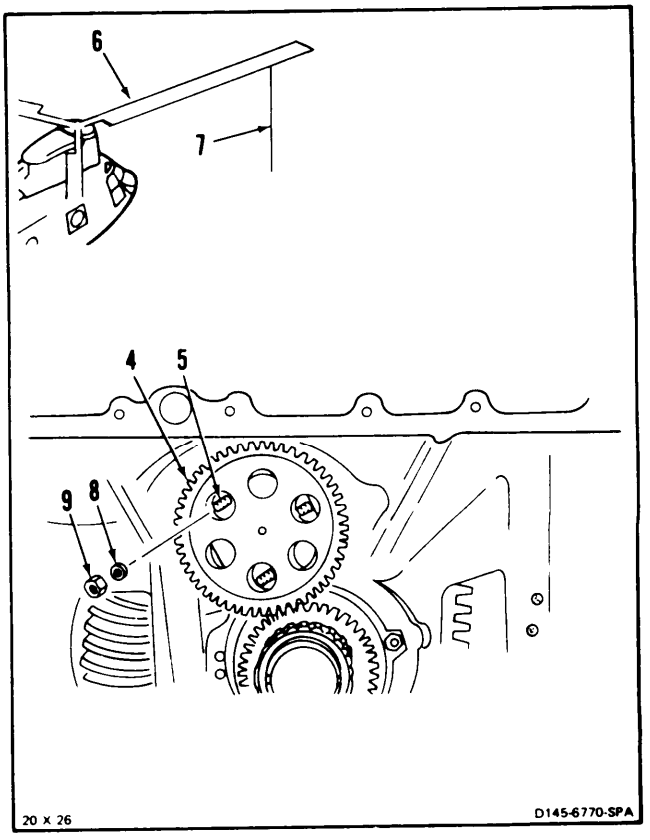
WARNING

Rotary-wing blades can seriously injure personnel. Make sure area around helicopter is clear of personnel before turning blades.

WARNING

Keep fingers away from drive gear as blades are turned. Turning gear can injure personnel.

3. Have helper pull blade (6) around with tie-down line (7) as needed to align access holes in drive gear (4) with three studs (5). **Install three** washers (8) and **nuts** (9). Torque **nuts to 60 inch-pounds.**



INSPECT

FOLLOW-ON MAINTENANCE:

Install aft transmission sump (Task 6-81).

Install aft transmission drip tray (Task 2-3).

Close baffles under aft transmission (Task 2-2).

Close cargo ramp (TM 55-1520-240-T).

END OF TASK

6-154 REPLACE AFT TRANSMISSION AUXILIARY OIL FILTER

INITIAL SETUP

Applicable Configurations:
All

Tools:
Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Container, Two Quart
Torque Wrench, 0 to 150 Inch-Pounds
Workstand

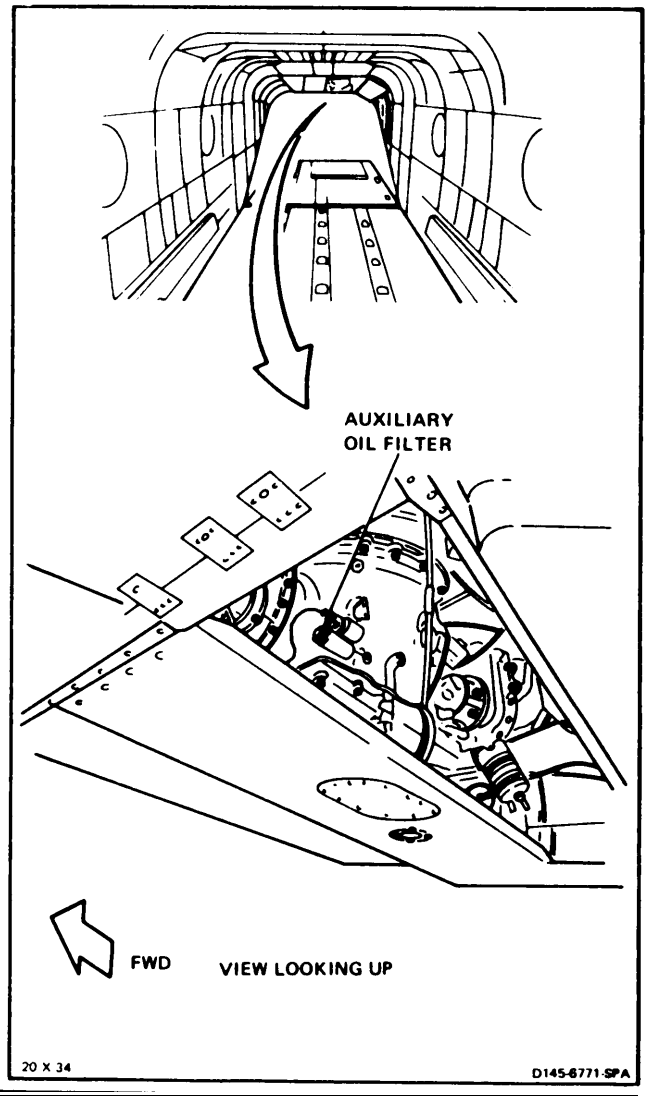
Materials:
Oil (E254)
Lockwire (E231)

Parts:
Packing
Filter

Personnel Required:
67U10 Medium Helicopter Repairer
67U30 Inspector

References:
TM 55-1520-240-23P

Equipment Condition:
Battery Disconnected (Task 1-39)
Electrical Power Off
Left Baffle Under Aft Transmission Open (Task 2-2)
Cargo Ramp Open and Level (TM 55-1520-240-T)



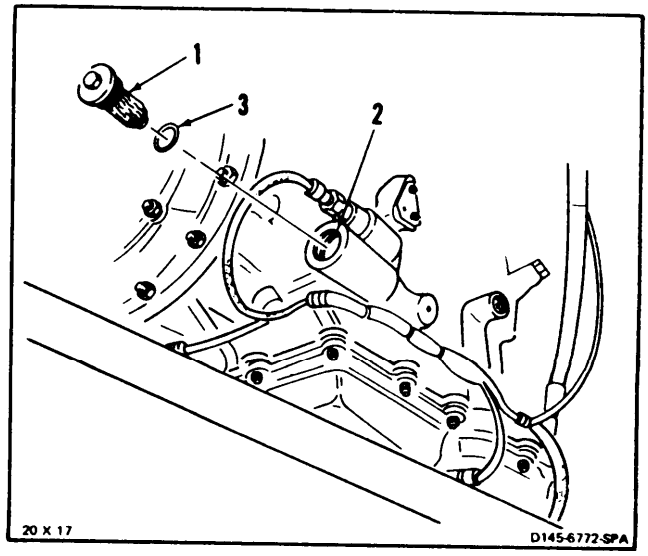
REMOVE FILTER

1. Remove lockwire from filter (1).

CAUTION

Do not let debris enter transmission. Damage can result.

2. **Remove filter (1)** from transmission cavity (2). Catch spilled oil in container. Remove packing (3) from filter.



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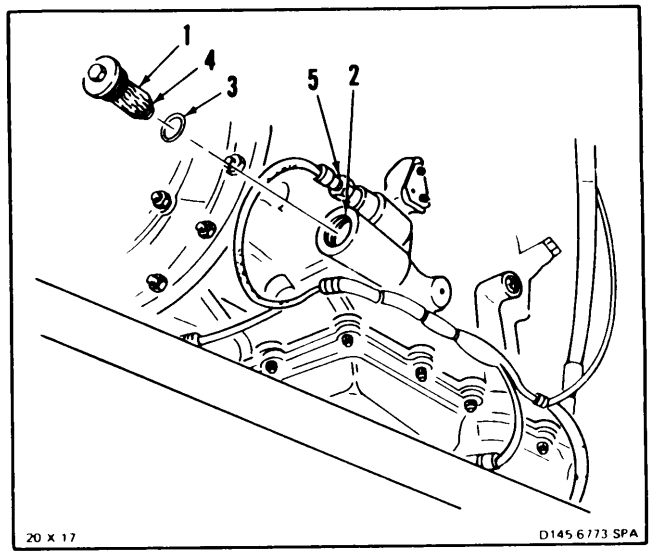
6-154 REPLACE AFT TRANSMISSION AUXILIARY OIL FILTER (Continued)

INSTALL FILTER

NOTE

Filter is supplied with one packing installed. Do not install a used filter.

3. Coat packings (3 and 4) and thread of new filter (1) with oil (E254).
4. **Install filter (1)** and packing (3) in transmission cavity (2). **Torque filter to 80 inch-pounds.**
5. Lockwire filter (1) to auxiliary oil pressure switch (5). Use lockwire (E231).



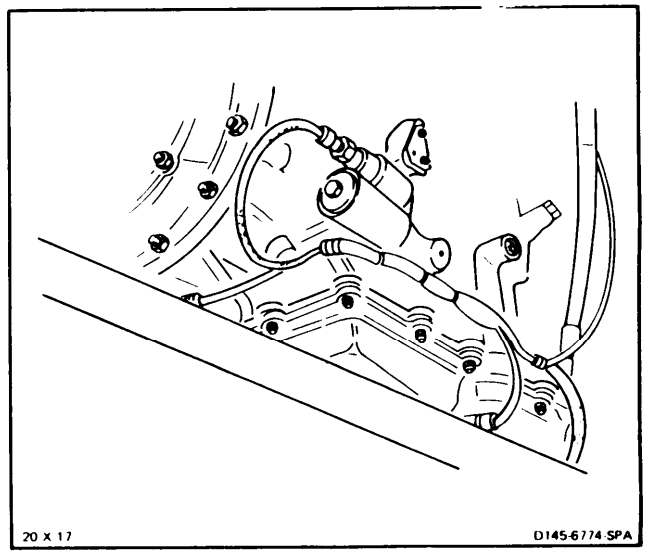
INSPECT

INSPECT

FOLLOW-ON MAINTENANCE:

Close baffle under aft transmission (Task 2-2).

Close cargo ramp (TM 55-1520-240-T).



END OF TASK

6-155 REMOVE AFT TRANSMISSION MAIN INLET SCREEN

INITIAL SETUP

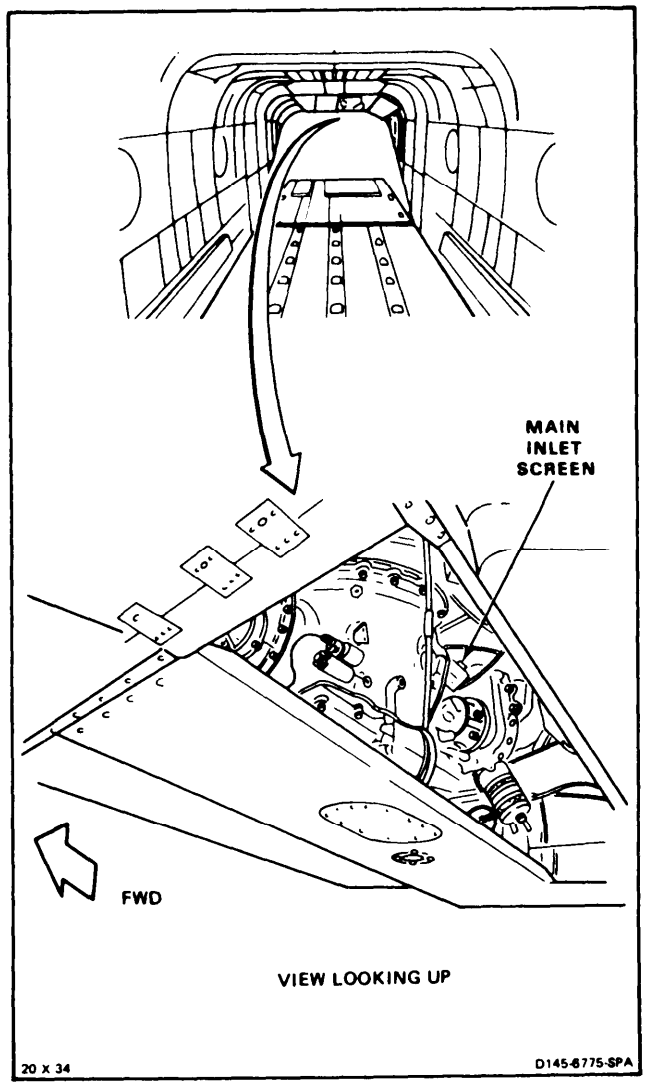
Applicable Configurations:
All

Tools:
Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692
Socket, 1-Inch
Workstand

Materials:
Barrier Material (E80)
Masking Tape (E388)

Personnel Required:
67U10 Medium Helicopter Repairer

Equipment Condition:
Battery Disconnected (Task 1-39)
Electrical Power Off
Left Baffle Under Aft Transmission Open (Task 2-2)
Cargo Ramp Open and Level (TM 55-1520-240-T)



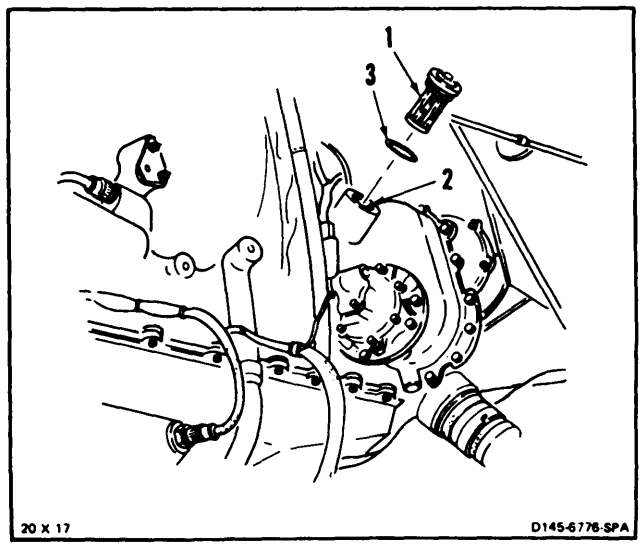
1. Remove lockwire from screen (1).

CAUTION

Do not let debris enter transmission. Damage can result.

2. **Remove screen (1)** from transmission cavity (2). Cover cavity with barrier material (E80) and tape (E388).

3. Remove packing (3) from screen (1).



FOLLOW-ON MAINTENANCE:

None

END OF TASK

6-156 INSTALL AFT TRANSMISSION MAIN INLET SCREEN

INITIAL SETUP

Applicable Configurations:
All

Tools:
Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Socket, 1-Inch
Torque Wrench, 30 to 150 Inch Pounds
Workstand

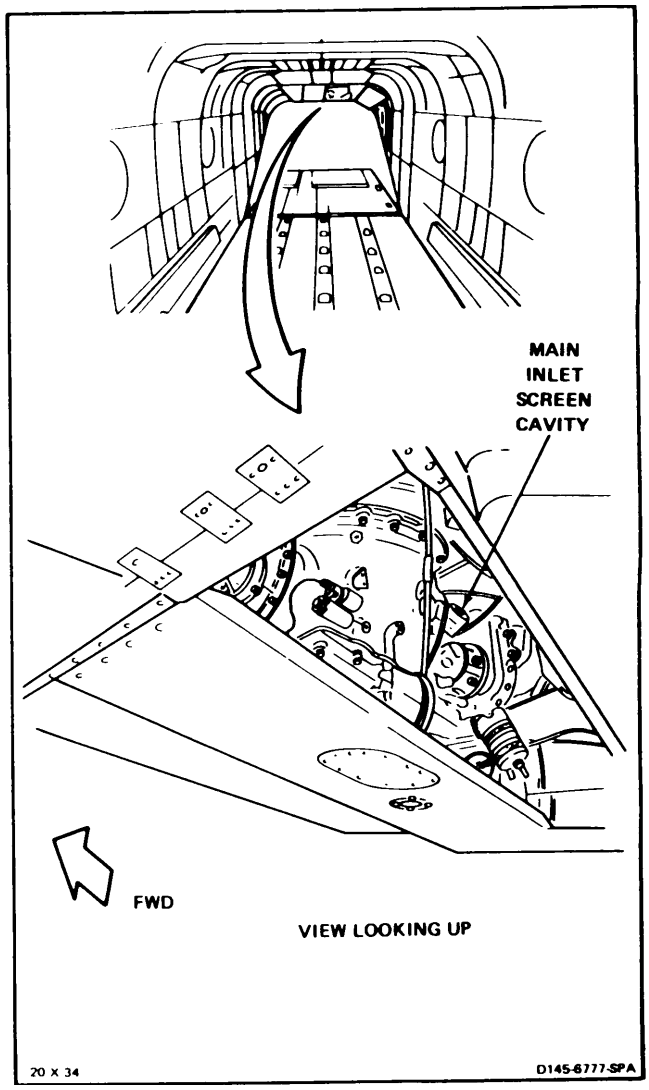
Materials:
Oil (E254)
Lockwire (E231)

Parts:
Packing

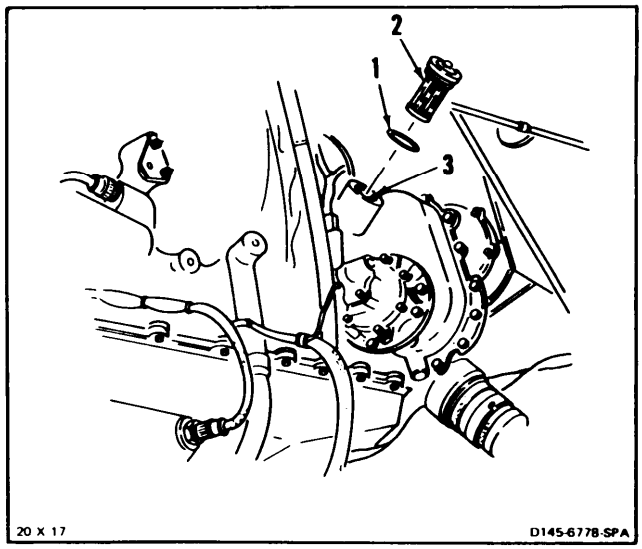
Personnel Required:
Medium Helicopter Repairer
Inspector

References:
TM 55-1520-240-23P

Equipment Condition:
Aft Transmission Main Inlet Screen Inspected (Task 6-131)



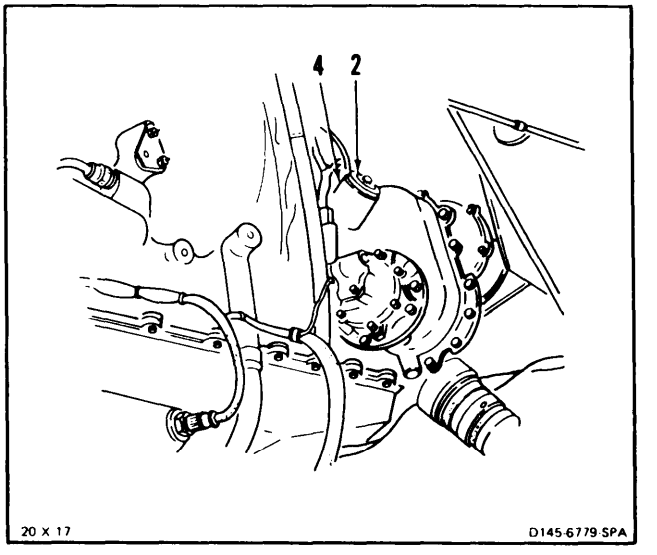
1. Coat packing (1) and thread of screen (2) With oil (E254). Install packing on screen.
2. Remove tape and barrier material from transmission cavity (3).
3. **Install screen (2)** in cavity (3). **Torque screen to 80 inch-pounds.**



GO TO NEXT PAGE

6-156 INSTALL AFT TRANSMISSION MAIN INLET SCREEN (Continued)

4. Lockwire screen (2) to transmission (4). Use lockwire (E231).



INSPECT

FOLLOW-ON MAINTENANCE:

Close left baffle under aft transmission (Task 2-2).

END OF TASK

6-157 REMOVE AFT TRANSMISSION DEBRIS DETECTION SCREEN

INITIAL SETUP

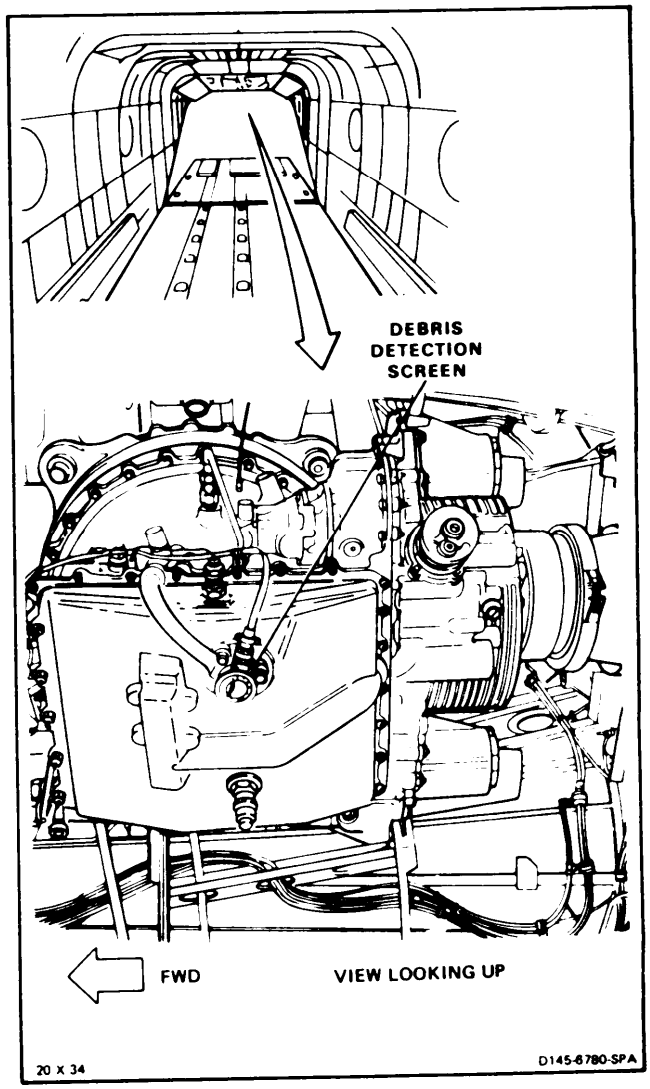
Applicable Configurations:
All

Tools:
Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692
Container, 2-Quart (Cap Removed Only)
Container, 14 Quart (3) (Cap and Housing Removal)

Materials:
Cloths (E120)

Personnel Required:
67U10 Medium Helicopter Repairer

Equipment Condition:
Battery Disconnected (Task 1-39)
Electrical Power Off
Aft Transmission Drip Tray Access Panel Removed (Cap Removal Only) (Task 2-3)
Baffles Under Transmission Open (Cap and Housing Removal) (Task 2-2)
Aft Transmission Drip Tray Removed (Cap and Housing Removal) (Task 2-3)



REMOVE CAP

1. **Disconnect electrical connector (1)** from cap receptacle (2).

NOTE

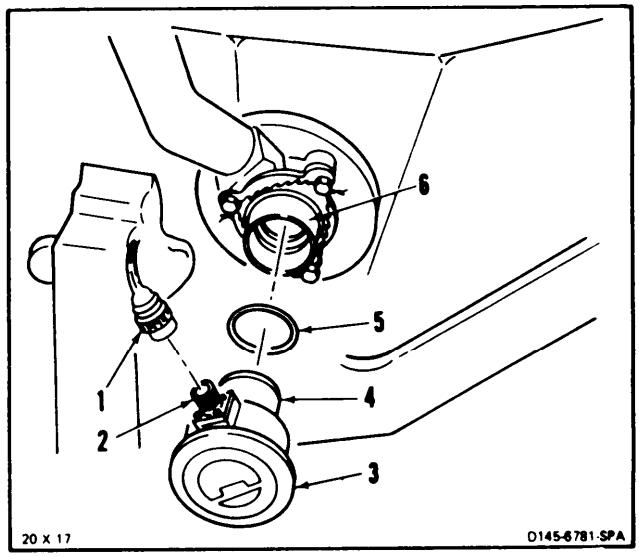
Cap holds 2 to 3 ounces of oil.

2. Hold container under cap (3). Push in center of cap and pull down cap to remove cap, screen (4), and packing (5). Drain oil into container.

NOTE

Screen is part of cap.

3. Filter drained oil through cloth (E120). Check cloth and screen (4) for debris. Retain debris for contamination analysis (Task 6-108).
4. If housing (6) will not be removed, go to FOLLOW-ON MAINTENANCE.



GO TO NEXT PAGE

6-157 REMOVE AFT TRANSMISSION DEBRIS DETECTION SCREEN (Continued)

REMOVE HOUSING

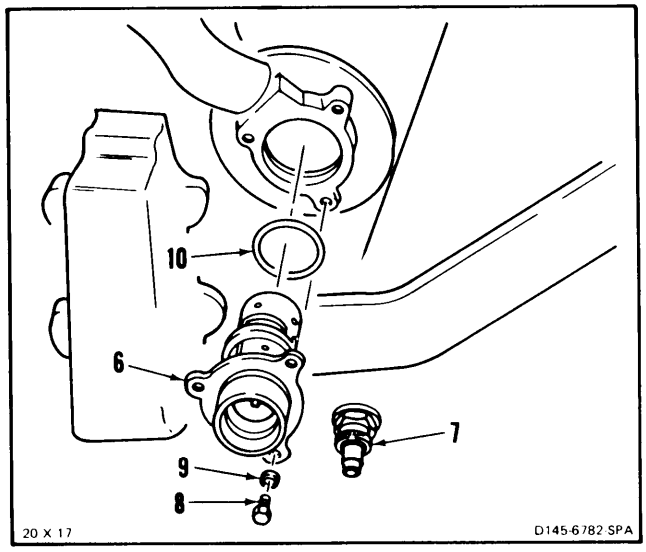
NOTE

Sump holds about 30 quarts of oil.

5. Push in drain valve (7), twist, and pull. **Drain oil** into container. Push in valve and twist to close.
6. Remove lockwire from three bolts (8). **Remove three bolts** and washers (9).
7. **Remove housing (6)** and packing (10).

FOLLOW-ON MAINTENANCE:

None



END OF TASK

6-158 INSTALL AFT TRANSMISSION DEBRIS DETECTION SCREEN

INITIAL SETUP

Applicable Configurations:
All

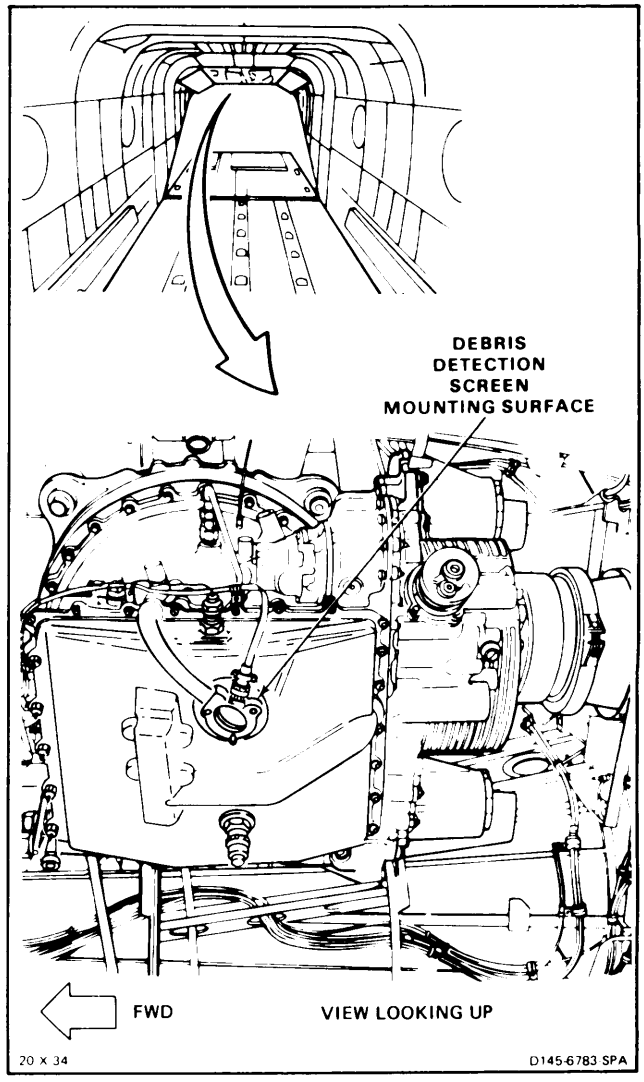
Tools:
Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692
Torque Wrench, 30 to 150 Inch-Pounds

Materials:
Lockwire (E231)

Parts:
Packings

Personnel Required:
67U10 Medium Helicopter Repairer
67U30 Inspector

References:
TM 55-1520-240-23P
TM 55-1520-240-T

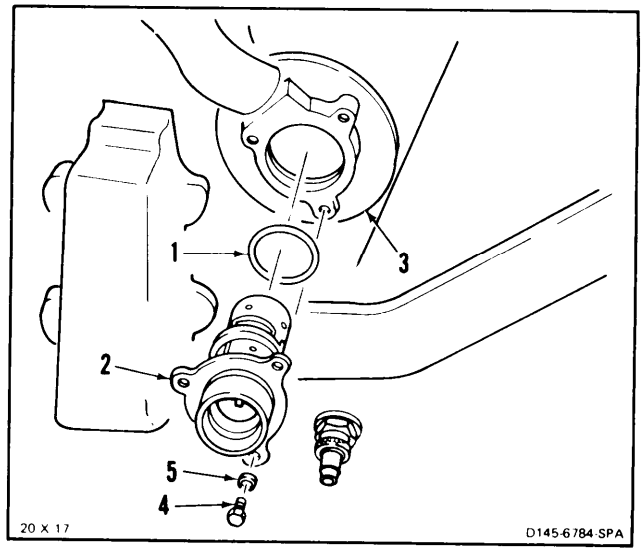


NOTE

If only cap is being installed, go to step 4.

INSTALL HOUSING

1. Install packing (1) on housing (2). **Install housing** in sump (3).
2. **Install three bolts (4)** and washers (5). **Torque bolts to <u>60 inch-pounds.</u>**
3. Lockwire three bolts (4) together. use lockwire (E231).



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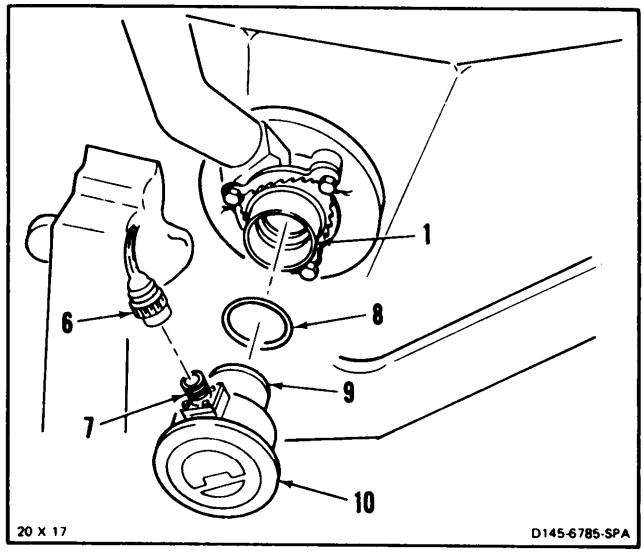
6-158 INSTALL AFT TRANSMISSION DEBRIS DETECTION SCREEN (Continued)

INSTALL CAP

NOTE

Screen is part of cap.

4. **Connect electrical connector (6)** to receptacle (7).
5. Perform operational check of aft transmission debris detection system (TM 55-1520-240-T).
6. Install packing (8) on screen (9).
7. Press in center of cap (10). **Install cap and screen (9)** in housing (1).



INSPECT

FOLLOW-ON MAINTENANCE:

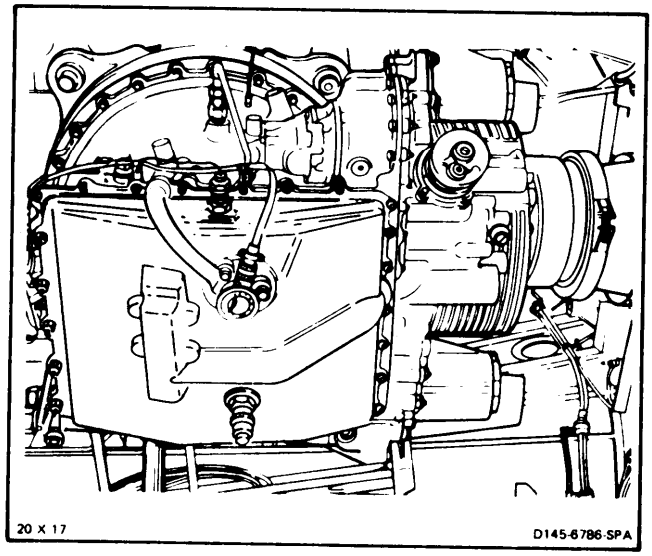
Service aft transmission (Task 1-54).

Install aft transmission drip tray access cover (cap only installed) (Task 2-3).

Install aft transmission drip tray (cap and housing installed) (Task 2-3).

Close baffles under aft transmission (cap and housing installed) (Task 2-2).

Close cargo ramp (TM 55-1520-240-T).



END OF TASK

6-158.1 REMOVE GENERATOR OIL OUTLET SCREENS

INITIAL SETUP

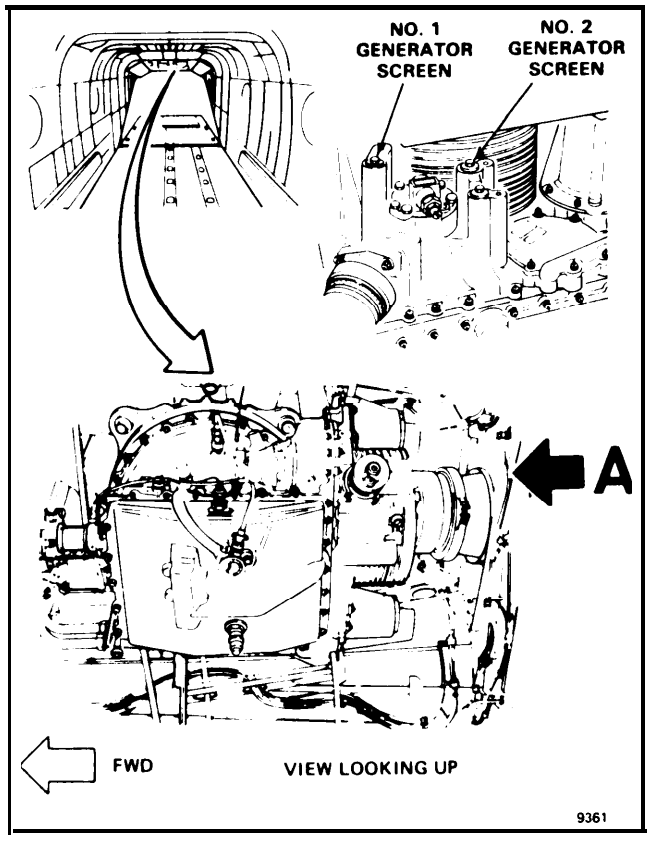
Applicable Configurations:
All

Tools:
Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Workstand
Container, Two-Quart

Matierials:
None

Personnel Required:
Medium Helicopter Repairer

Equipment Condition:
Battery Disconnected (Task 1-39)
Electrical Power Off
Baffles Under Aft Transmission Open (Task 2-2)
Aft Transmission Drip Tray Removed (Task 2-3)
Cargo Ramp Open and Level (TM 55-1520-240-T)



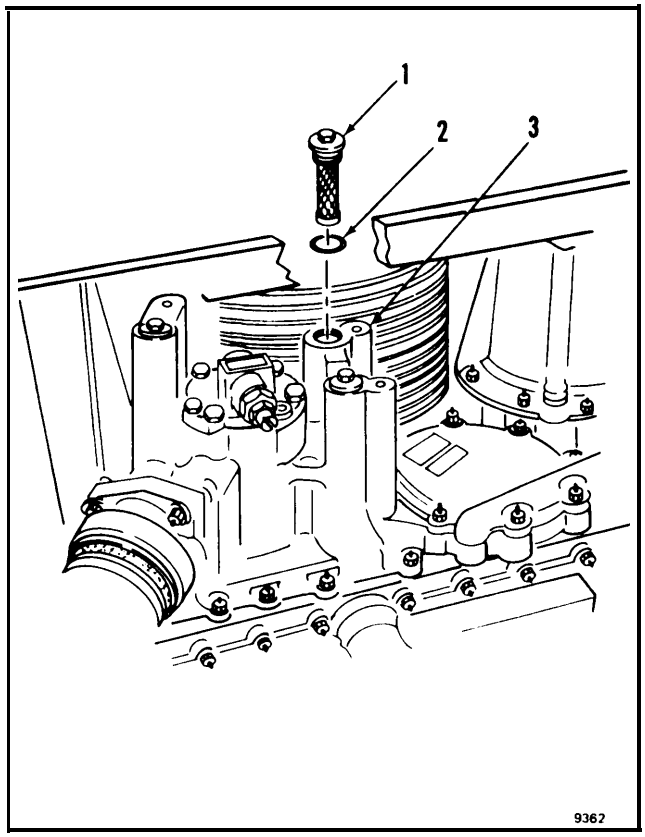
NOTE

Procedure is same to remove No. 1 or No. 2 generator oil outlet screen. No. 2 generator screen shown here.

1. **Remove lockwire** from screen (1).
2. **Remove screen (1)** and packing (2) from transmission (3). Catch spilled oil in container.

FOLLOW-ON MAINTENANCE:

If screen was removed following generator failure, inspect screen (Task 6-1 58.2).



END OF TASK

6-158.2 INSPECT GENERATOR OIL OUTLET SCREENS 6-158.2

INITIAL SETUP

Applicable Configurations:
All

Tools:
None

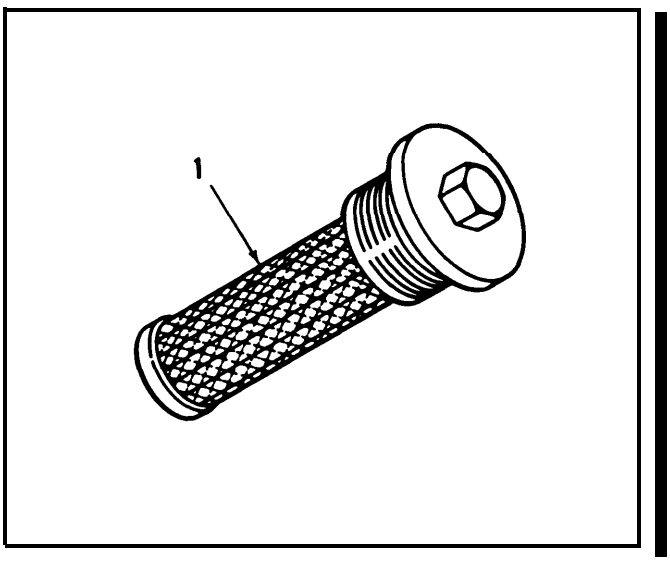
Materials:
Brush (E86)

Personnel Required:
Medium Helicopter Repairer

References:
Task 6-108

Equipment Condition:
Off Helicopter Task

1. **Check screen (1) for bits of metal** and other debris. Retain all debris for contamination analysis (Task 6-108). If debris is found, reject screen.
2. **Inspect screen (1) for tears.** There shall be no tears.



FOLLOW-ON MAINTENANCE:
None

END OF TASK

6-158.3 INSTALL GENERATOR OIL OUTLET SCREENS

INITIAL SETUP

Applicable Configurations:
All

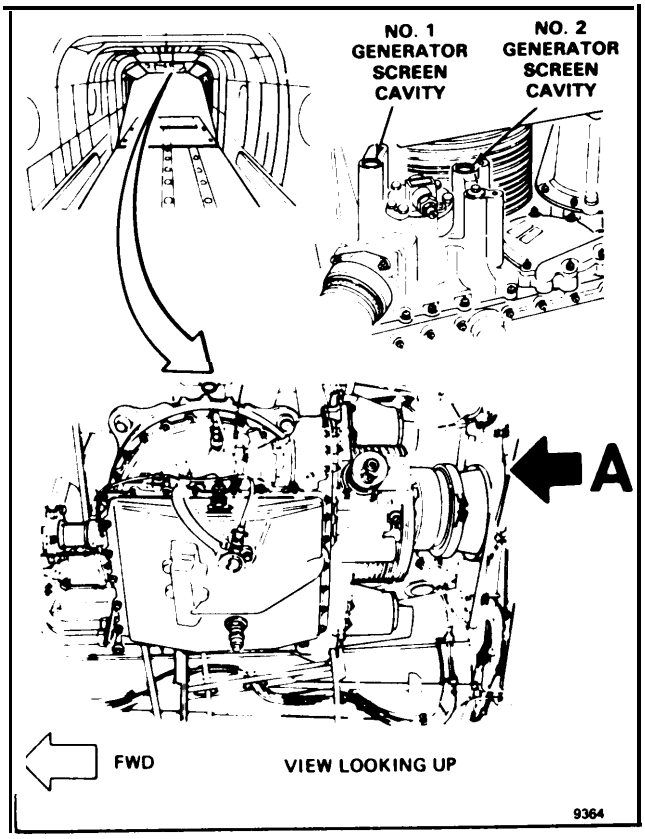
Tools:
Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692
Torque Wrench, 30 to 150 Inch-Pounds

Materials:
Oil (E254)
Lockwire (E232)

Parts:
Packing

Personnel Required:
Medium Helicopter Repairer
Inspector

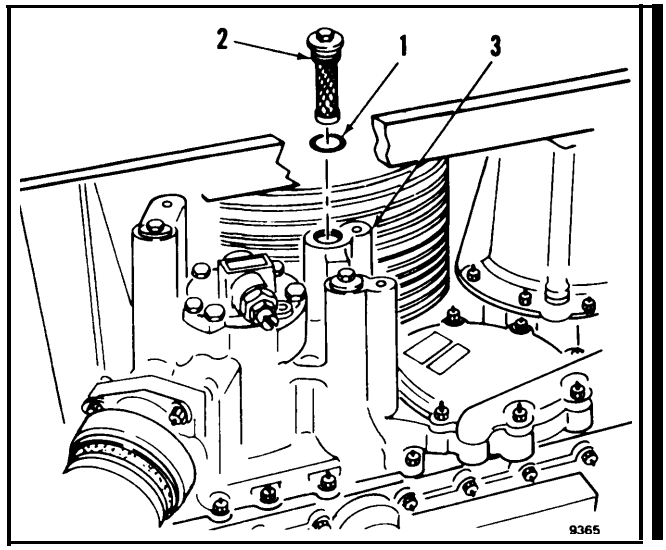
References:
TM 55-1520-240-23P



NOTE

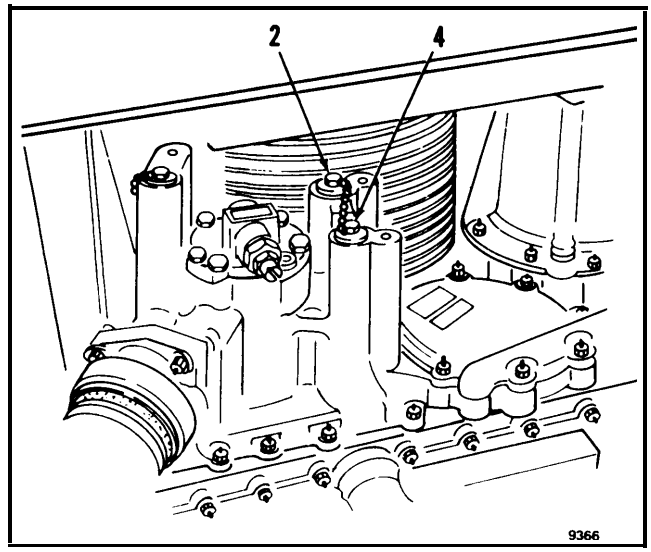
Procedure is same to install No. 1 or No. 2 generator oil outlet screen. No. 2 generator screen shown here.

1. **Coat** packing (1) and bread of screen (2) **with oil (E254).**
2. **Install packing (1)** on screen (2). **Install screen** in transmission (3). **Torque screen** to 80 inch-pounds.



GO TO NEXT PAGE

3. **Lockwire screen (2)** to spare screen housing (4).



FOLLOW-ON MAINTENANCE:

Service aft transmission with oil (Task 1-54).

Install aft transmission drip tray (Task 2-3).

Close baffles under aft transmission (Task 2-2).

Close cargo ramp (TM 55-1520-240-23P).

END OF TASK

6-159 REPLACE AFT TRANSMISSION SIGHT GAGE

INITIAL SETUP

Applicable Configurations:
All

Tools:
Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Container, 14-Quart
Spanner Wrench
Torque Wrench, 30 to 150 Inch-Pounds

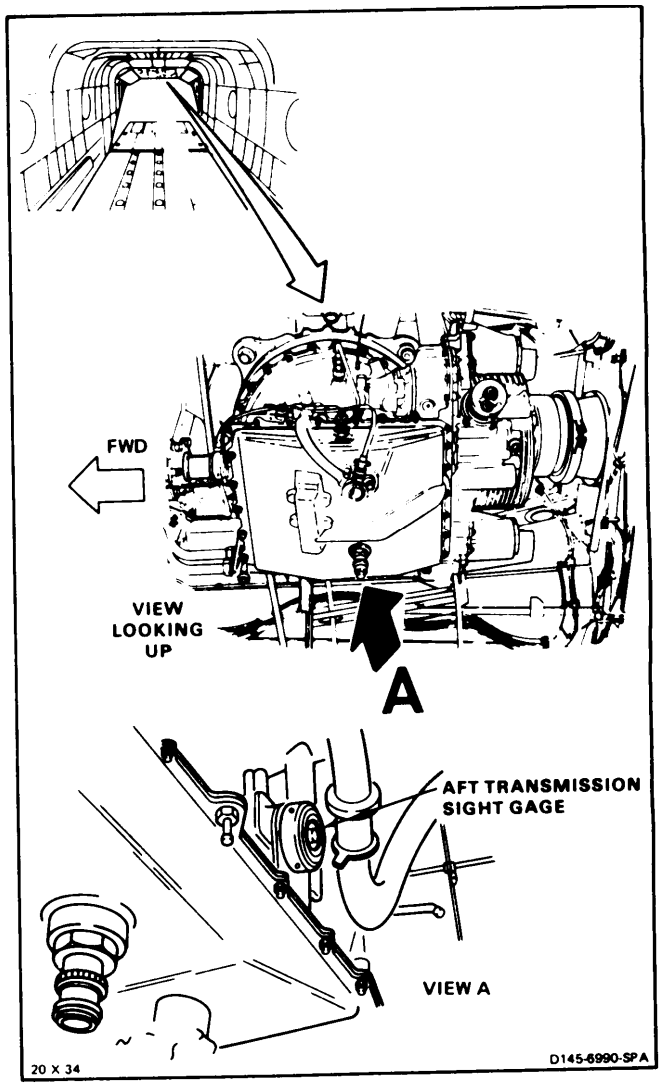
Materials:
Lockwire (E231)
Oil (E254)

Parts:
Packing

Personnel Required:
Medium Helicopter Repairer
Inspector

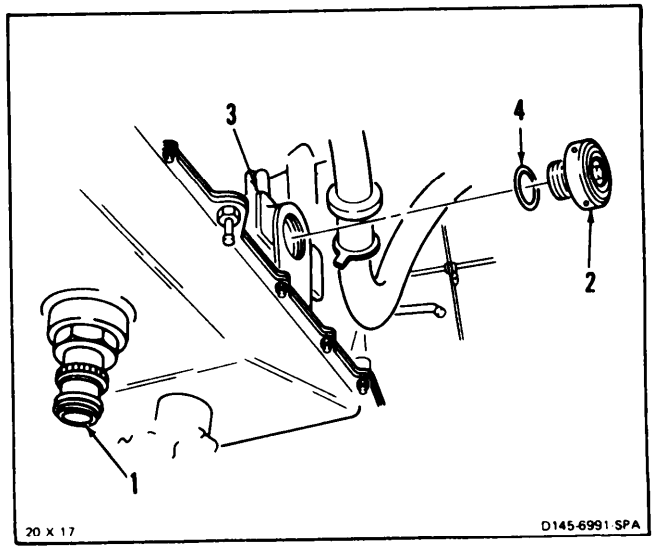
References:
TM 55-1520-240-23P

Equipment Condition:
Battery Disconnected (Task 1-39)
Electrical Power Off
Cargo Ramp Open and Level (TM 55-1520-240-T)
Right Baffle Under Aft Transmission Open (Task 2-2)



REMOVE SIGHT GAGE

1. Position container under sump drain valve (1).
2. Push in drain valve (1), twist and pull. **Drain oil** into container until oil level is below sight gage (2).
3. Close valve (1) by pushing it in and twisting it.
4. Remove lockwire from sight gage (2). **Remove gage** from transmission (3). Use spanner wrench.
5. Remove packing (4) from sight gage (2).

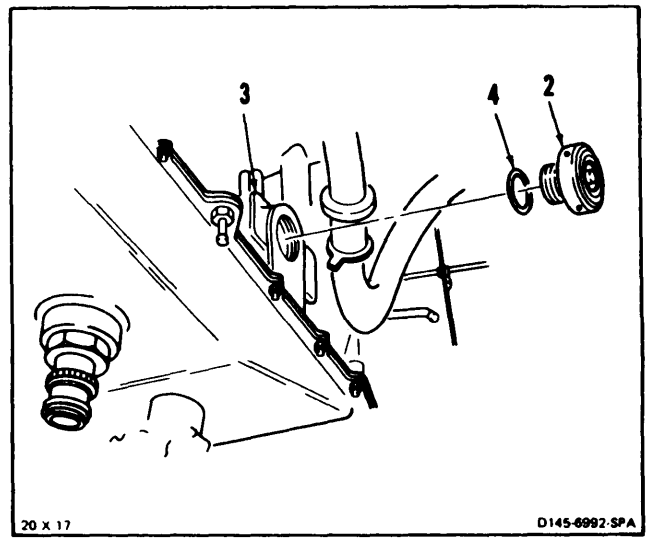


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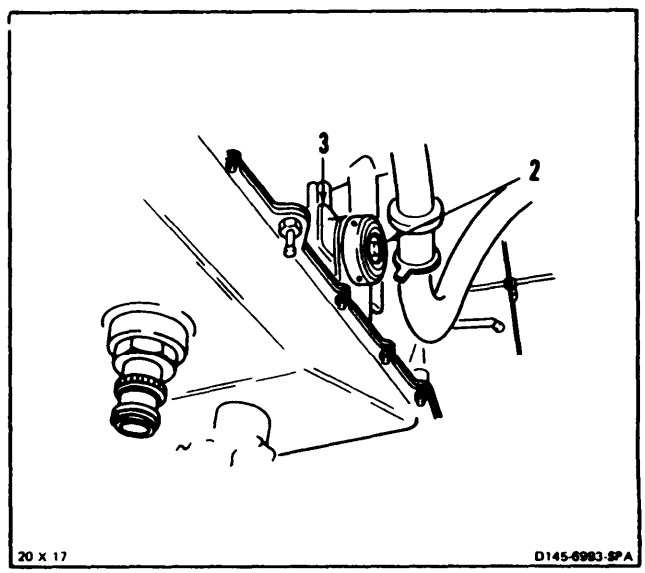
6-159 REPLACE AFT TRANSMISSION SIGHT GAGE (Continued)

INSTALL SIGHT GAGE

6. Coat packing (4) and thread of sight gage (2) with oil (E254). Install packing on gage.
7. **Install sight gage (2)** in transmission (3). Use spanner wrench. **Torque gage to 60 inch-pounds.**



8. Lockwire gage (2) to transmission (3). Use lockwire (E231).



INSPECT

FOLLOW-ON MAINTENANCE:

Service aft transmission (Task 1-54).

Close right baffle under aft transmission (Task 2-2).

Close cargo ramp (TM 55-1520-240-T).

END OF TASK

6-160 INSPECT AFT ROTOR SHAFT CHIP DETECTOR PLUG

INITIAL SETUP

Applicable Configurations:
All

Tools:
Aircraft Mechanic's Tool Kit,
NSN 5180-00-232-4692

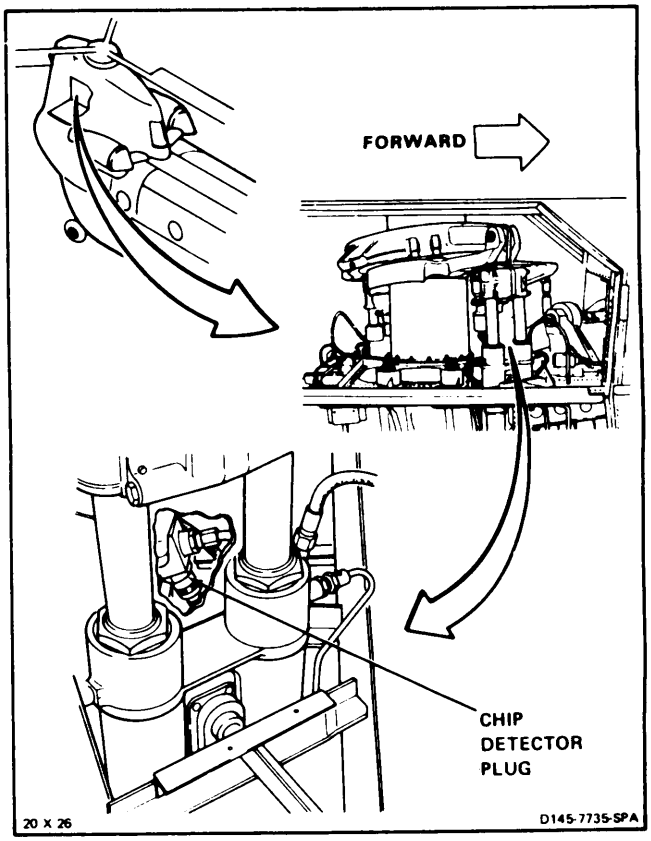
Materials:
Dry Cleaning Solvent (E162)
Cloths (E120)
Gloves (E186)

Parts:
Packing

Personnel Required:
Medium Helicopter Repairer
Inspector

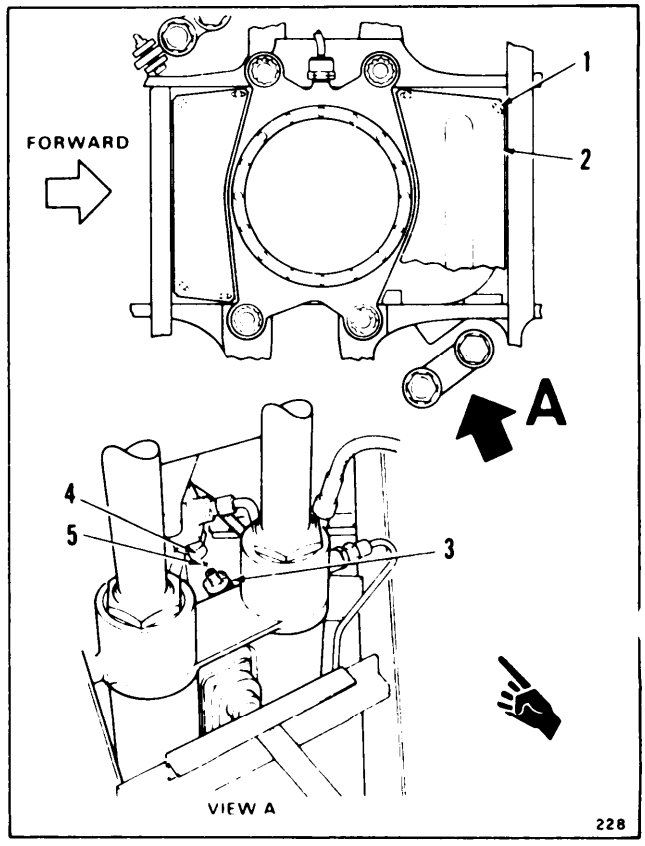
References:
TM 55-1520-240-23P
TM 55-1520-240-T
Task 6-108

Equipment Condition:
Battery Disconnected (Task 1-39)
Electrical Power Off
Aft Pylon Right Work Platform Open (Task 2-2)



REMOVE PLUG

1. Loosen four turnlock fasteners (1) on access panel (2). **Remove panel.**
2. Push in chip detector plug (3) and turn it counterclockwise. **Remove plug** from chip detector body (4).
3. **Remove packing (5)** from plug (3).



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6-160 INSPECT AFT ROTOR SHAFT CHIP DETECTOR PLUG (Continued)

INSPECT PLUG

NOTE

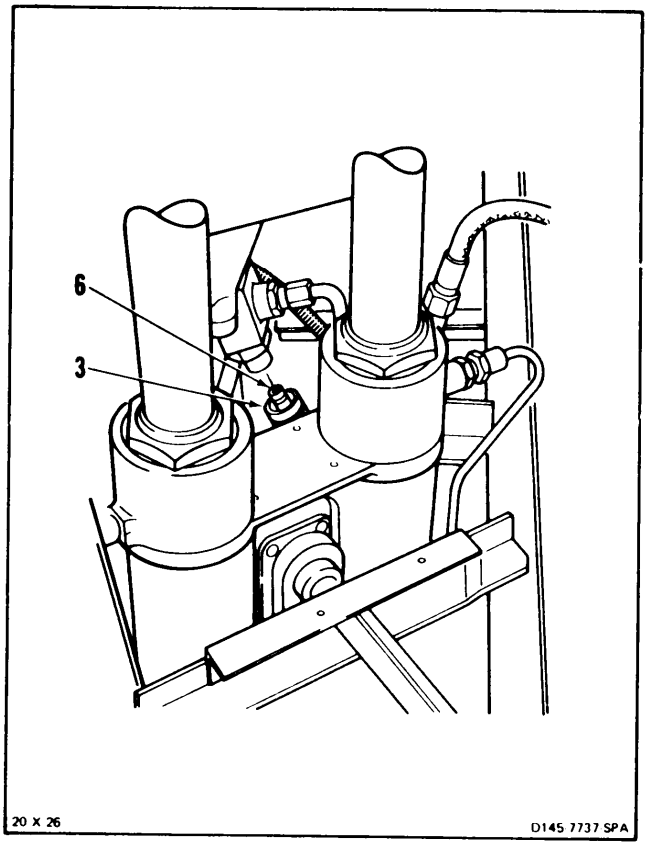
Some metal fuzz on tip of plug is normal.

4. **Check tip (6) of plug (3) for chips.** Save chips for contamination analysis (Task 6-108).

WARNING

Dry cleaning solvent (E162) is flammable and toxic. It can irritate skin and cause burns. Use only in well-ventilated area, away from heat and open flame. In case of contact, immediately flush skin or eyes with plenty of water for at least 15 minutes. Get medical attention for eyes.

5. **Clean tip (6)** with dry cleaning solvent (E162) and clean cloths (E120). Wear gloves (E186). Dry tip.
6. **Perform operational check** of plug (3) (TM 55-1520-240-T).

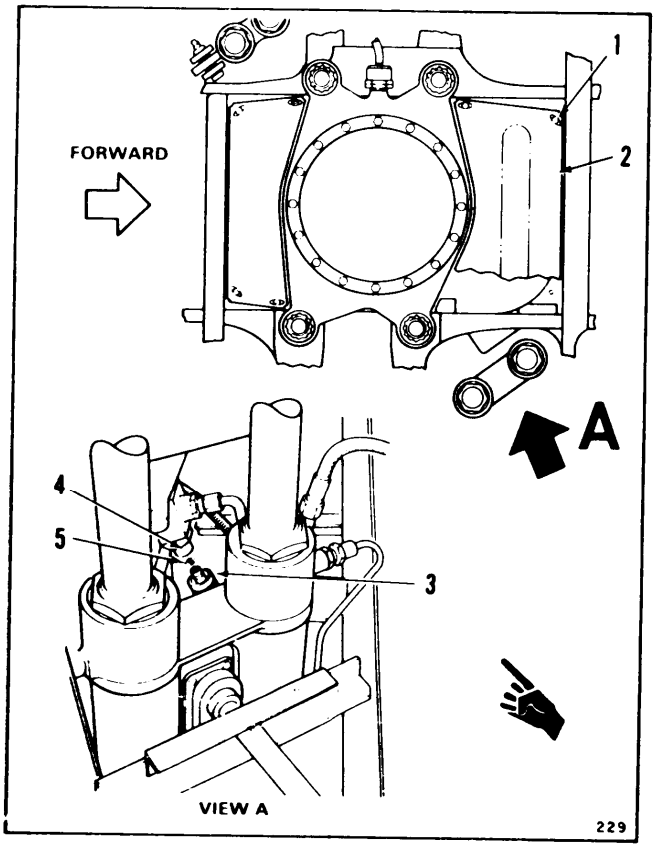


INSTALL PLUG

7. **Install packing (5)** on plug (3).
8. **Install plug (3)** in chip detector body (4). Push in and turn plug clockwise to lock it.

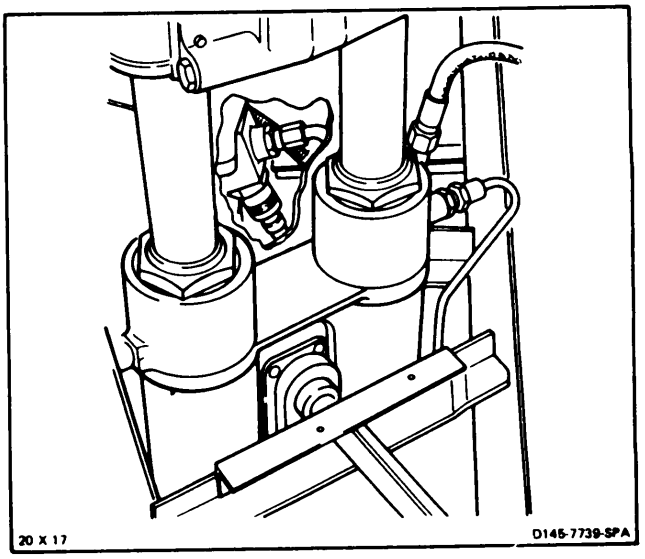
INSPECT

9. **Install access panel (2).** Tighten four turn-lock fasteners (1).



GO TO NEXT PAGE

6-160 INSPECT AFT ROTOR SHAFT CHIP DETECTOR PLUG (Continued)



INSPECT

FOLLOW-ON MAINTENANCE:

Close aft pylon right work platform (Task 2-2).

END OF TASK

6-161 REMOVE AFT ROTOR SHAFT CHIP DETECTOR

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692
Open End Wrench, 1 1/4-inch

Materials:

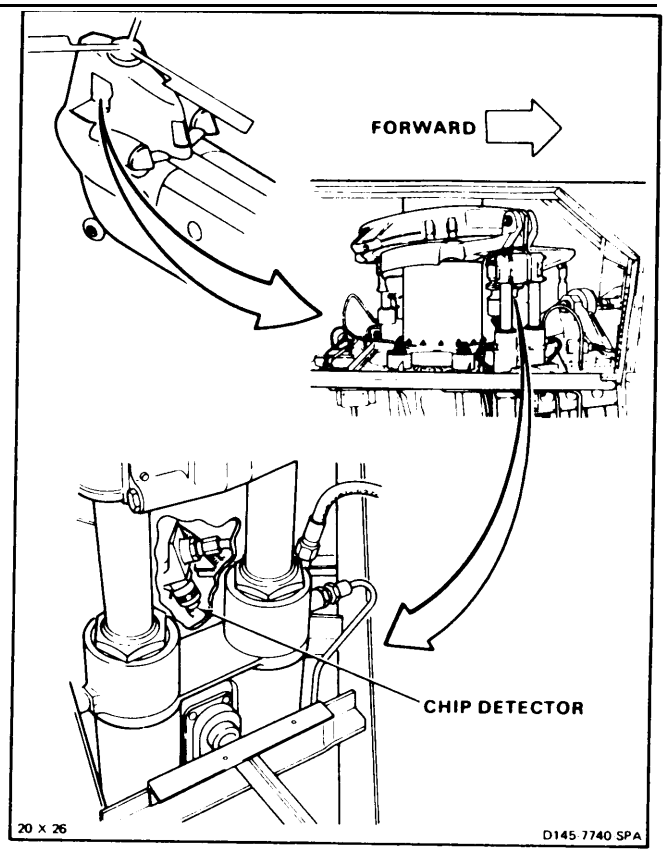
None

Personnel Required:

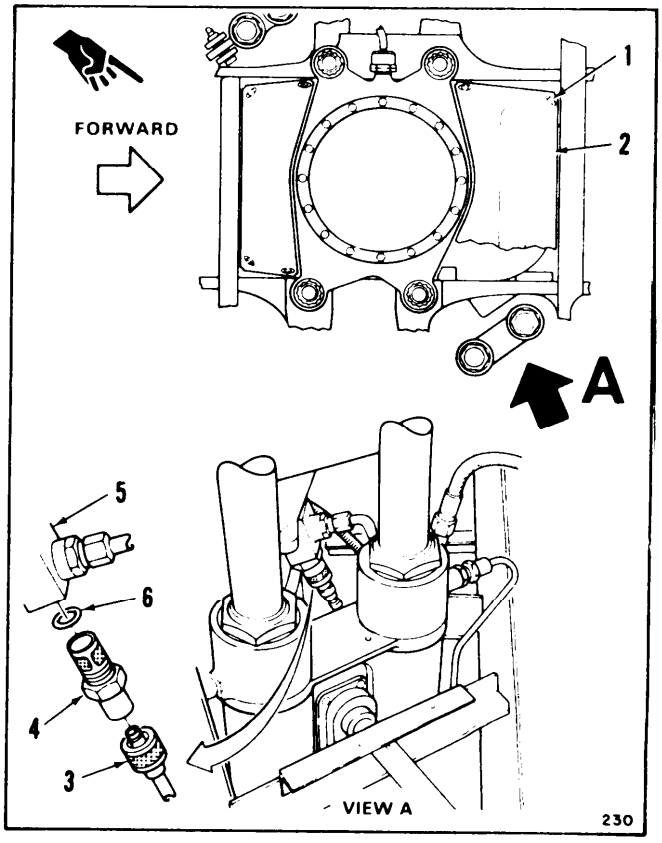
Medium Helicopter Repairer

Equipment Condition:

Battery Disconnected (Task 1-39)
Electrical Power Off
Aft Pylon Right Work Platform Open (Task 2-2)



1. Loosen four turnlock fasteners (1) on access panel (2). **Remove panel.**
2. **Disconnect electrical connector (3).**
3. Remove lockwire from body of chip detector (4). **Remove chip detector** from bearing support (5).
4. Remove packing (6) from chip detector (4).



FOLLOW-ON MAINTENANCE:

None

END OF TASK

6-162 INSTALL AFT ROTOR SHAFT CHIP DETECTOR

INITIAL SETUP

Applicable Configurations:
All

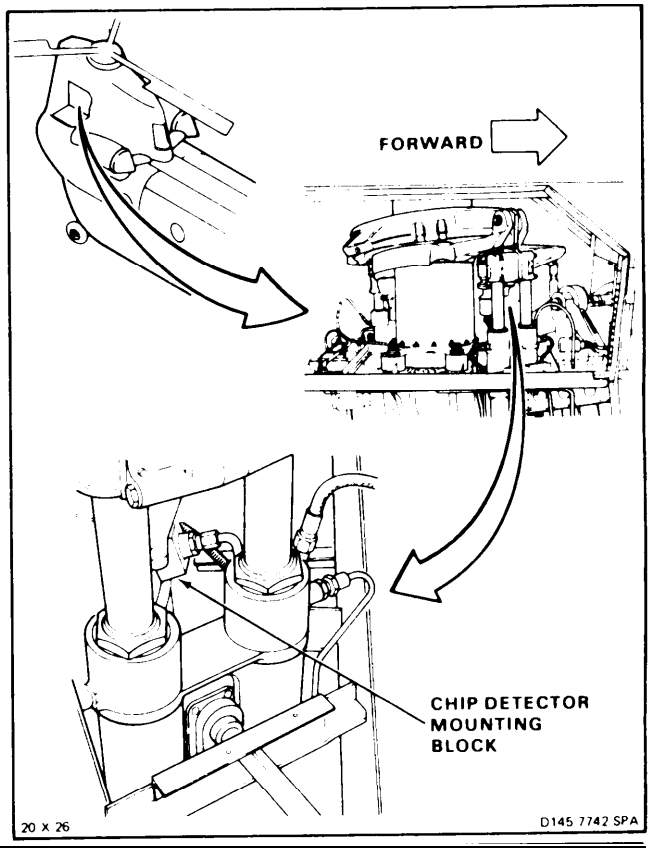
Tools:
Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692
Crowfoot Attachment, 1 1/4-inch
Torque Wrench, 30 to 150 Inch-Pounds

Materials:
Oil (E254)
Lockwire (E231)

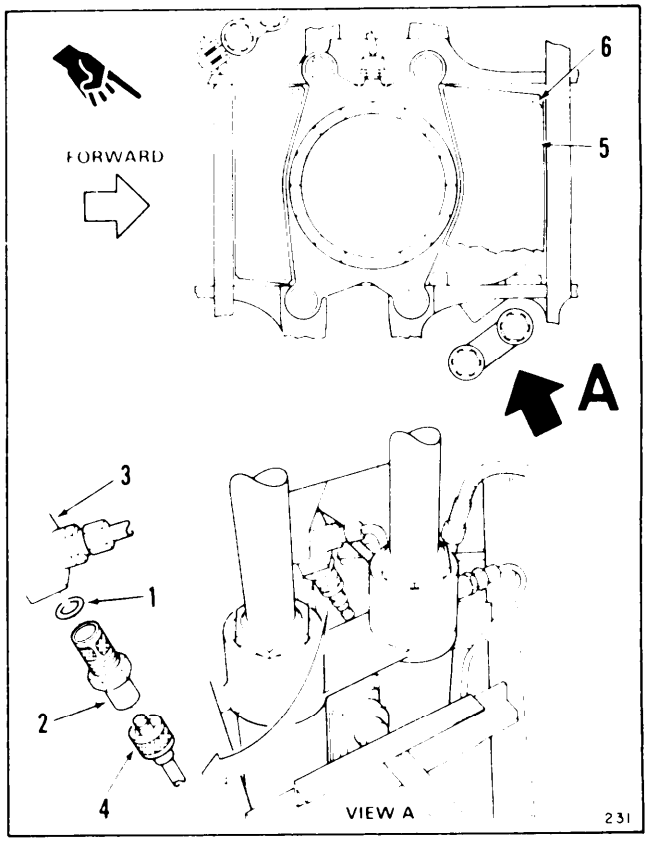
Parts:
Packings

Personnel Required:
Medium Helicopter Repairer
Inspector

References:
TM 55-1520-240-23P
TM 55-1520-240-T



1. Coat packing (1) and thread of chip detector (2) with oil (E254).
2. **Install chip detector (2)** in bearing support (3). Torque to **80 inch-pounds.**
3. **Lockwire chip detector (2)** to bearing support (3). Use lockwire (E231).
4. **Connect electrical connector (4).**
5. **Perform operational check** of aft rotor shaft chip detector plug. (Refer to TM 55-1520-240-T.)
6. **Install access panel (5).** Tighten four turn-lock fasteners (6).



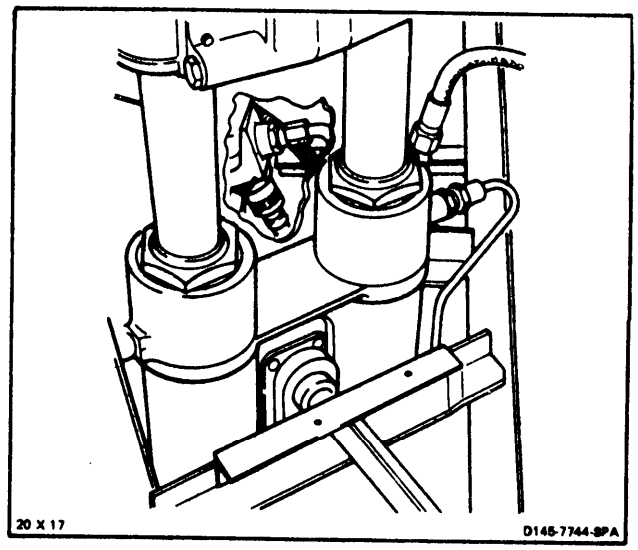
GO TO NEXT PAGE

6-162 INSTALL AFT ROTOR SHAFT CHIP DETECTOR (Continued)

INSPECT

FOLLOW-ON MAINTENANCE:

Close aft pylon right work platform (Task 2-2).



END OF TASK

6-163 REMOVE AFT ROTOR SHAFT OIL FILTER

INITIAL SETUP

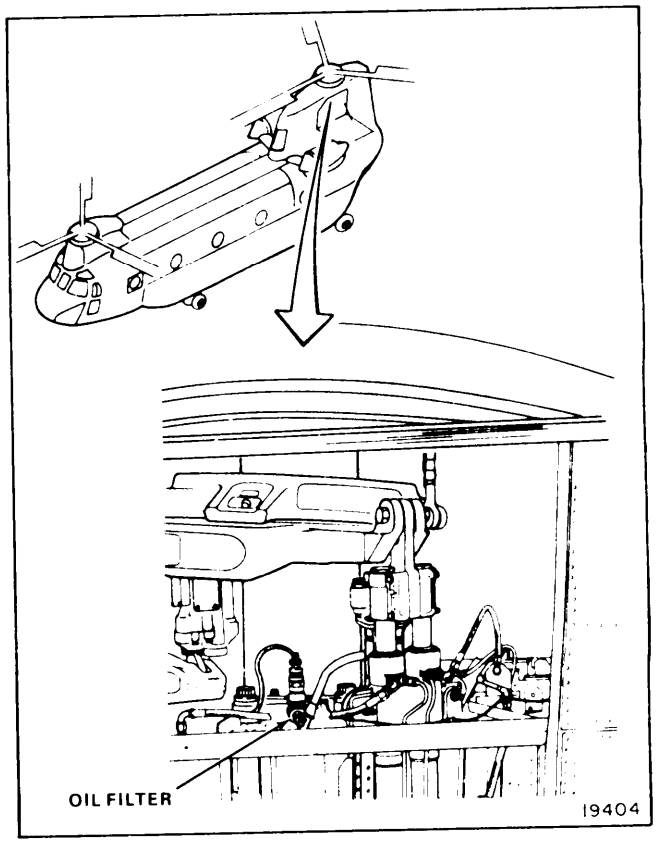
Applicable Configurations:
All

Tools:
Aircraft Mechanic Tool Kit,
NSN 5180-00-323-4692
Wrench, 1-3/4 Inch

Materials:
Cloths (E120)

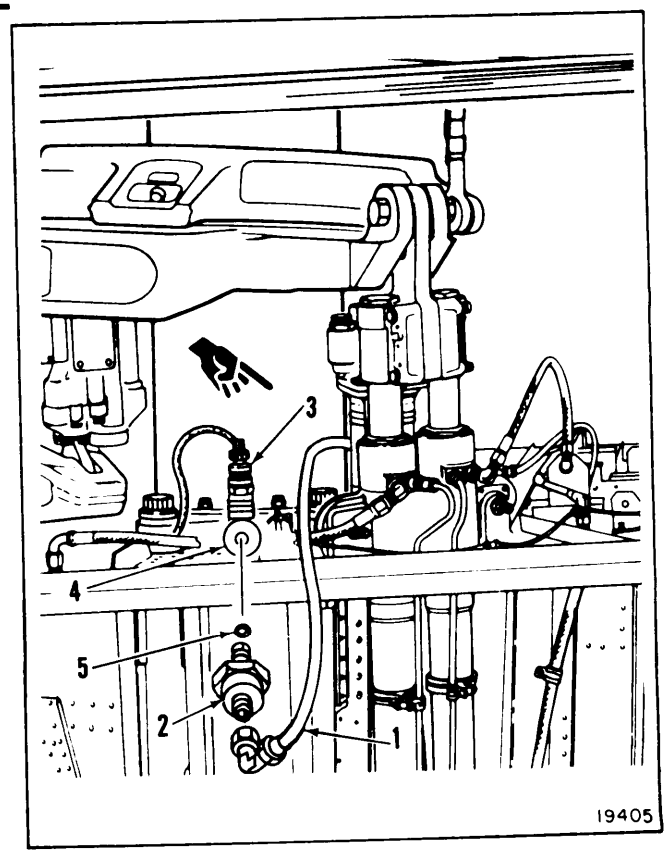
Personnel Required:
Medium Helicopter Repairer

Equipment Condition:
Battery Disconnected (Task 1-39)
Electrical Power Off
Aft Pylon Left Work Platform Open (Task 2-2)



1. **Disconnect oil hose (1)** from oil filter (2). Use cloths (E120) to absorb spillage.
2. Remove lockwire from between oil filter (2) and oil pressure switch (3). **Remove filter** from bearing support (4).
3. Remove packing (5) from filter (2).

FOLLOW-ON MAINTENANCE:
None



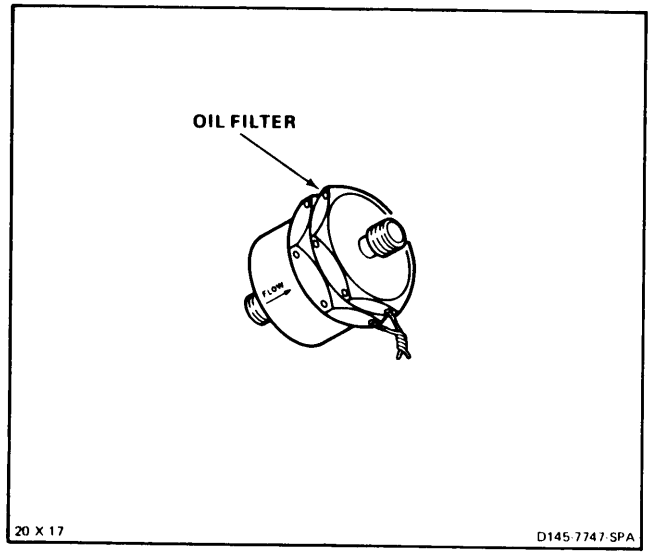
END OF TASK

6-164 CLEAN AND INSPECT AFT ROTOR SHAFT OIL FILTER

INITIAL SETUP

Applicable Configurations:
All

Tools:
Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692
Wrench, 1 3/4-inch (2)
Source of Low-Pressure Compressed Air



Materials:
Dry Cleaning Solvent (E162)
Brush (E86)
Gloves (E186)
Lockwire (E231)

Parts:
Packing

Personnel Required:
67U10 Medium Helicopter Repairer
67U30 Inspector

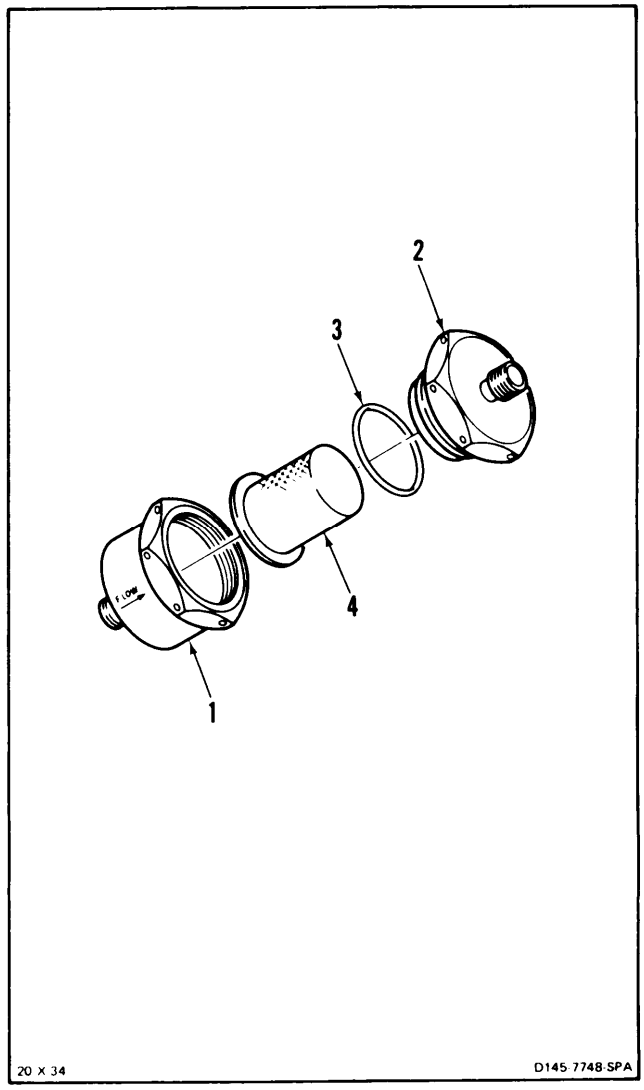
References:
TM 55-1520-240-23P

Equipment Condition:
Off Helicopter Task

GO TO NEXT PAGE

6-164 CLEAN AND INSPECT AFT ROTOR SHAFT OIL FILTER (Continued)

1. Remove lockwire. **Remove housing (1) from plug (2). Remove packing (3)** from plug.
2. **Remove strainer element (4)** from housing (1).
3. **Check strainer element (4)** for metal particles. Save particles for contamination analysis (Task 6-108).



WARNING

Dry cleaning solvent (E162) is flammable and toxic. It can irritate skin and cause burns. Use only in well-ventilated area, away from heat and open flame. In case of contact, immediately flush skin or eyes with plenty of water for at least 15 minutes. Get medical attention for eyes.

WARNING

Do not use more than 30 psi compressed air for cleaning purposes. Debris propelled under pressure can cause injury to eyes. Use source of compressed air undar 30 psi and eye protection to prevent injury to personnel.

4. **Clean housing (1), plug (2), and strainer element (4).** Use dry cleaning solvent (E162) and brush (E86). Dry with low-pressure compressed air. Wear gloves (E186).
5. **Inspect** housing (1), plug (2), and strainer (4) for damage. There shall be no damage.
6. Install packing (3) on plug (2).
7. **Install strainer element (4) in housing** (1). **Install housing on plug (2).**

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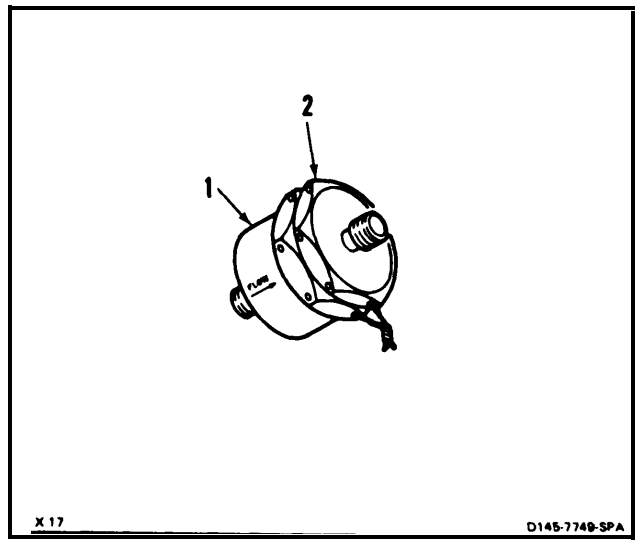
6-164 CLEAN AND INSPECT AFT ROTOR SHAFT OIL FILTER (Continued)

8. Lockwire housing (1) to plug (2). Use lockwire (E231).

INSPECT

FOLLOW-ON MAINTENANCE:

None



END OF TASK

INITIAL SETUP

Applicable Configurations:
All

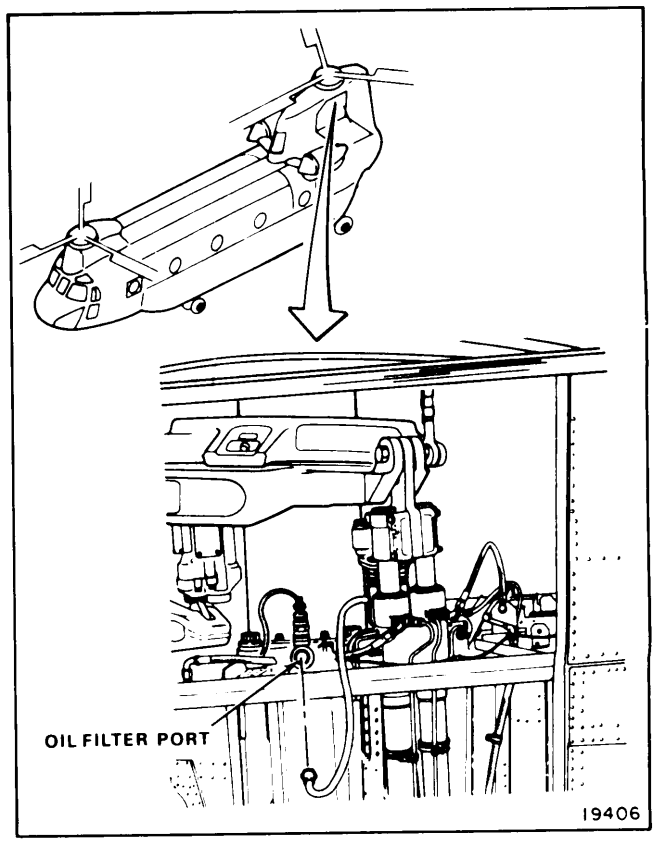
Tools:
Aircraft Mechanic Tool Kit,
NSN 5180-00-323-4692
Crowfoot Attachment, 1-3/4 Inch
Torque Wrench, 5 to 50 Inch-Pounds

Materials:
Oil (E254)
Lockwire (E231)

Parts:
Packing

Personnel Required:
Medium Helicopter Repairer
Inspector

References:
TM 55-1520-240-23P

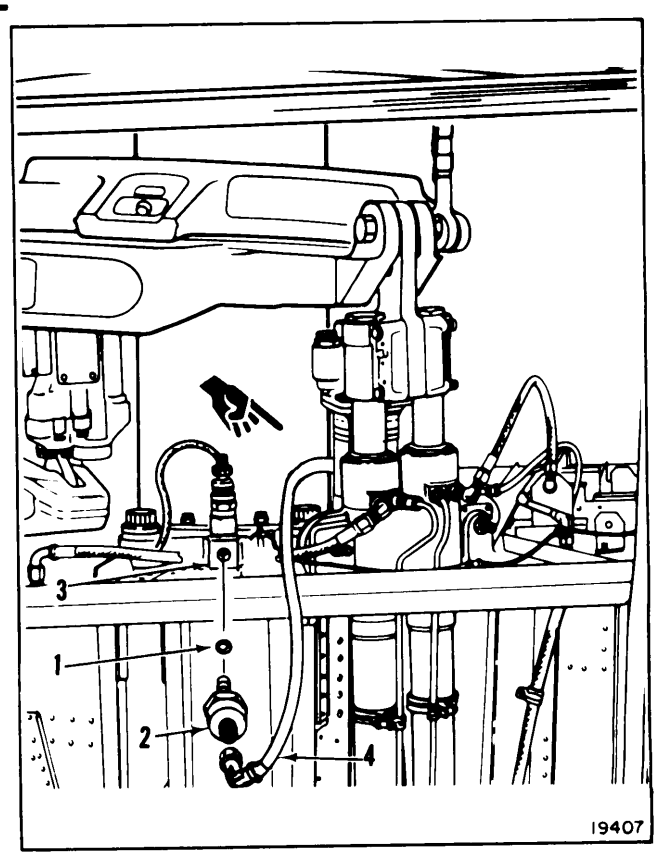


1. Coat packing (1) and thread of oil filter (2) with oil (E254).
2. **Install filter (2)** in bearing support (3). **Torque filter to 20 inch-pounds.**

WARNING

Make sure oil hose is routed to clear servocylinder when servocylinder is fully compressed.

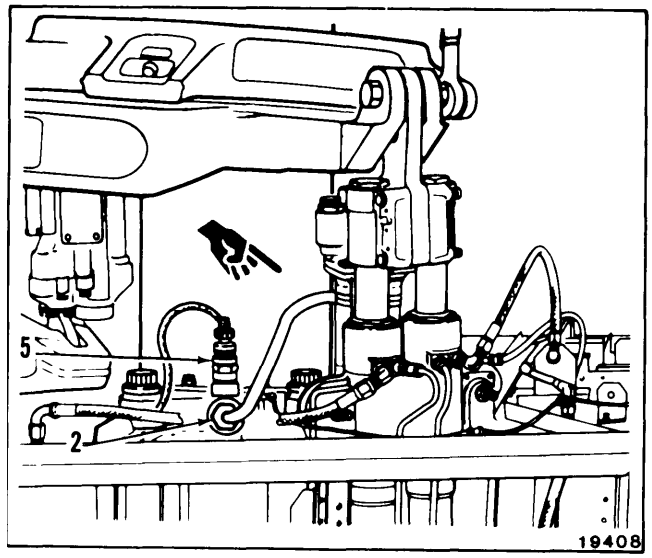
3. **Connect oil hose (4)** to filter (2).



GO TO NEXT PAGE

4. **Lockwire oil filter (2)** to oil pressure switch (5). Use lockwire (E231).

INSPECT



FOLLOW-ON MAINTENANCE:
Close aft pylon right work platform (Task 2-2).

END OF TASK

6-166 CONTAMINATION ANALYSIS OF COMBINING TRANSMISSION OIL

INITIAL SETUP

Applicable Configurations:
All

Tools:
Magnet
Magnifying Glass, 12-Power

Materials:
None

Personnel Required:
67U30 Inspector

Equipment Condition:
Off Helicopter Task

1. Solid particles found in the transmission oil system may be steel, magnesium, aluminum, silver, copper, bronze, or fiberglass. Examine particles as follows:

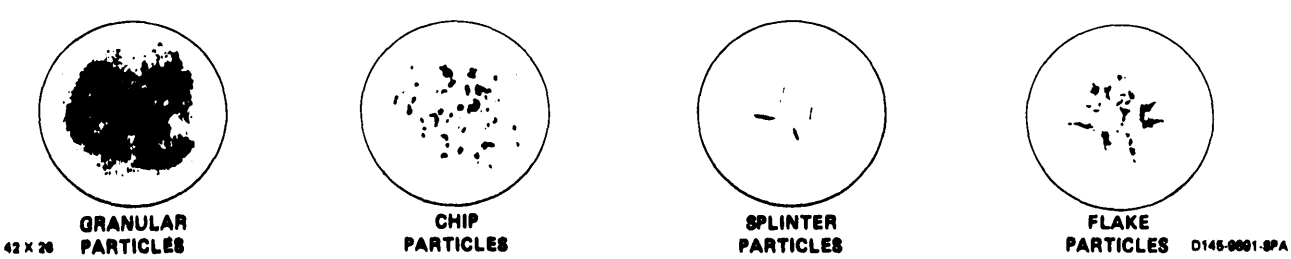
   a. Separate steel particles. Use a magnet.

   b. Identify and separate remaining particles by visual inspection.

   c. Examine particles with a magnifying glass to determine shape and condition. Look for marks or discoloration that may indicate shearing, burning, or fatigue.

FOLLOW-ON MAINTENANCE:
None

MATERIAL	DESCRIPTION	ACTION REQUIRED
Steel	Fine, hair-like fuzz particles	Normal wear. No action required.
	Limited amount of splinters, flakes. or or granular particles	Possible failure. Perform serviceability check (Task 6-170)
	Thin flakes up to 1/16-inch in diameter and 1/4-inch long, maximum of 10 flakes	Perform serviceability check (Task 6-170)
	Massive amount of splinters. flakes, or granular particles	Failure. Replace transmission (Task 6-72 and 6-77)
Aluminum or magnesium	Granular particles	Perform serviceability check (Task 6-170)
Copper, bronze, or silver	Limited amount of granular particles	Possible indication of bearing cage wear. Perform serviceability check (Task 6-170)
	Massive amount of granular particles or chip particles	Failure. Replace transmission (Task 6-72 and 6-77)
Fiberglass	Granular or fibrous particles	Perform serviceability check (Task 6-170)



END OF TASK

6-167 COMBINING TRANSMISSION OIL SYSTEM ALLOWABLE LEAKAGE

INITIAL SETUP

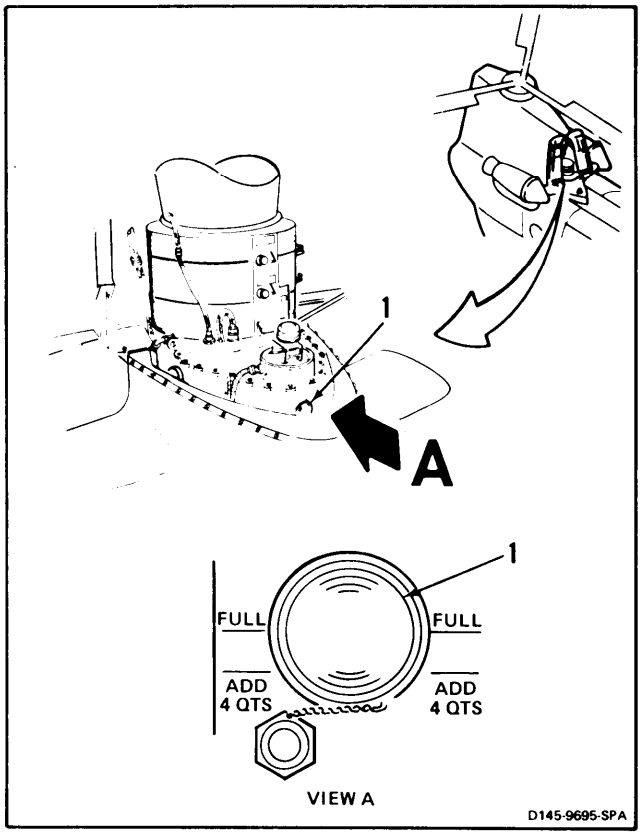
Applicable Configurations:
All

Tools:
None

Materials:
None

Personnel Required:
Medium Helicopter Repairer

Equipment Condition:
Battery Disconnected (Task 1-39)
Electrical Power Off
Helicopter On Level Surface
Pylon Access Doors Open (Task 2-2)



WARNING

Prolonged oil leakage can damage finish and create a work hazard by making the fuselage slippery. It can also affect other systems in the helicopter. Therefore, good judgment must be used when determining allowable leakage.

CAUTION

The maximum allowable leakage rate, static or dynamic, from any oil seal in the transmission is 20 drops (one cubic centimeter) per hour. If this limit is exceeded, the cause of the leakage shall be corrected by repair or replacement.

NOTE

If engines have not been operated within the past 30 minutes, perform a 5-minute ground run (TM 55-1520-240-10).

Check sight gage (1) to determine oil level. **Oil level shall be between the FULL and ADD 4 QTS lines after a 2 hour flight.**

FOLLOW-ON MAINTENANCE:

Service combining transmission.

Close pylon access door (Task 2-2).

END OF TASK

6-168 DRAIN COMBINING TRANSMISSION OIL

INITIAL SETUP

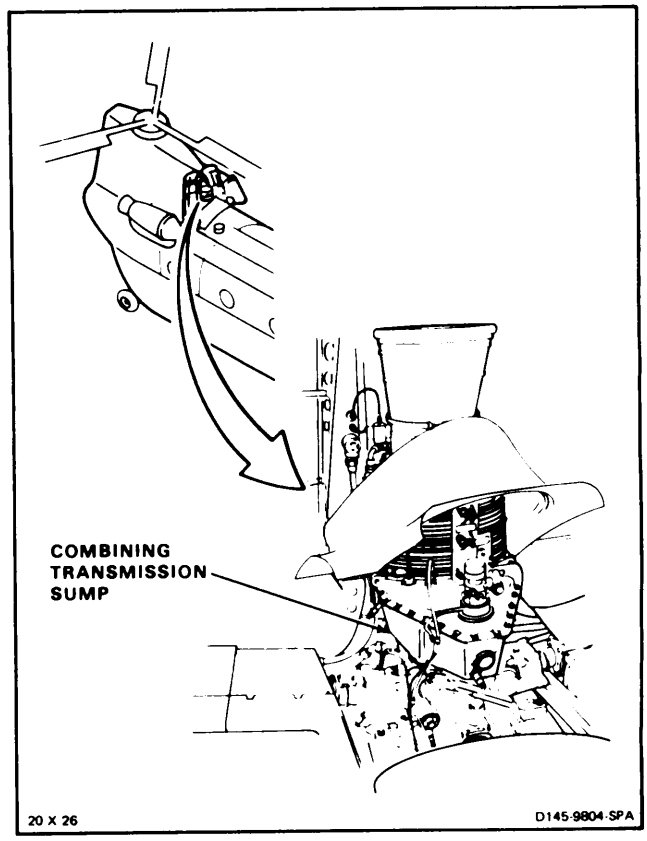
Applicable Configurations:
All

Tools:
Container, 14-Quart (2)
Hose, 1-Inch ID, 36 Inches Long
Workstand

Materials:
None

Personnel Required:
Medium Helicopter Repairer

Equipment Condition:
Battery Disconnected (Task 1-39)
Electrical Power Off
Pylon Access Doors Open (Task 2-2)
Pylon Lower Fairing Open (Task 2-2)



NOTE

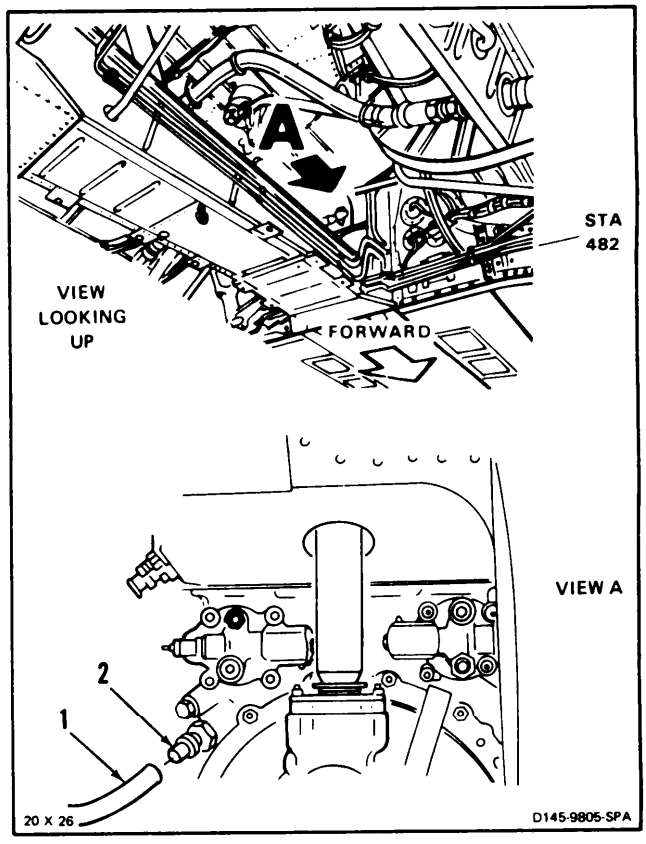
Combining transmission sump is divided into three compartments. One is for the combining transmission. The other two are for each engine transmission.

DRAIN COMBINING TRANSMISSION COMPARTMENT

NOTE

Combining transmission compartment holds about 22 quarts of oil.

1. From inside cabin, **connect hose (1)** to drain valve (2). Direct end of hose into container.
2. Push in drain valve (2), twist it, and pull. **Let oil drain** into container.
3. Push in drain valve (2), twist it, and pull down to close. Remove hose (1) from valve.



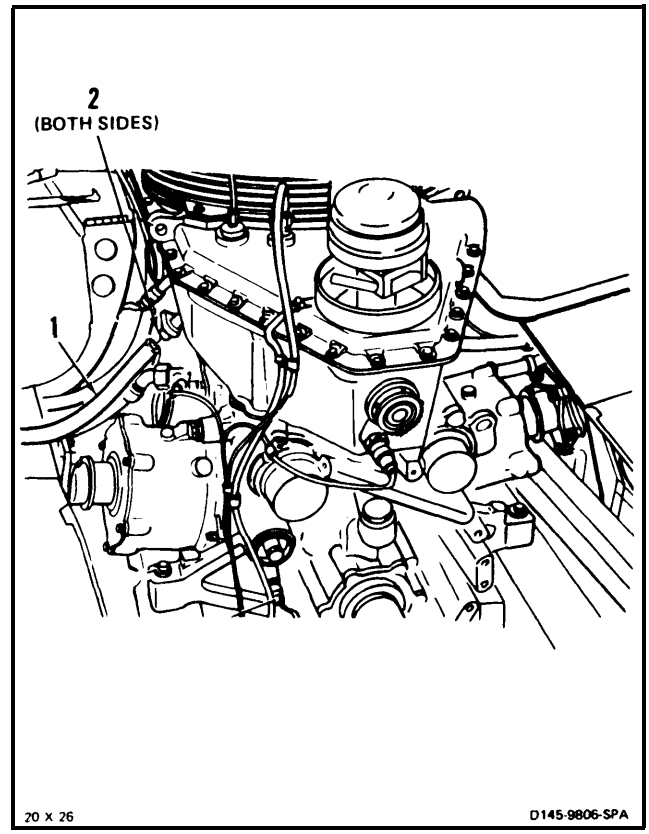
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DRAIN ENGINE TRANSMISSION COMPARTMENT

NOTE

- Drain either engine transmission compartment in same way. Right compartment shown.
- Each compartment holds about 7 quarts of oil.

4. **Connect hose (1)** to drain valve (2). Direct end of hose into container.
5. Push in drain valve (2), twist it, and pull. **Let oil drain** into container.
6. Push in drain valve (2), twist it, and pull down to close. Remove hose (1) from valve.



FOLLOW-ON MAINTENANCE:

Close pylon lower fairing (Task 2-2).

Close pylon access doors (Task 2-2).

END OF TASK

6-169 FLUSH COMBINING TRANSMISSION OIL SYSTEM 6-169

INITIAL SETUP

Applicable Configurations:
All

Tools:
Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692

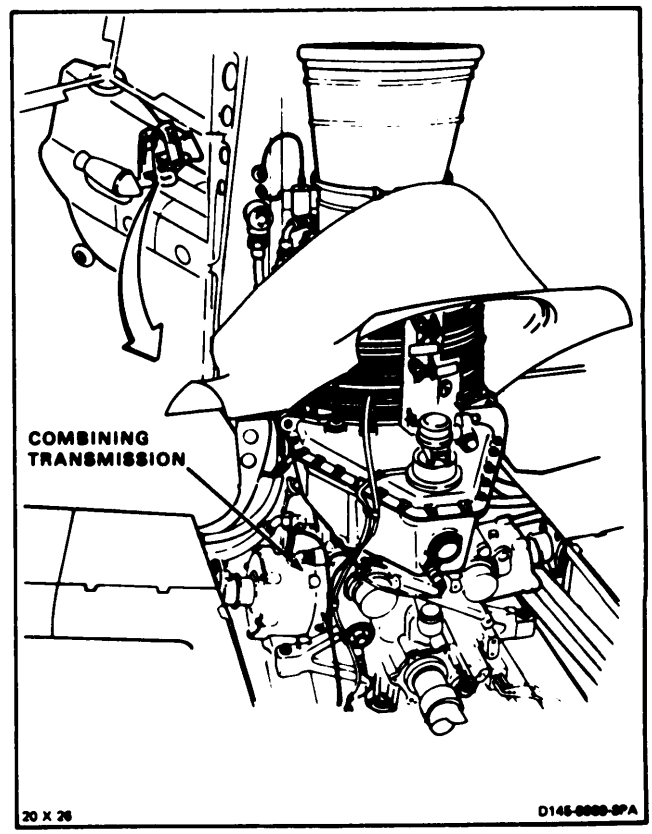
Materials:
None

Personnel Required:
67U10 Medium Helicopter Repairer
100C0 Rotary-Wing Aviator (2)

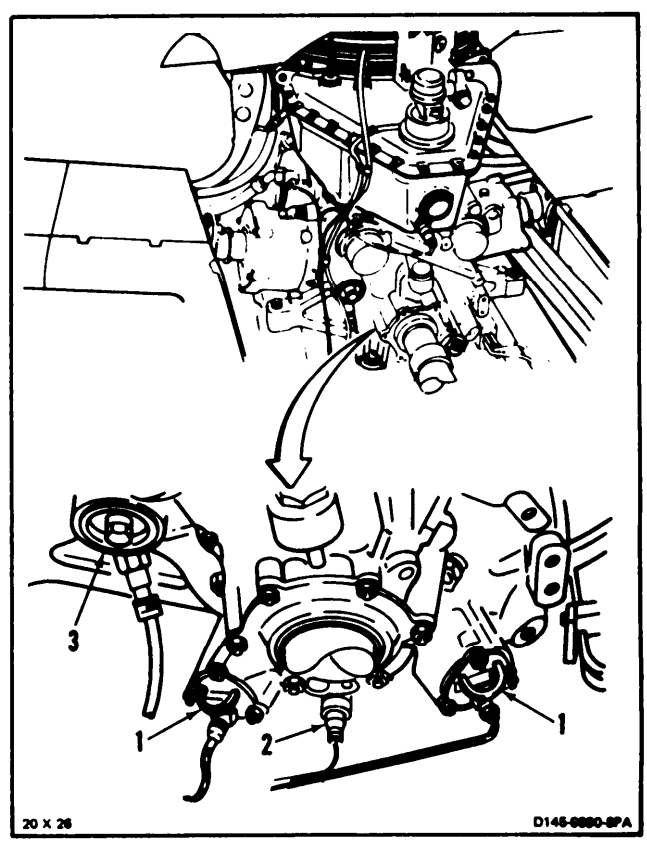
References:

Task 1-54	Task 6-175
Task 6-168	Task 6-176
Task 6-171	Task 6-178
Task 6-173	Task 6-180
Task 6-174	Task 6-181

Equipment Condition:
Battery Disconnected (Task 1-39)
Electrical Power Off
Pylon Access Doors Open (Task 2-2)
Pylon Lower Fairing Open (Task 2-2)



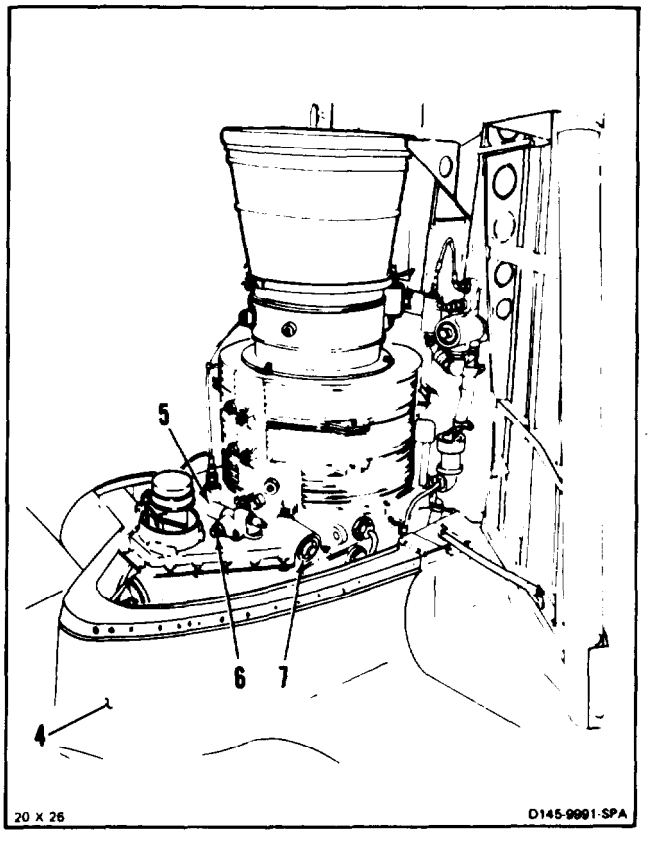
1. **Drain oil** from combining transmission (Task 6-168).
2. Remove, inspect, and **clean two debris detection screens** (1) (Task 6-174 and 6-175). Install screens (Task 6-176).
3. **Inspect chip detector (2)** (Task 6-178).
4. **Replace auxiliary oil filter (3)** (Task 6-1 73).



GO TO NEXT PAGE

6-169 FLUSH COMBINING TRANSMISSION OIL SYSTEM (Continued)

5. Close pylon lower fairing (4) (Task 2-2).
6. **Replace main oil filter element (5)** (Task 6-171). Note position of indicator button (6).
7. If indicator button (6) was extended, **replace inlet screen (7)** (Task 6-180 and 6-181).
8. **Service combining transmission** with oil (Task 1-54).
9. Have pilot **perform ground run** (TM 55-1520-240-10). When combining transmission oil temperature stabilizes at normal, have pilot shut down helicopter.
10. **Repeat steps 1 thru 8.**



FOLLOW-ON MAINTENANCE:

Close pylon access doors (Task 2-2).

END OF TASK

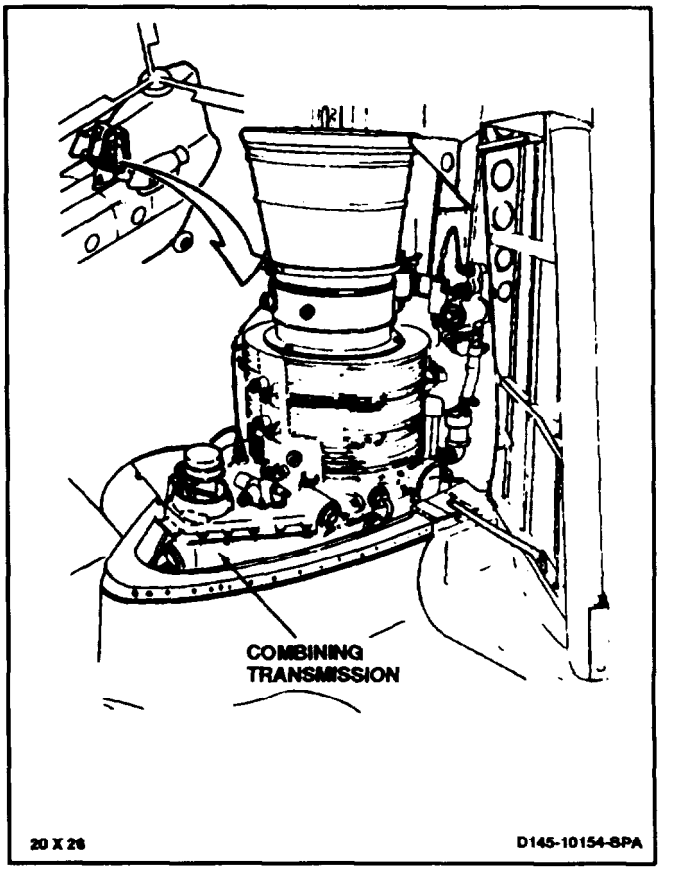
6-170 COMBINING TRANSMISSION SERVICEABILITY CHECK 6-170

INITIAL SETUP

Applicable Configurations:
All
Tools:
Aircraft Mechanic's Tool Kit,
NSN 5180-00-3234692
Materials:
Cheesecloth (E112)
Personnel Required
Medium Helicopter Repairer
Rotary-Wing Aviator (2)

Reference:
Task 6-168 Task 6-176
Task 6-169 Task 6-178
Task 6-171 Task 6-72
Task 6-173 Task 6-77
Task 6-174 TM 55-1520-240-10
Task 6-175 Task 2-2

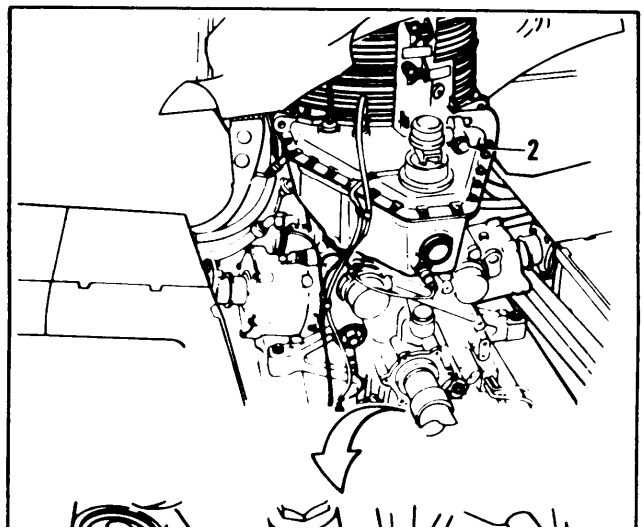
Equipment Condition:
Battery Disconnected (Task 1-36)
Electrical Power Off
Pylon Access Doors Open (Task 2-2)



1. Complete steps 1 through 8 of Task 6-169.
2. Have pilot **perform ground run** for 1 hour at normal rotor rpm (TM 55-1520-240-10). If combining transmission oil temperature or pressure changes abnormally during operation, have pilot shut down helicopter. Check for cause of change.
3. **Drain oil** through cheesecloth (E112) or similar filter material (Task 6-168). Check for contamination.
4. Note if oil filter indicator button (1) is extended. If button is extended, go to step 5. If button is not extended, go to step 8.
5. Replace element in main oil filter (2) (Task 6-171).
6. Open pylon lower fairing (3) (Task 2-2).

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6-170 COMBINING TRANSMISSION SERVICEABILITY CHECK (Continued) 6-170



7. Replace auxiliary oil filter (4) (Task 6-173).
8. Remove, inspect, and **clean two debris deotection screens (5)** (Task 6-174 and 6-175). Install screens (Task 6-176).
9. **Inspect chip detector (6)** (Task 6-178).
10. **If** quantity and size of **particles** obtained from filters (2 and 4), screens (5) and chip detector (6) **have not decreased by at least 30 percent** from original amount, **replace combining transmission** (Task 6-72 and 6-77).
11. **If** quantity and size of **particles** obtained from filters (2 and 4), screens (5) and chip detector (6) **have decreased by 30 percent or more, repeat steps 1 thru 9.** If any more debris is obtained, replace combining transmission (Task 6-72 and 6-77).

FOLLOW-ON MAINTENANCE:

Close pylon lower fairing (Task 2-2).

Close pylon access doors (Task 2-2).

6-171 REPLACE COMBINING TRANSMISSION MAIN OIL FILTER ELEMENT

INITIAL SETUP

Applicable Configurations:
All

Tools:
Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692
Torque Wrench, 30 to 150 Inch-Pounds
Container, Two Quart

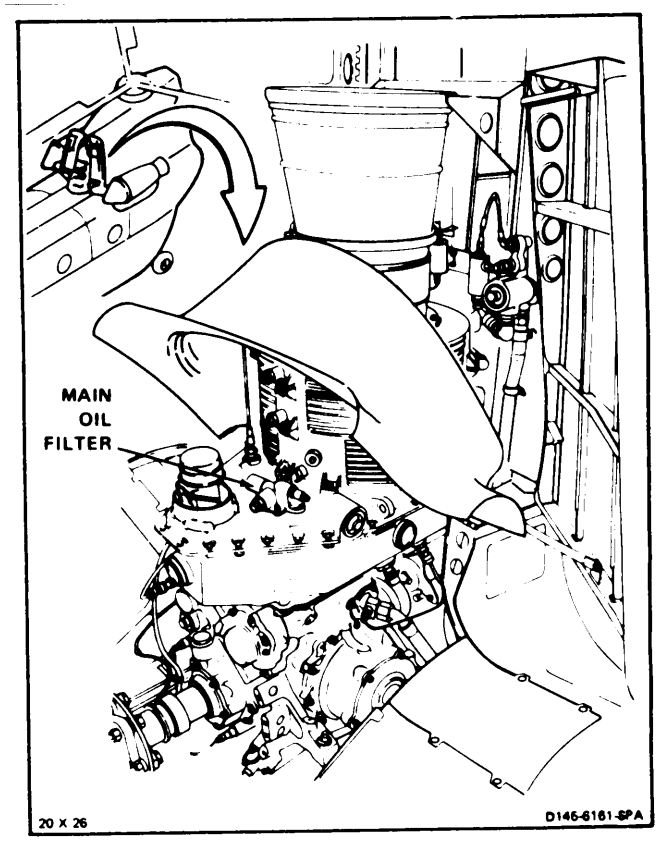
Materials:
Dry Cleaning Solvent (E162)
Cloths (E120)
Oil (E254)
Lockwire (E231)
Gloves (E186)

Parts:
Filter Element
Packing

Personnel Required:
67U10 Medium Helicopter Repairer
67U30 Inspector

References:
TM 55-1520-240-23P
Task 2-2

Equipment Condition:
Battery Disconnected (Task 1-39)
Electrical Power Off
Aft Pylon Doors Open (Task 2-2)
Aft Pylon Lower Fairing Open (Task 2-2)

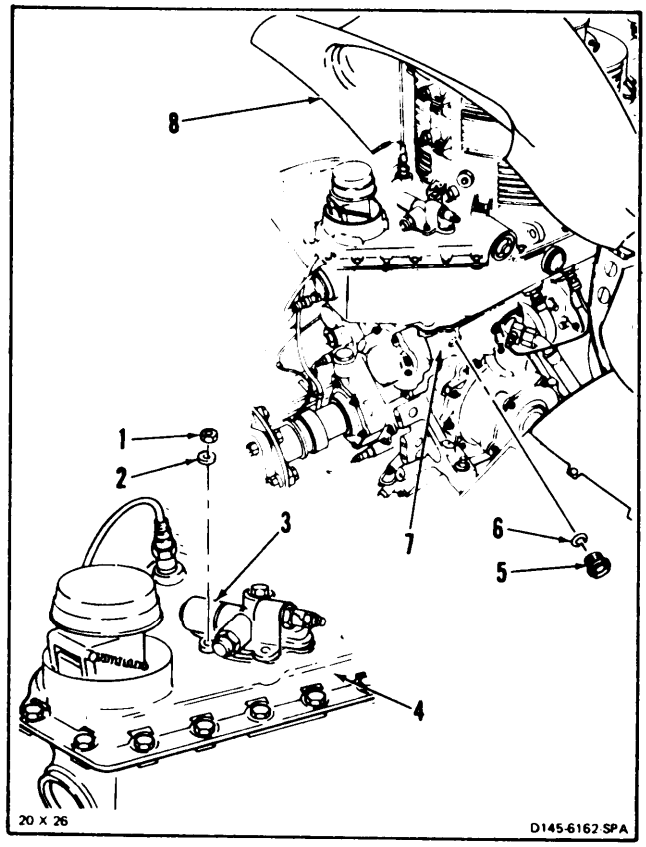


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6-171 REPLACE COMBINING TRANSMISSION MAIN OIL FILTER ELEMENT (Continued)

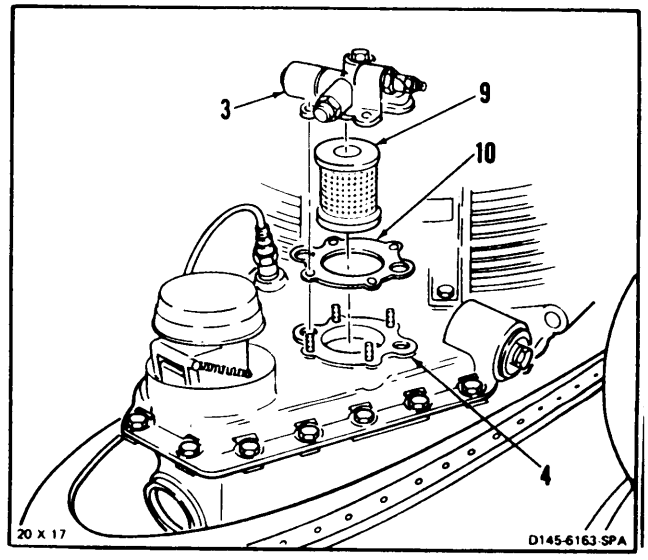
DRAIN OIL

1. Remove four nuts (1) and washers (2) from filter housing (3). Loosen housing on sump cover (4).
2. Remove lockwire from drain plug (5). Remove plug and packing (6). **Drain oil** into container.
3. Install packing (6) on plug (5). Install plug. **Torque plug to 45 inch-pounds.** Lockwire plug to transmission (7) with lockwire (E231).
4. Close aft pylon lower fairing (8) (Task 2-2).



REMOVE FILTER ELEMENT

5. **Remove housing (3), element (9) and gasket seal (10)** from sump cover (4).
6. Remove element (9) from housing (3.



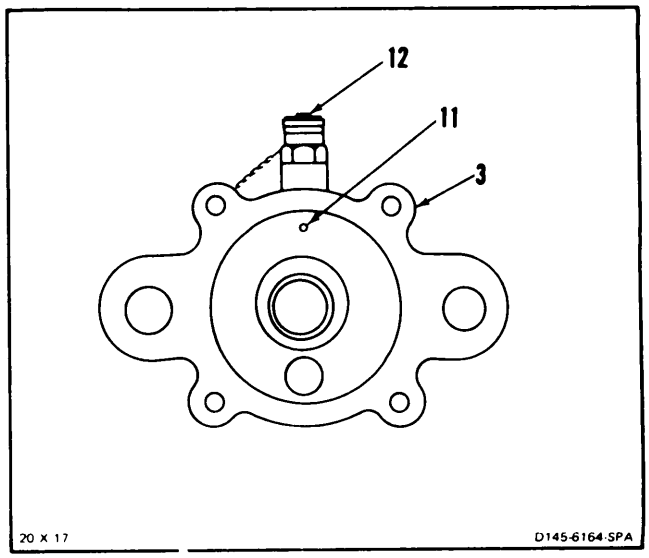
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INSTALL FILTER ELEMENT

WARNING

Dry cleaning solvent (E162) is flammable and toxic. It can irritate skin and cause burns. Use only in well-ventilated area, away from heat and open flame. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.

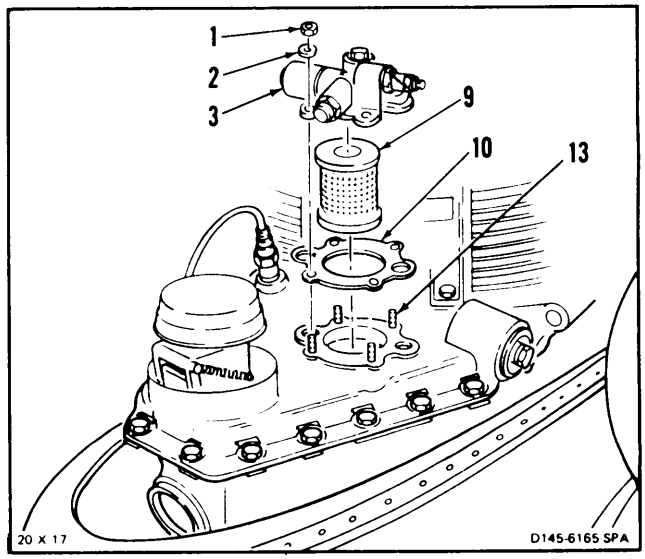
7. Clean inside of housing (3) with dry cleaning solvent (E162) and cloths (E120). Check that hole (11) is free of debris. Wear gloves (E186)
8. Hold housing (3) with indicating button (12) up. **Push down button** until it locks.



NOTE

Do not reuse removed element.

9. **Install new element (9) in housing (3).**
10. **Install gasket seal (10) and housing (3)** on four studs (13). Install four washers (2) and nuts (1). Torque nuts to **60 inch-pounds.**

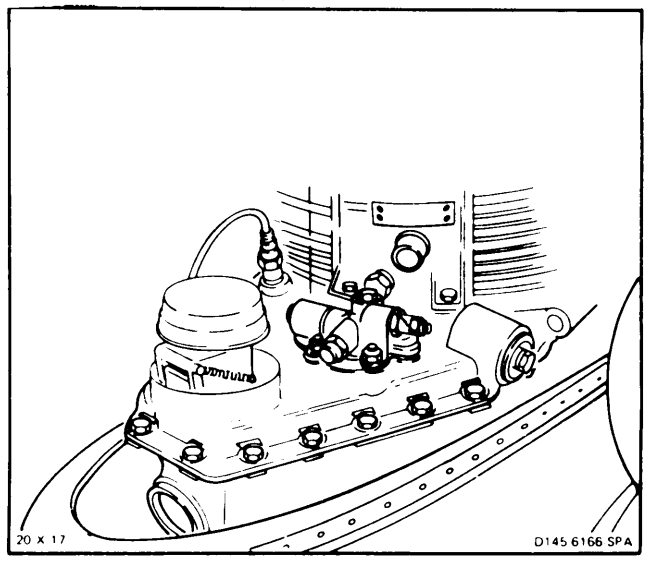


INSPECT

FOLLOW-ON MAINTENANCE:

Service combining transmission (Task 1-54).

Close aft pylon doors (Task 2-2).



END OF TASK

6-171.1 REPLACE COMBINING TRANSMISSION MAIN OIL FILTER PRESSURE DIFFERENTIAL INDICATOR

INITIAL SETUP

Applicable Configurations:
All

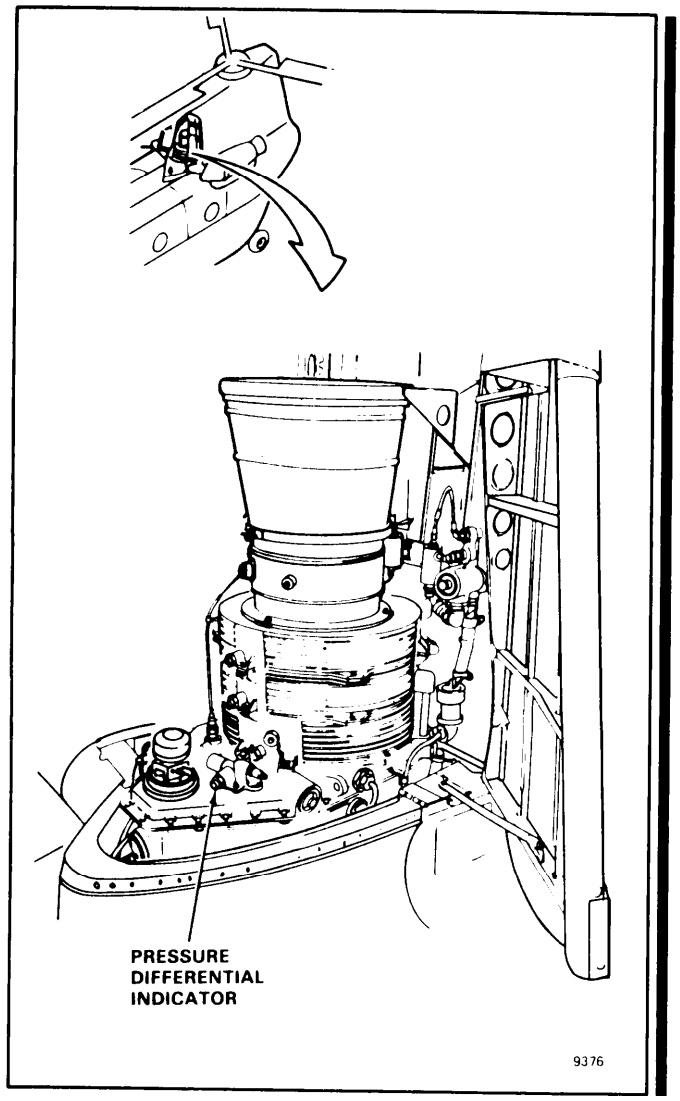
Tools:
Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692

Materials:
Lockwire (E231)

Personne/lRequired:
Medium Helicopter Repairer
Inspector

References:
TM 55-1520-240-23P

Equipment Condition:
Battery Disconnected (Task 1-39)
Electrical Power Off
Pylon Access Doors Open (Task 2-2)

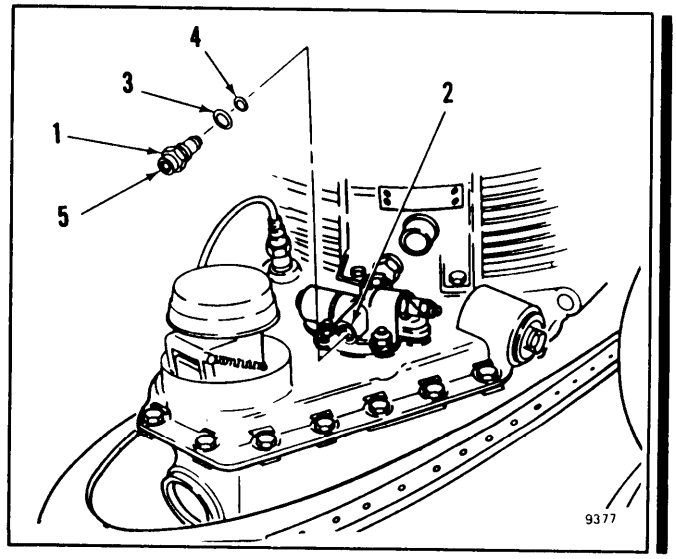


REMOVE INDICATOR

1. Remove lockwire from pressure differential indicator (1). **Remove indicator** from housing (2).
2. **Remove two packings (3 and 4) from indicator (1).**

INSTALL INDICATOR

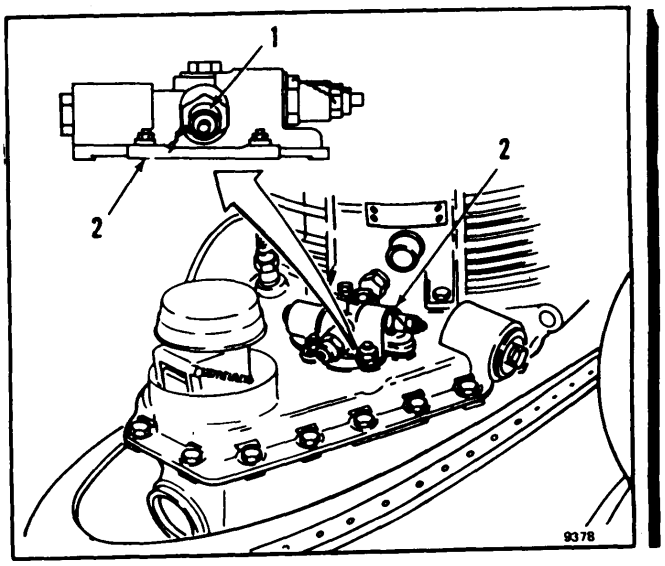
3. **Install two packings (3 and 4)** on indicator (1).
4. Hold indicator (1) so that button (5) points up. **Check that button is pushed in** and locked.
5. **Install indicator (1)** in housing (2).



GO TO NEXT PAGE

6-171.1 REPLACE COMBINING TRANSMISSION MAIN OIL FILTER PRESSURE DIFFERENTIAL INDICATOR (Continued)

6. Lockwire indicator (1) to housing (2). Use lockwire (E231).



INSPECT

FOLLOW-ON MAINTENANCE:

Close pylon access doors (Task 2-2).

END OF TASK

6-172 ADJUST COMBINING TRANSMISSION MAIN OIL PUMP

INITIAL SETUP

Applicable Configurations:
A l l

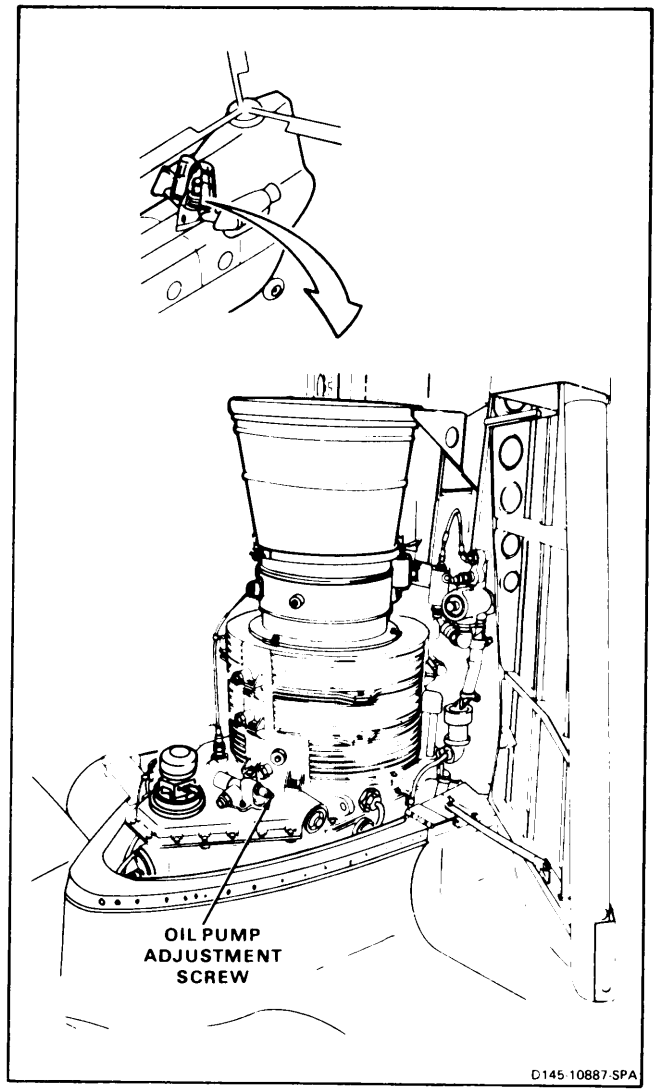
Tools:
Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692

Materials:
Lockwire (E230)

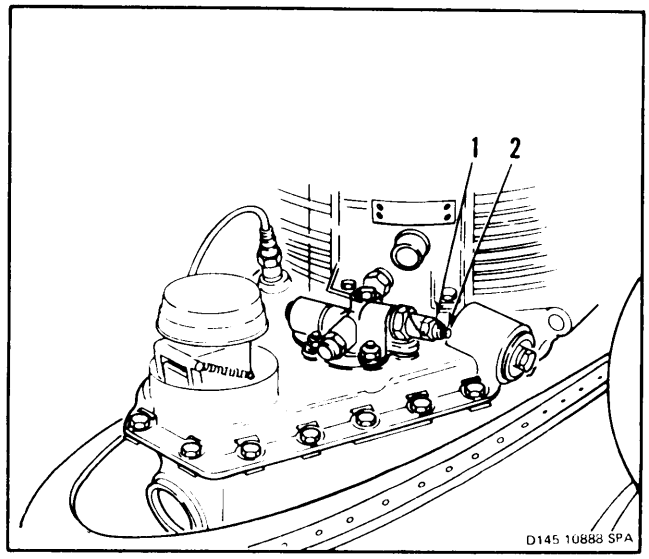
Personnel Required:
Medium Helicopter Repairer
Inspector
Army Rotary-Wing Aviator (2)

References:
TM 55-1520-240-10

Equipment Condition:
Battery Disconnected (Task 1-39)
Electrical Power Off
Pylon Access Doors Open (Task 2-2)



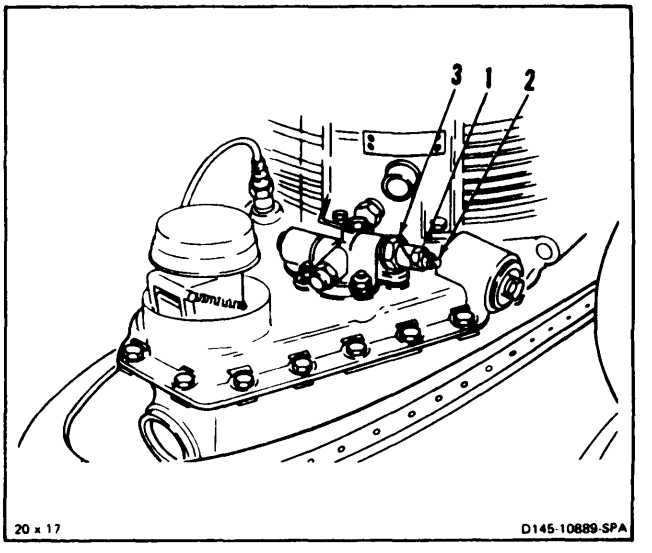
1. Remove lockwire from locknut (1) and setscrew (2). Hold setscrew from turning and **loosen locknut.**
2. **Turn setscrew (2) no more than 1/4 turn to adjust** transmission oil pressure. Turn setscrew clockwise to increase pressure. Turn setscrew counterclockwise to decrease pressure. Required gage pressure is 40 to 70 psi.
3. Hold setscrew (2) from turning. **Torque locknut (1) to 60 inch-pounds.**



GO TO NEXT PAGE

6-172 ADJUST COMBINING TRANSMISSION MAIN OIL PUMP (Continued)

4. Have pilot perform ground run at 100 percent rotor rpm until combining transmission oil temperature and pressure stabilize. **Record oil pressure.**
5. If oil pressure is 40 to 70 psi, go to step 6. **If pressure is not 40 to 70 psi, repeat task.**
6. Lockwire locknut (1) and setscrew (2) to retaining nut (3). Use lockwire (E230).



INSPECT

FOLLOW-ON MAINTENANCE:

Close pylon access doors (Task 2-2).

END OF TASK

6-173 REPLACE COMBINING TRANSMISSION AUXILIARY OIL FILTER

INITIAL SETUP

Applicable Configurations:
All

Tools:
Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692
Container, Two Quart
Torque Wrench, 30 to 150 Inch-Pounds

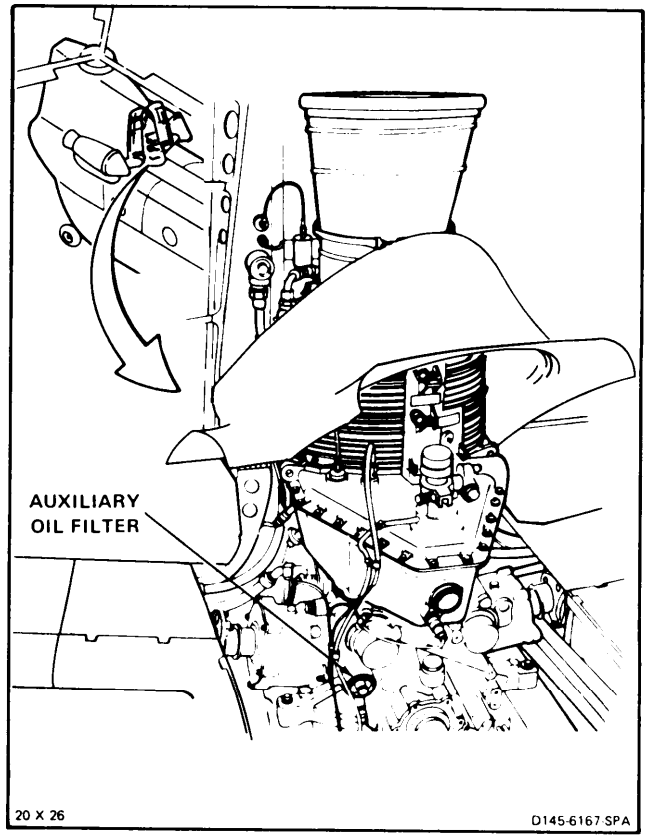
Materials:
Lockwire (E231)
Oil (E254)

Parts:
Packing
Filter

Personnel Required:
67U10 Medium Helicopter Repairer
67U30 Inspector

References:
TM 55-1520-240-23P
Task 6-108

Equipment Condition:
Battery Disconnected (Task 1-39)
Electrical Power Off
Pylon Hinged Fairing Open (Task 2-2)
Pylon Lower Fairing Open (Task 2-2)



REMOVE FILTER

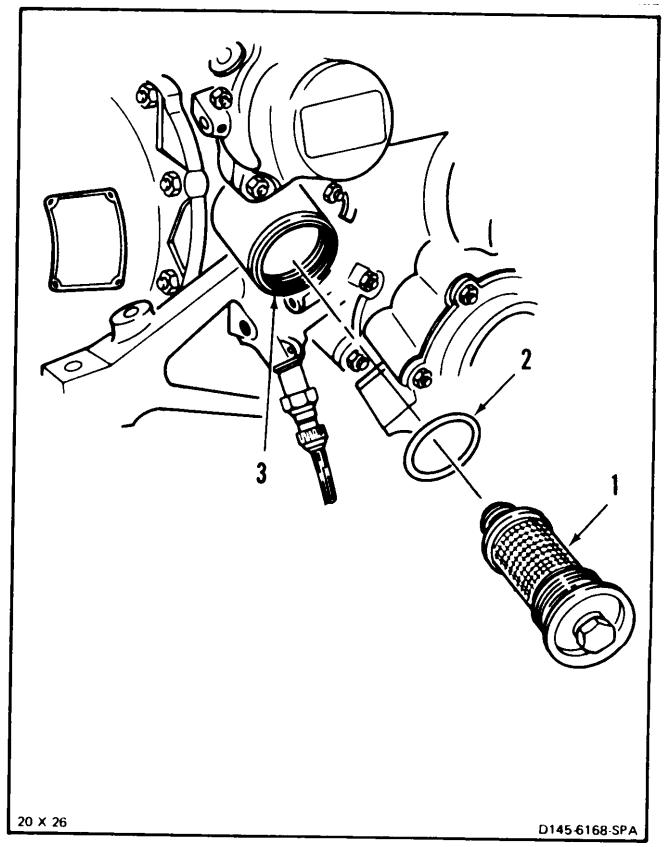
1. Remove lockwire from filter (1).

CAUTION

Do not let debris enter transmission cavity. Damage can result.

2. **Remove filter (1)** and packing (2) from transmission cavity (3). Use container to catch spilled oil.

3. **Check filter (1) for debris.** Retain debris for contamination analysis (Task 6-108).



GO TO NEXT PAGE

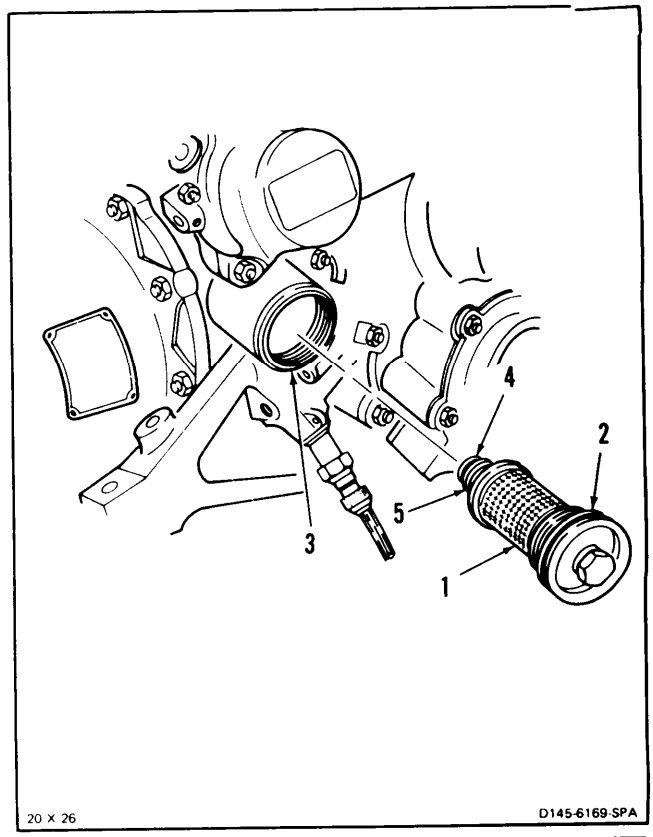
6-173 REPLACE COMBINING TRANSMISSION AUXILIARY OIL FILTER (Continued)

INSTALL FILTER

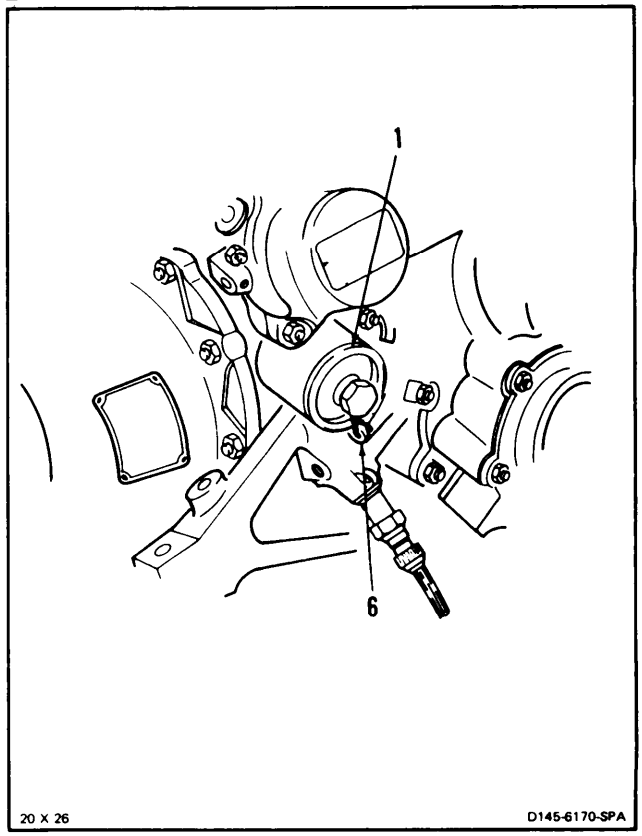
NOTE

Filter is supplied with two packings installed.

4. Coat packings (2, 4, and 5) and thread of filter (1) with oil (E254).
5. **Install filter (1)** and packing (2) in transmission cavity (3). **Torque filter to 80 inch-pounds.**



6. Lockwire filter (1) to transmission lug (6) lockwire (E231).



INSPECT

FOLLOW-ON MAINTENANCE:

Service combining transmission (Task 1-54).

Close aft pylon lower fairing (Task 2-2).

Close aft pylon doors (Task 2-2).

END OF TASK

6-174 REMOVE COMBINING TRANSMISSION DEBRIS DETECTION SCREEN

INITIAL SETUP

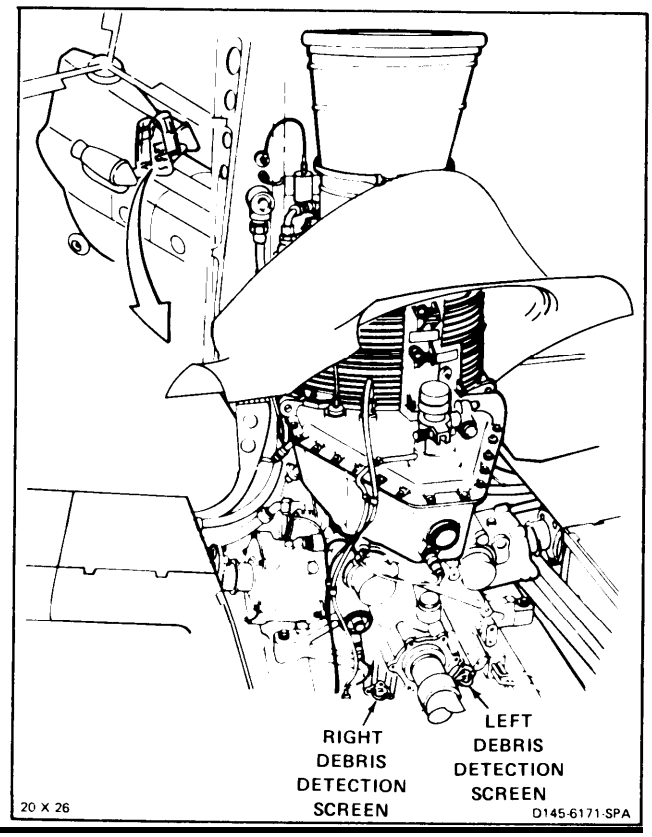
Applicable Configurations:
All

Tools:
Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692

Materials:
Cloths (E120)

Personnel Required:
67U10 Medium Helicopter Repairer

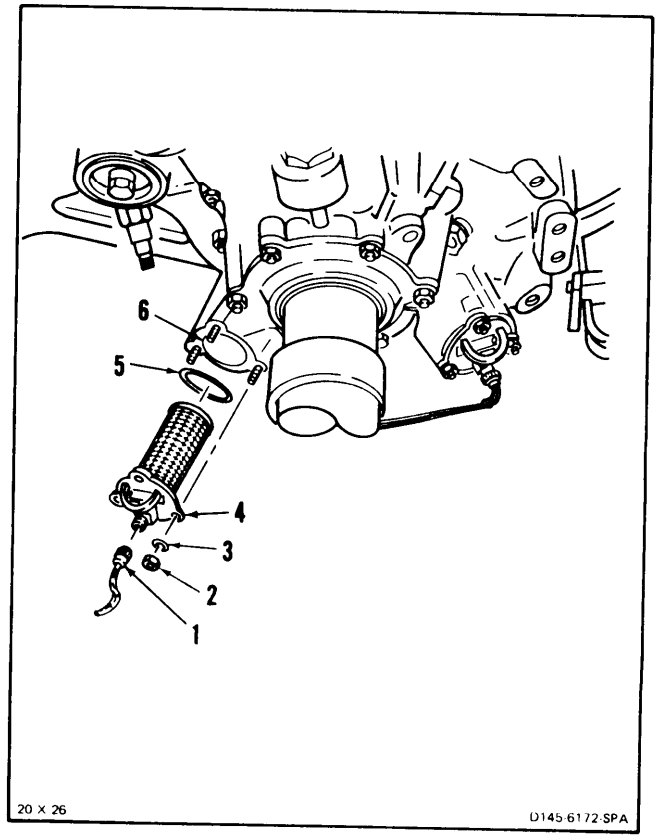
Equipment Condition:
Battery Disconnected (Task 1-39)
Electrical Power Off
Pylon Hinged Fairing Open (Task 2-2)
Pylon Lower Fairing Open (Task 2-2)



NOTE

Procedure is same to remove left or right screen. Removal of right screen is shown here.

1. **Disconnect electrical connector (1).**
2. **Remove three nuts (2)** and washers (3).
3. Place cloths (E120) under screen (4) to absorb spilled oil. **Remove screen** and packing (5) from transmission cavity (6).



FOLLOW-ON MAINTENANCE:

None

END OF TASK

6-175 INSPECT COMBINING TRANSMISSION DEBRIS DETECTION SCREEN 6-175

INITIAL SETUP

Applicable Configurations:
All

Tools:
Goggles

Materials:
Dry Cleaning Solvent (E162)
Cloth (E120)
Brush (E86)
Gloves (E186)

Personnel Required:
67U10 Medium Helicopter Repairer

References:
Task 6-108

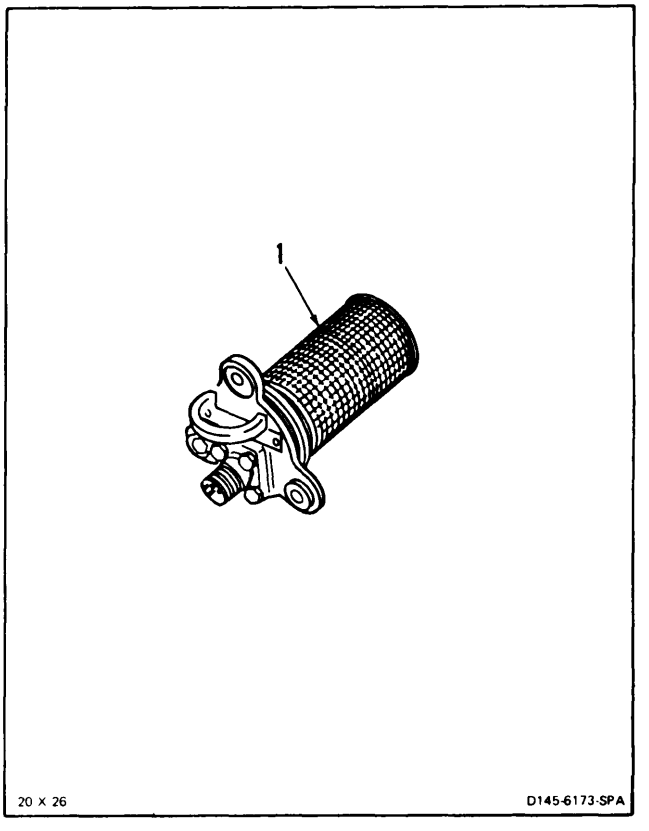
Equipment Condition:
Off Helicopter Task

1. **Check screen (1)** for bits of metal and other debris. Retain debris for contamination analysis (Task 6-108).

WARNING

Dry cleaning solvent (E162) is flammable and toxic. It can irritate skin and cause burns. Use only in well-ventilated area, away from heat and open flame. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.

2. Clean screen with solvent (E162) and brush (E86). Wear gloves (E186) and goggles. Dry with cloth (E120) or let air dry.
3. **Inspect screen (1)** for tears. There shall be no tears



FOLLOW-ON MAINTENANCE:

None

END OF TASK

6-176 INSTALL COMBINING TRANSMISSION DEBRIS DETECTION SCREEN

INITIAL SETUP

Applicable Configurations:
All

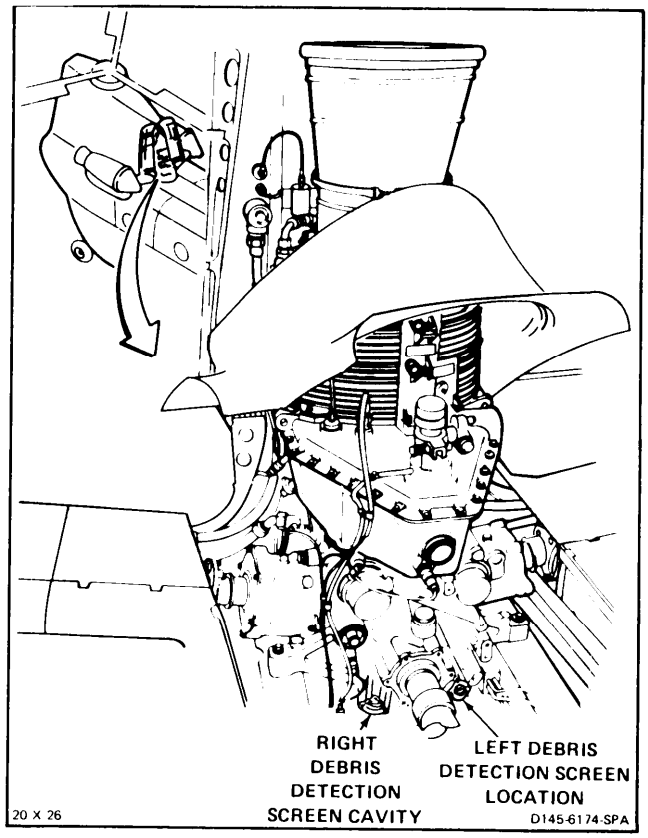
Tools:
Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692
Torque Wrench, 30 to 150 Inch-Pounds

Materials:
None

Parts:
Packing

Personnel Required:
67U10 Medium Helicopter Repairer
67U30 Inspector

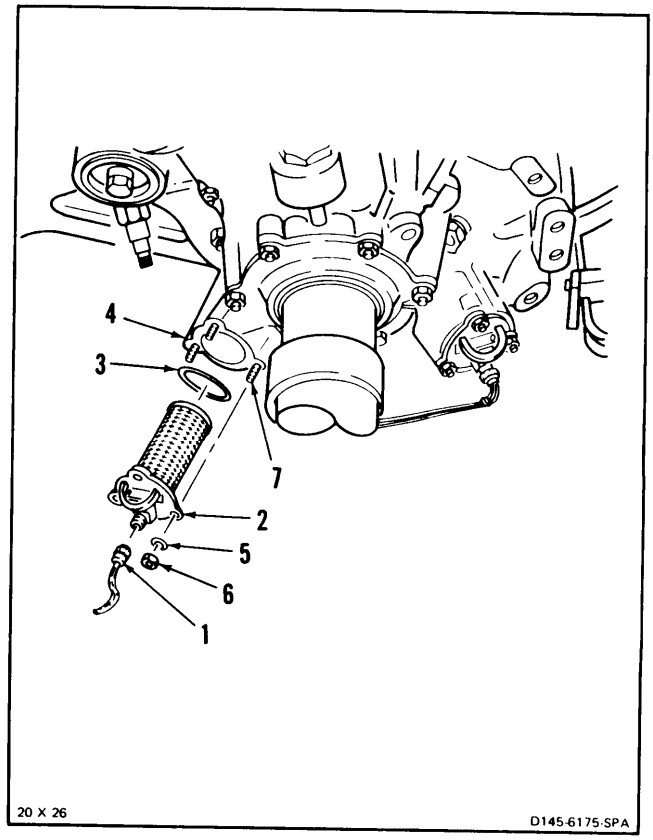
References:
TM 55-1520-240-23P
TM 55-1520-240-T



NOTE

Procedure is same to install left or right screen. Installation of right screen shown here.

1. **Connect electrical connector (1)** to screen (2).
2. **Perform operational check** of engine transmission debris detection system (TM 55-1520-240-T).
3. Install packing (3) on screen (2). **Install screen** in transmission cavity (4).
4. **Install** three washers (5) and nuts (6) on studs (1). **Torque nuts to <u>60 inch-pounds.</u>**



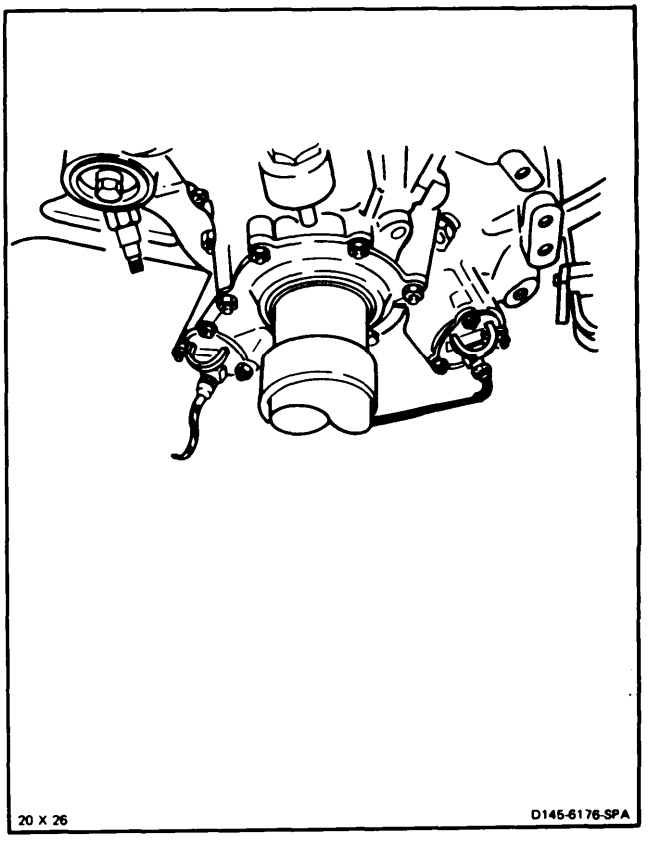
GO TO NEXT PAGE

6-176 INSTALL COMBINING TRANSMISSION DEBRIS DETECTION SCREEN (Continued)

FOLLOW-ON MAINTENANCE:

Close pylon lower fairing (Task 2-2).

Close pylon hinged fairing (Task 2-2).



END OF TASK

6-177 REMOVE COMBINING TRANSMISSION CHIP DETECTOR

INITIAL SETUP

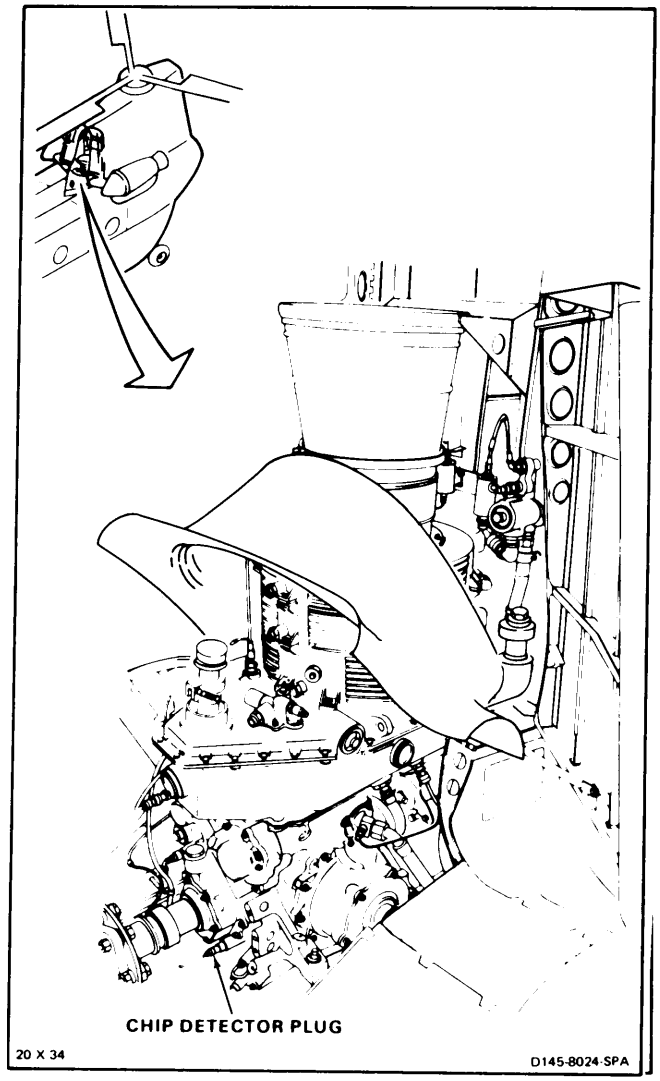
Applicable Configurations:
All

Tools:
Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692

Materials:
Cloths (E120)

Personnel Required:
67U10 Medium Helicopter Repairer

Equipment Condition:
Battery Disconnected (Task 1-39)
Electrical Power Off
Aft Pylon Doors Open (Task 2-2)
Aft Pylon Lower Fairing Open (Task 2-2)



1. **Disconnect electrical connector (1)** from chip detector (2). Remove lockwire.
2. Position cloths under chip detector (2) to absorb oil spillage.

NOTE

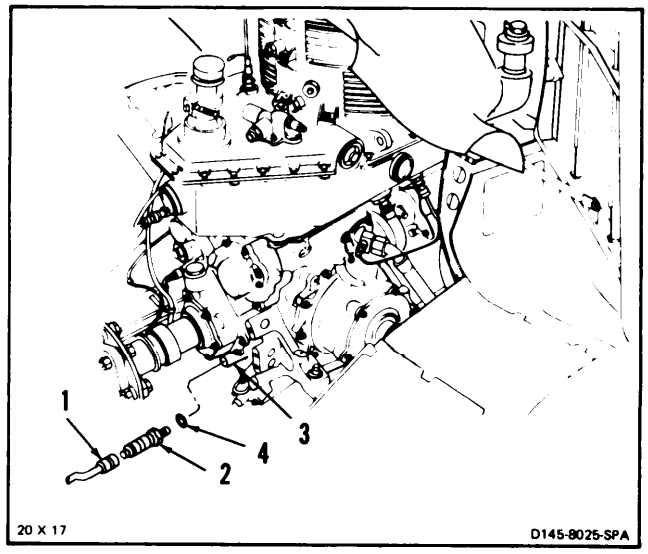
When detector is removed, oil will drain from port, Plug port quickly to prevent oil drainage.

3. **Remove chip detector (2).** Quickly plug port (3) to stop oil drainage.
4. Remove packing (4) from chip detector (2).

FOLLOW-ON MAINTENANCE:

None

END OF TASK



6-178 INSPECT COMBINING TRANSMISSION CHIP DETECTOR PLUG

INITIAL SETUP

Applicable Configurations:
All

Tools:
None

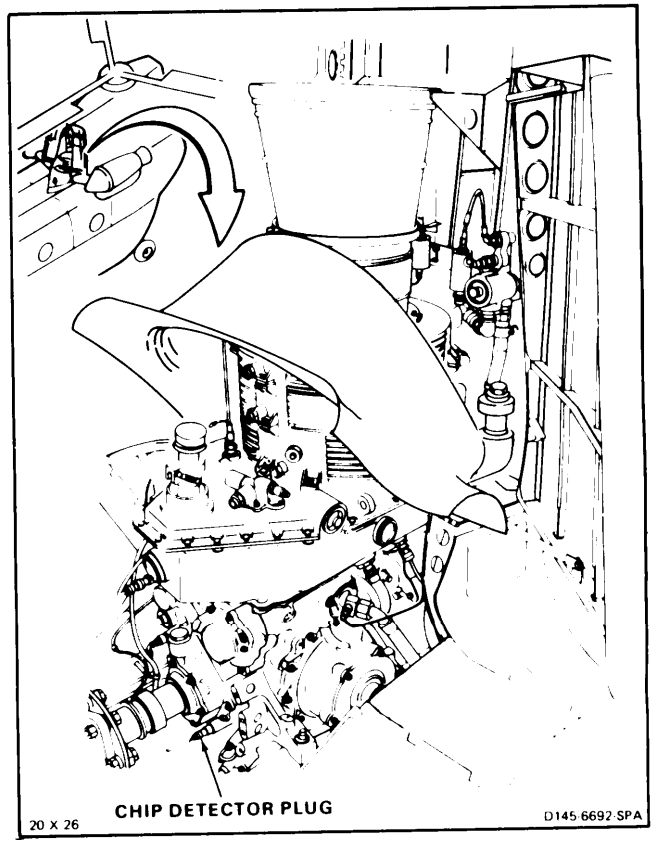
Materials:
Dry Cleaning Solvent (E162)
Cloths (E120)
Gloves (E186)

Parts:
Packing

Personnel Required:
67U10 Medium Helicopter Repairer
67U30 Inspector

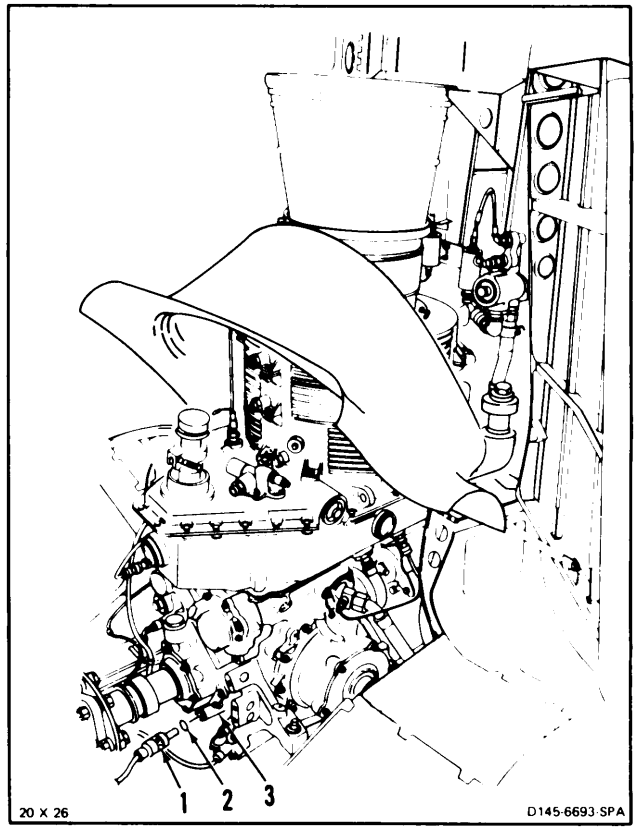
References:
TM 55-1520-240-23P
TM 55-1520-240-T
Task 6-108

Equipment Condition:
Battery Disconnected (Task 1-39)
Electrical Power Off
Aft Pylon Access Doors Open (Task 2-2)
Aft Pylon Lower Fairing Open (Task 2-2)



REMOVE PLUG

1. Push in chip detector plug (1) and turn it counterclockwise. **Remove plug** and packing (2) from chip detector body (3).



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6-178 INSPECT COMBINING TRANSMISSION CHIP DETECTOR PLUG (Continued) 6-178

INSPECT PLUG

NOTE

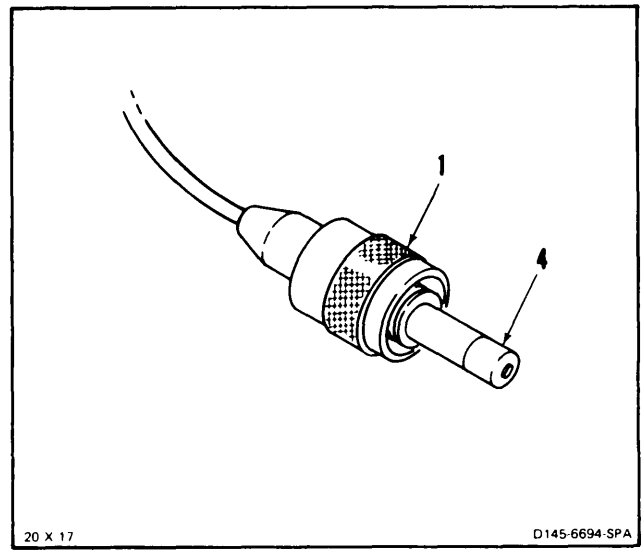
Some metal fuzz on tip of plug is normal.

2. **Check tip (4) on plug (1) for chips.** Save chips for contamination analysis (Task 6-108).

WARNING

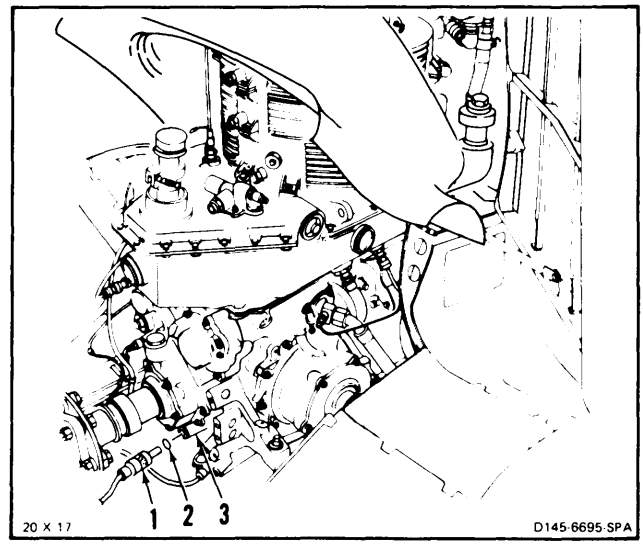
Dry cleaning solvent (E162) is flammable and toxic. It can irritate skin and cause burns. Use only in well-ventilated area, away from heat and open flame. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.

3. **Clean tip (4)** with dry cleaning solvent (E162) and clean cloths (E120). Wear gloves (E186). Dry tip.
4. **Perform operational check** of combining transmission chip detector system (TM 55-1520-240-T).



INSTALL PLUG

5. **Install plug (1)** and packing (2) in chip detector body (3). Push in and turn plug clockwise to lock.



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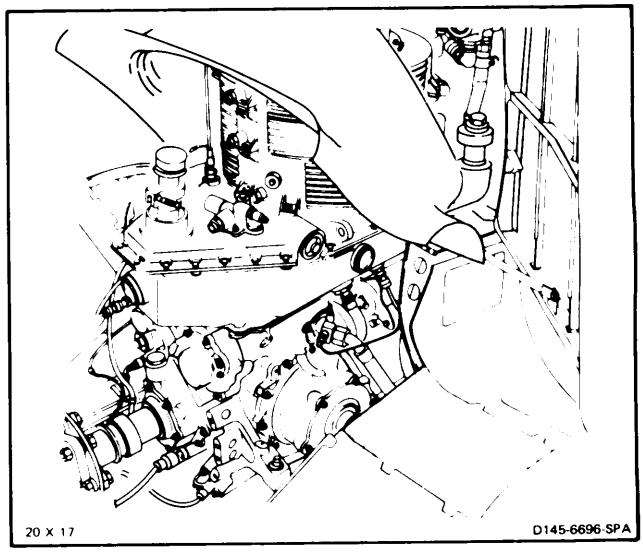
6-178 INSPECT COMBINING TRANSMISSION CHIP DETECTOR PLUG (Continued)

INSPECT

FOLLOW-ON MAINTENANCE:

Close aft pylon lower fairing (Task 2-2).

Close aft pylon access doors (Task 2-2).



END OF TASK

6-179 INSTALL COMBINING TRANSMISSION CHIP DETECTOR

INITIAL SETUP

Applicable Configurations:
A I I

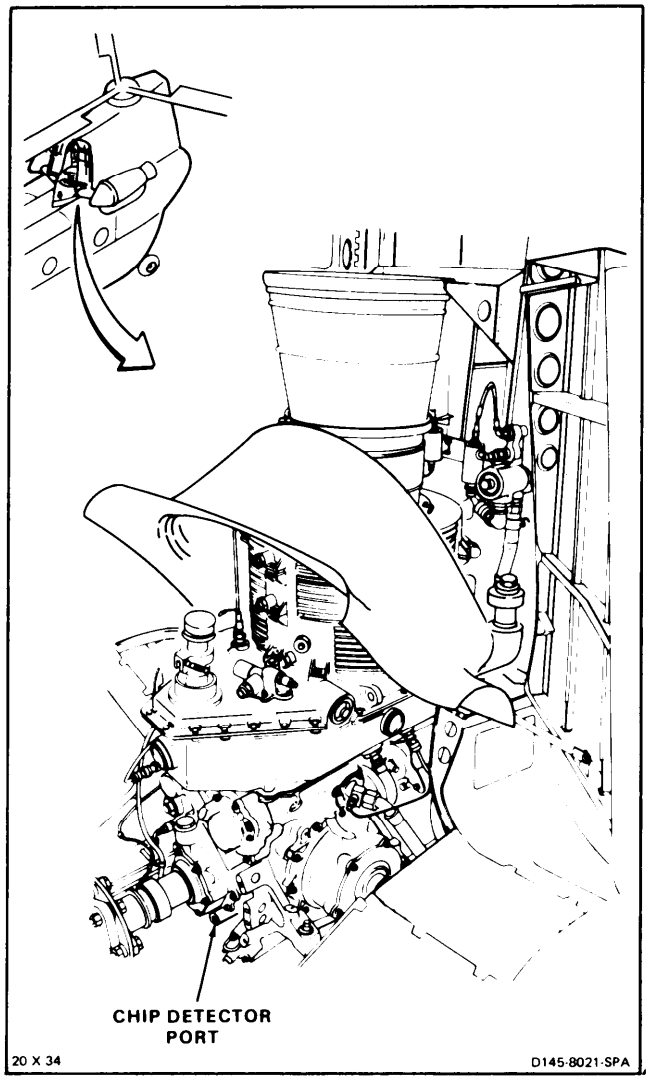
Tools:
Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692
Torque Wrench, 30 to 150 Inch-Pounds

Materials:
Lockwire (E231)
Oil (E254)

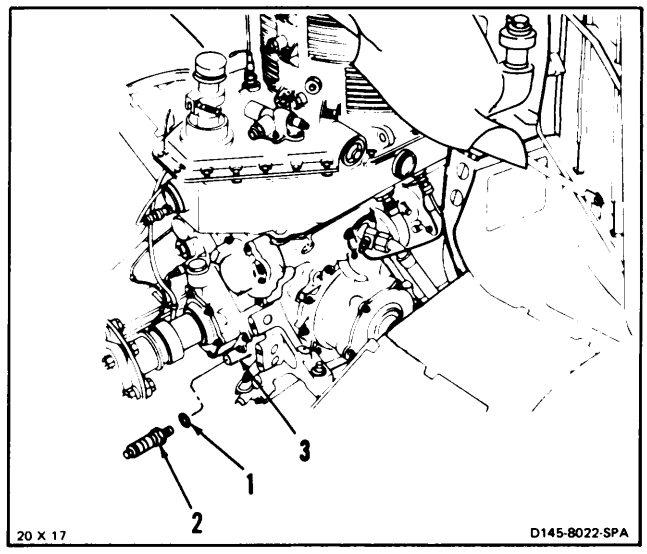
Parts:
Packing

Personnel Required:
67U10 Medium Helicopter Repairer
67U30 Inspector

References:
TM 55-1520-240-23P



1. Coat packing (1) and thread of chip detector (2) with oil (E254). **Install packing** on chip detector.
2. **Install chip detector (2)** in transmission port (3). **Torque chip detector to <u>80 inch-pounds.</u>**

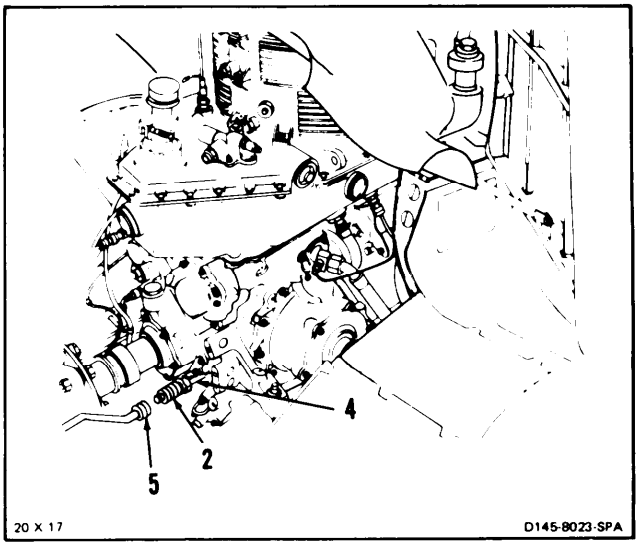


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6-179 INSTALL COMBINING TRANSMISSION CHIP DETECTOR (Continued)

3. **Lockwire chip detector (2)** to transmission (4). Use lockwire (E231).
4. **Connect electrical connector (5).**

INSPECT



FOLLOW-ON MAINTENANCE:

Close aft pylon lower fairing (Task 2-2).

Close aft pylon access doors (Task 2-2).

END OF TASK

6-180 REMOVE COMBINING TRANSMISSION INLET SCREEN 6-180

INITIAL SETUP

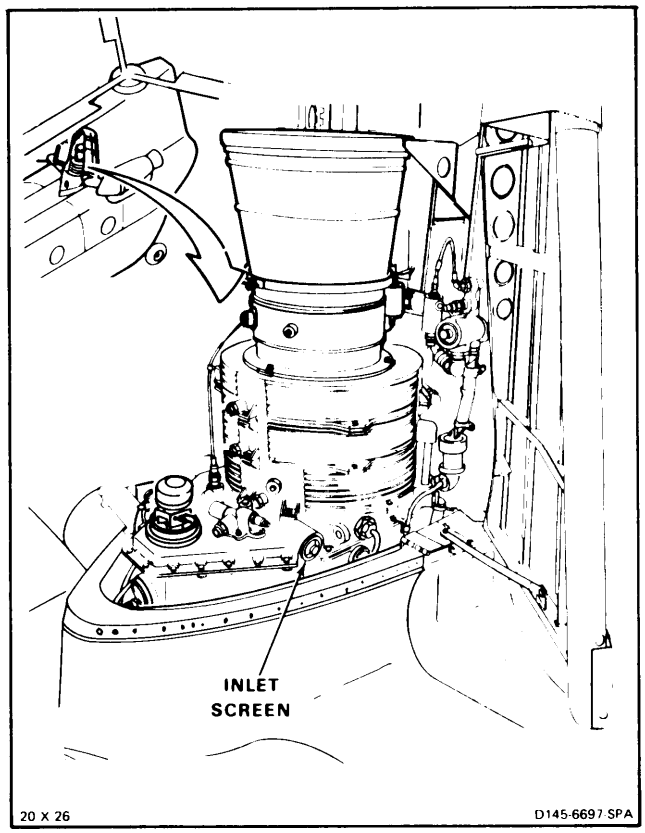
Applicable Configurations:
All

Tools:
Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692

Materials:
Barrier Material (E80)
Masking Tape (E388)
Cloths (E120)

Personnel Required:
67U10 Medium Helicopter Repairer

Equipment Condition:
Battery Disconnected (Task 1-39)
Electrical Power Off
Aft Pylon Access Doors Open (Task 2-2)
Aft Pylon Lower Fairing Open (Task 2-2)



1. Remove lockwire from inlet screen (1).

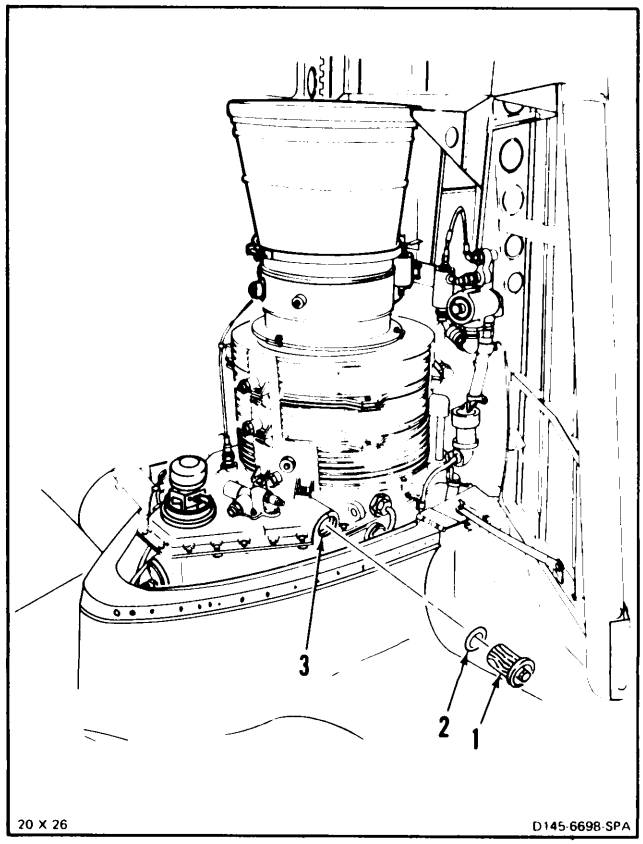
CAUTION

Do not let debris enter transmission cavity. Damage can result.

2. **Remove screen (1)** and packing (2) from transmission cavity (3). Use cloths (E120) to catch spilled oil.
3. Cover cavity (3) with barrier material (E80) and tape (E388).

FOLLOW-ON MAINTENANCE:

None



END OF TASK

6-181 INSTALL COMBINING TRANSMISSION INLET SCREEN 6-181

INITIAL SETUP

Applicable Configurations:
All

Tools:
Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692
Torque Wrench, 30 to 150 Inch-Pounds

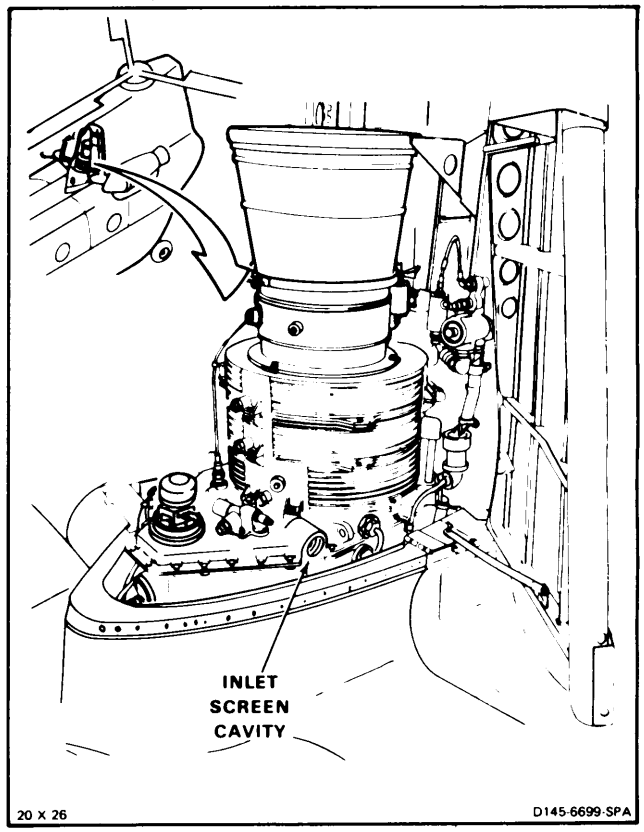
Materials:
Oil (E254)
Lockwire (E231)

Parts:
Packing

Personnel Required:
67U10 Medium Helicopter Repairer
67U30 Inspector

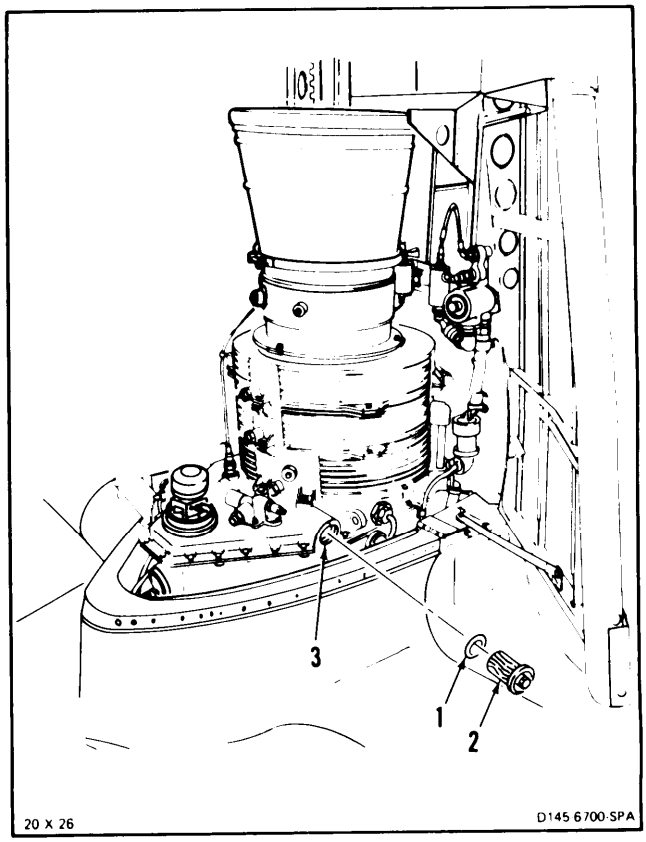
References:
TM 55-1520-240-23P

Equipment Condition:
Inlet Screen Inspected (Task 6-131)



1. Coat packing (1) and thread of inlet screen (2) with oil (E254). **Install packing on screen.**

2. **Install screan (2)** in transmission cavity (3) **Torque screen to <u>80 inch-pounds.</u>**



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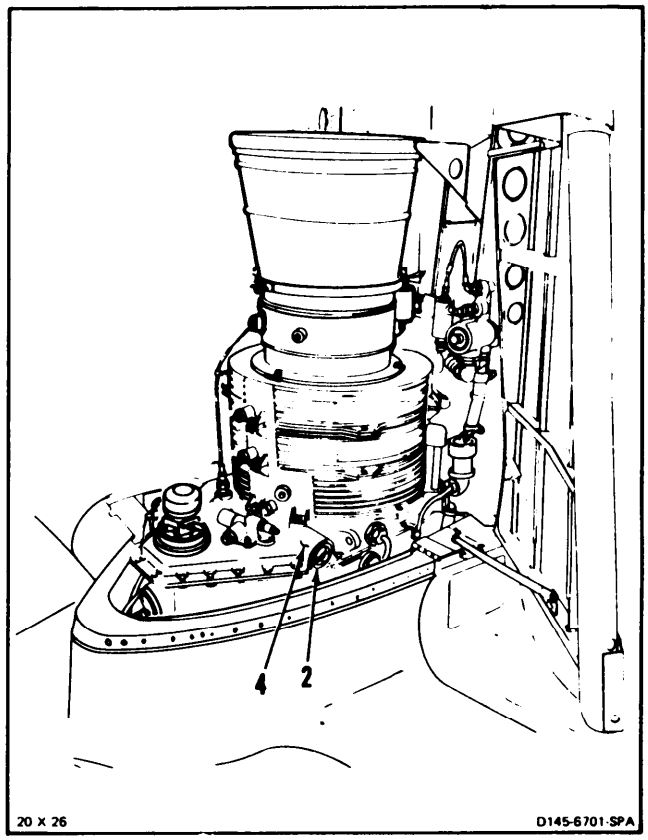
6-181 INSTALL COMBINING TRANSMISSION INLET SCREEN (Continued) 6-181

3. Lockwire screen (2) to transmission (4). Use lockwire (E231).

INSPECT

FOLLOW-ON MAINTENANCE:

Close aft pylon access doors (Task 2-2).



END OF TASK

6-181.1 REPLACE COMBINING TRANSMISSION OIL COOLER BYPASS VALVE

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Wrench, 1-Inch
Open End Wrench, 1 1/24-Inch
Container, 2-Quart (2)
Hose, 1-inch ID, 36 Inches Long
Funnel

Materials:

Cloths (E120)
Lockwire (E231)
Oil (E254)

Parts:

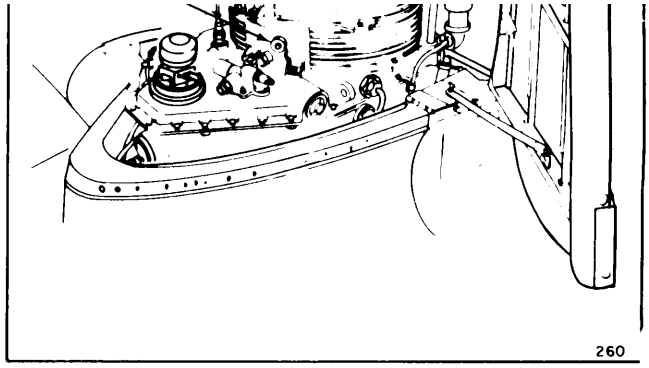
Packings (2)

Personnel Required:

Medium Helicopter Repairer
Inspector

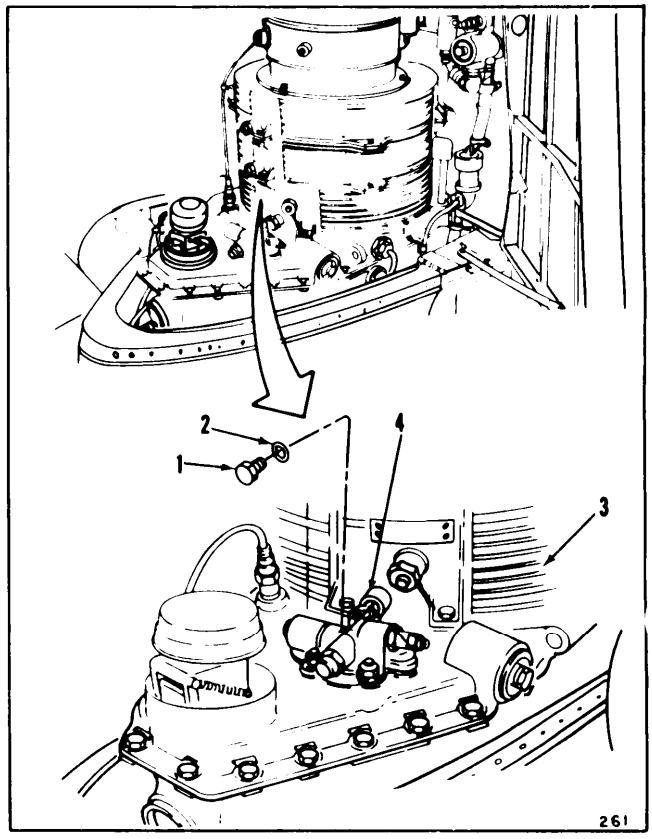
Equipment Condition:

Battery Disconnected (Task 1-39)
Electrical Power Off
Pylon Hinged Fairing Open (Task 2-2)



DRAIN OIL COOLER

1. Remove lockwire from drain plug (1).
2. Remove drain plug (1) and packing (2) from oil cooler (3). Hold funnel under port (4). Drain oil through hose into container. Remove hose and funnel.
3. Install drain plug (1) and packing (2). Lockwire plug to oil cooler (3). Use lockwire (E231).



GO TO NEXT PAGE

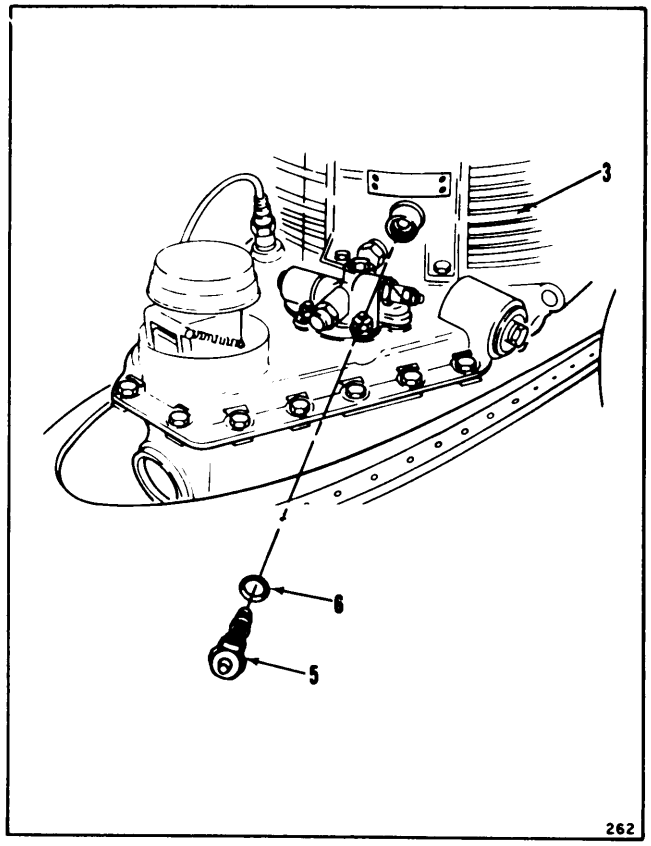
6-181.1 REPLACE COMBINING TRANSMISSION OIL COOLER BYPASS VALVE (Continued) 6-181.1

REMOVE BYPASS VALVE

NOTE

Do not let oil spill on fins of oil cooler. Spilled oil will spray from cooler during transmission operation.

4. Remove lockwire from bypass valve (5). **Remove valve** from oil cooler (3). Use cloths (E120) to absorb oil spillage.
5. Remove packing (6) from valve (5).



INSTALL VALVE

WARNING

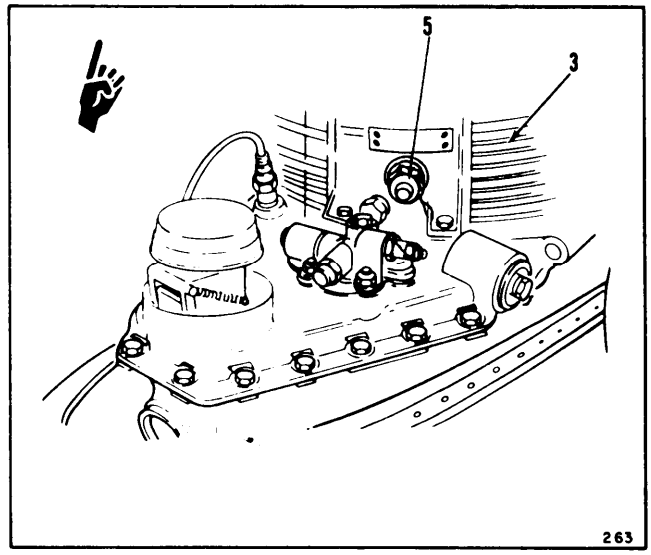
Oil (E253 or E254) is a skin irritant. If oil gets on skin, wash thoroughly. If oil soaks into clothes, change clothes immediately.

WARNING

Oil (E253 or E254) gives off fumes that can cause injury to personnel. Use oil in a well-ventilated area.

6. Coat packing (6) and thread of bypass valve (5) with oil (E254). **Install packing** on valve.
7. **Install valve (5)** in oil cooler (3). **Torque valve to 80 inch-pounds.**

8. Lockwire valve (5) to oil cooler (3). Use lockwire (E231).



INSPECT

FOLLOW-ON MAINTENANCE:

Service combining transmission (Task 1-54).

Close aft pylon doors (Task 2-2).

END OF TASK

6-181.2 INSPECT AND REPAIR COMBINING TRANSMISSION OIL COOLER FAN EXHAUST DUCT

INITIAL SETUP

Applicable Configurations:
All

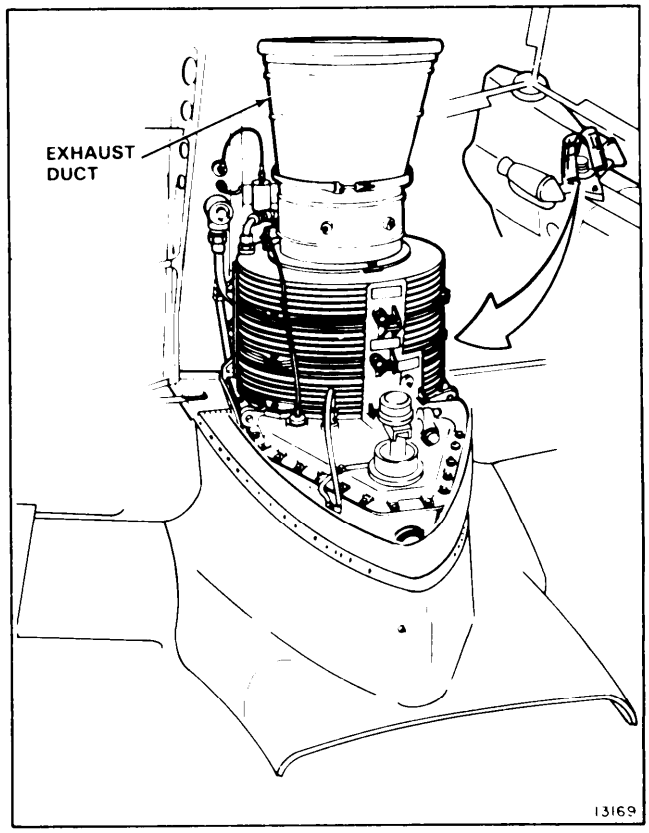
Tools:
Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692

Materials:
Oil (E254)

Parts:
Rivets
Washers
Seal (Appendix E-56)

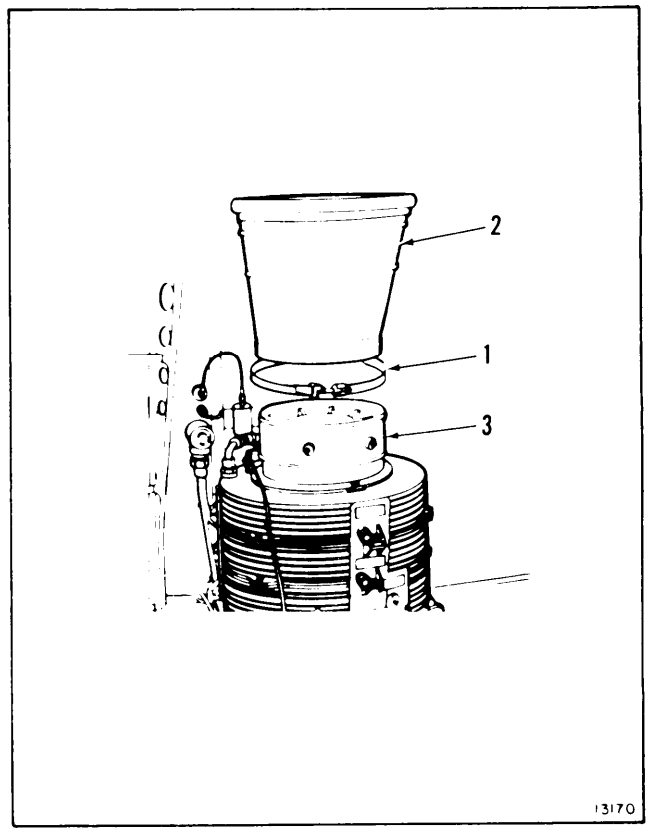
Personnel Required:
Aircraft Structural Repairer

Equipment Condition:
Battery Disconnected
Electrical Power Off
Pylon Hinged Fairing Open (Task 2-2)



REMOVE DUCT ASSEMBLY

1. ***Loosen clamp (1)*** securing duct assembly (2) to fan (3).
2. ***Remove duct assembly (2)*** and clamp (1).

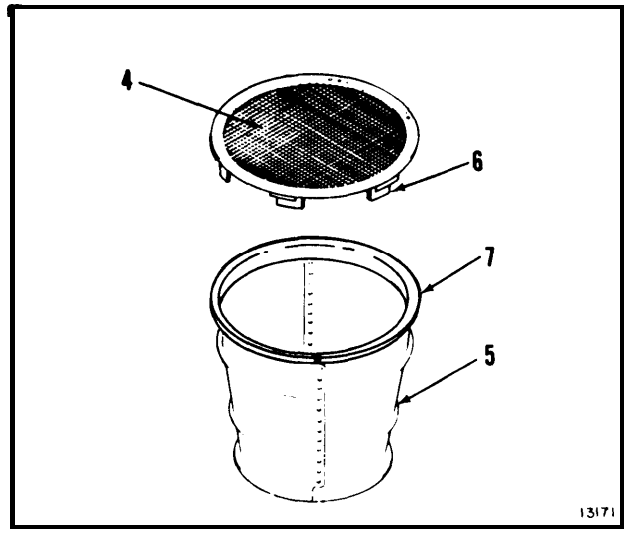


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6-181.2 INSPECT AND REPAIR COMBINING TRANSMISSION OIL COOLER FAN EXHAUST DUCT (Continued)

INSPECT DUCT ASSEMBLY

3. **Lift screen (4) out of duct assembly (5).**
4. **Check screen (4)** for holes and tears. Check clips (6) for cracks and looseness. There shall be no such damage.
5. **Check seal (7).** Seal shall be flexible, with no rips.
6. **Check duct assembly (5)** for holes, tears, and cracks that go all the way through the duct. There shall be no such damage.

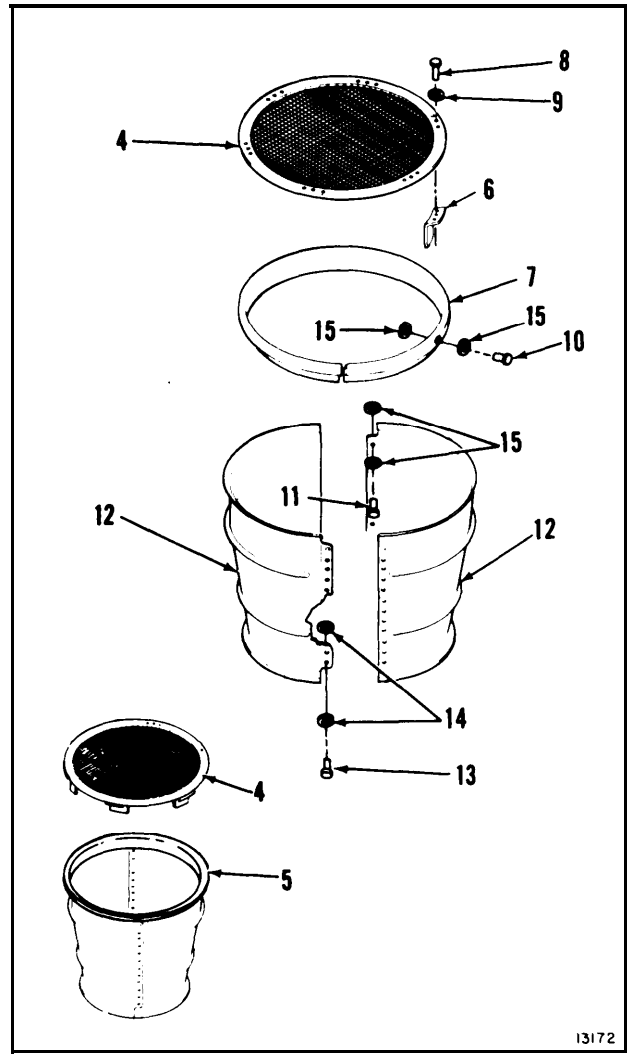


REPAIR DUCT ASSEMBLY

NOTE

Repair of duct is limited to replacement of parts.

7. Remove any of six clips (6) from screen (4) by drilling out rivets (8). Install new clips with new rivets and washers (9).
8. Remove seal (7) by drilling out rivets (10) and (11).
9. Separate duct halves (12) by drilling out rivets (13) at both ends of halves.
10. Join duct halves (12) with rivets (13) and washers (14). Use one washer under head and one under tail of each rivet.
11. Install new seal (E-56) (7). Use rivets (10 and 11) and washers (15). Use one washer under head and one under tail of each rivet.
12. Install screen (4) on duct assembly (5).

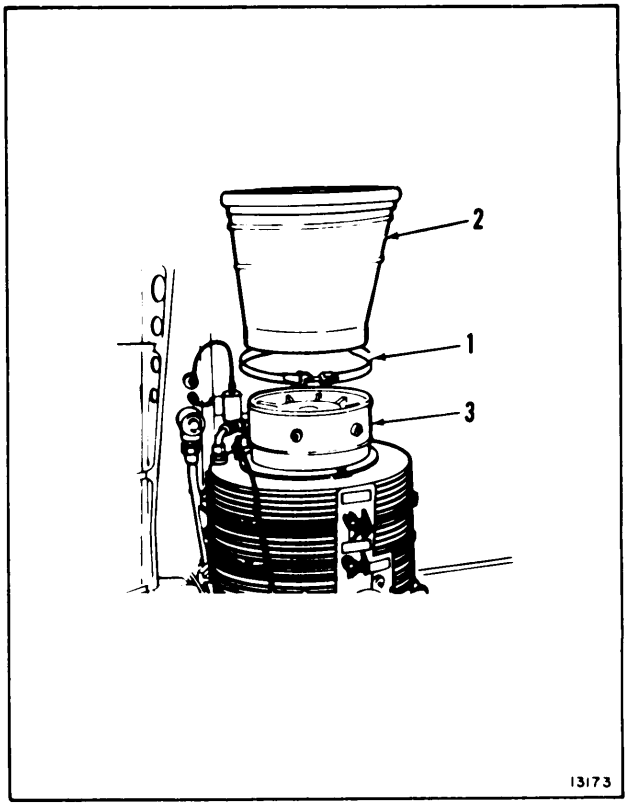


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6-181.2 INSPECT AND REPAIR COMBINING TRANSMISSION OIL COOLER FAN EXHAUST DUCT (Continued) 6-181.2

INSTALL DUCT ASSEMBLY

13. Coat thread of clamp (1) with oil (E254). **Install clamp (1)** around bottom of duct assembly (2).
14. **Install duct** assembly on fan (3). **Toque clamp to 35 inch-pounds.**



FOLLOW-ON MAINTENANCE:

Close Pylon Hinged Fairing (Task 2-2).

END OF TASK

6-182 REMOVE COMBINING TRANSMISSION OIL COOLER FAN AND SHAFT 6-182

INITIAL SETUP

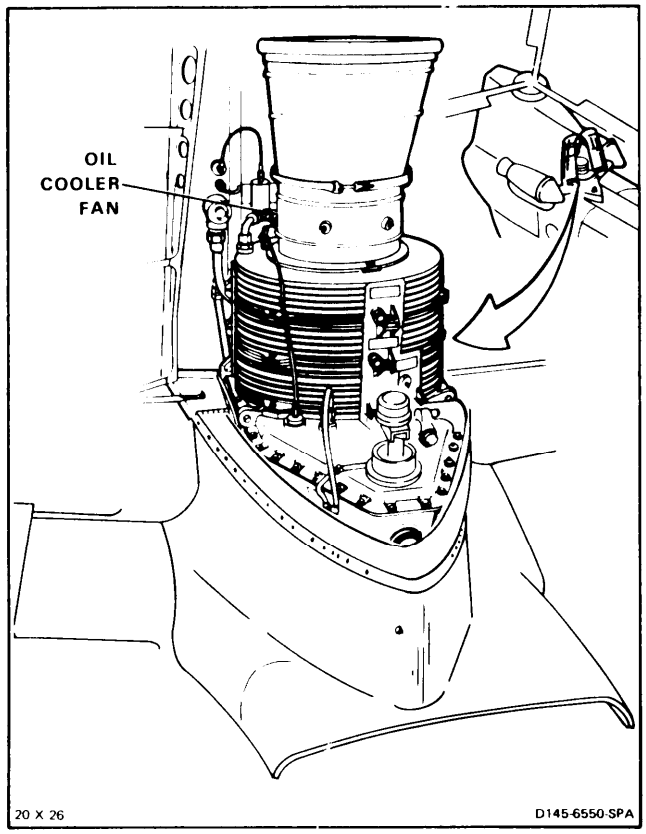
Applicable Configurations:
All

Tools:
Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692

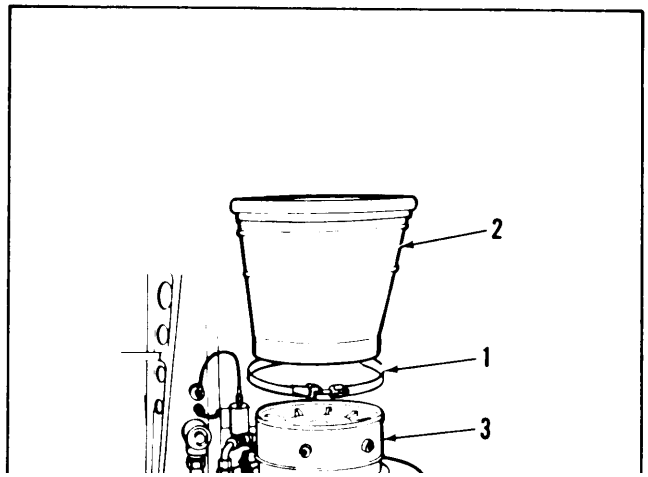
Materials:
None

Personnel Required:
Medium Helicopter Repairer

Equipment Condition:
Battery Disconnected (Task 1-39)
Electrical Power Off
Pylon Hinged Fairing Open (Task 2-2)



1. **Loosen clamp (1)** securing duct (2) to fan (3).
2. **Remove duct (2)** and clamp (1).



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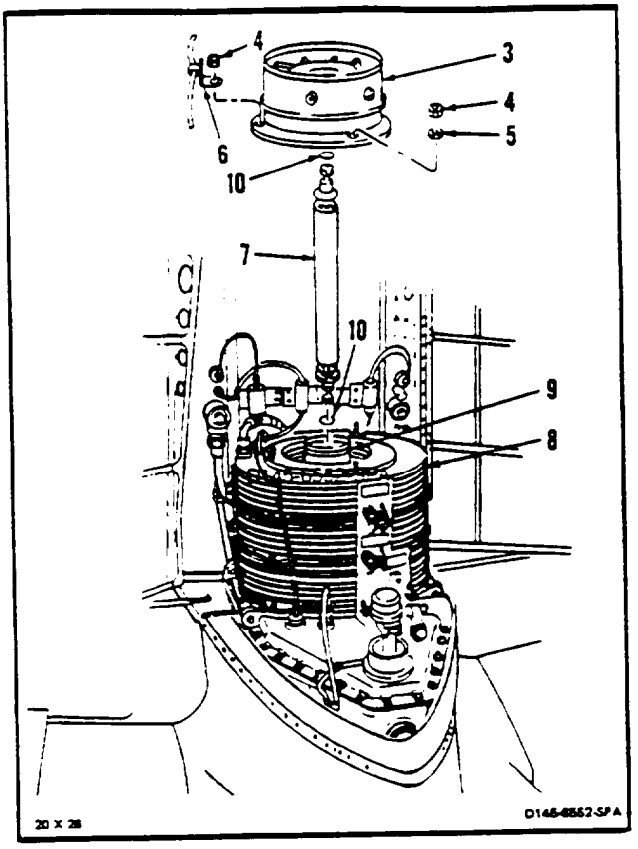
6-182 REMOVE COMBINING TRANSMISSION OIL COOLER FAN AND SHAFT (Continued)

3. **Remove four nuts (4),** washers (5). and bracket (6) from fan (3).

NOTE

The drive shaft may come out with the fan or stay in the transmission. The shaft is about 30 inches long.

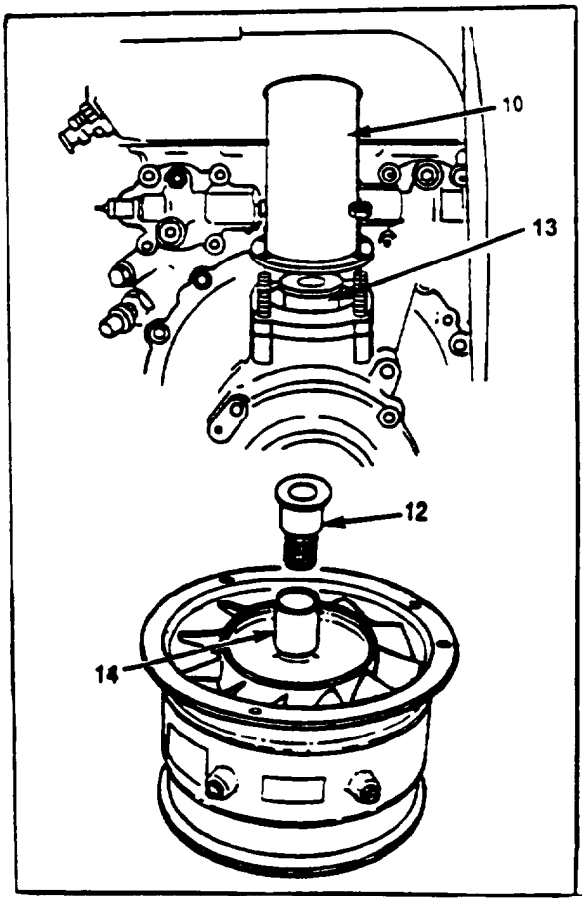
4. Lift fan (3) straight up until drive shaft (7) clears cooler (8). Remove shaft from baffle (9) or fan. Identify the upper end of the drive shaft with tape or marker.
5. On helicopters without 66, remove two packings (10) from shaft (7).



CAUTION

After removal of retaining shield, reinstall nuts on studs to hold the transmission gear cartridge in place. Tighten nuts not to exceed 60 inch pounds.

6. Remove retaining shield (11) (Task 6-184).
7. Remove adapters (12) from the splines of drive gear (13) and fan shaft (14).



FOLLOW-ON MAINTENANCE:
Inspect combing transmission oil cooler fan assembly and fan drive shaft (Task 6-182.1).

END OF TASK

6-182.1 INSPECT COMBINING TRANSMISSION FAN ASSEMBLY AND FAN DRIVE SHAFT

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit
NSN 5180-00-323-4692

Torque Wrench, 30 to 150 Inch-Pounds

Dial Indicator

Gage P/N SK33330-018

1 OX Magnification

Materials:

Dry Cleaning Solvent (E162)

Cloths (E120)

Gloves (El 86)

Oil (E253), (E254), or (E254.1)

Marking Pencil (E271)

Parts:

Packings

Personnel ***Required:***

Medium Helicopter Repairer

Inspector

References:

Task 6-72

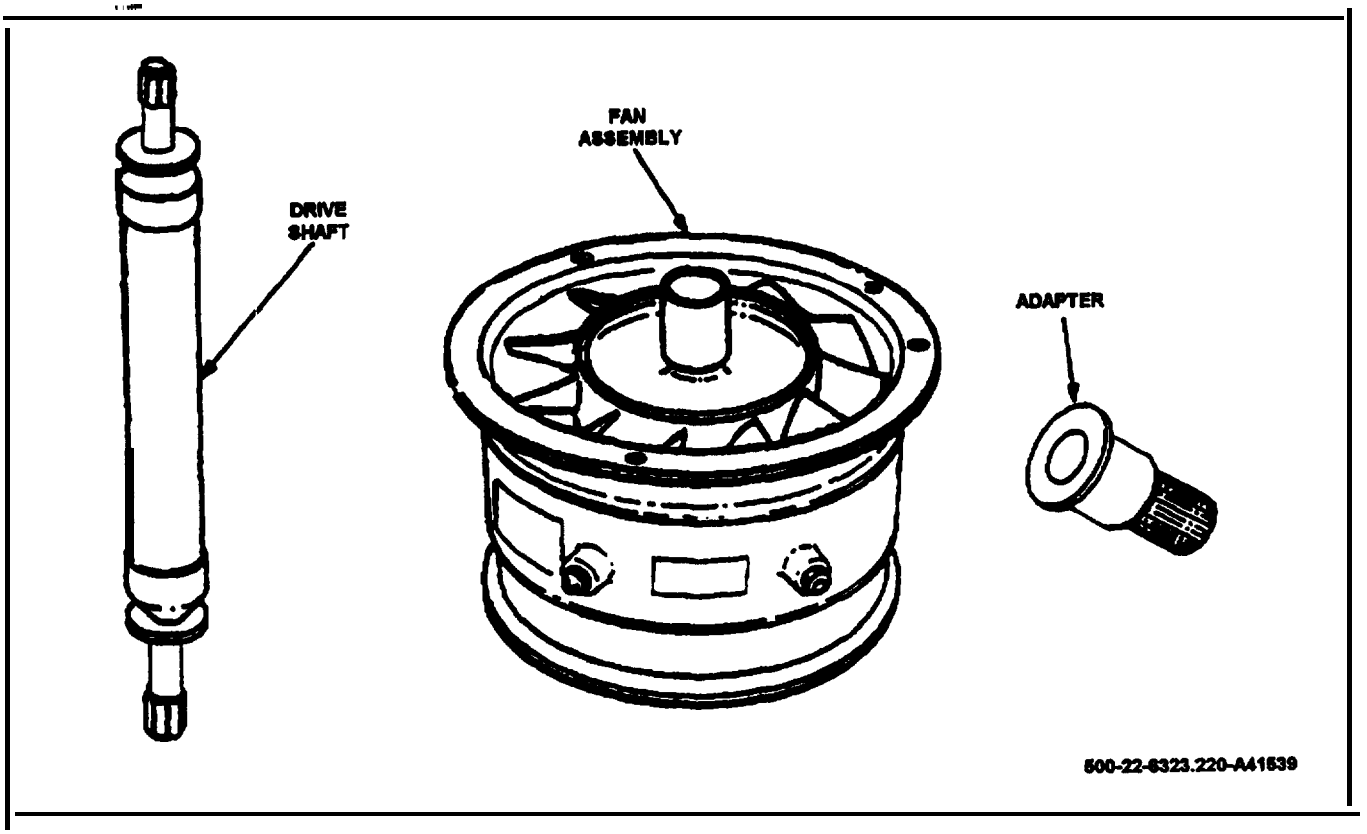
Task 6-77

Task 6-l 86

TM 55-1520-240-23P

Equipment Condition:

Combining Transmission Oil Cooler Fan and Shaft Removed (Task 6182)



GO TO NEXT PAGE

6182.1 INSPECT COMBINING TRANSMISSION FAN ASSEMBLY AND FAN DRIVE SHAFT (Continued) 8482.1

INSPECT DRIVE SHAFT (HELICOPTER WITHOUT 66)

1. Inspect splines (1) at each end of drive shaft (2) for wear. If wear is evident, proceed as follows:
   a. Place a straightedge (6 Inch metal ruler or equivalent) along the length of the spine, with the ruler spanning the worn area.
   b. Using a feeler gage, measure the depth of wear below the face of the spline.
   c. If spline wear exceeds 0.015, replace fan drive shaft.
   d. Deleted.
   e. Deleted.

1.1 Using 10X magnification, visually inspect the aluminum fan shaft tube for cracks extending from under the steel adapters. No cracks allowed.

CAUTION

Do not use tools to check for looseness on the Jo-bolts. Damage to the shaft will result.

1.2 Inspect jo-bolts that attach the adapters to the fan shaft tube for looseness. Attempt to turn the bolts by hand only. If any jo-bolts are loose, replace fan shaft.

1.3 Perform a check of the combining transmission output gear spline wear using splIne wear (GO-NO-GO) gage, P/N SK 33330-018. Insert the splIne gage into the output gear where the cooling fan shaft normally fits. If the gage does not fit, transmission is serviceable. If the gage fits, replace combining transmission.

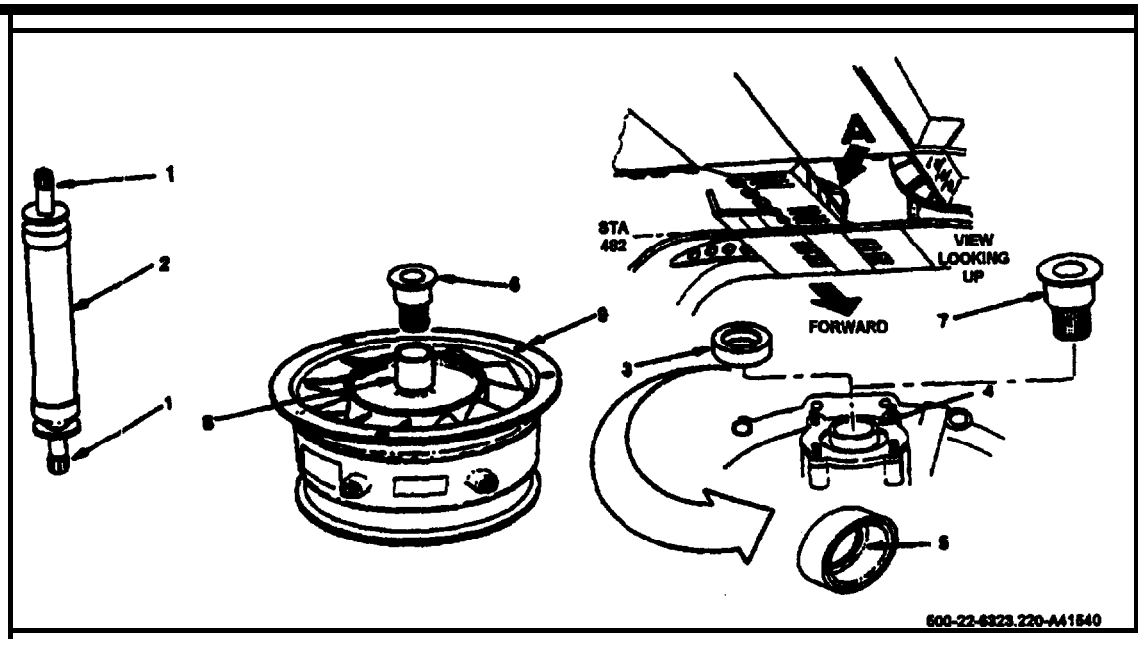
1.4 Perform a check of the fan assembly Input gear spline wear using splIne wear (GO-NO-GO) gage, P/N SK33330-018. Insert the spline gage into the Input gear of the fan where the cooling fan shaft normally fits. If the gage does not fit, cooling fan Is serviceable. If the gage fits, replace cooling fan.

INSPECT SNUBBER (HELICOPTER WITHOUT 66)

2. Inspect snubber (3) as follows:
   a. Lift the snubber from around the end of transmission gear (4).
   b. Check the snubber for cuts, tears, and erosion of seatlng surface (5). There shall be no such damages.
   c. Install the snubber over the end of transmission gear (4). Make sure the snubber Is fully seated.

INSPECT ADAPTERS (HELICOPTER WITH 66)

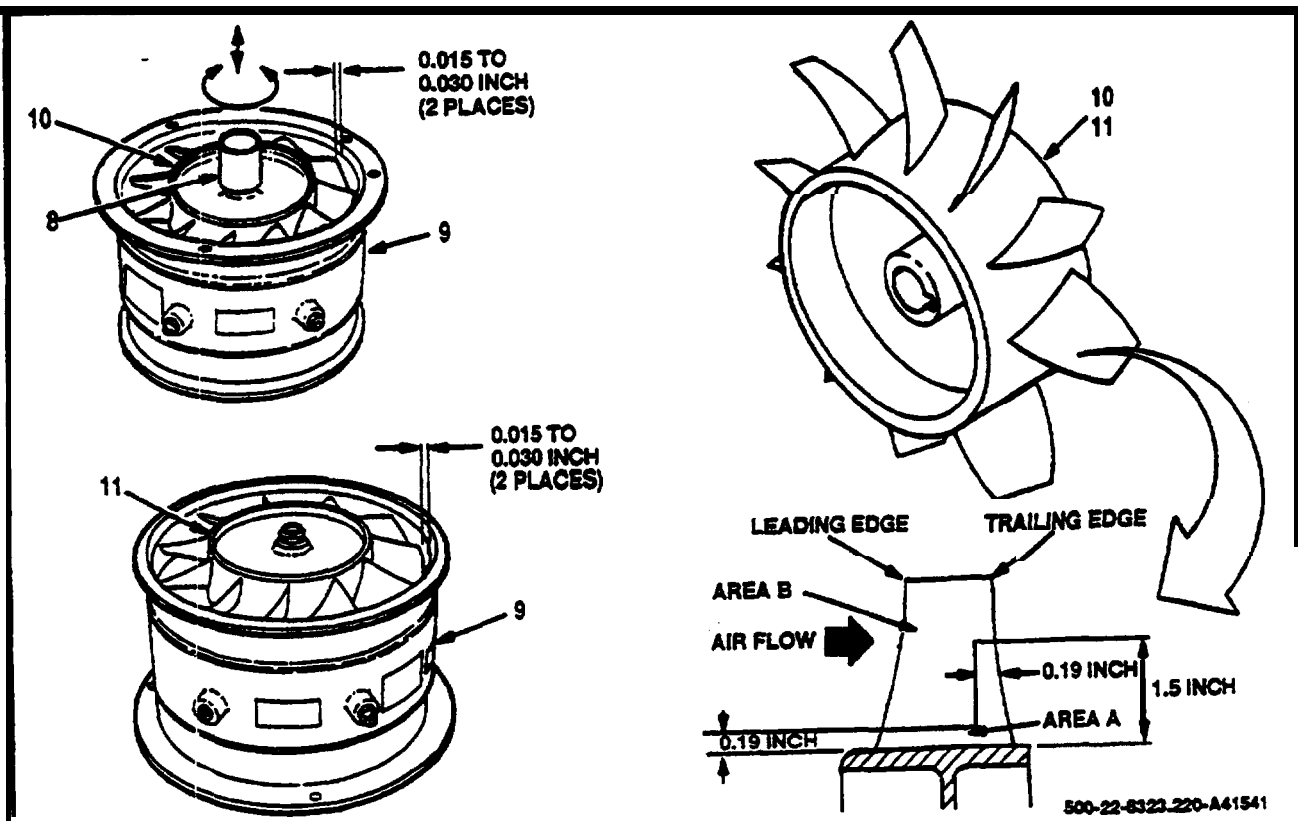
3. Inspect adapters (6) and (7) as follows:
   a. If adapter (6) remained In fan (9), remove the adapter from shaft (8) of the fan.
   b. If adapater (7) remained In the transmission, remove the adapter from transmission gear (4).
   c. Inspect adapters (6) and (7) for nicks, cracks, and spline wear.
   d. Install adapter (6) in shaft (8) of fan assembly (9). Install adapter (7) in transmission gear (4). If necessary, use drive shaft (2) to fully seat the adapters.



6182.1 INSPECT COMBINING TRANSMISSION FAN ASSEMBLY AND FAN DRIVE SHAFT (Continued) 6482.1

INSPECT FAN ASSEMBLY

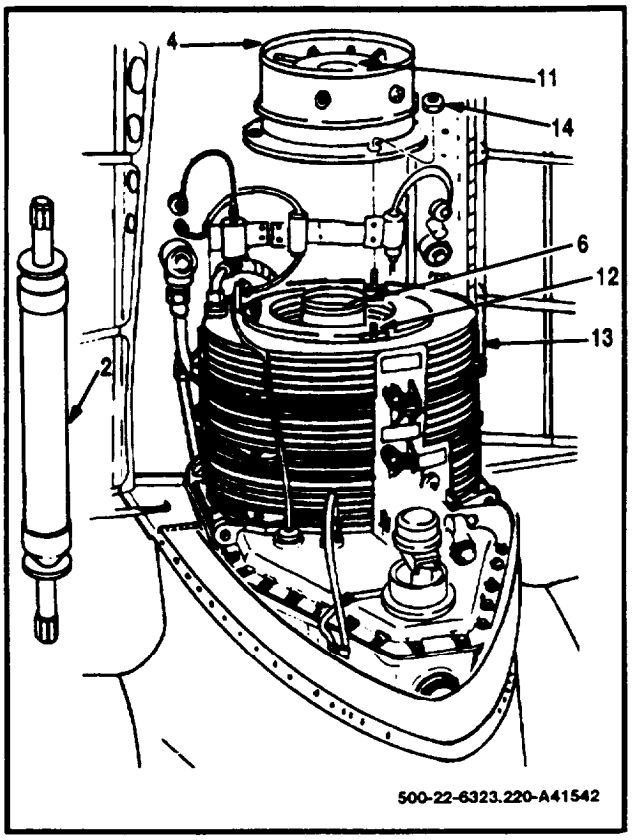
4. Turn fan shaft (8) by hand several turns. There shall be no binding or noise. Look for evidence of overheating, discoloration, paint blistering, or vane tip contact on housing (9).
5. Try to rotate one impeller (10) or (11) with respect to the other by securing one impeller to the housing and rotating the other impeller by hand. No rotational looseness is allowed.
6. Try to move shaft (8) up and down. Free play shall not exceed 0.010 inch.
7. Measure the gap between the vanes of *Impeller* (70) or (11) and the inside of housing (98) at two places as follows:
   a. Place two index marks 180 degrees apart on the housing flange. Use a marking pencil (E271). Also, index two impeller vanes approximately 180 degrees apart.
   b. Move the impeller radially as far as possible toward one index mark on the housing. Holding impeller in place, measure gap between indexed vane tips and the inside of the housing at each index mark. Gaps shall be 0.015 to 0.030 inch.
   c. Move the impeller radially as far as possible in the opposite direction toward the other index mark. Holding the impeller in place, measure the gap between the same vanes and the inside of the housing at each index mark.
   d. Subtract the gaps measured in step b. from the gaps measured at the same index marks in step c. The largest of these two values indicates the radial play of the impeller and shall not exceed 0.004 inch.
   e. If radial play is less than 0.004 inch, repeat steps a. thru d. for the other impeller.
8. Examine impellers (10) and (11) for damage:
   a. In area A, dents, gouges, and chips to 0.010 inch are allowed.
   b. In area B, dents, gouges, and chips to 0.030 inch are allowed.
   c. Uniform erosion is allowed over the entire blade. Such erosion is seen as a smooth transition from silver (magnesium) to tan (anodize) to yellow (primer) to black (top coat).



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9. **Coat four studs (12)** on oil cooler (13) with oil (E253), (E254), or (E254.1). **Install fan assembly (4)** on the studs without drive shaft (2).
10. Install nuts (14) on studs (12). **Torque the nuts** to 5 to 15 inch-pounds above run-on torque.
11. Slowly **rotate fan impeller assembly (15)** to ensure clearance with baffle (6). No rubbing or binding is allowed.
12. Remove nuts (14). **Remove tan assembly (4)** from oil cooler (12).

FOLLOW-ON MAINTENANCE:
Install combining transmission oil cooler fan and shaft (Task 6-186.1).



END OF TASK

Tasks 6-183 and 6-183.1, Including Pages 6-481 thru 6-486, deleted.

6-184 COMBINING TRANSMISSION OIL COOLER FAN DRIVE SHAFT RETAINING SHIELD REPLACEMENT

INITIAL SETUP

Applicable Configurations:

Helicopters With Retaining Shield Installed

Tools:

Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692

Materials:

Oil (E253), (E254), or (E254.1)

Personnel Required:

Medium Helicopter Repairer
Inspector

References:

Task 6-186
TM 55-1520-240-23P

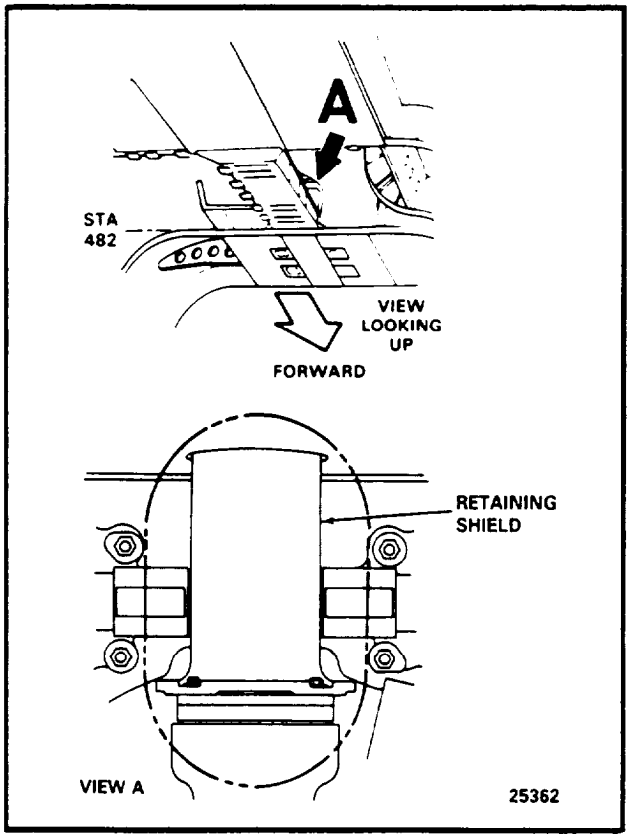
Equipment Condition:

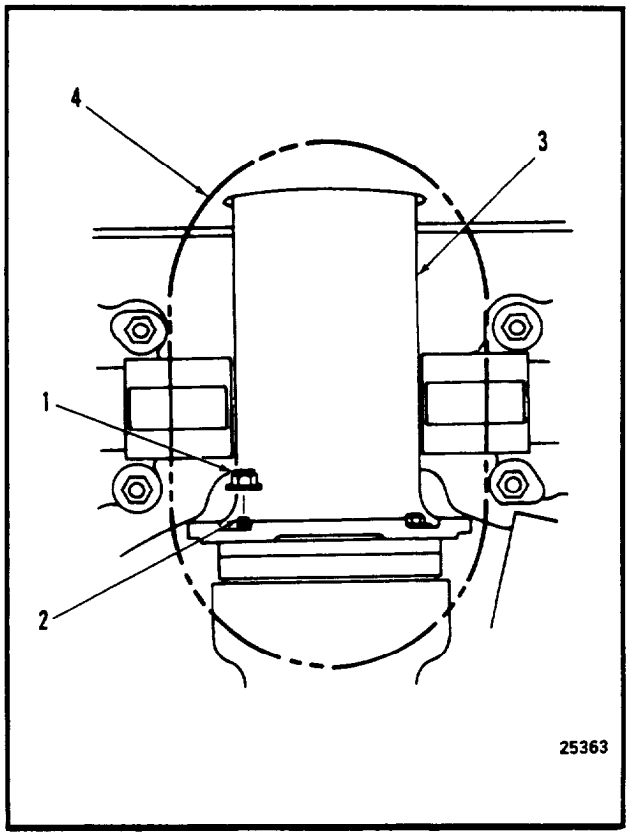
Battery Disconnected (Task 1-39)
Electrical Power Off
Oil Cooler Fan and Drive Shaft Removed (Task 6-182)

General Safety Instructions:

WARNING

Oil (E253, E254 or E254.1) is toxic. It can irritate skin and cause burns. Avoid inhaling. Use only with adequate ventilation. Avoid contact with skin,-eyes, or clothing. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.





REMOVE

1. **Remove nuts** (1) from four studs (2).
2. Lift retaining shield (3) from studs (2). Carefully **withdraw shield from cavity in sump (4).**

GO TO NEXT PAGE

INSTALLATION

3. On helicopters without 66 install shield (3) during the installation of the combining transmission oil cooler fan and drive shaft (Task 6-186).

4. On helicopters with 66, install shield (3) as follows:

WARNING

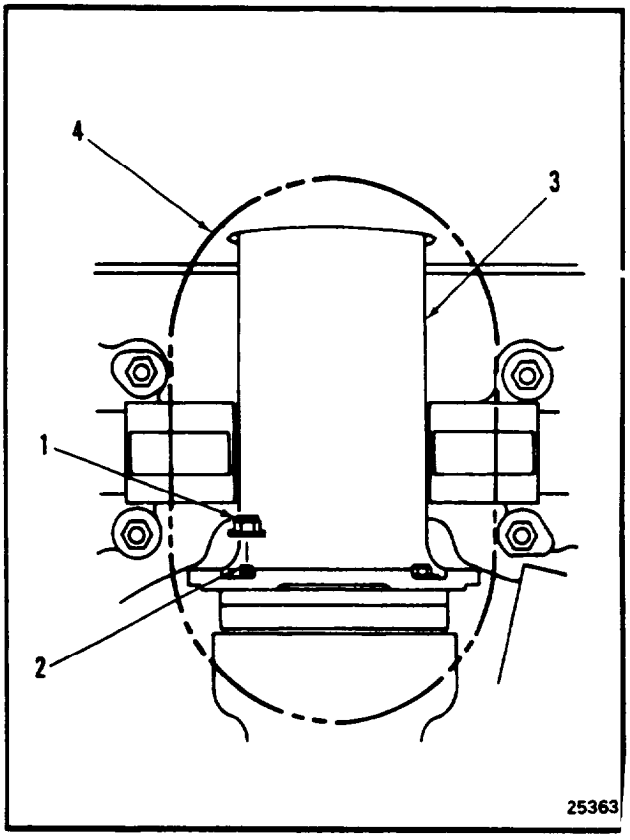
Oil (E253), (E254), or (E254.1) is toxic. It can irritate skin and cause burns. Avoid contact with skin, eyes, or clothing. Do not inhale. Use only with adequate ventilation. Keep away from heat, sparks, and open flame. In case of contact, flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.

a. Coat the thread of studs (2) with oil (E253), (E254), or (E254.1).

b. Install shield (3) into the cavity in sump (4) and lower it onto studs (2). Keep the beveled end of the shield flange facing forward.

c. Install four nuts (1) on studs (2). On previously used nuts, check for run-on torque of 10 to 15 inch-pounds.

d. Torque nuts (1) to 80 inch-pounds. Check that studs (2) protrude through the nuts at least two threads after nuts are torqued.



FOLLOW-ON MAINTENANCE:
None

END OF TASK

6-185 INSPECT COMBINING TRANSMISSION OIL COOLER FAN DRIVE SHAFT SNUBBER

INITIAL SETUP

Applicable Configurations:
All

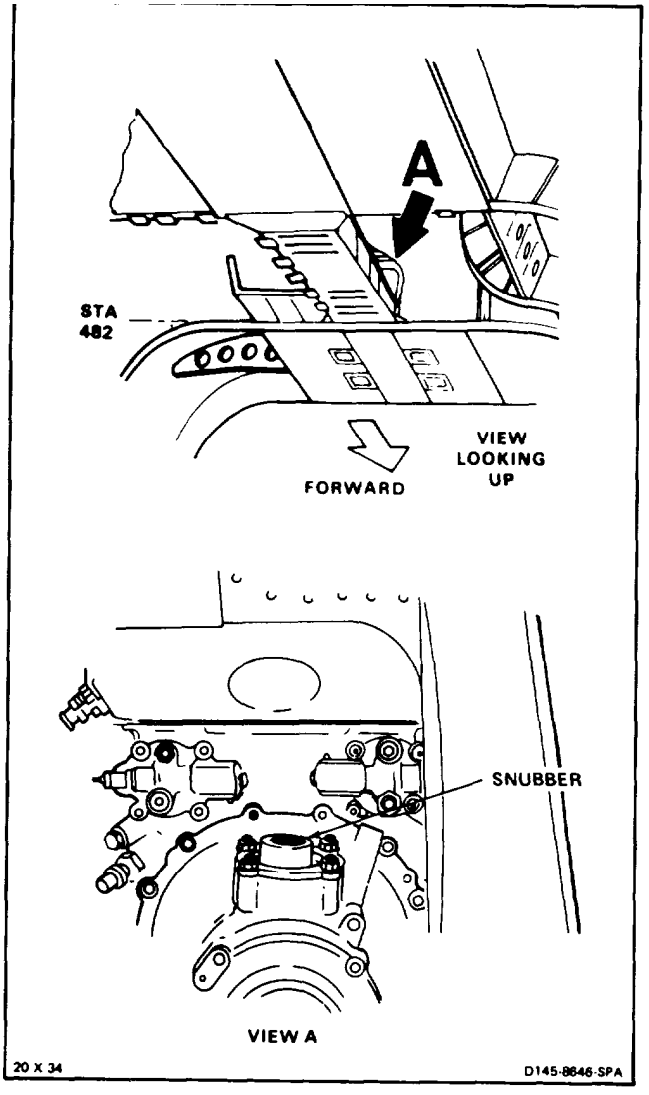
Tools:
Workstand

Materials:
None

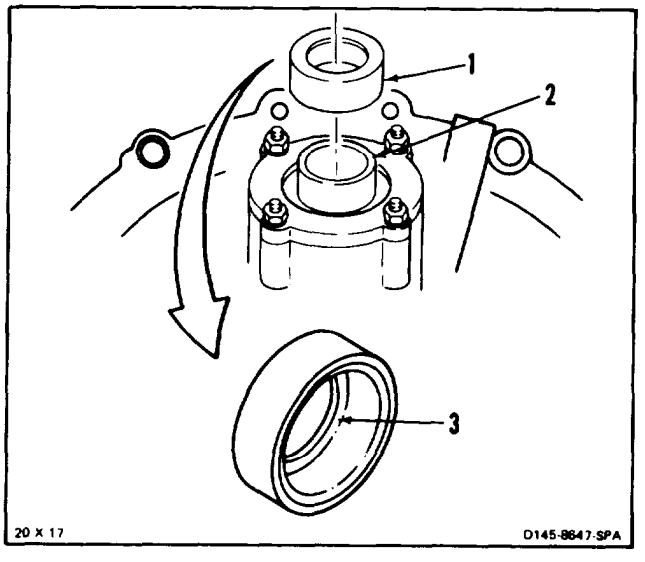
Personnel Required:
67U10 Medium Helicopter Repairer
67U30 Inspector

References:
TM 55-1520-240-23P

Equipment Condition:
Battery Disconnected (Task 1-39)
Electrical Power Off
Combining Transmission Oil Cooler Fan and Drive Shaft Removed (Task 6-182)
Cargo Ramp Open and Level (TM 55-1520-240-T)



1. **Lift snubber (1)** from around end of output shaft (2).
2. **Check snubber (1)** for cuts, tears, and erosion of seating surface (3). There shall be no such damage.
3. **Install snubber (1)** over end of output shaft (2). Make sure snubber is fully seated.



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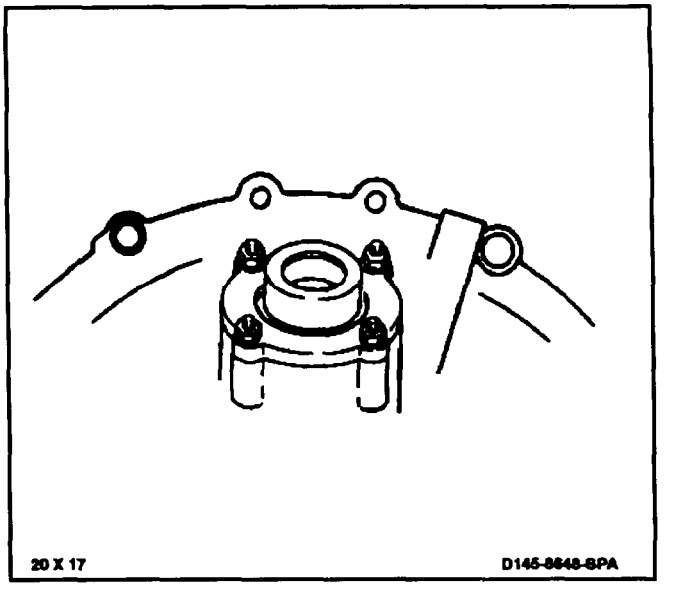
6-185 INSPECT COMBINING TRANSMISSION OIL COOLER FAN DRIVE SHAFT SNUBBER (Continued)

FOLLOW-ON MAINTENANCE:

Install combining transmission oil cooler fan drive shaft and fan (Task 6-186).

Close cargo ramp (TM 55-1520-240-T).

INSPECT



END OF TASK

6-186 INSTALL COMBINING TRANSMISSION OIL COOLER FAN AND SHAFT 145D5319-3 OR -5 6-186

INITIAL SETUP

Applicable Configurations:

Helicopters Without 66

Tools:

Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692
Torque Wrench, 0 to 150 Inch-Pounds
Hand Lubricating Gun
Rawhide Mallet
Wood Blocks

Materials:

Dry Cleaning Solvent (E162)
Cloths (E120)
Grease (E190)
Grease (E190.1)
Gloves (E186)
Oil (253), (E254), or (E254.1)

Parts:

Packings

Personnel Required:

Medium Helicopter Repairer
Inspector

References:

TM 55-1520-240-23P

Equipment Condition:

Inspect Combining Transmission Oil Cooler Fan Drive Shaft Snubber (Task 6-185)
Inspect Combining Transmission Oil Cooler Fan Assembly and Fan Drive Shaft (Task 6-182.1)

General Safety Instructions:

WARNING

Oil (253), (E254), and (E254.1) is toxic. It can irritate skin and cause burns. Use only with adequate ventilatlon. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.

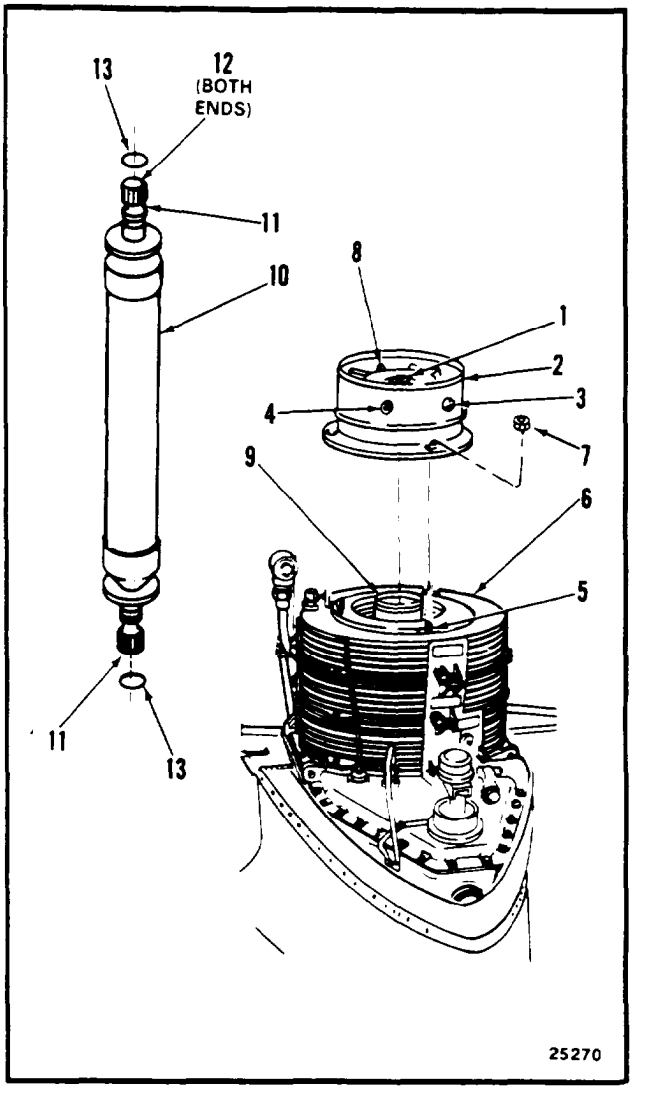
GO TO NEXT PAGE

6-186 INSTALL COMBINING TRANSMISSION OIL COOLER-FAN AND SHAFT 145D5319-3 OR -5 (Continued) 6-186

1. With retaining nut (1) of fan (2) facing up, set fan (2) on firm surface.

Overgreasing can damage the fan.

2. **Pump grease (E190) into grease fitting** (3) of fan (2) until grease comes out of vent fitting (4). **Do not overgrease fan.**
3. **Coat four studs** (5) on oil cooler (6) with oil (E253), (E254) or (E254.1). **Install fan (2)** on studs.
4. **Install nuts (7)** on studs (5). **Torque nuts to 5 to 15 inch-pounds** above run-on torque.
5. Slowly **rotate fan impeller assembly (8).** Check that the lower Impeller does not rub against baffle (9).
6. **Check for gaps** between flange of fan (2) and oil cooler (6). Use a feeler gage. **Record** the width **and mark** the location of any **gaps.**
7. Remove nuts (7) from studs (5). Remove fan (2) from cooler (6).
8. Prepare shaft (10) for Installation as follows:



Dry cleaning solvent (E162) is flammable and toxic. It can irritate skin and cause burns. Use only in well-ventilated area, away from heat and open flame. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.

a. **Clean splines (11)** at each end of the shaft. Use dry cleaning solvent (E162) and clean cloths (E120). Wear gloves (E186) and goggles.

b. **Check** that a **plug (12)** is in each end of the shaft.

c. If installed, remove packing (13) from each end of the shaft. Retain packings.

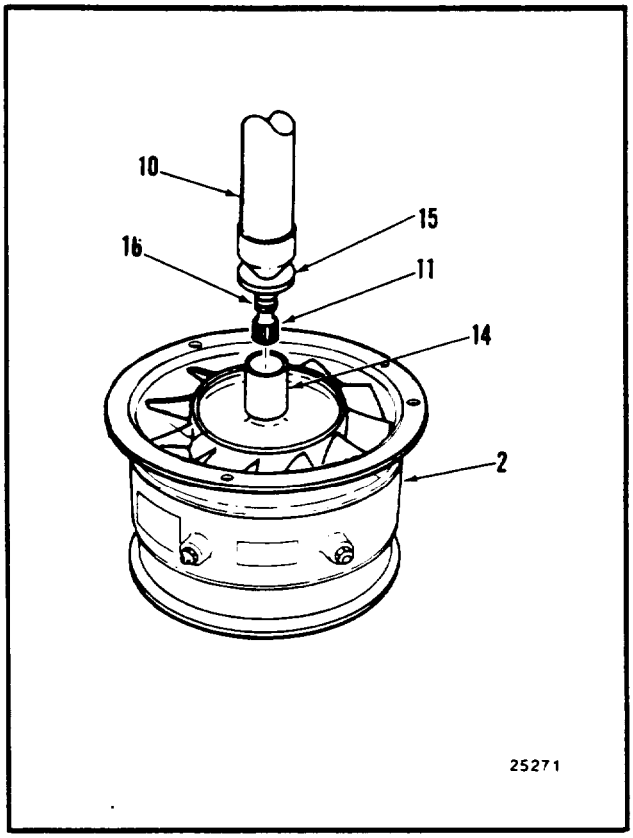
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6-186 INSTALL COMBINING TRANSMISSION OIL COOLER FAN AND SHAFT 145D5319-3 OR -5 (Continued) 6-186

d. Turn fan (2) upside down. **Half-fill the splined cavity** in fan shaft (14) on the underside of the fan **with grease (E190.1).**

e. **Insert shaft (10) into** splined cavity of **fan shaft (14)** until fully seated. Wipe off excess grease from around shaft and fan. **Check that shaft balance flange (15) seats** against end of fan shaft (14).

1. Slowly **remove shaft (10)** from fan. Do **not disturb the grease** on the shaft. Remove grease from the outside diameter of fan shaft (14) and from between packing groove (16) and balance flange (15) of the shaft. **Do not disturb grease** in the splined cavity of fan shaft (14) or between the packing groove and splines (11) of shaft (10).

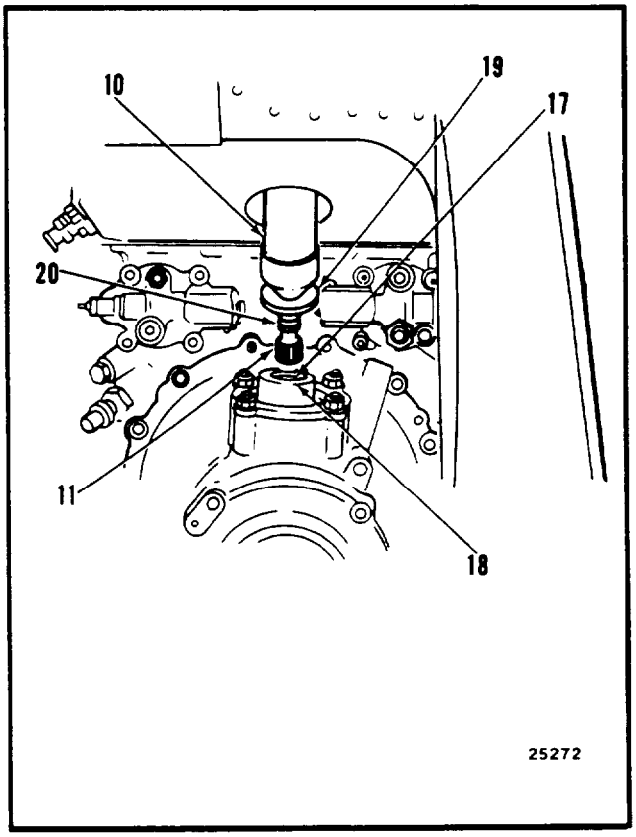


g. **Half-fill splined cavity (17) in the fan drive gear with grease (E190.1). Insert** the clean end of **shaft (10)** into the cavity. Gradually apply enough steady downward pressure to fully seat the shaft against snubber (18). Wipe off excess grease from around shaft and snubber (18). **Check that balance flange (19) seats against the snubber.**

NOTE

Before removing shaft, note for future reference which end mates with the transmission and which end mates with the fan.

h. Slowly **remove shaft (10)** from the drive gear. **Do not disturb the grease** on the shaft. Remove grease from around outside of drive gear and from between packing groove (20) and balance flange (19) of the shaft. **Do not disturb the grease** in splined cavity (17) of the gear or between the packing groove and splines (11) of the shaft.



GO TO NEXT PAGE

9. Install retaining shield (21) and shaft (10) as follows:

   a. **Coat** shield mounting **studs (22) with oil (E253), (E254), or (E254.1). Insert shield (21) into the cavity** in sump (23) **and lower it onto studs.** Keep beveled end of shield flange (24) forward.

   b. Inset-l small blocks of wood, or equivalent, between seal retainer (25) and shield (21) high enough to **raise the shield so that the top of snubber (18) can be seen.**

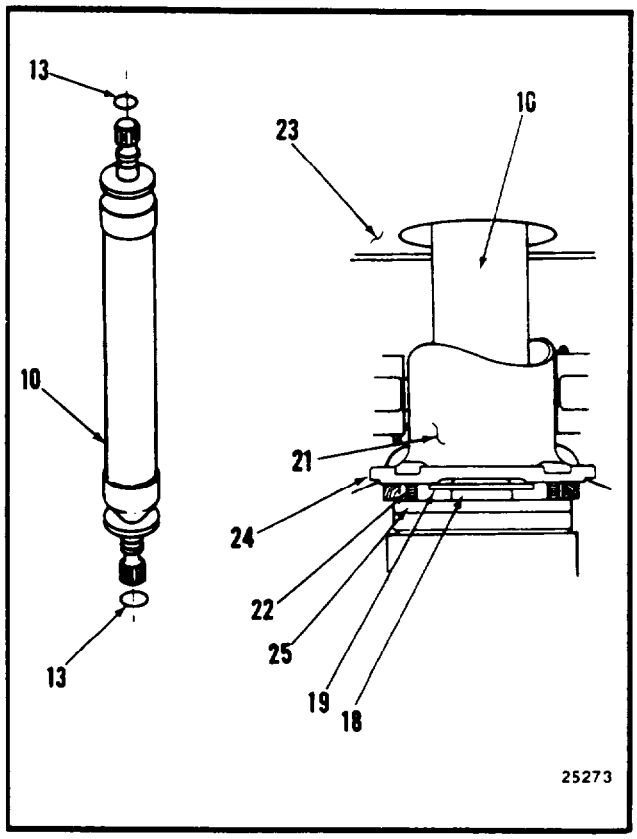
   c. **Check** that **snubber** (18) is firmly seated.

   d. **Install packing** (13) at each end of shaft (10). Take note of the spotfaces on shaft (10). Do not disturb grease on shaft.

NOTE

Rocking the shaft, in the direction of the spotfaces, while applying downward hand pressure will help to seat it against the snubber.

   e. **Install shaft** (10) through sump (23) into the transmission. Alternately apply and relax hand pressure on the shaft **until balance flange (19) contacts snubber** (18). Check under shield (21) to ensure contact.



10. Install fan (2) as follows:

a. **Coat four studs (5) with oil (E253), (E254), or (E254.1).**

b. **Lower the fan onto the studs.** Lightly tap the fan to **seat it on oil cooler (6).** Use a rawhide mallet.

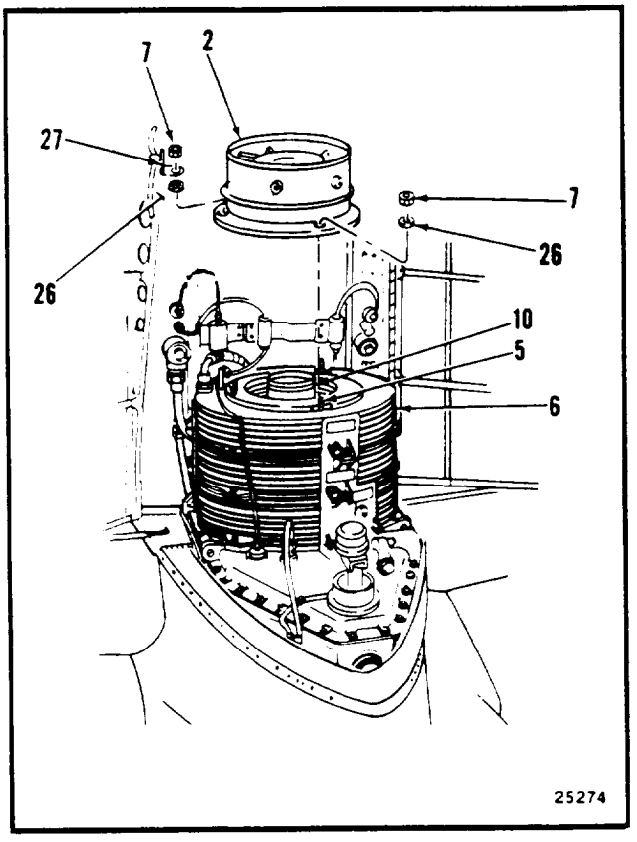
Do not use mounting nuts to jack the fan down against the oil cooler. **This pressure will load the bearing if there is too much grease.**

c. If the fan cannot be seated by tapping, remove it, being careful to hold shaft (10) in place at the transmission end to prevent the shalt from being removed with the fan. Wipe the grease from the first 0.5 inch of the cavity in the splined shaft of the fan. Repeat steps a through c to reinstall the fan.

d. **Check for gaps** under flange of the fan as in step 6. Compare with gaps noted in step 6. **If any gap has increased,** remove the fan. **Reinstall the fan** (steps a thru c.).

e. **Again, check and compare gaps** as in step d. **If any gap is still greater** than measured in step 6, remove the fan and shaft (10). **Repeat installation** from step 3.

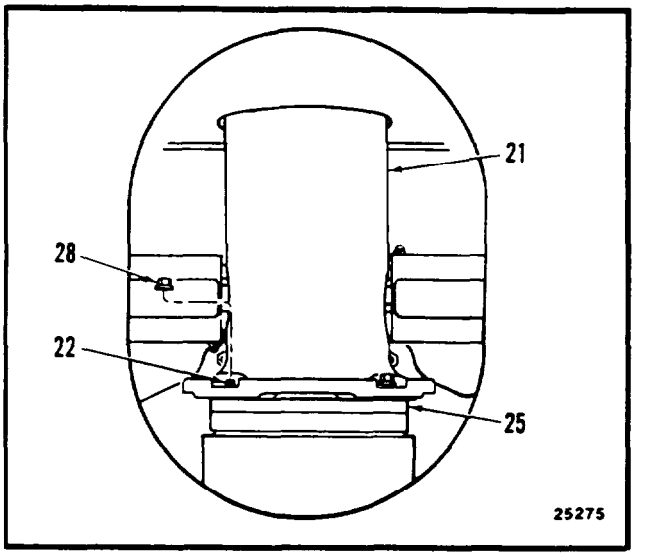
f. When the fan is seated, install washers (26), bracket (27) (at one stud only), and nuts (7) on studs (5). **Torque the nuts** to **100 to 146 inch-pounds.**



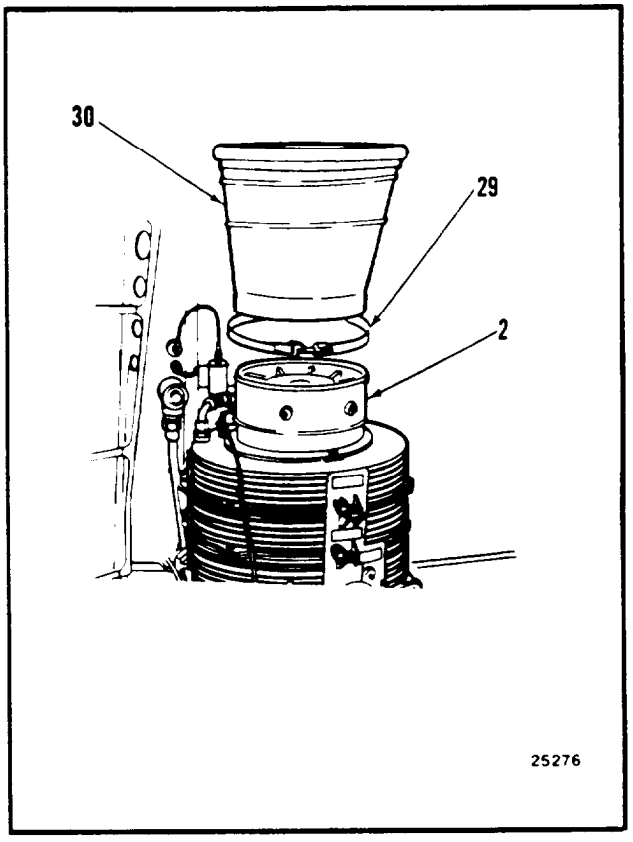
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6-186 INSTALL COMBINING TRANSMISSION OIL COOLER FAN AND SHAFT 145D5319-3 OR -5 (Continued) 6-186

11. Remove the blocks from under retaining shield (21). Coat studs (22) with oil (E253), (E254), or (E254.1). Install the shield on studs (22) against seal retainer (25).
12. **Install nuts (28)** on studs (22). **Check for run-on torque of 10 to 15 inch-pounds** on previously used nuts. **Torque nuts to 70 to 85 inch-pounds. Check** for a **stud protrusion** of at least two threads after nuts are torqued.

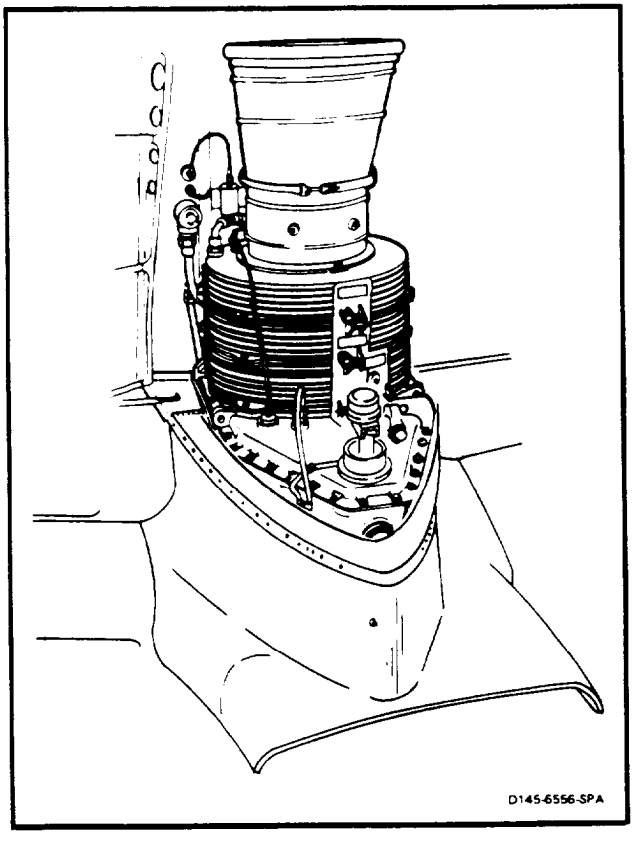


13. Coat thread of clamp (29) with oil (E253), (E254), or (E254.1). **Install clamp and duct (30)** on fan (2). **Torque clamp to 30 to 35 inch-pounds.**



INSPECT

FOLLOW-ON MAINTENANCE:
Close pylon hinged fairing (Task 2-2).
Perform ground run (TM 55-1520-240-10).



END OF TASK

6-186.1 INSTALL COMBINING TRANSMISSION OIL COOLER FAN AND SHAFT 145D5319-7 6-186.1

INITIAL SETUP

Applicable Configurations:
Helicopters With 66

Tools:
Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692
Torque Wrench, 0 to 150 Inch-Pounds
Rawhide Mallet

Materials:
Dry Cleaning Solvent (E162)
Cloths (E120)
Gloves (E186)
Oil (E253), (E254), or (E254.1)

Personnel Required:
Medium Helicopter Repairer
Inspector

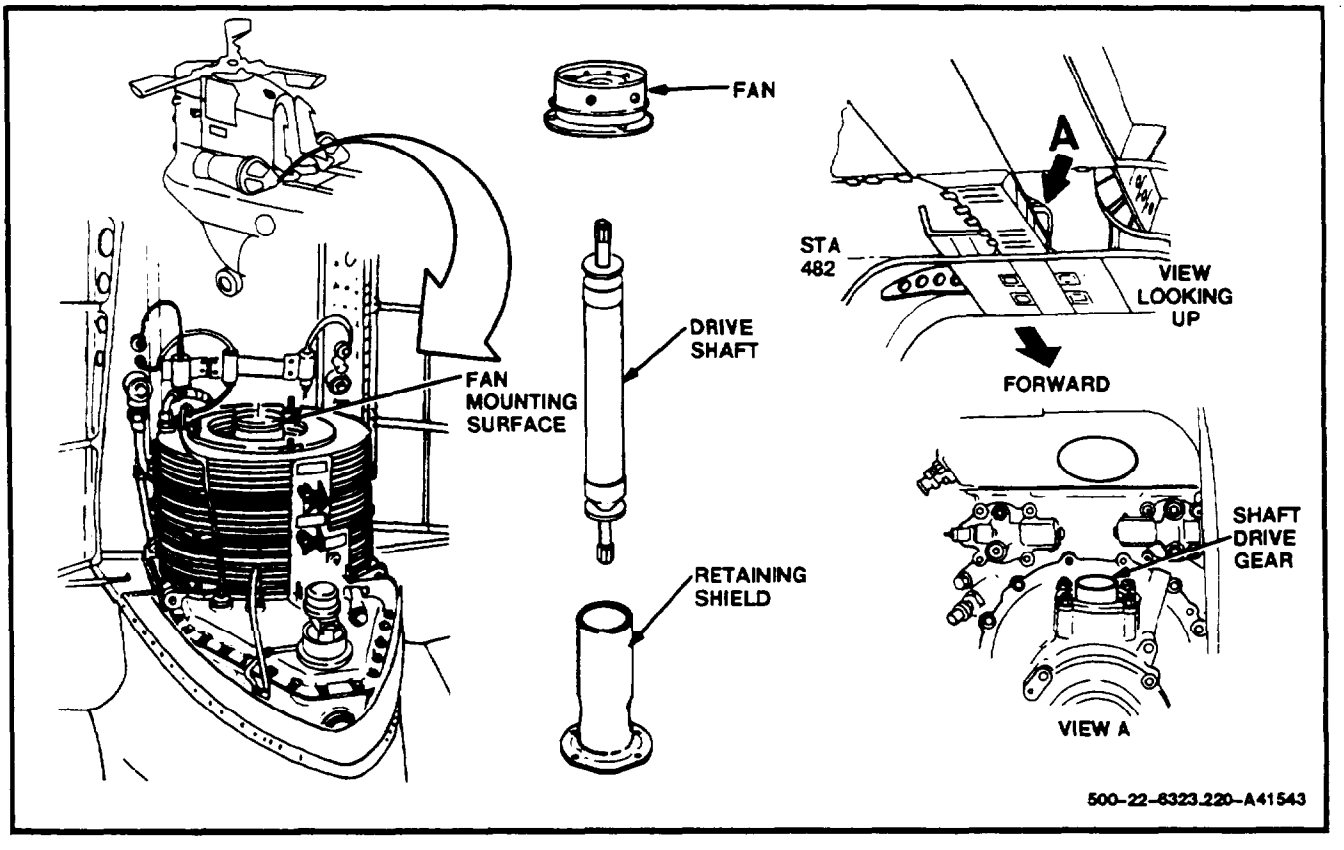
References:
TM 55-1520-240-23P

Equipment Condition:
Inspect Combining Transmission Oil Cooler Fan Assembly and Fan Drive Shaft (Task 6-182.1)

General Safety instructions:

WARNING

Oil (E253), (E254), and (E254.1) is toxic. It can irritate skin and cause burns. Use only with adequate ventilation. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.



6-186.1 INSTALL COMBINING TRANSMISSION OIL COOLER FAN AND SHAFT 145D5319-7 (Continued) 6-186.1

1. With retaining nut (1) of fan (2) facing up. set the fan on a firm surface.

CAUTION

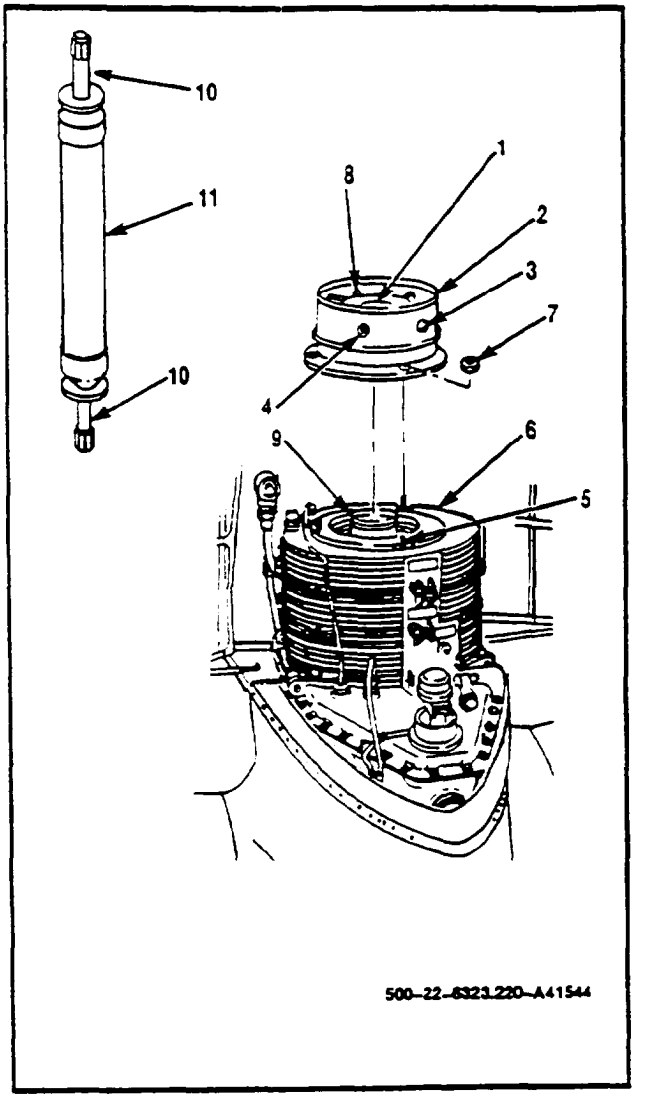
Overgreasing can damage fan.

2. **Pump grease (E190) into grease fitting (3)** of fan (2) until grease comes out of vent fitting (4). **Do not overgrease the fan.**
3. **Coat four studs (5)** on oil cooler (6) with oil (E253), (E254), or (E254.1). **Install fan (2)** on the studs.
4. **Install nuts (7)** on studs (5). **Torque nuts to 5 to 15 inch-pounds** above run-on torque.
5. Slowly **rotate fan impeller assembly (8).** Check that the lower impeller does not rub against baffle (9).
6. Remove nuts (7) from studs (5). Remove fan (2) from cooler (6).

WARNING

Dry cleaning solvent (E162) is flammable and toxic. It can irritate skin and cause burns. Use only in well-ventilated area, away from heat and open flame. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.

7. **Clean splines (10)** at each end of shaft (11). Use dry cleaning solvent (E162) and clean cloths (E120). Wear gloves (E186) and goggles.



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6-186.1 INSTALL COMBINING TRANSMISSION OIL COOLER FAN AND SHAFT 145D5319-7 (Continued)

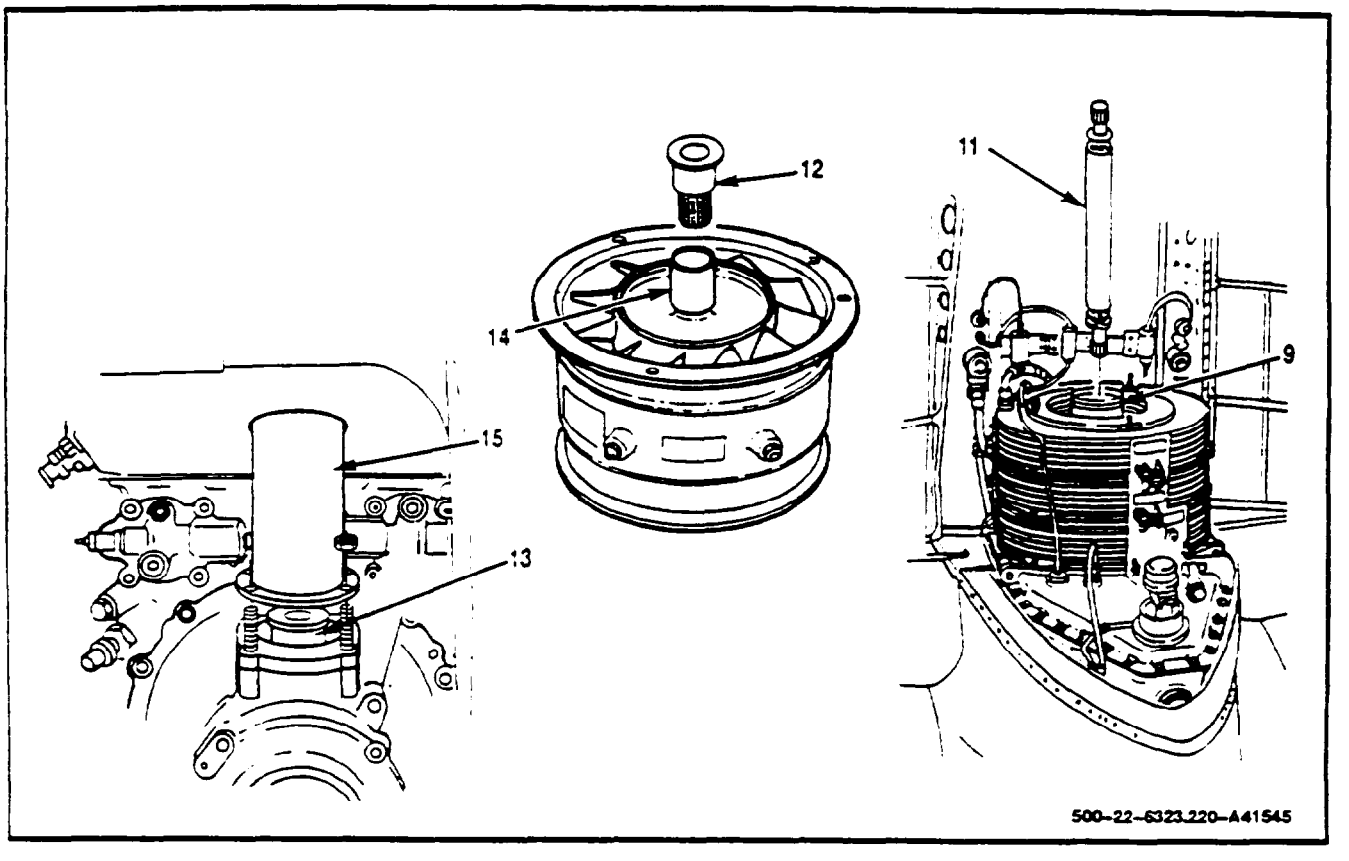
NOTE

Grease or other lubricant shall not be used on the splines of the drive shaft or adapters.

NOTE

Tap lightly using a 2x4 and hammer to fully seat adapters.

8. If removed, install adapters (12) into the splines of drive gear (13) and fan shaft (14). Use shaft (11) to fully seat the adapters as required.
9. Install retaining shield (15) (Task 6-184).
10. Install shaft (11) through baffle (9) into adapter (12) in gear (13).

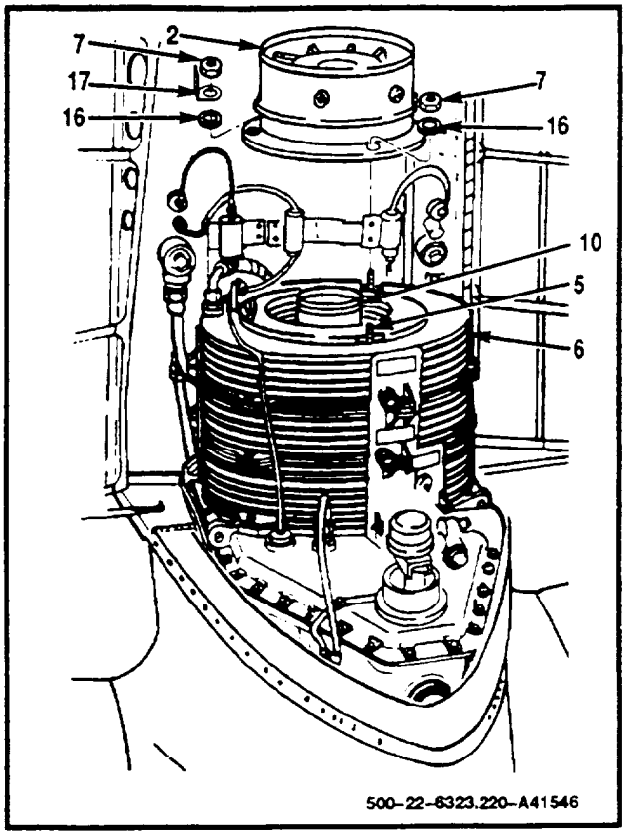


· 11. Install fan (2) as follows:

a. **Coat four studs (5) with oil (E253), (E254), or (E254.1).**

b. Lower the fan onto studs (5). Lightly tap the fan to seat it on oil cooler (6). Use a rawhide mallet.

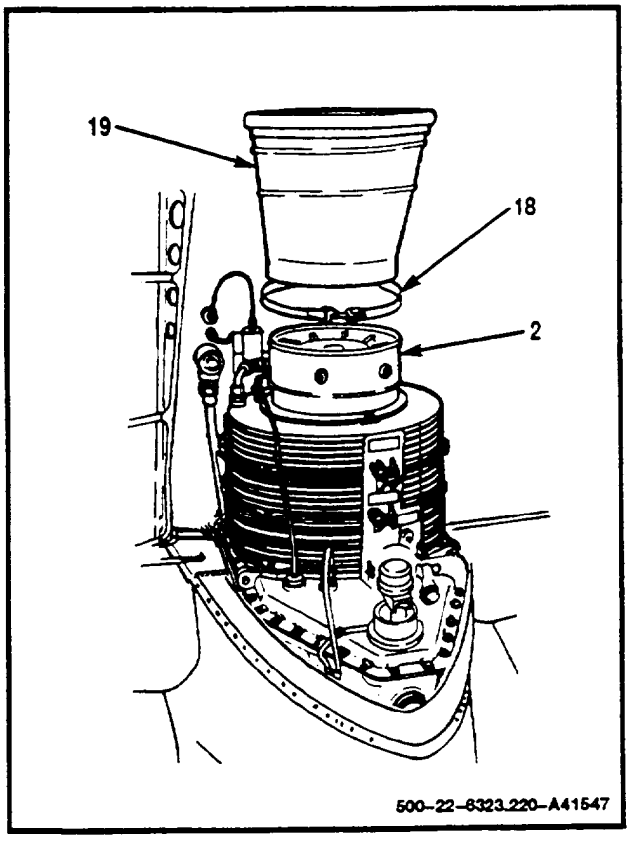
c. When the fan is seated, **install washers (16), bracket (17) (at right stud only), and nuts (7)** on studs (5). **Torque the nuts to 100 to 140 inch-pounds.**



·12. Coat thread of clamp (18) with oil (E253), (E254), or (E254.1). **Install clamp and duct (19)** on fan (2). **Torque the clamp to 30 to 35 inch-pounds.**

INSPECT

FOLLOW-ON MAINTENANCE:
Close pylon hinged fairing (Task 2-2).
Perform a ground run (TM 55-1520-240-10).



END OF TASK

6-187 REMOVE COMBINING TRANSMISSION OIL COOLER 6-187

INITIAL SETUP

Applicable Configurations:
All

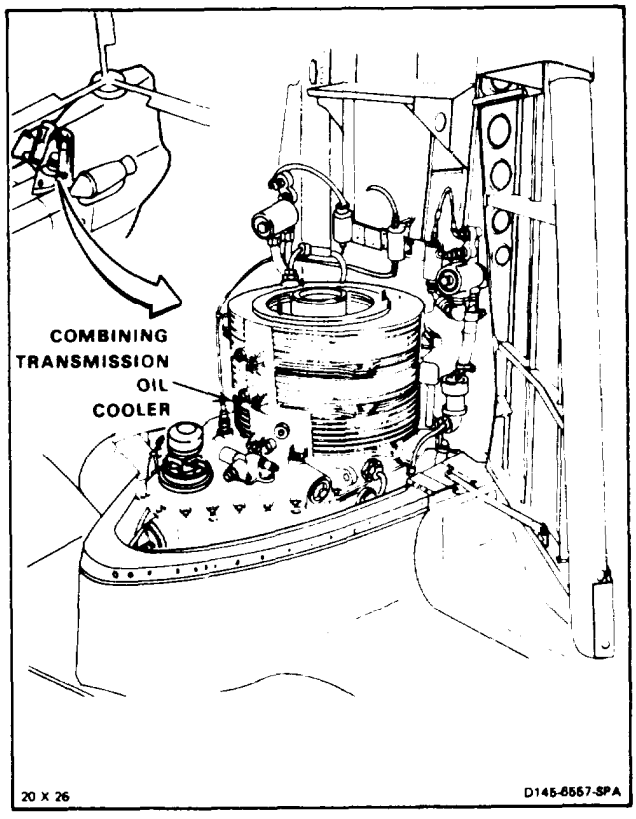
Tools:
Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Wrench, 1-inch
Open End Wrench, 1 1/2-Inch
Container, 2-Quart
Hose, 1-inch ID. 36-Inches Long
Funnel

Materials:
Cloths (E120)
Paper Tags (E264)

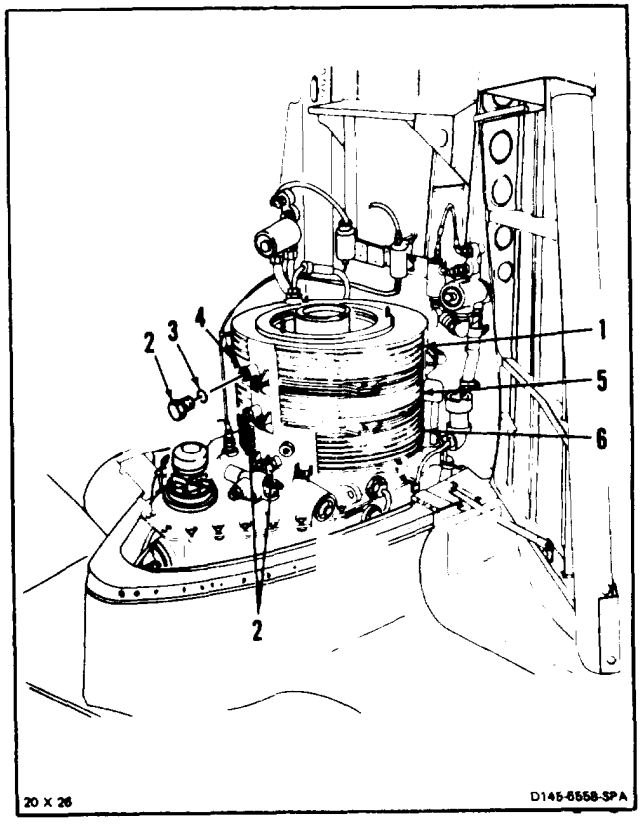
Personnel Required:
Medium Hellcopter Repairer

Parts:
Packings (3)

Equipment Condition:
Battery Disconnected (Task 1-39)
Electrical Power Off
Pylon Hinged Fairing Open (Task 2-2)
Oil Cooler Fan and Shaft Removed (Task 6-182)



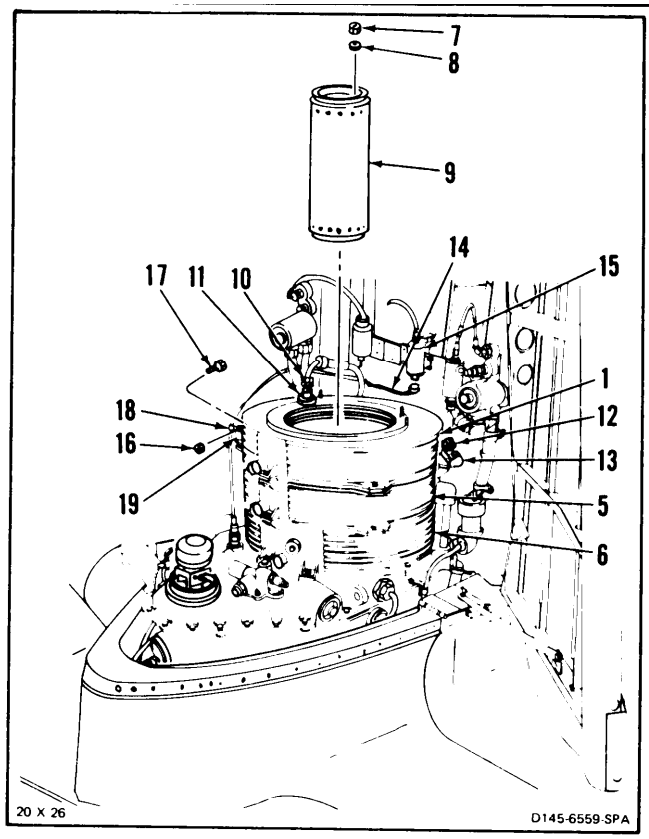
1. **Drain oil cooler (1)** as follows:
   a. Remove lockwire from drain plug (2).
   b. Remove drain plug (2) and packing (3). Hold funnel under port (4). Drain oil through hose into container. Remove hose and funnel.
   c. Install drain plug (2) and packing (3).
2. **Repeat steps 1 .a. through 1 .c. for oil coolers (5 and 6).**



GO TO NEXT PAGE

6-187 REMOVE COMBINING TRANSMISSION OIL COOLER (Continued)

3. **Remove four nuts (7) and washers (8)** from baffle (9). **Remove baffle.**
4. Tag and **disconnect oil hose (10)** from reducer (11) on top cooler (1).
5. Tag and **disconnect oil hose (12)** from elbow (13) on middle cooler (5).
6. **Disconnect oil hose (14)** from oil pressure transmitter (15).
7. **Remove** nut (16) and **bolt (17)** securing clamp (18) to bracket (19).



8. **Remove** nuts (20), washers (21), and **bolts (22)** from three places around inside of middle cooler (5).
9. **Remove** nuts (23), washers (24), and **bolts (25)** from six places around outside of middle cooler (5).

NOTE

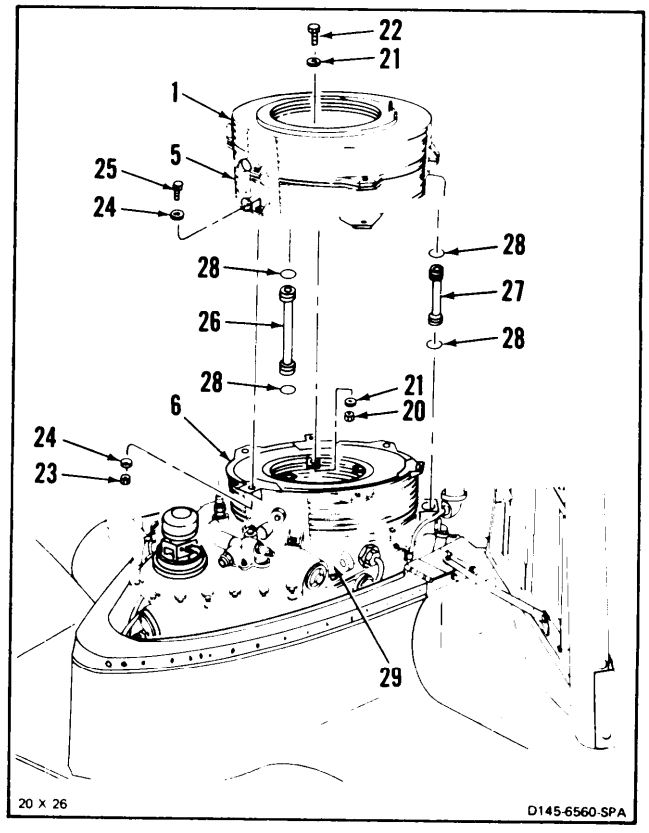
Do not tilt coolers. Oil can spill.

10. **Lift coolers (1 and 5) straight up and away** from cooler (6) and two oil transfer tubes (26 and 27).

NOTE

Transfer tubes may stay in coolers.

11. **Remove two oil transfer tubes (26 and 27)** and four packings (28) from sump cover (29).



GO TO NEXT PAGE

6-187 REMOVE COMBINING TRANSMISSION OIL COOLER (Continued)

12. **Remove six nuts (30)** and washers (31) from around inside of cooler (6).

13. **Remove** nuts (32), washers (33), and **bolts (34)** at four places around aft part of cooler (6). Remove three nuts (35) and washers (36) from forward edge of cooler.

NOTE

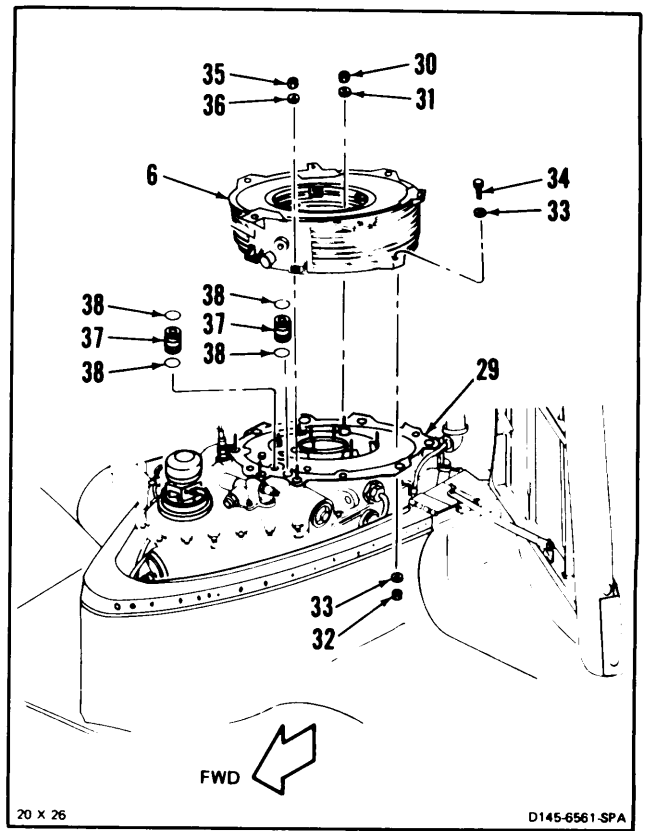
Do not tilt cooler. Oil can spill.

14. **Lift cooler (6) straight up and away** from sump cover (29) and two oil transfer tubes (37).

NOTE

Transfer tubes may stay in cooler.

15. **Remove two transfer tubes (7)** and four packings (38).



FOLLOW-ON MAINTENANCE:

None

END OF TASK

6-187.1 REPAIR COMBINING TRANSMISSION OIL COOLER OUTSIDE SURFACE 6-187.1

INITIAL SETUP

Applicable Configurations:
All

Tools:
Dial Indicating Depth Gage 643J
Goggles

Materials:
Naphtha (E245)
Emery Cloth (E123) or
Abrasive Paper (E13)
Crocus Cloth (E122)
Cloths (E120)
Gauze Sponges (E184)
Brush (E86)
Gloves (E184.1)
Acetic Acid (E21)
Alodine Powder (E65)
Epoxy Primer (E292) or (E293)
Methyl-Ethyl-Ketone (E244)
Black Lacquer Topcoat (E462)
Polyurethane Topcoat (E285.1)

Personnel Required:
Aircraft Powertrain Repairer
Inspector

References:
TM 43-0103
MIL-C-5541
MIL-C-53072

Equipment Condition:
Off Helicopter Task

General Safety Instructions:

WARNING

Naphtha (E245) is combustible and toxic. It can irritate skin and cause bums. Use only with adequate ventilation, away from open flame. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.

WARNING

Acetic acid (E21) is combustible and toxic. It can irritate skin and cause burns. Avoid inhaling. Use only with adequate ventilation, away from open flame. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.

WARNING

Alodine powder (E65) is an oxidizer. Discard cloths which contain this material in a separate container. If discarded with cloths contaminated with acetone, MEK, or other organic solvents, combustion can result. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.

WARNING

Epoxy primer (E292) or (E293), methyl-ethyl-ketone (E244), and polyurethane topcoat (E285.1) are flammable and toxic. They can irritate skin and cause burns. Use only with adequate ventilation, away from heat or open flame. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.

WARNING

Black lacquer topcoat (E462) is extemely flammable. It can be toxic. Keep away from heat, sparks, or open flames. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.

CAUTION

Do **not wear photogrey glasses when fluorescent inspecting. They reduce ability to see cracks.**

GO TO NEXT PAGE

6-187.1 REPAIR COMBINING TRANSMISSION OIL COOLER OUTSIDE 6-187.1 SURFACE (Continued)

NOTE

Reparable damage is limited to scratches, nicks, gouges, minor corrosion, and bent fins.

1. **Clean** oil and grease from **the damaged area.** Use naphtha (E245) and clean cloths (E120). Wear gloves (E184.1).
2. **Check** the extent and location of **damage** on cooler (1).

NOTE

Dimensions in this step refer to the extent of damage after rework.

a. **Depth of damage shall not be more than 0.025 inch.**

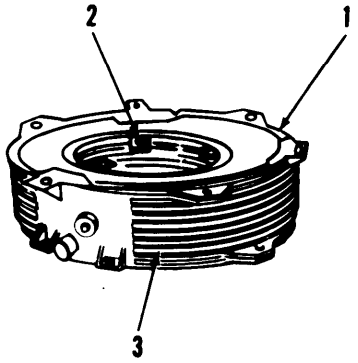
b. **Damage shall not extend over more than one surface or enter any radius.**

c. **Damage shall not be closer than 1.00 inch to any mounting hole (2).**

d. **More than 3 inches of fins (3) shall not be crushed beyond straightening.**

e. **If any fin is bent more than 30 degrees, straighten it.**

3. **Fluorescent inspect** the damaged area to check for cracks (TM 43-0103). **There shall be no cracks.**
4. **Blend out damage** with emery cloth (E123) or abrasive paper (E13). Observe the limits of step 2.
5. **Smooth the blended area** with crocus cloth (E122). Do not leave any sharp edges.



D145-12512-SPA

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6-187.1 REPAIR COMBINING TRANSMISSION OIL COOLER OUTSIDE 6-187.1 SURFACE (Continued)

WARNING

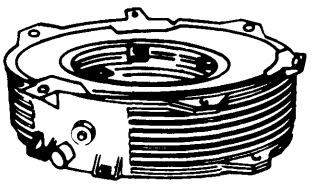
Wear gloves (E184.1) during the remainder of this task. Otherwise, personal injury could result.

6. Acid-etch the reworked area as follows:
   a. **Prepare a solution of 3 parts acetic acid (E21) in 7 parts water. Wear gloves (E184.1) and goggles.**
   b. **Swab the area with solution for 2 minutes. Use gauze sponges (E184).**
   c. **Rinse the area with cold water.**
7. **Fluorescent inspect** the reworked area to check for cracks (TM 43-0103). **There shall be no cracks.**
8. **Clean the reworked area with naphtha (E245)** and clean cloths (E120). Let the area air dry.
9. **Swab on solution of alodine powder (E65) and water (MIL-C-5541). Use gauze sponges (E184). Swab for 2 to 5 minutes. Rinse the area** with cold water and let air

NOTE

Priming and painting shall be done per MIL-C-53072.

10. **Apply one coat of epoxy primer (E292) or (E293)** to the reworked area. Let air dry for 2 hours.
11. **Finish** the reworked area with two coats of **black lacquer (E462) or polyurethane (E285.1) as determined by the following:**
    a. Apply methyl-ethyl-ketone (MEK) (E244) to a small area of the existing topcoat near the area to be refinished. Use brush (E86).
    b. Wipe the area. If the topcoat wipes away, use lacquer (E462). If the topcoat is unaffected, use polyurethane (E285.1).



D145-12513-SPA

INSPECT

FOLLOW-ON MAINTENANCE:
None

END OF TASK

6-188 INSTALL COMBINING TRANSMISSION OIL COOLER 6-188

INITIAL SETUP

Applicable Configurations:
All

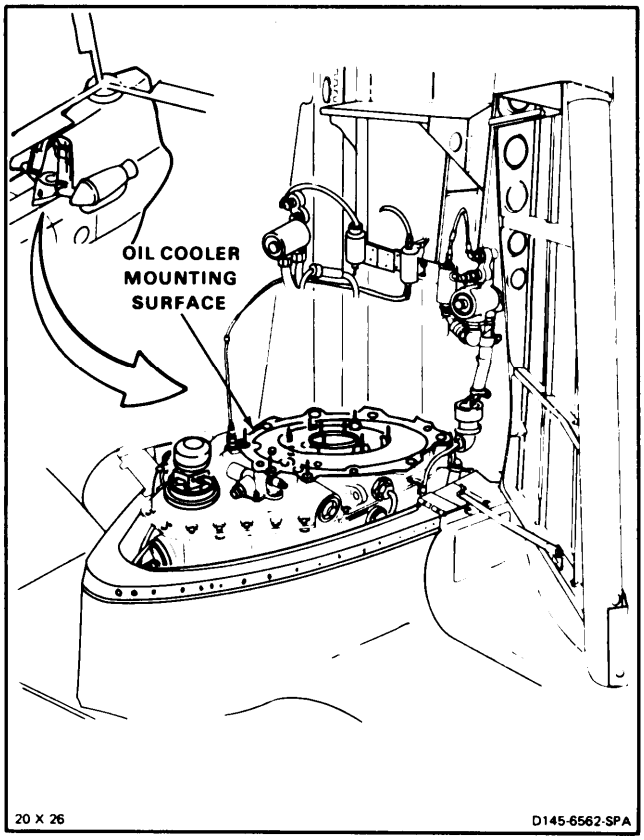
Tools:
Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692
Torque Wrench, 30 to 150 Inch-Pounds
Open End Wrench, 1 1/2-inch

Materials:
Oil (E254)
Lockwire (E231)

Parts:
Packings

Personnel Required:
Medium Helicopter Repairer
Inspector

References:
TM 55-1520-240-23P

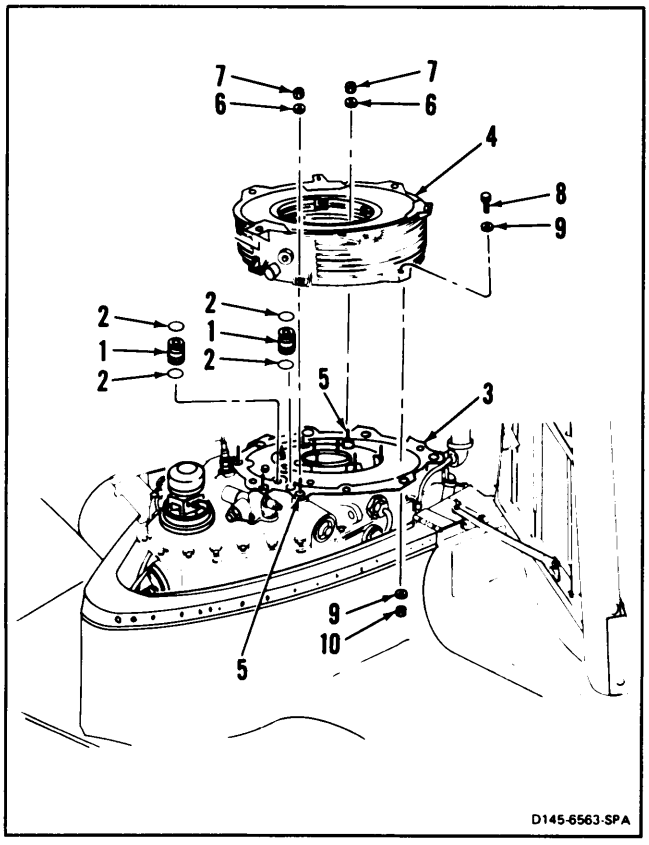


1. **Install two oil transfer tubes (1),** with four packings (2), in sump cover (3).

NOTE

Do not tilt cooler. Oil can spill.

2. **Install cooler (4)** on two transfer tubes (1) and nine studs (5). Press down firmly to seat cooler on tubes.
3. **Install** washers (6) and **nuts (7)** at six places around inside of cooler (4). Install washers and nuts at three places around outside of cooler. **Torque nuts to 70 inch-pounds.**
4. **Install bolts (8),** washers (9), and nuts (10) at four places around outside of cooler (4). **Torque nuts to 70 inch-pounds.**



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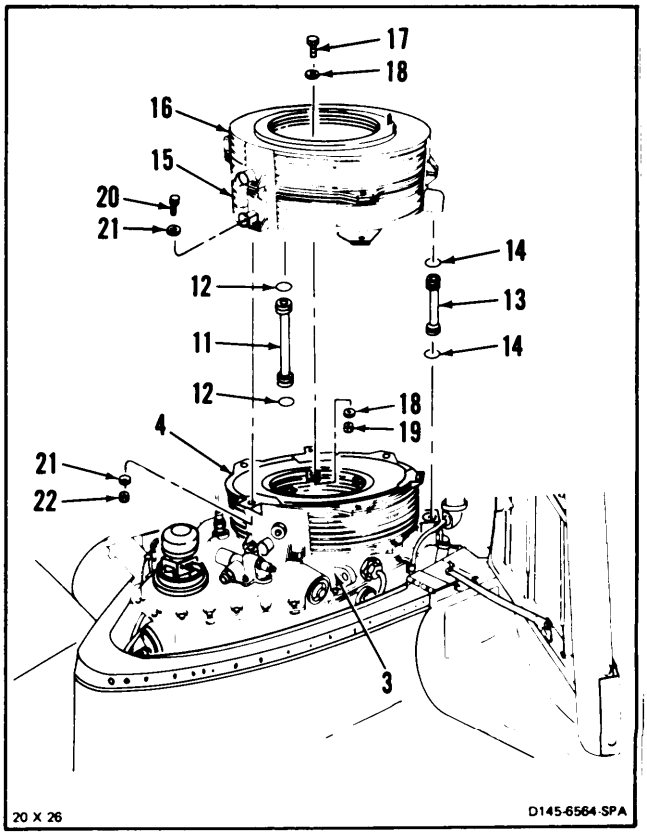
6-188 INSTALL COMBINING TRANSMISSION OIL COOLER (Continued)

5. **Install oil transfer tube (11)** and two packings (12) in aft left corner of sump cover (3). **Install oil transfer tube (13)** and two packings (14) in aft right corner of sump cover.

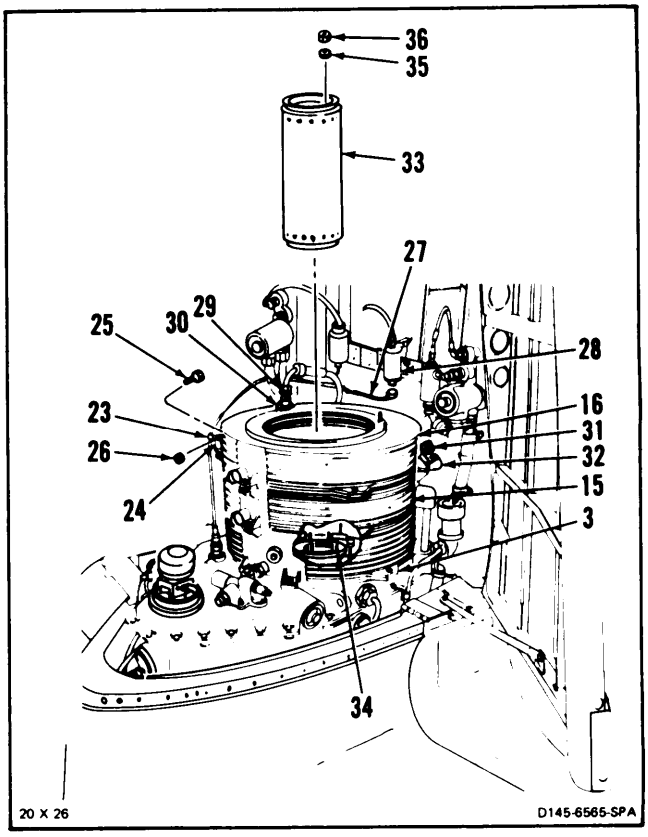
NOTE

Do not tilt coolers. Oil can spill.

6. **Install coolers (15 and 16)** over cooler (4) and on two transfer tubes (11 and 13). Press down firmly to seat coolers on tubes.
7. **Install bolts (17),** washers (18) and nuts (19) at three places around inside of cooler (15). **Torque nuts to 70 inch-pounds.**
8. **Install bolts (20),** washers (21) and nuts (22) at six places around outside of cooler (15). **Torque nuts to 70 inch-pounds.**



9. **Position clamp (23)** against bracket (24). **Install bolt (25)** and nut (26).
10. **Connect oil hose (27)** to oil pressure transmitter (28).
11. Coat thread of hose (29) with oil (E254). Connect hose to reducer (30) on cooler (16).
12. Coat thread of hose (31) with oil (E254). **Connect hose to elbow (32) on cooler (15).**
13. **Install baffle (33)** on four studs (34) on sump cover (3). Install washers (35) and nuts (36). **Torque nuts to 70 inch-pounds.**



GO TO NEXT PAGE

6-188 INSTALL COMBINING TRANSMISSION asgIL COOLER (Continued)

14. Lockwire three drain plugs (37) to oil cooler (4, 15, and 16). Use Iockwire (E231).

INSPECT

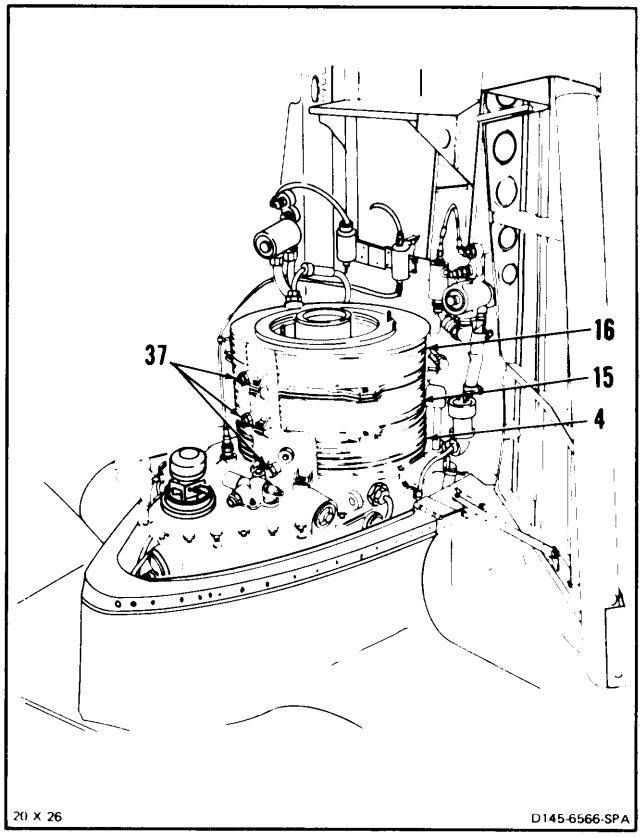
FOLLOW-ON MAINTENANCE:

Install oil cooler fan and shaft (Task 6-186).

Service combining transmission (Task 1-54

Close aft pylon doors (Task 2-2).

Perform ground run (TM 55-1520-240-10).



END OF TASK

6-189 REMOVE COMBINING TRANSMISSION SUMP

INITIAL SETUP

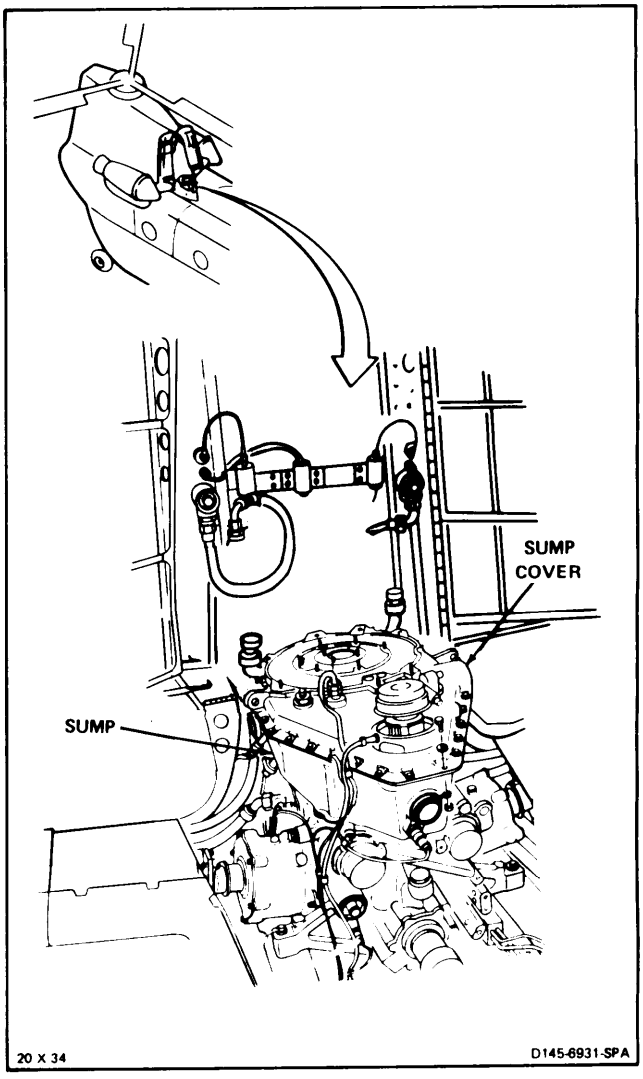
Applicable Configurations:
All

Tools:
Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692

Materials:
Paper Tags (E264)
Barrier Material (E80)
Tape (E388)

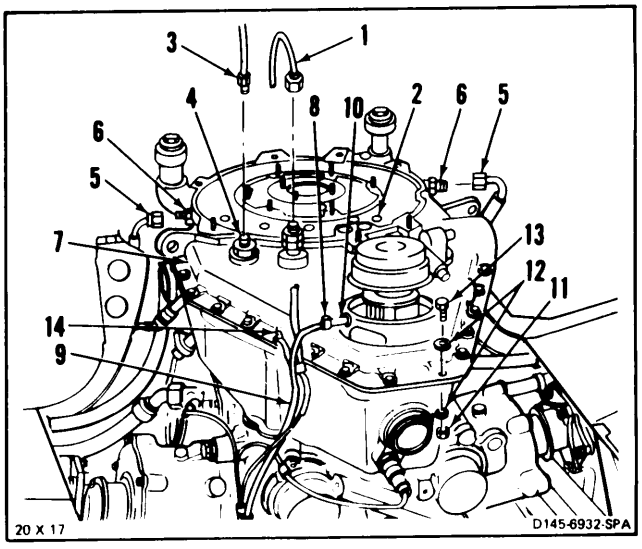
Personnel Required:
67U10 Medium Helicopter Repairer

Equipment Condition:
Battery Disconnected (Task 1-39)
Electrical Power Off
Aft Pylon Doors Open (Task 2-2)
Oil Cooler Fan and Shaft Removed (Task 6-182)
Combining Transmission Oil Cooler Removed (Task 6-187)
Aft Pylon Lower Fairing Removed (Task 2-2)
Sump Drained (Task 6-168)



REMOVE SUMP COVER

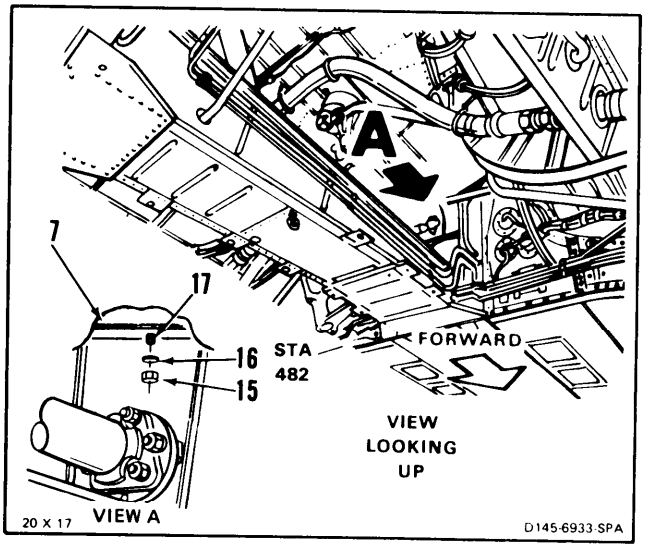
1. Tag and **disconnect electrical connector (1)** from oil pressure switch (2)
2. **Disconnect oil hose (3)** from union (4)
3. **Disconnect breather hose (5)** from reducer (6) on each side of sump cover (7)
4. Loosen drainline clamp (8) **Disconnect drainline** (9) from nipple (10)
5. **Remove** nuts (11) washers (12), and **bolts (13)** from 23 places around sump cover (7). Keep clip (14) with drainline (9).



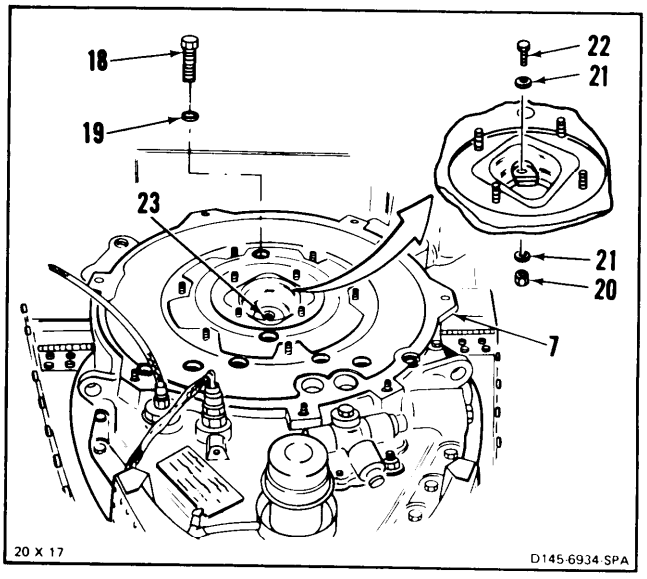
GO TO NEXT PAGE

6-189 REMOVE COMBINING TRANSMISSION SUMP (Continued) 6-189

6. From inside helicopter, **remove nuts (15)** and washers (16) from eight studs (17) at aft edge of cover (7).



7. **Remove eight bolts (18)** and washers (19) from top of sump cover (7). **Remove two** nuts (20), washers (21) and **bolts (22)** inside fan shaft hole (23).



GO TO NEXT PAGE

6-189 REMOVE COMBINING TRANSMISSION SUMP (Continued) 6-189

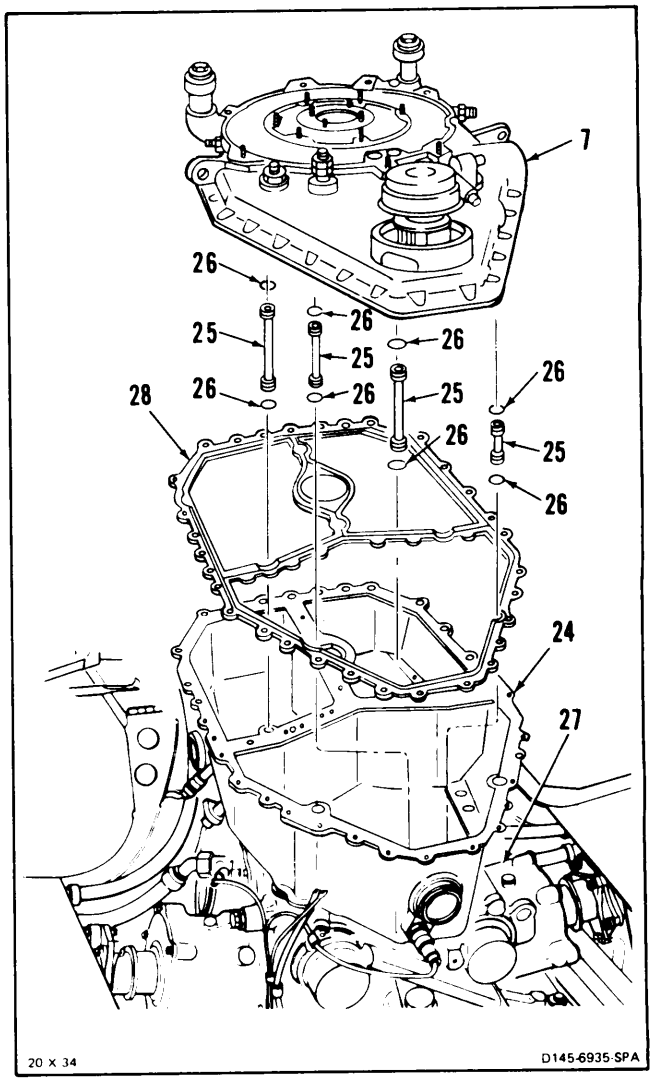
8. Lift cover (7) straight UP from sump (24) **Remove cover.**

NOTE

Tubes may come off with cover or stay in transmission.

9. **Remove four oil transfer tubes (25)** and eight packings (26) from cover (7) or transmission (27). Remove packings (26) from tubes.

10. **Remove gasket seal (28).**



GO TO NEXT PAGE

6-189 REMOVE COMBINING TRANSMISSION SUMP (Continued) 6-189

REMOVE SUMP

11. Tag and **disconnect electrical connectors (29)** from three temperature bulbs (30).
12. **Remove 19 nuts (31)** and washers (32).
13. Lift sump (24) straight up from transmission (27). **Remove sump.**

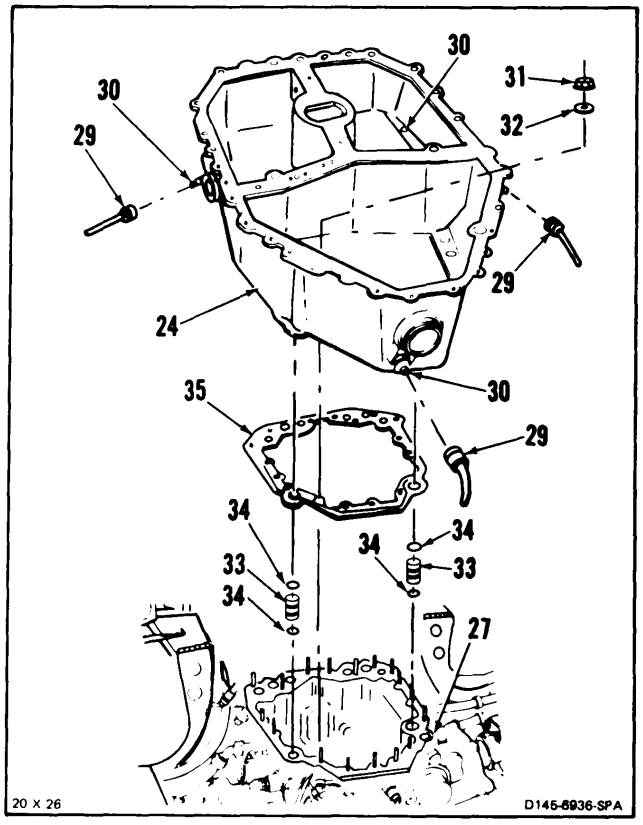
NOTE

Tubes may come off with sump or stay in transmission.

14. **Remove two oil transfer tubes (33)** and four packings (34) from sump (24) or transmission (27).
15. Remove gasket seal (35).
16. Cover opening in transmission (27) with barrier material (E80) and tape (E388).

FOLLOW-ON MAINTENANCE:

None



END OF TASK

6-190 DISASSEMBLE COMBINING TRANSMISSION SUMP

INITIAL SETUP

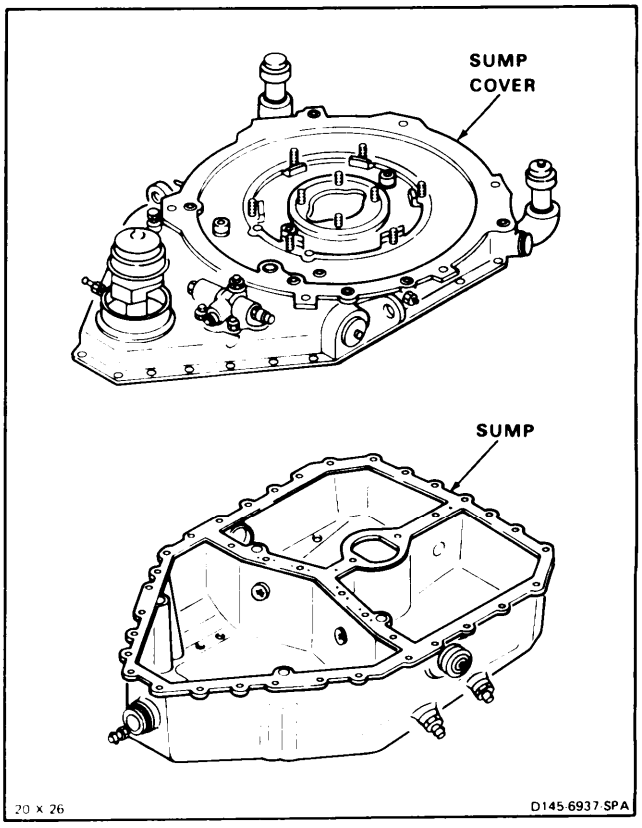
Applicable Configurations:
All

Tools:
Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692
Spanner Wrench
Open End Wrench, 1 3/8-inch

Materials:
None

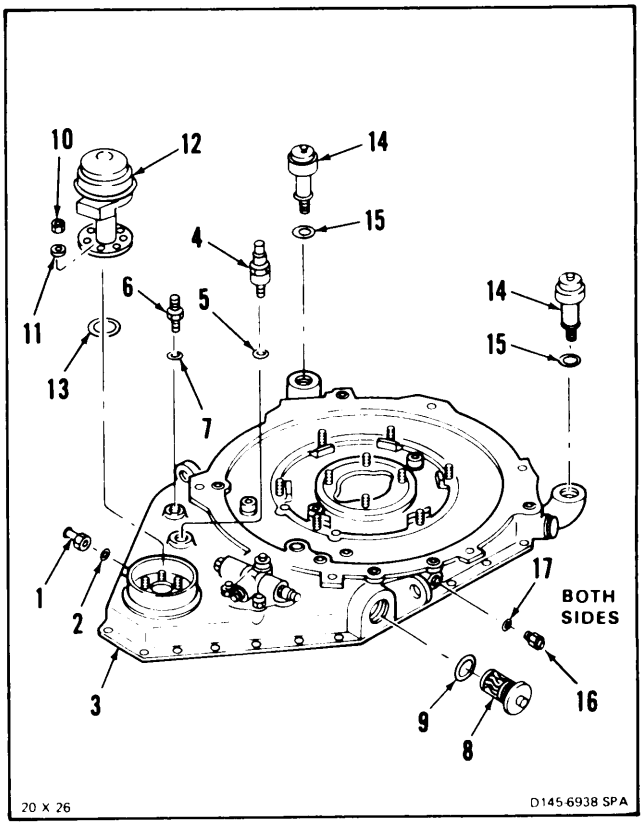
Personnel Required:
67U10 Medium Helicopter Repairer

Equipment Condition:
Off Helicopter Task



DISASSEMBLE SUMP COVER

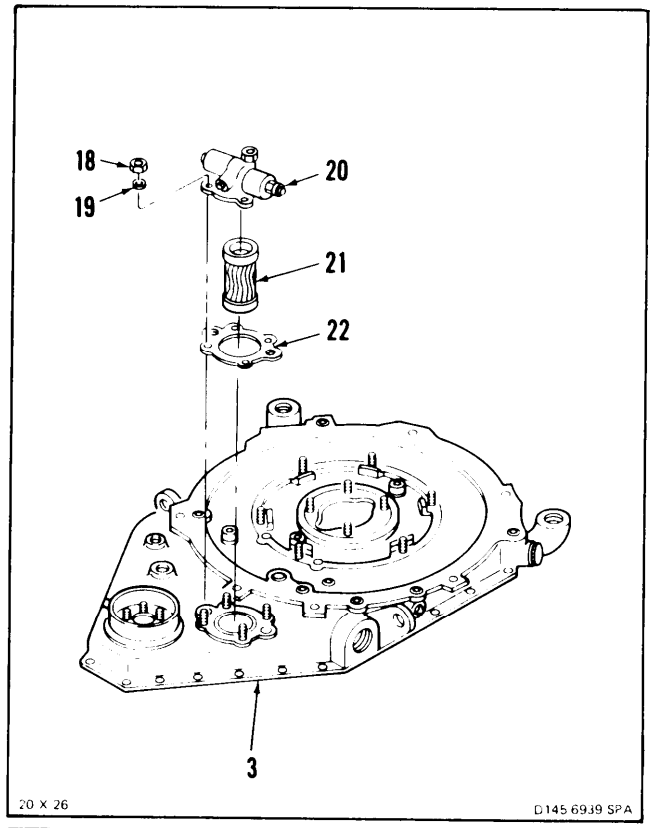
1. **Remove hose nipple (1)** and packing (2) from sump cover (3).
2. Remove lockwire from oil pressure switch (4). **Remove switch** and packing (5).
3. **Remove union (6)** and packing (7).
4. Remove lockwire from inlet screen (8). **Remove inlet screen** and packing (9).
5. Remove five nuts (10) and washers (11) from oil filler (12). **Remove oil filler** and packing (13).
6. Remove lockwire from two vents (14). **Remove vents** and packings (15).
7. **Remove reducer (16)** and packing (17) from each side of sump cover (3).



GO TO NEXT PAGE

6-190 DISASSEMBLE COMBINING TRANSMISSION SUMP (Continued)

8. Remove four nuts (18) and washers (19) from filter housing (20), **Remove filter housing, element (21), and gasket seal (22)** from sump cover (3c).



DISASSEMBLE SUMP

9. Remove lockwire from three temperature probes (23). **Remove temperature probes** and packings (24) from sump (25).

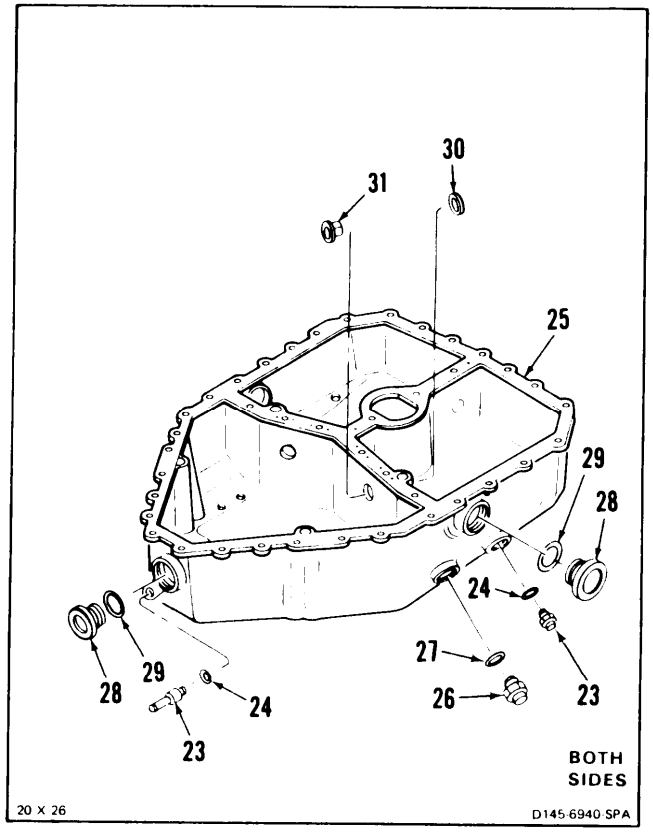
10. Remove lockwire from two drain valves (26). **Remove drain valves** and packings (27).

11. Remove lockwire from three sight gages (28). **Remove sight gages** and packings (29). Use spanner wrench.

12. **Remove three** retaining rings (30) and **screens (31).**

FOLLOW-ON MAINTENANCE:

None



END OF TASK

6-191 ASSEMBLE COMBINING TRANSMISSION SUMP

INITIAL SETUP

Applicable Configurations:
All

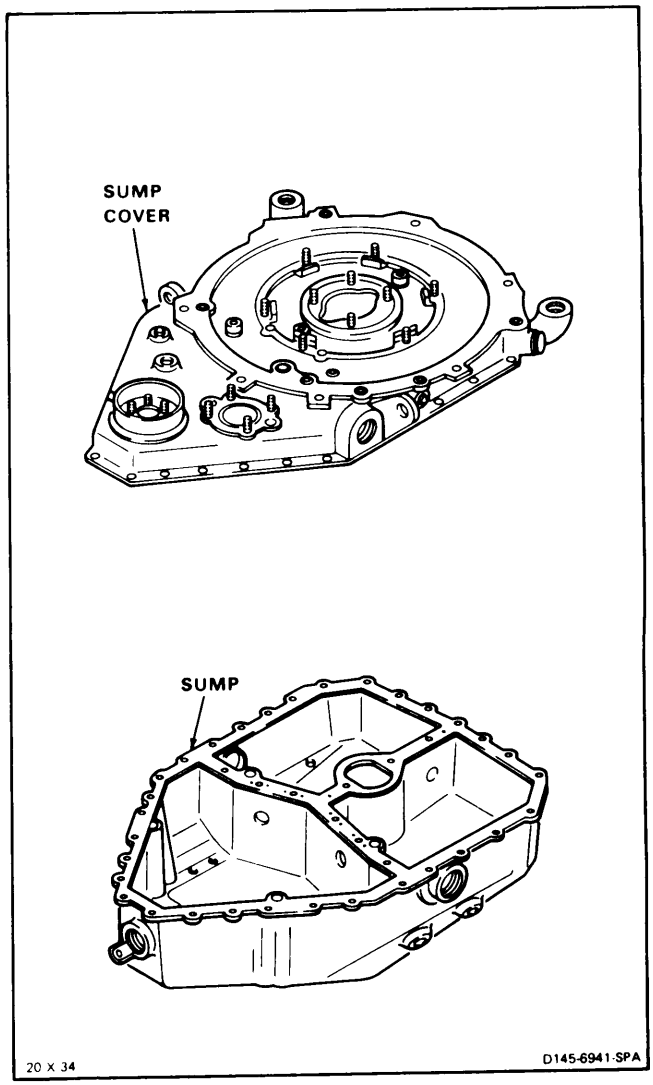
Tools:
Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692
Torque Wrench, 30 to 150 Inch-Pounds
Spanner Wrench
Deep Socket, 1 3/8-inch

Materials:
Oil (E254)
Lockwire (E231)
Dry Cleaning Solvent (E162)
Cloths (E120)
Gloves (E186)

Parts:
Packings

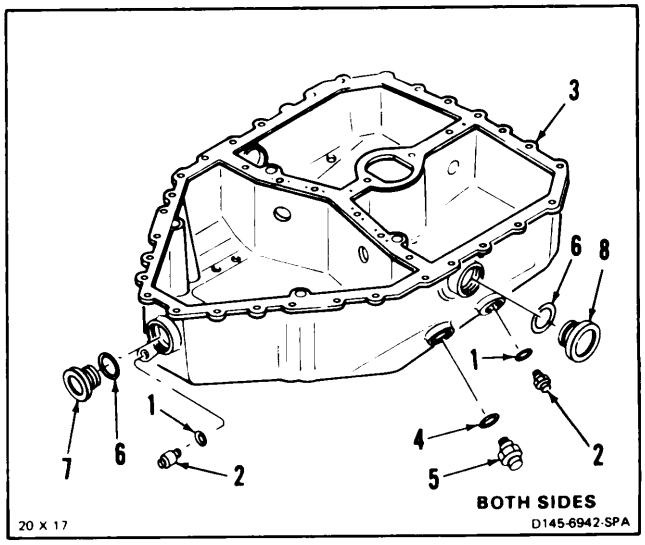
Personnel Required:
67U10 Medium Helicopter Repairer
67U30 Inspector

References:
TM 55-1520-240-23P



ASSEMBLE SUMP

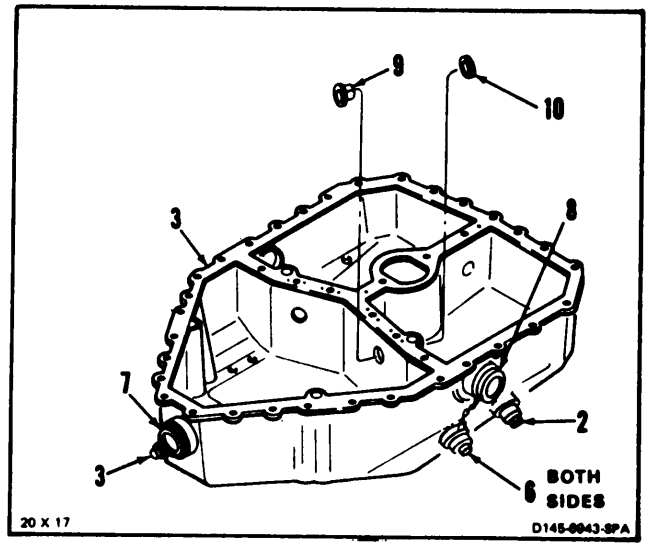
1. Coat packing (1) and thread of three temperature probes (2) with oil (E254). **Install packings** on probes. **Install probes** in sump (3). **Torque probes to 80 inch-pounds.**
2. Coat packing (4) and thread of two drain valves (5) with oil (E254). **Install packings** on drain valves. **Install drain valves** in sump (3). **Torque valves to 80 inch-pounds.**
3. Coat packings (6) and thread of sight gage (7) and two sight gages (8) with oil (E254). **Install Packings** on sight gages. **Install sight gages** in sump. **Torque gages to <u>80 inch-pounds.</u>** Use spanner wrench.



GO TO NEXT PAGE

6-191 ASSEMBLE COMBINING TRANSMISSION SUMP (Continued)

4. Lockwire sight gage (7) at front of sump (3) to temperature probe (3). Lockwire two sight gages (8) at sides of sump to drain valves (6). Use lockwire (E231).
5. Lockwire two temperature probes (2) at sides of sump (3) to sump. Use lockwire (E231).
6. **Install three screens (9)** and retaining rings (10).



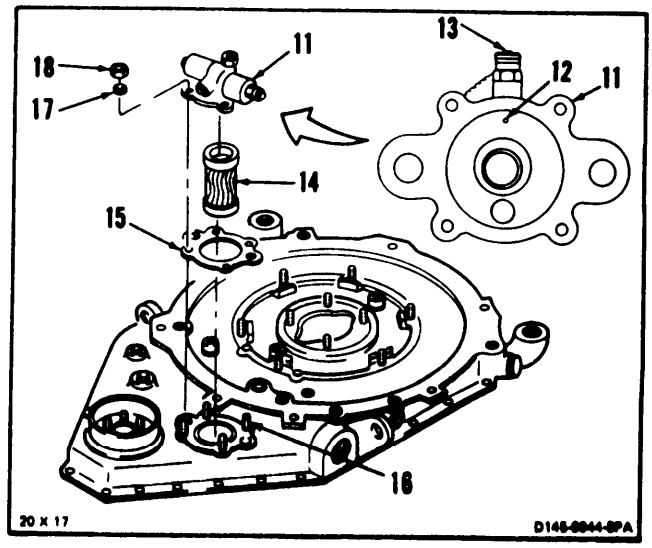
INSPECT

ASSEMBLE SUMP COVER

WARNING

Dry cleaning solvent (E162) is flammable and toxic. It can irritate skin and cause burns. Use only in well-ventilated area, away from heat and open flame. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.

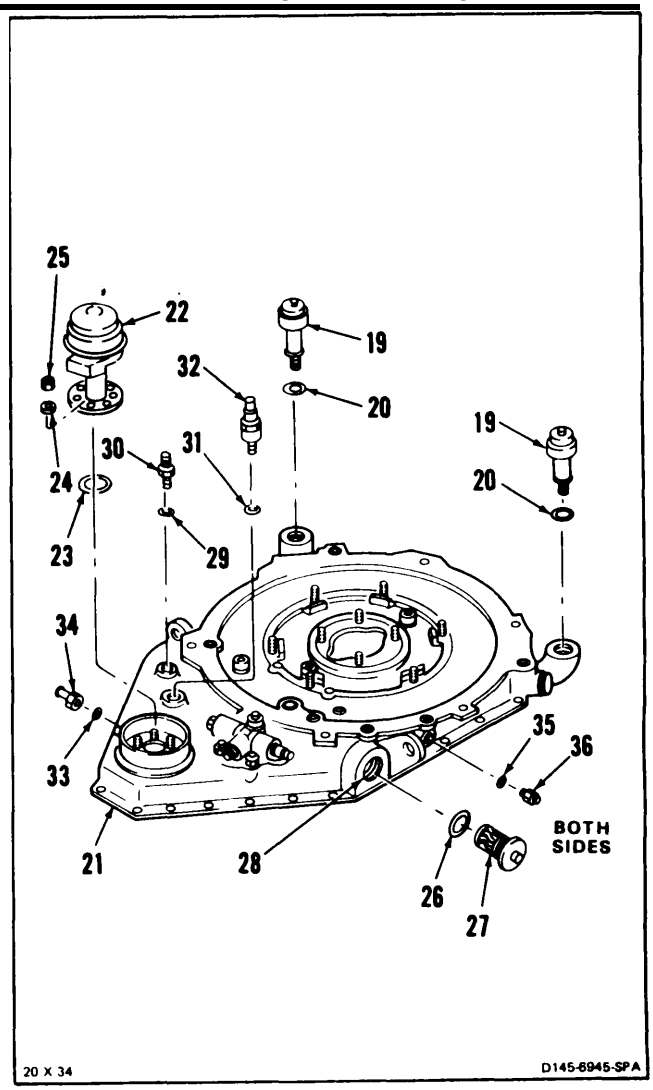
7. **Clean inside of filter housing (11)** with dry cleaning solvent (E162) and clean cloths (E120). Check that hole (12) is free of debris. Wear gloves (E186).
8. Hold housing (11) so that indicating button (13) points straight up. **Push in button** to lock it down.
9. **Install element (14)** in housing (11).
10. **Install gasket seal (15), and housing (11)** on four studs (16). Install four washers (17) and nuts (18). **Torque nuts to 60 inch-pounds.**



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6-191 ASSEMBLE COMBINING TRANSMISSION SUMP (Continued) 6-191

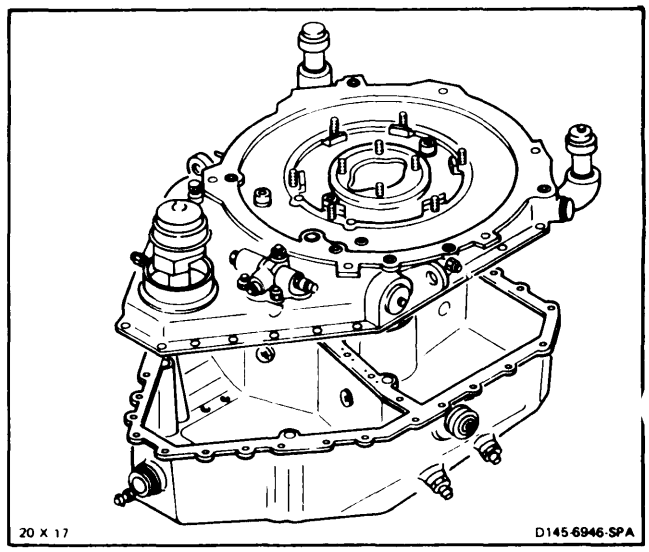
11. **Install two vents (19)** and packings (20). **Torque vents to 80 inch-pounds.** Lockwire vents to sump cover (21). Use lockwire (E231).
12. **Install oil filler (22)** and packing (23) on sump cover (21). Install five washers (24) and nuts (25). **Torque nuts to 60 inch-pounds.**
13. Coat packing (26) and thread of inlet screen (27) with oil (E254). **Install inlet screen** and packing in sump cover cavity (28). **Torque screen to 80 inch-pounds.** Lockwire screen to sump cover (21) with lockwire (E231).
14. Coat packing (29) and thread of union (30) with oil (E254). **Install union** and packing in cover (21). **Torque union to 80 inch-pounds.**
15. Coat packing (31) and thread of oil pressure switch (32) with oil (E254). **Install switch** and packing in cover (21). **Torque switch to 80 inch-pounds.** Lockwire switch to cover with lockwire (E231).
16. **Install** packing (33) and **hose nipple (34).**
17. Coat two packings (35) and thread of two reducers (36) with oil (E254). **Install reducers** and packings on each side of sump cover (21). **Torque reducers to 80 inch-pounds.**



INSPECT

FOLLOW-ON MAINTENANCE:

None



END OF TASK

6-192 INSTALL COMBINING TRANSMISSION SUMP

INITIAL SETUP

Applicable Configurations:
All

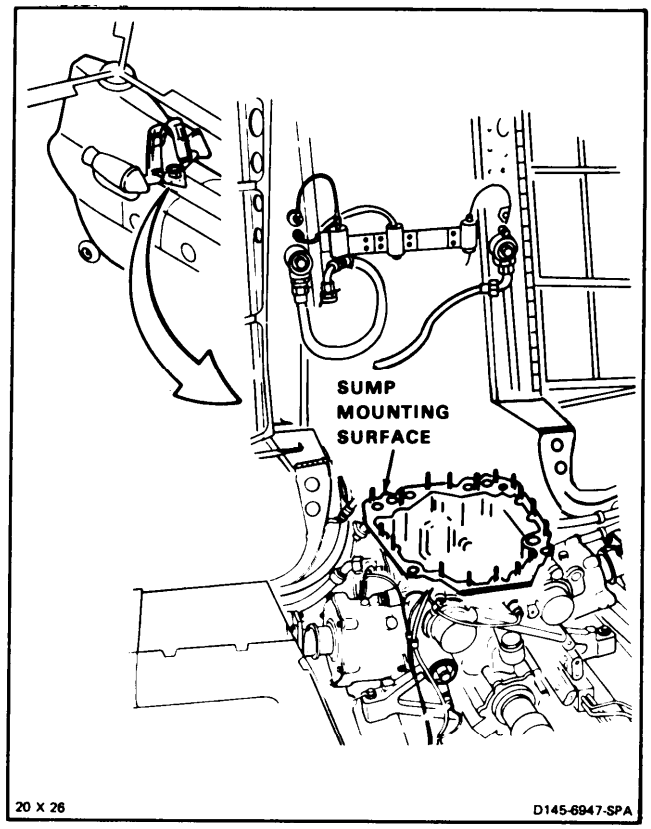
Tools:
Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692
Torque Wrench, 30 to 150 Inch-Pounds

Materials:
None

Parts:
Packings

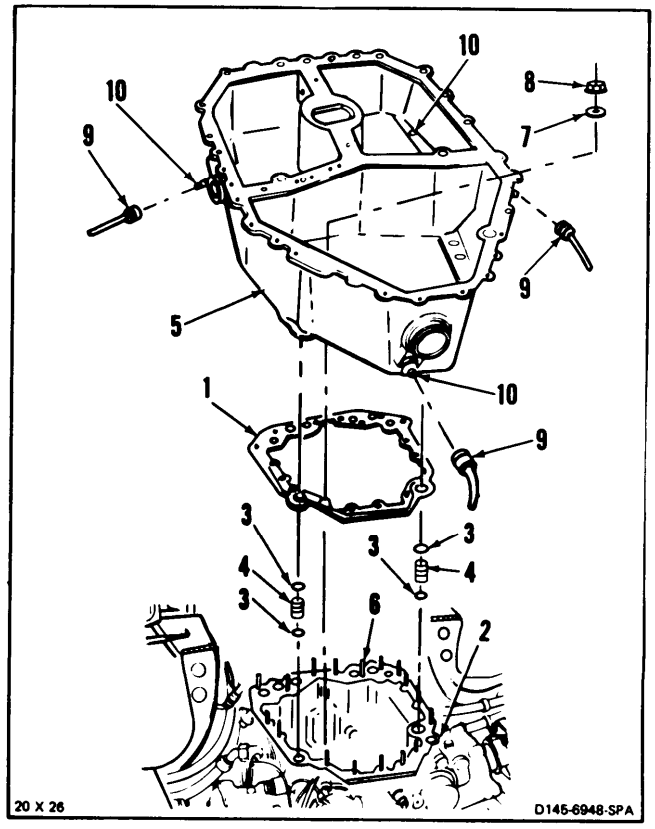
Personnel Required:
67U10 Medium Helicopter Repairer
67U30 Inspector

References:
TM 55-1520-240-23P



INSTALL SUMP

1. **Position gasket seal (1)** on transmission (2).
2. **Install four packings (3)** on two oil transfer tubes (4). **Install tubes** in transmission (2).
3. **Install sump (5)** on seal (1) and 19 studs (6).
4. **Install 19** washers (7) and **nuts (8)** on studs (6). **Torque nuts to <u>60 inch-pounds.</u>**
5. **Connect three electrical connectors (9)** to temperature bulbs (10). Remove tags.



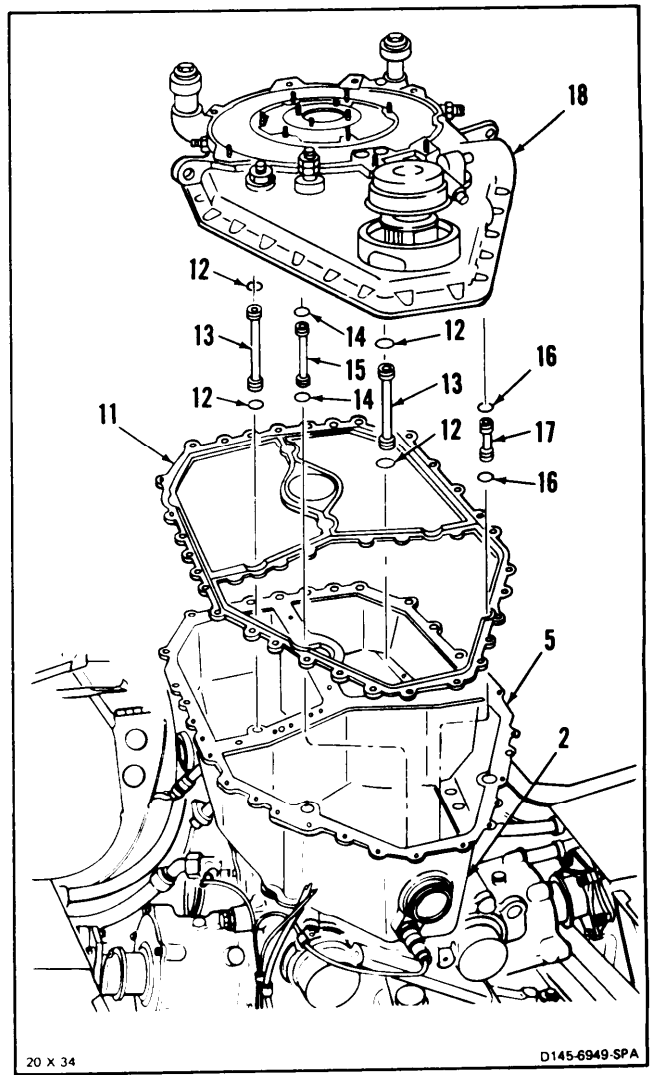
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6-192 INSTALL COMBINING TRANSMISSION SUMP (Continued) 6-192

INSPECT

INSTALL SUMP COVER

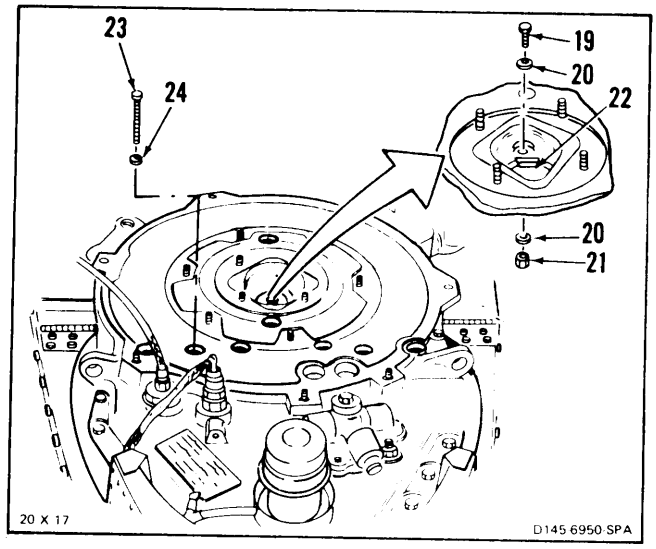
6. **Position gasket seal (11)** on sump (5).
7. Install four packings (12) on two oil transfer tubes (13). **Install tubes** in transmission (2).
8. Install two packings (14) on oil transfer tube (15). **Install tube** in transmission (2).
9. Install two packings (16) on oil transfer tube (17). **Install tube** in transmission (2).
10. Align sump cover (18) with four transfer tubes (13, 15, and 17). Install cover on sump (5). Make sure all tubes are firmly seated.



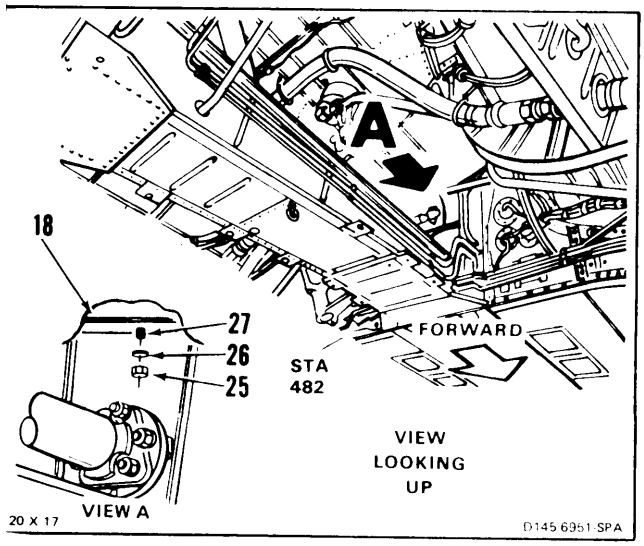
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6-192 INSTALL COMBINING TRANSMISSION SUMP (Continued)

11. **Install bolts (19), washers (20) and nuts (21)** at two places inside fan shaft hole (22). **Torque nuts to 60 inch-pounds.**
12. **Install eight bolts (23)** and seal washers (24). **Torque bolts to 50 inch-pounds.**



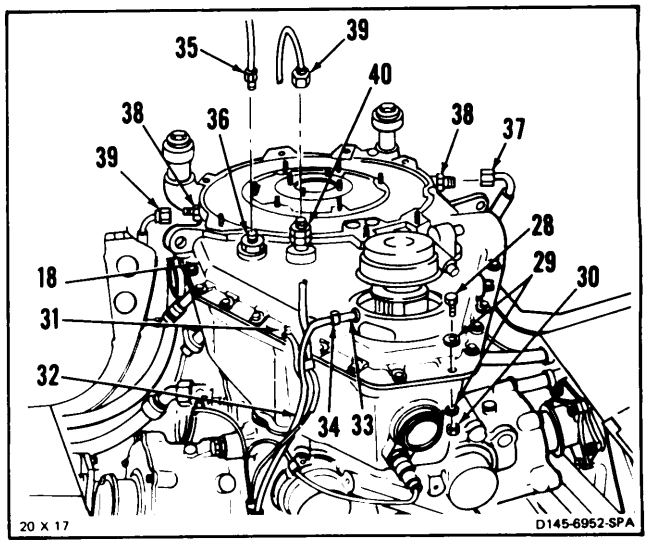
13. From inside helicopter, **install eight** washers (25) and **nuts (26)** on studs (27) at aft edge of sump cover (18). **Torque nuts to 60 inch-pounds.**



GO TO NEXT PAGE

6-192 INSTALL COMBINING TRANSMISSION SUMP (Continued) 6-192

14. **Install 23 bolts (28), washers (29), and nuts (30)** around sump cover (18). Install clip (31) under head of bolt where shown. **Torque nuts to 60 inch-pounds.**
15. **Connect drainline (32)** to hose nipple (33). Tighten clamp (34).
16. **Connect straight end of oil hose (35)** to union (36).
17. **Connect breather hose (37)** to reducer (38) on each side of sump cover (18).
18. **Connect electrical connector (39) to oil pressure** switch (40).



INSPECT

FOLLOW-ON MAINTENANCE:

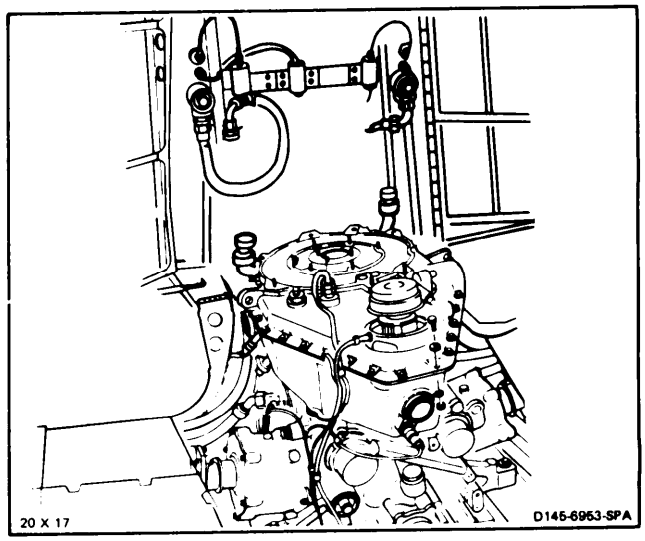
Install combining transmission oil cooler (Task 6-188).

Install oil cooler fan and shaft (Task 6-186).

Service combining transmission sump (Task 1-54).

Close aft pylon doors (Task 2-2).

Perform ground run (TM 55-1520-240-10).



END OF TASK

6-193 REPLACE COMBINING TRANSMISSION SIGHT GAGE

INITIAL SETUP

Applicable Configurations:
All

Tools:
Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692
Container, Two Quart
Hose, 1 -Inch id, 36 Inches Long
Spanner Wrench
Torque Wrench, 30 to 150 Inch-Pounds
Workstand

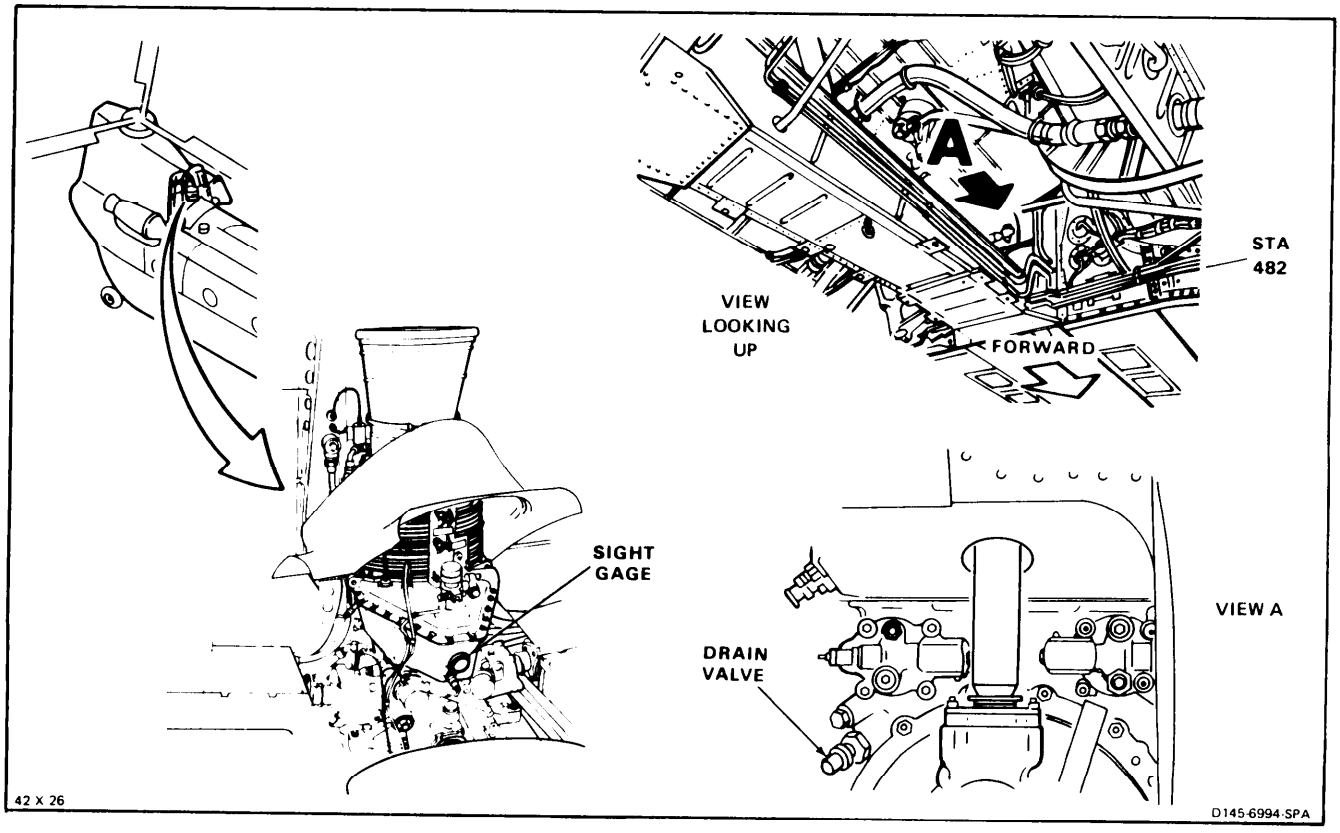
Materials:
Oil (E254)
Lockwire (E231)

Parts:
Packing

Personnel Required:
67U1O Medium Helicopter Repairer (2)
67U30 Inspector

References:
TM 55-1520-240-23P

Equipment Condition:
Battery Disconnected (Task 1-39)
Electrical Power Off
Aft Pylon Access Doors Open (Task 2-2)
Aft Pylon Lower Fairing Open (Task 2-2)
Cargo Ramp Open and Level (TM 55-1520-240-T)

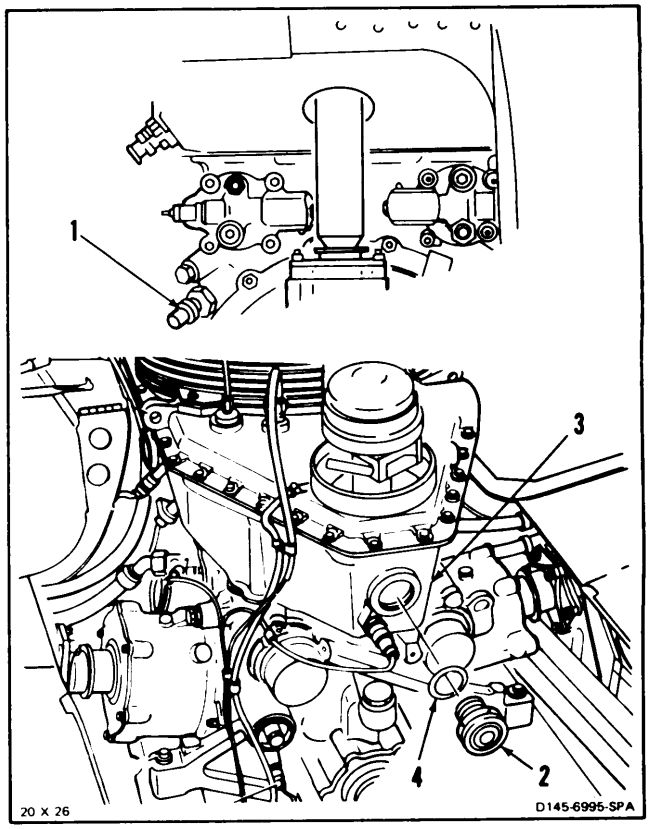


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6-193 REPLACE COMBINING TRANSMISSION SIGHT GAGE (Continued

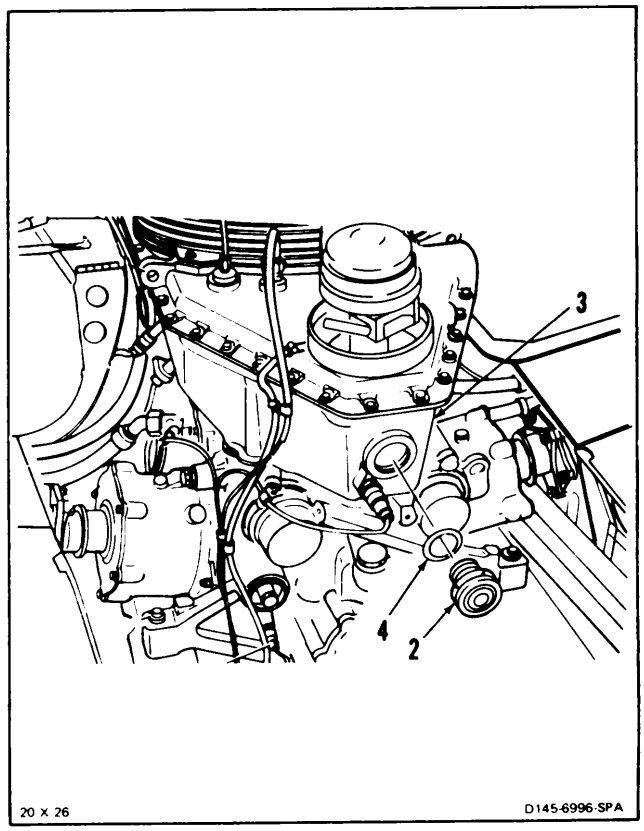
REMOVE SIGHT GAGE

1. From inside cabin, **connect hose** to drain valve (1). Direct end of hose into container
2. Have helper view sight gage (2) on sump (3). Push in drain valve (1), twist and pull **Drain oil** until level is below gage.
3. Close drain valve (1) by pushing it in and twisting it. Disconnect hose from valve.
4. Remove lockwire from sight gage (2). **Remove gage** from sump (3). Use spanner wrench.
5. Remove packing (4) from sight gage (2)



INSTALL SIGHT GAGE

6. Coat packing (4) and thread of sight gage (2) with oil (E254). Install packing on gage.
7. **Install sight gage (2)** in sump (3). Use spanner wrench. **Torque gage to 80 inch-pounds.**

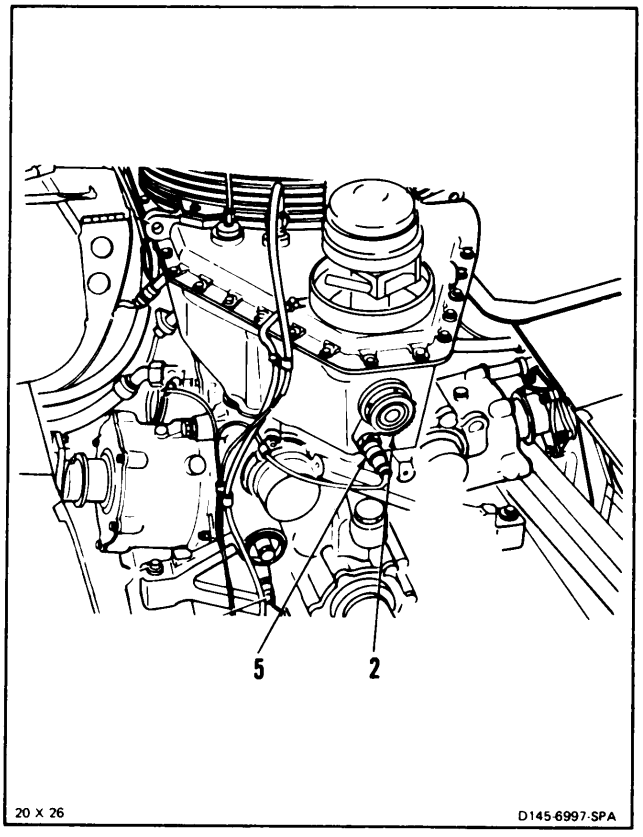


GO TO NEXT PAGE

6-193 REPLACE COMBINING TRANSMISSION SIGHT GAGE (Continued)

8. Lockwire sight gage (2) to temperature probe (5). Use lockwire (E231).

INSPECT



FOLLOW-ON MAINTENANCE:

Service combining transmission (Task 1-54).

Close aft pylon lower fairing (Task 2-2).

Close aft pylon access doors (Task 2-2).

Close cargo ramp (TM 55-1520-240-T).

END OF TASK

6-194 CONTAMINATION ANALYSIS OF ENGINE TRANSMISSION OIL

INITIAL SETUP

Applicable Configurations:
All

Tools:
Magnet
Magnifying Glass, 12-Power

Materials:
None

Personnel Required:
67U30 Inspector

Equipment Condition:
Off Helicopter Task

1. Solid particles found in the transmission oil system may be steel, magnesium, aluminum, silver, copper, bronze, or fiberglass. Examine particles as follows:

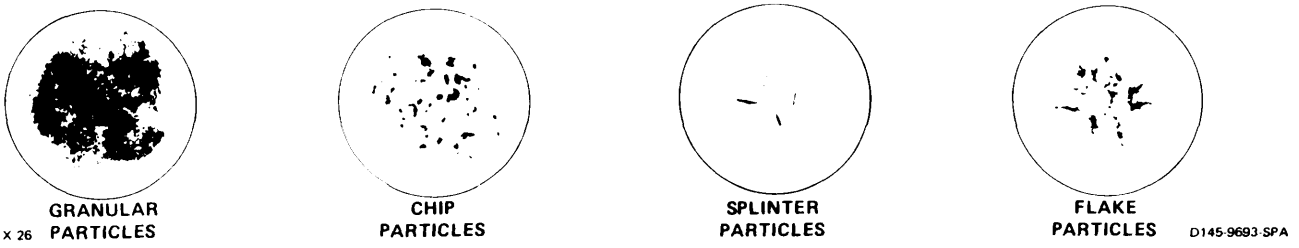
   a. Separate steel particles. Use a magnet.

   b. Identify and separate remaining particles by visual inspection.

   c. Examine particles with a magnifying glass to determine shape and condition. Look for marks or discoloration that may indicate shearing, burning, or fatigue.

FOLLOW-ON MAINTENANCE:
None

MATERIAL	DESCRIPTION	ACTION REQUIRED
Steel	Fine, hair-like fuzz particles	Normal wear. No action required
	Limited amount of splinters, flakes, or granular particles	Possible failure. Perform serviceability check (Task 6-198)
	Thin flakes up to 1/16-inch in diameter and l/4-inch long, maximum of 10 flakes	Perform serviceability check (Task 6-198)
	Massive amount of spiinters, flakes, or granular particles	Failure. Replace transmission (Task 6-100 and 6-107)
Aluminum or magnesium	Granular particles	Perform serviceability check (Task 6-198)
Copper, bronze. or silver	Limited amount of granular particles	Possible indication of bearing cage wear. Perform serviceability check (6-198)
	Massive amount of granular particles or chip particles	Failure. Replace transmission (6-100 and 6-107)
Fiberglass	Granular or fibrous particles	Perform serviceability check (6-198)



END OF TASK

6-195 INSPECTION—ALLOWABLE LEAKAGE OF ENGINE TRANSMISSION OIL

INITIAL SETUP

Applicable Configurations:
All

Tools:
None

Materials:
None

Personnel Required:
67U10 Medium Helicopter Repairer

Equipment Condition:
Battery Disconnected (Task 1-39)
Electrical Power Off
Helicopter on Level Surface

Engine transmission oil is supplied by the combining transmission oil system. Refer to Task 6-167.

FOLLOW-ON MAINTENANCE:
None

END OF TASK

6-196 DRAIN ENGINE TRANSMISSION OIL

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic Tool Kit,
NSN 5180-00-323-4692
Container, Two Quart
Socket, 1-3/8 Inch
Torque Wrench, 30 to 150 Inch-Pounds

Materials:

Lockwire (E231)

Parts:

Packing

Personnel Required:

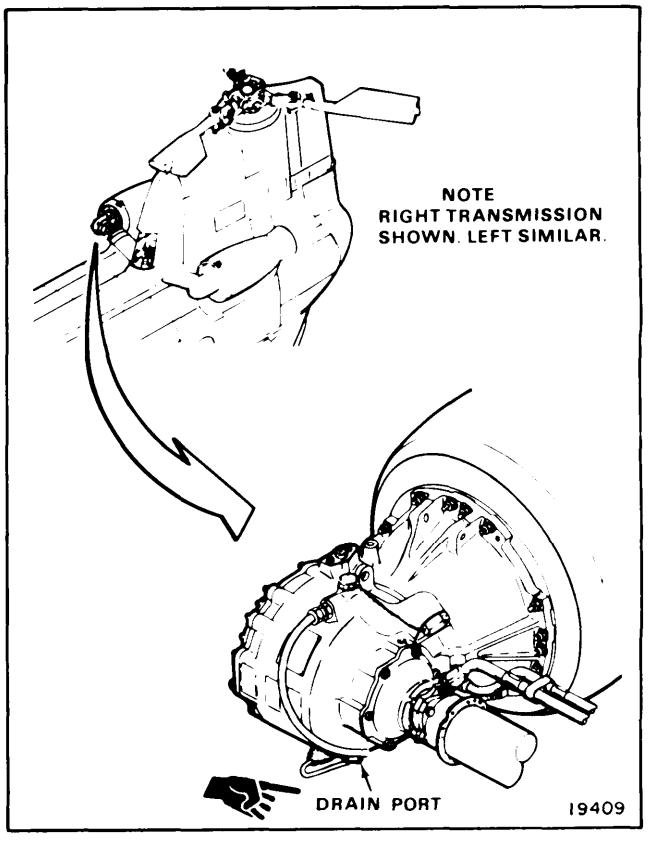
Medium Helicopter Repairer

References:

TM 55-1520-240-23P

Equipment Condition:

Battery Disconnected (Task 1-39)
Electrical Power Off
Engine Transmission Compartment of Combining Transmission Sump Drained (Task 6-168).
Engine Air Inlet Screen Removed (Task 4-65)
Engine Transmission Fairing Removed (Task 4-70)



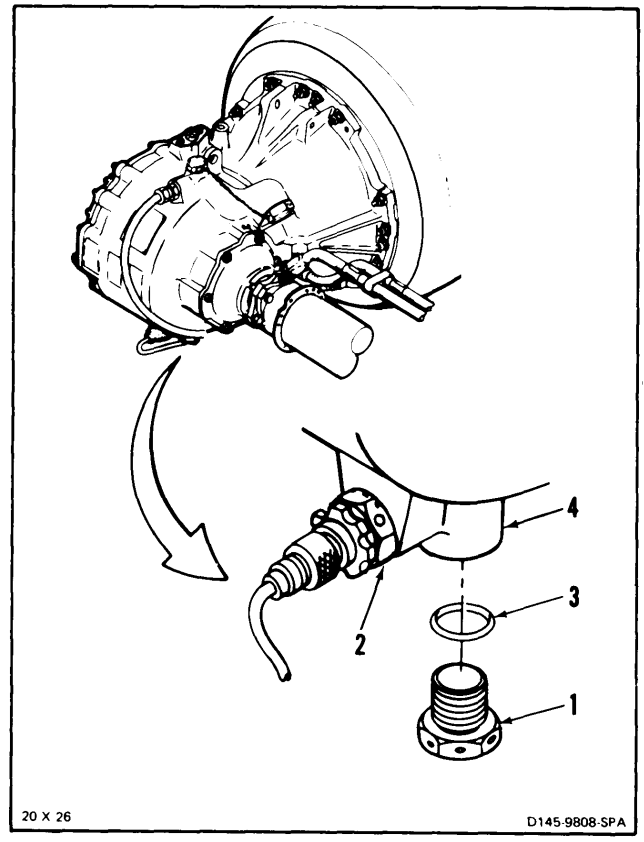
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NOTE

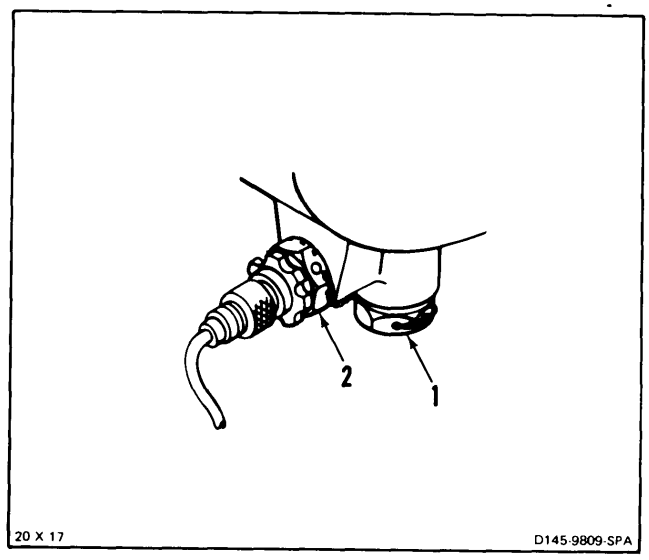
- Drain either engine transmission in same way. Right transmission shown.
- For helicopters with 37, go to step 7.

WITHOUT 37

1. Remove lockwire from drain plug (1) and chip detector.
2. **Remove drain plug (1). Let oil drain** into container.
3. Remove packing (3) from drain plug (1).
4. Install packing (3) on drain plug (1). **Install plug** in transmission port (4). **Torque plug to 90 inch-nounds.**



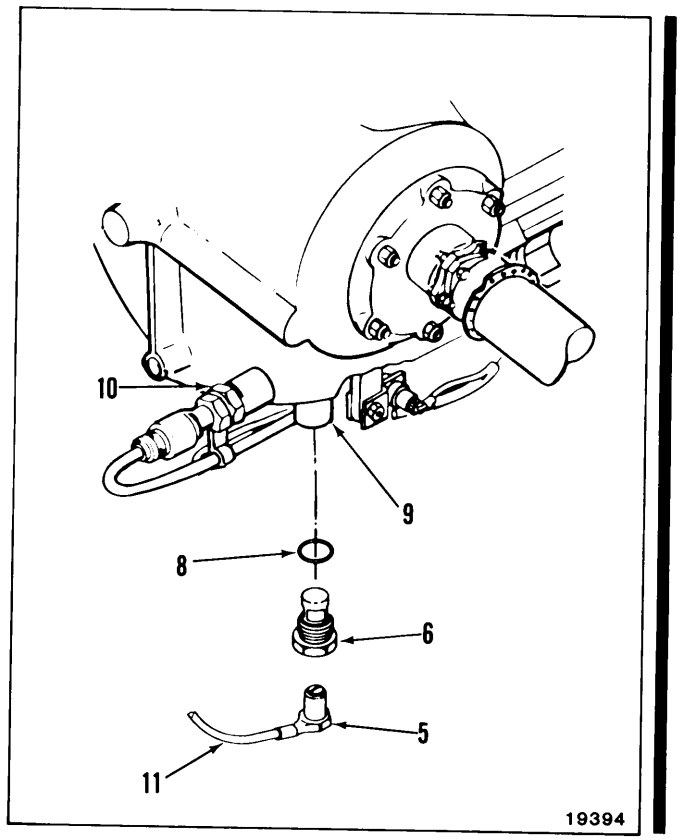
5. Lockwire drain plug (1) to chip detector (2). Use lockwire (E231).
6. Go to FOLLOW-ON MAINTENANCE.



GO TO NEXT PAGE

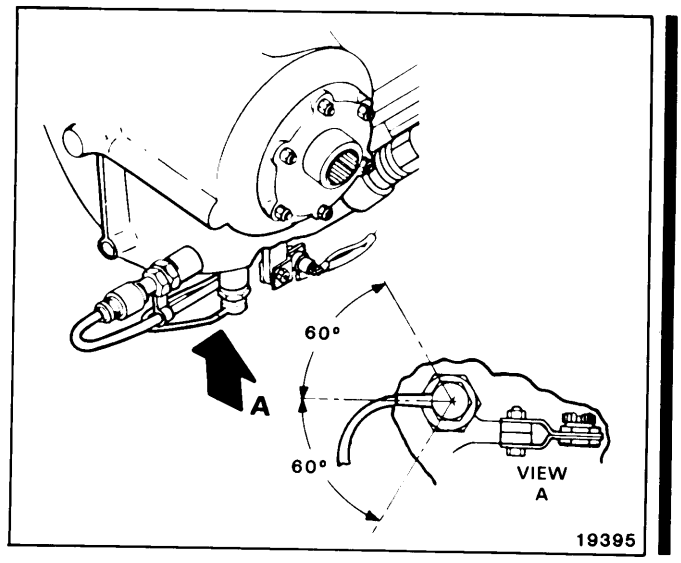
WITH 37

7. **Remove plug (5)** by turning it counterclockwise and pulling it from valve (6).
8. Remove lockwire from valve (6). **Remove valve,** with packing (8) from transmission port (9). **Let oil drain** into container.
9. **Install valve (6),** with new packing (8) in port (9). **Torque to 77 inch-pounds.**
10. **Lockwire valve (6)** to temperature switch adapter (10). Use lockwire (E231).
11. **Install plug (5)** in valve (6) by inserting it and twisting it clockwise until it locks in place.



12. Check that cable (11) points forward within 60 degrees as shown.

FOLLOW-ON MAINTENANCE:
Install engine transmission fairing (Task 4-73).
Install engine air inlet screen (Task 4-76).



END OF TASK

6-197 FLUSH ENGINE TRANSMISSION OIL SYSTEM 6-197

INITIAL SETUP

Applicable Configurations:
All

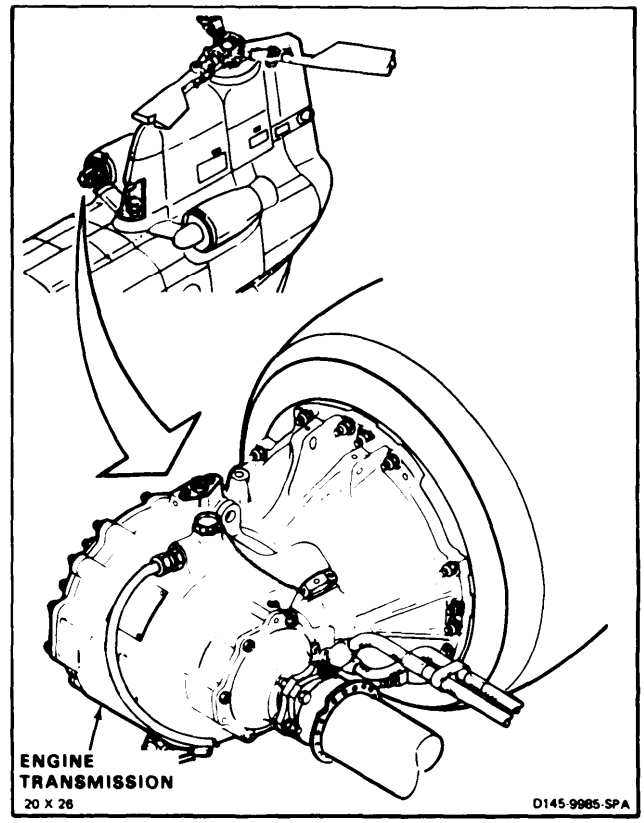
Tools:
Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692

Materials:
None

Personnel Required:
67U10 Medium Helicopter Repairer
100C0 Rotary-Wing Aviator (2)

References:
Task 1-54
Task 6-196
Task 6-199
Task 6-201
Task 6-202
Task 6-203
Task 6-204
Task 6-205
Task 6-206
Task 6-207
Task 6-208
Task 6-209
Task 6-210

Equipment Condition:
Battery Disconnected (Task 1-39)
Electrical Power Off
Pylon Access Doors Open (Task 2-2)
Pylon Lower Fairing Open (Task 2-2)
Engine Air Inlet Screen Removed (Task 4-65)
Engine Transmission Fairing Removed (Task 4-70)

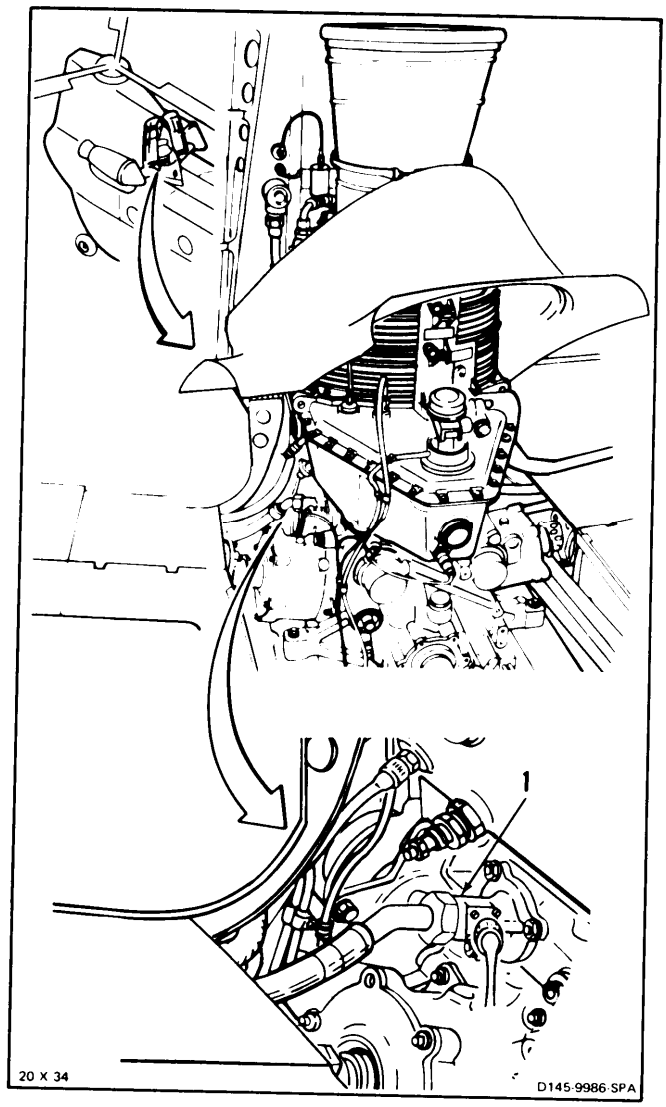


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NOTE

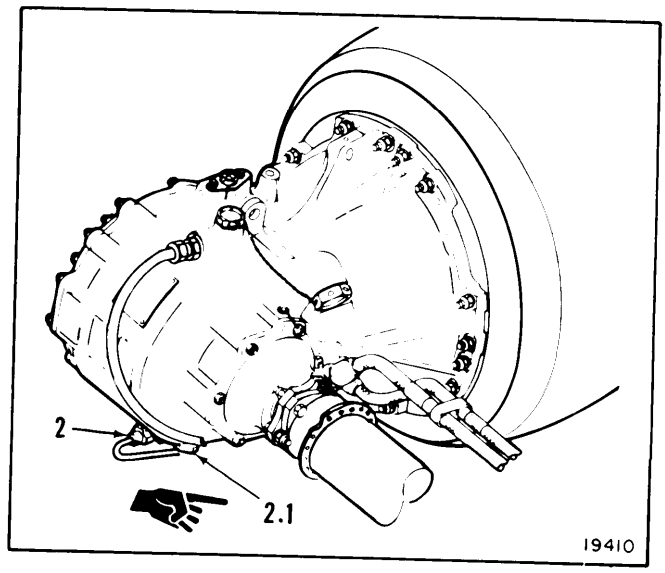
Flush either engine transmission oil system in same way. Right transmission shown.

1. **Drain oil** from engine transmission (Task 6-196).
2. Remove, inspect, and clean **debris detection screen (1)** (Task 6-201 and 6-202) stall screen (Task 6-203).



3. Without 37, Remove and inspect chip detector plug (2) (Task 6-204 and 6-205). install plug (Task 6-206).

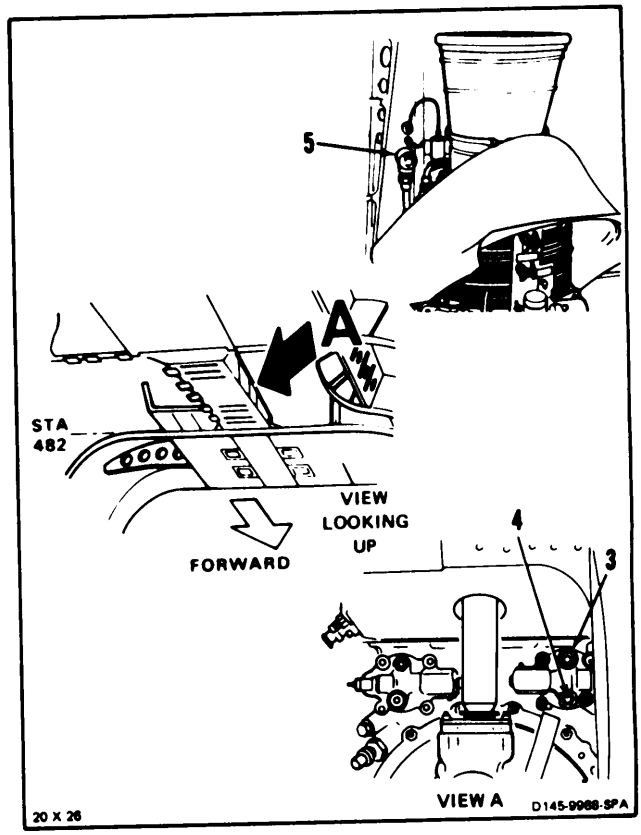
3.1. With 37 Inspect chip detector plug (2.1) (Task 6-208.1).



GO TO NEXT PAGE

6-197 FLUSH ENGINE TRANSMISSION OIL SYSTEM (Continued

4. **Replace main oil filter element (3)** (Task 6-199). Note position of indicator button (4).
5. If indicator button (4) was extended, remove and **inspect inlet screen** (5) (Task 6-209 and 6-210). **Install screon** (Task 6-211).
6. **Service engine transmission** with oil (Task 1 -54).
7. Have pilot **perform ground run** (TM 55-1520-240-10). When engine transmission oil temperature stabilizes at normal, have pilot shut down helicopter.
8. **Repeat steps 1 thru 6.**



FOLLOW-ON MAINTENANCE:

Install engine transmission fairing (Task 4-73).

Install engine air inlet screen (Task 4-76).

Close pylon lower fairing (Task 2-2).

Close pylon access doors (Task 2-2).

END OF TASK

6-198 ENGINE TRANSMISSION SERVICEABILITY CHECK 6-198

INITIAL SETUP

Applicable Configurations:
All

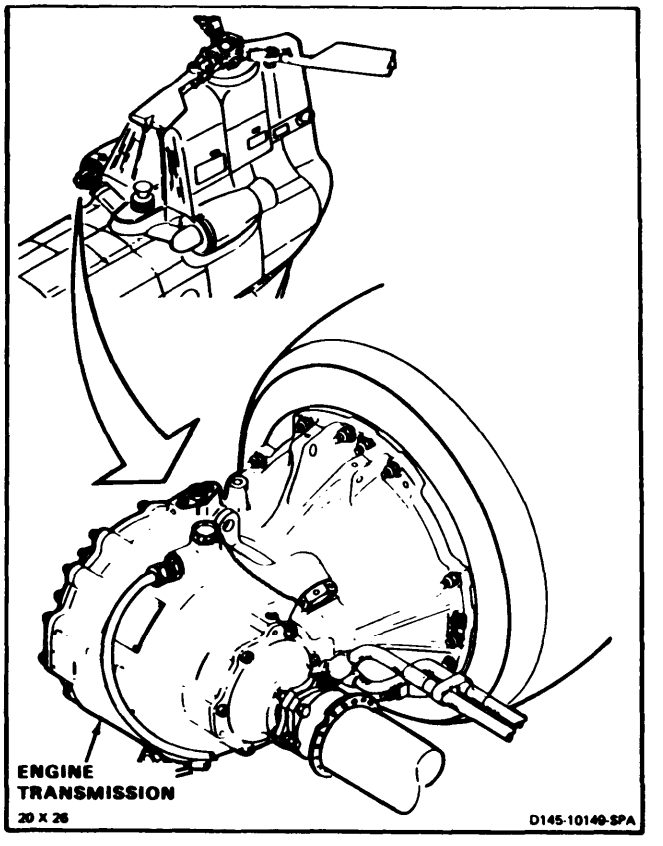
Tools:
Aircraft Mechanic's Tool Kit.
NSN 5180-00-323-4692

Materials:
Cheesecloth (E112)

Personnel Required:
67U20 Medium Helicopter Repairer
100C0 Rotary-Wing Aviator (2)

References:
Task 1-54
Task 6-100
Task 6-107
Task 6-196
Task 6-197
Task 6-199
Task 6-201
Task 6-202
Task 6-203
Task 6-204
Task 6-206
Task 6-207
6-209
6-210
6-211
TM 55-1520-240-10

Equipment Condtion:
Battery Disconnected (Task 1-39)
Electrical Power Off
Pylon Access Doors Open (Task 2-2)
Pylon Lower Fairing Open (Task 2-2)
Engine Air Inlet Screen Removed (Task 4-65)
Engine Transmission Fairing Removed (Task 4-70)



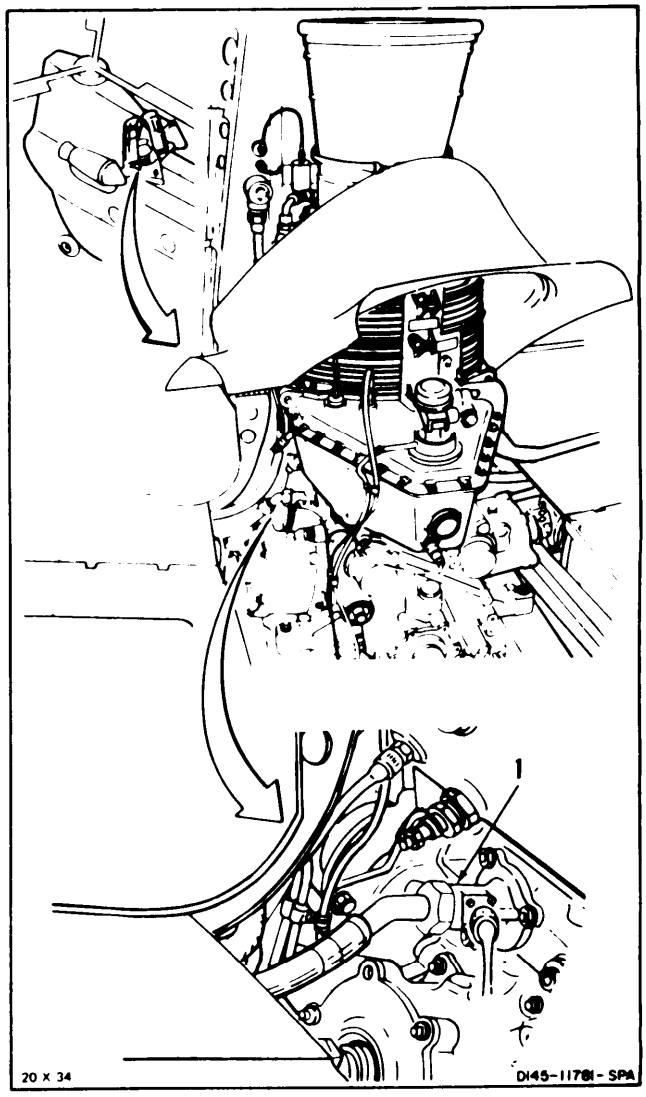
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6-198 ENGINE TRANSMISSION SERVICEABILITY CHECK (Continued)

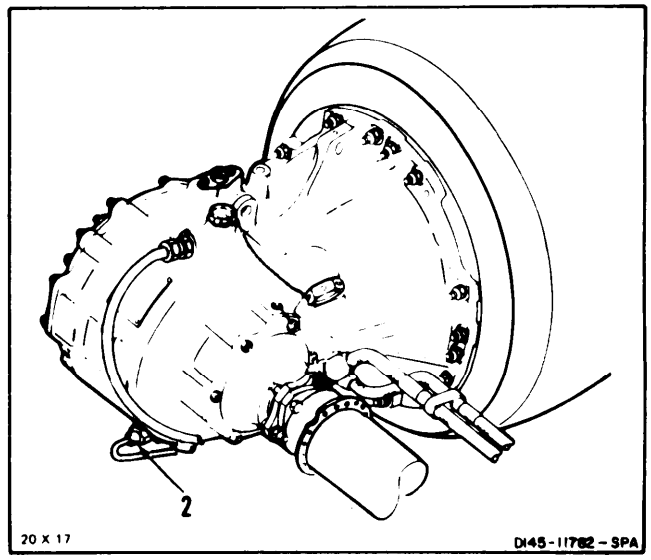
NOTE

Perform a serviceability check of either engine transmission in same way. Right transmission shown.

1. **Drain oil** from engine transmission (Task 6-196).
2. Remove, inspect, and **clean debris detection screen (1)** (Task 6-201 and 6-202). Install screen (Task 6-203).



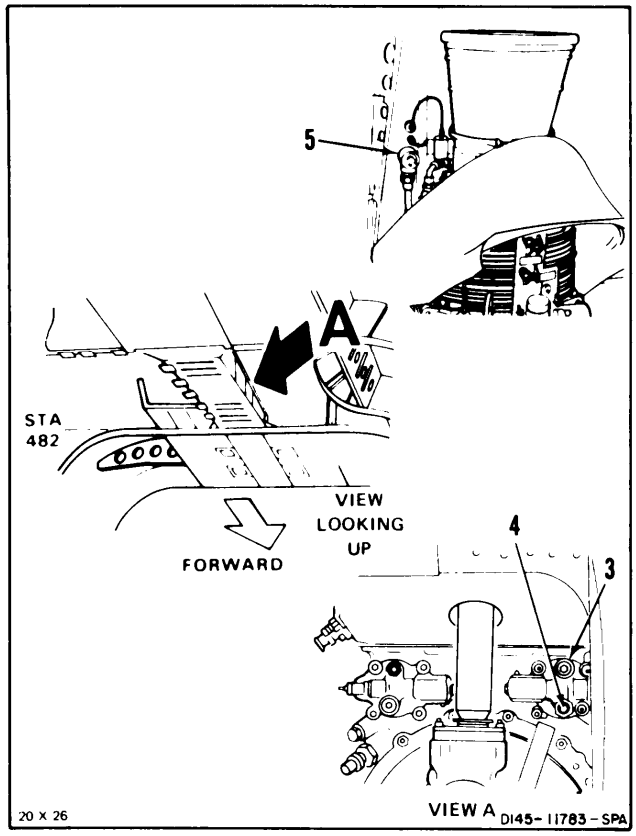
3. Remove and **inspect chip detector plug (2)** (Task 6-204 and 6-205). Install plug (Task 6-206).



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6-198 ENGINE TRANSMISSION SERVICEABILITY CHECK (Continued)

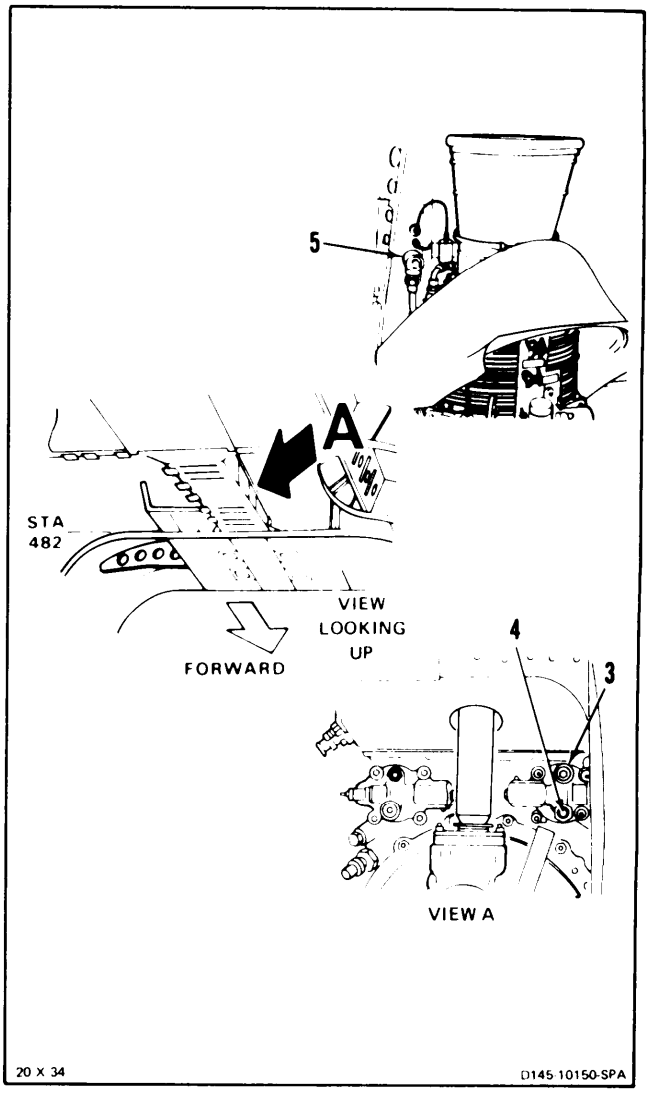
4. **Replace main oil filter element (3)** (Task 6-199). Note position of indicator button (4).
5. If indicator button (4) was extended, remove and **inspect inlet screen (5)** (Task 6-209 and 6-210). **Install screen** (Task 6-211).
6. **Service transmission** (Task 1-54).



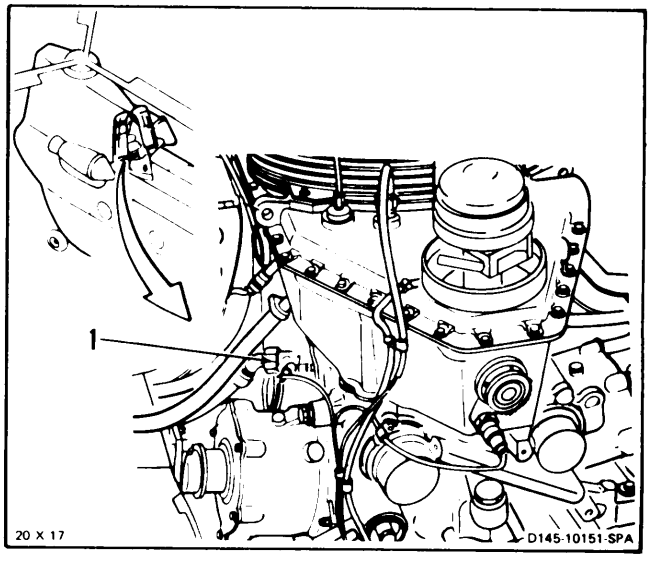
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6-198 ENGINE TRANSMISSION SERVICEABILITY CHECK (Continued)

7. Have pilot **perform ground run** for 1 hour at normal rotor rpm (TM 55-1520-240-10). If engine transmission oil temperature or pressure changes abnormally, or if debris screen or chip detector light comes on during operation, have pilot shut down helicopter. Check for cause.
8. **Drain oil** through cheesecloth (E112) or similar filter material (Task 6-196), Check for contamination.
9. **Remove element in oil filter (3). If** element contains **debris or** indicator **button (4)** was **extended, replace** with new **element** (Task 6-148).
10. **If** element in filter (3) contains **debris and** Indicator **button (4)** was **also extended, remove, inspect,** and install **inlet screen (5)** (Task 6-209, 6-210, and 6-211).



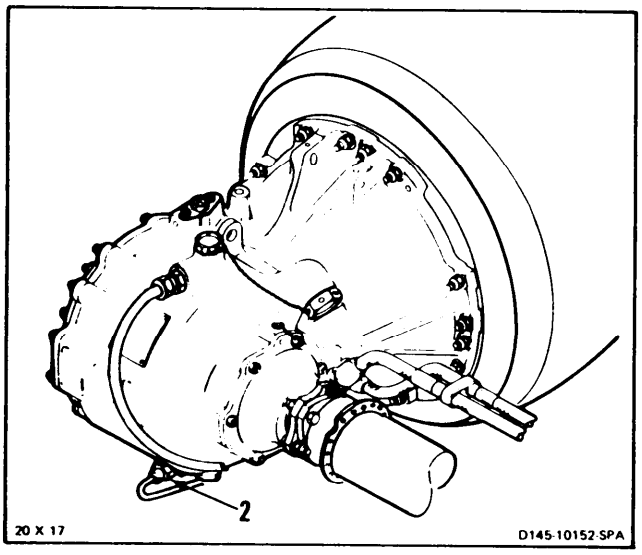
11. Remove, inspect, and **clean debris detection screen (1)** (Task 6-201 and 6-202). install screen (Task 6-203).



GO TO NEXT PAGE

6-198 ENGINE TRANSMISSION SERVICEABILITY CHECK (Continued) 6-198

12. Remove and **inspect chip detactor plug (2)** (Task 6-204 and 6-205). Install plug (Task 6-206).



13. **If** quantity and size of **particles** obtained from filter (3), screen (1), and chip detector (2) **have not decreased by at least 30 parcent** from original amount, **replace engine transmission** (Task 6-100 and 6-107).

14. **If** quantity and size of **particles** obtained from filter (3), screen (1) and chip detector (2) **have deicreased by 30 percent or more, repeat stops 1 thru 12.** If any more debris is obtained, replace engine transmission (Task 6-100 and 6-107).

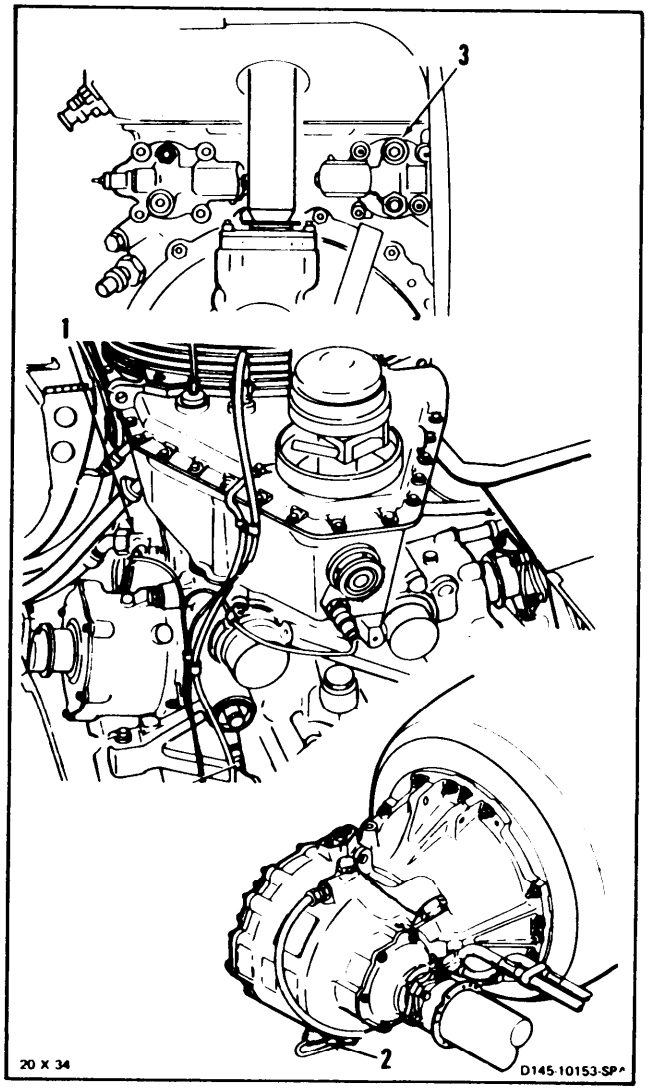
FOLLOW-ON MAINTENANCE:

Install engine transmission fairing (Task 4-73).

Install engine air inlet screen (Task 4-76).

Close pylon lower fairing (Task 2-2).

Close pylon access doors (Task 2-2).



END OF TASK

6-199 REPLACE ENGINE TRANSMISSION MAIN OIL FILTER ELEMENT

INITIAL SETUP

Applicable Configurations:
All

Tools:
Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Container, Two Quart
Torque Wrench, 30 to 150 Inch-Pounds
Workstand

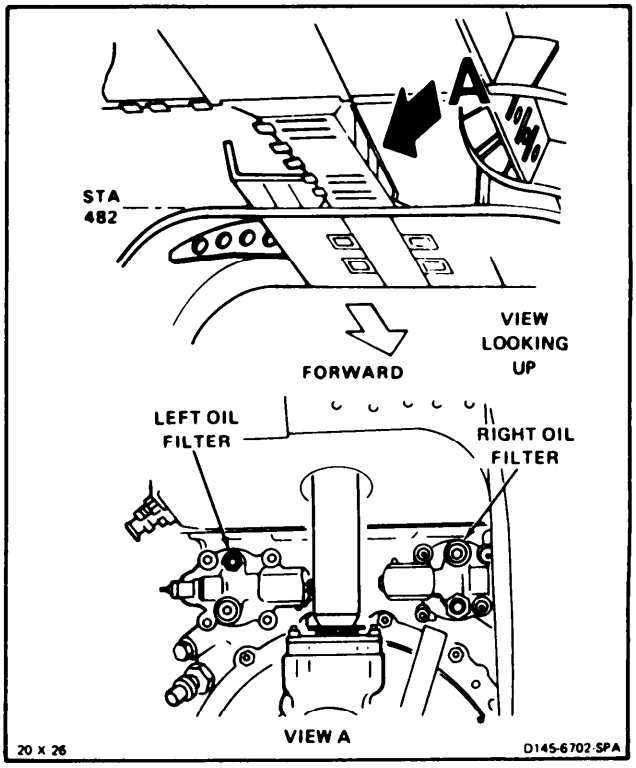
Materials:
Dry Cleaning Solvent (E162)
Cloths (E120)
Oil (E254)
Gloves (E186)
Lockwire (E231)

Parts:
Packing

Personnel Required:
67U10 Medium Helicopter Repairer
67U30 Inspector

References:
TM 55-1520-240-23P

Equipment Condition:
Battery Disconnected (Task 1-39)
Electrical Power Off
Cargo Ramp Open and Level (TM 55-1520-240-T)



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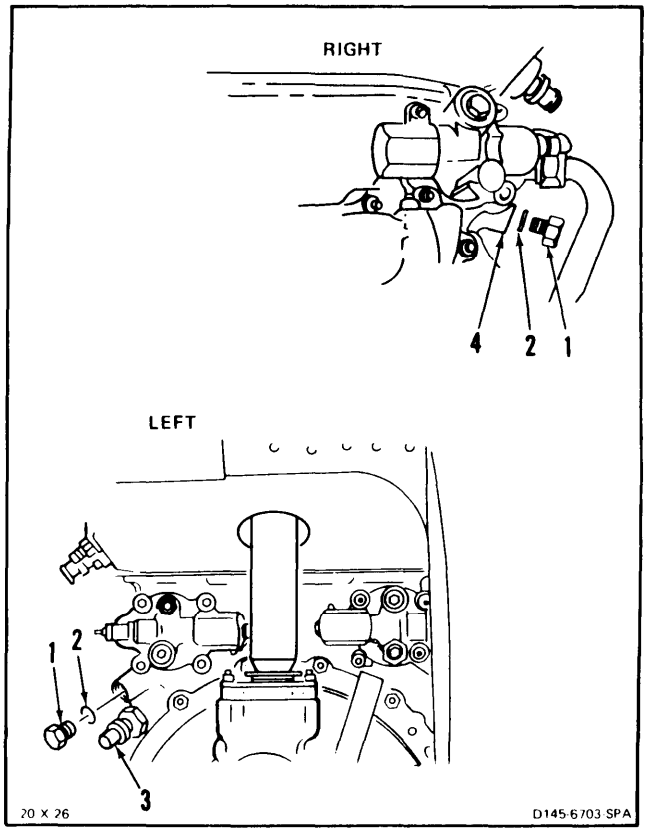
6-199 REPLACE ENGINE TRANSMISSION MAIN OIL FILTER ELEMENT (Continued)

NOTE

Procedure is same to remove left or right engine transmission main oil filter. Removal of left filter is shown here.

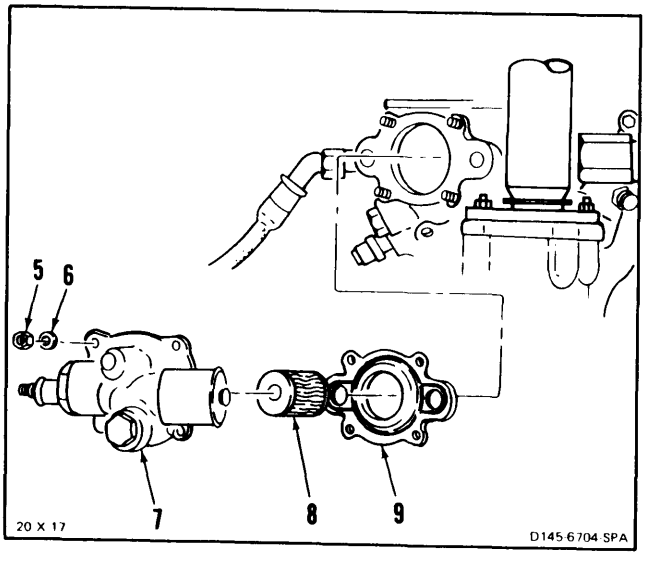
DRAIN OIL

1. Remove lockwire from drain plug (1). **Remove plug** and packing (2). **Drain oil** into container.
2. Coat plug (1) and packing (2) with oil (E254). **Install plug** and packing. **Torque plug to 45 inch-pounds.** Lockwire plug to sump drain (3) (left filter) or transmission (4) (right filter). Use lockwire (E231).



REMOVE FILTER ELEMENT

3. Remove four nuts (5) and washers (6) from filter housing (7). **Remove housing element (8), and gasket seal (9)** from transmission (4).
4. Remove element (8) from housing (7). Inspect element for debris. If debris is found, perform a contamination analysis (Task 6-108).



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INSTALL FILTER ELEMENT

WARNING

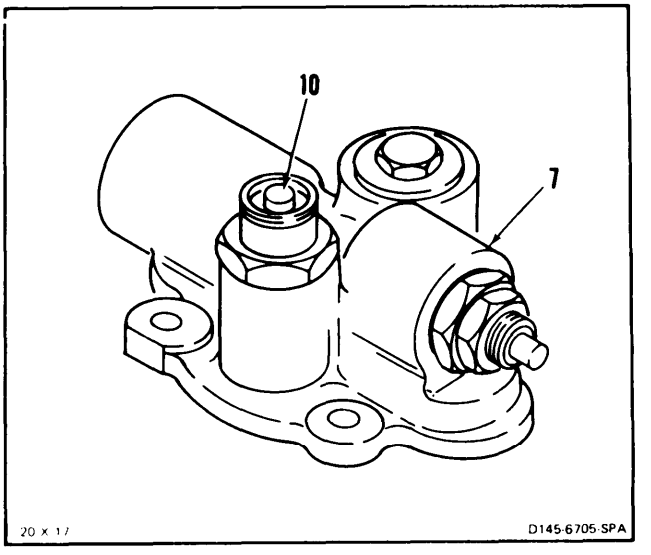
Dry cleaning solvent (E162) is flammable and toxic. It can irritate skin and cause burns. Use only in well-ventilated area, away from heat and open flame. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention.

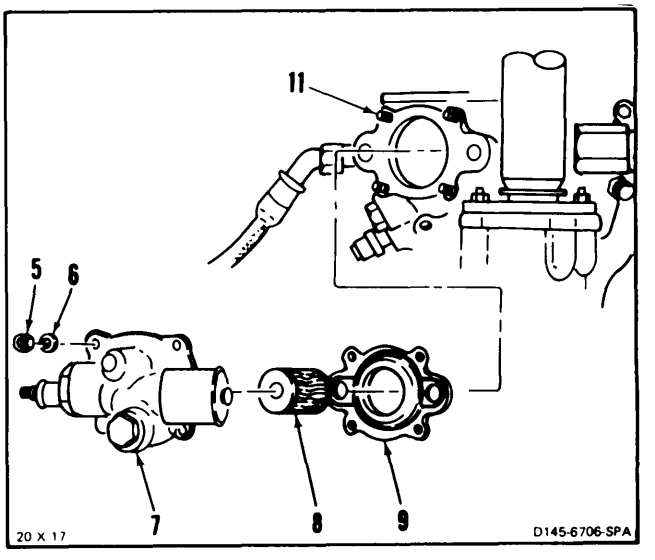
5. Clean inside of housing (7) with dry cleaning solvent (E162) and cloths (E120). Wear gloves (E186).
6. Hold housing (7) with indicating button (10) up. **Push in button** to lock it down.

NOTE

Do not install a used filter.

7. **Install new element (8)** in housing (7). **Install gasket seal (9) and housing** on four studs (11).
8. **Install four** washers (6) and nuts (5). **Torque nuts to 60 inch-pounds.**



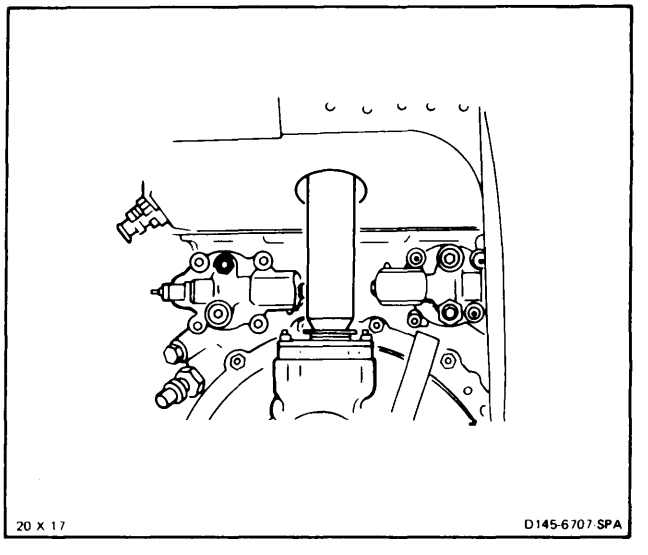


INSPECT

FOLLOW-ON MAINTENANCE:

Service engine transmission (Task 1-54).

Close cargo ramp (TM 55-1520-240-T).



END OF TASK

6-199.1 REPLACE ENGINE TRANSMISSION MAIN OIL FILTER PRESSURE DIFFERENTIAL INDICATOR

INITIAL SETUP

Applicable Configurations:
All

Tools:
Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Container, Two-Quart
Torque Wrench, 30 to 150 Inch-Pounds
Workstand

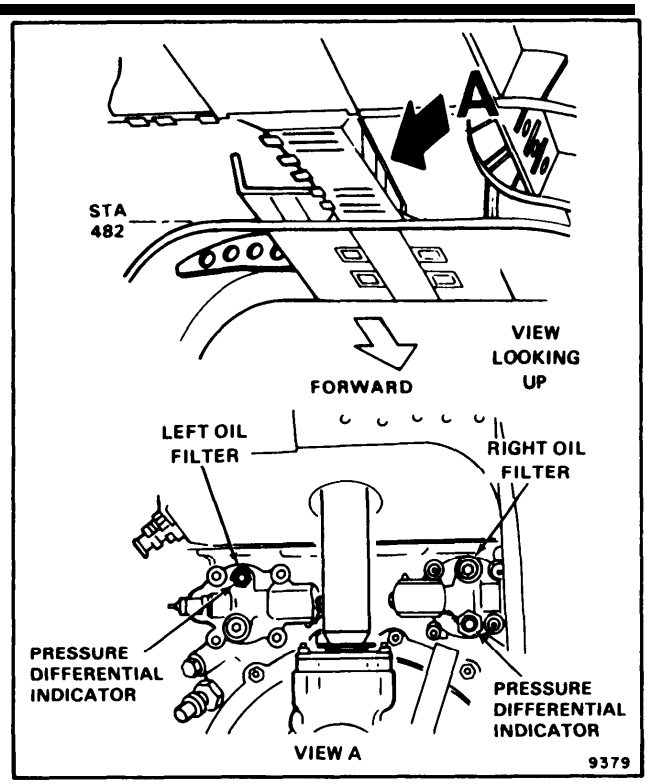
Materials:
Oil (E254)
Lockwire (E231)

Parts:
Packing

Personnel Required:
Medium Helicopter Repairer
Inspector

References:
TM 55-1520-240-23P

Equipment Condition:
Battery Disconnected (Task 1-39)
Electrical Power Off
Cargo Ramp Open and Level (TM 55-1520-240-T)

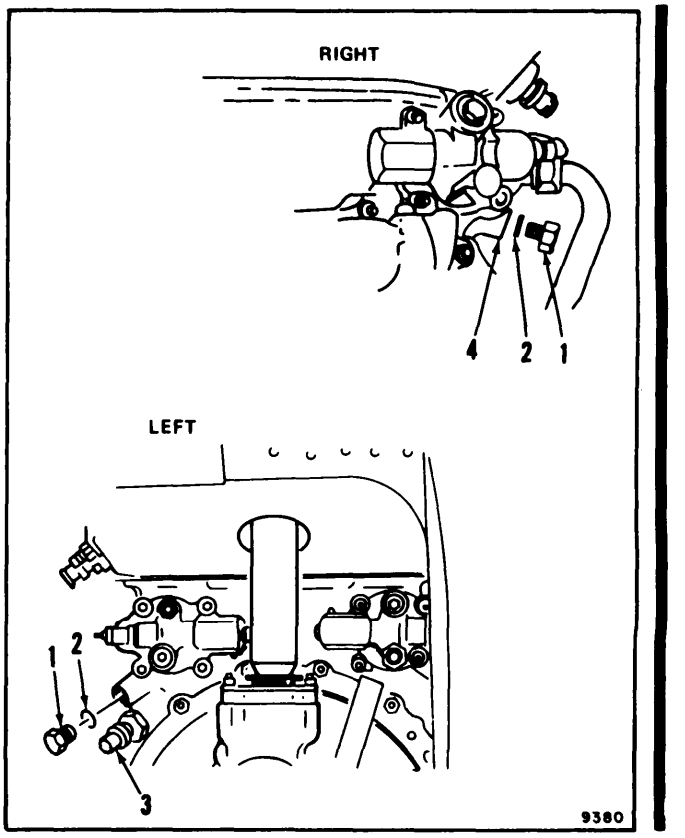


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6-199.1 REPLACE ENGINE TRANSMISSION MAIN OIL FILTER PRESSURE DIFFERENTIAL INDICATOR (Continued) 6-199.1

NOTE

Procedure is same to remove indicator from left or right engine transmission main oil filter. Removal of indicator from left filter is shown here.



DRAIN OIL

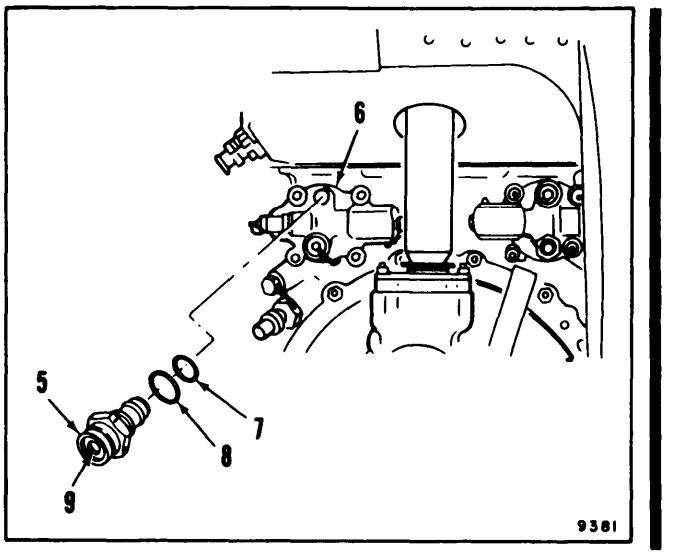
1. Remove lockwire from drain plug (1). **Remove plug** and packing (2). **Drain oil** into container.
2. Coat plug (1) and packing (2) with oil (E254). **Install plug** and packing. **Torque plug to 45 inch-pounds.** Lockwire plug to sump drain (3) (left filter) or transmission (4) (right filter). Use lockwire (E231).

REMOVE INDICATOR

3. Remove lockwire from pressure differential indicator (5). **Remove indicator** from housing (6).
4. Remove two packings (7 and 8) from indicator (5).

INSTALL INDICATOR

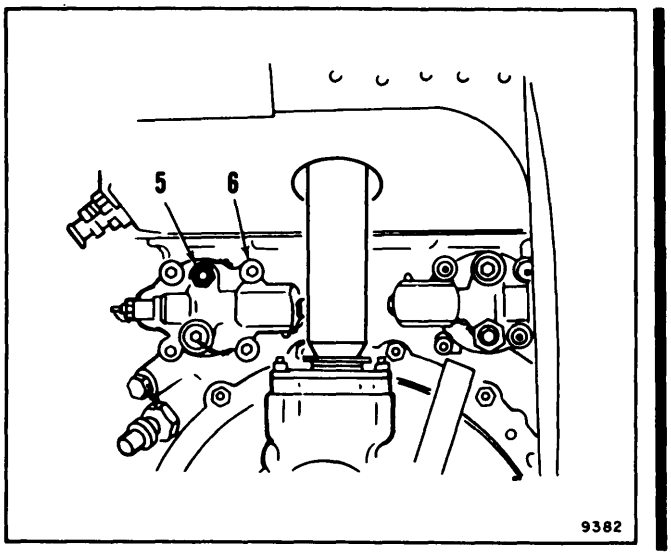
5. **Install two packings (7 and 8)** on indicator (5).
6. Hold indicator (5) so that button (9) points up. **Check that button is pushed in and locked.**
7. **Install indicator (5)** in housing (6).



GO TO NEXT PAGE

6-199.1 REPLACE ENGINE TRANSMISSION MAIN OIL FILTER PRESSURE DIFFERENTIAL INDICATOR (Continued)

8. Lockwire indicator (5) to housing (6). Use lockwire (E231).



INSPECT

FOLLOW-ON MAINTENANCE:

Close cargo ramp (TM 55-1520-240-T).

END OF TASK

6-200 ADJUST ENGINE TRANSMISSION MAIN OIL PUMP 6-200

INITIAL SETUP

Applicable Configurations:
All

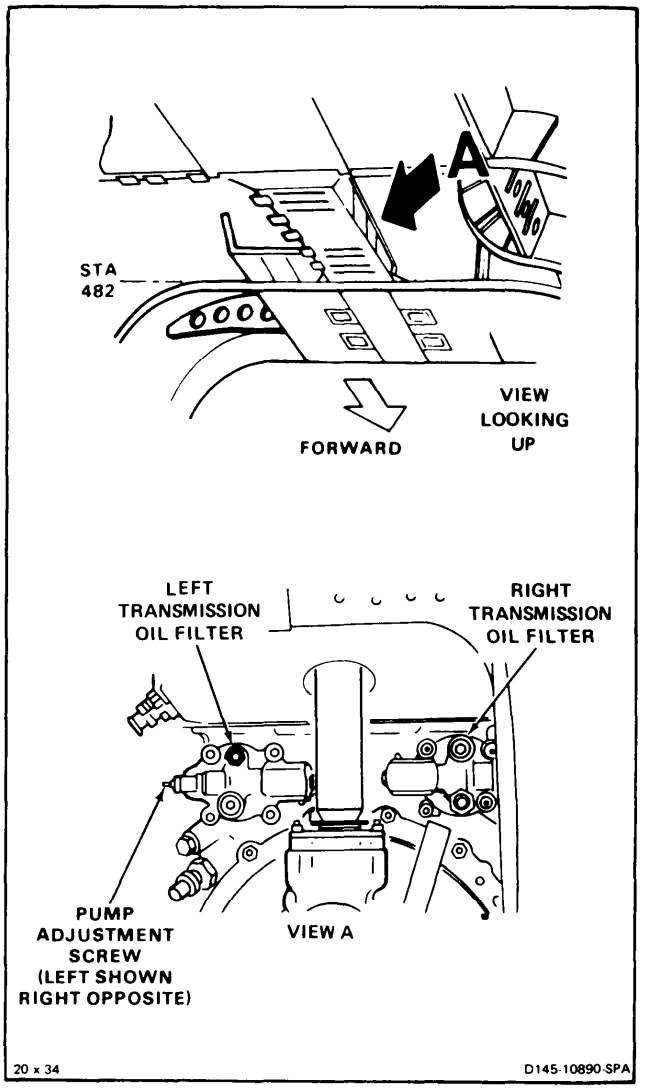
Tools:
Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Torque Wrench, 0 to 150 Inch-Pounds
Workstand

Materials:
Lockwire (E230)

Personnel Required:
Medium Helicopter Repairer
Inspector
Army Rotary-Wing Aviator (2)

References:
TM 55-1520-240-10

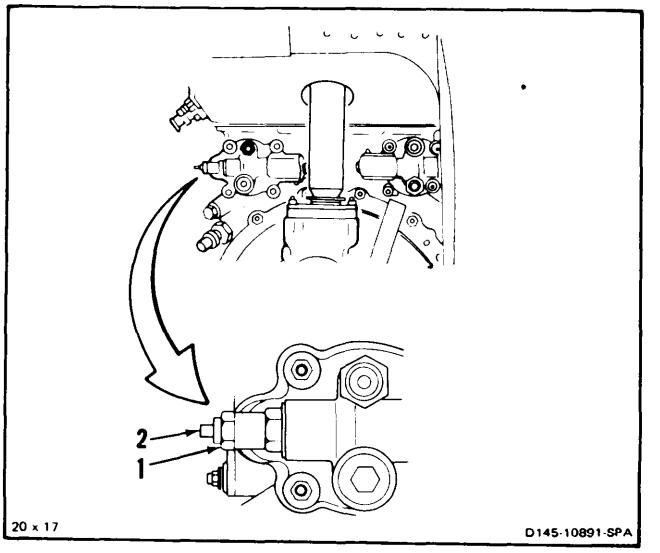
Equipment Condition:
Battery Disconnected (Task 1-39)
Electrical Power Off
Cargo Ramp Open and Level (TM 55-1520-240-T)



NOTE

Procedure is same to adjust left or right engine transmission pump. Adjustment of pump shown here.

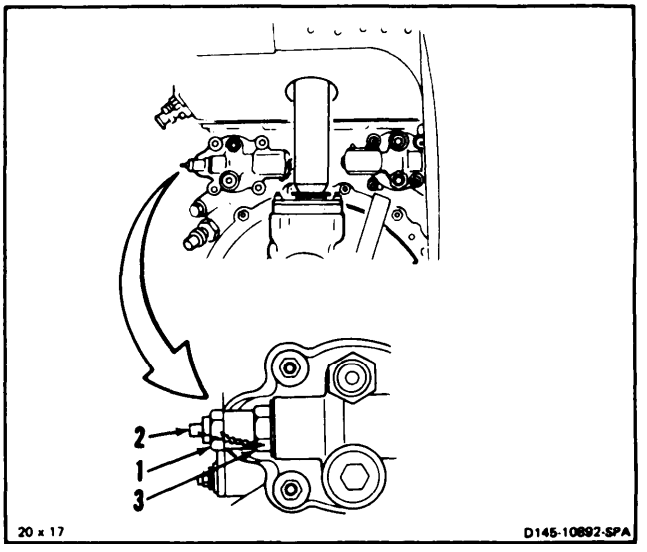
1. Remove lockwire from locknut (1) and setscrew (2). Hold setscrew and **loosen locknut.**
2. **Turn setscrew no more than 1/4 turn to adjust** transmission oil pressure. Turn setscrew clockwise to increase pressure. Turn setscrew counterclockwise to decrease pressure. Required gage pressure is 40 to 70 psi.
3. Hold setscrew (2). **Torque locknut (1) to 60 inch-pounds.**



GO TO NEXT PAGE

6-200 ADJUST ENGINE TRANSMISSION MAIN OIL PUMP (Continued)

4. Have pilot perform ground run at 100 percent rotor rpm until engine transmission oil temperature and pressure stabilize. **Record oil pressure.**
5. If oil pressure is 40 to 70 psi, go to step 6. **If pressure is not 40 to 70 psi, repeat task.**
6. Lockwire locknut (1) and setscrew (2) to retaining nut (3). Use lockwire (E230).



INSPECT

FOLLOW-ON MAINTENANCE:

Close cargo ramp (TM 55-1520-240-T).

END OF TASK

6-201 REMOVE ENGINE TRANSMISSION DEBRIS DETECTION SCREEN

INITIAL SETUP

Applicable Configurations:
All

Tools:
Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692
Open End Wrench, 1 1/2-inch
Container, Two Quart

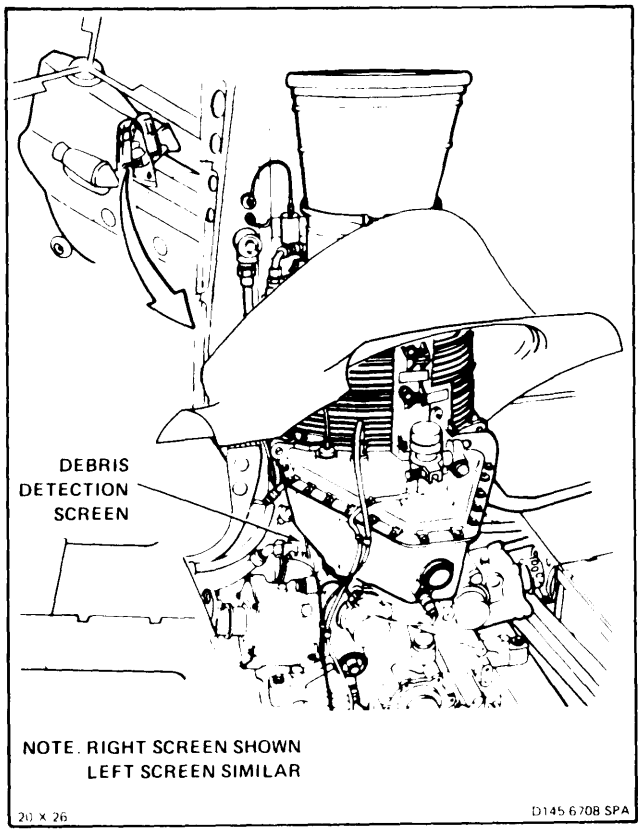
Materials:
None

Personnel Required:
67U10 Medium Helicopter Repairer

Equipment Condition:
Battery Disconnected (Task 1-39)
Electrical Power Off
Aft Pylon Access Doors Open (Task 2-2)
Aft Pylon Lower Fairing Open (Task 2-2)

NOTE

Procedure is same to remove left or right transmission debris detection screen. Removal of right screen is shown here.



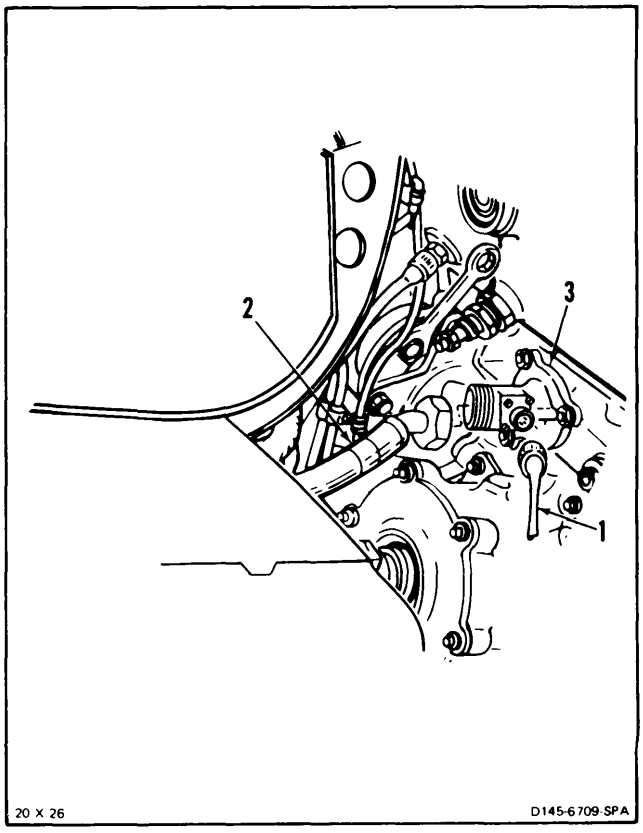
GO TO NEXT PAGE

1. **Disconnect electrical connector (1).**

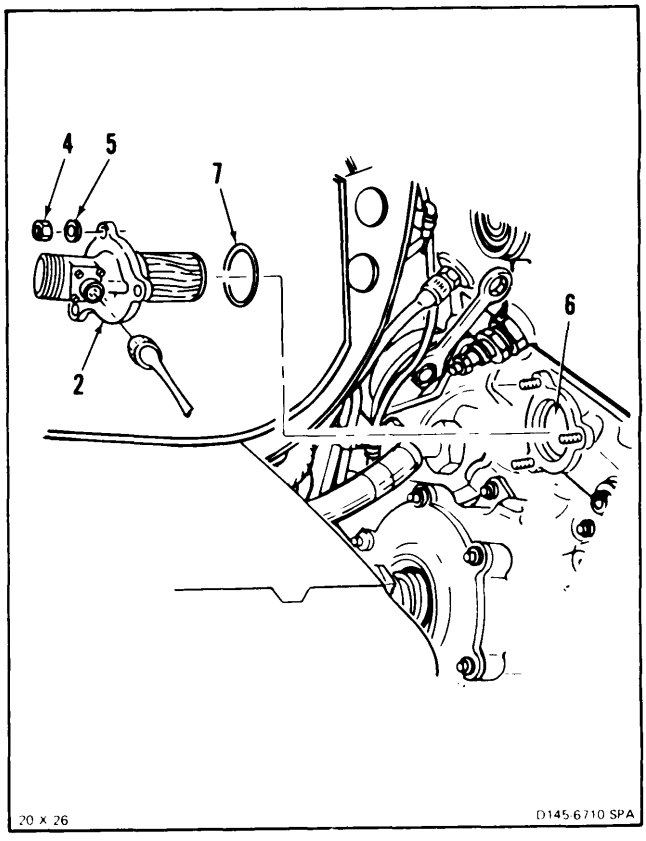
CAUTION

If hose is not removed from screen, debris may fall into hose when screen is removed from transmission. Continued contamination may result.

2. **Disconnect hose (2)** from screen (3). Cap hose quickly to prevent oil loss. Catch spilled oil in container. Retain spilled oil for contamination analysis (Task 6-108).



3. Remove three washers (4) and nuts (5). **Remove screen (2)** from transmission cavity (6). Catch spilled oil in container.
4. Remove packing (7) from screen (2).



FOLLOW-ON MAINTENANCE:

None

END OF TASK

6-202 INSPECT ENGINE TRANSMISSION DEBRIS DETECTION SCREEN

INITIAL SETUP

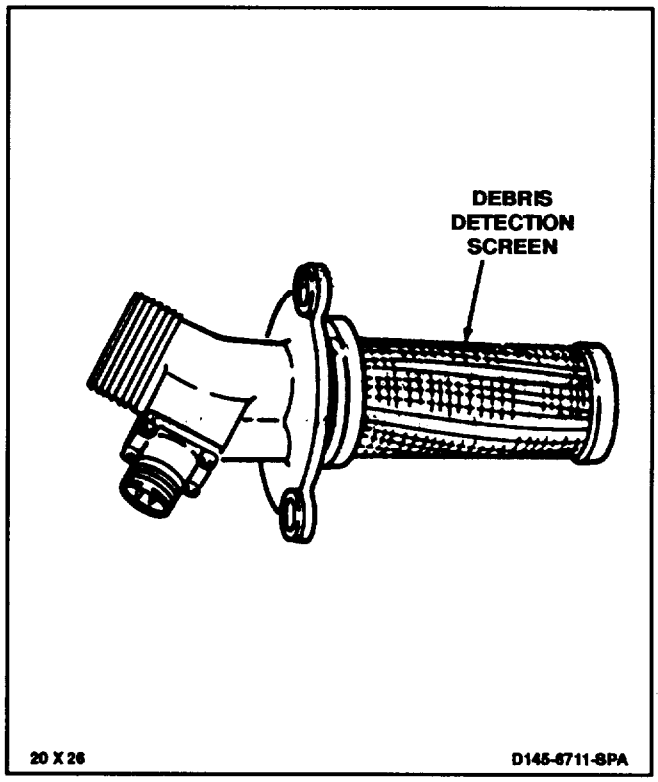
Applicable Configurations:
All

Tools:
Goggles

Materials:
Dry Cleaning Solvent (E162)
Cloth (E120)
Brush (E86)
Gloves (E186)

Personnel Required:
Medium Helicopter Repairer

Equipment Condition:
Off Helicopter Task



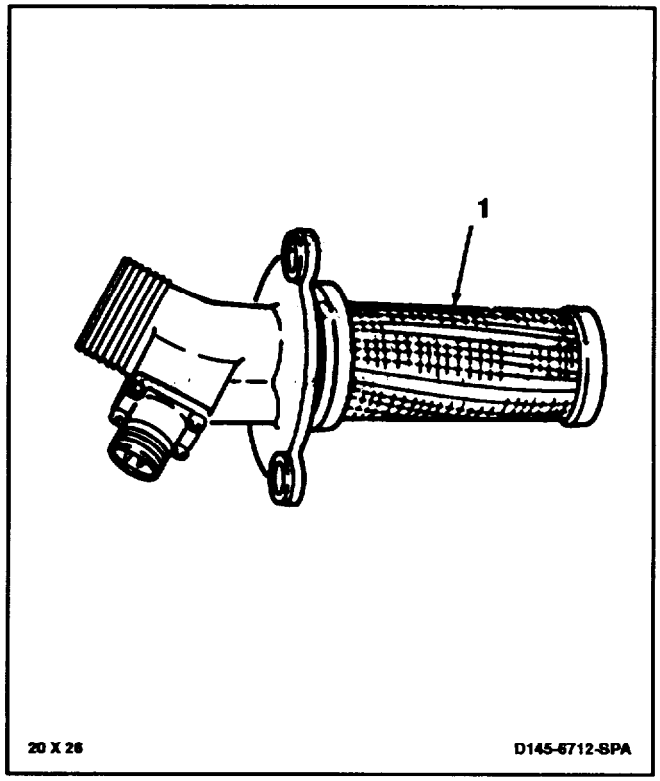
1. **Check screen (1)** for bits of metal and other debris. Retain all debris for contamination analysis (Task 6-194).

WARNING

Dry cleaning solvent (E162) is flammable and toxic. It can irritate skin and cause burns. Use only in well-ventilated area, away from heat and open flame. In case of contact immediately flush skin or eyes with water for at least 15 minutes Get medical attention for eyes.

2. **Clean screen (1)** with dry cleaning solvent (E162) and brush (E86). Wear gloves (E186) and goggles.

3. **Inspect screen (1)** for tears. There shall be no tears.



FOLLOW-ON MAINTENANCE:

None

END OF TASK

6-203 INSTALL ENGINE TRANSMISSION DEBRIS DETECTION SCREEN

INITIAL SETUP

Applicable Configurations:
All

Tools:
Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692
Container, Two Quart
Open End Wrench, 1 1/2-inch
Crows Foot, 1 1/2-inch
Torque Wrench, 30 to 150 Inch-Pounds

Materials:
None

Parts:
Packing

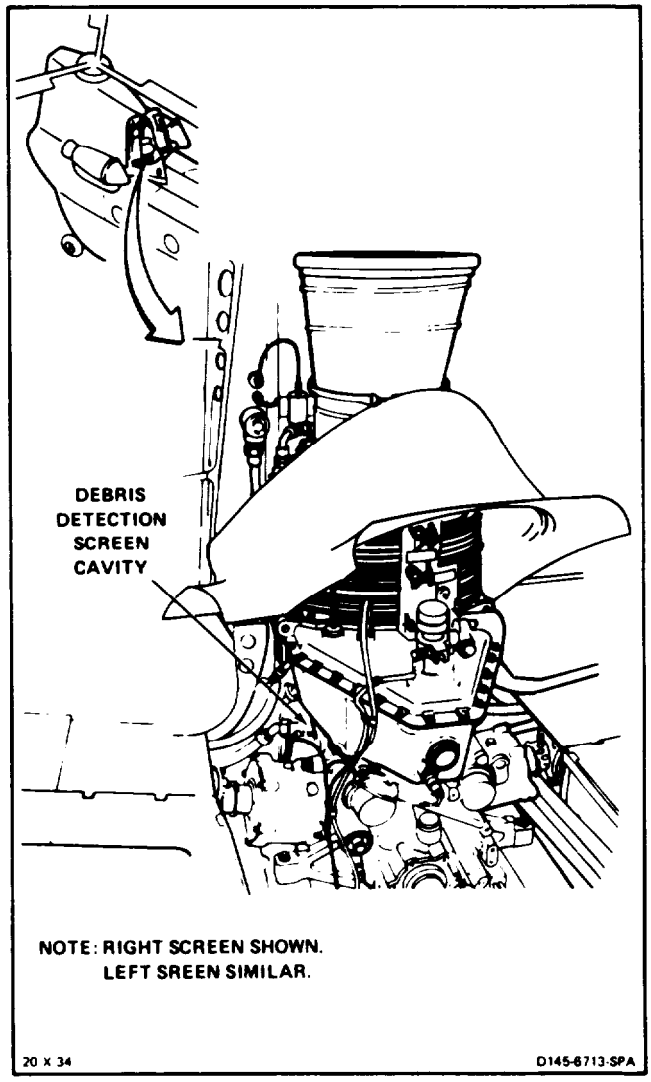
Personnel Required:
67U10 Medium Helicopter Repairer
67U30 Inspector

References:
TM 55-1520-240-23P
TM 55-1520-240-T

Equipment Condition:
Engine Transmission Debris Detection Screen Inspected (Task 6-202)

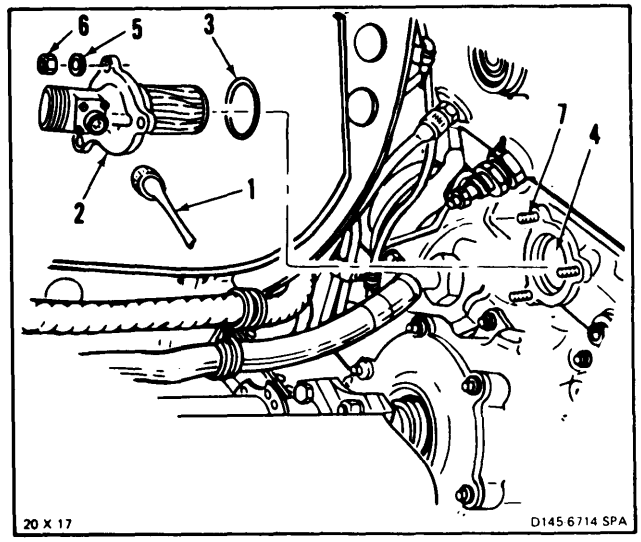
NOTE

Procedure is same to install left or right transmission debris detector screen. Installation of right screen is shown here.



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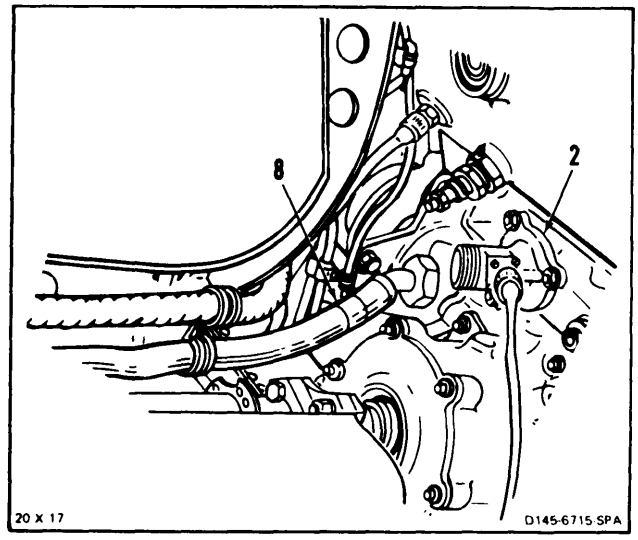
1. **Connect electrical connector (1)** to screen (2).
2. **Perform operational check** of engine transmission debris detection system (TM 55-1520-240-T).
3. Install packing (3) on screen (2). **Install screen** in transmission cavity (4).
4. **Install** washers (5) and **nuts (6)** on three studs (7). **Torque nuts to 80 inch-pounds.**



NOTE

Connect hose quickly to prevent oil loss.

5. Remove cap and **connect oil hose (8)** to screen (2). Use container to catch spilled oil. **Torque hose to 80 inch-pounds.**



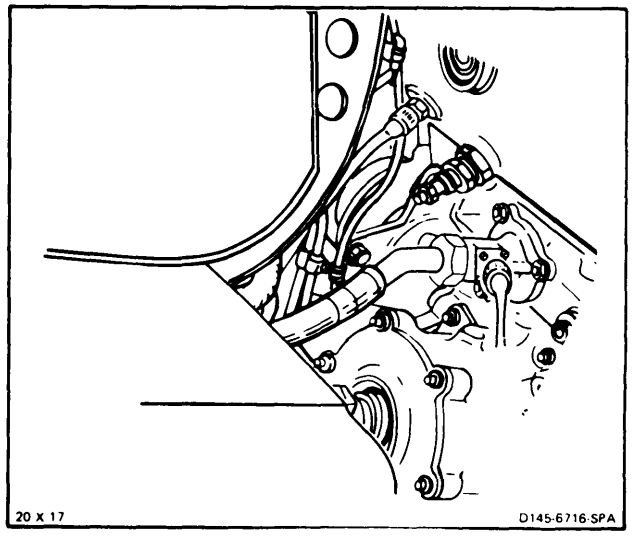
INSPECT

FOLLOW-ON MAINTENANCE:

Service engine transmission (Task 1-54).

Close aft pylon lower fairing (Task 2-2).

Close aft pylon access doors (Task 2-2).



END OF TASK

6-204 REMOVE ENGINE TRANSMISSION CHIP DETECTOR PLUG

INITIAL SETUP

Applicable Configurations:

Without 37

Tools:

None

Materials:

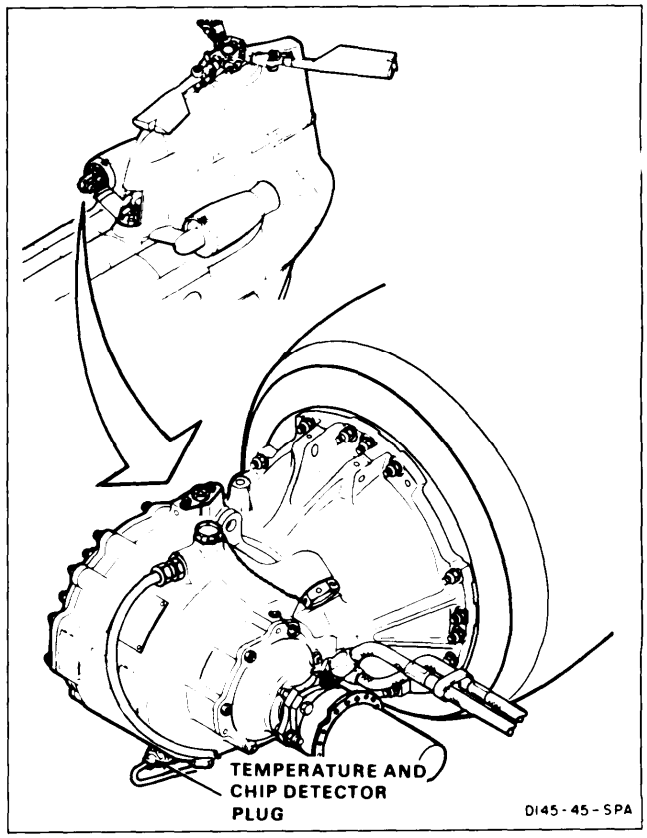
None

Personnel Required:

Medium Helicopter Repairer

Equipment Condition:

Battery Disconnected (Task 1-39)
Electrical Power Off
Engine Air Inlet Screen Removed (Task 4-65)
Engine Transmission Fairing Removed (Task 4-70)



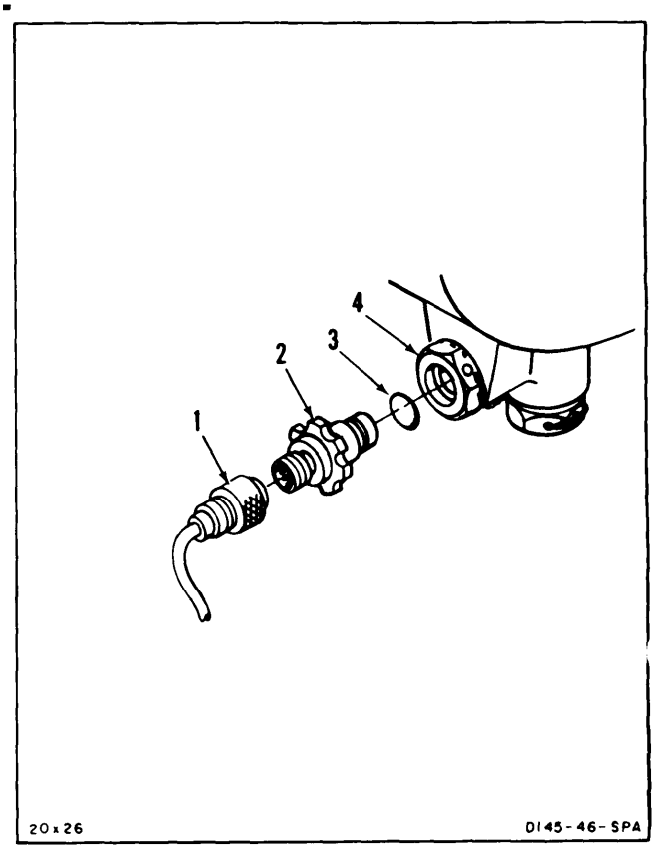
NOTE

Procedure is same to remove plug from right or left engine transmission. Right transmission is shown here.

1. **Disconnect cable plug (1).**
2. Push in chip detector plug (2) and turn counterclockwise. **Remove chip detector plug** and packing (3) from body (4).

FOLLOW-ON MAINTENANCE:

None



END OF TASK

6-205 INSPECT ENGINE TRANSMISSION CHIP DETECTOR PLUG

INITIAL SETUP

Applicable Configurations:

Without 37

Tools:

None

Materials:

Cloths (E120)
Dry Cleaning Solvent (E162)
Gloves (E186)

Parts:

Steel Nut, 1/4-28

Personnel Required:

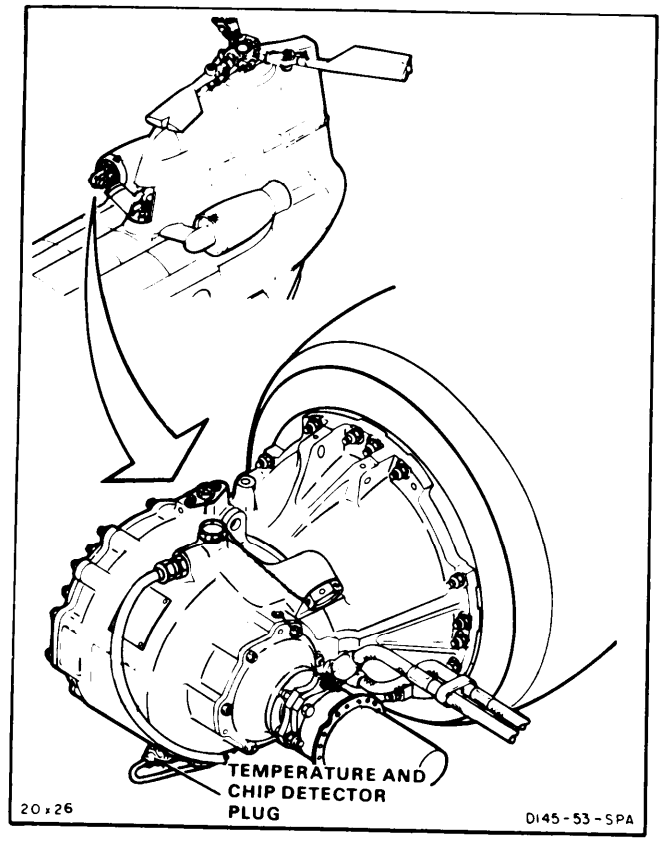
Medium Helicopter Repairer
Inspector

References:

TM 55-1520-240-23P
TM 55-1520-240-T

Equipment Condition:

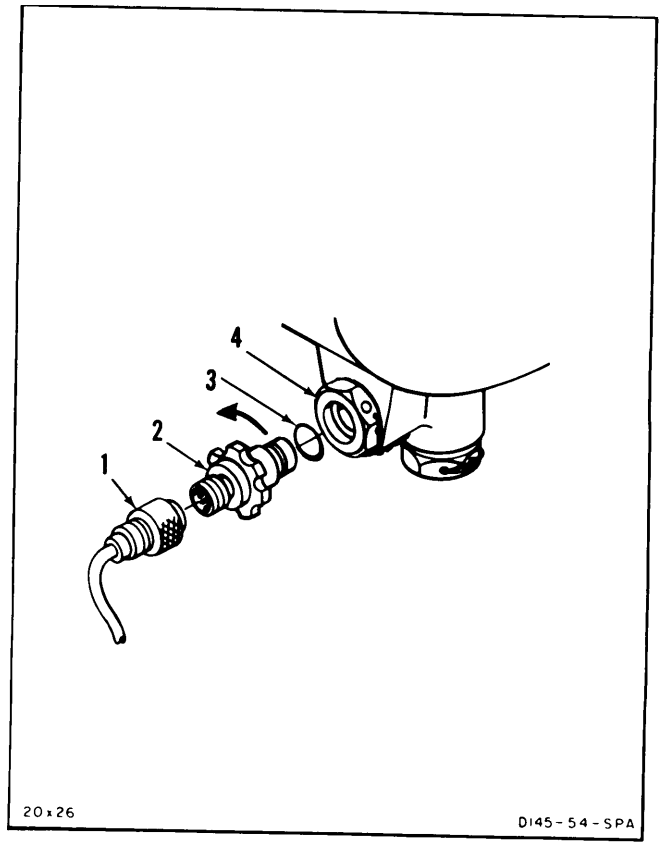
Battery Disconnected (Task 1-39)
Electrical Power Off
Engine Air Inlet Screen Removed (Task 4-65)
Engine Transmission Fairing Removed (Task 4-70)



NOTE

Procedure is same to inspect plug on left or right engine transmission. Right transmission is shown here.

1. **Disconnect cable plug (1).**
2. Push in chip detector plug (2) and turn counterclockwise until it unlocks. **Remove chip detector plug** and packing (3) from body (4).



GO TO NEXT PAGE

6-205 INSPECT ENGINE TRANSMISSION CHIP DETECTOR PLUG (Continued) 6-205

NOTE

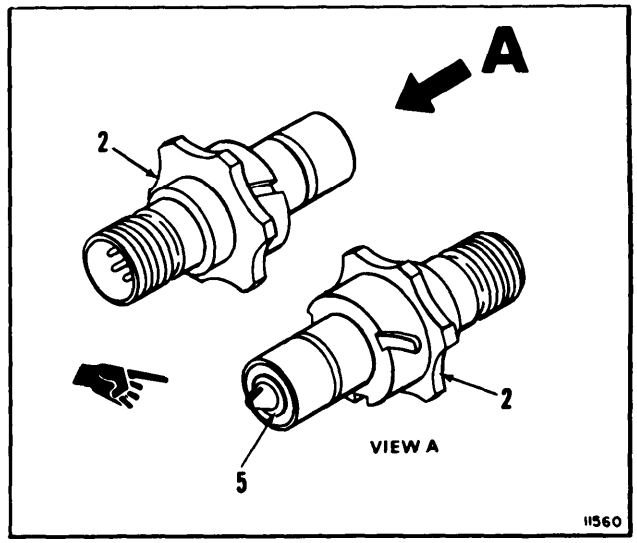
Some fuzz on tip of plug is normal.

3. **Check tip (5) of plug (2) for chips.** Remove any chips and save them for contamination analysis (Task 6-194).

WARNING

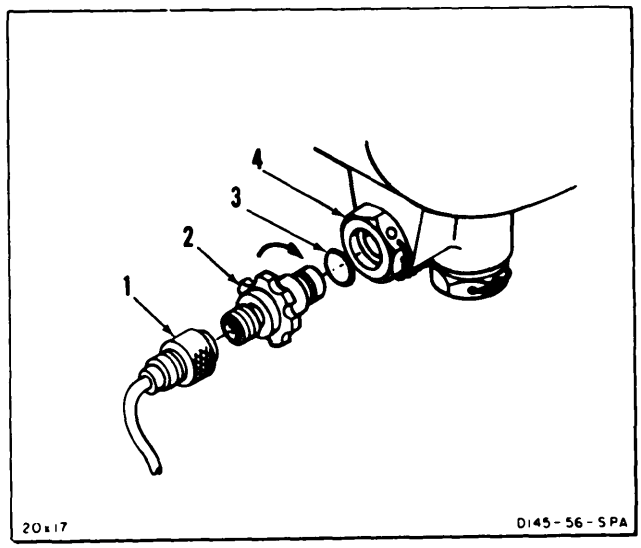
Dry cleaning solvent (E162) is flammable and toxic. It may irritate skin and cause burns. Use only in well-ventilated area away from heat and open flame. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.

4. Clean tip (5) with dry cleaning solvent (E162) and cloths (E120). Wear gloves (E186). Dry tip.
5. Check magnetism of tip (5). Tip shall lift a 1/4-28 steel nut.



6. Perform operational check of chip detector plug (2) (TM 55-1520-240-T).
7. **Install chip detector plug (2)** and packing (3) in body (4). Push in and turn chip detector plug clockwise to lock in place.
8. **Connect cable plug (1).**

INSPECT

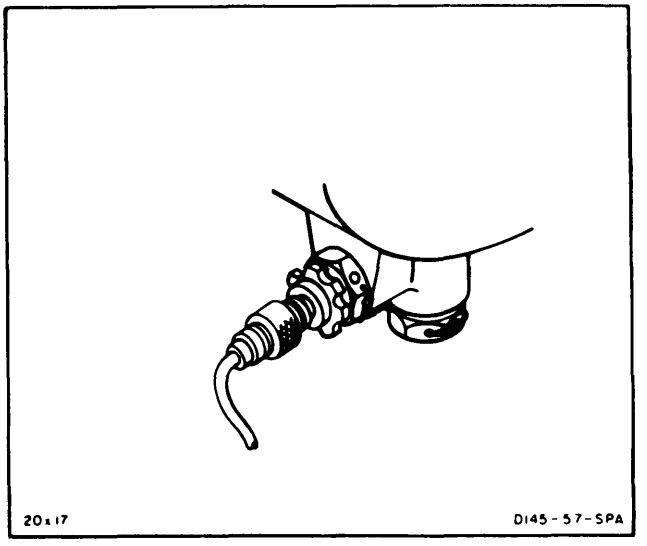


GO TO NEXT PAGE

FOLLOW-ON MAINTENANCE:

Install engine transmission fairing (Task 4-73).

Install engine air inlet fairing (Task 4-75).



END OF TASK

INITIAL SETUP

Applicable Configurations:
Without 37

Tools:
None

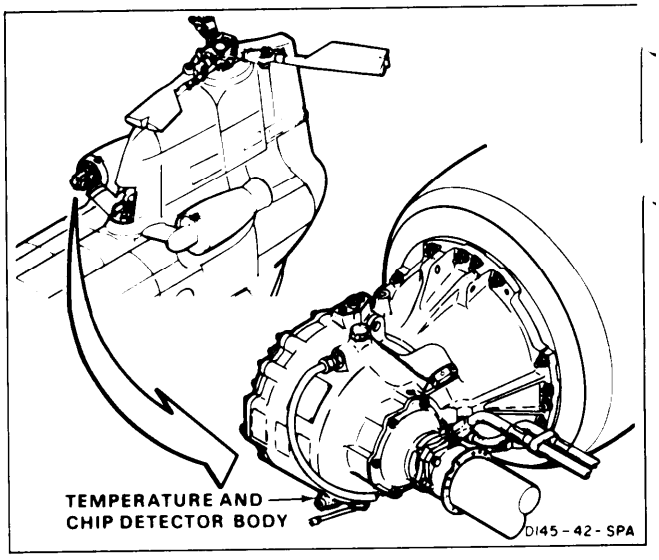
Materials:
None

Parts:
Preformed Packing

Personnel Required:
Medium Helicopter Repairer
Inspector

References:
TM 55-1520-240-23P

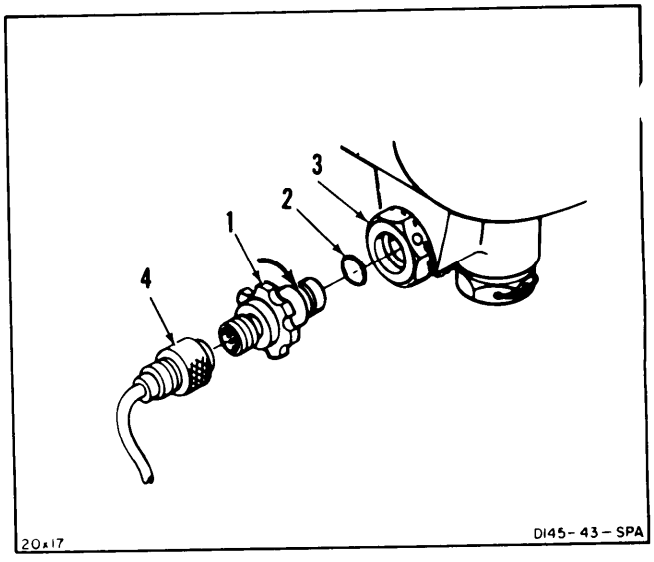
Equipment Condition:
Operational Check of Temperature and Chip Detector Plug Performed (TM 55-1520-240-T)



NOTE

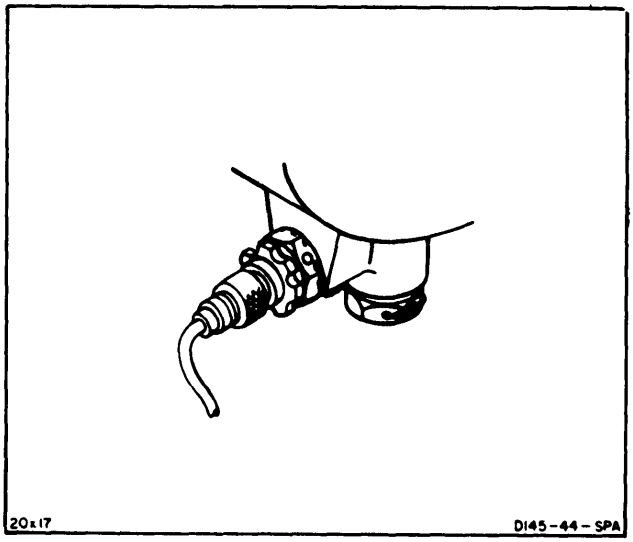
Procedure is same to install plug on left or right engine transmission. Right transmission is shown here.

1. **Install chip detector plug (1)** and packing (2) in body (3). Push in and turn chip detector plug clockwise to lock in place.
2. **Connect cable plug (4).**



GO TO NEXT PAGE

6-206 INSTALL ENGINE TRANSMISSION CHIP DETECTOR PLUG (Continued)



FOLLOW-ON MAINTENANCE:

Install engine transmission fairing (Task 4-73).

Install engine air inlet fairing (Task 4-75).

END OF TASK

6-207 REMOVE ENGINE TRANSMISSION TEMPERATURE AND CHIP DETECTOR

INITIAL SETUP

Applicable Configurations:

Without 37

Tools:

Aircraft Mechanic Tool Kit,
NSN 5180-00-323-4692
Torque Wrench, 0 to 150 Inch-Pounds
Container, 1 Gallon
Modified Socket (Appx E)

Materials:

Cloths (E120)

Parts:

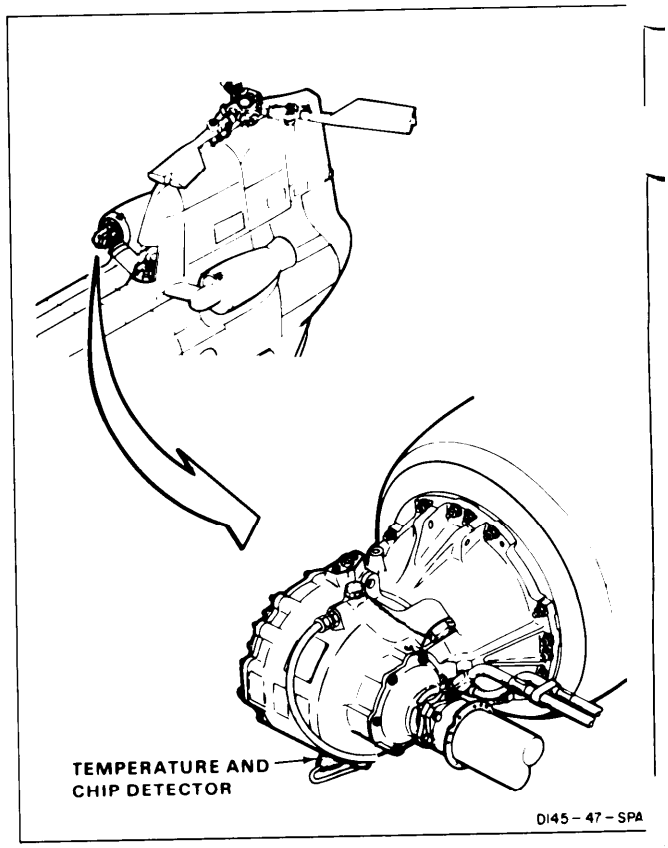
Preformed Packing

Personnel Required:

Medium Helicopter Repairer

Equipment Condition:

Battery Disconnected (Task 1-39)
Electrical Power Off
Engine Air Inlet Screen Removed (Task 4-65)
Engine Transmission Fairing Removed (Task 4-70)

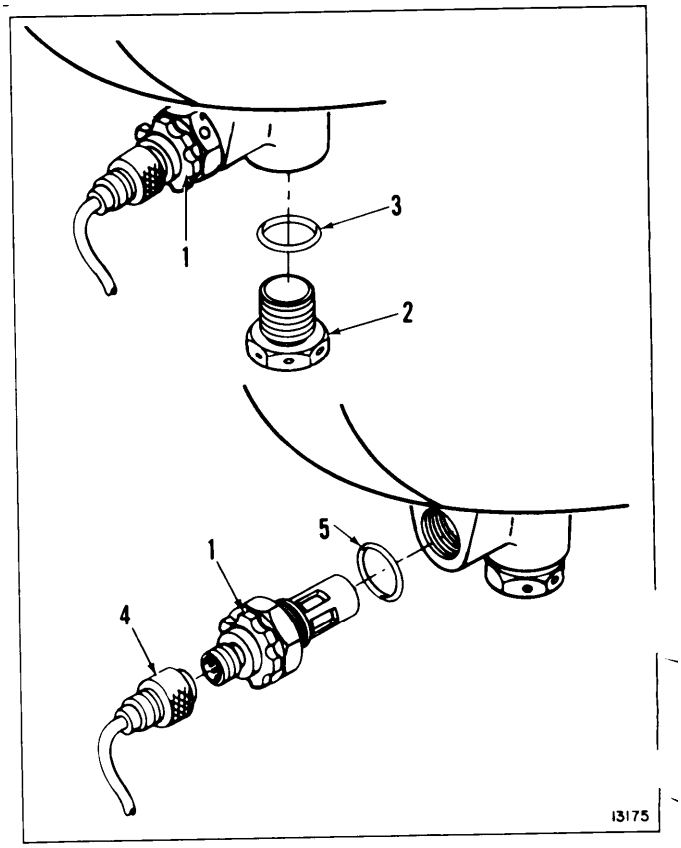


NOTE

Procedure is same to remove temperature and chip detector from left or right engine transmission. Right transmission is shown here.

1. Remove lockwire from detector (1) and drain plug (2).
2. Remove plug (2) and packing (3). **Drain oil.** Use container for oil.
3. Install plug (2) and packing (3). **Torque plug to 90 inch-pounds.**
4. Wipe up any spilled oil with cloths (E120).
5. **Disconnect cable plug (4).**
6. **Remove detector (1)** and packing (5). Use modified socket (Appx E).

FOLLOW-ON MAINTENANCE:
None



END OF TASK

6-208 INSTALL ENGINE TRANSMISSION TEMPERATURE AND CHIP DETECTOR

INITIAL SETUP

Applicable Configurations:
Without 37

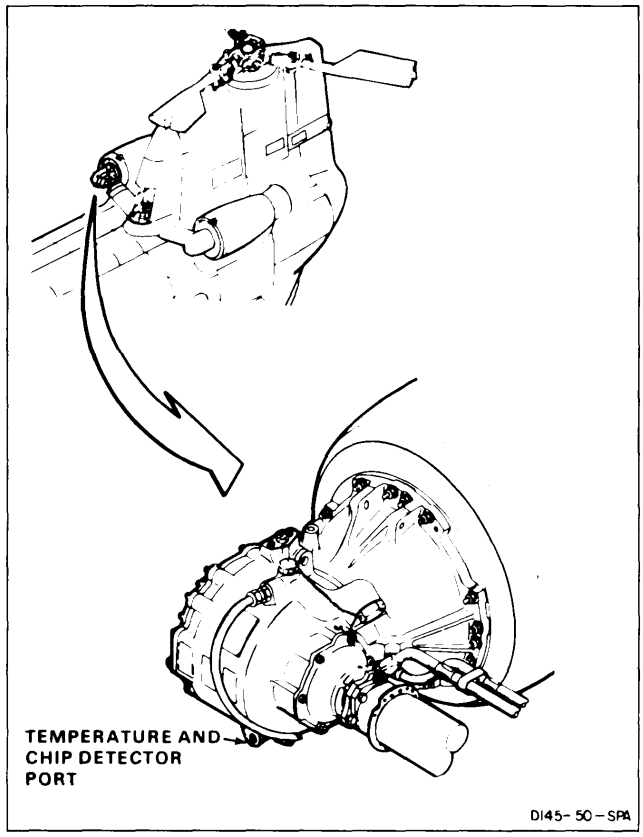
Tools:
Aircraft Mechanic Tool Kit,
NSN 5180-00-323-4692
Torque Wrench, 0 to 150 Inch-Pounds
Modified Socket (Appx E)

Materials:
Lockwire (E231)

Parts:
Preformed Packing

Personnel Required:
Medium Helicopter Repairer
Inspector

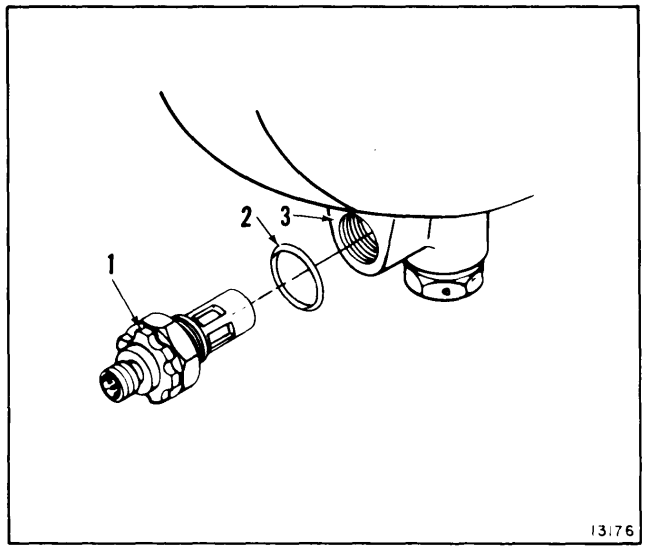
References:
TM 55-1520-240-23P



NOTE

Procedure is same to install temperature and chip detector on left or right engine transmission. Right transmission is shown here.

1. **Install detector (1)** and packing (2) in port (3). **Torque detector to 90 inch-pounds.** Use modified socket (Appx E).

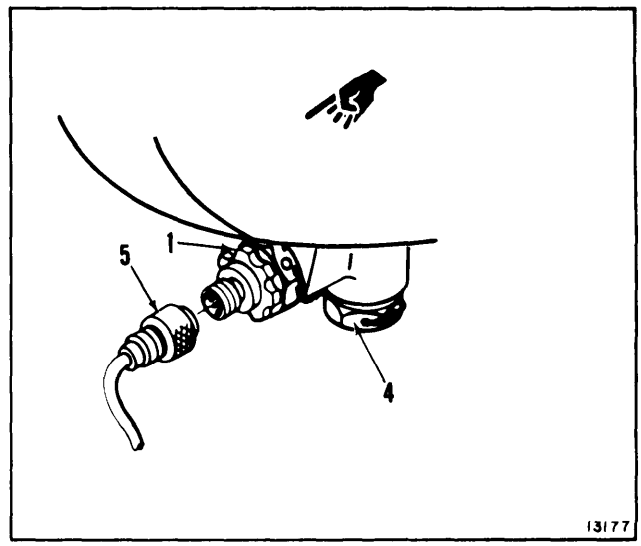


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6-208 INSTALL ENGINE TRANSMISSION TEMPERATURE AND CHIP DETECTOR (Continued) 6-208

2. Lockwire detector (1) to drain plug (4). Use lockwire (E231).
3. Connect cable plug (5).

INSPECT



FOLLOW-ON MAINTENANCE:

Perform operational check of chip detector (TM 55-1520-240-T).

Service engine transmission (Task 1-54).

Install engine transmission fairing (Task 4-73).

Install engine air inlet fairing (Task 4-75).

END OF TASK

6-208.1 INSPECT ENGINE TRANSMISSION CHIP DETECTOR PLUG 6-208.1

INITIAL SETUP

Applicable Configurations:
With 37

Tools:
None

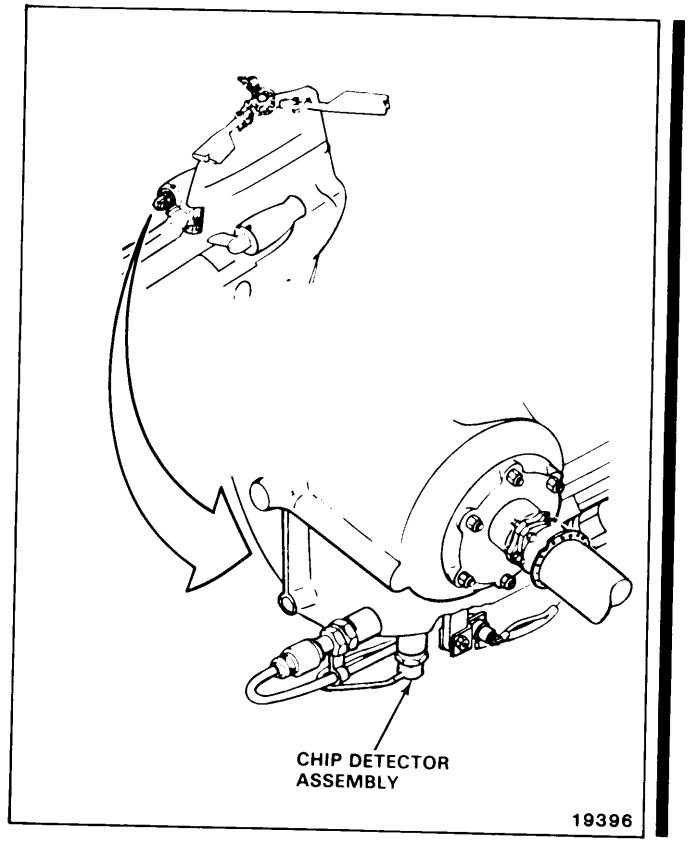
Materials:
Cloths (E120)
Dry Cleaning Solvent (E162)
Gloves (E186)

Parts:
Steel Nut, 1/4-28

Personnel Required:
Medium Helicopter Repairer
Inspector

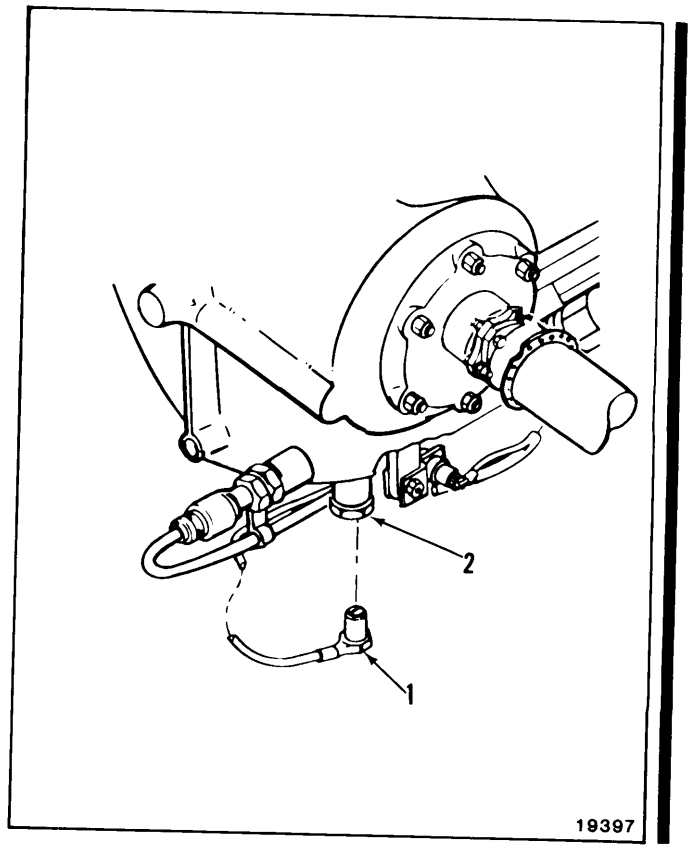
References:
TM 55-1520-240-23P
TM 55-1520-240-T

Equipment Condition:
Battery Disconnected (Task 1-39)
Electrical Power Off
Engine Air Inlet Screen Removed (Task 4-65)
Engine Transmission Fairing Removed (Task 4-70)



NOTE
Procedure is same to inspect plug on left or right engine transmission. Right transmission is shown here.

1. Push in chip detector plug (1) and turn counterclockwise. **Remove chip detector plug** from valve (2).



GO TO NEXT PAGE

NOTE

Some fuzz on tip of plug is normal.

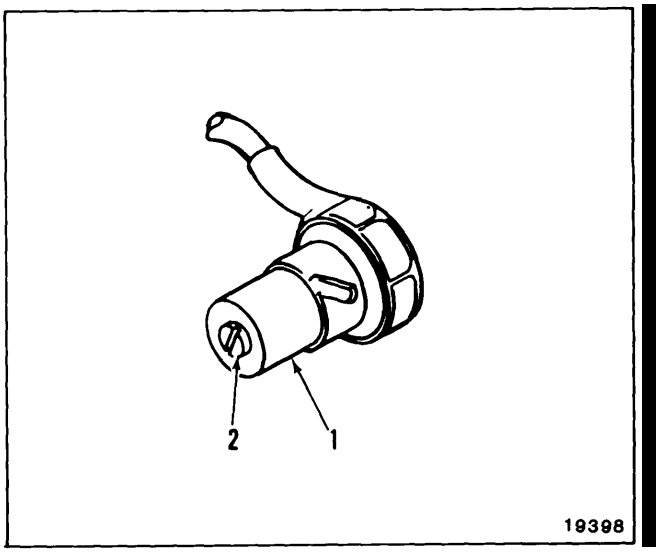
2. **Check tip (3) of plug (1) for chips.** Remove any chips and save them for contamination analysis (Task 6-194).

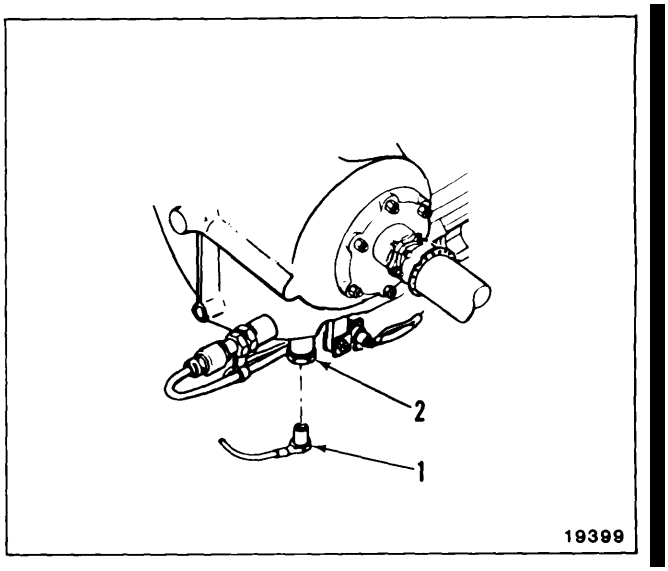
WARNING

Dry cleaning solvent (E162) is flammable and toxic. It may irritate skin and cause burns. Use only in well-ventilated area away from heat and open flame. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.

3. Clean tip (3) with dry cleaning solvent (E162) and cloths (E120). Wear gloves (E186). Dry tip.
4. Check magnetism of tip (3) Tip shall lift a 1/4-28 steel nut.
5. Perform operational check of chip detector plug (1) (TM 55-1520-240-T).
6. **Install chip detector plug (1)** in valve (2). Push in and turn chip detector plug clockwise to lock in place.

INSPECT

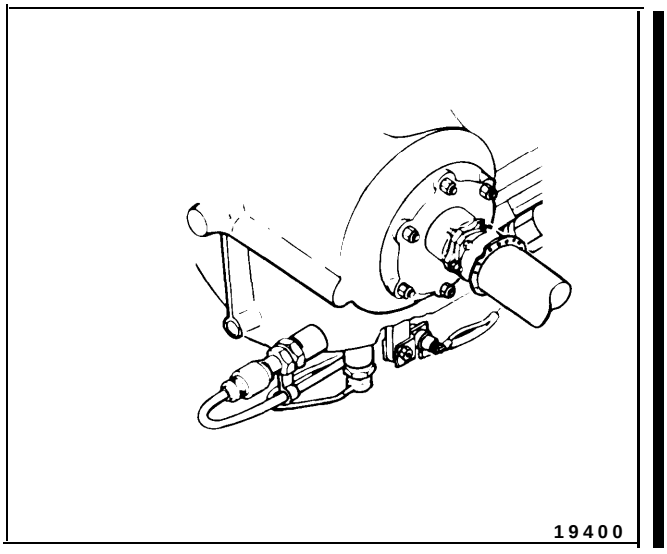




6-208.1 INSPECT ENGINE TRANSMISSION CHIP DETECTOR PLUG 6-208.1 (Continued)

FOLLOW-ON MAINTENANCE:

Install engine transmission fairing (Task 4-73).
Install engine air inlet fairing (Task 4-75).



END OF TASK

6-208.2 REMOVE ENGINE TRANSMISSION CHIP DETECTOR ASSEMBLY

INITIAL SETUP:

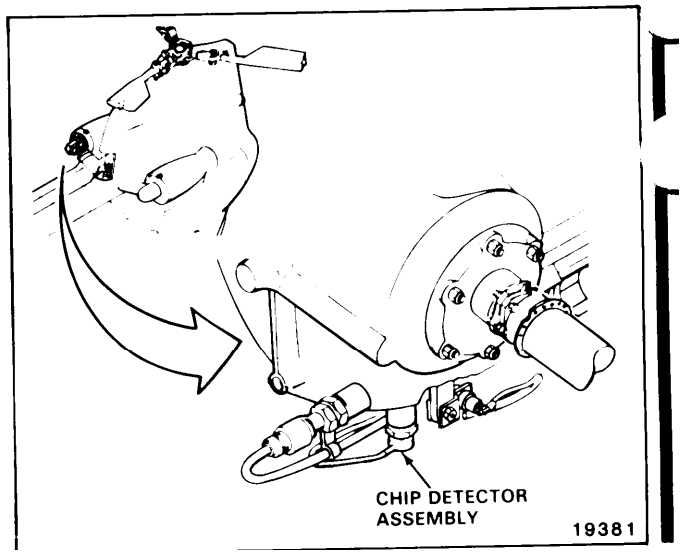
Applicable Configurations:
With 37

Tools:
Aircraft Mechanic Tool Kit,
NSN 5180-00-323-4692
Container, 1 Gallon

Materials:
Cloths (E120)

Personnel Required:
Medium Helicopter Repairer

Equipment Condition:
Battery Disconnected (Task 1-39)
Electrical Power Off
Engine Air Inlet Screen Removed (Task 4-65)
Engine Transmission Fairing Removed (Task 4-70)



NOTE

Procedure is same to remove chip detector assembly from left or right transmission. Right transmission shown.

REMOVE PLUG

1. **Remove chip detector plug (1)** by turning it counterclockwise and pulling it from valve (2).

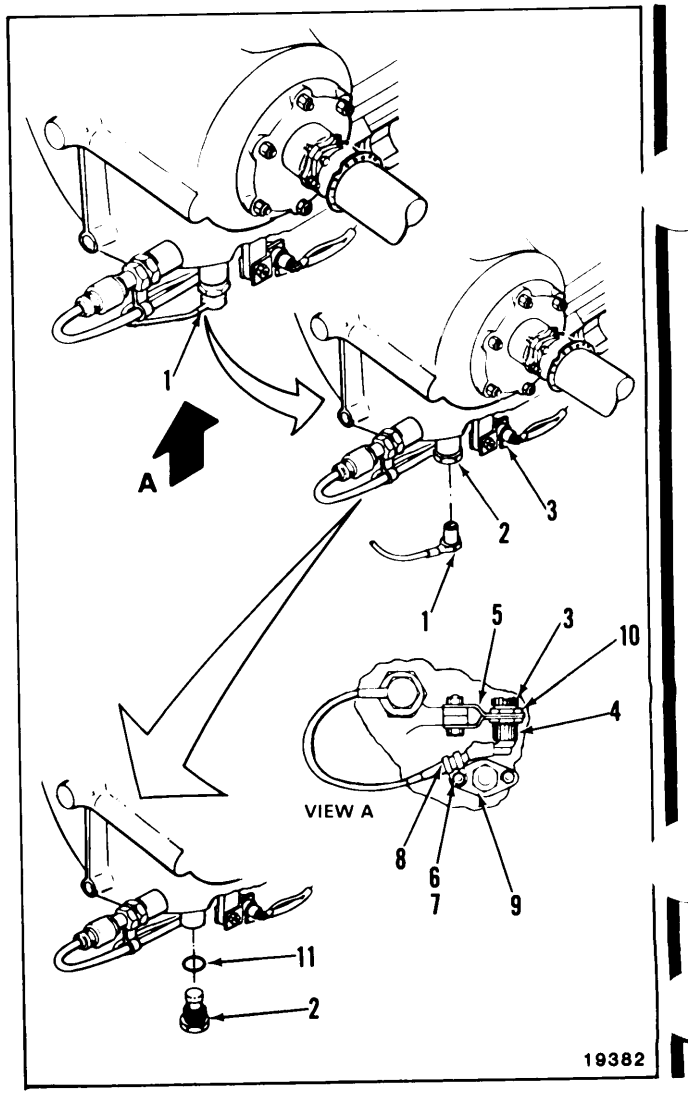
REMOVE CABLE ASSEMBLY

2. **Disconnect electrical connector (3)** from assembly connector (4) at bracket (5).
3. Remove nut (6), washer (7), and clamp (8) from stud on oil jet (9). **Remove clamp from cable.** Loosely install clamp, nut, and washer on stud.
4. Remove lockwire from assembly connector nut (10). Remove nut. **Remove connector (4) from bracket (5).** Loosely install nut on connector.

REMOVE VALVE

5. Remove lockwire from valve (2).
6. Place container under transmission to collect drain oil.
7. **Screw valve (2) out of transmission.** Let oil drain. Discard packing (11).

FOLLOW-ON MAINTENANCE:
None



END OF TASK

6-208.3 INSTALL ENGINE TRANSMISSION CHIP DETECTOR ASSEMBLY

INITIAL SETUP

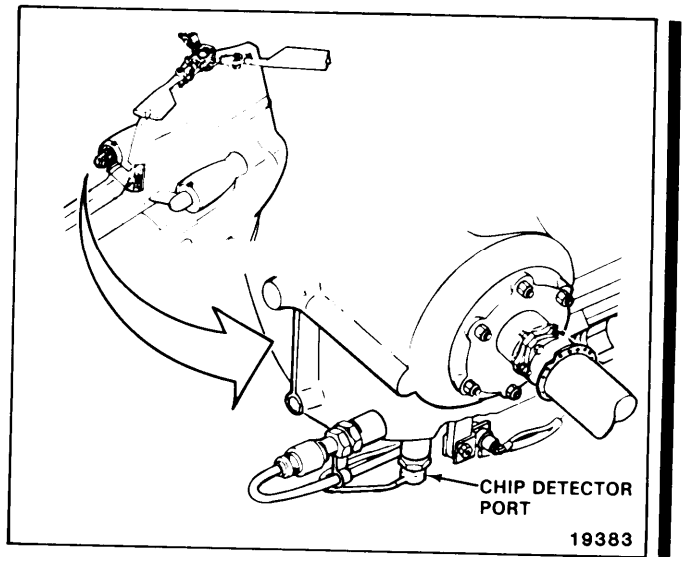
Applicable Configurations:
With 37

Tools:
Aircraft Mechanic Tool Kit,
NSN 5180-00-323-4692
Torque Wrench, 0 to 30 Inch-Pounds
Torque Wrench, 0 to 150 Inch-Pounds

Materials:
Lockwire (E231)

Personnel Required:
Medium Helicopter Repairer
Inspector

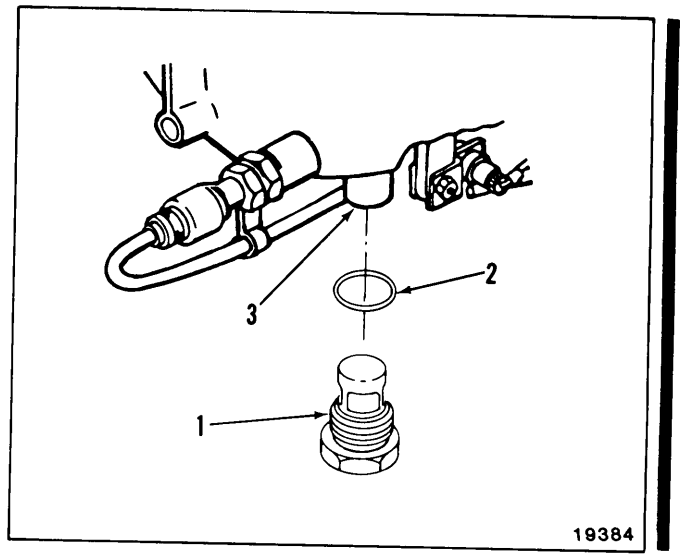
References:
TM 55-1520-240-23P



NOTE
Procedure is same to install chip detector assembly in right or left transmission. Right transmission shown.

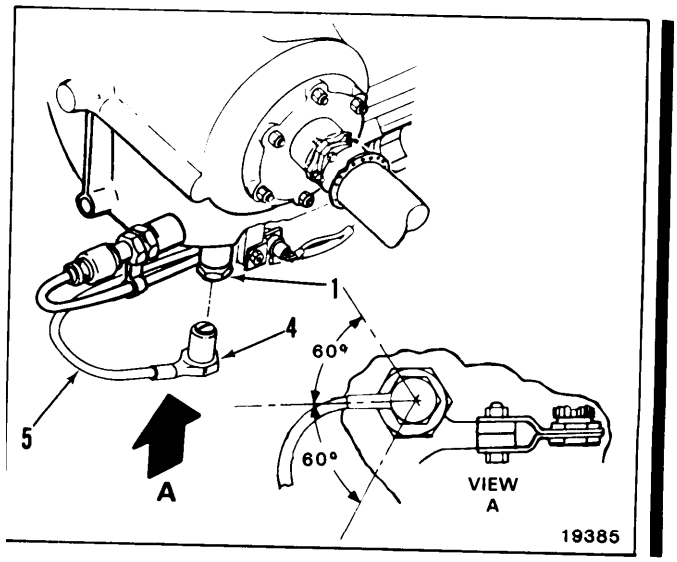
INSTALL VALVE

1. **Install valve (1)** with new packing (2) in port (3). Torque valve to 77 inch-pounds.



INSTALL PLUG

2. **Install chip detector plug (4) in valve (1)** by inserting and twisting it clockwise until it locks in place. **Make sure cable (5) points forward** within 60 degrees as shown.

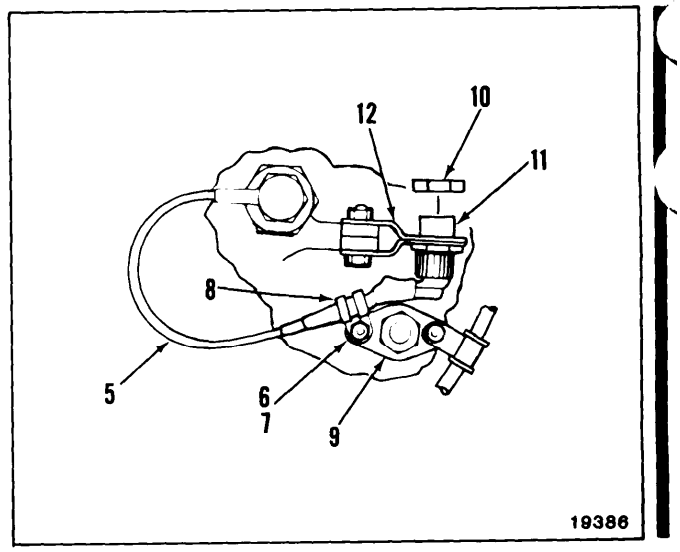


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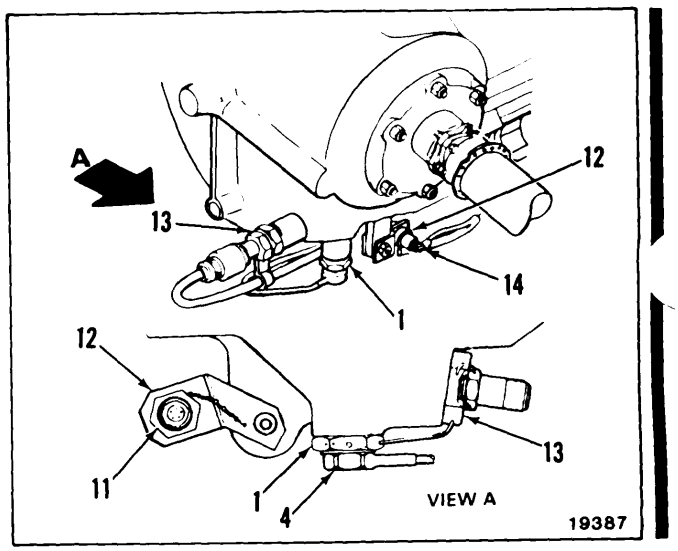
6-208.3 INSTALL ENGINE TRANSMISSION CHIP DETECTOR ASSEMBLY (Continued) 6-208.3

INSTALL CABLE ASSEMBLY

3. Remove loosely-installed nut (6), washer (7), and clamp (8) from stud on oil jet (9). **Install clamp on cable (5).**
4. Remove nut (10) from assembly connector (11). **Install connector through bracket (12).** Install nut on connector.
5. Check that cable (6) is in a smooth curve, with no kinks or sharp bends. Torque nut (11) to 45 inch-pounds.
6. **Install clamp (8),** washer (7), and nut (6) on stud of oil jet (9). Torque nut to 16 inch-pounds.



7. **Lockwire chip detector valve (1)** to temperature switch adapter (13). Use lockwire (E231)
8. **Connect electrical connector (14)** to assembly connector (11) at bracket (12).



FOLLOW-ON MAINTENANCE:
Perform operational check of chip detector (TM 55-1520-240-T).
Service engine transmission (Task 1-54).
Install engine transmission fairing (Task 4-73).
Install engine air inlet fairing (Task 4-75).

END OF TASK

6-208.4 REMOVE ENGINE TRANSMISSION TEMPERATURE SWITCH ASSEMBLY

INITIAL SETUP

Applicable Configurations:
With 37

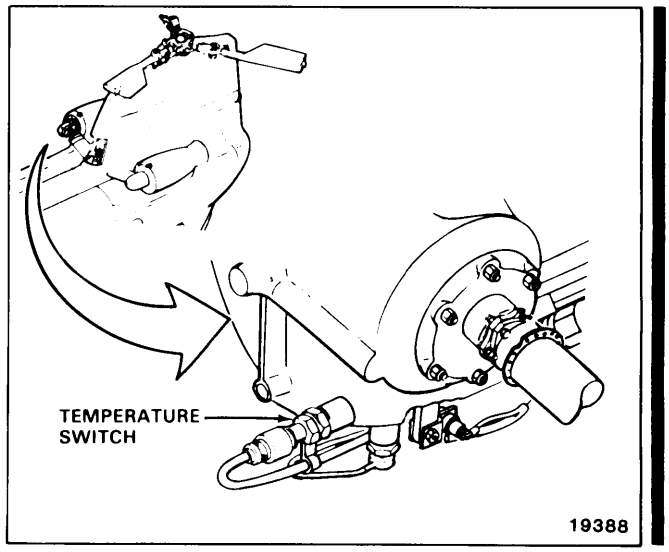
Tools:
Aircraft Mechanic Tool Kit,
NSN 5180-00-323-4692
Container, 1 Gallon

Materials:
Cloths (E120)

Personnel Required:
Medium Helicopter Repairer

References:
Task 6-208.2
Task 6-208.3

Equipment Condition:
Battery Disconnected (Task 1-39)
Electrical Power Off
Engine Air Inlet Screen Removed (Task 4-65)
Engine Transmission Fairing Removed (Task 4-70)



NOTE

Procedure is same to remove temperature switch from left or right transmission. Right transmission shown.

1. **Drain transmission oil** by removing chip detector plug (1) and valve (2) (Task 6-208.2). **Install adapter and plug** (Task 6-208.3). Do not lockwire adapter at this time.

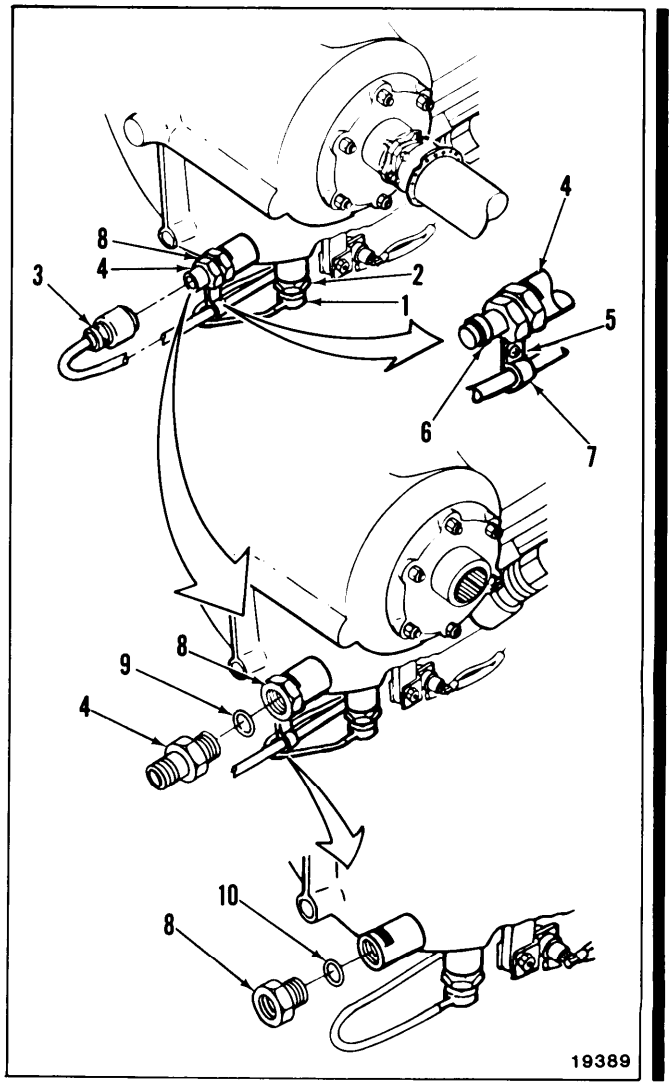
REMOVE SWITCH

2. **Disconnect electrical connector (3)** from temperature switch (4).
3. Loosen screw (5) at clamps (6) and (7). **Slide clamp assembly forward off switch (4).**
4. Remove lockwire securing switch (4) to adapter (8).
5. **Remove switch (4)** and packing (9) from adapter (8). Discard packing.

REMOVE ADAPTER

6. **Remove adapter (8)** and packing (10) from transmission. Discard packing.

FOLLOW-ON MAINTENANCE:
None



END OF TASK

6-208.5 INSTALL ENGINE TRANSMISSION TEMPERATURE SWITCH ASSEMBLY

INITIAL SETUP

Applicable Configurations:
With 37

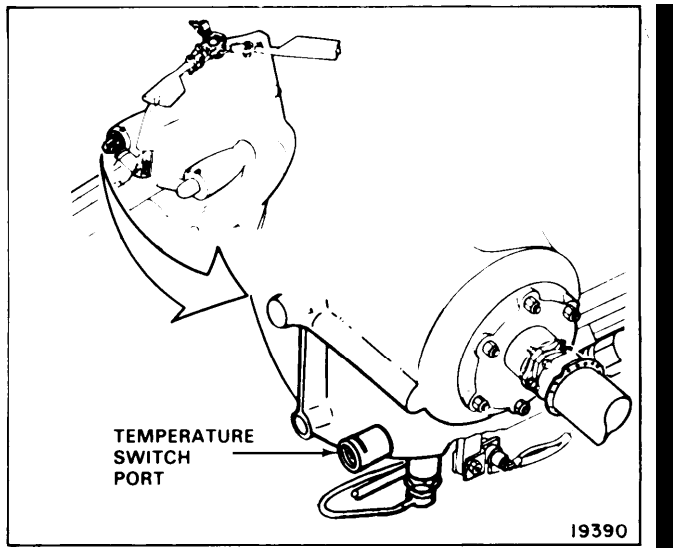
Tools:
Aircraft Mechanic Tool Kit,
NSN 5180-00-323-4692
Torque Wrench, 0 to 150 Inch-Pounds

Materials:
Lockwire (E231)

Parts:
Preformed Packings

Personnel Required:
Medium Helicopter Repairer
Inspector

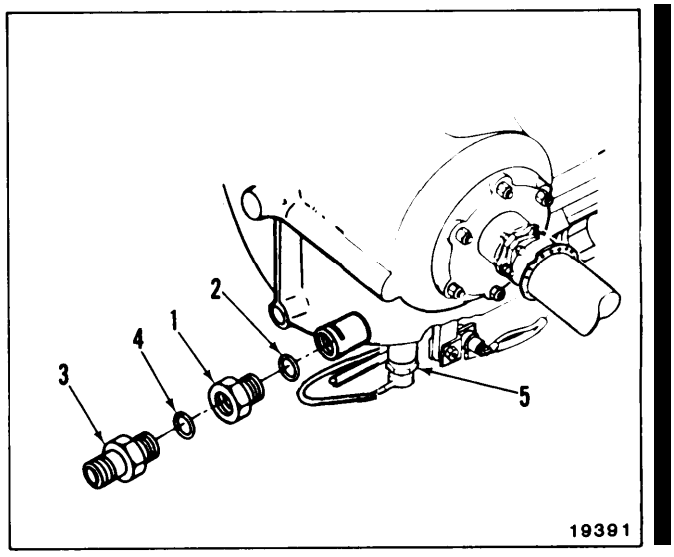
References:
TM 55-1520-240-23P



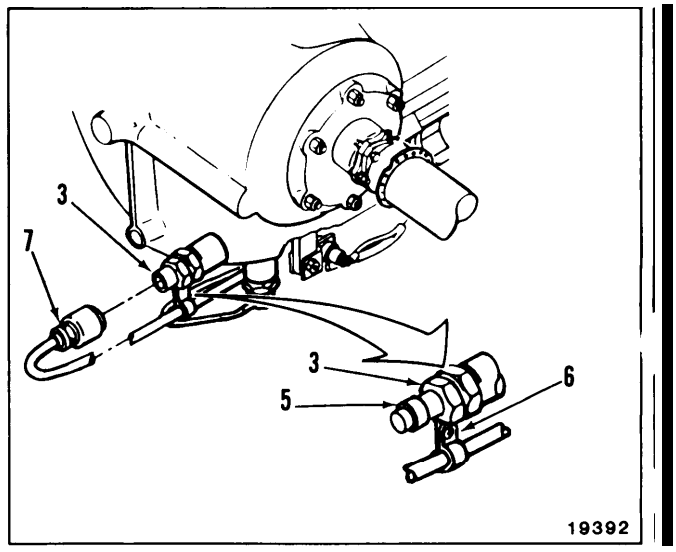
NOTE

Procedure is same to install temperature switch in left or right transmission. Right transmission shown.

1. **Install adapter (1)** with new packing (2) in the transmission port. **Torque to 77 inch-pounds.**
2. **Install temperature switch (3)** with new packing (4) in adapter (1) **Torque to 77 inch-pounds.**
3. **Lockwire adapter (1)** to chip detector valve (5). Lockwire switch (3) to adapter (1). Use lockwire (E231).



4. **Slide clamp (5) onto switch (3).** Tighten screw (6).
5. **Connect electrical connector (7)** to switch (3).

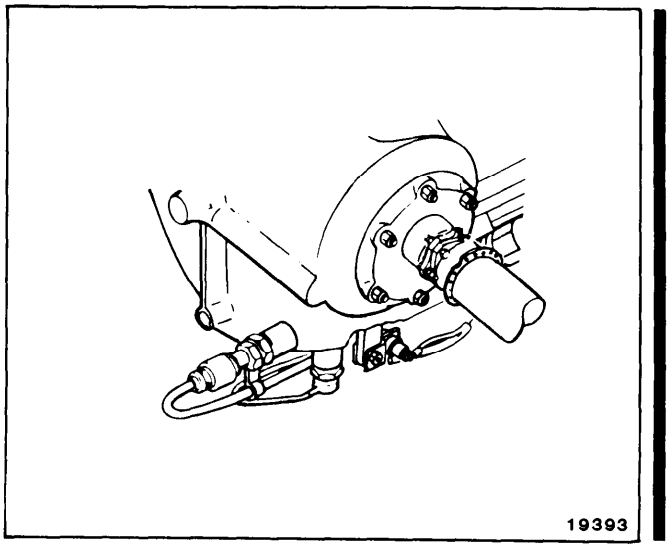


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6-208.5 INSTALL ENGINE TRANSMISSION TEMPERATURE SWITCH ASSEMBLY (Continued)

FOLLOW-ON MAINTENANCE:

Perform operational check of temperature switch (TM 55-1520-240-T).
Service engine transmission (Task 1-54).
Install engine transmission fairing (Task 4-73).
Install engine air inlet fairing (Task 4-75).



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END OF TASK

6-209 REMOVE ENGINE TRANSMISSION INLET SCREEN 6-209

INITIAL SETUP

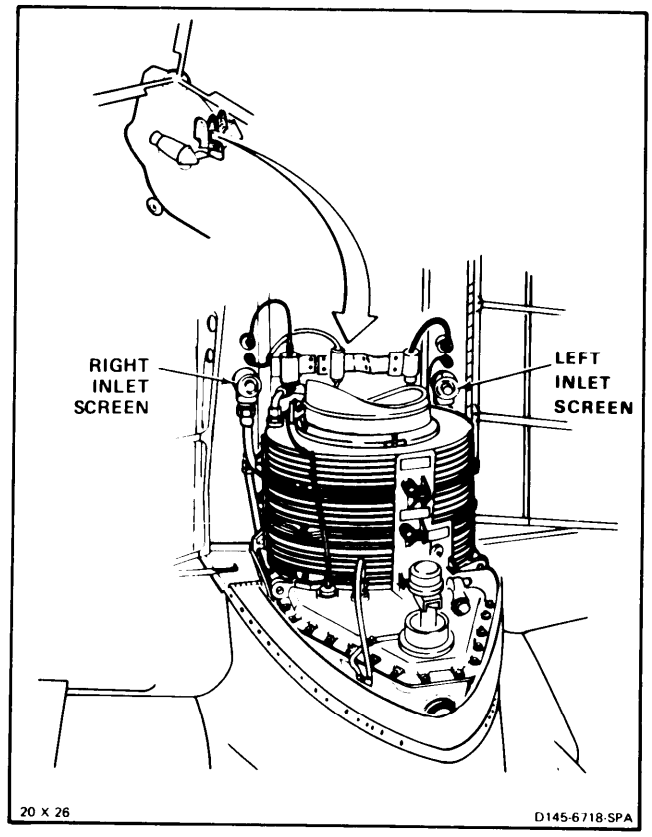
Applicable Configurations:
All

Tools:
Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692

Materials:
Barrier Material (E80)
Masking Tape (E388)

Personnel Required:
67U10 Medium Helicopter Repairer

Equipment Condition:
Battery Disconnected (Task 1-39)
Electrical Power Off
Aft Pylon Access Doors Open (Task 2-2)



NOTE

Procedure is same to remove left or right engine transmission inlet screen. Removal of right screen is shown here.

1. Remove lockwire from screen (1).

CAUTION

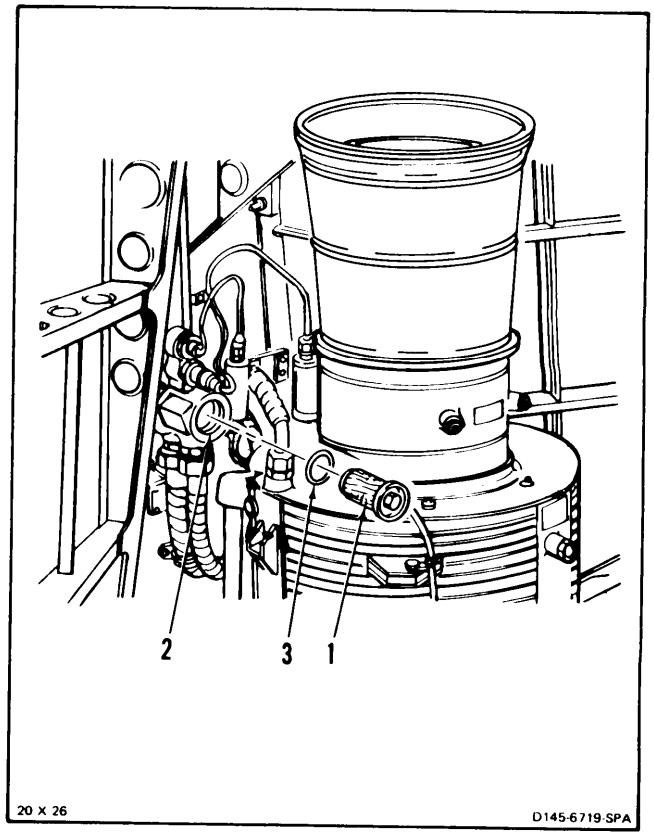
If debris enters screen housing, transmission can be damaged.

2. **Remove screen (1)** from housing (2). Cover opening in housing with barrier material (E80) and masking tape (E388).
3. Remove packing (3) from screen (1).

FOLLOW-ON MAINTENANCE:

None

END OF TASK



6-210 INSPECT ENGINE TRANSMISSION INLET SCREEN

INITIAL SETUP

Applicable Configurations:
All

Tools:
None

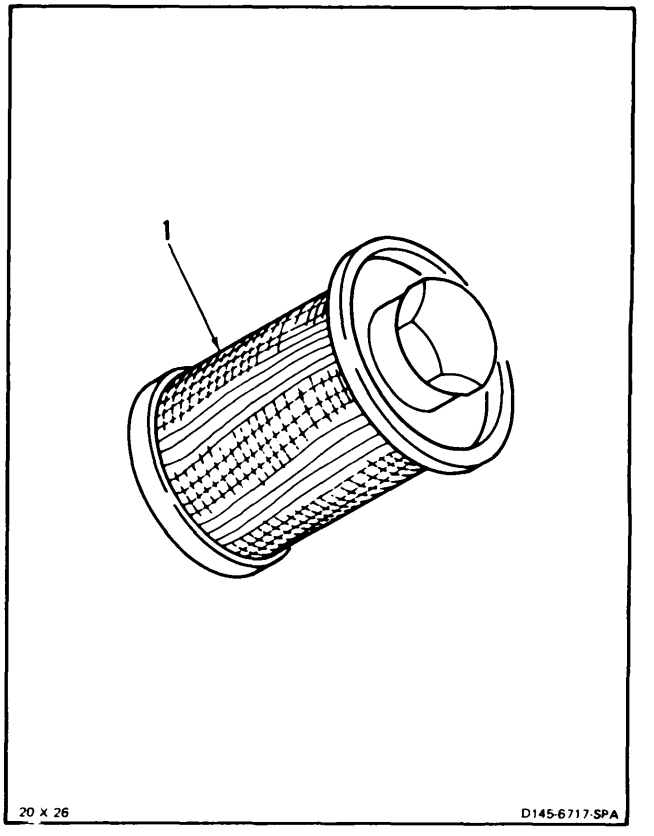
Materials:
Brush (E86)

Personnel Required:
67U10 Medium Helicopter Repairer

Equipment Condition:
Off Helicopter Task

1 **Check screen (1)** for bits of metal and other debris. Retain debris for contamination analysis (Task 6-1 08). If debris is found, reject screen.

2 **Inspect screen (1) for tears.** There shall be no tears.



FOLLOW-ON MAINTENANCE:

None

END OF TASK

6-211 INSTALL ENGINE TRANSMISSION INLET SCREEN 6-211

INITIAL SETUP

Applicable Configurations:
All

Tools:
Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692
Torque Wrench, 30 to 150 Inch-Pounds

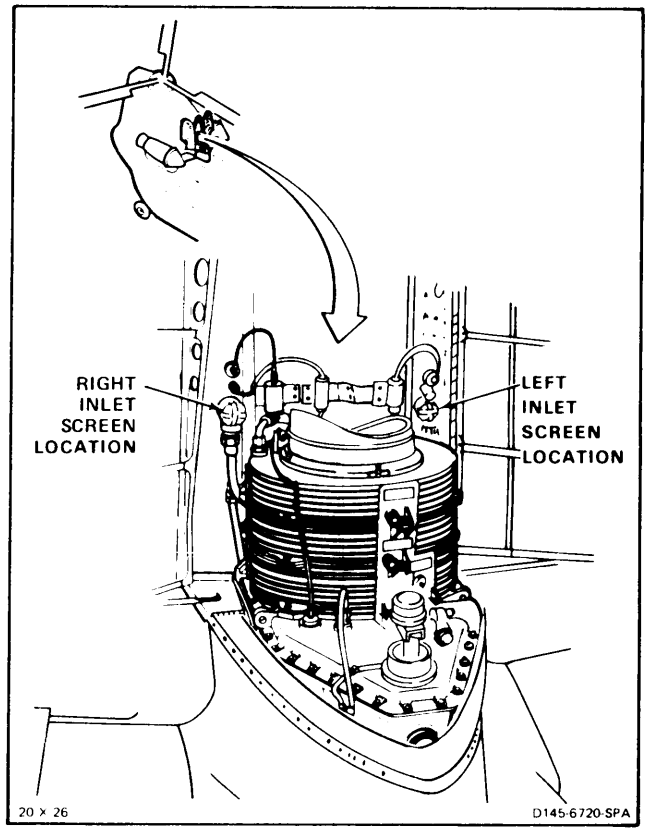
Materials:
Oil (E254)
Lockwire (E231)

Parts:
Packing

Personnel Required:
67U10 Medium Helicopter Repairer
67U30 Inspector

Equipment Condition:
Engine Transmission Inlet Screen Inspected (Task 6-210)

References:
TM 55-1520-240-23P



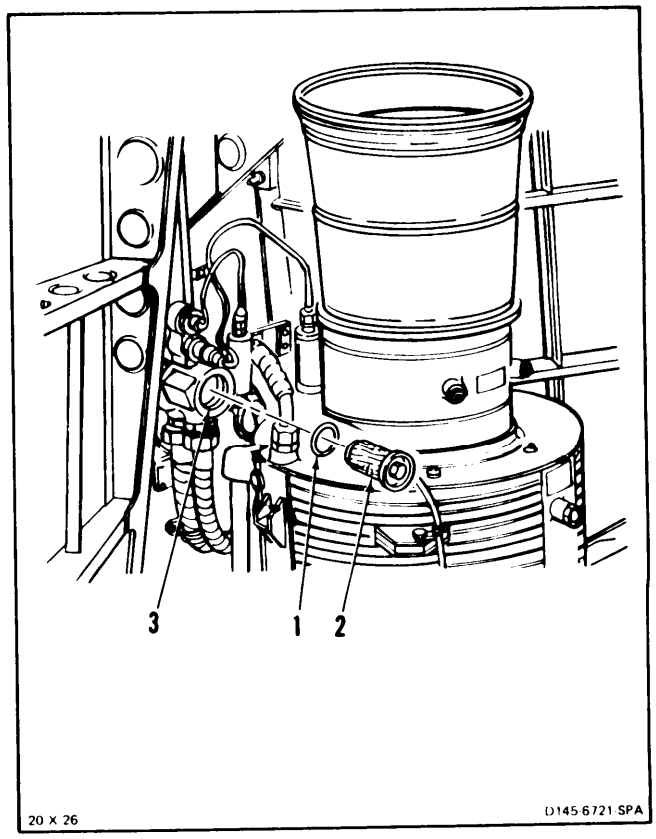
NOTE

Procedure is same to install left or right engine transmission screen. installation of right screen is shown here.

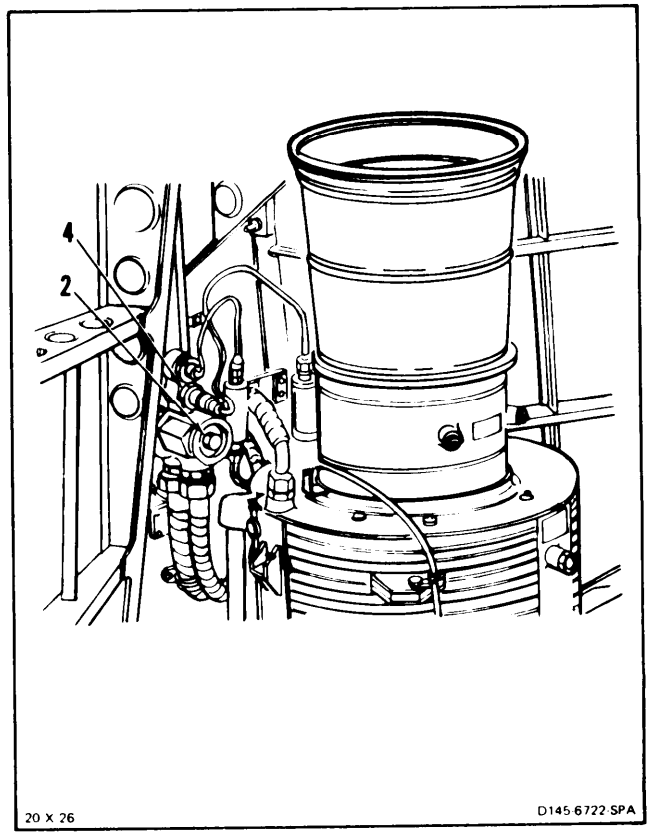
GO TO NEXT PAGE

6-211 INSTALL ENGINE TRANSMISSION INLET SCREEN (Continued)

1. Coat packing (1) and thread of screen (2) With oil (E254). Install packing on screen.
2. Remove tape and barrier material from cavity (3).
3. Install screen (2) in cavity (3). **Torque screen to 80 inch-pounds.**



4. Lockwire screen (2) to oil pressure switch (4). Use Iockwire (E231).



INSPECT

FOLLOW-ON MAINTENANCE:

Close aft pylon access doors (Task 2-21).

END OF TASK

6-212 REPLACE ENGINE TRANSMISSION SIGHT GAGE

INITIAL SETUP

Applicable Configurations:
All

Tools:
Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692
Container, 2-Quart (2)
Hose, 1 -Inch id, 24 Inches Long
Spanner Wrench
Torque Wrench, 30 to 150 Inch-Pounds

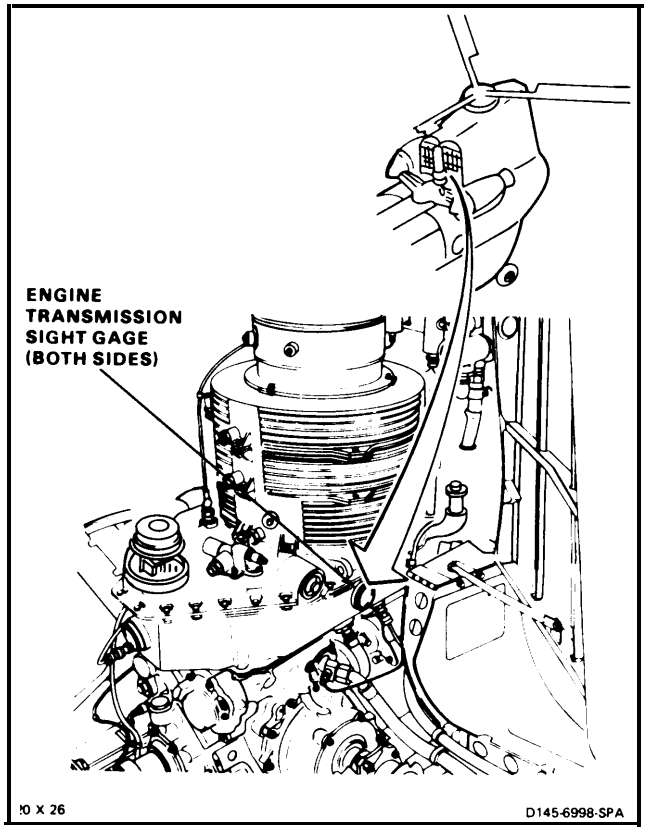
Materials:
Oil (E254)
Lockwire (E231)

Parts:
Packing

Personnel Required:
67U10 Medium Helicopter Repairer
67U30 Inspector

References:
TM 55-1520-240-23P

Equipment Condition:
Battery Disconnected (Task 1-39)
Electrical Power Off
Aft Pylon Access Doors Open (Task 2-2)
Aft Pylon Lower Fairing Removed (Task 2-2)



GO TO NEXT PAGE

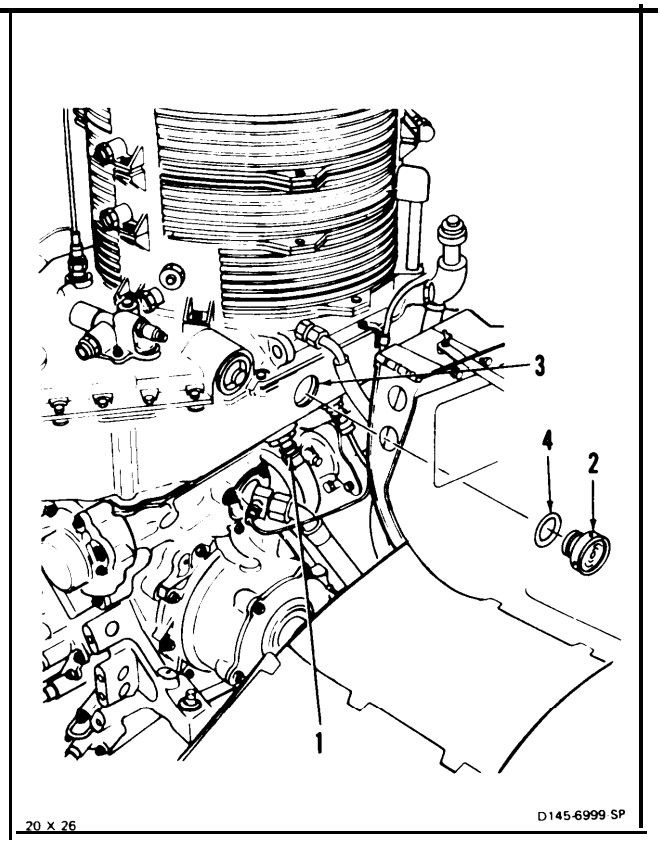
6-212 REPLACE ENGINE TRANSMISSION SIGHT GAG E (Continued)

NOTE

Procedure is same to remove left or right engine transmission sight gage. Left gage is shown here.

REMOVE GAGE

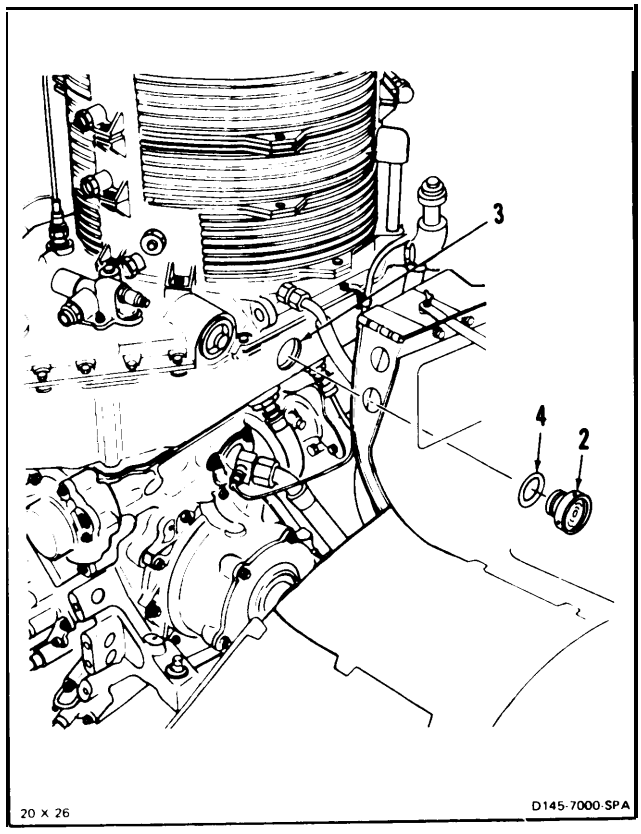
1. **Connect hose** to drain valve (1). Direct end of hose into container.
2. Push in drain valve (1), twist, and pull. **Drain oil** until oil level is below sight gage (2).
3. Close drain valve (1) by pushing it in and twisting it. Disconnect hose from valve.
4. Remove lockwire from sight gage (2). **Remove gage** from sump (3). Use spanner wrench.



5. Remove packing (4) from sight gage (2).

INSTALL GAGE

6. Coat packing (4) and thread of sight gage (2) with oil (E254), Install packing on gage.
7. **Install sight gage (2)** in sump (3). Use spanner wrench. **Torque gage to 80 inch-pounds.**



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6-212 REPLACE ENGINE TRANSMISSION SIGHT GAGE (Continued)

8. Lockwire sight gage (2) to drain valve (1). Use lockwire (E231).

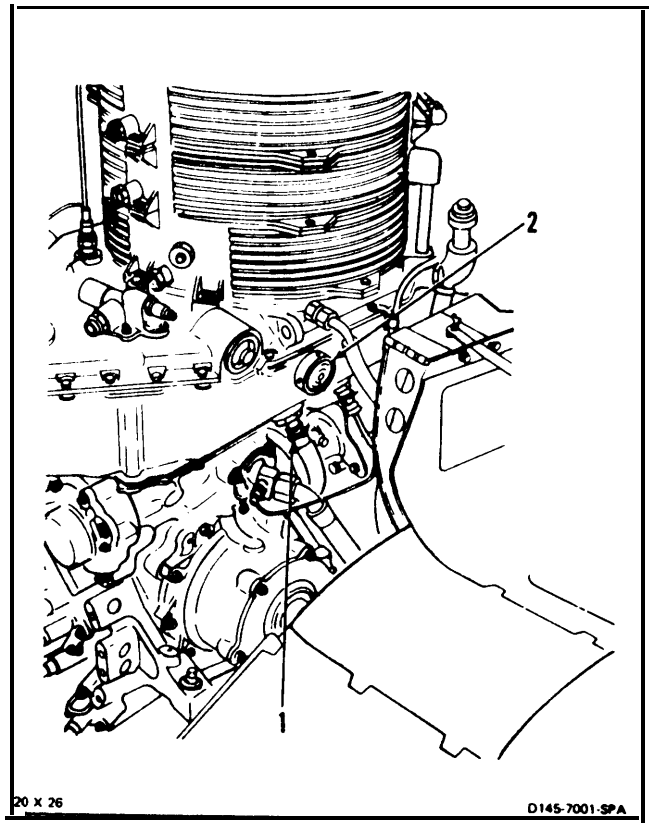
INSPECT

FOLLOW-ON MAINTENANCE:

Service engine transmission (Task 1-54).

Install aft pylon lower fairing (Task 2-2).

Close aft pylon access doors (Task 2-2).



END OF TASK

6-212.1 REPLACE RIGHT ENGINE TRANSMISSION OIL COOLER BYPASS VALVE

INITIAL SETUP

Applicable Configurations:
All

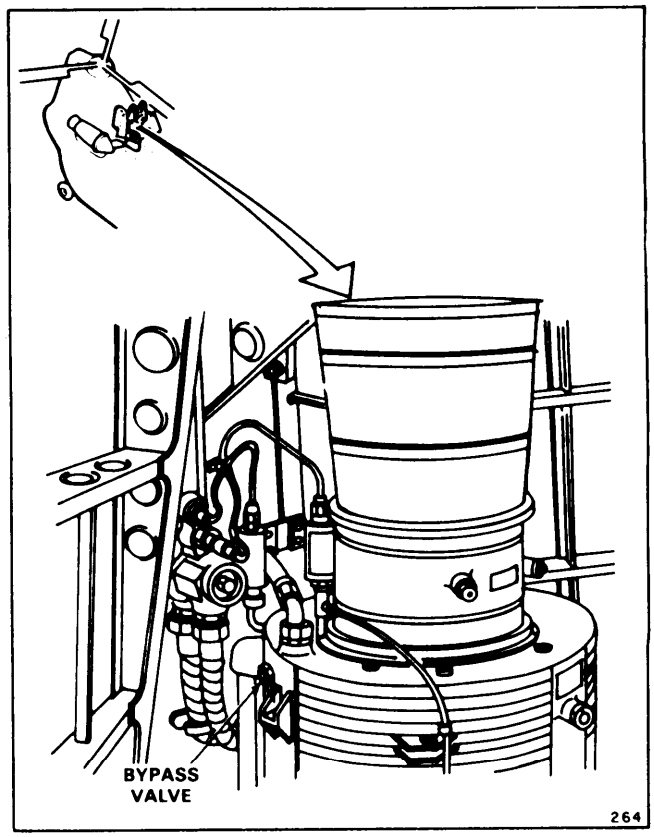
Tools:
Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Open End Wrench, 1-Inch
Open End Wrench, 1 1/2-Inch
Funnel
Container, 2-Quart
Hose, 1 Inch id X 36 Inches Long

Materials:
Cloths (E120)
Oil (E254)
Lockwire (E231)

Parts:
Packing

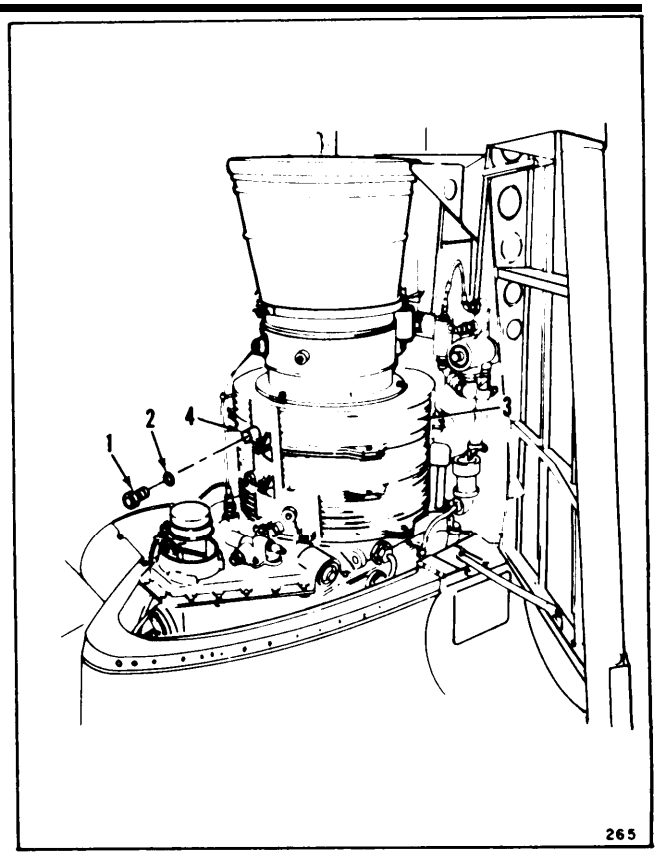
Personnel Required:
Medium Helicopter Repairer
Inspector

Equipment Condition:
Battery Disconnected (Task 1-39)
Electrical Power Off
Pylon Hinged Fairing Open (Task 2-2)



DRAIN OIL COOLER

1. Remove lockwire from drain plug (1).
2. **Remove drain plug (1)** and packing (2) from oil cooler (3). Place funnel under port (4). **Drain oil** through funnel into container.
3. Install plug (1) and packing (2). Lockwire plug to oil cooler (3). Use lockwire (E231).



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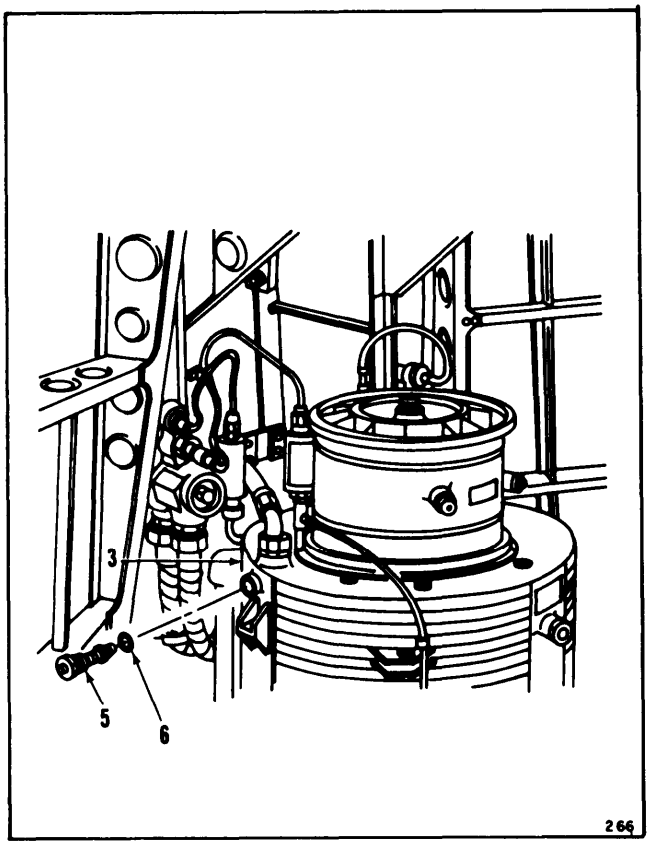
6-212.1 REPLACE RIGHT ENGINE TRANSMISSION OIL COOLER BYPASS VALVE (Continued) 6-212.1

REMOVE VALVE

NOTE

Do not let oil spill on fins of oil cooler. Spilled oil will spray from cooler during transmission operation.

4. Remove lockwire from bypass valve (5). **Remove valve** from oil cooler (3). Use cloths (E120) to absorb oil spillage.
5. Remove packing (6) from valve (5).



INSTALL VALVE

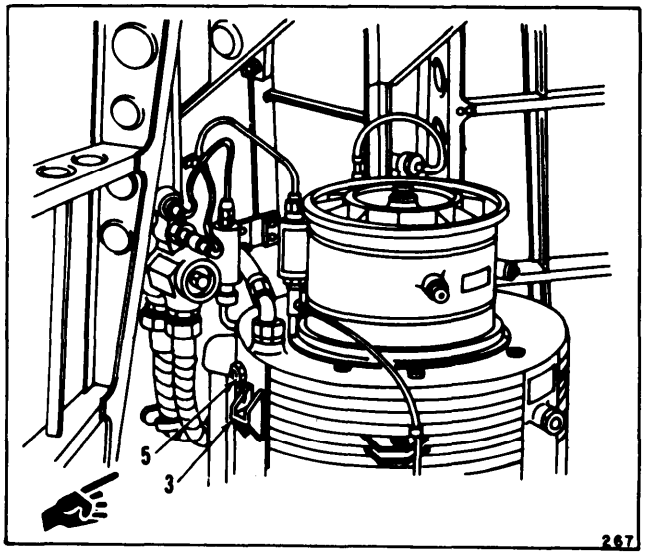
WARNING

Oil (E254) is a skin irritant. If oil gets on skin, wash thoroughly. If oil soaks into clothes, change clothes immediately.

WARNING

Oil (E254) gives off fumes that can cause injury to personnel. Use oil in a well-ventilated area.

6. Coat packing (6) and thread of bypass valve (5) with oil (E254), Install packing on valve.
7. Install valve (5) in oil cooler (3).
8. Lockwire valve (5) to oil cooler (3). Use lockwire (E231).



INSPECT

FOLLOW-ON MAINTENANCE:

Service combining transmission (Task 1-54).

Close aft pylon doors (Task 2-2).

GO TO NEXT PAGE

6-213 REMOVE RIGHT ENGINE TRANSMISSION OIL COOLER

INITIAL SETUP

Applicable Configurations:
All

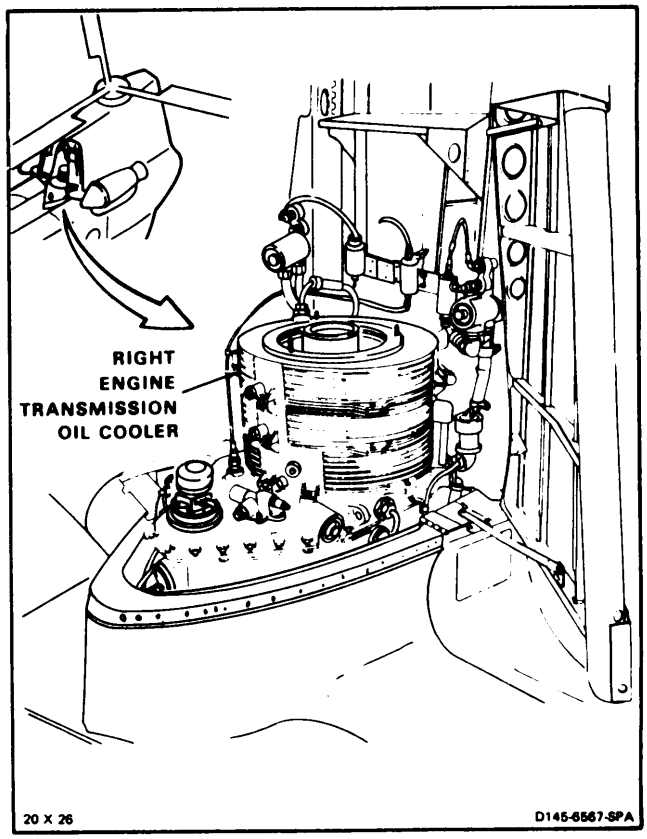
Tools:
Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692
Open End Wrench, 1-Inch
Open End Wrench, 1 1/24-Inch
Open End Wrench, 1 5/8-Inch
Funnel
Container, 2-Quart

Materials:
Cloths (E120)

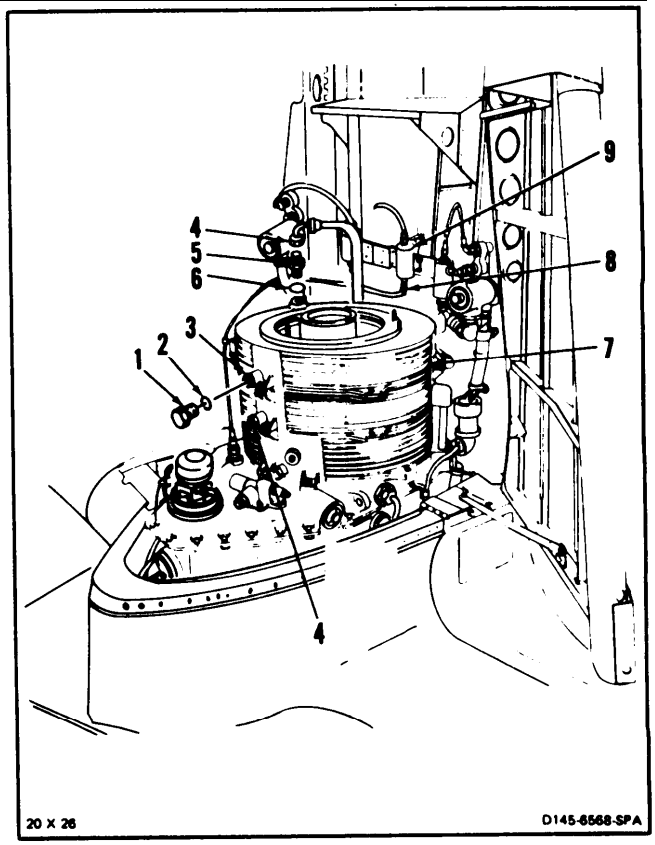
Parts:
Packing

Personnel Required:
Medium Helicopter Repairer

Equipment Condition:
Battery Disconnected (Task 1-39)
Electrical Power Off
Pylon Hinged Fairing Open (Task 2-2)
Oil Cooler Fan and Shaft Removed (Task 6-182)

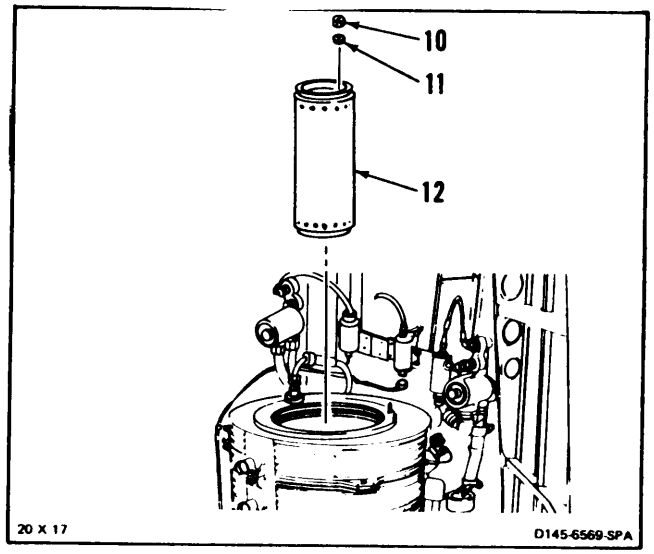


1. Remove lockwire from drain plug (1).
2. **Remove drain plug (1)** and packing (2). Place funnel under port (3). **Drain oil** through funnel into container.
3. **Install drain plug (1)** and packing (2).
4. **Disconnect oil hose (4)** from reducer (5). **Remove reducer** and packing (6) from cooler (7).
5. **Disconnect oil hole (8)** from pressure transmitter (9).

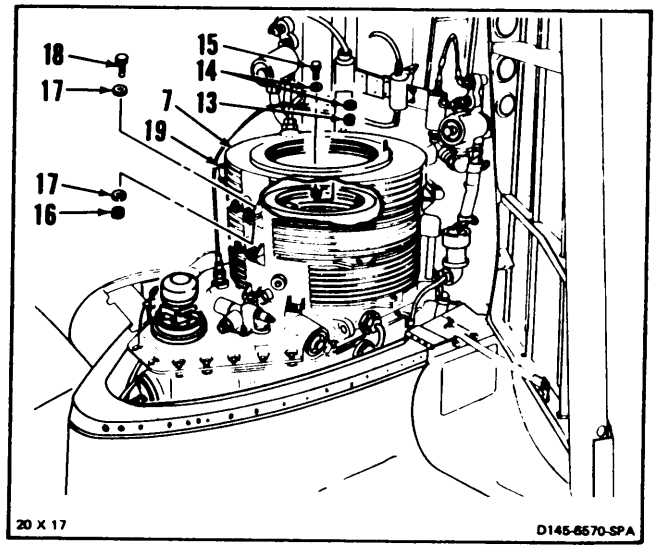


GO TO NEXT PAGE

6. Remove four nuts (10) and washers (11) from baffle (12). **Remove baffle.**



7. **Remove** nuts (13), washers (14), and **bolts** (15) from three places around inside of cooler (7).
8. **Remove** nuts (16), washers (17), and **bolts (18)** from six places around outside of cooler (7). **Remove bracket (19).**



NOTE

Do not tilt cooler when lifting it. Oil can spill.

9. **Lift coder (7) straight up and away** from cooler (20) and oil transfer tube (21).

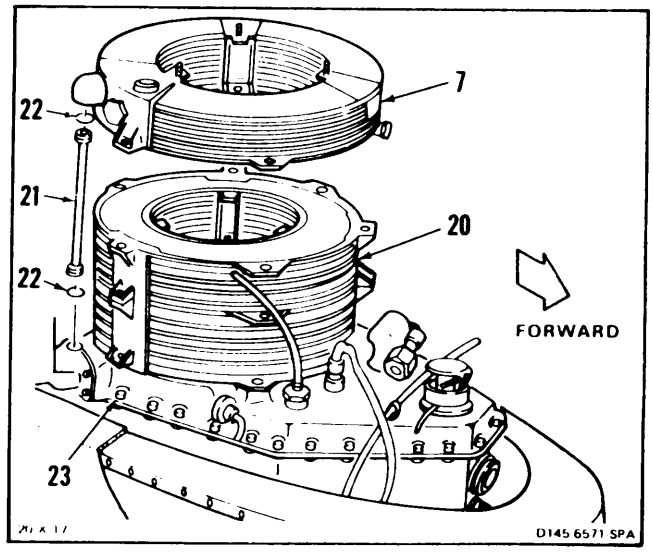
NOTE

Transfer tube may stay in cooler.

10. **Remove transfer tube (21)** and two packings (22) from sump cover (23).

FOLLOW-ON MAINTENANCE:

None



END OF TASK

6-213.1 REPLACE LEFT ENGINE TRANSMISSION OIL COOLER BYPASS VALVE

INITIAL SETUP

Applicable Configurations:
All

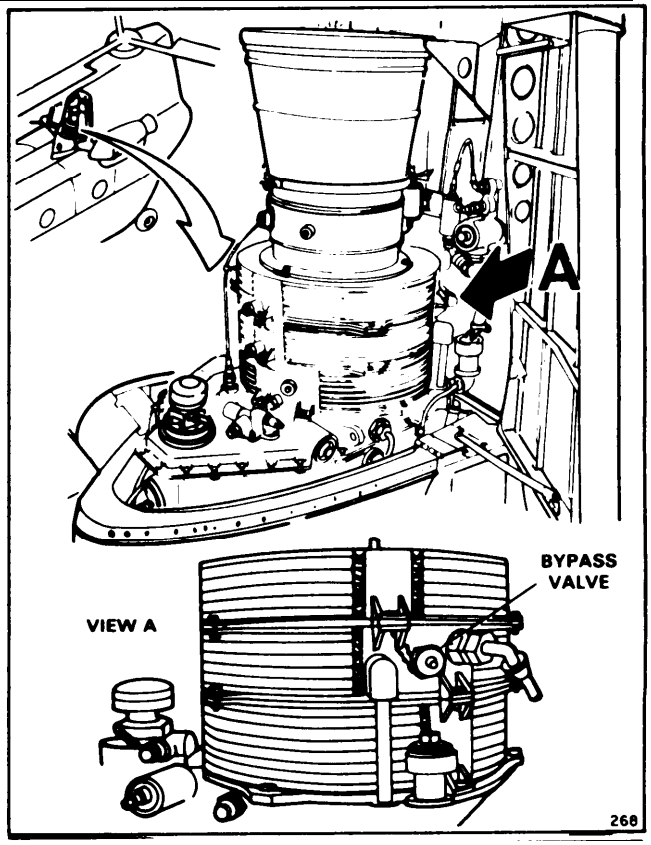
Tools:
Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Wrench, 1-Inch
Open End Wrench, 1 1/2-Inch
Container, 2-Quart
Hose, 1-Inch ID, 36 Inches Long
Funnel

Materials:
Cloths (E120)
Lockwire (E231)
Oil (E254)

Parts:
Packings (2)

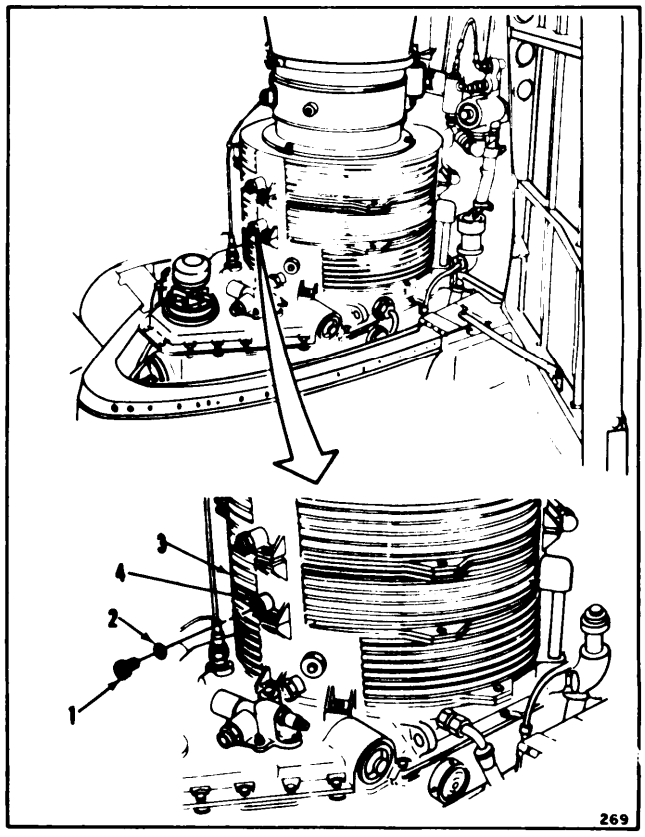
Personnel Required:
Medium Helicopter Repairer
Inspector

Equipment Condition:
Battery Disconnected (Task 1-39)
Electrical Power Off
Pylon Hinged Fairing Open (Task 2-2)



DRAIN OIL COOLERS

1. Remove lockwire from drain plug (1).
2. Remove drain plug (1) and packing (2) from oil cooler (3). Hold funnel under port (4). Drain oil through hose into container. Remove hose and funnel.
3. Install drain plug (1) and packing (2). Lockwire plug to oil cooler (3). Use lockwire (E231).



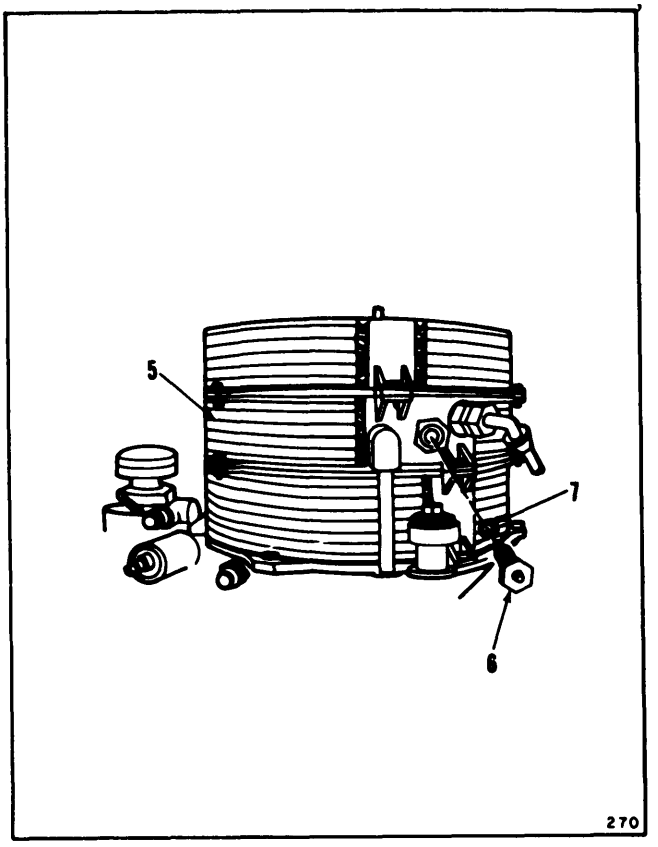
GO TO NEXT PAGE

REMOVE VALVE

NOTE

Do not let oil spill on fins of oil cooler. Spilled oil will spray from cooler during transmission operation.

4. Remove lockwire from bypass valve (6). **Remove valve** from oil cooler (5). Use cloths (E120) to absorb spillage.
5. Remove packing (7) from valve (6).



INSTALL VALVE

WARNING

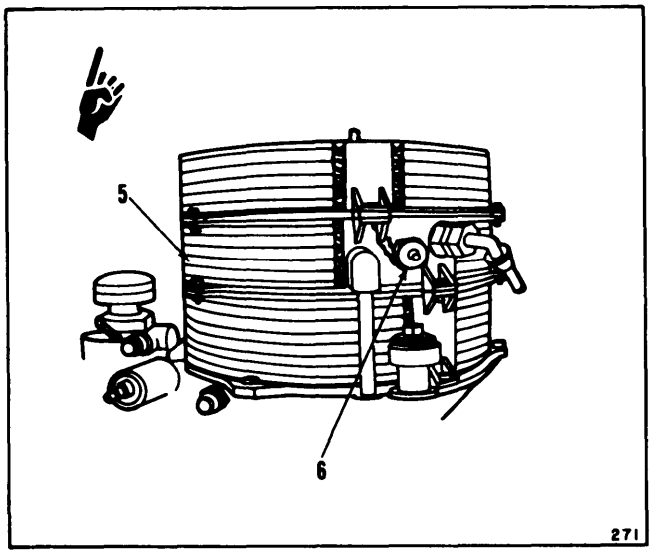
Oil (254) is a skin irritant. If oil gets on skin, wash thoroughly. If oil soaks into clothes, change clothes immediately.

WARNING

Oil (E254) gives off fumes that can cause injury to personnel. Use oil in a well-ventilated area.

6. Coat packing (7) and thread of bypass valve (6) with oil (E254). Install packing on valve.
7. Install valve (6) in oil cooler (5). Torque valve to 80 inch-pounds.

8. Lockwire valve (6) to oil cooler (5). Use lockwire (E231).



INSPECT

FOLLOW-ON MAINTENANCE:

Service combining transmission (Task 1-54).

Close aft pylon doors (Task 2-2).

END OF TASK

6-214 REMOVE LEFT ENGINE TRANSMISSION OIL COOLER

INITIAL SETUP

Applicable Configurations:
All

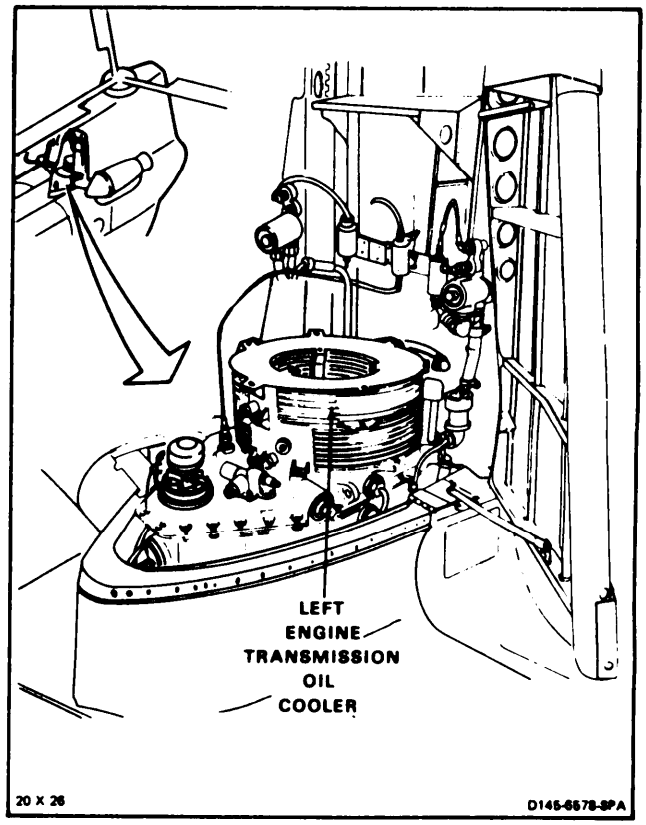
Tools:
Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Wrench, 1-Inch
Open End Wrench, 1 1/2-Inch
Open End Wrench, 1 5/8-Inch
Funnel
Container, 2-Quart

Materials:
None

Personnel Required:
67U10 Medium Helicopter Repairer

Parts:
Packing

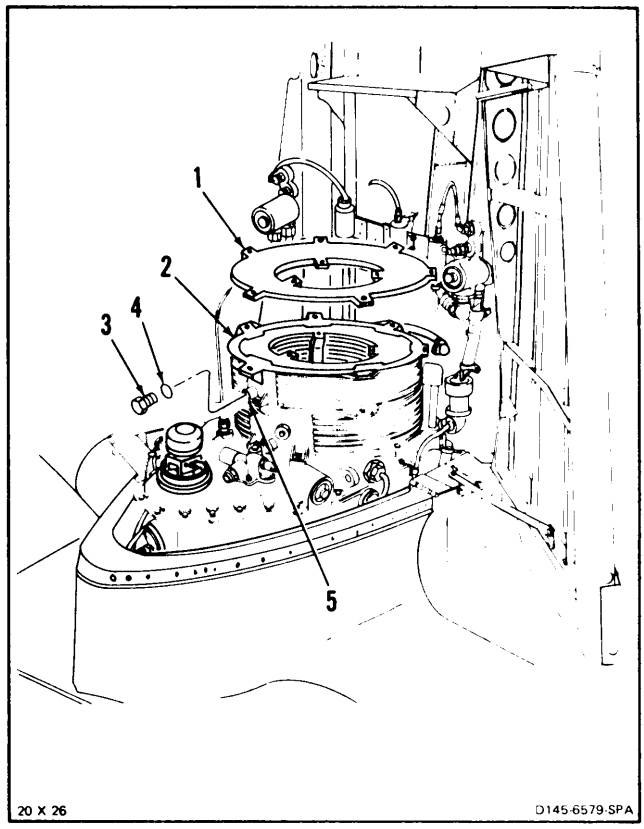
Equipment Condition:
Battery Disconnected (Task 1-39)
Electrical Power Off
Pylon Hinged Fairing Open (Task 2-2)
Oil Cooler Fan and Shaft Removed (Task 6-182)
Right Engine Transmission Oil Cooler Removed (Task 6-213)



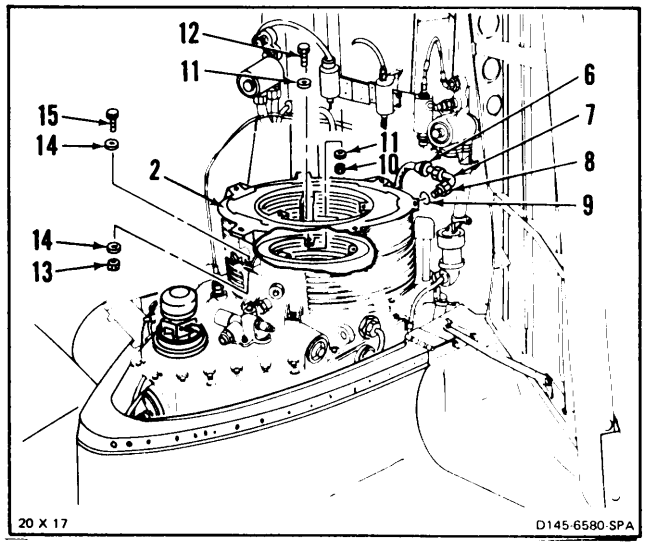
GO TO NEXT PAGE

6-214 REMOVE LEFT ENGINE TRANSMISSION OIL COOLER (Continued)

1. **Remove armor plate (1)** from cooler (2).
2. Remove lockwire from drain plug (3).
3. **Remove drain plug (3)** and packing (4). Place funnel under port (5). **Drain oil** through funnel into container.
4. **Install drain plug (3)** and packing (4).



5. **Disconnect hose (6)** from elbow (7). **Remove elbow (7),** nut (8), and packing (9) and cooler (2).
6. **Remove** nuts (10), washers (11), and **bolts** (12) from three places around inside of cooler (2).
7. **Remove** nuts (13), washers (14), and **bolts** (15) from six places around outside of cooler (2).



GO TO NEXT PAGE

6-214 REMOVE LEFT ENGINE TRANSMISSION OIL COOLER (Continued)

NOTE

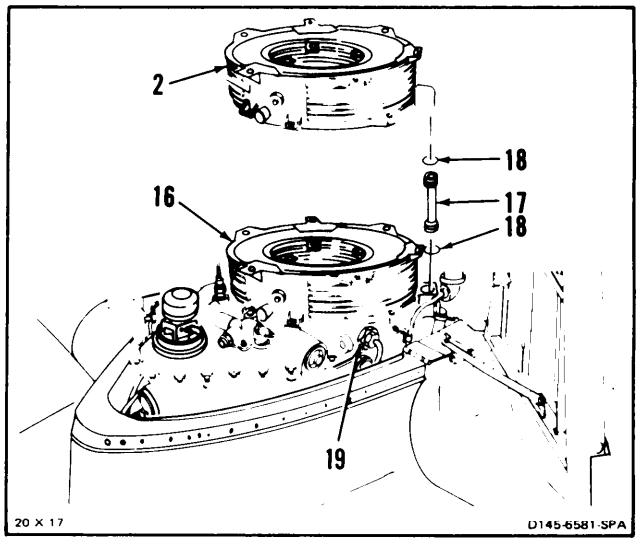
Do not tilt cooler. Oil can spill.

8. **Lift cooler (2) straight up and away** from cooler (16) and oil transfer tube (17).

NOTE

Transfer tube may stay in cooler.

9. **Remove transfer tube (17)** and two packings (18) from sump cover (19).



FOLLOW-ON MAINTENANCE:

None

END OF TASK

6-214.1 REPAIR ENGINE TRANSMISSION OIL COOLER OUTSIDE SURFACE

INITIAL SETUP

Applicable Configurations:
All

Tools:
Dial Indicating Depth Gage 643J
Goggles

Materials:
Naphtha (E245)
Emery Cloth (E123) or
Abrasive Paper (E13)
Crocus Cloth (E122)
Cloths (E120)
Gauze Sponges (E184)
Gloves (E186)
Acetic Acid (E21)
Alodlne Powder (E65)
Epoxy Primer (E293)
Black Lacquer Topcoat (E215)

Personnel Required:
Aircraft Powertrain Repairer
Inspector

References:
TM 43-0103
MIL-C-5541
MIL-C-22751

Equipment Condition:
Off Helicopter Task

General Safety Instructions:

WARNING

Naphtha (E245) is combustible and toxic. It can irritate skin and cause burns. Use only with adequate ventilation, away from open flame. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.

WARNING

Acetic acid (E21) is combustible and toxic. It can irritate skin and cause burns. Avoid inhaling. Use only with adequate ventilation, away from open flame. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.

WARNING

Alodim powder (E65) is an oxidizer. Discard cloths which contain this material in a separate container. If discarded with cloths contaminated with acetone, M EK, or other organic solvents, combustion can result. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.

WARNING

Epoxy primer (E293) is flammable and toxic. It can irritate skin and cause burns. Use only with adequate ventilation, away from heat or open flame. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.

CAUTION

Do not wear photogrey glasses when fluorescent inspecting. They reduce ability to see cracks.

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6-214.1 REPAIR ENGINE TRANSMISSION OIL COOLER OUTS IDE SURFACE (Continued)

NOTE

Repairable damage is limited to scratches, nicks, gouges. minor corrosion, and bent fins.

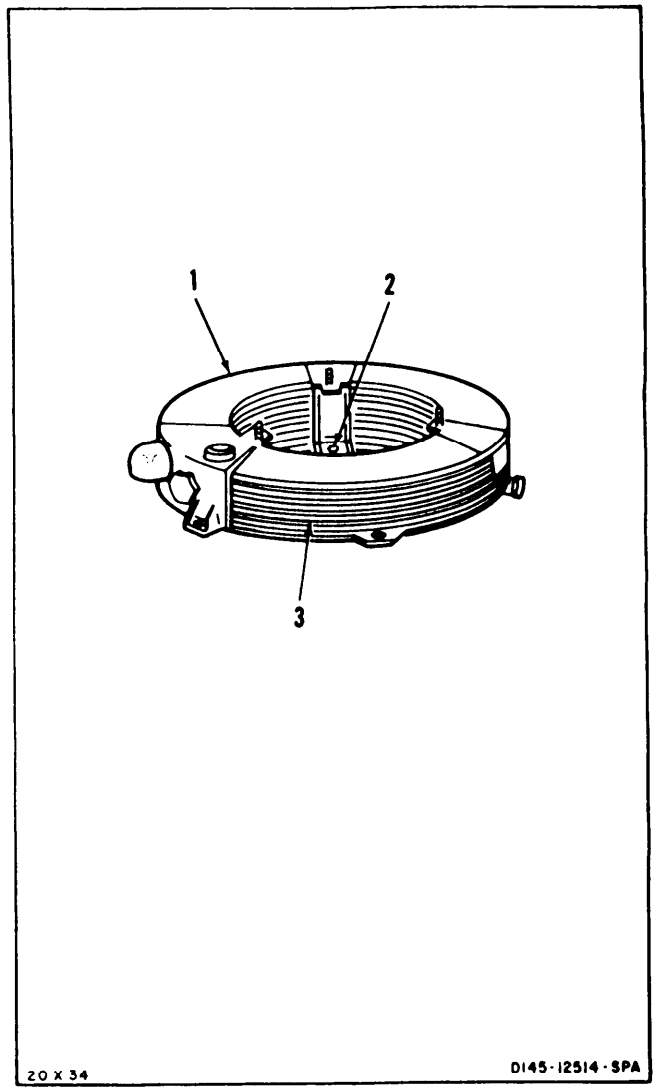
1. **Clean** oil and grease from **damaged area.** Use naphtha (E245) and clean cloths (E120). Wear gloves (E186).
2. **Check** extent and location of **damage** on cooler (1):

NOTE

Dimensions in this step refer to extent of damage after rework.

   a. **Depth of damage shall not be more than 0.025 inch.**
   b. **Damage shall not extend over more than one surface or enter any radius.**
   c. **Damage shall not be closer than 1.00 inch to any mounting hole (2).**
   d. **More than 3 inches of fins (2) shall not be crushed beyond straightening.**

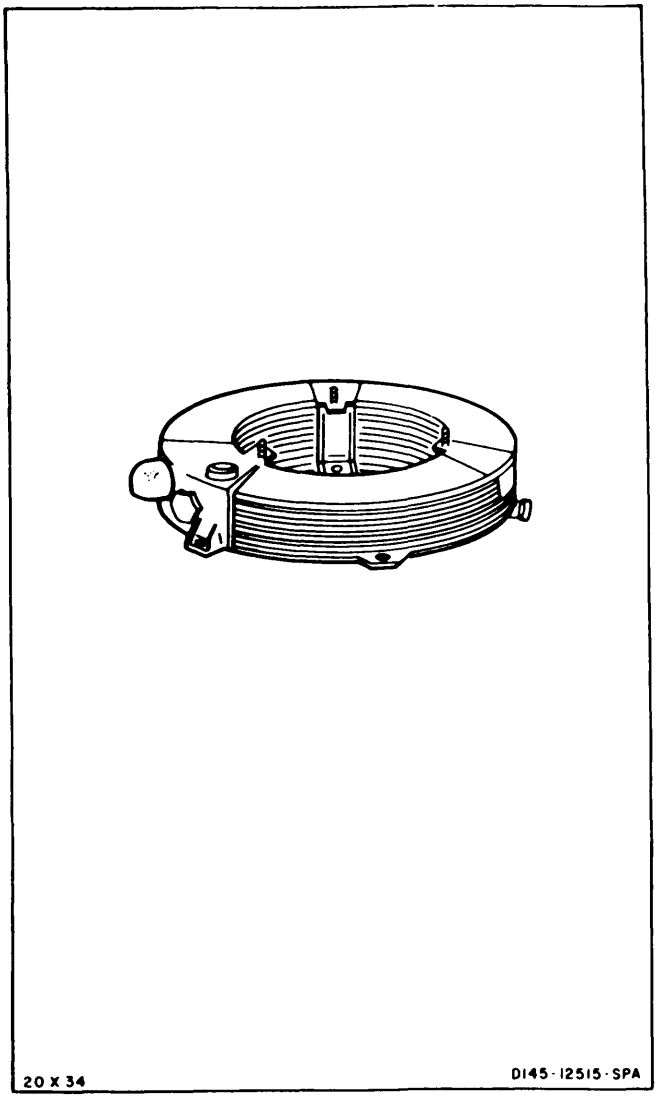
3. **Fluorescent inspect** damaged area to check for cracks (TM 43-0103). **There shall be no cracks.**
4. **Blend out damage** with emery cloth (E123) or abrasive paper (13). Observe limits of step 2.
5. **Smooth Mended area** with crocus cloth (E122). Do not leave any sharp edges.



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6-214.1 REPAIR ENGINE TRANSMISSION OIL COOLER OUTSIDE SURFACE (Continued)

6. Acid-etch reworked area as follows:
   a. **Prepare solution of 3 parts acetic acid (E21) in 7 parts water. Wear gloves (E186) and goggles.**
   b. **Swab area with solution for 2 minutes. Use gauze sponges (E184).**
   c. **Rinse area with cold water.**
7. **Fluorescent inspect** reworked area to check for cracks (TM 43-0103). **There shall be no cracks.**
8. **Clean** reworked area **with naphtha (E245)** and clean cloths (E120). Wear gloves (E186). Let area air dry.
9. **Swab on solution of alodina powder (E65) and water (MIL-C-5541). Use gauze sponges (E184).** Swab for 2 to 5 minutes. Rinse area with cold water and let air dry.
10. **Apply epoxy primer (E293)** to reworked area. Let air dry for 2 hours.
11. **Apply black lacquer topcoat (E215) (MIL-C-22751).**



INSPECT

FOLLOW-ON MAINTENANCE:

None

END OF TASK

6-215 INSTALL LEFT ENGINE TRANSMISSION OIL COOLER

INITIAL SETUP

Applicable Configurations:
All

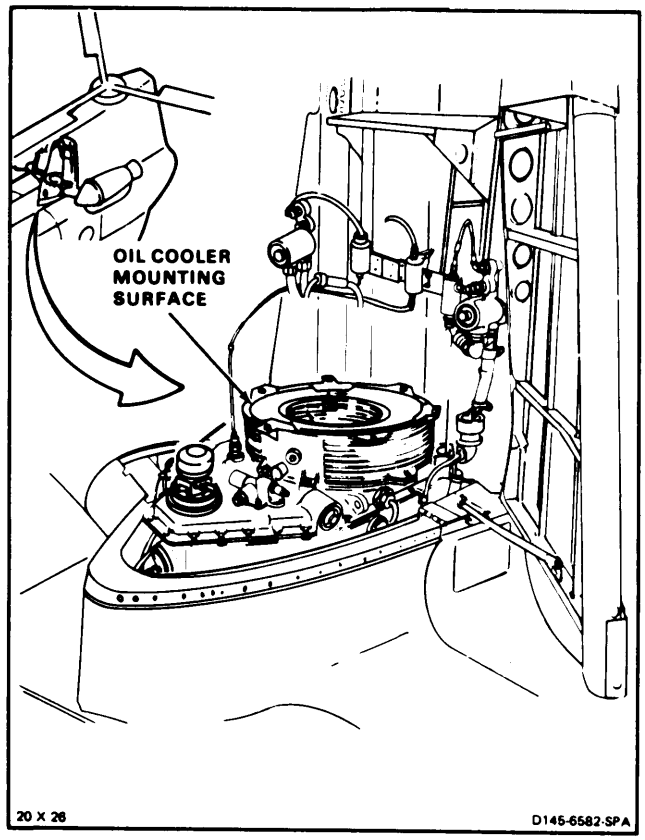
Tools:
Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692
Torque Wrench, 30 to 150 Inch-Pounds
Open End Wrench, 1 1/2-Inch
Open End Wrench, 1 5/8-Inch
Crow's Foot, 1 5/8-Inch

Materials:
Oil (E254)
Lockwire (E231)

Parts:
Packings

Personnel Required:
67U10 Medium Helicopter Repairer
67U30 Inspector

References:
TM 55-1520-240-23P

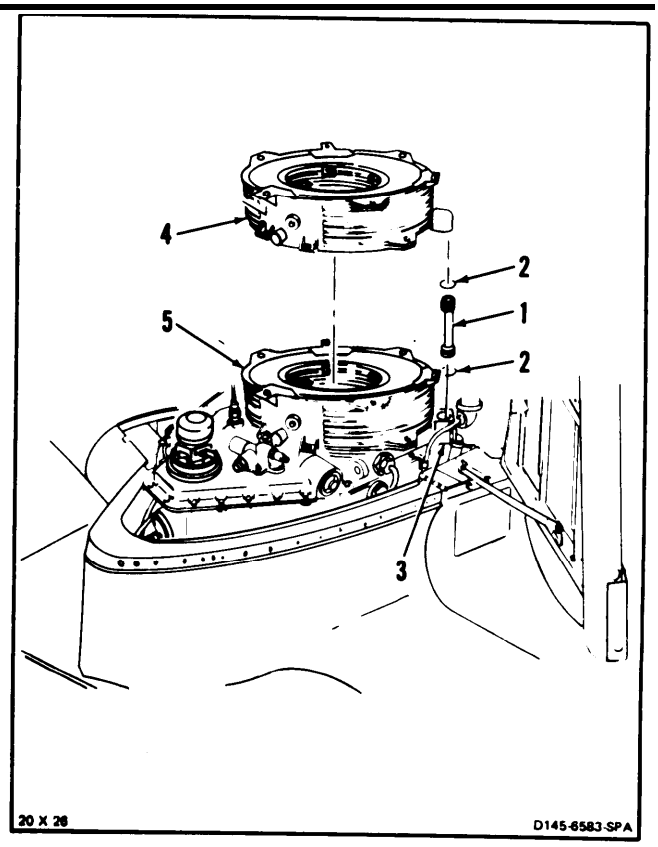


1. **Install oil transfer tube (1)** and two packings (2) in sump cover (3).

NOTE

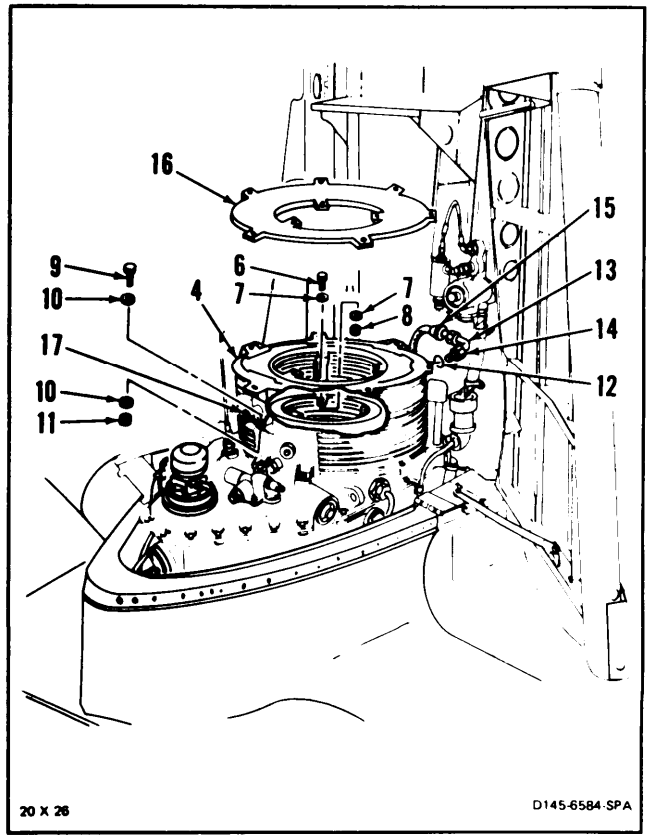
Do not tilt cooler, Oil can spill.

2. **Install cooler (4)** on cooler (5) and transfer tube (1). Press down firmly to seat cooler on tube.



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3. **Install bolts (6),** washers (7), and nuts (8) at three places around inside of cooler (4). **Torque nuts to 70 inch-pounds.**
4. **Install bolts (9),** washers (10), and nuts (11) at six places around outside of cooler (4). **Torque nuts to 70 inch-pounds.**
5. Coat packing (12) and thread of elbow (13) with oil (E254). **Install elbow** and packing in cooler (4). **Torque nut (14) to 80 inch-nounds.**
6. Coat thread of hose (15) with oil (E254). **Connect hose** to elbow (13).
7. **Install armor plate (16)** on cooler (4).
8. If drain plug (17) is not lockwired, lockwire plug to cooler (4). Use lockwire (E231).



FOLLOW-ON MAINTENANCE:

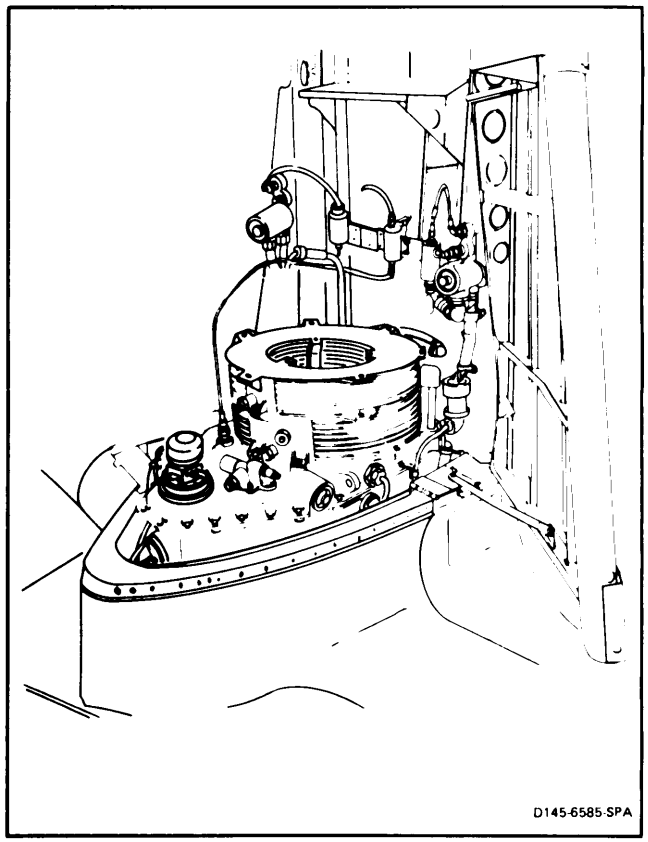
Install right engine transmission oil cooler (Task 6-216).

Install oil cooler fan and shaft (Task 6-186).

Service combining transmission (Task 1-54).

Close pylon hinged fairing (Task 2-2).

Perform ground run (TM 55-1520-240-10).



END OF TASK

6-216 INSTALL RIGHT ENGINE TRANSMISSION OIL COOLER

INITIAL SETUP

Applicable Configurations:
All

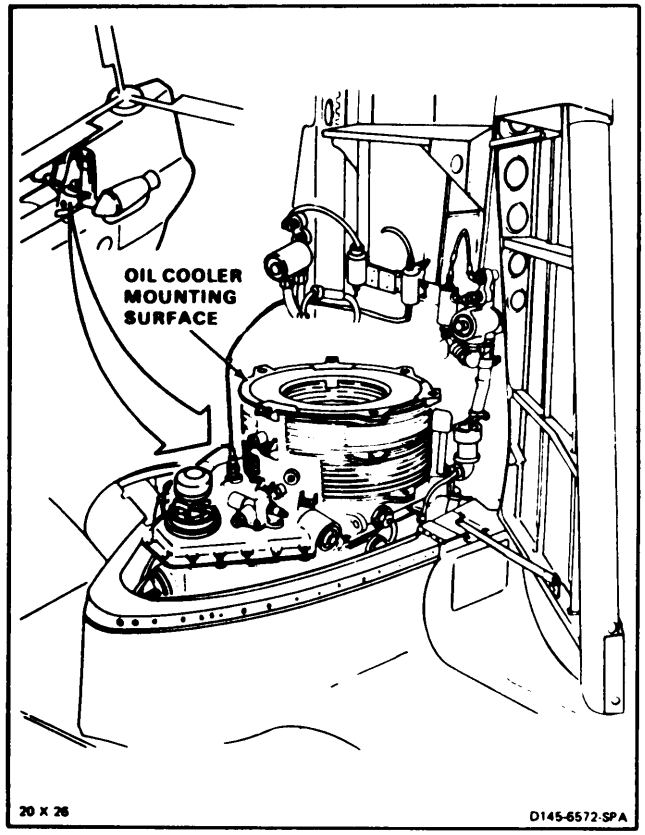
Tools:
Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692
Torque Wrench, 30 to 150 Inch-Pounds
Open End Wrench, 1 1/2-inch
Open End Wrench, 1 5/8-inch
Crow's Foot, 1 5/8-inch

Materials:
Oil (E254)
Lockwire (E231)

Parts:
Packings

Personnel Required:
67U10 Medium Helicopter Repairer
67U30 Inspector

References:
TM 55-1520-240-23P

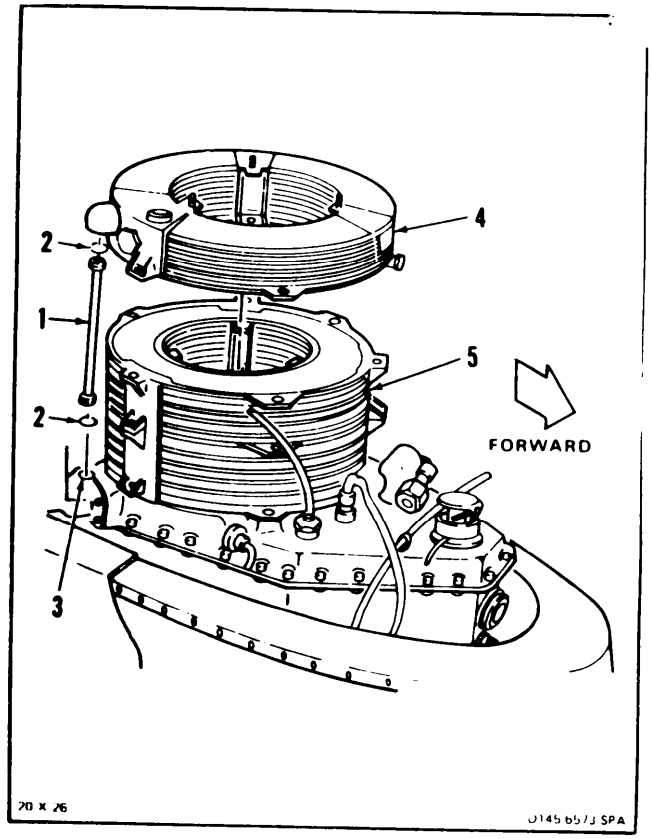


1. **Install oil transfer tube (1)** and two packings (2) in sump cover (3).

NOTE

Do not tilt cooler. Oil can spill.

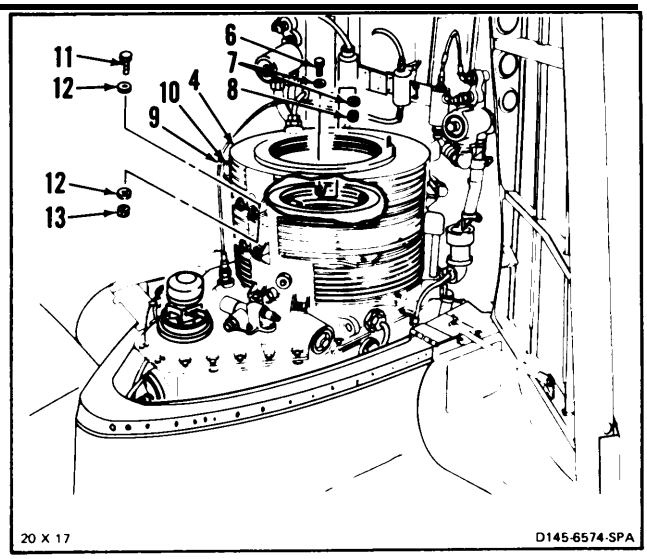
2. **Install cooler (4)** on cooler (5) and transfer tube (1). Press down firmly to seat cooler on tube.



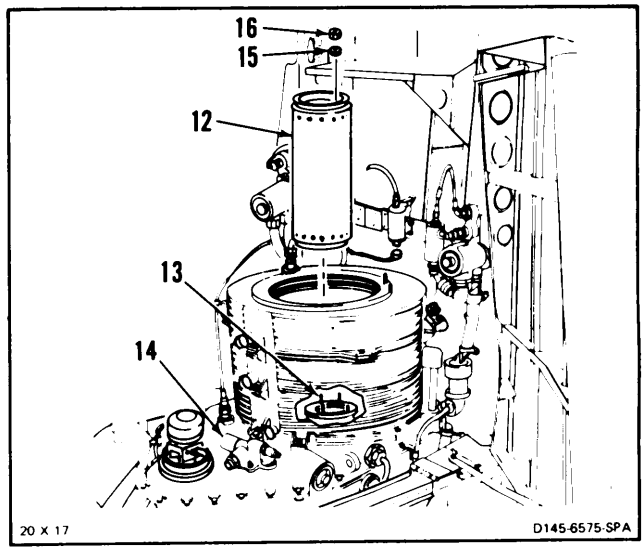
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6-216 INSTALL RIGHT ENGINE TRANSMISSION OIL COOLER (Continued)

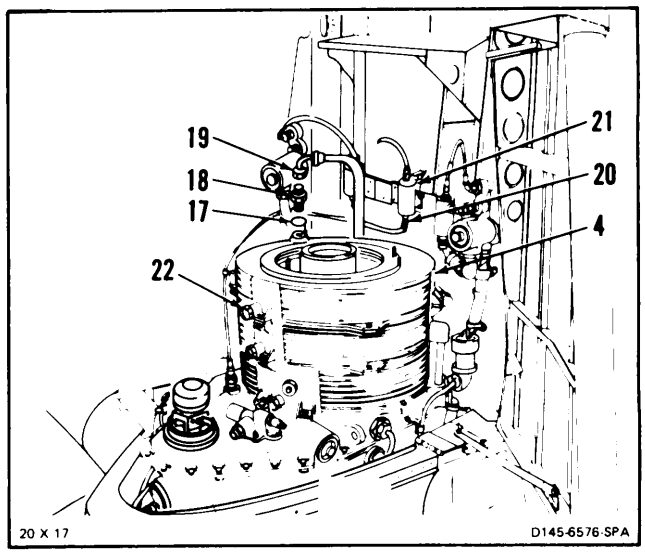
3. **Install bolts (6),** washers (7) and nuts (8) at three places around inside of cooler (4). **Torque nuts to 70 inch-pounds.**
4. Position bracket (9) on mounting lug (10). **Install bolts (11),** washers (12) and nuts (13) at six places around outside of cooler (4). **Torque nuts to 70 inch-pounds.**



5. **Install baffle (12)** on four studs (13) on sump cover (14). Install washers (15) and nuts (16). **Torque nuts to 70 inch-pounds.**



6. Coat packing (17) and thread of reducer (18) with oil (E254). **Install reducer,** with packing, in cooler (4). **Torque reducer to 80 inch-pounds.**
7. Coat thread of hose (19) with oil (E231). **Connect hose to reducer (18).**
8. **Connect hose (20)** to pressure transmitter (21).
9. If drain plug (22) is not lockwired, lockwire plug to cooler (4). Use lockwire (E231).



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6-216 INSTALL RIGHT ENGINE TRANSMISSION OIL COOLER (Continued)

INSPECT

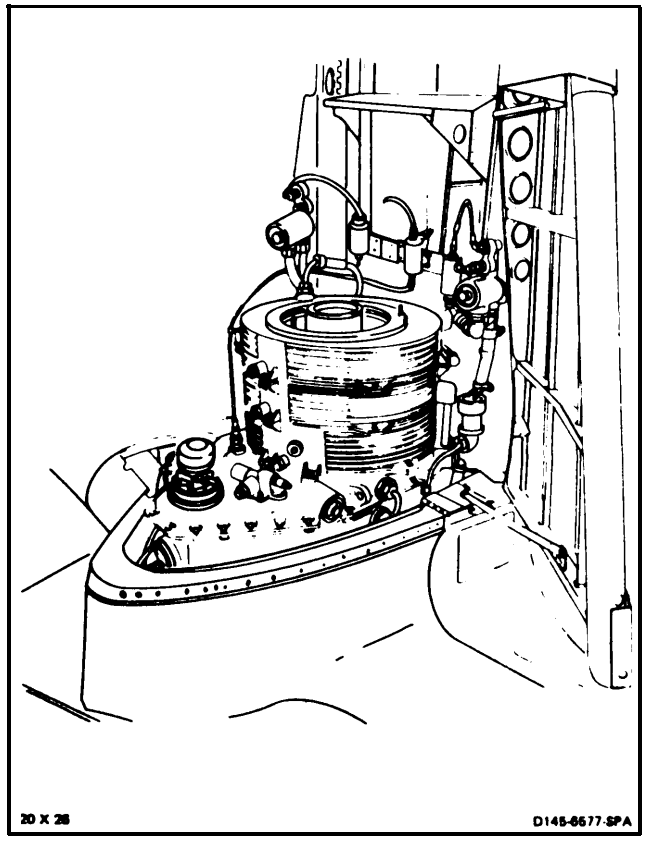
FOLLOW-ON MAINTENANCE:

Install oil cooler fan and shaft (Task 6-186).

Service combining transmission (Task 1-54).

Close pylon hinged fairing (Task 2-2).

Perform ground run (TM 55-1520-240-10).



END OF TASK

Pages Index-1 thru Index-118 Deleted

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic Tool Kit,
NSN 5180-00-232-4692
Vibrex Accessory Kit (T65)
Torque Wrench, 30 to 150 Inch-Pounds

Materials:

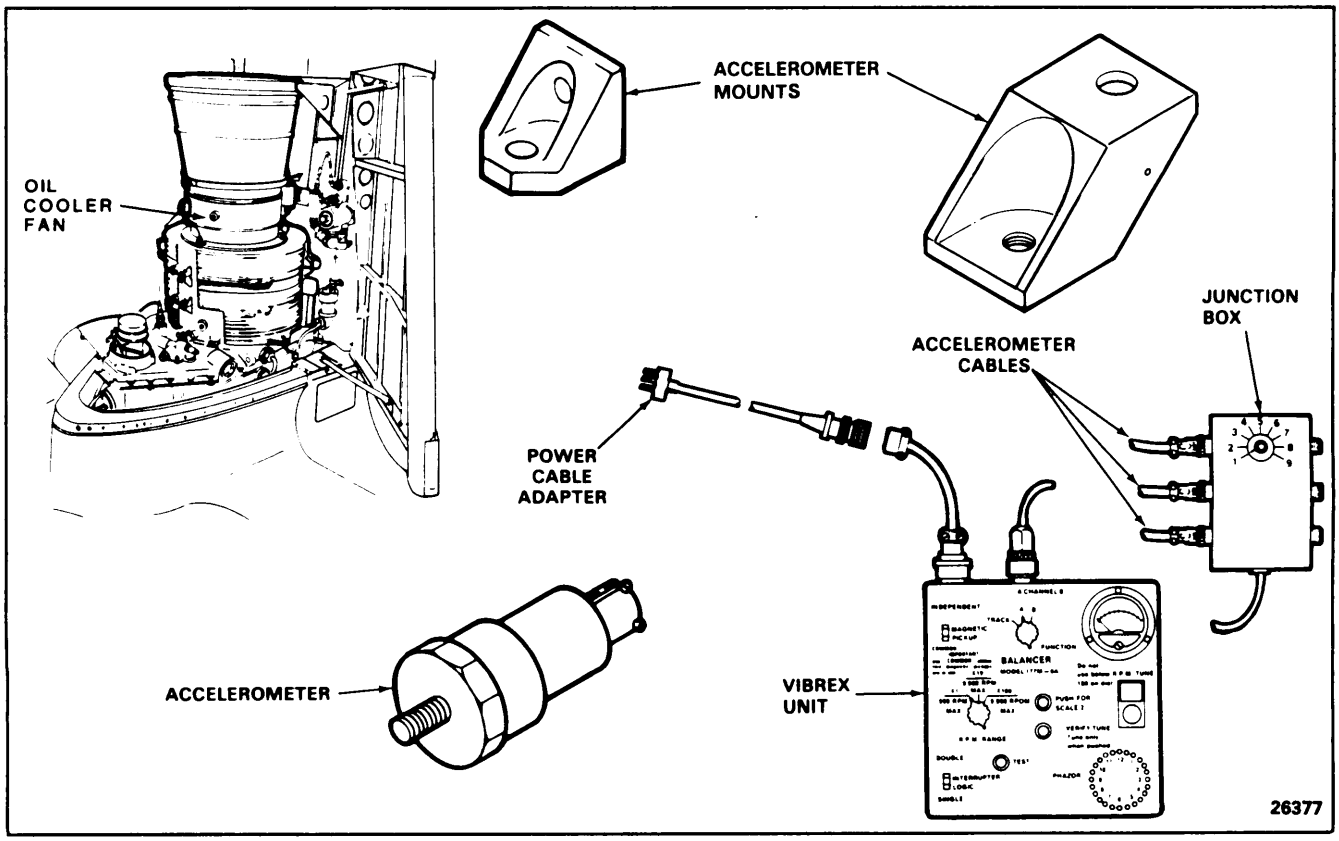
Plastic Strap (E274)
Oil (E254)
Gloves (E186)

Personnel Required:

Medium Helicopter Repairer
Inspector

Equipment Condition:

Battery Disconnected (Task 1-39)
Electrical Power Off
Hydraulic Power Off
Pylon Hinged Fairing Open (Task 2-2)



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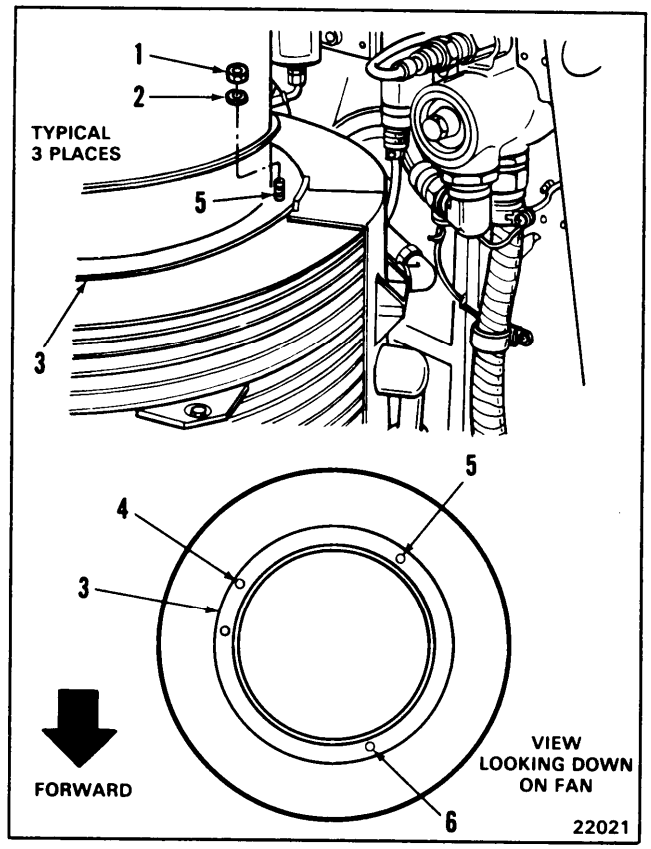
INSTALL MOUNTS

1. **Remove nut (1)** and washer (2) **from oil** cooler mounting flange (3) at 3 places as shown.

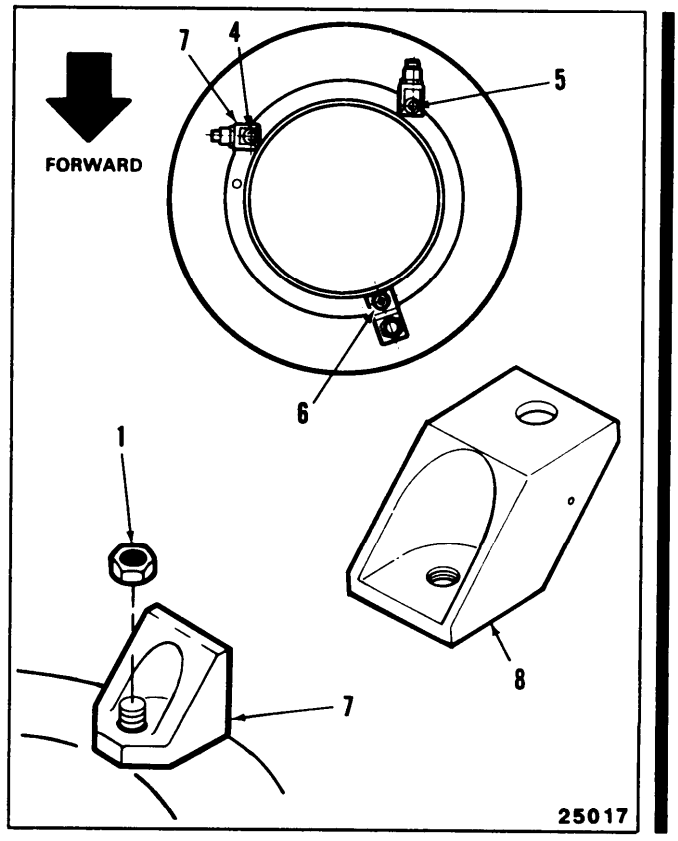
WARNING

Oil (E254) is toxic. It can irritate skin and cause burns. Avoid inhaling. Use only with adequate ventilation. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.

2. **Apply** a light coat of **oil (E254) to studs** (4), (5), and (6). Wear gloves (E186).



3. **Install an accelerometer mount on each stud** (4, 5, and 6) as follows:
   a. Install one mount 5242-5606-8 (7) on right aft stud (4) with flat facing right, as shown.
   b. Install one mount 5242-5606-8 (7) on left aft stud (5) with flat facing aft, as shown,
   c. Install vertical accelerometer mount 5242-5242 (8) on forward stud (6) with flat facing up, as shown.
   d. Secure each mount with nut (1) only. Torque nuts to 100 to 140 inch-pounds.



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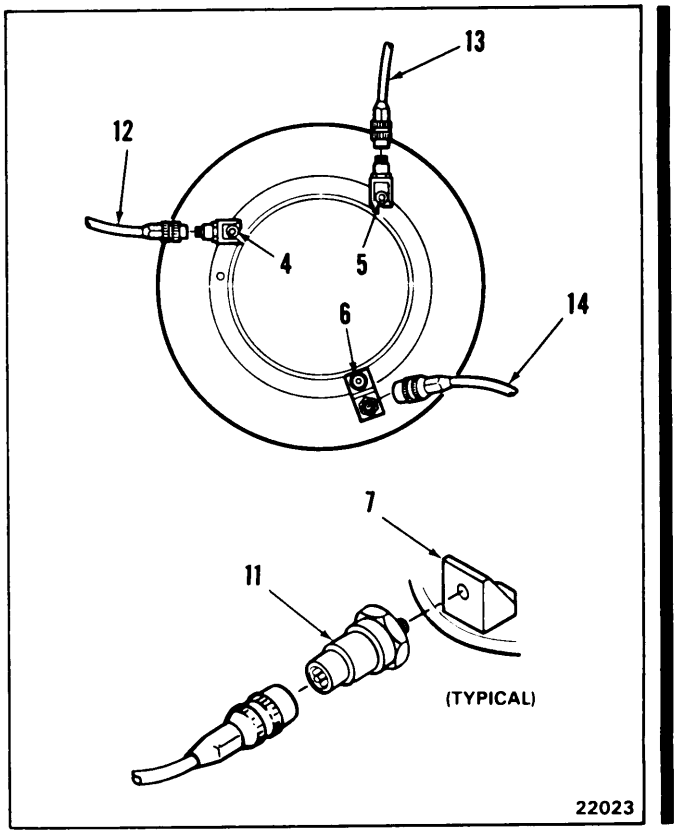
6-217 INSTALL VIBRATION ANALYSIS EQUIPMENT (VIBREX) (Continued)

INSTALL ACCELEROMETERS

4. **Install an accelerometer (11) in the flat side of each mount (7).**

INSTALL CABLES

5. **Connect No. 1 cable (12) to later alaccelerometer** at stud (4).
6. **Connect No. 2 cable (13) to longitudianl accelerometer** at stud (5).
7. **Connect No. 3 cable (14) tovertical accelerometer** at stud (6).

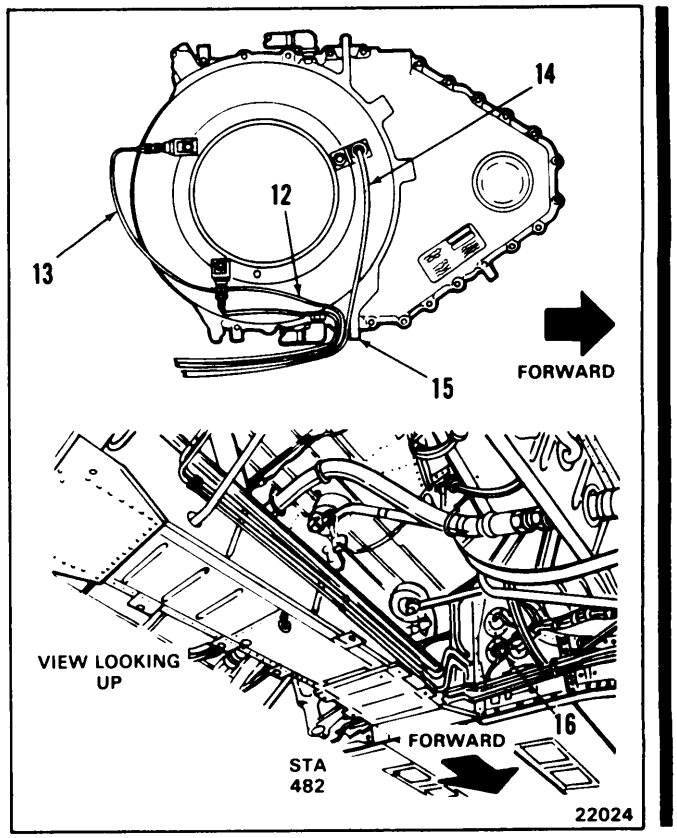


8. **Route three cables** (12), (13), and (14) around and down to lifting lug (15) as shown. **Pass the cables back through one of two wire holes (16)** in the former at sta 482, behind the combining transmission.

NOTE

Cables must be tied loosely, not tight. Tightly tied cables may cause faulty signals.

9. **Tie the three cables** to lifting lug (15) and **away from rotating parts.** Use plastic strap (E274).

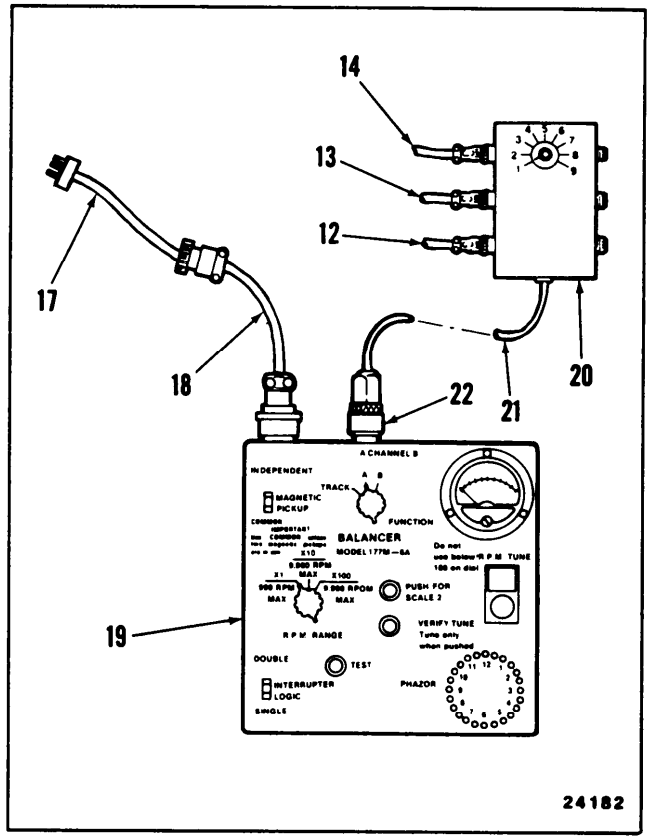


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6-217 INSTALL VIBRATION ANALYSIS EQUIPMENT (VIBREX) (Continued)

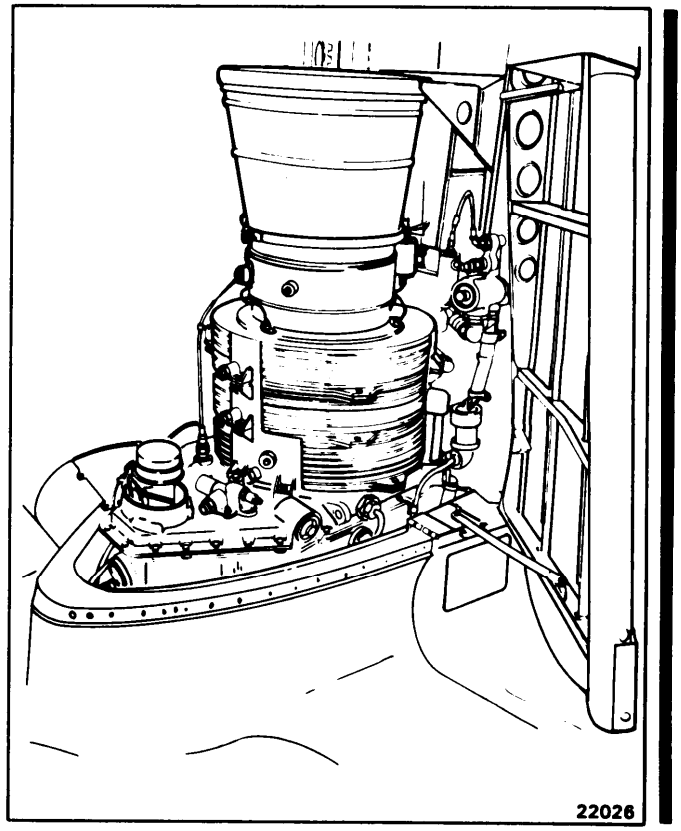
CONNECT VIBREX UNIT

10. **Connect power cable adapter** (17) to power cable (18) of Vibrex unit (19).
11. **Connect accelerometer cables** No. 1, 2, and 3 (12, 13, and 14) to receptacles 1, 2, and 3 of junction box (20).
12. **Connect output cable** (21) of junction box (20) to CHANNEL A receptacle (22) of unit (19).



CAUTION

Vibrex unit shall not be connected to aircraft power unless main generators are operating (engines running).



INSPECT

FOLLOW ON MAINTENANCE:
Close pylon hinged fairing (Task 2-2)

END OF TASK

INITIAL SETUP

Applicable Configurations:

Tools:

Aircraft Mechanic Tool Kit,NSN 5180-00-232-4692

Materials:

None

Personnel Required:

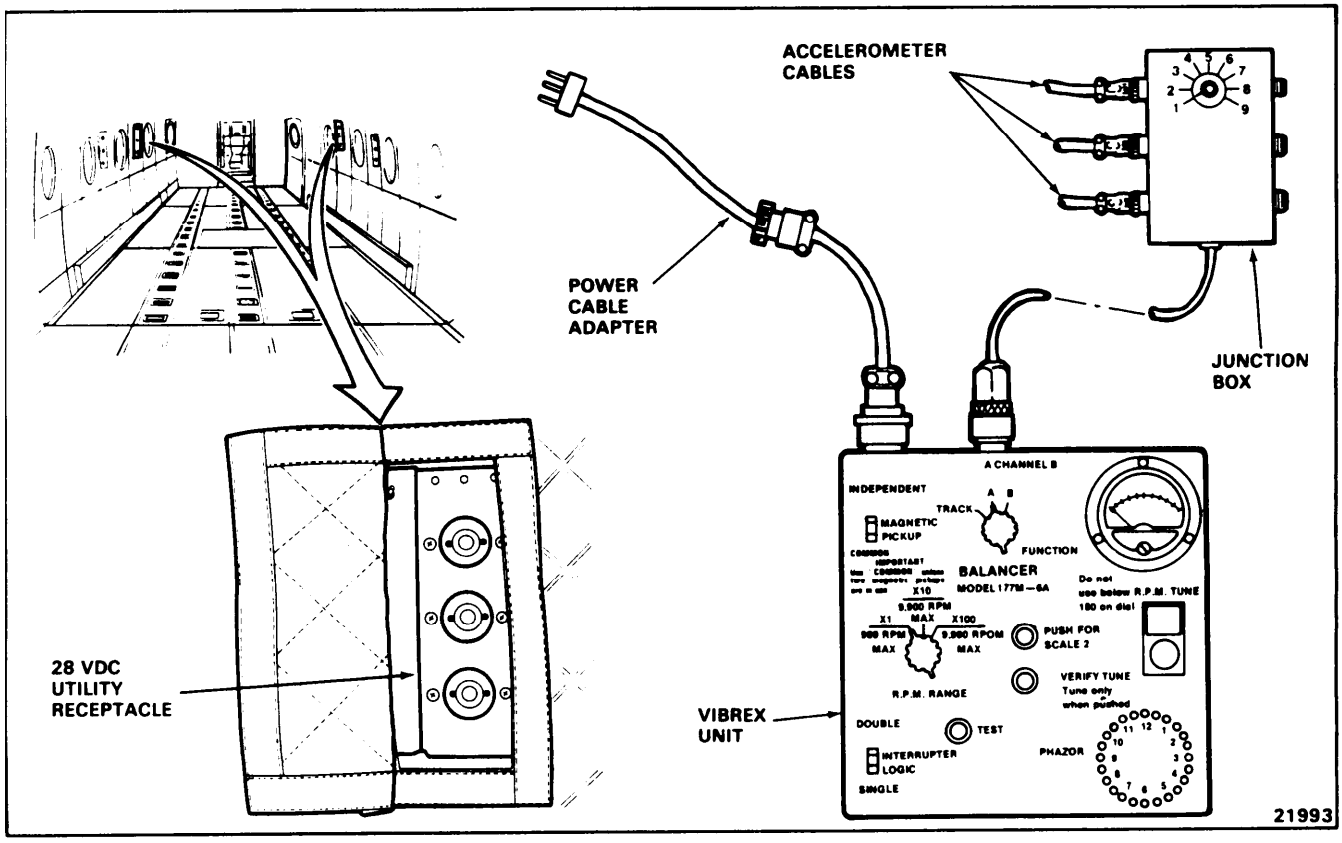
Medium Helicopter Repairer
Rotary-Wing Aviator (2)

References:

Task 6-219

Equipment Condition:

Install Vibration Analysis Equipment (Task 6-217)
All Access Doors and Panels Closed (Task 2-2)

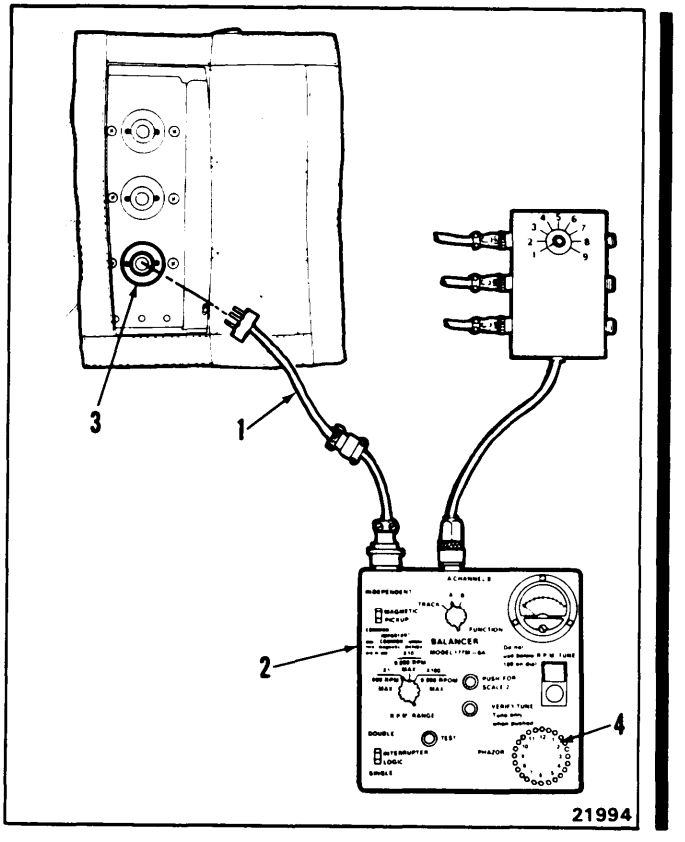


CONNECT POWER

NOTE

- Ground run may be performed with engine transmission cowling removed.
- Main generators shall be operating before connecting Vibrex power cable.

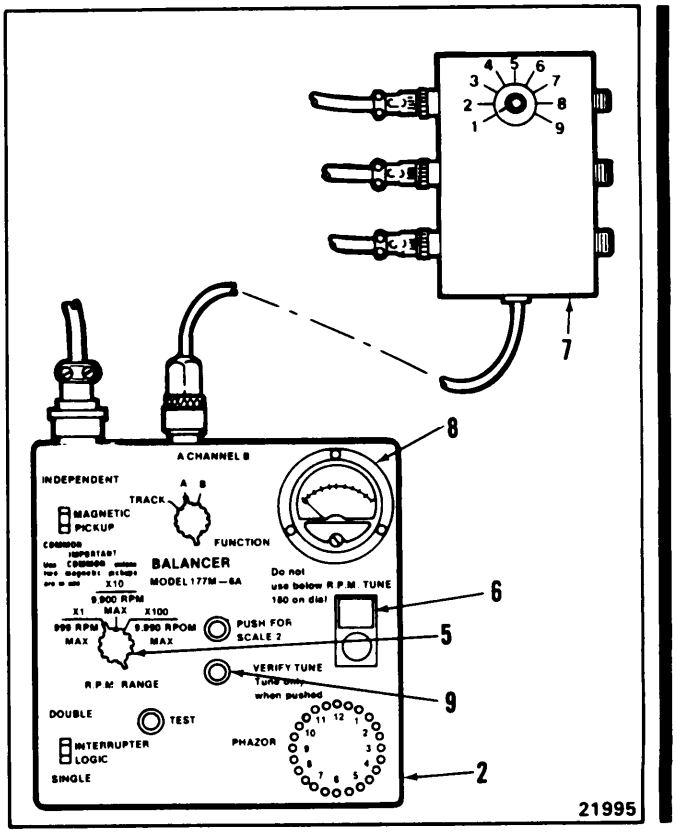
1. Close all access doors and panels (Task 2-2).
2. Have pilot **perform ground run.** Establish 100 percent rpm with engine torques matched as closely as possible (within 5 percent).
3. **Connect power cable adapter** (1) from Vibrex unit (2) to 5A 28 VDC receptacle (3) at station 260 or 360. **Check for power to Vibrex unit,** indicated by any PHAZOR light (4) being lit.



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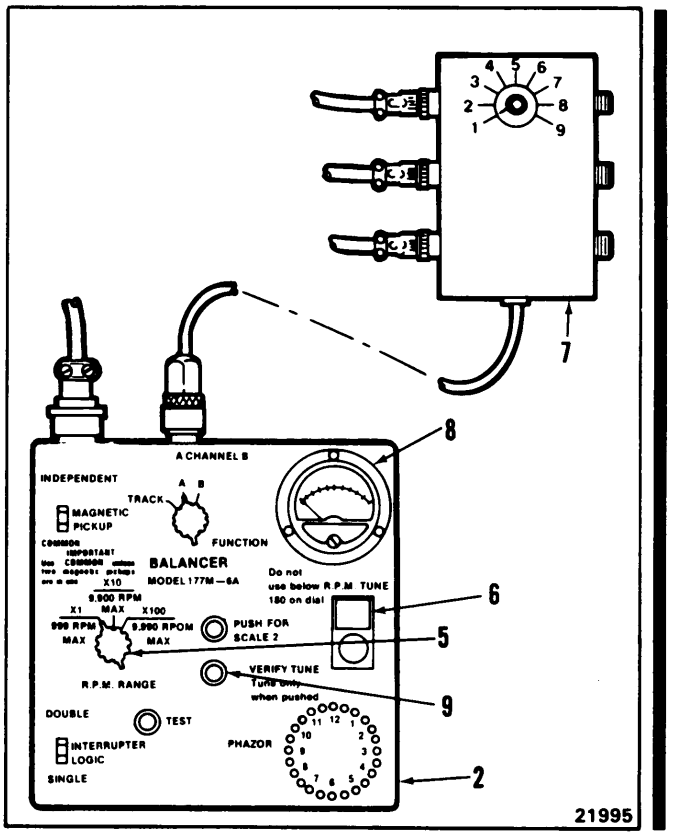
ENGINE DRIVE SHAFTS

4. **Adjust Vibrex unit** (2) as follows:
   a. Set RPM RANGE switch (5) to X100.
   b. Set RPM TUNE dial (6) to 122.
   c. Select channel 1 (lateral) on junction box (7).
   d. Note indication on IPS meter (8). Press VERIFY TUNE button (9). If meter indication does not change, tuning is not necessary. Do not perform step e.
   e. With VERIFY TUNE button (9) pressed, adjust RPM TUNE dial (6) until IPS meter (8) reads the same with button pressed or released.
5. Record IPS reading in LATERAL 1 box of chart at end of task.
6. **Select channel 2** (longitudinal) on junction box (7). **Repeat steps 4.d. and 4.e.** as necessary.
7. **Record IPS reading** in LONGITUDINAL 2 box of chart at end of task.
8. **Select channel 3** (vertical) on junction box (7). **Repeat steps 4.d. and 4.e.** as necessary.
9. **Record IPS reading** in VERTICAL 3 box of chart at end of task.
10. If all three IPS readings in steps 5, 7, and 9, are 1.0 or less, go to step 11. If any reading is greater than 1.0, perform correction procedure (Task 6-219).



SYCHRONIZING SHAFTING

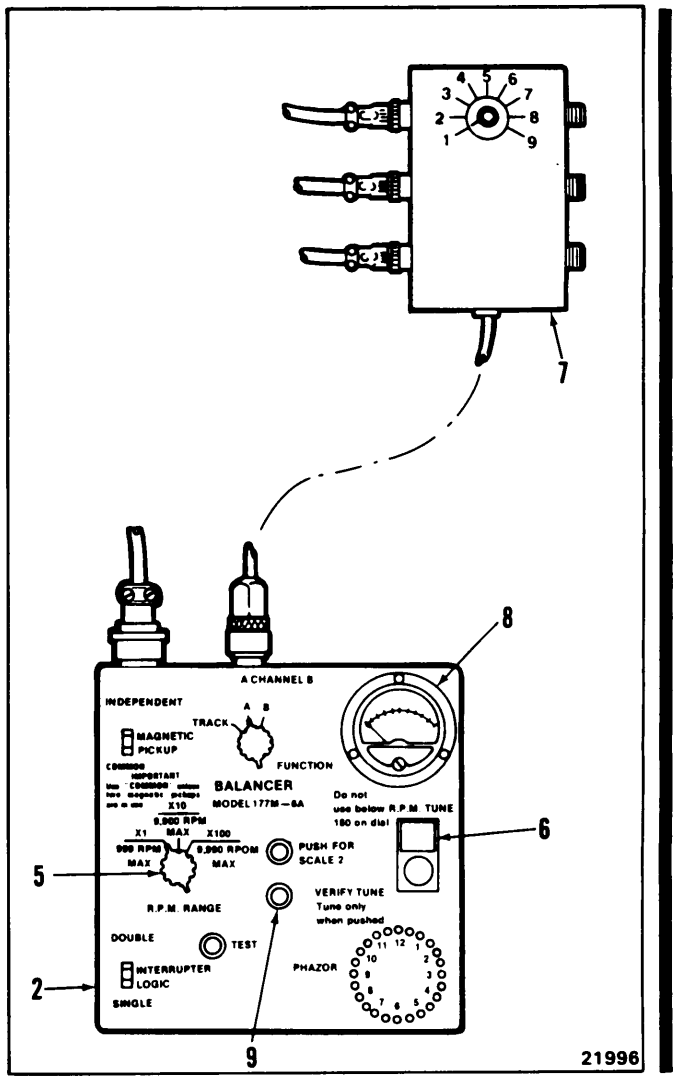
11. **Adjust Vibrex unit** (2) as follows:
    a. Set RPM RANGE switch (5) to X10.
    b. Set RPM TUNE dial (6) to 691.
    c. Select channel 1 (lateral) on junction box (7).
    d. Note indication on IPS meter (8). Press VERIFY TUNE button (9) If meter indication does not change, tuning is not necessary. Do not perform step e.
    e. With VERIFY TUNE button (9) pressed, adjust RPM TUNE dial (6) until IPS meter (8) reads the same with button pressed or released.
12. **Record IPS reading** in LATERAL 1 box of chart at end of task.
13. **Select channel 2** (longitudinal) on junction box (7). **Repeat steps 11.d. and 11.e.** as necessary.
14. **Record IPS reading** in LONGITUDINAL 2 box of chart at end of task.
15. **Select channel 3** (vertical) on junction box (7). **Repeat steps 11.d. and 11.e.** as necessary.
16. **Record IPS reading** in VERTICAL 3 box of chart at end of task.
17. If all three IPS readings in steps 12, 14, and 16 are 0.5 or less, go to step 18. If any reading is greater than 0.5, perform correction procedure (Task 219).



GO TO NEXT PAGE

FAN DRIVE SHAGT

18. **Adjust Vibrex unit** (2) as follows:
    a. Set RPM RANGE switch (5) to X10.
    b. Set RPM TUNE dial (6) to 974.
    c. Select channel 1 (lateral) on junction box (7).
    d. Note indication on IPS meter (8). Press VERIFY TUNE button (9) If meter indication does not change, tuning is not necessary. Do not perform step e.
    e. With VERIFY TUNE button (9) pressed, adjust RPM TUNE dial (6) until IPS meter (8) reads the same with button pressed or released.
19. **Record IPS reading** in LATERAL 1 box of chart at end of task.
20. **Select channel 2** (longitudinal) on junction box (7). **Repeat steps 18.d. and 18.e.** as necessary.
21. **Record IPS reading** in LONGITUDINAL 2 box of chart at end of task.
22. **Select channel 3** (vertical) on junction box (7). **Repeat steps 11.d. and 11.e.** as necessary.
23. **Record IPS reading** in VERTICAL 3 box of chart at end of task.
24. If all three IPS readings in steps 19, 21, and 23 are 0.2 or less, go to step 25. If any reading is greater than 0.2, perform correction procedure (Task 219).
25. **Disconnect power cable adapter** (1) from receptacle (3).



Ground Run No.							
ITEM	RPM	VIBREX SETTING	ACCELEROMETER	JUNCTION BOX CHANNEL NO.	VIB. LIMITS (IPS)	READING (IPS)	CHANGES TO MEET LIMITS
Engine Drive Shaft	12,263	X100 RPM Range 122 RPM Tune	LATERAL	1	1.0		
Engine Drive Shaft	12,263	X100 RPM Range 122 RPM Tune	LONGITUDINAL	2	1.0		
Fan Drive Shaft	9,739	X10 RPM Range 974 RPM Tune	LATERAL	1	0.3		
Fan Drive Shaft	9,739	X10 RPM Range 974 RPM Tune	LONGITUDINAL	2	0.3		
Sync Shafting	6,912	X10 RPM Range 691 RPM Tune	LATERAL	1	0.7		
Sync Shafting	6,912	X10 RPM Range 691 RPM Tune	LONGITUDINAL	2	0.7		

FOLLOW-ON MAINTENANCE:

Close pylon hinged fairing (Task 2-2).

END OF TASK

6-219 VIBRATION CORRECTION PROCEDURE (VIBREX/ ROTORTUNER) 6-219

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic Tool Kit,
NSN 5180-00-232-4692
Torque Wrench, 30 to 150 Inch-pounds
Torque Wrench, 150 to 750 Inch-Pounds

Materials:

Marking Pencil (E270.1)
Oil (E254)
Grease (E190)
Dry Cleaning Solvent (E162)
Cloths (E120)
Gloves (E186)

Personnel Required:

Medium Helicopter Repairer
Inspector

References:

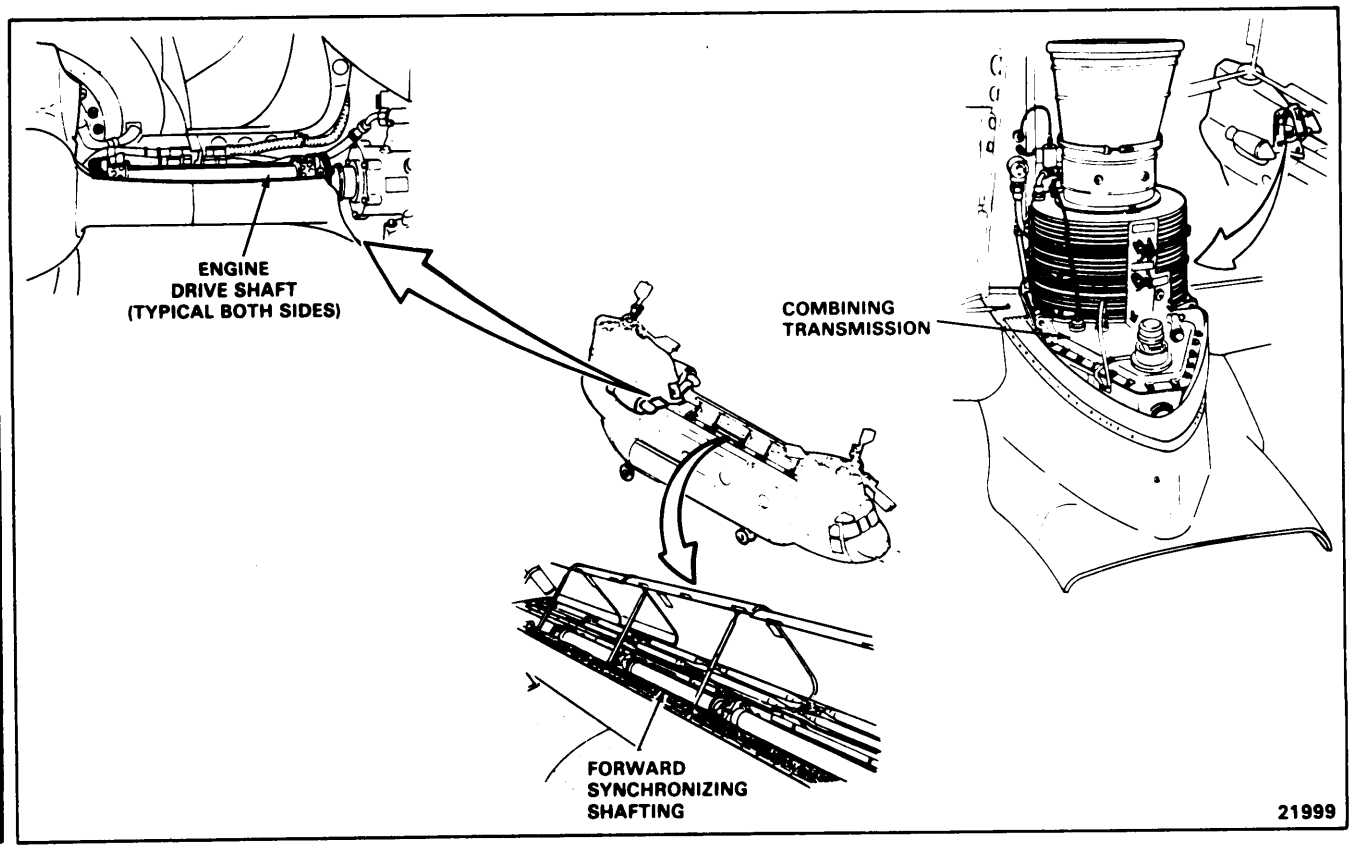
Tasks 6-2 through 6-6
Tasks 6-8 through 6-10
Tasks 6-12 through 6-19
Task 1-89
Task 6-30
Task 6-30.1
Task 6-32
Task 6-182
Task 6-186
Task 6-218
Task 6-222
TM 55-1520-240-10

Equipment Condition:

Battery Disconnected (Task 1-39)
Electrical Power Off
Hydraulic Power Off
Pylon Hinged Fairing Open (Task 2-2)
Pylon Lower Fairing Open (Task 2-2)
Engine Drive Shaft Access Covers Removed (Task 2-2)
Engine Air Inlet Screens Removed (Task 4-65)
Engine Transmission Fairing Access Covers Open (Task 2-2)

NOTE

For vibration analysis with the Vibrex go to task 6-218. For vibration analysis with the Rotortuner go to task 6-222.



GO TO NEXT PAGE

6-219 VIBRATION CORRECTION PROCEDURE (VIBREX/ ROTORTUNER) 6-219 (Continued)

ENGINE DRIVE SHAFTS

NOTE

Adjust No.1 and No.2 engine drive shaft in the same way. No. 2 engine drive shaft shown.

1. **Inspect adapter assemblies** (1 and 2) at each end of shaft (3) (Task 6-30.1).
2. **Loosen nuts (4)** at adapter assemblies (1 and 2) of shaft (3). Hold bolt heads to keep bolts from turning.

CAUTION

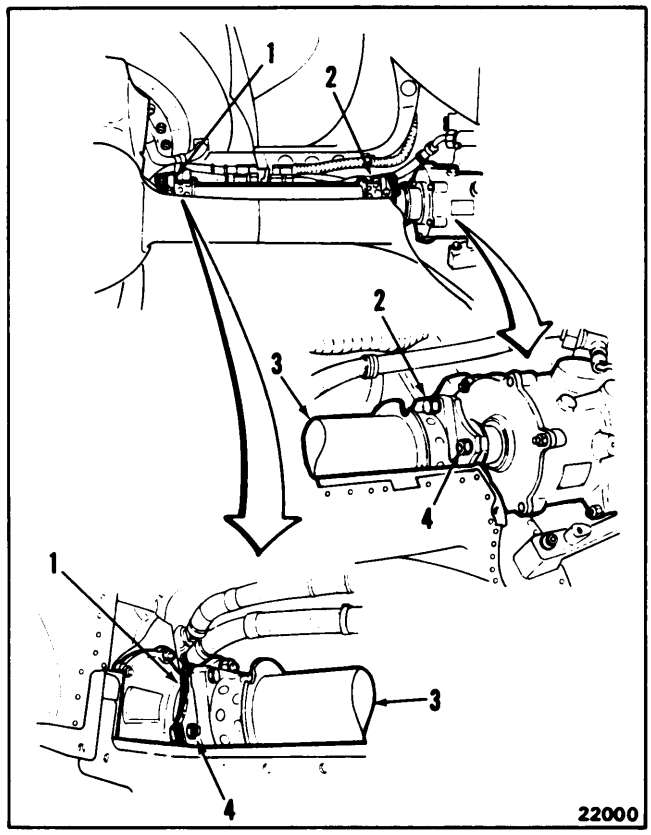
If bolts are allowed to turn, bolts, plates and shaft adapter assembly can be damaged.

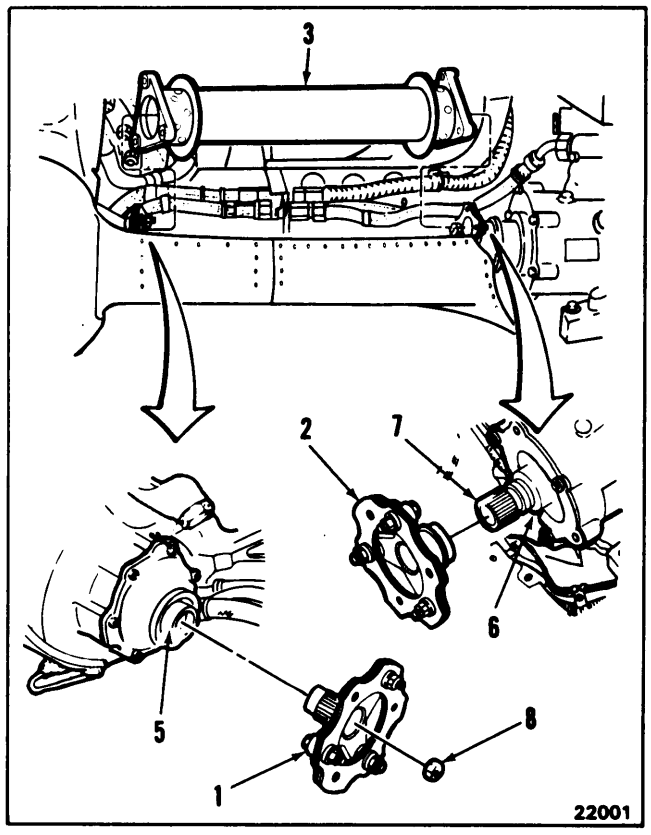
3. **Torque nuts (4)** to 440 inch-pounds.
4. Perform a vibration check for engine drive shafts. If vibration is not greater than 1.0 ips, go to FOLLOW-ON MAINTENANCE. If check is unsatisfactory (vibration greater than 1.0 ips), continue with step 5.
5. **Match-mark each drive shaft (3) to adapters (1 and 2). Match-mark adapter (1) to engine transmission (5) and adapter (2) to combining transmission (6).** Use a marking pencil (E270.1).
6. Remove drive shaft (3) and adapters (1 and 2) (Task 6-30). **Inspect shaft and adapters** (Task 6-30.1). Check interior of shaft for water and foreign objects.

WARNING

Dry cleaning solvent (E162) is combustible and toxic. It can irritate skin and cause burns. Use only with adequate ventilation, away from open flame. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.

7. **Clean splines** on adapters (1 and 2), splines (7) on combining transmission (6), **thread of nut (8), and mating stud** within engine transmission (5). Use solvent (E162) and cloths (E120). Wear gloves (186).
8. **Inspect all splines** for wear or damage.
9. **Install adapters** (1 & 2) and drive shaft (3) (Task 6-32). **Make sure all match-marks line up.**





GO TO NEXT PAGE

6-219 VIBRATION CORRECTION PROCEDURE (VIBREX/ ROTORTUNER) 6-219 (Continued)

10. Repeat step 4. If check is still unsatisfactory, continue with step 11.
11. Perform engine drive shaft vibration check with No. 1 engine at minimum beep and rpm re-established at 100 percent with No.2 engine only.
12. Repeat the check of step 11. with No. 2 engine at minimum beep and rpm re-established at 100 percent with No. 1 engine only.
13. Shut down engines (TM 55-1520-240-10).
14. **Compare vibration readings** of steps 11. and 12. **If readings of step 12. are higher,** perform steps a. thru d. on **No. 2 engine drive shaft** (3). If readings of **step 11.** are higher, perform steps a. thru d. on **No. 1 shaft.**

NOTE

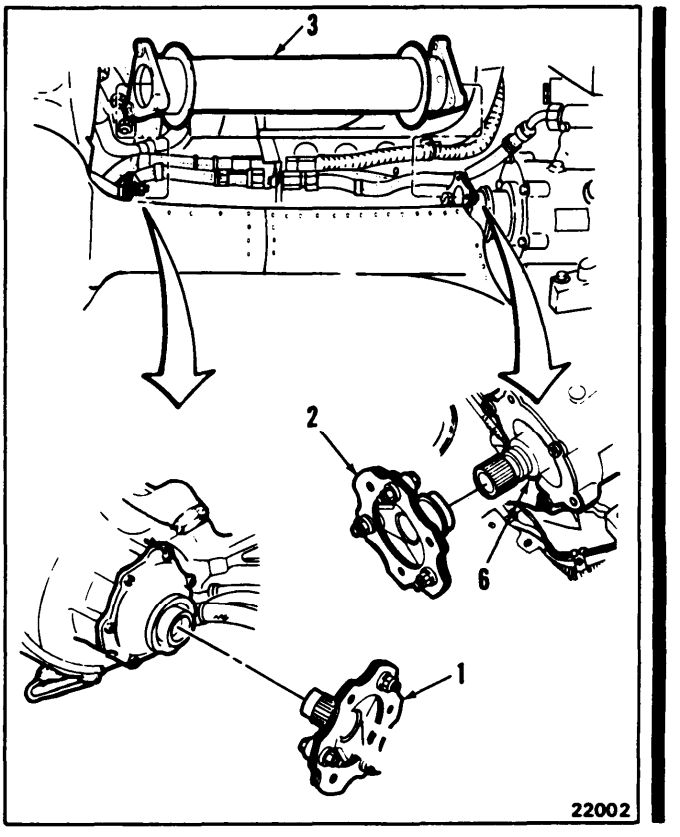
No. 2 engine drive shaft is shown. No.1 shaft is similar.

a. Match-mark adapters (1 and 2) to shaft (3). Use a marking pencil (E270.1).
b. Remove shaft (3) (Task 6-30).
c. Remove adapter (2) from combining transmission (6) (Task 6-30). Rotate it 90 degrees clockwise facing combining transmission input pinion and reinstall it (Task 6-32).
d. Align match-marks on adapters (1 and 2) and shaft (3). Reinstall the shaft (Task 6-32).

15. Repeat step 6. If check is still unsatisfactory, repeat steps 11. through 14. a maximum of two times. If vibration still exceeds 1.0 ips. replace the fan (Tasks 6-182 and 6-186).

NOTE

If fan has been replaced, repeat entire vibration analysis. Task 6-218 for the Vibrex or task 6-222 for Rotortuner.

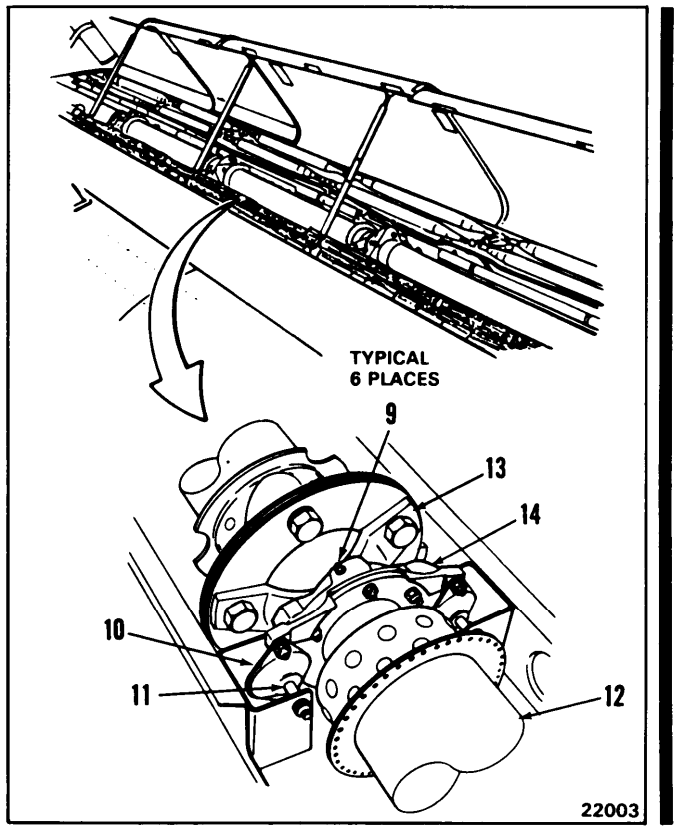


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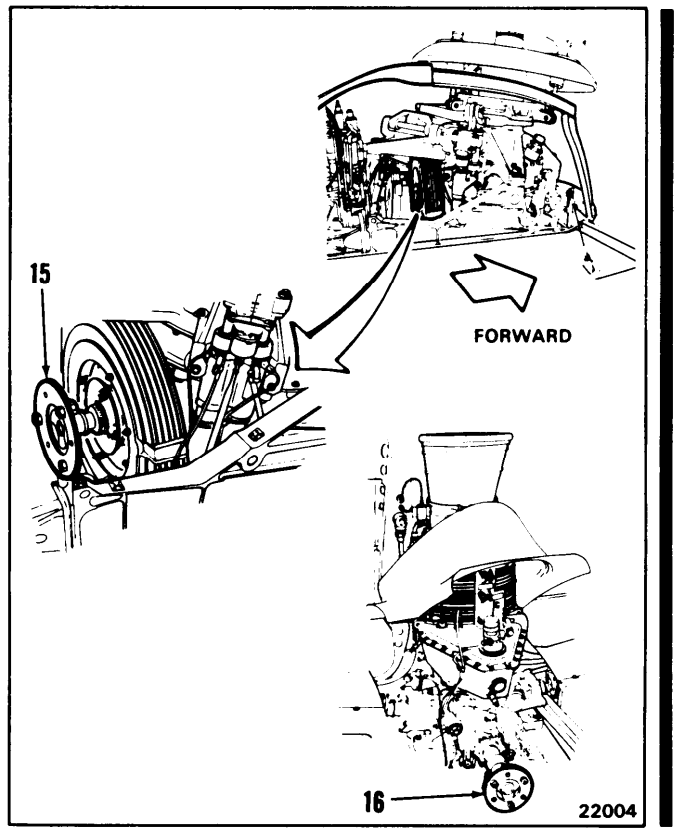
6-219 VIBRATION COREECTION PROCEDURE (VIBREX/ ROTORTUNER) 6-219 (Continued)

SYNCHRONIZING SHAFTING

16. **Lubricate shafting bearings** at fitting (9) (Task 1-89).
17. **Inspect shafting mounts** (10) at six places (Task 6-10). Replace bushings (11) if binding or excessive play is noted (Tasks 6-13 through 6-15).
18. **Check each of seven shafts (12) and six adapter assemblies (13)** for damage (Task 6-10). Replace any damaged shaft (Tasks 6-2 through 6-4 and 6-17 through 6-19).
19. **Inspect each drive shaft support** (14) for signs of overheating. If overheating is indicated, replace the support bearing (Tasks 6-12 and 6-16).



20. Remove, **lubricate,** and reinstall **forward transmission adapter assembly** (15) (Tasks 6-5 and 6-8).
21. Remove, **lubricate,** and reinstall **combining transmission forward output shaft adapter** (16) (Tasks 6-6 and 6-9).
22. Perform a ground run vibration check for synchronizing shaft vibration. If check is unsatisfactory, (vibration greater than 0.5 ips), continue with step 23.



GO TO NEXT PAGE

6-219 VIBRATION CORRECTION PROCEDURE (VIBREX/ ROTORTUNER) 6-219 (Continued)

23. **Reposition combining transmission forward output shaft pinion adapter** (16) as follows:
    a. **Match-mark** combining transmission forward output shaft pinion **adapter (16) to combining transmission (6). Match-mark No. 7 shaft (17) to No. 6 shaft** (18). Use a marking pencil (E270.1).
    b. Remove No. 7 shaft (Task 6-4).
    c. **Remove adapter (16)** from transmission (6) (Task 6-6). **Rotate it 120 degrees clockwise** and reinstall it (Task 6-9).
    d. Reinstall No. 7 shaft (17) according to No, 6 shaft (18) match-mark.

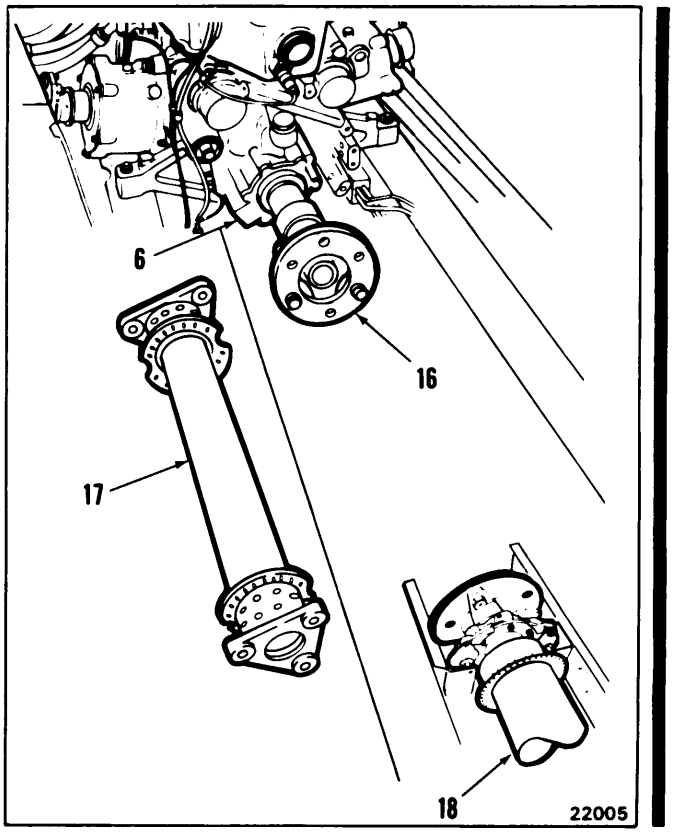
CAUTION

Before repeating ground run, check that rotor blades are properly phased.

24. Repeat step 22. If check is still unsatisfactory, repeat step 23. If vibration still exceeds 0.5 ips replace the fan (Tasks 6-182 and 6-186).

NOTE

If fan has been replaced, repeat entire vibration analysis. Task 6-218 for the Vibrex or task 6-222 for Rotortuner.



GO TO NEXT PAGE

6-219 VIBRATION CORRECTION PROCEDURE (VIBREX/ ROTORTUNER) 6-219 (Continued)

FAN DRIVE SHAFT

25. Loosen clamp (19) and remove duct (20) from fan (21).
26. **Inspect fan** (21) for signs of contact between the vanes of impeller (22) and housing (23). If there is no evidence of contact, continue with step 28. If there is evidence of contact, replace the fan (Tasks 6-182 and 6-186).
27. Perform a ground run vibration check for the combining transmission fan. If the check is unsatisfactory (vibration greater than 0.2 ips), continue with step 28.
28. **Match-mark a vane** on impeller (22) **to housing** (23). Use a marking pencil (E270.1).
29. **Raise fan assembly** (21) from fan shaft (24) and rotate slightly to rest on studs (Task 6-182). **Make sure the fan shaft remains engaged in the transmission and does not rotate.**
30. Rotate fan impeller (22) 90 degrees clockwise with respect to fan drive shaft (24), Refer to match marks. **Lower fan assembly** (21) (Task 6-186).

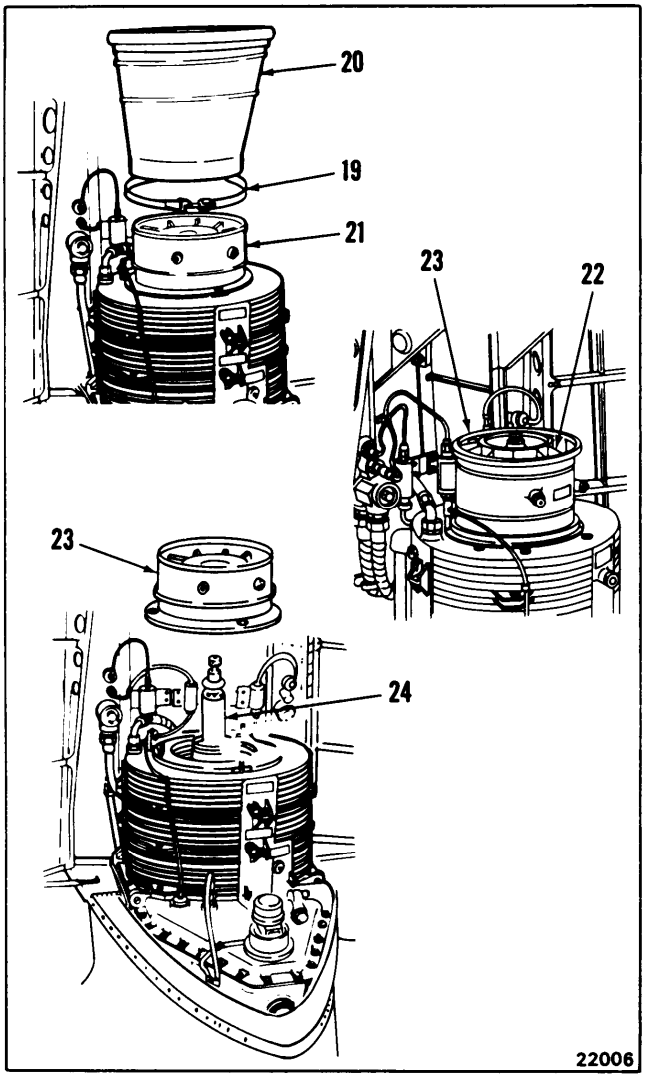
WARNING

Oil (E254) is toxic. It can irritate skin and cause burns. Avoid inhaling. Use only with adequate ventilation. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.

31. **Install duct** (20) and clamp (19). Coat thread of clamp with oil (E254). Wear gloves (E186). Torque clamp to 35 inch-pounds.
32. Repeat step 27. If check is still unsatisfactory, repeat steps 29, through 31. two times. If vibration still exceeds 0.2 ips, replace the fan (Tasks 6-182 and 6-186).

NOTE

If fan has been replaced, repeat entire vibration analysis. Task 6-218 for Vibrex task 6-222 for Rotortuner.



GO TO NEXT PAGE

6-219 VIBRATION CORRECTION PROCEDURE (VIBREX/ ROTORTUNER) 6-219 (Continued)

FOLLOW ON MAINTENANCE:

Remove vibration analysis equipment for Vibrex (Task 6-220).

Remove vibration analysis equipment for Rotortuner (Task 6-223).

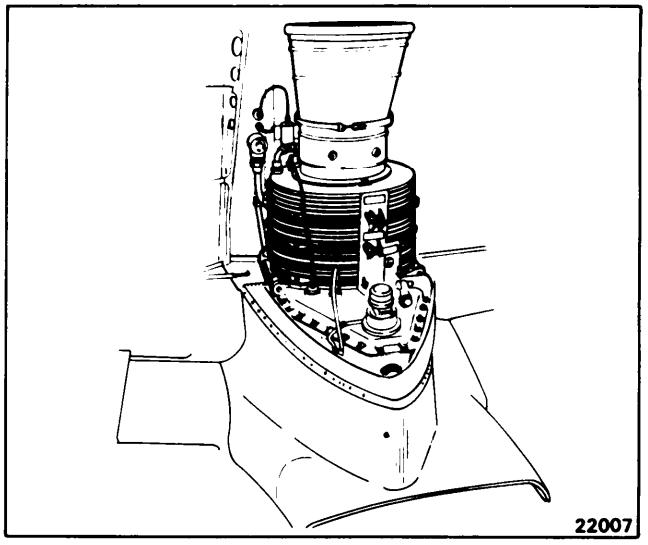
Close engine transmission fairing access cover (Task 2.2).

Close pylon lower fairing (Task 2.2).

Close pylon hinged fairing (Task 2-2).

Install engine air inlet screen (Task 4-76).

Perform ground run (TM 55-1520-240-10).



END OF TASK

6-220 REMOVE VIBRATION ANALYSIS EQUIPMENT (VIBREX) 6-220

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic Tool Kit,
NSN 5180-00-232-4692
Torque Wrench, 30 to 150 Inch-Pounds

Materials:

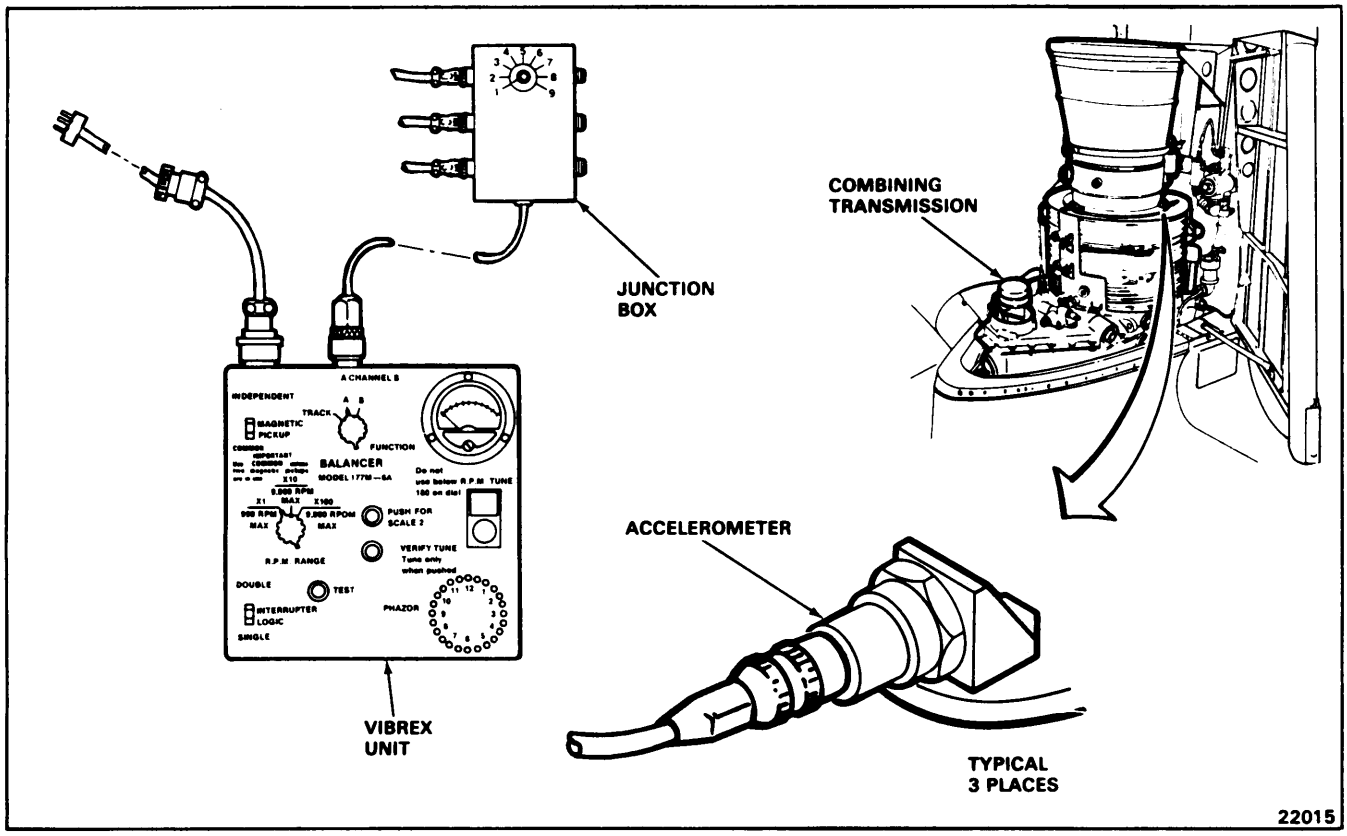
Oil (E254)
Gloves (E186)

Personnel Required:

Medium Helicopter Repairer
Inspector

Equipment Condition:

Battery Disconnected (Task 1-39)
Electrical Power Off
Hydraulic Power Off
Pylon Hinged Fairing Open (Task 2-2)

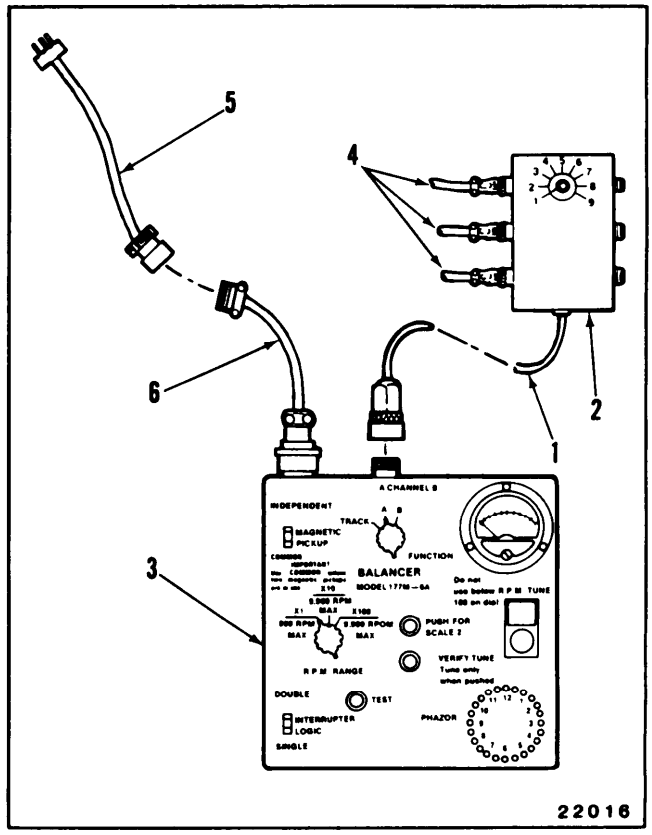


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6-220 REMOVE VIBRATION ANALYSIS EQUIPMENT (VIBREX) (Continued) 6-220

DISCONNECT VIBREX UNIT

1. **Disconnect output cable** (1) of junction box (2) from Vibrex unit (3).
2. **Disconnect three accelerometer cables** (4) from junction box (2).
3. **Disconnect power cable adapter** (5) from power cable (6) of Vibrex unit (3).



REMOVE CABLES

4. **Disconnect cables (4) from three accelerometers** (7) at combining transmission oil cooler fan (8).

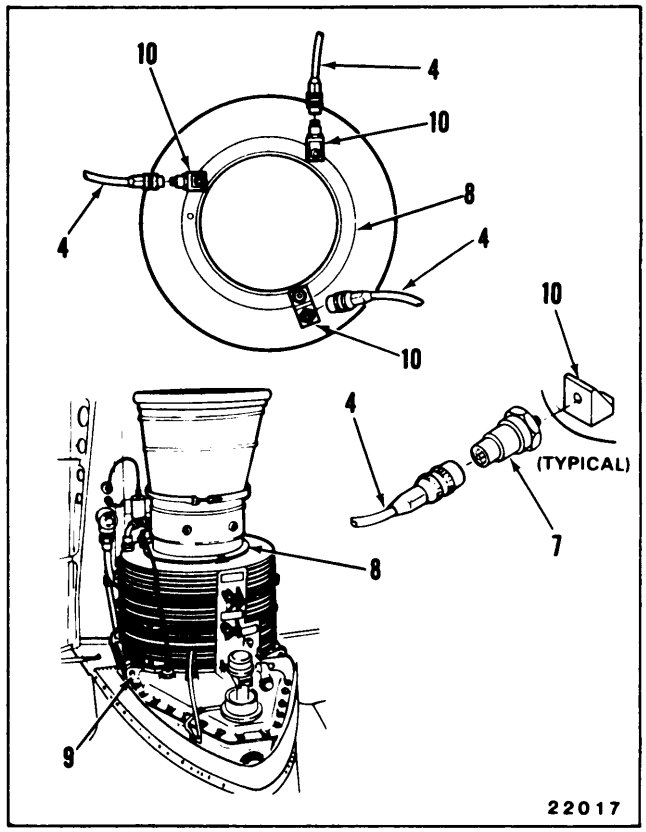
NOTE

Cables may be secured with plastic straps at various places along their length.

5. Untie cables (4) from lifting lug (9). Pull three cables through the hole in the former at sta 482, aft of the combining transmission.

REMOVE ACCELEROMETERS

6. **Remove three accelerometers** (7) from mounts (10) on the flange of fan (8).



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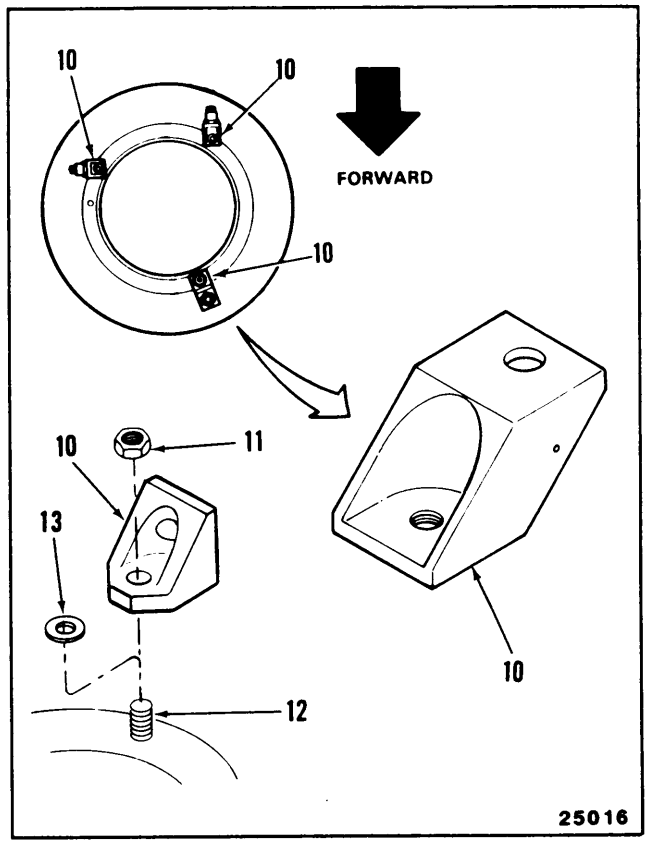
REMOVE MOUNTS

7. Remove nut (11) from each stud (12). **Remove mounts** (10) from studs.

WARNING

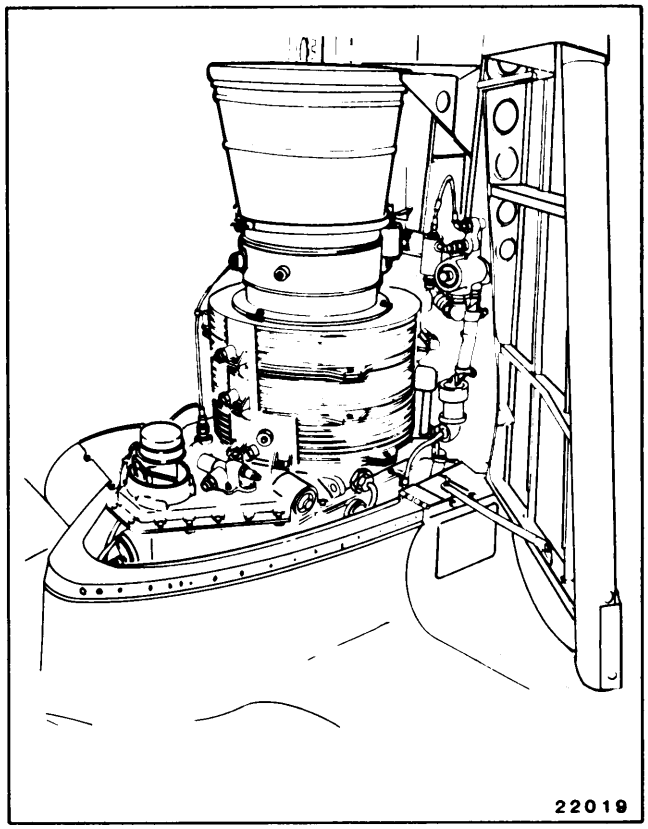
Oil (E254) is toxic. It can irritate skin and cause burns. Avoid inhaling. Use only with adequate ventilation. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.

8. **Apply** a light coat of oil (E254) **to each of three studs (12).** Wear gloves (E186). **Install washer (13) and nut (11)** on each stud. **Torque nuts to 100 to 140 inch-pounds.**



INSPECT

FOLLOW ON MAINTENANCE:
Close pylon hinged fairing (Task 2-2)



END OF TASK

6-221 INSTALL VIBRATION ANALYSIS EQUIPMENT (ROTORTUNER) 6-221

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic Tool Kit,
NSN 5180-00-232-4692
Rotortuner Dash 5
Accelerometer 4177B or Equaliv (3)
Accelerometer Mount 5242-5606-8 (2)
Accelerometer Mount 5242-5242 (1)
Torque Wrench, 30 to 150 Inch-Pounds

Materials:

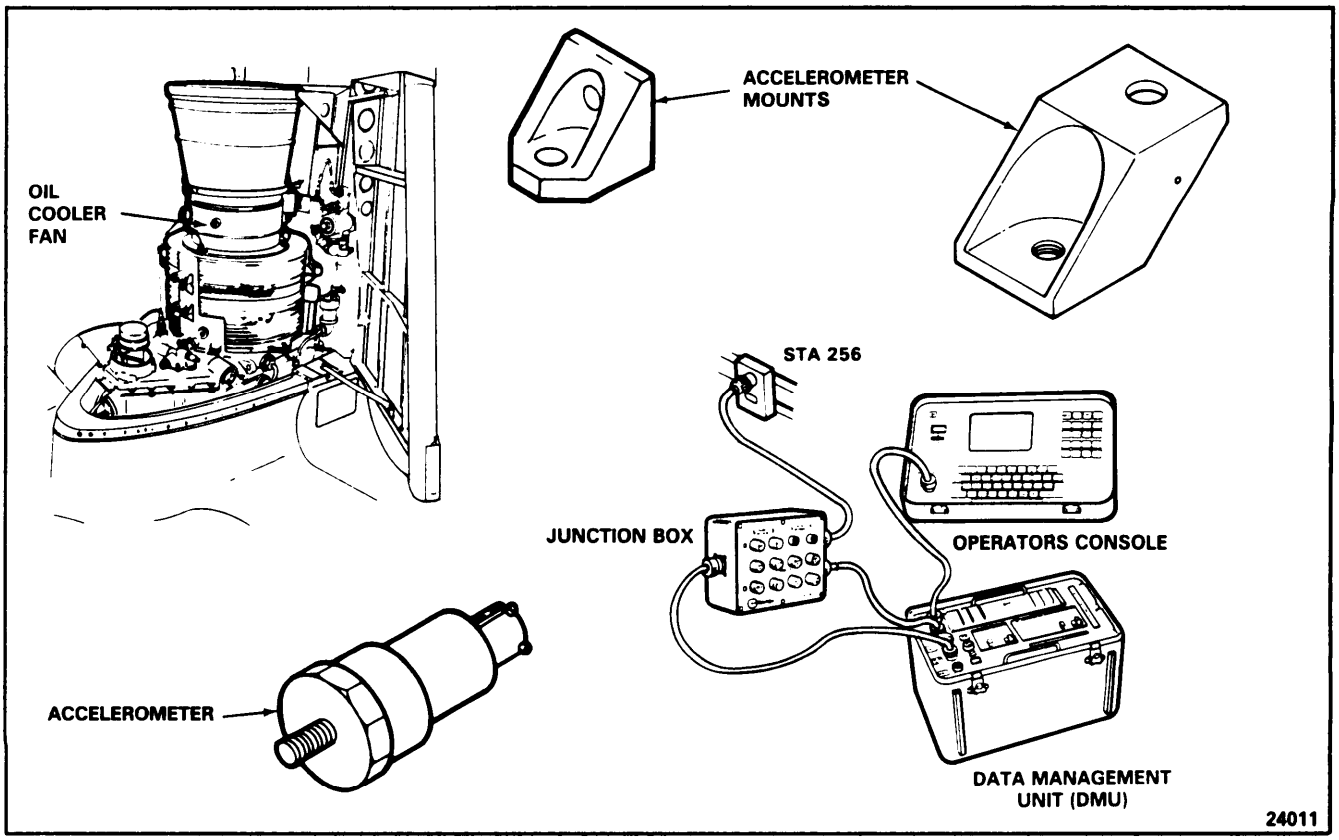
Plastic Strap (E274)
Oil (E254)
Gloves (E186)

Personnel Required:

Medium Helicopter Repairer
Inspector

Equipment Condition:

Battery Disconnected (Task 1-39)
Electrical Power Off
Hydraulic Power Off
Pylon Hinged Fairing Open (Task 2-2)



GO TO NEXT PAGE

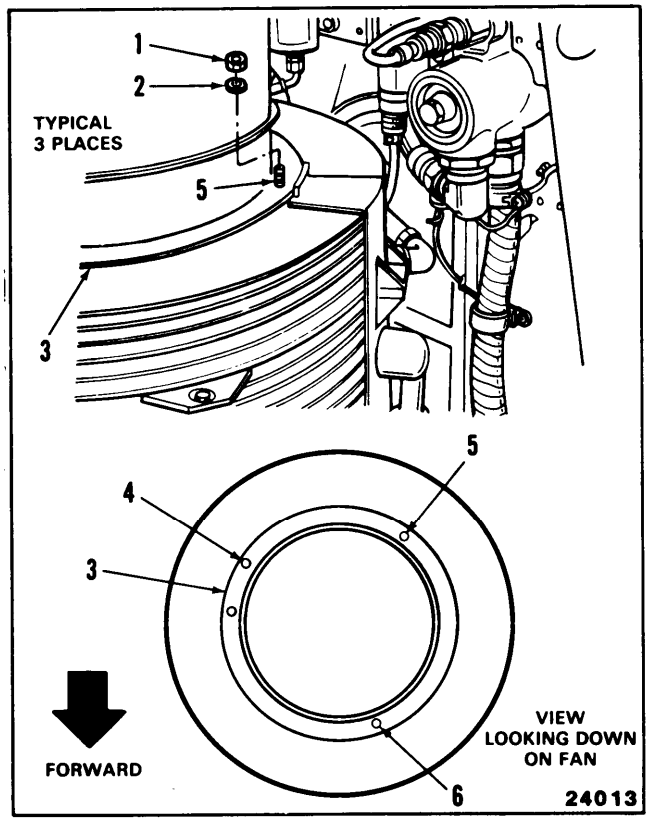
INSTALL MOUNTS

1. **Remove nut (1)** and washer (2) **from oil cooler** mounting flange (3) at 3 places as shown.

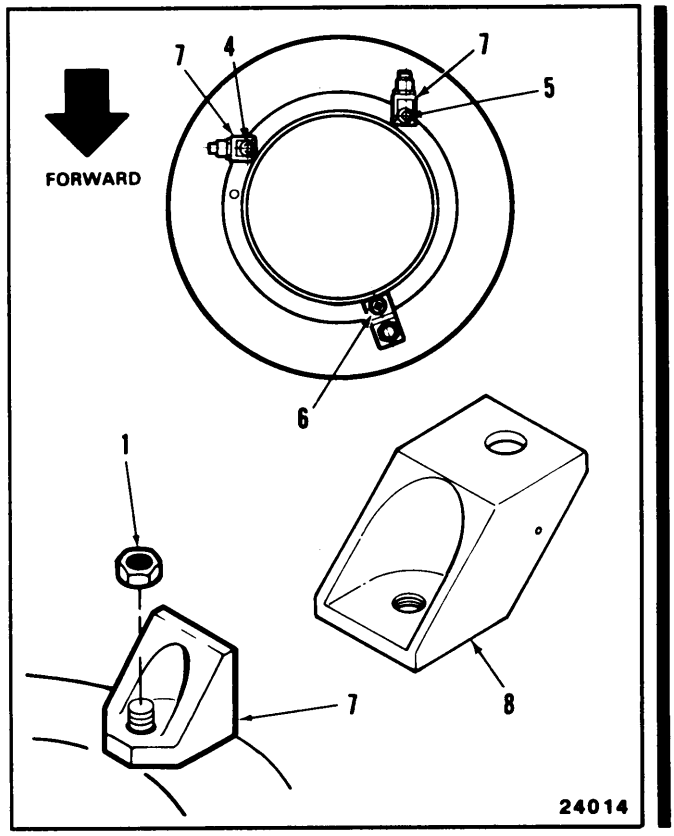
WARNING

Oil (E254) is toxic. It can irritate skin and cause burns. Avoid inhaling. Use only with adequate ventilation. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.

2. **Apply** a light coat of **oil (E254) to studs** (4), (5), and (6). Wear gloves (E186).



3. **Install an accelerometer mount on each stud** (4, 5, and 6) as follows:
   a. Install one mount 5242-5606-8 (7) on right aft stud (4) with flat facing right, as shown.
   b. Install one mount 5242-5606-8 (7) on left aft stud (5) with flat facing aft, as shown.
   c. Install vertical accelerometer mount 5242-5242 (8) on forward stud (6) with flat facing up, as shown.
   d. Secure each mount with nut (1) only. Torque nuts to 100 to 140 inch-pounds.



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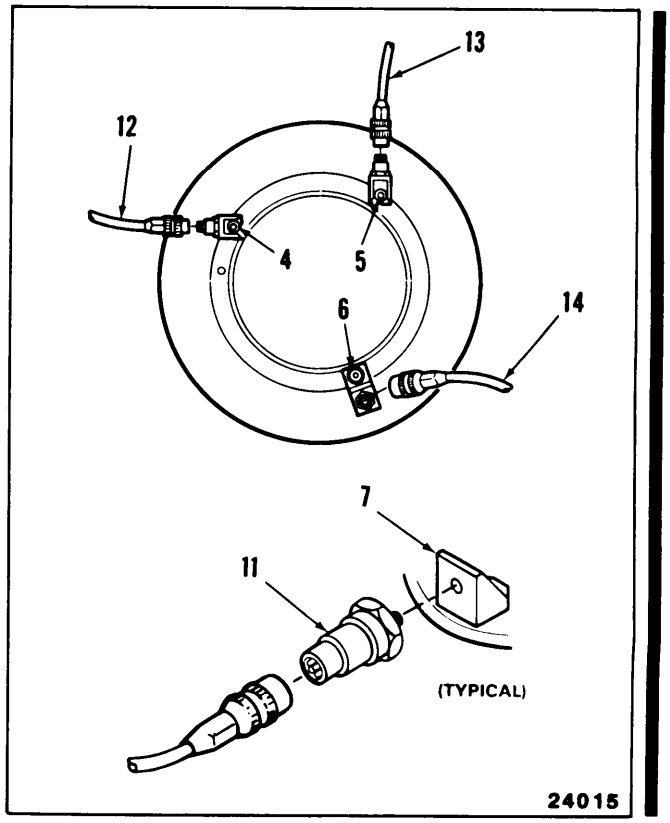
6-221 INSTALL VIBRATION ANALYSIS EQUIPMENT (ROTORTUNER) (Continued)

INSTALL ACCELEROMETERS

4. **Install an accelerometer (11) in the flat side of each mount (7) or (8).**

INSTALL CABLES

5. **Connect No. 5 cable (12) to lateral accelerometer** at stud (4).
6. **Connect No. 6 cable (13) to longitudinal accelerometer** at stud (5).
7. **Connect No. 7 cable (14) to vertical accelerometer** at stud (6).

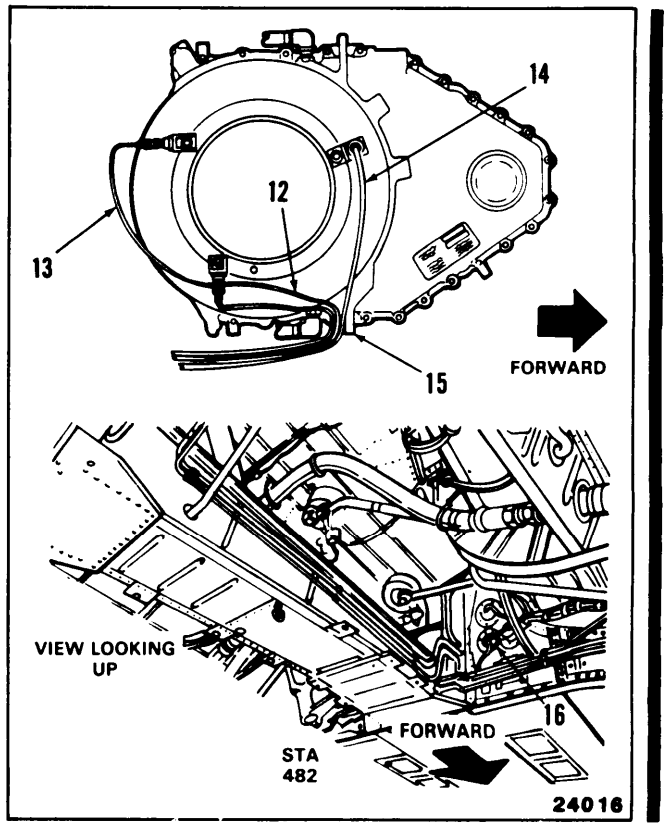


8. **Route three cables** (12), (13), and (14) around and down to lifting lug (15) as shown. **Pass the cables back through one of two wire holes (16)** in the former at sta 482, behind the combining transmission.

NOTE

Cables must be tied loosely, not tight. Tightly tied cables may cause faulty signals.

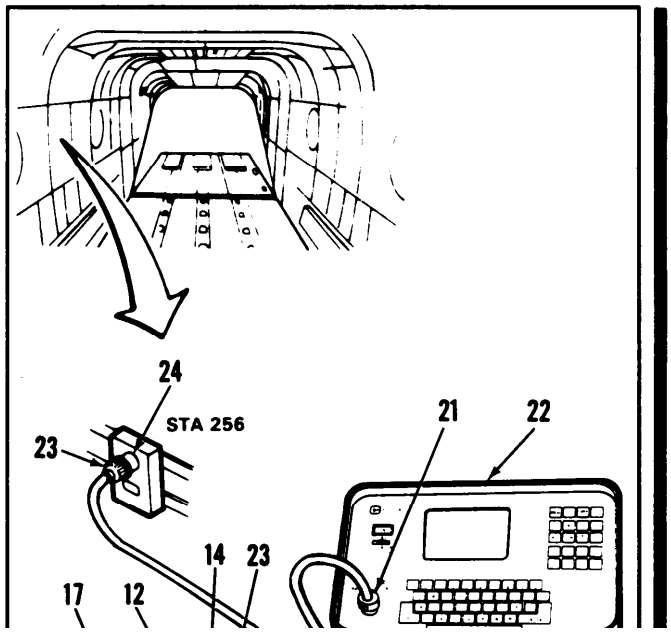
9. **Tie the three cables** to lifting lug (15) and **away from rotating parts.** Use plastic strap (E274).



GO TO NEXT PAGE

6-221 INSTALL VIBRATION ANALYSIS EQUIPMENT (ROTORTUNER) 6-221 (Continued)

10. Connect Rotortuner As Follows:
    a. **Connect accelerometer cables,** No. 5, 6 and 7 (12, 13, and 14) to receptacles 5,6 and 7 of junction box (17).
    b. **Connect cable connectors** (18) to junction box (17) then to the **28v DC connection** on the DMU (19).
    c. **Connect cable connectors** (23) to junction box (17) and to DMU (19).
    d. **Connect cable connectors** (21) to DMU (19) and operators console (22).
    e. **Connect 28v DC power cable** (20) to junction box (17) then to blade track receptacle (24) at station 256.



INSPECT

FOLLOW ON MAINTENANCE:
Close pylon hinged fairing (Task 2-2)
Rotortuner Data Card Formatting (Task 5-147)

END OF TASK

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic Tool Kit,
NSN 5180-00-232-4692
Rotortuner Dash 5

Materials:

None

Personnel Required:

Rotary Wing Aviator (2)
Medium Helicopter Repairer
Power Train Repairer

Equipment Condition:

Rotortuner Data Card Formatting (Task 5-147)

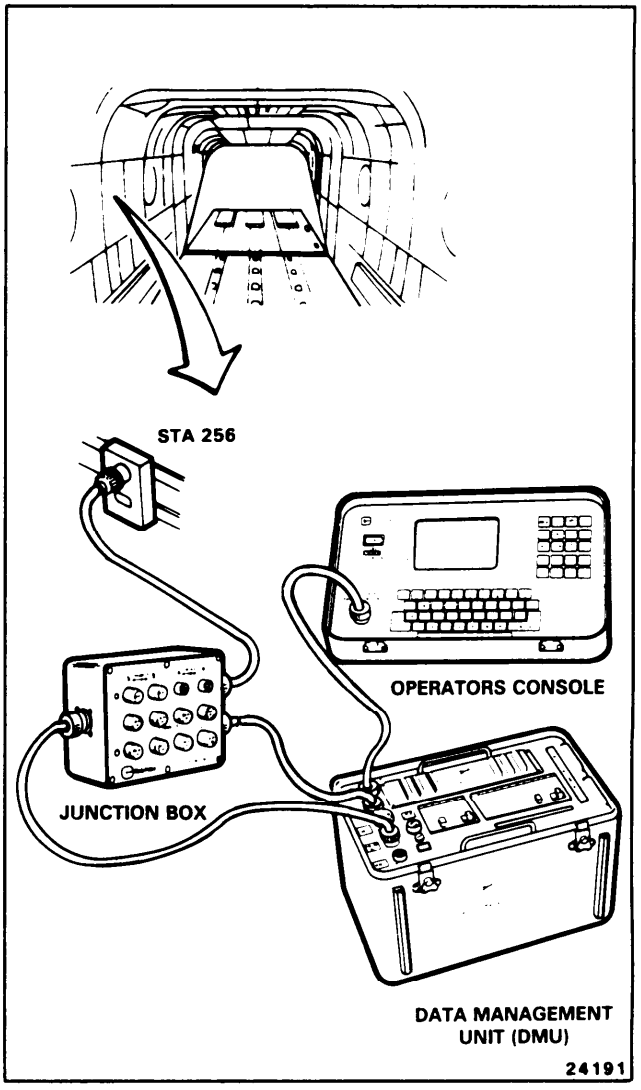
WARNING

When the rotors are turning, use care outside the helicopter. Stay outside of the rotor disk area in front of the helicopter. Do not climb on the helicopter until the blades come to a stop. Serious injury or loss of life can occur if personnel are struck by a moving blade.

CAUTION

Loss of power to memory card will result in all data being lost. The battery has a useful life of approximately 2 years and must be changed on or before the replacement date indicated on the card label.

1. **Have pilot start engines and run at <u>100 percent rotor rpm.</u>** (TM 55-1520-240-10).

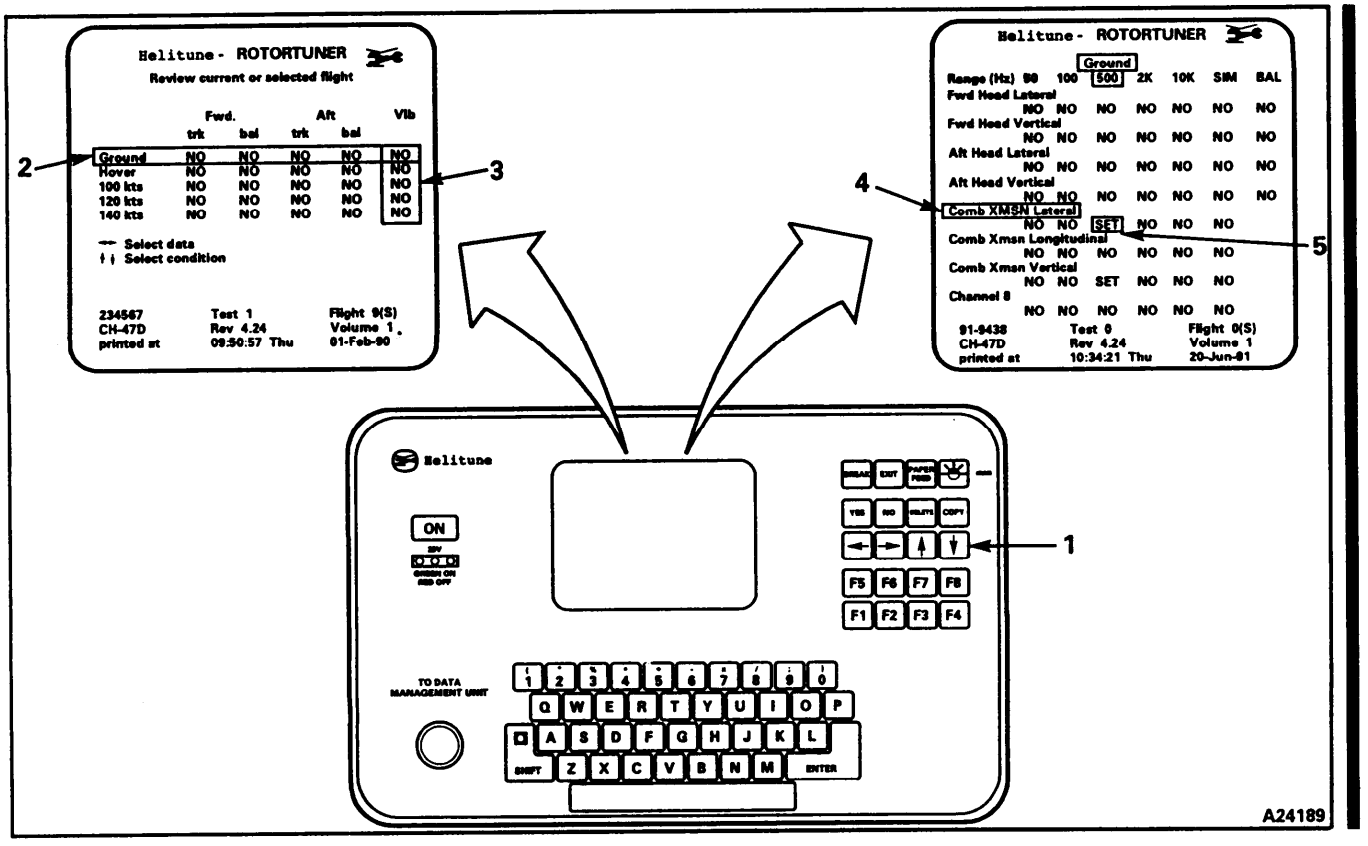


NOTE

- The Helitune Rotortuner is capable of collecting data manually and automatically. For automatic data collection do steps 3 thru 42. For manual data collection do steps 43 thru 64.
- Text in *italics* denotes ROTORTUNER commands and prompts as they appear on the display screen.

AUTOMATIC DATA COLLECTION

2. From the Rotortuner executive menu press key F6, *Auto test program* on the function key pad (1).
3. On the Auto test program display the word *Ground* (2) will be highlighted. Use the right cursor arrow on the function key pad to cursor over to *Vib* column (3).
4. Press key F1, *set/no.*
5. Use the right cursor arrow to cursor over in the *Range (Hz)* row to *500.*
6. Use the cursor down arrow to cursor down to *Comb XMSN Lateral (4).*
7. Press key F1, *set/no.*
8. The word *SET* (5) will appear in place of the word *NO.*
9. Use the cursor down arrow to cursor down to Comb *XMSN* Longitudinal.
10. Press key F1, *set/no.*
11. The word *SET* will appear in place of the word *NO.*
12. Use the cursor down arrow to cursor down to *Comb XMSN Vertical.*
13. Press key F1, set/no.
14. The word *SET* will appear in place of the word *NO.*
15. Press key F8 two times to return to the rotortuner executive menu.



GO TO NEXT PAGE

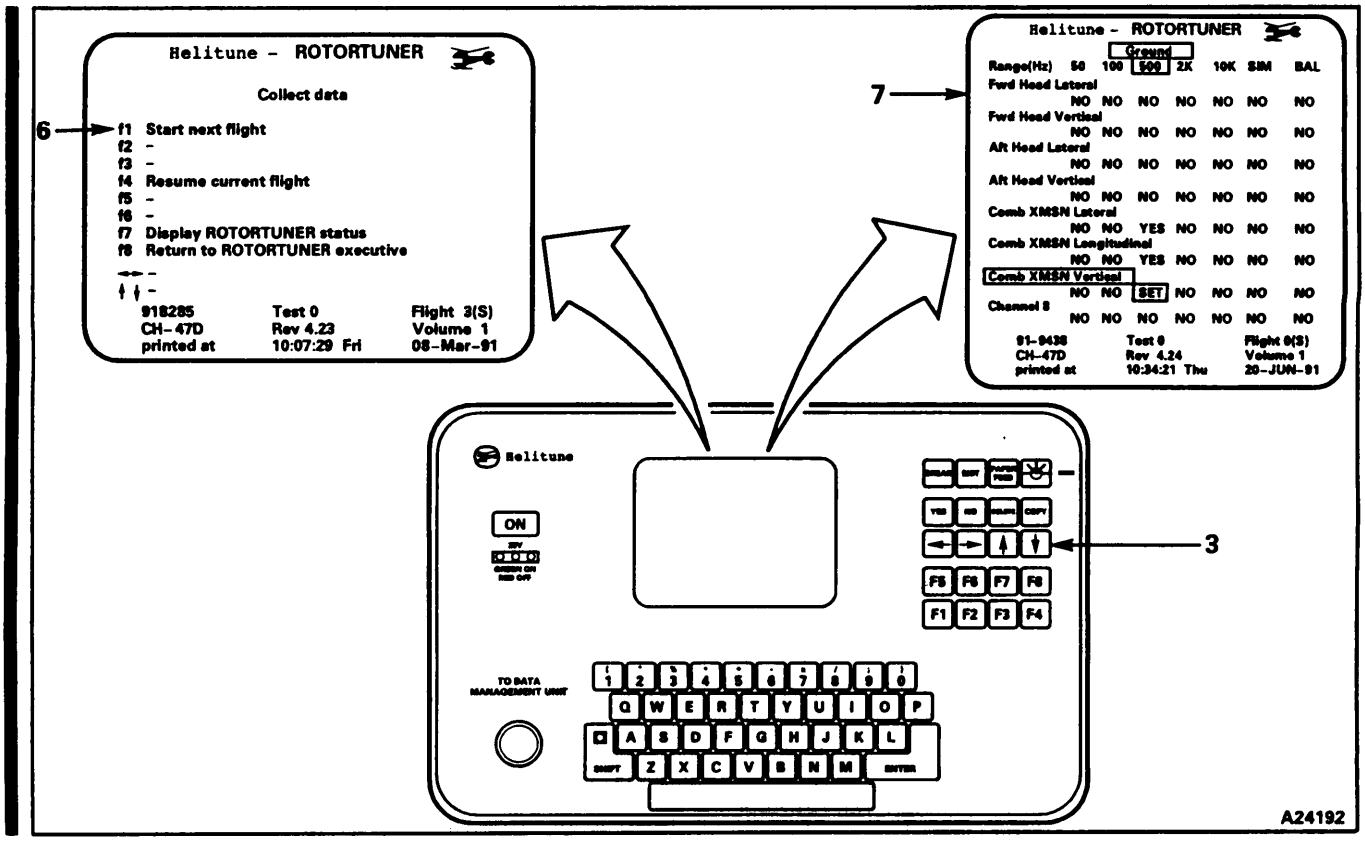
AUTOMATIC DATA COLLECTION

16. Press key F1, *Collect data* on function key pad (3).
17. Press key F1, *Start next flight (6).*
18. Press key F2, *Automatic data collection.*
19. *Enter changes first ? (Y/N)* will appear on the screen. Press *NO* on the function key pad.
20. At 100 percent/ 225 rotor rpm press key F1, *confirm.*

NOTE

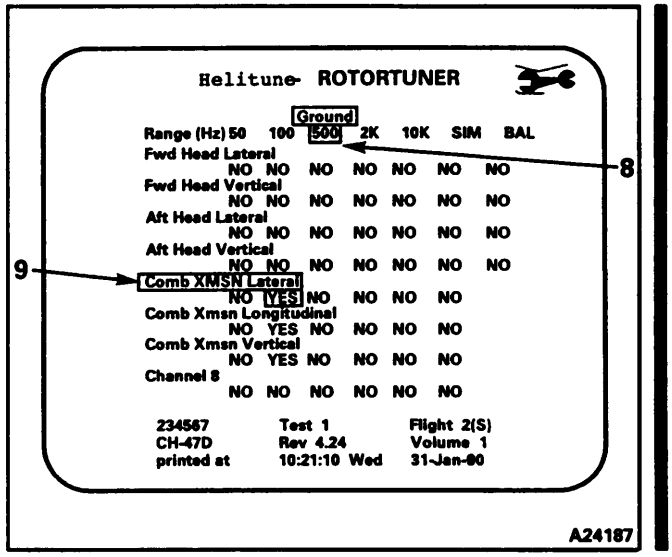
The word set (7) on the signature collection display will change to *yes* as the data is collected.

21. Press key F8 twice to return to the Rotortuner executive menu.



REVIEW DATA

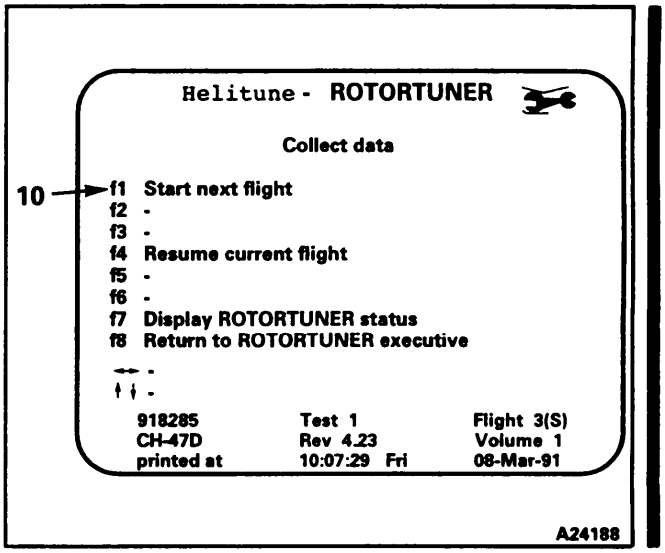
22. Press key F2, *Review data and corrections.*
23. Press key F1, *Review data and corrections.*
24. Use the right cursor arrow to cusor over to the *Vib* column.
25. Press key F1, *review.*
26. Use the right cursor arrow to cursor over in the *Range (Hz)* row to *500 (8).*
27. Use the cursor down arrow to cursor down to *Comb XMSN Lateral* (9).
28. Press key F1 , *review.*
29. Press key F5, *print.*
30. Press key F1, *Order Sheet Sources & Values print.*
31. Press key F8, *finish* to reset.
32. Use the cursor down arrow to cursor down to *Comb XMSN Longitudinal.*
33. Repeat steps 29 thru 31. Then go to step 34.
34. Use the cursor down arrow to cursor down to *Comb XMSN Vetical.*
35. Repeat steps 29 thru 31 then go to step 36.
36. Press key F8 three times to return to the executive menu.
37. Press key F8, *Change card, reset or turn off.*
38. Press key F4, *Turn off the ROTORTUNER.*
39. Record the IPS readings from the ORDER SHEET SOURCES & VALUES sheet onto the VIBRATION DATA SHEET.
40. If any of the vibration signature data exceeds the vibration limits on the data sheet, refer to the identified task on the data sheet for the correction procedure.
41. If the vibration signature data is within limits go to follow on maintenance.



GO TO NEXT PAGE

MANUAL DATA COLLECTION

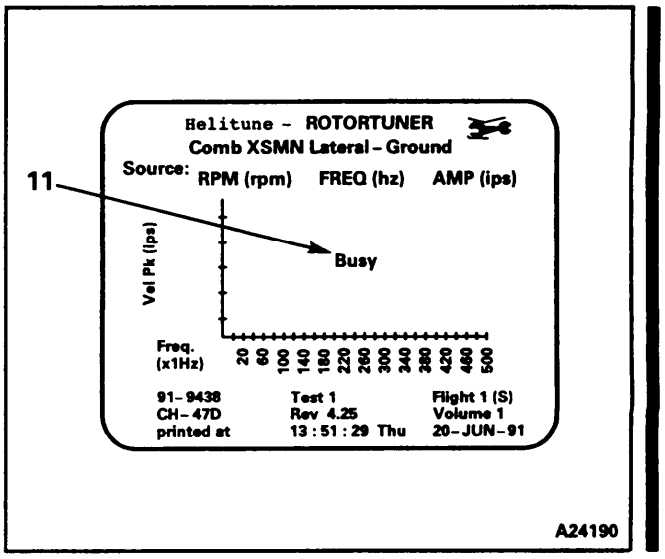
42. From the rotortuner executive menu press key F1, *Collect data* on the function key pad.
43. Press key F1, *Start next flight (10).*
44. Press key F4 , *Manual data collection.*
45. *Enter changes first ? (Y/N) will appear on the* screen. Press *NO* on the function key pad.
46. On the manual data collection screen the word *Ground* will be highlighted. Use the right cursor arrow on the function key pad to cursor over to *Vib* column.
47. Press key F1, *collect.* The signature collection display will appear on the screen.
48. Use the right cursor arrow to cursor over in the *Range (Hz)* row to *500.*
49. Use the cursor down arrow to cursor down to *Comb XMSN Lateral.*
50. Press key F1, *collect.*



NOTE

The word *busy* (11) will appear on the vibration signature display screen while data is being collected. Once the data has been collected a graph will appear on the display screen. Note the IPS level.

51. Press key F5, *print.*
52. Press key F1, *Order Sheet Sources & Values print.*
53. Press key F8, *finish.*
54. Use the cursor down arrow to cursor down to *Comb XMSN Longitudinal.*
55. Repeat steps 50 thru 52 then go to step 56.
56. Use the cursor down arrow to cursor down to *Comb XMSN Vertical.*
57. Repeat steps 50 thru 52 then go to step 58.
58. Press key F8 three times to return to the rotortuner executive menu.
59. Press key F8, *Change card, reset or turn OK*
60. Press key F4, *Turn off the ROTORTUNER.*



NOTE

Rotortuner accelerometer numbers appear in brackets on VIBRATION DATA SHEET.

61. Record the IPS readings from the ORDER SHEET SOURCES & VALUES sheet onto the VIBRATION DATA SHEET.
62. If any of the vibration signature data exceeds the vibration limits on the data sheet, refer to the identified task on the data sheet for the correction procedure.
63. If the vibration signature data is within limits go to follow on maintenance.

FOLLOW ON MAINTENANCE:

Remove Rotortuner Vibration Analysis Equipment (Task 6-223)

VIBRATION DATA SHEET

PAGE _____ OF _____

DATE: _____

HELICOPTER SERIAL NO.: _____

GRD RUN NO. _____

ITEM	RPM	VIBREX SETTING	ACCEL NO.	VIB LIMITS	READINGS IN IPS	CORRECTIVE ACTION
ENGINE CROSS SHAFT	12,263	X100 RPM RANGE 122 RPM TUNE	LATERAL 1 [5]	1.0 ips		Task 6 - 219
			LONGITUDINAL 2 [6]	1.0 ips		
			VERTICAL 3 [7]	1.0 ips		
SYNC SHAFT	6,912	X10 RPM RANGE 691 RPM TUNE	LATERAL 1 [5]	0.5 ips		Task 6 - 219
			LONGITUDINAL 2 [6]	0.5 ips		
			VERTICAL 3 [7]	0.5 ips		
COMB FAN DRIVE SHAFT	9,733	X10 RPM RANGE 974 RPM TUNE	LATERAL 1 [5]	0.2 ips		Task 6 - 219
			LONGITUDINAL 2 [6]	0.2 ips		
			VERTICAL 3 [7]	0.2 ips		

A24186

END OF TASK

6-223 REMOVE VIBRATION ANAIYSIS EQUIPMENT (ROTORTUNER) 6-223

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic Tool Kit,
NSN 5180-00-232-4692
Torque Wrench, 30 to 150 Inch-Pounds

Materials:

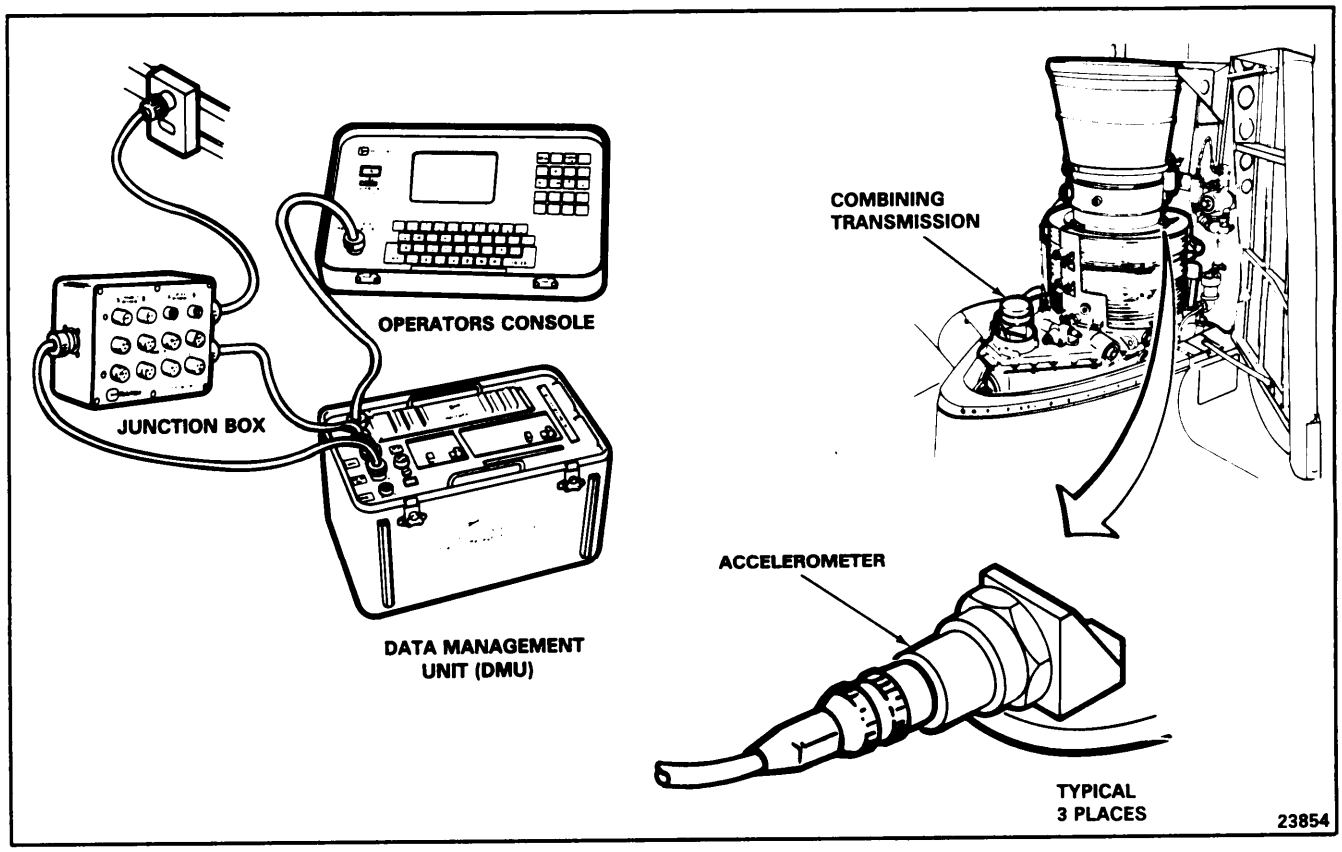
Oil (E254)
Gloves (E186)

Personnel Required:

Medium Helicopter Repairer
Inspector

Equipment Condition:

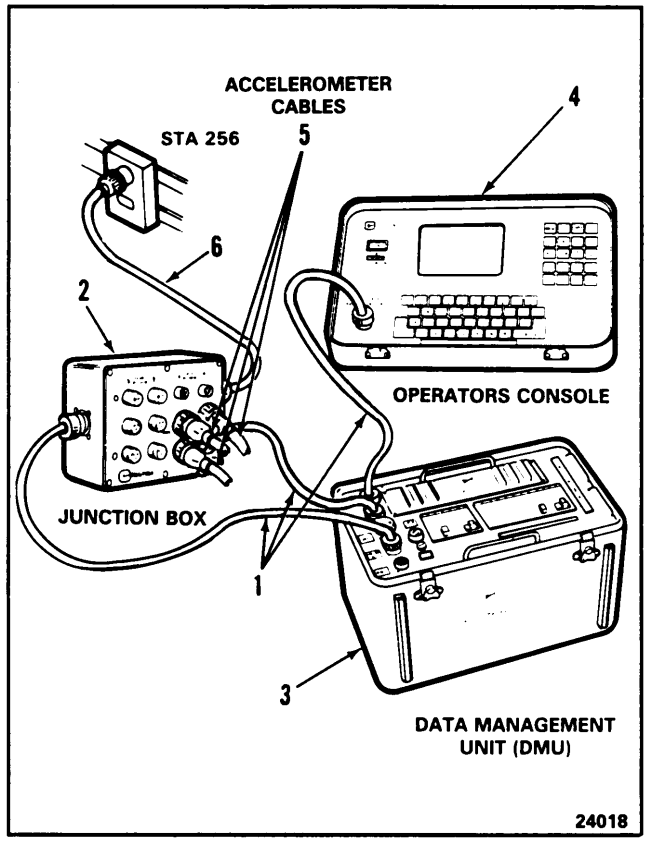
Battery Disconnected (Task 1-39)
Electrical Power Off
Hydraulic Power Off
Pylon Hinged Fairing Open (Task 2-2)



GO TO NEXT PAGE

DISCONNECT ROTORTUNER

1. **Disconnect three cables** (1) from junction box (2), DMU (3) and operators console (4).
2. **Disconnect three accelerometer cables** (5) from junction box (2).
3. **Disconnect 28v DC power cable connectors** (6) from junction box (2) and blade track receptacle at station 256.



REMOVE CABLES

4. **Disconnect cables (4) from three accelerometers** (7) at combining transmission oil cooler fan (8).

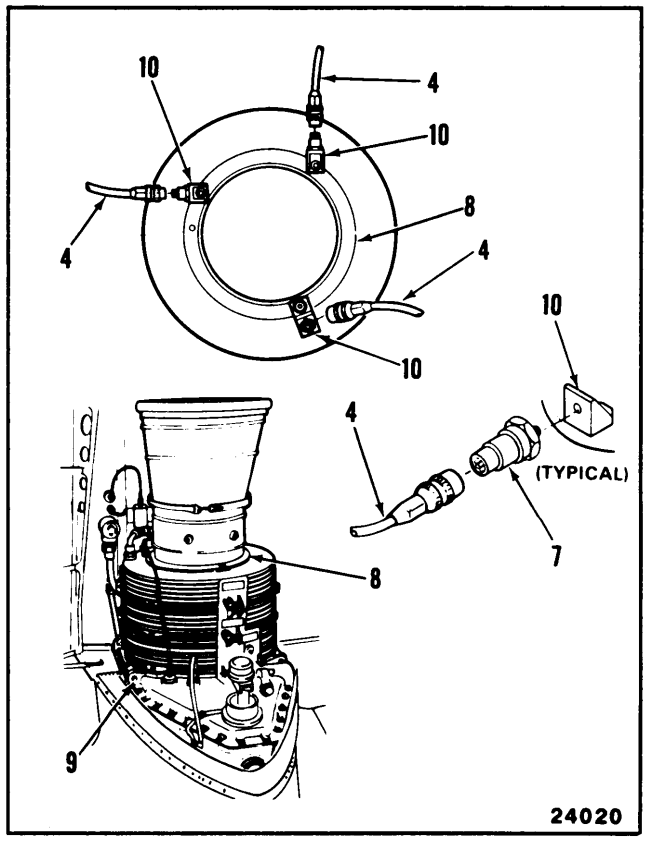
NOTE

Cables may be secured with plastic strap at various places along their length.

5. Untie cables (4) from lifting lug (9). Pull three cables through the hole in the former at sta 482, aft of the combining transmission,

REMOVE ACCELEROMETERS

6. **Remove three accelerometers** (7) from mounts (10) on the flange of fan (8).



GO TO NEXT PAGE

6-223 REMOVE VIBRATION ANALYSIS EQUIPMENT (ROTORTUNER) (Continued) 6-223

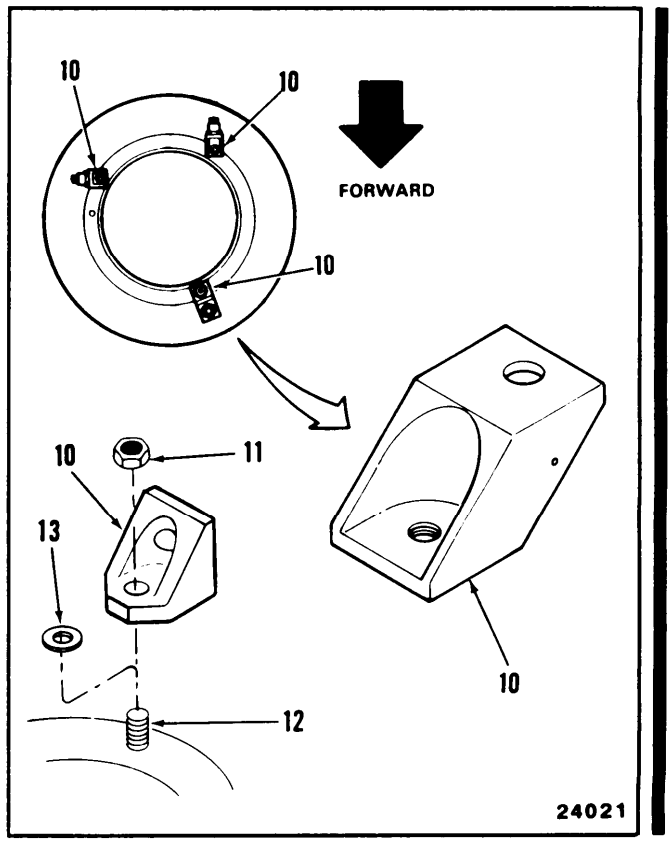
REMOVE MOUNTS

7. Remove nut (11) from each stud (12). **Remove mounts** (10) from studs.

WARNING

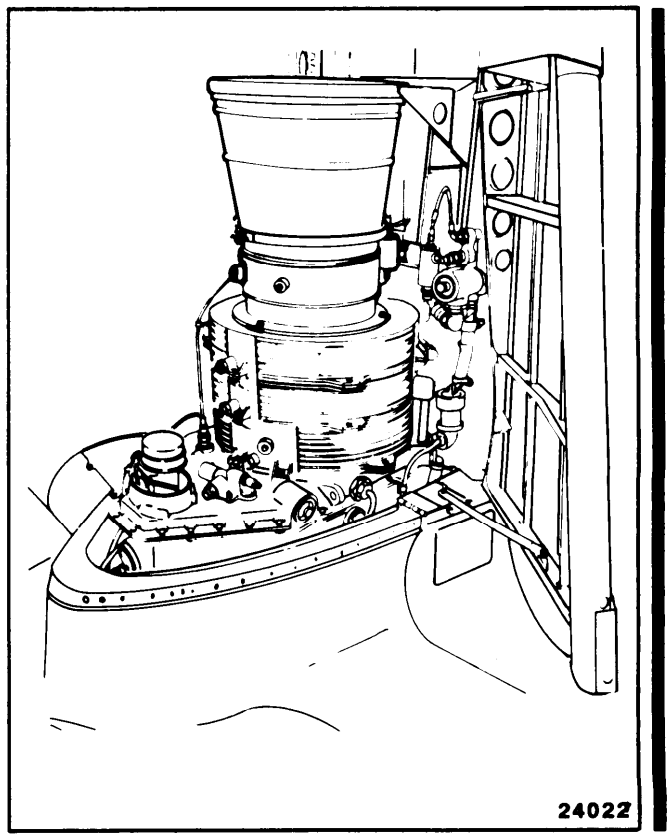
Oil (E254) is toxic. It can irritate skin and cause burns. Avoid inhaling. Use only with adequate ventilation. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.

8. **Apply** a light coat of oil (E254) **to each of three studs** (12). Wear gloves (E186). **Install washer (13) and nut (11)** on each stud. **Torque nuts** to 100 to 140 inch-pounds.



INSPECT

FOLLOW ON MAINTENANCE:
Close pylon hinged fairing (Task 2-2)



END OF TASK

☆ U.S. GOVERNMENT PRINTING OFFICE: 1992 554-123/40047

6-224 INSTALL ROTORTUNER VIBRATION ANALYSIS EQUIPMENT ON 6-224 AFT TRANSMISSION FAN

INITIAL SETUP

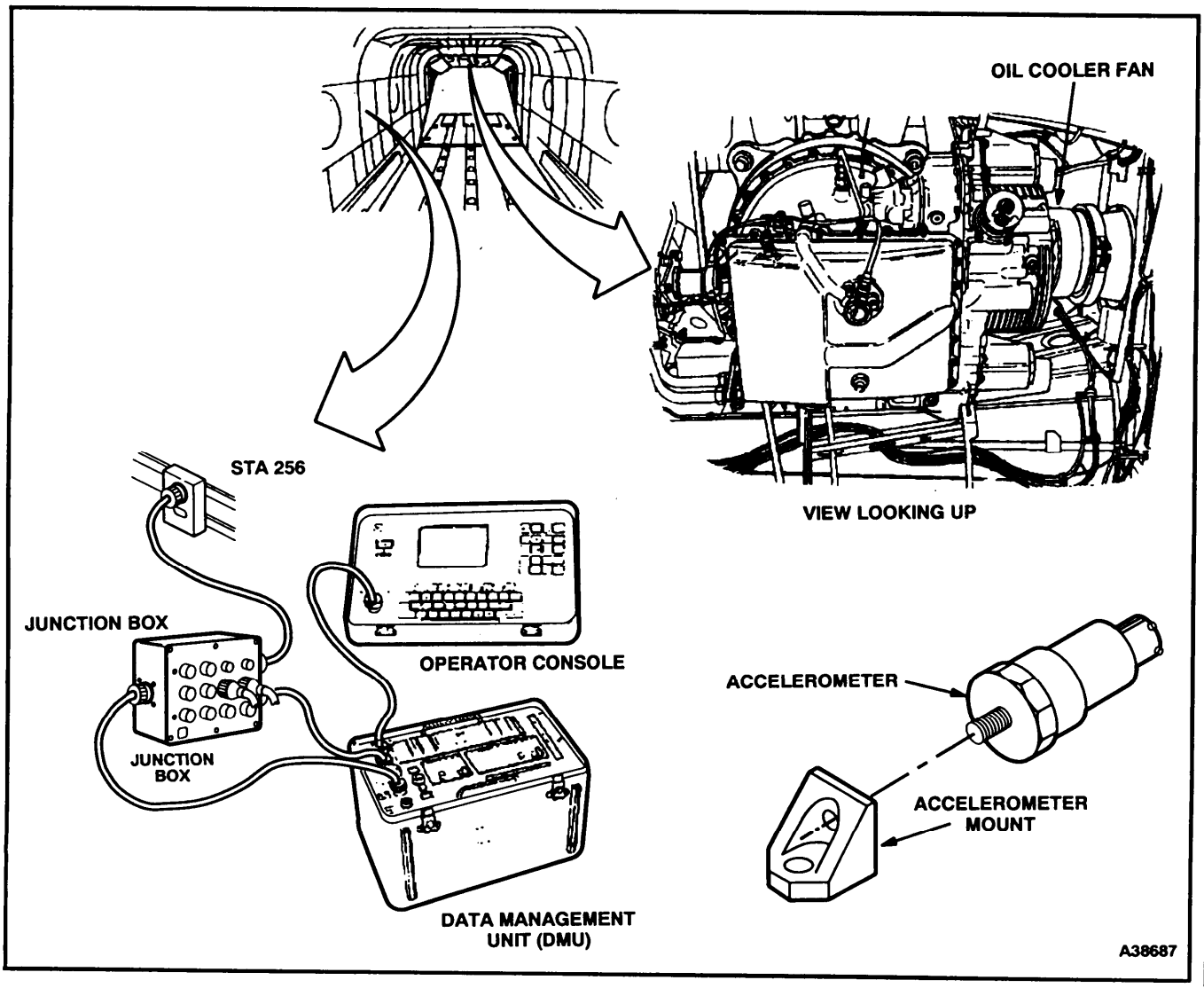
Applicable Configurations:
All

Tools:
Aircraft Mechanic's Tool Kit, NSN 5180-00-232-4692
Rotortuner Dash 5 Kit
Torque Wrench, 30 to 150 Inch-Pounds

Materials:
Plastic Strap (E274)
Oil (E253), (E254), or (E254.1)
Gloves (E184.1)

Personnel Required:
Medium Helicopter Repairer
Inspector

Equipment Condition:
Battery Disconnected (Task 1-39)
Electrical Power Off
Hydraulic Power Off
Cargo Ramp Open and Level (TM 55-1520-240-10)
Baffles Under Aft Transmission Open (Task 2-2)



GO TO NEXT PAGE

6-224 INSTALL ROTORTUNER VIBRATION ANALYSIS EQUIPMENT ON 6-224 AFT TRANSMISSION FAN (Continued)

INSTALL MOUNT BRACKETS

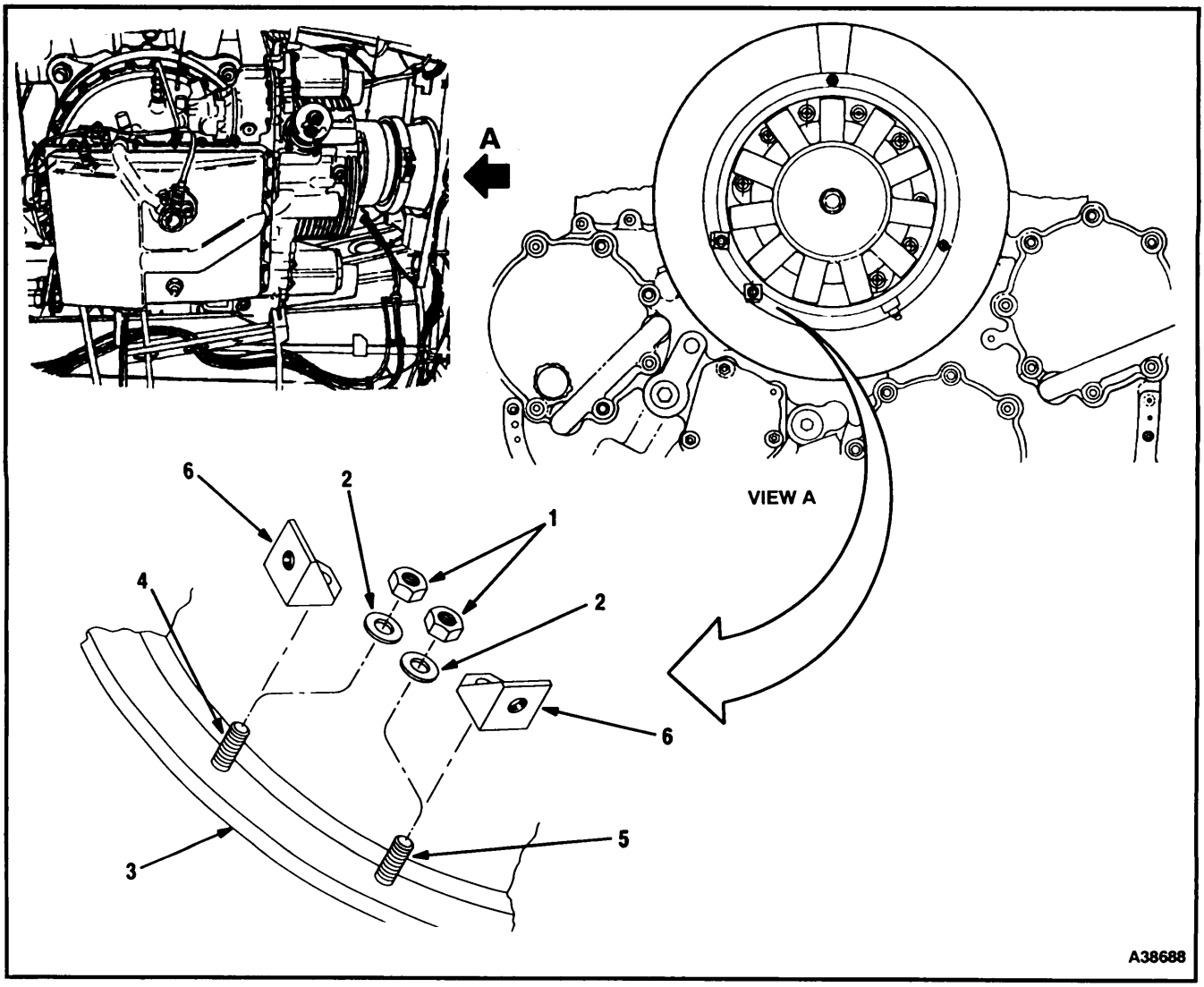
1. **Remove nut (1)** and washer (2) **from oil cooler fan** mounting flange (3) at 2 places as shown.

WARNING

Oil (E253), (E254), or (E254.1) is toxic. It can irritate skin and cause bums. Avoid contact with skin, eyes, or clothing. Do not inhale. Use only with adequate ventilation- Keep away from heat, sparks, or open flame. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.

2. **Apply** a light coat of **oil (E253), (E254), or (E254.1) to studs** (4) and (5). Wear gloves (E184.1).

3. **Install an accelerometer mounting bracket 5242-5606 (6) on each stud** (4) and (5) as follows:
   a. Install one bracket (6) on stud (4) nearest the 8 o'clock position with the flat facing left, as shown.
   b. Install one bracket (6) on stud (5) nearest the 7 o'clock position with the flat facing down, as shown.
   c. Secure each bracket (6) with nut (1) only. Torque the nuts to 80 inch-pounds.



GO TO NEXT PAGE

6-224 INSTALL ROTORTUNER VIBRATION ANALYSIS EQUIPMENT ON 6-224 AFT TRANSMISSION FAN (Continued)

INSTALL ACCELEROMETERS

4. **Install an accelerometer (7) in the flat side of each bracket (6).**

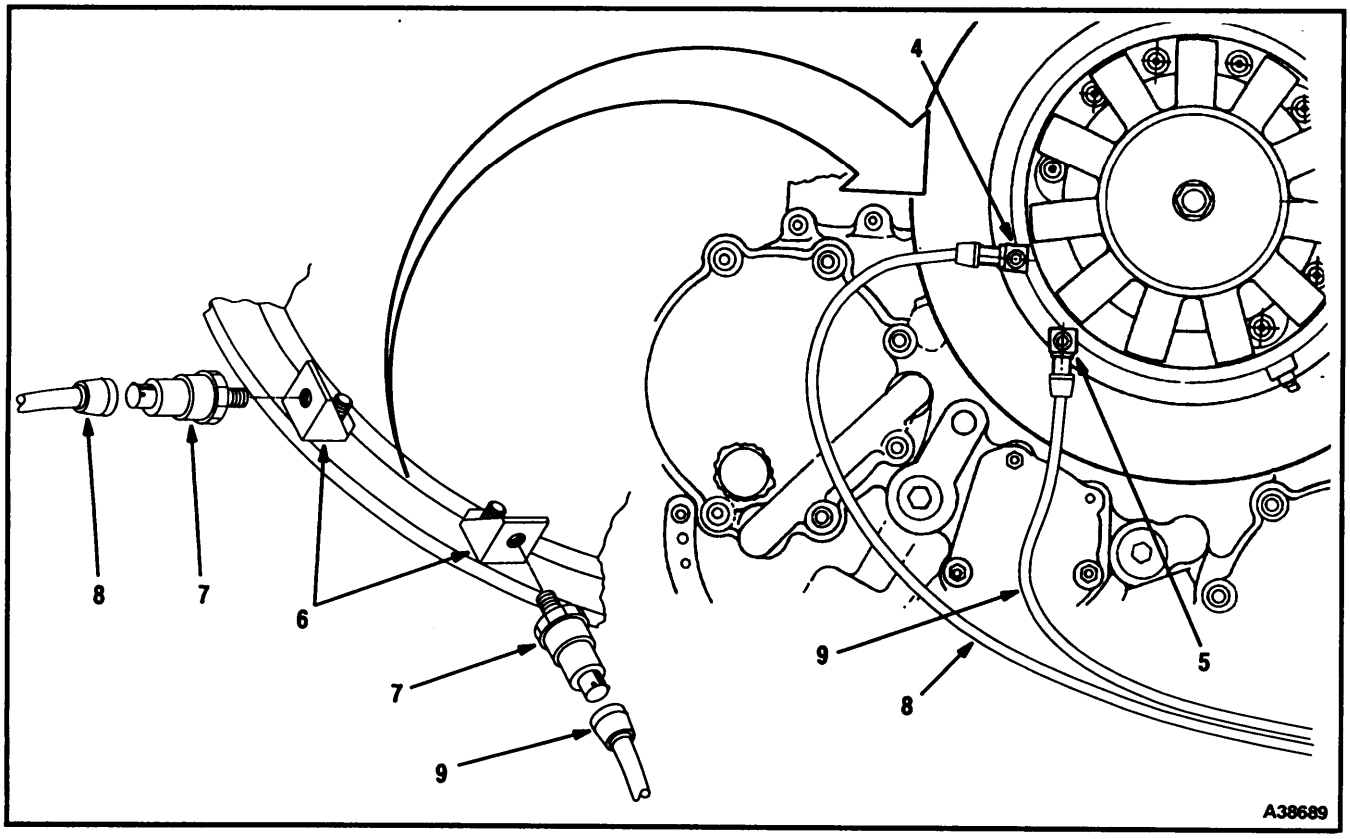
INSTALL CABLES

5. **Connect No. 5 cable (8) to lateral accelerometer (7)** at stud (4),
6. **Connect No. 7 cable (9) to vertical accelerometer (7)** at stud (5).

NOTE

Cables must be tied loosely, not tight. Tightly tied cables may cause faulty signals.

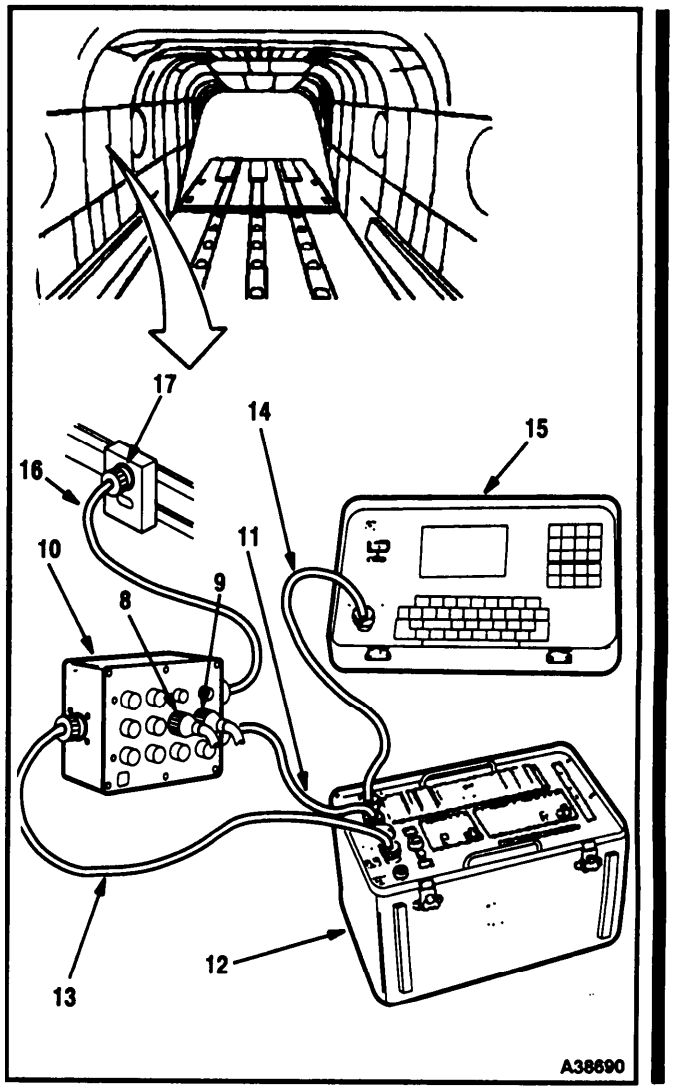
7. **Loosely tie the two cables (8 and 9) together** along their length. Use plastic strap (E274). Route them foward to the right side of the cabin.



GO TO NEXT PAGE

6-224 INSTALL ROTORTUNER VIBRATION ANALYSIS EQUIPMENT ON 6-224 AFT TRANSMISSION FAN (Continued)

8. Connect the Rotortuner system as follows:
   a. **Connect accelerometer cables,** No. 5 and 7 (8 and 9) to receptacles 5 and 7 of junction box (10).
   b. **Connect cable 5390 (11)** to the lower receptacle at the right side of junction box (10), then to the **28VDC connection** on DMU (12).
   c. **Connect cable 5380 (13)** to the receptacle on the left side of junction box (10) and to the JUNCTION BOX receptacle on DMU (12).
   d. **Connect cable 5377 (14)** to the CONSOLE receptacle on DMU (12) and to the TO DATA MANAGEMENT receptacle on operator console (15).
   e. **Connect 28VDC power cable 5848 (16)** to the top receptacle on the right side of junction box (10), then to blade track receptacle (17) at sta 256 on the right side of the helicopter.



INSPECT

FOLLOW ON MAINTENANCE:
InstaLL aft transmission drip tray (Task 2-3).
Close baffLes under aft transmission. (Task 2-2).
Format Rotortuner data card (Task 5-147).

END OF TASK

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit,
NSN 5180-00-232-4692
Rotortuner Dash 5 Kit

Materials:

None

Personnel Required:

Rotary Wing Aviator (2)
Medium Helicopter Repairer
Power Train Repairer

References:

Task 6-226

Equipment Condition:

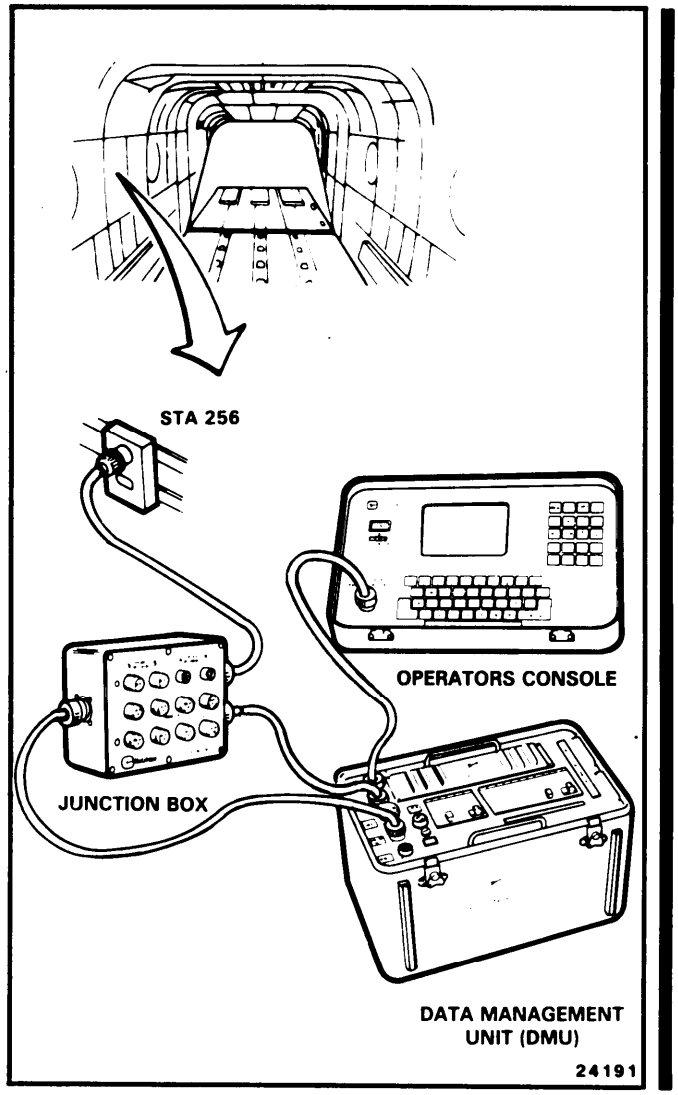
Rotortuner Data Card Formatted (Task 5-147)

WARNING

When the rotors are turning, use care outside the helicopter. Stay outside of the rotor disk area in front of the helicopter. Do not climb on the helicopter until the blades come to a stop. Serious injury or loss of life can occur if personnel are struck by a moving blade.

CAUTION

Loss of power to memory card will result in all data being lost. The battery has a useful life of approximately 2 years and must be changed on or before the replacement date indicated on the card label.



GO TO NEXT PAGE

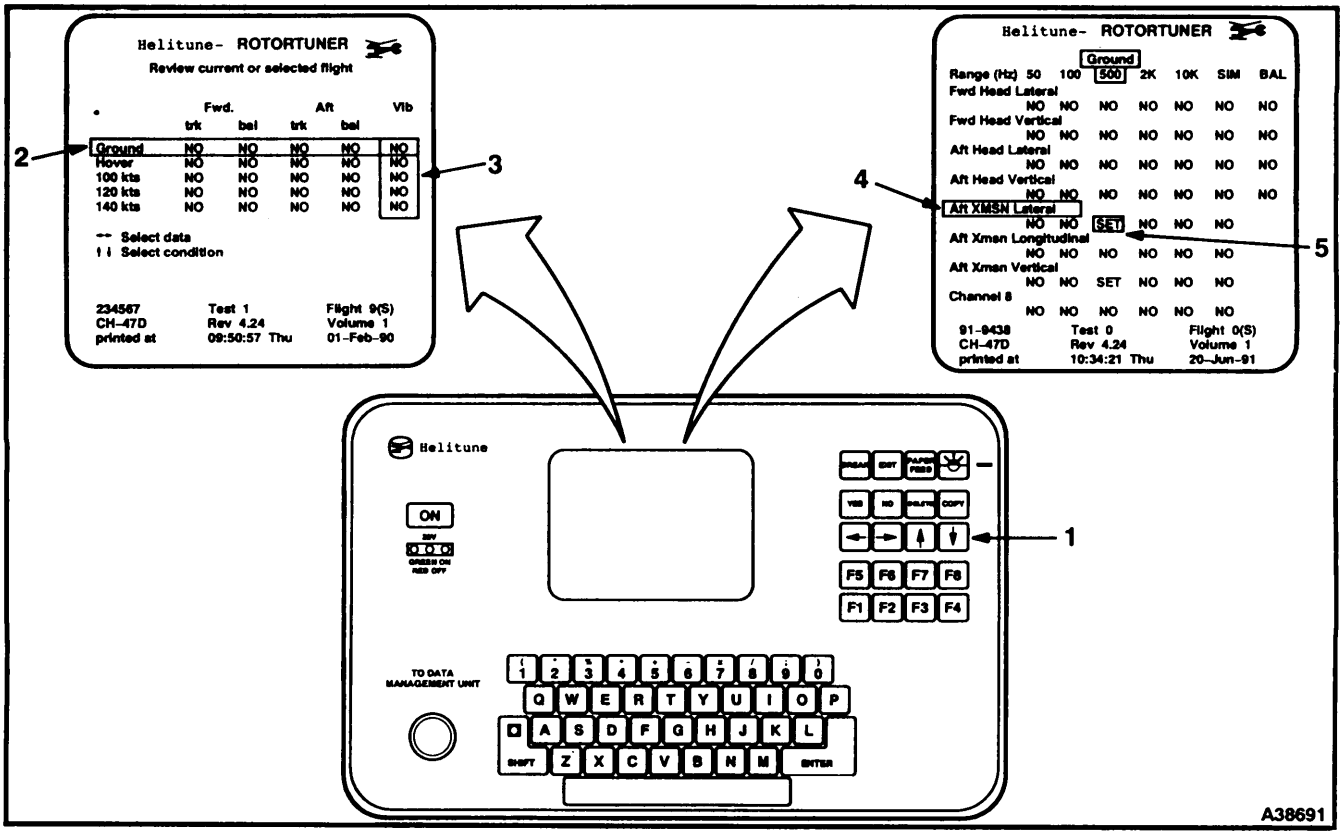
NOTE

- The Helitune Rotortuner is capable of collecting data manually and automatically. For automatic data collection, perform steps 2 thru 31. For manual data collection, perform steps 32 thru 48.
- Text in *italics* denotes ROTORTUNER commands and prompts as they appear on the display screen.

1. **Have pilot start engines and run at <u>100 percent rotor rpm.</u>** (TM 55-1520-240-10).

AUTOMATIC DATA COLLECTION

2. From the Rotortuner executive menu, press key F6, *Auto test program* on function key pad (1). On the Auto test program display, the word *Ground* (2) will be highlighted.
3. Use the right cursor arrow on the function key pad to move the cursor to *Vib* column (3).
4. Press key F1, *set/ no.*
5. Use the right arrow to move the cursor to *500* in the *Range (Hz)* row.
6. Use the down arrow to move the cursor to *Aft XMSN Lateral (4).*
7. Press key F1, *set/ no.* The word *SET* (5) will appear in place of the word *NO.*
8. Use the down arrow to move the cursor to *Aft XMSN Vertical.*
9. Press key F1, *set/ no.* The word *SET* will appear in place of the word *NO.*
10. Press key F8 three times to return to the rotortuner executive menu.

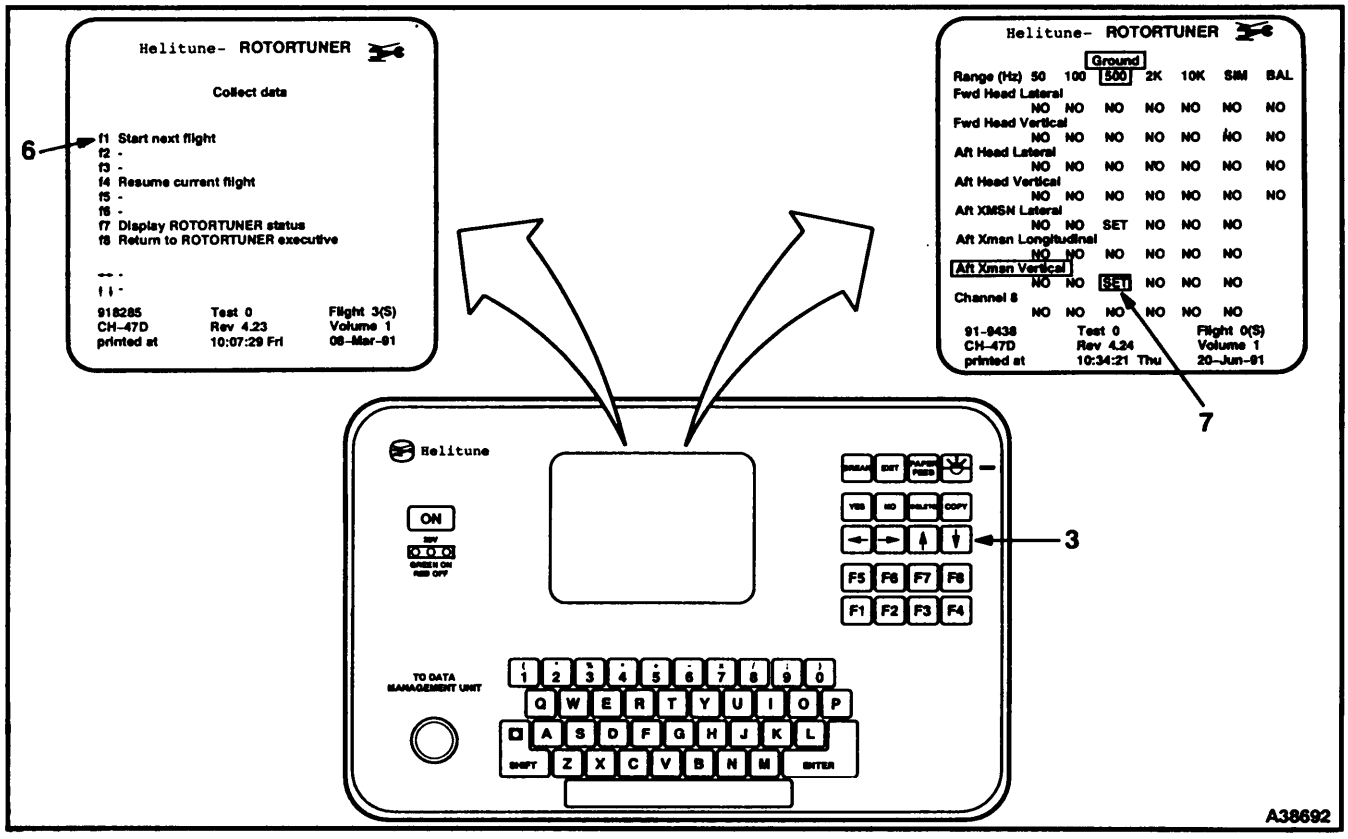


11. Press key F1, *Collect data* on function key pad (3).
12. Press key F1, *Start next flight (6).*
13. Press key F2, *Automatic data collection.*
14. *Enter changes first (Y/ N)* will appear on the screen. Press *NO* on the function key pad.
15. At 100 percent/ 225 rotor rpm press key F1, *confirm.*

NOTE

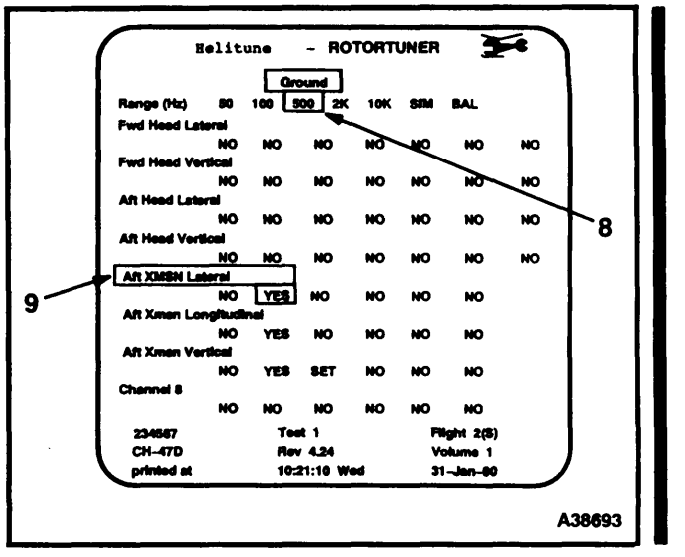
The word *set* (7) on the signature collection display will change to *yes* as the data is collected.

16. Press key F8 twice to return to the Rotortuner executive menu.



REVIEW DATA

17. Press key F2, *Review data and corrections.*
18. Press key F1, *Review data and corrections.*
19. Use the right arrow to move the cursor to the *Vib* column.
20. Press key F1, *review data and corrections.*
21. Use the right arrow to move the cursor to *500* (8) in the *Range (Hz)* row.
22. Use the down arrow to move the cursor to *Aft XMSN Lateral* (9).
23. Press key F1, *review data and corrections.*
24. Press key F5, *print.*
25. Press key F1, *Order Sheet Sources & Values print* will appear on the screen.
26. Press key F8 *finish* to reset.
27. Use the down arrow to move the cursor to *Aft XMSN Vertical.*
28. Repeat steps 23 thru 26. Then go to step 29.
29. Press key F8 five times to return to the executive menu.
30. Press key F4 to turn off the data management unit (DMU).
31. Note the IPS readings on the ORDER SHEET SOURCES & VALUES printout sheet.
    a. If lateral and vertical vibration is 0.7 IPS or less, go to Follow On Maintenance.
    b. If either vibration level exceeds 0.7 IPS, perform corrective action (Task 6-226).



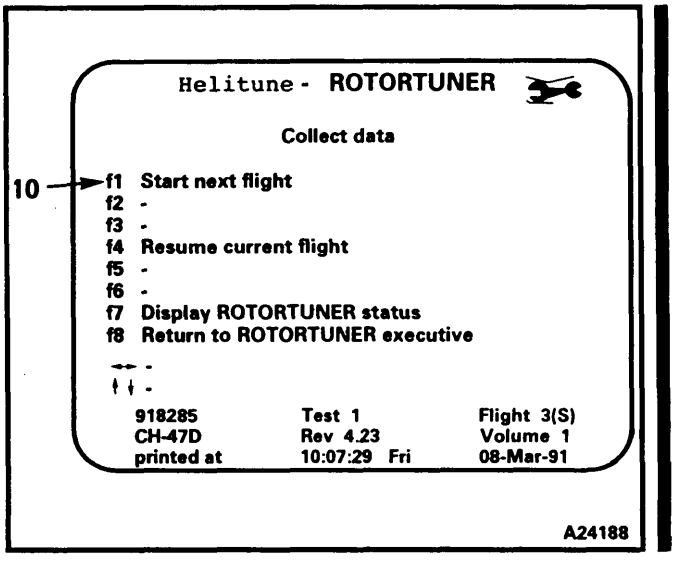
MANUAL DATA COLLECTION

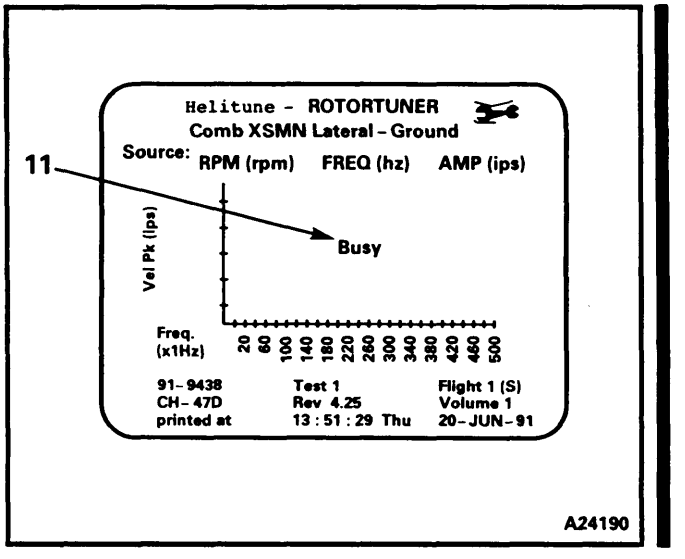
32. From the rotortuner executive menu press key F1, *Collect data* on the function key pad.
33. Press key F1, *Start next flight (10).*
34. Press key F4 , *Manual data collection.*
35. *Enter changes first ? (Y/N)* will appear on the screen. Press *NO* on the function key pad.
36. On the manual data collection screen, the word *Ground* will be highlighted. Use the right arrow on the function key pad to move the cursor to *Vib* column.
37. Press key F1, *collect.* The signature collection display will appear on the screen.
38. Use the right arrow to move the cursor to *500* in the *Range (Hz)* row.
39. Use the down arrow to move the cursor to *AFT XMSN* Lateral.
40. Press key F1, *Collect Data.*

NOTE

The word *busy* (11) will appear on the vibration signature display screen while data is being collected. After data has been collected, a graph will appear on the display screen. Note the IPS level.

41. Press key F5, *print.*
42. Press key F1, *Order Sheet Sources & Values print.*
43. Press key F8, *finish.*
44. Use the down arrow to move the cursor to *Aft XMSN Longitudinal.*
45. Repeat steps 40 thru 43, then go to step 46.
46. Press key F8 five times to return to the rotortuner executive menu.
47. Press key F4, *Turn off the ROTORTUNER.*
48. Note the IPS readings on the ORDER SHEET SOURCES & VALUES printout sheet.
    a. If lateral and vertical vibration is 0.7 IPS or above, go to Follow On Maintenance.
    b. If either vibration level exceeds 0.7 IPS, perform corrective action (Task 6-226).





FOLLOW ON MAINTENANCE:
Remove Rotortuner Vibration Analysis Equipment (Task 6-227).

END OF TASK

6-226 AFT TRANSMISSION FAN VIBRATION CORRECTION PROCEDURE

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-232-4692

Materials:

Marking Pencil (E271)
Cloths (E120)

Personnel Required:

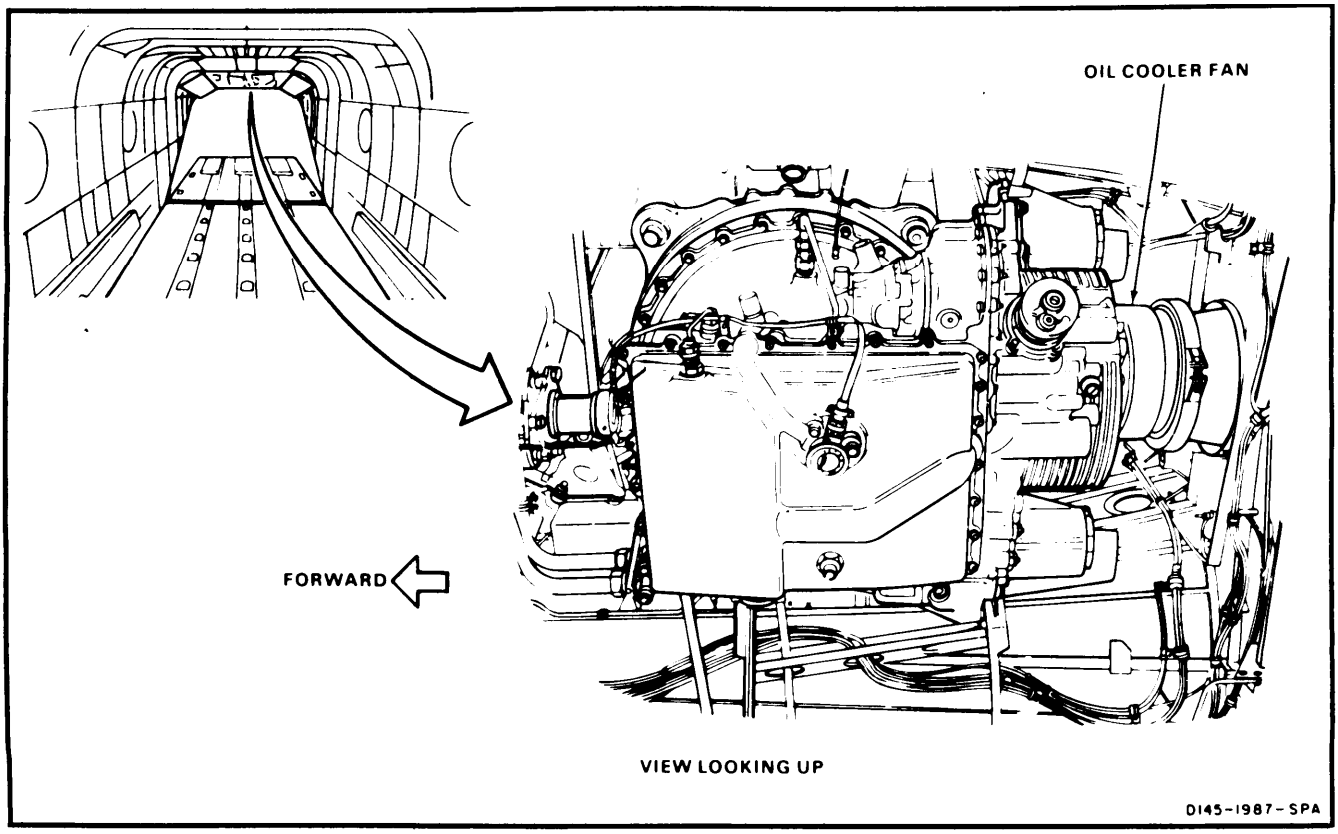
Medium Helicopter Repairer
Inspector

References:

Task 6-141
Task 6-144
Task 6-1225

Equipment Condition:

Battery Disconnected (Task 1-39)
Electrical Power Off
Hydraulic Power Off
Baffles Under Aft Transmission Open (Task 2-2)
Aft Transmission Drip Tray Removed (Task 2-3)



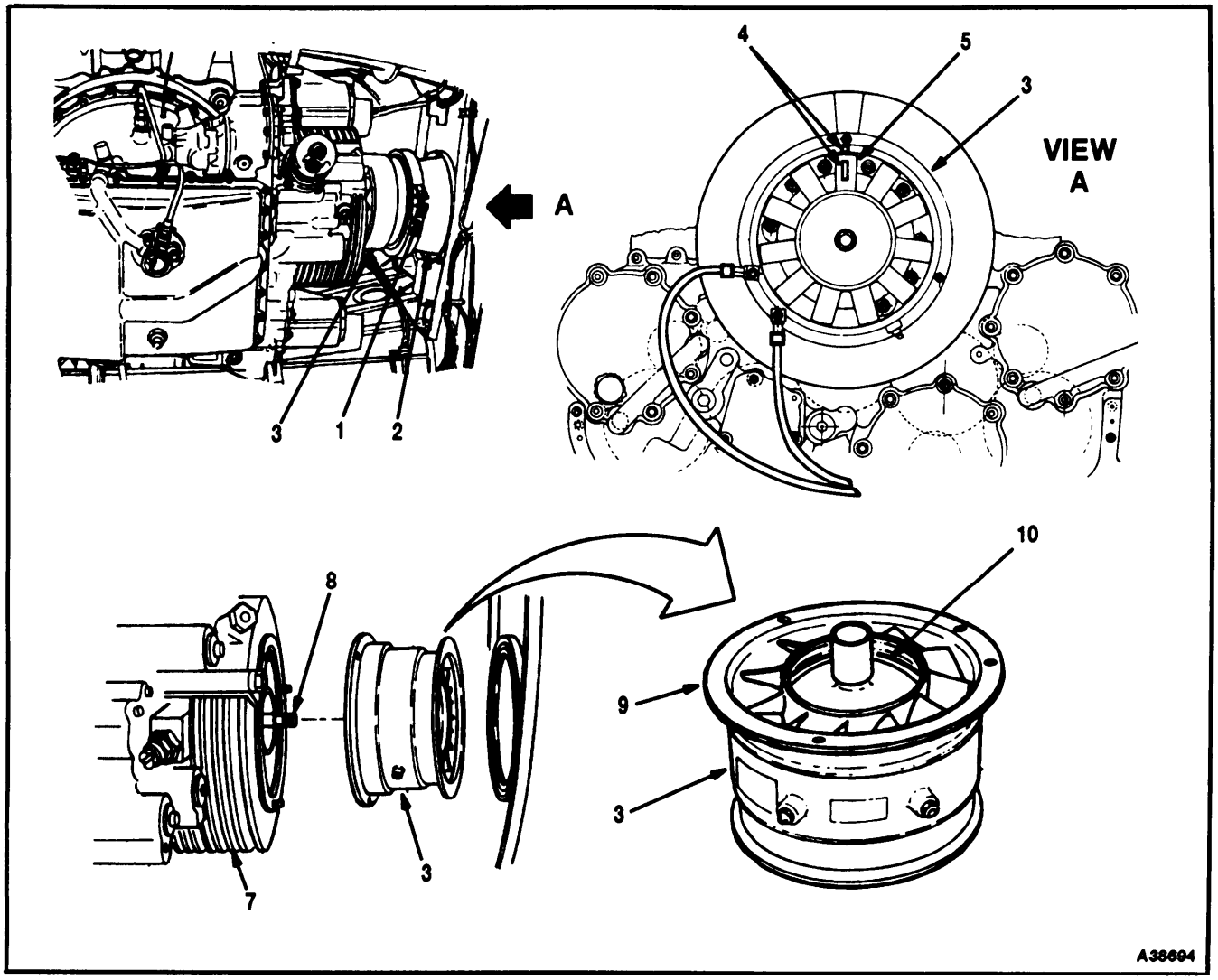
GO TO NEXT PAGE

1. **Loosen clamp (1)** securing duct (2) to oil cooler fan (3). **Slide duct and clamp aft.**
2. **Place match marks (4) across one blade of impeller (5) and housing (6)** of fan (3). Use marking pencil (E271).

NOTE

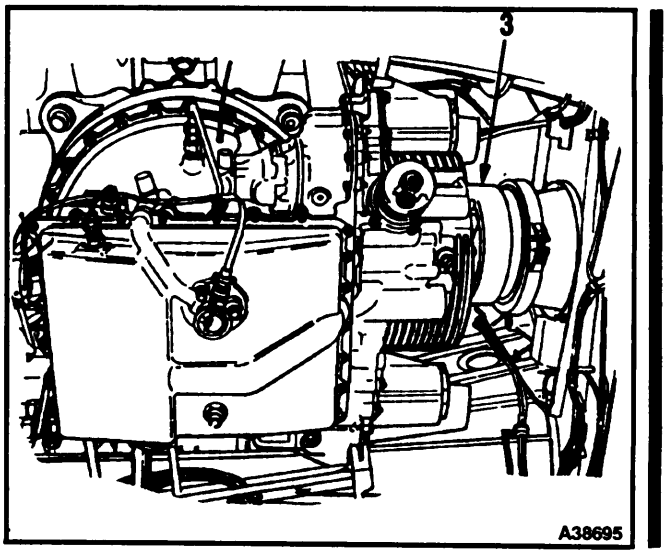
The fan drive shaft must not rotate during fan removal.

3. **Remove fan (3)** from oil cooler (7) (Task 6-141). **Do not remove drive shaft (8)** from within the oil cooler **or allow it to rotate.**
4. **Turn fan (3)** so that mounting flange (9) faces up. **Check** the area of balance groove (10) around the inside of the hub flange **for an accumulation of grease.**
   a. **If there is an accumulation** of grease, wipe it clean with cloths (E120). Install the fan (Task 6-144). **Make sure that match-marks (4) remain aligned and shaft (8) does not rotate** during installation.
   b. **If there is no accumulation** of grease, use match-marks (4) as a reference to **rotate impeller (5) 90 degrees** with respect to housing (6). Install the fan (Task 6-144). **Make sure that shaft (8) does not rotate** during installation.



GO TO NEXT PAGE

5. Repeat vibration analysis (Task 6-225). If the vertical or lateral vibration level still exceeds 0.7 IPS, repeat steps 2 and 3. If vibration continues to exceed 0.7 IPS after three repeat checks (complete rotation of impeller), replace fan (3) (Task 6-144).



FOLLOW ON MAINTENANCE:
Remove vibration analysis equipment (Task 6-227).
Install aft transmission drip tray (Task 2-3),
Close baffles under aft transmission (Task 2.2).
Close cargo ramp (TM 55-1520-240-10)
Perform ground run (TM 55-1520-240-10).

END OF TASK

6-227 REMOVE VIBRATION ANALYSIS EQUIPMENT FROM AFT TRANSMISSION FAN

INITIAL SETUP

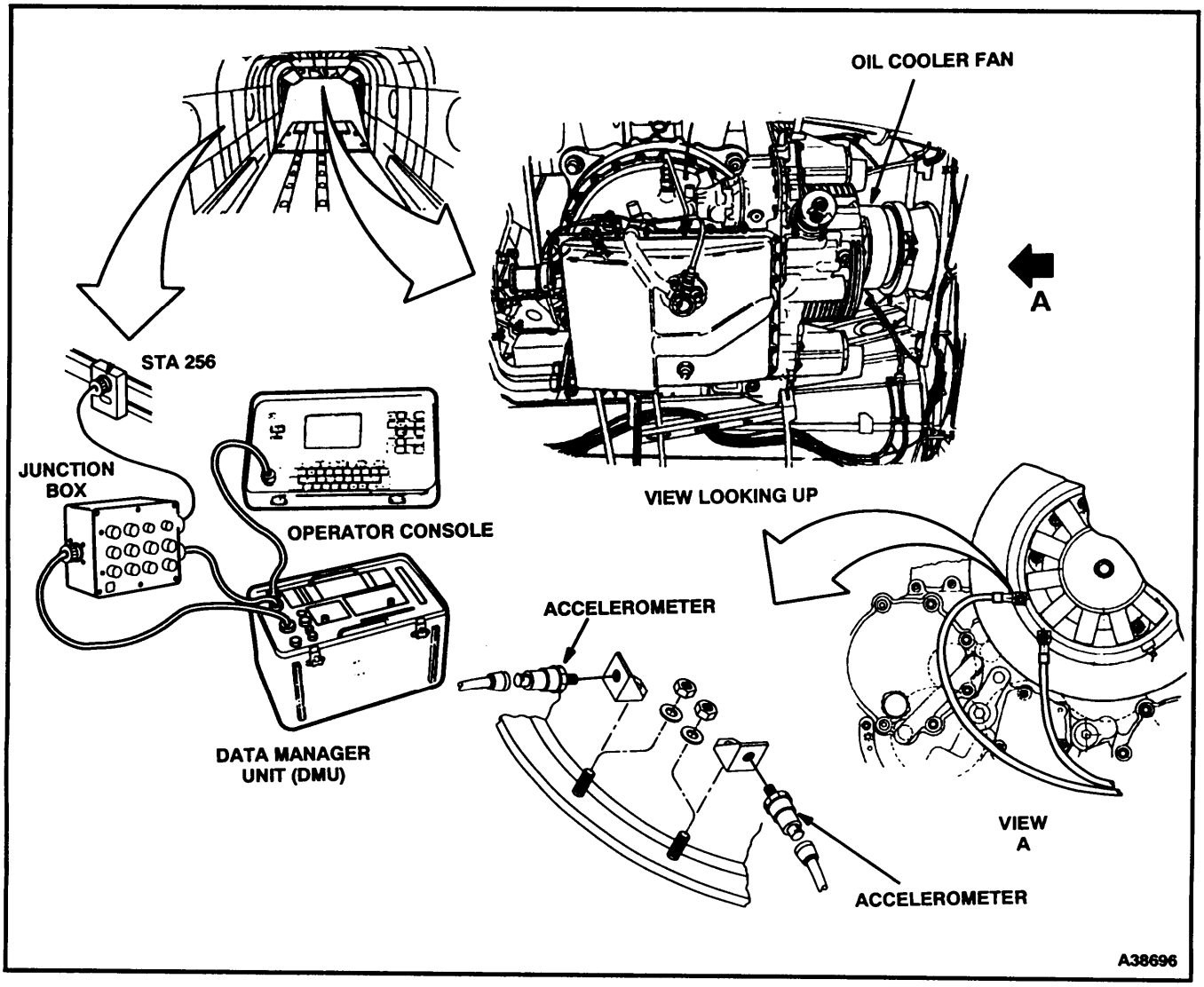
Applicable Configurations:
All

Tools:
Aircraft Mechanic's Tool Kit, NSN 5180-00-232-4692
Torque Wrench, 30 to 150 Inch-Pounds

Materials:
Oil (E253), (E254), or (E254.1)
Protective Gloves (E184.1)

Personnel Required:
Medium Helicopter Repairer
Inspector

Equipment Condition:
Battery Disconnected (Task 1-39)
Electrical Power Off
Hydraulic Power Off
Cargo Ramp Open and Level (TM 55-1520-240-10
Baffles Under Aft Transmission Open (Task 2-2)
Aft Transmission Drip Tray Removed (Task 2-3)

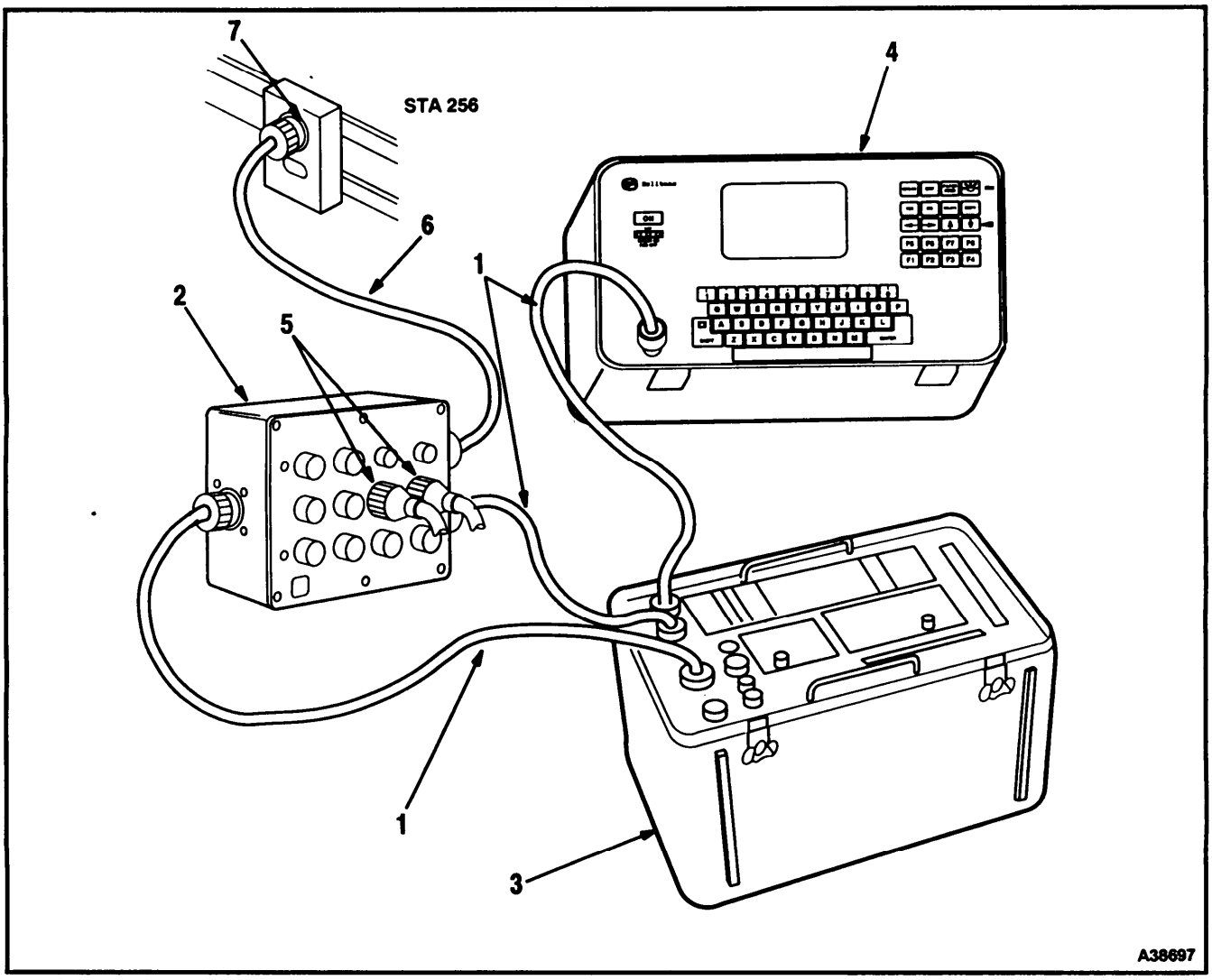


GO TO NEXT PAGE

6-227 REMOVE VIBRATION ANALYSIS EQUIPMENT FROM AFT TRANSMISSION FAN (Continued)

DISCONNECT ROTORTUNER

1. **Disconnect three cables** (1) from junction box (2), DMU (3) and operators console (4).
2. **Disconnect two accelerometer cables** (5) from junction box (2).
3. **Disconnect 28VDC power cable** (6) from junction box (2) and blade track receptacle (7) at sta 256.



GO TO NEXT PAGE

REMOVE CABLES

4. **Disconnect cables (5) from two accelerometers** (8) at aft transmission oil cooler fan (9). Remove the cables from the cabin.

NOTE

The cables may be secured with plastic strap at various places along their length.

REMOVE ACCELEROMETERS

5. **Remove two accelerometer** (8) from mounting brackets (10) on the flange of fan (9).

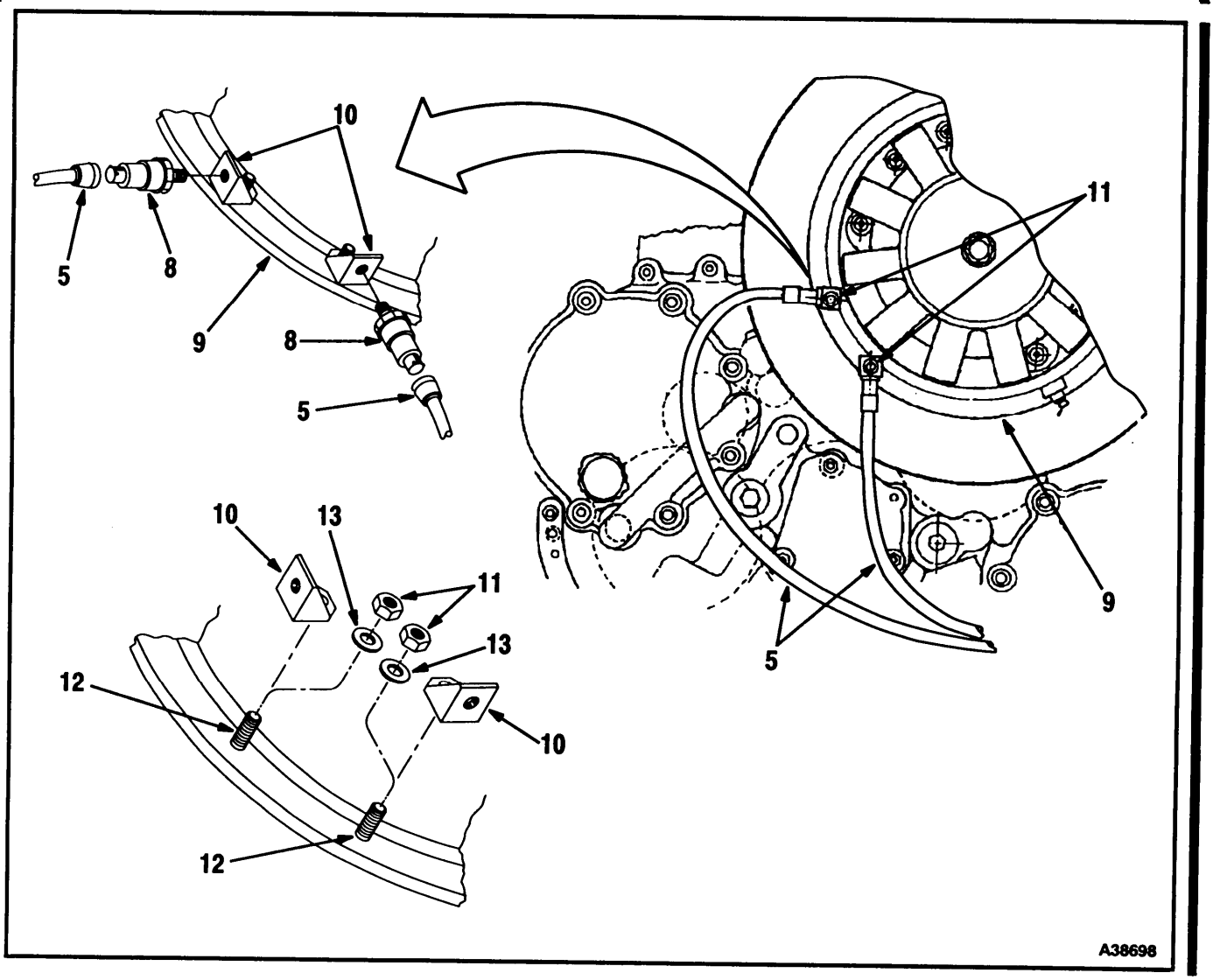
REMOVE MOUNT BRACKETS

6. Remove nut (11) from each stud (12). **Remove accelerometer mounting brackets** (10) from studs.

WARNING

Oil (E253), (E254), or (E254.1) is toxic. It can irritate skin and cause bums. Avoid contact with skin, eyes, or clothing. Do not inhale. Use only with adequate ventilation. Keep away from heat, sparks, or open flame. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.

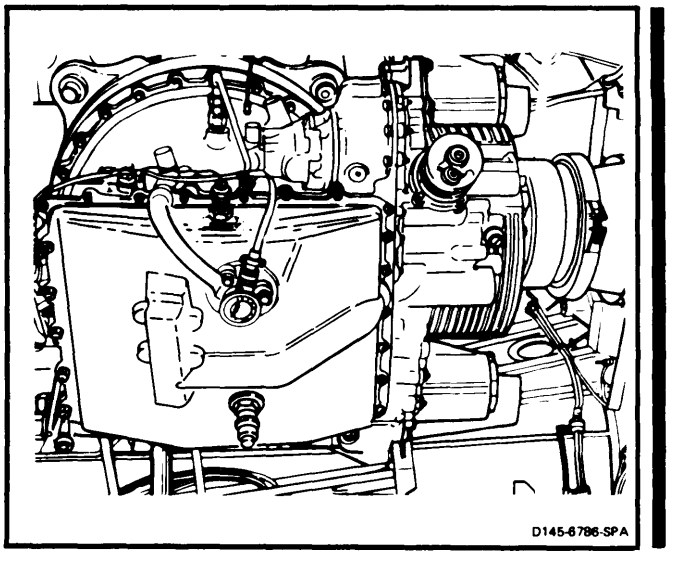
7. Apply a light coat of **oil** (E253), (E254), or (E254.1) **to each of two studs (12).** Wear gloves (E184.1). **Install washer (13) and nut (11)** on each stud. **Torque the nuts** to 80 inch-pounds.



GO TO NEXT PAGE

INSPECT

FOLLOW ON MAINTENANCE:
Install aft transmission drip tray (Task 2-3).
Close baffles under aft transmission (Task 2-2)
Close cargo ramp (TM 56-1520-240-10).



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By Order of the Secretary of the Army:

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General, United States Army
Chief of Staff

Official:

ROBERT M. JOYCE
Major General, United States Army
The Adjutant General

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The following format must be used if submitting an electronic 2028. The subject line must be exactly the same and all fields must be included: however, only the following fields are mandatory: 1, 3, 4, 5, 6, 7, 8, 9, 10, 13, 15, 16, 17, and 27.

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To: Is-lp@redstone.army.mil
Subject: DA Form 2028

1. **From:** Joe Smith
2. Unit: home
3. **Address:** 4300 Park
4. **City:** Hometown
5. **St:** AL
6. **zip:** 77777
7. **Date Sent:** 19-OCT-93
8. **Pub No:** 55-2840-229-23
9. **Pub Title:** TM
10. **Publication Date:** 04-JUL-85
11. Change Number: 7
12. Submitter Rank: MSG
13. **Submitter Fname:** Joe
14. Submitter Mname: T
15. **Submitter Lname:** Smith
16. **Submitter Phone:** 123-123-1234
17. **Problem:** 1
18. Page: 2
19. Paragraph: 3
20. Line: 4
21. NSN: 5
22. Reference: 6
23. Figure: 7
24. Table: 8
25. Item: 9
26. Total: 123
27. **Text:**

This is the text for the problem below line 27.

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THEN . . JOT DOWN THE DOPE ABOUT IT ON THIS FORM. CAREFULLY TEAR IT OUT. FOLD IT AND DROP IT IN THE MAIL!

SOMETHING WRONG WITH THIS PUBLICATION?

FROM (PRINT YOUR UNIT'S COMPLETE ADDRESS)

DATE SENT

PUBLICATION NUMBER	PUBLICATION DATE	PUBLICATION TITLE
TM 55-1520-240-23-5	6 May 1983	AVUM/AVIM Manual CH-47D Hel

BE EXACT PIN-POINT WHERE IT IS

PAGE NO	PARA-GRAPH	FIGURE NO	TABLE NO

IN THIS SPACE TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT:

PRINTED NAME GRADE OR TITLE AND TELEPHONE NUMBER

SIGN HERE

DA FORM 1 JUL 79 2028-2

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DEPARTMENT OF THE ARMY

COMMANDER
US ARMY AVIATION AND MISSILE COMMAND
ATTN AMSAM-MMC-LS-LP
REDSTONE ARSENAL AL 35898-5230

The Metric System and Equivalents

Linear Measure

1 centimeter = 10 millimeters = .39 inch
1 decimenter = 10 centimeters = 3.94 inches
1 meter = 10 decimeters = 39.37 inches
1 dekameter = 10 meters = 32.8 feet
1 hectometer = 10 dekameters = 328.08 feet
1 kilometer = 10 hectometers = 3,280.8 feet

Weights

1 centigram = 10 milligrams = .15 grain
1 decigram = 10 centigrams = 1.54 grains
1 gram = 10 decigrams = .035 ounce
1 dekagram = 10 grams = .35 ounce
1 hectogram = 10 dekagrams = 3.52 ounces
1 kilogram = 10 hectograms = 2.2 pounds
1 quintal = 100 kilograms = 220.46 pounds
1 metric ton = 10 quintals = 1.1 short tons

Liquid Measure

1 centiliter = 10 milliliters = .34 fl. ounce
1 deciliter = 10 centiliters = 3.38 fl. ounces
1 liter = 10 deciliters = 38.82 fl. ounces
1 dekaliter = 10 liters = 2.64 gallons
1 hectoliter = 10 dekaliters = 26.42 gallons
1 kiloliter = 10 hectoliters = 264.18 gallons

Square Measure

1 sq. centimeter = 100 sq. millimeters = .155 sq. inch
1 sq. decimenter = 100 sq. centimeters = 15.5 sq. inches
1 sq. meter (centare) = 100 sq. decimeters = 10.76 sq. feet
1 sq. dekameter (are) = 100 sq. meters = 1,076.4 sq. feet
1 sq. hectometer (hectare) = 100 sq. dekameters = 2.47 acres
1 sq. kilometer = 100 sq. hectometers = .386 sq. mile

Cubic Measure

1 cu. centimeter = 1000 cu. millimeters = .06 cu. inch
1 cu. decimeter = 1000 cu. centimeters = 61.02 cu. inches
1 cu meter = 1000 cu. decimeters = 35.31 cu. feet

Approximate Conversion Factors

To change	*To*	*Multiply by*	*To change*	*To*	*Multiply by*
inches	centimeters	2.540	ounce-inches	newton-meters	.007062
feet	meters	.305	centimeters	inches	3.94
yards	meters	.914	meters	feet	3.280
miles	kilometers	1.609	meters	yards	1.094
square inches	square centimeters	6.451	kilometers	miles	.621
square feet	square meters	.093	square centimeters	square inches	.155
square yards	square meters	.836	square meters	square feet	10.764
square miles	square kilometers	2.590	square meters	square yards	1.196
acres	square hectometers	.405	square kilometers	square miles	.386
cubic feet	cubic meters	.028	square hectometers	acres	2.471
cubic yards	cubic meters	.765	cubic meters	cubic feet	35.315
fluid ounces	milliliters	29,573	cubic meters	cubic yards	1.308
pints	liters	.473	milliliters	fluid ounces	.034
quarts	liters	.946	liters	pints	2.113
gallons	liters	3.785	liters	quarts	1.057
ounces	grams	28.349	liters	gallons	.264
pounds	kilograms	.454	grams	ounces	.035
short tons	metric tons	.907	kilograms	pounds	2.205
pound-feet	newton-meters	1.365	metric tons	short tons	1.102
pound-inches	newton-meters	.11375			

Temperature (Exact)

°F	Fahrenheit temperature	5/9 (after subtracting 32)	Celsius temperature	°C