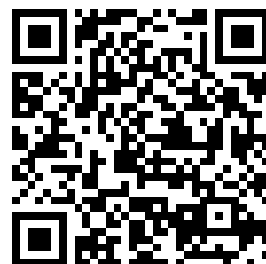

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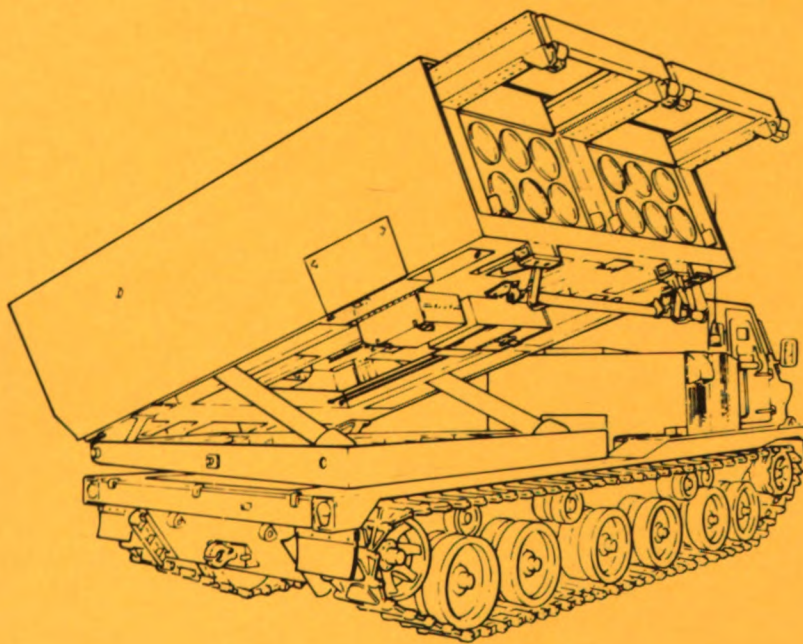
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TECHNICAL MANUAL
MAINTENANCE INSTRUCTIONS
DIRECT SUPPORT

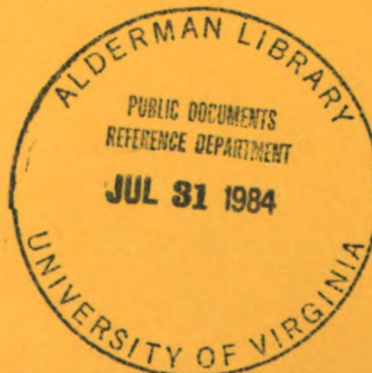
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(1055-01-092-0596)



MULTIPLE LAUNCH
ROCKET SYSTEM

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LAUNCHER LOADER
MODULE MAINTENANCE
PAGE 5-1

LAUNCHER DRIVE
SYSTEM MAINTENANCE
PAGE 6-1

FIRE CONTROL SYSTEM
MAINTENANCE
PAGE 7-1

REFERENCES
PAGE A-1

EXPENDABLE/DURABLE
SUPPLIES AND
MATERIALS LISTS
PAGE B-1

ALPHABETICAL
INDEX
PAGE INDEX-1

10-1452-248-30-2

10-1452-248-30-2

10-1452-248-30-2

10-1452-248-30-2

10-1452-248-30-2

10-1452-248-30-2

10-1452-248-30-2

10-1452-248-30-2

10-1452-248-30-2

10-1452-248-30-2

10-1452-248-30-2

10-1452-248-30-2

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Page No.	*Change No.
Cover	0
A	0
B Blank	0
i	0
ii Blank	0
5-1 thru 5-194	0
6-1 thru 6-94	0
7-1 thru 7-11	0
7-12 Blank	0
A-1	0
A-2 Blank	0
B-1 thru B-3	0
B-4 Blank	0
C-1 thru C-3	0
C-4 Blank	0
D-1 thru D-4	0
Glossary-1 thru Glossary-3	0
Glossary-4 Blank	0
Index-1 thru Index-12.	0

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TECHNICAL MANUAL)
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HEADQUARTERS
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 Washington, D.C., 16 July 1984

DIRECT SUPPORT MAINTENANCE MANUAL
LAUNCHER, ROCKET, ARMORED
VEHICLE MOUNTED: M270
(1055-01-092-0596)
MULTIPLE LAUNCH ROCKET SYSTEM

TABLE OF CONTENTS

REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

You can help improve this manual. If you find any mistakes or if you know of a 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 Missile Command, ATTN: DRSMI-SNPM, Redstone Arsenal, AL 35898. A reply will be furnished to you.

	<i>Page</i>
CHAPTER 5.	LAUNCHER LOADER MODULE MAINTENANCE 5-1
Section I.	General 5-2
Section II.	Maintenance Procedures 5-2
CHAPTER 6.	LAUNCHER DRIVE SYSTEM MAINTENANCE 6-1
Section I.	General 6-1
Section II.	Maintenance Procedures 6-1
CHAPTER 7.	FIRE CONTROL SYSTEM MAINTENANCE 7-1
Section I.	General 7-1
Section II.	Maintenance Procedures 7-1
APPENDIX A.	REFERENCES A-1
APPENDIX B.	EXPENDABLE/DURABLE SUPPLIES AND MATERIALS LIST B-1
APPENDIX C.	ILLUSTRATED LIST OF MANUFACTURED ITEMS C-1
APPENDIX D.	TORQUE LIMITS D-1
GLOSSARY	GLOSSARY Glossary-1
Section I.	Abbreviations Glossary-1
Section II.	Definitions of Unusual Terms Glossary-2
INDEX	ALPHABETICAL INDEX Index-1

CHAPTER 5 LAUNCHER LOADER MODULE MAINTENANCE

CHAPTER CONTENTS

	<i>Paragraph</i>	<i>Page</i>
SECTION I. GENERAL		5-2
Introduction.	5-1	5-2
SECTION II. MAINTENANCE PROCEDURES		5-2
General Maintenance Procedures.	5-2	5-2
Boom Electrical Control Assembly Maintenance Instructions	5-3	5-3
Boom Motor and Reduction Gearbox Maintenance Instructions	5-4	5-5
Boom Drive Shaft Maintenance Instructions	5-5	5-11
Boom Extension Actuator Maintenance Instructions	5-6	5-12
Ballnut Drive Assembly Maintenance Instructions	5-7	5-17
Intermediate Beam Maintenance Instructions	5-8	5-20
Fixed Beam Maintenance Instructions	5-9	5-24
Beam Slide Button Maintenance Instructions	5-10	5-27
Boom Forward Roller Assembly Maintenance Instructions	5-11	5-29
Boom In Limit Switch Maintenance Instructions	5-12	5-32
Boom Out Limit Switch Maintenance Instructions	5-13	5-36
LP/C Hoist Cable Maintenance Instructions	5-14	5-39
LP/C Hoist Assembly Maintenance Instructions	5-15	5-45
LP/C Hoist Hook and Pulley Maintenance Instructions	5-16	5-49
LP/C Hoist Pulleys Maintenance Instructions	5-17	5-55
LP/C Hoist Carriage Assembly Maintenance Instructions	5-18	5-60
LP/C Hoist Electrical Control Assembly Maintenance Instructions	5-19	5-79
Hoist Up Limit Switch Maintenance Instructions	5-20	5-80
Hoist Down Limit Switch Maintenance Instructions	5-21	5-84
LP/C Latch Assembly Maintenance Instructions	5-22	5-89
Travel Lock Maintenance Instructions	5-23	5-100
Blast Shield Assembly Maintenance Instructions	5-24	5-116
267- and 480-Mil (15- and 27-Degree) Limit Switch Maintenance Instructions	5-25	5-127
Cage Down Limit Switch Maintenance Instructions	5-26	5-137
22.2-Mil (1.25-Degree) Limit Switch Maintenance Instructions	5-27	5-141
Cage Assembly Maintenance Instructions	5-28	5-145
Turret Assembly Maintenance Instructions	5-29	5-163
Armor Door Maintenance Instructions.	5-30	5-174
Crew Equipment Container Maintenance Instructions	5-31	5-183

Section I. GENERAL

5-1. INTRODUCTION. This section contains the Launcher Loader Module (LLM) maintenance procedures authorized for direct support by the

Maintenance Allocation Chart (MAC). The MAC is in Appendix B of TM 9-1425-646-20.

Section II. MAINTENANCE PROCEDURES

5-2. GENERAL MAINTENANCE PROCEDURES. The following general inspection and cleaning procedures should be used when performing maintenance tasks. Special inspections and cleaning procedures, when required, are included with each maintenance task.

a. Inspection.

(1) Check bolts, nuts, and screws for stripped threads or other damage. Repair or replace as necessary. Do not reuse self-locking nuts that do not meet minimum breakaway torque (Appendix D).

(2) Check bearings and bushings for scored, galled, or other visual damage. Replace if damaged.

(3) Check components for chipped paint, rust, broken welds, elongated holes, or other visual damage. Repair or replace as required.

(4) Check electrical cables and connectors for cracked or broken insulation, bare wires, and loose or damaged connectors. Repair or replace as required.

(5) Check hoses and fluid lines for frayed hoses, nicked or scratched fluid lines, and damaged connectors. Repair or replace as required.

b. Cleaning and Painting.

(1) Using cotton wiping cloth and approved solvent, if required, clean all components before installation.

(2) Spot paint all areas that have chipped or scratched paint.

5-3. BOOM ELECTRICAL CONTROL ASSEMBLY MAINTENANCE INSTRUCTIONS. This paragraph covers the replacement of the boom electrical control assembly.

INITIAL SETUP

Tools

Kit, tool, 13032302

Materials/Parts

Cloth, cotton wiping (6, Appendix B)
 Primer, zinc chromate (47, Appendix B)
 Varnish (71, Appendix B)

Personnel Required

2 MLRS Repairers MOS 27M (MLRS
 Crewmember MOS 13M to assist
 as required)

References

TM 9-1425-646-10
 TM 9-1425-646-20

Troubleshooting

Paragraph 2-9

Equipment Condition

Position LLM to 3200 mils (180 degrees)
 azimuth and 0 mils elevation
 (TM 9-1425-646-10)

a. Remove.

(1) Disconnect electrical connector W26P2 or W27P2 from connector J2.

(2) Disconnect electrical connector P1 from connector J1.

(3) Using 10mm combination wrench, remove ground strap from cage structure.

(4) Using 17mm box end wrench and 12mm socket, one repairer removes four nuts and four washers while the other repairer supports the assembly. Discard nuts.

(5) Remove control assembly, four bolts, and four washers.

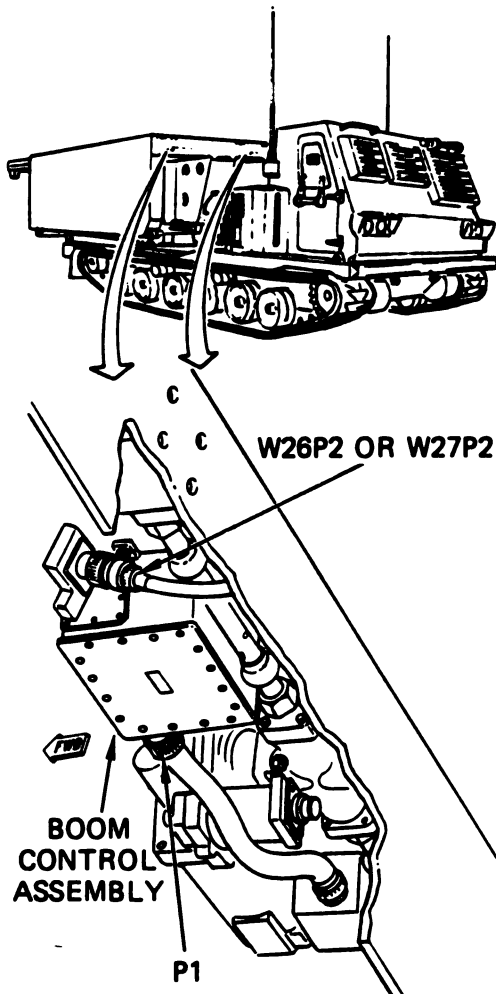
b. Install.

(1) Prepare control assembly, mounting surface and ground strap mounting stud for electrical bond (paragraph 3-10).

(2) Apply zinc chromate primer to three bolts.

(3) While one repairer positions the control assembly, the other repairer installs four bolts, eight washers, and four nuts. Install bolt without primer in mounting hole cleaned for electrical bond.

(4) Using 17mm box end wrench and 12mm socket, tighten nuts.

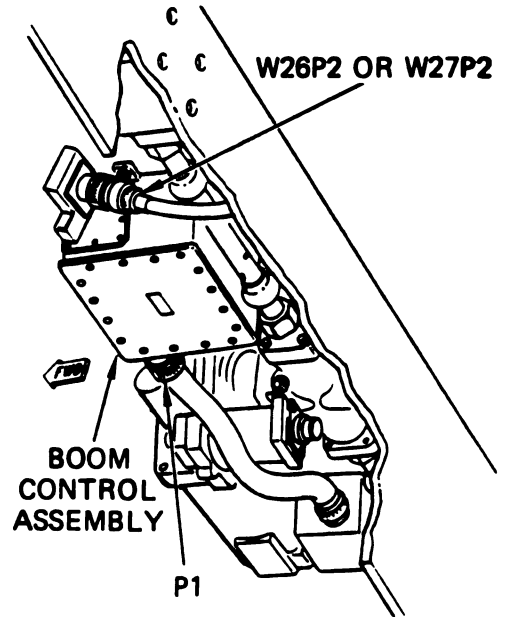
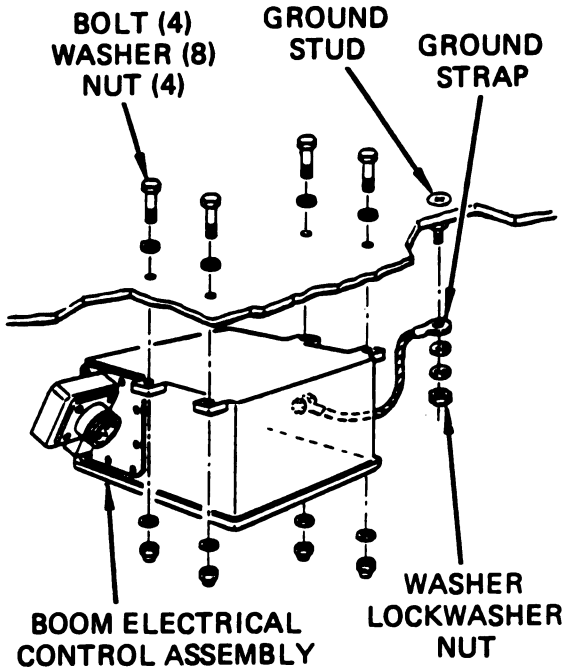


5-3. BOOM ELECTRICAL CONTROL ASSEMBLY MAINTENANCE INSTRUCTIONS (CONT)

(5) Using 10mm combination wrench, install ground strap to cage structure.

(6) Apply varnish on bolt, nut, and stud for electrical bond and ground strap mounting.

(7) Connect electrical connectors P1 to J1, and W26P2 or W27P2 to J2.



FOLLOW-ON PROCEDURE

Using BC, extend and retract boom two times and check for smooth operation (TM 9-1425-646-20).

Stow LLM (TM 9-1425-646-10).

5-4. BOOM MOTOR AND REDUCTION GEARBOX MAINTENANCE INSTRUCTIONS. This paragraph covers the maintenance tasks for the following items:

<i>Item</i>	<i>Page</i>
1. Boom Motor and Reduction Gearbox	5-5
2. Boom Motor and Brake Assembly	5-7
3. Manual Drive Assembly	5-9

INITIAL SETUP

Tools

Kit, tool, 13032302

Materials/Parts

- Cloth, cotton wiping (6, Appendix B)
- Compound, cleaning (12, Appendix B)
- Grease (19, Appendix B)
- Lockwire (24, Appendix B) (for item 1)
- Packing, preformed (42, Appendix B)
- Packing, preformed (43, Appendix B)
- Primer, zinc chromate (47, Appendix B)
- Solvent, drycleaning (61, Appendix B)
- Varnish (71, Appendix B) (for item 1)

Personnel Required

MLRS Repairer MOS 27M (MLRS Crewmember MOS 13M to assist as required)

References

- TM 9-1425-646-10
- TM 9-1425-646-20

Troubleshooting

Paragraph 2-9

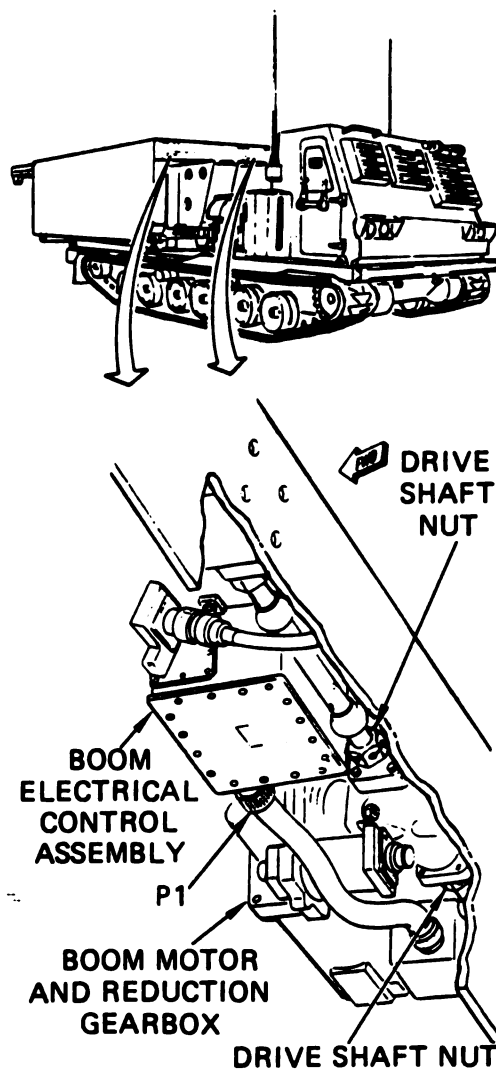
Equipment Condition

Position LLM to 3200 mils (180 degrees) azimuth and 0 mils elevation (TM 9-1425-646-10)

1. BOOM MOTOR AND REDUCTION GEARBOX.

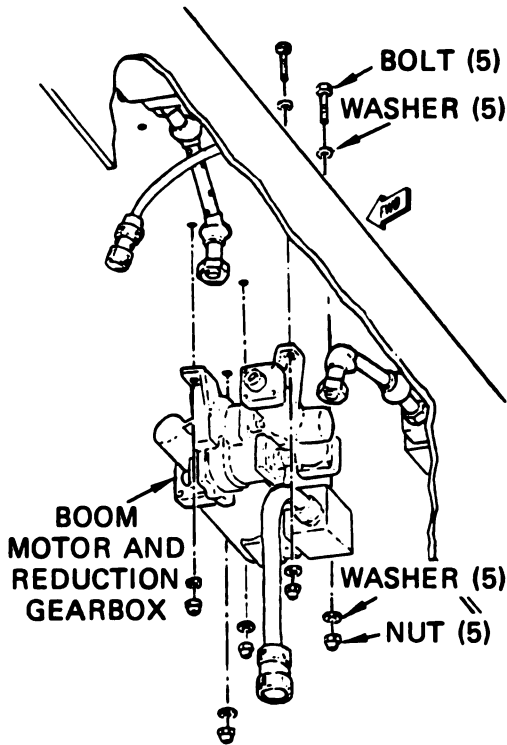
a. Remove.

- (1) Disconnect electrical connector P1 from boom electrical control assembly connector J1.
- (2) Cut and remove lockwire. Using 1-5/8 inch open end wrench, disconnect drive shafts.



5-4. BOOM MOTOR AND REDUCTION GEARBOX MAINTENANCE INSTRUCTIONS (CONT)

(3) Using 17mm box end wrench and 12mm socket, remove five nuts, ten washers, and five bolts. Remove boom motor and reduction gearbox.

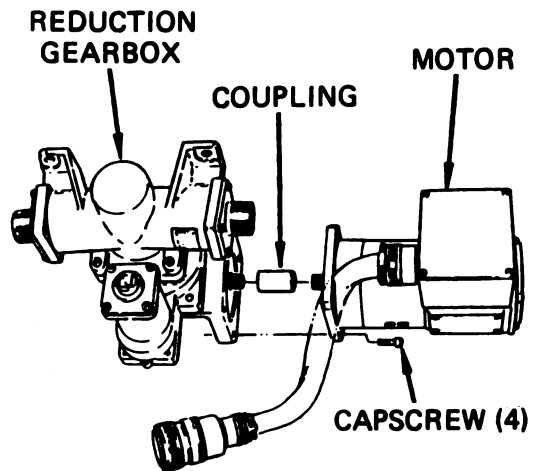


(4) Using 1/4-inch socket head key, remove four capscrews securing motor to reduction gearbox. Remove reduction gearbox and retain coupling.

b. Install.

(1) Install drive coupling on motor and brake assembly output shaft.

(2) Position motor and brake assembly onto gearbox. Apply zinc chromate primer to four capscrew threads and secure motor to gearbox. Using 1/4-inch socket head key, tighten capscrews.



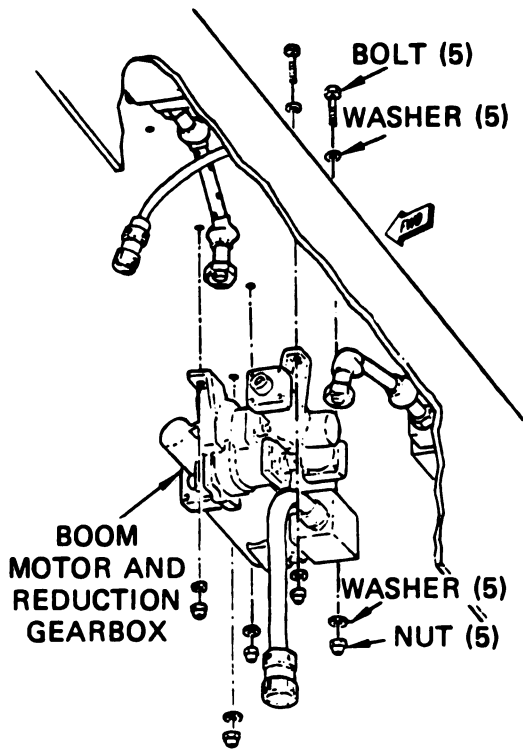
(3) Prepare surface for electrical bond (paragraph 3-10).

(4) Apply zinc chromate primer to four bolts.

(5) Place new motor and reduction gearbox in position and install five bolts, ten washers, and five nuts. Install clean bolt in mounting hole for electrical bond.

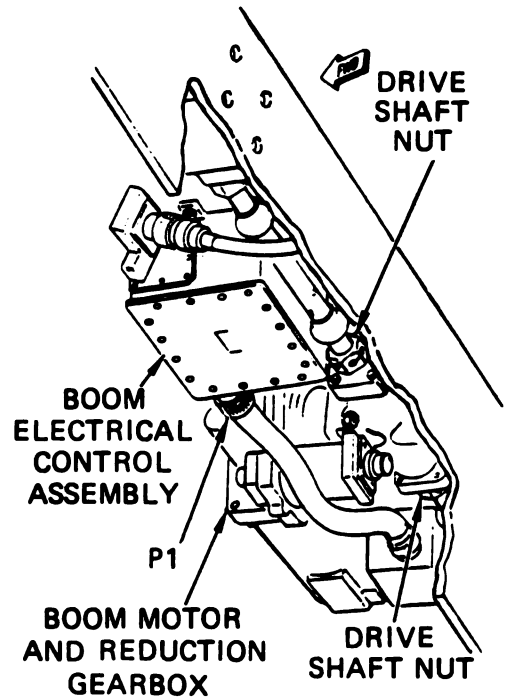
5-4. BOOM MOTOR AND REDUCTION GEARBOX MAINTENANCE INSTRUCTIONS (CONT)

(6) Tighten nuts with 17mm box end wrench and 12mm socket. Apply varnish on electrical bond mounting bolt and nut.



(7) Engage drive shafts and tighten nuts with 1-5/8 inch open end wrench. Safety-wire nuts to boom motor and reduction gearbox with lockwire.

(8) Connect electrical connector P1 to boom electrical control connector J1.



(9) If no further maintenance is required, perform follow-on procedure (page 5-10).

2. BOOM MOTOR AND BRAKE ASSEMBLY.

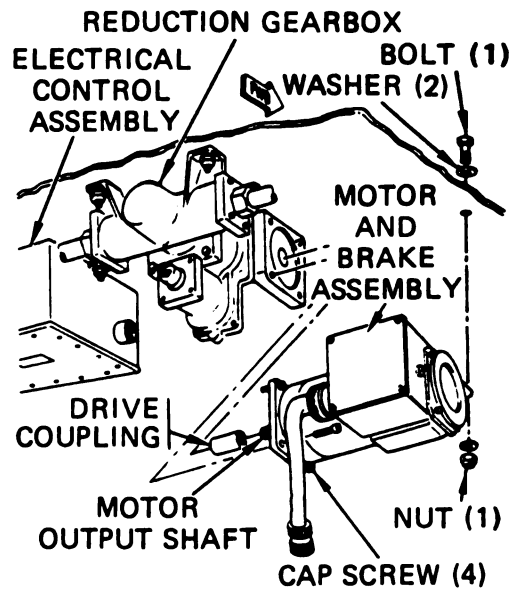
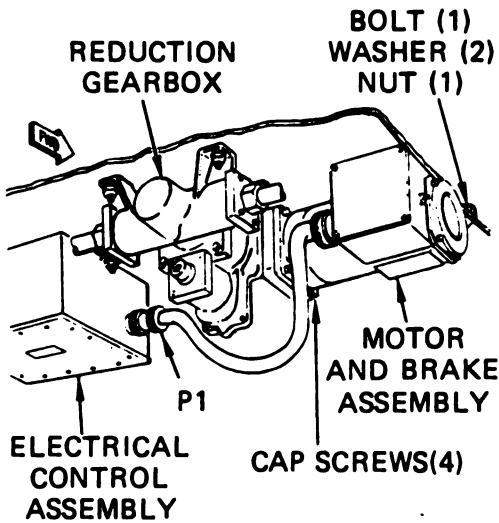
a. Remove.

(1) Disconnect electrical connector P1 from boom electrical control assembly connector J1.

(2) Using 17mm box end wrench and 12mm socket, remove bolt, two washers, and nut securing motor to cage.

5-4. BOOM MOTOR AND REDUCTION GEARBOX MAINTENANCE INSTRUCTIONS (CONT)

(3) Using 1/4-inch socket head key, remove four capscrews securing motor to reduction gearbox. Remove motor and retain coupling.



b. Install.

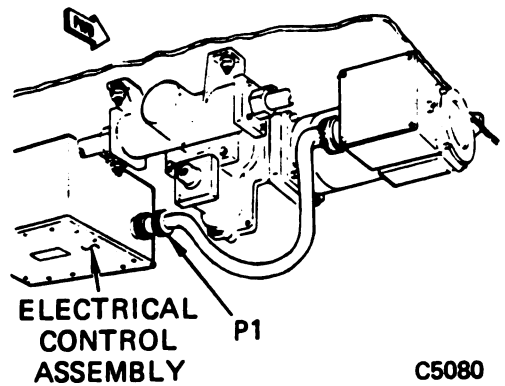
(1) To insure that gearbox does not bind, manually extend and retract boom to insure smooth operation (TM 9-1425-646-10).

(2) Install drive coupling on motor output shaft.

(3) Apply zinc chromate primer to threads of four screws. Position motor to gearbox and install four capscrews. Using 1/4-inch socket head key, tighten capscrews.

(4) Apply zinc chromate primer to bolt and secure motor to cage with bolt, two washers, and nut. Tighten nut using 17mm box end wrench and 12mm socket.

(5) Connect electrical connector P1 to boom electrical control connector J1.



(6) If no further maintenance is required, perform follow-on procedure (page 5-10).

5-4. BOOM MOTOR AND REDUCTION GEARBOX MAINTENANCE INSTRUCTIONS (CONT)

3. MANUAL DRIVE ASSEMBLY.

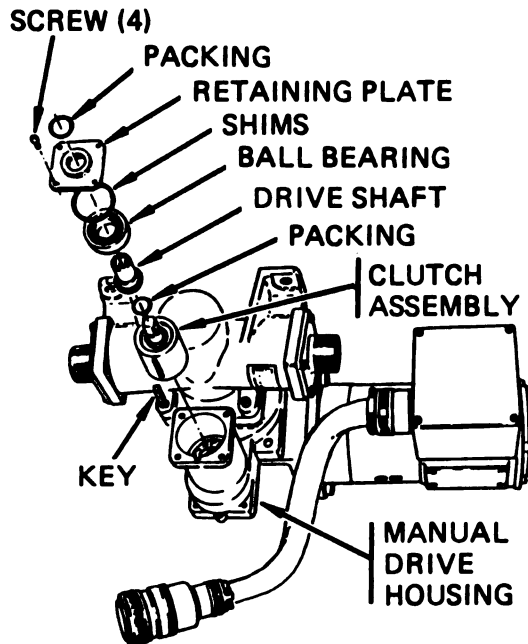
a. Remove.

(1) Remove boom motor and reduction gearbox (item 1, a).

(2) Using crosstip screwdriver, remove four screws securing manual drive retaining plate to manual drive housing. Remove retaining plate and preformed packing. Discard preformed packing.

(3) Remove drive shaft, ball bearing, and shims. Retain shims.

(4) Remove clutch assembly and key from manual drive housing.



b. Clean and Lubricate.

WARNING

P-D-680 solvent vapors are toxic. Avoid prolonged or repeated breathing of vapors or solvent contact with skin. Use only with adequate ventilation. Solvent is flammable and should not be used near open flame. Fire extinguishers should be readily available when solvent is used.

NOTE

A solution of one part cleaning compound to four parts drycleaning solvent may be used to remove grease and oil. After cleaning, rinse parts in cold water and dry thoroughly.

(1) Clean drive shaft, retaining plate, and bearing. Discard preformed packing on drive shaft. Insure that ball bearing rolls easily.

(2) Clean upper manual drive housing with dampened cloth.

(3) Coat bearing mounted on spur gear with MIL-G-10924 grease. Lubricate new clutch assembly with grease. Coat drive shaft bearing with grease. Lubricate two new preformed packings with grease.

c. Install.

(1) Position key on new clutch assembly and insert clutch assembly into housing. Aline clutch with spur gear.

(2) Install new preformed packing on drive shaft. Assemble bearing onto drive shaft and install drive shaft with bearing into housing.

5-4. BOOM MOTOR AND REDUCTION GEARBOX MAINTENANCE INSTRUCTIONS (CONT)

(3) Install shims as required to fill void between bearing and retaining plate.

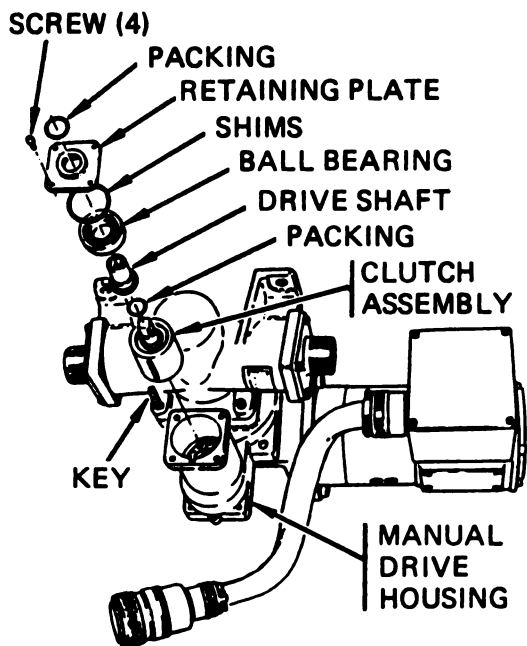
(4) Install new preformed packing into the retaining plate. Install retaining plate on housing and secure with four screws. Using crosstip screwdriver, tighten screws.

(5) Install boom motor and reduction gearbox (item 1, b).

FOLLOW-ON PROCEDURE

Using BC, extend and retract boom two times and check for smooth operation (TM 9-1425-646-20).

Perform load test after repair (paragraph 3-9).



5-5. BOOM DRIVE SHAFT MAINTENANCE INSTRUCTIONS. This paragraph covers the replacement of the boom drive shaft.

INITIAL SETUP

Tools

Kit, tool, 13032302

Materials/Parts

Lockwire (24, Appendix B)

Personnel Required

MLRS Repairer MOS 27M

References

TM 9-1425-646-10

TM 9-1425-646-20

Troubleshooting
Paragraph 2-9

Equipment Condition

Position LLM to 3200 mils (180 degrees) azimuth and 0 mils elevation (TM 9-1425-646-10)

Manually extend booms until crossbar is forward of boom electrical control assembly (TM 9-1425-646-10)

a. Remove.

(1) Using wire twister pliers, cut and remove lockwire. Using 1-5/8 inch open end wrench, disconnect drive shaft nuts at both ends of shaft.

(2) Disengage drive shaft from gearbox drive sockets.

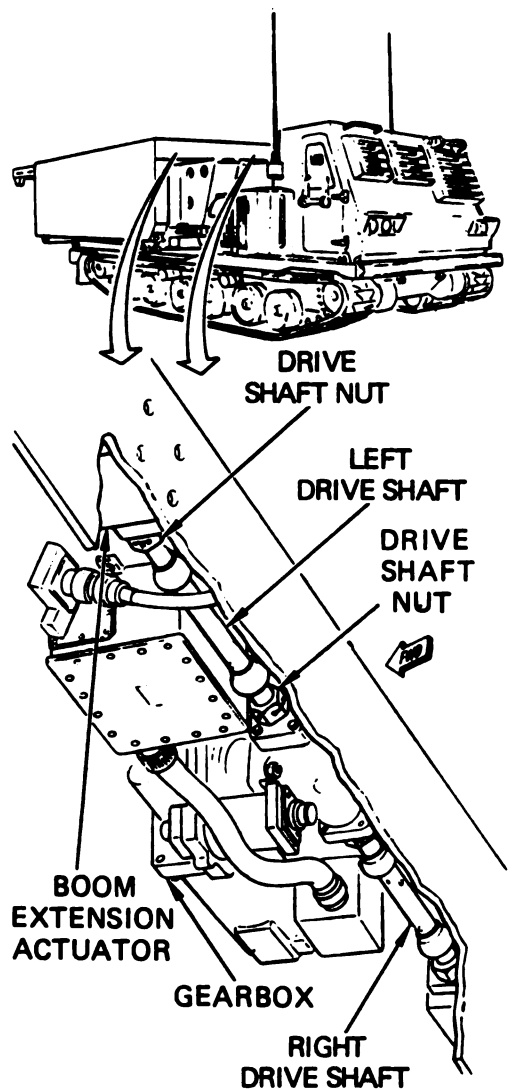
(3) Remove drive shaft from boom extension actuator.

b. Install.

(1) Place drive shaft in position. Engage the splined shaft at one end of drive shaft. Tighten nut finger-tight.

(2) Engage other end of drive shaft and tighten nut finger-tight.

(3) Using 1-5/8 inch open end wrench, tighten nuts at each end of drive shaft. Safety-wire nuts with lockwire.



FOLLOW-ON PROCEDURE

Using BC, extend and retract boom two times and check for smooth operation (TM 9-1425-646-20).

Stow LLM (TM 9-1425-646-10).

5-6. BOOM EXTENSION ACTUATOR MAINTENANCE INSTRUCTIONS. This paragraph covers the replacement of the boom extension actuator.

INITIAL SETUP

Test/Support Equipment
Training LP/C, 13031990

Tools
Kit, tool, 13032302
Set, shop, 13032303
Drill, electric, 1311-09
Drive assembly, A3012A
Gloves, cloth, UG001396
Heater, gun type, LFT550
Puller, mech, GGGP00781
Wrench, pipe, strap, 5
Wrench, spanner, 314-21N

Materials/Parts
Cloth, wiping (6, Appendix B)

Grease (19, Appendix B)
Lockwire (24, Appendix B)
Primer, zinc chromate (47, Appendix B)
Seal (56, Appendix B)

Personnel Required
2 MLRS Repairers MOS 27M (MLRS
Crewmembers MOS 13M to assist as
required)

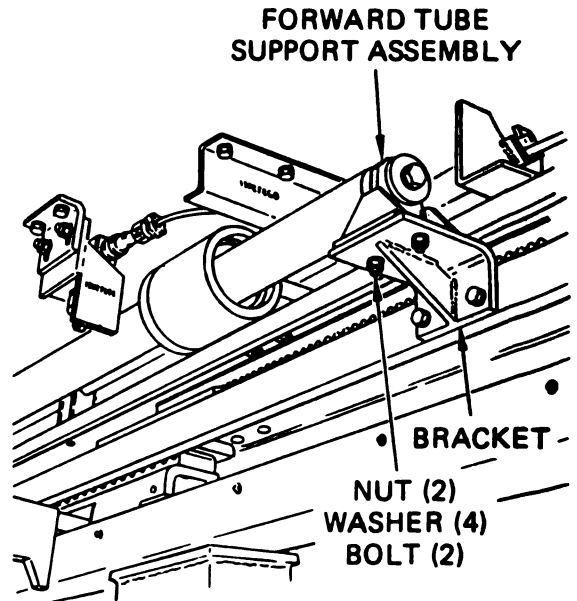
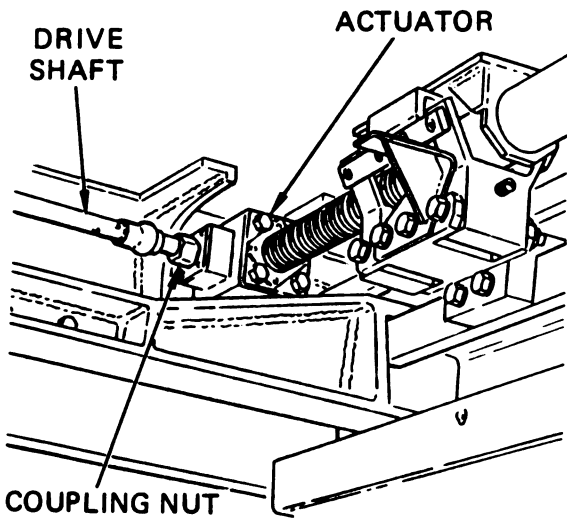
Troubleshooting
Paragraph 2-9

Equipment Condition
Position LLM to 3200 mils (180 degrees)
azimuth and 0 mils elevation
(TM 9-1425-646-10)

a. Remove.

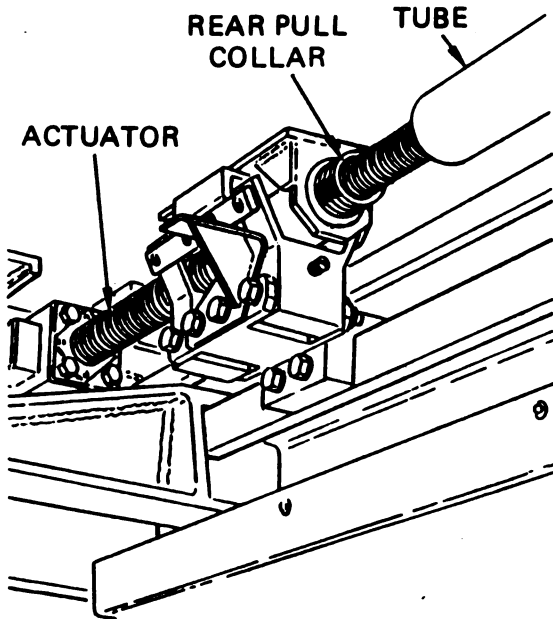
- (1) Manually extend boom 3 to 4 feet.
- (2) Cut and remove lockwire from drive shaft coupling nuts to both actuators.
- (3) Using 1-5/8 inch open end wrench, remove drive shaft from good actuator.

- (4) Using 10mm socket and 10mm box end wrench, remove two nuts, four washers, and two bolts securing forward tube support assembly to bracket.



5-6. BOOM EXTENSION ACTUATOR MAINTENANCE INSTRUCTIONS (CONT)

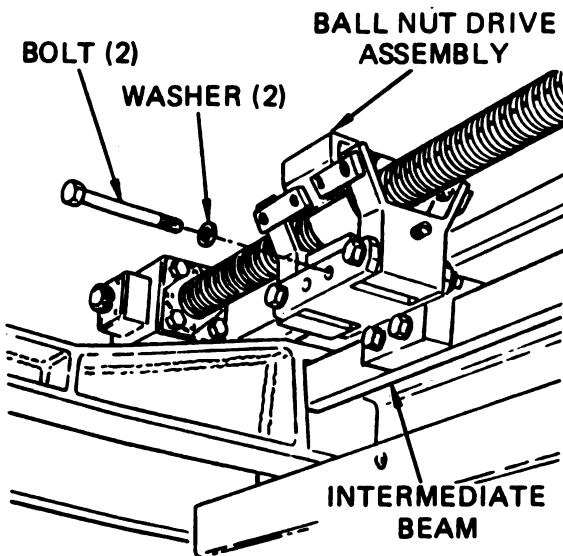
(5) Using strap wrench and spanner wrench, unscrew tube assembly from rear pull collar. Slide tube assembly forward through mount assembly and remove tube assembly from actuator.



NOTE

The right side actuator has two washers instead of a boom out limit switch cam.

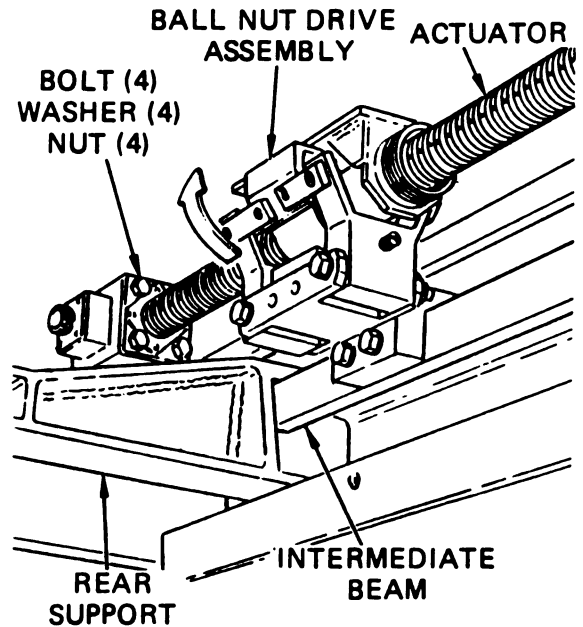
(6) Using 19mm socket with 6-inch extension, remove two bolts securing ballnut drive assembly to intermediate beam.



(7) Rotate ballnut drive assembly to clear rear support on intermediate beam, while using electric drill and driver assembly to retract ballnut drive assembly.

(8) Using 1-5/8 inch open end wrench, remove drive shaft from defective actuator.

(9) Using 14mm socket and 19mm box end wrench, remove four nuts, washers, and bolts securing actuator to cage structure.



5-6. BOOM EXTENSION ACTUATOR MAINTENANCE INSTRUCTIONS (CONT)

(10) Using rags to protect exposed actuator jackscrew and hands, slide actuator forward and then to the rear and down until actuator is free of mount assembly. Remove actuator from cage.

(11) Using measuring tape, measure distance from forward face of ballnut drive assembly to rear edge of actuator gear housing. Record dimension.

(12) Using 13mm socket, remove four bolts and eight washers securing rear tube support assembly to ballnut drive assembly. Remove rear tube support and ballnut drive assembly.

(15) Using hammer and chisel, cut sleeve to remove sleeve from actuator. Discard sleeve.

(16) Remove rear pull collar and seal. Discard seal.

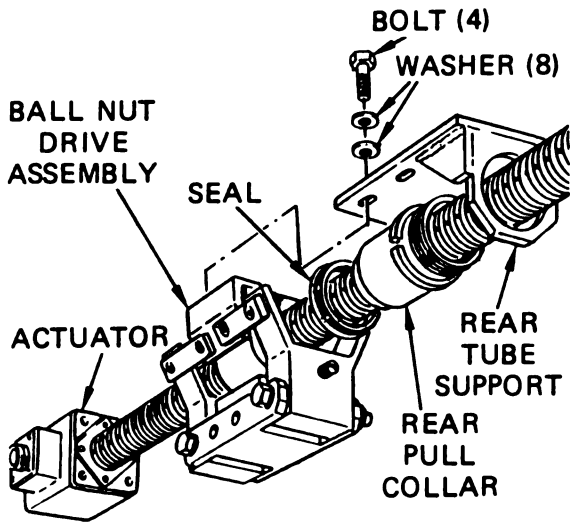
(17) Install new seal on rear pull collar and install pull collar on new actuator.

(18) Apply heat to new seal. Using hammer, drive new seal on actuator.

(19) Using hammer and block of wood, drive new bushing on sleeve.

(20) Apply zinc chromate primer to threads of actuator for spanner nut.

(21) Install ring on sleeve and secure with lockwasher and spanner nut. Bend all locking tangs on lockwasher into slots on spanner nut to decrease outer diameter and prevent interference with tube assembly.

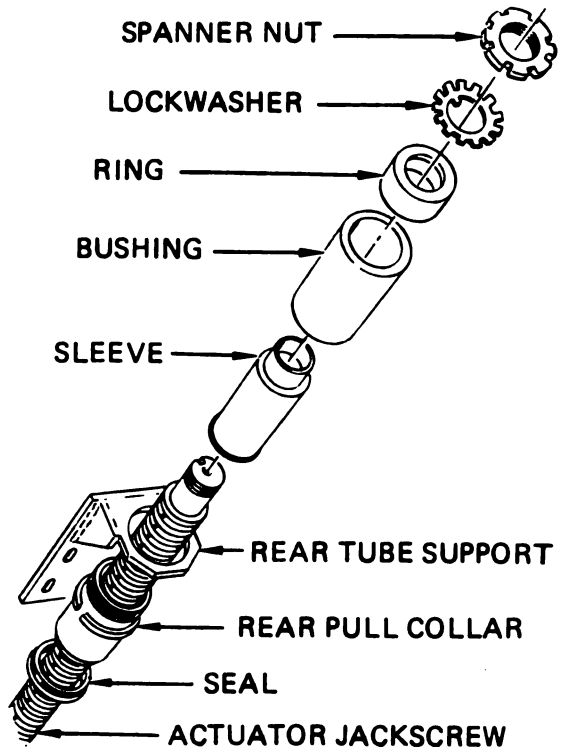


NOTE

Steps (13) through (19) are not required if the actuator is being removed to perform maintenance on other components and then will be reinstalled. If the actuator is to be replaced, the seal, sleeve, and bushing must also be replaced.

(13) Using 1/8-inch pin punch and hammer, bend tangs on lockwasher out of slots in spanner nut. Remove spanner nut and lockwasher. Remove and retain ring.

(14) Using hammer and chisel, cut bushing to remove bushing from sleeve. Discard bushing.



5-6. BOOM EXTENSION ACTUATOR MAINTENANCE INSTRUCTIONS (CONT)

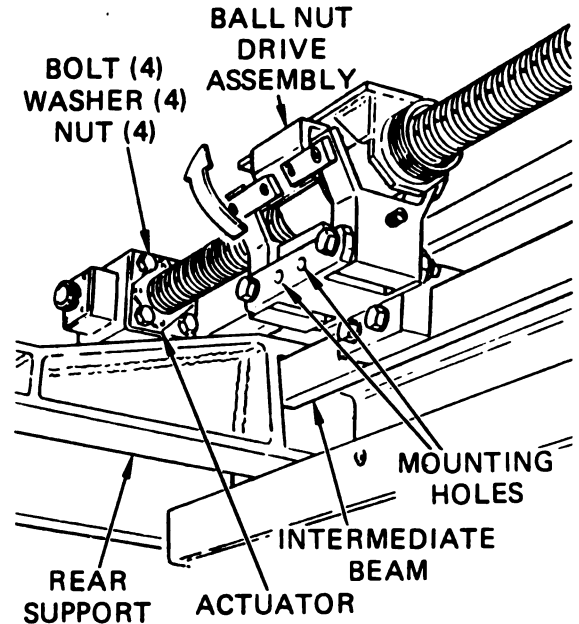
b. Install.

(1) Liberally lubricate entire length of jackscrew with MIL-G-10924 grease.

(2) Position rear tube support and ballnut drive assembly on actuator. While one repairer applies force on rear tube support to firmly seat rear pull collar seal against actuator ballnut and to align holes in rear tube support with ballnut drive assembly and actuator ballnut, another repairer should perform step (3).

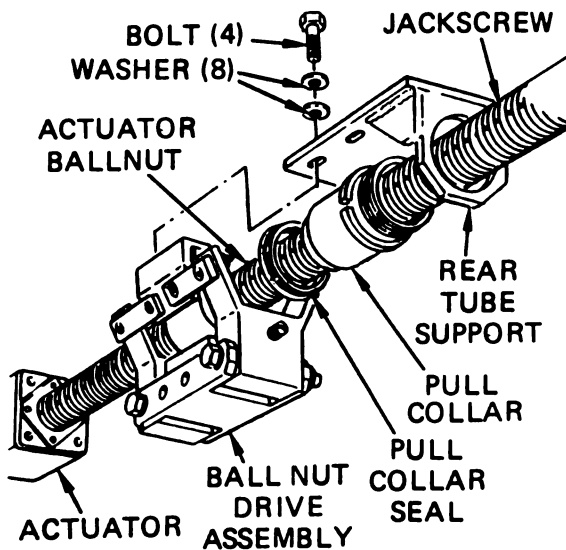
(3) Apply zinc chromate primer to four bolts. Install four bolts and eight washers to secure rear tube support to ballnut drive assembly. Using 13mm box end wrench, tighten bolts.

(4) Rotate ballnut drive assembly to position recorded during removal.



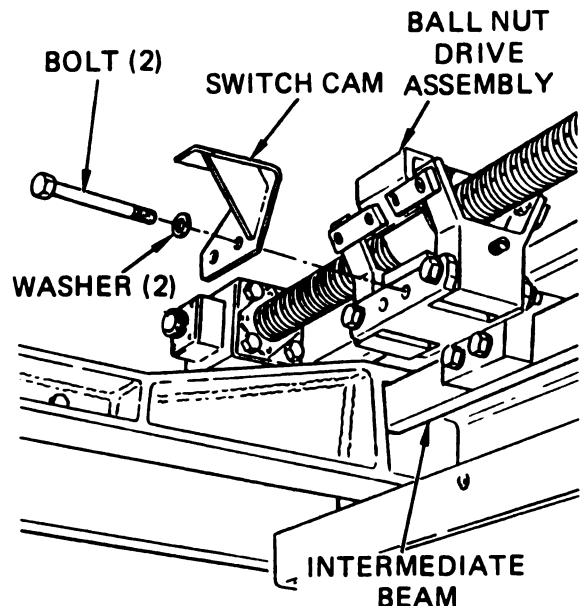
(7) Manually rotate jackscrew to position ballnut drive assembly in line with mounting holes in intermediate beam.

(8) Apply zinc chromate primer to two bolts. Position switch cam on ballnut drive assembly, if required, and install two bolts to secure switch cam or two washers and ballnut drive assembly to intermediate beam. Using 19mm socket, tighten bolts.



(5) Position actuator over intermediate beam aft support and into forward mount assembly. Slide actuator to the rear until bolts can be installed to secure actuator to cage.

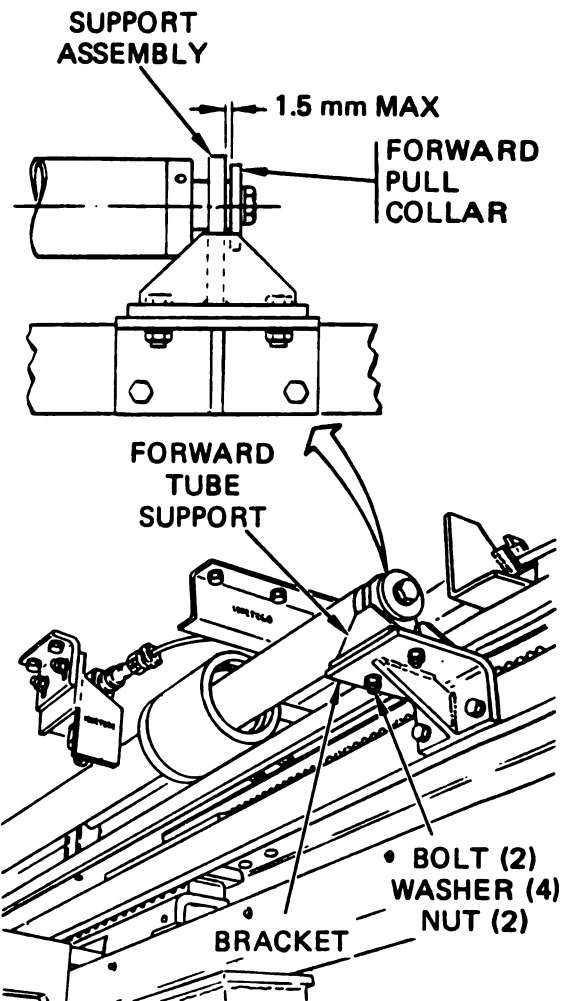
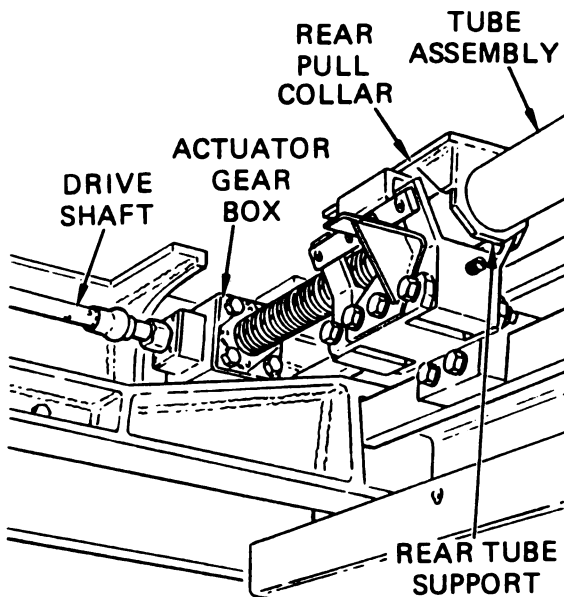
(6) Apply zinc chromate primer to four bolts. Install four bolts, washers, and nuts to secure actuator to cage. Using 14mm socket and 19mm box end wrench, tighten nuts.



5-6. BOOM EXTENSION ACTUATOR MAINTENANCE INSTRUCTIONS (CONT)

(9) Slide tube assembly through forward mount assembly and rear tube support. Screw tube assembly onto rear pull collar. Using strap wrench and spanner, tighten tube assembly.

(10) Install drive shaft to actuator and motor and reduction gearbox. Using 1-5/8 inch open end wrench, tighten coupling nuts. Check to make sure there is end play in drive shaft. Using lockwire, secure coupling nuts.



(11) Position forward tube support to bracket. Apply zinc chromate primer to two bolts. Install two bolts, four washers, and two nuts. Using 10mm socket and 10mm box end wrench, tighten nuts.

(12) Using thickness gage, measure gap between forward pull collar and support assembly. Gap should not exceed 1.5mm. If necessary, loosen two nuts and reposition forward tube support on bracket to obtain required gap.

(13) Using electric drill and driver assembly, manually retract boom to full in position while checking that boom travel is smooth and not binding.

(14) Using training LP/C, perform boom operational check to verify proper movement of boom (TM 9-1425-646-10).

(15) Unload training LP/C and stow LLM (TM 9-1425-646-10).

5-7. BALLNUT DRIVE ASSEMBLY MAINTENANCE INSTRUCTIONS. This paragraph covers the maintenance tasks for the following items:

<i>Item</i>	<i>Page</i>
1. Ballnut Drive Assembly	5-17
2. Bracket Assembly	5-17
3. Support Assembly	5-18
4. Yoke Assembly	5-18
5. Link Assembly	5-19

INITIAL SETUP

Tools

Kit, tool, 13032302

Materials/Parts

Primer, zinc chromate (47, Appendix B)

Personnel Required

MLRS Repairer MOS 27M

References

TM 9-1425-646-10
TM 9-1425-646-20

Troubleshooting
Paragraph 2-9

Equipment Condition

Position LLM to 3200 mils (180 degrees) azimuth and 0 mils elevation (TM 9-1425-646-10)

1. BALLNUT DRIVE ASSEMBLY.

a. Remove.

(1) Remove boom extension actuator (paragraph 5-6).

(2) Using 13mm box end wrench, remove four bolts and eight washers securing rear tube support assembly to ballnut drive assembly.

(3) Slide rear tube support assembly away from ballnut drive to separate rear pull collar from ballnut drive.

(4) Remove ballnut drive from boom extension actuator.

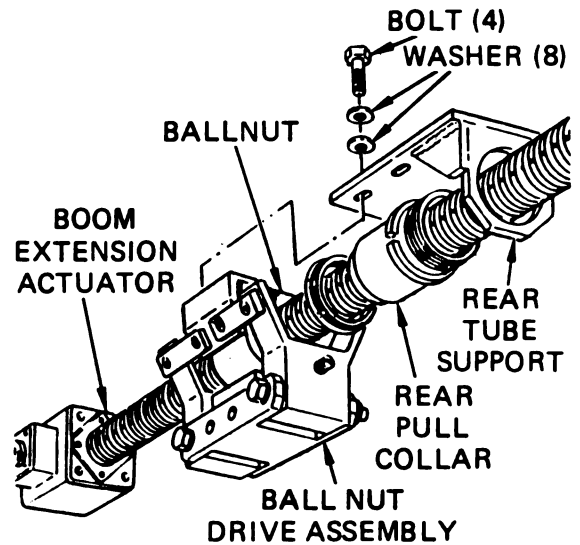
b. Install.

(1) Position ballnut drive on ballnut of boom extension actuator.

(2) Slide rear tube support and rear pull collar against ballnut drive.

(3) While one repairer applies force on rear tube support to firmly seat seal against ballnut and to align holes in rear tube support assembly with holes in ballnut drive assembly, another repairer should perform step (4).

(4) Apply zinc chromate primer to four bolts. Install four bolts and eight washers to secure rear tube support to ballnut drive assembly. Using 13mm box end wrench, tighten bolts.



(5) Install boom extension actuator (paragraph 5-6).

2. BRACKET ASSEMBLY.

a. Remove.

(1) Remove ballnut drive assembly (item 1, a).

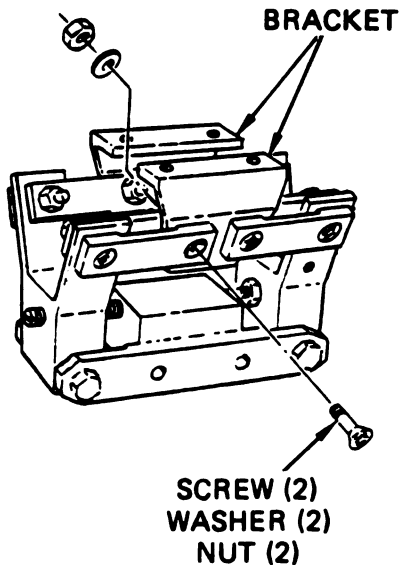
(2) Using torque set No. 10 screwdriver bit and 5/16-inch open end wrench, remove two screws, two washers, and two nuts. Remove bracket assembly.

5-7. BALLNUT DRIVE ASSEMBLY MAINTENANCE INSTRUCTIONS (CONT)

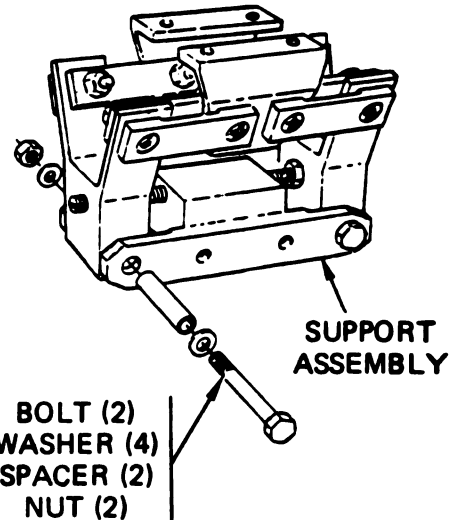
b. Install.

(1) Position new bracket assembly on ballnut drive assembly.

(2) Apply zinc chromate primer to two screws and install two screws, two washers, and two nuts. Using torque set No. 10 screwdriver bit and 5/16-inch open end wrench, tighten nuts.



(2) Apply zinc chromate primer to two bolts. Install two bolts, four washers, and two nuts. Using 17mm box end wrench and 12mm socket, tighten nuts.



(3) Install ballnut drive assembly (item 1, a).

3. SUPPORT ASSEMBLY.

a. Remove.

(1) Remove ballnut drive assembly (item 1, a).

(2) Using 17mm box end wrench and 12mm socket, remove two bolts, four washers, two spacers, and two nuts securing support assembly to yoke assembly. Remove support assembly.

b. Install.

(1) Position new support assembly to yoke assembly and install two spacers.

(3) Install ballnut drive assembly (item 1, b).

4. YOKE ASSEMBLY.

a. Remove.

(1) Remove ballnut drive assembly (item 1, a).

(2) Using 17mm box end wrench and 12mm socket, remove bolt, two washers, spacer, and nut securing yoke assembly to support assembly.

(3) Using torque set No. 10 screwdriver bit and 5/16-inch open end wrench, remove two screws, two washers, and two nuts securing yoke assembly to link assembly. Remove yoke assembly.

(4) Using flat tip screwdriver and 19mm open end wrench, remove adjusting screw and nut from yoke assembly.

b. Install.

(1) Apply zinc chromate primer to adjusting screw and install adjusting screw and nut in yoke assembly.

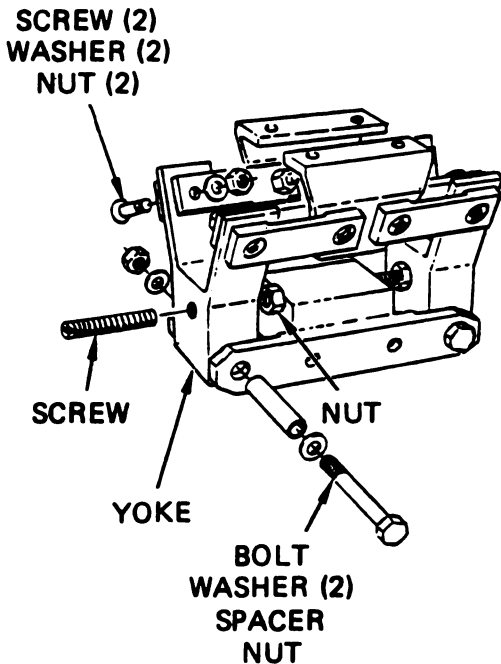
5-7. BALLNUT DRIVE ASSEMBLY MAINTENANCE INSTRUCTIONS (CONT)

(2) Position new yoke assembly in ballnut drive assembly and install spacer.

(3) Apply zinc chromate primer to bolt and install bolt, two washers, and nut. Using 17mm box end wrench and 12mm socket, tighten nut.

(4) Apply zinc chromate primer to two screws. Install two screws, two washers, and two nuts securing yoke assembly to link assembly. Using torque set No. 10 screwdriver bit and 5/16-inch open end wrench, tighten nuts.

(5) Using flat tip screwdriver bit, 19mm open end wrench, and thickness gage, adjust gap between support assembly and adjusting screw to 0.089 to 0.153mm. Tighten nut.



(6) Install ballnut drive assembly (item 1, b).

5. LINK ASSEMBLY.

a. Remove.

(1) Remove ballnut drive assembly (item 1, a).

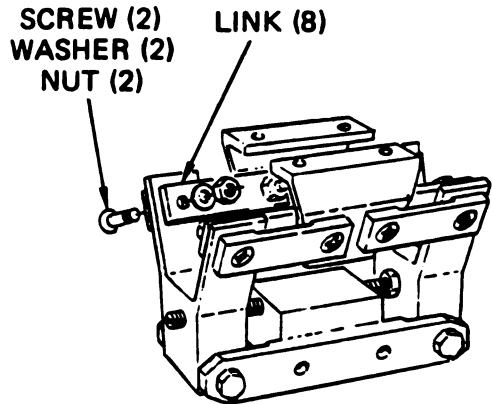
(2) Using torque set No. 10 screwdriver bit and 5/16-inch open end wrench, remove two screws, two washers, and two nuts securing link assembly to ballnut drive assembly. Remove link assembly.

b. Install.

(1) Apply zinc chromate primer to two screws.

(2) Position new link assembly to ballnut drive assembly and install two screws, two washers, and two nuts.

(3) Using torque set No. 10 screwdriver bit and 5/16-inch open end wrench, tighten nuts.



(4) Install ballnut drive assembly (item 1, b).

5-8. INTERMEDIATE BEAM MAINTENANCE INSTRUCTIONS. This paragraph covers the maintenance tasks for the following items:

<i>Item</i>	<i>Page</i>
1. Intermediate Beam	5-20
2. Pinion Gear	5-23

INITIAL SETUP

Test/Support Equipment

- Rope, manila, 25-foot (2 each) (for item 1)
- Support, wood, 4- X 4-inch X 5-foot (2 each) (for item 1)
- Wrecker, HEMTT (for item 1)

Tools

- Kit, tool, 13032302
- Set, shop, 13032303
- Wrench, adjustable spanner, 314, 2-inch
- Wrench, pipe strap, 5

Materials/Parts

- Primer, zinc chromate (47, Appendix B)
- Seal (56, Appendix B)

Personnel Required

- Wrecker Truck Operator MOS 63H
- 2 MLRS Repairers MOS 27M (MLRS Crewmembers MOS 13M to assist as required)

Troubleshooting
Paragraph 2-9

Equipment Condition

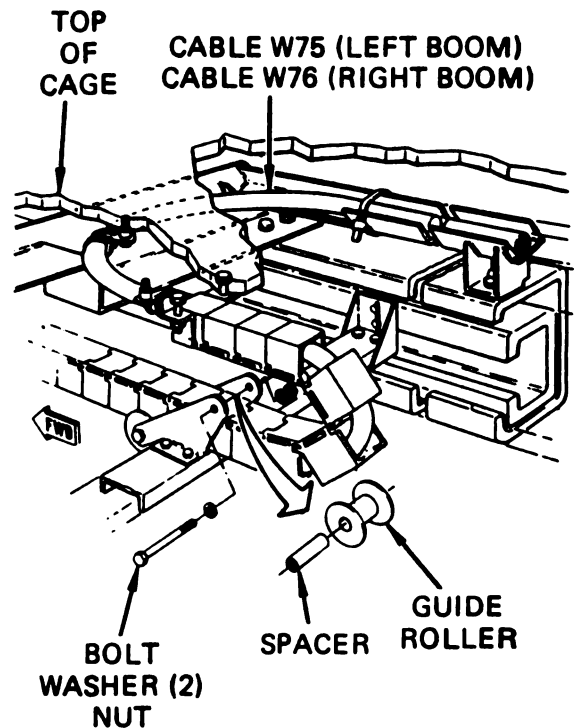
- Hoist carriage removed (paragraph 5-18)

1. INTERMEDIATE BEAM.

a. Remove.

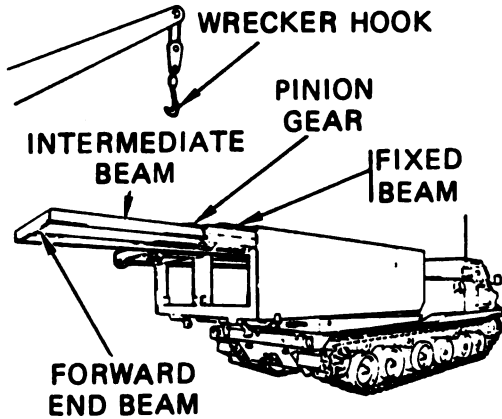
(1) Temporarily install forward end beam, which was removed during hoist carriage removal, with four bolts, washers, and screws. Using 19mm socket and 8mm socket attachment, tighten bolts and screws.

(2) Using 12mm socket and 17mm box end wrench, remove upper guide roller for cable W75 or W76 and pull cable to rear of cage. Using twine or rope, tie cable to top of cage. Use care in handling to prevent damage to cable.



5-8. INTERMEDIATE BEAM MAINTENANCE INSTRUCTIONS (CONT)

(3) Position wrecker in front of boom so that wrecker hook is over end of fixed beam.



(4) Attach rope to intermediate beam and wrecker. Pull intermediate beam out until pinion gear is clear of fixed beam.

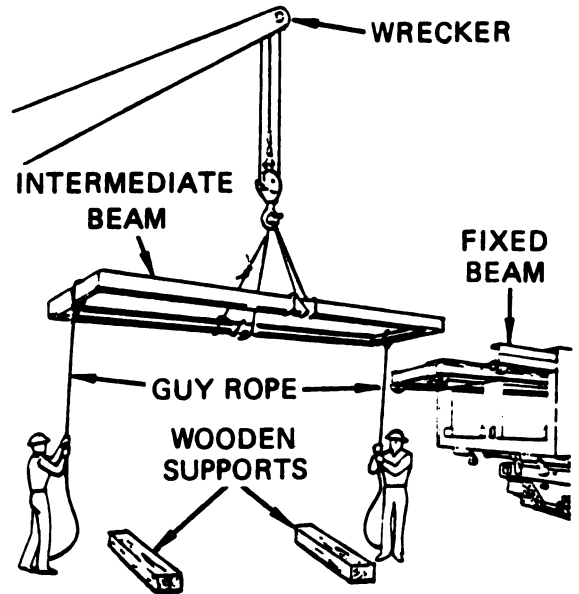
(5) Tie guy rope at each end of intermediate beam.

WARNING

Do not stand under beam. Beam is heavy and could fall, swing, or tip, causing injury.

(6) Using wrecker, lift intermediate beam to remove weight off fixed beam.

(7) Push intermediate beam out of fixed beam. Use guy ropes to keep beam flat and horizontal while lowering onto wooden supports. Remove sling.



b. Install.

(1) Make sure forward end beam is installed on new intermediate beam.

(2) Place rope around beam at pinion gears and hook free end to wrecker hook. Tie guy rope at each end of beam.

WARNING

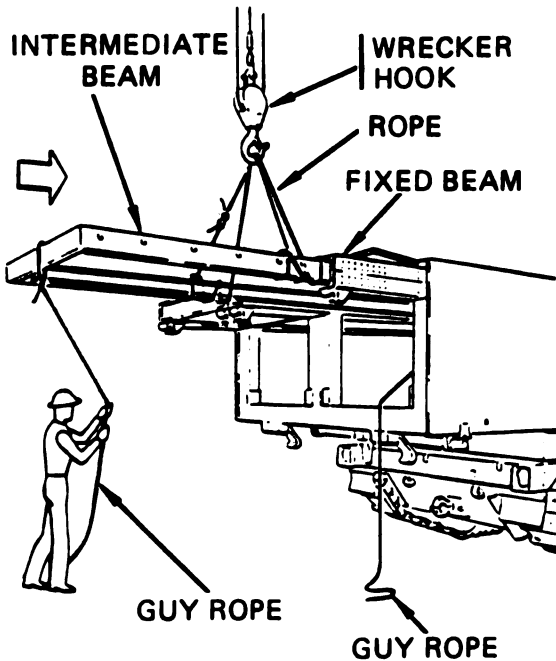
Do not stand under beam. Beam is heavy and could fall, swing, or tip, causing injury.

(3) Using wrecker, lift new intermediate beam using guy ropes to keep it flat and horizontal.

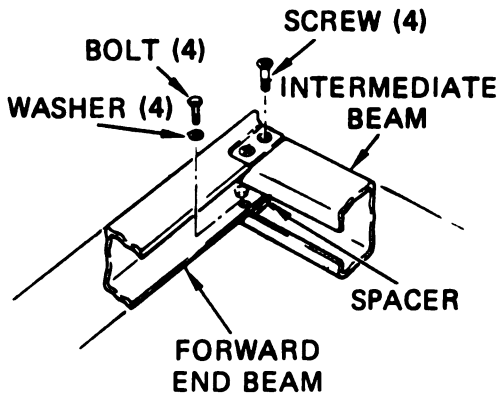
(4) Position beam in front of fixed beam. Use guy rope to pull the beam into fixed beam. Use wrecker hoist to keep intermediate beam weight off fixed beam.

5-8. INTERMEDIATE BEAM MAINTENANCE INSTRUCTIONS (CONT)

(5) Slide intermediate beam into fixed beam until rope hits fixed beam. Remove rope and guy ropes, then push intermediate beam into fixed beam until pinion gear is just forward of fixed beam rack gear.

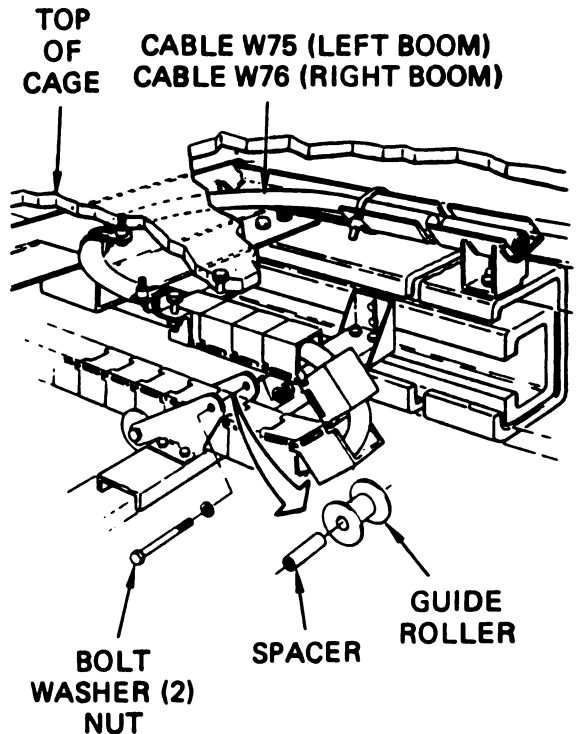


(6) Using 19mm socket and 8mm socket attachment, remove four bolts, four washers, and four screws securing forward end beam. Remove forward end beam.



(7) Install LP/C hoist carriage assembly (paragraph 5-18, item 1, b steps (1) through (11)).

(8) Position cable W75 or W76 within upper roller guide. Install bolt, two washers, spacer, and nut to secure upper roller within roller guide support. Using 12mm socket and 17mm box end wrench, tighten nut.



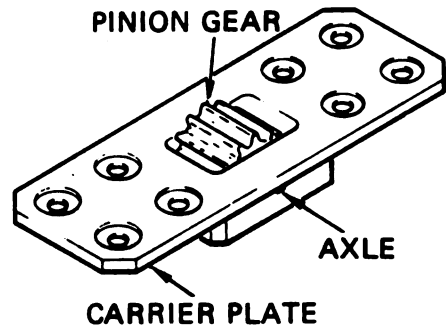
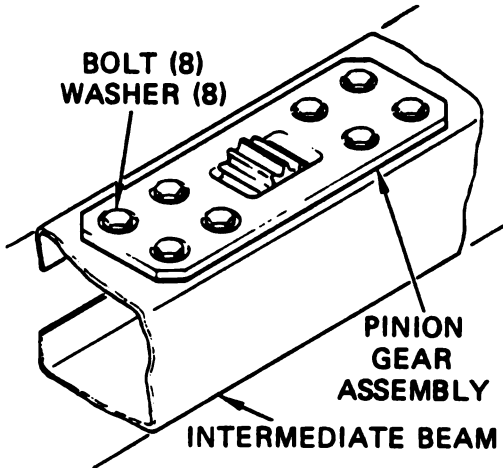
(9) Complete installation of LP/C hoist carriage (paragraph 5-18, item 1, b steps (13) through (21)).

5-8. INTERMEDIATE BEAM MAINTENANCE INSTRUCTIONS (CONT)

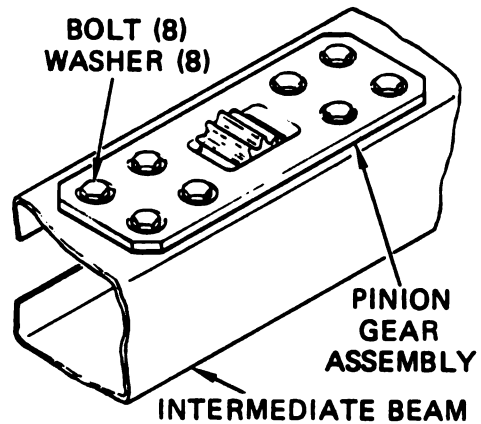
2. PINION GEAR.

a. Remove.

- (1) Remove intermediate beam (item 1, a).
- (2) Using 19mm socket, remove eight bolts and eight washers securing carrier plate to intermediate beam.



- (2) Apply zinc chromate primer to eight bolts. Position pinion gear and carrier plate in intermediate beam and install eight bolts and eight washers. Using 19mm socket, tighten bolts.



- (3) Using drift punch and hammer, drive axle out of carrier plate and gear. Remove gear.

b. Install.

- (1) Position new gear in carrier plate and install axle. Use hammer and drift punch as necessary to drive axle through carrier plate and pinion gear.

- (3) Install intermediate beam (item 1, b).

5-9. FIXED BEAM MAINTENANCE INSTRUCTIONS. This paragraph covers the maintenance tasks for the following items:

<i>Item</i>	<i>Page</i>
1. Separator Strip	5-24
2. Rack Gear	5-26

INITIAL SETUP

Tools

- Kit, tool, 13032302
- Set, shop, 13032303
- Drill, electric, 1/4-inch (for item 1)
- Drill, twist (for item 1)
- Heater, gun type, 1000 watts (for item 1)
- Rivet set, hand (for item 1)

Materials/Parts

- Cloth, abrasive (5, Appendix B)
- Cloth, cotton (6, Appendix B)

- Methyl-ethyl-ketone (25, Appendix B)
- Primer, alodine (45, Appendix B)
- Primer, epoxy (46, Appendix B)
- Sealant (59, Appendix B)

Personnel Required

- MLRS Repairer MOS 27M

Troubleshooting

- Paragraph 2-9

Equipment Condition

- Intermediate beam removed (paragraph 5-8)

1. SEPARATOR STRIP.

a. Inspect.

(1) Visually inspect separator strip for tears, separation of strips from beam, or signs of metal to metal wear.

(2) Using machinist rule, measure thickness of separator strip. Minimum allowable thickness of separator strip is 2.60mm.

(3) If separator strip is damaged or worn beyond allowable limit, replace separator strip.

b. Remove.

(1) Using electric drill and 1/8-inch twist drill, remove rivets securing separator strip to beam.

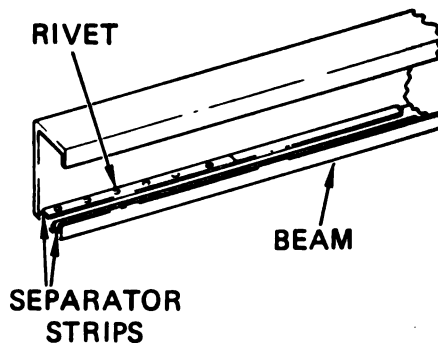
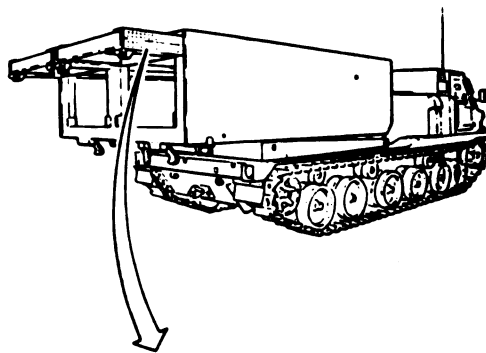
(2) Using scraping knife, scrape off defective separator strip and sealant.

(3) Using gun heater, abrasive cloth, and wire brush, remove all adhesive from beam.

WARNING

Methyl-ethyl-ketone vapors are toxic. Avoid prolonged or repeated breathing of vapors, or contact with skin. Use only with adequate ventilation. Methyl-ethyl-ketone is flammable and should not be used near open flame. Fire extinguisher should be available when solvent is used.

(4) Using abrasive cloth, hand sand bonding surface of beam. Use methyl-ethyl-ketone to clean bonding surface and allow to dry.



c. Install.

(1) Using old separator strip as guide, drill rivet holes in new separator strip using electric drill and 1/8-inch twist drill.

5-9. FIXED BEAM MAINTENANCE INSTRUCTIONS (CONT)

(2) Counterbore separator strip holes 10.0 to 10.5mm diameter and 1.6mm deep.

(3) Using cloth dampened with alodine primer, apply primer to bonding surface of beam.

WARNING

Methyl-ethyl-ketone vapors are toxic. Avoid prolonged or repeated breathing of vapors, or contact with skin. Use only with adequate ventilation. Methyl-ethyl-ketone is flammable and should not be used near open flame. Fire extinguisher should be available when solvent is used.

(4) Using abrasive cloth, sand one side of new separator strip. Using methyl-ethyl-ketone, clean sanded side. Allow surface to dry.

WARNING

Primer and coating vapors are toxic. Avoid prolonged or repeated breathing of vapors or contact with skin. Use only with adequate ventilation. Observe all precautions printed on containers.

(5) Apply epoxy primer to separator strip cleaned surface. Allow primer to dry.

(6) Apply thin coating of sealant to separator strip and beam.

(7) Starting at one end of beam and separator strip, while holding opposite end of separator strip up, press separator strip firmly down on beam.

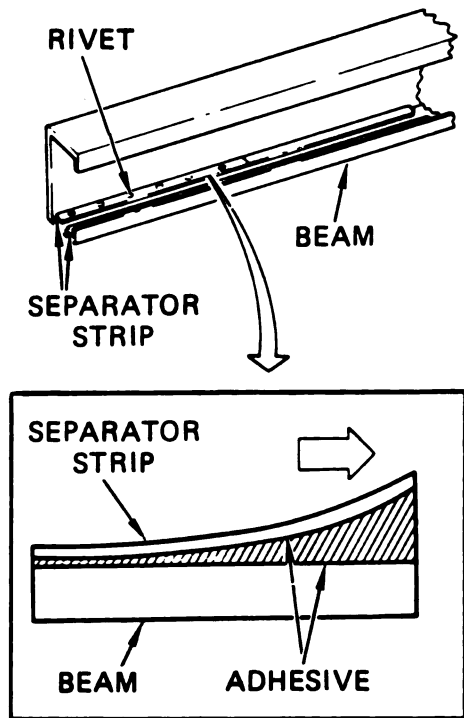
(8) Install C-clamps to secure separator strip to fixed beam. Allow assembly to cure for 4 hours at ambient temperature.

NOTE

Do not apply heat to accelerate drying until after the bonding is allowed to cure.

(9) After 4 hours of curing, apply heat with heat gun held 18 inches from beam. Bond will reach maximum strength after 4 hours curing and 4 hours of accelerated drying with heat gun. If heat is not applied, normal cure time for maximum strength is 30 hours.

(10) Using rivet set, install rivets to secure separator strip to beam.



(11) If no further maintenance is required, perform follow-on procedure (page 5-26).

5-9. FIXED BEAM MAINTENANCE INSTRUCTIONS (CONT)

2. RACK GEAR.

a. Remove.

NOTE

Note number of washers under each nut so washers can be reinstalled in same place.

(1) Using 5/16-inch hi-torque screwdriver bit and 7/16-inch socket, remove six nuts, washers, and bolts securing rack gear to beam.

NOTE

Shims are factory set and should be installed in same position when rack gear is removed and installed.

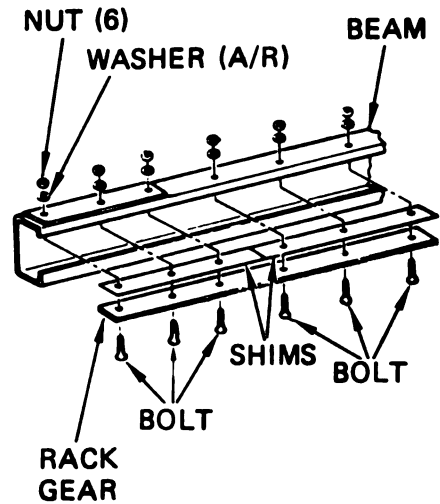
(2) Remove rack gear and shim. Note position of shims under rack gear.

b. Install.

(1) Place shims on rack gear in same position noted during removal.

(2) Position shim and new rack gear on beam and install six bolts, washers, and nuts. Install same number of washers under each nut as noted during removal.

(3) Using 5/16-inch hi-torque screwdriver bit and 7/16-inch socket, tighten nuts.



(4) If no further maintenance is required, perform follow-on procedure.

FOLLOW-ON PROCEDURE

Install intermediate beam (paragraph 5-8).

5-10. BEAM SLIDE BUTTON MAINTENANCE INSTRUCTIONS. This paragraph covers the inspection and replacement of the beam slide buttons.

INITIAL SETUP

Tools

Kit, tool, 13032302
Set, shop, 13032303
Heater, LFT550

Materials/Parts

Cloth, abrasive (5, Appendix B)
Cloth, cotton wiping (6, Appendix B)

Methyl-ethyl-ketone (25, Appendix B)
Primer, alodine (45, Appendix B)
Primer, epoxy (46, Appendix B)
Sealant (59, Appendix B)

Personnel Required

MLRS Repairer MOS 27M

NOTE

Some of the slide buttons can be replaced by extending the intermediate beam. Remove intermediate beam only if necessary to provide access to defective button.

a. Inspect.

- (1) Visually inspect slide buttons for tears or missing buttons.
- (2) Using machinist rule, measure thickness of slide buttons. Minimum allowable thickness of slide button is 1.0mm.
- (3) If slide button is damaged or worn beyond allowable limit, replace slide button.

b. Remove.

- (1) Remove intermediate beam if necessary (paragraph 5-8).
- (2) Using crosstip screwdriver, remove screw and washer from slide button.
- (3) Using scraping knife, remove defective slide button from beam.
- (4) Using abrasive cloth and wire brush, remove all sealant residue from beam.

WARNING

Methyl-ethyl-ketone vapors are toxic. Avoid prolonged or repeated breathing of vapors and contact with skin. Use only with adequate ventilation. Methyl-ethyl-ketone is flammable and should not be used near open flame. Fire extinguisher should be available when solvent is used.

(5) Using methyl-ethyl-ketone, clean bonding surface of beam.

(6) Using cloth dampened with alodine primer, apply primer to cleaned surface of beam.

c. Install.

(1) Using abrasive cloth, sand bonding surface of slide button.

WARNING

Methyl-ethyl-ketone vapors are toxic. Avoid prolonged or repeated breathing of vapors and contact with skin. Use only with adequate ventilation. Methyl-ethyl-ketone is flammable and should not be used near open flame. Fire extinguisher should be available when solvent is used.

(2) Clean sanded surface with methyl-ethyl-ketone and allow to air-dry.

5-10. BEAM SLIDE BUTTON MAINTENANCE INSTRUCTIONS (CONT)

WARNING

Primer and coating vapors are toxic. Avoid prolonged or repeated breathing of vapors or contact with skin. Use only with adequate ventilation. Observe all precautions printed on containers.

(3) Apply epoxy primer to cleaned surface of slide button. Allow primer to dry.

(4) Apply thin coat of sealant to bonding surfaces on both beam and slide button.

(5) Insert button in beam mounting hole. Using crosstip screwdriver, install self-tapping screw and washer.

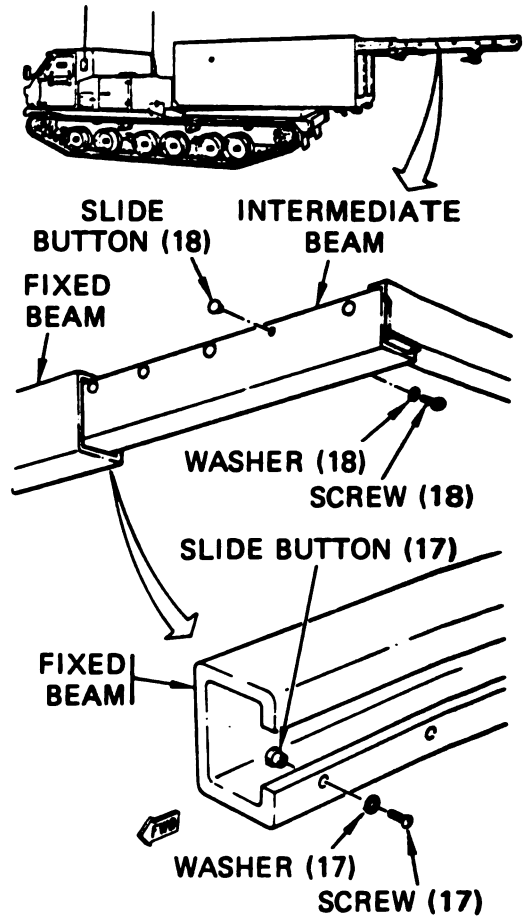
(6) Allow sealant to cure for 4 hours at ambient temperature.

NOTE

Do not apply heat to accelerate drying until after the sealant is allowed to cure.

(7) After 4 hours of curing, apply heat with heat gun held 18 inches from beam. Bond will reach maximum strength after 4 hours curing and 4 hours of accelerated drying with heat gun. If heat is not applied, normal cure time for maximum strength is 30 hours.

(8) Install intermediate beam if removed (paragraph 5-8).



5-11. BOOM FORWARD ROLLER ASSEMBLY MAINTENANCE INSTRUCTIONS. This paragraph covers the maintenance tasks for the following items:

<i>Item</i>	<i>Page</i>
1. Forward Roller	5-29
2. Roller Fork Assembly	5-30
3. Roller Base Assembly	5-31

INITIAL SETUP

Test/Support Equipment
Sling, nylon
Wrecker, HEMTT

Tools
Kit, tool, 13032302
Set, shop, 13032303
Wrench, torque, 30 to 250 N•m

Materials/Parts
Primer, zinc chromate (47, Appendix B)

Personnel Required
MLRS Repairer MOS 27M

References
TM 9-1425-646-10
TM 9-1425-646-20

Troubleshooting
Paragraph 2-9

Equipment Condition
Position LLM to 3200 mils (180 degrees) azimuth and 0 mils elevation (TM 9-1425-646-20)

1. FORWARD ROLLER.

NOTE

The following procedure is for the later configured AVMLs equipped with cotter pins and washers to secure the roller axle. Some earlier configured AVMLs may be equipped with retaining rings to secure the roller axle.

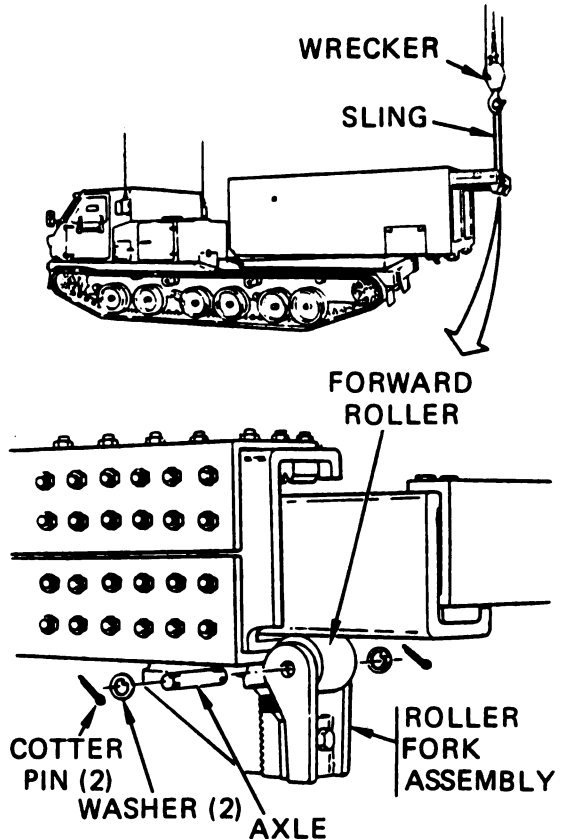
a. Remove.

- (1) Using sling and wrecker, lift intermediate beam to remove weight from roller.
- (2) Remove two cotter pins and washers.
- (3) Using drift punch and hammer, tap axle out of fork assembly and roller. Remove roller.

b. Install.

- (1) Using sling and wrecker, lift intermediate beam to remove weight.
- (2) Position new roller in fork assembly and install axle. Use drift punch and hammer as necessary to position axle.
- (3) Install two cotter pins and washers.
- (4) Lower beam and disconnect sling.

(5) If no further maintenance is required, perform follow-on procedure (page 5-31).



5-11. BOOM FORWARD ROLLER ASSEMBLY MAINTENANCE INSTRUCTIONS (CONT)

2. ROLLER FORK ASSEMBLY.

a. Remove.

(1) Remove forward roller (item 1, a).

(2) Using 1-1/16 inch box end wrench and 15/16-inch socket, remove nut, washer, and bolt securing roller fork assembly to roller base assembly. Remove roller fork assembly.

(3) Using 8mm socket attachment and 19mm box end wrench, remove four screws, washers, and nuts securing adjustment block to roller base assembly. Remove adjustment block.

b. Install.

(1) Install forward roller (item 1, b).

(2) Position adjustment block on roller base assembly at lowest position and install four screws, washers, and nuts to hold adjustment block against serrations of roller base assembly.

(3) Position new roller fork assembly to adjustment block and install bolt, washer, and nut.

(4) Using BC, extend boom to full extension (TM 9-1425-646-20).

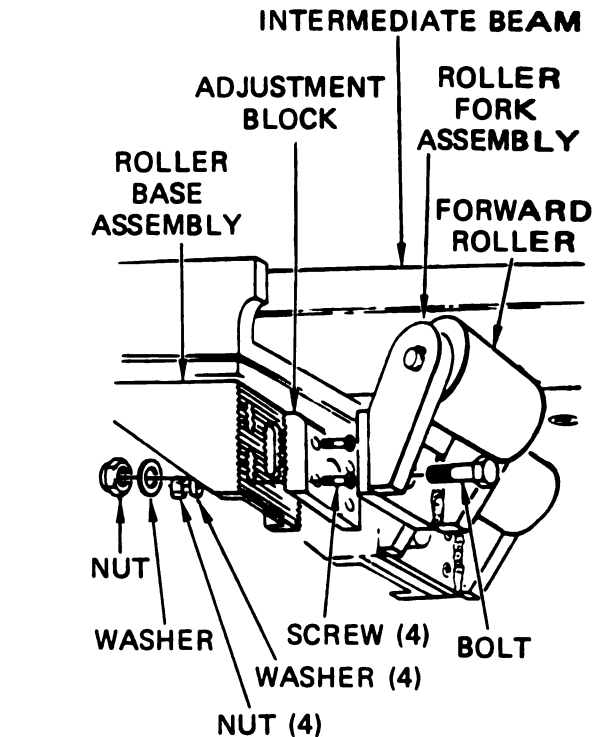
(5) Slide roller fork assembly up until roller touches beam. Mark position of adjustment block on roller base assembly.

(6) Remove roller fork assembly and raise adjustment block 0.8mm higher than marked position. If serrations do not match, engage next higher serration. Using 8mm socket attachment and 19mm box end wrench, tighten four nuts securing adjustment block to roller base assembly.

(7) Using sling and wrecker, lift end of intermediate beam slightly.

(8) Position fork assembly to adjusting block and install bolt, washer, and nut. Using 1-1/16 inch box end wrench and 15/16-inch socket, torque nut to 125 to 146 N•m and then loosen nut 1/2 turn.

(9) Lower boom and disconnect sling and wrecker.



(10) Using BC, retract boom (TM 9-1425-646-20).

(11) If no further maintenance is required, perform follow-on procedure (page 5-31).

5-11. BOOM FORWARD ROLLER ASSEMBLY MAINTENANCE INSTRUCTIONS (CONT)

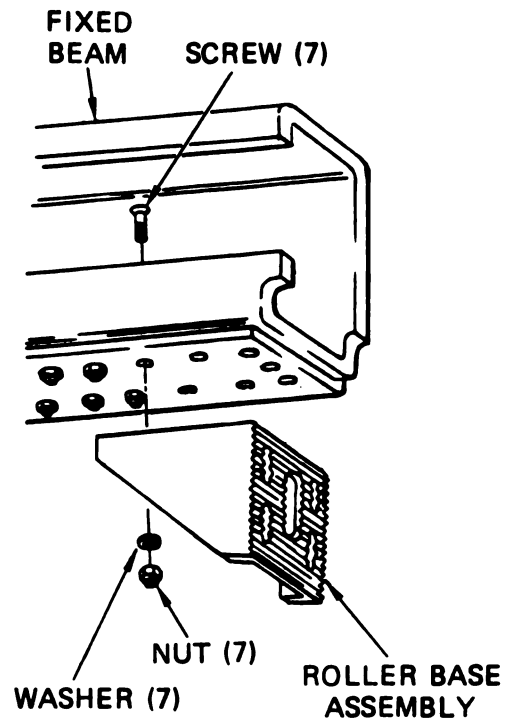
3. ROLLER BASE ASSEMBLY.

a. Remove.

- (1) Remove intermediate beam (paragraph 5-8).
- (2) Remove roller fork assembly (item 2, a).
- (3) Using 8mm socket attachment and 19mm box end wrench, remove seven nuts, washers, and screws securing roller base assembly to fixed beam. Remove roller base assembly.

b. Install.

- (1) Apply zinc chromate primer to seven screws. Position new roller base assembly to fixed beam and install seven screws, washers, and nuts. Using 8mm socket attachment and 19mm box end wrench, torque nuts to 104 to 127 N•m.
- (2) Install intermediate beam (paragraph 5-8).
- (3) Install roller fork assembly (item 2, b).



- (4) If no further maintenance is required, perform follow-on procedure.

FOLLOW-ON PROCEDURE

Using BC, extend and retract boom two times and check for smooth operation (TM 9-1425-646-20).

Stow LLM (TM 9-1425-646-10).

5-12. BOOM IN LIMIT SWITCH MAINTENANCE INSTRUCTIONS. This paragraph covers the replacement and adjustment of the boom in limit switch.

INITIAL SETUP

Tools

- Kit, tool, 13032302
- Set, shop, 13032303
- Multimeter, 8050A-01
- Test cable, 13103718

Materials/Parts

- Compound, sealing (15, Appendix B)
- Lockwire (23, Appendix B)
- Methyl-ethyl-ketone (25, Appendix B)
- Varnish (71, Appendix B)

Personnel Required

MLRS Repairer MOS 27M (MLRS Crew-member MOS 13M to assist as required)

References

TM 9-1425-646-10

Troubleshooting

Paragraph 2-9

Equipment Condition

Position LLM to 3200 mils (180 degrees) azimuth and 0 mils elevation (TM 9-1425-646-20)

a. Remove.

(1) Manually extend boom until switch striker is clear of switch (TM 9-1425-646-10).

(2) Disconnect electrical connector W26P3 or W27P3 from limit switch.

NOTE

There are two types of switch roller guide setscrews. One type requires a 0.062-inch socket head key. The other type requires a crosstip screwdriver. Sealing compound is used during installation of the socket head key type setscrew. No sealing compound is required with the crosstip screwdriver type setscrew. Methyl-ethyl-ketone or a soldering iron must be applied to the socket head key type setscrew to loosen the sealing compound before the setscrew can be removed. In the following procedure, steps applying methyl-ethyl-ketone or sealing compound do not apply if the roller guide setscrew is the crosstip screwdriver type.

(3) Inspect switch roller guide to determine which type of setscrew has been used.

WARNING

Methyl-ethyl-ketone vapors are toxic. Avoid prolonged or repeated breathing of vapors, or contact with skin. Use only with adequate ventilation. Methyl-ethyl-ketone is flammable and should not be used near open flame. Fire extinguisher should be available when solvent is used.

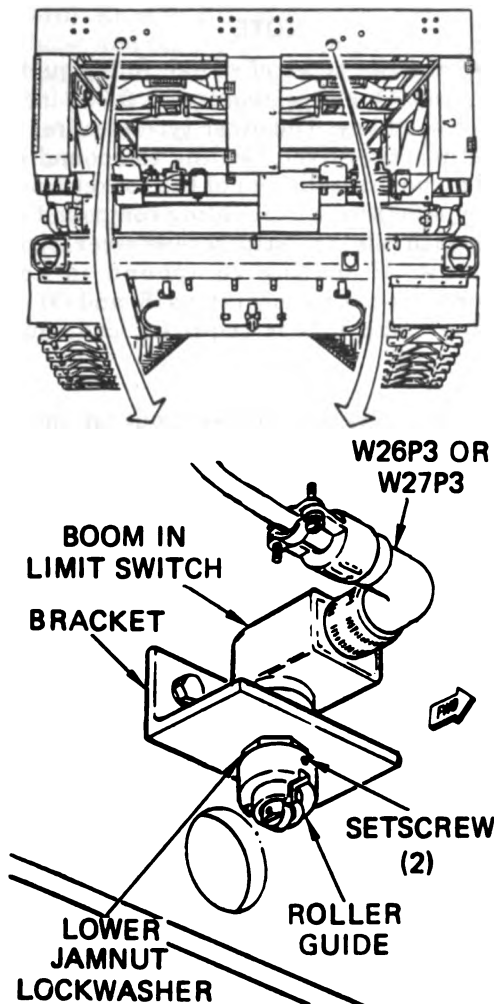
(4) If applicable, apply methyl-ethyl-ketone or heat to roller guide setscrews. Allow a minute or two for penetration and then remove both setscrews.

(5) If applicable, apply methyl-ethyl-ketone into both setscrew holes. Allow a minute or two for penetration. Note position of roller guide for installation and then remove roller guide.

(6) Cut and remove lockwire from switch jamnuts.

(7) Using 15/16-inch open end wrench, remove jamnut and lockwasher securing switch to bracket. Remove switch and keywasher from bracket.

5-12. BOOM IN LIMIT SWITCH MAINTENANCE INSTRUCTIONS (CONT)



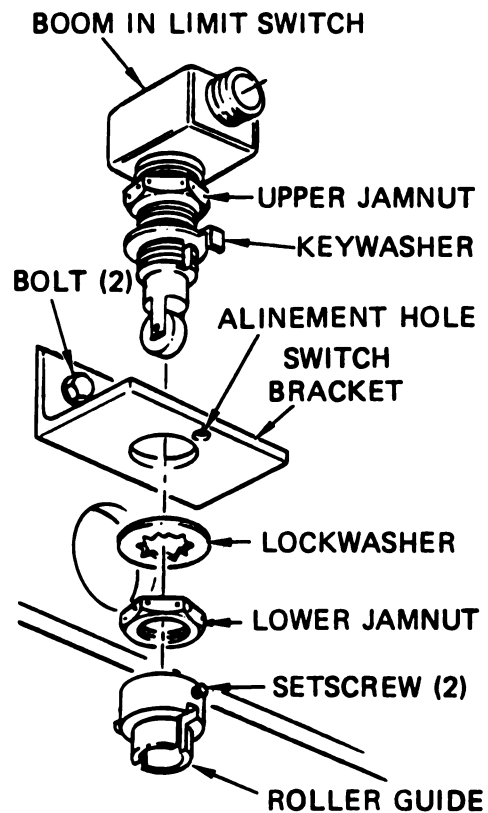
b. Install.

- (1) Prepare switch mounting surface for electrical bond (paragraph 3-10).
- (2) Using 0.062-inch socket head key or crosstip screwdriver, loosen two setscrews securing roller guide on new switch. Remove and retain roller guide.
- (3) Remove and retain outer jamnut and lockwasher from new switch.
- (4) Using fingers, screw inside jamnut fully on new switch. Install new switch and keywasher in switch bracket with tab of keywasher inverted into alignment hole in switch bracket.
- (5) Install lockwasher and outer jamnut. Tighten jamnut finger-tight.

(6) Screw roller guide onto switch until it bottoms, then loosen just far enough to align switch roller with striker as noted during removal.

(7) Using 0.062-inch socket head key or crosstip screwdriver, tighten both setscrews.

(8) Adjust jamnuts so switch is as far away from striker as possible. Tighten jamnuts finger-tight making sure tab in keywasher remains in alignment hole in bracket.



(9) Connect cable connector W26P3 or W27P3 to switch.

(10) Perform switch adjustment (paragraph c).

c. Adjust.

(1) Manually position boom until end of intermediate beam is 62.9 to 64.5mm from rear cage structure (TM 9-1425-646-10).

5-12. BOOM IN LIMIT SWITCH MAINTENANCE INSTRUCTIONS (CONT)

(2) Disconnect cable connector W26P3 or W27P3 from switch.

(3) Connect test cable to switch. Connect multimeter between test cable pins 1 and 2. Continuity will be indicated on multimeter indicating that switch is not actuated.

(4) Adjust jamnuts until infinity is indicated on multimeter indicating that switch is actuated and then adjust lower jamnut 1 turn more. Using 15/16-inch open end wrench, tighten upper jamnut being careful not to change adjustment.

(5) Disconnect multimeter and test cable from switch. Connect cable connector W26P3 or W27P3 to switch.

(6) Using lockwire, safety-wire jamnuts together.

(7) Apply varnish to switch mounting surface that was prepared for electrical bond.

NOTE

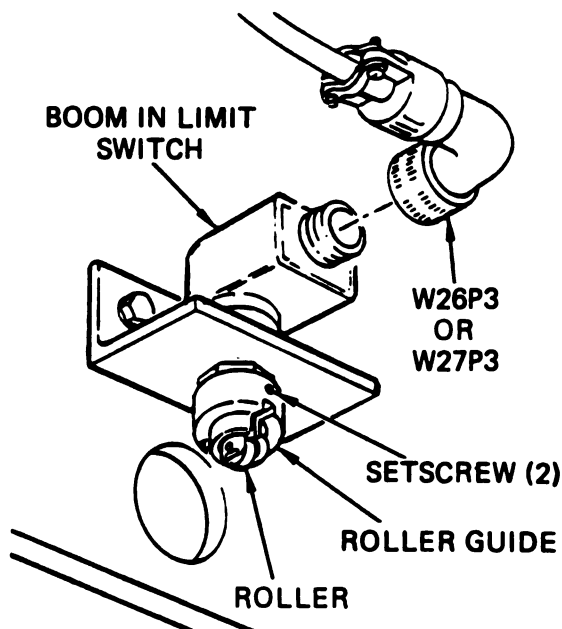
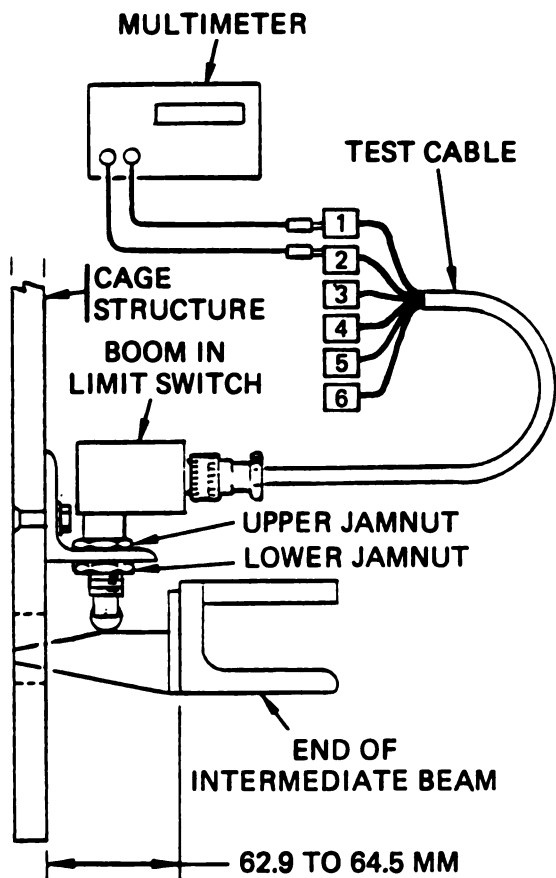
There are two types of switch roller guide setscrews. One type requires a 0.062-inch socket head key. The other type requires a crosstip screwdriver. Sealing compound is used during installation of the socket head key type setscrew. No sealing compound is used with the crosstip screwdriver type setscrew. If sealing compound is not required, do not perform steps (8) and (9). If sealing compound is required, continue with step (8).

(8) Manually position boom out far enough to remove switch roller guide.

CAUTION

When applying sealing compound, use care not to allow any sealing compound to get on any switch moving part.

(9) Using 0.062-inch socket head key, remove roller guide setscrews. Screw roller guide onto switch until it bottoms. Apply four drops of sealing compound into each setscrew hole. Rotate roller guide back and forth about 45 degrees to spread sealing compound. Apply one drop of sealing compound to each setscrew threads. Install both setscrews in roller guide and then bottom roller guide. Back roller guide off just far enough to align switch roller with striker. Using 0.062-inch socket head key, tighten both setscrews.



5-12. BOOM IN LIMIT SWITCH MAINTENANCE INSTRUCTIONS (CONT)

(10) Enable BC. Using BC, extend boom, lower hoist and secure to training rocket pod. Raise rocket pod up to stop and retract boom (TM 9-1425-646-20). Verify that intermediate beam stops with end of intermediate beam 62.9 to 64.5mm from rear of cage structure.

(11) Lower rocket pod in LLM. Pull blast shield door forward and measure, in plane of motion

of door link, for a 6 to 7mm clearance between door and rocket pod bulkhead. If measurement is not correct, adjust blast shield door (paragraph 5-24).

FOLLOW-ON PROCEDURE

Unload rocket pod and stow LLM (TM 9-1425-646-10).

5-13. BOOM OUT LIMIT SWITCH MAINTENANCE INSTRUCTIONS. This paragraph covers the replacement and adjustment of the boom out limit switch.

INITIAL SETUP

Tools

- Kit, tool, 13032302
- Set, shop, 13032303
- Gage, NPN58
- Multimeter, 8050A-01
- Test cable, 13103718

Materials/Parts

- Compound sealing (15, Appendix B)
- Lockwire (23, Appendix B)
- Methyl-ethyl-ketone (25, Appendix B)
- Varnish (71, Appendix B)

Personnel Required

MLRS Repairer MOS 27M (MLRS Crew-member MOS 13M to assist as required)

References

- TM 9-1425-646-10
- TM 9-1425-646-20

Troubleshooting

Paragraph 2-9

Equipment Condition

Position LLM to 3200 mils (180 degrees) azimuth and 0 mils elevation (TM 9-1425-646-20)

a. Remove.

(1) Manually extend boom to position convenient to replace switch (TM 9-1425-646-10).

(2) Disconnect electrical connector W26P4 or W27P4 from limit switch.

NOTE

There are two types of switch roller guide setscrews. One type requires a 0.062-inch socket head key. The other type requires a crosstip screwdriver. Sealing compound is used during installation of the socket head key type setscrew. No sealing compound is required with the crosstip screwdriver type setscrew. Methyl-ethyl-ketone or a soldering iron must be applied to the socket head key type setscrew to loosen the sealing compound before the setscrew can be removed. In the following procedure, steps applying methyl-ethyl-ketone or sealing compound do not apply if the roller guide setscrew is the crosstip screwdriver type.

(3) Inspect switch roller guide to determine which type of setscrew has been used.

WARNING

Methyl-ethyl-ketone vapors are toxic. Avoid prolonged or repeated breathing of vapors, or contact with skin. Use only with adequate ventilation. Methyl-ethyl-ketone is flammable and should not be used near open flame. Fire extinguisher should be available when solvent is used.

(4) If applicable, apply methyl-ethyl-ketone or heat to roller guide setscrews. Allow a minute or two for penetration and then remove both setscrews.

(5) If applicable, apply methyl-ethyl-ketone into both setscrew holes. Allow a minute or two for penetration. Note position of roller guide for installation and then remove roller guide.

(6) Cut and remove lockwire from switch jamnuts.

(7) Using 15/16-inch open end wrench, remove jamnut and lockwasher securing switch to bracket. Remove switch and keywasher from bracket.

b. Install.

(1) Prepare switch mounting surface for electrical bond (paragraph 3-10).

(2) Using 0.062-inch socket head key or crosstip screwdriver, loosen two setscrews securing roller guide on new switch. Remove and retain roller guide.

(3) Remove and retain outer jamnut and lockwasher from new switch.

(4) Using fingers, screw inside jamnut fully on new switch. Install new switch and keywasher in switch bracket with tab of keywasher inserted into alinement hole in switch bracket.

(5) Install lockwasher and outer jamnut. Tighten jamnut finger-tight.

(6) Screw roller guide onto switch until it bottoms, then loosen just far enough to aline switch roller with striker as noted during removal.

5-13. BOOM OUT LIMIT SWITCH MAINTENANCE INSTRUCTIONS (CONT)

(7) Using 0.062-inch socket head key or crosstip screwdriver, tighten both setscrews.

(8) Adjust jamnuts so switch is as far away from striker as possible. Tighten jamnuts finger-tight making sure tab in keywasher remains in alignment hole in bracket.

(9) Connect cable connector W26P4 or W27P4 to switch.

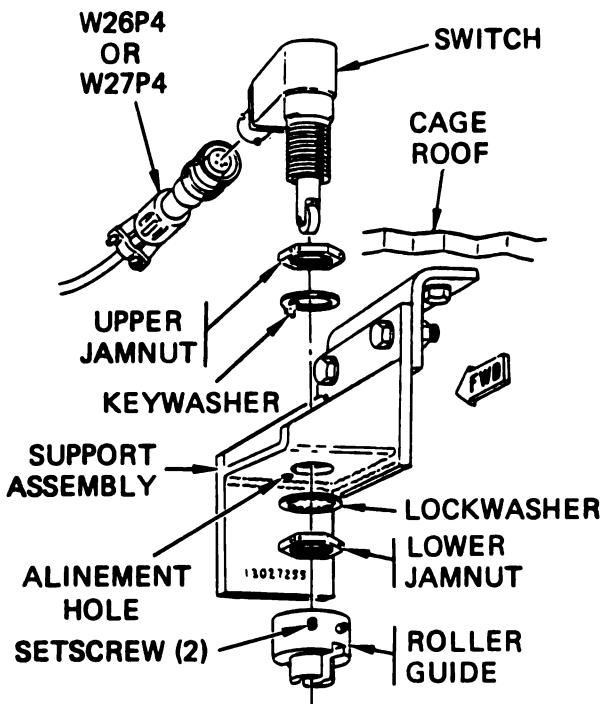
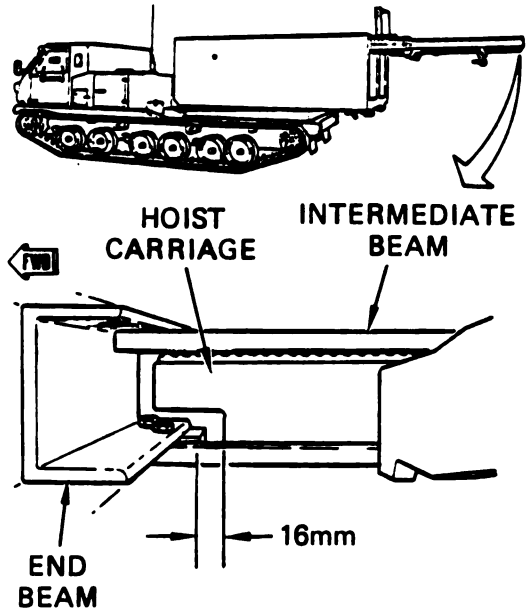
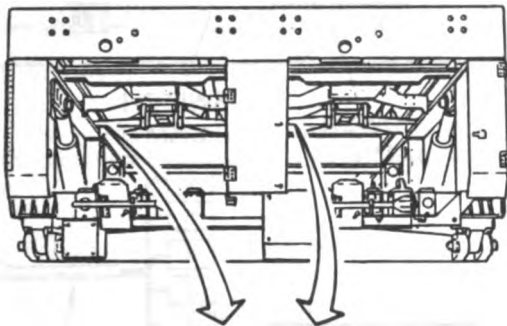
(10) Perform switch adjustment (paragraph c).

c. Adjust.

(1) Manually extend boom until intermediate beam is 16mm from hoist carriage.

(2) Disconnect cable connector W26P4 or W27P4 from switch.

(3) Connect test cable to switch. Connect multimeter between test cable pins 1 and 2. Continuity will be indicated on multimeter indicating that switch is not actuated.



(4) Adjust jamnuts until infinity is indicated on multimeter indicating that switch is actuated and then adjust lower jamnut one turn more. Using 15/16-inch open end wrench, tighten upper jamnut being careful not to change adjustment.

(5) Disconnect multimeter and test cable from switch. Connect cable connector W26P4 or W27P4 to switch.

(6) Using lockwire, safety-wire jamnuts together.

5-13. BOOM OUT LIMIT SWITCH MAINTENANCE INSTRUCTIONS (CONT)

(7) Apply varnish to switch mounting surface that was prepared for electrical bond.

NOTE

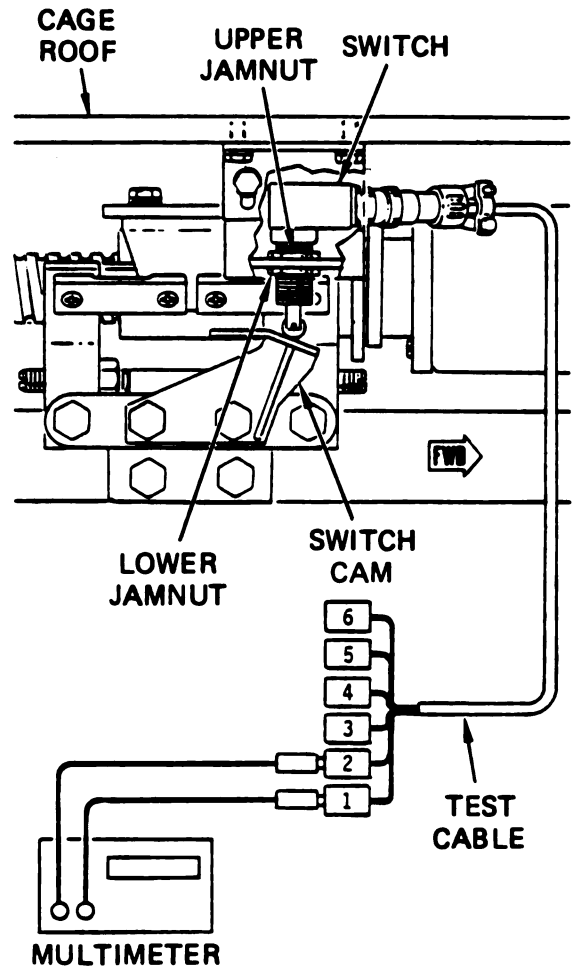
There are two types of switch roller guide setscrews. One type requires a 0.062-inch socket head key. The other type requires a crosstip screwdriver. Sealing compound is used during installation of the socket head key type setscrew. No sealing compound is used with the crosstip screwdriver type setscrew. If sealing compound is not required, do not perform steps (8) and (9). If sealing compound is required, continue with step (8).

(8) Manually position boom out far enough to remove switch roller guide.

CAUTION

When applying sealing compound, use care not to allow any sealing compound to get on any switch moving part.

(9) Using 0.062-inch socket head key, remove roller guide setscrews. Screw roller guide onto switch until it bottoms. Apply four drops of sealing compound into each setscrew hole. Rotate roller guide back and forth about 45 degrees to spread sealing compound. Apply one drop of sealing compound to each setscrew threads. Install both setscrews in roller guide and then bottom roller guide. Back roller guide off just far enough to align switch roller with striker. Using 0.062-inch socket head key, tighten both setscrews.



(10) Enable BC. Using BC, extend boom, lower hoist and secure to training rocket pod. Raise rocket pod to stop and retract and extend boom (TM 9-1425-646-20). Verify that boom stops at extended position when forward end of hoist carriage is between 8.0 and 16.0mm from end of intermediate beam.

FOLLOW-ON PROCEDURE

Unload rocket pod and stow LLM (TM 9-1425-646-10).

5-14. LP/C HOIST CABLE MAINTENANCE INSTRUCTIONS. This paragraph covers the replacement of the LP/C hoist cable.

INITIAL SETUP

Tools

Kit, tool, 13032302
 Set, shop, 13032303
 Breakout box, hoist control, 13103690
 Cutter, bolt, GGG-C-740 TY 2 CL 1
 Multimeter, 8050A-01

Materials/Parts

Cloth, cotton (6, Appendix B)
 Primer, zinc chromate (47, Appendix B)

Personnel Required

MLRS Repairer MOS 27M
 (MLRS Crewmember MOS 13M to assist
 as required)

References

TM 9-1425-646-10
 TM 9-1425-646-20

Troubleshooting

Paragraph 2-9

Equipment Condition

Position LLM to 3200 mils (180 degrees)
 azimuth and 0 mils elevation
 (TM 9-1425-646-10)
 Boom extended (TM 9-1425-646-20)

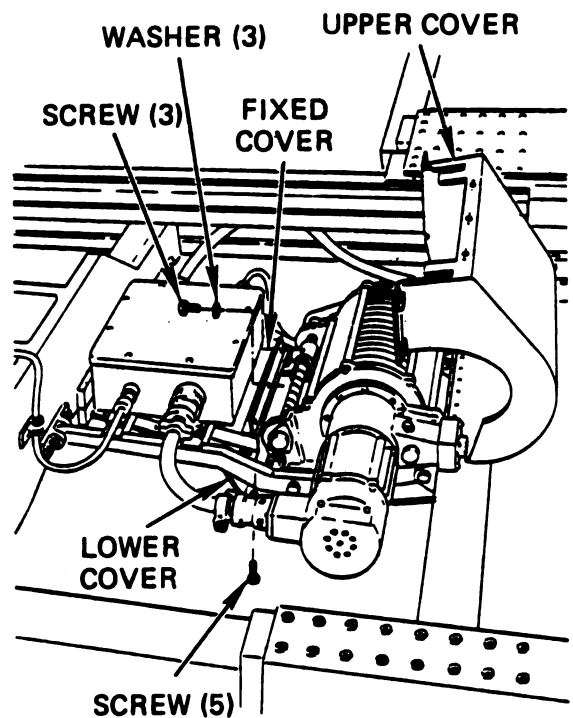
a. Remove.

(1) Using crosstip screwdriver, remove five screws securing hoist upper dust cover to lower dust cover.

(2) Using 10mm open end wrench, remove three screws and washers securing hoist upper dust cover to fixed cover. Open upper dust cover.

(3) Using crosstip screwdriver, remove six screws securing lower dust cover to fixed cover. Open lower dust cover.

(4) Retain cable slides.



5-14. LP/C HOIST CABLE MAINTENANCE INSTRUCTIONS (CONT)

(5) Remove hoist down limit switch (paragraph 5-21).

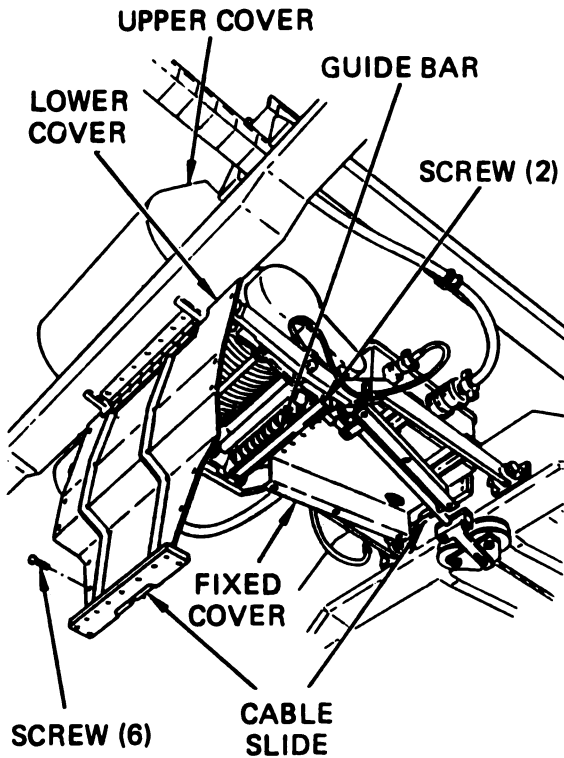
(6) Using 5/32-inch socket head key, remove two screws securing guide bar to hoist.

CAUTION

Note position of cable guide as cable is payed out. Pay out cable only to the point where cable guide is aligned with last rope groove on drum.

(10) Using BC with aid of second repairer, pay out hoist cable until cable guide is approximately 1 inch from hoist flange.

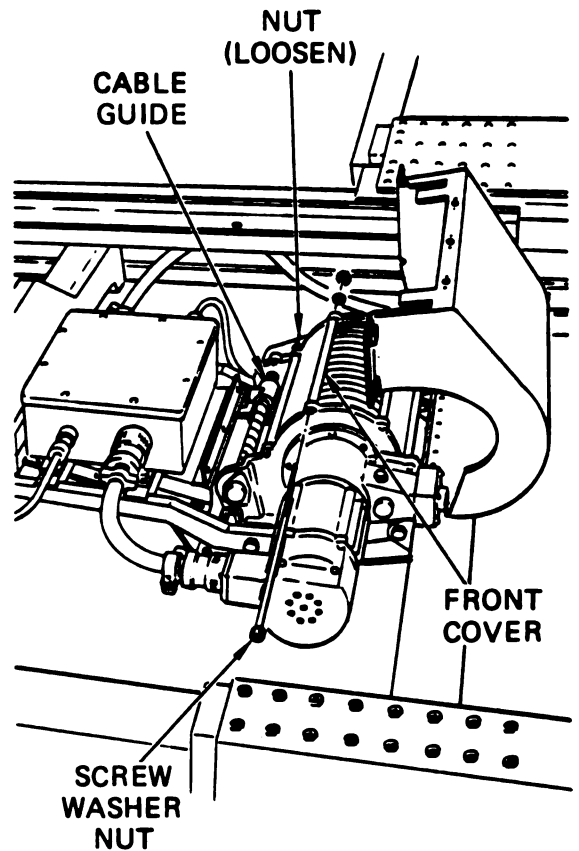
(11) Using 3/8-inch screwdriver bit and 7/16-inch box end wrench, remove top nut, washer, and screw securing front cover on hoist assembly. Loosen bottom nut and swing cover down to provide access to cable on drum.



(7) Using machinist rule, measure distance down limit switch actuating screw extends out from cable guide housing. Record dimension.

(8) Cut lockwire and using 11/32-inch open end wrench, loosen locknut. Using 1/4-inch open end wrench, remove limit switch actuating screw.

(9) Check condition of cable on hoist drum. If cable is seized or tangled on hoist drum, cut cable and manually unthread cable from drum. If cable is not seized, manually turn drum in hoist down direction until damaged area of cable is clear of hoist. Do not bottom level wind at end of travel.

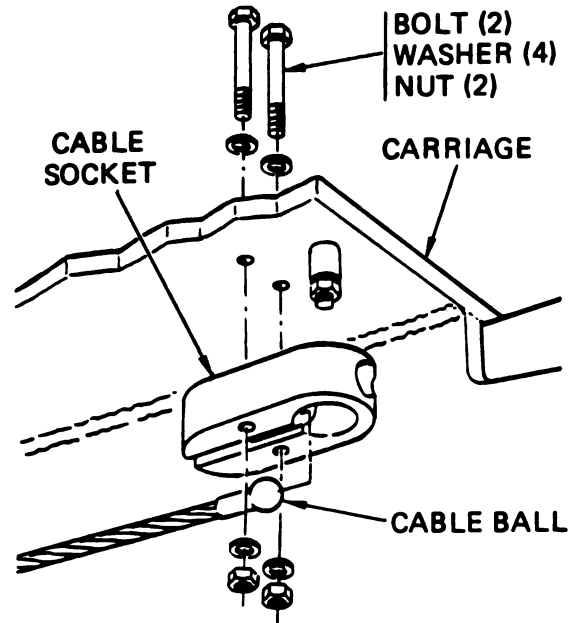
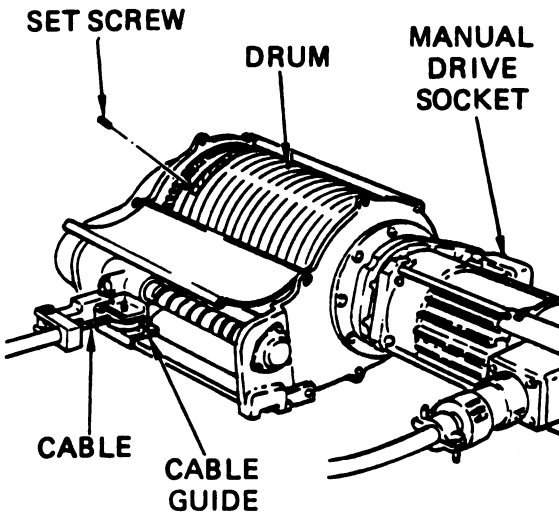
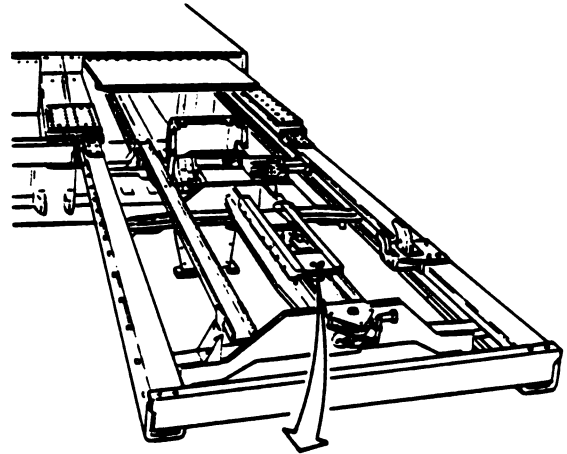


5-14. LP/C HOIST CABLE MAINTENANCE INSTRUCTIONS (CONT)

(12) Manually rotate hoist drum until cable setscrew is accessible. Using 7/64-inch socket head key, remove cable setscrew. Retain setscrew.

(13) Push spring-loaded pulley back and then push cable back through cable guide to provide enough slack to remove cable from drum recess.

(14) Pull cable from drum recess noting how cable is wrapped on drum. Remove cable and cable guide from drum. Lower hook and pulley assembly to a clean surface.



(15) Using 10mm box end wrench and 10mm socket, remove two nuts, four washers, and two bolts securing cable socket to carriage. Using drift punch, remove cable ball end from socket.

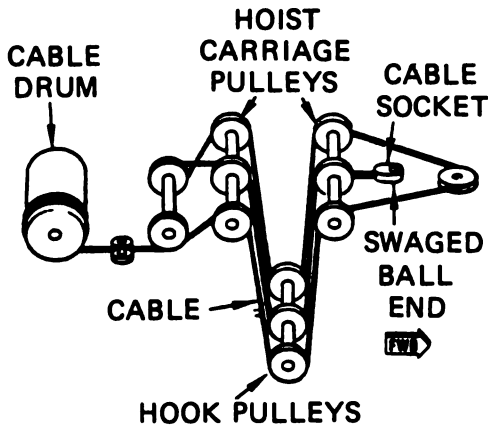
(16) Note how cable is threaded through pulleys while unthreading cable. Remove cable from pulleys.

5-14. LP/C HOIST CABLE MAINTENANCE INSTRUCTIONS (CONT)

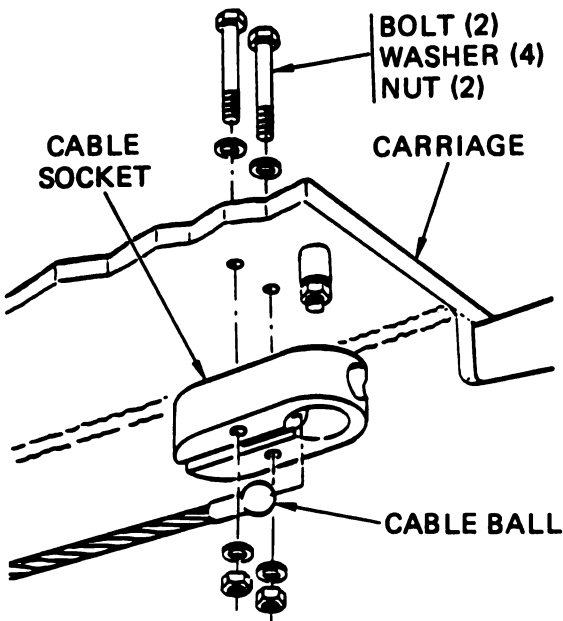
b. Install.

(1) Lay new cable out and measure 1219cm from plain end. Mark this point with zinc chromate primer.

(2) Starting at cable socket end, thread plain end of cable through pulleys. Pull all but about 6 inches of cable through pulleys.



(3) Install ball end of cable in cable socket. Pull ball into recess of socket and install socket on carriage. Apply zinc chromate primer on bolts and install two bolts, four washers, and two nuts. Using 10mm box end wrench and 10mm socket, tighten nuts.



(4) Manually rotate hoist to position cable guide directly in line with first groove of drum and cable recess in drum is on forward side of drum.

(5) Inspect plain end of cable. If necessary, use hand file to remove any burrs.

CAUTION

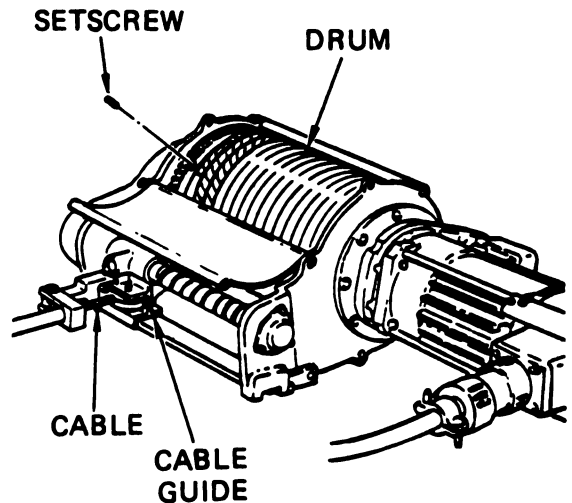
Take care when bending cable around drum. Do not bend too sharply as the cable may kink.

(6) Depress spring-loaded pulley in cable guide. Thread cable through cable guide and loop loosely around drum in first drum groove.

(7) Insert plain end of cable in drum recess. Inspect setscrew hole to make sure cable is fully inserted in drum recess and install setscrew. Using 7/64-inch socket head key, tighten setscrew.

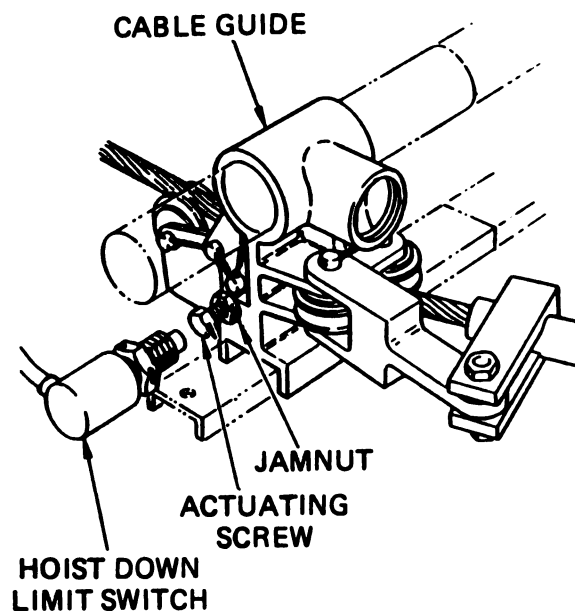
(8) Position cable snugly around drum and carefully turn drum in direction to rewind cable, with first turn covered by second and third along side second. Continue to position cable on drum. Pull cable snug to remove all slack and then turn drum manually until at least four cable turns are on drum.

(9) Check that cable guide is lined up with cable and that drum groove is directly opposite guide. If not, reinstall cable paying attention to number of cable wraps on drum.



5-14. LP/C HOIST CABLE MAINTENANCE INSTRUCTIONS (CONT)

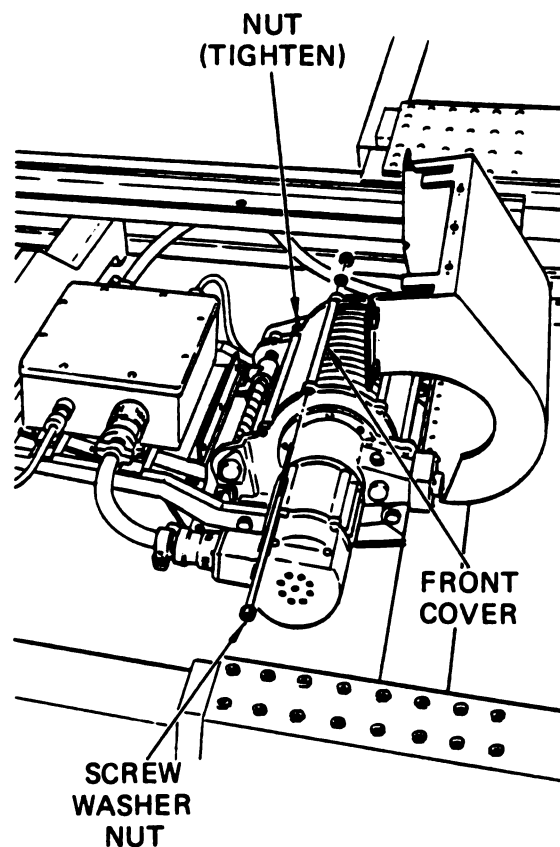
(10) Manually turn hoist to position cable guide as required to install down limit switch actuating screw. Install screw and jamnut to dimension recorded during removal.



(11) Install hoist down limit switch (paragraph 5-21).

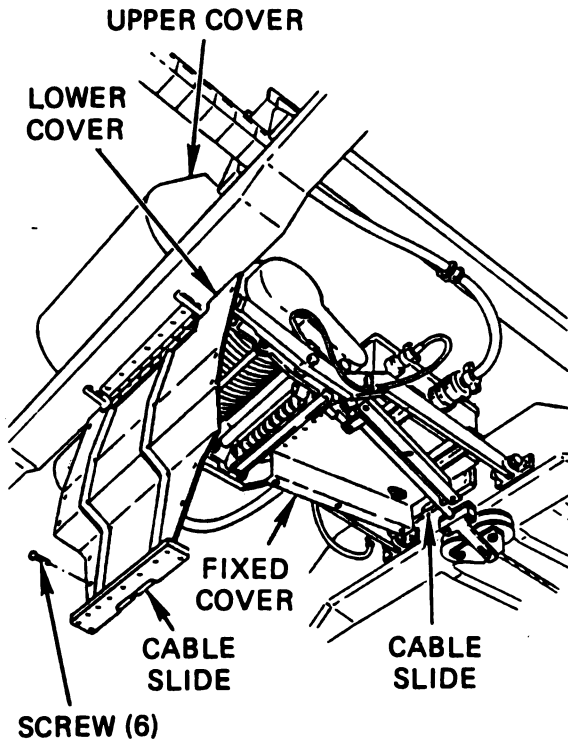
(12) Install guide bar and secure with two screws. Using 5/32-inch socket head key, tighten screws.

(13) Position front cover on hoist assembly and install screw, washer, and nut. Using 3/8-inch screwdriver bit and 7/16-inch box end wrench, tighten nut.



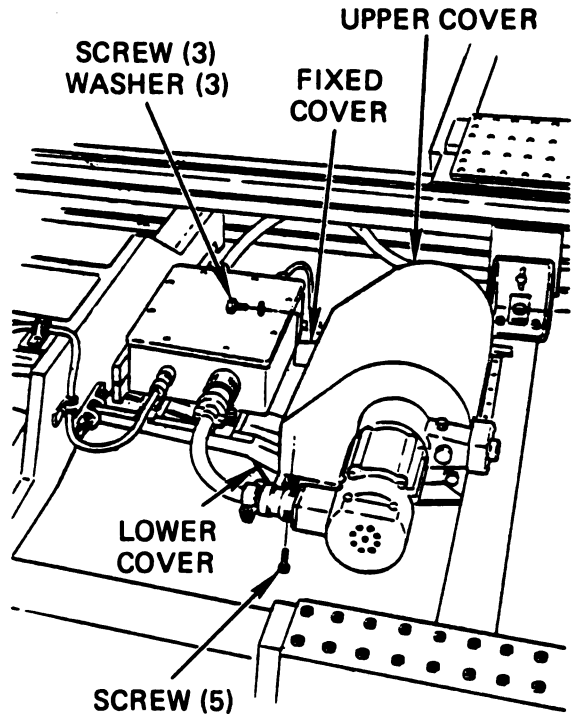
5-14. LP/C HOIST CABLE MAINTENANCE INSTRUCTIONS (CONT)

(14) Apply zinc chromate primer to six screws. Close lower dust cover and install six screws securing lower cover to fixed cover. Using crosstip screwdriver, tighten screws. Install cable slides.



(15) Apply zinc chromate primer to three screws. Close upper dust cover and install three screws and washers securing upper cover to fixed cover. Using 10mm open end wrench, tighten screws.

(16) Apply zinc chromate primer to five screws. Install five screws securing upper dust cover to lower cover. Using crosstip screwdriver, tighten screws.



FOLLOW-ON PROCEDURE

Perform load test after repair (paragraph 3-9).

5-15. LP/C HOIST ASSEMBLY MAINTENANCE INSTRUCTIONS. This paragraph covers the maintenance tasks for the following items:

<i>Item</i>	<i>Page</i>
1. Hoist Assembly	5-45
2. Hoist Motor Assembly	5-47

INITIAL SETUP

Tools

- Kit, tool, 13032302
- Set, shop, 13032303
- Wrench, torque, 0.1 to 3.5 N•m

Materials/Parts

- Cloth, cotton (6, Appendix B)
- Compound, cleaning (12, Appendix B)
- Compound, sealing (14, Appendix B)
- Packing, preformed (41, Appendix B)
- Primer, zinc chromate (47, Appendix B)
- Solvent, drycleaning (61, Appendix B)
- Varnish (71, Appendix B)

Personnel Required

- MLRS Repairer MOS 27M
- (MLRS Crewmember MOS 13M to assist as required)

References

- TM 9-1425-646-10
- TM 9-1425-646-20

Troubleshooting
Paragraph 2-9

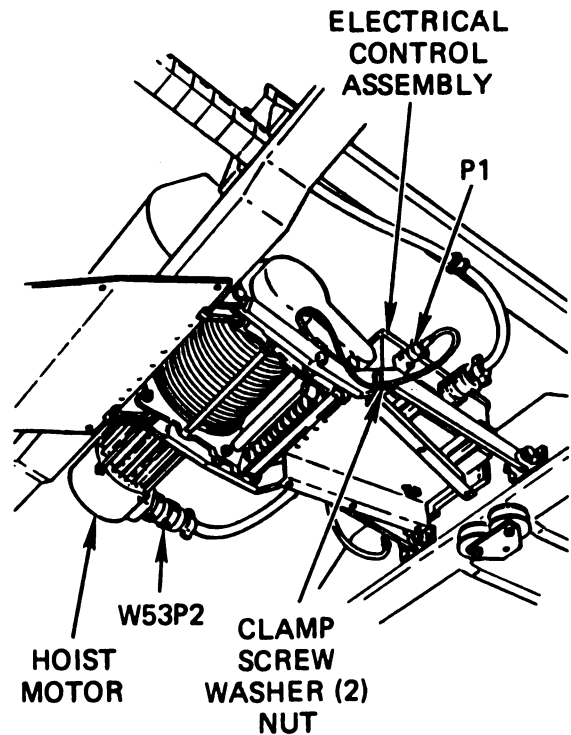
Equipment Condition

- Position LLM to 3200 mils (180 degrees) azimuth and 0 mils elevation (TM 9-1425-646-10)
- Boom extended (TM 9-1425-646-20)

1. HOIST ASSEMBLY.

a. Remove.

- (1) Remove hoist cable (paragraph 5-14).
- (2) Remove cotter pin and pin securing link to level wind. Reinstall pulley and replace pin in level wind.
- (3) Disconnect electrical connector W53P2 from J1 on hoist motor and limit switch P1 from J4 on electrical control assembly. Using crosstip screwdriver and 8mm socket, remove screw, washer, nut, and clamp securing limit switch cable.



5-15. LP/C HOIST ASSEMBLY MAINTENANCE INSTRUCTIONS (CONT)

NOTE

While one repairer removes the attaching hardware, the other must support the hoist assembly.

(4) Using 10mm box end wrench and 10mm socket, remove two nuts, four washers, and two bolts securing hoist assembly to hoist support.

(5) Using 17mm box end wrench and 12mm socket, remove two nuts, four washers, and two bolts securing hoist assembly to rear support. Remove hoist assembly.

b. Install.

NOTE

If new hoist has cable installed on drum, remove cable before installing hoist.

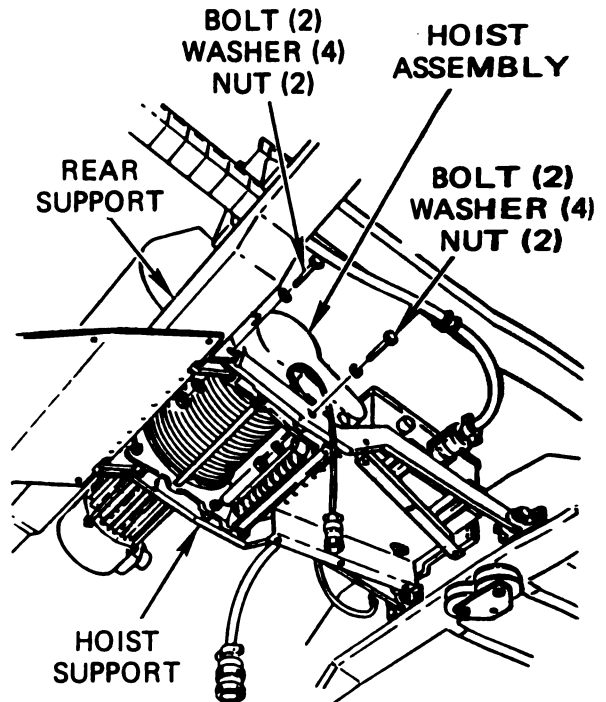
(1) Clean forward mounting surface for electrical bond.

(2) Apply zinc chromate primer to two bolts. Position new hoist assembly in carriage and install two bolts, four washers, and two nuts to secure hoist assembly to rear support.

(3) Using 17mm box end wrench and 12mm socket, tighten nuts.

(4) Clean two bolts for electrical bond and install two bolts, four washers, and two nuts to secure hoist assembly to hoist supports (paragraph 3-10).

(5) Using 10mm box end wrench and 10mm socket, tighten nuts.



(6) Inspect end of cable for burrs. Using file, remove any burrs.

(7) Remove pin from level wind and position link. Install pin through link and level wind pulley. Using cotter pin, secure pin.

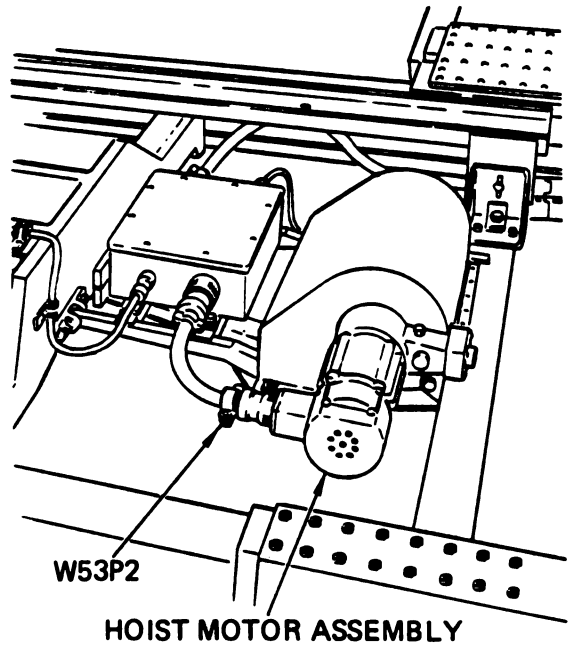
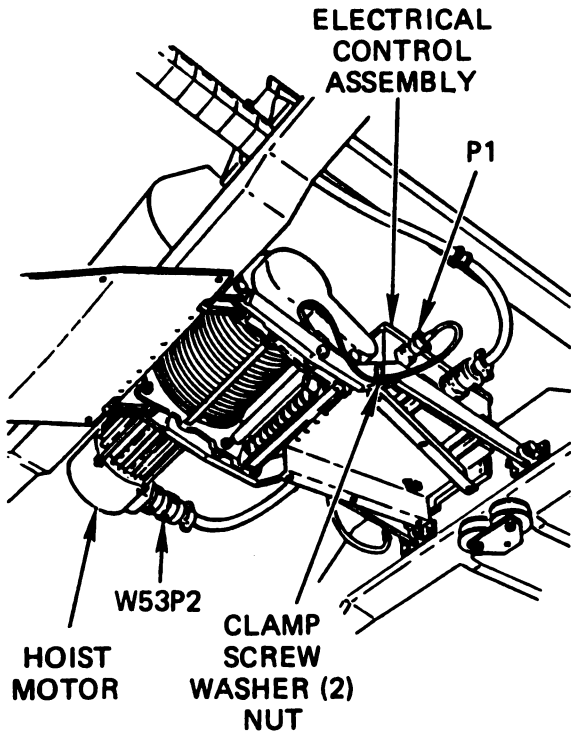
(8) Install hoist cable (paragraph 5-14).

(9) Connect electrical connector W53P2 to J1 on hoist motor and limit switch P1 to J4 on electrical control assembly. Using crosstip screwdriver and 8mm socket, install clamp, screw, washer, and nut securing limit switch cable.

5-15. LP/C HOIST ASSEMBLY MAINTENANCE INSTRUCTIONS (CONT)

(10) Record hoist assembly serial number and replacement date in Equipment Maintenance Log, DA Form 2409.

(11) If no further maintenance is required, perform follow-on procedure (page 5-48).



NOTE

The hoist motor weighs 6.8 kg (15 lb) and requires one person to support motor while another person removes attaching hardware.

2. HOIST MOTOR ASSEMBLY.

a. Remove.

(1) Disconnect cable connector W53P2 from J1 on hoist motor assembly.

(2) Using 3/16-inch socket head key, remove two bottom capscrews and washers. Then, remove two top capscrews and washers.

5-15. LP/C HOIST ASSEMBLY MAINTENANCE INSTRUCTIONS (CONT)

(3) Pull motor away from hoist intermediate housing and discard preformed packing. Retain woodruff key.

b. Install.

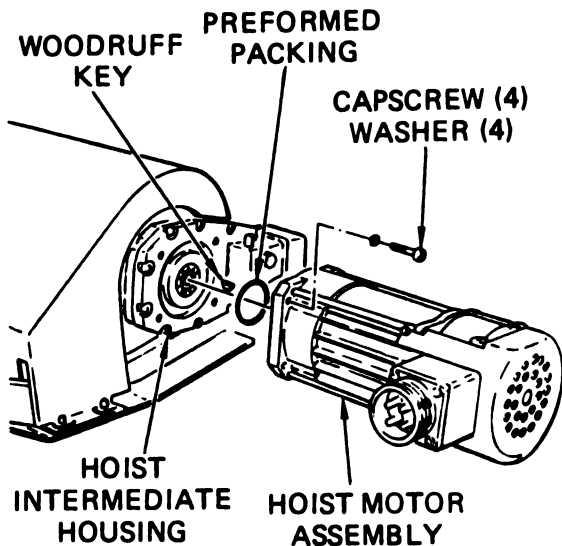
(1) Install new preformed packing on hoist intermediate housing.

(2) Install woodruff key on motor shaft.

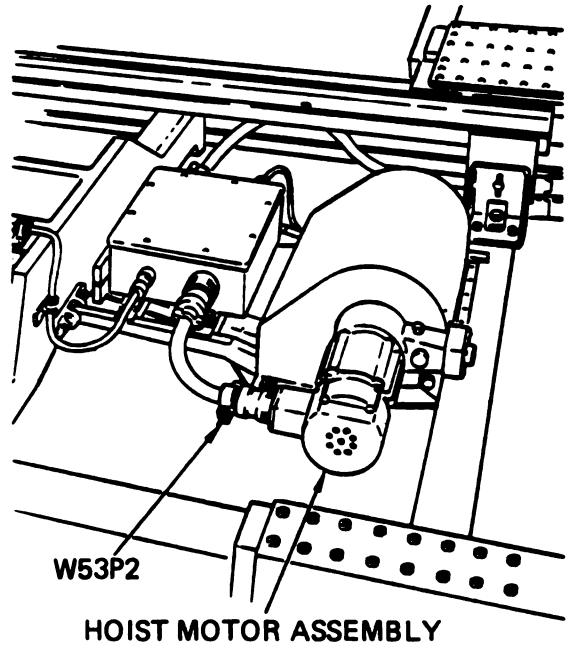
NOTE

One person must support motor while the other installs attaching hardware.

(3) Apply sealing compound to threads of four capscrews. Position motor to hoist intermediate housing and install four capscrews and washers. Install top capscrews first.



(4) Connect cable connector W53P2 to J1 on hoist motor.



(5) Using BC, lower and raise hoist hook and pulley assembly to check motor operation (TM 9-1425-646-20).

(6) If no further maintenance is required, perform follow-on procedure.

FOLLOW-ON PROCEDURE

Perform load test after repair (paragraph 3-9).

5-16. LP/C HOIST HOOK AND PULLEY MAINTENANCE INSTRUCTIONS. This paragraph covers the maintenance tasks for the following items:

<i>Item</i>	<i>Page</i>
1. Pulley Assembly	5-49
2. Hook	5-50
3. Lockspring	5-51
4. Lock Assembly	5-51
5. Spacer Assembly	5-52
6. Splice Plate	5-53
7. Spreader Assembly	5-53
8. Handle Assembly	5-54

INITIAL SETUP

Tools

- Kit, tool, 13032302
- Set, shop, 13032303
- Extractor, insert (for item 7)
- Tool, insert (for item 7)
- Wrench, torque, 0.5 to 10 N•m

Materials/Parts

- Cloth, cotton (6, Appendix B)
- Oil, lubricating (26, Appendix B)
- Primer, zinc chromate (47, Appendix B)

Personnel Required

- MLRS Repairer MOS 27M
- (MLRS Crewmember MOS 13M to assist as required)

References

TM 9-1425-646-10

Troubleshooting

Paragraph 2-9

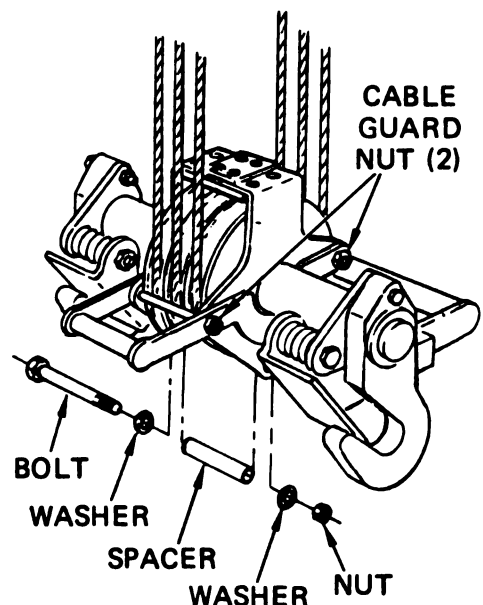
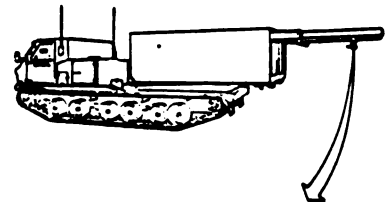
Equipment Condition

- Position LLM to 3200 mils (180 degrees) azimuth and 0 mils elevation (TM 9-1425-646-10)
- Boom extended and hook and pulley lowered onto convenient clean working surface (TM 9-1425-646-20)

1. PULLEY ASSEMBLY.

a. Remove.

(1) Using 7mm box end wrench and 10mm socket, remove nut, two washers, spacer, and bottom cable guard bolt. Loosen two nuts on the other two cable guard bolts.



5-16. LP/C HOIST HOOK AND PULLEY MAINTENANCE INSTRUCTIONS (CONT)

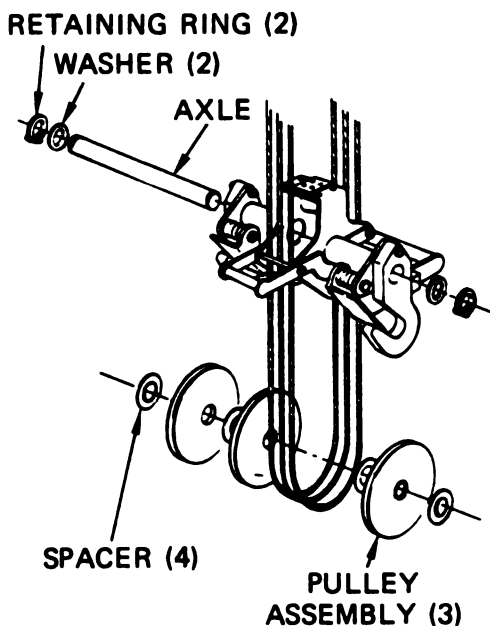
(2) Using retaining ring pliers, remove two retaining rings, two washers, and axle. Pull down on cable and remove three pulley assemblies and four spacers.

b. Install.

(1) Pull down on cable and insert three new pulley assemblies and four spacers between spacer assemblies.

(2) Apply light coat of oil to axle and insert axle through spacer assemblies, pulley assemblies, and spacers.

(3) Install two washers and using retaining ring pliers, install two retaining rings.

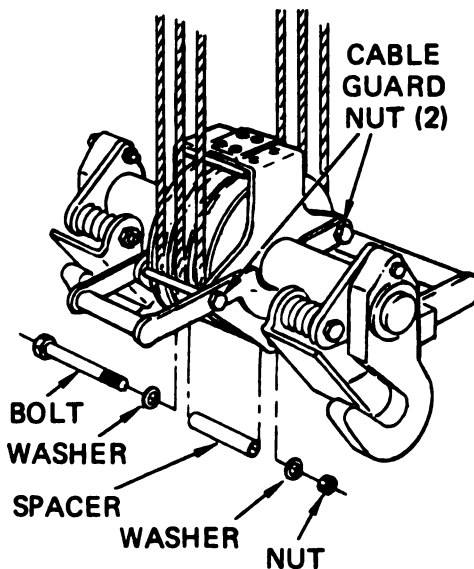


(4) Apply zinc chromate primer to cable guard bolt and install bolt, two washers, spacer, and nut.

(5) Remove nuts from other two cable guard bolts and apply zinc chromate primer to bolt threads. Install two nuts.

(6) Using 7mm box end wrench and 10mm socket, tighten two nuts.

(7) If no further maintenance is required, perform follow-on procedure (page 5-54).



2. HOOK.

a. Remove.

(1) Using 6mm box end wrench and 8mm socket, remove nut, two washers, and bolt securing hook to spacer assembly.

(2) Using retaining ring pliers, remove retaining ring and washer. Remove hook from axle.

b. Install.

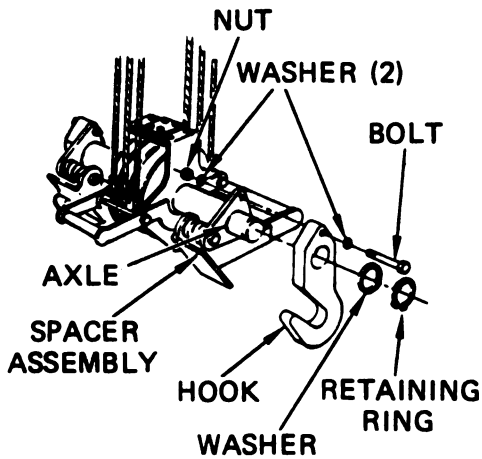
(1) Position new hook on axle and install washer. Using retaining ring pliers, install retaining ring.

(2) Apply zinc chromate primer to bolt. Install bolt, two washers, and nut to secure lock to spacer assembly.

(3) Using 6mm box end wrench and 8mm socket, tighten nut.

5-16. LP/C HOIST HOOK AND PULLEY MAINTENANCE INSTRUCTIONS (CONT)

(4) If no further maintenance is required, perform follow-on procedure (page 5-54).



3. LOCKSPRING.

a. Remove.

(1) Using 17mm box end wrench and 12mm socket, remove nut, two washers, and bolt.

(2) Slide spacer from inside spring out through hole in lock assembly.

(3) Remove lockspring, two spacers, and lock assembly.

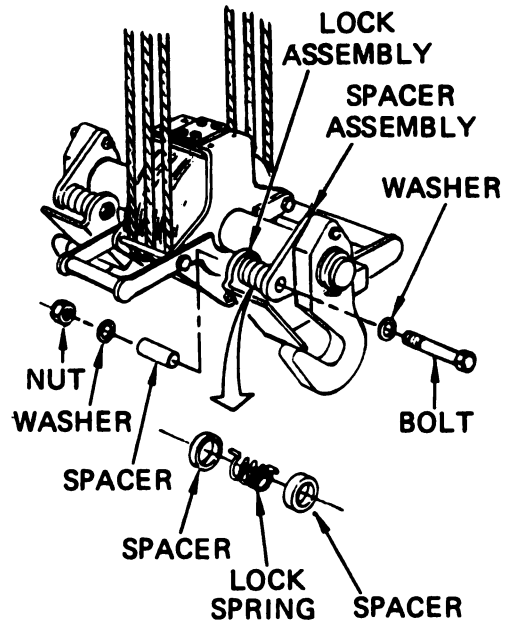
b. Install.

(1) Apply zinc chromate primer to bolt.

(2) Position new lockspring and two spacers between lock assembly and spacer assembly.

(3) Apply zinc chromate primer to bolt. Slide spacer through lock assembly, lockspring, and two spacers. Install bolt, two washers, and nut. Using 17mm box end wrench and 12mm socket, tighten nut.

(4) If no further maintenance is required, perform follow-on procedure (page 5-54).



4. LOCK ASSEMBLY.

a. Remove.

(1) Remove lockspring (item 3, a).

(2) Remove lock assembly from hook and pulley.

(3) Using 8mm box end wrench and 6mm socket, remove four bolts, eight washers, and four nuts securing left-hand ballast to lock assembly. Remove two ballast.

(4) Using 8mm box end wrench and 6mm socket, remove four bolts, eight washers, and four nuts securing right-hand ballast to lock assembly.

(5) Using 8mm socket and 6mm box end wrench, remove bolt, two washers, and nut securing one end of spring.

5-16. LP/C HOIST HOOK AND PULLEY MAINTENANCE INSTRUCTIONS (CONT)

(6) Using 10mm socket and 7mm box end wrench, remove bolt, two washers, spacer, and nut securing stop plate. Remove two ballast.

(7) Unhook spring from stop plate.

(8) Using 9/16-inch box end wrench and 3/8-inch socket, remove two nuts, four washers, spacer, and two bolts securing handle to lock assembly. Remove handle.

(9) Using cotter pin extractor, remove two cotter pins and two washers securing rod to handle and stop plate. Remove rod.

b. Install.

(1) Position rod in handle and stop plate. Install two washers and two cotter pins.

(2) Apply zinc chromate primer to two bolts. Position handle on lock assembly and install two bolts, four washers, spacer, and two nuts. Using 9/16-inch box end wrench and 3/8-inch socket, tighten nuts.

(3) Hook spring to stop plate.

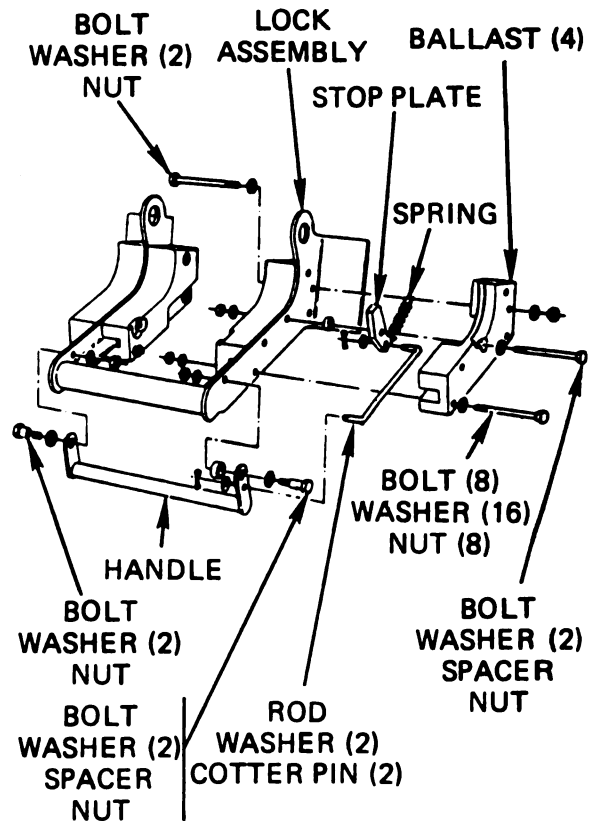
(4) Apply zinc chromate primer to bolt. Install bolt and washer on inside ballast and position ballast on lock assembly. Hook spring on bolt.

(5) Apply zinc chromate primer to bolt. Install bolt and washer on outside ballast. Position ballast to lock assembly and slide bolt through stop plate and spacer.

(6) Push spring bolt and stop plate bolts through both ballast and install washers and nuts. Using 10mm socket and 7mm box end wrench, tighten stop plate nut. Using 8mm socket and 6mm box end wrench, tighten spring nut.

(7) Apply zinc chromate primer to four bolts. Install four bolts, eight washers, and four nuts securing right-hand ballast. Using 8mm box end wrench and 6mm socket, tighten nuts.

(8) Apply zinc chromate primer to four bolts. Position left-hand ballast on lock assembly and install four bolts, eight washers, and four nuts. Using 8mm box end wrench and 6mm socket, tighten nuts.



(9) Position lock assembly on hook and pulley and install lockspring (item 3, b).

5. SPACER ASSEMBLY.

a. Remove.

- (1) Remove hook (item 2, a).
- (2) Remove lock assembly (item 4, a).
- (3) Remove spreader assembly (item 7, a).

(4) Using 10mm box end wrench and 7mm socket, remove three nuts, three spacers, six washers, and three cable guard bolts.

(5) Remove handle assembly and slide spacer assembly off axle.

b. Install.

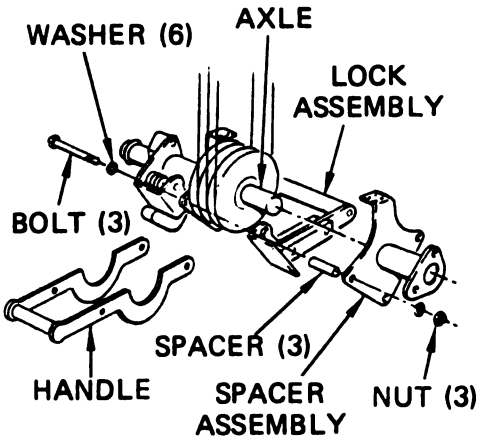
- (1) Slide new spacer assembly on axle.

(2) Apply zinc chromate primer to three cable guard bolts.

5-16. LP/C HOIST HOOK AND PULLEY MAINTENANCE INSTRUCTIONS (CONT)

(3) Position handle assembly to spacer assembly and install three cable guard bolts, three spacers, six washers, and three nuts.

(4) Using 10mm box end wrench and 7mm socket, tighten nuts.



- (5) Install hook (item 2, b).
- (6) Install lock assembly (item 4, b).
- (7) Install spreader assembly (item 7, b).

6. SPLICE PLATE.

a. Remove.

(1) Using 8mm socket, remove four bolts securing splice plate to spacer assembly.

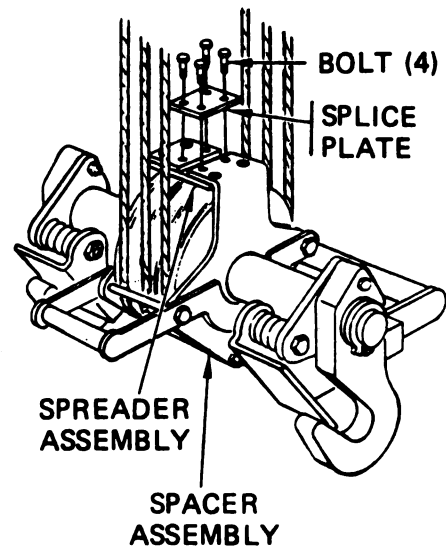
(2) Remove splice plate.

b. Install.

(1) Apply zinc chromate primer to four bolts.

(2) Position new splice plate to spacer assembly and install four bolts. Using 8mm socket, tighten bolts.

(3) If no further maintenance is required, perform follow-on procedure (page 5-54).

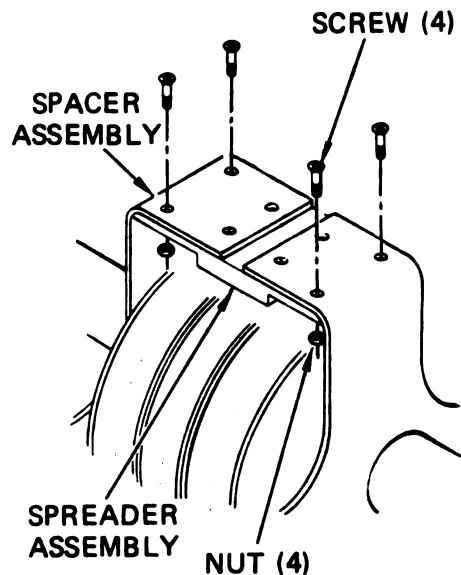


7. SPREADER ASSEMBLY.

a. Remove.

(1) Remove splice plate (item 6, a).

(2) Using 3mm socket head key and 6mm box end wrench, remove four nuts and four screws securing spreader assembly to spacer assemblies. Remove spreader assembly.

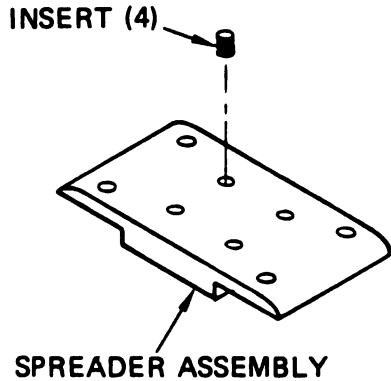


5-16. LP/C HOIST HOOK AND PULLEY MAINTENANCE INSTRUCTIONS (CONT)

b. Repair.

(1) Using insert extractor tool, remove four inserts from spreader assembly.

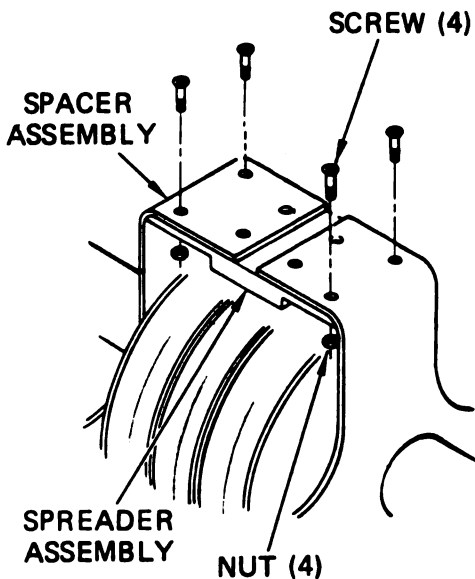
(2) Using insertion tool, install four new inserts in spreader assembly.



c. Install.

(1) Apply zinc chromate primer to four screws.

(2) Position new spreader assembly to spacer assembly and install four screws and four nuts. Using 3mm socket head key and 6mm box end wrench, tighten nuts.



(3) Install splice plate (item 6, b).

8. HANDLE ASSEMBLY.

a. Remove.

(1) Using 10mm box end wrench and 7mm socket, remove two nuts, four washers, two spacers, and two bolts.

(2) Remove handle assembly from spacer assembly.

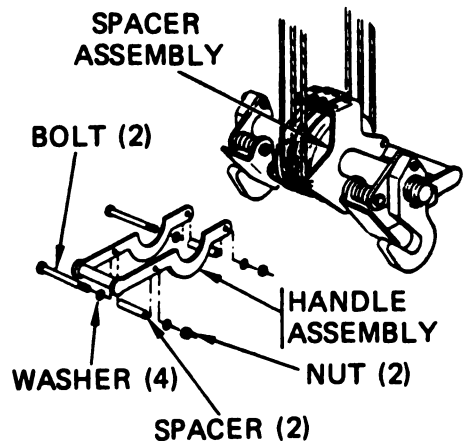
b. Install.

(1) Apply zinc chromate primer to two bolts.

(2) Position new handle assembly to spacer assembly and install two bolts, four washers, two spacers, and two nuts.

(3) Using 10mm box end wrench and 7mm socket, tighten nuts.

(4) If no further maintenance is required, perform follow-on procedure.



FOLLOW-ON PROCEDURE

Perform load test after repair (paragraph 3-9).

5-17. LP/C HOIST PULLEYS MAINTENANCE INSTRUCTIONS. This paragraph covers the maintenance tasks for the following items:

<i>Item</i>	<i>Page</i>
1. Pulley Support Assembly	5-55
2. Spacers	5-58
3. Pulleys	5-58

INITIAL SETUP

Test/Support Equipment
Wrecker, HEMTT

Tools
Kit, tool, 13032302
Set, shop, 13032303
Wrench, torque, 0.5 to 10 N•m

Materials/Parts
Cloth, cotton (6, Appendix B)
Primer, zinc chromate (47, Appendix B)
Rope, manila (55, Appendix B)

Personnel Required
MLRS Repairer MOS 27M
Wrecker Driver MOS 63H
(MLRS Crewmember MOS 13M to assist as required)

Troubleshooting
Paragraph 2-9

Equipment Condition
Hoist cable removed (paragraph 5-14)

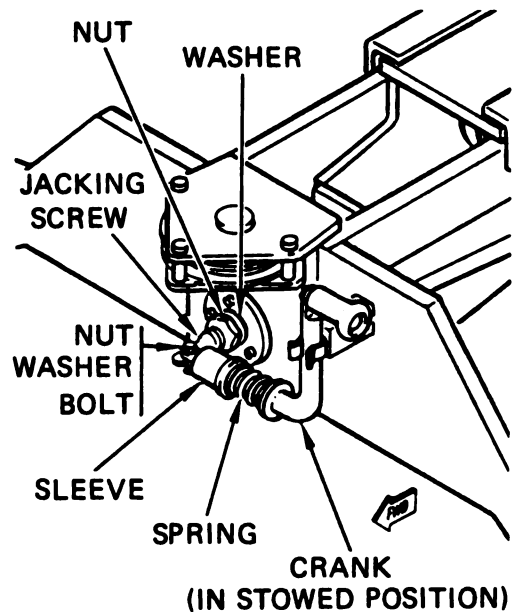
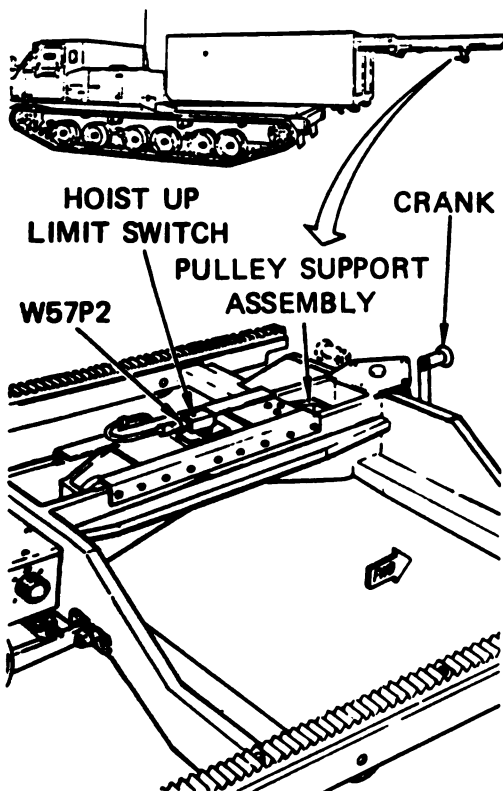
1. PULLEY SUPPORT ASSEMBLY.

a. Remove.

- (1) Disconnect electrical connector W57P2 from hoist up limit switch.
- (2) Using crank, move pulley support assembly to M77 position.

- (3) Position crank in stowed position. Using 8mm box end wrench and 8mm socket, remove nut, washer, bolt, crank, sleeve, and spring.

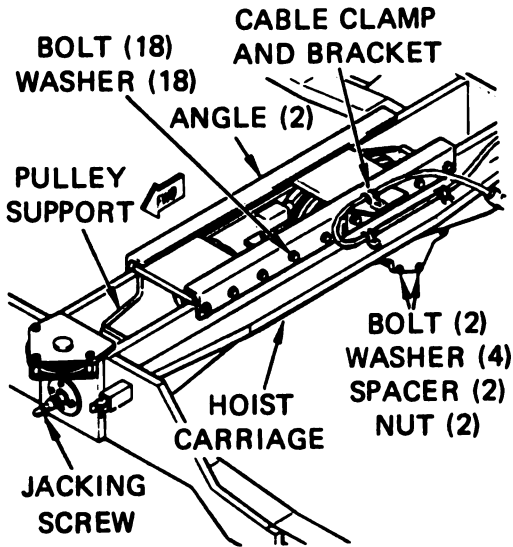
- (4) Using 24mm wrench, remove nut and washer securing jacking screw to hoist carriage.



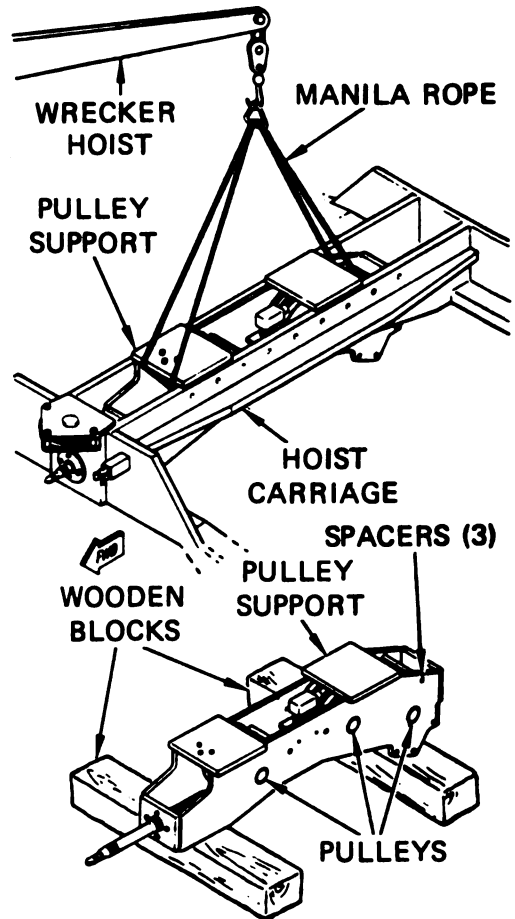
5-17. LP/C HOIST PULLEYS MAINTENANCE INSTRUCTIONS (CONT)

(5) Push pulley support back until jacking screw is clear of hoist carriage. Using 8mm socket, remove 18 bolts and washers securing two angles and clamp bracket to carriage. Remove angles.

(6) Using 10mm wrench and 10mm socket, remove two nuts, four washers, and two bolts securing two spacers. Remove spacers.



(7) Using manila rope secured to pulley support assembly and wrecker hoist, lift pulley support out of hoist and set on wooden blocks. Remove manila rope from pulley support.



(8) Remove spacers (item 2, a).

(9) Remove pulleys (item 3, a).

b. Install.

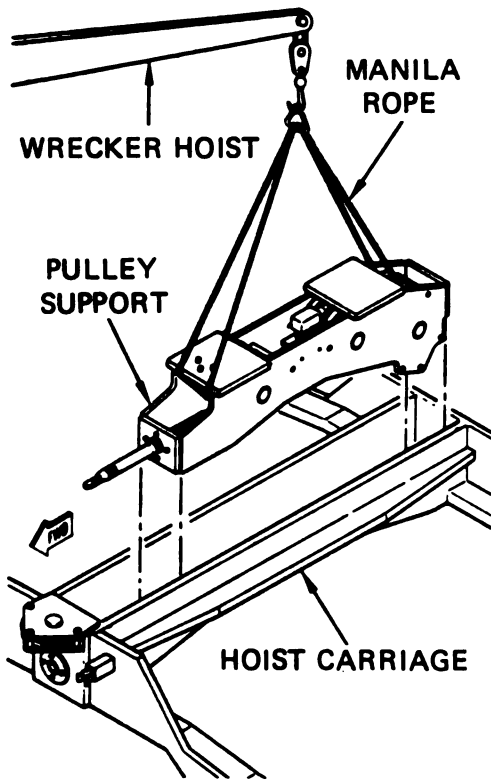
(1) Install pulleys (item 3, b).

(2) Install spacers (item 2, b).

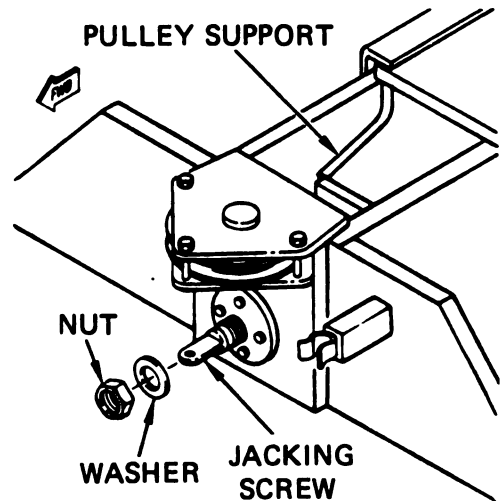
(3) Secure manila rope to new pulley support assembly and wrecker hoist.

5-17. LP/C HOIST PULLEYS MAINTENANCE INSTRUCTIONS (CONT)

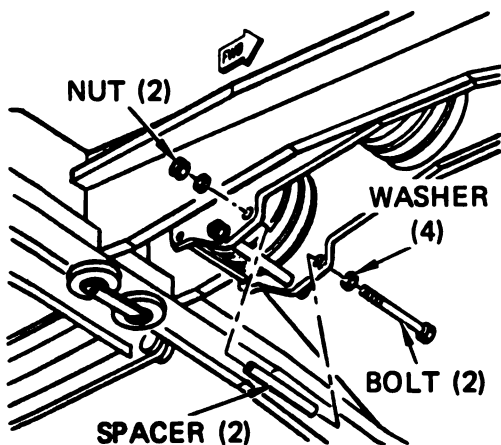
(4) Hoist pulley support assembly into position on hoist carriage.



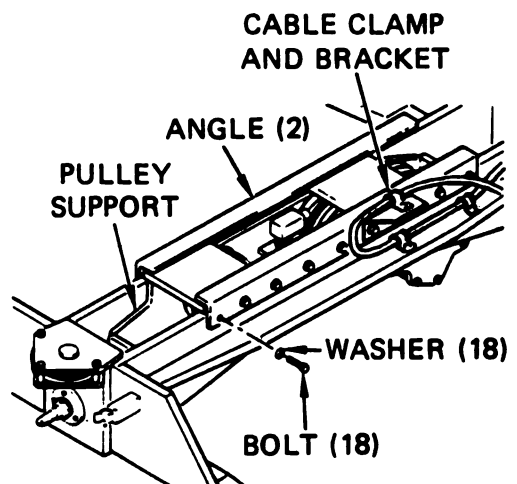
(6) Slide pulley support assembly forward to M77 position and install washer and nut on jacking screw. Using 24mm wrench, tighten nut.



(5) Apply zinc chromate primer to two bolts and install two bolts, four washers, two spacers, and two nuts. Using 10mm wrench and 10mm socket, torque nuts to 11.4 to 13.9 N•m.

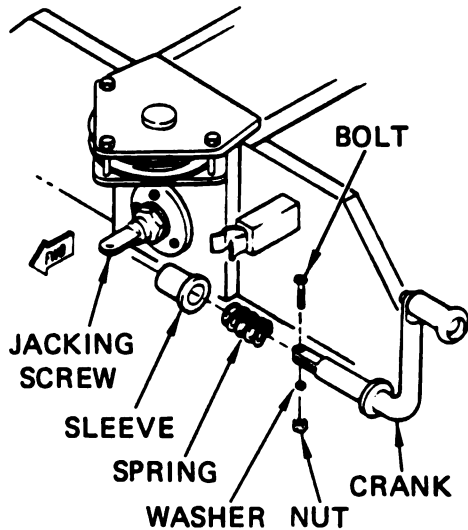


(7) Apply zinc chromate primer to 18 bolts. Position two angles and clamp bracket on pulley support assembly and secure with 18 bolts and washers. Using 8mm socket, torque bolts to 6.5 to 8 N•m.

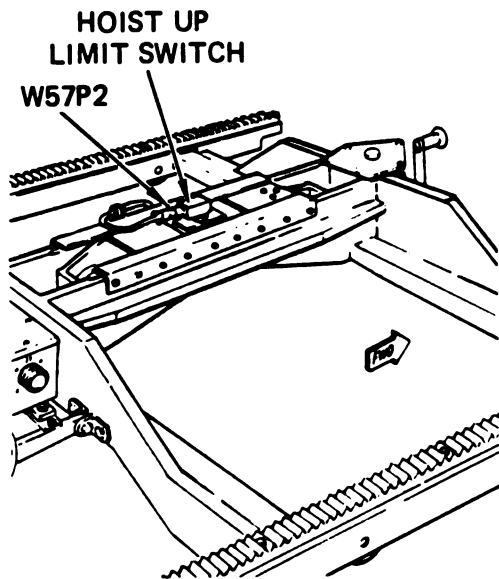


5-17. LP/C HOIST PULLEYS MAINTENANCE INSTRUCTIONS (CONT)

(8) Apply zinc chromate primer to bolt. Place spring and sleeve on crank and position crank to jacking screw. Install bolt, washer, and nut. Using 8mm box end wrench and 8mm socket, torque nut to 6.5 to 8 N•m.



(9) Connect electrical connector W57P2 to hoist up limit switch.



(10) If no further maintenance is required, perform follow-on procedure (page 5-59).

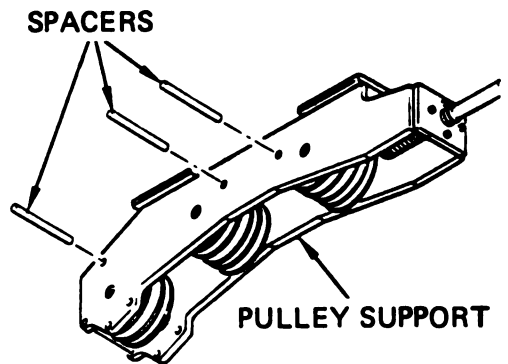
2. SPACERS.

a. Remove.

- a). (1) Remove pulley support assembly (item 1, a).
- (2) Using flat tip screwdriver, press out defective spacer.

b. Install.

- (1) Using flat tip screwdriver, press new spacer in position in pulley support assembly.



- (2) Install pulley support assembly (item 1, b).

3. PULLEYS.

a. Remove.

- a). (1) Remove pulley support assembly (item 1, a).

CAUTION

The pulley spacers are not identical. Note position of spacers between pulleys when removing to insure proper installation.

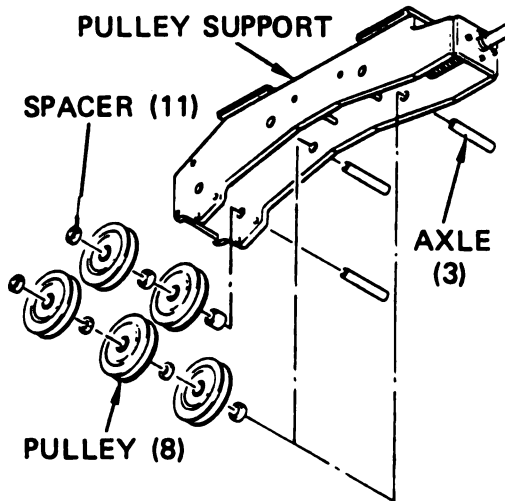
- (2) Push pulley axle out and remove pulleys and spacers.

b. Install.

- (1) Assemble pulleys and spacers in pulley support assembly making sure spacers are in position noted during removal.

5-17. LP/C HOIST PULLEYS MAINTENANCE INSTRUCTIONS (CONT)

(2) Insert axle through pulley support assembly, spacers and pulleys.



(3) Install pulley support assembly (item 1, b).

FOLLOW-ON PROCEDURE

Install hoist cable (paragraph 5-14).

5-18. LP/C HOIST CARRIAGE ASSEMBLY MAINTENANCE INSTRUCTIONS. This paragraph covers the maintenance tasks for the following items:

<i>Item</i>	<i>Page</i>
1. Carriage Assembly	5-60
2. Carriage Rollers	5-66
3. Rack Gear	5-66
4. Cable Socket	5-67
5. Idler Pulleys	5-68
6. Jacking Screw	5-70
7. Hoist Cable Guide Tube	5-74

INITIAL SETUP

Test/Support Equipment
Wrecker, HEMTT

Tools
Kit, tool, 13032302

Materials/Parts
Compound, locking (14, Appendix B)
Primer, zinc chromate (47, Appendix B)
Rope, manila (54, Appendix B)

Personnel Required
2 MLRS Repairers MOS 27M

Wrecker Driver MOS 63H
(MLRS Crewmember MOS 13M to assist as required)

References
TM 9-1425-646-10

Troubleshooting
Paragraph 2-9

Equipment Condition
Position LLM to 3200 mils (180 degrees) azimuth and 0 mils elevation (TM 9-1425-646-10)

1. CARRIAGE ASSEMBLY.

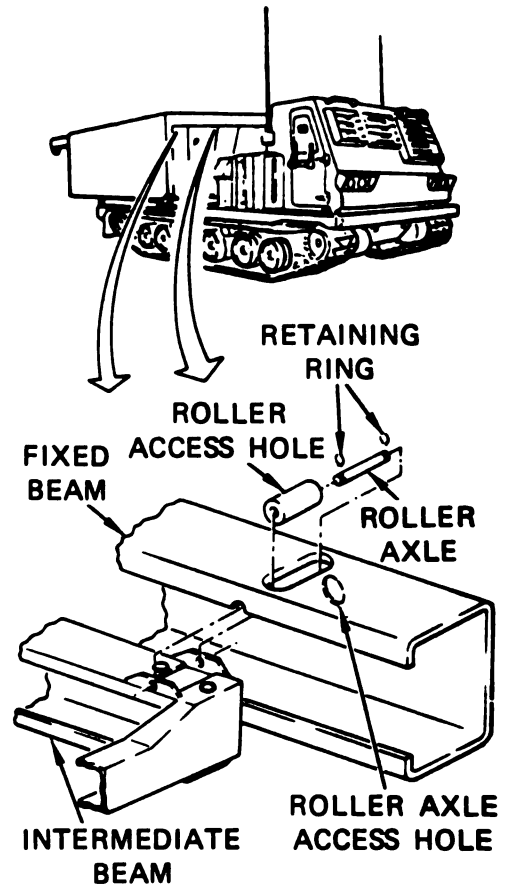
a. Remove.

(1) Manually extend intermediate beam on boom not being repaired until rear end of boom is forward of access holes in fixed beam (TM 9-1425-646-10).

(2) Manually extend intermediate beam on boom with defective carriage until intermediate beam roller axle is alined with access hole in fixed beam and cage outer plate (TM 9-1425-646-10).

(3) Using retaining ring pliers, remove inboard retaining ring from roller axle.

(4) Using drift punch and hammer, drive axles out through access hole in fixed beam. Remove roller through top access hole.



5-18. LP/C HOIST CARRIAGE ASSEMBLY MAINTENANCE INSTRUCTIONS (CONT)

(5) Remove boom extension actuator (paragraph 5-6).

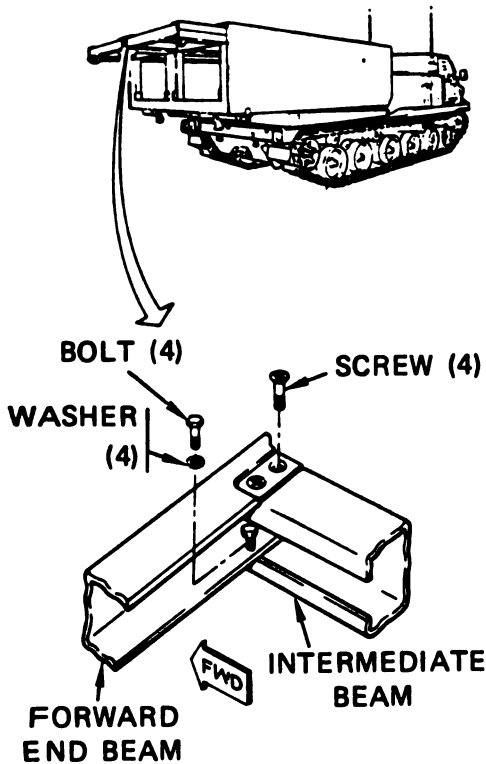
(6) Using 19mm socket, remove four bolts and washers from forward end beam assembly.

(7) Using 8mm key socket attachment, remove four screws from top of forward end beam assembly. Remove forward end beam assembly.

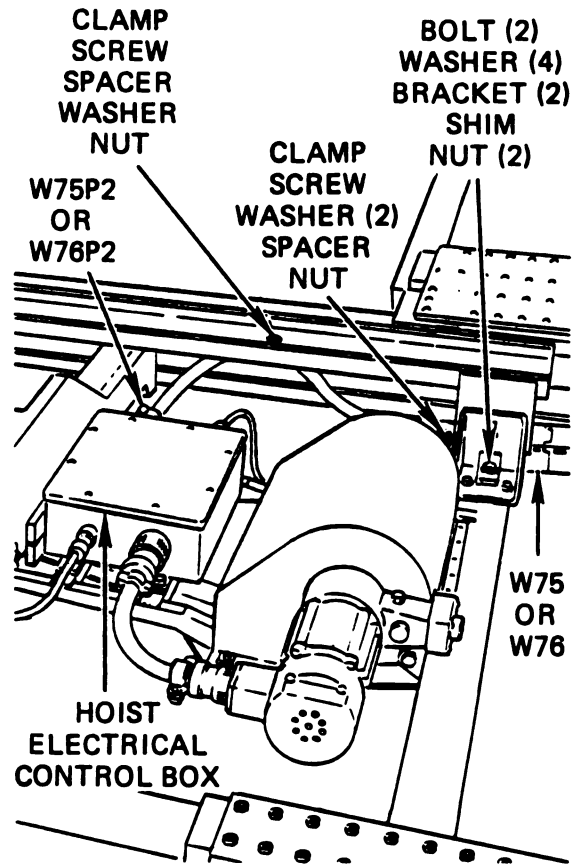
(9) Using crosstip screwdriver and 6mm box end wrench, remove clamp from W75 or W76.

(10) Using 12mm socket and 17mm box end wrench, remove two bolts, nuts, and four washers securing flexible cable bracket to hoist support.

(11) Remove flexible cable from hoist support and support cable out of the way.



(8) Cut lockwire and disconnect W75P2 or W76P2 from hoist electrical control box connector J1.

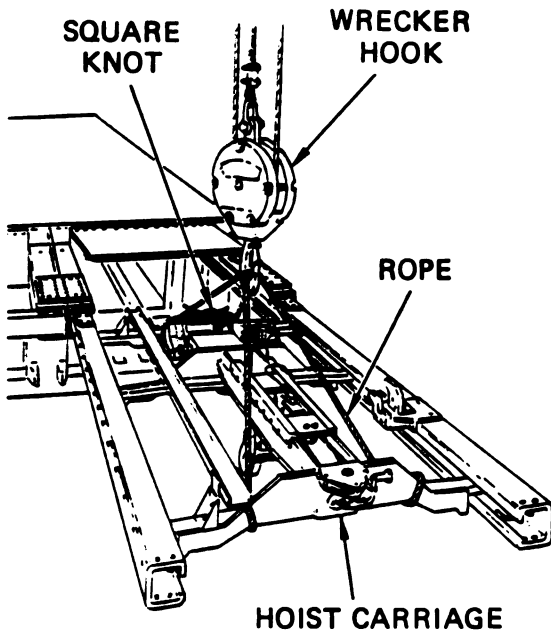


5-18. LP/C HOIST CARRIAGE ASSEMBLY MAINTENANCE INSTRUCTIONS (CONT)

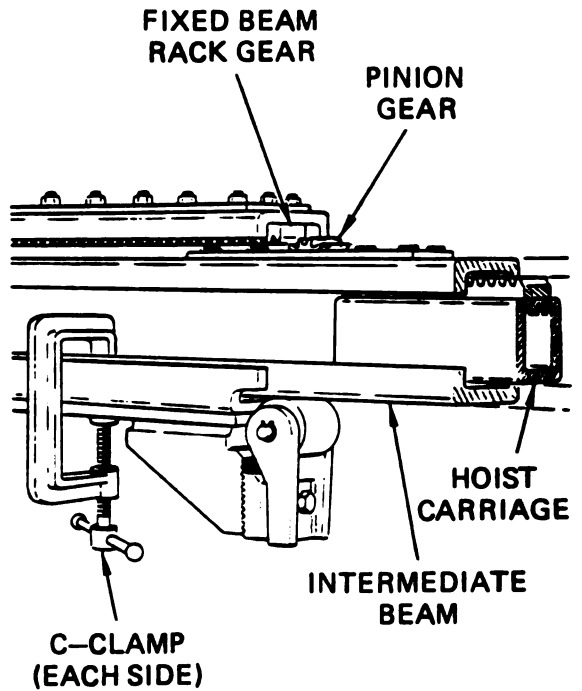
WARNING

Do not stand under carriage. Carriage is heavy and could fall, swing, or tip causing injury.

(12) Position wrecker so that hook is centered over carriage. Secure rope to carriage. Use square knot and position rope on hook.



(13) Secure intermediate beam in position, with pinion gear just forward of fixed beam rack gear, using C-clamp on each side.



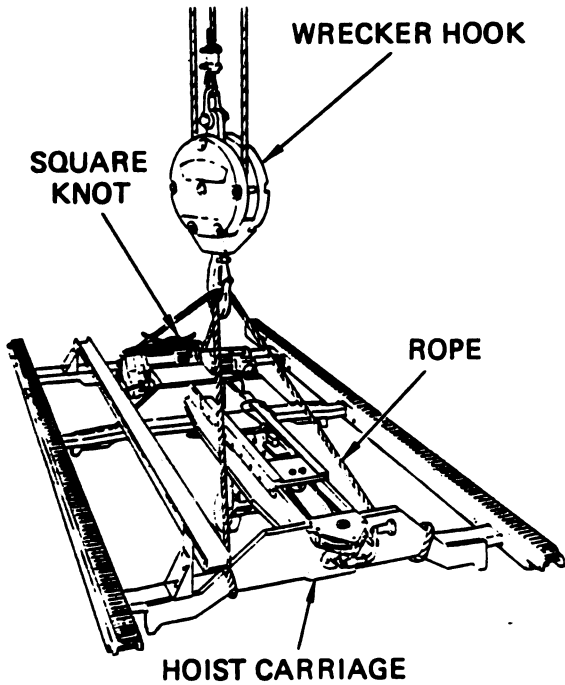
(14) While supporting weight of carriage with wrecker, move wrecker away from SPLL and pull carriage out of intermediate beam.

(15) Lower carriage onto wooden supports and remove rope and wrecker.

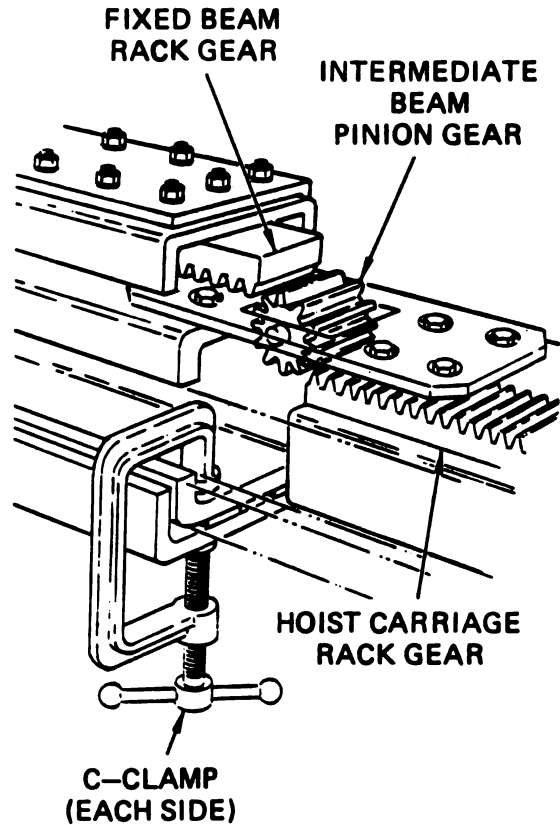
5-18. LP/C HOIST CARRIAGE ASSEMBLY MAINTENANCE INSTRUCTIONS (CONT)

b. Install.

(1) Position wrecker hook over center of new carriage and connect rope to hook and carriage.



(2) Position pinion gear just forward of fixed beam rack gear and using C-clamp on each side, clamp intermediate beam in position.

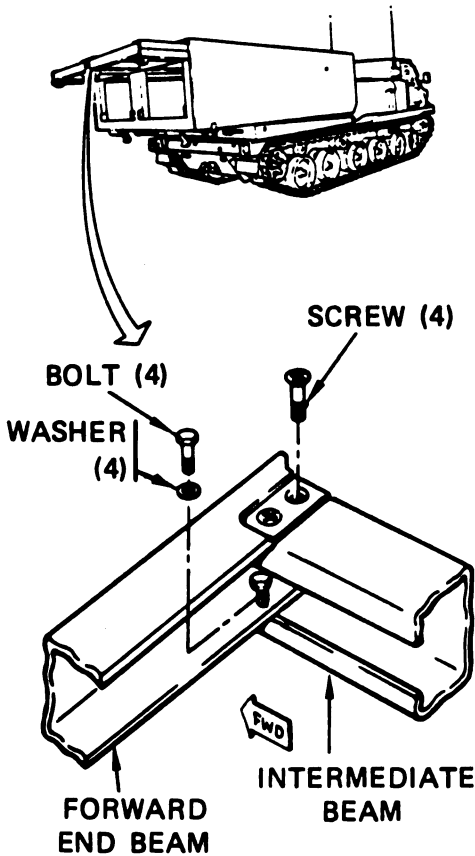


(3) Lift carriage into position and pull carriage rails into intermediate beam. Using C-clamps and by tapping both beams with wood block, aline beams and carriage until first tooth on each of the four rack gears engage at same time.

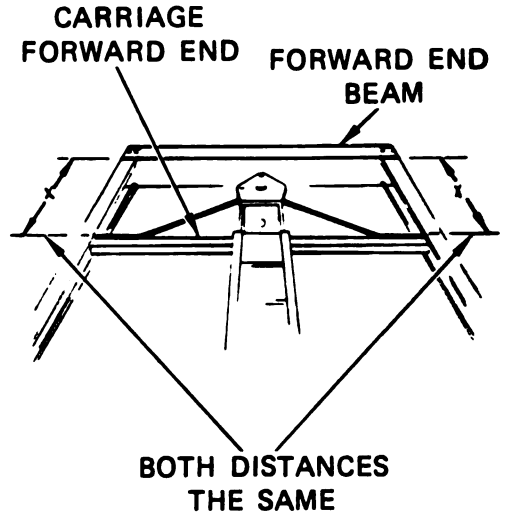
5-18. LP/C HOIST CARRIAGE ASSEMBLY MAINTENANCE INSTRUCTIONS (CONT)

(4) Place forward end beam in position on intermediate beam. Apply zinc chromate primer to screws and bolts. Install four screws on top side and four bolts with washers on bottom.

(5) Using 8mm socket attachment and 19mm socket, tighten screws and bolts.

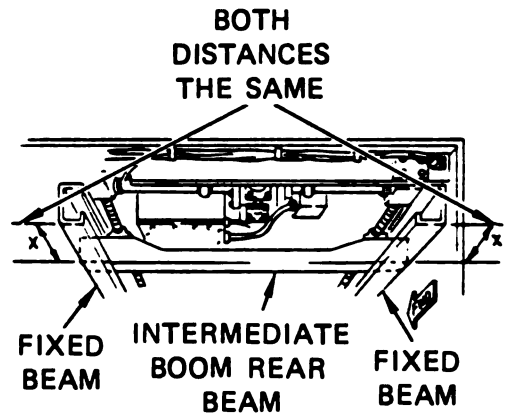


(6) Measure distance from both sides of forward end of carriage to rear surface of forward end beam. Compare measurements.



(7) Measure distance from both sides of rear surface of intermediate beam and rear of fixed beam. Compare measurements.

(8) If either measurement does not agree, carriage or intermediate beam have not engaged equally on both sides. Reinstall carriage, paying particular attention to engage pinion and gear rack simultaneously on each side.



5-18. LP/C HOIST CARRIAGE ASSEMBLY MAINTENANCE INSTRUCTIONS (CONT)

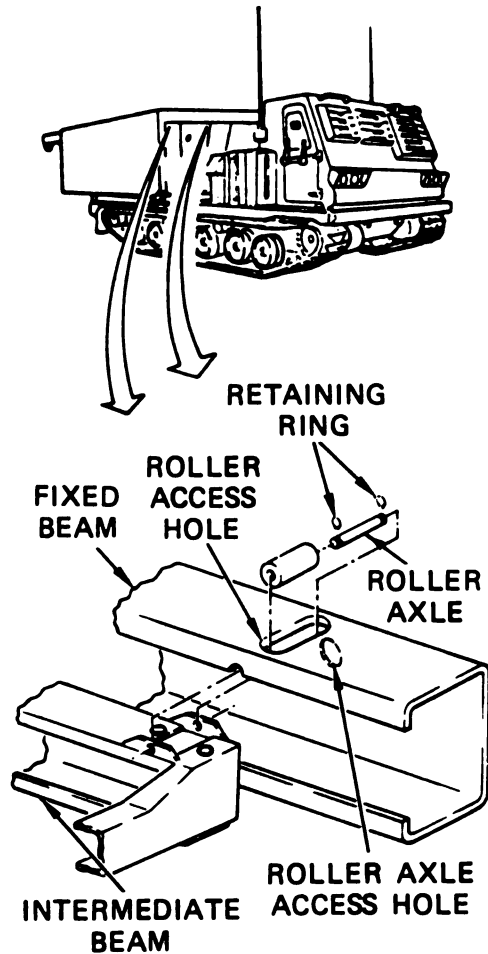
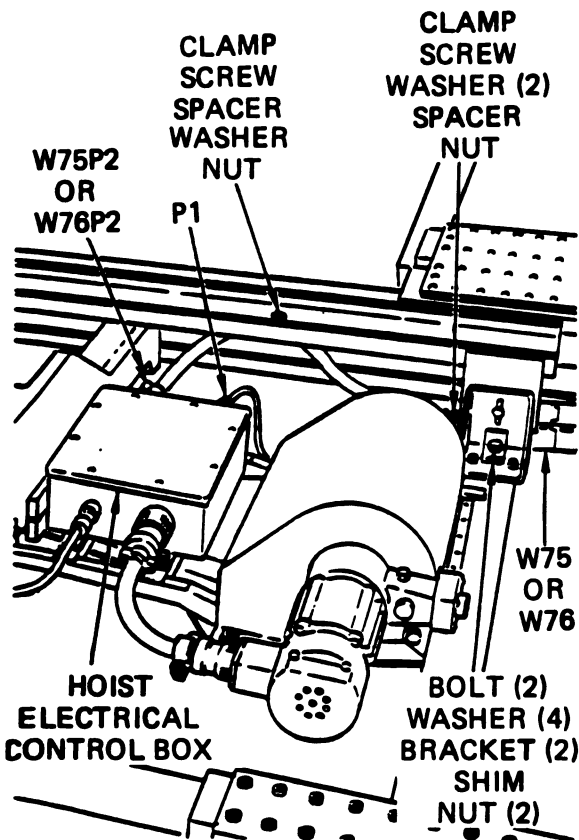
(9) Secure flexible cable and flexible cable bracket to hoist support assembly with two bolts wet with zinc chromate primer, four washers, and two nuts. Using 12mm socket and 17mm box end wrench, tighten nuts.

(10) Connect W75P2 or W76P2 to hoist electrical control box connector J1. Lock-wire W75P2 or W76P2 to hoist down limit switch connector P1.

(11) Clamp cable W75 or W76 to carriage using crosstip screwdriver and 6mm box end wrench.

(14) Place rollers into position through access holes in top of fixed beam. Insert roller axles into position through side access holes in fixed beam. Use punch and hammer as required to install axles.

(15) Use retaining ring pliers to install retaining ring on each end of axles.



(12) Install boom extension actuator (paragraph 5-6).

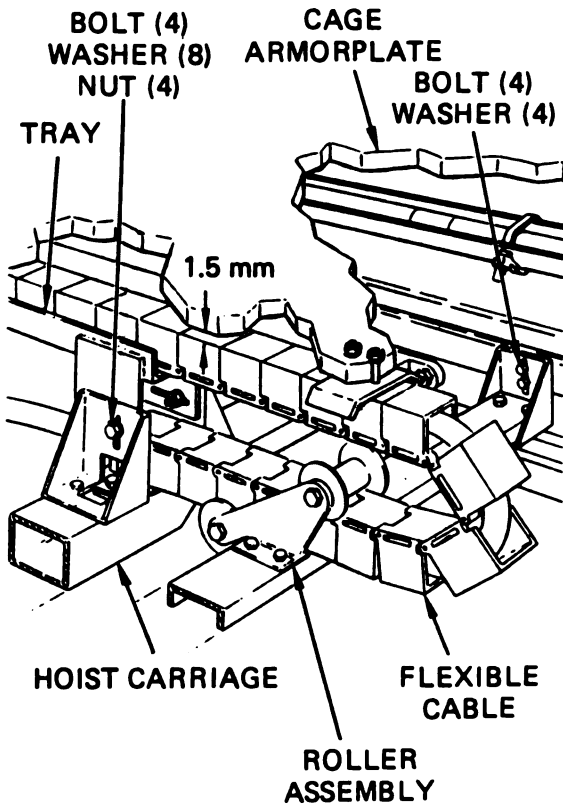
(13) Manually retract boom until holes for axle in roller mounting brackets line up with access hole in fixed beam and cage outer plate (TM 9-1425-646-10).

(16) Manually retract boom to full in position. Check that boom travel is smooth and not binding.

(17) With hoist carriage fully retracted, measure clearance between flexible cable, as it lies in tray, and inside cage armorplate. Using 8mm and 6mm box end wrenches, raise or lower tray in its mounting bracket to obtain clearance of 1.5mm at both ends of tray.

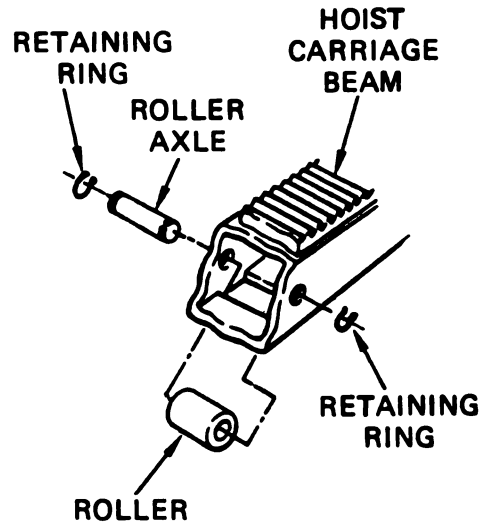
5-18. LP/C HOIST CARRIAGE ASSEMBLY MAINTENANCE INSTRUCTIONS (CONT)

(18) With hoist carriage fully retracted, check to insure flexible cable is supported by roller assembly. Using 8mm combination wrench, raise or lower roller assembly until roller assembly contacts flexible cable.



b. Install.

- (1) Position new rollers in carriage beams.
- (2) Using hammer and punch, tap axle through carriage beam and rollers.
- (3) Using retaining ring pliers, install two retaining rings.



- (4) Install carriage assembly (item 1, b).

(19) Check adjustment of boom limit switches (paragraphs 5-12 and 5-13).

(20) Check adjustment of hoist limit switches (paragraphs 5-20 and 5-21).

(21) If no further maintenance is required, perform follow-on procedure (page 5-78).

2. CARRIAGE ROLLERS.

a. Remove.

- (1) Remove carriage assembly (item 1, a).
- (2) Using retaining ring pliers, remove two retaining rings from roller shaft.
- (3) Using punch and hammer, drive axle out of roller and carriage. Remove roller.

3. RACK GEAR.

a. Remove.

- (1) Remove carriage assembly (item 1, a).

NOTE

Shims are factory set and should be installed in the same position whenever a rack gear is replaced.

- (2) Mark location and direction of both shims under rack gear being removed.

NOTE

The number of washers under each nut may vary. Record number of washers under each nut.

- (3) Using 5/16 hi-torque screwdriver bit and 9/16-inch socket, remove six nuts, washers, and

5-18. LP/C HOIST CARRIAGE ASSEMBLY MAINTENANCE INSTRUCTIONS (CONT)

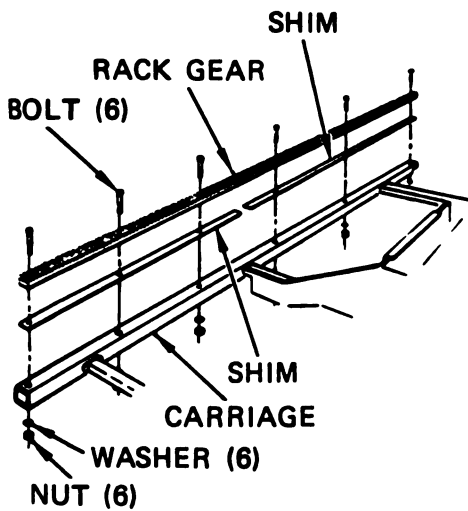
bolts. Record number of washers under each nut. Remove rack gear and shims.

b. Install.

(1) Position shims on carriage in location and direction noted during removal.

(2) Position new rack gear on shims and install six bolts, number of washers noted during removal, and six nuts.

(3) Using 5/16 hi-torque screwdriver bit and 9/16-inch socket, tighten nuts.



(4) Install carriage assembly (item 1, b).

4. CABLE SOCKET.

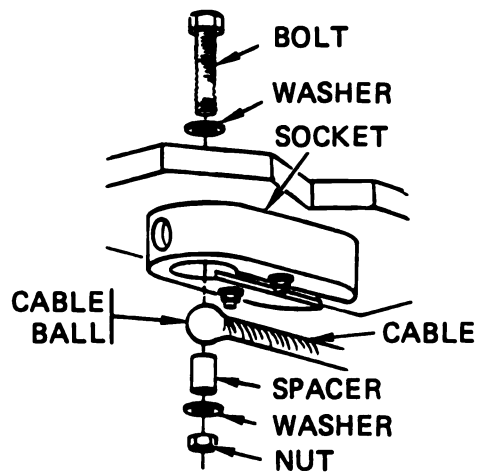
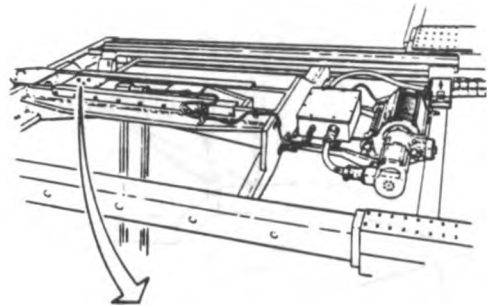
a. Remove.

(1) Manually extend boom and lower hoist hook to convenient clean surface. Allow about 2 feet of slack in cable (TM 9-1425-646-10).

(2) Using 10mm box end wrench and 10mm socket, remove nut, spacer, washer, and bolt securing cable in socket.

(3) Push cable ball out of recessed area of socket and pull down and out of socket.

(4) Secure cable to carriage with twine.

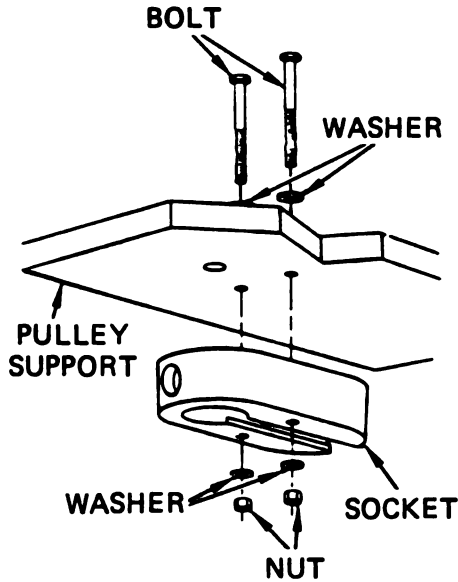


(5) Using 10mm box end wrench and 10mm socket, remove two nuts, four washers, and two bolts securing socket to pulley support. Remove socket.

5-18. LP/C HOIST CARRIAGE ASSEMBLY MAINTENANCE INSTRUCTIONS (CONT)

b. Install.

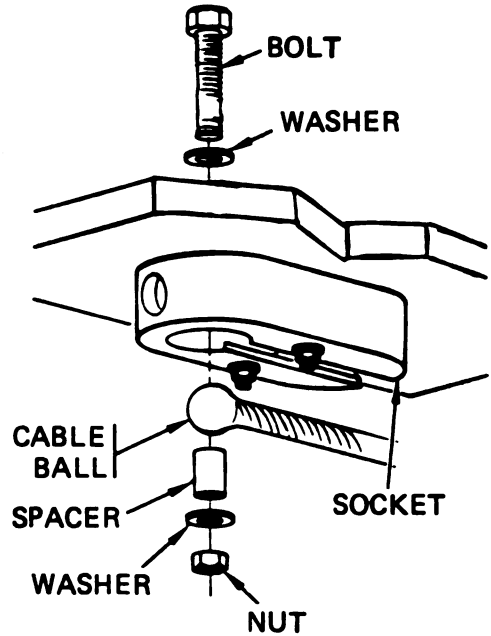
(1) Apply zinc chromate primer to two bolts. Position new socket to pulley support and install two bolts, four washers, and two nuts. Using 10mm box end wrench and 10mm socket, torque nuts to 11.5 to 13.5 N•m.



(2) Cut twine securing cable to carriage. Push cable ball up and forward into socket, then pull cable back so ball fits into socket recess.

(3) Install bolt, spacer, washer, and nut to secure cable in socket. Using 10mm box end wrench and 10mm socket, torque nut to 11.5 to 13.5 N•m.

(4) If no further maintenance is required, perform follow-on procedure (page 5-78).



5. IDLER PULLEYS.

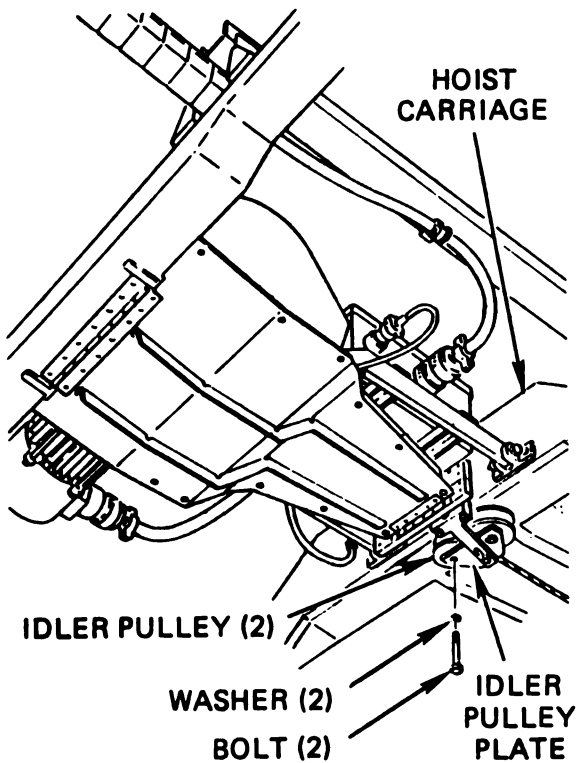
a. Remove.

(1) Manually extend boom and lower hook to convenient clean surface. Allow some slack in cable (TM 9-1425-646-10).

(2) Using 17mm socket, remove bolt and washer from defective rear idler pulley.

(3) Slide idler pulley from beneath idler pulley plate. If necessary, use 17mm socket and loosen bolt on other pulley to release pressure on defective pulley.

5-18. LP/C HOIST CARRIAGE ASSEMBLY MAINTENANCE INSTRUCTIONS (CONT)



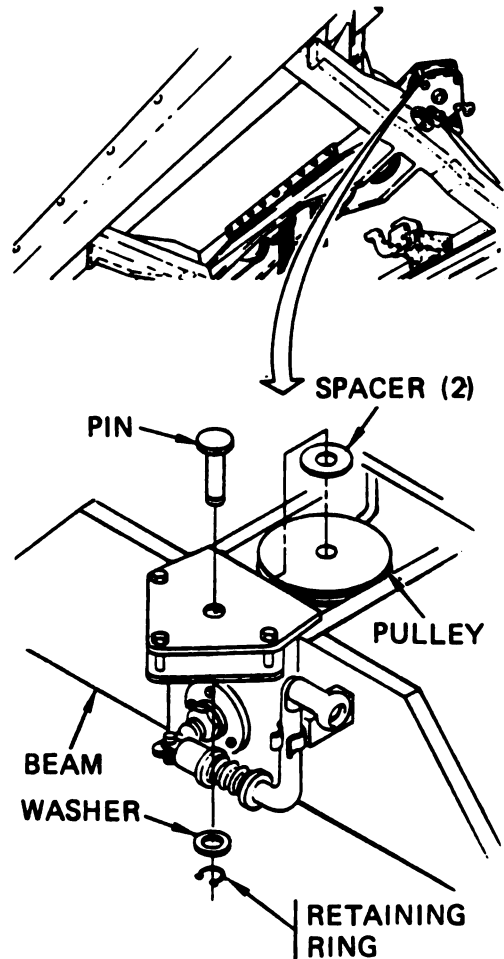
(4) Using retaining ring pliers, remove retaining ring and washer from pin in front idler pulley.

(5) Pull pin out of pulley and slide pulley to rear. Remove pulley and two spacers from beam.

b. Install.

(1) Position cable on new front idler pulley and slide pulley and spacer forward in beam.

(2) Install pin through beam and pulley. Install washer and using retaining ring pliers, install retaining ring to secure pin in beam.

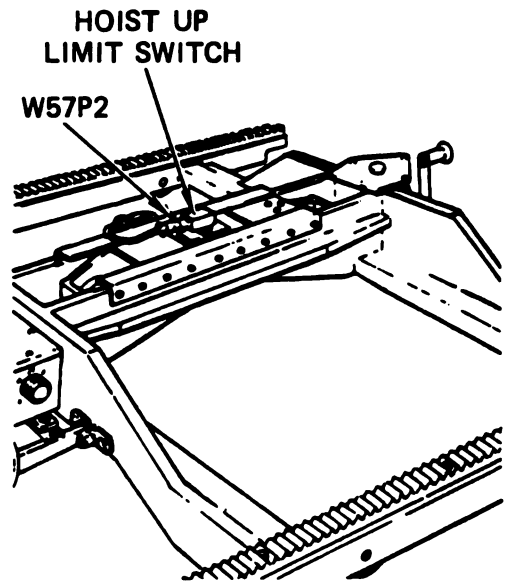
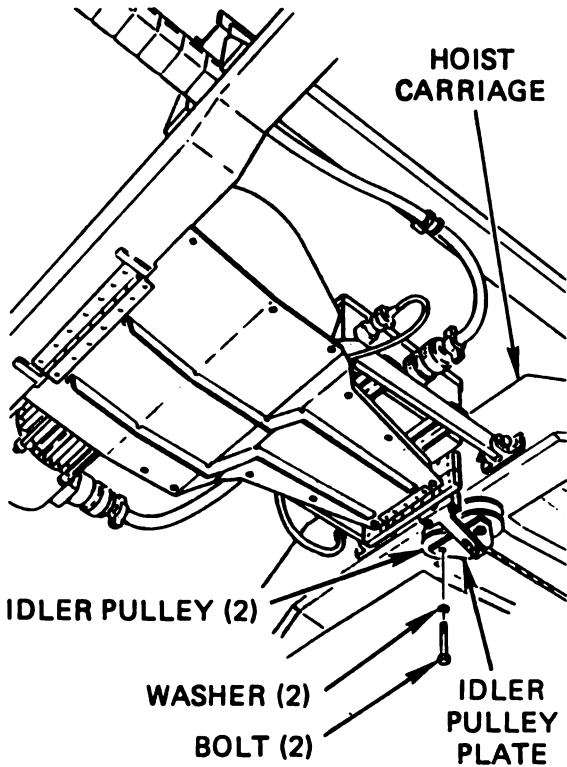


5-18. LP/C HOIST CARRIAGE ASSEMBLY MAINTENANCE INSTRUCTIONS (CONT)

(3) Position new rear pulley in carriage and under idler pulley plate.

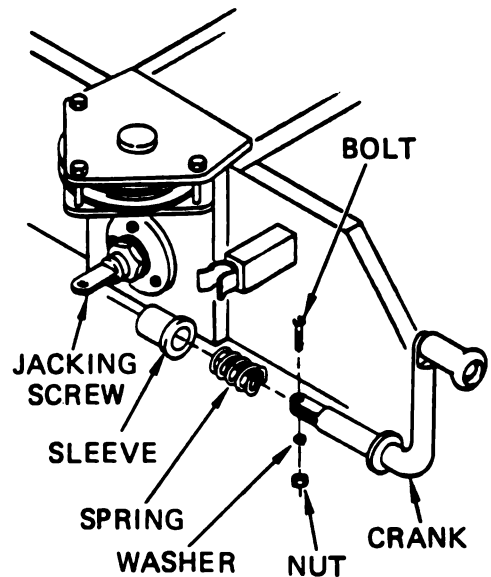
(4) Install bolt and washer. Using 17mm socket, torque two bolts securing idler pulley plate and pulleys to 11 to 15 N•m.

(5) If no further maintenance is required, perform follow-on procedure (page 5-78).



(3) Using crank, position pulley support assembly in M77 position.

(4) Place crank in stowed position. Using 8mm box end wrench and 8mm socket, remove nut, washer, and bolt. Remove crank and slide sleeve and spring from crank.



6. JACKING SCREW.

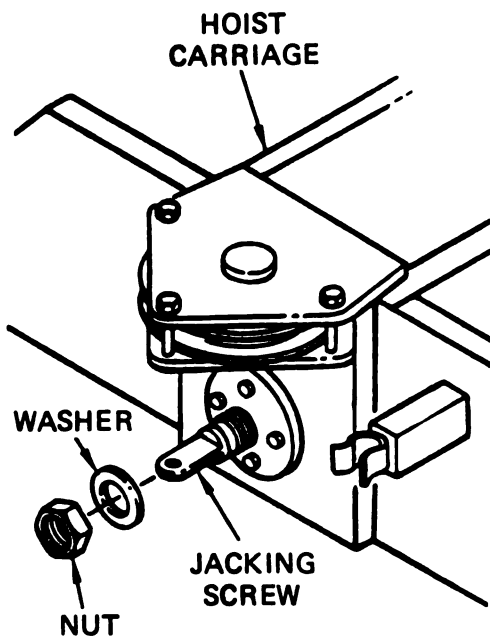
a. Remove.

(1) Manually extend boom and lower hoist hook to convenient clean surface. Provide some slack in cable (TM 9-1425-646-10).

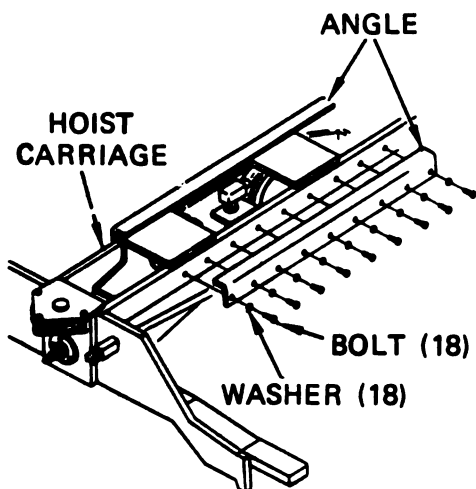
(2) Disconnect electrical connector W57P1 from hoist up limit switch.

5-18. LP/C HOIST CARRIAGE ASSEMBLY MAINTENANCE INSTRUCTIONS (CONT)

(5) Using 24mm wrench, remove nut and washer securing jacking screw to hoist carriage.

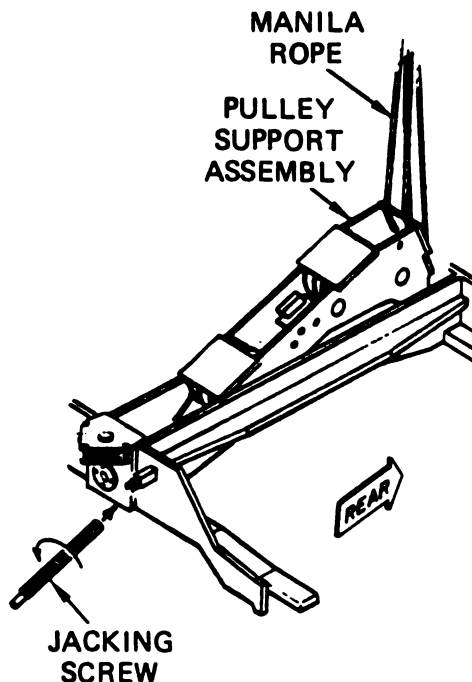


(6) Using 8mm socket, remove 18 bolts and washers securing two angles to hoist carriage. Remove angles.

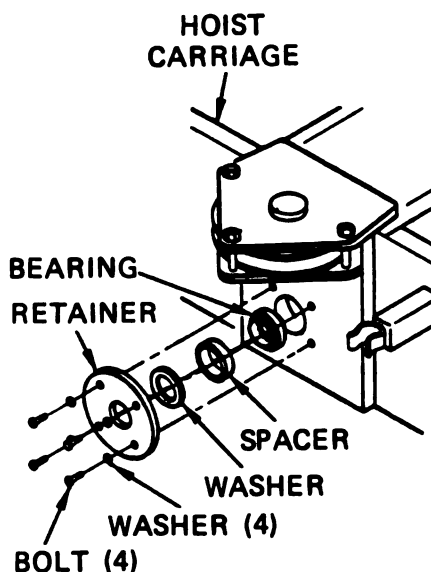


(7) Push pulley support back until jacking screw is clear of carriage.

(8) Secure manila rope to rear beam of pulley support and wrecker hook. Lift back end of pulley support until jacking screw is below carriage. Unscrew jacking screw from pulley support assembly.



(9) Using 8mm socket, remove four bolts and washers securing retainer to carriage. Remove retainer, spacer, washer, and bearing.

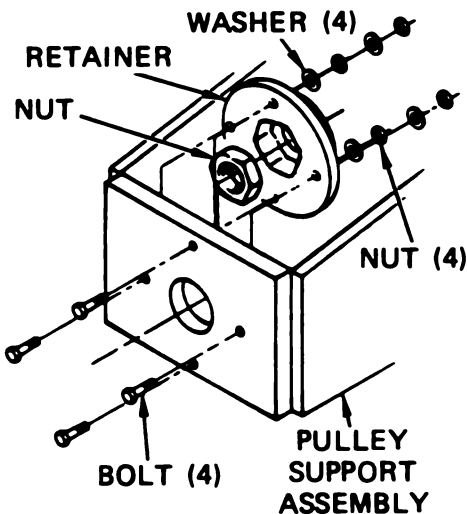
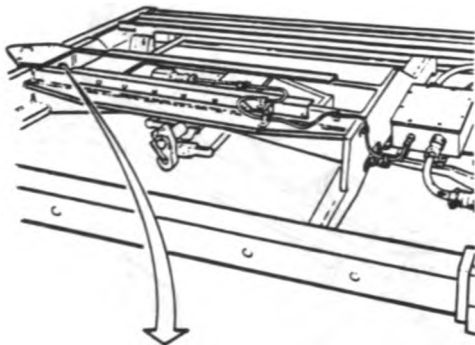


5-18. LP/C HOIST CARRIAGE ASSEMBLY MAINTENANCE INSTRUCTIONS (CONT)

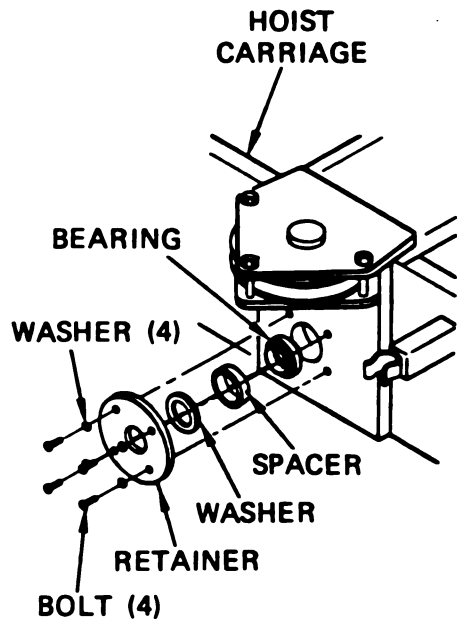
(10) Using 8mm box end wrench and 8mm socket, remove four bolts, washers, and nuts securing retainer to pulley support. Remove retainer and nut.

b. Install.

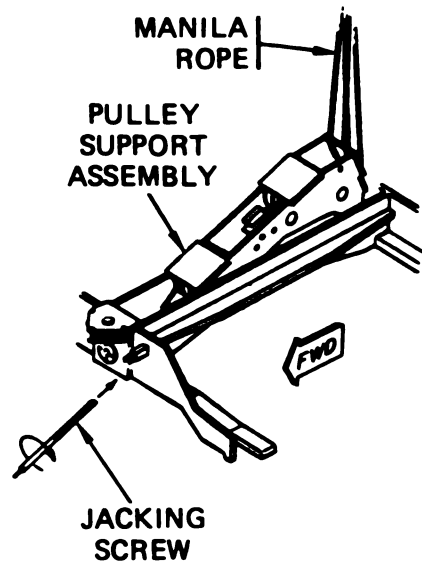
(1) Position nut and retainer on pulley support assembly and install four bolts, washers, and nuts. Using 8mm box end wrench and 8mm socket, tighten nuts.



(2) Position bearing, washer, spacer, and retainer on carriage and install four bolts and washers. Using 8mm socket, tighten bolts.



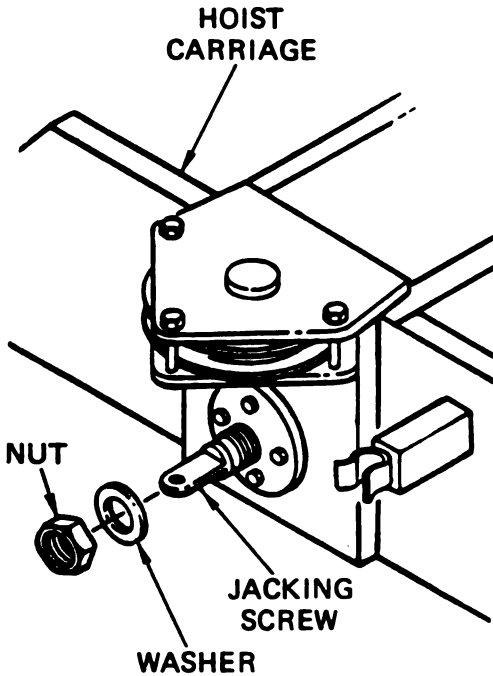
(3) Secure manila rope to rear end of pulley support assembly and wrecker hook. Lift back end of pulley support assembly and screw new jacking screw into nut on pulley support assembly. Lower pulley support assembly and disconnect manila rope.



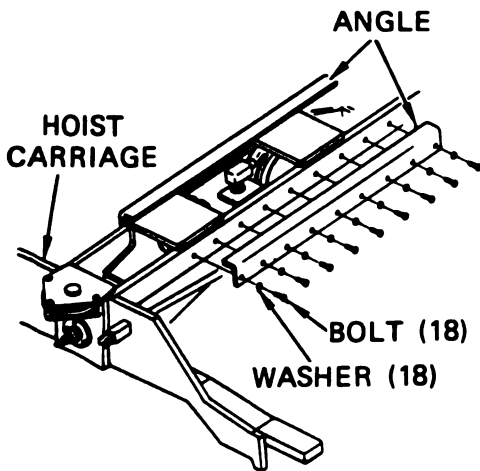
5-18. LP/C HOIST CARRIAGE ASSEMBLY MAINTENANCE INSTRUCTIONS (CONT)

(4) Push pulley support assembly forward until jacking screw extends through bearing in carriage beam.

(5) Install washer and nut to secure jacking screw to carriage. Using 24mm socket, tighten nut.

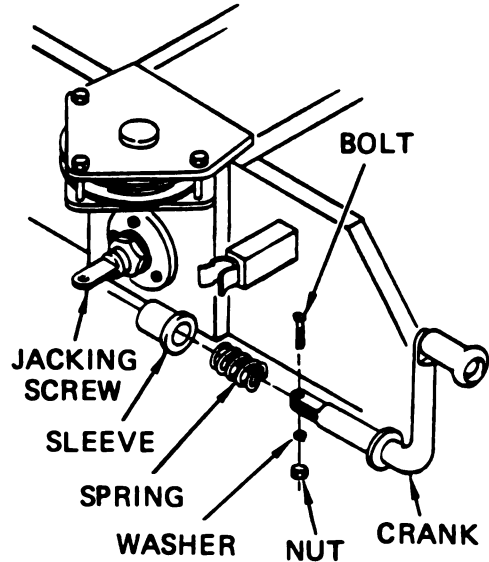


(6) Position two angles on carriage and install 18 bolts and washers. Using 8mm socket, tighten bolts.



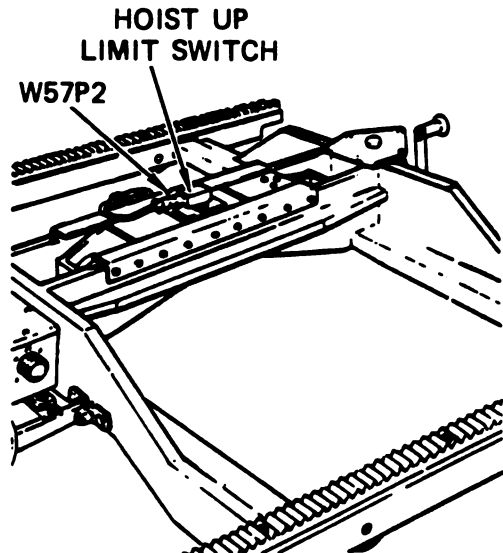
(7) Position spring and sleeve on crank. Place crank in position on jacking screw and install bolt, washer, and nut. Using 8mm box end wrench and 8mm socket, tighten nut.

(8) Position carriage in M77 position. Place crank in stowed position.



(9) Connect electrical connector W57P1 to hoist up limit switch.

(10) If no further maintenance is required, perform follow-on procedure (page 5-78).



5-18. LP/C HOIST CARRIAGE ASSEMBLY MAINTENANCE INSTRUCTIONS (CONT)

7. HOIST CABLE GUIDE TUBE.

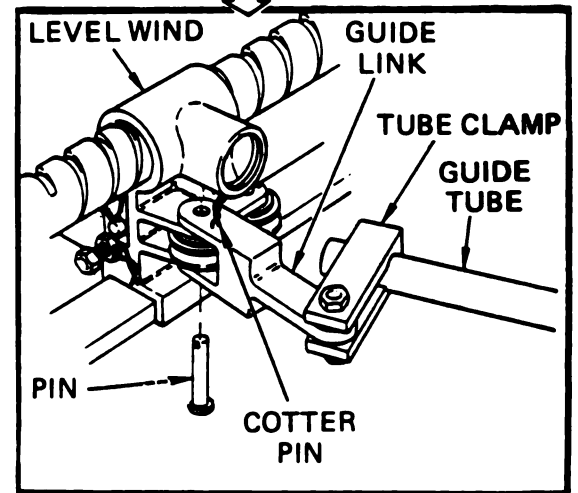
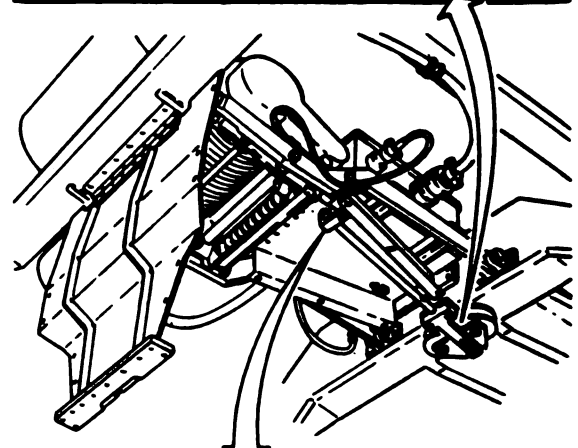
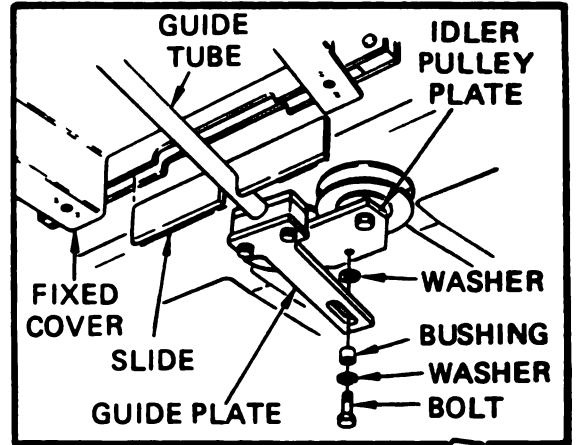
a. Remove.

(1) Remove hoist cable from hoist drum. Unthread only as far as through idler pulleys. Position cable to prevent further unthreading.

(2) Remove cotter pin and pin securing guide link to hoist level wind.

(3) Using 10mm socket, remove bolt, washers, and bushing securing guide plate to idler pulley plate.

(4) Remove cable guide tube assembly consisting of guide link, tube clamp, guide tube, and guide plate. Remove and retain slide from fixed cover.



5-18. LP/C HOIST CARRIAGE ASSEMBLY MAINTENANCE INSTRUCTIONS (CONT)

b. Repair.

(1) Using 6mm socket and 8mm box end wrench, remove bolt, washer, and nut securing guide link to tube clamp. Slide guide tube out of tube clamp.

(2) Using 8mm socket, remove two bolts and washers securing guide plate and two clamp halves to guide tube.

(3) Position guide plate and two clamp halves on bellmouth end of new guide tube. Apply zinc chromate primer to two bolts. Install two bolts and washers through guide plate to clamp halves securing guide tube. Tighten bolts finger-tight.

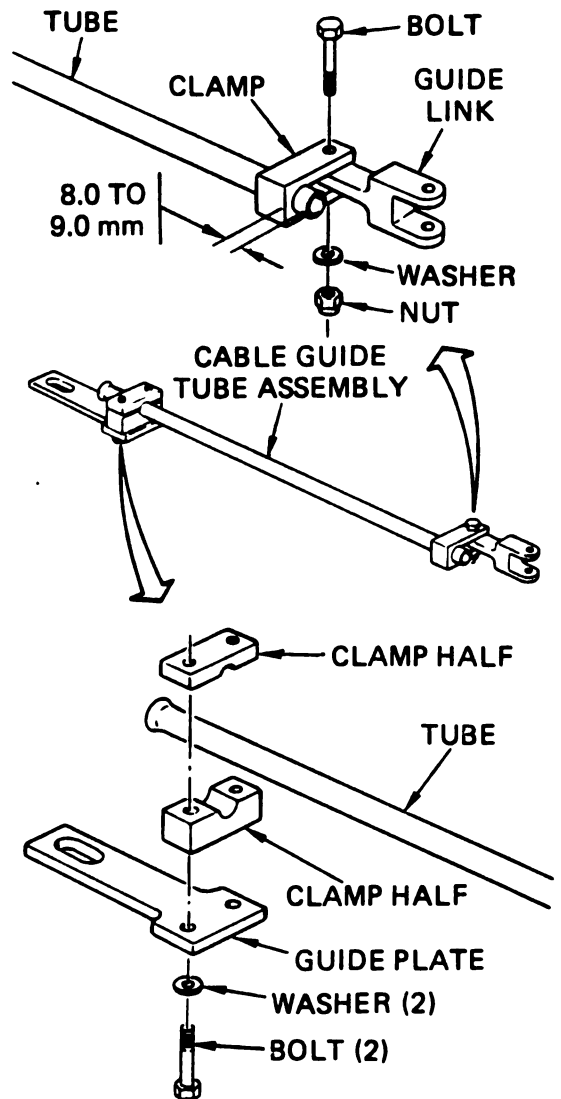
NOTE

Steps (4) through (6) must be followed to insure that cable guide assembly is held in position adequately without crimping tube or restricting its movement throughout its arc of travel.

(4) Position tube clamp on guide tube. Apply zinc chromate primer to bolt and attach guide link to clamp with bolt, washer, and nut. Position tube in clamp so 8.0 to 9.0mm of tube extends beyond clamp.

(5) Using 6mm socket, 8mm box end wrench, and feeler gage, tighten nut. Make sure link moves freely in clamp.

(6) Hold tube clamp securely with one hand and using your thumb, apply approximately 20N (5 lb) of force to end of guide tube. Force should be applied axially along tube to insure tube does not slip within clamp. If tube slips, repeat step (5).



5-18. LP/C HOIST CARRIAGE ASSEMBLY MAINTENANCE INSTRUCTIONS (CONT)

c. Install.

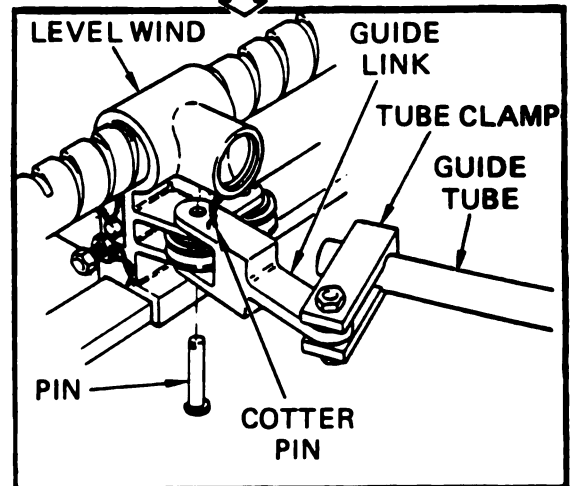
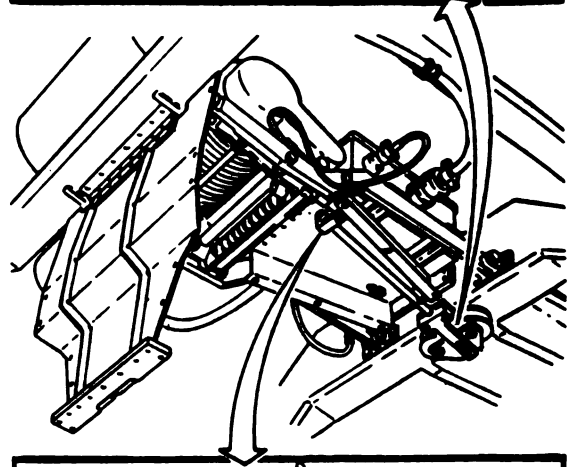
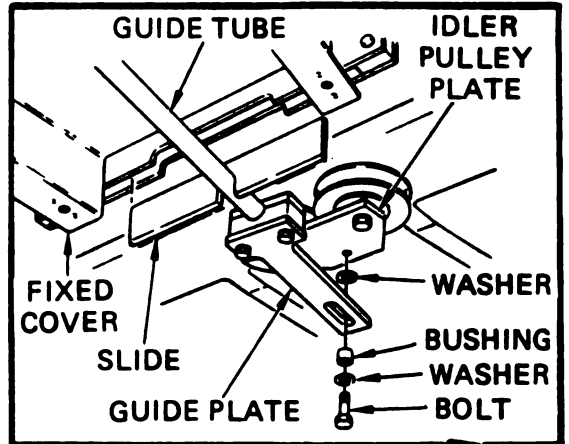
NOTE

It is essential that the cable guide tube assembly is positioned properly in relation to the tube clamps at each end. The cable guide tube assembly and its mounting hardware must not bind but have free movement at all points of travel. Avoid overtightening clamps on tubes. Do not crimp or bind cable guide tube assembly.

(1) Install slide in fixed cover. Position cable guide tube assembly so hole in guide plate aligns with hole in idler pulley plate.

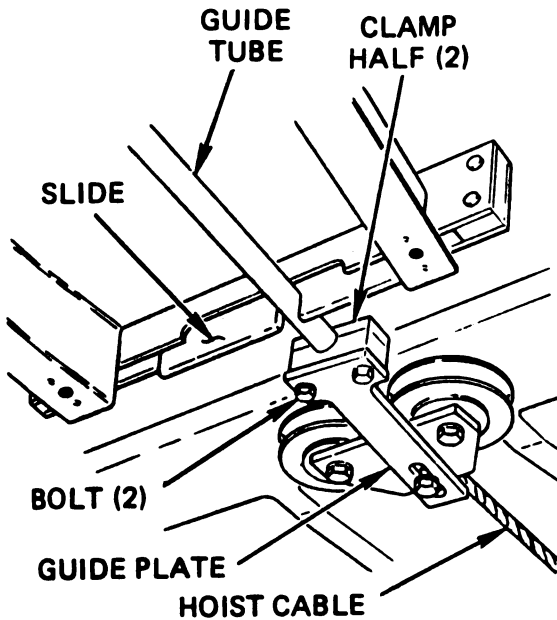
(2) Apply MIL-S-22473, Grade A locking compound to bolt threads. Install washer between guide plate and idler pulley plate. Install bushing in guide plate slot. Install washer on bolt and install bolt to secure guide plate to idler pulley plate. Tighten bolt finger-tight to hold guide plate in position.

(3) Position guide assembly link on hoist level wind and install pin. Secure pin with cotter pin.



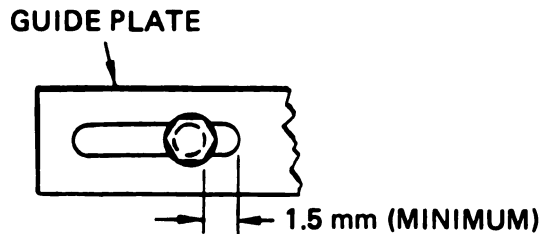
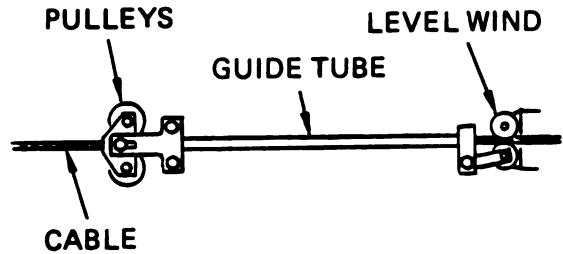
5-18. LP/C HOIST CARRIAGE ASSEMBLY MAINTENANCE INSTRUCTIONS (CONT)

(4) Thread hoist cable through idler pulleys, guide tube, hoist level wind, and onto hoist drum. Secure hoist cable to drum (paragraph 5-14).



(1) Using BC, lower hooks until guide tube and cable form straight line from idler pulleys to drum level wind.

(2) Check for 1.5mm minimum gap between slot in guide plate and bushing on guide plate attaching bolt.



(5) Perform hoist guide tube rigging.

d. Hoist Guide Tube Rigging.

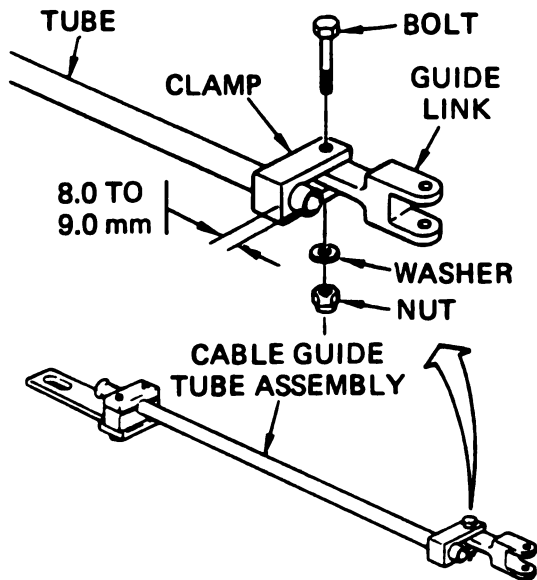
CAUTION

Hold upper cover away from hoist drum to prevent binding.

(3) Check to make sure flared end of guide tube is as close as possible to guide plate clamp. If necessary, loosen guide tube clamp and reposition guide tube. Using 8mm socket, tighten guide tube clamp.

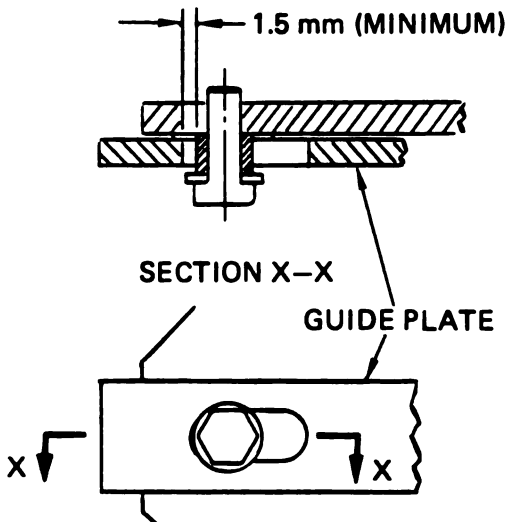
5-18. LP/C HOIST CARRIAGE ASSEMBLY MAINTENANCE INSTRUCTIONS (CONT)

(4) Measure distance guide tube extends beyond clamp on guide clamp. Guide tube should extend 8.0 to 9.0mm. If necessary, reposition guide tube and repeat steps (2) and (3).

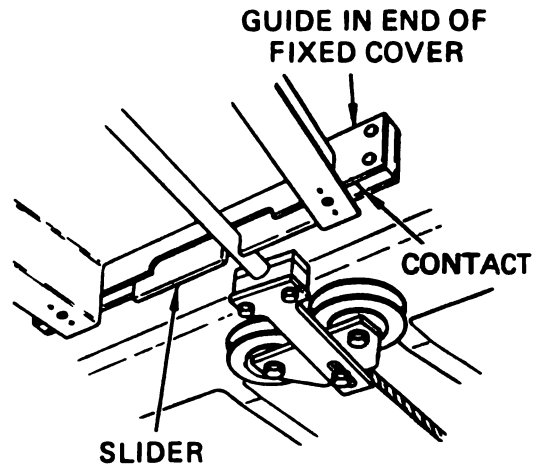


(5) Operate hoist and lower hooks to full out position (down limit switch engaged). As hooks lower, check slider to insure opposite end of slider does not hit end of slide guide slot and cause tube guide and guide plate to bind.

(6) While applying approximately 20 N (5 lb) force axially on guide tube in direction of hoist motor, check distance from forward edge of slot in guide plate and space on guide plate attaching bolt. Distance should not be less than 1.5mm.

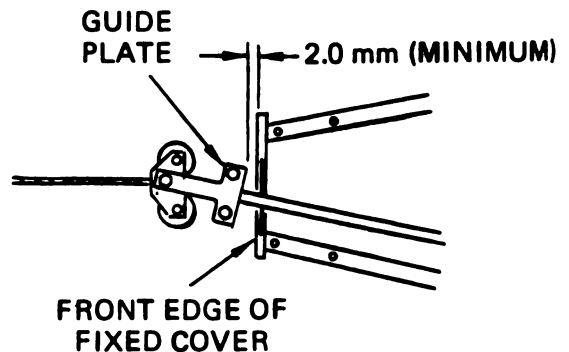


(7) Operate hoist and raise hooks to full up position. As hooks raise, check slide to make sure end of slider does not hit end of slide guide in fixed cover and cause guide tube and guide plate to bind.



(8) Place lower slider into position in fixed cover guide and make sure it is same length as other slider and then close covers.

(9) Check front of covers. Make sure it does not interfere with rear corner on guide plate and that there is at least 2.0mm distance between them.



(10) Operate hoist to raise and lower hook from full up to full down. Recheck guide plate and tube guide to make sure there is no binding over full length of travel.

(11) If no further maintenance is required, perform follow-on procedure.

FOLLOW-ON PROCEDURE

Perform load test after repair (paragraph 3-9).

5-19. LP/C HOIST ELECTRICAL CONTROL ASSEMBLY MAINTENANCE INSTRUCTIONS.

This paragraph covers the replacement of the hoist electrical control assembly.

INITIAL SETUP

Tools

Kit, tool, 13032302

Materials/Parts

Primer, zinc chromate (47, Appendix B)
Varnish (71, Appendix B)

Personnel Required

MLRS Repairer MOS 27M

References

TM 9-1425-646-10
TM 9-1425-646-20

Troubleshooting
Paragraph 2-9

Equipment Condition

Position LLM to 3200 mils (180 degrees)
azimuth and 0 mils elevation
(TM 9-1425-646-10)
Boom extended (TM 9-1425-646-20)

a. Remove.

(1) Disconnect four electrical connectors at control assembly.

(2) Using 10mm box end wrench and 10mm socket, remove four nuts, eight washers, and four bolts securing control assembly to support. Remove control assembly.

b. Install.

(1) Prepare one bolthole mounting surface for electrical bond (paragraph 3-10).

(2) Position new control assembly on supports and install bolt, two washers, and nut in mounting hole prepared for electrical bond.

(3) Using 10mm box end wrench and 10mm socket, tighten nuts. Apply varnish to mounting bolt and nut.

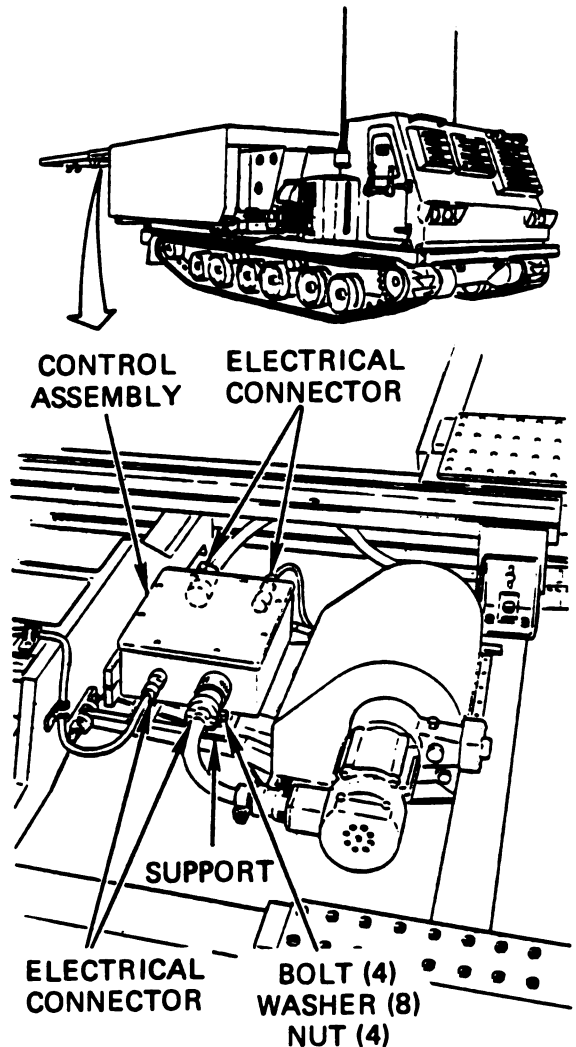
(4) Apply zinc chromate primer to three bolts.

(5) Install three bolts, six washers, and three nuts. Using 10mm box end wrench and 10mm socket, tighten nuts.

(6) Connect electrical connectors as follows:

<u>Cable</u>	<u>Connector</u>
W75P2 or W76P2	J1
W57P1	J5
W53P1	J3
Hoist down switch P1	J4

(7) Lock-wire W75P2 or W76P2 to hoist down switch P1.



FOLLOW-ON PROCEDURE

Using BC, lower and raise hoist hook two times and check for smooth operation (TM 9-1425-646-20).

Retract boom (TM 9-1425-646-20).

Stow LLM (TM 9-1425-646-10).

5-20. HOIST UP LIMIT SWITCH MAINTENANCE INSTRUCTIONS. This paragraph covers the replacement and adjustment of the hoist up limit switch.

INITIAL SETUP

Tools

- Kit, tool, 13032302
- Set, shop, 13032303
- Multimeter, 8050A-01
- Test cable, 13103718

Materials/Parts

- Compound, sealing (15, Appendix B)
- Lockwire (23, Appendix B)
- Methyl-ethyl-ketone (25, Appendix B)
- Varnish (71, Appendix B)

Personnel Required

- MLRS Repairer MOS 27M
- (MLRS Crewmember MOS 13M to assist as required)

References

- TM 9-1425-646-10
- TM 9-1425-646-20

Troubleshooting

- Paragraph 2-9

Equipment Condition

- Boom extended and hoist hook lowered (TM 9-1425-646-20)

a. Remove.

(1) Turn system power off. Disconnect electrical connector W57P2 from limit switch.

(2) Measure full length of switch from lower end of mount bracket to lower edge of roller. Record measurement.

NOTE

There are two types of switch roller guide setscrews. One type requires a 0.062-inch socket head key. The other type requires a crosstip screwdriver. Sealing compound is used during installation of the socket head key type setscrew. No sealing compound is required with the crosstip screwdriver type setscrew. Methyl-ethyl-ketone or a soldering iron must be applied to the socket head key type setscrew to loosen the sealing compound before the setscrew can be removed. In the following procedure, steps applying methyl-ethyl-ketone or sealing compound do not apply if the roller guide setscrew is the crosstip screwdriver type.

(3) Inspect switch roller guide to determine which type of setscrew has been used.

WARNING

Methyl-ethyl-ketone vapors are toxic. Avoid prolonged or repeated breathing of vapors, or contact with skin. Use only with adequate ventilation. Methyl-ethyl-ketone is flammable and should not be used near open flame. Fire extinguisher should be available when solvent is used.

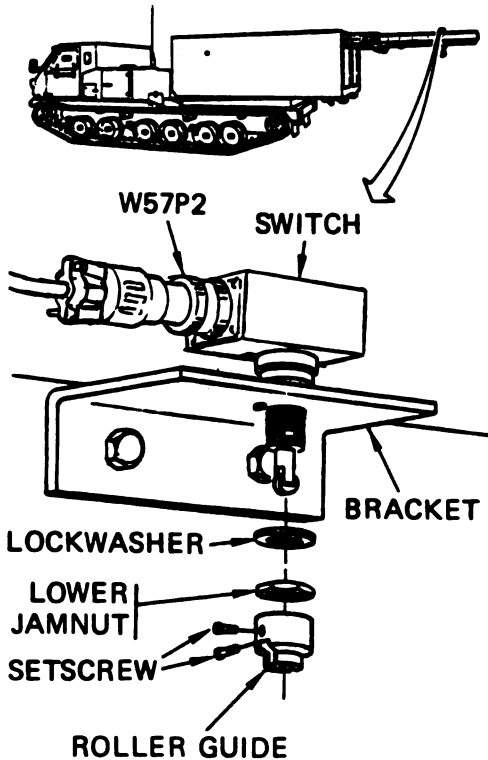
(4) If applicable, apply methyl-ethyl-ketone or heat to roller guide setscrews. Allow a minute or two for penetration and then remove both setscrews.

(5) If applicable, apply methyl-ethyl-ketone into both setscrew holes. Allow a minute or two for penetration. Note position of roller guide for installation and then remove roller guide.

(6) Cut and remove lockwire from switch jamnuts.

5-20. HOIST UP LIMIT SWITCH MAINTENANCE INSTRUCTIONS (CONT)

(7) Using 15/16-inch open end wrench, remove jamnut and lockwasher securing switch to bracket. Remove switch and keywasher from bracket.



b. Install.

(1) Prepare switch mounting surface for electrical bond (paragraph 3-10).

(2) Using 0.062-inch socket head key or crosstip screwdriver, loosen two setscrews securing roller guide on new switch. Remove and retain roller guide.

(3) Remove and retain outer jamnut and lockwasher from new switch.

(4) Using fingers, screw inside jamnut fully on new switch. Install new switch and keywasher in switch bracket with tab of keywasher inserted into alignment hole in switch bracket.

(5) Install lockwasher and outer jamnut. Tighten jamnut finger-tight.

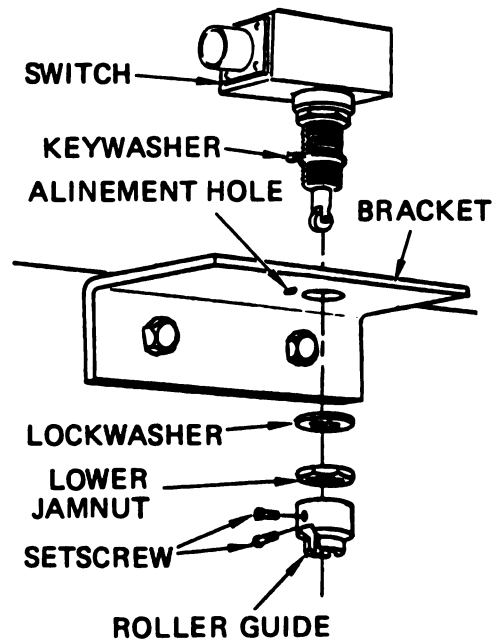
(6) Screw roller guide onto switch until it bottoms, then loosen just far enough to align switch roller with striker as noted during removal.

(7) Using 0.062-inch socket head key or crosstip screwdriver, tighten both setscrews.

(8) Adjust jamnuts so switch is as far away from striker as possible. Tighten jamnuts finger-tight making sure tab in keywasher remains in alignment hole in bracket.

(9) Connect cable connector W57P2 to switch.

(10) Perform switch adjustment (paragraph c).



c. Adjust.

(1) Manually lower hook and pulley assembly.

(2) Connect hook and pulley assembly to trainer LP/C.

(3) Using BC, slowly raise LP/C to approximately 50mm (2 inches) of the full up position. Turn system power off (TM 9-1425-646-20).

5-20. HOIST UP LIMIT SWITCH MAINTENANCE INSTRUCTIONS (CONT)

(4) Manually raise LP/C until rails contact beam assembly just enough that strong hand pressure will not move LP/C relative to beam assembly (TM 9-1425-646-10).

(5) Disconnect cable connector W57P2 from switch and connect test cable to switch.

(6) Connect multimeter between test cable pins 1 and 2. Continuity will be indicated on multimeter to indicate switch is not actuated.

(7) Adjust jamnuts until infinity is indicated on multimeter indicating that switch is actuated, then adjust lower jamnut 3/4 to 1 turn more. Using 15/16-inch open end wrench, tighten upper jamnut being careful not to change adjustment.

(8) Disconnect multimeter and test cable from switch. Connect cable connector W57P2 to switch.

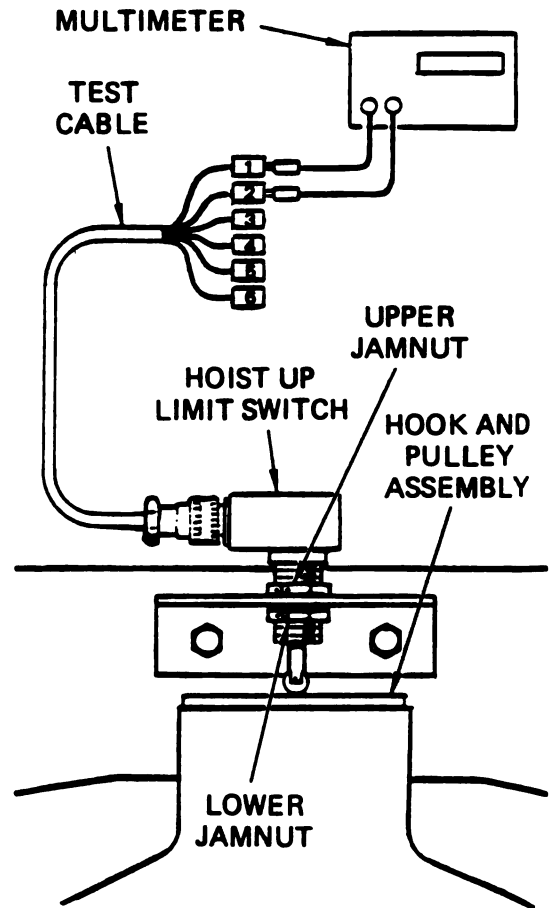
(9) Using BC, lower hoist slightly and then raise hoist up to stop position. Verify that strong hand pressure will not move LP/C (TM 9-1425-646-20).

(10) Manually unwind hoist drum 12.0mm at its periphery (outer edge). Verify that minimum of 0.25mm exists at two or more LP/C contact points.

(11) Using BC, lower and disconnect LP/C (TM 9-1425-646-20).

(12) Using lockwire, safety-wire jamnuts together.

(13) Apply varnish to switch mounting surface prepared for electrical bond.



5-20. HOIST UP LIMIT SWITCH MAINTENANCE INSTRUCTIONS (CONT)

NOTE

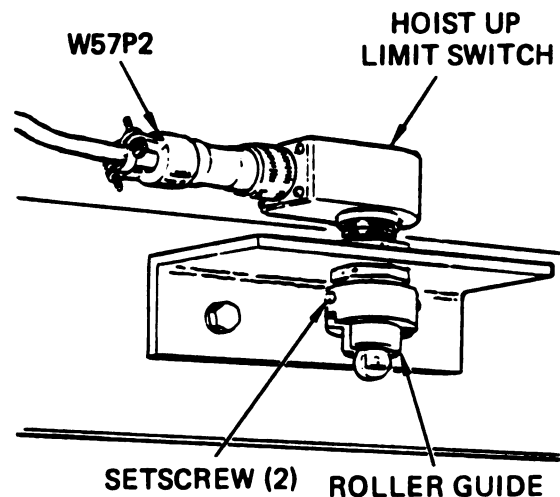
There are two types of switch roller guide setscrews. One type requires a 0.062-inch socket head key. The other type requires a crosstip screwdriver. Sealing compound is used during installation of the socket head key type setscrew. No sealing compound is used with the crosstip screwdriver type setscrew. If sealing compound is not required, do not perform steps (14) and (15). If sealing compound is required, continue with step (14).

(14) Inspect switch roller guide to determine type of setscrews.

CAUTION

When applying sealing compound, use care not to allow any sealing compound to get on any switch moving part.

(15) Using 0.062-inch socket head key, remove roller guide setscrews. Screw roller guide onto switch until it bottoms. Apply four drops of sealing compound into each setscrew hole. Rotate roller guide back and forth about 45 degrees to spread sealing compound. Apply one drop of sealing compound to each setscrew threads. Install both setscrews in roller guide and then bottom roller guide. Back roller guide off just far enough to align switch roller with striker. Using 0.062-inch socket head key, tighten both setscrews.



(16) Using BC, raise hoist and retract booms (TM 9-1425-646-20).

(17) Stow LLM (TM 9-1425-646-10).

5-21. HOIST DOWN LIMIT SWITCH MAINTENANCE INSTRUCTIONS. This paragraph covers the replacement and adjustment of the hoist down limit switch.

INITIAL SETUP

Tools

- Kit, tool, 13032302
- Set, shop, 13032303
- Breakout box, hoist control, 13103690
- Multimeter, 8050A-01

Materials/Parts

- Lockwire (23, Appendix B)
- Primer, zinc chromate (47, Appendix B)

Personnel Required

- MLRS Repairer MOS 27M
- (MLRS Crewmember MOS 13M to assist as required)

References

- TM 9-1425-646-20

Equipment Condition

- Boom extended (TM 9-1425-646-20)

a. Remove.

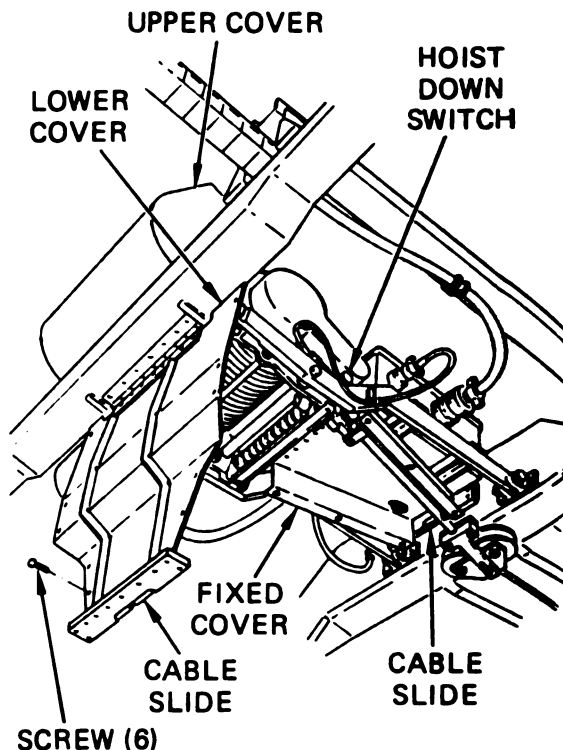
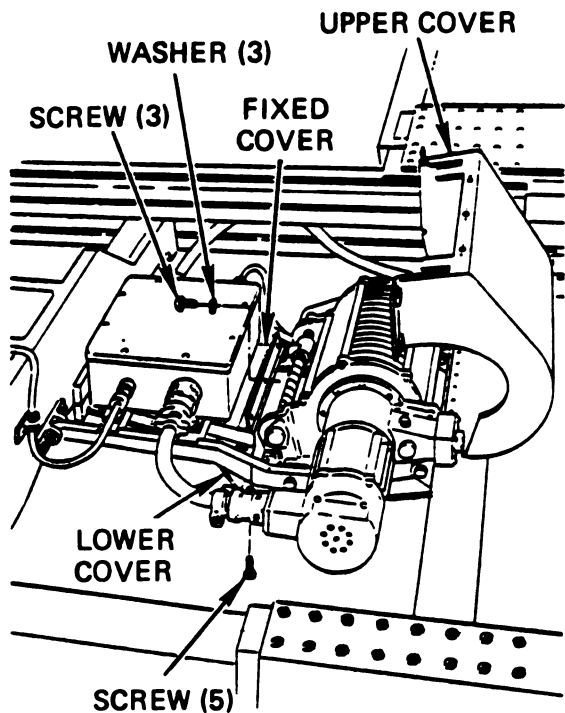
(1) Turn system power off. Manually turn hoist in unwind direction at least one full turn (TM 9-1425-646-20).

(2) Using crosstip screwdriver, remove five screws securing hoist upper dust cover to lower dust cover.

(3) Using 10mm open end wrench, remove three screws and washers securing hoist upper dust cover to fixed cover. Open upper dust cover.

(4) Using crosstip screwdriver, remove six screws securing lower dust cover to fixed cover. Open lower dust cover.

(5) Retain cable slides.



(6) Cut lockwire and disconnect cable connector P1 from hoist electrical control assembly.

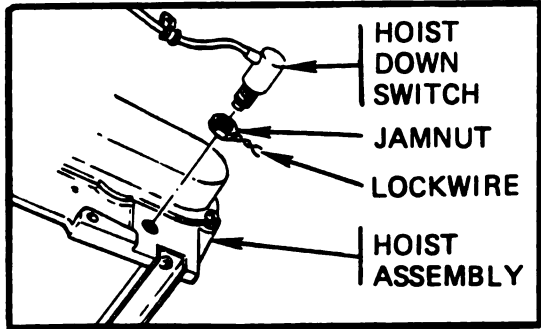
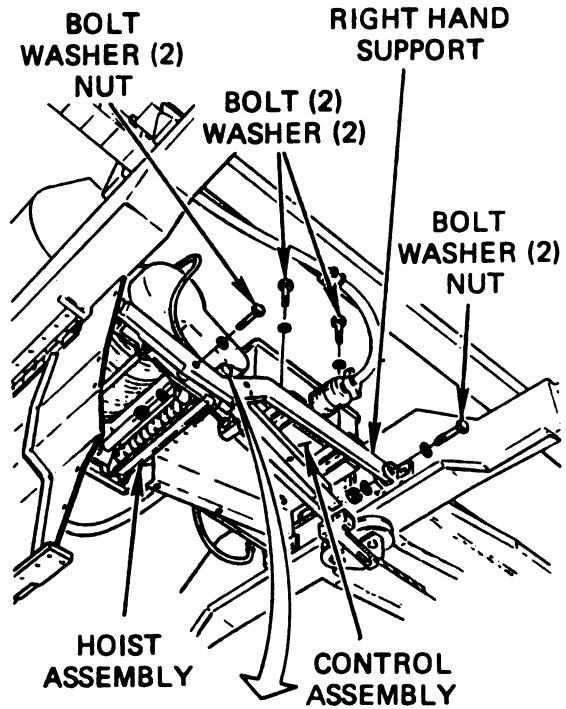
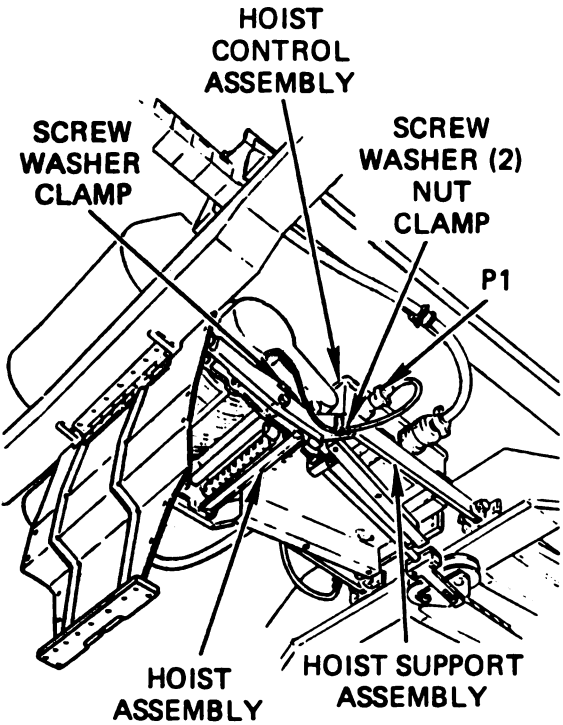
5-21. HOIST DOWN LIMIT SWITCH MAINTENANCE INSTRUCTIONS (CONT)

(7) Using crosstip screwdriver and 8mm open end wrench, remove screw, two washers, nut, and clamp securing cable to hoist support assembly.

(8) Using crosstip screwdriver, remove screw, washer, and clamp securing cable to hoist assembly.

Using 5/8-inch open end wrench, install jamnut. Using lockwire, safety-wire jamnut.

(2) Using 12mm socket and 17mm combination wrench, install bolt, washer, and nut in front end of right-hand support.



(9) Using 12mm socket and 17mm combination wrench, remove nut, bolt, and washer from front end of right-hand support.

(10) Using 10mm combination wrench and 10mm socket, remove two nuts, washers, and bolts from right-hand support and control assembly.

(11) Using 10mm box end wrench and 10mm socket, remove nut, washer, and bolt from right-hand support and hoist motor. Move support arm down and clear.

(12) Cut lockwire. Using 5/8-inch open end wrench, unscrew defective switch.

(3) Using 10mm socket and 10mm combination wrench, install two bolts, washers, and nuts securing control assembly to right-hand support.

(4) Using 10mm box end wrench and 10mm socket, install bolt, washer, and nut securing hoist motor to right-hand support.

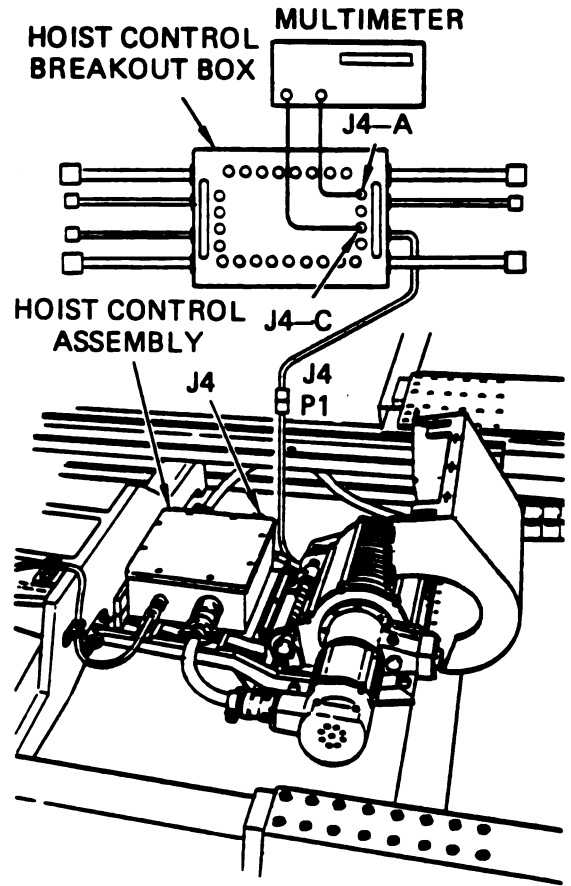
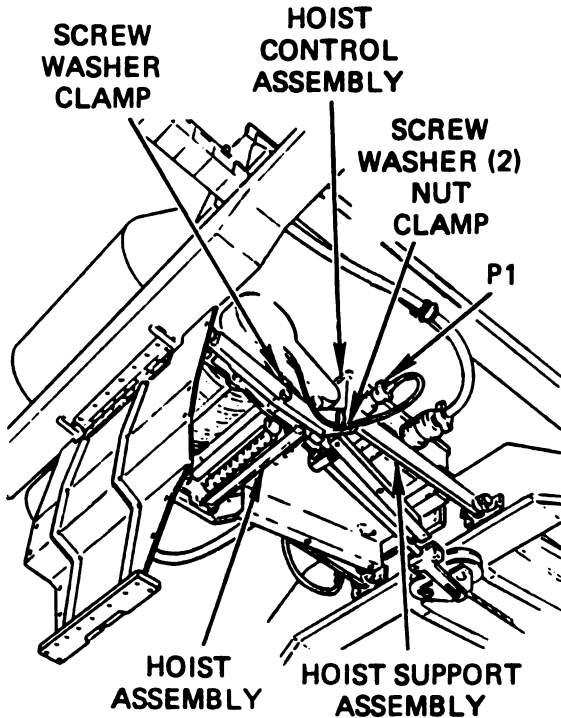
b. Install.

(1) Apply zinc chromate primer to new switch threads and install switch in hoist housing.

5-21. HOIST DOWN LIMIT SWITCH MAINTENANCE INSTRUCTIONS (CONT)

(5) Connect switch connector P1 to hoist control assembly. Lockwire P1 to W75P2 or W76P2.

(6) Adjust switch.



c. Adjust.

(1) Lower hoist hooks until limit switch actuating screw is within 1 inch of limit switch.

(2) Disconnect down limit switch cable P1 from J4 on hoist control assembly. Connect limit switch cable P1 to hoist control breakout box J4. Connect multimeter to breakout box pins J4-A and J4-C. Meter should read continuity.

(3) Manually turn hoist in unwind direction until limit switch is actuated. Meter should indicate infinity.

(4) Check to see if zinc chromate mark on cable is in line with front of cable guide.

(5) If mark is not in line with front of cable guide, loosen jamnut on switch actuating screw and turn actuating screw into cable guide until it is bottomed out.

(6) Manually turn hoist to aline mark on cable with front of cable guide while watching to make sure actuating screw does not contact switch.

(7) Slowly back out limit switch actuating screw until screw contacts switch and multimeter indicates infinity. Using 11/32- and 1/4-inch open end wrenches, tighten jamnut on limit switch actuating screw.

5-21. HOIST DOWN LIMIT SWITCH MAINTENANCE INSTRUCTIONS (CONT)

(8) Remove breakout box and connect limit switch cable P1 to J4 on hoist control assembly.

(9) Using BC, operate hoist to check that limit switch stops hoist when mark on cable is in line with cable guide ± 5 cm.

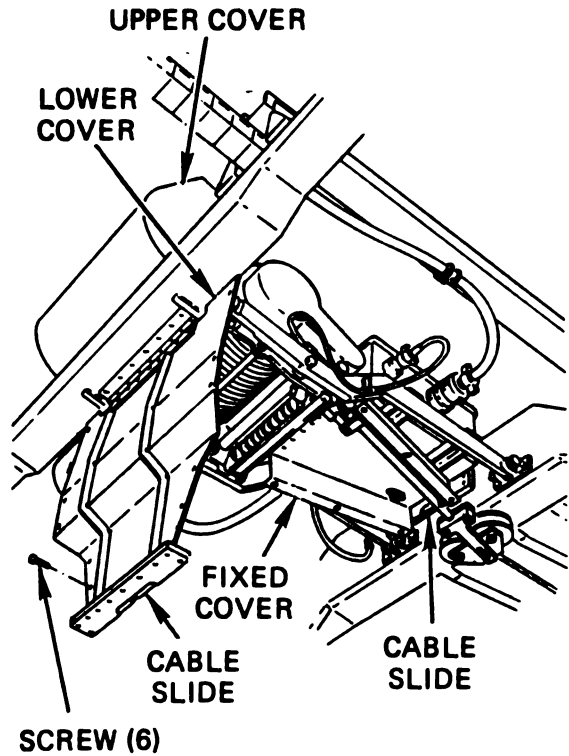
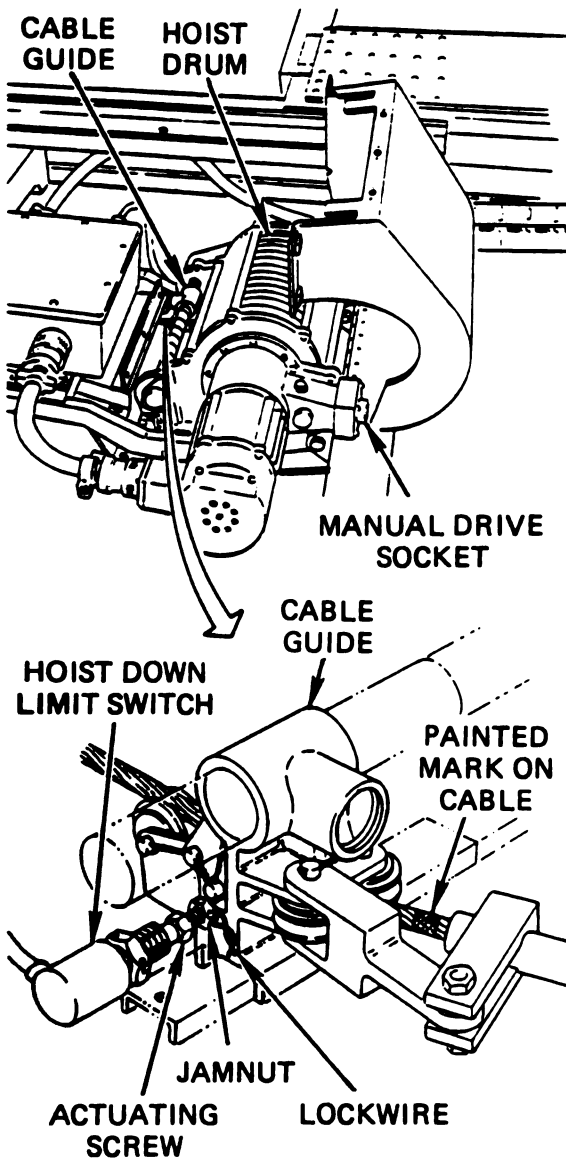
(10) Lock-wire limit switch actuating screw jamnut.

(11) Perform checkout.

d. Checkout.

(1) Using BC, raise and lower hook twice and check switch adjustment.

(2) Apply zinc chromate primer to six screws. Close lower dust cover and install six screws securing lower cover to fixed cover. Using crosstip screwdriver, tighten screws. Install cable slides.

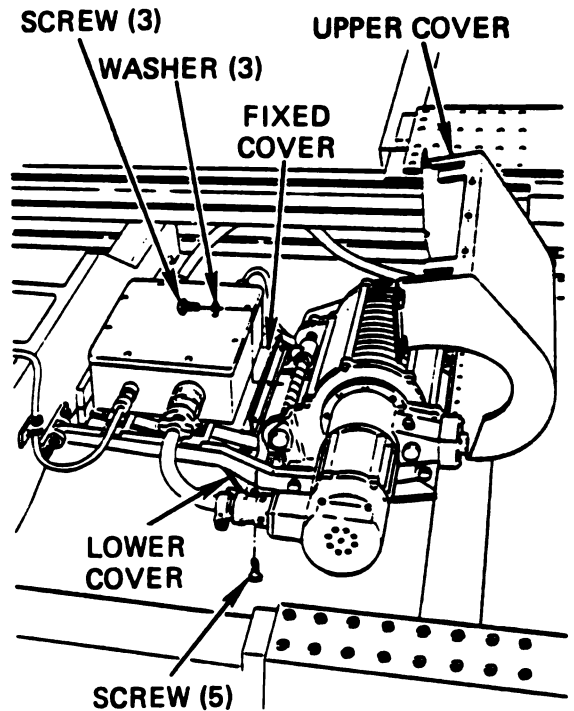


5-21. HOIST DOWN LIMIT SWITCH MAINTENANCE INSTRUCTIONS (CONT)

(3) Apply zinc chromate primer to three screws. Close upper dust cover and install three screws and washers securing upper cover to fixed cover. Using 10mm open end wrench, tighten screws.

(4) Apply zinc chromate primer to five screws. Install five screws securing upper dust cover to lower cover. Using crosstip screwdriver, tighten screws.

(5) Raise hook and pulley assembly and retract boom (TM 9-1425-646-20).



5-22. LP/C LATCH ASSEMBLY MAINTENANCE INSTRUCTIONS. This paragraph covers the maintenance tasks for the following items:

<i>Item</i>	<i>Page</i>
1. Hook Assembly	5-89
2. Roller	5-93
3. Handle Bracket Assembly	5-93
4. Bellcrank Assembly	5-93
5. Link and Rod Assemblies	5-94
6. LP/C Latch Assembly Adjustment	5-96

INITIAL SETUP

Tools

- Kit, tool, 13032302
- Set, shop, 13032303
- Gage, hook rigging, 13025007

Materials/Parts

- Lockwire (23, Appendix B)
- Primer, zinc chromate (47, Appendix B)
- Shim stock (60, Appendix B)

Personnel Required

MLRS Repairer MOS 27M

References

TM 9-1425-646-20

Troubleshooting

Paragraph 2-9

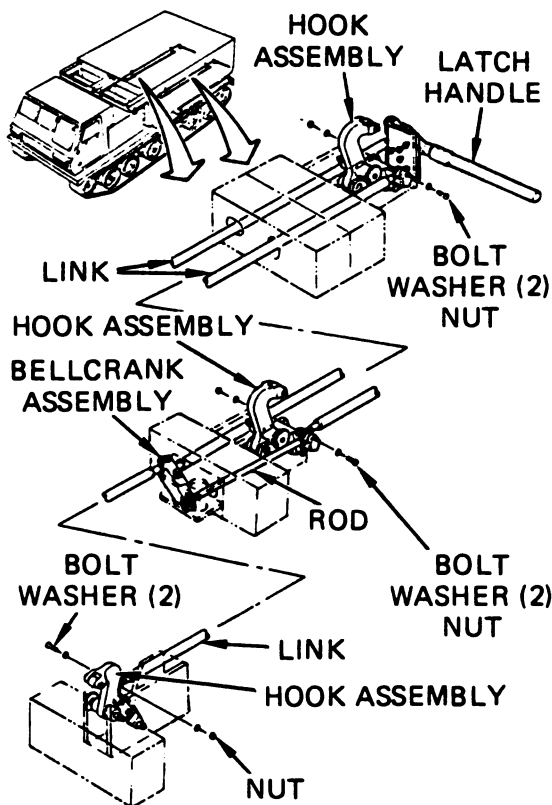
Equipment Condition

Position LLM to 1600 mils (90 degrees) azimuth and 0 mils elevation (TM 9-1425-646-20)

1. HOOK ASSEMBLY.

a. Remove.

- (1) Set latch handle to open (unlatched) position.
- (2) Using 9/16-inch box end wrench and 7/16-inch open end wrench, remove nut, two washers, and bolt securing link assemblies to hook assembly.



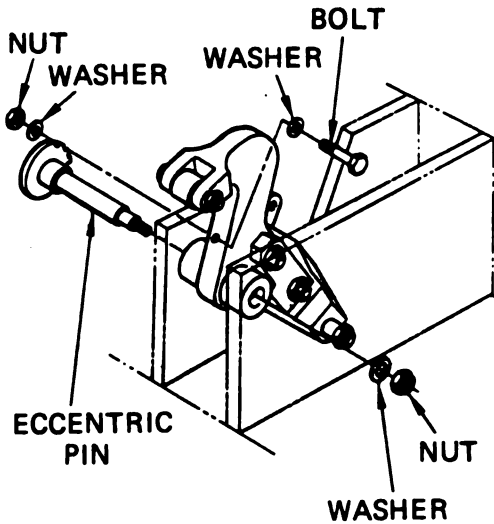
5-22. LP/C LATCH ASSEMBLY MAINTENANCE INSTRUCTIONS (CONT)

NOTE

Place latch handle in a position as required to provide access for removal of eccentric pin.

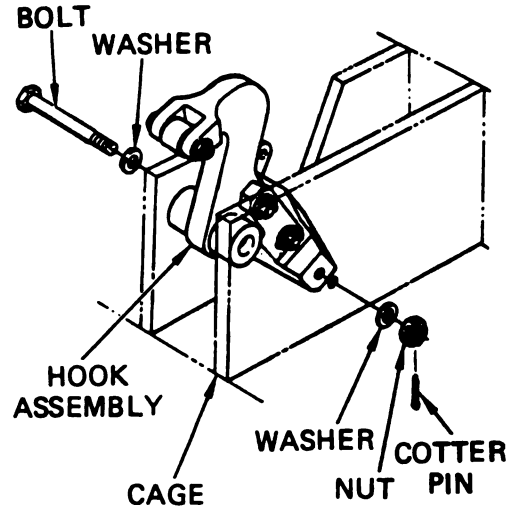
(3) Using 17mm socket, remove nut and washer from eccentric pin.

(4) Using 5/16- and 7/16-inch open end wrenches, remove eccentric pin adjustment bolt, washer, and nut. Remove eccentric pin.



(5) Using cotter pin extractor, remove cotter pin.

(6) Using 3/4-inch box end wrench and 3/4-inch socket, remove nut, two washers, and bolt. Remove hook assembly.



(7) Using cotter pin extractor, remove two cotter pins.

(8) Using 3/4-inch box end wrench and 3/4-inch socket, remove two nuts, four washers, and two bolts securing bellcrank, hook, and link together.

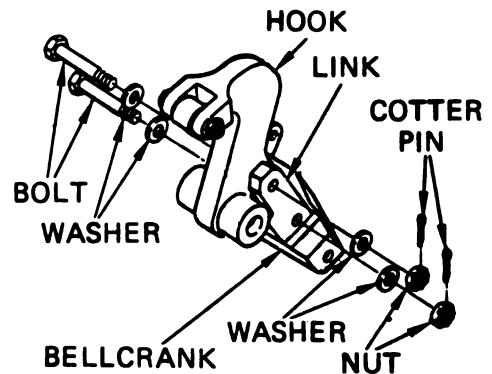
(9) Remove roller from hook (item 2, a).

b. Install.

(1) Install roller (item 2, b).

(2) Position bellcrank, hook, and link together with crosspiece of link on top and install two bolts, four washers, and two nuts.

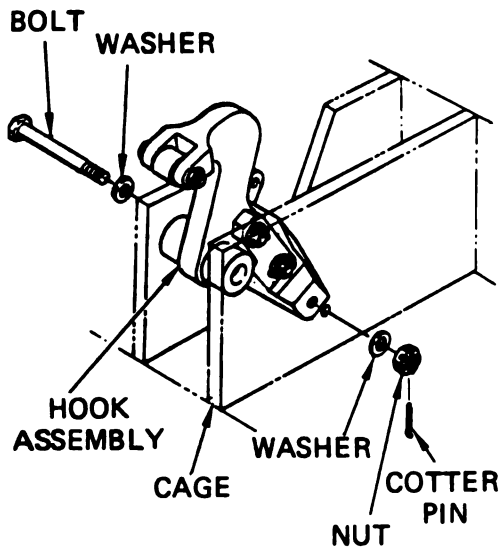
(3) Using 3/4-inch box end wrench and 3/4-inch socket, tighten nuts, then back nut off until cotter pin can be installed. Install new cotter pin.



5-22. LP/C LATCH ASSEMBLY MAINTENANCE INSTRUCTIONS (CONT)

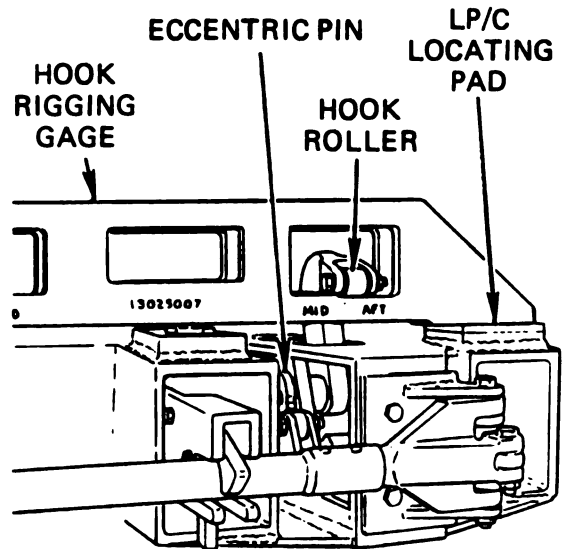
(4) Position hook assembly in cage and install bolt, two washers, and nut to secure hook assembly to cage.

(5) Using 3/4-inch box end wrench and 3/4-inch socket, tighten nut to 5.5 to 7.5 N•m, then back nut off until cotter pin can be installed. Install new cotter pin.

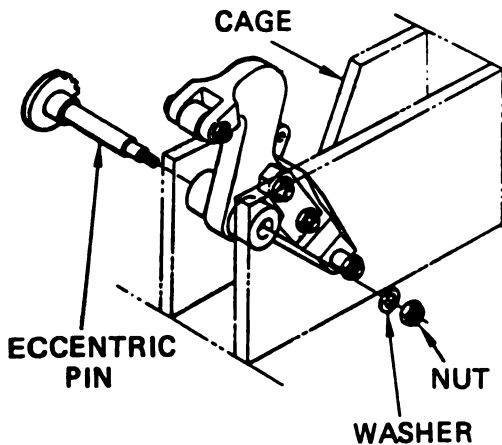


(7) Position hook in closed position making sure that link and bellcrank is in overcenter position.

(8) Position rigging gage on LP/C locating pads. Rotate eccentric pin until hook roller contacts hook rigging gage.



(6) Install eccentric pin with notched index plate on side of hook that has adjustment bolthole. Install washer and nut but do not tighten nut.



NOTE

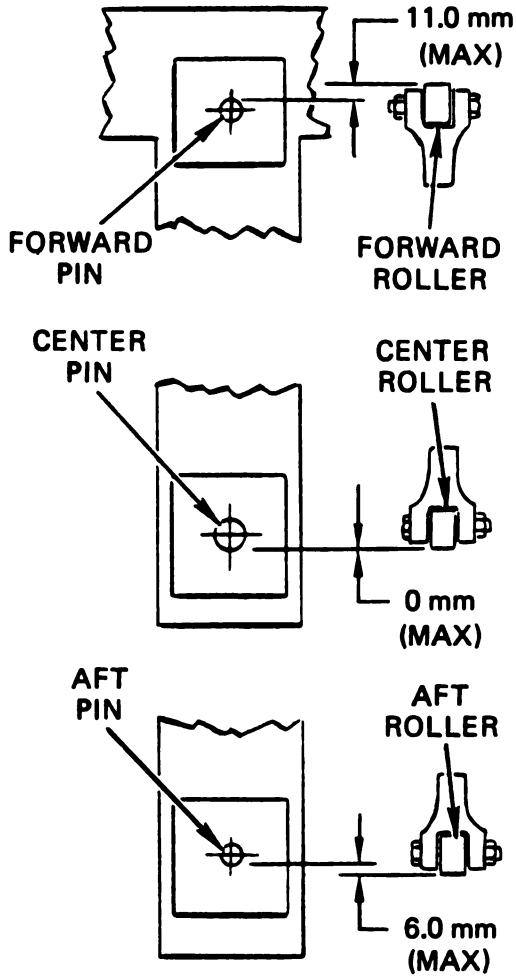
The rollers should not go beyond the centering pins more than the dimensions indicated in steps (9) and (10).

(9) With hooks in closed position, distance between forward surface of forward roller and forward surface of LP/C centering pin should not exceed 11.0mm.

5-22. LP/C LATCH ASSEMBLY MAINTENANCE INSTRUCTIONS (CONT)

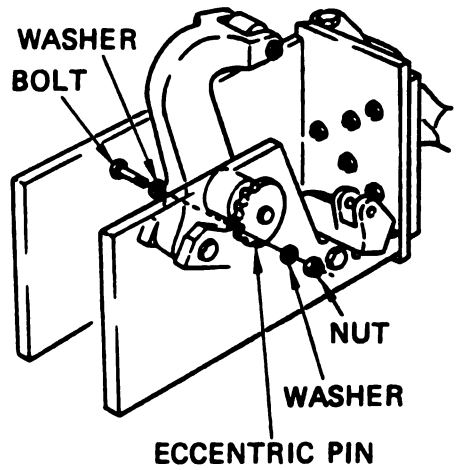
(10) With hooks in closed position, distance between aft surface of center and aft rollers and aft surface of LP/C centering pins should not exceed the following:

Center roller - 0.0mm (max)
 Aft roller - 6.0mm (max)

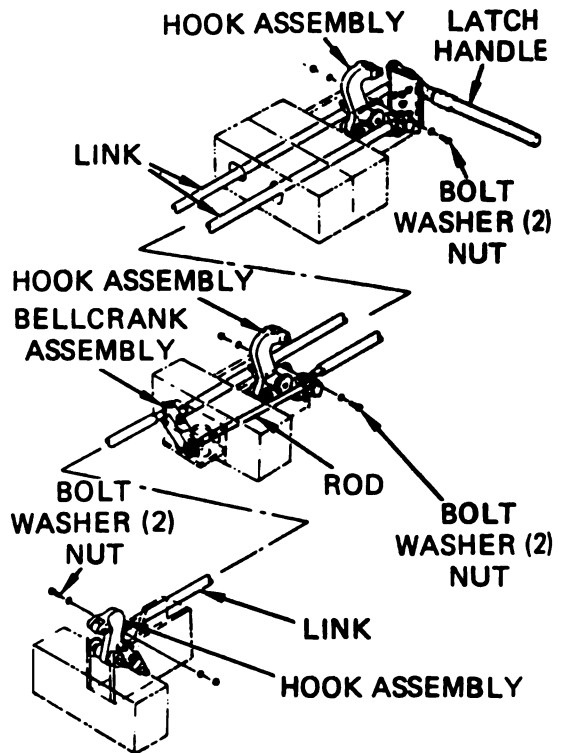


(11) Apply zinc chromate primer to adjustment bolt. Rotate eccentric pin to nearest locking notch and install bolt, two washers, and nut. Using 5/16-inch and 7/16-inch box end wrenches, tighten nut.

(12) Apply zinc chromate primer to eccentric pin threads. Using 17mm socket, tighten nut.



(13) Position link assembly to hook assembly. Install bolt, two washers, and nut.



5-22. LP/C LATCH ASSEMBLY MAINTENANCE INSTRUCTIONS (CONT)

(14) Perform LP/C latch assembly adjustment (item 6).

2. ROLLER.

a. Remove.

(1) Using 9/16-inch box end wrench and 7/16-inch socket, remove nut, two washers, and bolt.

(2) Remove roller from hook assembly.

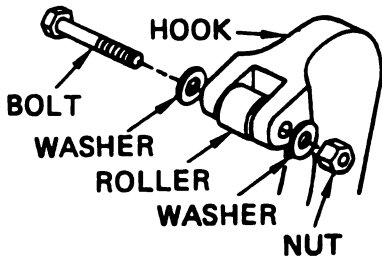
b. Install.

(1) Apply zinc chromate primer to bolt.

(2) Position new roller in hook assembly and install bolt, two washers, and nut.

(3) Using 9/16-inch box end wrench and 7/16-inch socket, tighten nut.

(4) If no further maintenance is required, perform follow-on procedure (page 5-99).



3. HANDLE BRACKET ASSEMBLY.

a. Remove.

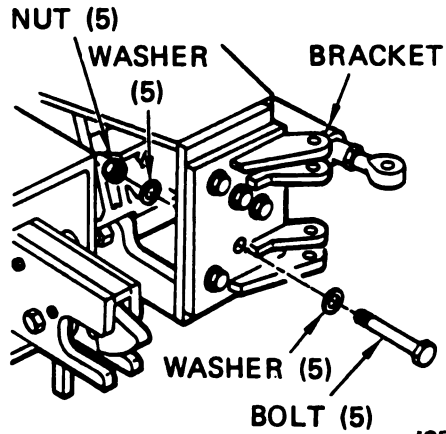
(1) Remove latch handle assembly (TM 9-1425-646-20).

(2) Using 12mm box end wrench and 17mm socket, remove five nuts, ten washers, and five bolts. Remove bracket assembly.

b. Install.

(1) Apply zinc chromate primer to bolts. Position new bracket assembly to cage and install five bolts, ten washers, and five nuts.

(2) Using 12mm box end wrench and 17mm socket, tighten nuts.



(3) Install latch handle assembly (TM 9-1425-646-20).

(4) If no further maintenance is required, perform follow-on procedure (page 5-99).

4. BELLCRANK ASSEMBLY.

a. Remove.

(1) Using 7/16-inch box end wrench and 9/16-inch socket, remove two nuts, four washers, and two bolts. Disconnect link and rod assemblies from bellcrank assembly.

(2) Using cotter pin extractor, remove cotter pin.

(3) Using 3/4-inch box end wrench and 3/4-inch socket, remove nut, two washers, and bolt. Remove bellcrank assembly.

b. Install.

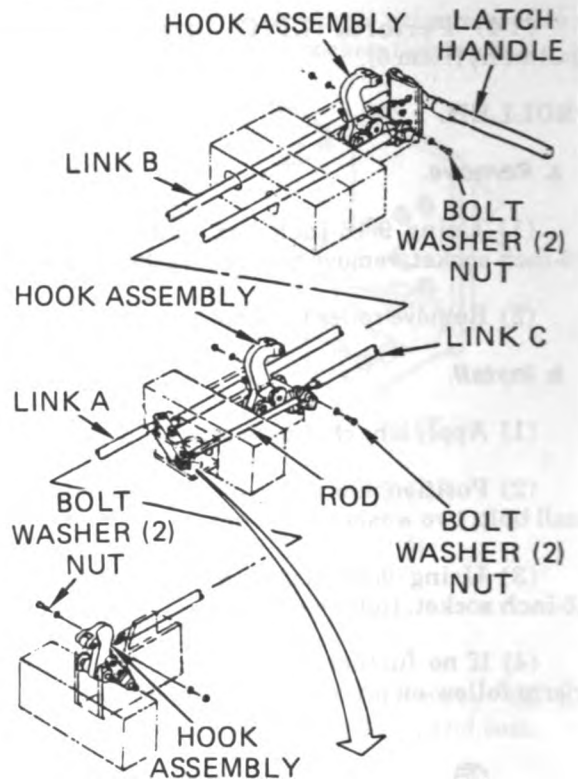
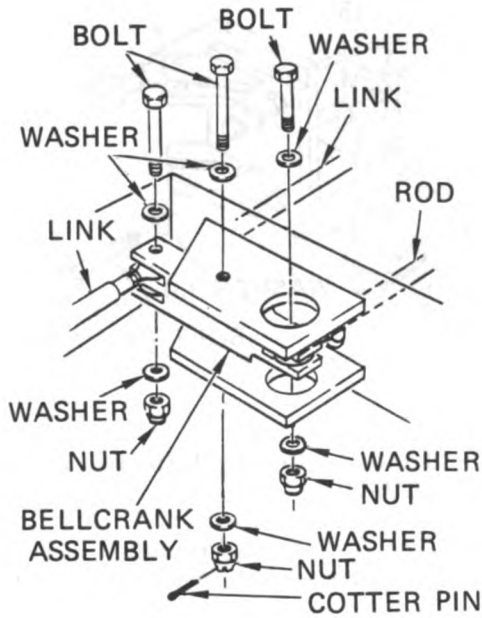
(1) Position new bellcrank assembly in cage and install bolt, two washers, and nut. Install bolt with bolthead up.

(2) Using 3/4-inch box end wrench and 3/4-inch socket, tighten nut. Then back nut off until cotter pin can be installed. Check that bellcrank assembly rotates freely and install new cotter pin.

(3) Position link and rod assemblies into bellcrank assembly. Install two bolts, four washers, and two nuts.

5-22. LP/C LATCH ASSEMBLY MAINTENANCE INSTRUCTIONS (CONT)

(4) Perform LP/C latch assembly adjustment (item 6).



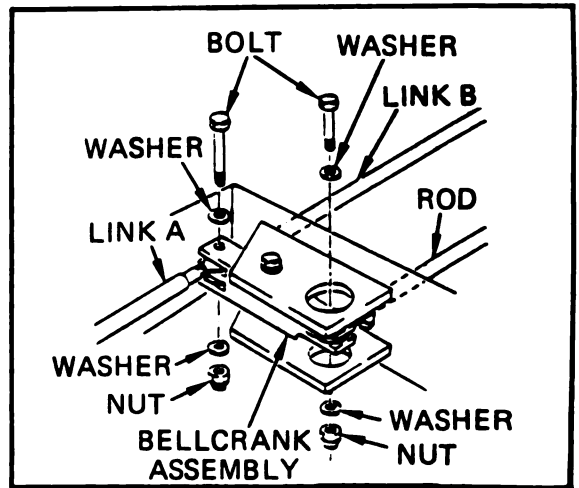
5. LINK AND ROD ASSEMBLIES.

a. Remove.

(1) Set latch handle to closed (latched) position to remove links A or B and open position to remove link C or rod.

(2) Using 7/16-inch box end wrench and 9/16-inch socket, remove nut, two washers, and bolt securing each end of link or rod assembly.

(3) Pull link or rod assembly through hole in cage structure.



5-22. LP/C LATCH ASSEMBLY MAINTENANCE INSTRUCTIONS (CONT)

b. Repair.

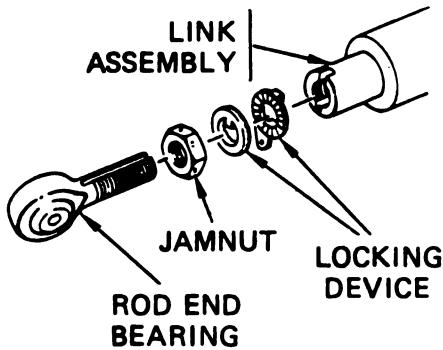
(1) Using wire twister pliers, remove lockwire securing jamnut to locking device.

NOTE

One jamnut and rod end bearing have left-hand threads.

(2) Using 9/16-inch open end wrench, loosen jamnut.

(3) Remove rod end bearing, jamnut, and locking device from link or rod assembly.



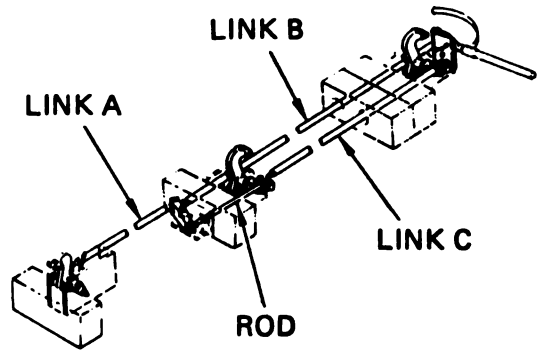
(4) Install jamnut and locking device on new rod end bearing. Screw rod end bearing into link or rod until the following dimensions between bearing ends are obtained.

(a) Link A - 972.52mm (38-1/4 in.)

(b) Link B - 2691.00mm (106-15/16 in.)

(c) Link C - 2128.00mm (83-3/4 in.)

(d) Rod - 450.54mm (17-3/4 in.)



c. Install.

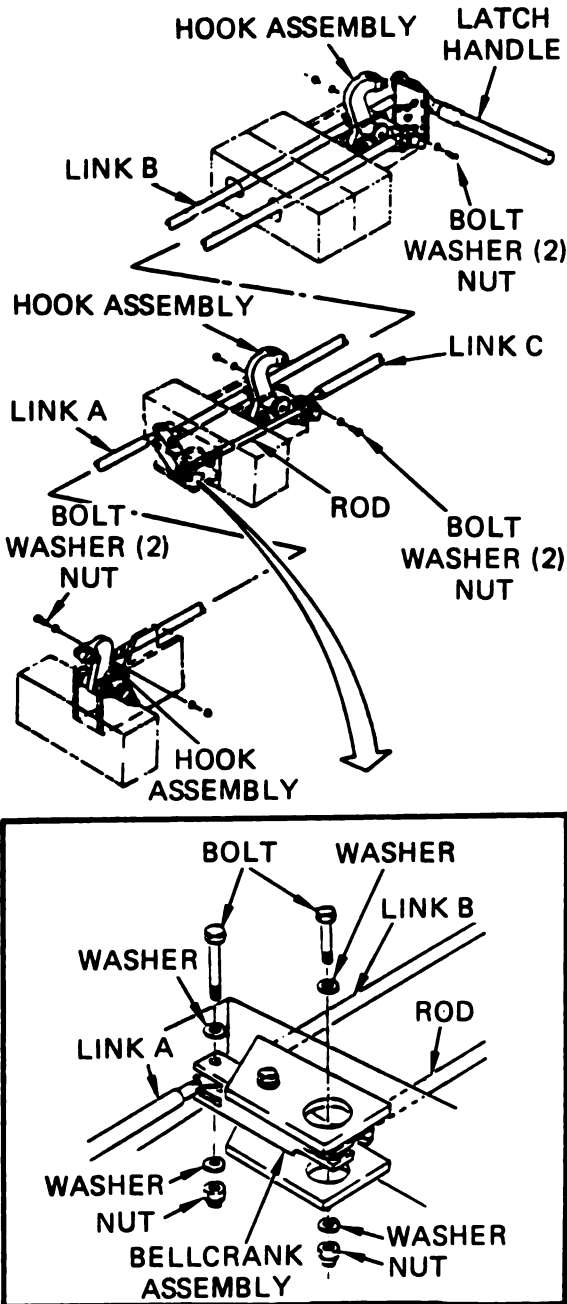
(1) Set latch handle to closed (latched) position to install link A or B and open position to install link C or rod.

(2) Slide link or rod assembly through cage access hole and place in position.

(3) Install bolt in one end of link or rod assembly and turn tube to adjust length until bolt can be installed in other end.

5-22. LP/C LATCH ASSEMBLY MAINTENANCE INSTRUCTIONS (CONT)

(4) Install two bolts, four washers, and two nuts to secure link or rod assembly.



(5) Perform LP/C latch assembly adjustment (item 6).

6. LP/C LATCH ASSEMBLY ADJUSTMENT.

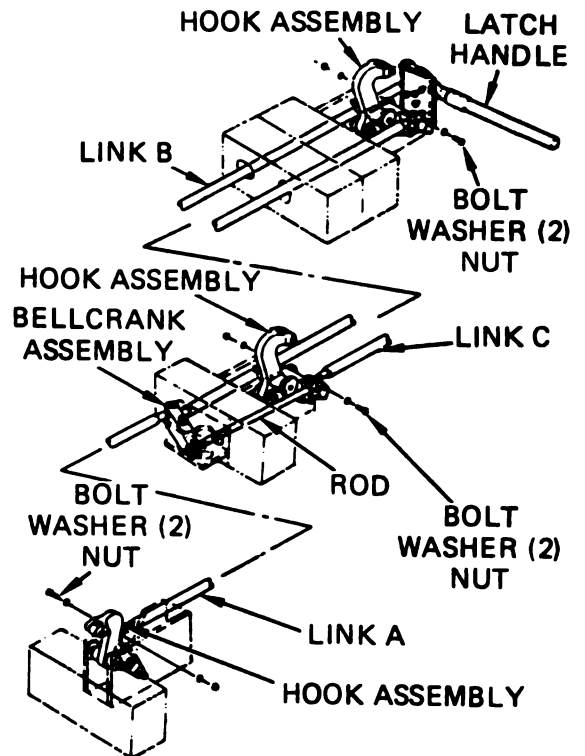
NOTE

Do not rotate barrel of link unless directed to by the procedure. Careless handling of the links during adjustment can cause adjustment procedure to be inaccurate.

a. Check hook roller attaching bolts for interference with cage structure. If interference is noted, using 9/16-inch box end wrench and 7/16-inch socket, remove bolt and reinstall in opposite direction. Torque nut 5.6 to 7.9 N•m.

b. Remove bolt, washer, and nut securing link C and rod assembly to center hook.

c. Remove bolt, washer, and nut securing link A to bellcrank. Reinstall bolt without nut through bellcrank and link B.



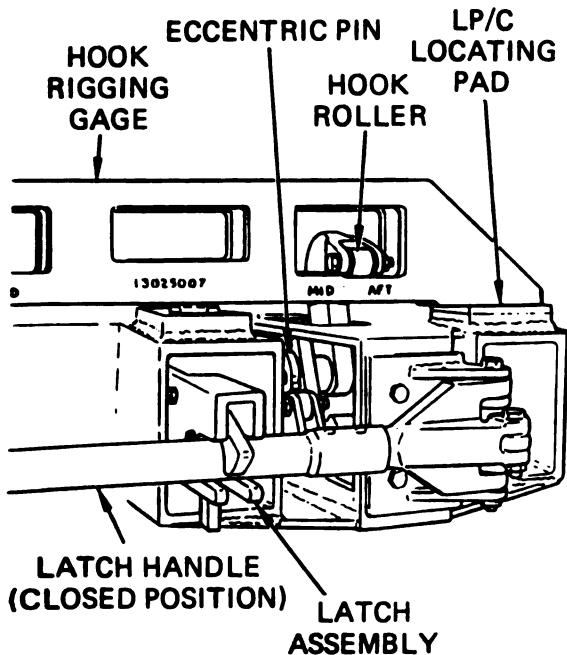
5-22. LP/C LATCH ASSEMBLY MAINTENANCE INSTRUCTIONS (CONT)

d. Position latch handle in closed (latched) position making sure that handle is locked in latch assembly and bellcranks are in overcenter position.

NOTE

Rotation of the eccentric pin moves the hooks vertically and horizontally.

e. Position hook rigging gage on LP/C locating pads. Position hooks in closed (latched) position and check height of hooks. If necessary, using 5/16- and 7/16-inch box end wrench, remove eccentric pin locking bolt and rotate eccentric pin until hook roller contacts rigging gage.



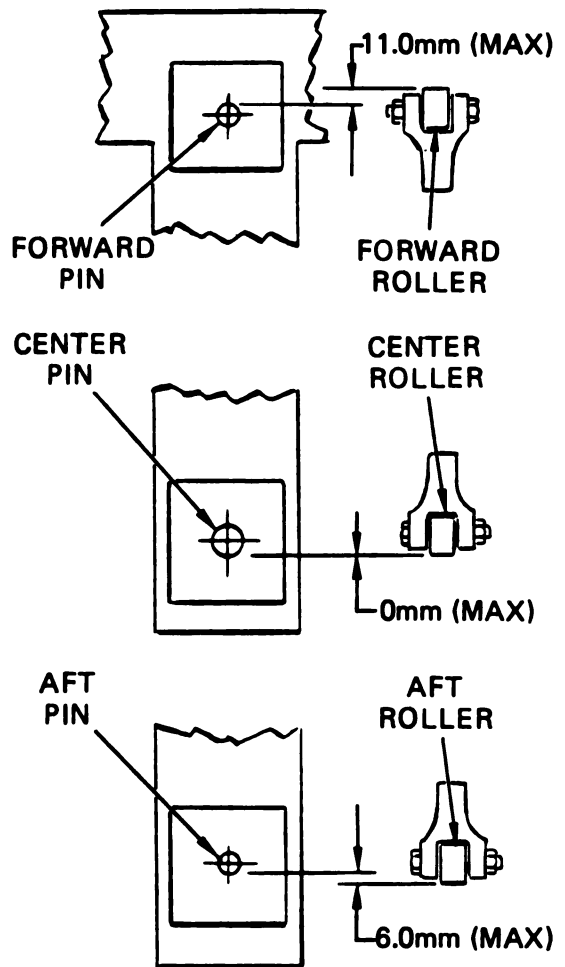
NOTE

The rollers should not go beyond the centering pins more than the dimensions indicated.

f. Using straight edge and scale, check distance between hook roller surface and LP/C centering pins. Rollers should not exceed dimensions indicated.

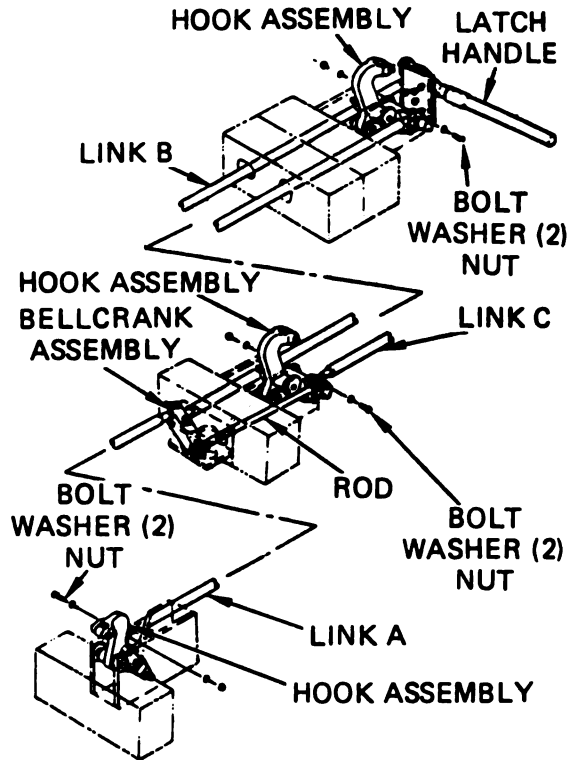
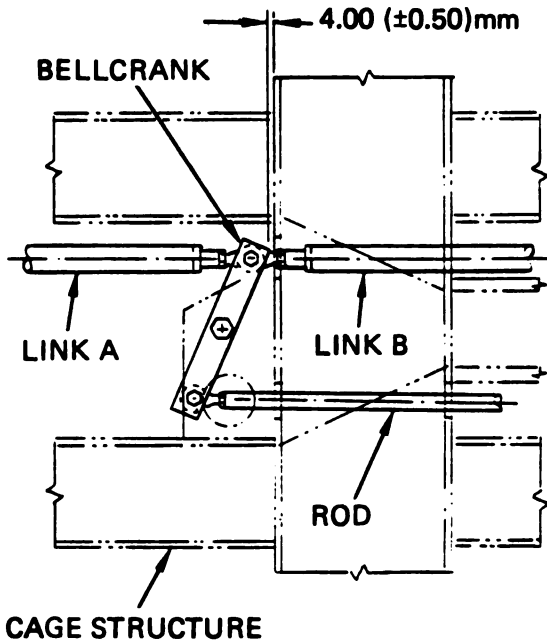
g. If distance in step f is not correct, rotate eccentric pin until distance is correct with roller still contacting rigging gage.

h. Reinstall locking bolt. Using 5/16- and 7/16-inch box end wrenches, tighten nut.



5-22. LP/C LATCH ASSEMBLY MAINTENANCE INSTRUCTIONS (CONT)

i. Check distance between bellcrank and cage structure for 3.50 to 4.50mm clearance. If necessary, loosen jamnuts on link B rod ends and rotate barrel of link to obtain clearance. Using 9/16-inch open end wrench, tighten link B jamnuts and lock-wire to locking devices.



NOTE

An assistant is required to complete the adjustment.

A piece of plain bond paper may be used instead of 0.0015-inch shim stock to perform the adjustment.

j. Loosen jamnuts on rod assembly. Adjust rod so that bolt can be installed securing rod to center hook linkage.

k. Loosen jamnuts on link C. Rotate barrel of link C until bolt can be installed securing link C to center hook. Install bolt and washer without nut to secure link C and rod assembly to center hook linkage.

l. Loosen jamnuts on link A. Rotate barrel of link A until bolt can be installed securing link A to bellcrank. Install bolt.

m. Install washers and nuts on rod assembly attaching bolts.

n. Open LP/C latch handle approximately 90 degrees from closed (latched) position.

o. Using piece of shim stock 5/8-inch wide by 6 inches long, insert one end into space between hook link and bellcrank on forward hook assembly.

p. Position LP/C latch handle to closed and latched position.

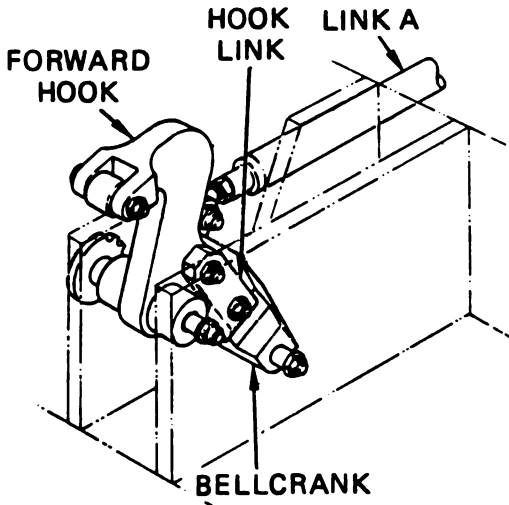
q. While assistant attempts to slide shim stock, rotate barrel link A until shim stock can be pulled out with a firm drag. Remove shim stock and shorten link A by rotating barrel 1/4 turn (two flats).

5-22. LP/C LATCH ASSEMBLY MAINTENANCE INSTRUCTIONS (CONT)

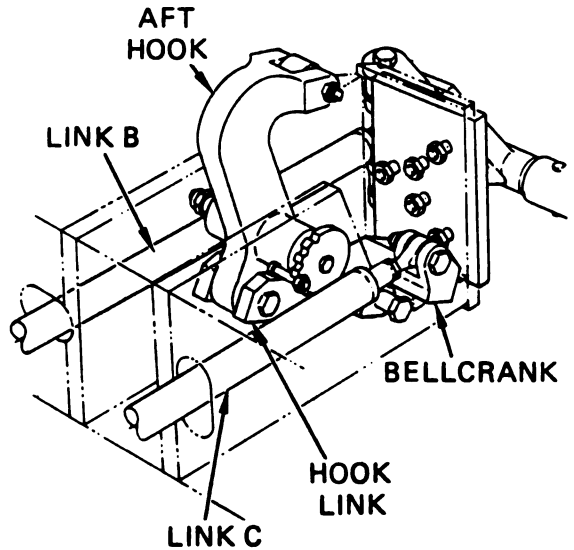
NOTE

If barrel of rod cannot be rotated freely, lengthen link C.

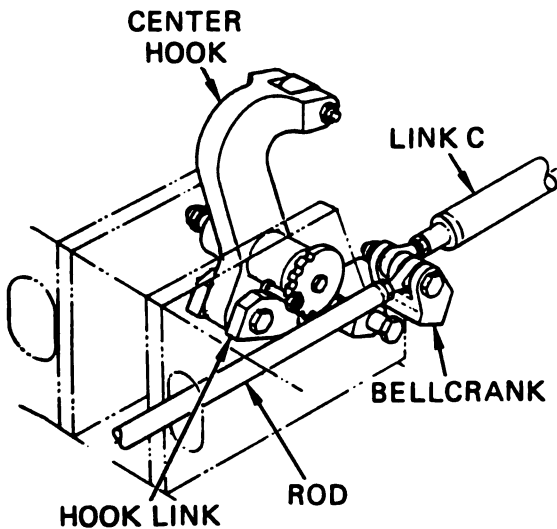
r. Repeat steps n through q for center hook except rotate rod to obtain firm drag on shim stock.



t. Position latch handle in unlatched position and place shim stock in position noted in step p for each hook assembly.



s. Repeat steps n through q for rear hook except rotate link C to obtain firm drag on shim stock. Do not shorten link C after obtaining firm drag.



u. Load training LP/C (TM 9-1425-646-10).

v. Close latch handle and check each hook assembly to insure that shim stock is firmly gripped by hook assembly mechanism. If shim stock is not firmly gripped, shorten link for that hook 1/6 turn (1 flat) at a time until proper grip is obtained.

w. Using 9/16-inch open end wrench, tighten jamnuts on links A and C and rod. Check that tabs on locking devices are positioned so that no interference with structure will occur.

x. Using wire twister pliers, lock-wire jamnuts to locking devices.

FOLLOW-ON PROCEDURE

Open and close LP/C latch assembly two times to insure latch operates smoothly without binding.

5-23. TRAVEL LOCK MAINTENANCE INSTRUCTIONS. This paragraph covers the maintenance tasks for the following items:

<i>Item</i>	<i>Page</i>
1. Torque Tube	5-100
2. Torque Tube Bearing Plate	5-102
3. Torque Tube Fitting	5-103
4. Link	5-104
5. Probe Assembly	5-104
6. Bumper Assembly	5-104
7. Hook	5-105
8. Actuator	5-106
9. Actuator Fitting	5-107
10. Roller Assembly	5-108
11. Roller	5-108
12. Centering Socket	5-109
13. Travel Lock System Adjustment	5-111

INITIAL SETUP

Primer, zinc chromate (47, Appendix B)
Sealant (59, Appendix B)

Tools

- Kit, tool, 13032302
- Set, shop, 13032303, NPN24
- C-clamp (for item 12)
- Cutter, 9.5D1N209 (for item 12)
- Drill, electric, 1046-09 (for item 12)
- Drill, twist, 1/4-inch (for item 8)
- Drill, twist, 11424 (for item 12)
- Extractor, 773 (for item 11)
- Hook tool, 13025008
- Installation tool, WT117 (for item 11)
- Puller set, GGGP00781 (for items 1 and 7)

Personnel Required

MLRS Repairer MOS 27M
(MLRS Crewmember MOS 13M to assist as required)

References

TM 9-1425-646-10

Troubleshooting

Paragraph 2-9

Equipment Condition

Position LLM to 3200 mils (180 degrees)
azimuth and 0 mils elevation
(TM 9-1425-646-10)

Materials/Parts

- Cloth, cotton (6, Appendix B)
- Lockwire (24, Appendix B) (for items 4 and 8)

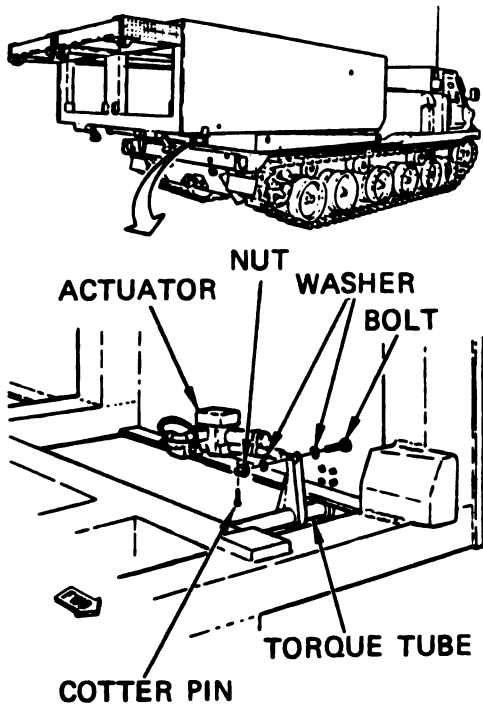
1. TORQUE TUBE.

a. Remove.

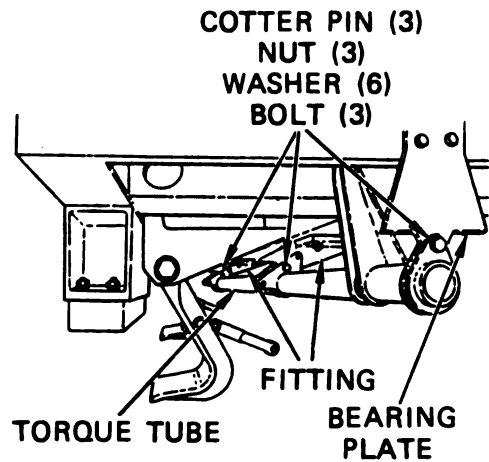
(1) Using cotter pin extractor, remove cotter pin from actuator attachment bolt.

(2) Using 7/16-inch box end wrench and 7/16-inch socket, remove nut, two washers, and bolt securing actuator to torque tube.

5-23. TRAVEL LOCK MAINTENANCE INSTRUCTIONS (CONT)



and three bolts securing torque tube to two fittings and bearing plate.



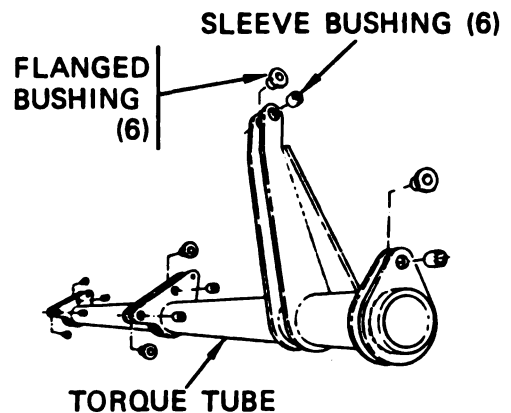
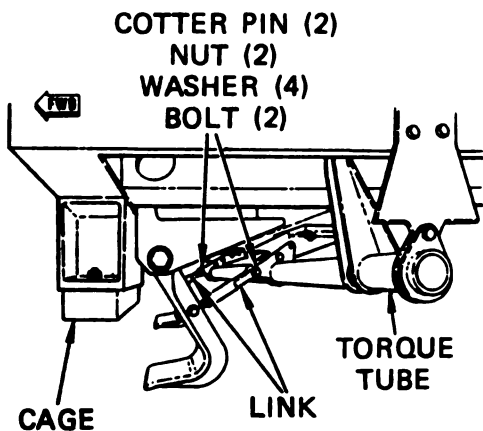
b. Repair.

(3) Using cotter pin extractor, remove two cotter pins from link attachment bolts.

(4) Using 7/16-inch box end wrench and 7/16-inch socket, remove two nuts, four washers, and two bolts securing two links to torque tube.

(1) Using puller set with adjustable open end wrench, remove defective bushings.

(2) Apply zinc chromate primer to outside diameter of new bushing and insert bushing in torque tube. Be sure bushing is flush and fully engaged.



(5) Using cotter pin extractor, remove three cotter pins from torque tube attachment bolts.

(6) Using 7/16-inch box end wrench and 7/16-inch socket, remove three nuts, six washers,

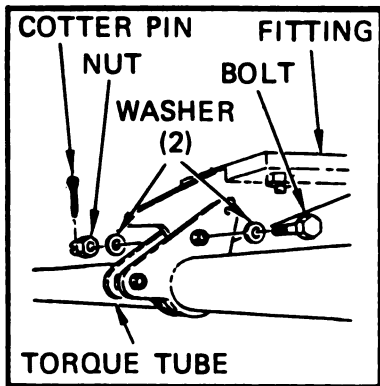
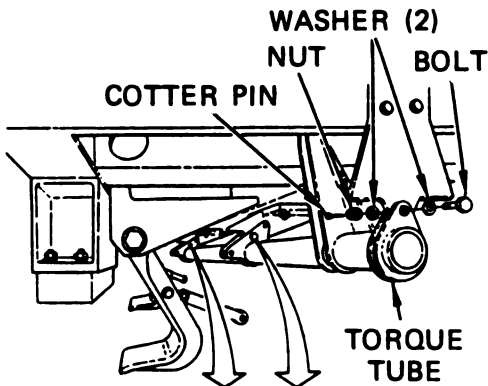
c. Install.

(1) Apply zinc chromate primer to three bolts.

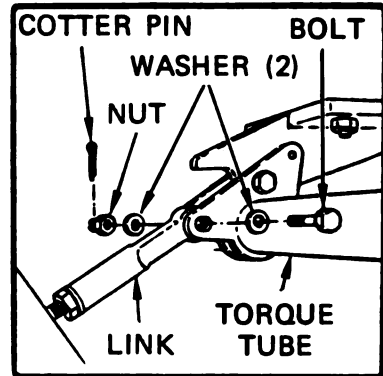
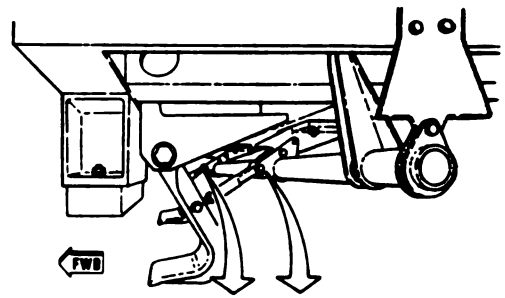
(2) Position new torque tube to LLM and install three bolts, six washers, and three nuts to secure torque tube to two fittings and bearing plate.

5-23. TRAVEL LOCK MAINTENANCE INSTRUCTIONS (CONT)

(3) Using 7/16-inch box end wrench and 7/16-inch socket, tighten nuts. Back nut off to nearest cotter pin hole and install new cotter pin.

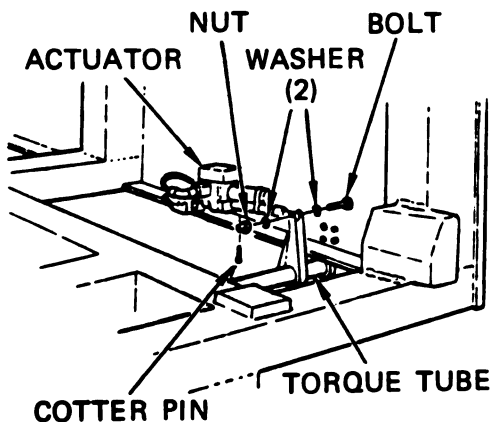


(6) Apply zinc chromate primer to two bolts. Position two links in torque tube arms and install two bolts, four washers, and two nuts.



(4) Apply zinc chromate primer to bolt. Position actuator in torque tube arm and install bolt, two washers, and nut.

(5) Using 7/16-inch box end wrench and 7/16-inch socket, tighten nut. Back nut off to nearest cotter pin hole and install new cotter pin.



(8) Perform torque tube and actuator rigging (item 13, a).

(9) If no further maintenance is required, perform follow-on procedure (page 5-115).

2. TORQUE TUBE BEARING PLATE.

a. Remove.

(1) Using cotter pin extractor, remove cotter pin from torque tube attachment bolt.

(2) Using 7/16-inch box end wrench and 7/16-inch socket, remove nut, two washers, and bolt securing torque tube to bearing plate.

(3) Using 10mm box end wrench and 10mm socket, remove four nuts, eight washers, and four bolts securing bearing plate to LLM. Remove bearing plate.

5-23. TRAVEL LOCK MAINTENANCE INSTRUCTIONS (CONT)

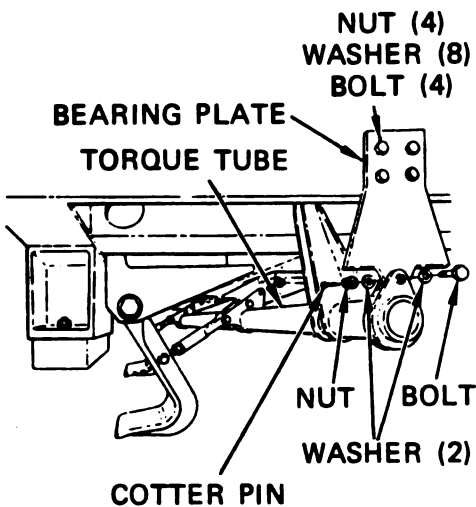
b. Install.

(1) Apply zinc chromate primer to four bolts. Position new bearing plate on LLM and to torque tube arm. Install four bolts, eight washers, and four nuts.

(2) Using 10mm box end wrench and 10mm socket, tighten nuts.

(3) Apply zinc chromate primer to bolt. Install bolt, two washers and nut to secure torque tube to bearing plate.

(4) Using 7/16-inch box end wrench and 7/16-inch socket, tighten nut. Back nut off to nearest cotter pin hole and install new cotter pin.



(5) If no further maintenance is required, perform follow-on procedure (page 5-115).

3. TORQUE TUBE FITTING.

a. Remove.

(1) Using cotter pin extractor, remove cotter pin from torque tube attachment bolt.

(2) Using 7/16-inch box end wrench and 7/16-inch socket, remove nut, two washers, and bolt securing torque tube to fitting.

(3) Using 10mm box end wrench and 10mm socket, remove four nuts, eight washers, and four bolts securing fitting to LLM. Remove fitting.

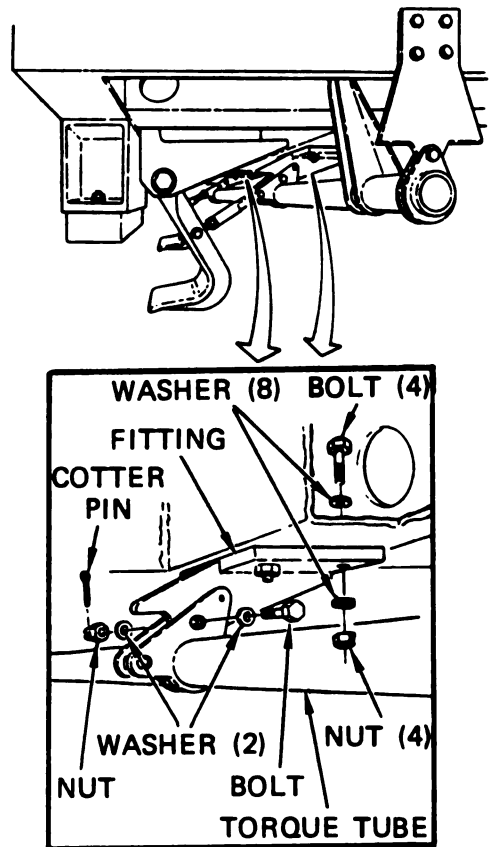
b. Install.

(1) Apply zinc chromate primer to four bolts. Position new fitting on LLM and torque tube arm. Install four bolts, eight washers, and four nuts.

(2) Using 10mm box end wrench and 10mm socket, tighten nuts.

(3) Apply zinc chromate primer to bolt. Install bolt, two washers, and nut to secure torque tube to fitting.

(4) Using 7/16-inch box end wrench and 7/16-inch socket, tighten nut. Back nut off to nearest cotter pin hole and install new cotter pin.



(5) If no further maintenance is required, perform follow-on procedure (page 5-115).

5-23. TRAVEL LOCK MAINTENANCE INSTRUCTIONS (CONT)

4. LINK.

a. Remove.

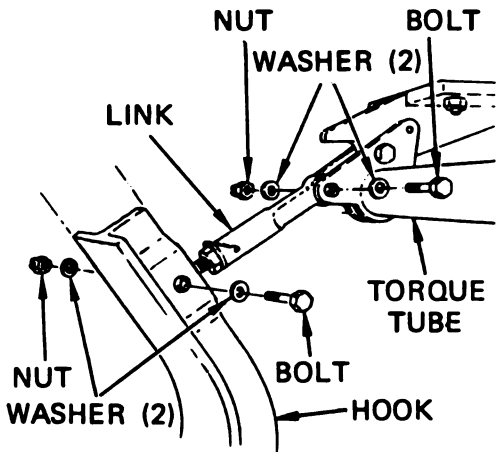
(1) Using cotter pin extractor, remove two cotter pins from link attaching bolts.

(2) Using 7/16-inch box end wrench and 7/16-inch socket, remove nut, two washers, and bolt securing link to torque tube.

(3) Using 1/2-inch open end wrench and 1/2-inch socket, remove nut, two washers, and bolt securing link to hook. Remove link.

b. Install.

(1) Apply zinc chromate primer to two bolts. Adjust new link to length of removed link and install two bolts, four washers, and two nuts.



(2) Perform hook rigging (item 13, c).

5. PROBE ASSEMBLY.

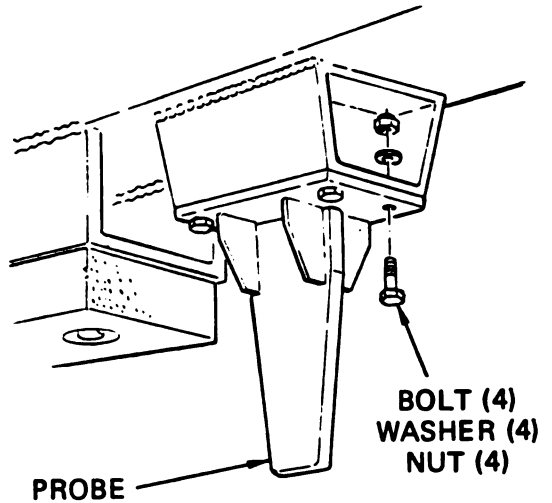
a. Remove.

(1) Using 19mm socket and 19mm open end wrench, remove four nuts, four washers, and four bolts securing probe to LLM.

(2) Remove probe.

b. Install.

(1) Apply zinc chromate primer to four bolts. Position probe on LLM and install four bolts, four washers, and four nuts. Using 19mm socket and 19mm open end wrench, tighten nuts.



(2) If no further maintenance is required, perform follow-on procedure (page 5-115).

6. BUMPER ASSEMBLY.

NOTE

The following procedure is for the later configured SPLs equipped without spacers in the bumper. Some earlier configured SPLs may be equipped with spacers inside the mounting holes of the bumper.

a. Remove.

(1) Using 17mm box end wrench and 17mm socket, remove two nuts, four washers, and two bolts.

(2) Remove bumper assembly from LLM, then remove six shims.

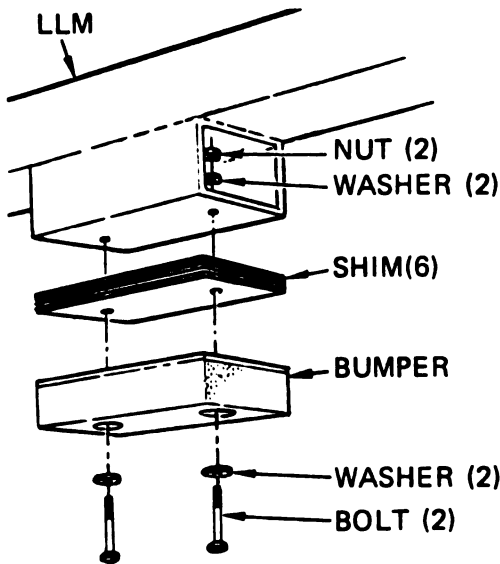
b. Install.

(1) Perform bumper rigging (item 13, b).

5-23. TRAVEL LOCK MAINTENANCE INSTRUCTIONS (CONT)

(2) Apply zinc chromate primer to two bolts. Position bumper assembly with shims on LLM and install two bolts, four washers, and two nuts.

(3) Using 17mm box end wrench and 17mm socket, tighten nuts.



(4) If no further maintenance is required, perform follow-on procedure (page 5-115).

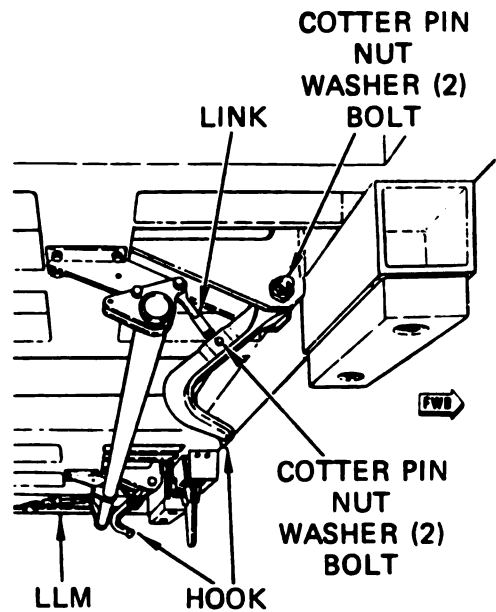
7. HOOK.

a. Remove.

(1) Using cotter pin extractor, remove two cotter pins from hook attachment bolts.

(2) Using 1/2-inch box end wrench and 1/2-inch socket, remove nut, two washers, and bolt securing link to hook.

(3) Using 1-7/16 inch box end wrench and 1-7/16 inch socket, remove nut, two washers, and bolt securing hook to LLM.

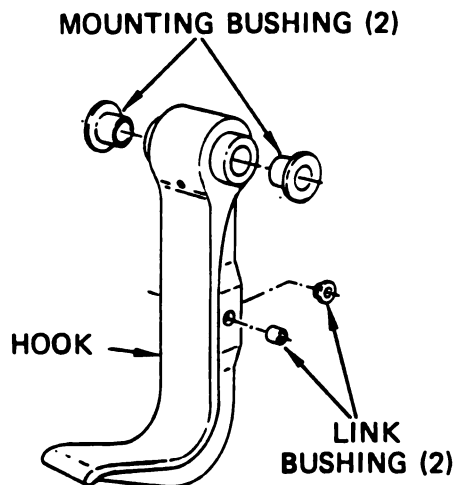


b. Repair.

(1) Using puller set with adjustable open end wrench, remove two hook mounting bushings and two link bushings.

(2) Apply zinc chromate primer to outside diameter of new bushings.

(3) Insert new bushings in hook and seat in place. Be sure bushings are flush and fully engaged.

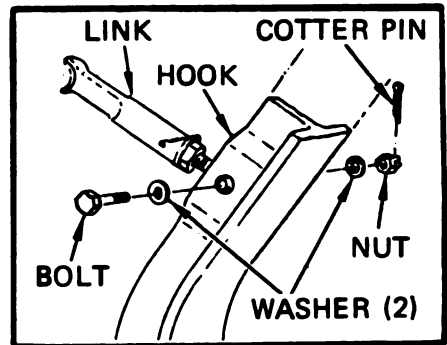
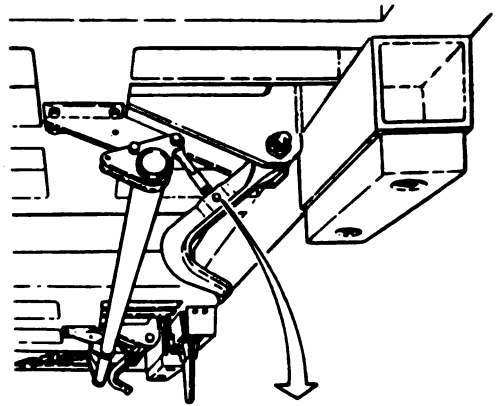
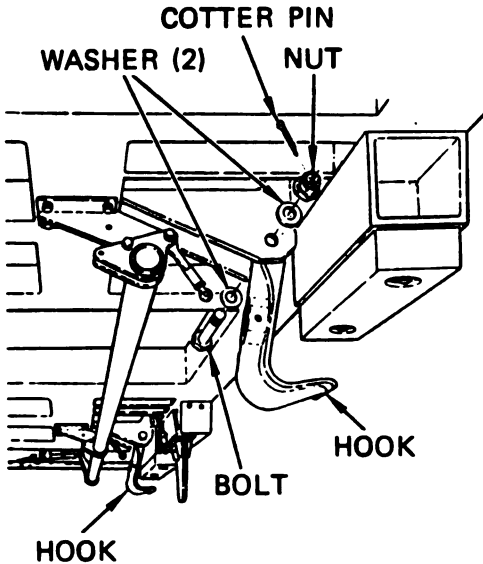


5-23. TRAVEL LOCK MAINTENANCE INSTRUCTIONS (CONT)

c. Install.

(1) Apply zinc chromate primer to bolt. Position new hook in LLM attachment and install bolt, two washers, and nut.

(2) Using 1-7/16 inch box end wrench and 1-7/16 inch socket, tighten nut. Back off nut to nearest cotter pin hole and install new cotter pin.



(6) If no further maintenance is required, perform follow-on procedure (page 5-115).

(3) Perform hook rigging (item 13, c).

(4) Apply zinc chromate primer to bolt. Position link to hook and install bolt, two washers, and nut.

(5) Using 1/2-inch box end wrench and 1/2-inch socket, tighten nut. Back off nut to nearest cotter pin hole and install new cotter pin.

8. ACTUATOR.

NOTE

If unable to manually position LLM, actuator may be removed with LLM in stow position.

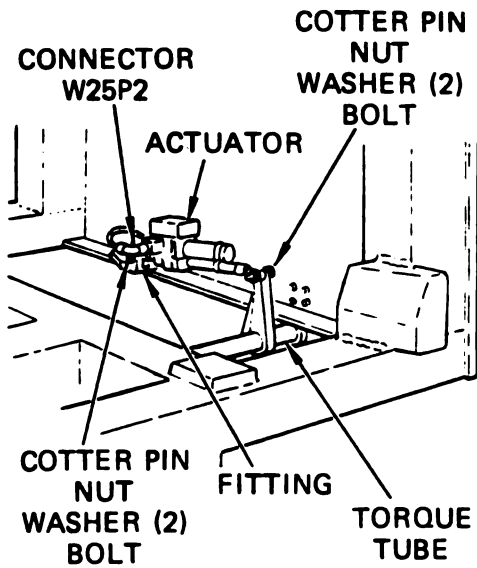
a. Remove.

(1) Disconnect electrical connector W25P2 from connector J1 on actuator.

(2) Using cotter pin extractor, remove two cotter pins from actuator mounting bolts.

(3) Using 7/16-inch box end wrench and 7/16-inch socket, remove nut, two washers, and bolt securing actuator to torque tube.

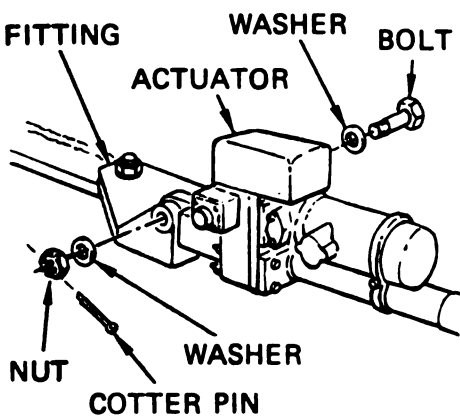
5-23. TRAVEL LOCK MAINTENANCE INSTRUCTIONS (CONT)



(4) Using 7/16-inch box end wrench and 7/16-inch socket, remove nut, two washers, and bolt securing actuator to actuator fitting.

b. Install.

(1) Apply zinc chromate primer to bolt. Position actuator to align rear bearing with hole in fitting. Install bolt, two washers, and nut. Tighten nut. Back nut off to nearest cotter pin hole and install new cotter pin.



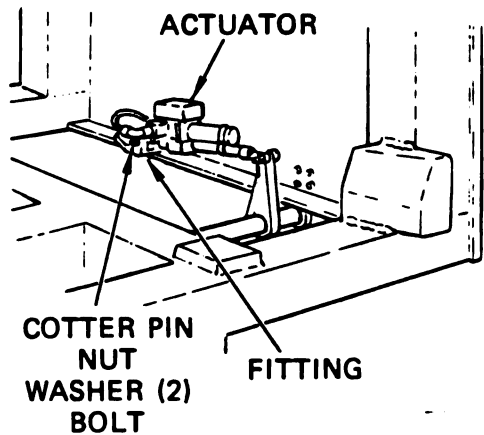
(2) Perform torque tube and actuator rigging (item 13, a).

9. ACTUATOR FITTING.

a. Remove.

(1) Using cotter pin extractor, remove cotter pin from actuator mounting bolt.

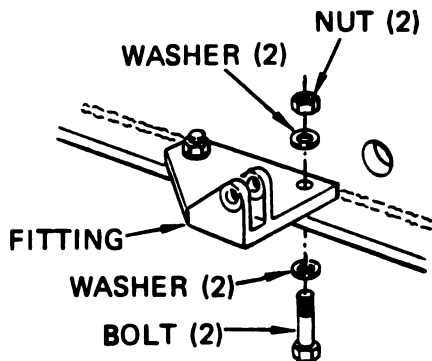
(2) Using 7/16-inch box end wrench and 7/16-inch socket, remove nut, two washers, and bolt securing actuator to fitting.



(3) Using 13mm box end wrench and 13mm socket, remove two nuts, four washers, and two bolts securing fitting. Remove fitting.

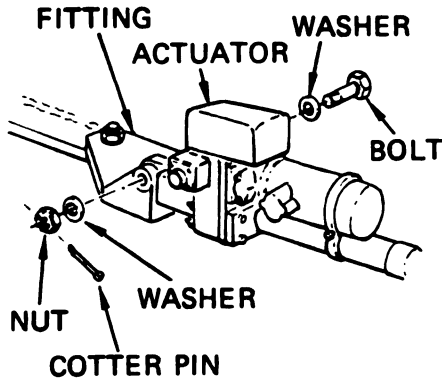
b. Install.

(1) Apply zinc chromate primer to two bolts. Position fitting and install two bolts, four washers, and two nuts. Using 13mm box end wrench and 13mm socket, tighten nuts.



5-23. TRAVEL LOCK MAINTENANCE INSTRUCTIONS (CONT)

(2) Apply zinc chromate primer to bolt. Position actuator to align rear bearing with hole in fitting. Install bolt, two washers, and nut. Using 7/16-inch box end wrench and 7/16-inch socket, tighten nut. Back nut off to nearest cotter pin hole and install cotter pin.



(3) If no further maintenance is required, perform follow-on procedure (page 5-115).

10. ROLLER ASSEMBLY.

a. Remove.

(1) Using 17mm box end wrench and 17mm socket, remove two nuts, two washers, and two bolts securing lower end of roller assembly.

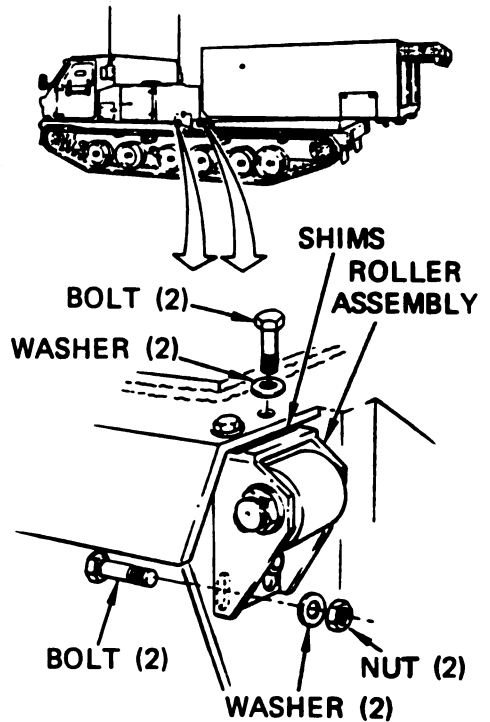
(2) Using 17mm socket, remove two bolts and two washers securing upper end of roller assembly. Remove roller assembly and shims. Retain shims.

b. Install.

(1) Apply zinc chromate primer to four bolts.

(2) Place new roller assembly and shims in position and install two bolts and two washers securing upper end of roller assembly. Do not tighten bolts.

(3) Install two bolts, two washers, and two nuts securing lower end of roller assembly. Do not tighten nuts.



(4) Perform hook rigging (item 13, c).

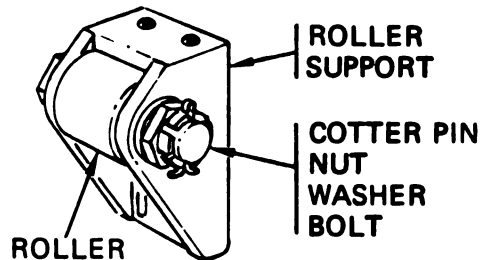
11. ROLLER.

a. Remove.

(1) Remove roller assembly (item 10, a).

(2) Using cotter pin extractor, remove cotter pin.

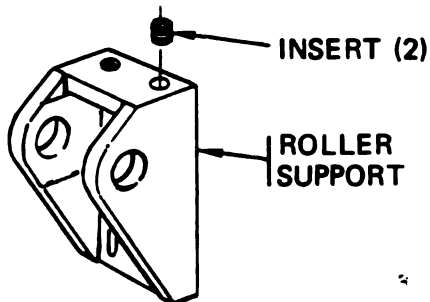
(3) Using hammer and drift pin punch, remove nut, washer, and bolt. Remove roller from roller support.



5-23. TRAVEL LOCK MAINTENANCE INSTRUCTIONS (CONT)

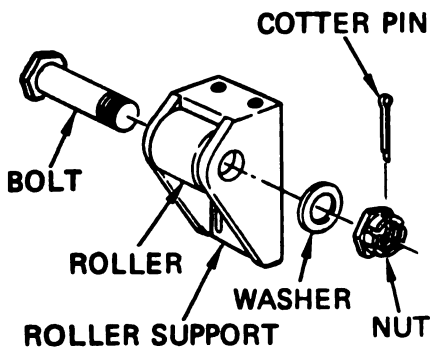
b. Repair.

- (1) Using insert extractor tool, remove two inserts from roller support.
- (2) Apply zinc chromate primer to inserts.
- (3) Using insert installation tool, install new inserts 1/2 to 3/4 turn below roller support surface.



c. Install.

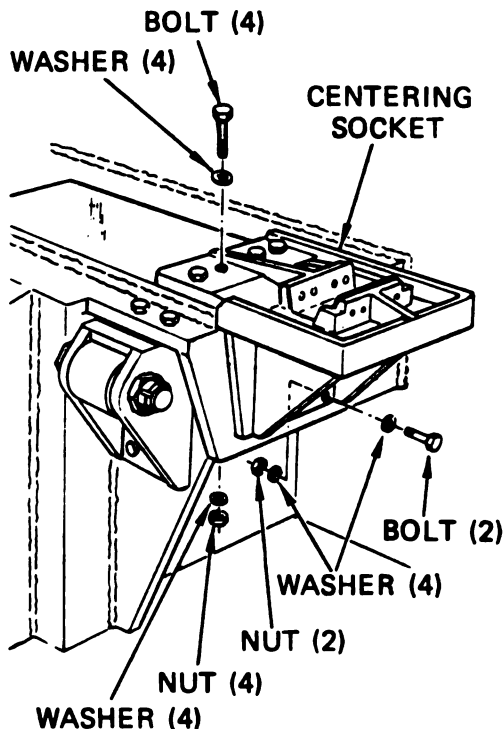
- (1) Position roller in roller support and install bolt, washer, and nut.
- (2) Using hammer and drift pin punch, tighten nut. Back nut off to nearest cotter pin hole and install new cotter pin.
- (3) Install roller assembly (item 10, b).
- (4) If no further maintenance is required, perform follow-on procedure (page 5-115).



12. CENTERING SOCKET.

a. Remove.

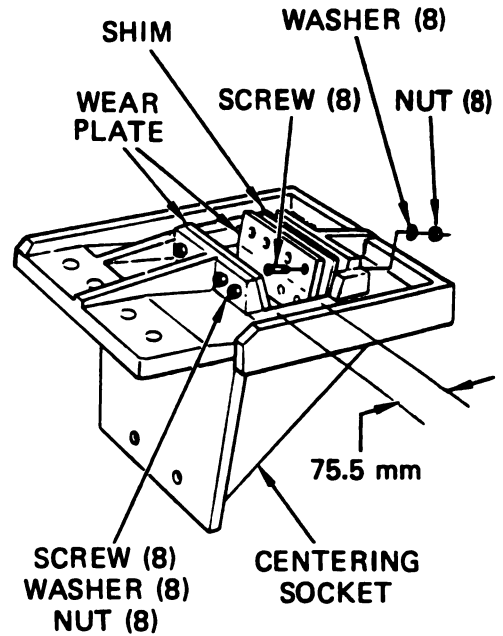
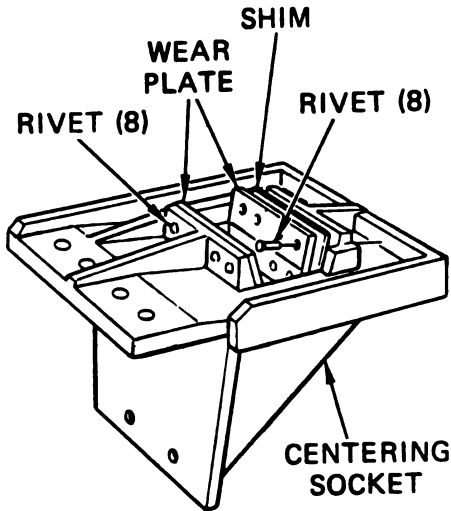
- (1) Using 17mm box end wrench and 17mm socket, remove two washers and two bolts securing lower end of centering socket.
- (2) Using 19mm box end wrench and 19mm socket, remove four nuts, eight washers, and four bolts securing centering socket to vehicle. Remove centering socket.



5-23. TRAVEL LOCK MAINTENANCE INSTRUCTIONS (CONT)

b. Repair.

(1) Using electric drill with 11/64-inch twist drill and drive pin punch, remove eight rivets securing wear plates and shims to centering socket. Do not discard wear plate.



c. Install.

(2) Using removed wear plate for template, drill eight holes in new wear plate and shims with electric drill and 11/64-inch twist drill.

(3) Using 100 degree countersink cutter, countersink holes until screw heads fit flush with wear plate surface.

(4) Using C-clamps, position wear plate and shims on centering socket. Using machinist rule, measure distance between wear plates. Peel shim until distance is 75.5mm.

(5) Apply zinc chromate primer to eight screws and install screws, eight washers, and eight nuts. Using crosstip screwdriver and 11/32-inch open end wrench, tighten nuts.

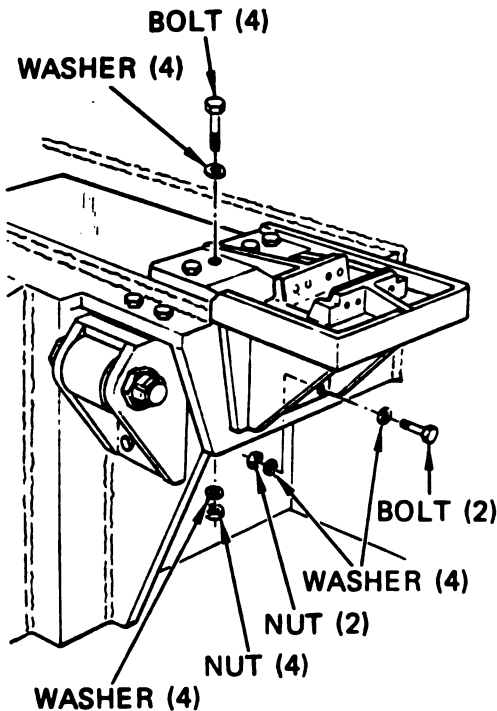
(1) Apply sealant to new centering socket.

(2) Apply zinc chromate primer to six bolts. Position centering socket on vehicle and install four bolts, eight washers, and four nuts at top of centering socket.

(3) Using 19mm box end wrench and 19mm socket, tighten nuts.

5-23. TRAVEL LOCK MAINTENANCE INSTRUCTIONS (CONT)

(4) Install two bolts, eight washers, and two nuts to lower end of socket. Using 17mm box end wrench and 17mm socket, tighten nuts.



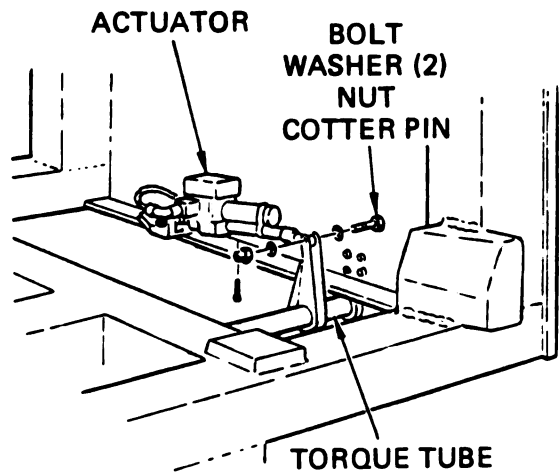
(5) If no further maintenance is required, perform follow-on procedure (page 5-115).

13. TRAVEL LOCK SYSTEM ADJUSTMENT.

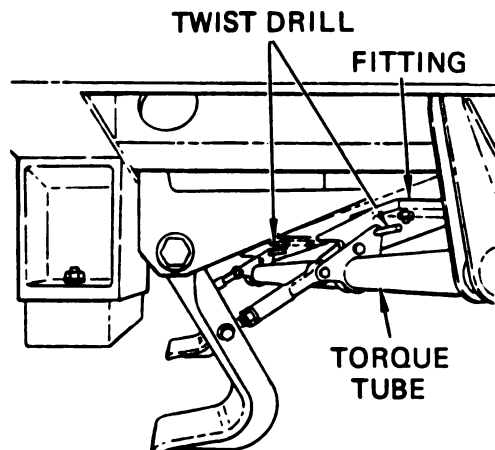
a. Torque Tube and Actuator Rigging.

(1) Using cotter pin extractor, remove cotter pin from actuator rod end bolt.

(2) Using 7/16-inch box end wrench and 7/16-inch socket, remove nut, two washers, and bolt securing actuator to torque tube.



(3) Rotate torque tube to align rigging holes in fitting with holes in torque tube. Install 1/4-inch twist drill in each rigging hole.



(4) Disconnect hydraulic quick-disconnect from azimuth and elevation servomotors.

CAUTION

Be sure actuator can be fully extended without striking a stationary object.

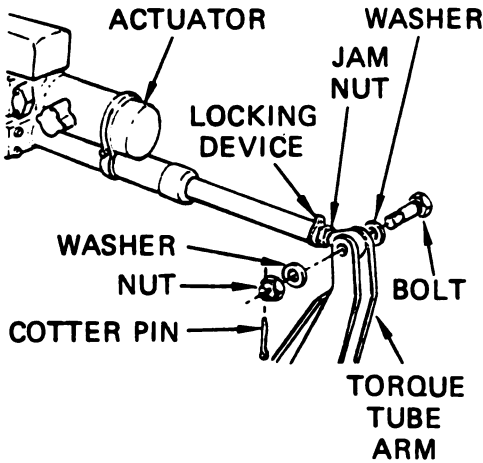
(5) Turn FCS on. Actuator will run to full extended position and stop. Shut off FCS.

5-23. TRAVEL LOCK MAINTENANCE INSTRUCTIONS (CONT)

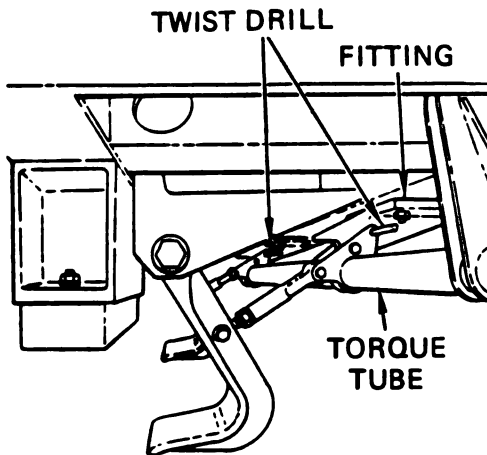
(6) Cut and remove lockwire from actuator jamnut. Using 1/2-inch open end wrench, loosen jamnut and adjust rod end until bolt can be installed through torque tube arm and rod end. Tighten jamnut finger-tight.

(7) Apply zinc chromate primer to bolt. Aline actuator rod end with torque tube arm and install bolt, two washers, and nut. Tighten nut and then back off to nearest cotter pin hole and install new cotter pin.

(8) Using 1/2-inch open end wrench, tighten jamnut. Using lockwire, safety-wire jamnut to locking device.



(9) Remove twist drills from rigging holes.



(10) Connect hydraulic quick-disconnect to azimuth and elevation servomotors. Turn coupling until ratchet lock begins to click, then turn coupling 1/2 turn more.

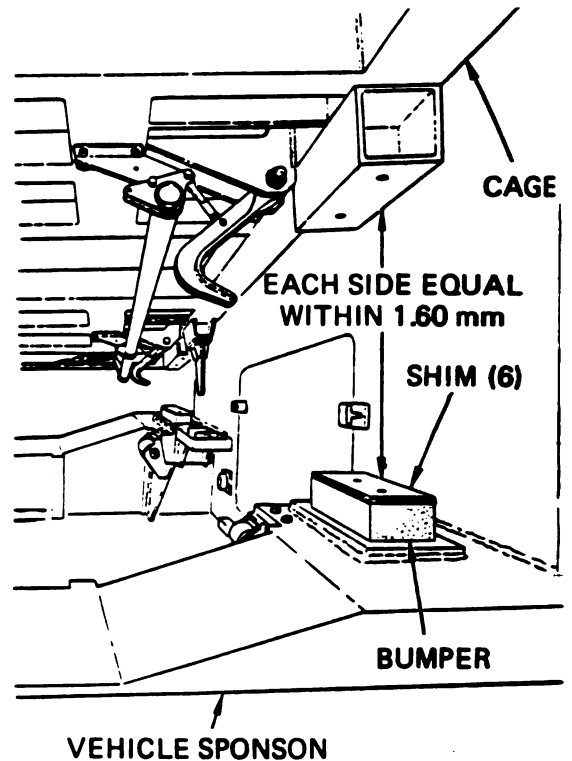
(11) If no further maintenance is required, perform follow-on procedure (page 5-115).

b. Bumper Rigging.

(1) Place bumper and six shims on each vehicle sponson bumper support.

(2) Manually position cage at zero azimuth and lower cage until cage clears bumper and shims by 5.0 to 15.0mm (TM 9-1425-646-10).

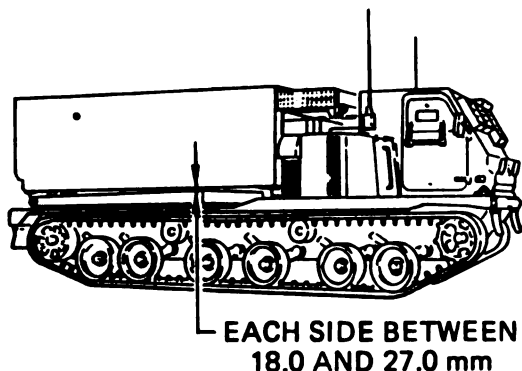
(3) Remove or add shims from one bumper to the other until cage to bumper clearance on left and right bumper is equal within 1.60mm.



5-23. TRAVEL LOCK MAINTENANCE INSTRUCTIONS (CONT)

(4) With shims and bumper in place but not secured, using manual drive, lower cage until there is a no-load condition on elevation actuators.

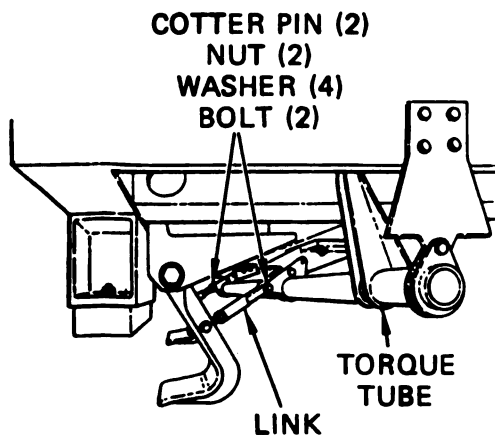
(5) Measure distance between cage and turret on each side at forward corner of turret. If this measurement is not between 18.0 and 27.0mm, remove or add shims equally on both sides to obtain measurement while maintaining no-load on elevation actuators.



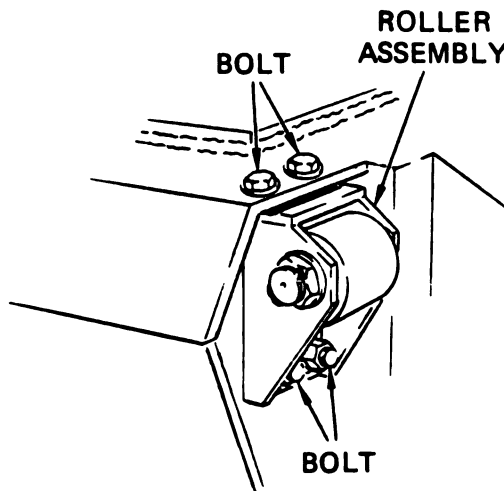
(6) Manually raise cage. Cage to bumper clearance on both sides must be equal within 1.60mm.

c. Hook Rigging.

(1) Using 1/2-inch open end wrench and 1/2-inch socket, remove cotter pin, bolt, two washers, and nut securing link to torque tube.



(2) Using 17mm box end wrench and 17mm socket, loosen bolts securing both roller assemblies.



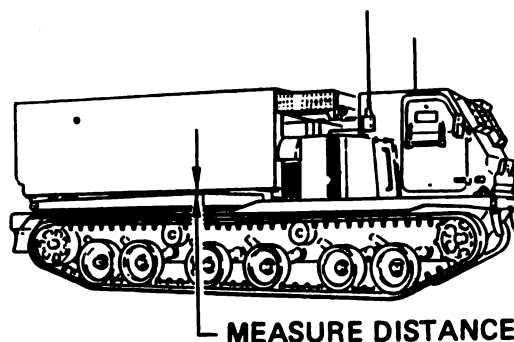
(3) Turn FCS on and electrically extend actuator to fully extended position. Turn FCS off.

(4) Attach links to hooks using bolt, two washers, and nuts.

(5) Turn FCS on and retract hooks. Turn FCS off.

(6) With cage in down position at zero azimuth and elevation actuators in a no-load condition, measure distance between cage and turret at forward corner of turret.

(7) Manually lower cage until clearance measured in step (6) is reduced by 10.0 (±1.0)mm to load elevation actuators.



5-23. TRAVEL LOCK MAINTENANCE INSTRUCTIONS (CONT)

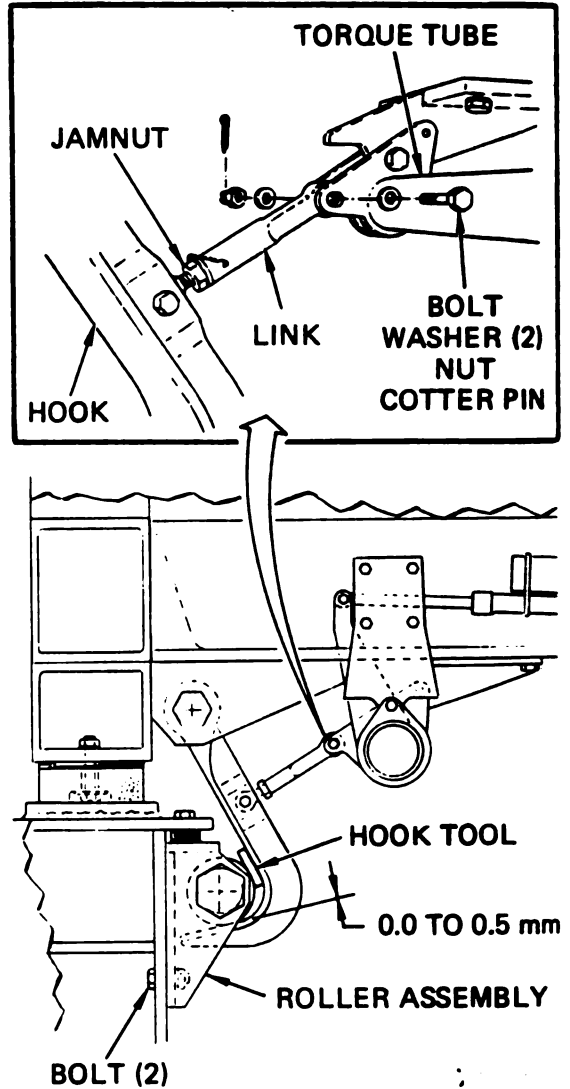
(8) With elevation actuators in loaded condition and roller assemblies loose, turn FCS on and extend travel lock actuator to position hooks in locked position.

(9) Remove bolt, two washers, and nut securing links to torque tube.

(10) Cut lockwire from link jamnut. Using 1/2-inch open end wrench, loosen jamnut. Place hook tool between hook and roller assembly and adjust link until bolt can be installed. Apply zinc chromate primer to bolts. Install bolt, two washers, nut, and cotter pin to secure links to torque tube.

(11) Adjust roller assemblies to obtain 0.0 to 0.5mm clearance between bottom of roller and hook. Using 17mm box end wrench and 17mm socket, tighten bottom two bolts on roller assembly.

(12) Using 1/2-inch open end wrench, tighten link jamnut. Using lockwire, safety-wire jamnut to locking device. Remove hook tool.



5-23. TRAVEL LOCK MAINTENANCE INSTRUCTIONS (CONT)

(13) Mark position of roller assembly. Turn FCS on, retract hooks and elevate cage. Install jury struts (TM 9-1425-646-20).

(14) Remove two upper bolts and washers, then adjust roller assembly shims to obtain position marked in step (13). Install bolts and washers. Using 17mm box end wrench and 17mm socket, torque four roller assembly bolts 35.4 to 43.2 N·m. Remove jury struts.

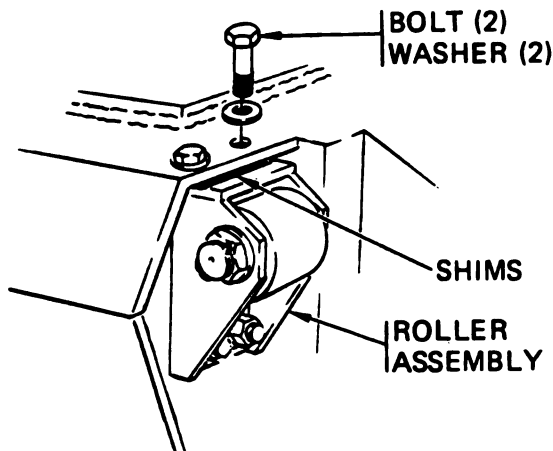
(15) Adjust cage down limit switch (paragraph 5-26).

(16) Turn FCS on and cycle cage from elevated position to stowed position to verify operation of hooks. Turn FCS off (TM 9-1425-646-10).

(17) With cage in down position and elevation actuators loaded in accordance with step (7), check hook to roller clearance as indicated in step (11).

FOLLOW-ON PROCEDURE

Perform stow procedure and check for smooth operation of travel lock (TM 9-1425-646-10).



5-24. BLAST SHIELD ASSEMBLY MAINTENANCE INSTRUCTIONS. This paragraph covers the maintenance tasks for the following items:

<i>Item</i>	<i>Page</i>
1. Door Hinge	5-116
2. Door Open Cam	5-117
3. Door Close Cam	5-117
4. Cam Support	5-117
5. Door Link	5-118
6. Track Roller	5-119
7. Link Assembly	5-120
8. Link Support	5-121
9. Door Adjustment	5-122
10. Blast Shield Extension	5-124
11. Blast Shield Door	5-125
12. Blast Shield	5-126

INITIAL SETUP

Tools

- Kit, tool, 13032302
- Set, shop, 13032303
- Assembly, driver, A3012A
- Bar, rivet bucking, AT694 (for item 1)
- Drill, electric, 1311-09

Materials/Parts

- Lockwire (23, Appendix B)
- Methyl-ethyl-ketone (25, Appendix B)
- Primer, zinc chromate (47, Appendix B)
- Sealant (57, Appendix B)

Personnel Required

MLRS Repairer MOS 27M
(MLRS Crewmember to assist as required)

References

- TM 9-1425-646-10
- TM 9-1425-646-20

Troubleshooting

Paragraph 2-9

Equipment Condition

Position LLM to 1600 mils (90 degrees)
azimuth and 0 mils elevation
(TM 9-1425-646-10)

1. DOOR HINGE.

a. Remove.

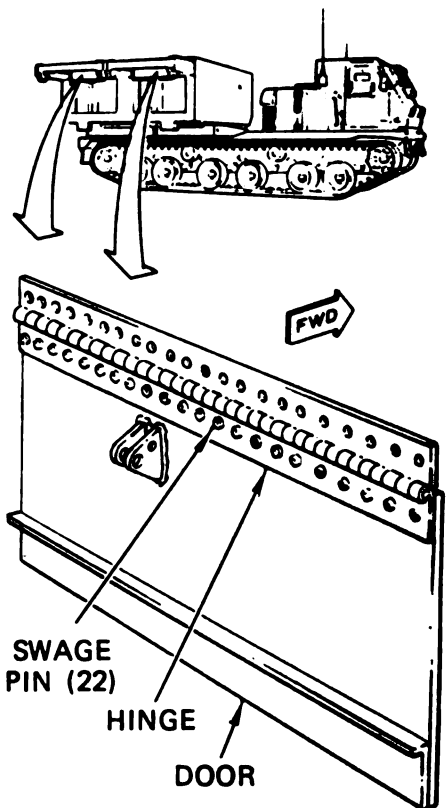
- (1) Remove blast shield (item 12, a).
- (2) Using chisel, hammer, and bucking bar, cut collar from 22 swage lock pins.
- (3) Using punch and hammer, remove 22 swage lockpins. Remove hinge from door.

b. Install.

NOTE

Screws and nuts are used to replace lockpins.

- (1) Apply zinc chromate primer to 22 new screws.
- (2) Position new hinge on door and install 22 screws, washers, and nuts. Using crosstip screwdriver and 5/16-inch box end wrench, tighten nuts.
- (3) Install blast shield (item 12, b).



5-24. BLAST SHIELD ASSEMBLY MAINTENANCE INSTRUCTIONS (CONT)

2. DOOR OPEN CAM.

a. Remove.

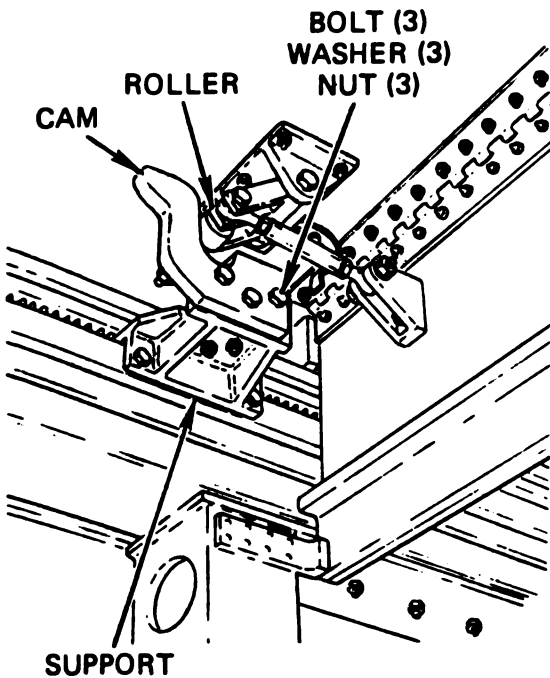
(1) Using electric drill and driver assembly, extend boom until cam is approximately in center of roller.

(2) Using 10mm box end wrench and 13mm socket, remove three nuts, six washers, and three bolts securing cam to support assembly. Remove cam.

b. Install.

(1) Apply zinc chromate primer to three bolts.

(2) Position new cam on support and install three bolts, six washers, and three nuts. Do not tighten nuts.



(3) Perform door adjustment (item 9).

3. DOOR CLOSE CAM.

a. Remove.

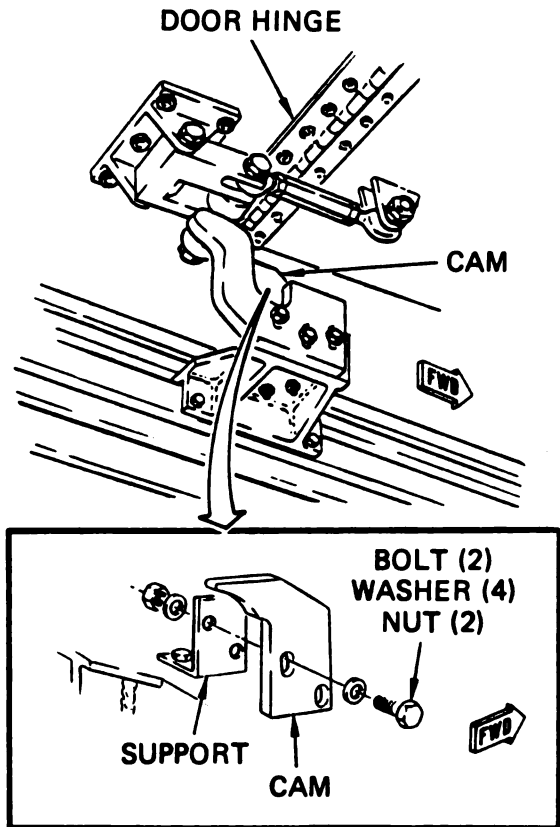
(1) Using electric drill and driver assembly, extend boom until cam upper surface is just behind blast door hinge.

(2) Using 17mm box end wrench and 12mm socket, remove two nuts, four washers, and two bolts. Remove cam.

b. Install.

(1) Apply zinc chromate primer to two bolts.

(2) Position new cam on support and install two bolts, four washers, and two nuts. Do not tighten nuts.



(3) Perform door adjustment (item 9).

4. CAM SUPPORT.

a. Remove.

(1) Using electric drill and driver assembly, extend boom until cam support is clear of door.

(2) Remove door open cam (item 2, a).

5-24. BLAST SHIELD ASSEMBLY MAINTENANCE INSTRUCTIONS (CONT)

(3) Using 13mm box end wrench and 10mm socket, remove three nuts, washers, and bolts securing door close cam support.

(4) Using 17mm socket, remove two bolts and washers securing cam support to side of boom beam.

(5) Using 6mm socket attachment, remove six screws securing cam support to top of boom beam. Remove support.

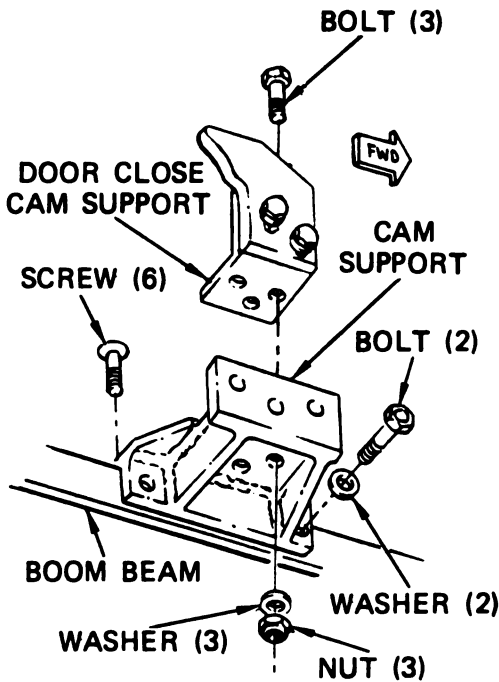
b. Install.

(1) Apply zinc chromate primer to bolts and screws.

(2) Position new cam support on boom beam and using 6mm socket attachment, install six screws. Using 17mm socket, install two bolts and washers.

(3) Apply zinc chromate primer to bolts.

(4) Position door close cam support and install three bolts, washers, and nuts. Using 13mm box end wrench and 10mm socket, tighten nuts.



(5) Install door open cam (item 2, b).

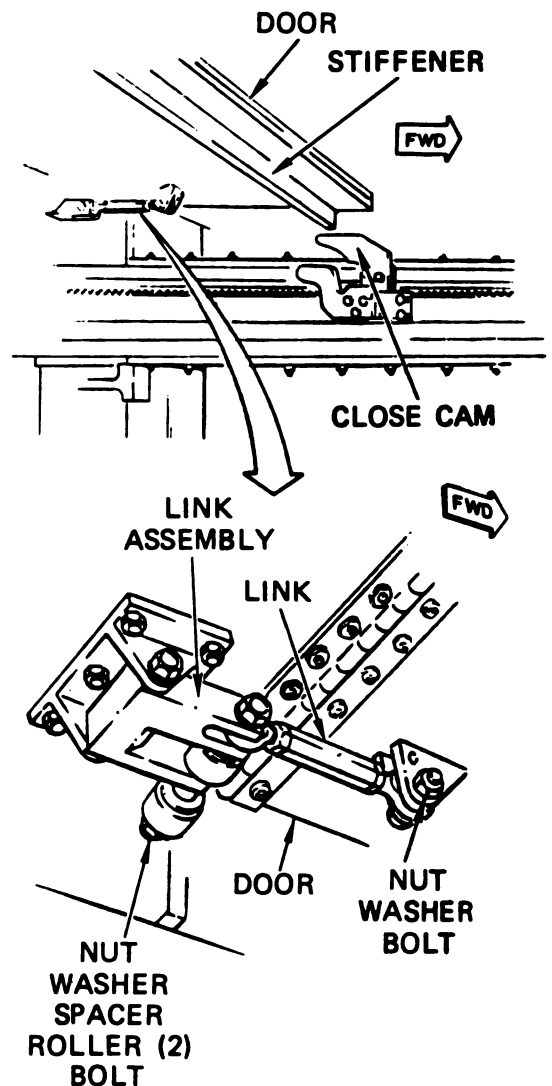
5. DOOR LINK.

a. Remove.

(1) Using electric drill and driver assembly, extend boom until door close cam is under door stiffener.

(2) Using 3/4-inch open end wrench and 3/4-inch socket, remove nut, washer, and bolt securing link to door.

(3) Using 3/4-inch open end wrench and 3/4-inch socket, remove nut, washer, spacer, bolt, and two rollers securing link to link assembly. Remove link.

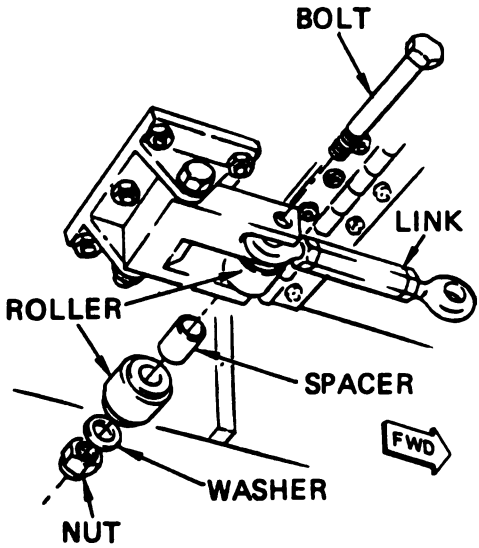


5-24. BLAST SHIELD ASSEMBLY MAINTENANCE INSTRUCTIONS (CONT)

b. Install.

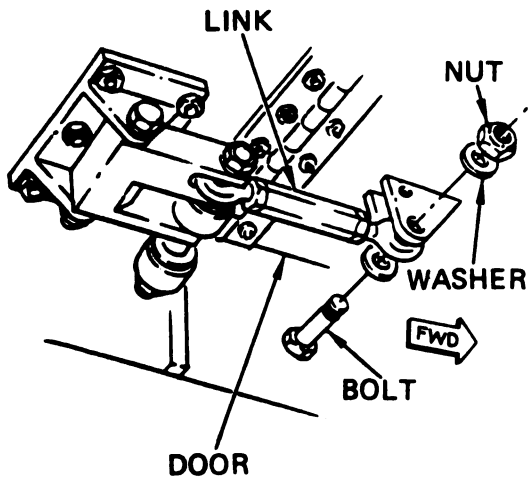
(1) Apply zinc chromate primer to two bolts.

(2) Install bolt, washer, two rollers, spacer, and nut securing new link to link assembly. Using 3/4-inch open end wrench and 3/4-inch socket, tighten nut.



(3) Adjust link (maintaining same number of threads in both ends of link) until bolt can be installed in door.

(4) Install bolt, washer, and nut. Using 3/4-inch open end wrench and 3/4-inch socket, tighten nut.



(5) Perform door adjustment (item 9).

6. TRACK ROLLER.

a. Remove.

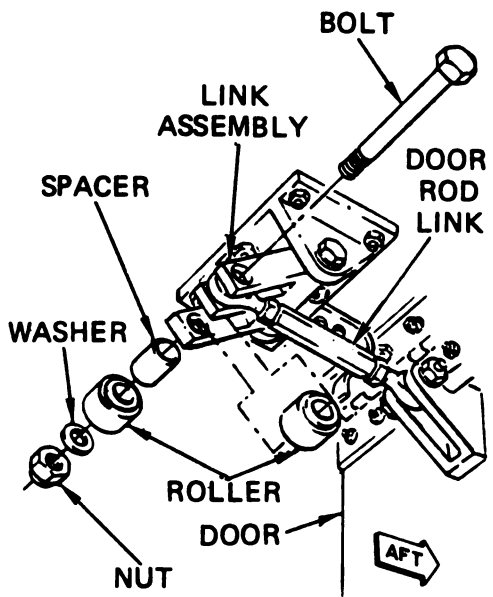
(1) Using 3/4-inch open end wrench and 3/4-inch socket, remove nut, two washers, spacer, two rollers, and bolt securing door rod link to link assembly. Do not change adjustment of door rod link.

(2) Remove rollers.

b. Install.

(1) Install bolt, two new rollers, spacer, two washers, and nut securing door rod link to link assembly.

(2) Using 3/4-inch open end wrench and 3/4-inch socket, tighten nut.



(3) Perform door adjustment (item 9).

5-24. BLAST SHIELD ASSEMBLY MAINTENANCE INSTRUCTIONS (CONT)

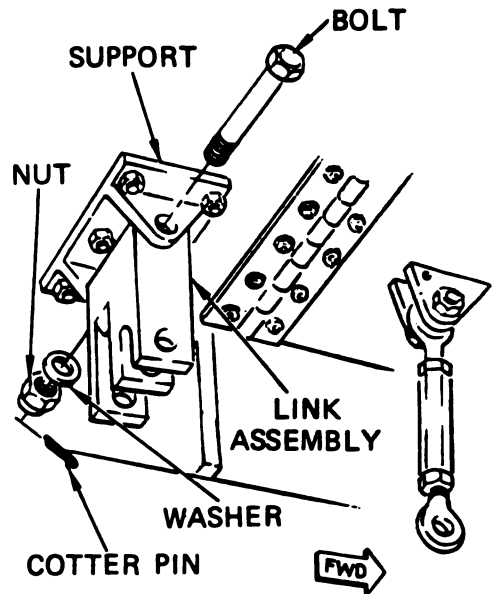
7. LINK ASSEMBLY.

a. Remove.

(1) Manually extend boom until door close cam is under door stiffener (TM 9-1425-646-10).

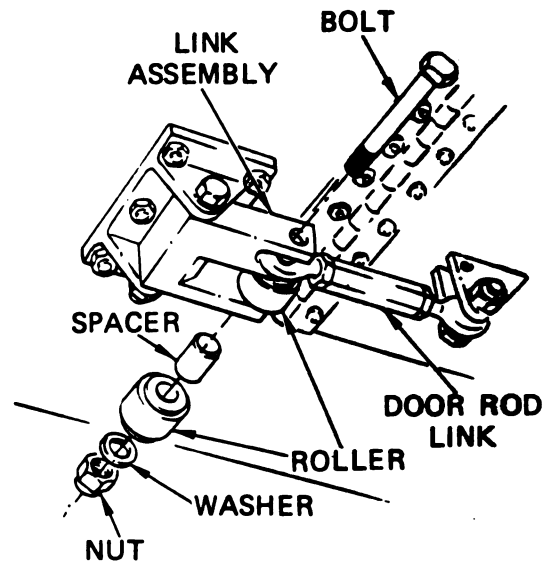
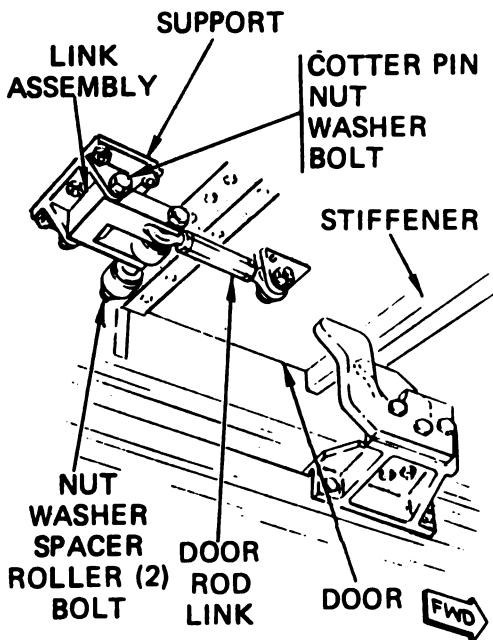
(2) Using 3/4-inch open end wrench and 3/4-inch socket, remove nut, two washers, spacer, rollers, and bolt securing door rod link to link assembly. Do not change adjustment of door rod link.

(3) Using cotter pin extractor, remove cotter pin and throw it away. Using 3/4-inch open end wrench and 3/4-inch socket, remove nut, washer, and bolt securing link assembly to support. Remove link assembly.



(5) Position door rod link in link assembly and install bolt, two rollers, spacer, two washers, and nut.

(6) Using 3/4-inch open end wrench and 3/4-inch socket, tighten nut.



b. Install.

(1) Apply zinc chromate primer to bolt.

(2) Position new link assembly in support and install bolt, washer, and nut.

(3) Using 3/4-inch open end wrench and 3/4-inch socket, tighten nut.

(4) Back off nut until link assembly pivots freely and install new cotter pin.

(7) Perform door adjustment (item 9).

5-24. BLAST SHIELD ASSEMBLY MAINTENANCE INSTRUCTIONS (CONT)

8. LINK SUPPORT.

a. Remove.

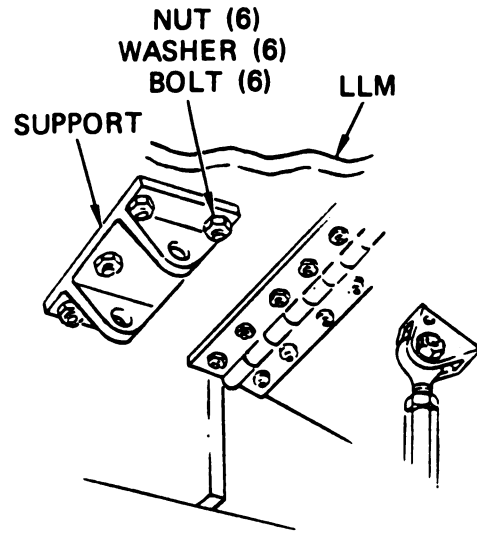
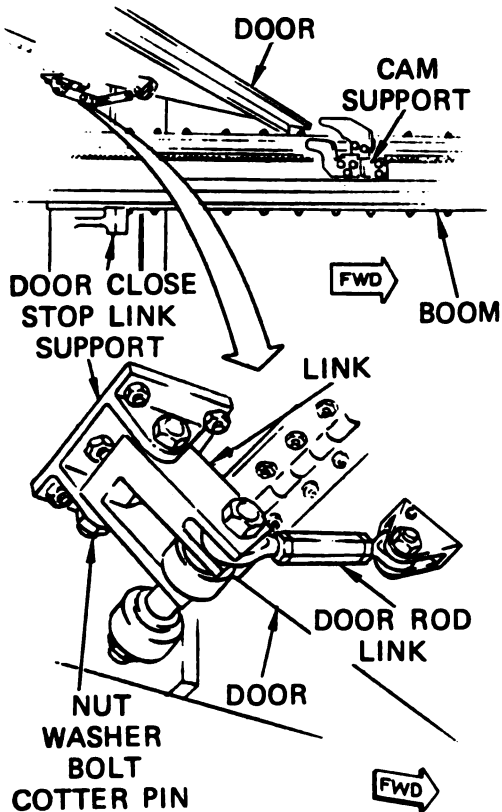
(1) Using electric drill and driver assembly, extend boom until cam support is clear of door.

(2) While holding door up, manually push door rod link over center. Slowly lower door until it is resting on door closed stops. Do not change adjustment of door rod link.

(3) Using cotter pin extractor, remove cotter pin and throw it away.

(4) Using 3/4-inch open end wrench and 3/4-inch socket, remove nut, washers, and bolt securing link assembly to link support.

(5) Using 17mm box end wrench and 12mm socket, remove 6 nuts, 12 washers, and 6 bolts securing link support to LLM. Remove link support.



b. Install.

(1) Apply zinc chromate primer to six bolts.

(2) Position new link support to LLM and install 6 bolts, 12 washers, and 6 nuts.

(3) Using 17mm box end wrench and 12mm socket, tighten six nuts.

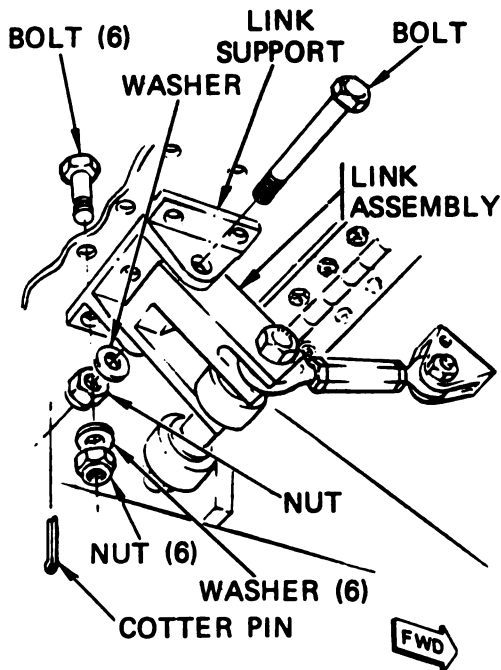
(4) Apply zinc chromate primer to bolt.

(5) Position link assembly to link support and install bolt, washers, and nut.

(6) Using 3/4-inch open end wrench and 3/4-inch socket, tighten nut.

5-24. BLAST SHIELD ASSEMBLY MAINTENANCE INSTRUCTIONS (CONT)

(7) Back off nut until link assembly pivots freely and install new cotter pin.

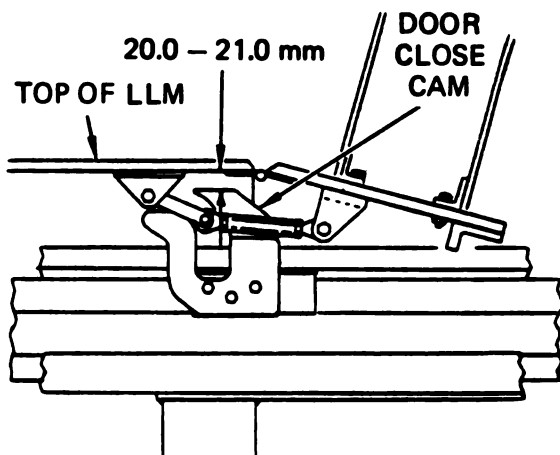


(8) Perform door adjustment (item 9).

9. DOOR ADJUSTMENT.

a. Using electric drill and driver assembly, extend boom until door close cam is just behind door hinge.

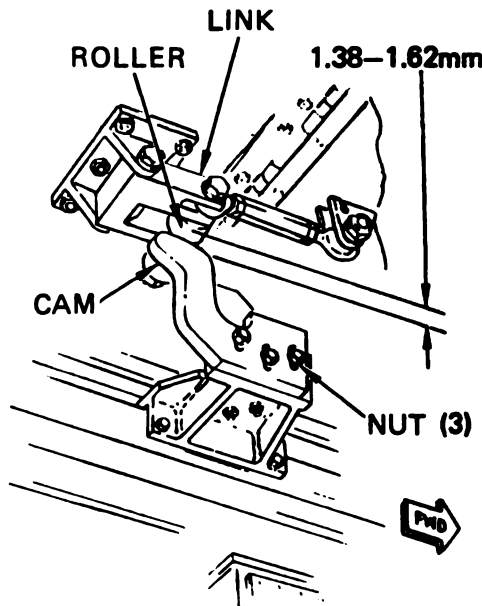
b. Using 17mm box end wrench and 17mm socket, loosen two nuts. Adjust door close cam to provide 20.0 to 21.0mm clearance between top of door close cam and underside of top of LLM. Tighten two nuts.



c. Manually extend boom until door open cam is directly under roller on link assembly.

d. Manually open blast shield door to full position. Check that link is against stop bolt and roller is secured by retainer.

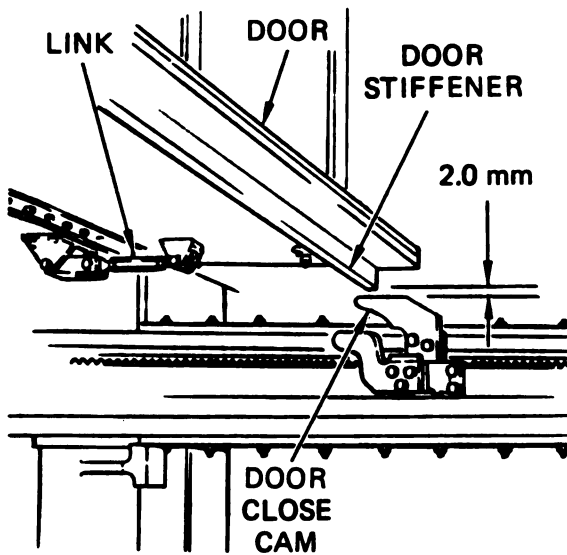
e. Using 10mm box end wrench and 13mm socket, loosen three nuts securing door open cam. Adjust door open cam to provide clearance of 1.38 to 1.62mm between top of door open cam and roller. Do not completely tighten nuts as door open cam is adjusted horizontally later.



5-24. BLAST SHIELD ASSEMBLY MAINTENANCE INSTRUCTIONS (CONT)

f. Check clearance between door close cam and center of door hinge. Clearance should be 1.0mm minimum. If this minimum clearance is not obtained, reposition door close cam according to steps a and b.

g. Extend boom until door close cam is centered under stiffener on door. Check that clearance between door close cam and door stiffener is 2.0mm. If necessary, cut lockwire and loosen jamnuts on link. Adjust link barrel until clearance is obtained. Tighten jamnuts and install lockwire.



h. Manually retract boom while watching for interference between link roller and door open cam. If link roller contacts door open cam before boom is fully retracted, reposition door open cam horizontally while maintaining vertical adjustment.

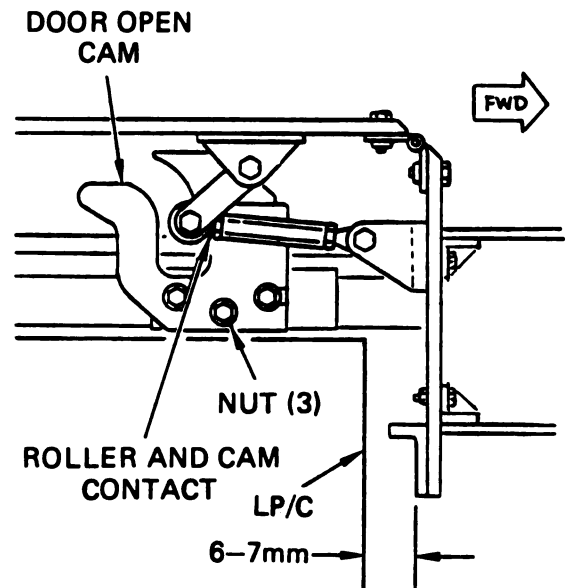
i. Extend boom a short distance. Using BC, retract boom to electrical stop.

j. Without changing door open cam vertical adjustment and while pulling door forward to remove free play in linkage, adjust door open cam horizontally until link roller contacts forward edge of cam. Using 10mm box end wrench and 13mm socket, tighten nuts.

k. Load training LP/C in LLM.

l. Using BC, extend and retract boom. With boom fully retracted electrically, pull door forward and measure, in plane of motion of link assembly, for 6 to 7mm clearance between door and LP/C bulkhead.

m. If clearance in step l is not obtained, readjust door open cam horizontally to obtain required clearance. Recheck adjustment in step l.



n. If no further maintenance is required, perform follow-on procedure (page 5-126).

5-24. BLAST SHIELD ASSEMBLY MAINTENANCE INSTRUCTIONS (CONT)

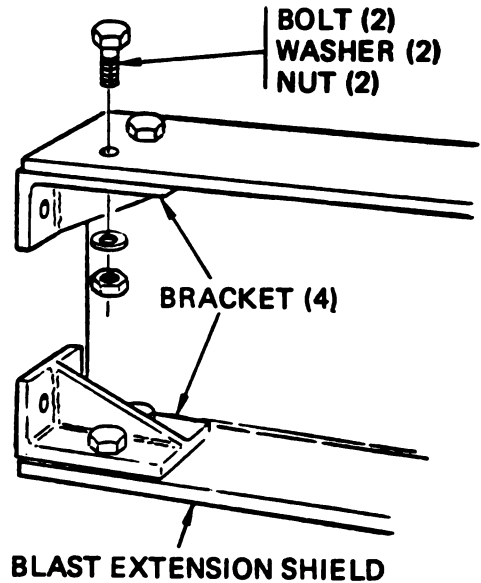
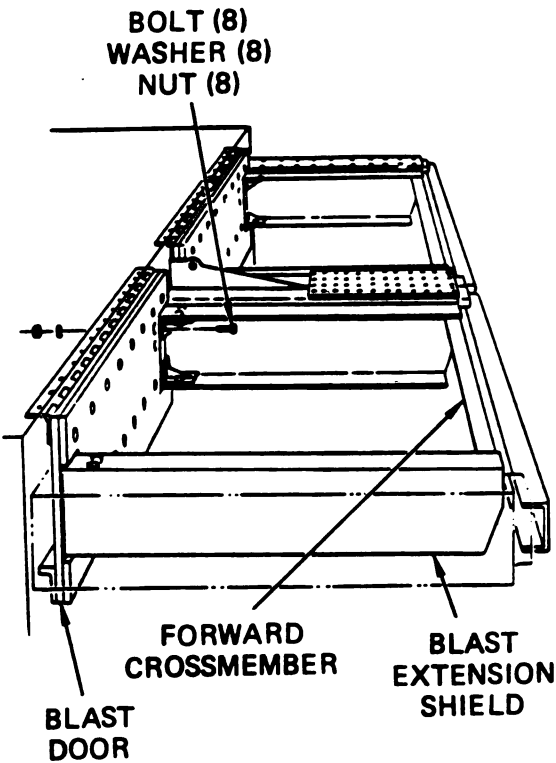
10. BLAST SHIELD EXTENSION.

a. Remove.

(1) Using chisel and hammer, remove ablative material covering nuts and bolts securing blast shield extension to brackets and brackets to blast door.

(2) Using 17mm socket and 17mm box end wrench, remove eight bolts, washers, and nuts securing shield extension mounting brackets to door. Remove shield extension.

(3) Using 17mm socket and 17mm box end wrench, remove eight bolts, washers, and nuts securing four brackets to extension. Remove brackets.

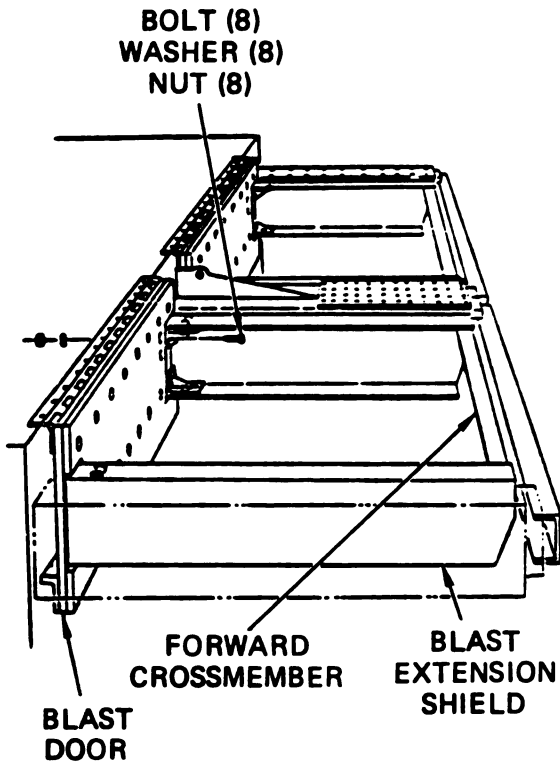


b. Install.

(1) Position brackets on blast door and secure with eight bolts, washers, and nuts. Using 17mm socket and 17mm box end wrench, tighten nuts.

(2) Position shield extension on brackets and secure with eight bolts, washers, and nuts. Using 17mm socket and 17mm box end wrench, tighten nuts.

5-24. BLAST SHIELD ASSEMBLY MAINTENANCE INSTRUCTIONS (CONT)



b. Install.

WARNING

The blast shield door weighs approximately 25 kg (55 lb). Use two personnel to install door. Be careful not to drop door as personnel could be injured or equipment damaged.

(1) Apply zinc chromate primer to 22 bolts. Position new door assembly to LLM and secure with 22 bolts, 44 washers, and 22 nuts. Using 5mm socket attachment and 13mm box end wrench, tighten nuts.

(2) Apply zinc chromate primer to two bolts. Position fitting assembly to door assembly and install two bolts and washers. Using 17mm socket, tighten bolts.

(3) Apply ablative blast protection coating on brackets, mounting hardware, and between brackets and blast door (paragraph 3-12).

11. BLAST SHIELD DOOR.

a. Remove.

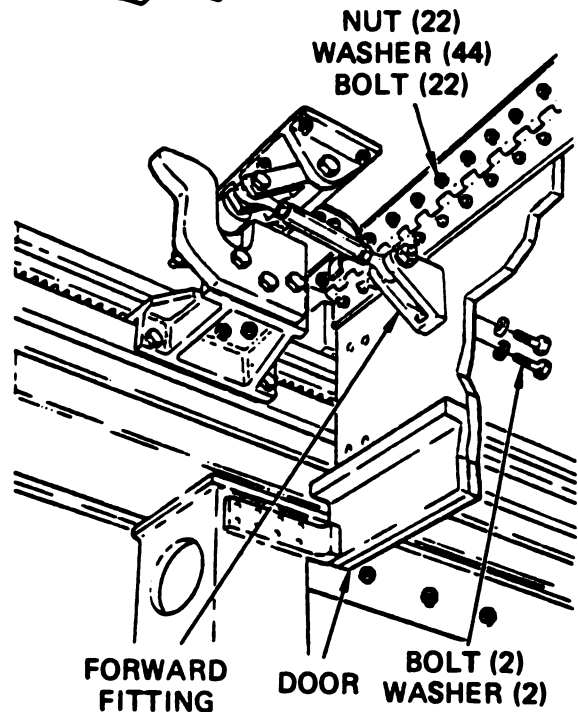
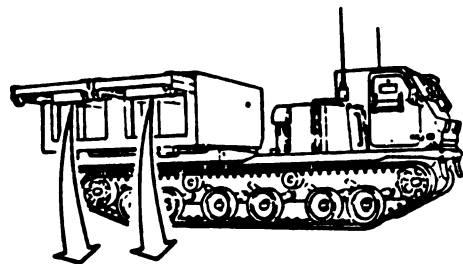
(1) Remove blast shield extension (item 10, a).

(2) Using 17mm socket, remove two bolts and washers securing fitting assembly to blast door.

WARNING

The blast shield door weighs approximately 25 kg (55 lb). Use two personnel to remove door. Be careful not to drop door as personnel could be injured or equipment damaged.

(3) Using 5mm socket attachment and 13mm box end wrench, remove 22 bolts, 44 washers, and 22 nuts securing door assembly hinge to LLM. Remove door assembly.



5-24. BLAST SHIELD ASSEMBLY MAINTENANCE INSTRUCTIONS (CONT)

(3) Install blast shield extension (item 10, b).

12. BLAST SHIELD.

a. Remove.

(1) Remove blast shield door (item 11, a).

(2) Using 7mm socket and 10mm box end wrench, remove 10 nuts, 20 washers, and 10 bolts securing blast shield to top of door and 8 bolts and washers at bottom of door.

(3) Using hammer and cold chisel, remove blast shield from door.

WARNING

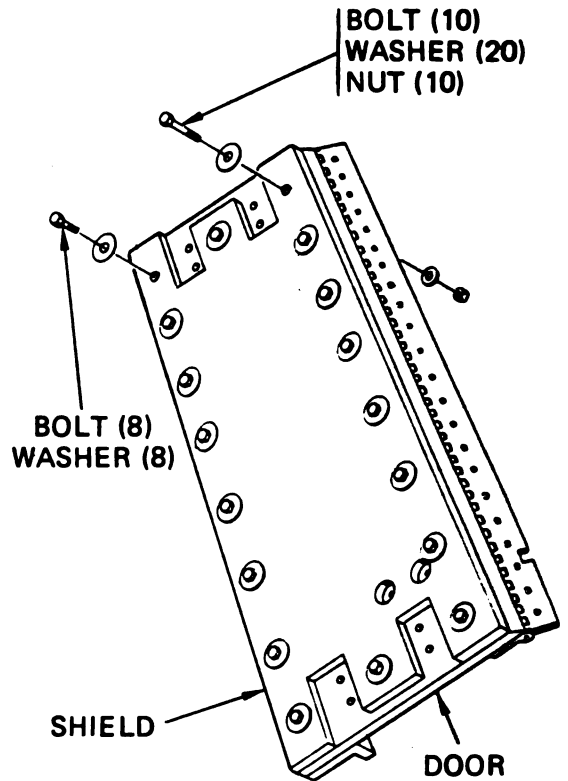
Methyl-ethyl-ketone vapors are toxic. Avoid prolonged or repeated breathing of vapors, or contact with skin. Use only with adequate ventilation. Methyl-ethyl-ketone is flammable and should not be used near open flame. Fire extinguishers should be available when solvent is used.

(4) Using methyl-ethyl-ketone, clean old sealant from door surface.

b. Install.

(1) Apply 75mm wide border of sealant around door.

(2) Apply zinc chromate primer to 18 bolts. Position shield on door and secure with 10 bolts, 20 washers, and 10 nuts at top of door and 8 bolts and washers at bottom of door. Using 7mm socket and 10mm box end wrench, tighten bolts.



(3) Install blast shield door (item 11, b).

FOLLOW-ON PROCEDURE

Using BC, extend and retract boom two times and check for smooth operation of blast shield assembly (TM 9-1425-646-20).

Perform stow procedure (TM 9-1425-646-10).

5-25. 267- AND 480-MIL (15- AND 27-DEGREE) LIMIT SWITCH MAINTENANCE INSTRUCTIONS.

This paragraph covers the maintenance tasks for the following items:

<i>Item</i>	<i>Page</i>
1. Switch Cover	5-127
2. 267-Mil (15-Degree) Limit Switch	5-128
3. 480-Mil (27-Degree) Limit Switch	5-132

INITIAL SETUP

Test/Support Equipment
Wrecker, HEMTT, 10-ton

Tools

Kit, tool, 13032302
Set, shop, 13032303
Drill, twist, 206-1-8 (for item 1)
Drill, electric, 1046-09 (for item 1)
Bar, bucking, rivet, AT694 (for item 1)
Hammer, pneumatic, CP4X (for item 1)
Rivet set, pneumatic, N155-5130-1-5
(for item 1)
Multimeter, 8050A-01
Receptacle, 15-degree shorting,
13103056-1
Receptacle, 27-degree shorting,
13103056-2
Sling assembly, hoisting, 13029709
Test cable, 13103718

Materials/Parts

Compound, sealing (15, Appendix B)
(for items 2 and 3)

Lockwire (23, Appendix B)
Methyl-ethyl-ketone (25, Appendix B)
Varnish (71, Appendix B)

Personnel Required

MLRS Repairer MOS 27M
(MLRS Crewmember MOS 13M to
assist as required)
Wrecker Driver MOS 63H (for items 2 and 3)

References

TM 9-1425-646-10
TM 9-1425-646-20

Troubleshooting Paragraph 2-9

Equipment Condition

Position LLM to the right 1600 mils
(90 degrees)
Cage elevated during switch adjustment
(items 2 and 3) must be supported with
wrecker and hoisting sling to prevent
accidental lowering. Wrecker cable
should be taut.

1. SWITCH COVER.

a. Remove.

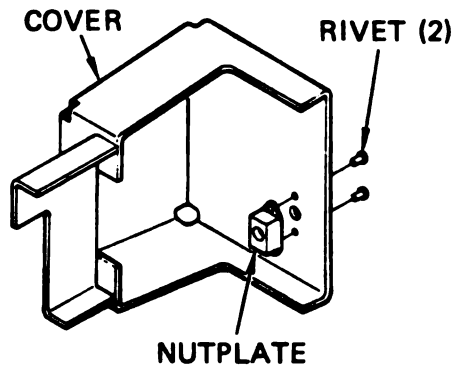
(1) Install jury struts (TM 9-1425-646-20).

(2) Using 10mm socket, remove three bolts and three washers securing switch cover. Remove cover.

b. Repair.

(1) Using electric drill with 1/8-inch twist drill, remove two rivets securing nutplate to cover. Remove nutplate.

(2) Position new nutplate on cover. Secure nutplate with two rivets.

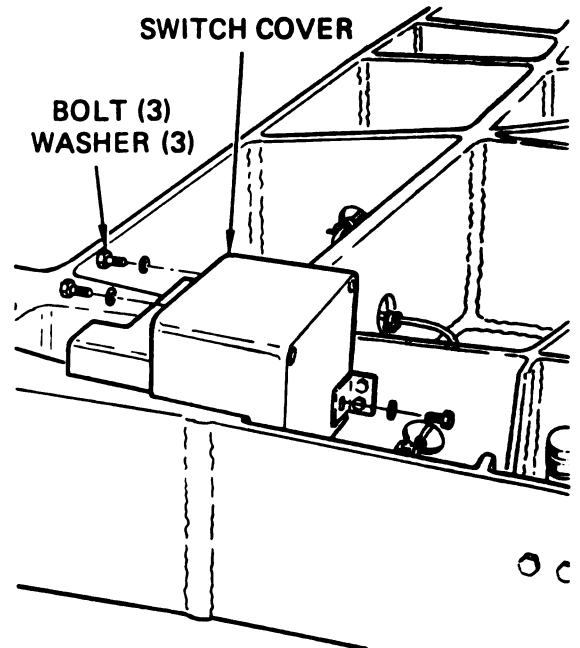
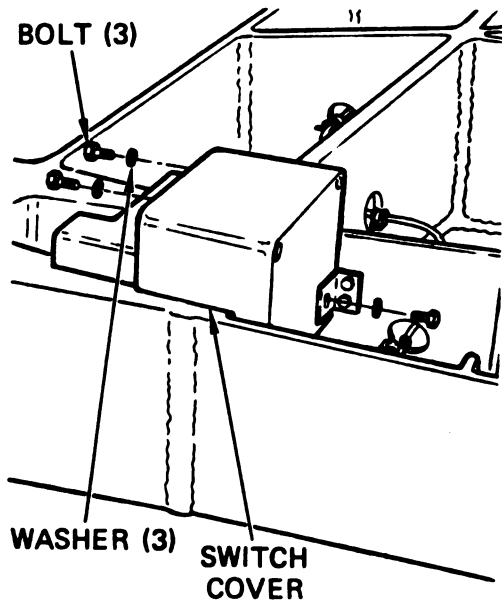


c. Install.

(1) Position switch cover over switches and install three bolts and three washers.

5-25. 267- AND 480-MIL (15- AND 27-DEGREE) LIMIT SWITCH MAINTENANCE INSTRUCTIONS (CONT)

(2) Remove jury struts (TM 9-1425-646-20).



2. 267-MIL (15-DEGREE) LIMIT SWITCH.

a. Remove.

NOTE

If the 15-degree switch is defective, it may not be possible to raise the cage far enough to install the jury struts with the BC.

(1) Using BC, raise cage as far as possible or until jury struts can be installed. If necessary, turn system power off and manually raise cage and install jury struts (TM 9-1425-646-20).

(2) Using 10mm socket, remove three bolts and washers securing switch cover. Remove cover.

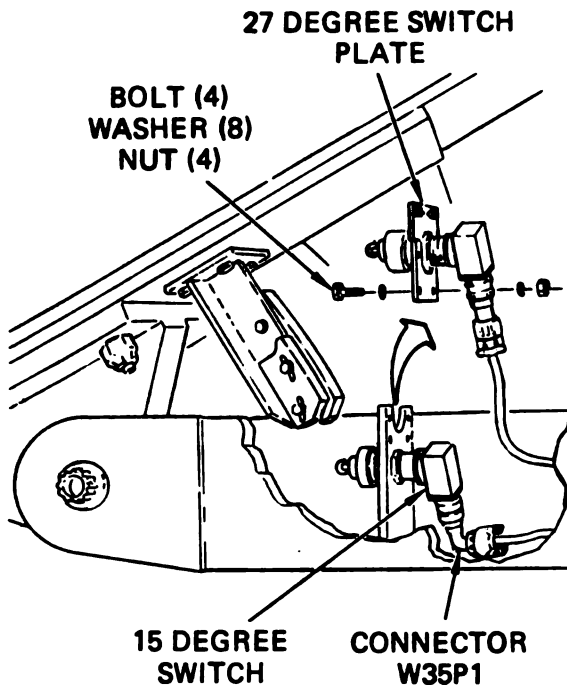
(3) Using 10mm and 7mm box end wrenches, remove four bolts, eight washers, and four nuts securing 27-degree switchplate.

(4) Cut lockwire from 15- and 27-degree switch jamnuts. Move 27-degree switchplate, with switch attached, out of the way to gain access to 15-degree switch.

(5) Disconnect connector W35P1 from 15-degree switch and install shorting receptacle on connector W35P1.

5-25. 267- AND 480-MIL (15- AND 27-DEGREE) LIMIT SWITCH MAINTENANCE INSTRUCTIONS (CONT)

(6) Disconnect connector W35P5 from 27-degree switch and install shorting receptacle on connector W35P5.



NOTE

There are two types of switch roller guide setscrews. One type requires a 0.062-inch socket head key. The other type requires a crosstip screwdriver. Sealing compound is used during installation of the socket head key type setscrew. No sealing compound is required with the crosstip screwdriver type setscrew. Methyl-ethyl-ketone or a soldering iron must be applied to the socket head key type setscrew to loosen the sealing compound before the setscrew can be removed. In the following procedure, steps applying methyl-ethyl-ketone or sealing compound do not apply if the roller guide setscrew is the crosstip screwdriver type.

(7) Inspect switch roller guide to determine which type of setscrew has been used.

WARNING

Methyl-ethyl-ketone vapors are toxic. Avoid prolonged or repeated breathing of vapors, or contact with skin. Use only with adequate ventilation. Methyl-ethyl-ketone is flammable and should not be used near open flame. Fire extinguisher should be available when solvent is used.

(8) If applicable, apply methyl-ethyl-ketone or heat to roller guide setscrews. Allow a minute or two for penetration and then remove both setscrews.

(9) If applicable, apply methyl-ethyl-ketone into both setscrew holes. Allow a minute or two for penetration. Note position of roller guide for installation and then remove roller guide.

(10) Cut and remove lockwire from switch jamnuts.

(11) Using 15/16-inch open end wrench, remove jamnut and lockwasher securing switch to bracket. Remove switch and keywasher from bracket.

b. Install.

(1) Prepare switch mounting surface for electrical bond (paragraph 3-10).

(2) Using 0.062-inch socket head key or crosstip screwdriver, loosen two setscrews securing roller guide on new switch. Remove and retain roller guide.

(3) Remove and retain outer jamnut and lockwasher from new switch.

(4) Using fingers, screw inside jamnut fully on new switch. Install new switch and keywasher in switch bracket with tab of keywasher inserted into alignment hole in switch bracket.

(5) Install lockwasher and outer jamnut. Tighten jamnut finger-tight.

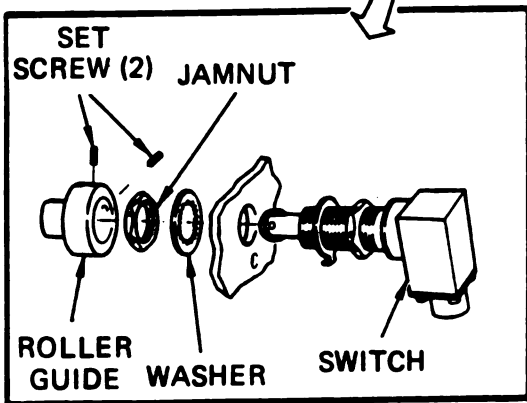
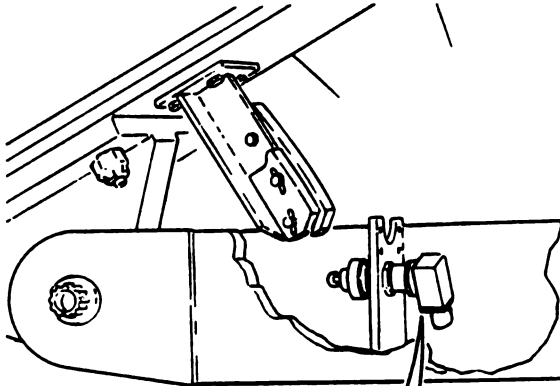
(6) Screw roller guide onto switch until it bottoms and then loosen just far enough to align switch roller with striker as noted during removal.

5-25. 267- AND 480-MIL (15- AND 27-DEGREE) LIMIT SWITCH MAINTENANCE INSTRUCTIONS (CONT)

(7) Using 0.062-inch socket head key or crosstip screwdriver, tighten both setscrews.

(8) Adjust jamnuts so switch is as far away from striker as possible. Tighten jamnuts finger-tight making sure tab in keywasher remains in alignment hole in bracket.

(9) Perform switch adjustment (paragraph c).



c. Adjust

(1) Remove jury struts (TM 9-1425-646-20).

CAUTION

While moving LLM, be sure the switch cover, cables, and 27-degree switch are positioned out of the way. Observe that the switch roller guide does not bottom out and damage the switch.

(2) Enable BC (TM 9-1425-646-20).

(3) While watching 15-degree switch roller and roller guide, press and release BC switches to position LLM 90 degrees right and fully lowered.

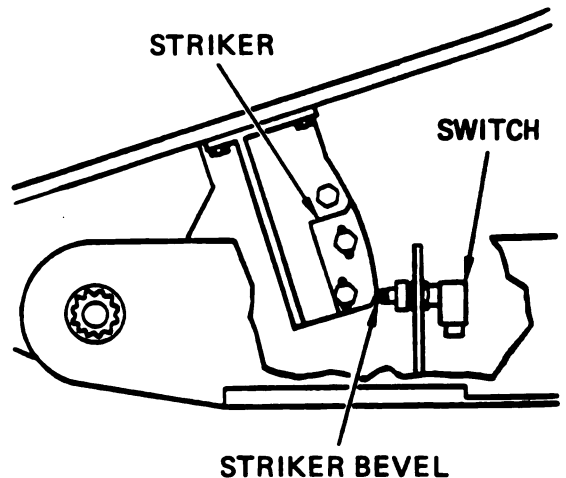
(4) Using BC, load two trainer LP/Cs into cage and secure with LP/C latch.

NOTE

The following procedures use the FCP elevation resolver readout for adjusting the switch.

(5) Using BC, while observing 15-degree switch and roller guide for bottoming, press and release BC UP switch to position LLM as near as possible to 267 mils. Turn system power off.

(6) Manually move LLM up or down as necessary to obtain readout on FCP of 267 mils. Switch roller shall be positioned close to top edge of bevel on striker.



NOTE

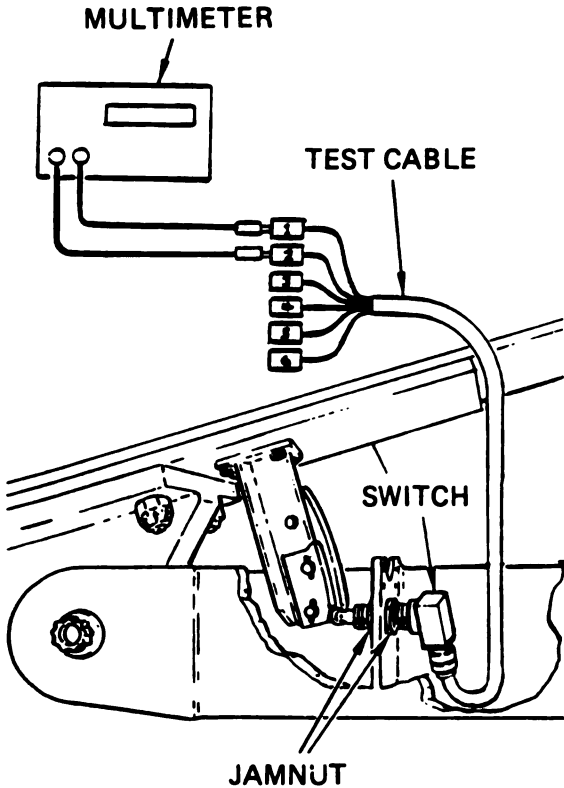
The wrecker will be used to secure cage in place. Using hoisting sling, attach wrecker to cage. Wrecker cable should be tightened to remove all cable slack but the weight of the cage must be maintained on the cage components to insure proper switch adjustment.

(7) Attach wrecker to cage and remove cable slack.

5-25. 267- AND 480-MIL (15- AND 27-DEGREE) LIMIT SWITCH MAINTENANCE INSTRUCTIONS (CONT)

(8) Connect switch test cable to switch.

(9) Connect multimeter between test cable pins 1 and 2. Continuity will be indicated on multimeter. Adjust switch jamnuts in until infinity is indicated on multimeter (switch actuated), then adjust jamnuts in 3/8 to 5/8 turn more.



NOTE

There are two types of switch roller guide setscrews. One type requires a 0.062-inch socket head key. The other type requires a crosstip screwdriver. Sealing compound is used during installation of the socket head key type setscrew. No sealing compound is used with the crosstip screwdriver type setscrew. If sealing compound is not required, do not perform steps (14) and (15). If sealing compound is required, continue with step (14).

(14) Manually elevate cage and wrecker cable to allow access for removal of switch roller guide.

CAUTION

When applying sealing compound, use care not to allow any sealing compound to get on any switch moving part.

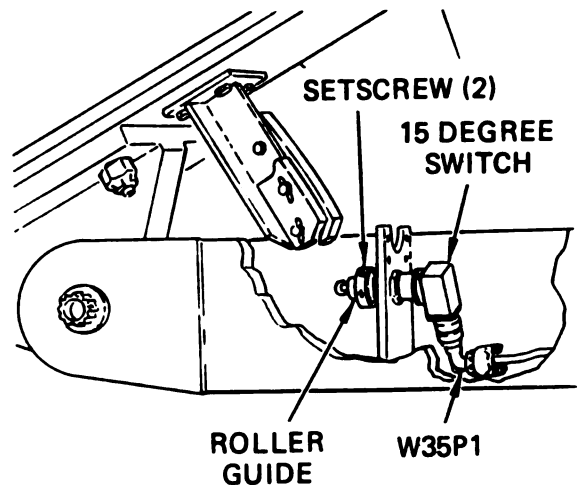
(15) Using 0.062-inch socket head key, remove roller guide setscrews. Screw roller guide onto switch until it bottoms. Apply four drops of sealing compound into each setscrew hole. Rotate roller guide back and forth about 45 degrees to spread sealing compound. Apply one drop of sealing compound to each setscrew threads. Install both setscrews in roller guide and then bottom roller guide. Back roller guide off just far enough to align switch roller with striker. Using 0.062-inch socket head key, tighten both setscrews.

(10) Using 15/16-inch open end wrench, tighten jamnuts using care not to change adjustment.

(11) Disconnect multimeter and test cable from switch. Remove shorting receptacle from W35P1 and W35P5 but do not connect W35P1 and W35P5 to switches.

(12) Install lockwire into 15-degree switch jamnuts and twist for about an inch. Jamnuts on 15-degree switch will be safety-wired to jamnuts on 27-degree switch after installation of 27-degree switch.

(13) Apply varnish to 15-degree switch mounting surface prepared for electrical bond.

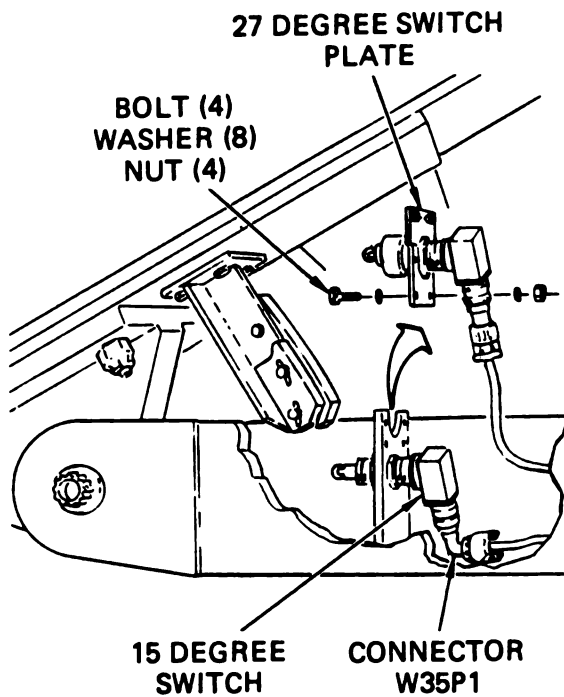


5-25. 267- AND 480-MIL (15- AND 27-DEGREE) LIMIT SWITCH MAINTENANCE INSTRUCTIONS (CONT)

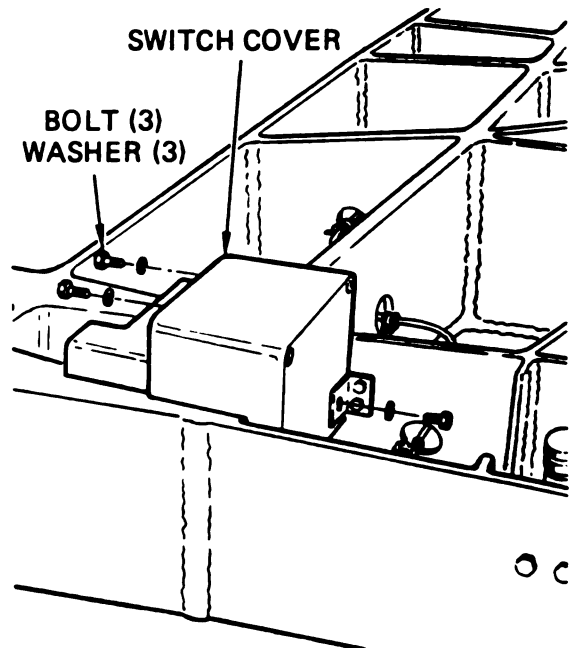
(16) Install 27-degree switch bracket, with switch attached, and secure with four bolts, eight washers, and four nuts. Using 10mm and 7mm box end wrenches, tighten nuts. The 27-degree switch should not require adjustment.

(17) Safety-wire 15-degree switch jamnuts to 27-degree switch jamnuts on both sides of bracket.

(18) Connect cable connectors W35P1 to 15-degree switch and W35P5 to 27-degree switch.



(19) Position switch cover over switches and secure with three bolts and washers. Using 10mm socket, tighten bolts.



(20) Disconnect hoisting sling and remove wrecker and hoisting sling.

(21) Enable BC. Using BC, unload trainer LP/C (TM 9-1425-646-10).

(22) Stow LLM (TM 9-1425-646-10).

3. 480-MIL (27-DEGREE) LIMIT SWITCH.

a. Remove.

NOTE

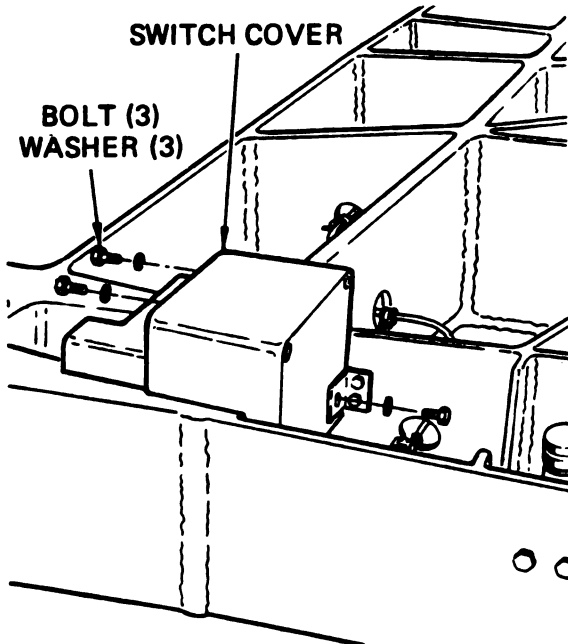
Some SPLs have incorporated a 15-degree and 27-degree switch cover modification that allows the cover to be removed with the LLM stowed. If the cover can be removed with the LLM stowed, do not perform steps (1) through (4).

(1) Manually unlock and elevate cage approximately 89 mils (5 degrees) to gain access to remove switch cover. Secure in this position with wrecker using sling and pear shaped link.

5-25. 267- AND 480-MIL (15- AND 27-DEGREE) LIMIT SWITCH MAINTENANCE INSTRUCTIONS (CONT)

(2) Using 10mm socket, remove three bolts and washers securing switch cover. Remove cover.

(6) Install jury struts (TM 9-1425-646-20).



(3) Disconnect W35P5 from 27-degree switch and install shorting receptacle on connector W35P5.

(4) Disconnect wrecker cable from sling and move wrecker cable up out of the way.

NOTE

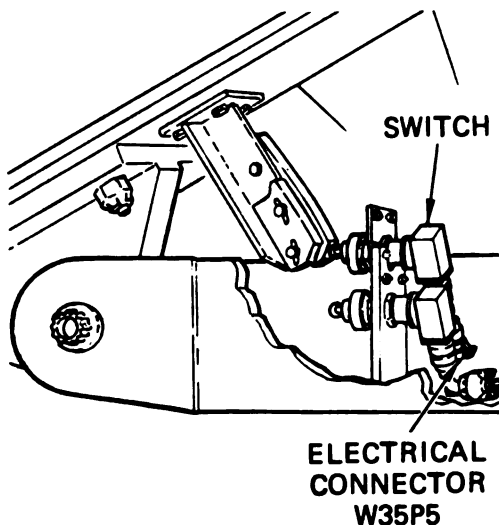
There are two types of switch roller guide setscrews. One type requires a 0.062-inch socket head key. The other type requires a crosstip screwdriver. Sealing compound is used during installation of the socket head key type setscrew. No sealing compound is required with the crosstip screwdriver type setscrew. Methyl-ethyl-ketone or a soldering iron must be applied to the socket head key type setscrew to loosen the sealing compound before the setscrew can be removed. In the following procedure, steps applying methyl-ethyl-ketone or sealing compound do not apply if the roller guide setscrew is the crosstip screwdriver type.

(7) Inspect switch roller guide to determine which type of setscrew has been used.

WARNING

Methyl-ethyl-ketone vapors are toxic. Avoid prolonged or repeated breathing of vapors, or contact with skin. Use only with adequate ventilation. Methyl-ethyl-ketone is flammable and should not be used near open flame. Fire extinguisher should be available when solvent is used.

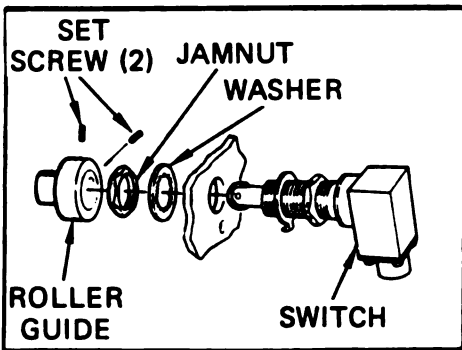
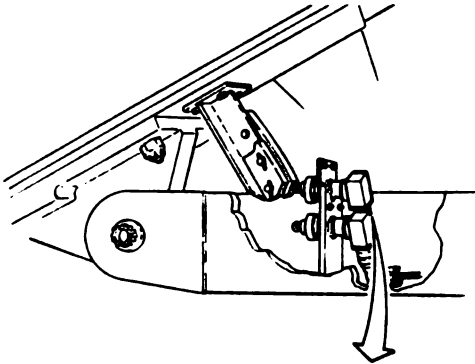
(8) If applicable, apply methyl-ethyl-ketone or heat to roller guide setscrews. Allow a minute or two for penetration and then remove both setscrews.



(5) Enable BC and position LLM to 90 degrees right (TM 9-1425-646-10).

5-25. 267- AND 480-MIL (15- AND 27-DEGREE) LIMIT SWITCH MAINTENANCE INSTRUCTIONS (CONT)

(9) If applicable, apply methyl-ethyl-ketone into both setscrew holes. Allow a minute or two for penetration. Note position of roller guide for installation and then loosen roller guide several turns.



(10) Cut and remove lockwire from switch jamnuts.

(11) Using 15/16-inch open end wrench, remove jamnut, lockwasher, and roller guide securing switch to bracket. Remove switch and keywasher from bracket.

b. Install.

(1) Prepare switch mounting surface for electrical bond (paragraph 3-10).

(2) Using 0.062-inch socket head key or crosstip screwdriver, loosen two setscrews securing

roller guide on new switch. Remove and retain roller guide.

(3) Remove and retain outer jamnut and lockwasher from new switch.

(4) Using fingers, screw inside jamnut fully on new switch. Install new switch and keywasher in switch bracket with tab of keywasher inserted into alignment hole in switch bracket.

(5) Install lockwasher and outer jamnut. Tighten jamnut finger-tight.

(6) Screw roller guide onto switch until it bottoms and then loosen just enough to align switch roller with striker as noted during removal.

(7) Using 0.062-inch socket head key or crosstip screwdriver, tighten both setscrews.

(8) Adjust jamnuts so switch is as far away from striker as possible. Tighten jamnuts finger-tight making sure tab in keywasher remains in alignment hole in bracket.

(9) Perform switch adjustment (paragraph c).

c. Adjust.

(1) Remove jury struts (TM 9-1425-646-20).

(2) Enable BC (TM 9-1425-646-20).

(3) While watching 27-degree switch roller and guide for bottoming, press and release BC DN switch until LLM has been fully lowered.

(4) Using BC, load two trainer LP/Cs into cage and secure with LP/C latch.

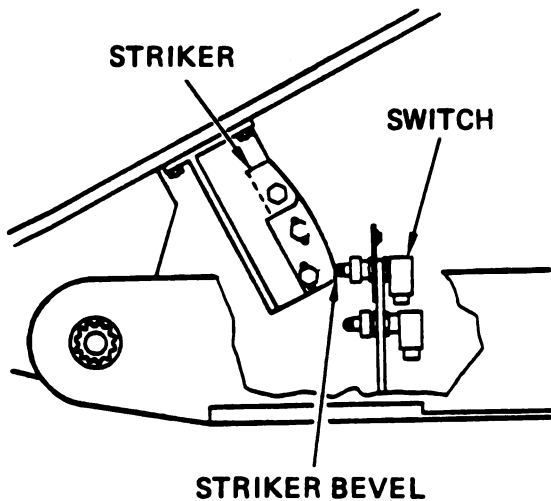
NOTE

The following procedures use the FCP elevation resolver readout for adjusting the switch.

(5) Using BC, while observing 27-degree switch and roller guide for bottoming, press and release BC UP switch to position LLM as near as possible to 480 mils. Turn system power off.

5-25. 267- AND 480-MIL (15- AND 27-DEGREE) LIMIT SWITCH MAINTENANCE INSTRUCTIONS (CONT)

(6) Manually move LLM up or down as necessary to obtain readout on FCP of 480 mils. Switch roller shall be positioned close to top edge of bevel on striker.



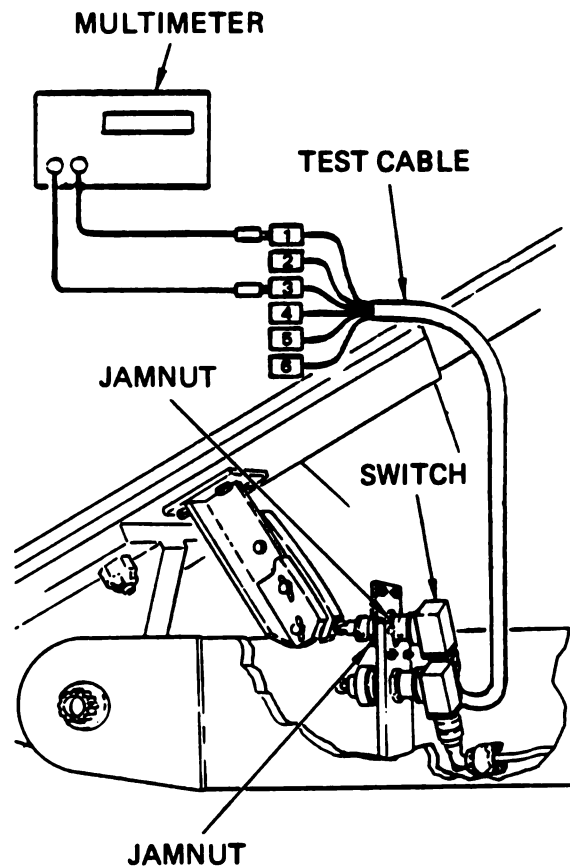
NOTE

The wrecker will be used to secure cage in place. Using hoisting sling, attach wrecker to cage. The wrecker cable should be tightened to remove all cable slack but the weight of the cage must be maintained on the cage components to insure proper switch adjustment.

(7) Attach wrecker to cage and remove cable slack.

(8) Connect switch test cable to switch.

(9) Connect multimeter between test cable pins 1 and 3. Infinity will be indicated on multimeter. Adjust switch jamnuts in until continuity is indicated on multimeter (switch actuated), then adjust jamnuts $3/8$ to $5/8$ turn more.



(10) Using $15/16$ -inch open end wrench, tighten jamnuts using care not to change adjustment.

(11) Disconnect multimeter and test cable from switch. Remove shorting receptacle from W35P5 but do not connect W35P5 to switch.

(12) Safety-wire jamnuts to 15-degree switch jamnuts on both sides of bracket.

(13) Connect cable connector W35P5 to switch.

(14) Apply varnish to 15-degree switch mounting surface prepared for electrical bond.

5-25. 267- AND 480-MIL (15- AND 27-DEGREE) LIMIT SWITCH MAINTENANCE INSTRUCTIONS (CONT)

NOTE

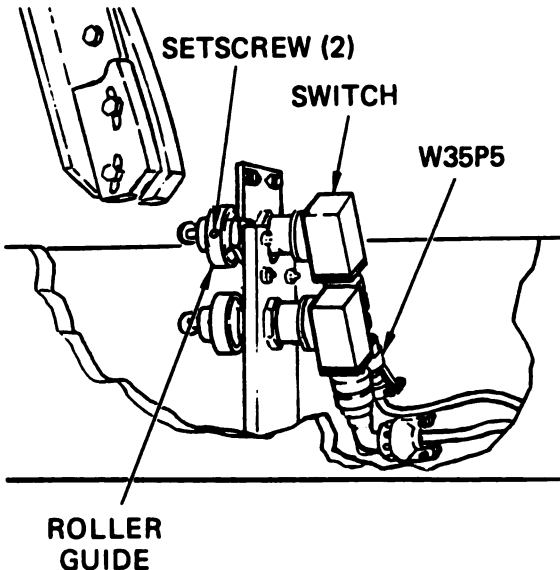
There are two types of switch roller guide setscrews. One type requires a 0.062-inch socket head key. The other type requires a crosstip screwdriver. Sealing compound is used during installation of the socket head key type setscrew. No sealing compound is used with the crosstip screwdriver type setscrew. If sealing compound is not required, do not perform steps (15) and (16). If sealing compound is required, continue with step (15).

(15) Manually elevate cage and wrecker cable to allow access for removal of switch roller guide.

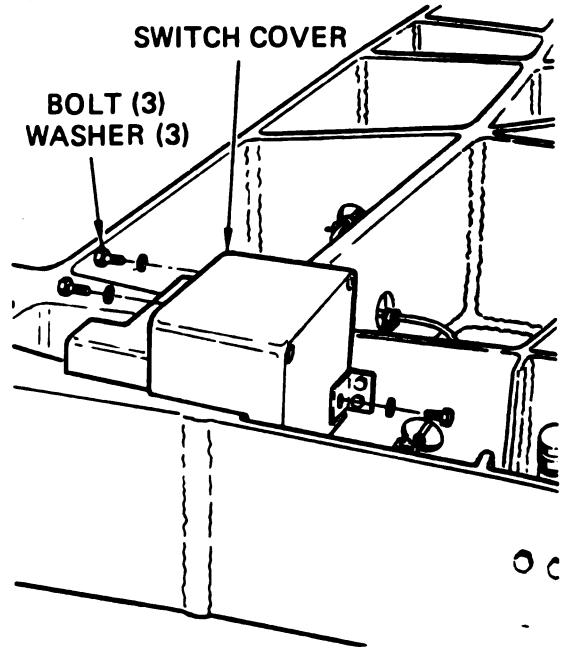
CAUTION

When applying sealing compound, use care not to allow any sealing compound to get on any switch moving part.

(16) Using 0.062-inch socket head key, remove roller guide setscrews. Screw roller guide onto switch until it bottoms. Apply four drops of sealing compound into each setscrew hole. Rotate roller guide back and forth about 45 degrees to spread sealing compound. Apply one drop of sealing compound to each setscrew threads. Install both setscrews in roller guide and then bottom roller guide. Back roller guide off just far enough to align switch roller with striker. Using 0.062-inch socket head key, tighten both setscrews.



(17) Position switch cover over switches and secure with three bolts and washers. Using 10mm socket, tighten bolts.



(18) Disconnect hoisting sling and remove wrecker and hoisting sling.

(19) Enable BC. Using BC, unload trainer LP/C (TM 9-1425-646-10).

(20) Stow LLM (TM 9-1425-646-10).

5-26. CAGE DOWN LIMIT SWITCH MAINTENANCE INSTRUCTIONS. This paragraph covers the replacement and adjustment of the cage down limit switch.

INITIAL SETUP

Tools

Kit, tool, 13032302
Set, shop, 13032303
Multimeter, 8050A-01
Test cable, 13103718

Materials/Parts

Compound, sealing (15, Appendix B)
Lockwire (23, Appendix B)
Methyl-ethyl-ketone (25, Appendix B)
Varnish (71, Appendix B)

Personnel Required

MLRS Repairer MOS 27M
(MLRS Crewmember MOS 13M to assist as required)

References

TM 9-1425-646-10
TM 9-1425-646-20

Troubleshooting

Paragraph 2-9

a. Remove.

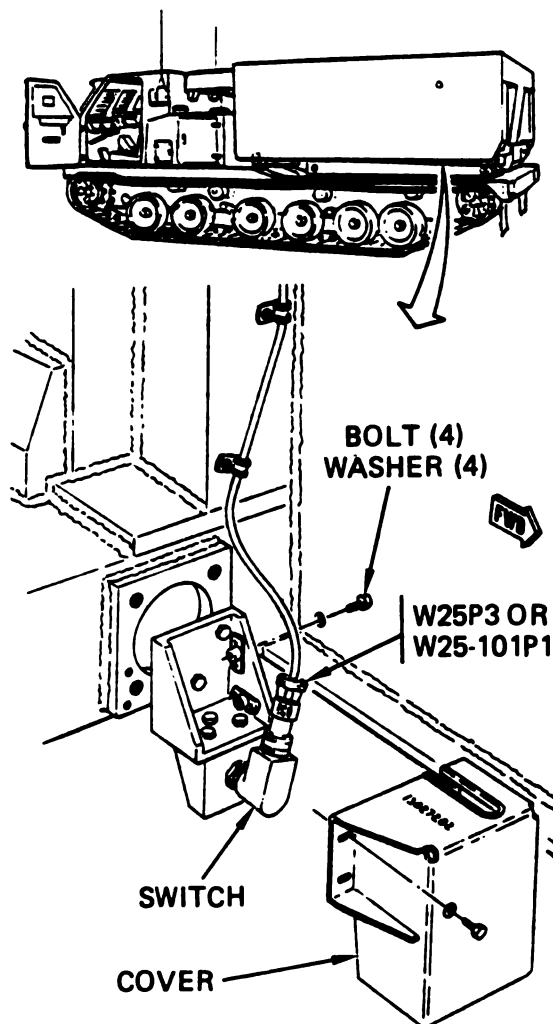
NOTE

Cage can be in the down position during switch removal. However, installation of the jury struts provides better access.

(1) Install jury struts (TM 9-1425-646-20).

(2) Using 10mm socket, remove four bolts and washers securing limit switch cover. Remove cover.

(3) Disconnect electrical connector W25P3 or W25-101P1 from limit switch.



5-26. CAGE DOWN LIMIT SWITCH MAINTENANCE INSTRUCTIONS (CONT)

NOTE

There are two types of switch roller guide setscrews. One type requires a 0.062-inch socket head key. The other type requires a crosstip screwdriver. Sealing compound is used during installation of the socket head key type setscrew. No sealing compound is required with the crosstip screwdriver type setscrew. Methyl-ethyl-ketone or a soldering iron must be applied to the socket head key type setscrew to loosen the sealing compound before the setscrew can be removed. In the following procedure, steps applying methyl-ethyl-ketone or sealing compound do not apply if the roller guide setscrew is the crosstip screwdriver type.

(4) Inspect switch roller guide to determine which type of setscrew has been used.

WARNING

Methyl-ethyl-ketone vapors are toxic. Avoid prolonged or repeated breathing of vapors, or contact with skin. Use only with adequate ventilation. Methyl-ethyl-ketone is flammable and should not be used near open flame. Fire extinguisher should be available when solvent is used.

(5) If applicable, apply methyl-ethyl-ketone or heat to roller guide setscrews. Allow a minute or two for penetration and then remove both setscrews.

(6) If applicable, apply methyl-ethyl-ketone into both setscrew holes. Allow a minute or two for penetration. Note position of roller guide for installation and then remove roller guide.

(7) Cut and remove lockwire from switch jamnuts.

(8) Using 15/16-inch open end wrench, remove jamnut and lockwasher securing switch to bracket. Remove switch and keywasher from bracket.

b. Install.

(1) Prepare switch mounting surface for electrical bond (paragraph 3-10).

(2) Using 0.062-inch socket head key or crosstip screwdriver, loosen two setscrews securing roller guide on new switch. Remove and retain roller guide.

(3) Remove and retain outer jamnut and lockwasher from new switch.

(4) Using fingers, screw inside jamnut fully on new switch. Install new switch and keywasher in switch bracket with tab of keywasher inserted into alinement hole in switch bracket.

(5) Install lockwasher and outer jamnut. Tighten jamnut finger-tight.

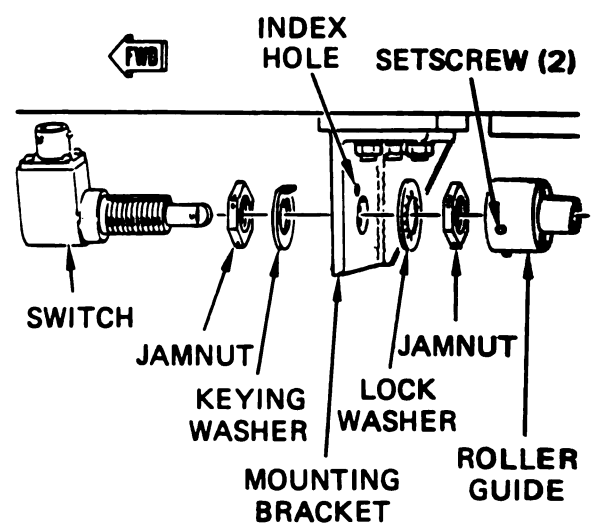
(6) Screw roller guide onto switch until it bottoms, then loosen just enough to aline switch roller with striker as noted during removal.

(7) Using 0.062-inch socket head key or crosstip screwdriver, tighten both setscrews.

(8) Adjust jamnuts so switch is as far away from striker as possible. Tighten jamnuts finger-tight making sure tab in keywasher remains in alinement hole in bracket.

(9) Connect cable connector W25P3 or W25-101P1 to switch.

(10) Perform switch adjustment (paragraph c).



5-26. CAGE DOWN LIMIT SWITCH MAINTENANCE INSTRUCTIONS (CONT)

c. Adjust

(1) Measure 32mm from bottom surface of striker near both edges and mark visible line across face of striker.

(2) Remove jury struts (TM 9-1425-646-20).

(3) Manually position cage until bumpers on cage are just touching pad on vehicle sponson with maximum gap of 0.5mm.

(4) Check switch roller. Roller must be centered on line marked in step (1). If roller is on line marked, go to step (5). If roller is not on marked line, perform step (4).

(5) Using 10mm socket, loosen three bolts attaching switch support and slide switch support up or down to center roller on line. Tighten three bolts making sure to keep roller on marked line.

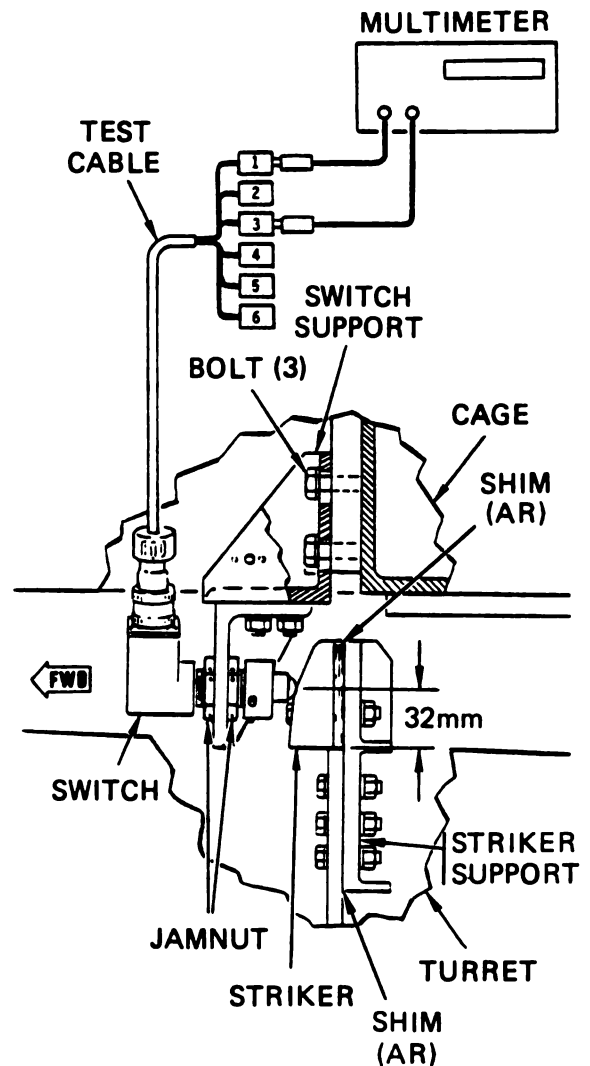
(6) Disconnect W25P3 or W25-101P1 from switch. Connect switch test cable to switch connector.

(7) Connect multimeter between pin 1 and pin 3 of test cable. If switch is actuated, multimeter will indicate continuity. If switch is not actuated, multimeter will indicate infinity.

(8) If switch is actuated, adjust jamnuts to move switch away from striker until multimeter indicates infinity, then adjust aft jamnut until meter just indicates continuity. Using 15/16-inch open end wrench, tighten forward jamnut while maintaining adjustment.

(9) If unable to adjust switch or interference exists between switch roller and striker, add or remove shims under striker or strike support as required. Repeat steps (7) and (8).

(10) Disconnect multimeter and remove test cable from switch connector.



5-26. CAGE DOWN LIMIT SWITCH MAINTENANCE INSTRUCTIONS (CONT)

(11) Connect electrical connector W25P3 or W25-101P1 to limit switch connector.

(12) Check switch operation by performing LLM LEFT or LLM RIGHT, then STOW (TM 9-1425-646-10).

(13) Install jury struts (TM 9-1425-646-20).

(14) Using lockwire, safety-wire both jamnuts.

(15) Apply varnish to switch mounting surface that was prepared for electrical bond.

NOTE

There are two types of switch roller guide setscrews. One type requires a 0.062-inch socket head key. The other type requires a crosstip screwdriver. Sealing compound is used during installation of the socket head key type setscrew. No sealing compound is used with the crosstip screwdriver type setscrew. If sealing compound is not required, do not perform step (17). If sealing compound is required, continue with step (17).

(16) Inspect switch roller guide to determine type of setscrew.

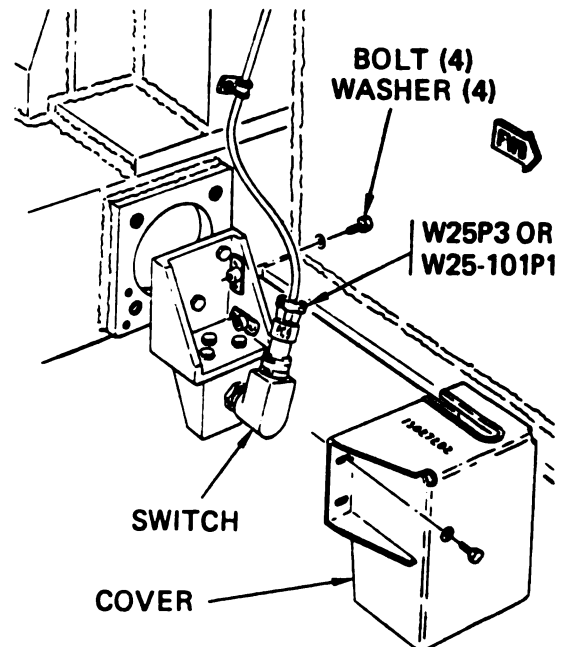
CAUTION

When applying sealing compound, use care not to allow any sealing compound to get on any switch moving part.

(17) Using 0.062-inch socket head key, remove roller guide setscrews. Screw roller guide onto switch until it bottoms. Apply four drops of

sealing compound into each setscrew hole. Rotate roller guide back and forth about 45 degrees to spread sealing compound. Apply one drop of sealing compound to each setscrew threads. Install both setscrews in roller guide and then bottom roller guide. Back roller guide off just far enough to align switch roller with striker. Using 0.062-inch socket head key, tighten both setscrews.

(18) Position cover over switch and install four bolts and washers. Using 10mm socket, tighten bolts.



(19) Remove jury struts (TM 9-1425-646-20).

5-27. 22.2-MIL (1.25-DEGREE) LIMIT SWITCH MAINTENANCE INSTRUCTIONS. This paragraph covers the replacement and adjustment of the 22.2-MIL (1.25-degree) limit switch.

INITIAL SETUP

Tools

Kit, tool, 13032302
Set, shop, 13032303
Multimeter, 8050A-01
Test cable, 13103718

Materials/Parts

Compound, sealing (15, Appendix B)
Lockwire (23, Appendix B)
Methyl-ethyl-ketone (25, Appendix B)
Varnish (71, Appendix B)

Personnel Required

MLRS Repairer MOS 27M
(MLRS Crewmember MOS 13M to assist
as required)

References

TM 9-1425-646-10
TM 9-1425-646-20

Troubleshooting

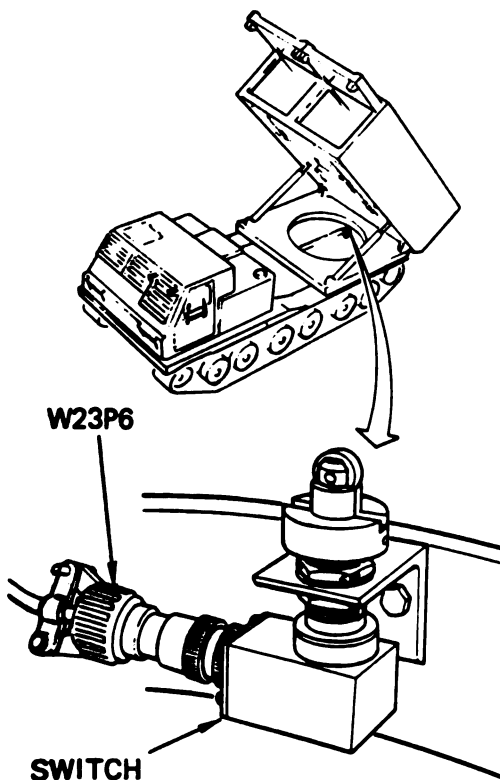
Paragraph 2-9

Equipment Condition

Position LLM to 1600 mils (90 degrees)
azimuth (TM 9-1425-646-10)
Install jury struts (TM 9-1425-646-20)

a. Remove.

- (1) Install jury struts (TM 9-1425-646-20).
- (2) Disconnect electrical connector W23P6 from limit switch.



NOTE

There are two types of switch roller guide setscrews. One type requires a 0.062-inch socket head key. The other type requires a crosstip screwdriver. Sealing compound is used during installation of the socket head key type setscrew. No sealing compound is required with the crosstip screwdriver type setscrew. Methyl-ethyl-ketone or a soldering iron must be applied to the socket head key type setscrew to loosen the sealing compound before the setscrew can be removed. In the following procedure, steps applying methyl-ethyl-ketone or sealing compound do not apply if the roller guide setscrew is the crosstip screwdriver type.

- (3) Inspect switch roller guide to determine which type of setscrew has been used.

WARNING

Methyl-ethyl-ketone vapors are toxic. Avoid prolonged or repeated breathing of vapors, or contact with skin. Use only with adequate ventilation. Methyl-ethyl-ketone is flammable and should not be used near open flame. Fire extinguisher should be available when solvent is used.

- (4) If applicable, apply methyl-ethyl-ketone or heat to roller guide setscrews. Allow a minute or two for penetration and then remove both setscrews.

5-27. 22.2-MIL (1.25-DEGREE) LIMIT SWITCH MAINTENANCE INSTRUCTIONS (CONT)

(5) If applicable, apply methyl-ethyl-ketone into both setscrew holes. Allow a minute or two for penetration. Note position of roller guide for installation and then remove roller guide.

(6) Cut and remove lockwire from switch jamnuts.

(7) Using 15/16-inch open end wrench, remove jamnut and lockwasher securing switch to bracket. Remove switch and keywasher from bracket.

b. Install.

(1) Prepare switch mounting surface for electrical bond (paragraph 3-10).

(2) Using 0.062-inch socket head key or crosstip screwdriver, loosen two setscrews securing roller guide on new switch. Remove and retain roller guide.

(3) Remove and retain outer jamnut and lockwasher from new switch.

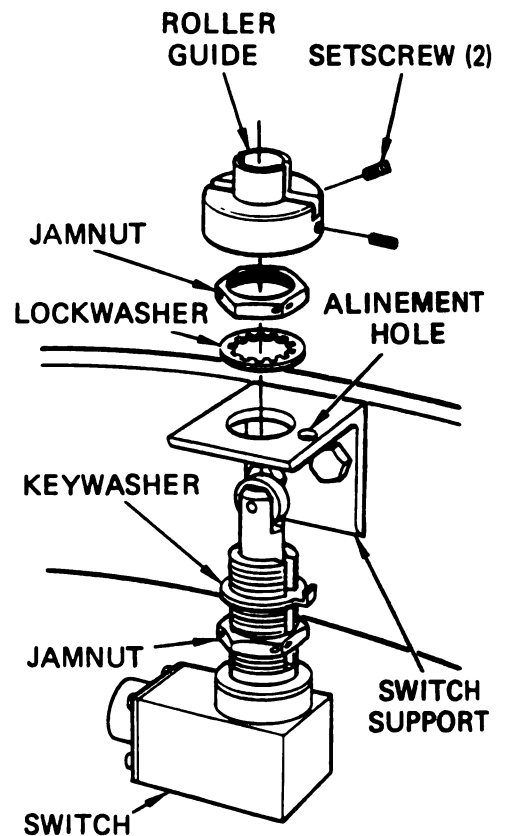
(4) Using fingers, screw inside jamnut fully on new switch. Install new switch and keywasher in switch bracket with tab of keywasher inserted into alignment hole in switch bracket.

(5) Install lockwasher and outer jamnut. Tighten jamnut finger-tight.

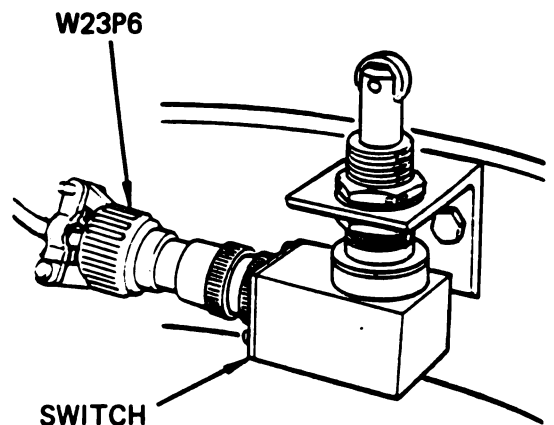
(6) Screw roller guide onto switch until it bottoms, then loosen just far enough to align switch roller with striker as noted during removal.

(7) Using 0.062-inch socket head key or crosstip screwdriver, tighten both setscrews.

(8) Adjust jamnuts so switch is as far away from striker as possible. Tighten jamnuts finger-tight making sure tab in keywasher remains in alignment hole in bracket.



(9) Connect cable connector W23P6 to switch.



5-27. 22.2-MIL (1.25-DEGREE) LIMIT SWITCH MAINTENANCE INSTRUCTIONS (CONT)

(10) Remove jury struts and using BC, position cage zero mils azimuth position. Turn system power off.

NOTE

Observe that the probe assembly remains centered with the centering socket while lowering the cage far enough to lock cage down. It may be necessary to manually rotate cage in azimuth while lowering cage.

(11) Manually lower cage until travel lock can be locked. Manually lock travel locks.

CAUTION

Be sure that the travel lock hooks clear the rollers while locking cage down as damage to the travel lock actuator can occur if too much force is applied to actuator.

(12) Manually lock cage down (TM 9-1425-646-10).

(13) Perform switch adjustment.

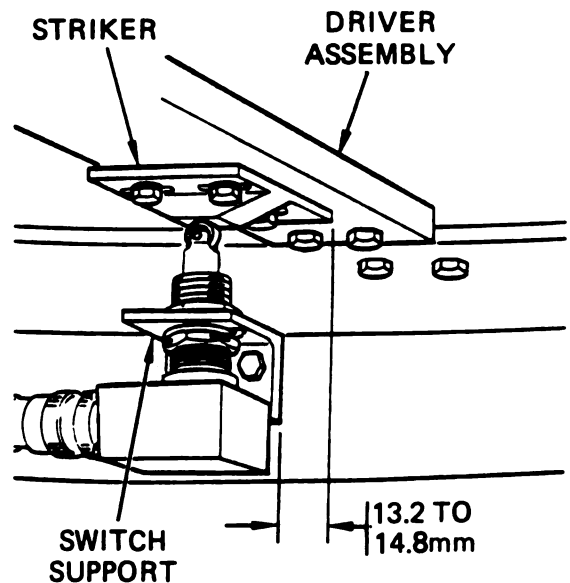
c. Adjust.**NOTE**

Cage must be stowed and locked.

(1) Verify that switch roller is alined with center of striker. If not, perform steps (2) and (3). If alined, go to step (4).

(2) Using 10mm box end wrench and 7mm socket, loosen nuts securing striker to driver assembly.

(3) Adjust striker to obtain 13.2 to 14.8mm between end of striker and edge of switch support. Using 10mm box end wrench and 7mm socket, tighten nuts.



(4) Disconnect W23P6 from switch and connect test cable to switch.

(5) Connect multimeter between pin 1 and pin 3 of test cable. Multimeter will indicate continuity (switch not actuated). Adjust jamnuts until infinity is indicated. Adjust switch jamnuts in until meter indicates continuity. Turn jamnut one more turn.

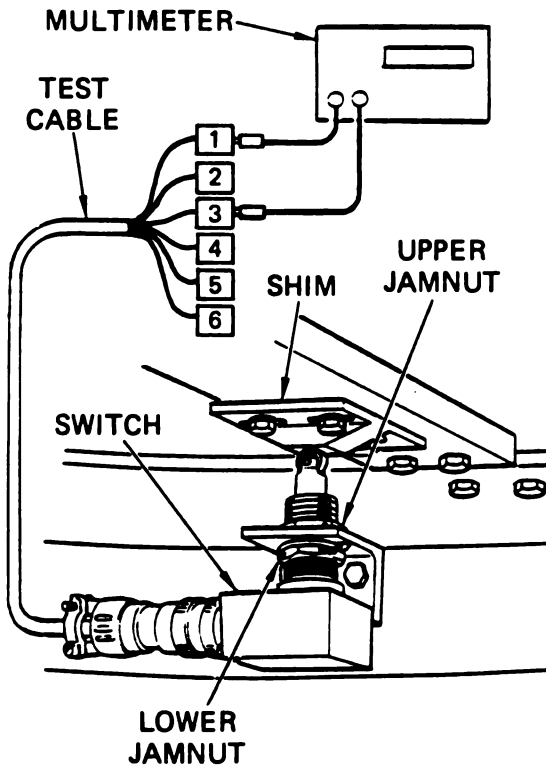
(6) Tighten jamnut using care not to change adjustment and using lockwire, safety-wire jamnuts.

5-27. 22.2-MIL (1.25-DEGREE) LIMIT SWITCH MAINTENANCE INSTRUCTIONS (CONT)

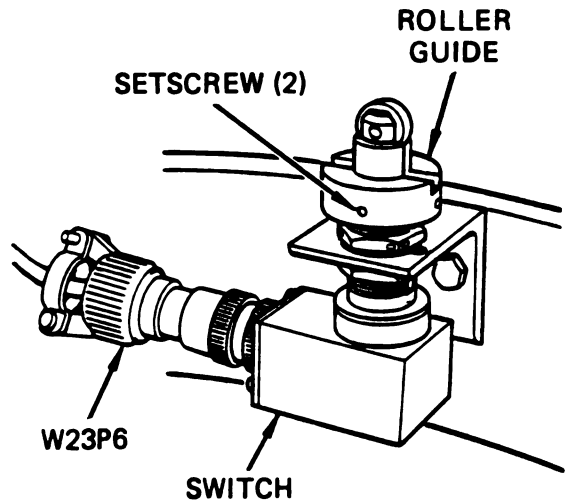
(7) Disconnect multimeter and test cable, then connect W23P6 to switch.

CAUTION

When applying sealing compound, use care not to allow any sealing compound to get on any switch moving part.



(10) Using 0.062-inch socket head key, remove roller guide setscrews. Screw roller guide onto switch until it bottoms. Apply four drops of sealing compound into each setscrew hole. Rotate roller guide back and forth about 45 degrees to spread sealing compound. Apply one drop of sealing compound to each setscrew threads. Install both setscrews in roller guide and then bottom roller guide. Back roller guide off just far enough to align switch roller with striker. Using 0.062-inch socket head key, tighten both setscrews.



(8) Apply varnish to switch mounting surface prepared for electrical bond.

NOTE

There are two types of switch roller guide setscrews. One type requires a 0.062-inch socket head key. The other type requires a crosstip screwdriver. Sealing compound is used during installation of the socket head key type setscrew. No sealing compound is used with the crosstip screwdriver type setscrew. If sealing compound is not required, do not perform steps (9) and (10). If sealing compound is required, continue with step (9).

(11) If no further maintenance is required, perform follow-on procedure.

FOLLOW-ON PROCEDURE

Using BC, cycle LLM in azimuth and elevation two times performing stow procedures both times to check for smooth operation (TM 9-1425-646-20).

(9) Enable BC and position LLM left or right 90 degrees and fully lowered. Turn system power off (TM 9-1425-646-10).

5-28. CAGE ASSEMBLY MAINTENANCE INSTRUCTIONS. This paragraph covers the maintenance tasks for the following items:

<i>Item</i>	<i>Page</i>
1. Cage Assembly	5-145
2. Fitting Bushings	5-152
3. Wiring Trough	5-153
4. Centering Pin	5-154
5. Fastener Receptacles	5-154
6. AT2 Stowage Receptacle	5-155
7. Elevation Actuator Nut Retainer	5-156
8. PDB/SNVT Door Hinge	5-157
9. Elevation Actuator Bushings	5-157
10. LP/C Mounting Plate	5-158
11. LP/C Mounting Plate Adjustment	5-158
12. Blast Shield Plate	5-161

INITIAL SETUP

Test/Support Equipment

Sling, hoisting, 13029709
Theodolite, T263MIL
Wrecker, HEMTT

Tools

Kit, tool, 13032302
Set, shop, 13032303
Drill, electric, 1046-09 (for item 8)
Drill, twist, 206-1-4 (for item 8)
Gage, depth, 599-603-223 (for item 1)
Gage, LP/C rigging, 13025007 (for item 11)
Gage, telescoping, 599-591-1 (for item 1)
Jack, screw, GGGJ5TY1CL38TON
(for item 11)
Magnet, scale holder, 71-6065 (for item 11)
Micrometer, 599-1-101 (for item 1)
Quadrant, fire control, 7197156
(for item 11)
Scale, optical alinement, 716010
(for item 11)
Set, rivet, N155-5130-1-5

Fabricated Tools

Elevation actuator supports (2, Appendix D)

Materials/Parts

Compound, sealing (15, Appendix B)
Methyl-ethyl-ketone (25, Appendix B)
Primer, zinc chromate (47, Appendix B)
Rope, manila (54, Appendix B)
Strap, electrical tiedown (63, Appendix B)

Personnel Required

2 MLRS Repairers MOS 27M
(3 MLRS Crewmembers MOS 13M and
Lance/MLRS Missile Crewmember
MOS 15D to assist as required)
Wrecker Driver MOS 63H (for item 1)

References

TM 9-1425-646-10
TM 9-1425-646-20

Troubleshooting

Paragraph 2-9

1. CAGE ASSEMBLY.

a. Remove.

(1) Manually unlock travel lock (TM 9-1425-646-10).

(2) Using crosstip screwdriver, unlatch four studs securing elevation resolver door assembly. Remove door assembly.

WARNING

Methyl-ethyl-ketone vapors are toxic. Avoid prolonged or repeated breathing of

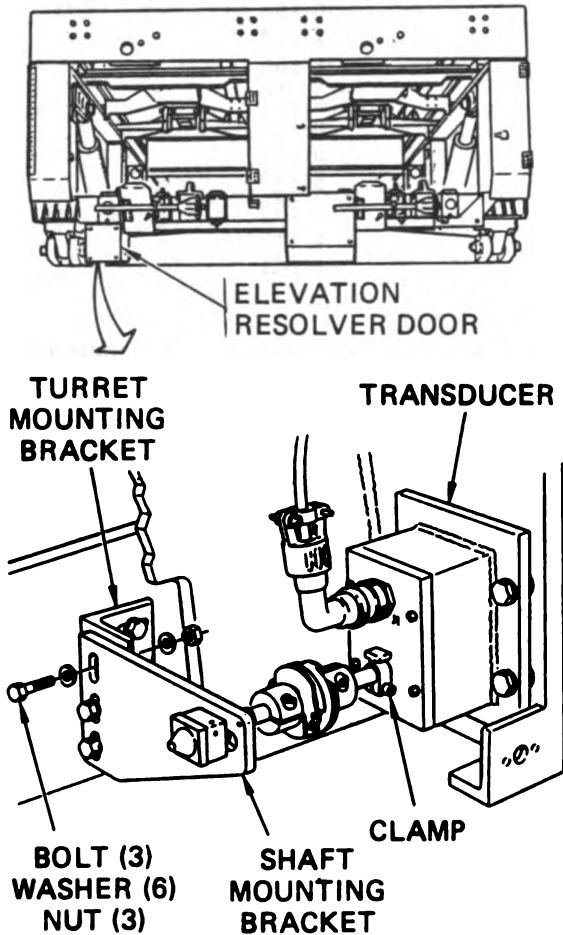
vapors, or contact with skin. Use only with adequate ventilation. Methyl-ethyl-ketone is flammable and should not be used near open flame. Fire extinguisher should be available when solvent is used.

(3) Apply small amount of methyl-ethyl-ketone to clamp screw on elevation resolver shaft. Allow methyl-ethyl-ketone to loosen sealing compound before loosening screw. Using 7/64-inch socket head key, loosen clamp screw.

(4) Using scribe, mark shaft mounting bracket and turret mounting bracket. Using 7mm socket and 10mm box end wrench, remove three bolts, six washers, and three nuts securing shaft mounting bracket to turret bracket.

5-28. CAGE ASSEMBLY MAINTENANCE INSTRUCTIONS (CONT)

(5) Remove mounting bracket with elevation resolver shaft.



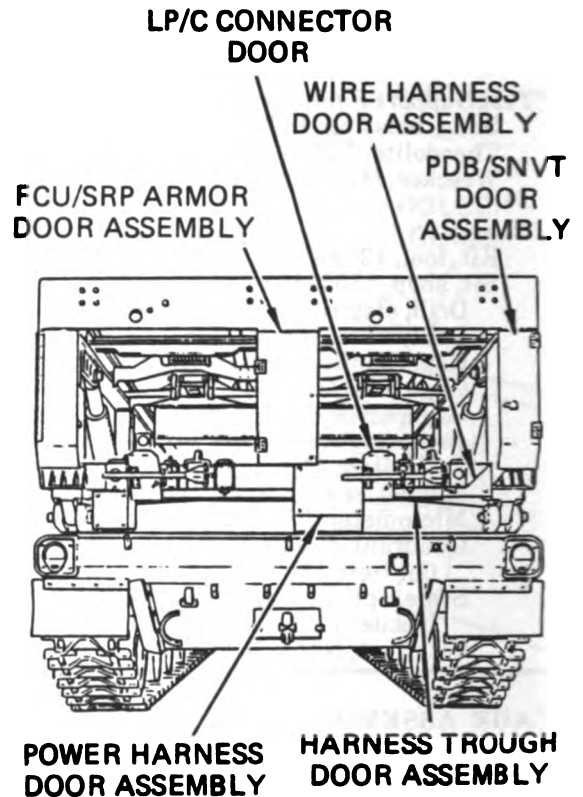
(6) Using crosstip screwdriver, unlatch four studs securing power harness door assembly. Remove door assembly.

(7) Using crosstip screwdriver, unlatch one stud securing harness trough door assembly. Open door.

(8) Using crosstip screwdriver, unlatch two studs securing wire harness door assembly. Remove door assembly.

(9) Unlatch and open right LP/C connector door.

(10) Unlatch and open FCU/SRP armor door and PDB/SNVT door assembly.



5-28. CAGE ASSEMBLY MAINTENANCE INSTRUCTIONS (CONT)

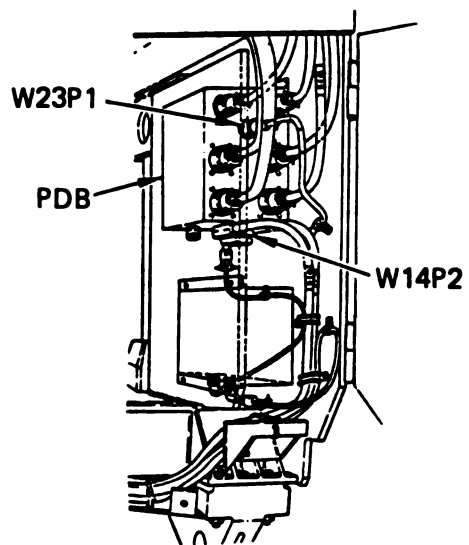
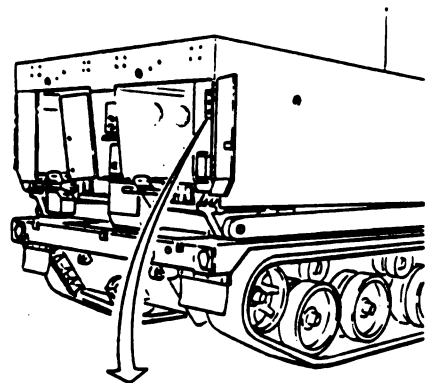
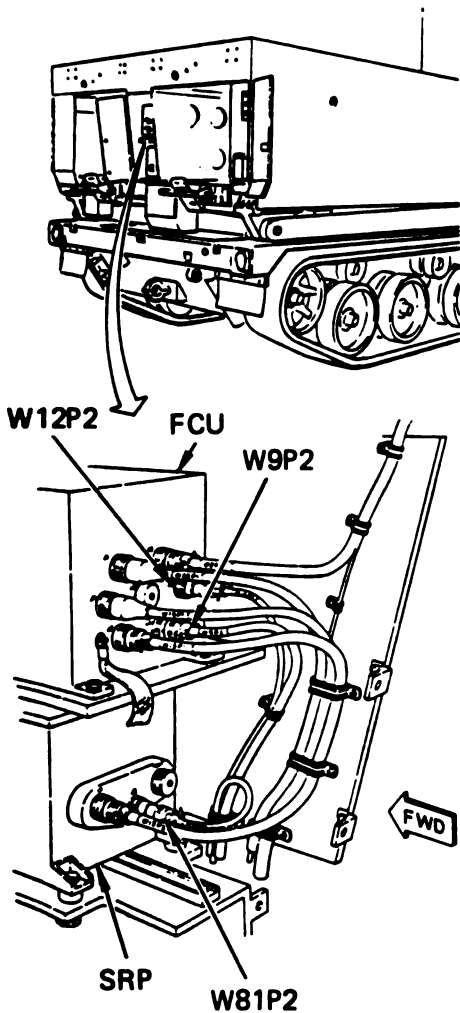
(11) Disconnect electrical connectors W12P2 and W9P2 from FCU.

(12) Disconnect electrical connector W81P2 from SRP.

(13) Disconnect electrical connector W23P1 and W14P2 from PDB.

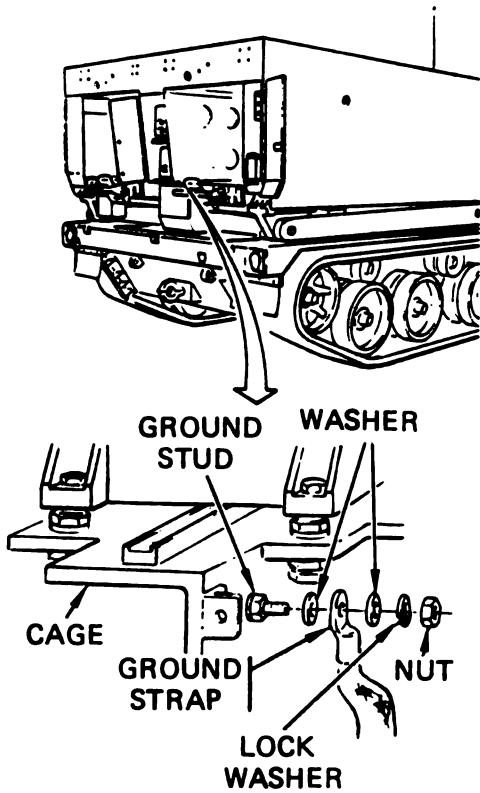
(14) Using crosstip screwdriver, remove clamps securing electrical cables W9, W12, W14, W23, and W81. Reinstall clamps to aid in installation.

(15) Using diagonal pliers, cut cable ties securing cables in bundle.

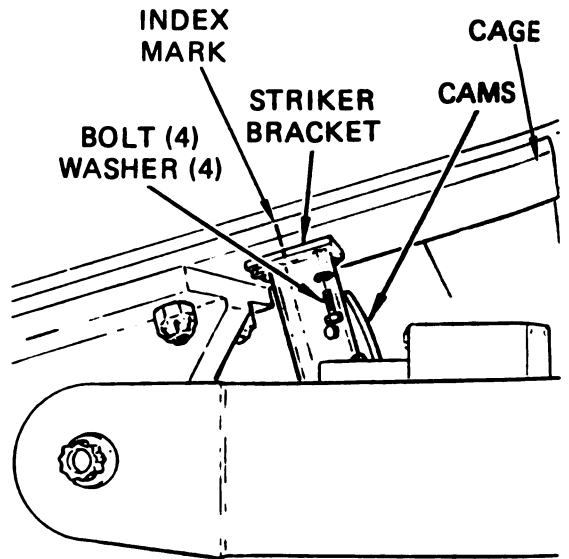


5-28. CAGE ASSEMBLY MAINTENANCE INSTRUCTIONS (CONT)

(16) Using 17mm box end wrench and 17mm open end wrench, remove lockwasher, two washers, and nut securing ground strap to cage.



(17) Mark striker bracket and cage to assist in installation. Using 17mm box end wrench, remove four bolts and washers securing 15- and 27-degree switch striker bracket. Do not loosen bolts securing striker cams on bracket. Remove switch striker bracket.

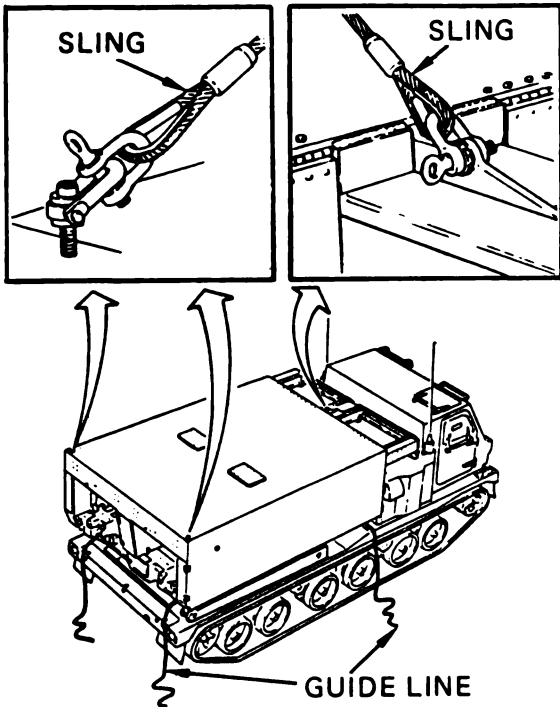


(18) Remove cable clamp securing ground strap.

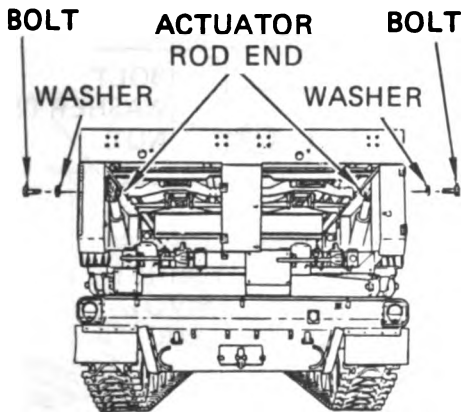
(19) Pull cables and ground strap from cage into turret.

(20) Using a 5/8-inch socket head key, connect hoisting sling to cage. Position wrecker and secure sling to wrecker hook. Remove slack from sling. Attach manila rope guidelines to each corner of cage.

5-28. CAGE ASSEMBLY MAINTENANCE INSTRUCTIONS (CONT)



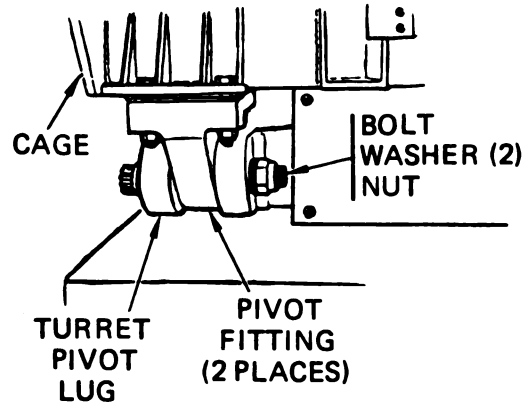
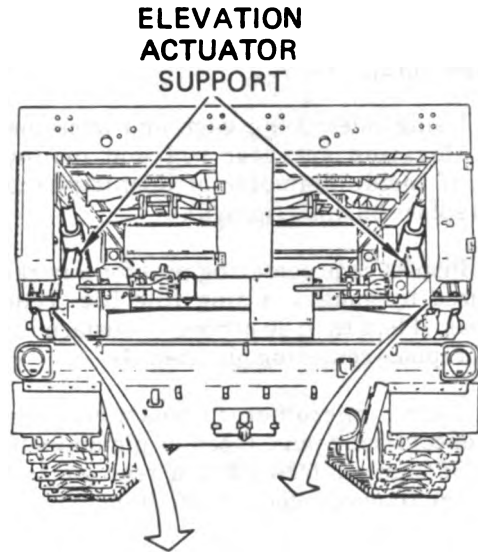
(21) Using manual drive, release pressure on bolts. Using 46mm socket, remove right and left elevation actuators, upper bolts, and washers.



(22) Manually lower actuators to rest on elevation actuator supports.

(23) Release pressure on pivot bolts, lift cage at rear with screw jacks and 2 X 4 wood block.

(24) Using 1-5/8 inch socket and 2-1/4 inch open end wrench, remove two nuts, washers, and bolts securing pivot fitting to turret pivot lugs.



(25) With one repairer on each guideline, use wrecker to hoist cage and pull to rear clear of vehicle. Lower cage to flat surface.

(26) Lower sling to top of cage and unhook wrecker.

(27) Lift elevation actuators off supports. Lay supports on turret and lower actuators on supports.

5-28. CAGE ASSEMBLY MAINTENANCE INSTRUCTIONS (CONT)

b. Inspect.

(1) Visually inspect cage pivot fitting bushing. If 1/4 of teflon bushing liner is missing, replace bushing (item 2).

(2) Visually inspect turret pivot lug bushing. If 1/4 of teflon bushing liner is missing, replace bushing (paragraph 5-29).

(3) Using telescoping gage and micrometer, measure elevation actuator rod end, mounting bushings. If inside diameter of bushing exceeds 31.6mm, replace bushing (item 9).

(4) Inspect cage centering pins for any raised areas caused by gouges. Using fine file, remove raised areas. If less than 80 percent of surface is free of gouges, replace centering pin (item 4).

(5) Using micrometer, measure outside diameter of centering pins. If center pin diameter is less than 36.4mm or forward and rear pin is less than 23.6mm, replace defective pin (item 4).

(6) Using depth gage, measure depth of nicks and gouges in LP/C mounting plates. If nicks and gouges exceed 0.2mm, replace defective plate. Use fine file to remove any raised areas (item 10).

c. Install.

NOTE

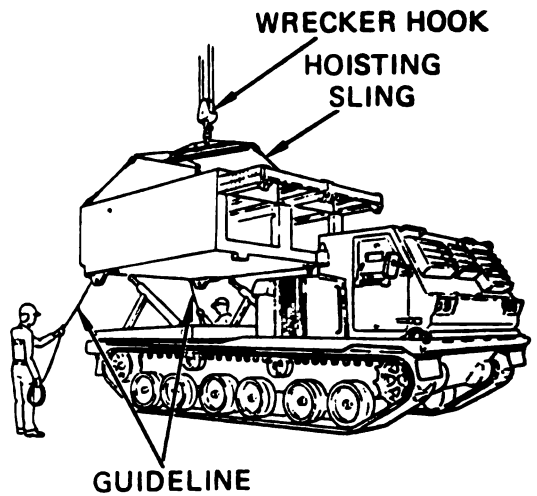
Elevation actuators must be supported as was done during removal.

(1) Lift elevation actuators and install supports.

(2) Using vernier caliper, measure and note dimension between turret pivot lugs.

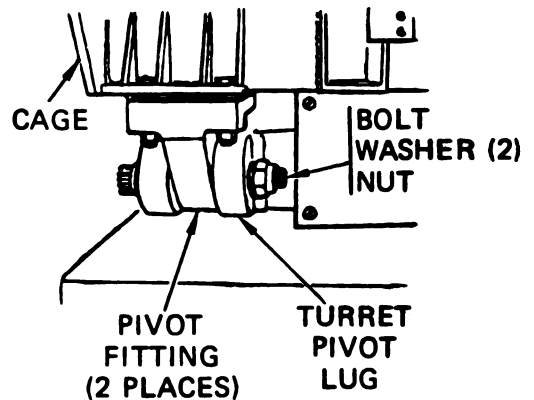
(3) Connect wrecker hook to cage sling. Lift cage. Using gunner quadrant, check side-to-side level of cage. Lower cage and adjust turnbuckles as necessary until cage pivot fitting will engage turret pivot lug equally when lowered onto turret.

(4) With repairer on each guideline, slowly lower cage and aline pivot fittings in turret pivot lugs.



(5) Using screw jacks, line up bolt holes in pivot fitting with holes in turret pivot lugs and install bolts, washers, and nuts. Manual operation of azimuth may assist in lining up boltholes.

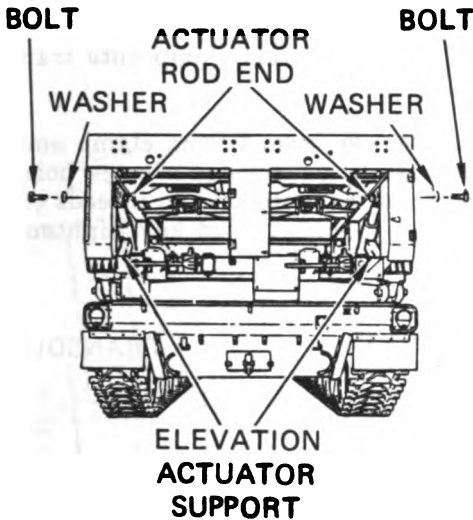
(6) Using 1-5/8 inch socket and 2-1/4 inch open end wrench, tighten nut until dimension between turret pivot lugs is 0.18mm (0.007 inch) less than dimension noted in step (2).



(7) Manually raise elevation actuators to position actuator rod end. Remove actuator supports. Apply zinc chromate primer to two bolts and install two bolts and washers. Using 46mm socket, torque bolts to 500 to 600 N•m.

5-28. CAGE ASSEMBLY MAINTENANCE INSTRUCTIONS (CONT)

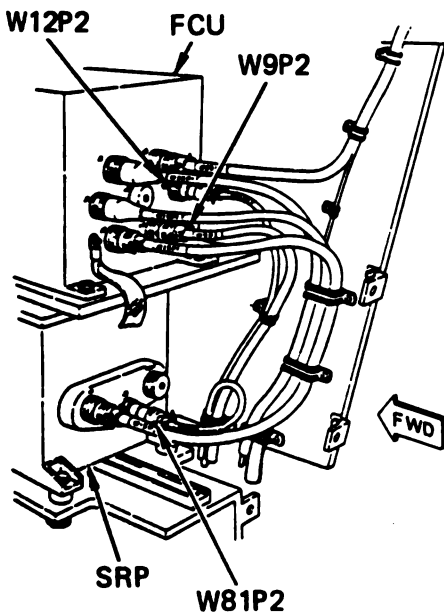
(8) Disconnect hoisting sling from wrecker. Remove sling from cage.



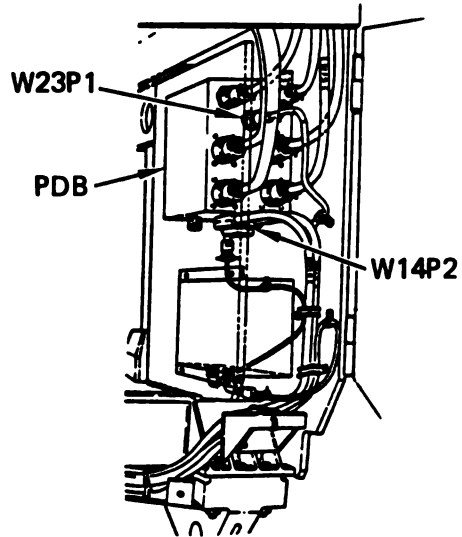
(9) Route cables W9, W12, W14, W23, W81, and ground strap through hole in rear of cage.

(10) Route cables W12 and W9 up along SRP to FCU. Connect W12P2 to J6 and W9P2 to J7 on FCU.

(11) Route cable W81 to SRP. Connect W81P2 to SRP.

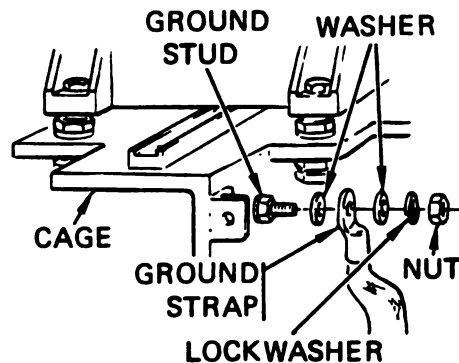


(12) Route cables W23 and W14 through cable troughs on right bottom of cage to PDB. Connect W23P1 to J4 on PDB.



(13) Prepare ground strap for electrical bond (paragraph 3-10).

(14) Position ground strap to cage and install lockwasher, two washers, and nut. Using 17mm box end wrench and 17mm open end wrench, torque nut to 57.5 to 70.5 N•m.

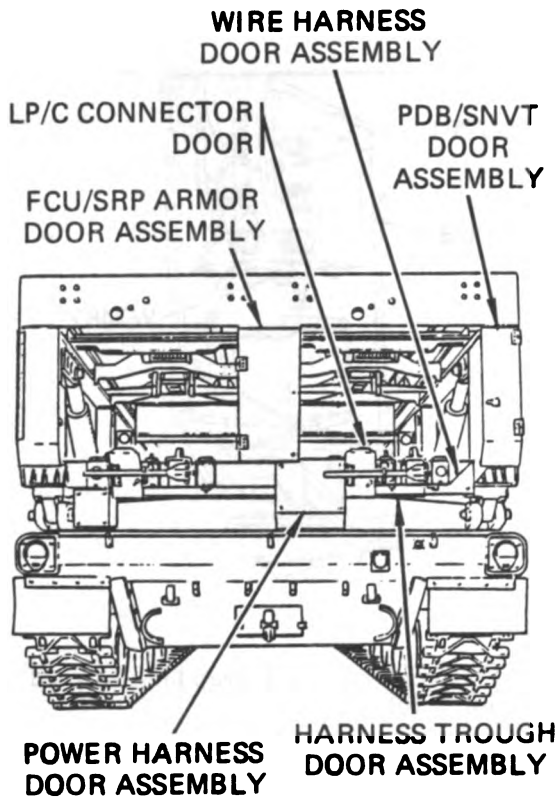


(15) Using crosstip screwdriver, reinstall clamps on cables as required. Using cable ties, secure cables in bundle as required.

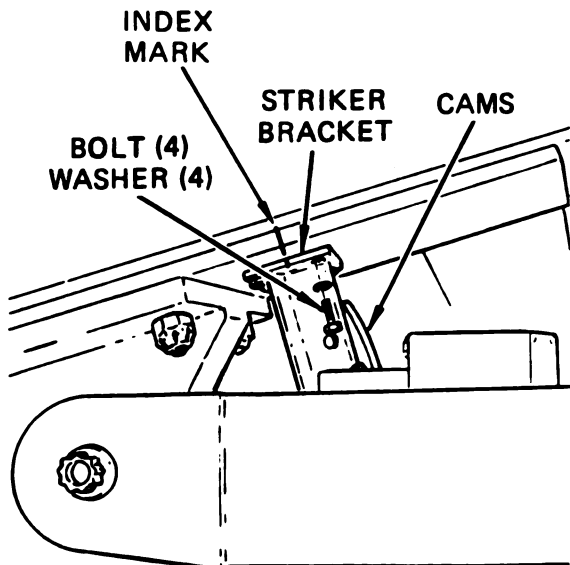
(16) Close and latch PDB/SNVT and FCU/SRP door assemblies.

5-28. CAGE ASSEMBLY MAINTENANCE INSTRUCTIONS (CONT)

(17) Install or close three wire harness trough doors and using crosstip screwdriver, secure studs.



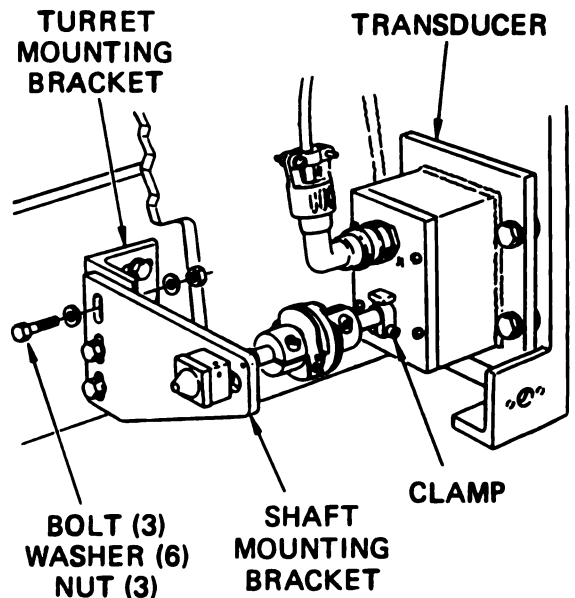
(18) Apply zinc chromate primer to four bolts. Position 15- and 27-degree switch striker bracket on cage alined with index marks made during removal and install four bolts and washers. Using 17mm box end wrench, tighten bolts.



(19) Install transducer shaft bracket as indexed during removal. Apply zinc chromate primer to three bolts. Using 7mm socket and 10mm box end wrench, tighten bolts.

(20) Carefully slide clamp onto transducer shaft.

(21) Remove screws from clamp and apply four drops of sealing compound in screw hole. Apply one drop of sealing compound on threads of screw. Using 7/64-inch socket head key, tighten clamp screw.



(22) Adjust transducer (paragraph 6-21).

(23) Position elevation resolver door assembly to cage. Using crosstip screwdriver, latch four studs to secure door.

(24) If no further maintenance is required, perform follow-on procedure (page 5-162).

2. FITTING BUSHINGS.

a. Remove.

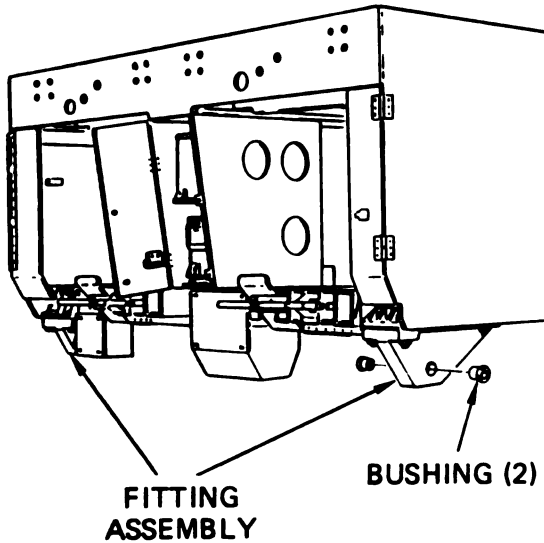
(1) Remove cage assembly (item 1, a).

(2) Using puller, remove defective bushing from fitting.

5-28. CAGE ASSEMBLY MAINTENANCE INSTRUCTIONS (CONT)

b. Install.

- (1) Apply zinc chromate primer to bushing.
- (2) Using bolt, washer, and nut, install new bushing.



- (3) Install cage assembly (item 1, b).

3. WIRING TROUGH.

a. Remove.

- (1) Extend boom (TM 9-1425-646-20).
- (2) Using diagonal pliers, cut cable ties on defective trough.
- (3) Lift electrical cable out of wiring trough. If necessary, use crosstip screwdriver to remove cable clamps at end of trough. Reinstall clamp.
- (4) Using 10mm box end wrench, remove bolts and washers securing wiring trough to fixed beam. Remove trough.

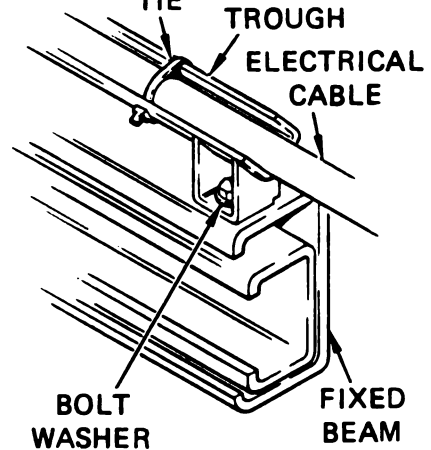
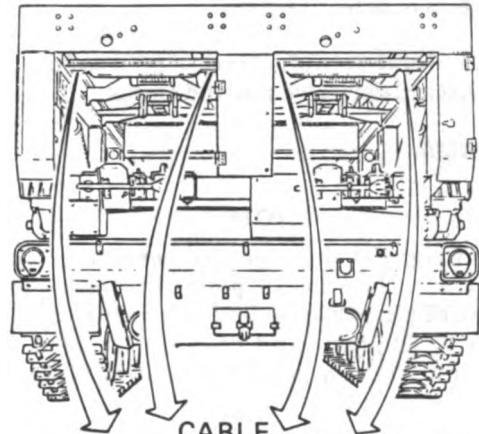
b. Install.

- (1) Position new wiring trough on fixed beam.

- (2) Apply zinc chromate primer to bolts and install bolts and washers. Using 10mm box end wrench, torque bolts to 11.5 to 13.5 N•m.

- (3) Place electrical cable in trough. If removed, use crosstip screwdriver and reinstall cable clamps.

- (4) Using cable ties, secure electrical cable in trough.



- (5) Retract boom (TM 9-1425-646-20).

- (6) If no further maintenance is required, perform follow-on procedure (page 5-162).

5-28. CAGE ASSEMBLY MAINTENANCE INSTRUCTIONS (CONT)

4. CENTERING PIN.

NOTE

There are two sizes of centering pins. Removal and replacement is identical for both sizes.

a. Remove.

(1) Using 14mm deep socket, remove nut from bottom of defective pin.

(2) Remove defective pin, washers, and shims. Discard defective pin and shims.

b. Install.

NOTE

The height of the mounted centering pins vary with location of pins. Dimension for forward pin is 22.0 to 22.5mm, center pin is 21.5 to 22.0mm, and rear pin is 21.0 to 21.5mm from top of LP/C mounting plate.

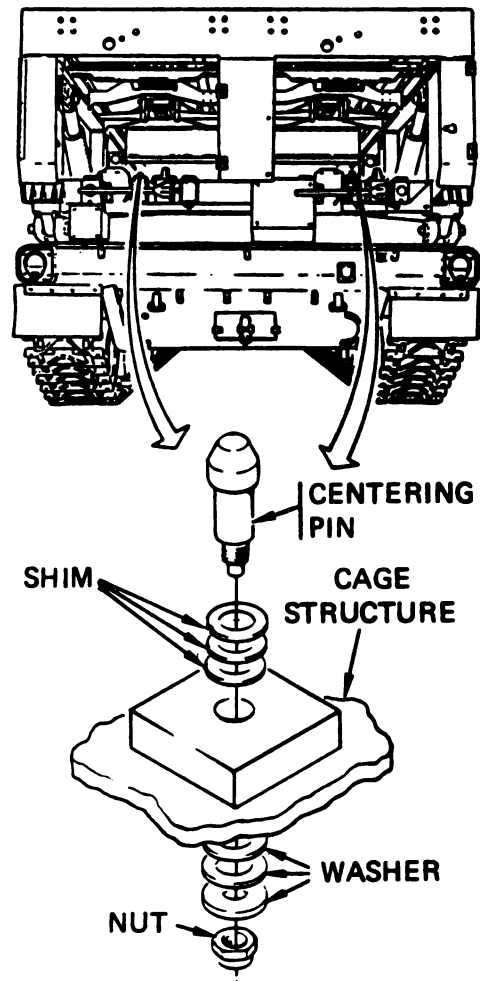
(1) Place shims on shaft of centering pin to maximum of 3.18mm and install centering pin. Install washers and nut. Tighten nut finger-tight.

(2) Place straight edge across LP/C mounting plates on each side of centering pin. Measure height of pin from straight edge to top of pin. Add thickness of straight edge to measurement.

(3) Remove nut and washers. Adjust thickness of shims to obtain required pin height.

(4) Apply zinc chromate primer to threads of pin and position pin in cage.

(5) Install washers, as required, and nut. Using 14mm socket, torque nut 104 to 127 N•m.



5. FASTENER RECEPTACLES.

NOTE

This procedure is typical of all the armor door fastener receptacles. All fastener receptacles are removed and installed the same way.

a. Remove.

(1) Open or remove door assembly that has defective fastener receptacle.

5-28. CAGE ASSEMBLY MAINTENANCE INSTRUCTIONS (CONT)

(2) Using electric drill and 3/32-inch twist drill, remove rivets securing receptacle to cage structure. Remove receptacle.

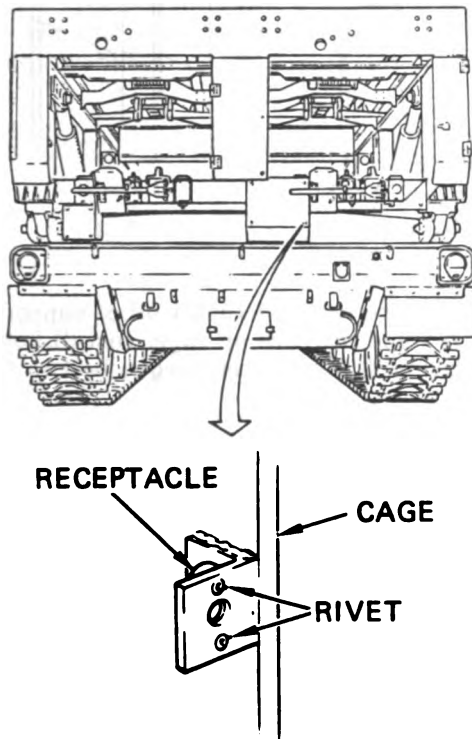
b. Install.

(1) Apply zinc chromate primer to new receptacle and rivets.

(2) Position new receptacle on cage structure and install new rivets.

(3) Close or install door assembly.

(4) If no further maintenance is required, perform follow-on procedure.



6. AT2 STORAGE RECEPTACLE.

a. Remove.

(1) Open LP/C connector door and disconnect W20P2 or W20P3 from receptacle.

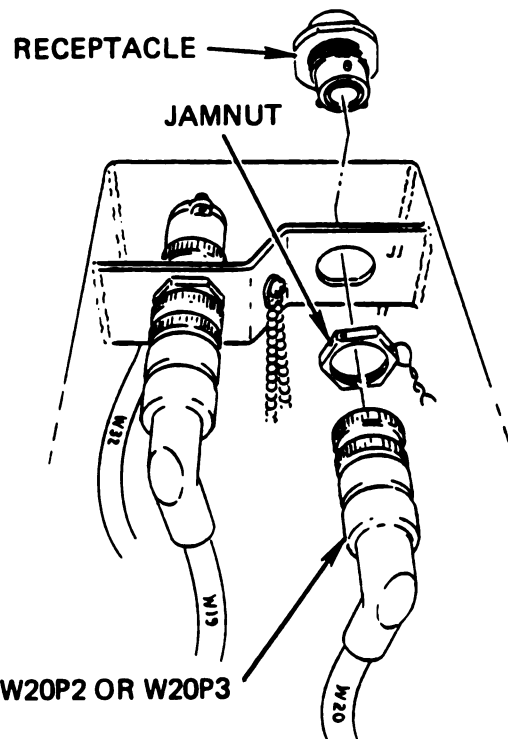
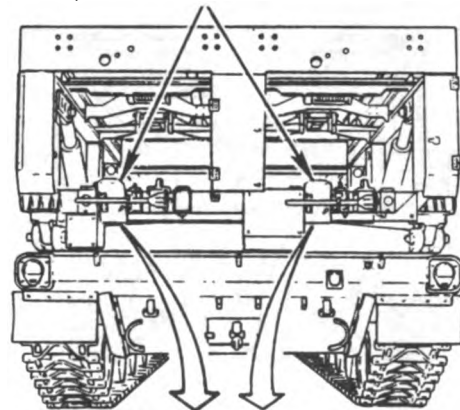
(2) Cut and remove lockwire securing receptacle jamnut. Using slip joint pliers, remove jamnut. Remove receptacle.

b. Install.

(1) Position receptacle on cage and secure with jamnut. Using slip joint pliers, tighten jamnut. Lock-wire jamnut.

(2) Install W20P2 or W20P3 on receptacle and close LP/C connector door.

LP/C CONNECTOR DOOR

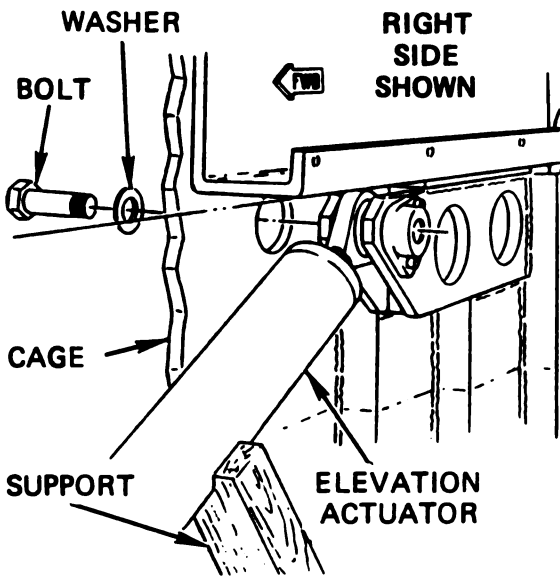
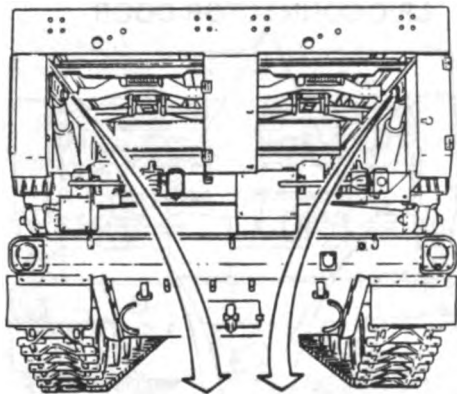


5-28. CAGE ASSEMBLY MAINTENANCE INSTRUCTIONS (CONT)

7. ELEVATION ACTUATOR NUT RETAINER.

a. Remove.

(1) Using 46mm socket, remove upper bolt from elevation actuator. Position actuator on actuator supports.



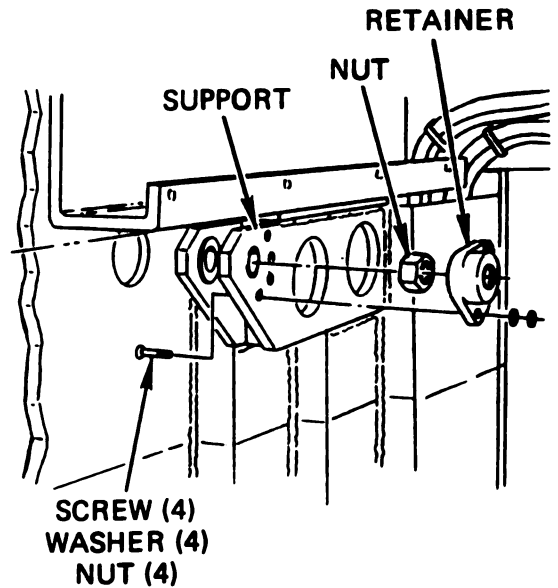
(2) Using electric drill and 1/4-inch twist drill, drill out rivets securing nut retainer to cage. Use drift pin punch and hammer to remove rivets. Remove defective nut and retainer.

b. Install.

NOTE

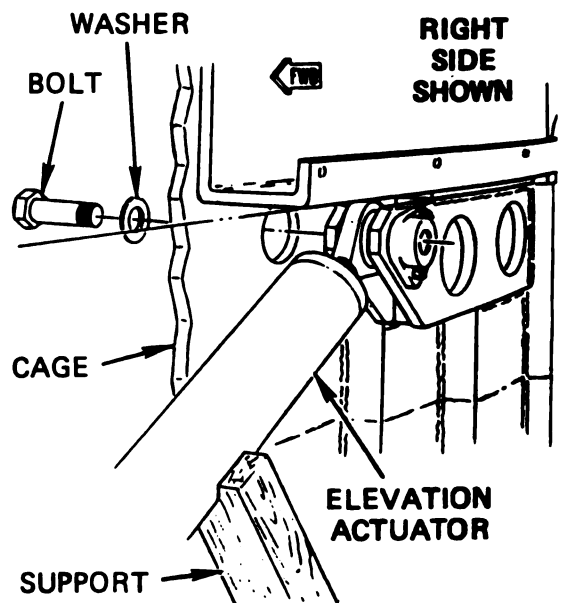
Screws and nuts are used to replace rivets.

(1) Position new nut and retainer to support and secure with four screws, washers, and nuts. Using offset crosstip screwdriver and 7/16-inch socket, tighten nuts.



(2) Lift elevation actuator off of support and position rod end in place on cage. Install bolt and washer. Using 46mm socket, torque bolt to 500 to 600 N•m.

(3) Remove elevation actuator supports.



5-28. CAGE ASSEMBLY MAINTENANCE INSTRUCTIONS (CONT)

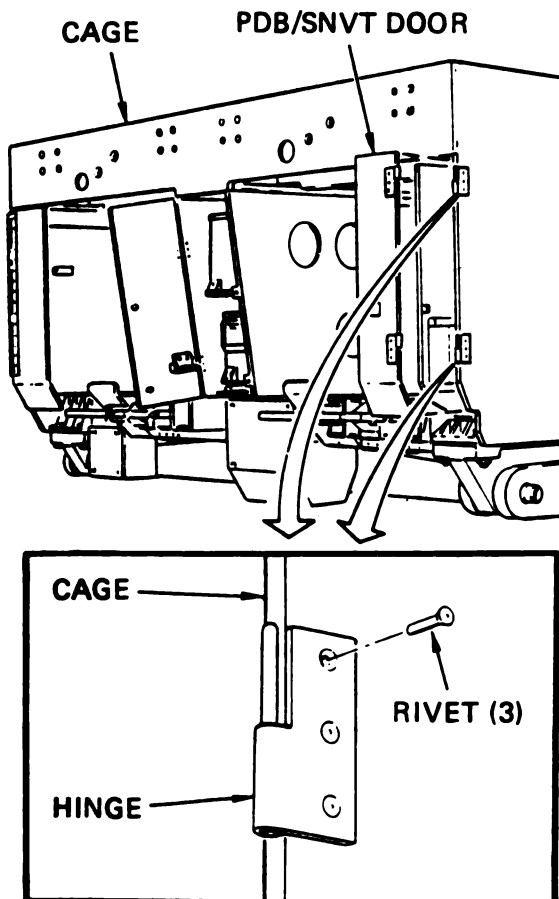
8. PDB/SNVT DOOR HINGE.

a. Remove.

- (1) Open and remove PDB/SNVT door.
- (2) Using electric drill with 1/4-inch twist drill, drill through center of three rivet heads.
- (3) Pry head off of three rivets. Using punch, remove rivets and defective hinge.

b. Install.

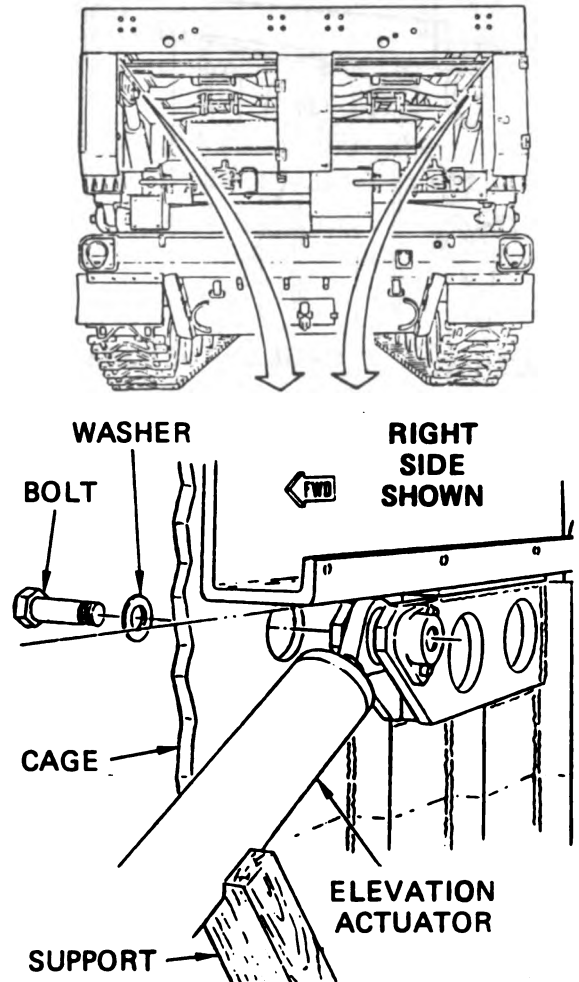
- (1) Using electric drill and 1/4-inch twist drill, drill holes in replacement hinge.
- (2) Position hinge on cage and install three rivets wet with zinc chromate primer. Install rivet head next to hinge.



9. ELEVATION ACTUATOR BUSHINGS.

a. Remove.

- (1) Using 46mm socket, remove upper bolt and washer from elevation actuator. Position actuator on actuator supports.



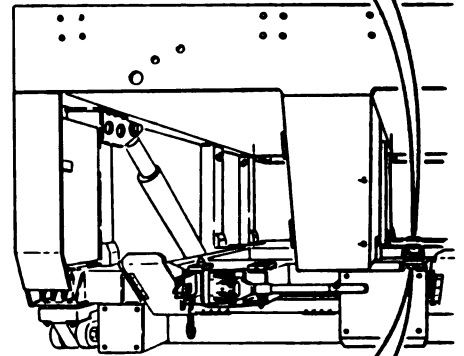
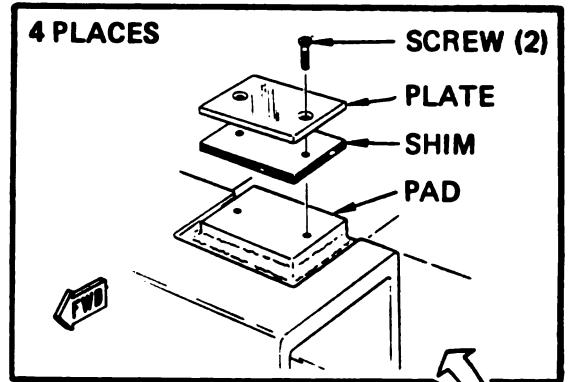
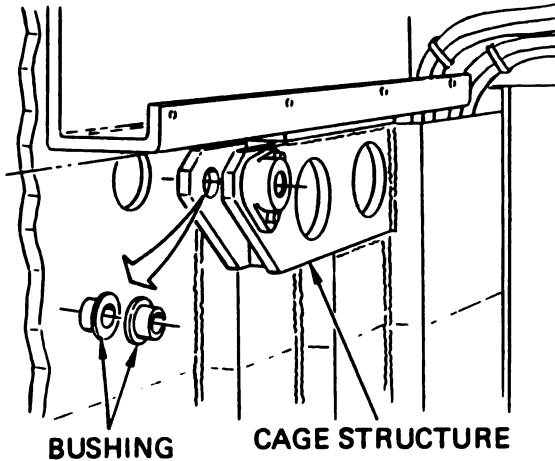
- (2) Using puller, remove defective bushing from cage structure.

b. Install.

- (1) Apply zinc chromate primer to outside diameter of new bushing.
- (2) Install new bushing in cage structure.

5-28. CAGE ASSEMBLY MAINTENANCE INSTRUCTIONS (CONT)

(3) Manually raise elevation actuator off support and position rod end in place on cage. Install bolt and washer. Using 46mm socket, torque bolt to 500 to 600 N•m.



10. LP/C MOUNTING PLATE.

a. Remove.

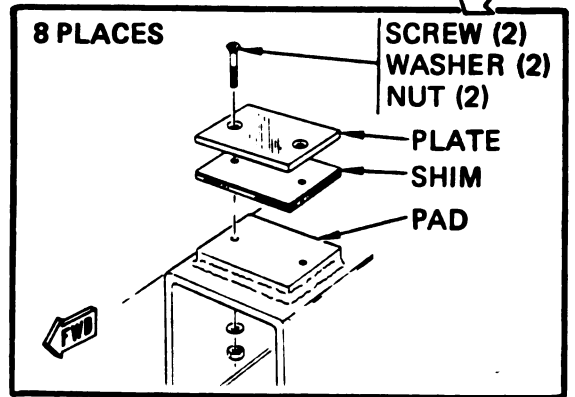
(1) Using crosstip screwdriver for forward LP/C mounting plates and crosstip screwdriver with 8mm box end wrench for center and rear plates, remove two screws from forward plate and two screws, washers, and nuts from center and rear plates.

(2) Remove defective plate. Do not remove or damage shims.

b. Install.

(1) Position new plate on shims and secure with two screws for forward plate and two screws, washers, and nuts for center and rear plates.

(2) Using crosstip screwdriver and 8mm box end wrench, if required, tighten screws.



(3) Perform LP/C mounting plate adjustment (item 11).

11. LP/C MOUNTING PLATE ADJUSTMENT.

a. Level Cage.

(1) Manually unlock and elevate cage about 25 to 75mm (1 to 3 inches) off bumper assemblies (TM 9-1425-646-10).

5-28. CAGE ASSEMBLY MAINTENANCE INSTRUCTIONS (CONT)

(2) Place two 8-ton jacks under rear idler arms of SPLL.

(3) Open FCU/SRP armor door. Using 5mm socket attachment, loosen two screws securing aim verification bracket to door. Remove aim verification bracket.

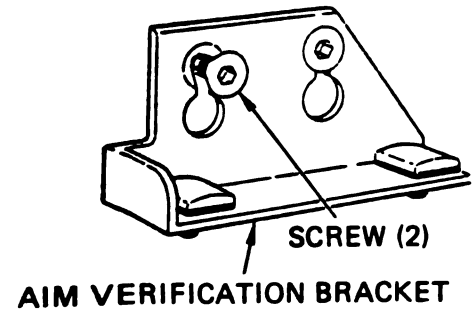
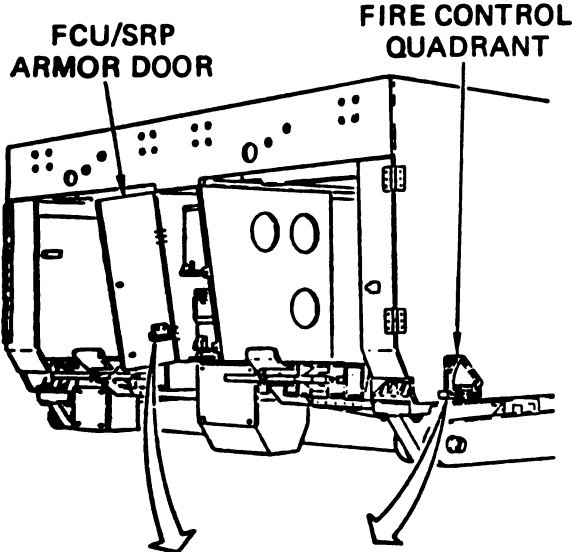
(4) Using 5mm socket attachment loosen two screws on right side of cage. Install aim verification bracket on screws and tighten screws. Place fire control quadrant on bracket.

(5) Raise jacks simultaneously until cage is pointed nose down as indicated by fire control quadrant.

(6) Place an 8-ton jack under SPLL front support approximately 355mm (14 inches) behind front of SPLL.

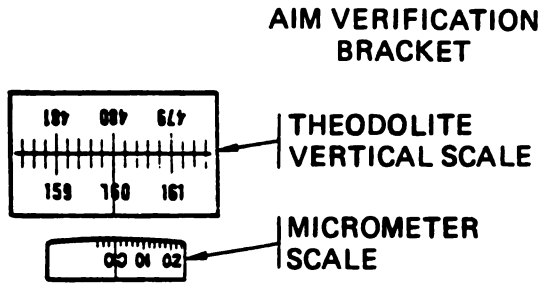
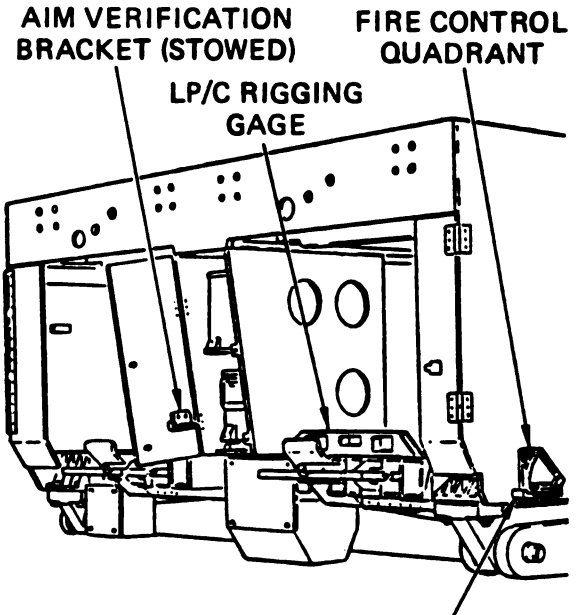
(7) Raise forward jack until suspension is seen to move.

(8) Verify that cage is still pointing nose down. If not, repeat step (5).



(9) Place LP/C rigging gage across LP/C pads and using fire control quadrant, determine which side is low.

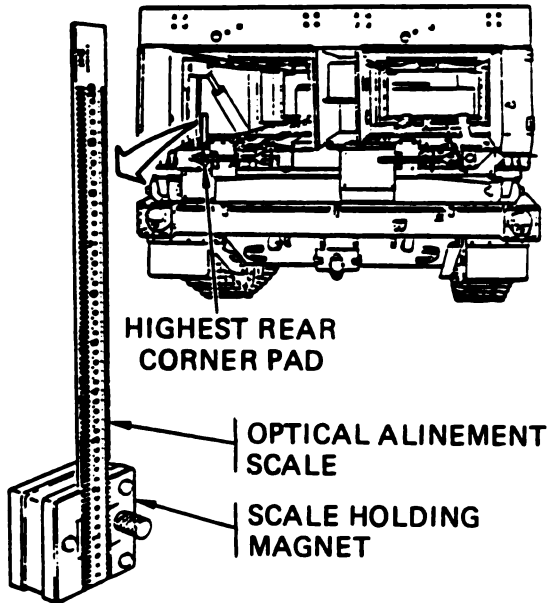
(10) Set up and level theodolite about 3 meters (10 feet) behind SPLL in such a position that optical alinement scale can be seen on each four corner LP/C mounting pads. Height of theodolite will be approximately 2 meters (6 feet). Make sure theodolite vertical scale is always on 1600 mils when sighting optical alinement scale.



(11) Position optical alinement scale in scale holding magnet and place on highest rear corner pad.

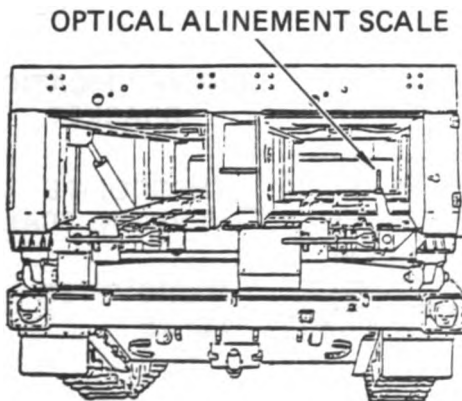
(12) With theodolite level, note reading on scale. Make sketch of sight picture for future reference.

5-28. CAGE ASSEMBLY MAINTENANCE INSTRUCTIONS (CONT)



(13) Move optical alinement scale to diagonally opposite corner pad and again take sight picture without disturbing vertical setting of theodolite.

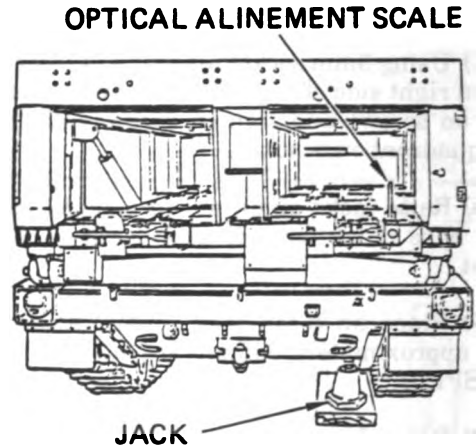
(14) Manually elevate cage until sight picture matches that obtained in step (12).



(15) Move optical alinement scale to rear corner pad which was determined to be low in step (9).

(16) Raise jack on this side until sight picture matches that obtained on highest corner pad.

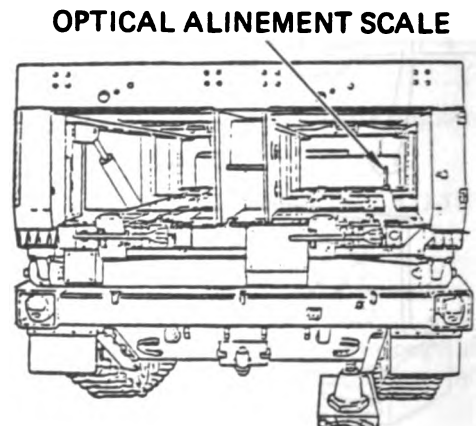
(17) Move optical alinement scale back to highest corner pad and recheck sight picture. If sight picture has changed, adjust jack while moving scale from one rear corner pad to other until sight pictures are same.



NOTE

Due to racking and the difficulties in trying to level one plane without changing the other plane, it may be necessary to compromise with two or three corner pads having the same reading and the other being off not more than 0.25mm (0.010 inch).

(18) Move optical alinement scale to pad in front and recheck sight picture. Manually elevate or depress cage until sight picture is identical with that finally used in step (17).



5-28. CAGE ASSEMBLY MAINTENANCE INSTRUCTIONS (CONT)

NOTE

Do not disturb or move the theodolite while taking the four sight pictures.

(19) Place optical alinement scale on each of four corner pads and verify that same sight picture is obtained on all four. Repeat steps (17) and (18) until sight pictures are same.

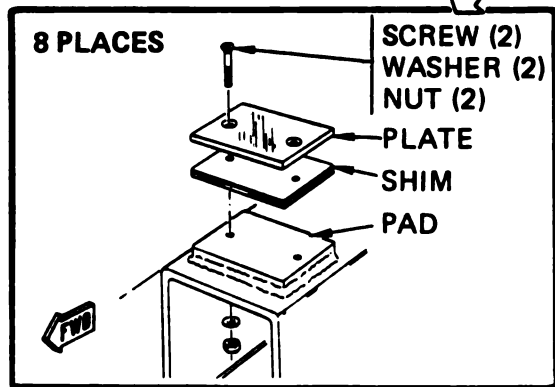
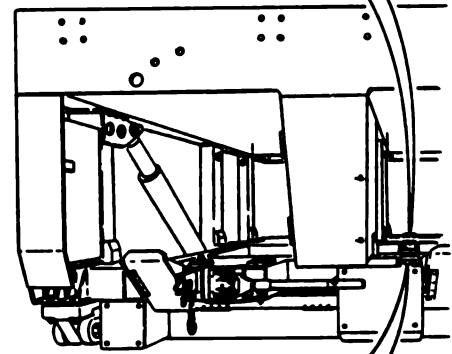
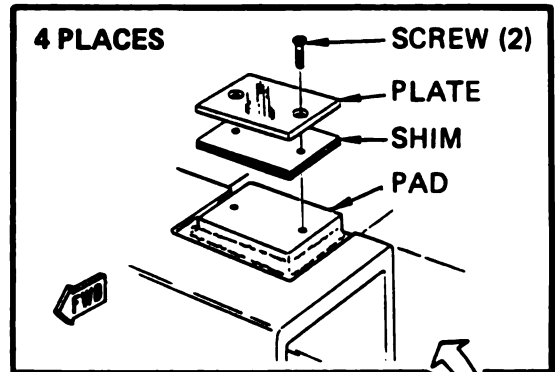
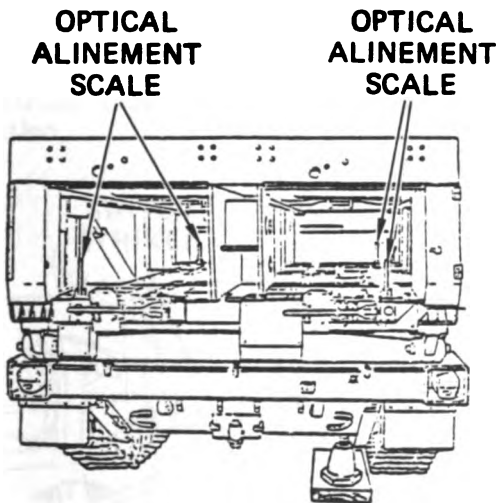
b. Adjust Plate.

(1) Position optical alinement scale in scale holding magnet and place on plate that has not been replaced.

(2) Set up and level theodolite about 3 meters (10 feet) behind SPLL in position optical alinement scale can be seen on each mounting plate.

(3) With theodolite level, sight optical alinement scale and note reading on scale.

(4) Place optical alinement scale on new plate and note reading. Repeat procedure on remaining plates. Plates are to be within 0.25mm of each other.



(7) Remove jacks, optical alinement scale, and theodolite.

(8) Perform stow procedures (TM 9-1425-646-10).

12. BLAST SHIELD PLATE.

a. Remove.

(1) Using BC, position LLM 1600 mils (90 degrees) azimuth and 0 mils elevation (TM 9-1425-646-20).

(5) Add or remove shims under new plate until correct readings are obtained.

(6) Use crosstip screwdriver and 8mm box end wrench, if required, torque screws to 1.35 to 1.69 Nm.

5-28. CAGE ASSEMBLY MAINTENANCE INSTRUCTIONS (CONT)

(2) Using 8mm socket, remove 11 screws and washers securing blast shield plate to cage.

(3) Remove and discard defective plate.

b. Install.

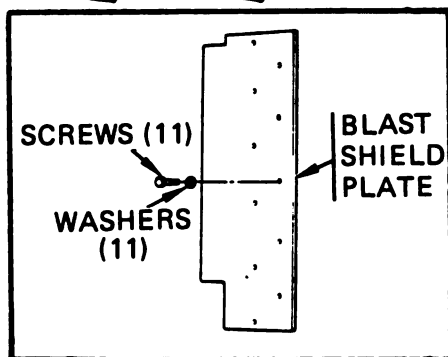
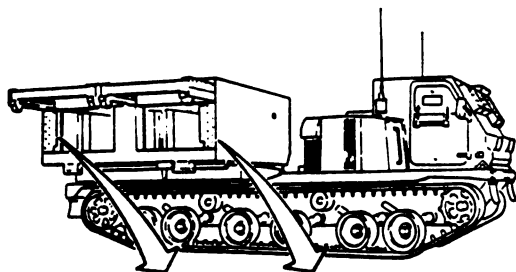
(1) Apply zinc chromate primer to threads of 11 screws.

(2) Position new blast shield plate on cage and secure with 11 screws and washers. Using 8mm socket, torque screws to 4.1 to 5.0 N•m.

(3) Perform stow procedures (TM 9-1425-646-10).

FOLLOW-ON PROCEDURE

Using BC, cycle LLM in elevation two times and check for smooth operation (TM 9-1425-646-20).



5-29. TURRET ASSEMBLY MAINTENANCE INSTRUCTIONS. This paragraph covers the maintenance tasks for the following items:

<i>Item</i>	<i>Page</i>
1. Turret Assembly	5-163
2. Electrical Cable Support Assembly	5-167
3. Driver Assembly	5-168
4. Pivot Bushing	5-173

INITIAL SETUP

Test/Support Equipment
Sling, hoisting, 13029709
Wrecker, HEMTT

Tools
Kit, tool, 13032302
Set, shop, 13032303
Drill, electric, 1046-09 (for items 2 and 3)
Drill, twist, 206-3-32 (for items 2 and 3)
Set, rivet, N155-5130-1-5 (for items 2 and 3)
Wrench, torque, 30 to 250 N•m
Wrench, torque, 0.1 to 3.5 N•m

Materials/Parts
Primer, zinc chromate (47, Appendix B)
Rope, manila (54, Appendix B)
Strap, electrical tiedown (63, Appendix B)

Personnel Required

MLRS Repairer MOS 27M
(2 MLRS Crewmembers MOS 13M to assist as required)
Wrecker Driver MOS 63H (for item 1)

Troubleshooting
Paragraph 2-9

Equipment Condition
Cage removed (paragraph 5-28)
Elevation transmission removed (paragraph 6-16)

1. TURRET ASSEMBLY.

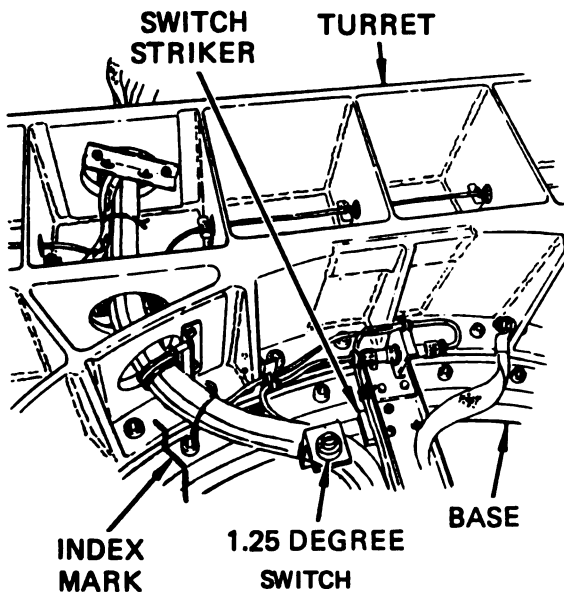
a. Remove.

(1) Using 24mm socket, manually rotate turret left or right to free 1.25-degree switch from switch striker. Index mark turret and base to aid in installation.

(2) Using crosstip screwdriver and 8mm box end wrench, remove screws and washers securing three cable clamps to turret structure. Remove clamps from cable and reinstall to structure. Remove ground strap.

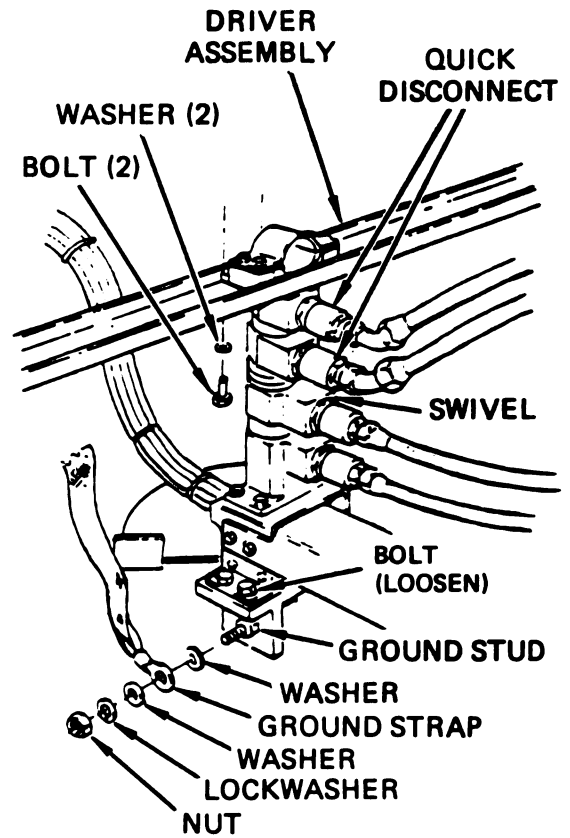
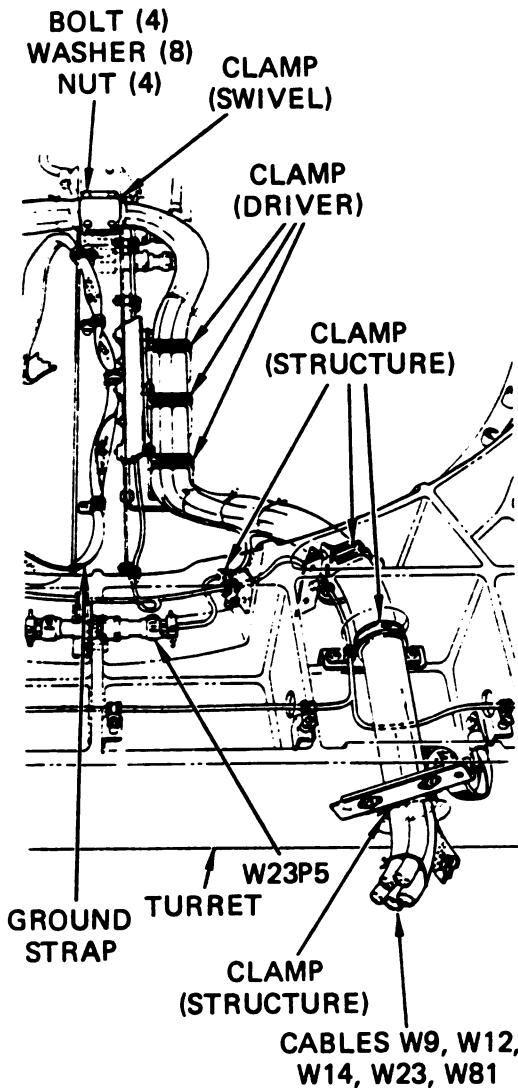
(3) Disconnect electrical connector W23P5. Using crosstip screwdriver and 6mm box end wrench, remove three screws, spacers, washers, and nuts securing three cable clamps to driver. Remove clamps from cable and reinstall on driver.

(4) Using 7mm box end wrench and 10mm socket, remove four nuts, eight washers, two spacers, and four bolts securing cable clamp to swivel. Remove cable from clamp and reinstall clamp on swivel.

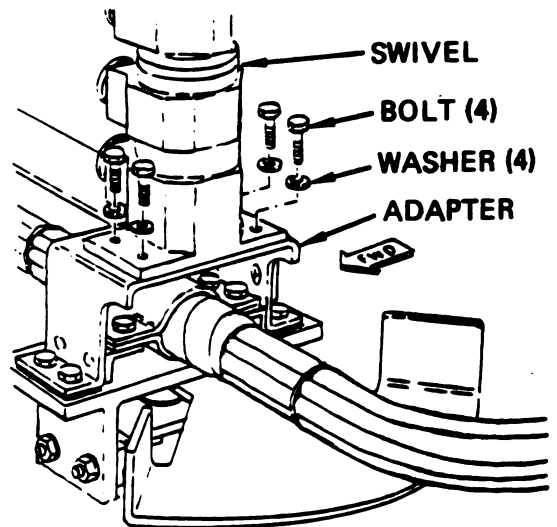


5-29. TURRET ASSEMBLY MAINTENANCE INSTRUCTIONS (CONT)

(5) Remove connector P2 from cable W14 (paragraph 4-7). Pull cable bundle free of turret and lay bundle in base assembly.



(9) Using 8mm socket, remove four bolts and washers securing swivel to adapter. Lay swivel on vehicle bed.



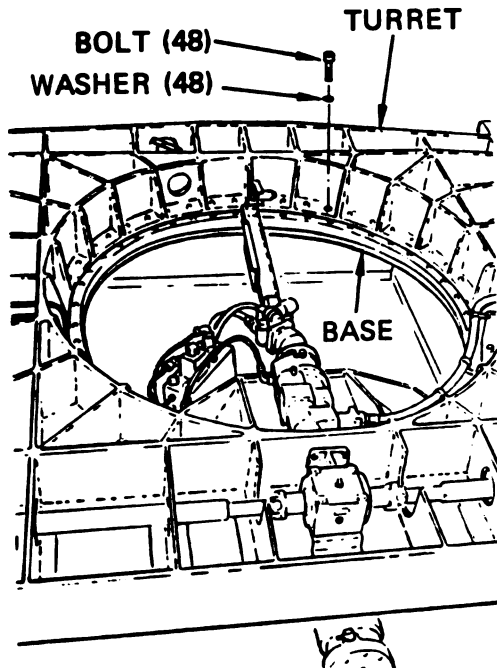
(6) Using 10mm box end wrench and 7mm open end wrench, loosen one bolt and nut to gain access to ground strap mounting. Using 17mm box end wrench and 17mm socket, remove lockwasher, two washers, and nut securing ground strap to stud on swivel support.

(7) Using 10mm socket, remove two bolts and two washers securing driver assembly to swivel.

(8) Disconnect four hydraulic hoses from elevation valve module at swivel quick-disconnects.

5-29. TURRET ASSEMBLY MAINTENANCE INSTRUCTIONS (CONT)

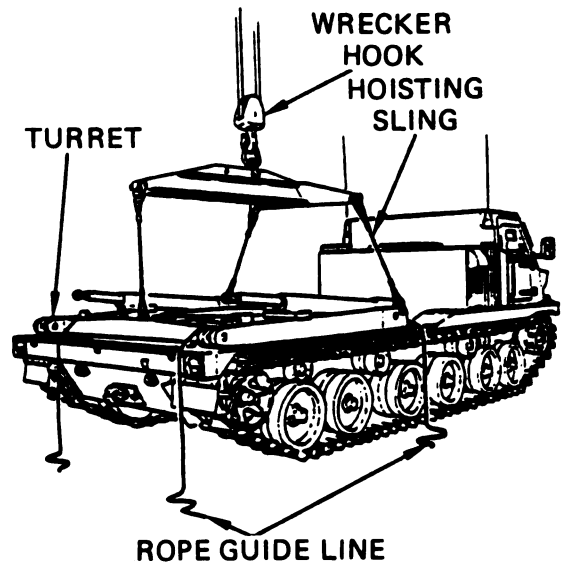
(10) Using 12mm socket attachment, remove 48 bolts and washers securing turret to base assembly.



(11) Connect hoisting sling to turret. Position wrecker and secure sling to wrecker hook. Attach manila rope guidelines to each corner of turret.

(12) With one repairer on each guideline, use wrecker to hoist turret clear of base assembly. Lower turret to flat clean surface.

(13) Lower sling and disconnect from wrecker hook.



b. Install.

(1) Inspect felt seal on base assembly. If seal is damaged, replace seal (paragraph 6-12).

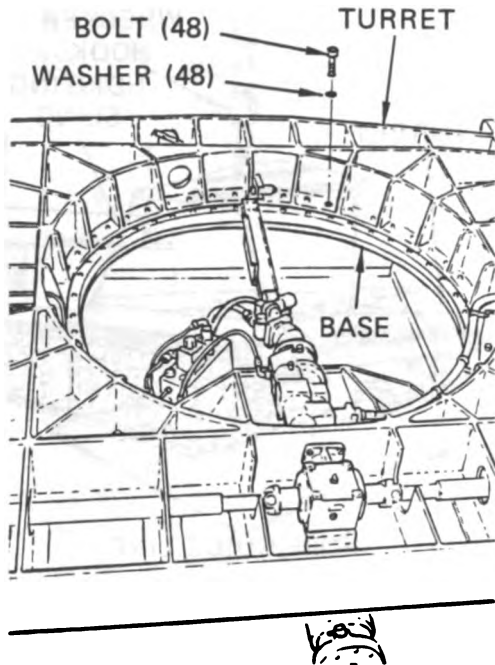
(2) Connect wrecker hook to turret sling. Lift and position turret on base assembly using four repairers on guidelines.

(3) Aline index mark on turret with index mark on base assembly.

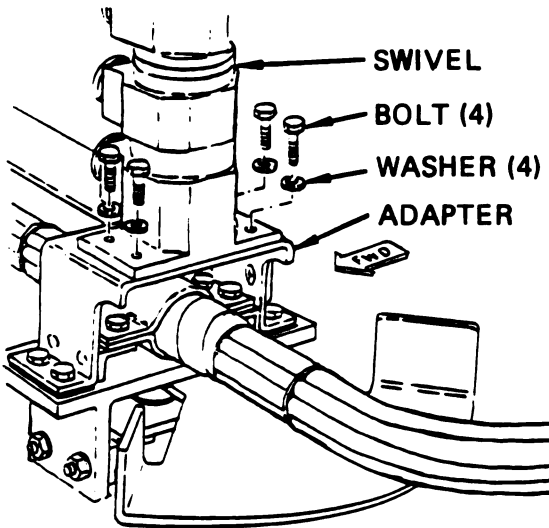
(4) Apply zinc chromate primer to 48 bolts. Install 48 bolts and washers. Using 12mm socket attachment, torque bolts to 190 to 210 N•m.

5-29. TURRET ASSEMBLY MAINTENANCE INSTRUCTIONS (CONT)

(5) Disconnect hoisting sling from wrecker. Remove sling from turret.



(6) Position swivel to adapter and install four bolts and washers. Using 8mm socket, tighten bolts.

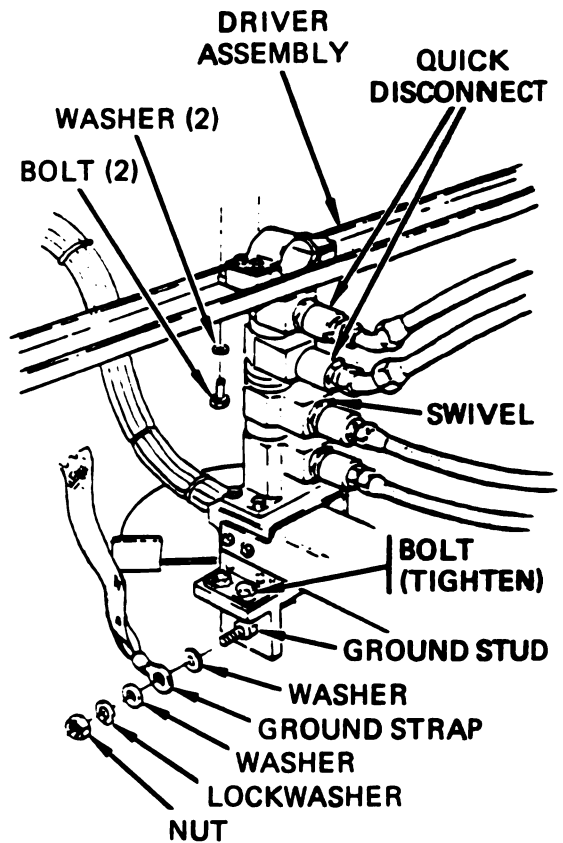


(7) Prepare surface of swivel and driver for electrical bond. Install two bolts and two washers to secure driver assembly to swivel. Using 10mm socket, tighten bolt (paragraph 3-10).

(8) Connect hydraulic hoses from elevation valve module to quick-disconnects on swivel. Turn quick-disconnects until ratchet lock clicks, then turn 1/2 turn more.

(9) Prepare ground strap and mounting surface on swivel for electrical bond (paragraph 3-10).

(10) Position ground strap on swivel in base assembly and install lockwasher, two washers, and nut. Using 17mm box end wrench and 17mm socket, tighten nut. Tighten bolt and nut loosened to gain access to ground strap.



(11) Remove cable clamp from top of swivel. Position tape wrapped area of cable bundle on top of swivel and install clamp. Install four bolts, eight washers, and four nuts. Using 7mm box end wrench and 10mm socket, tighten nuts.

(12) Route cable bundle along driver assembly and out through three holes in rear of turret structure.

5-29. TURRET ASSEMBLY MAINTENANCE INSTRUCTIONS (CONT)

(13) Remove three cable clamps from driver assembly. Install clamps on cable bundle. Using crosstip screwdriver and 6mm box end wrench, install three screws, spacers, washers, and nuts to secure clamps to driver. Tighten nuts.

(14) Install connector P2 on cable W14 (paragraph 4-7).

(15) Remove three cable clamps from turret structure. Install clamps on cable bundle. Using crosstip screwdriver, install screws and washers to secure clamps to turret structure. Tighten bolts. Connect electrical connector W23P5.

(16) Install elevation transmission/brake (paragraph 6-16).

(17) If no further maintenance is required, perform follow-on procedure (page 5-173).

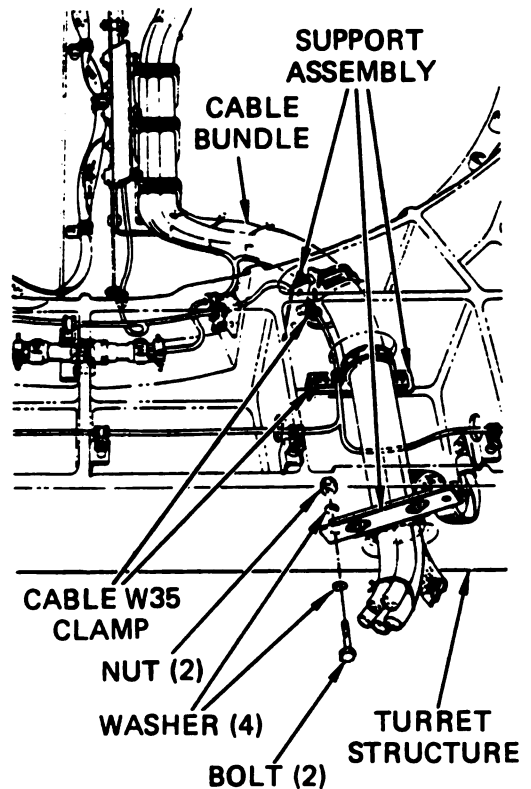
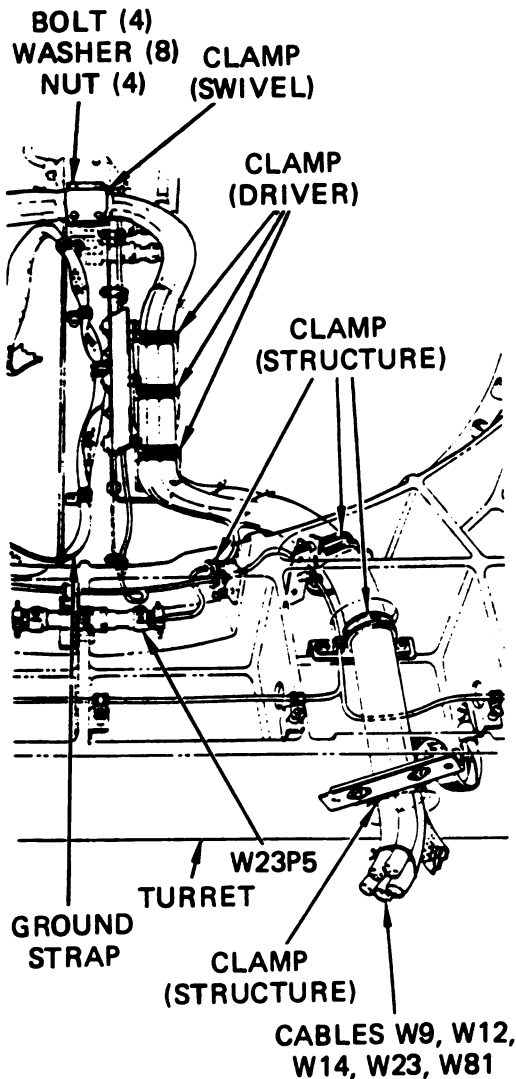
2. ELECTRICAL CABLE SUPPORT ASSEMBLY.

a. Remove.

(1) Using crosstip screwdriver and 8mm socket, remove screw and washer securing cable bundle to support assembly.

(2) Using crosstip screwdriver and 6mm box end wrench, remove screw, two washers, and nut securing cable W35 clamp to support.

(3) Using 10mm box end wrench and 7mm socket, remove two nuts, four washers, and two bolts securing support assembly to turret structure. Remove support assembly.

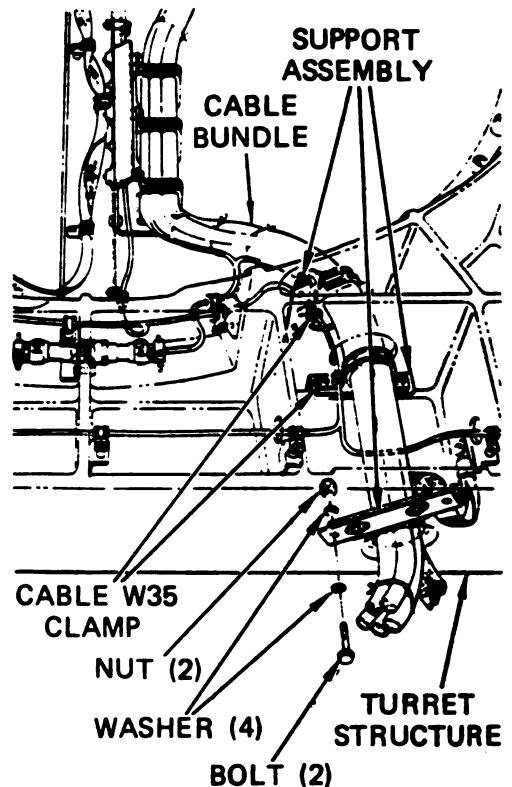
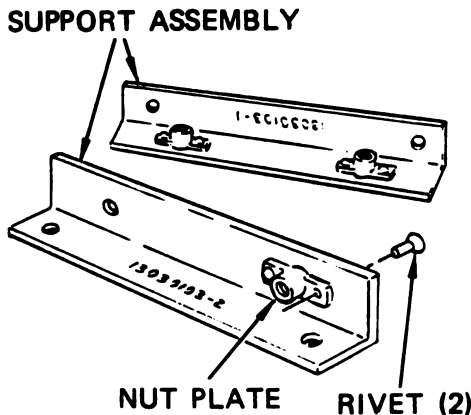


5-29. TURRET ASSEMBLY MAINTENANCE INSTRUCTIONS (CONT)

b. Repair.

(1) Using electric drill and 3/32-inch twist drill, remove two rivets securing nutplate to support assembly.

(2) Apply zinc chromate primer to new rivets. Position nutplate on support assembly and using rivet set, install two rivets.



c. Install.

(1) Apply zinc chromate primer to two bolts. Position support assembly to turret structure and install two bolts, four washers, and two nuts. Using 10mm box end wrench and 7mm socket, tighten nut.

(2) Position cable W35 clamp on support assembly and install screw, two washers, and nut. Using crosstip screwdriver and 6mm box end wrench, tighten nut.

(3) Position cable bundle clamp on support assembly and install screw and washer. Using crosstip screwdriver and 8mm socket, tighten bolt.

3. DRIVER ASSEMBLY.

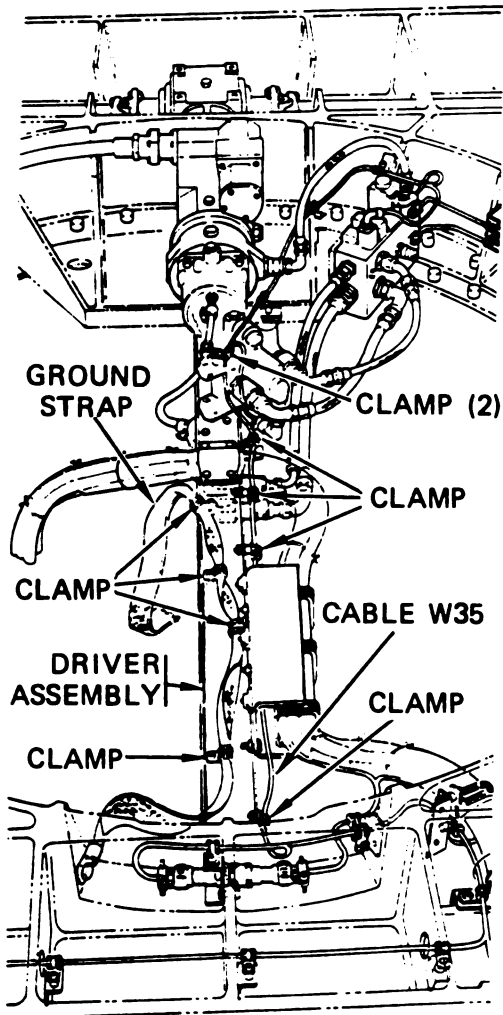
a. Remove.

(1) Install jury struts (TM 9-1425-646-20).

(2) Using crosstip screwdriver and 6mm box end wrench, remove screws, spacers, washers, and nuts securing cable clamps to driver.

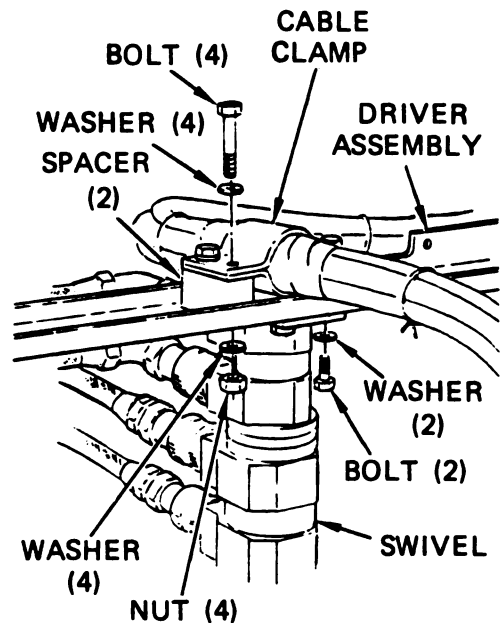
5-29. TURRET ASSEMBLY MAINTENANCE INSTRUCTIONS (CONT)

(3) Using crosstip screwdriver and 6mm box end wrench, remove four nuts, spacers, washers, screws, and clamps securing ground strap to driver assembly.

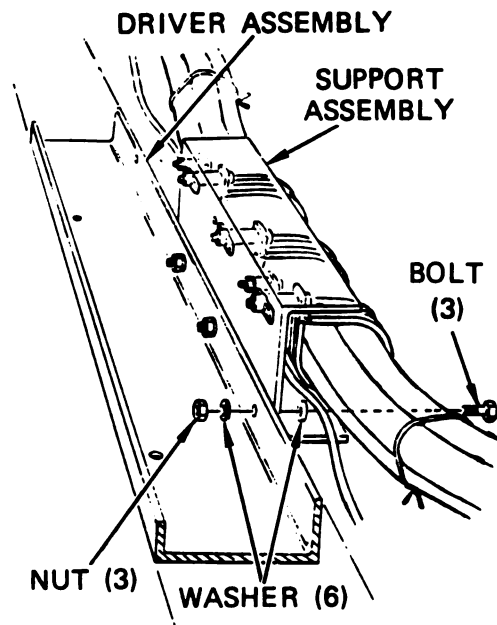


(4) Using 10mm box end wrench and 7mm socket, remove four nuts, eight washers, and four bolts securing cable clamp to driver assembly. Remove cable clamp and two spacers.

(5) Using 10mm socket, remove two bolts and two washers securing driver assembly to swivel.

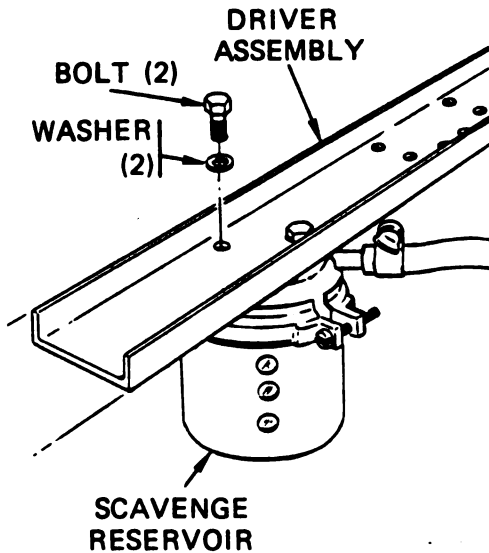


(6) Using 10mm box end wrench and 7mm socket, remove three nuts, six washers, and three bolts securing support and cable clamps to driver assembly.



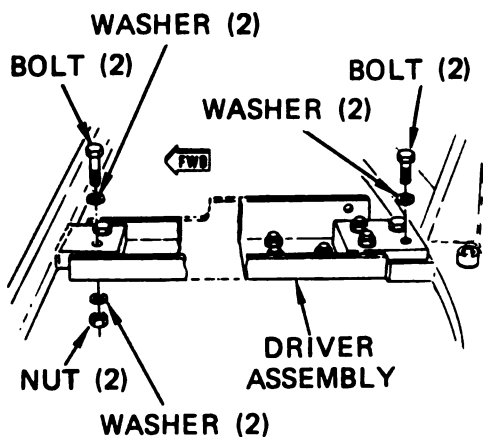
5-29. TURRET ASSEMBLY MAINTENANCE INSTRUCTIONS (CONT)

(7) Using 10mm socket, remove two bolts and washers securing scavenge reservoir to driver assembly.



(8) Using 10mm socket, remove two bolts, two washers, and nuts securing rear of driver assembly to turret.

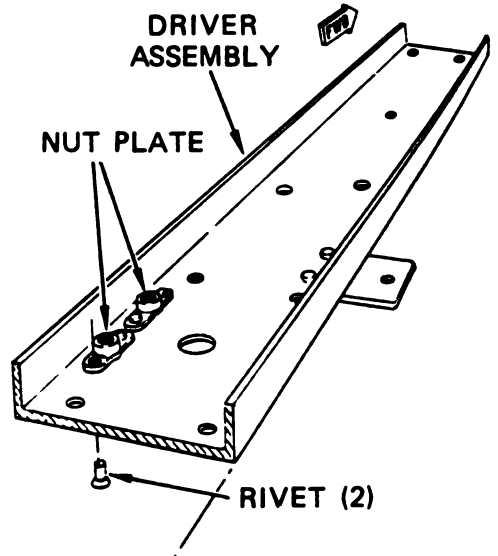
(9) Using 10mm box end wrench and 7mm socket, remove two bolts, washers, and nuts securing forward end of driver assembly to turret. Remove driver assembly.



b. Replace Nutplates.

(1) Using electric drill and 3/32-inch twist drill, remove two rivets securing defective nutplate. Remove nutplate.

(2) Apply zinc chromate primer to two rivets. Position new nutplate on driver and using rivet set, install two rivets.



c. Replace Tab and Striker.

(1) Using 10mm box end wrench and 7mm socket, remove two bolts, two washers, and two nuts securing tab to driver assembly.

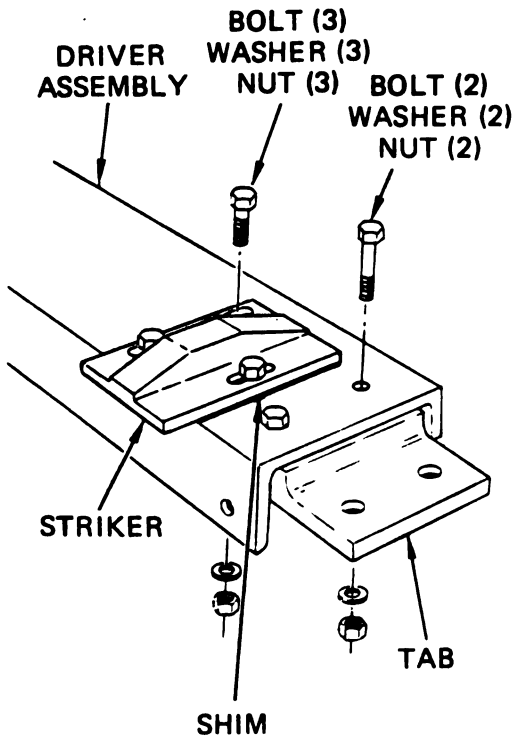
(2) Using 10mm box end wrench and 7mm socket, remove three bolts, three washers, and three nuts securing striker to driver assembly. Remove striker and shim.

(3) Apply zinc chromate primer to two bolts. Position new tab on driver and install two bolts, two washers, and two nuts.

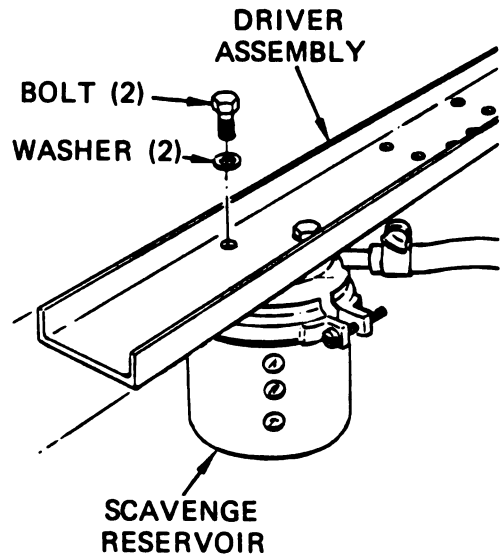
(4) Apply zinc chromate primer to three bolts. Position new striker and shim on driver and install three bolts, three washers, and three nuts.

5-29. TURRET ASSEMBLY MAINTENANCE INSTRUCTIONS (CONT)

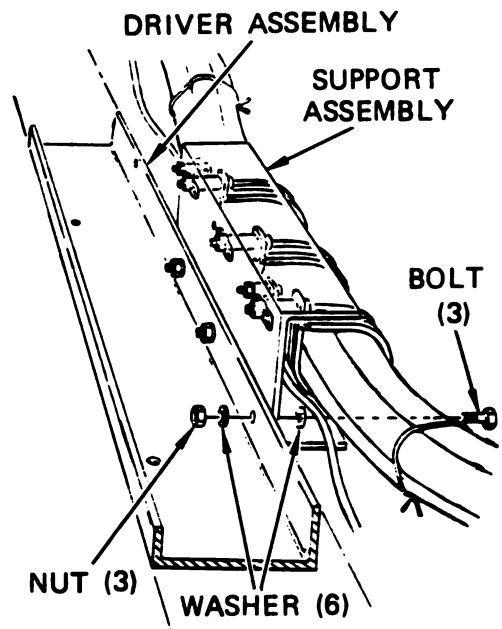
(5) Using 10mm box end wrench and 7mm socket, tighten nuts.



(2) Apply zinc chromate primer to four bolts. Position scavenge reservoir to driver assembly and install four bolts, washers, and nuts. Using 10mm socket, tighten bolts at rear of driver assembly. Using 10mm box end wrench and 7mm socket, tighten bolts at forward end.

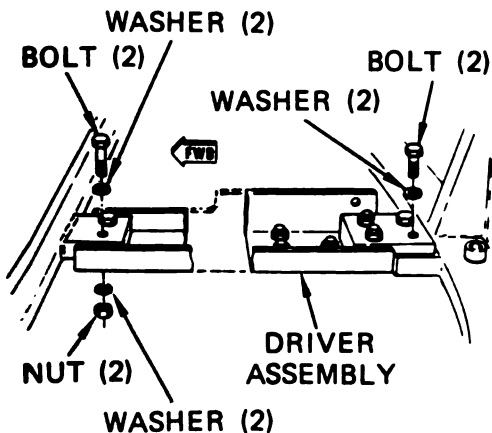


(3) Position support to driver assembly and install three bolts, six washers, and three nuts. Using 10mm box end wrench and 7mm socket, tighten nuts.



d. Install.

(1) Prepare tab and turret for electrical bond. Position driver assembly in turret and install two bolts and two washers. Using 10mm socket, tighten bolts (paragraph 3-10).

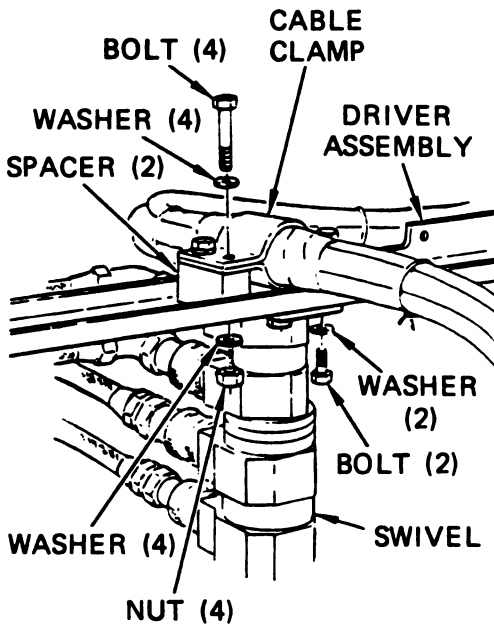


5-29. TURRET ASSEMBLY MAINTENANCE INSTRUCTIONS (CONT)

(4) Prepare driver and swivel for electrical bond. Install two bolts and two washers to secure driver assembly to swivel. Using 10mm socket, tighten bolts (paragraph 3-10).

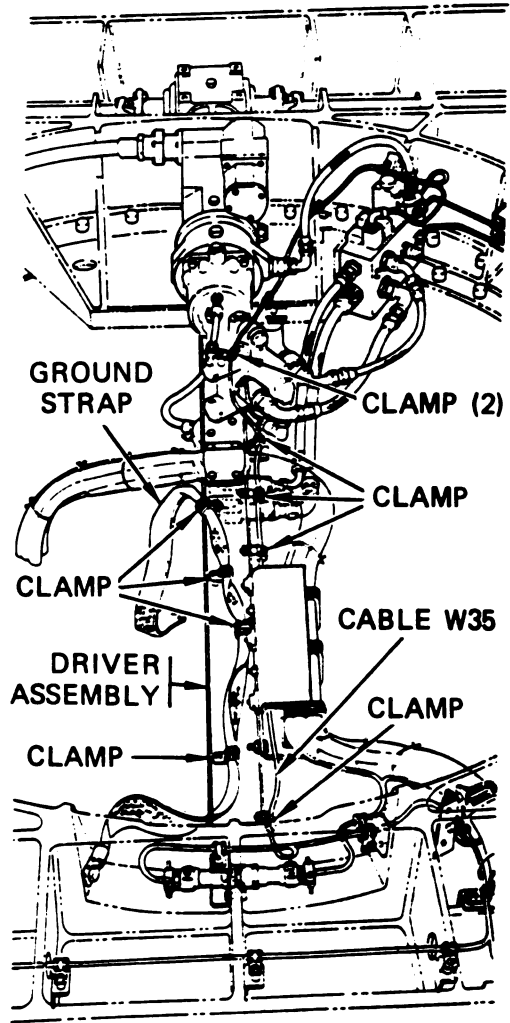
(5) Position wrapped section of cable bundle on top of swivel and position spacer and clamp on cable.

(6) Install four bolts, two spacers, eight washers, and four nuts to secure clamp to driver assembly. Using 10mm box end wrench and 7mm socket, tighten nut.



(7) Position clamps on ground strap. Install four screws, spacers, washers, and nuts to secure clamps to driver assembly. Using crosstip screwdriver and 6mm box end wrench tighten nuts.

(8) Position cable clamps to driver and install screws, spacers, washers, and nuts to secure clamps to driver. Using crosstip screwdriver and 6mm box end wrench, tighten nuts.



(9) Remove jury struts (TM 9-1425-646-20).

5-29. TURRET ASSEMBLY MAINTENANCE INSTRUCTIONS (CONT)

4. PIVOT BUSHING.

a. Remove.

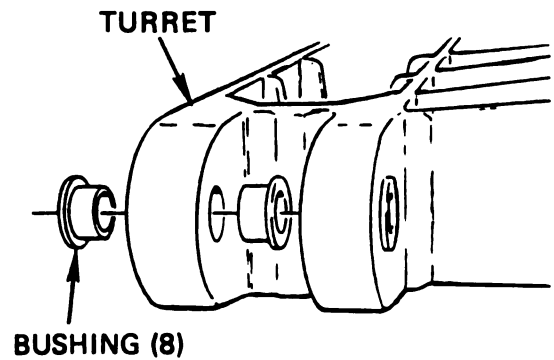
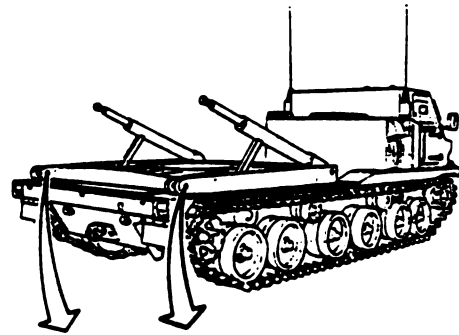
- (1) Remove cage (paragraph 5-28).
- (2) Using puller, remove defective bushing from turret.

b. Install.

- (1) Apply zinc chromate primer to new bushing.
- (2) Install new bushing in turret using nut, washers, and bolt. Tighten nut until bushing is seated.
- (3) Install cage (paragraph 5-28).

FOLLOW-ON PROCEDURE

Install cage (paragraph 5-28).



5-30. ARMOR DOOR MAINTENANCE INSTRUCTIONS. This paragraph covers the maintenance tasks for the following items:

<i>Item</i>	<i>Page</i>
1. Elevation Resolver Door	5-174
2. LP/C Connector Door	5-175
3. LH Harness Trough Door	5-176
4. Power Harness Door	5-177
5. RH Harness Trough Door	5-178
6. Wiring Harness Door	5-179
7. Wiring Harness Closure	5-179
8. Boom Controller Door	5-180
9. PDB/SNVT Door Hinge	5-182

INITIAL SETUP

Tools

- Kit, tool, 13032302
- Set, shop, 13032303
- Drill, electric, 1046-09 (for items 2, 3, 5, and 8)
- Drill, twist, 206-3-32 (for item 8)
- Drill, twist, 206-1-8 (for item 8)
- Drill, twist, 206-3-16 (for items 2, 3, 5, and 8)
- Installing tool, T96-1

Rivet set, N155-5130-1-5 (for items 2, 3, 5, 8, and 9)

Materials/Parts

- Primer, zinc chromate (47, Appendix B)
- Sealant (59, Appendix B)

Personnel Required

- MLRS Repairer MOS 27M
- (MLRS Crewmember MOS 13M to assist as required)

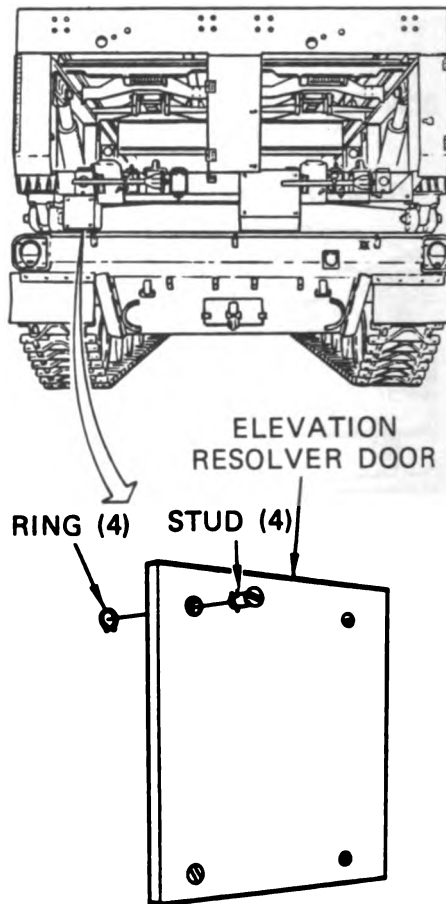
1. ELEVATION RESOLVER DOOR.

a. Remove.

- (1) Support door while using crosstip screwdriver to unlatch four fasteners. Remove door.
- (2) Using diagonal pliers, cut and remove retaining ring.
- (3) Pull stud out of door and discard stud.

b. Install.

- (1) Insert stud in door.
- (2) Using installing tool, install retaining ring by rotating tool until tabs on retaining ring engage slot in stud.
- (3) Position door and secure with four fasteners using crosstip screwdriver.



5-30. ARMOR DOOR MAINTENANCE INSTRUCTIONS (CONT)

2. LP/C CONNECTOR DOOR.

NOTE

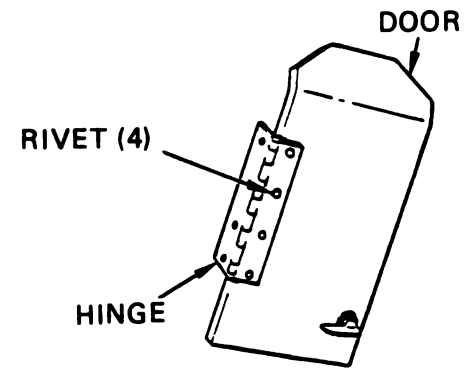
The following procedure is for the later configured SPLs equipped with screws securing the door hinge to the cage. Some earlier configured SPLs may be equipped with rivets to secure the door hinge to the cage.

a. Remove.

- (1) Unlatch fastener and open door.
- (2) Using crosstip screwdriver, remove four screws securing door hinge to cage. Remove door.

b. Hinge Replacement.

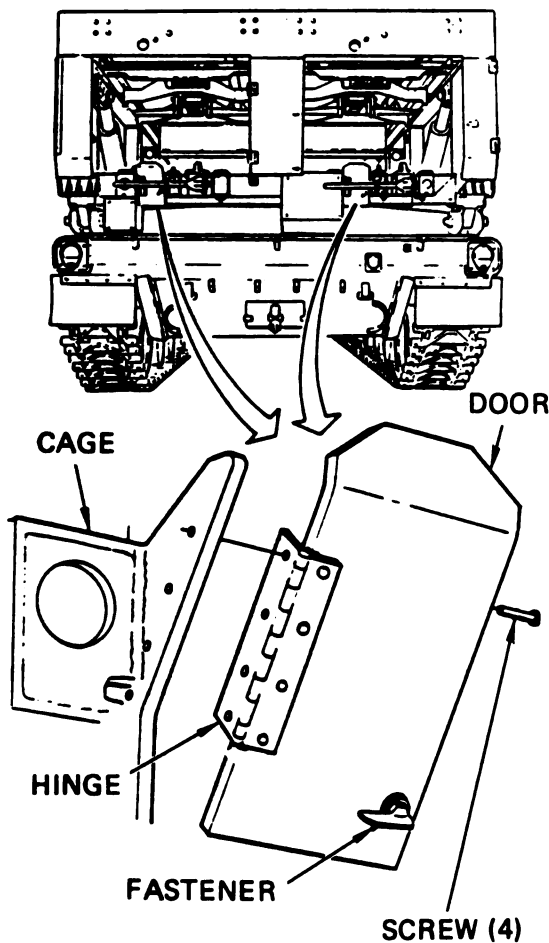
- (1) Remove door and place on work surface.
- (2) Using electric drill and 3/16-inch twist drill, drill out center of four rivets.
- (3) Using punch and hammer, punch out four rivets. Remove hinge from door.
- (4) Apply zinc chromate primer to four rivets. Position hinge on door.
- (5) Using pneumatic hammer and bucking bar, install four rivets with heads outside door to secure hinge to door.



- (6) Install door on cage.

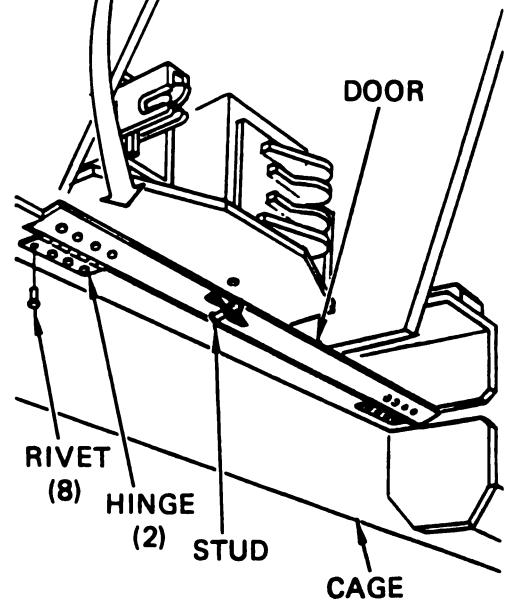
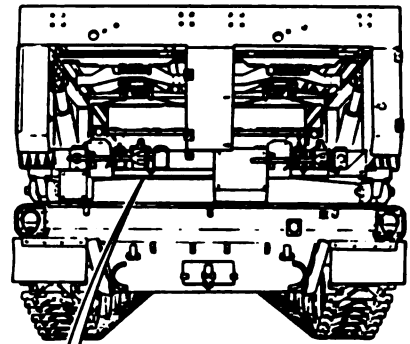
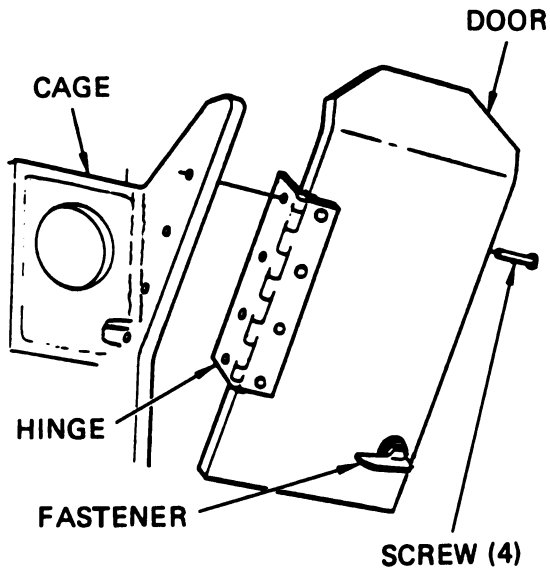
c. Install.

- (1) Apply zinc chromate primer to four screws. Position door on cage and install four screws. Using crosstip screwdriver, tighten screws.



5-30. ARMOR DOOR MAINTENANCE INSTRUCTIONS (CONT)

(2) Close door and latch fastener.



3. LH HARNESS TROUGH DOOR.

a. Remove.

(1) Using crosstip screwdriver, unlatch stud securing door closed. Open door.

(2) Using electric drill and 5/32-inch twist drill, remove eight rivets securing door hinge to cage. Remove door.

b. Repair.

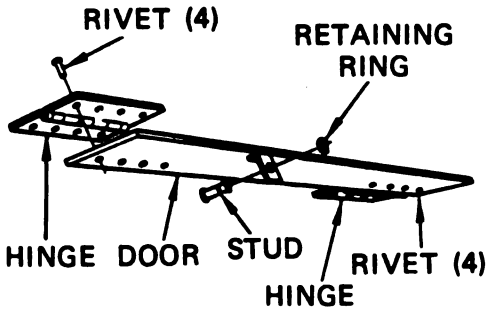
(1) Using diagonal pliers, cut and remove retaining ring securing stud in door. Remove stud.

(2) Position new stud in door and using installing tool, install retaining ring by rotating tool until two tabs on retaining ring engage slots in stud.

5-30. ARMOR DOOR MAINTENANCE INSTRUCTIONS (CONT)

(3) Using electric drill and 3/16-inch twist drill, remove four rivets securing defective hinge to door. Remove defective hinge.

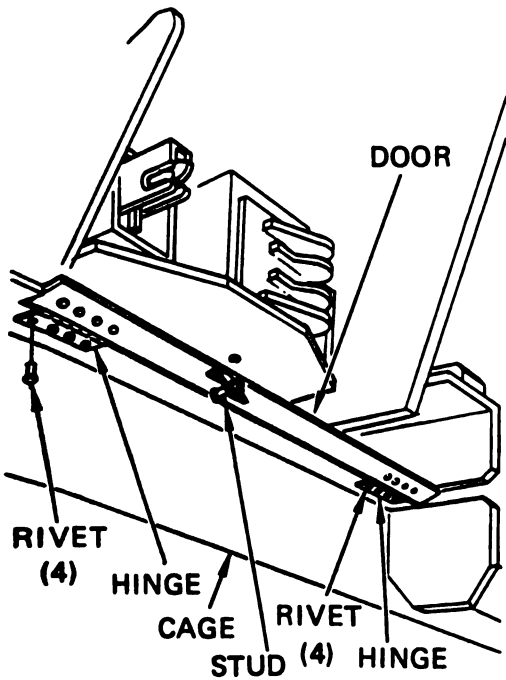
(4) Apply zinc chromate primer to four rivets. Position new hinge on door and, using rivet set, install four rivets.



c. Install.

(1) Apply zinc chromate primer to eight rivets. Position door on cage and install eight rivets.

(2) Close door and using crosstip screwdriver, latch stud to secure door closed.



4. POWER HARNESS DOOR.

a. Remove.

(1) Using crosstip screwdriver, unlatch four studs securing door.

(2) Remove door from cage.

b. Repair.

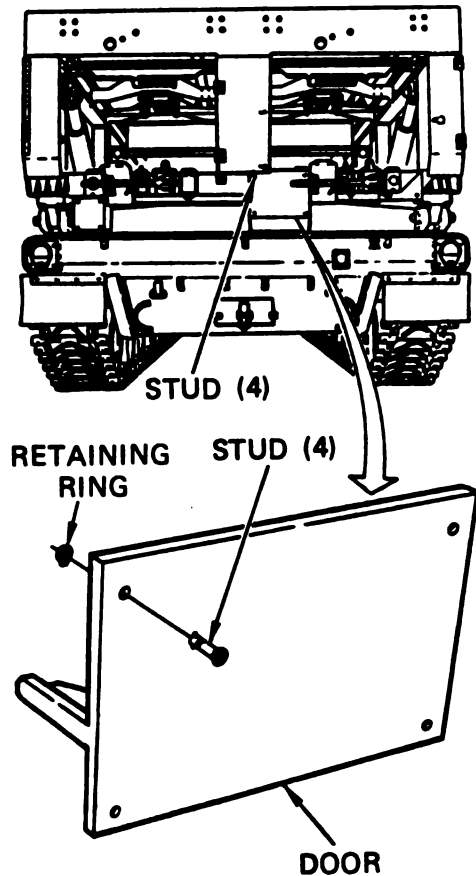
(1) Using diagonal pliers, cut and remove retaining ring securing defective stud in door. Remove stud.

(2) Position new stud in door. Using installing tool, install retaining ring by rotating tool until tabs on ring engage slots in stud.

c. Install.

(1) Position door on cage.

(2) Using crosstip screwdriver, latch four studs to secure door to cage.



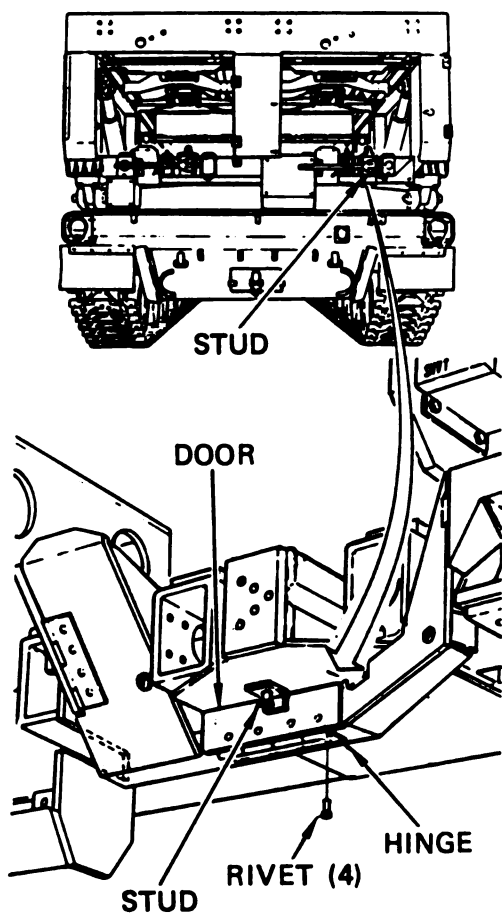
5-30. ARMOR DOOR MAINTENANCE INSTRUCTIONS (CONT)

5. RH HARNESS TROUGH DOOR.

a. Remove.

(1) Using crosstip screwdriver, unlatch stud securing door closed.

(2) Using electric drill and 5/32-inch twist drill, remove four rivets securing door hinge to cage. Remove door.



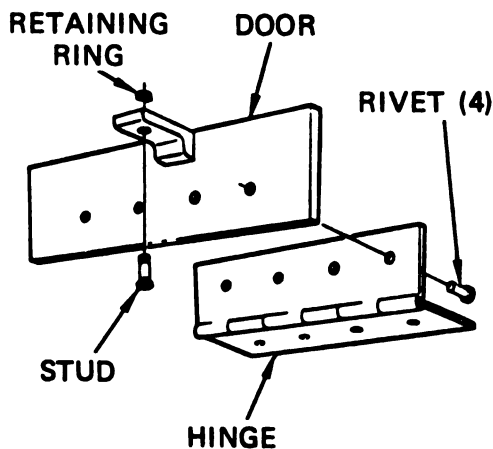
b. Repair.

(1) Using diagonal pliers, cut and remove retaining ring securing defective stud to door. Remove stud.

(2) Position new stud in door. Using installing tool, install retaining ring by rotating tool until ring tabs engage slots in stud.

(3) Using electric drill and 3/16-inch twist drill, remove four rivets securing defective hinge to door.

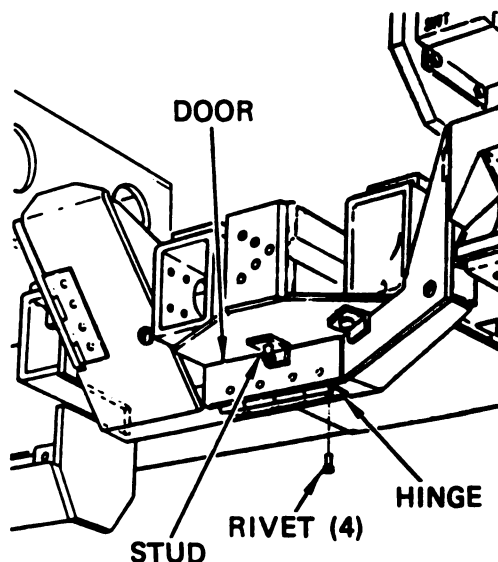
(4) Apply zinc chromate primer to four rivets. Position hinge on door and, using rivet set, install four rivets.



c. Install.

(1) Apply zinc chromate primer to four rivets. Position door to cage and install four rivets.

(2) Close door and, using crosstip screwdriver, latch stud to secure door in closed position.



5-30. ARMOR DOOR MAINTENANCE INSTRUCTIONS (CONT)

6. WIRING HARNESS DOOR.

a. Remove.

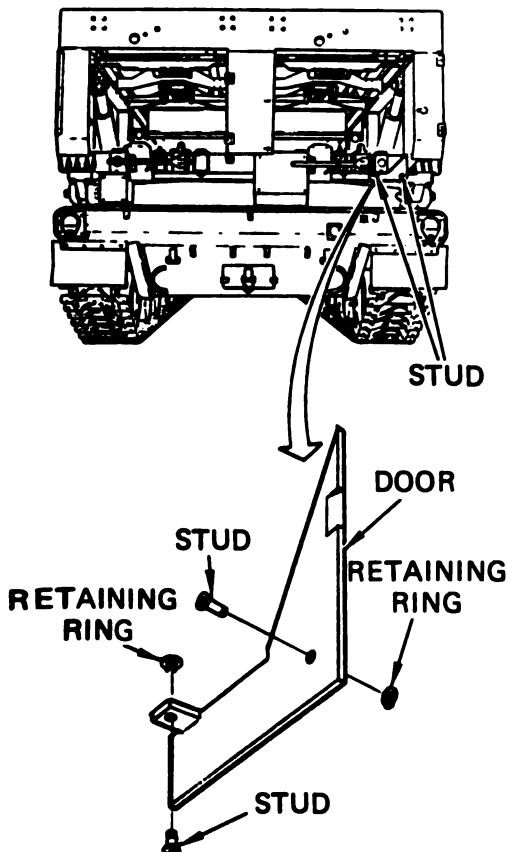
- (1) Using crosstip screwdriver, unlatch two studs securing door to cage.
- (2) Remove door from cage.

b. Repair.

- (1) Using diagonal pliers, cut and remove retaining ring from defective stud. Remove stud.
- (2) Position new stud in door. Using installing tool, install retaining ring by rotating tool until two ring tabs engage slots in stud.

c. Install.

- (1) Position door on cage.
- (2) Using crosstip screwdriver, latch two studs to secure door to cage.



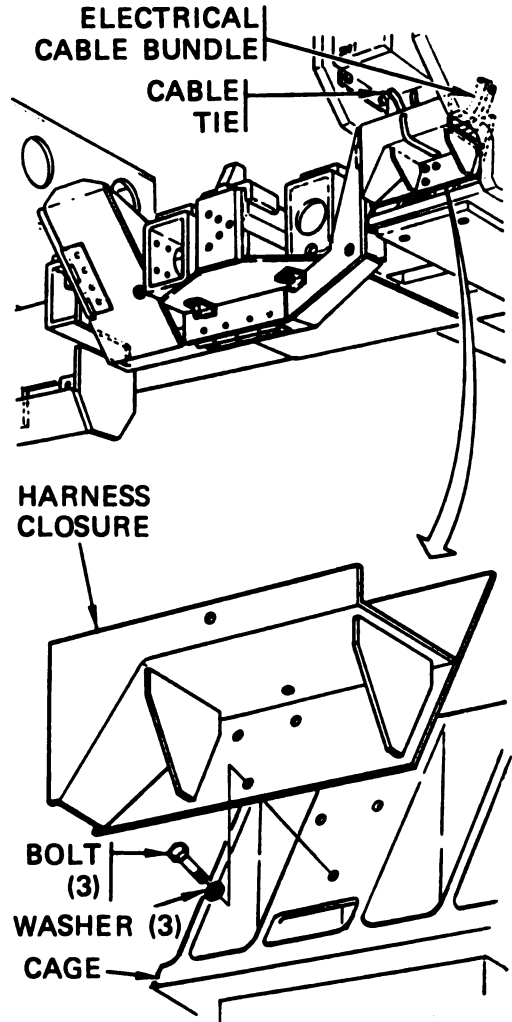
7. WIRING HARNESS CLOSURE.

a. Remove.

- (1) Cut cable ties securing electrical cable bundle to harness closure.
- (2) Using 13mm socket, remove three bolts and three washers securing closure to cage. Remove closure.

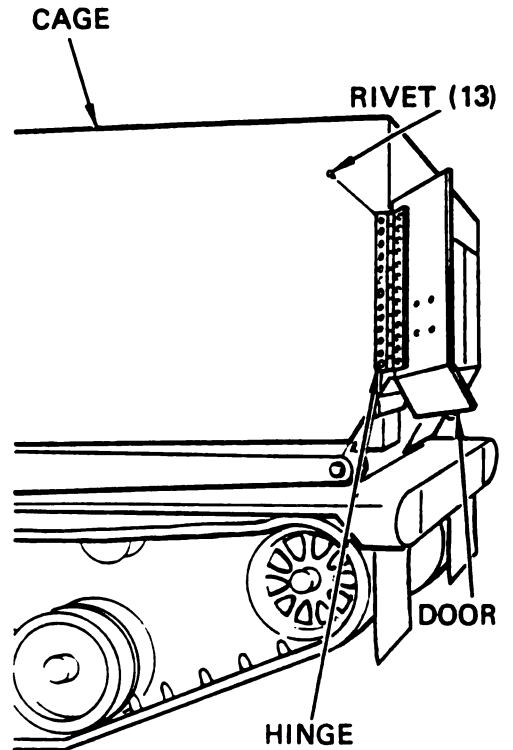
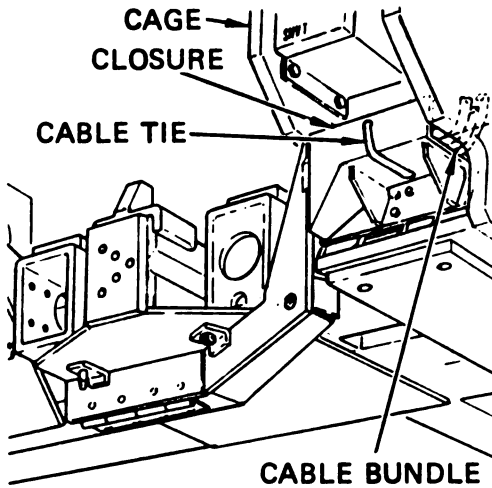
b. Install.

- (1) Apply zinc chromate primer to three bolts. Position closure to cage and install three bolts and three washers. Using 13mm socket, tighten bolts.



5-30. ARMOR DOOR MAINTENANCE INSTRUCTIONS (CONT)

(2) Position cable bundle in closure and secure with cable ties.



8. BOOM CONTROLLER DOOR.

a. Remove.

(1) Remove boom controller storage box (paragraph 7-3).

(2) Using electric drill and 3/16-inch twist drill, remove 13 rivets securing door hinge to cage. Remove door.

b. Repair.

NOTE

Repair on the door, except the replacement of hinge, may be performed with the door installed on the cage.

(1) Using electric drill and 1/8-inch twist drill, remove four rivets securing bracket to door. Remove bracket.

5-30. ARMOR DOOR MAINTENANCE INSTRUCTIONS (CONT)

(2) Apply zinc chromate primer to four rivets. Position bracket on door and install four rivets.

(3) Using electric drill and 3/16-inch twist drill, remove three rivets securing defective latch to door. Remove latch.

(4) Apply zinc chromate primer to three rivets. Position latch on door and install three rivets. Close door and adjust latches until door fits tight against storage box. Tighten locknut on latch.

(5) Using electric drill and 3/16-inch twist drill, remove 13 rivets securing hinge to door. Remove hinge.

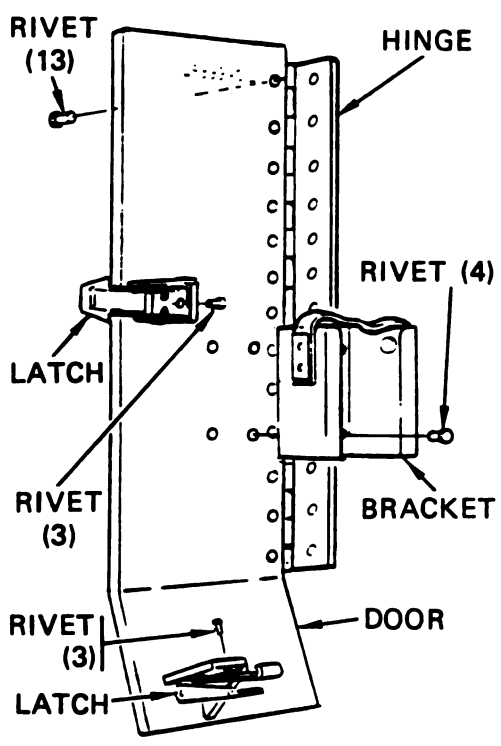
(6) Apply zinc chromate primer to 13 rivets. Position hinge on door and, using rivet set, install 13 rivets.

(8) Using fastener pliers, remove eyelet and stud from strap and button and socket from bracket.

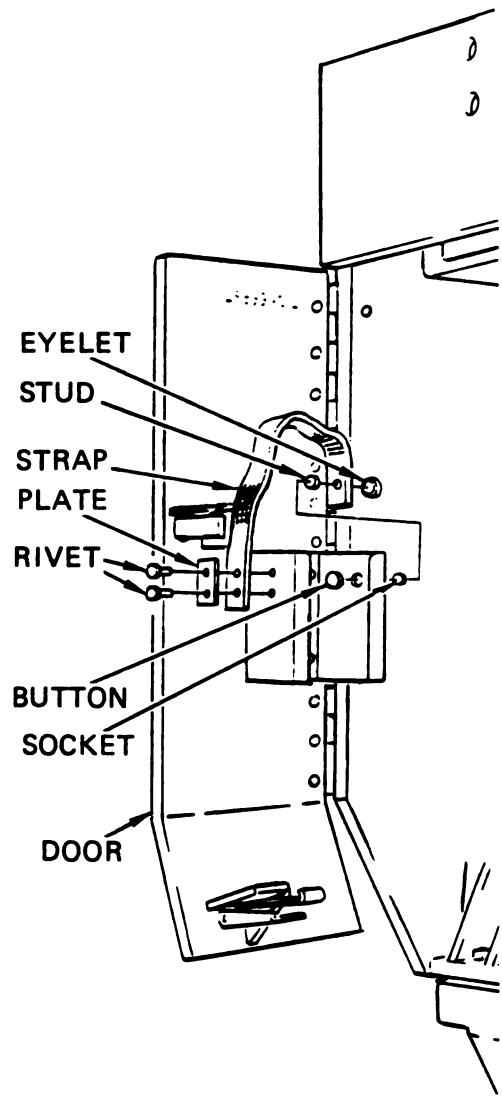
(9) Using fastener pliers, install new button and socket on bracket. Apply sealant over button on inside of bracket.

(10) Using fastener pliers, install new eyelet and stud on web strap.

(11) Position web strap and plate on bracket and, using rivet set, install two rivets.



(7) Using electric drill and 1/8-inch twist drill, remove two rivets securing web strap to bracket. Remove plate and strap.

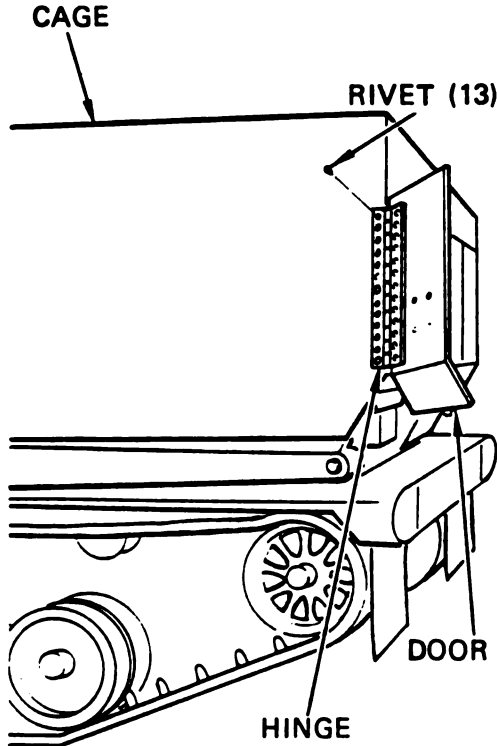


5-30. ARMOR DOOR MAINTENANCE INSTRUCTIONS (CONT)

c. Install.

(1) Apply zinc chromate primer to 13 rivets. Position door on cage and install 13 rivets.

(2) Install boom controller storage box (paragraph 7-3).



9. PDB/SNVT DOOR HINGE.

a. Remove.

(1) Open and remove PDB/SNVT door.

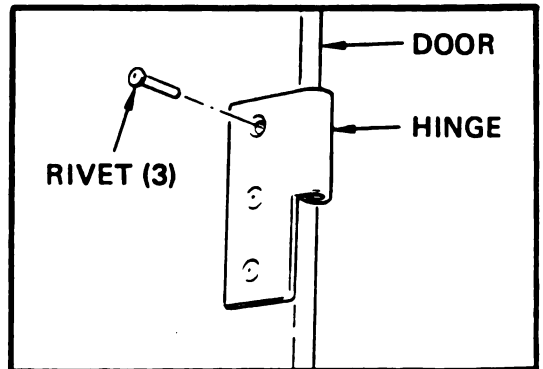
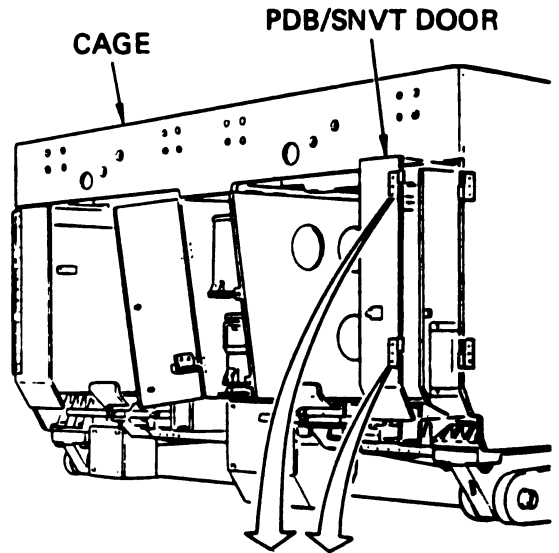
(2) Using electric drill with 1/4-inch twist drill, drill through center of three rivet heads.

(3) Pry head off of three rivets. Using punch, remove rivets and defective hinge.

b. Install.

(1) Using electric drill and 1/4-inch twist drill, drill holes in replacement hinge.

(2) Position hinge on door and install three rivets wet with zinc chromate primer. Install rivet head next to hinge.



5-31. CREW EQUIPMENT CONTAINER MAINTENANCE INSTRUCTIONS. This paragraph covers the maintenance tasks for the following items:

<i>Item</i>	<i>Page</i>
1. R/H Vehicle Bed Container	5-183
2. L/H Vehicle Bed Container	5-185
3. Hygiene Kit Container	5-188
4. Duffel and Sleeping Bag Container	5-190

INITIAL SETUP

Tools

Kit, tool, 13032302
 Set, shop, 13032303
 Drill, electric, 1/4-inch
 Drill, twist, 1/8-inch
 Drill, twist, 3/16-inch
 Rivet set

Materials/Parts

Primer, zinc chromate (47, Appendix B)

Personnel Required

MLRS Repairer MOS 27M

References

TM 9-1425-646-20

Equipment Condition

Crew equipment container removed
 (TM 9-1425-646-20)

1. R/H VEHICLE BED CONTAINER.

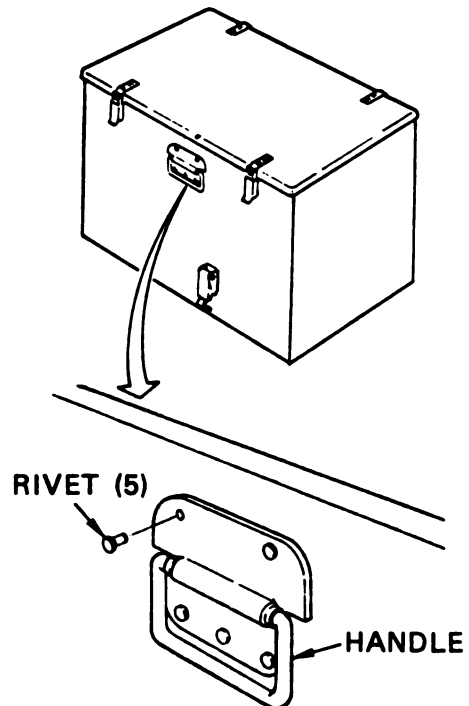
a. Replace Handle.

(1) Using electric drill and 3/16-inch twist drill, drill head off five rivets securing defective handle.

(2) Using hammer and punch, remove rivet stems. Remove defective handle.

(3) Apply zinc chromate primer to five rivets. Position new handle on container. Using rivet set, install five rivets to secure handle to container.

(4) If no further maintenance is required, perform follow-on procedure (page 5-194).



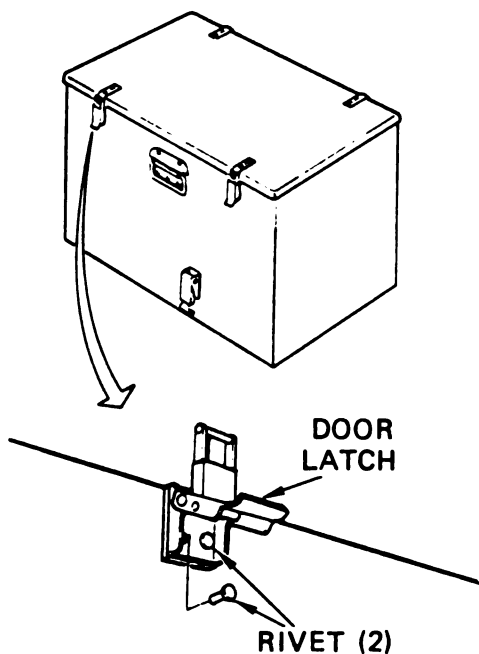
5-31. CREW EQUIPMENT CONTAINER MAINTENANCE INSTRUCTIONS (CONT)

b. Replace Door Latch.

(1) Using electric drill and 1/8-inch twist drill, drill head off two rivets securing defective latch.

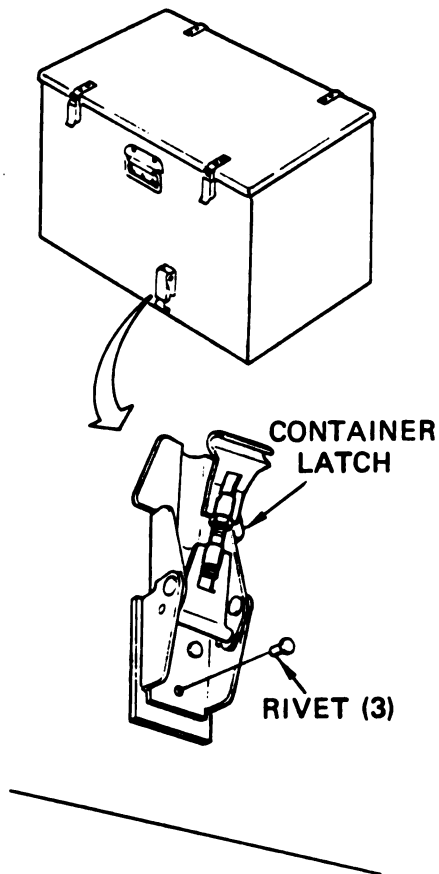
(2) Using hammer and punch, remove rivet stems. Remove defective latch.

(3) Apply zinc chromate primer to two rivets. Position spacer and new latch on container. Using rivet set, install two rivets to secure latch to container.



(2) Using hammer and punch, remove rivet stems. Remove defective latch.

(3) Apply zinc chromate primer to three rivets. Position new latch on container. Using rivet set, install three rivets to secure latch to container.



(4) If no further maintenance is required, perform follow-on procedure (page 5-194).

(4) If no further maintenance is required, perform follow-on procedure (page 5-194).

c. Replace Container Latch.

(1) Using electric drill and 3/16-inch twist drill, drill head off three rivets securing defective latch.

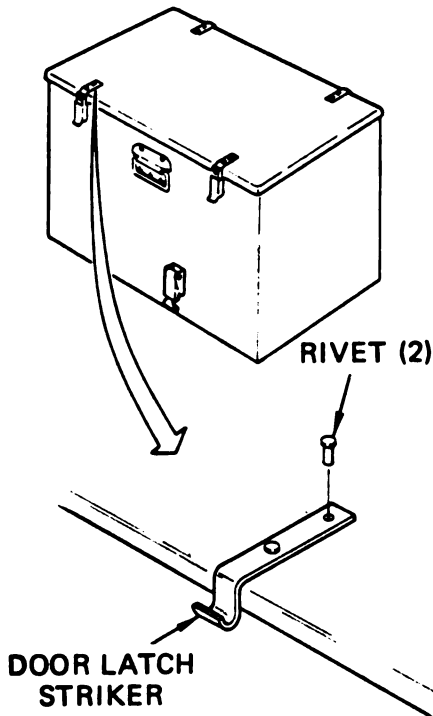
d. Replace Door Latch Striker.

(1) Using electric drill and 3/8-inch twist drill, drill head off two rivets securing defective striker to door.

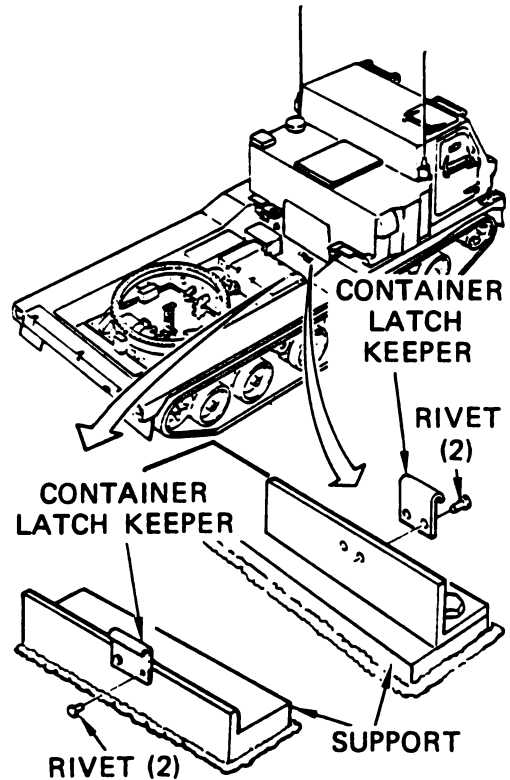
5-31. CREW EQUIPMENT CONTAINER MAINTENANCE INSTRUCTIONS (CONT)

(2) Using hammer and punch, remove rivet stems. Remove striker.

(3) Apply zinc chromate primer to two rivets. Position new striker on door. Using rivet set, install two rivets to secure striker to door.



(3) Apply zinc chromate primer to two rivets. Position new keeper on support. Using rivet set, install two rivets to secure keeper to support.



(4) If no further maintenance is required, perform follow-on procedure (page 5-194).

e. Replace Container Latch Keeper.

(1) Using electric drill and 3/16-inch twist drill, drill head off two rivets securing defective keeper to support.

(2) Using hammer and punch, remove rivet stems. Remove keeper.

(4) If no further maintenance is required, perform follow-on procedure (page 5-194).

2. L/H VEHICLE BED CONTAINER.

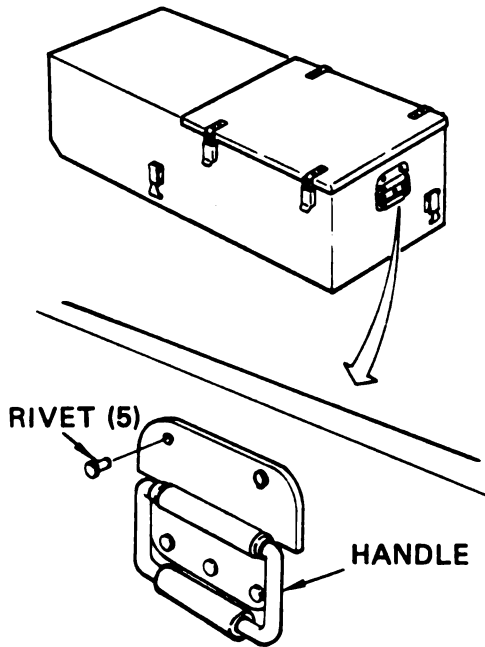
a. Replace Handle.

(1) Using electric drill and 3/16-inch twist drill, drill head off five rivets securing defective handle.

5-31. CREW EQUIPMENT CONTAINER MAINTENANCE INSTRUCTIONS (CONT)

(2) Using hammer and punch, remove rivet stems. Remove defective handle.

(3) Apply zinc chromate primer to five rivets. Position new handle on container. Using rivet set, install five rivets to secure handle to container.



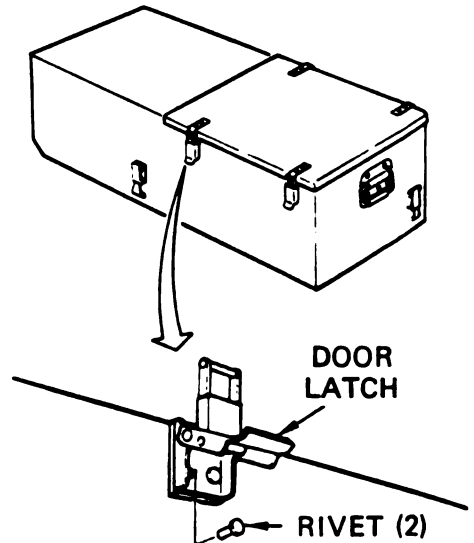
(4) If no further maintenance is required, perform follow-on procedure (page 5-194).

b. Replace Door Latch.

(1) Using electric drill and 1/8-inch twist drill, drill head off two rivets securing defective latch to container.

(2) Using hammer and punch, remove rivet stems. Remove defective latch.

(3) Apply zinc chromate primer to two rivets. Position new latch on container. Using rivet set, install two rivets to secure latch to container.



(4) If no further maintenance is required, perform follow-on procedure (page 5-194).

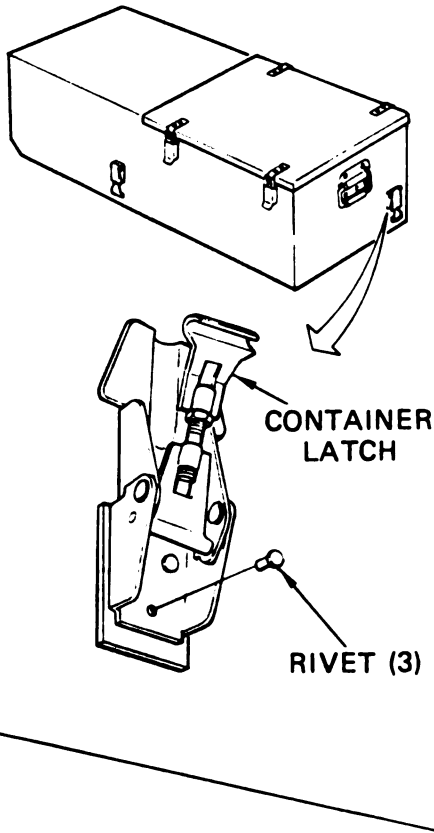
c. Replace Container Latch.

(1) Using electric drill and 3/16-inch twist drill, drill head off three rivets securing defective latch to container.

(2) Using hammer and punch, remove rivet stems. Remove defective latch.

5-31. CREW EQUIPMENT CONTAINER MAINTENANCE INSTRUCTIONS (CONT)

(3) Apply zinc chromate primer to three rivets. Position new latch on container. Using rivet set, install three rivets to secure latch to container.



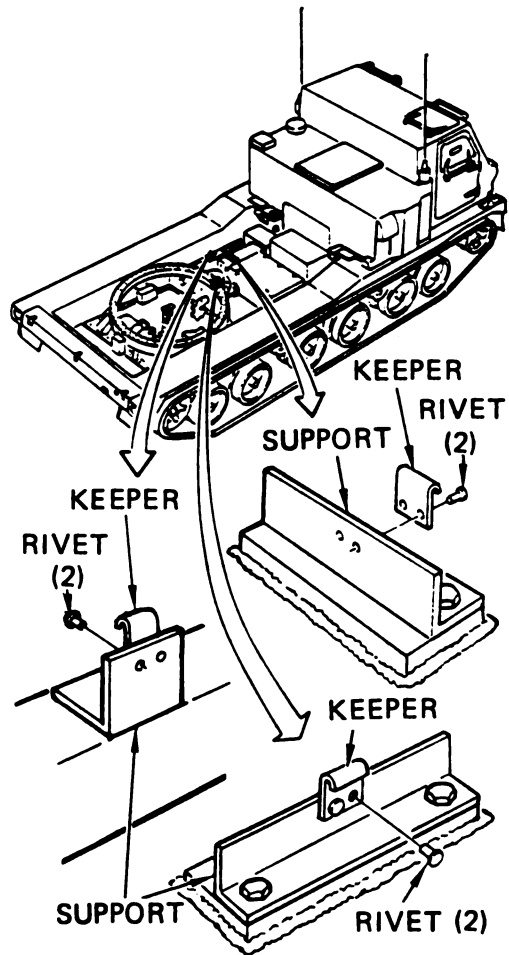
(4) If no further maintenance is required, perform follow-on procedure (page 5-194).

d. Replace Container Latch Keeper.

(1) Using electric drill and 3/16-inch twist drill, drill head off two rivets securing defective keeper to support.

(2) Using hammer and punch, remove rivet stems. Remove keeper.

(3) Apply zinc chromate primer to two rivets. Position new keeper on support. Using rivet set, install two rivets to secure keeper to support.



(4) If no further maintenance is required, perform follow-on procedure (page 5-194).

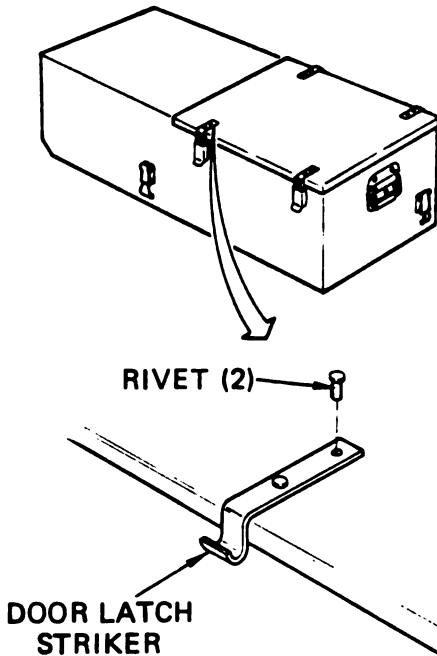
5-31. CREW EQUIPMENT CONTAINER MAINTENANCE INSTRUCTIONS (CONT)

e. Replace Door Latch Striker.

(1) Using electric drill and 1/8-inch twist drill, drill head off two rivets securing defective striker to door.

(2) Using hammer and punch, remove rivet stems. Remove striker.

(3) Apply zinc chromate primer to two rivets. Position new striker on door. Using rivet set, install two rivets to secure striker to door.



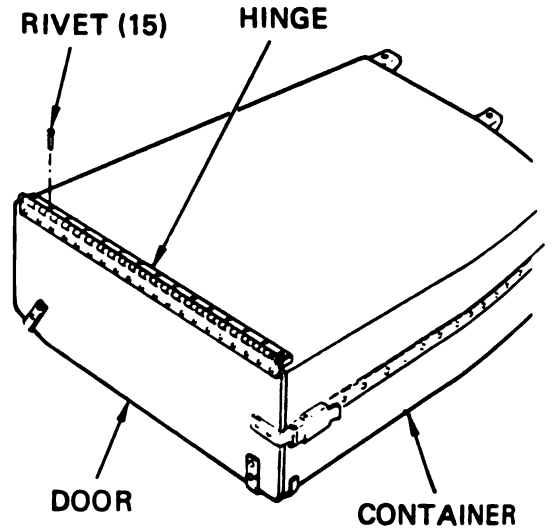
(4) If no further maintenance is required, perform follow-on procedure (page 5-194).

3. HYGIENE KIT CONTAINER.

a. Replace Door Hinge.

(1) Using electric drill and 1/8-inch twist drill, drill head off 15 rivets securing defective hinge to container.

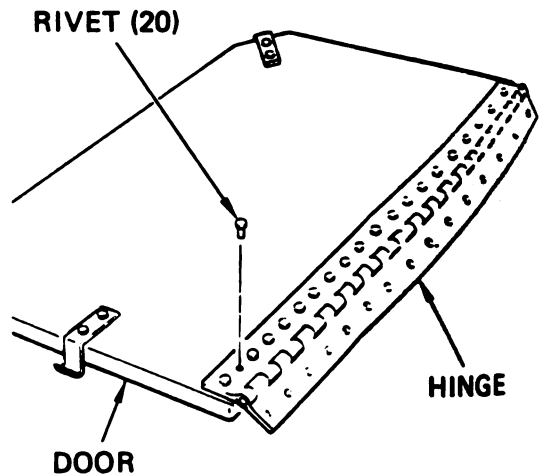
(2) Using hammer and punch, remove rivet stems. Remove door and hinge from container.



(3) Using electric drill and 1/8-inch twist drill, drill head off 20 rivets securing hinge to door.

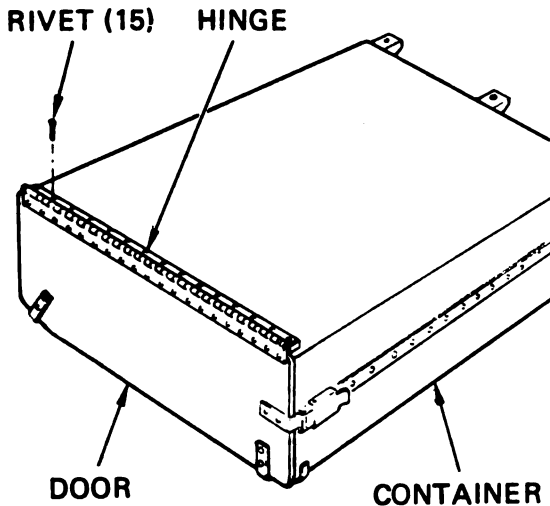
(4) Using hammer and punch, remove rivet stems. Remove defective hinge from door.

(5) Apply zinc chromate primer to 20 rivets. Position hinge on door. Using rivet set, install 20 rivets to secure hinge to door.



5-31. CREW EQUIPMENT CONTAINER MAINTENANCE INSTRUCTIONS (CONT)

(6) Apply zinc chromate primer to 15 rivets. Position hinge and door on container. Using rivet set, install 15 rivets to secure hinge to container.



(7) If no further maintenance is required, perform follow-on procedure (page 5-194).

b. Replace Door Latch Keeper.

(1) Using electric drill and 1/8-inch twist drill, drill head off two rivets securing defective keeper to door.

(2) Using hammer and punch, remove rivet stems. Remove defective keeper from door.

(3) Apply zinc chromate primer to two rivets. Position keeper on door. Using rivet set, install two rivets to secure keeper to door.

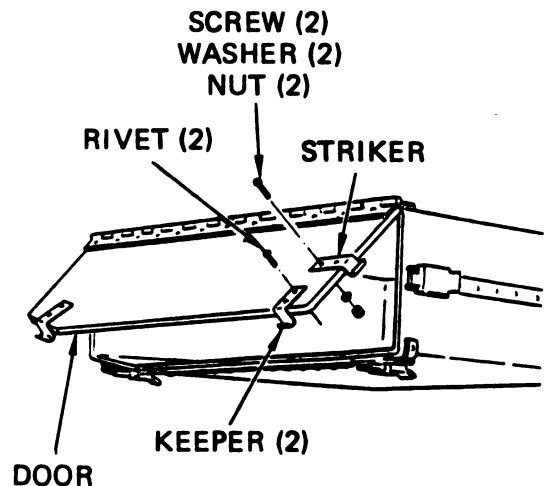
(4) If no further maintenance is required, perform follow-on procedure (page 5-194).

c. Replace Striker.

(1) Using crosstip screwdriver and 8mm box end wrench, remove two screws, washers, and nuts securing striker to container door. Remove defective striker.

(2) Apply zinc chromate primer to two screws. Position striker on container door and secure with two screws, washers, and nuts. Using crosstip screwdriver and 8mm box end wrench, tighten nuts.

(3) If no further maintenance is required, perform follow-on procedure (page 5-194).



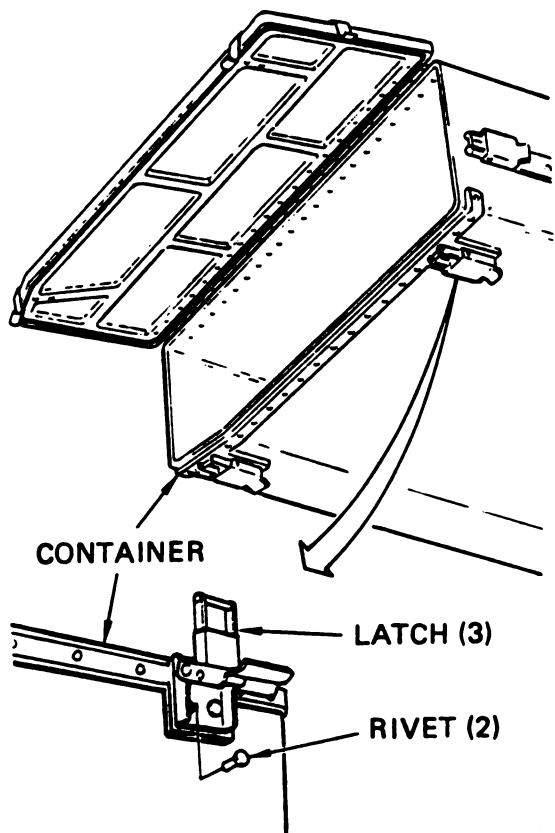
d. Replace Door Latch.

(1) Using electric drill and 1/8-inch twist drill, drill head from two rivets securing defective latch.

(2) Using hammer and punch, remove rivet stems. Remove door latch.

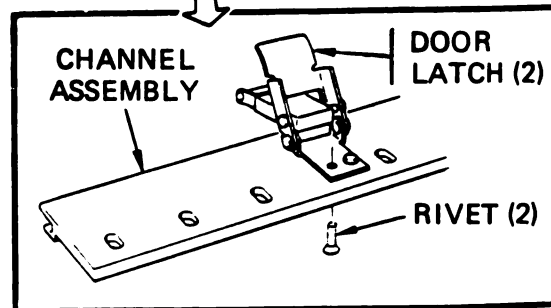
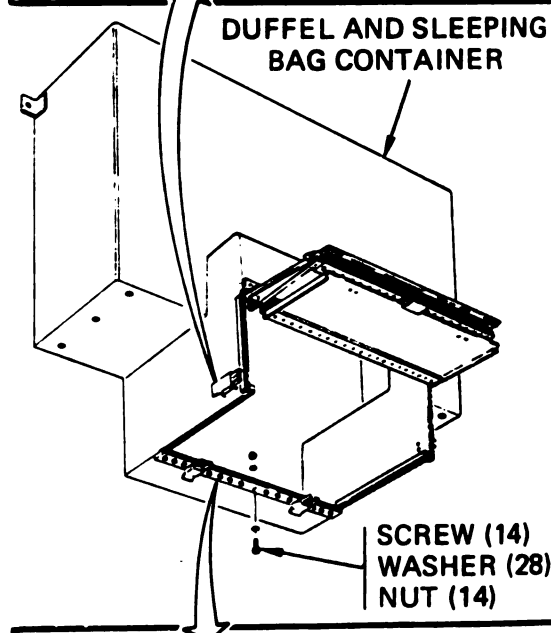
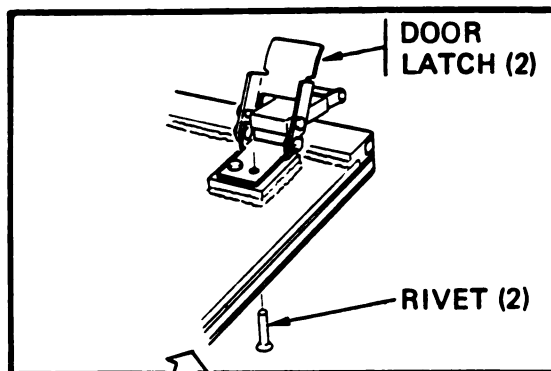
5-31. CREW EQUIPMENT CONTAINER MAINTENANCE INSTRUCTIONS (CONT)

(3) Apply zinc chromate primer to two rivets. Position latch to container. Using rivet set, install two rivets to secure latch to container.



(3) Using hammer and punch, remove rivet stems. Remove latch.

(4) Apply zinc chromate primer to two rivets. Position new latch on channel assembly. Using rivet set, install two rivets to secure latch.



(4) If no further maintenance is required, perform follow-on procedure (page 5-194).

4. DUFFEL AND SLEEPING BAG CONTAINER.

a. Replace Door Latch.

NOTE

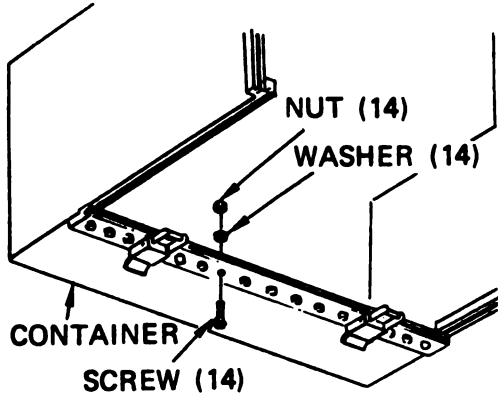
Perform step (1) only if defective latch is mounted on channel assembly.

(1) Using crosstip screwdriver and 8mm box end wrench, remove 14 nuts, washers, and screws securing channel assembly.

(2) Using electric drill and 1/8-inch twist drill, drill head off two rivets securing defective latch.

5-31. CREW EQUIPMENT CONTAINER MAINTENANCE INSTRUCTIONS (CONT)

(5) Apply zinc chromate to 14 screws. Position channel assembly to container and install 14 screws, washers, and nuts. Do not tighten nuts.



b. Replace Door Latch Striker or Keeper.

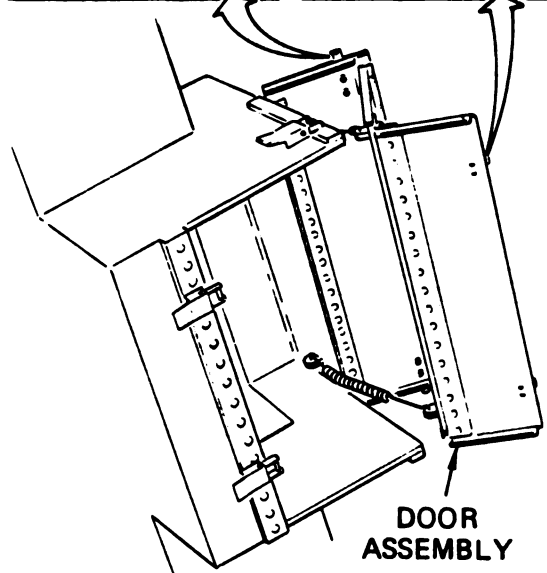
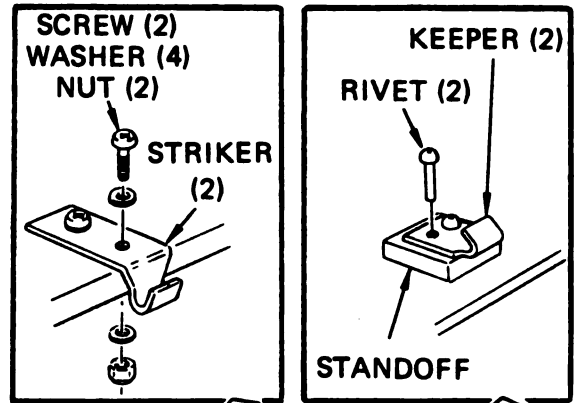
(1) Using crosstip screwdriver and 8mm box end wrench, remove two screws, four washers, and two nuts securing striker. Remove striker.

(2) Apply zinc chromate primer to two screws. Position striker on door and secure with two screws, four washers, and two nuts. Using crosstip screwdriver and 8mm box end wrench, tighten nuts.

(3) Using electric drill and 1/8-inch twist drill, drill head off two rivets securing defective keeper and standoff to door assembly.

(4) Using hammer and punch, remove rivet stems. Remove keeper and standoffs. Retain standoff.

(5) Apply zinc chromate primer to two rivets. Position new keeper and standoff to door assembly. Using rivet set, install two rivets to secure keeper and standoff to door assembly.



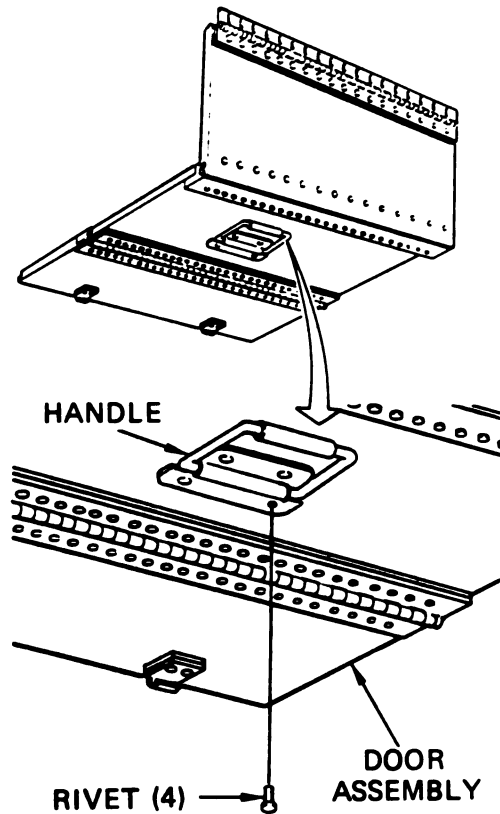
c. Replace Handle.

(1) Using electric drill and 3/16-inch twist drill, drill head off of four rivets securing defective handle to door assembly.

(2) Using hammer and punch, remove rivet stems. Remove handle.

5-31. CREW EQUIPMENT CONTAINER MAINTENANCE INSTRUCTIONS (CONT)

(3) Apply zinc chromate primer to four rivets. Position new handle to door assembly. Using rivet set, install four rivets to secure handle to door assembly.



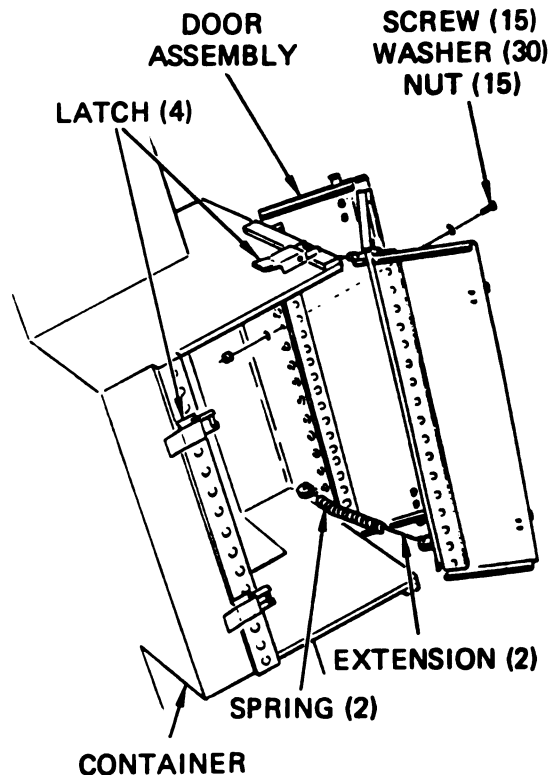
d. Replace Door Hinge.

NOTE

There are three hinges on the door assembly. The only difference in replacing the hinges is the number of rivets securing hinge to door.

(1) Unlatch door and remove springs and spring extension.

(2) Using crosstip screwdriver and 8mm box end wrench, remove 15 screws, 30 washers, and 15 nuts securing door to container. Remove door assembly.



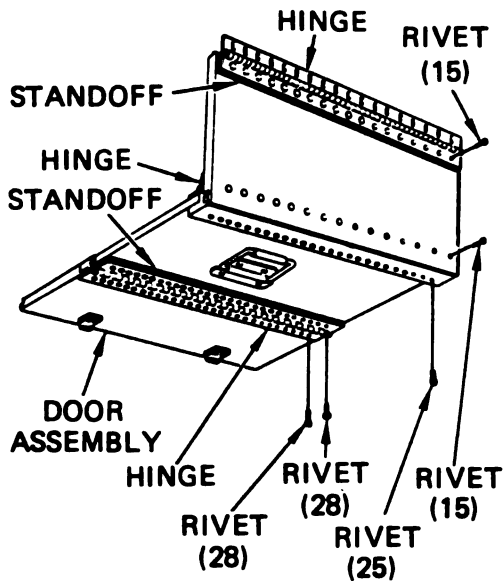
(3) Using electric drill and 1/8-inch twist drill, drill head off rivets securing defective hinge to door.

(4) Using hammer and punch, remove rivet stems. Remove hinge and standoff. Retain standoff.

5-31. CREW EQUIPMENT CONTAINER MAINTENANCE INSTRUCTIONS (CONT)

(5) Apply zinc chromate primer to rivets. Position standoff and new hinge on door. Using rivet set, install rivets to secure hinge and standoff to door.

(6) Apply zinc chromate primer to 15 screws. Position door on container and install 15 screws, 30 washers, and 15 nuts. Do not tighten nuts.



(7) Adjust door assembly.

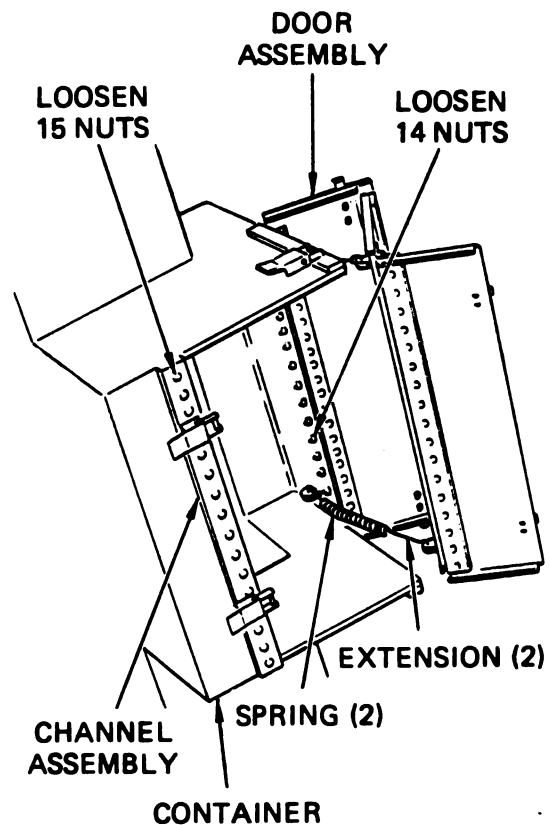
e. Adjust Door Assembly.

(1) Using crosstip screwdriver and 8mm box end wrench, loosen 15 nuts securing door assembly hinge to container.

(2) Using crosstip screwdriver and 8mm box end wrench, loosen 14 nuts securing channel assembly to container.

(3) Remove spring and spring extension from inside door assembly.

(4) Position door assembly in closed position making sure that sealing surfaces on door assembly are in sealing grooves on container. Latch door closed.



CONTAINER

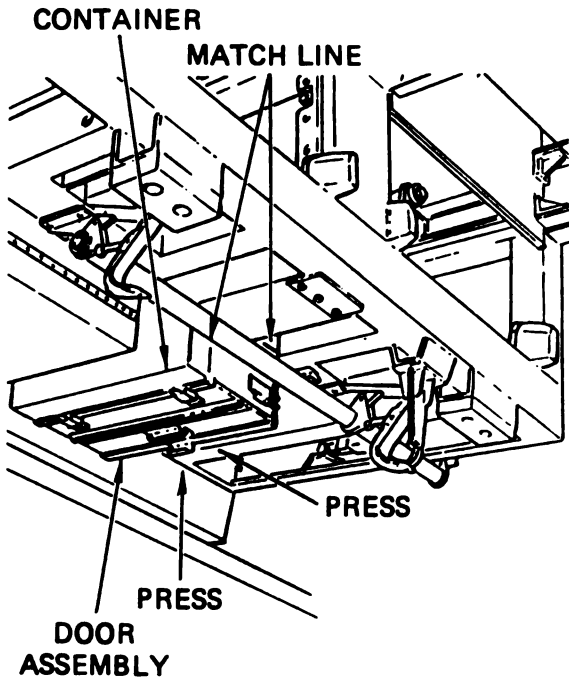
5-31. CREW EQUIPMENT CONTAINER MAINTENANCE INSTRUCTIONS (CONT)

(5) Manually apply an upward force and a force toward channel assembly until sealing surfaces on door are compressed into sealing gaskets on container.

(6) Mark matching line on each side of container between channel assembly and container and between door hinge and container.

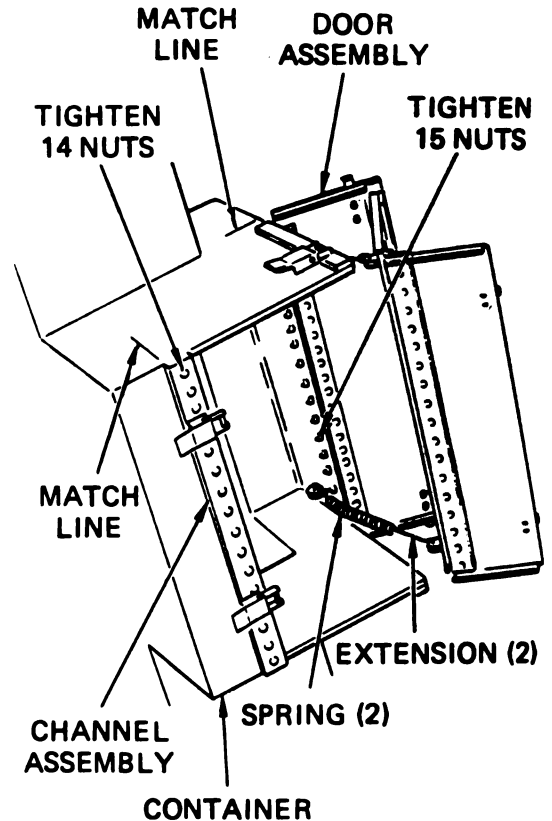
(9) Install spring and spring extension on door and container.

(10) Close and latch door assembly. Check that door sealing surfaces are compressed into sealing groove in container.



(7) Unlatch door. Line up marks on channel assembly and container. Using crosstip screwdriver and 8mm box end wrench, tighten 14 nuts on channel assembly.

(8) Line up marks on door hinge and container. Using crosstip screwdriver and 8mm box end wrench, tighten 15 nuts securing hinge to container.



FOLLOW-ON PROCEDURE

Install crew equipment container (TM 9-1425-646-20).

CHAPTER 6 LAUNCHER DRIVE SYSTEM MAINTENANCE

CHAPTER CONTENTS

		<i>Paragraph</i>	<i>Page</i>
SECTION I.	GENERAL		6-1
	Introduction	6-1	6-1
SECTION II.	MAINTENANCE PROCEDURES		6-1
	General Maintenance Procedures	6-2	6-1
	Hydraulic System Bleeding	6-3	6-3
	Heat Exchanger Maintenance Instructions	6-4	6-6
	Hydraulic Power Supply Maintenance Instructions	6-5	6-8
	Contactor Assembly Maintenance Instructions	6-6	6-16
	Hydraulic Swivel Assembly Maintenance Instructions	6-7	6-19
	Azimuth Servomotor Assembly Maintenance Instructions	6-8	6-24
	Azimuth Hydraulic Valve Module Maintenance Instructions	6-9	6-27
	Azimuth Drive Speed Reducer Maintenance Instructions	6-10	6-30
	Azimuth Drive Geared Bearing Maintenance Instructions	6-11	6-37
	Base and Drive Assembly Maintenance Instructions	6-12	6-41
	Azimuth Manual Drive Assembly Maintenance Instructions	6-13	6-50
	Azimuth Position Transducer/Switch Maintenance Instructions	6-14	6-53
	Elevation Servomotor Assembly Maintenance Instructions	6-15	6-56
	Elevation Transmission/Brake Maintenance Instructions	6-16	6-59
	Elevation Manual Drive Maintenance Instructions	6-17	6-62
	Elevation Drive Propeller Shaft Maintenance Instructions	6-18	6-64
	Elevation Angle Drive Unit Maintenance Instructions	6-19	6-66
	Elevation Actuator-Support Assembly Maintenance Instructions	6-20	6-68
	Elevation Position Monitor Transducer Maintenance Instructions	6-21	6-79
	Elevation Hydraulic Valve Module Maintenance Instructions	6-22	6-84
	Hydraulic Hose and Tube Maintenance Instructions	6-23	6-90

Section I. GENERAL

6-1. INTRODUCTION. This section contains the Launcher Drive System (LDS) maintenance procedures authorized for direct support by the

Maintenance Allocation Chart (MAC). The MAC is in Appendix B of TM 9-1425-646-20.

Section II. MAINTENANCE PROCEDURES

6-2. GENERAL MAINTENANCE PROCEDURES. The following procedures should be used when performing maintenance tasks. Special inspections and cleaning procedures, when required, are included with each maintenance task.

a. Inspection.

(1) Check bolts, nuts, and screws for stripped threads or other damage. Repair or replace as necessary. Do not reuse self-locking nuts that do not meet minimum breakaway torque (Appendix D).

6-2. GENERAL MAINTENANCE PROCEDURES (CONT)

(2) Check bearings and bushings for scored, galled, or other visual damage. Replace if damaged.

(3) Check components for chipped paint, rust, broken welds, elongated holes, or other visual damage. Repair or replace as required.

(4) Check electrical cables and connectors for cracked or broken insulation, bare wires, and loose or damaged connectors. Repair or replace as required.

(5) Check hoses and fluid lines for frayed hoses, nicked or scratched fluid lines, and damaged connectors. Repair or replace as required.

b. Cleaning and Painting.

(1) Using cotton wiping cloth and approved solvent, if required, clean all components before installation.

(2) Spot paint all areas that have chipped or scratched paint.

WARNING

Be sure hydraulic pressure is zero before performing maintenance on any hydraulic component.

When checking for hydraulic leaks with the system pressurized, be sure to wear eye protection to prevent injury by a stream of hydraulic fluid under high pressure.

CAUTION

Exercise extreme care when working in the open to avoid contamination of the hydraulic system.

Do not use improper tools. This not only damages the equipment, but causes chips.

Do not substitute unauthorized hydraulic fluid, preformed packings, or filters, approved fluid is MIL-H-46170TY1.

Do not leave lines, hoses, fittings, or components open. Seal immediately with approved closures.

If possible, have replacement component on hand for immediate installation upon removal of defective component.

Fill filter bowl with fluid prior to installing. This minimizes reduction of air into the system.

Do not reuse previously installed preformed packings.

Do not reuse previously installed backup rings.

Decontaminate lines, hoses, or fittings if found or received open.

Soak new preformed packings with clean hydraulic fluid prior to installation to aid in installing.

6-3. HYDRAULIC SYSTEM BLEEDING. This paragraph covers bleeding the hydraulic system.

INITIAL SETUP

Test/Support Equipment

Hydraulic servicing unit, 13029784
 Drain pan, NPN8

Materials/Parts

Cloth, cotton (6, Appendix B)
 Fluid, hydraulic (17, Appendix B)
 Tubing, plastic, clear (68, Appendix B)
 Tubing, plastic, clear (69, Appendix B)

Personnel Required

2 MLRS Repairers MOS 27M
 (MLRS Crewmember MOS 13M to assist as required)

References

TM 9-1425-646-20

Troubleshooting

Paragraph 2-9

Equipment Condition

Hydraulic system serviced (TM 9-1425-646-20)

WARNING

Industrial goggles must be worn to prevent eye injury in event of a line break or similar incident.

CAUTION

Do not bend hose to a radius less than original. Leakage may occur due to cracked hose liner.

Use only fire resistance MIL-H-46170, Type 1 hydraulic fluid.

NOTE

Bleed air from system whenever spongy operation indicates the presence of air in the system or a hydraulic component is replaced.

Maintain high cleanliness standards to prevent contamination. Do not permit servicing unit hose to rest on ground.

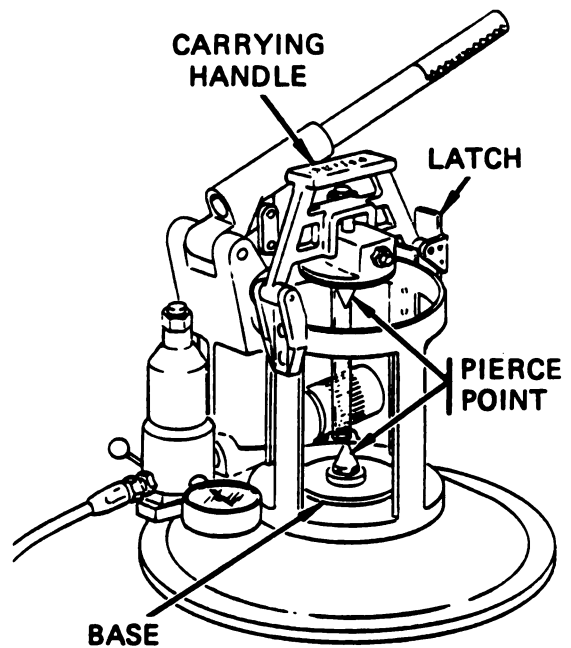
a. Return and Pressure Line Bleeding.

NOTE

Monitor fluid level in servicing unit, to prevent air from entering system, by pressing down on sight gage bleed valve until fluid in sight gage stops rising.

(1) Using cleaning cloth and hydraulic fluid, clean top and bottom of fluid container.

- (2) Clean pierce point and base of servicing unit.
- (3) Unlatch and raise carrying handle.
- (4) Clean pierce point on handle.



(5) Place container in servicing unit and press down to pierce and seal bottom of container.

(6) Close and latch carrying handle to pierce and seal top of container.

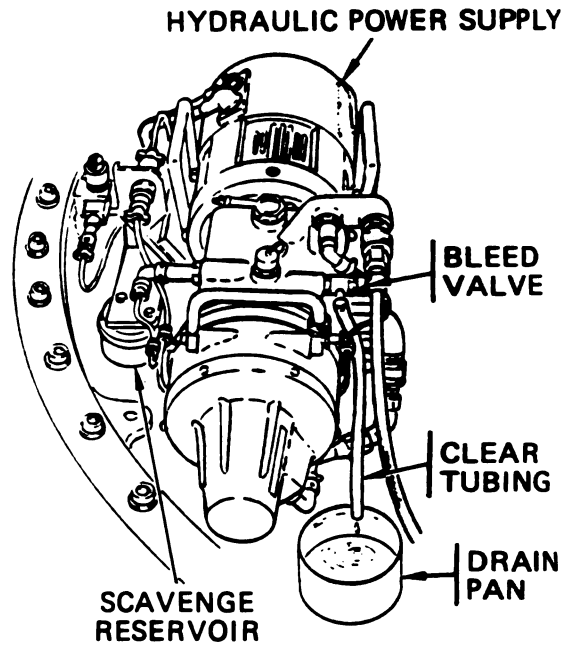
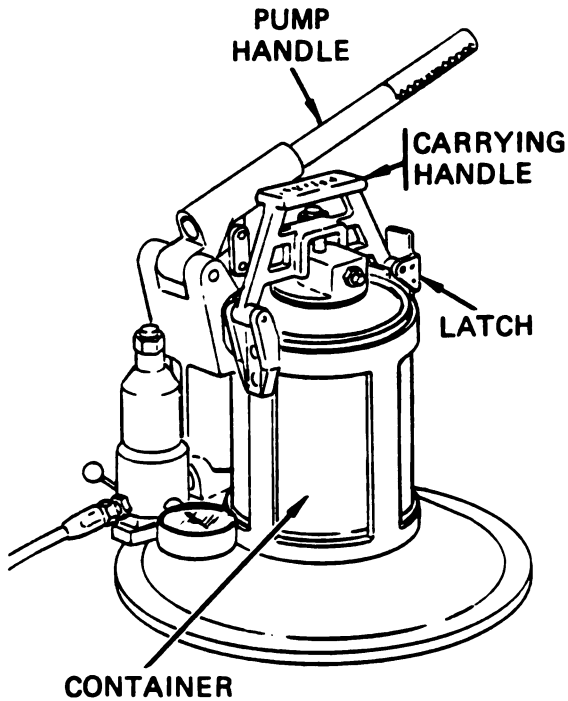
6-3. HYDRAULIC SYSTEM BLEEDING (CONT)

(7) Stroke pump handle while depressing air trap bleed valve to bleed air from servicing unit. Release bleed valve when air-free fluid flows from bleed valve.

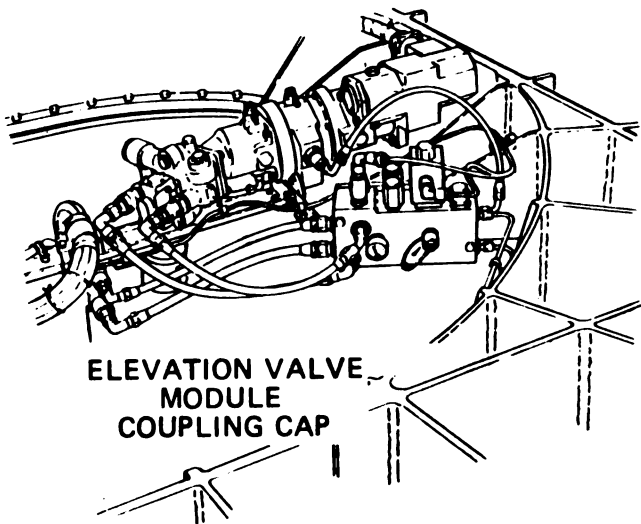
(9) Attach clear plastic tubing to bleed valve fitting on hydraulic power supply.

(10) Route clear plastic tubing to drain pan.

(11) Operate bleed valve while pumping fluid from hydraulic servicing unit. Do not exceed 690 kPa (100 psi). Stop pumping when air-free fluid appears at bleed fitting.

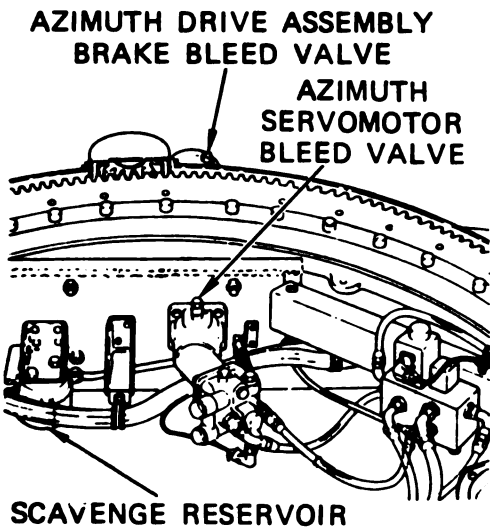
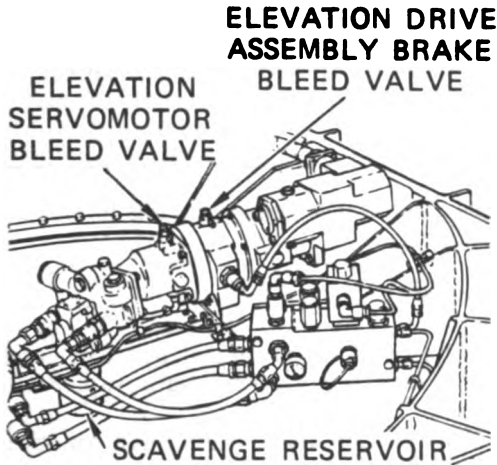


(8) Remove coupling cap from elevation valve module and connect hydraulic servicing unit to coupling half.

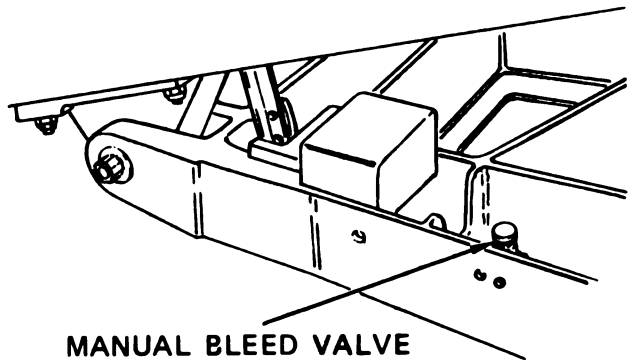


6-3. HYDRAULIC SYSTEM BLEEDING (CONT)

(12) Repeat steps (9), (10), and (11) on elevation servomotor, azimuth servomotor, azimuth drive assembly brake, and then elevation drive assembly brake.



(13) Repeat bleeding procedure on elevation drive assembly brake while holding manual bleed valve, on right side of turret, open.



(14) Remove clear plastic tubing, drain pan, and disconnect hydraulic servicing unit.

(15) Install cap on coupling half on elevation valve module.

b. After System Operation Bleeding.

(1) Using BC, operate LLM in elevation and azimuth five times. Stow LLM (TM 9-1425-646-20).

(2) Check for leakage at all fittings and disconnects. No leakage is acceptable.

(3) Check seal drain scavenge reservoir. Leakage of 5 cc per hour is acceptable.

(4) Allow system to rest for 1 hour to permit air to come out of fluid.

(5) Repeat return and supply line bleeding (paragraph a).

(6) Clean any spilled hydraulic fluid from base and turret.

(7) Perform follow-on procedure.

FOLLOW-ON PROCEDURE

Service hydraulic system (TM 9-1425-646-20).

6-4. HEAT EXCHANGER MAINTENANCE INSTRUCTIONS. This paragraph covers the replacement of the heat exchanger.

INITIAL SETUP

Tools

Kit, tool, 13032302

Materials/Parts

Caps and plugs, plastic (3, Appendix B)
Primer, zinc chromate (47, Appendix B)

Personnel Required

MLRS Repairer MOS 27M

References

TM 9-1425-646-20

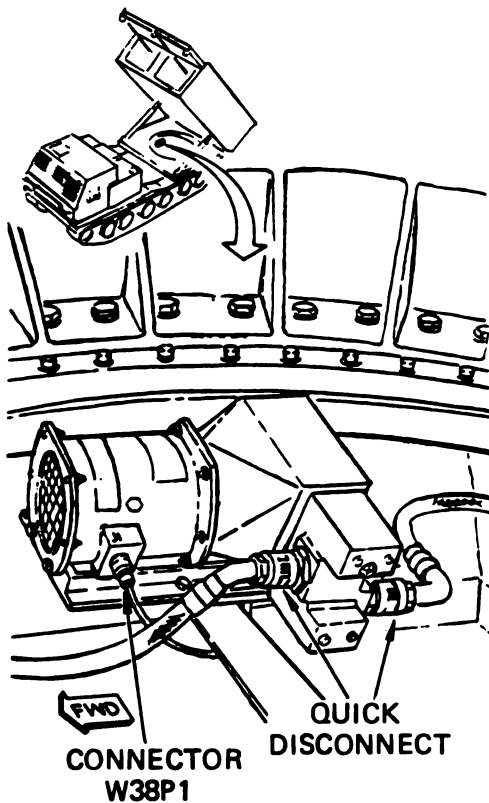
Troubleshooting
Paragraph 2-9

Equipment Condition

Jury struts installed (TM 9-1425-646-20)

a. Remove.

- (1) Disconnect connector W38P1 from heat exchanger.
- (2) Disconnect two quick-disconnects from heat exchanger.
- (3) Using plastic caps and plugs, cover each open line and port.

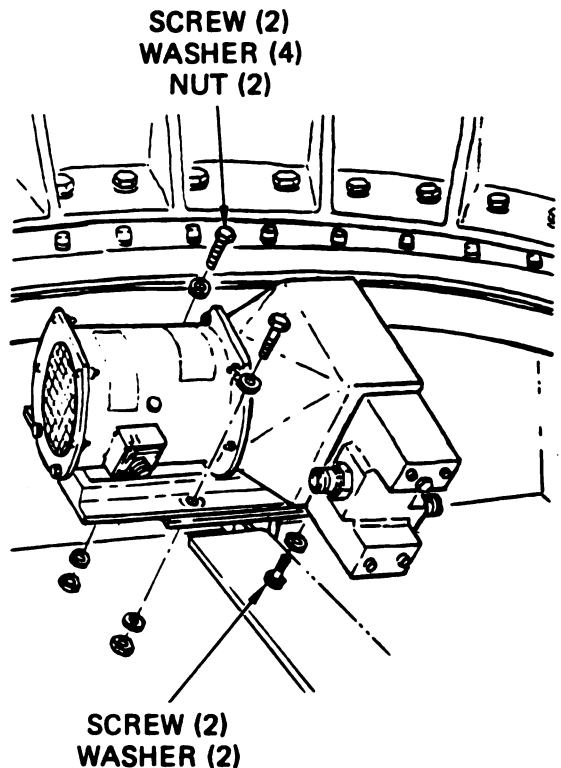


- (4) Using 13mm socket, remove two screws and washers securing bottom of heat exchanger.
- (5) Using 13mm box end wrench and 10mm socket with 9-inch extension, remove two nuts, four

washers, and two screws securing forward end of heat exchanger.

b. Install.

- (1) Prepare mounting bracket and heat exchanger for electrical bond (paragraph 3-10).
- (2) Position heat exchanger on mounting bracket with radiator facing rear.
- (3) Apply zinc chromate primer to one forward screw. Using 13mm box end wrench and 10mm socket with 9-inch extension, install two forward screws, four washers, and two nuts.
- (4) Apply zinc chromate primer to bottom outboard screw. Using 13mm socket, install two screws and washers.



6-4. HEAT EXCHANGER MAINTENANCE INSTRUCTIONS (CONT)

(5) Connect connector W38P1 to heat exchanger connector J1.

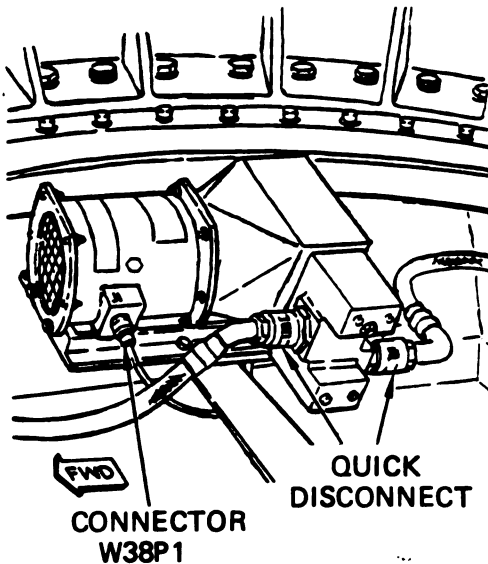
(6) Remove protective caps and plugs from hydraulic quick-disconnect couplings and heat exchanger ports.

(7) Place mating halves of two quick-disconnects together, turn couplings to right until ratchet lock begins to click. To insure firm lock, turn coupling 1/2 turn more.

FOLLOW-ON PROCEDURE

Check hydraulic reservoir for proper fluid level (TM 9-1425-646-20).

Using BC, cycle LLM two times in azimuth (TM 9-1425-646-20).



6-5. HYDRAULIC POWER SUPPLY MAINTENANCE INSTRUCTIONS. This paragraph covers the maintenance tasks for the following items:

<i>Item</i>	<i>Page</i>
1. Hydraulic Power Supply	6-8
2. Hydraulic Pump or Electric Motor	6-12
3. Filter Element	6-13
4. Electric Motor Brush Inspection	6-13

INITIAL SETUP

Tools

Kit, tool, 13032302
Set, shop, 13032303

Materials/Parts

Caps and plugs, plastic (3, Appendix B)
Cloth, cleaning (7, Appendix B) (for item 4)
Cloth, cotton (6, Appendix B)
Cover, sleeve (16, Appendix B)
Fluid, hydraulic (17, Appendix B)
Lockwire (24, Appendix B)
Packing (38, Appendix B) (for item 3)
Packing (39, Appendix B) (for item 3)
Packing (40, Appendix B) (for item 3)
Packing, preformed (27, Appendix B)
(for item 1)
Primer, zinc chromate (47, Appendix B)
Solvent, freon (62, Appendix B)
Strap (64, Appendix B)
Varnish (71, Appendix B)

Personnel Required

2 MLRS Repairers MOS 27M
(MLRS Crewmember MOS 13M to assist as required)

References

TM 9-1425-646-10
TM 9-1425-646-20

Troubleshooting
Paragraph 2-9

Equipment Condition

Position LLM to 1600 mils (90 degrees azimuth) (TM 9-1425-646-10)
Electrical cable W13 disconnected from electronics box (paragraph 4-6)

1. HYDRAULIC POWER SUPPLY.

a. Remove.

(1) Disconnect electrical connector W34P7. Position cable out of the way.

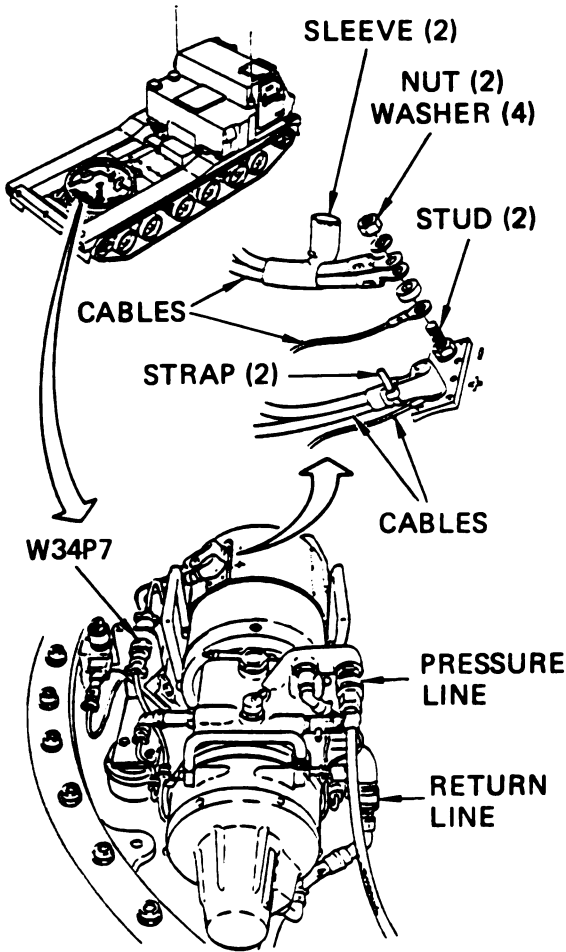
(2) Cut strap and sleeve cover off terminals.

(3) Using box end wrenches (17mm on negative and 19mm on positive), remove two nuts and washers from motor terminal studs.

(4) Remove cables from terminal and position cables to one side.

(5) Position wiping cloth under quick-disconnect couplings to catch hydraulic fluid drippings. Disconnect pressure and return line quick-disconnects.

6-5. HYDRAULIC POWER SUPPLY MAINTENANCE INSTRUCTIONS (CONT)

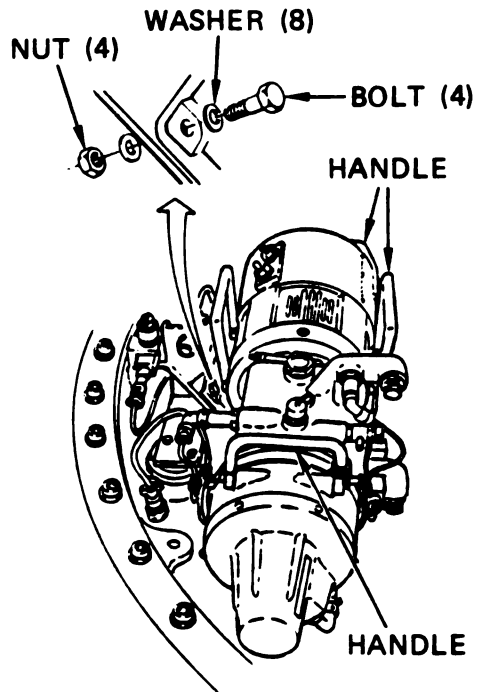


WARNING

The hydraulic power supply assembly weighs 69 Kg (153 lb). It will take two persons to lift the assembly. Also, the assembly is held in place by shoulder bolts that engage the hydraulic power supply assembly.

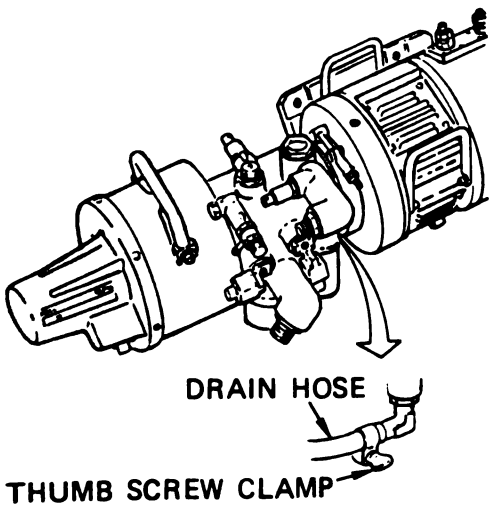
(8) Using 19mm box end wrench and 19mm socket with universal joint, remove four nuts, eight washers, and four bolts.

(9) Using handles, slowly lift assembly up and out of vehicle.



(6) Loosen thumbscrew clamp on pump drain hose and slide clamp back on hose.

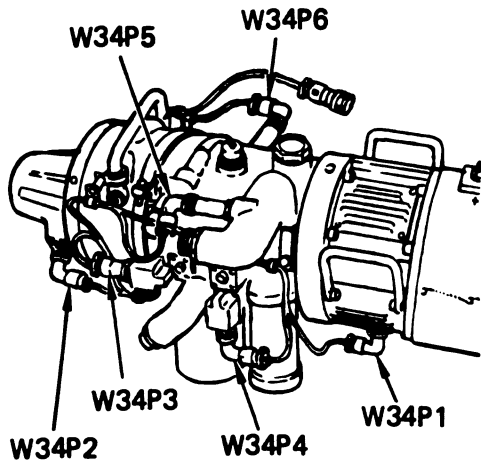
(7) Disconnect drain hose from hydraulic power supply and install protective caps on open lines.



(10) Disconnect electrical connectors W34P1, W34P2, W34P3, W34P4, W34P5, and W34P6 from hydraulic power supply.

6-5. HYDRAULIC POWER SUPPLY MAINTENANCE INSTRUCTIONS (CONT)

(11) Using crosstip screwdriver and 6mm box end wrench, remove nuts, washers, screws, and clamps from W34 cable.



(12) Using crosstip screwdriver and 6mm box end wrench, remove nut, two washers, screw, and electric routing clamp assembly.

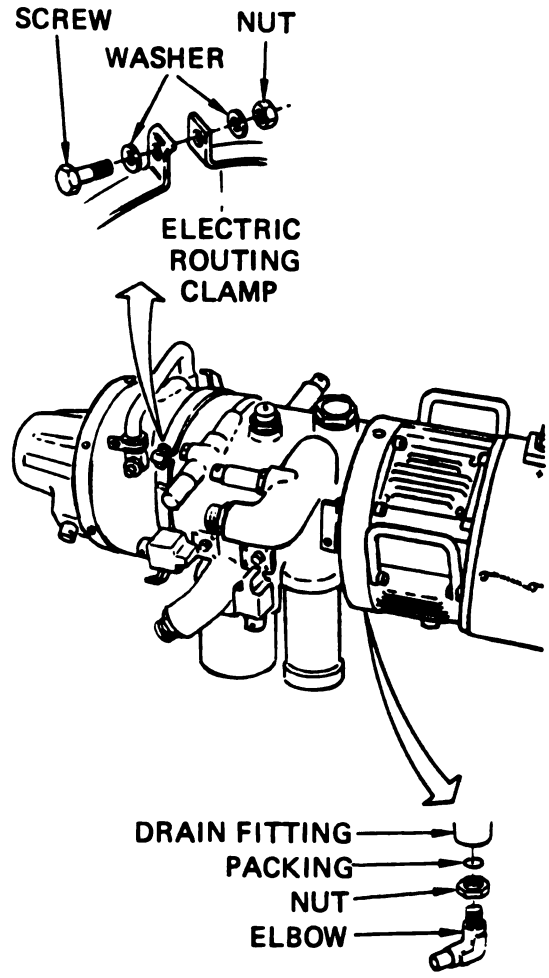
(13) Using 7/16-inch open end wrench to hold elbow and 11/16-inch wrench to loosen nut, remove elbow, nut, and preformed packing from drain fitting. Discard preformed packing.

b. Install.

(1) Apply hydraulic fluid on new packing. Insert new preformed packing in drain fitting. Install elbow and nut and position elbow for drain hose connection. Using 7/16-inch open end wrench to hold elbow, tighten nut using 11/16-inch open end wrench.

(2) Apply zinc chromate primer to screws.

(3) Using crosstip screwdriver and 6mm box end wrench, install electric routing clamp assembly and secure with screw, two washers, and nut.



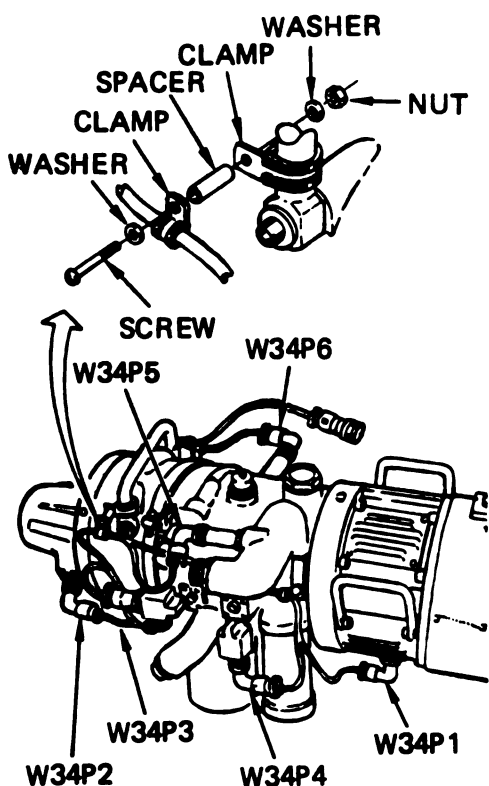
6-5. HYDRAULIC POWER SUPPLY MAINTENANCE INSTRUCTIONS (CONT)

(4) Apply zinc chromate primer to screws. Position electrical harness and using crosstip screwdriver and 6mm box end wrench, install seven clamps, screws, washers, and nuts on cable W34.

NOTE

Electrical connectors W34P5 and W34P6 must be clocked on installation to permit mating with hydraulic pressure and fluid temperature components on hydraulic pump.

(5) Connect electrical connectors W34P1, W34P2, W34P3, W34P4, W34P5, and W34P6.



(6) Clean upper right-hand mounting boltholes (and mating surface) to provide an electrical bond (paragraph 3-10).

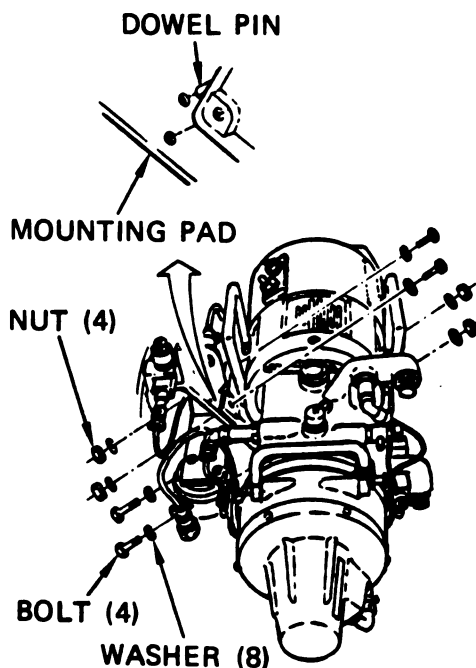
(7) Slowly lower assembly until shoulder bolts on mounting pad fit into keyways on power supply assembly base.

NOTE

Install two top bolts with heads facing up and lower two bolts with heads down.

(8) Apply wet primer to three bolts and install in upper left and bottom holes. Install six washers and three nuts. Install clean bolt in upper right hole and secure with two washers, and nut.

(9) Using 19mm box end wrench and 19mm socket with universal joint, tighten nuts.



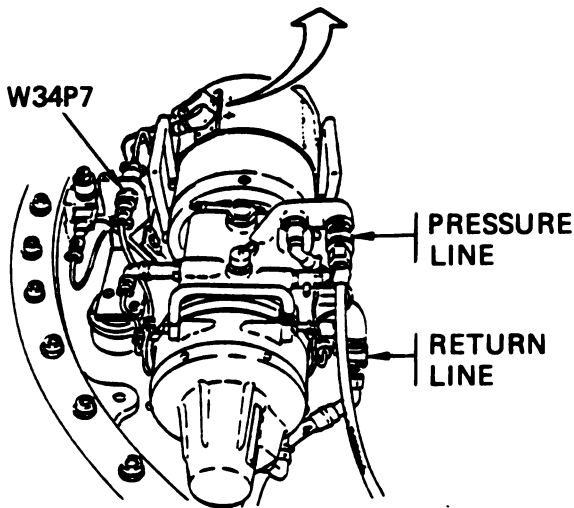
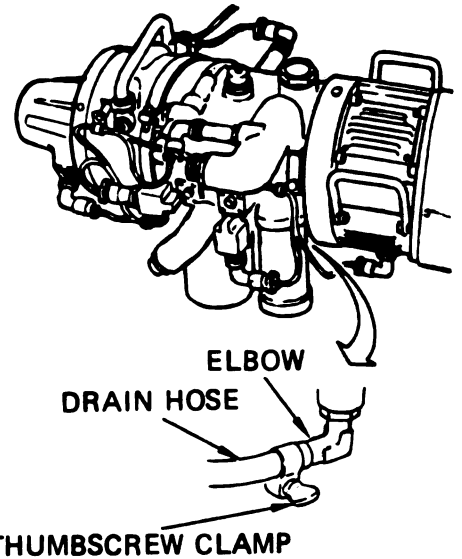
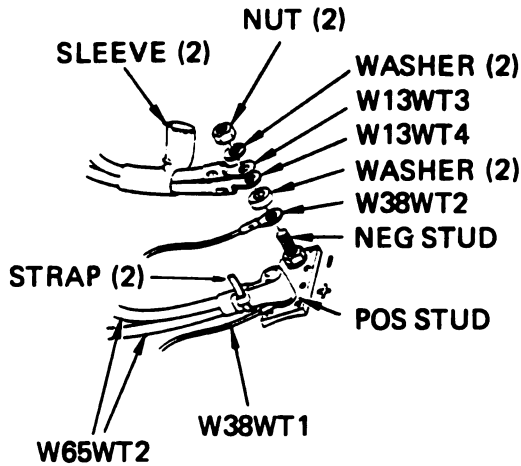
(10) Connect electrical connector W34P7.

(11) Position cable terminal lugs back to back. Slide sleeve cover onto cable with lugs through hole. Fold sleeve cover back and install terminal lugs W65WT2 and W38WT1 to positive stud (large). Using 19mm box end wrench, secure terminal lugs with washer and nut.

(12) Position cable terminal lugs back to back. Slide sleeve cover onto cable with lugs through hole. Fold sleeve cover back and install terminal lugs W13WT3, W13WT4, and W38WT2 to negative stud (small) on motor. Using 17mm box end wrench, secure terminal lugs with washer and nut.

6-5. HYDRAULIC POWER SUPPLY MAINTENANCE INSTRUCTIONS (CONT)

(13) Apply light coat of varnish to terminals. Pull sleeve cover down over stud. Using heat gun, shrink sleeve cover. Fold excess sleeve cover back and secure with strap.



(14) Remove protective caps from lines.

(15) Install drain line on elbow and tighten thumbscrew clamp.

(16) Connect return line and pressure line quick-disconnects. Turn coupling until ratchet lock begins to click, then turn 1/2 turn more.

2. HYDRAULIC PUMP OR ELECTRIC MOTOR.

a. Remove.

(1) Remove hydraulic power supply (item 1, a).

(2) Cut and remove lockwire. Using 1/2-inch deep socket, loosen nut on V-band coupling. Remove coupling.

(3) Separate electric motor from hydraulic pump.

(4) If removing hydraulic pump, using 3mm socket head key, remove bolt, shaft coupling, and two preformed packings from pump shaft.

b. Install.

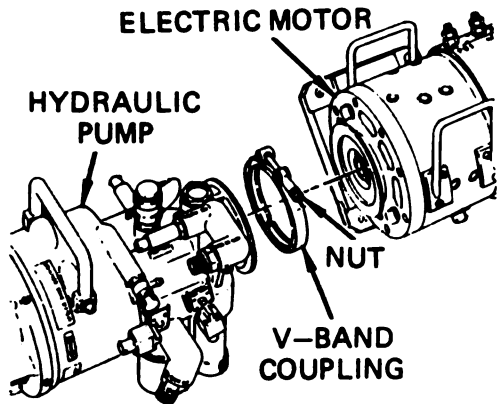
(1) If installing hydraulic pump, apply hydraulic fluid to two new preformed packings and install packings on shaft coupling.

(2) If installing hydraulic pump, install shaft coupling on pump shaft and secure with bolt. Using 3mm socket head key, tighten bolt.

(3) Position electric motor to hydraulic pump.

6-5. HYDRAULIC POWER SUPPLY MAINTENANCE INSTRUCTIONS (CONT)

(4) Install V-band coupling. Using 1/2-inch deep socket, torque coupling nut to 19.5 to 20.0 Nm. Lock-wire nut.



(5) Install hydraulic power supply (item 1, b).

3. FILTER ELEMENT.

a. Remove.

(1) Clean area around filter bowl. Using 15/16-inch open end wrench, carefully remove filter bowl to retain hydraulic fluid for evaluation.

(2) Inspect fluid for contamination. Remove filter element from bowl.

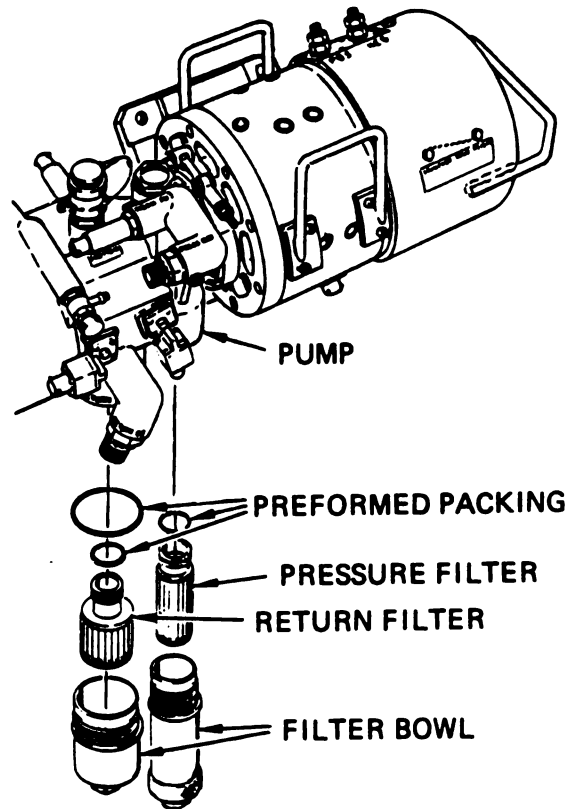
(3) Remove and discard preformed packings.

b. Install.

(1) Clean filter bowl to remove any foreign matter.

(2) Wet packings with hydraulic fluid. Install preformed packings on filter element. On return filter, install packing in pump.

(3) Install new filter element in filter bowl.



(4) Install filter bowl on hydraulic power supply. Using 15/16-inch open end wrench, tighten filter bowl.

4. ELECTRIC MOTOR BRUSH INSPECTION.

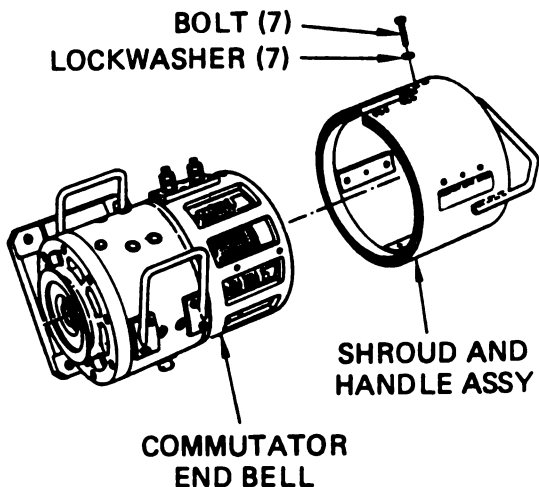
a. Remove.

(1) Remove electric motor from hydraulic pump (item 2, a).

6-5. HYDRAULIC POWER SUPPLY MAINTENANCE INSTRUCTIONS (CONT)

(2) Cut and remove lockwire from seven bolts securing shroud and handle assembly to commutator end bell.

(3) Using 3/8-inch box end wrench, remove seven bolts and lockwashers. Remove shroud and handle assembly.



(4) Using 7/16-inch socket, remove four bolts, four washers, and one spacer securing brush shunts to brush holder. Note position of longer bolt and brass spacer. Mark this position.

(5) Remove four brushes. Label each brush as to location for installation.

b. Inspect.

NOTE

If any brush fails any of the inspections or checks, replace motor.

(1) Inspect each brush to see if it is chipped, cracked, or burnt. Check for frayed shunts. Check that brushes move freely in brush holder.

(2) Measure each brush from top of metal clip to longest tip. Minimum brush length is 1.0 inch.

(3) Check brush spring for bends or breaks. Check spring tension.

c. Install.

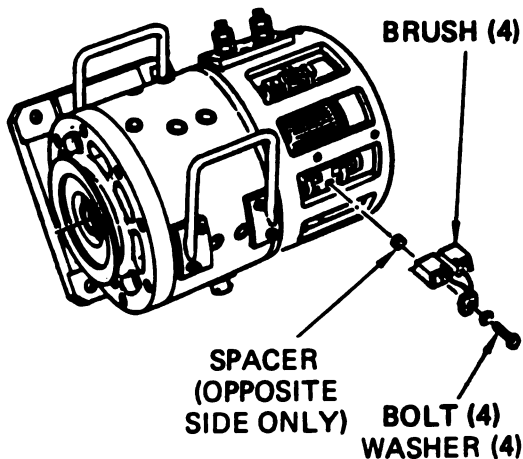
(1) Using freon solvent and cloth, clean commutator to remove oil and dirt.

NOTE

Install brushes in original position as noted in paragraph a, step (5).

(2) Install brushes in brush holders.

(3) Secure brush shunts and jumper leads to brush holder with four bolts, four washers, and one spacer. Position spacer and long bolt in position noted in paragraph a, step (4). Using 7/16-inch socket, tighten bolts.



6-5. HYDRAULIC POWER SUPPLY MAINTENANCE INSTRUCTIONS (CONT)

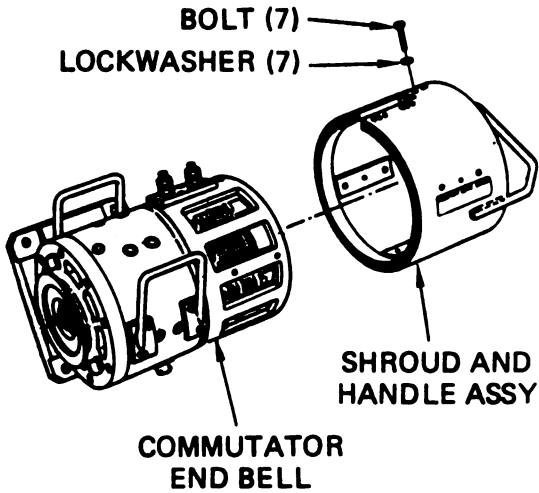
(4) Check for free rotation of armature.

(5) Position shroud and handle assembly on commutator end bell and secure with seven bolts and washers. Using 3/8-inch box end wrench, tighten bolts. Secure bolts with lockwire.

(6) Install electric motor on hydraulic pump (item 2, b).

FOLLOW-ON PROCEDURE

Check hydraulic fluid reservoir (TM 9-1425-646-20).



6-6. CONTACTOR ASSEMBLY MAINTENANCE INSTRUCTIONS. This paragraph covers the replacement of the contactor assembly.

INITIAL SETUP

Tools

Kit, tool, 13032302

Materials/Parts

Primer, zinc chromate (47, Appendix B)
Varnish (71, Appendix B)

Personnel Required

MLRS Repairer MOS 27M

References

TM 9-1425-646-20

Troubleshooting
Paragraph 2-9

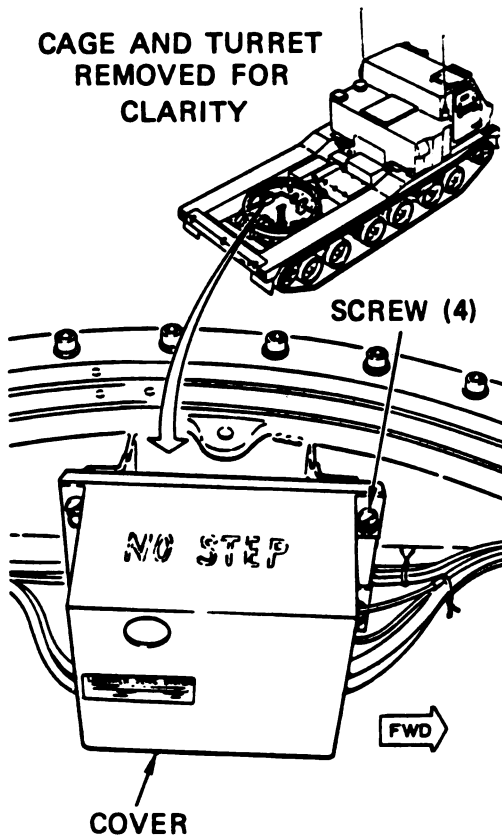
Equipment Condition

Jury struts installed (TM 9-1425-646-20)
Electrical cable W13 disconnected from electronics box (paragraph 4-6)

a. Remove.

(1) Using flat tip screwdriver, loosen four screws.

(2) Remove cover.



(3) Using 17mm box end wrench and 17mm socket, remove nut, washer, and bolt securing cable W65 to contactor.

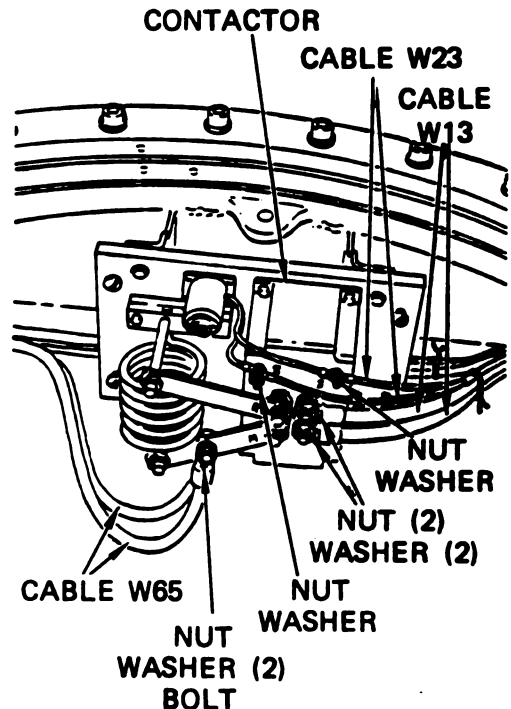
(4) Remove cable W65, from contactor.

(5) Using 3/8-inch socket, remove two nuts and washers securing cable W23 to terminal studs X1 and X2 on contactor.

(6) Remove cable W23 terminal lugs from studs.

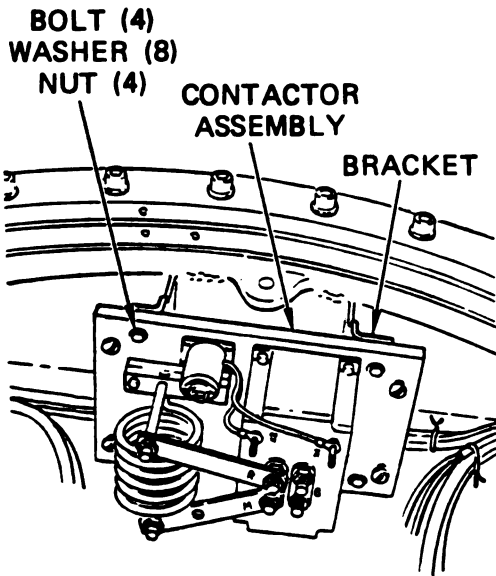
(7) Using 13mm box end wrench, remove nut and washer securing cable W13 to RFI filter.

(8) Remove cable W13 from terminal stud.



(9) Using 7mm box end wrench, 10mm socket, and 9-inch socket extension, remove four nuts, four bolts, and eight washers securing contactor assembly to bracket.

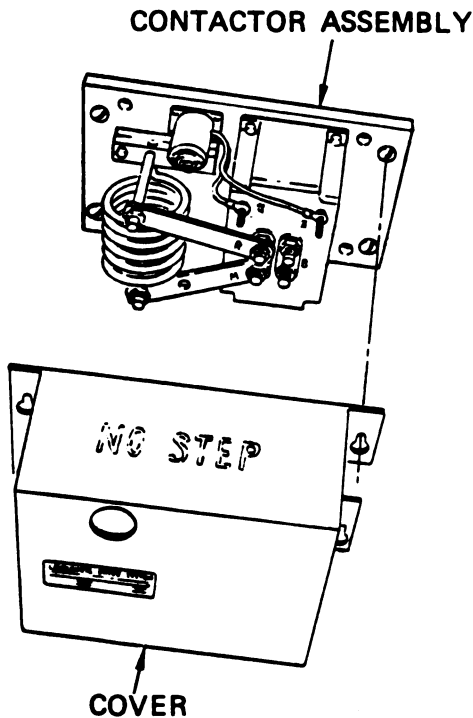
6-6. CONTACTOR ASSEMBLY MAINTENANCE INSTRUCTIONS (CONT)



(10) Using flat tip screwdriver, install cover on contactor assembly and tighten four screws.

b. Install.

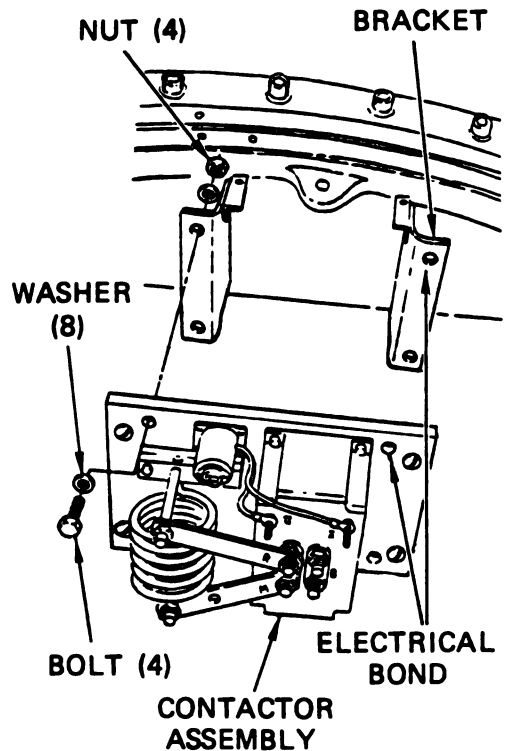
(1) Using flat tip screwdriver, loosen four screws securing cover. Remove cover from replacement contactor.



(2) Clean base of bracket and contactor for electrical bond (paragraph 3-10).

(3) Wet three bolts with zinc chromate primer. Position contactor on bracket and install four bolts, eight washers, and four nuts. Install bolt, without primer, in upper right-hand mounting hole.

(4) Using 7mm box end wrench and 10mm socket with 9-inch extension, tighten nuts.



(5) Position cable W23 terminal WT1 on stud X1 and terminal WT2 on stud X2. Secure with washer and nut.

(6) Using 3/8-inch socket, tighten nut.

(7) Position cable W65 on contactor bus bar and install washer and nut.

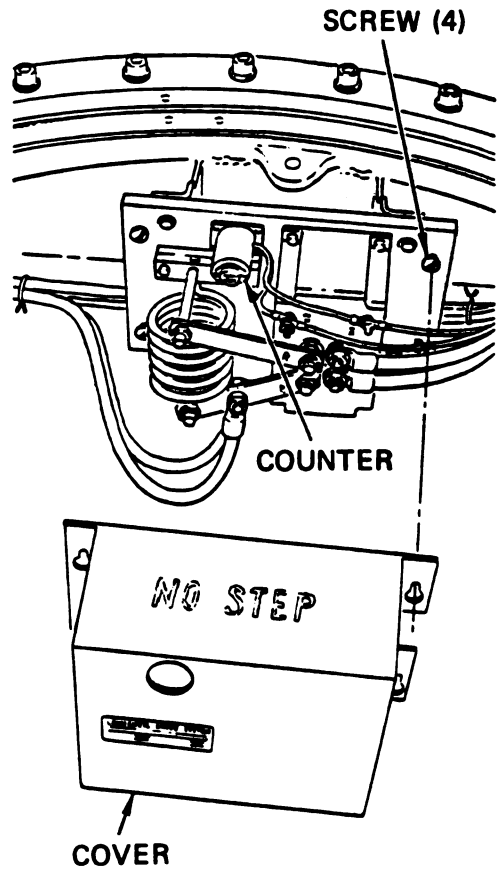
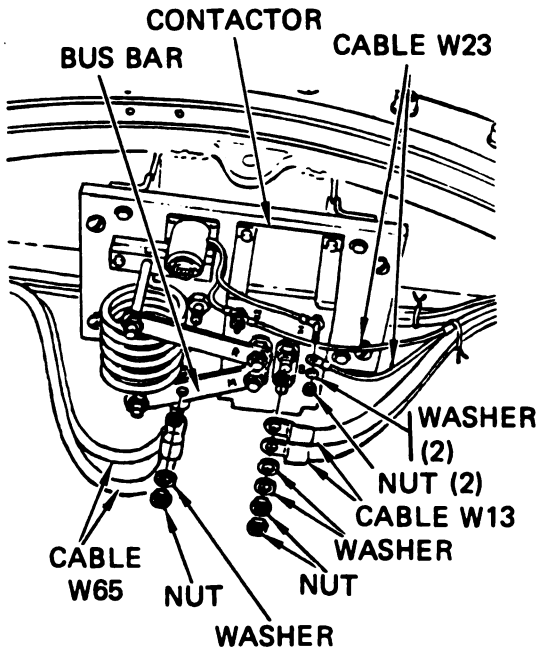
(8) Using 17mm box end wrench and 12mm socket, tighten nut.

(9) Position cable W13WT1 and W13WT2 on terminal B and install washer and nut.

6-6. CONTACTOR ASSEMBLY MAINTENANCE INSTRUCTIONS (CONT)

(10) Using 13mm box end wrench, tighten nut.

(11) Apply varnish to electrical connections.



(12) Position cover on contactor assembly and, using flat tip screwdriver, tighten four screws.

FOLLOW-ON PROCEDURE

Record counter reading in logbook.

Remove jury struts (TM 9-1425-646-20).

Enable BC and operate in elevation and azimuth two times to check for proper operation (TM 9-1425-646-20).

6-7. HYDRAULIC SWIVEL ASSEMBLY MAINTENANCE INSTRUCTIONS. This paragraph covers the maintenance tasks for the following items:

<i>Item</i>	<i>Page</i>
1. Swivel Assembly	6-19
2. Adapter Support	6-20
3. Harness Support	6-23

INITIAL SETUP

Tools

- Kit, tool, 13032302
- Set, shop, 13032303
- Bar, rivet bucking (for item 2)
- Drill, electric, 1/4-inch (for item 2)
- Drill, twist, 3/32-inch (for item 2)
- Hammer, pneumatic (for item 2)
- Rivet set, pneumatic (for item 2)

Materials/Parts

- Caps and plugs, plastic (3, Appendix B)
(for item 1)
- Primer, zinc chromate (47, Appendix B)

Personnel Required

MLRS Repairer MOS 27M

References

TM 9-1425-646-20

Troubleshooting
Paragraph 2-9

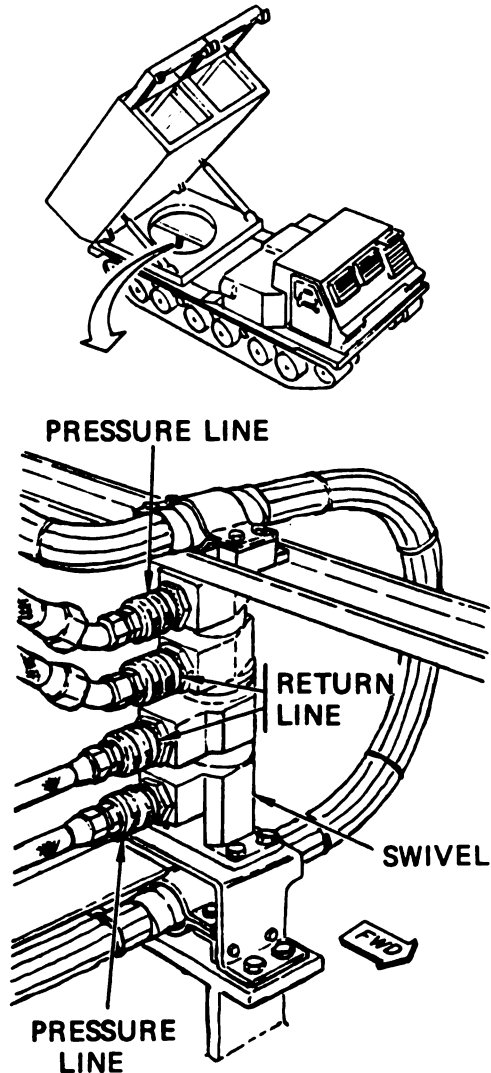
Equipment Condition

Jury struts installed (TM 9-1425-646-20)

I. SWIVEL ASSEMBLY.

a. Remove.

(1) Disconnect two pressure and two return line quick-disconnects from swivel. Install protective caps on open line.



6-7. HYDRAULIC SWIVEL ASSEMBLY MAINTENANCE INSTRUCTIONS (CONT)

(2) Using 10mm socket, remove two bolts and two washers securing swivel to driver.

(3) Using 8mm socket, remove four bolts and washers securing swivel to adapter and remove swivel.

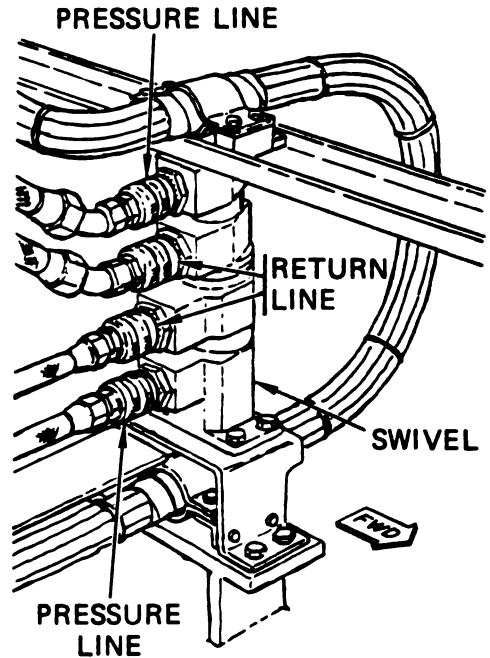
b. Install.

(1) Clean mounting surfaces for electrical bond.

(2) Apply zinc chromate primer to four bolts. Position swivel and align mounting holes.

(3) Install four bolts and washers securing swivel to adapter. Using 8mm socket, tighten bolts.

(4) Apply zinc chromate primer to one bolt. Install two bolts and washers securing swivel to driver. Tighten bolts using 10mm socket. Coat bare bolt with varnish.



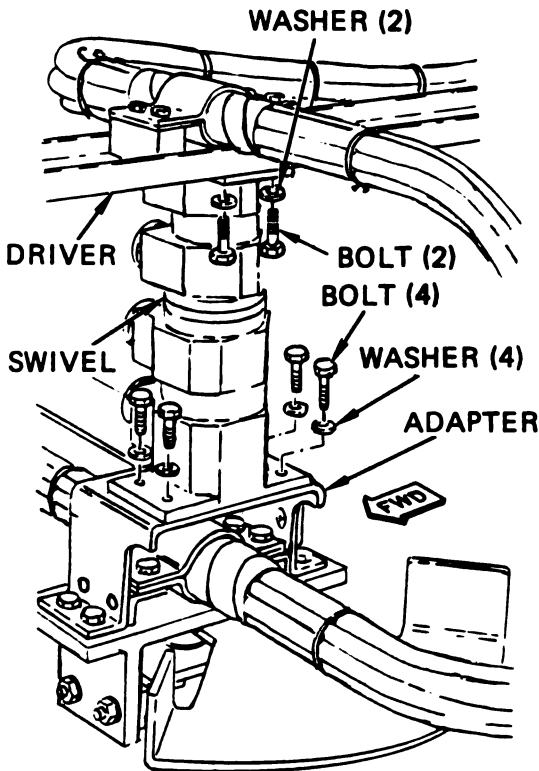
(6) If no further maintenance is required, perform follow-on procedure (page 6-23).

2. ADAPTER SUPPORT.

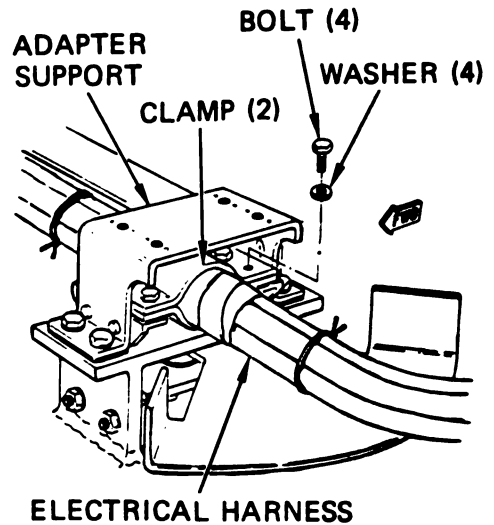
a. Remove.

(1) Remove swivel assembly (item 1, a).

(2) Using 8mm socket, remove four bolts and four washers securing electrical cable to adapter.

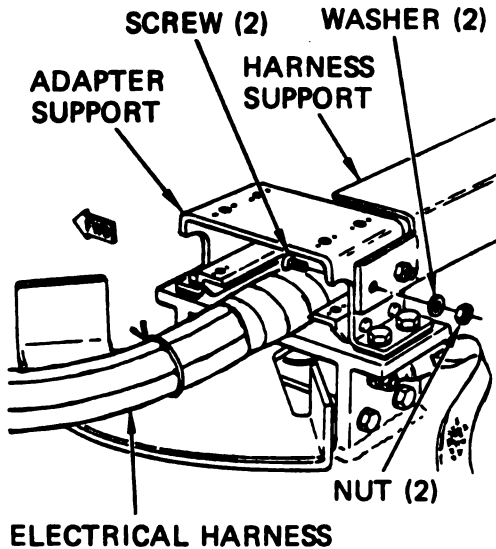


(5) Connect two pressure and two return line quick-disconnects. Turn quick-disconnects until ratchet lock begins to click, then turn 1/2 turn more.

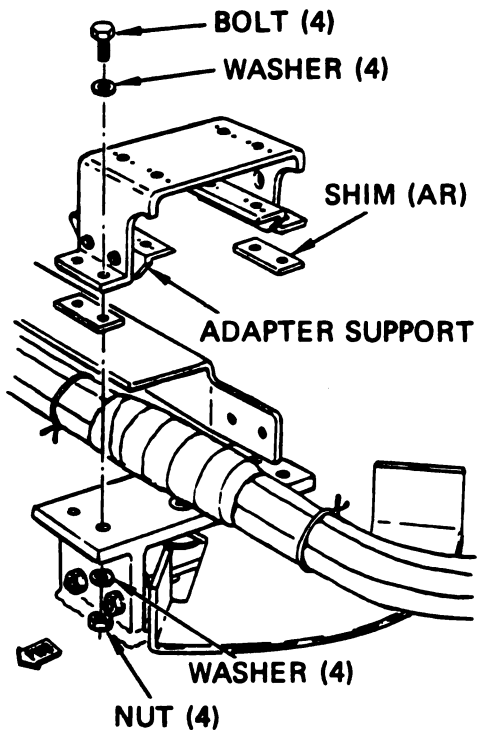


6-7. HYDRAULIC SWIVEL ASSEMBLY MAINTENANCE INSTRUCTIONS (CONT)

(3) Using 10mm box end wrench and 7mm socket, remove two bolts and two nuts securing electrical harness support to adapter support.



(4) Using 10mm box end wrench and 7mm socket, remove four bolts, eight washers, and four nuts securing adapter support.



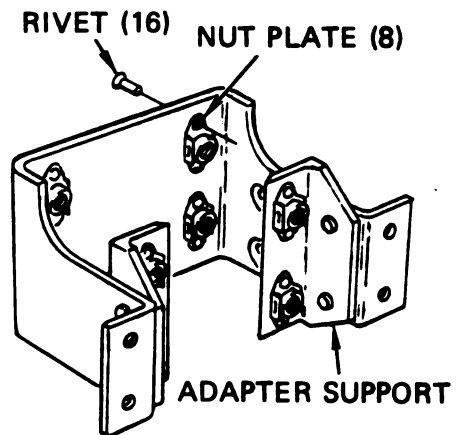
b. Repair.

(1) Using electric drill and 3/32-inch twist drill, drill rivet heads off defective nutplate.

(2) Using punch and hammer, drive rivets out and remove nutplate.

(3) Apply zinc chromate primer to new nutplate.

(4) Position nutplate to adapter support and, using pneumatic rivet set and pneumatic hammer, install two rivets.



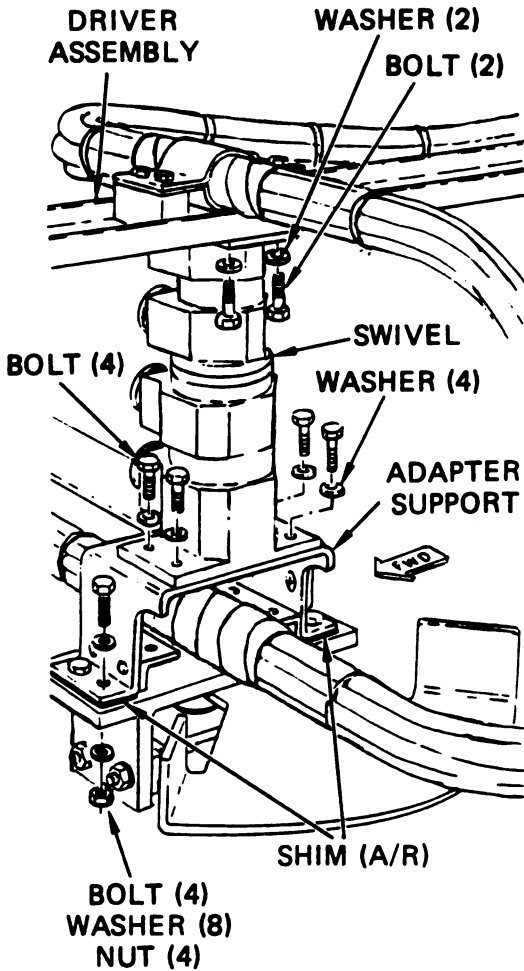
c. Install.

(1) Clean mounting surfaces for electrical bond (paragraph 3-10).

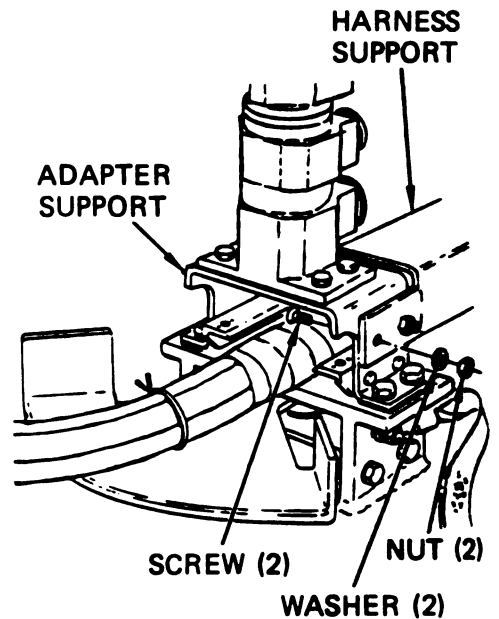
(2) Position swivel to driver assembly and secure with two bolts and two washers. Using 8mm socket, tighten bolt.

6-7. HYDRAULIC SWIVEL ASSEMBLY MAINTENANCE INSTRUCTIONS (CONT)

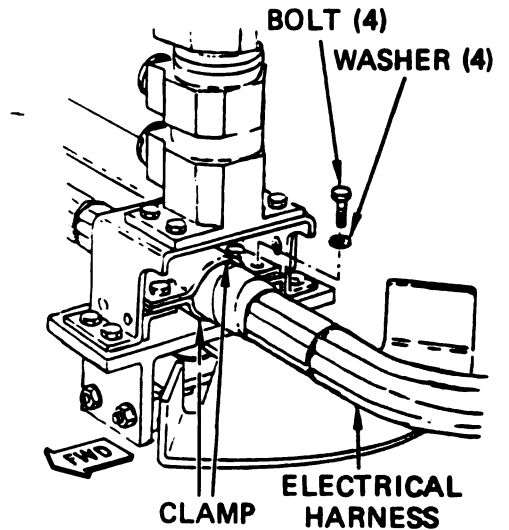
(3) Position adapter support and secure to swivel with four bolts and four washers. Install shims as required and install four bolts, eight washers, and four nuts. Using 10mm box end wrench and 7mm socket, tighten nuts.



(4) Position harness support to adapter support and install two screws, two washers, and two nuts. Using crosstip screwdriver and 7mm socket, tighten nuts.



(5) Position clamp around electrical harness and secure with four bolts and four washers. Using 8mm socket, tighten bolts.



(6) If no further maintenance is required, perform follow-on procedure (page 6-23).

6-7. HYDRAULIC SWIVEL ASSEMBLY MAINTENANCE INSTRUCTIONS (CONT)

3. HARNESS SUPPORT.

a. Remove.

(1) Remove adapter support (item 2, a).

(2) Using crosstip screwdriver and 13mm box end wrench, remove nut, washer, and bolt securing harness support. Remove bushing from harness support.

b. Install.

(1) Position bushing in harness support.

(2) Install harness support and secure with screw, washer, and nut. Using crosstip screwdriver and 13mm box end wrench, tighten nut.

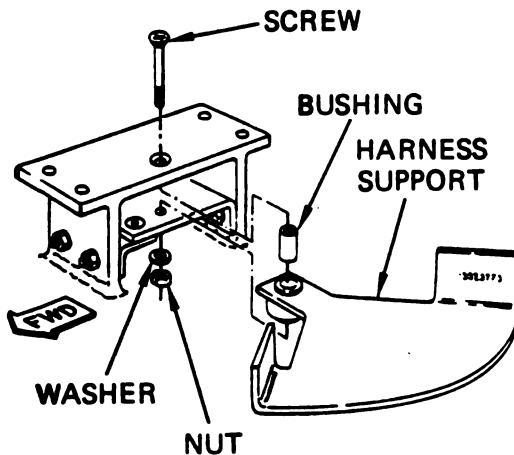
(3) Install adapter support (item 2, b).

(4) If no further maintenance is required, perform follow-on procedure.

FOLLOW-ON PROCEDURE

Check hydraulic level (TM 9-1425-646-20).

Remove jury struts (TM 9-1425-646-20).



6-8. AZIMUTH SERVOMOTOR ASSEMBLY MAINTENANCE INSTRUCTIONS. This paragraph covers the replacement of the azimuth servomotor assembly.

INITIAL SETUP

Tools

Kit, tool, 13032302

Materials/Parts

- Caps and plugs, plastic (3, Appendix B)
- Cloth, cotton (6, Appendix B)
- Fluid, hydraulic (17, Appendix B)
- Gasket (18, Appendix B)
- Packing, preformed (28, Appendix B)
- Primer, zinc chromate (47, Appendix B)
- Varnish (71, Appendix B)

Personnel Required

MLRS Repairer MOS 27M

References

- TM 9-1425-646-10
- TM 9-1425-646-20

Troubleshooting

Paragraph 2-9

Equipment Condition

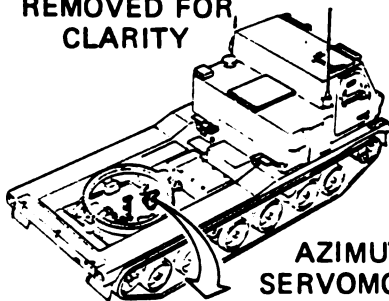
Position LLM to 1600 mils (90 degrees) azimuth and 0 mils elevation (TM 9-1425-646-10)

a. Remove.

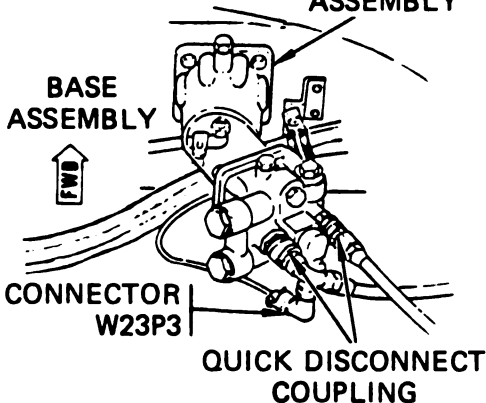
- (1) Disconnect electrical connector W23P3 from servomotor connector J1.
- (2) Install plastic caps on disconnected connectors.
- (3) Turn quick-disconnect coupling outer ring and pull back away from servomotor and at the same time, turn coupling outer ring and unscrew coupling. Repeat procedure for other coupling.
- (4) Using plastic caps and plugs, cover each open line and port.

- (5) Loosen thumbscrew clamp securing drain hose to elbow on motor.
- (6) Slide clamp back on hose and disconnect hose from motor.

CAGE AND TURRET
REMOVED FOR
CLARITY



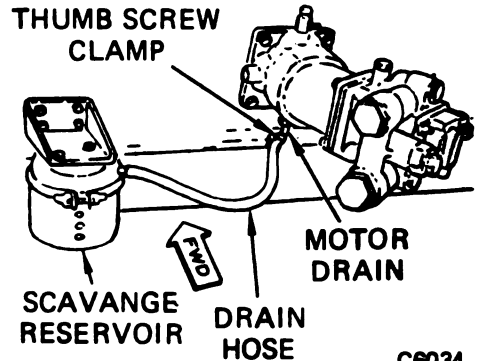
AZIMUTH
SERVOMOTOR
ASSEMBLY



BASE
ASSEMBLY

CONNECTOR
W23P3

QUICK DISCONNECT
COUPLING



THUMB SCREW
CLAMP

SCAVENGE
RESERVOIR

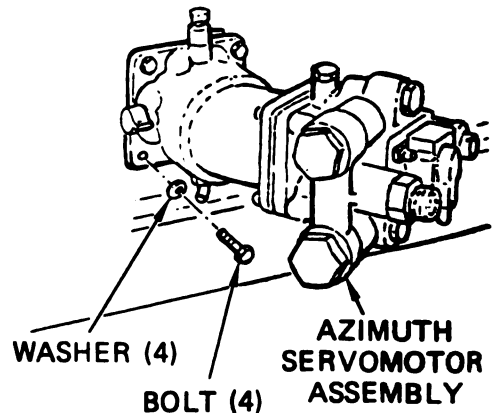
DRAIN
HOSE

MOTOR
DRAIN

C6034

- (7) Using 13mm socket and 6-inch extension, remove four bolts and washers securing servomotor to azimuth drive speed reducer.

- (8) Pull servomotor straight out and away from azimuth drive speed reducer to disengage drive shaft. Remove azimuth servomotor assembly. Discard gasket.



WASHER (4)

BOLT (4)

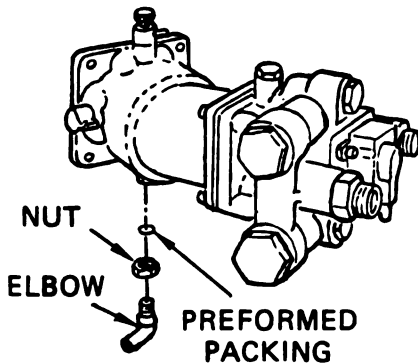
AZIMUTH
SERVOMOTOR
ASSEMBLY

6-8. AZIMUTH SERVO MOTOR ASSEMBLY MAINTENANCE INSTRUCTIONS (CONT)

b. Install.

(1) Using 11/16- and 7/16-inch open end wrenches to hold elbow, remove nut, elbow, and preformed packing from removed servomotor. Discard packing.

(2) Apply hydraulic fluid to new packing. Install new preformed packing and nut on elbow. Install elbow in new servomotor drain port. Do not tighten nut.



(3) Clean one mounting hole for electrical bond (paragraph 3-10).

(4) Install gasket on servomotor. Position servomotor so that electrical connector and quick-disconnects are facing right side of base.

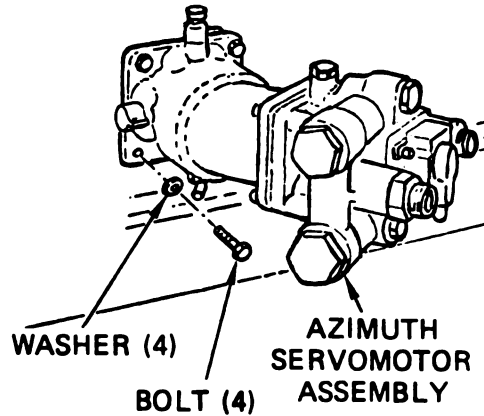
(5) Position drain elbow for routing of drain hose. Using 11/16-inch open end wrench, tighten elbow nut while holding elbow with 7/16-inch open end wrench.

(6) Slowly engage servomotor drive shaft into azimuth drive speed reducer until mounting surfaces are flush.

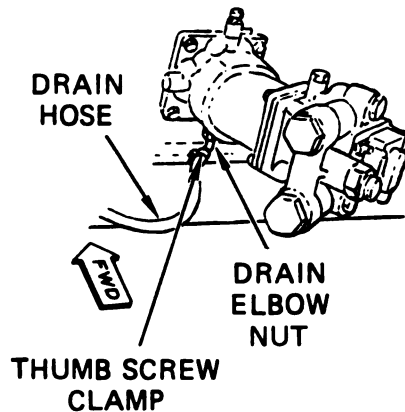
(7) Apply zinc chromate primer to three mounting bolts. Install bolt and washer without primer in lower right-hand hole. Install remaining three bolts and washers in remaining holes.

(8) Using 13mm socket and 6-inch extension, torque bolts to 24 to 29 N·m.

(9) Apply varnish to bolt for electrical bond.



(10) Connect drain hose to elbow, slide thumbscrew clamp into position and tighten clamp.



(11) Remove protective caps from hydraulic quick-disconnects.

(12) Place mating halves of quick-disconnect couplings together and turn coupling to right until ratchet lock begins to click. To insure firm lock, turn coupling 1/2 turn more.

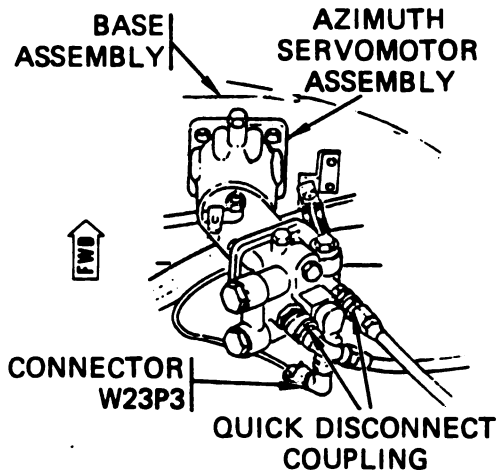
6-8. AZIMUTH SERVO MOTOR ASSEMBLY MAINTENANCE INSTRUCTIONS (CONT)

(13) Connect connector W23P3 to servomotor connector J1.

FOLLOW-ON PROCEDURE

Service hydraulic system (TM 9-1425-646-20).

Using BC, cycle LLM in azimuth two times to check for smooth operation (TM 9-1425-646-20).



6-9. AZIMUTH HYDRAULIC VALVE MODULE MAINTENANCE INSTRUCTIONS. This paragraph covers the maintenance tasks for the following items:

<i>Item</i>	<i>Page</i>
1. 2-Way, 2-Position Solenoid Valve	6-27
2. Pressure Relief Valve	6-28
3. Unions	6-29

INITIAL SETUP

Tools

- Kit, tool, 13032302
- Set, shop, 13032303
- Wrench, torque, 30 to 250 Ncm

Materials/Parts

- Fluid, hydraulic (17, Appendix B)
- Packing (36, Appendix B) (for item 1)
- Packing, preformed (28, Appendix B) (for item 3)
- Packing, preformed (29, Appendix B) (for item 3)
- Packing, preformed (30, Appendix B) (for items 2 and 3)
- Packing, preformed (31, Appendix B) (for item 1)

- Packing, preformed (32, Appendix B) (for item 2)
- Retainer, packing (48, Appendix B) (for item 1)
- Retainer, packing (49, Appendix B) (for item 2)

Personnel Required

MLRS Repairer MOS 27M

References

- TM 9-1425-646-10
- TM 9-1425-646-20

Troubleshooting
Paragraph 2-9

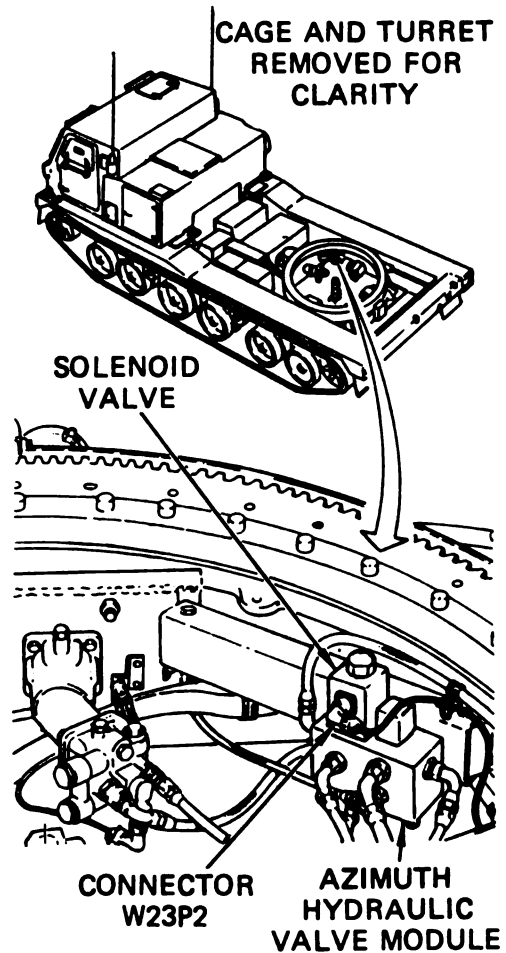
Equipment Condition

Jury struts installed (TM 9-1425-646-20)

1. 2-WAY, 2-POSITION SOLENOID VALVE.

a. Remove.

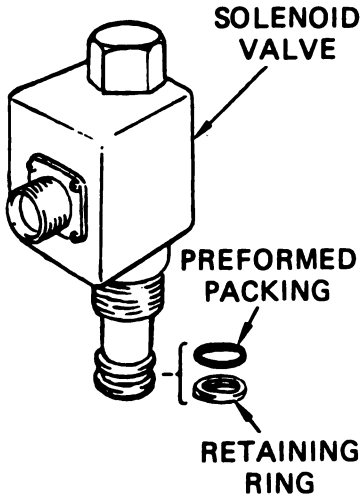
- (1) Cut lockwire and disconnect electrical connector W23P2 from J1 on valve.
- (2) Using 1-inch open end wrench, remove nut securing solenoid on valve. Remove solenoid.
- (3) Using 1-5/8 inch open end wrench, remove valve from module.
- (4) Discard preformed packing and retaining ring.



6-9. AZIMUTH HYDRAULIC VALVE MODULE MAINTENANCE INSTRUCTIONS (CONT)

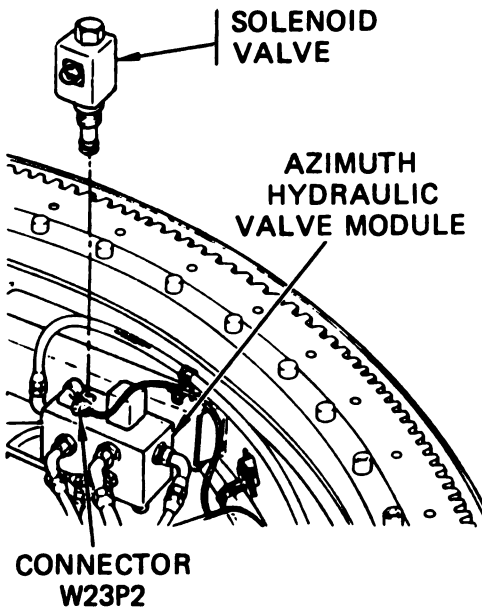
b. Install.

(1) Apply hydraulic fluid to new packing. Install retaining ring and preformed packing on valve.



(2) Install valve in module. Using 1-5/8 inch open end wrench, tighten valve.

(3) Position solenoid on valve. Install nut and, using 1-inch open end wrench, tighten nut. Connect electrical connector W23P2 to J1 on valve. Lock-wire W23P2 to valve module.



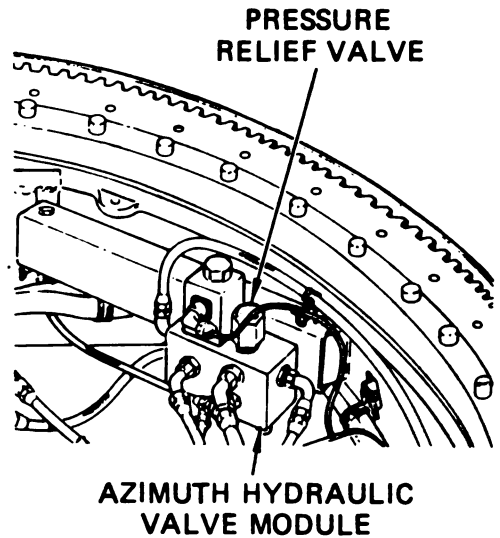
(4) If no further maintenance is required, perform follow-on procedure (page 6-29).

2. PRESSURE RELIEF VALVE.

a. Remove.

(1) Using 1-inch open end wrench, remove pressure relief valve from module.

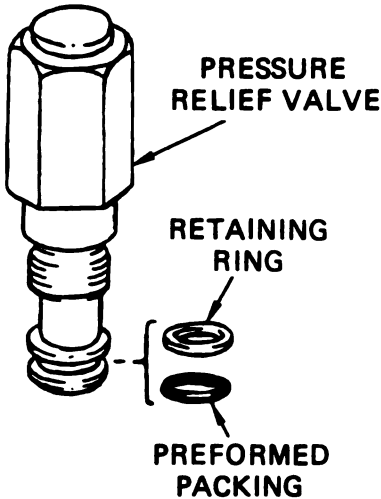
(2) Discard preformed packing and retaining ring.



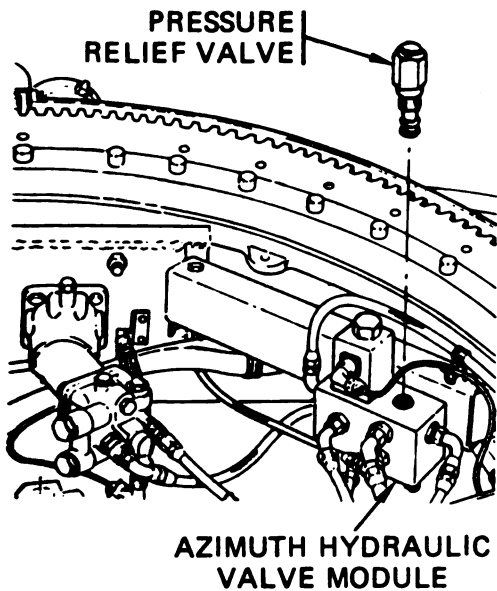
6-9. AZIMUTH HYDRAULIC VALVE MODULE MAINTENANCE INSTRUCTIONS (CONT)

b. Install.

(1) Apply hydraulic fluid to new packing. Install retaining ring and preformed packing on valve.



(2) Install valve in module. Using 1-inch open end wrench, tighten valve.



(3) If no further maintenance is required, perform follow-on procedure.

3. UNIONS.

a. Remove.

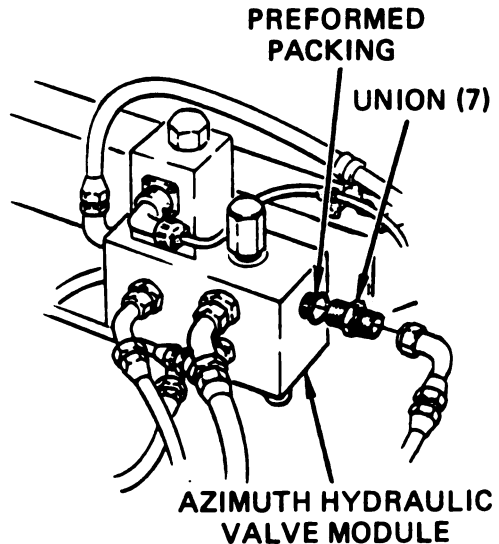
(1) Remove component from defective union.

(2) Using 13/16- and 1-1/8 inch open end wrenches, remove union from module. Discard preformed packing.

b. Install.

(1) Apply hydraulic fluid to new packing. Install new preformed packing on union. Install union in module and tighten with 13/16- and 1-1/8 inch open end wrenches.

(2) Install component in union.



(3) If no further maintenance is required, perform follow-on procedure.

FOLLOW-ON PROCEDURE

Service hydraulic system (TM 9-1425-646-20).

Remove jury struts (TM 9-1425-646-20).

Bleed hydraulic system (paragraph 6-3).

Using BC, cycle LLM two times in azimuth and check for smooth operation (TM 9-1425-646-20).

Stow LLM (TM 9-1425-646-10).

6-10. AZIMUTH DRIVE SPEED REDUCER MAINTENANCE INSTRUCTIONS. This paragraph covers the maintenance tasks for the following items:

<i>Item</i>	<i>Page</i>
1. Pinion Gear Cover	6-30
2. Speed Reducer	6-31
3. Adjust Azimuth Drive Brake	6-35

INITIAL SETUP

Tools

- Kit, tool, 13032302
- Set, shop, 13032303
- Attachment, dial indicator, 599-7739-3 (for item 2)
- Bar, 599-7739-4 (for item 2)
- Bar, rivet bucking, AT694 (for item 1)
- Clamp, 599-7739-2 (for item 2)
- Drill, electric, 1046-09 (for item 1)
- Drill, twist, 206-3-64 (for item 1)
- Gage, thickness, 599-646 (for item 2)
- Hammer, pneumatic, CP4X (for item 1)
- Indicator, dial, 599-8251-112 (for item 2)
- Rod, holding, 599-7739-6 (for item 2)
- Swivel, dial indicator, 599-7739-1 (for item 2)
- Wrench, torque, 6014NM (for item 2)

Materials/Parts

- Caps and plugs, plastic (3, Appendix B) (for item 2)
- Fluid, hydraulic (17, Appendix B)
- Packing, preformed (27, Appendix B) (for item 2)

- Packing, preformed (28, Appendix B) (for item 2)
- Primer, zinc chromate (47, Appendix B)
- Sealant (59, Appendix B) (for item 1)
- Varnish (71, Appendix B) (for item 2)

Personnel Required

- MLRS Repairer MOS 27M
(MLRS Crewmember MOS 13M to assist as required)

References

- TM 9-1425-646-10
- TM 9-1425-646-20

Troubleshooting

- Paragraph 2-9

Equipment Condition

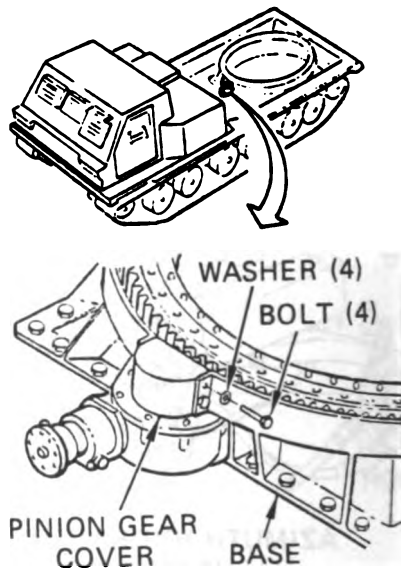
- Turret removed (paragraph 5-29) (for item 2)
- Battery box removed (TM 9-1425-646-20)
- Azimuth servomotor removed (paragraph 6-8)
- Electronics box removed (paragraph 4-4)

1. PINION GEAR COVER.

a. Remove.

(1) Using 10mm socket, remove four bolts and four washers securing cover to base.

(2) Remove cover.



6-10. AZIMUTH DRIVE SPEED REDUCER MAINTENANCE INSTRUCTIONS (CONT)

b. Repair.

(1) Using electric drill with 3/64-inch twist drill, drill out two rivets securing defective nutplate.

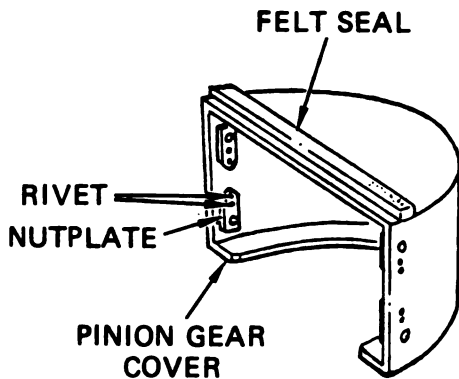
(2) Using pin punch, punch out rivets and remove nutplate.

(3) Apply zinc chromate primer to nutplate and two rivets.

(4) Position new nutplate to pinion gear cover and using rivet set and hammer, install two rivets.

(5) Remove felt seal from pinion gear cover. Using wire brush, clean grease and sealant from pinion gear cover.

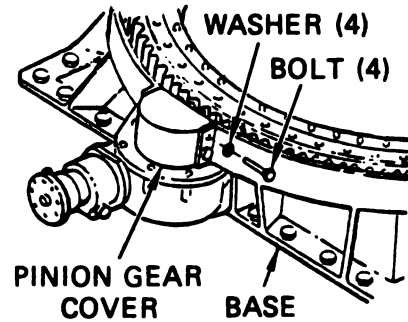
(6) Using sealant, bond new felt seal to pinion gear cover.



c. Install.

(1) Apply zinc chromate primer to four bolts. Position new cover on base and install four bolts and four washers.

(2) Using 10mm socket, tighten four bolts. Torque bolts to 6 to 8 N·m.

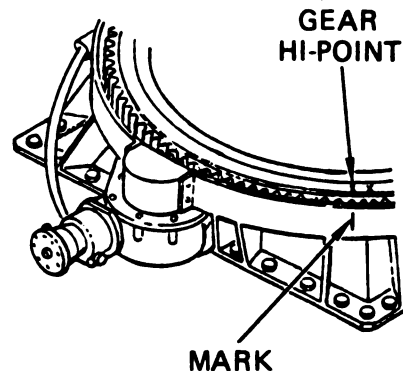


(3) If no further maintenance is required, perform follow-on procedure (page 6-36).

2. SPEED REDUCER.

a. Remove.

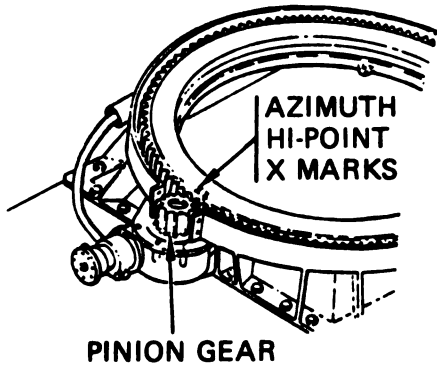
(1) Note position of X marks on azimuth geared bearing. Mark this position on base to assist in turret installation.



6-10. AZIMUTH DRIVE SPEED REDUCER MAINTENANCE INSTRUCTIONS (CONT)

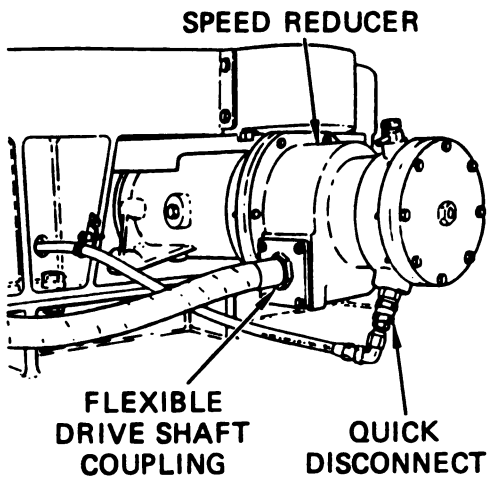
(2) Remove pinion gear cover (item 1, a).

(3) Manually rotate azimuth geared bearing until X marks on geared bearing are on each side of X mark on pinion gear (TM 9-1425-646-10).



(4) Using 1-5/8 inch open end wrench, disconnect flexible drive shaft from speed reducer.

(5) Disconnect hydraulic hose quick-disconnect coupling half from speed reducer.

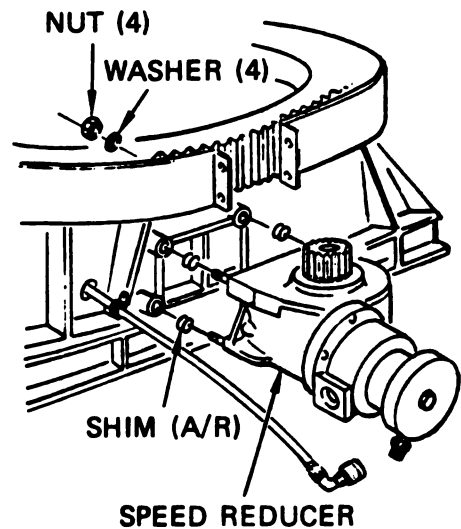


(6) Using 24mm deep well socket, remove four nuts and four washers securing speed reducer to base.

WARNING

The azimuth drive speed reducer weighs 68.04 Kg (150 lb) and requires two persons to remove.

(7) Slowly pull speed reducer away from base until studs and shims are clear. Record location and thickness of shims on each stud to assist in installation.



(8) Using 7/8-inch open end wrench, remove coupling half and preformed packing from speed reducer. Discard preformed packing.

(9) Using 11/16-inch open end wrench, loosen jamnut and remove bleed valve, retainer, and preformed packing. Discard packing.

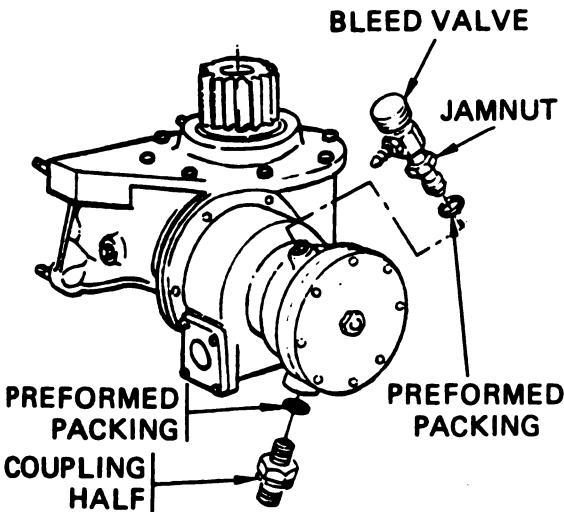
6-10. AZIMUTH DRIVE SPEED REDUCER MAINTENANCE INSTRUCTIONS (CONT)

b. Install.

(1) Apply hydraulic fluid to new packing. Install new preformed packing on coupling half.

(2) Install coupling half in speed reducer. Using 7/8-inch crowfoot wrench, torque coupling half to 20 to 28 N•m.

(3) Install new preformed packing, wet with hydraulic fluid, on bleed valve. Install bleed valve and tighten with 11/16-inch open end wrench.



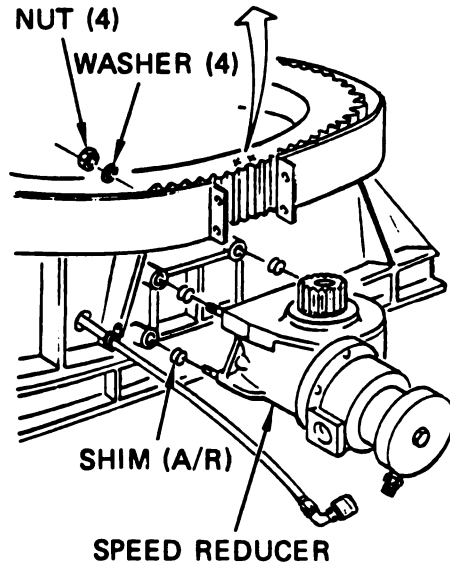
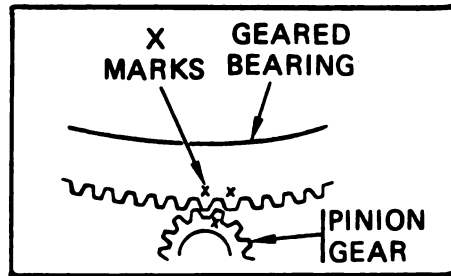
(4) Install shims. If damaged, install new shims to thickness recorded in removal.

WARNING

The azimuth drive speed reducer weighs 68.04 Kg (150 lb) and requires two persons to install.

(5) Position speed reducer to base with pinion gear X mark between X marks on geared bearing.

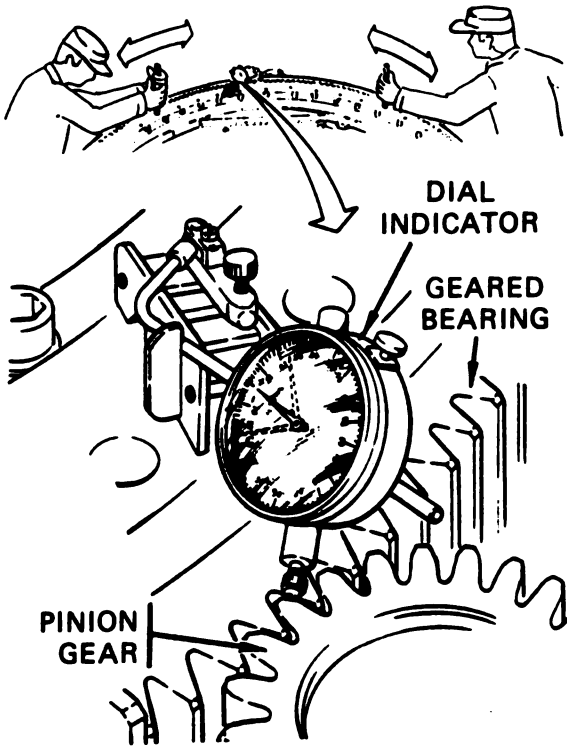
(6) Apply zinc chromate primer to three studs. Slowly push speed reducer on base until gears are engaged. Install four washers and four nuts. Using 24mm deep socket, torque nuts to 220 to 240 N•m.



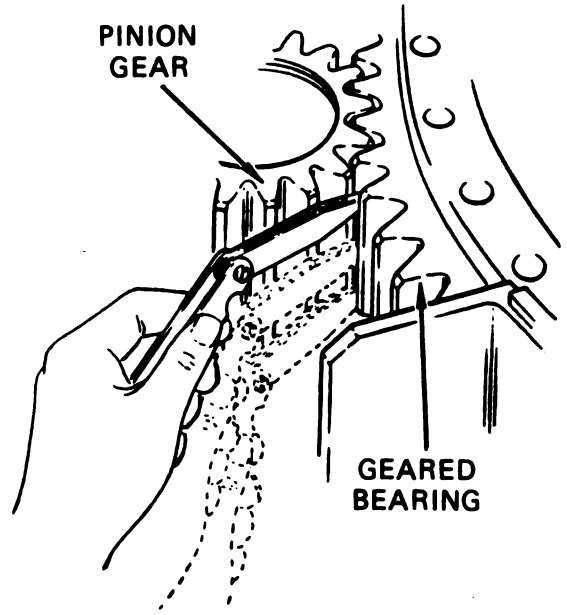
6-10. AZIMUTH DRIVE SPEED REDUCER MAINTENANCE INSTRUCTIONS (CONT)

(7) Using dial indicator, check from center of geared bearing tooth and pinion gear tooth for a 0 to 0.025mm backlash.

(8) Use shims to obtain backlash required in step (7).

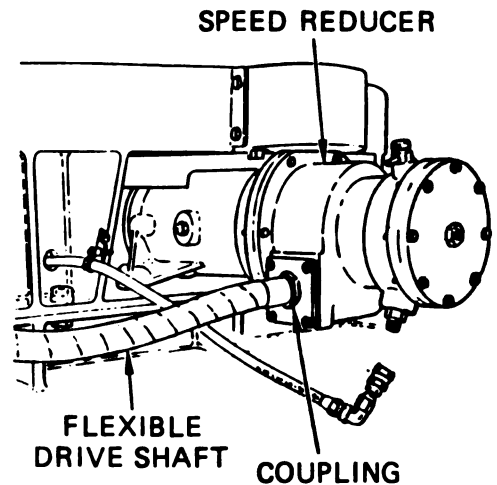


(9) Using feeler gage, check that gear engagement is true for full parallelism of pinion gear and geared bearing teeth.



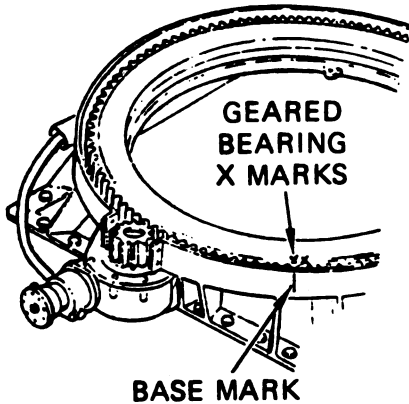
(10) Apply varnish to nut and stud that is free of zinc chromate primer.

(11) Connect flexible drive shaft to speed reducer. Using 1-5/8 inch open end wrench, tighten coupling.

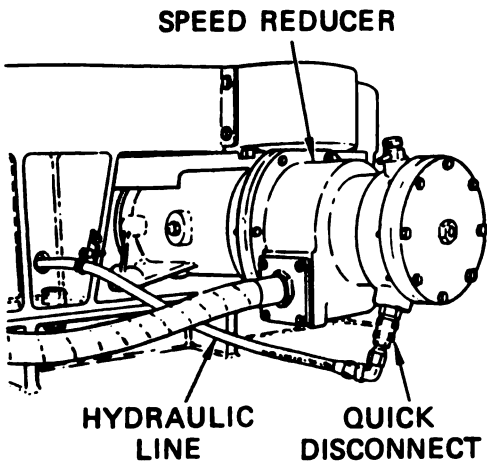


6-10. AZIMUTH DRIVE SPEED REDUCER MAINTENANCE INSTRUCTIONS (CONT)

(12) Manually rotate azimuth geared bearing in opposite direction from paragraph a, step (3) until X marks on geared bearing aligns with mark on base made during removal.



(13) Connect hydraulic line quick-disconnect coupling and turn coupling until ratchet lock begins to click, then turn 1/2 turn more.



(14) Install pinion gear cover (item 1, c).

(15) If no further maintenance is required, perform follow-on procedure (page 6-36).

3. ADJUST AZIMUTH DRIVE BRAKE.

a. Position LLM at 3200 mils (180 degrees) azimuth and 0 mils elevation (TM 9-1425-646-10).

b. Using 8mm socket head key, hold adjusting screw while loosening jamnut 1/4 to 3/4 turn with 24mm open end wrench.

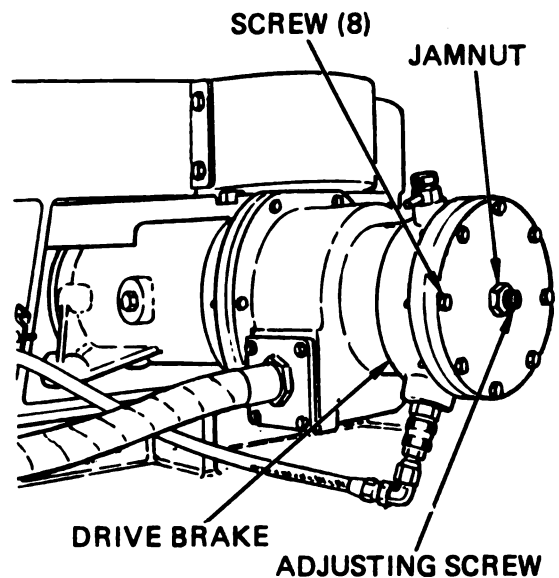
c. Using 8mm socket head key, loosen adjusting screw 1-3/4 to 2-1/4 turns to assure there is no contact between adjusting screw and brake.

NOTE

The eight screws in cover can be used to determine 1/8 turn of adjusting screw.

d. Slowly tighten adjusting screw with 8mm socket head key until contact with brake is felt. A slight increase in torque will be detected. Turn socket head key back and forth 1/8 turn to be sure contact has been made. Tighten adjusting screw an additional 7/8 ($\pm 1/16$) turn.

e. While holding the 8mm socket head key to keep adjusting screw from turning, torque jamnut with 24mm crowfoot wrench to 25 to 35 N•m.



6-10. AZIMUTH DRIVE SPEED REDUCER MAINTENANCE INSTRUCTIONS (CONT)

f. Manually rotate LLM left and right in azimuth to insure there is no freewheeling of manual drive.

g. Using BC, operate LLM in azimuth both left and right to make sure brake is operating (TM 9-1425-646-20).

h. Perform stow procedures (TM 9-1425-646-10).

FOLLOW-ON PROCEDURE

Install azimuth servomotor (paragraph 6-8).

Install battery box (paragraph 4-3).

Install electronics box (paragraph 4-4).

Install turret (paragraph 5-29).

Using BC, cycle LLM in azimuth two times in azimuth and elevation to check for smooth operation (TM 9-1425-646-20).

Perform load test after repair (paragraph 3-9).

6-11. AZIMUTH DRIVE GEARED BEARING MAINTENANCE INSTRUCTIONS. This paragraph covers the maintenance tasks for the following items:

<i>Item</i>	<i>Page</i>
1. Geared Bearing	6-37
2. Shim	6-39

INITIAL SETUP

Test/Support Equipment
Sling, hoisting, 13029709
Wrecker, HEMTT

Tools
Kit, tool, 13032302

Materials/Parts
Grease (21, Appendix B)
Primer, zinc chromate (47, Appendix B)
Sealant (59, Appendix B) (for item 2)
Solvent, drycleaning (61, Appendix B)
(for item 2)
Varnish (71, Appendix B) (for item 2)

Personnel Required
2 MLRS Repairers MOS 27M
Wrecker Driver MOS 63H

Troubleshooting
Paragraph 2-9

Equipment Condition
Turret removed (paragraph 5-29)
Azimuth position transducer/switch removed
(paragraph 6-14)

1. GEARED BEARING.

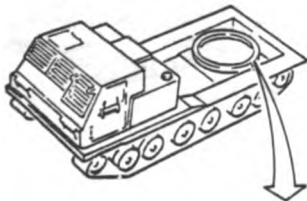
a. Remove.

(1) Note and mark on base position of X marks on gear teeth to assist in installation.

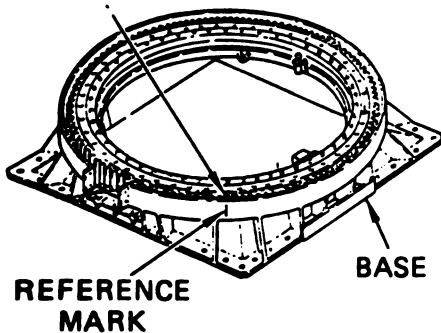
(2) Using 13mm socket and 6-inch extension, remove four bolts and washers securing servomotor to azimuth drive speed reducer.

(3) Using 10mm socket, remove four bolts and washers securing pinion gear cover. Remove cover.

(4) Using 24mm deep well socket, loosen four nuts securing azimuth drive speed reducer. Pull speed reducer away from base far enough for pinion gear to be free of geared bearing.

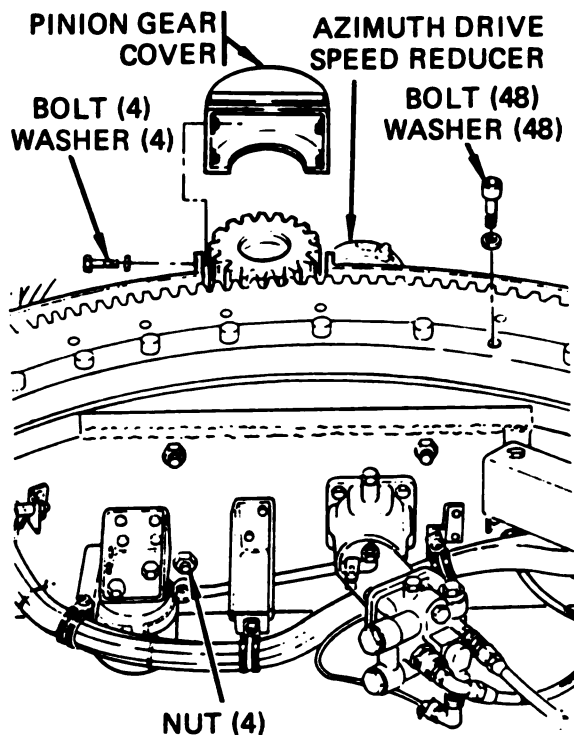


**GEARED
BEARING
X MARKS**



6-11. AZIMUTH DRIVE GEARED BEARING MAINTENANCE INSTRUCTIONS (CONT)

(5) Using 12mm socket attachment, remove 48 bolts and washers securing bearing to base.



(6) Install three pieces of hoisting arrangement hardware approximately 120 degrees apart.

(7) Connect sling to hardware.

(8) Center 5-ton wrecker hook over geared bearing and connect wrecker to sling.

(9) Slowly lift geared bearing off base and lower on wooden supports.

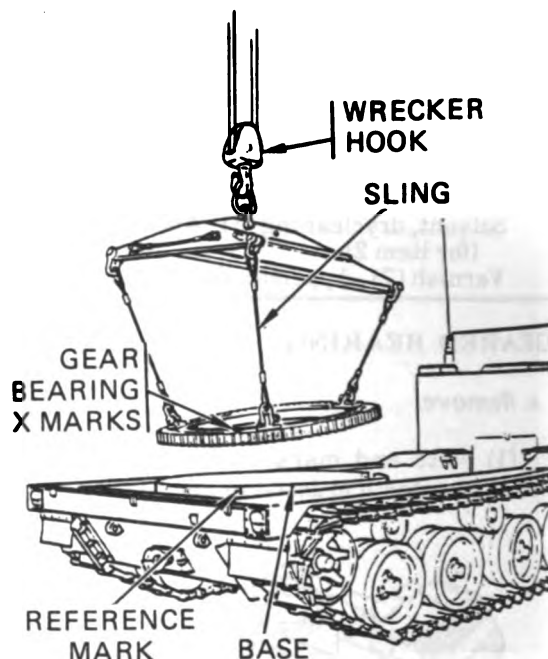
b. Install.

(1) Apply light coat of grease to gear teeth leaving area with X marks free of grease.

(2) Install hoisting arrangement hardware and sling on new geared bearing.

(3) Center 5-ton wrecker hook over geared bearing and connect wrecker to sling. Raise geared bearing and set it on base with X marks at position marked during removal.

(4) Remove sling and hoisting arrangement hardware from geared bearing.



(5) Coat threads of bolts with zinc chromate primer.

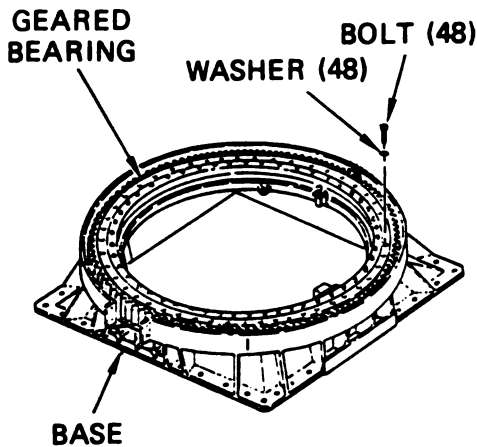
(6) Install 48 bolts and washers securing geared bearing to base.

NOTE

Torque every 12th bolt first to insure an even pressure around the azimuth geared bearing before proceeding to the remaining bolts.

(7) Using 12mm socket attachment, with torque wrench, torque bolts to 190 to 210 N•m.

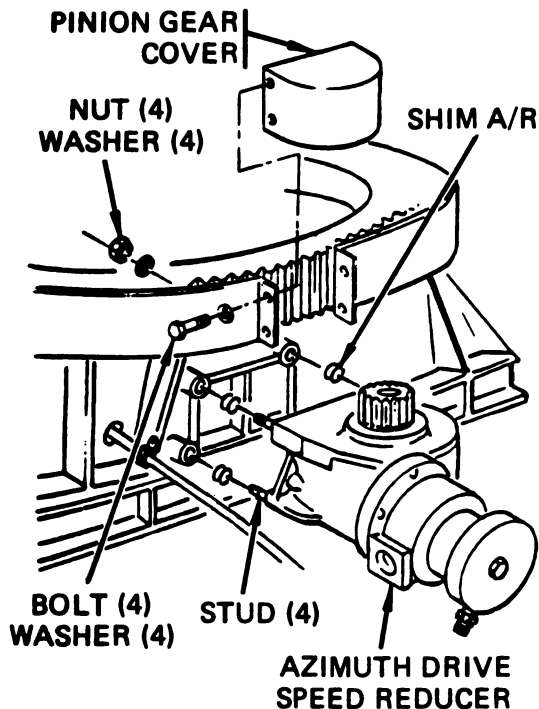
6-11. AZIMUTH DRIVE GEARED BEARING MAINTENANCE INSTRUCTIONS (CONT)



(8) Position azimuth drive speed reducer against base. Apply zinc chromate primer to three studs. Using 24mm deep well socket, torque nuts to 220 to 240 N_{em}. Apply varnish to nut without zinc chromate primer.

(9) Install pinion gear cover and secure with four bolts and washers. Using 10mm socket, tighten bolts.

(10) Inspect azimuth transducer shim. If shim is damaged, replace shim (item 2).



2. SHIM.

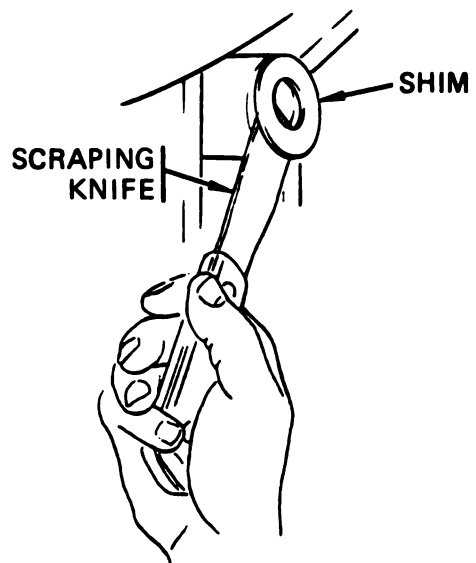
a. Remove.

(1) Using scraping knife, remove shim and sealant.

WARNING

Drycleaning solvent vapors are toxic. Avoid prolonged or repeated breathing of vapors and solvent contact with skin. Use only with adequate ventilation. Solvent is flammable and should not be used near open flame. Fire extinguishers should be readily available when solvent is used.

(2) Using drycleaning solvent, remove all sealant.



b. Install.

(1) Manually rotate azimuth geared bearing until X marks on top side of two adjacent gear teeth is in centerline of transducer/switch mounting pad.

(2) Using 10.9728mm diameter gage pin between gear teeth, measure distance from edge of gage pin and adjust thickness of peelable shim to obtain 21.10 to 21.40mm.

(3) Apply sealant to mating surface of shim and install shim on mounting pad.

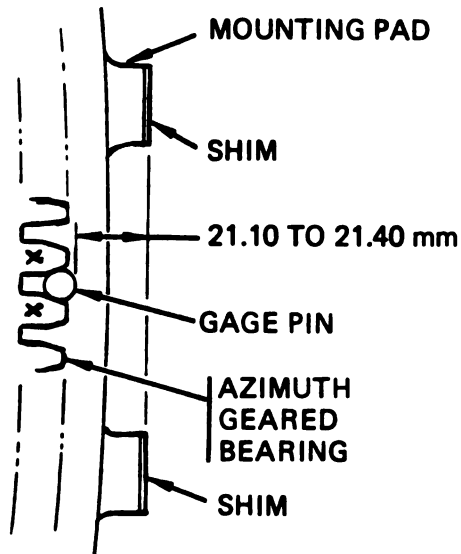
6-11. AZIMUTH DRIVE GEARED BEARING MAINTENANCE INSTRUCTIONS (CONT)

(4) Rotate azimuth geared bearing in opposite direction from step (1) until X marks are in original position.

FOLLOW-ON PROCEDURE

Install azimuth position transducer/switch (paragraph 6-14).

Install turret (paragraph 5-29).



6-12. BASE AND DRIVE ASSEMBLY MAINTENANCE INSTRUCTIONS. This paragraph covers the maintenance tasks for the following items:

<i>Item</i>	<i>Page</i>
1. Base and Drive Assembly	6-41
2. Base Felt Seal	6-48
3. Azimuth Drive Bearing Inserts	6-48
4. Azimuth Position Monitor Transducer Inserts	6-48
5. Azimuth ± 1.25 -Degree Switch Inserts	6-49

INITIAL SETUP

Test/Support Equipment
Sling, hoisting, 13029709
Wrecker, HEMTT

Tools
Kit, tool, 13032302
Set, shop, 13032303
Extractor, insert (for items 3, 4, and 5)
Tool, insert installation (for items 3, 4, and 5)
Wrench, torque, 30 to 250 N \cdot m (for item 1)

Materials/Parts
Primer, zinc chromate (47, Appendix B)
Varnish (71, Appendix B)

Fabricated Tools

Short 24mm box end wrench (3, Appendix C)

Personnel Required

2 MLRS Repairers MOS 27M
Wrecker Driver MOS 63H
(MLRS Crewmember MOS 13M to assist as required)

Troubleshooting

Paragraph 2-9

Equipment Condition

Turret removed (paragraph 5-29)

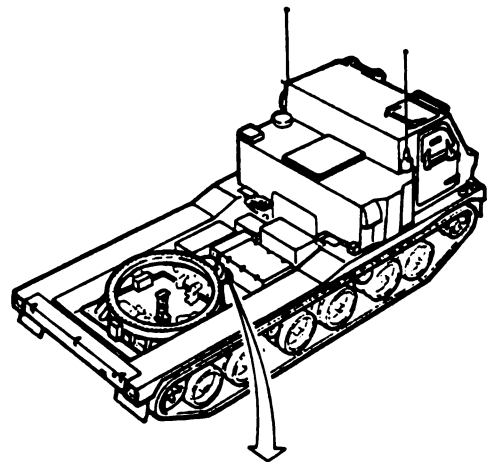
1. BASE AND DRIVE ASSEMBLY.

a. Remove.

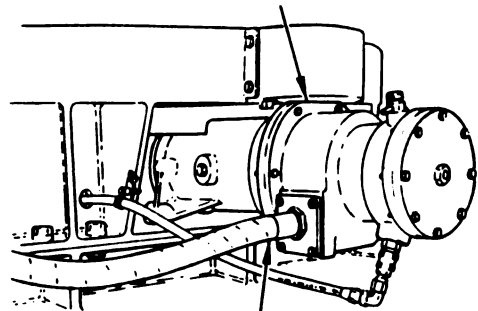
NOTE

Base and drive assembly is normally removed only to perform maintenance on vehicle. If necessary to replace base and drive assembly, refer to individual component paragraph for removal of components.

(1) Using 1-5/8 inch open end wrench, disconnect manual drive flexible shaft from azimuth drive speed reducer.



AZIMUTH DRIVE SPEED REDUCER

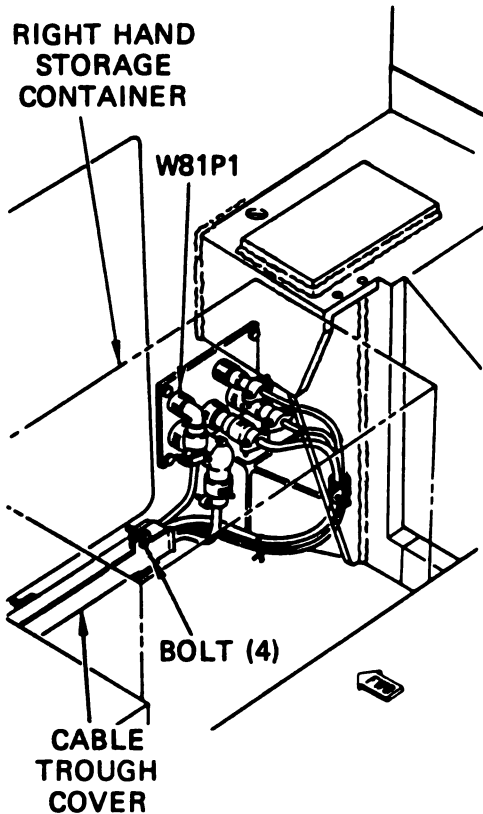


MANUAL DRIVE FLEXIBLE SHAFT

6-12. BASE AND DRIVE ASSEMBLY MAINTENANCE INSTRUCTIONS (CONT)

(2) Disconnect electrical connector W81P1 from vehicle bulkhead connector W80J1.

(3) Using 10mm socket, remove four bolts securing cover on cable trough along front of vehicle bed. Remove cover.



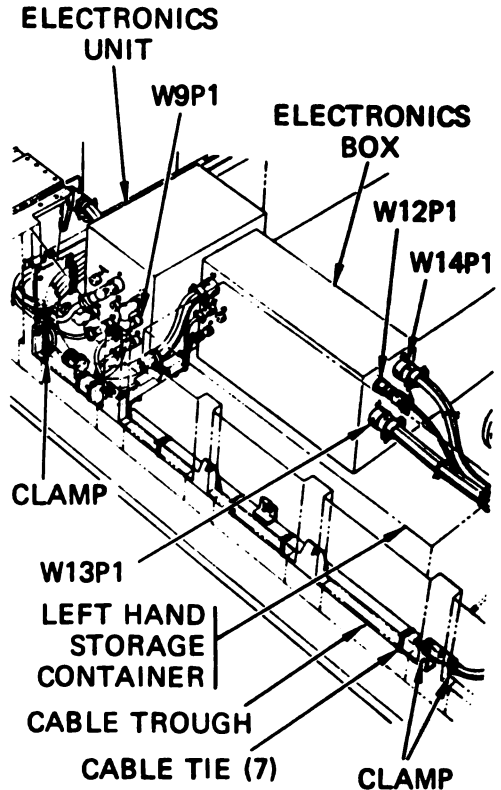
(4) Using diagonal pliers, cut cable ties on cable trough on left side of vehicle bed.

(5) Using crosstip screwdriver and 6mm box end wrench, remove three clamps securing cables W81 and W9 to vehicle. Reinstall clamps on vehicle.

(6) Disconnect electrical connector W9P1 from connector J3 on electronics unit.

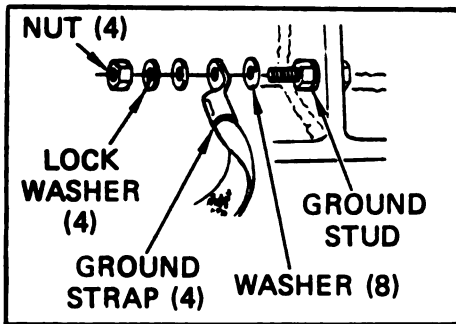
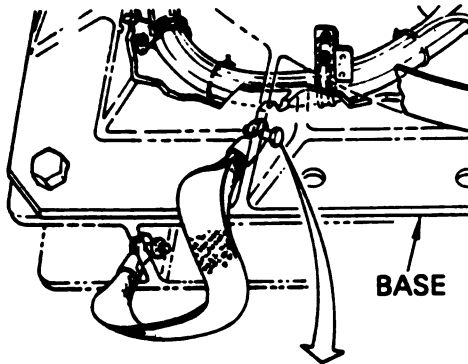
(7) Cut lockwire from W13P1 to W14P1. Disconnect electrical connectors W13P1, W12P1, and W14P1 from electronics box.

(8) Pull cables from vehicle bed and secure to base assembly.



6-12. BASE AND DRIVE ASSEMBLY MAINTENANCE INSTRUCTIONS (CONT)

(9) Using 17mm box end wrench and 17mm socket, remove four nuts, eight washers, and four bolts securing electrical ground straps to each corner of base.



(10) Remove hydraulic swivel adapter support (paragraph 6-7).

(11) Using crosstip screwdriver and 8mm box end wrench, hold ground stud and remove nut, washer, and lockwasher securing ground strap from flexible drive tube to vehicle.

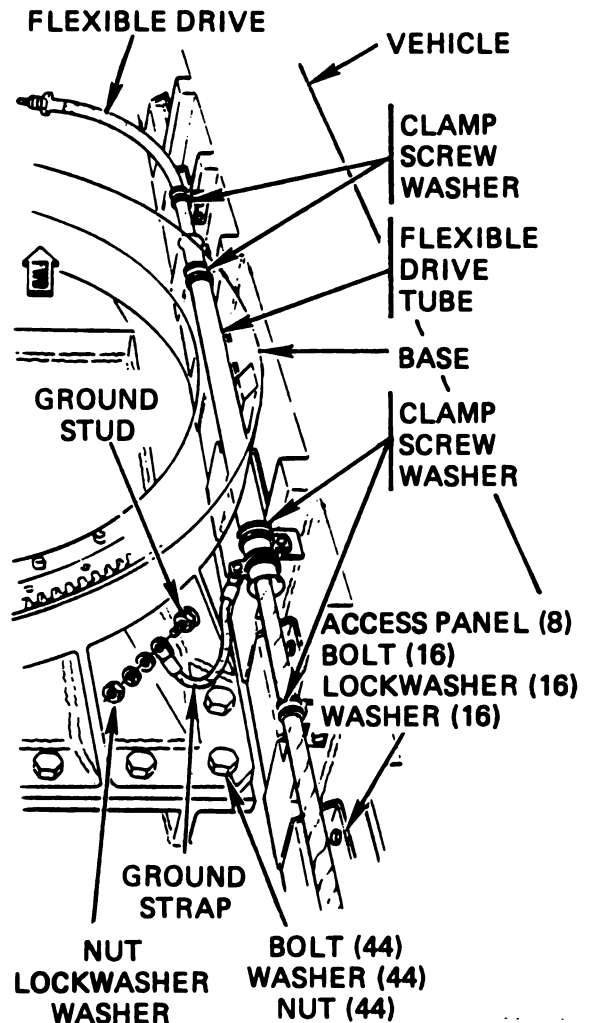
(12) Using crosstip screwdriver, remove four screws, washers, and clamps securing flexible drive to vehicle. Position flexible drive away from base.

(13) Using 9/16-inch socket, remove bolts and washers securing access panels on vehicle walls. Remove access panels to gain access to base mounting bolts.

WARNING

Position fabricated wrench onto nut and brace wrench to hold nut. Do not try to hold wrench while loosening nut as hand could be caught between wrench and base.

(14) Using fabricated box end wrench and 24mm socket with 20-inch extension and universal joint, remove 44 nuts, washers, and bolts securing base to vehicle. Record number of washers at each location.



6-12. BASE AND DRIVE ASSEMBLY MAINTENANCE INSTRUCTIONS (CONT)

(15) Secure three brackets from hoisting arrangement hardware to geared bearing 120 degrees apart with six turret mounting capscrews.

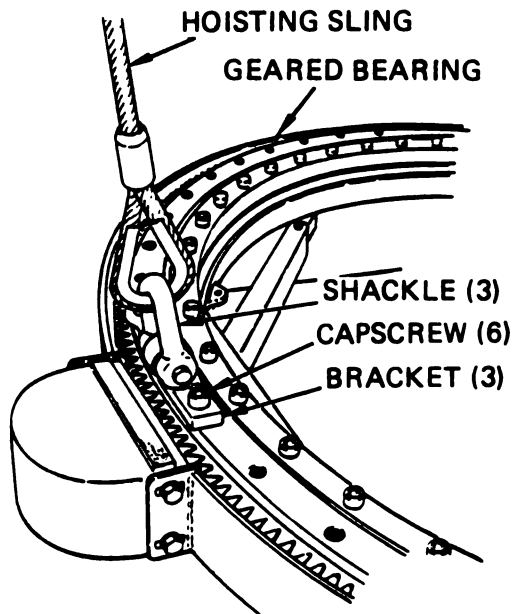
(16) Using 12mm wrench attachment socket, tighten capscrews.

(17) Secure hoisting sling to brackets with three shackles.

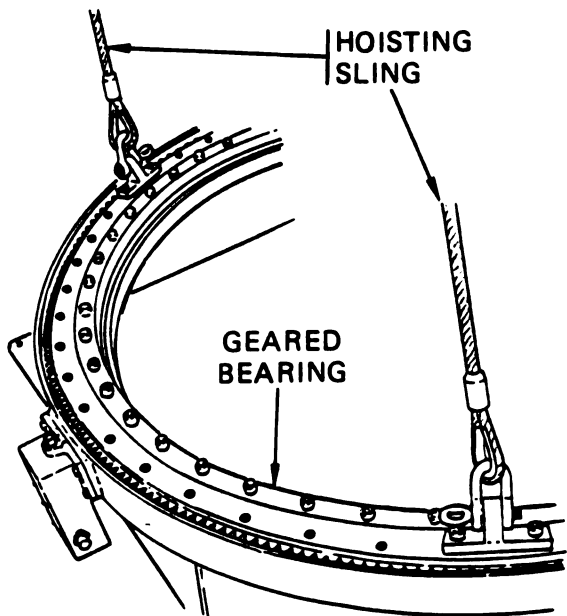
(18) Center wrecker hook over base and attach sling to hook. Slowly lift base off vehicle and lower onto wood blocks.

b. Install.

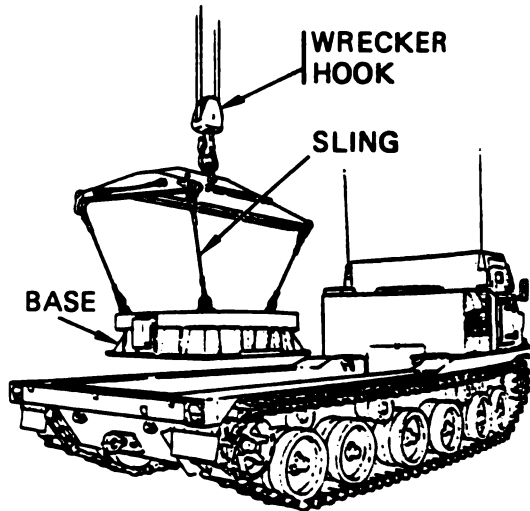
(1) Center wrecker hook over base and attach sling to hook. Slowly lift base off wood blocks and lower into position on vehicle.



FRONT ATTACHMENT



REAR ATTACHMENT



6-12. BASE AND DRIVE ASSEMBLY MAINTENANCE INSTRUCTIONS (CONT)

(2) Disconnect sling. Using 12mm wrench attachment socket, remove six capscrews securing three brackets to geared bearing. Remove brackets.

NOTE

A maximum of nine washers may be used at each bolt location to prevent nut from bottoming out before attaining proper torque.

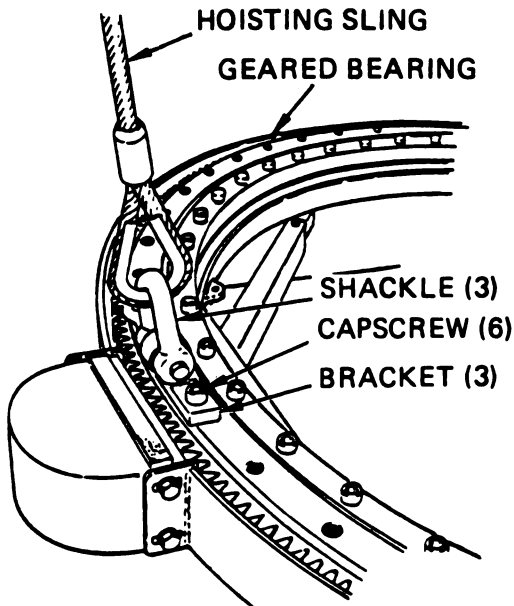
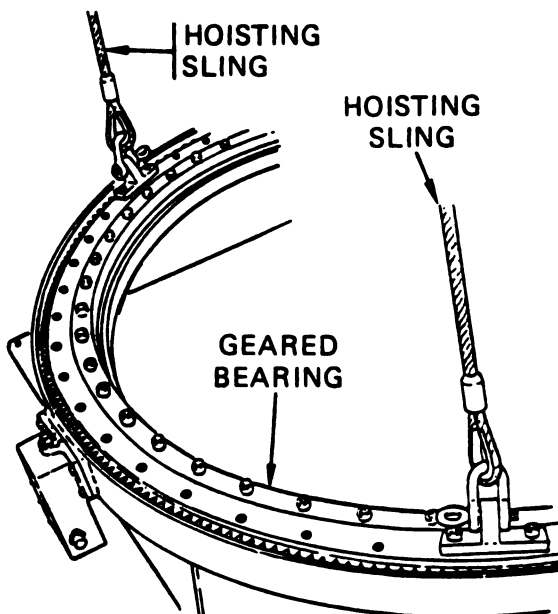
(3) Apply zinc chromate primer to 44 bolts. Install bolts, washers (as required), and nuts to secure base to vehicle.

WARNING

Position fabricated wrench onto nut and brace wrench to hold nut. Do not try to hold wrench while torquing nut as hand could be caught between wrench and base.

(4) Using fabricated box end wrench and 24mm socket with 20-inch extension and universal joint, torque nuts to 124 to 147 N•m.

(5) Install access panels on vehicle wall and secure with bolts and washers. Using 9/16-inch socket, tighten bolts.

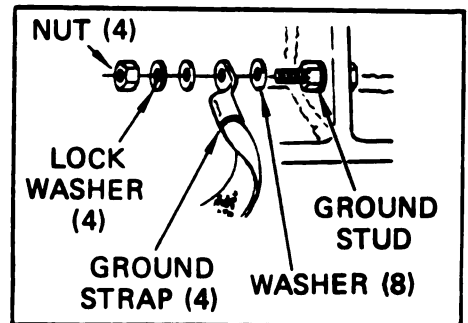
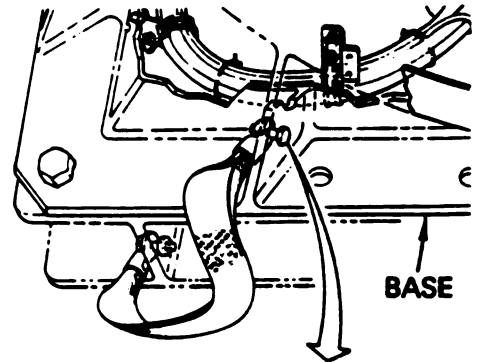
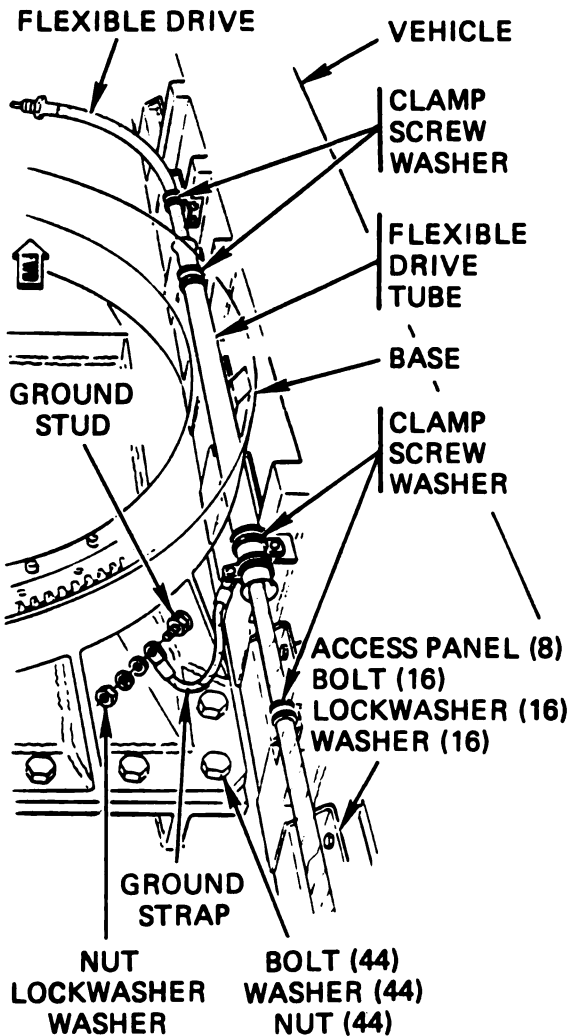
**FRONT ATTACHMENT****REAR ATTACHMENT**

6-12. BASE AND DRIVE ASSEMBLY MAINTENANCE INSTRUCTIONS (CONT)

(6) Position ground strap from flexible drive tube to base. Install nut, lockwasher, and washer. Hold ground stud with crosstip screwdriver and tighten nut with 8mm box end wrench. Install four clamps, washers, and screws securing flexible drive to vehicle. Using crosstip screwdriver, tighten screws.

(7) Clean electrical ground strap mounting holes at each corner of base for electrical bond (paragraph 3-10).

(8) Install four electrical ground straps and secure with four bolts, eight washers, and four nuts. Using 17mm box end wrench and 12mm socket, tighten nuts. Apply varnish over bolts and nuts.



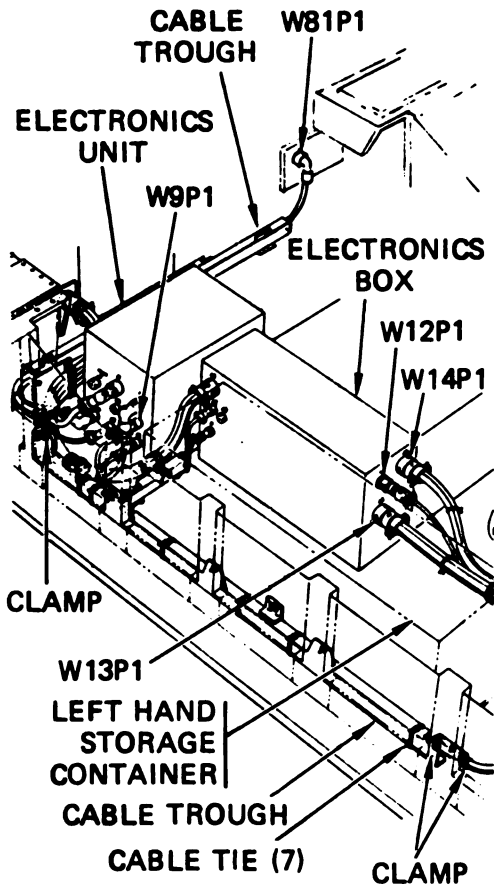
(9) Route cables W12, W13, and W14 to electronics box. Connect electrical connector W12P1 to J4, W13P1 to J5, and W14P1 to J6. Lock-wire W13P1 to W14P1.

(10) Route cables W9 and W81 through cable trough on left side of vehicle. Connect W9P1 to J3 on electronics unit.

6-12. BASE AND DRIVE ASSEMBLY MAINTENANCE INSTRUCTIONS (CONT)

(11) Continue to route cable W81 through cable trough along front of vehicle bed. Connect W81P1 to W80J1 on vehicle bulkhead.

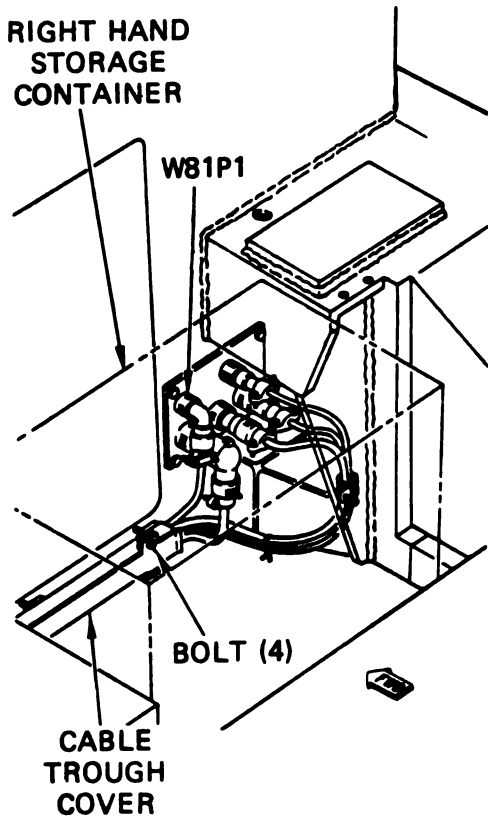
(12) Using crosstip screwdriver and 6mm box end wrench, remove three clamps. Position cables W9 and W81 in clamps and reinstall clamps.



(13) Using cable ties, secure cables W9 and W81 in cable trough on left side of vehicle bed.

(14) Position cover on cable trough along front of vehicle bed and install four bolts. Using 10mm socket, tighten bolts.

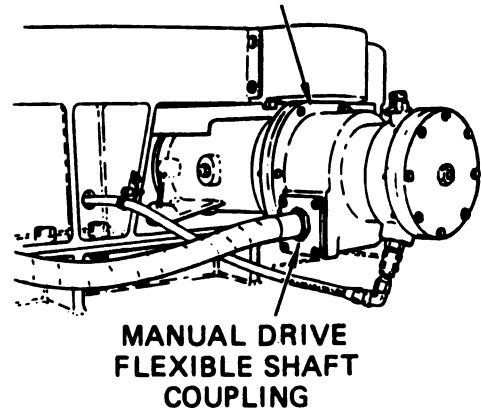
RIGHT HAND STORAGE CONTAINER



(15) Install hydraulic swivel adapter support (paragraph 6-7).

(16) Connect manual drive flexible shaft to azimuth drive speed reducer. Using 1-5/8 inch crowfoot wrench, tighten coupling.

AZIMUTH DRIVE SPEED REDUCER



6-12. BASE AND DRIVE ASSEMBLY MAINTENANCE INSTRUCTIONS (CONT)

(17) If no further maintenance is required, perform follow-on procedure (page 6-49).

2. BASE FELT SEAL.

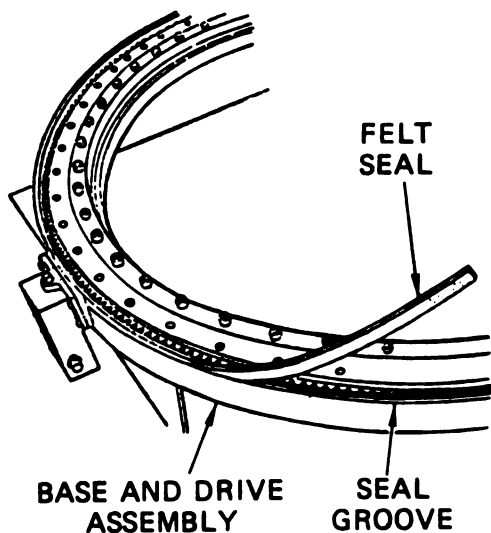
a. Remove.

(1) Remove felt seal from base and drive assembly.

(2) Using wire brush, clean seal groove.

b. Install.

(1) Install new felt seal in groove on base and drive assembly.



(2) If no further maintenance is required, perform follow-on procedure (page 6-49).

3. AZIMUTH DRIVE BEARING INSERTS.

a. Remove.

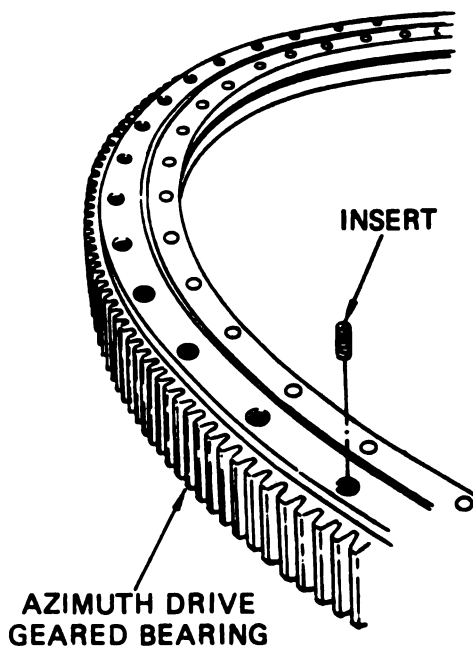
(1) Remove azimuth drive geared bearing (paragraph 6-11).

(2) Using insert extractor, remove defective insert.

b. Install.

(1) Apply zinc chromate primer to new insert. Using insert installation tool, install new insert.

(2) Install azimuth drive geared bearing (paragraph 6-11).



(3) If no further maintenance is required, perform follow-on procedure (page 6-49).

4. AZIMUTH POSITION MONITOR TRANSDUCER INSERTS.

a. Remove.

(1) Remove azimuth position monitor transducer (paragraph 6-14).

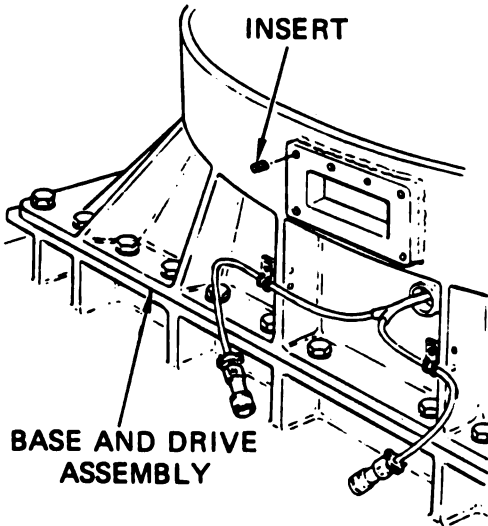
(2) Using insert extractor, remove defective insert.

b. Install.

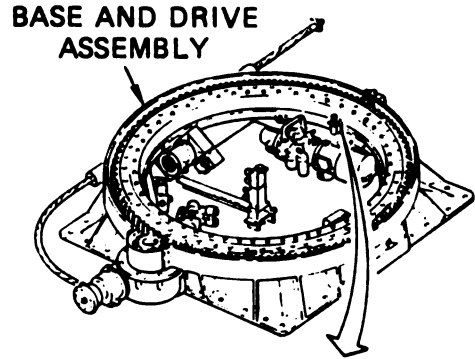
(1) Apply zinc chromate primer to new insert. Using insert installation tool, install new insert.

6-12. BASE AND DRIVE ASSEMBLY MAINTENANCE INSTRUCTIONS (CONT)

(2) Install azimuth position monitor transducer (paragraph 6-14).



(2) Position switch support to base support. Apply zinc chromate primer to two bolts. Install two bolts and two washers to secure switch support to base support. Using 10mm socket, tighten bolts.



(3) If no further maintenance is required, perform follow-on procedure.

5. AZIMUTH ± 1.25 -DEGREE SWITCH INSERTS.

a. Remove.

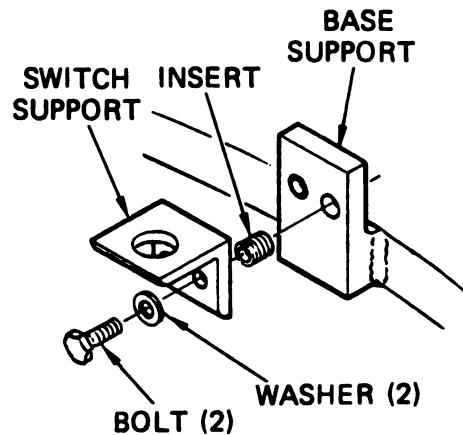
(1) Remove azimuth ± 1.25 -degree switch (paragraph 5-27).

(2) Using 10mm socket, remove two bolts and two washers securing switch support to base support.

(3) Using insert extractor, remove defective insert.

b. Install.

(1) Apply zinc chromate primer to new insert. Using insert installation tool, install new insert.



(3) Install azimuth ± 1.25 -degree switch (paragraph 5-27).

(4) If no further maintenance is required, perform follow-on procedure.

FOLLOW-ON PROCEDURE

Install turret (paragraph 5-29).

6-13. AZIMUTH MANUAL DRIVE ASSEMBLY MAINTENANCE INSTRUCTIONS. This paragraph covers the maintenance tasks for the following items:

<i>Item</i>	<i>Page</i>
1. Flexible Shaft	6-50
2. Adapter Assembly	6-51

INITIAL SETUP

Tools

- Kit, tool, 13032302
- Set, shop, 13032303
- Set, puller, CG-40C-B (for item 2)

Materials/Parts

- Primer, zinc chromate (47, Appendix B)

Personnel Required

- 2 MLRS Repairers MOS 27M

References

- TM 9-1425-646-10
- TM 9-1425-646-20

Troubleshooting

- Paragraph 2-9

Equipment Condition

- Jury struts installed (TM 9-1425-646-20)

1. FLEXIBLE SHAFT.

a. Remove.

NOTE

It may be necessary to traverse the turret to gain access to some clamps.

(1) Using crosstip screwdriver, remove screws and washers securing clamps. Remove clamps from flexible shaft.

(2) Using 1-5/8 inch open end wrench, disconnect flexible shaft from adapter assembly and

azimuth drive speed reducer. Remove flexible shaft from tube assembly.

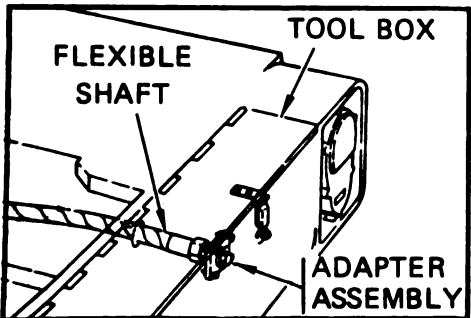
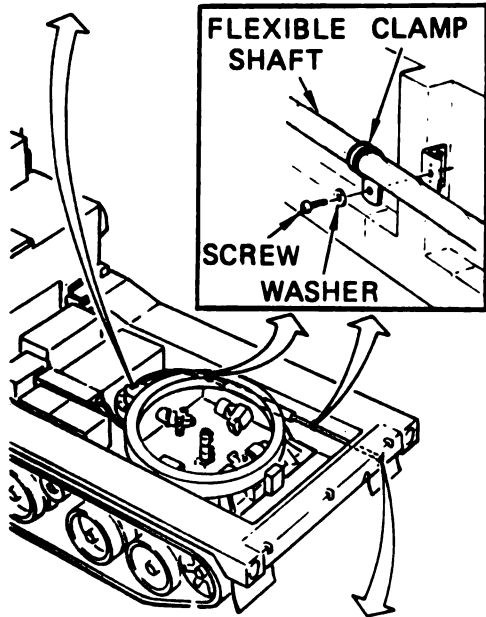
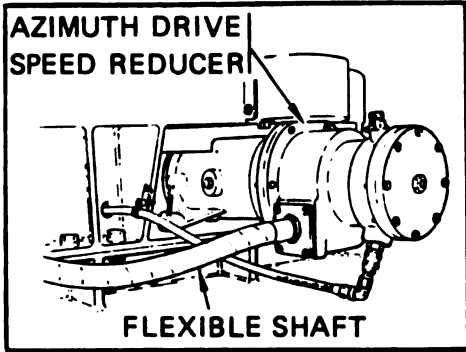
b. Install.

(1) Position flexible shaft in tube assembly with male fitting at azimuth drive speed reducer.

(2) Using 1-5/8 inch open end wrench, secure flexible shaft to azimuth drive speed reducer and adapter assembly.

(3) Position clamps on flexible shaft and secure with screws and washers. Using crosstip screwdriver, tighten screws.

6-13. AZIMUTH MANUAL DRIVE ASSEMBLY MAINTENANCE INSTRUCTIONS (CONT)

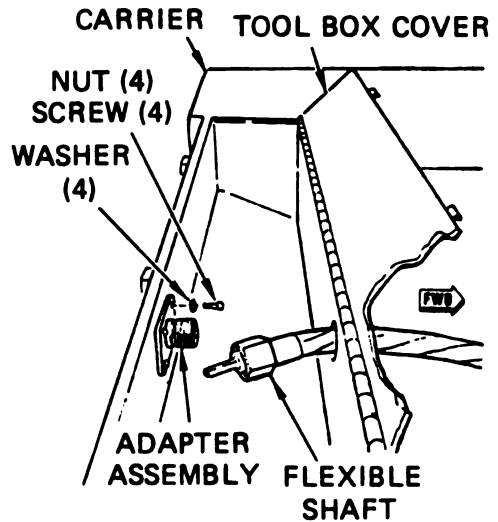


2. ADAPTER ASSEMBLY.

a. Remove.

(1) Using 1-5/8 inch open end wrench, disconnect flexible shaft from adapter assembly. Pull flexible shaft away from adapter assembly.

(2) Using 5mm socket attachment and 13mm box end wrench, remove four screws, washers, nut, and spacers securing adapter assembly to carrier. Remove adapter assembly.



b. Repair.

(1) Using retaining ring pliers, remove retaining ring from shoulder shaft. Remove shoulder shaft and washer.

(2) Using puller set, remove sleeve bearing from adapter housing.

NOTE

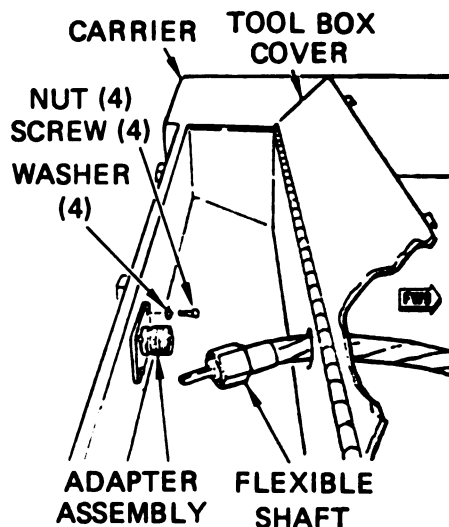
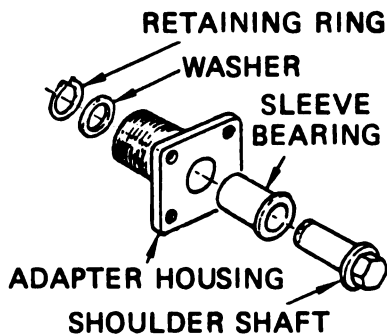
Replace shoulder shaft, sleeve bearing, or adapter housing if defective.

(3) Coat outside of sleeve bearing with zinc chromate primer and install in housing.

(4) If no further maintenance is required, perform follow-on procedure (page 6-52).

6-13. AZIMUTH MANUAL DRIVE ASSEMBLY MAINTENANCE INSTRUCTIONS (CONT)

(4) Install shoulder shaft and washer in housing. Using retaining ring pliers, install retaining ring.



c. Install.

(1) Apply zinc chromate primer to four screws. Position adapter assembly on carrier and install four screws, washers, spacer, and nuts. Using 5mm socket attachment and 13mm box end wrench, tighten nuts.

(2) Connect flexible shaft to adapter assembly and tighten using 1-5/8 inch open end wrench.

(3) If no further maintenance is required, perform follow-on procedure.

FOLLOW-ON PROCEDURE

Remove jury struts (TM 9-1425-646-20).

Manually traverse LLM two times and check for smooth operation. Stow LLM (TM 9-1425-646-10).

6-14. AZIMUTH POSITION TRANSDUCER/SWITCH MAINTENANCE INSTRUCTIONS. This paragraph covers the replacement of the azimuth position transducer/switch.

INITIAL SETUP

Tools

- Kit, tool, 13032302
- Set, shop, 13032303
- Wrench, torque, 0.1 to 3.5 Nm

Materials/Parts

- Cloth, cotton (6, Appendix B)
- Compound, locking (14, Appendix B)
- Primer, zinc chromate (47, Appendix B)
- Sealant (59, Appendix B)
- Sealant (58, Appendix B)

- Solvent, drycleaning (61, Appendix B)
- Varnish (71, Appendix B)

Personnel Required

- 2 MLRS Repairers MOS 27M

References

- TM 9-1425-646-10
- TM 9-1425-646-20

Troubleshooting
Paragraph 2-9

a. Remove.

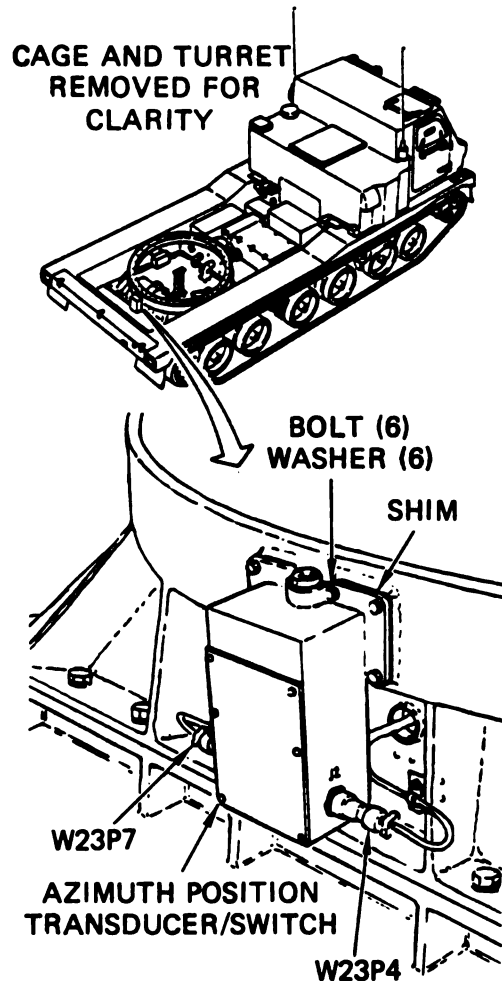
- (1) Disconnect electrical cable connectors W23P4 and W23P7 from transducer/switch.

.....
CAUTION

Do not damage shim between transducer and base.

- (2) Using 10mm socket, remove six bolts and six washers. Remove transducer/switch.

- (3) If shim is damaged, replace shim (paragraph 6-11).



6-14. AZIMUTH POSITION TRANSDUCER/SWITCH MAINTENANCE INSTRUCTIONS (CONT)

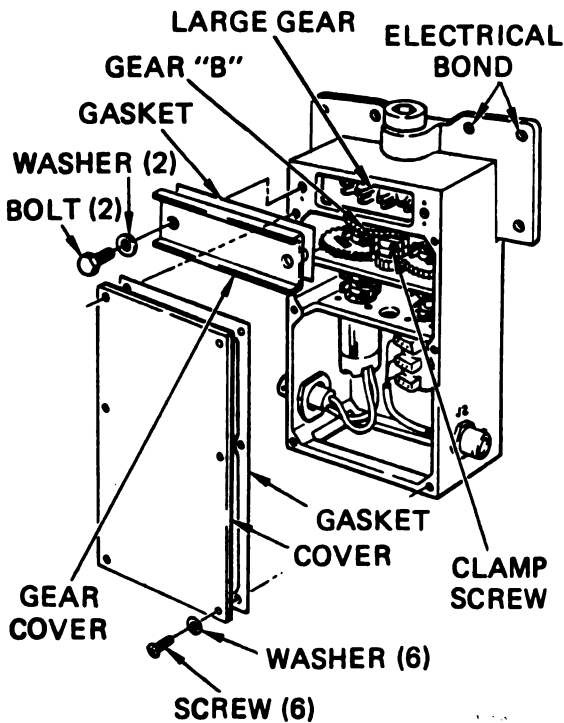
b. Install.

(1) Clean around lower left bolthole on transducer/switch for electrical bond (paragraph 3-10).

(2) Using crosstip screwdriver, remove six screws and six washers securing cover on new transducer/switch. Remove cover and gasket.

(3) Using 10mm socket, remove two bolts and washers securing gear cover. Remove cover and gasket.

(4) Rotate large gear until screw in clamp on gear B is accessible.



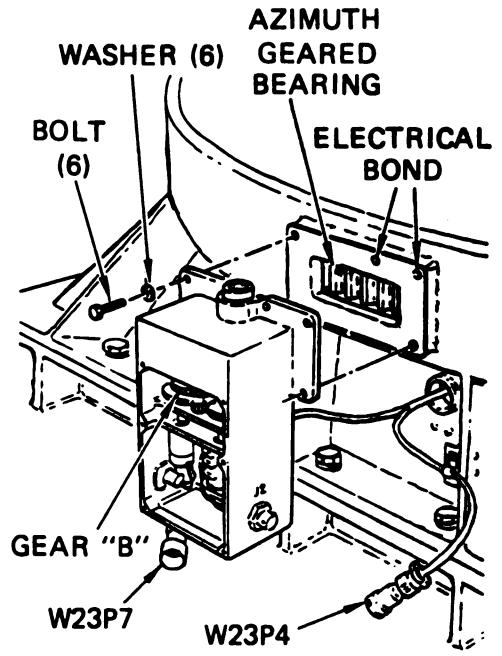
(5) Apply zinc chromate primer to five bolts.

(6) Hold gear B to prevent rotation. Preload large gear one tooth and position transducer/switch on mounting pad. Rotate gear B left and right to engage teeth of azimuth geared bearing.

(7) Install six bolts and six washers to secure transducer/switch. Clean bolt for electrical bond ground strap.

(8) Using 10mm socket, tighten bolts. Apply varnish on ground strap connection.

(9) Connect electrical connectors W23P7 to J1 and W23P4 to J2 on transducer/switch.



c. Adjust.

WARNING

Methyl-ethyl-ketone vapors are toxic. Avoid prolonged or repeated breathing of vapors or contact with skin. Use only with adequate ventilation. Methyl-ethyl-ketone is flammable and should not be used near open flame. Fire extinguisher should be available when solvent is used.

(1) Apply small amount of methyl-ethyl-ketone to clamp screw. Allow methyl-ethyl-ketone to loosen sealing compound before removing screw.

6-14. AZIMUTH POSITION TRANSDUCER/SWITCH MAINTENANCE INSTRUCTIONS (CONT)

NOTE

The following procedure is for the later configured SPLs equipped with a clamp to secure the gears to the shafts. Some earlier configured SPLs may be equipped with a setscrew in the gear hub to secure the gears to the shaft. These earlier configured AVMLs require a 0.050-inch socket head key to loosen the setscrew.

(2) Using 7/64-inch socket head key, loosen screw in clamp on gear B. Do not loosen screw in clamp on gear C.

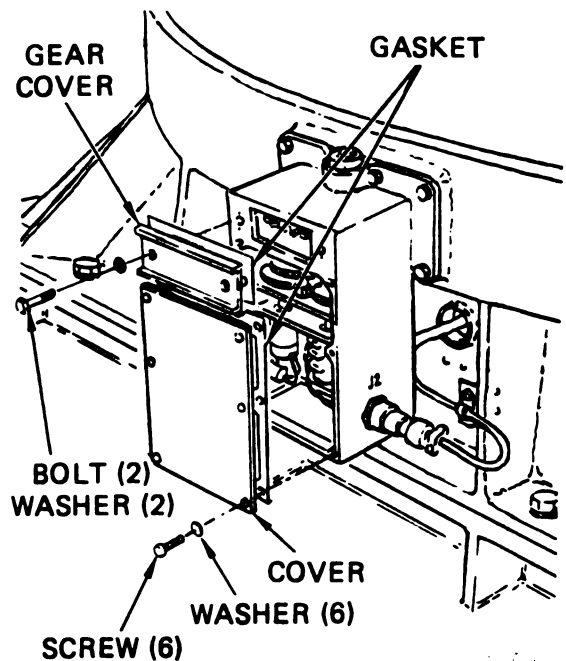
(3) Turn on FCS and select RESOLVER READOUT on test menu (TM 9-1425-646-10).

(4) Rotate pinion gear C until AZ RESOLVER READOUT indicates +1.8 to -1.8 mils. Loosen clamp screw until outer two threads are exposed. Apply drop of sealing compound onto screw threads. Using 7/64-inch socket head key, tighten screw tight enough to prevent gear from slipping on shaft. Check that AZ RESOLVER READOUT on FCP still indicates +1.8 to -1.8 mils.

(5) Turn off FCS (TM 9-1425-646-10).

(6) Apply zinc chromate primer to screws. Apply sealing compound to both sides of gasket. Position cover and gasket on transducer/switch. Install six screws and six washers. Torque screws to 0.5 to 0.8 Nm.

(7) Apply zinc chromate primer to two bolts. Install gear cover and gasket. Secure cover with two bolts and washers. Using 10mm socket, tighten bolts.



(8) Position LLM to right rear and observe that LLM goes to correct position (TM 9-1425-646-10).

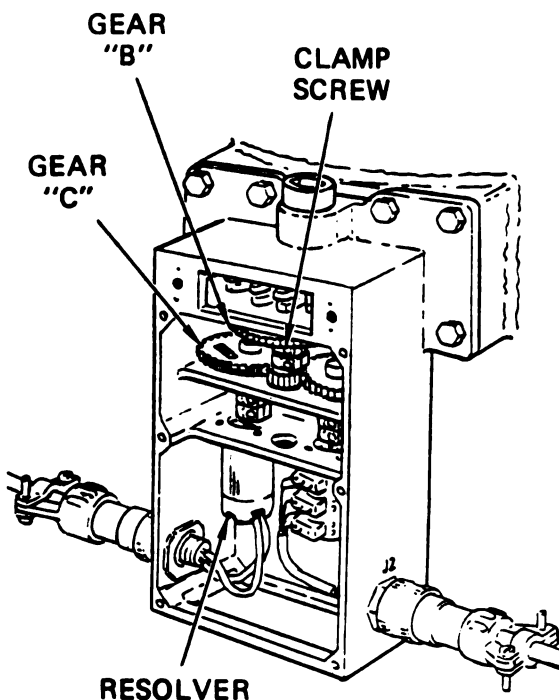
(9) Perform stow procedures and observe that LLM properly stows (TM 9-1425-646-10).

(10) Repeat steps (8) and (9) with LLM to left rear.

FOLLOW-ON PROCEDURE

Using BC, cycle LLM two times in azimuth and check for smooth operation (TM 9-1425-646-20).

Perform stow procedures (TM 9-1425-646-10).



6-15. ELEVATION SERVOMOTOR ASSEMBLY MAINTENANCE INSTRUCTIONS. This paragraph covers the replacement of the elevation servomotor assembly.

INITIAL SETUP

Tools

Kit, tool, 13032302

Materials/Parts

- Caps and plugs, plastic (3, Appendix B)
- Cloth, cotton (6, Appendix B)
- Gasket (18, Appendix B)
- Packing, preformed (27, Appendix B)
- Primer, zinc chromate (47, Appendix B)
- Varnish (71, Appendix B)

Personnel Required

MLRS Repairer MOS 27M

References

- TM 9-1425-646-10
- TM 9-1425-646-20

Troubleshooting

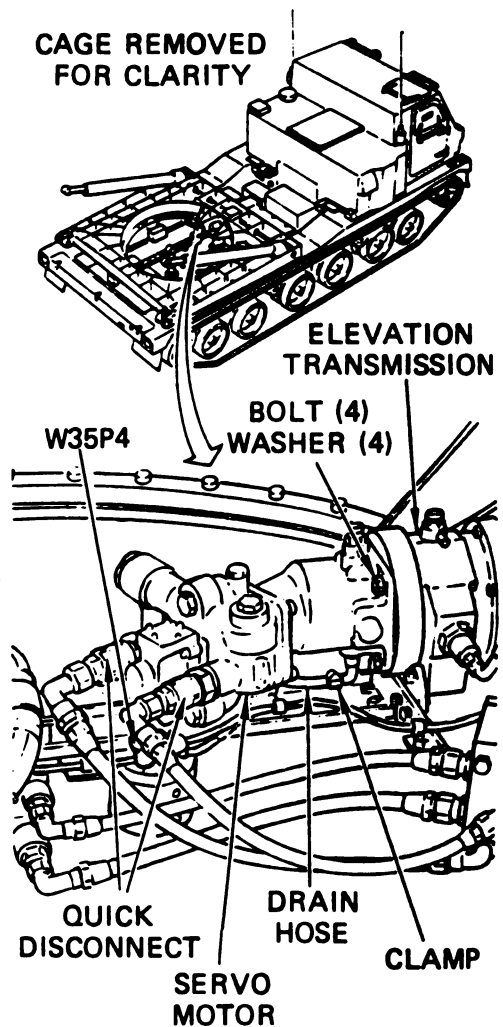
Paragraph 2-9

Equipment Condition

Position LLM to 1600 mils (90 degrees) azimuth and 0 mils elevation (TM 9-1425-646-10)

a. Remove.

- (1) Disconnect electrical connector W35P4 from servomotor connector J1.
- (2) Install plastic caps on disconnected connectors.
- (3) Disconnect two hydraulic quick-disconnects.
- (4) Using plastic caps and plugs, cover each open line and port.
- (5) Loosen thumbscrew clamp securing drain hose to elbow on motor.
- (6) Slide thumbscrew clamp back on hose and disconnect hose from motor.
- (7) Using 13mm socket with extension, remove four bolts and washers securing servomotor to elevation transmission.
- (8) Pull servomotor straight out and away from elevation transmission to disengage drive shaft. Remove elevation servomotor assembly. Discard gasket.

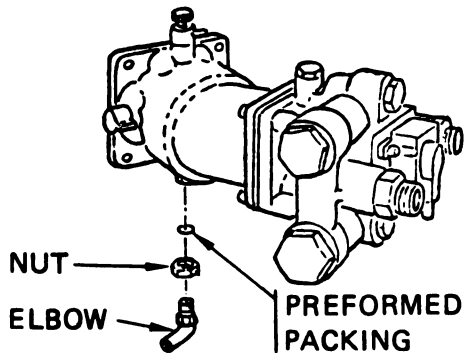


6-15. ELEVATION SERVOMOTOR ASSEMBLY MAINTENANCE INSTRUCTIONS (CONT)

(9) Using 11/16-inch open end wrench and 7/16-inch open end wrench, remove nut, elbow, and preformed packing from removed servomotor. Discard packing.

b. Install.

(1) Apply hydraulic fluid to new packing. Install new preformed packing and nut on elbow. Install elbow in new servomotor drain port. Do not tighten nut.



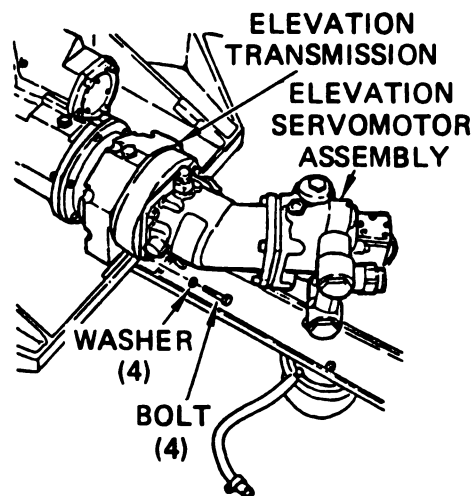
(2) Clean lower right-hand mounting hole for electrical bond (paragraph 3-10).

(3) Install gasket on servomotor. Position servomotor so that electrical connector and quick-disconnects are facing to right side of base.

(4) Slowly engage servomotor drive shaft into elevation transmission until mounting surfaces are flush.

(5) Apply zinc chromate primer to three mounting bolts. Using 13mm socket with extension, install bolt (without primer) and washer in lower right-hand hole. Install remaining three bolts and washers in remaining holes.

(6) Using 13mm socket and torque wrench, torque bolts to 11 to 15 N·m. Apply varnish to bolt for electrical bond.



6-15. ELEVATION SERVOMOTOR ASSEMBLY MAINTENANCE INSTRUCTIONS (CONT)

(7) Position drain elbow for routing of drain hose. Using 11/16-inch open end wrench, tighten elbow nut while holding elbow with 7/16-inch open end wrench.

(8) Connect drain hose to elbow, slide thumbscrew clamp in position and tighten.

(9) Remove protective caps from hydraulic quick-disconnects.

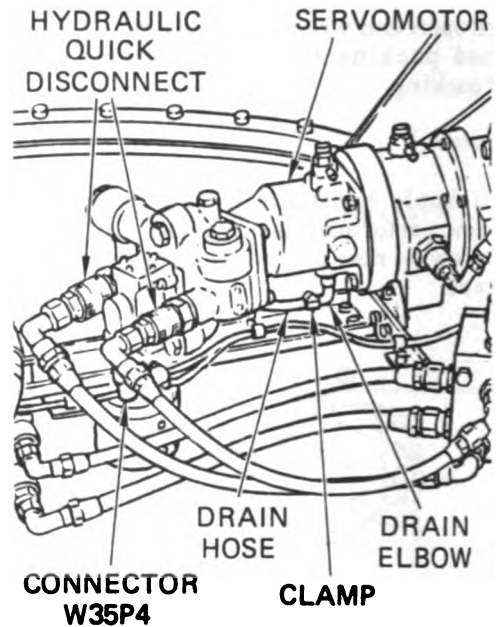
(10) Connect two hydraulic quick-disconnects. Turn coupling until ratchet lock begins to click and then turn 1/2 turn more.

(11) Connect connector W35P4 servomotor connector J1.

FOLLOW-ON PROCEDURE

Service hydraulic system (TM 9-1425-646-20).

Using BC, cycle LLM in elevation two times and check for smooth operation (TM 9-1425-646-20).



6-16. ELEVATION TRANSMISSION/BRAKE MAINTENANCE INSTRUCTIONS. This paragraph covers the replacement of the elevation transmission/brake.

INITIAL SETUP

Test/Support Equipment
Wrecker, HEMTT, 10-ton

Tools
Kit, tool, 13032302
Set, shop, 13032303
Sling, hoisting, 13029709

Materials/Parts
Block, wood
Fluid, hydraulic (17, Appendix B)
Packing, preformed (27, Appendix B)
Primer, zinc chromate (47, Appendix B)

Personnel Required
MLRS Repairer MOS 27M
(MLRS Crewmember MOS 13M to assist as required)
Wrecker Driver MOS 63H

References
TM 9-1425-646-10
TM 9-1425-646-20

Troubleshooting
Paragraph 2-9

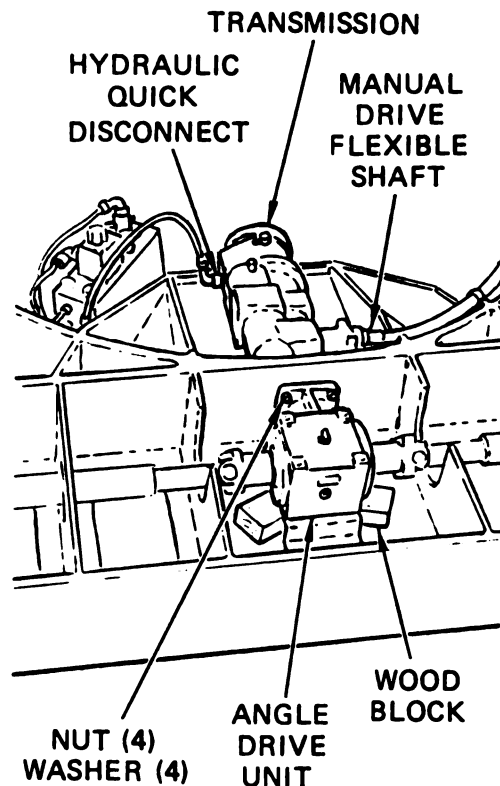
Equipment Condition
Elevation servomotor assembly removed (paragraph 6-15)
Cage down against turret or vehicle sponson bumper assembly. If cage is elevated too much or not enough for jury strut installation and cannot be moved, support cage with wrecker. Use shackle and link on cage for wrecker attachment. Wrecker cable should be taut to support full weight of cage.

a. Remove.

WARNING

If cage is not down against turret or vehicle sponson bumpers, or elevated with jury struts installed, support cage with wrecker when removing transmission. This will prevent personnel injury or death from falling cage.

- (1) Using wood block, block up angle drive unit for support and to prevent rotation.
- (2) Using 1-5/8 inch open end wrench, disconnect manual drive flexible shaft from transmission. Position shaft away from transmission.
- (3) Disconnect brake hydraulic hose quick-disconnect.
- (4) Using 13mm box end wrench, remove four nuts and four washers securing angle drive unit to transmission.



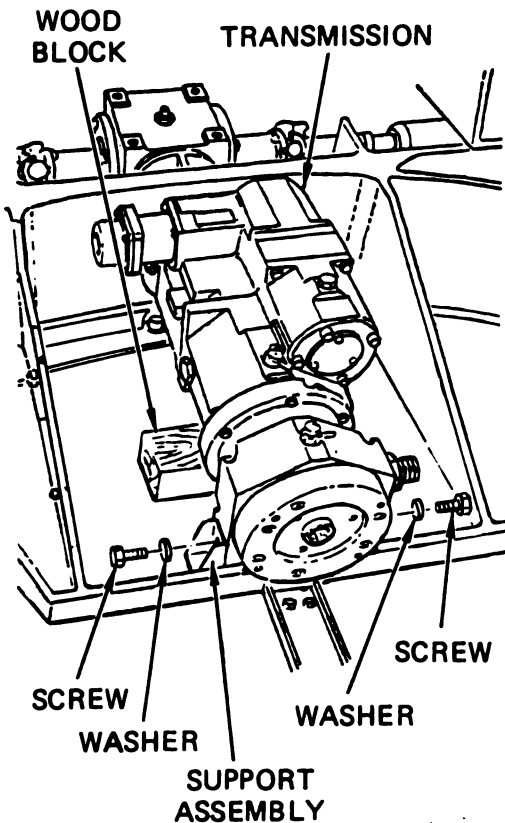
6-16. ELEVATION TRANSMISSION/BRAKE MAINTENANCE INSTRUCTIONS (CONT)

(5) Place wood block under end of transmission. Using 13mm socket, remove two screws and two washers securing transmission to support assembly.

WARNING

Transmission is heavy. It is necessary to use two people to remove it.

(6) Slowly pull transmission to rear until studs and drive shaft is clear of turret. Remove transmission.

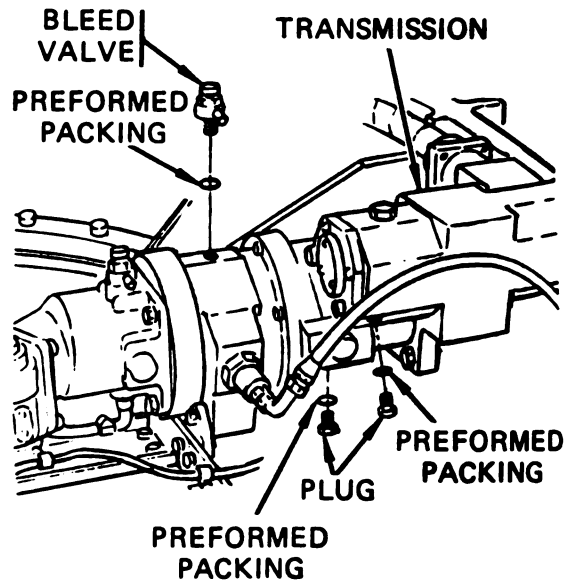


b. Install.

(1) Remove bleed valve from defective transmission. Remove plug from new transmission. Wet preformed packing with hydraulic fluid. Install new nut, retainer, and preformed packing on bleed valve.

(2) Install bleed valve in new transmission. Using 11/16-inch open end wrench, tighten bleed valve.

(3) Remove two plugs from bottom of defective transmission. Wet new preformed packing with hydraulic fluid and install on plugs. Install plugs in new transmission. Using 11/16-inch open end wrench, tighten plugs.



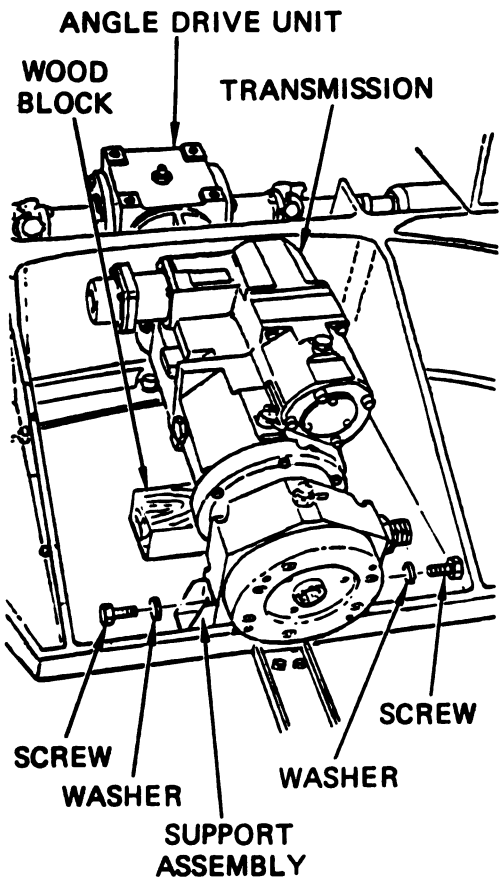
6-16. ELEVATION TRANSMISSION/BRAKE MAINTENANCE INSTRUCTIONS (CONT)

WARNING

Transmission is heavy. It is necessary to use two people to install it.

(4) Position filler on angle drive unit. Line up drive shaft and transmission studs with angle drive unit. Slowly push transmission forward until drive shaft is fully engaged in angle drive unit.

(5) Apply zinc chromate primer to two screws. Install two screws and two washers securing transmission to support assembly. Using 13mm socket, tighten screws.

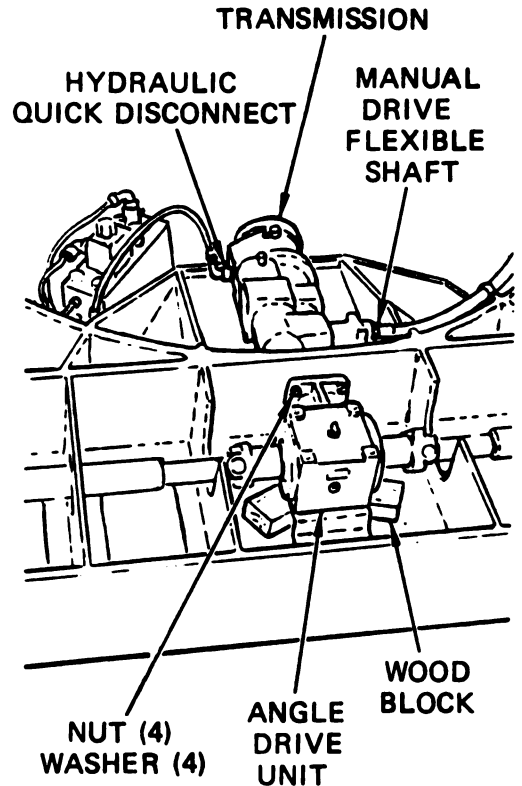


(6) Install four nuts and four washers securing transmission and angle drive unit. Using 13mm crowfoot wrench, torque nuts to 11 to 15 Nm.

(7) Connect hydraulic hose quick-disconnect to transmission. Turn quick-disconnect until ratchet lock begins to click and then turn 1/2 turn more.

(8) Position manual drive flexible shaft to transmission. Using 1-5/8 inch open end wrench, tighten flexible shaft coupling.

(9) Remove wood blocks from under transmission and angle drive unit.



(10) If no further maintenance is required, perform follow-on procedure.

FOLLOW-ON PROCEDURE

Install elevation servomotor assembly (paragraph 6-15).

Using BC, cycle LLM two times in elevation and check for smooth operation (TM 9-1425-646-20).

Manually elevate and lower LLM and check for smooth operation (TM 9-1425-646-10).

Perform load test after repair (paragraph 3-9).

6-17. ELEVATION MANUAL DRIVE MAINTENANCE INSTRUCTIONS. This paragraph covers the maintenance tasks for the following items:

<i>Item</i>	<i>Page</i>
1. Flexible Shaft	6-62
2. Adapter Assembly	6-63

INITIAL SETUP

Tools

- Kit, tool, 13032302
- Set, shop, 13032303
- Set, puller, CG-40C-B (for item 2)

Materials/Parts

- Primer, zinc chromate (47, Appendix B)

Personnel Required

- 2 MLRS Repairers MOS 27M

References

- TM 9-1425-646-10
- TM 9-1425-646-20

Troubleshooting

- Paragraph 2-9

Equipment Condition

- Jury struts installed (TM 9-1425-646-20)

1. FLEXIBLE SHAFT.

a. Remove.

(1) Using crosstip screwdriver and 6mm box end wrench, remove four nuts, eight washers, and four screws securing four clamps. Remove clamps from flexible shaft.

(2) Using 1-5/8 inch open end wrench, disconnect both ends of flexible shaft.

(3) Disconnect flexible shaft core from elevation transmission and adapter assembly. Remove flexible shaft from turret.

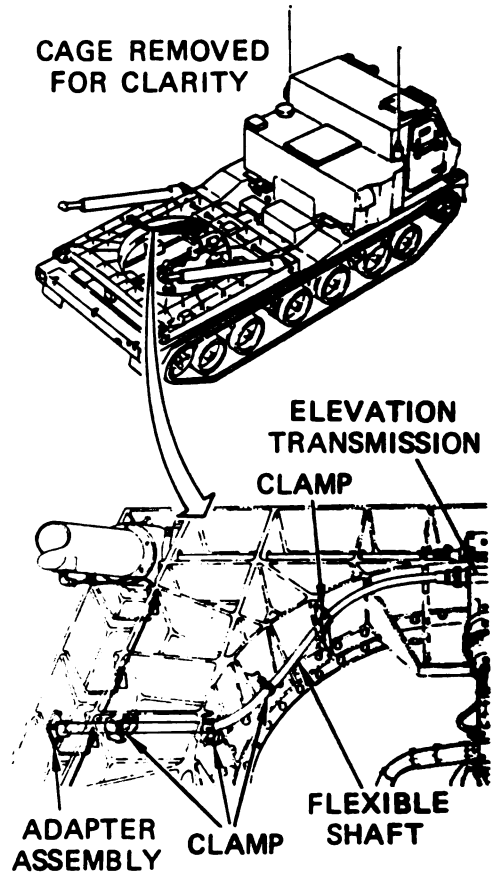
b. Install.

(1) Position new flexible shaft in turret with male fitting at elevation transmission.

(2) Using 1-5/8 inch crowfoot wrench, tighten flexible shaft to elevation transmission and adapter assembly.

(3) Position four clamps on flexible shaft and secure with four screws, eight washers, and four nuts. Using crosstip screwdriver and 6mm box end wrench, tighten nuts.

(4) If no further maintenance is required, perform follow-on procedure (page 6-63).



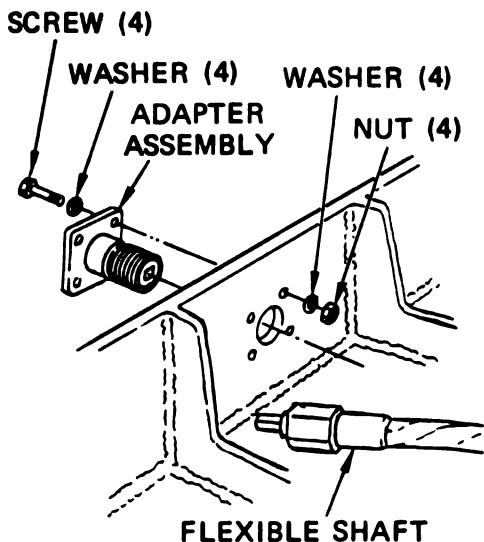
6-17. ELEVATION MANUAL DRIVE MAINTENANCE INSTRUCTIONS (CONT)

2. ADAPTER ASSEMBLY.

a. Remove.

(1) Using 1-5/8 inch open end wrench, disconnect flexible shaft from adapter assembly. Pull flexible shaft away from adapter assembly.

(2) Using 13mm socket and 10mm box end wrench, remove four nuts, eight washers, and four bolts securing adapter assembly to LLM. Remove adapter assembly.



b. Repair.

(1) Using retaining ring pliers, remove retaining ring from shoulder shaft. Remove shoulder shaft and washer.

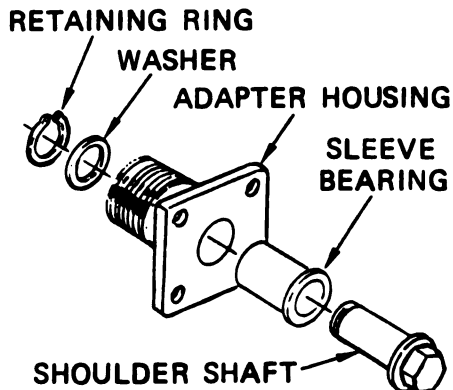
(2) Using puller set, remove sleeve bearing from adapter housing.

NOTE

Replace shoulder shaft, sleeve bearing, or adapter housing if defective.

(3) Coat outside of sleeve bearing with zinc chromate primer and install in housing.

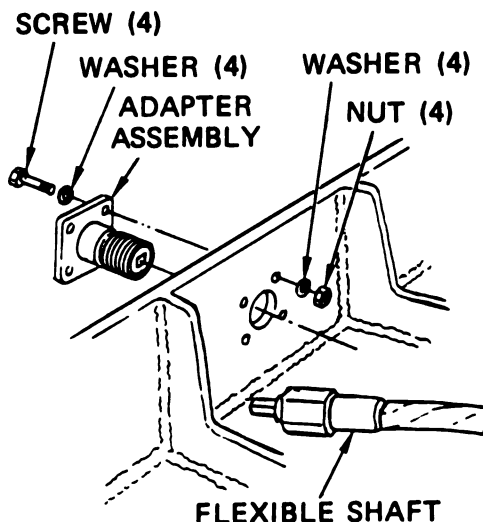
(4) Install shoulder shaft and washer in housing. Using retaining ring pliers, install retaining ring.



c. Install.

(1) Apply zinc chromate primer to four bolts. Position adapter assembly on LLM and install four bolts, eight washers, and four nuts. Using 13mm socket and 10mm box end wrench, tighten nuts.

(2) Connect flexible shaft to adapter assembly and using 1-5/8 inch open end wrench, tighten flexible shaft.



(3) If no further maintenance is required, perform follow-on procedure.

FOLLOW-ON PROCEDURE

Remove jury struts (TM 9-1425-646-20).

Manually elevate and lower LLM two times and check for smooth operation (TM 9-1425-646-10).

6-18. ELEVATION DRIVE PROPELLER SHAFT MAINTENANCE INSTRUCTIONS. This paragraph covers the replacement of the elevation drive propeller shaft.

INITIAL SETUP

Test/Support Equipment
Wrecker, HEMTT, 10-ton

Tools
Kit, tool, 13032302
Set, shop, 13032303
Sling, hoisting, 13029709

Materials/Parts
Cloth, abrasive (5, Appendix B)
Compound, corrosion preventive (13, Appendix B)
Primer, zinc chromate (47, Appendix B)

Personnel Required
MLRS Repairer MOS 27M
Wrecker Driver MOS 63H

References
TM 9-1425-646-10
TM 9-1425-646-20

Troubleshooting
Paragraph 2-9

Equipment Condition
Jury struts installed (TM 9-1425-646-20)
If cage is elevated too much or not enough for jury strut installation and cannot be moved, support cage with wrecker. Use shackle and link on cage for wrecker attachment. Wrecker cable should be taut to support full weight of cage.

a. Remove.

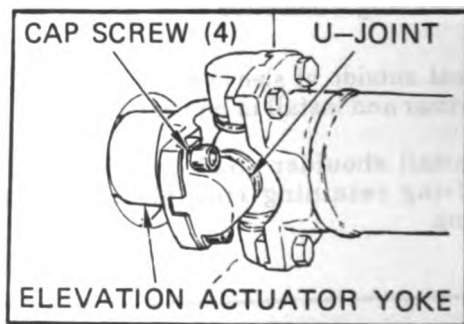
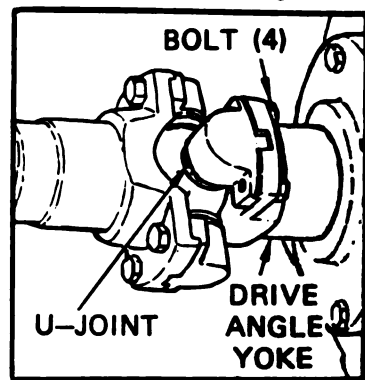
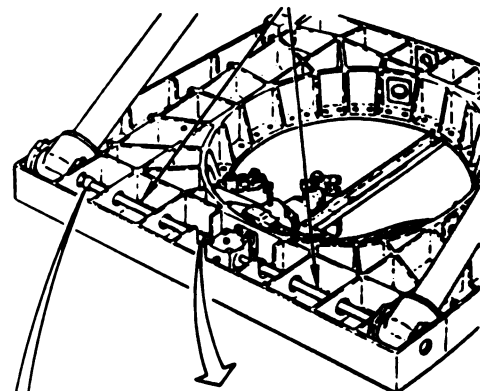
(1) Using 1/2-inch socket, remove four bolts securing propeller shaft U-joint to drive angle yoke.

(2) Using 1/4-inch socket attachment, remove four capscrews securing propeller shaft U-joint to elevation actuators.

(3) Using plastic insert hammer, tap U-joint off angle drive and elevation actuator yokes.

(4) Collapse propeller shaft and remove from LLM.

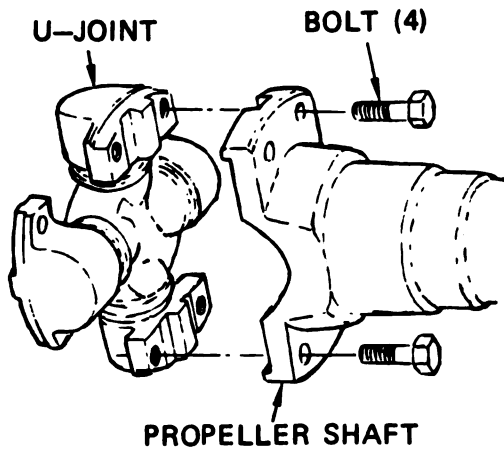
PROPELLER SHAFT



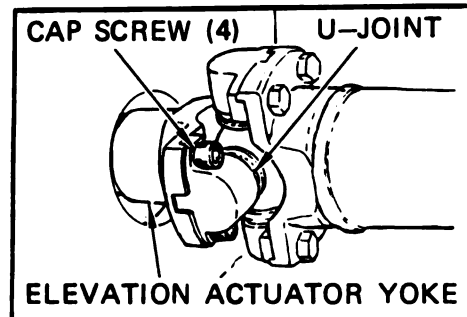
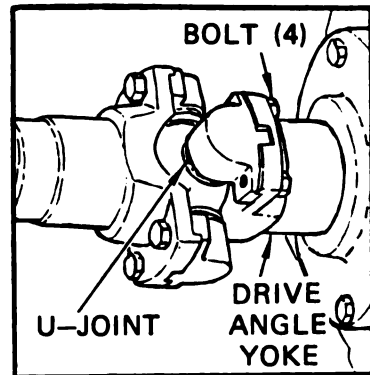
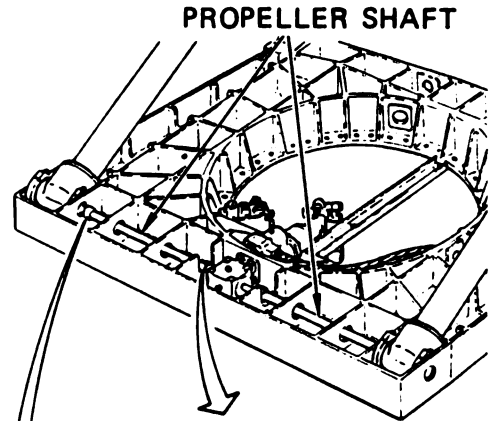
6-18. ELEVATION DRIVE PROPELLER SHAFT MAINTENANCE INSTRUCTIONS (CONT)

b. Repair.

- (1) Using 1/2-inch socket, remove four bolts securing U-joint to propeller shaft.
- (2) Using plastic insert hammer, tap U-joint off shaft.
- (3) Position new U-joint to shaft and using plastic insert hammer, tap U-joint onto shaft.
- (4) Install four bolts securing U-joint to shaft.
- (5) Using 1/2-inch socket, torque bolts to 27.0 to 32.0 N•m.



- (5) Install four capscrews securing propeller shaft U-joint to elevation actuator yoke. Using 1/4-inch socket attachment, torque capscrews to 27.0 to 32.0 N•m.



c. Install.

- (1) Inspect groove in yoke for rust or burrs. Using abrasive cloth, smooth and polish groove.
- (2) Apply light coat of corrosion preventive compound to grooves of U-joint and yoke.
- (3) Position propeller shaft U-joint to yokes and using hammer, tap U-joint on yoke.
- (4) Apply zinc chromate primer to four bolts. Install four bolts securing propeller shaft U-joint to angle drive yoke. Using 1/2-inch socket, torque bolts to 27.0 to 32.0 N•m.

FOLLOW-ON PROCEDURE

Remove jury struts (TM 9-1425-646-20).

Using BC, cycle LLM in elevation two times to check for smooth operation (TM 9-1425-646-20).

6-19. ELEVATION ANGLE DRIVE UNIT MAINTENANCE INSTRUCTIONS. This paragraph covers the replacement of the elevation angle drive unit.

INITIAL SETUP

Test/Support Equipment
Wrecker, HEMTT, 10-ton

Tools
Kit, tool, 13032302
Set, shop, 13032303
Sling, hoisting, 13029709

Materials/Parts
Primer, zinc chromate (47, Appendix B)

Personnel Required
MLRS Repairer MOS 27M
Wrecker Driver MOS 63H

Troubleshooting
Paragraph 2-9

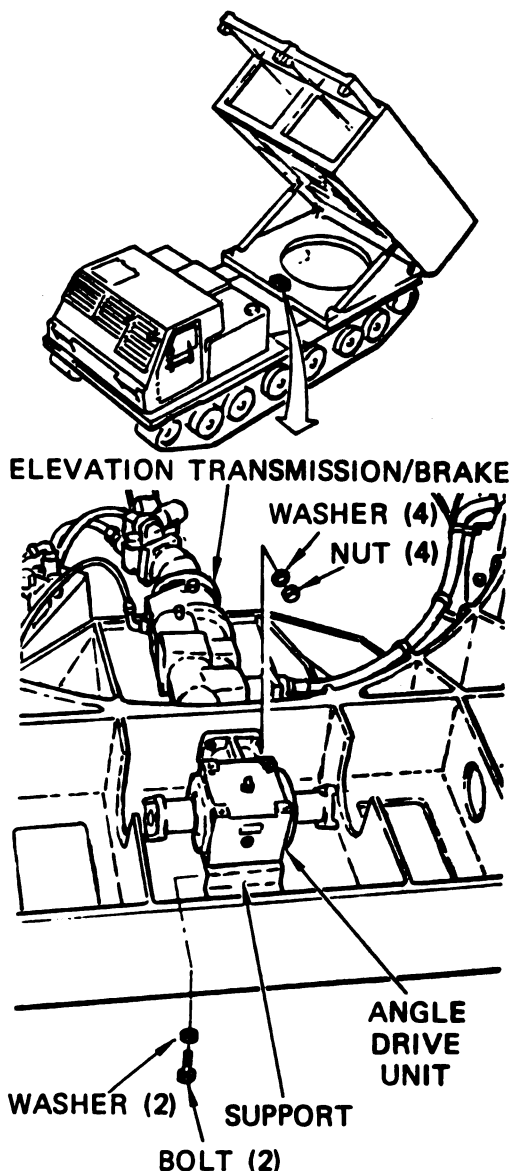
Equipment Condition
Elevation drive propeller shafts removed (paragraph 6-18)
Cage elevated and jury struts installed (TM 9-1425-646-20). If cage is elevated too much or not enough for jury strut installation and cannot be moved, support cage with wrecker. Use shackle and link on cage for wrecker attachment. Wrecker cable should be taut to support full weight of cage.

a. Remove.

(1) Using 19mm combination open end/box end wrench, remove two bolts and two washers securing angle drive unit to support.

(2) Using 13mm combination open end/box end wrench, remove four nuts and four washers securing angle drive unit to elevation transmission/brake.

(3) Remove angle drive unit by pulling straight back until angle drive unit mounting holes clear mounting studs, then lift out. Do not remove filler from mounting studs.



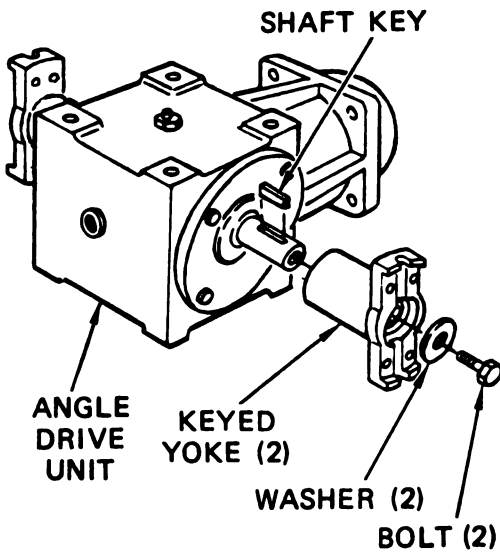
6-19. ELEVATION ANGLE DRIVE UNIT MAINTENANCE INSTRUCTIONS (CONT)

(4) Using 13mm socket, remove two bolts and washers securing keyed yokes to angle drive unit. Remove keyed yoke and shaft key from angle drive unit.

b. Install.

(1) Position shaft key in slot of output shafts on angle drive unit. Aline keyed yoke slot with shaft key and slide keyed yoke on shaft.

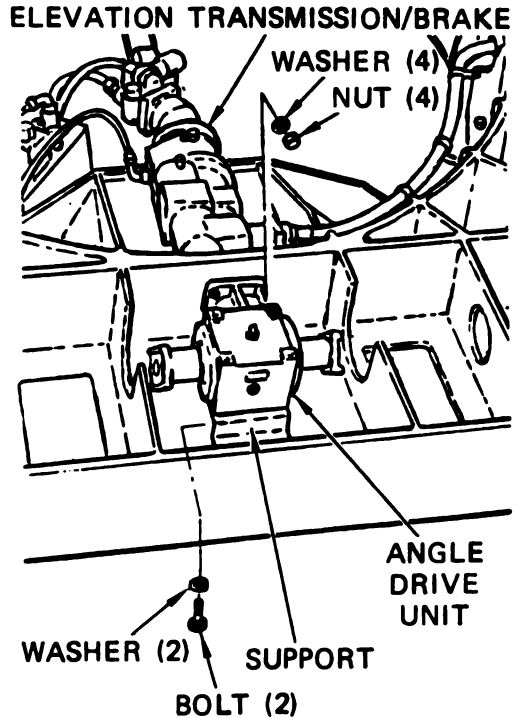
(2) Apply zinc chromate primer to bolts. Install bolts and washers securing keyed yoke to angle drive unit output shaft. Using 13mm socket, tighten bolts.



(3) Position angle drive unit on mounting studs and slide toward transmission.

(4) Apply zinc chromate primer to studs. Install four washers and four nuts securing angle drive unit to transmission. Using 13mm crowfoot wrench, torque nuts to 11 to 15 N•m.

(5) Install two bolts and two washers securing angle drive unit to support. Using 19mm wrench, tighten bolts.



FOLLOW-ON PROCEDURE

Install elevation drive propeller shafts (paragraph 6-18).

6-20. ELEVATION ACTUATOR-SUPPORT ASSEMBLY MAINTENANCE INSTRUCTIONS.

This paragraph covers the maintenance tasks for the following items:

<i>Item</i>	<i>Page</i>
1. Actuator-Support Assembly	6-68
2. Actuator-Support	6-72
3. Lug Assembly	6-72
4. Actuator Rod End	6-74
5. Limit Switch	6-75

INITIAL SETUP

Test/Support Equipment

- Sling, nylon (for item 1)
- Wrecker, HEMTT, 10-ton

Tools

- Kit, tool, 13032302
- Set, shop, 13032303
- Set, puller, CG-40C-B
- Sling, hoisting, 13029709
- Wrench, torque, 0.5 to 10 N•m (for item 1)
- Wrench, torque, 150 to 800 N•m (for items 1 and 3)

Materials/Parts

- Primer, zinc chromate (47, Appendix B)

Personnel Required

- 2 MLRS Repairers MOS 27M (MLRS Crewmember MOS 13M to assist as required)
- Wrecker Driver MOS 63H

References

- TM 9-1425-646-10
- TM 9-1425-646-20

Troubleshooting

- Paragraph 2-9

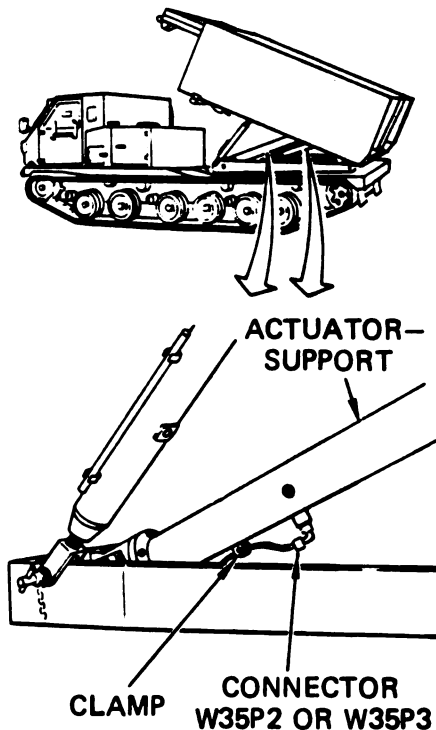
Equipment Condition

- Elevation drive propeller shaft removed (paragraph 6-18) (for items 1 and 2)
- Cage elevated and jury struts installed (TM 9-1425-646-20). If cage is elevated too much or not enough for jury strut installation and cannot be moved, support cage with wrecker. Use shackle and link on cage for wrecker attachment. Wrecker cable should be taut to support full weight of cage.

1. ACTUATOR-SUPPORT ASSEMBLY.

a. Remove.

- (1) Disconnect electrical connector W35P2 or W35P3. Using crosstip screwdriver and 6mm box end wrench, remove screw, two washers, and nut securing cable clamp to actuator-support.

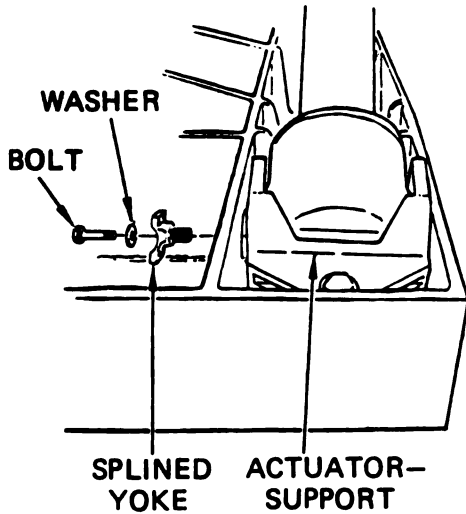


6-20. ELEVATION ACTUATOR-SUPPORT ASSEMBLY MAINTENANCE INSTRUCTIONS (CONT)

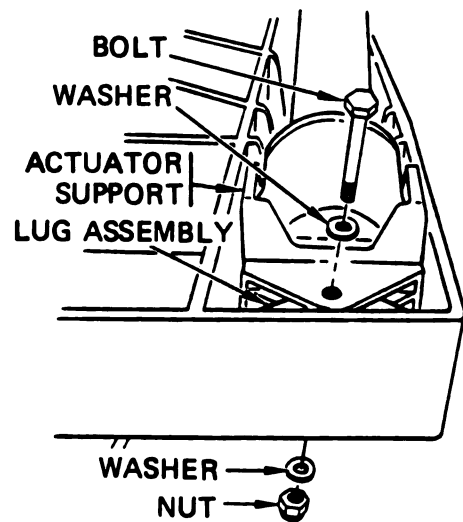
(2) Using 13mm socket, remove bolt and washer securing splined yoke to actuator-support. Remove yoke.

CAUTION

Keep actuator-support balanced while removing.



(6) Using 1-7/16 inch box end wrench and 1-7/16 inch socket, remove nut, two washers, and bolt securing actuator-support to lug assembly. Use drift pin punch and hammer, as required, to remove bolt.



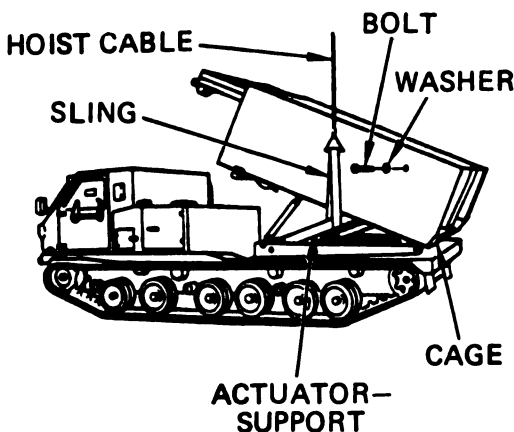
(3) Manually rotate LLM until actuator-support bottom attachment nut is accessible (TM 9-1425-646-10).

(4) Using wrecker and nylon sling, secure sling to wrecker and around actuator-support. Remove slack from sling.

(5) Using 46mm socket, remove bolt and washer securing actuator-support to cage.

NOTE

It may be necessary to pry actuator-support from lug assembly.



(7) Using wrecker hoist, remove actuator-support from SPLL.

b. Inspect Bushings.

(1) Using telescoping gage and micrometer, measure inside diameter of elevation actuator rod end bushing in cage. If inside diameter exceeds 31.6mm, replace bushing (paragraph 5-28).

(2) Using telescoping gage and micrometer, measure inside diameter of lug assembly bushing. If inside diameter exceeds 25.3mm, replace bushing (item 3).

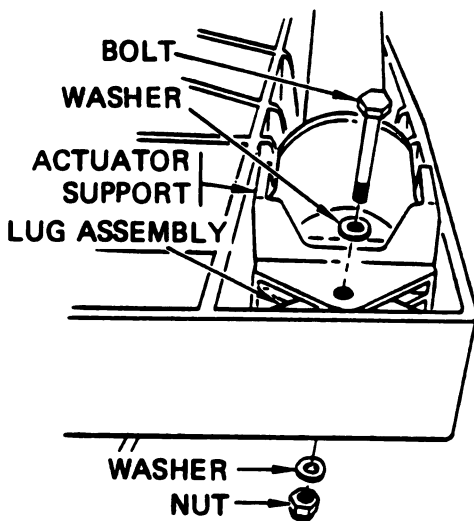
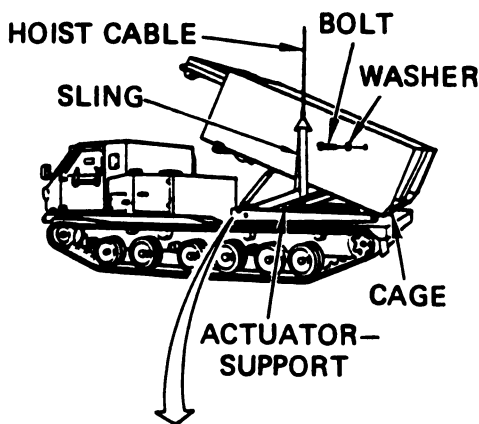
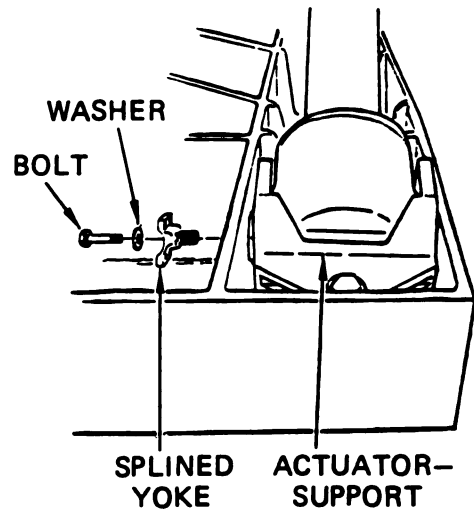
6-20. ELEVATION ACTUATOR-SUPPORT ASSEMBLY MAINTENANCE INSTRUCTIONS (CONT)

c. Install.

(1) Secure sling to wrecker hoist and actuator-support.

(2) Hoist actuator-support into position on lug assembly and install bolt, two washers, and nut. Tighten nut using 1-7/16 inch box end wrench and 1-7/16 inch socket.

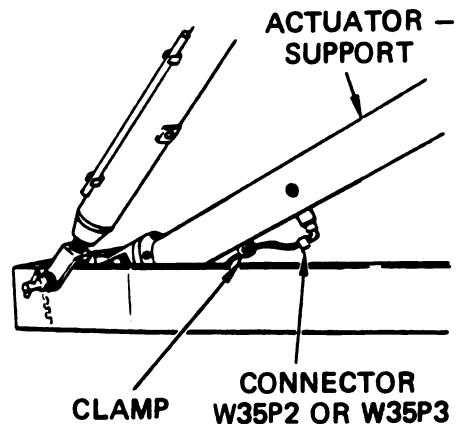
(3) Raise actuator-support into position on LLM. Using splined yoke, raise or lower actuator rod end to aline mounting holes. Install bolt and washer. Remove sling and wrecker. Do not tighten bolt.



(4) Apply zinc chromate primer to bolt. Position splined yoke on actuator-support and install bolt and washer. Using 13mm socket, tighten bolt.

(5) Install elevation drive propeller shaft (paragraph 6-18).

(6) Connect electrical connector W35P2 or W35P3 to actuator-support and secure cable with clamp, screw, washer, and nut. Using crosstip screwdriver and 6mm box end wrench, tighten nut.



(7) Remove jury struts (TM 9-1425-646-20).

(8) Position LLM to 1600 mils (90 degrees) azimuth (TM 9-1425-646-10).

(9) Manually lower LLM until it touches turret structure (TM 9-1425-646-10).

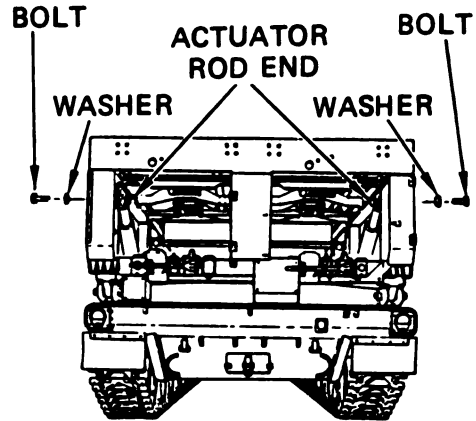
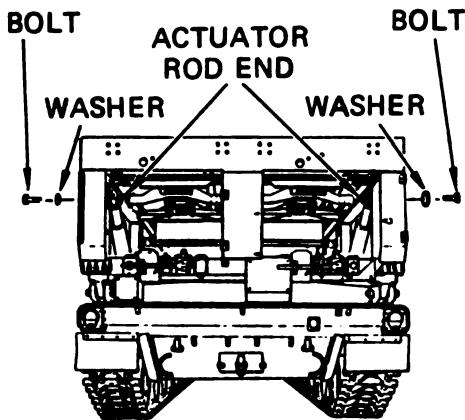
6-20. ELEVATION ACTUATOR-SUPPORT ASSEMBLY MAINTENANCE INSTRUCTIONS (CONT)

(10) Disconnect elevation drive propeller shaft from each actuator splined yoke (paragraph 6-18).

(11) Using 46mm socket, remove bolt and washer securing both actuator rod ends to LLM.

(12) Manually retract each actuator against internal mechanical stops, then extend actuator noting number of turns required to permit installation of bolt in actuator rod end. Desired number of turns is 2 to 3.

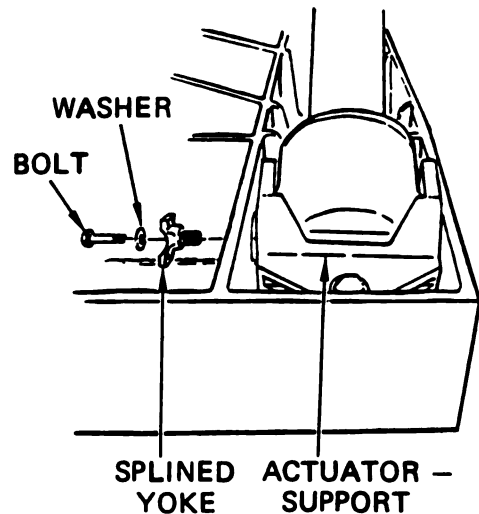
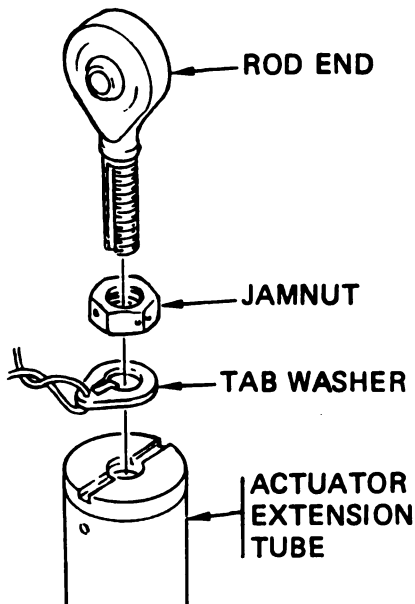
(14) Install bolt and washer securing rod end to LLM. Using 46mm socket, torque bolts to 500 to 600 N•m.



(13) If bolt cannot be installed within desired number of turns, cut lockwire and adjust rod end. Tighten jamnut and safety-wire jamnut to tab washer with lockwire.

(15) Connect elevation drive propeller shaft to actuator splined yoke. If shaft cannot be connected to yoke within 1/8 turn, remove splined yoke and realine yoke on actuator (paragraph 6-18).

(16) Apply zinc chromate primer to bolt and secure splined yoke to actuator. Using 13mm socket, tighten bolt.



(17) Connect elevation drive propeller shaft to splined yoke (paragraph 6-18).

6-20. ELEVATION ACTUATOR-SUPPORT ASSEMBLY MAINTENANCE INSTRUCTIONS (CONT)

2. ACTUATOR-SUPPORT.

a. Remove.

(1) Using 14mm box end wrench and 14mm socket, remove four nuts, four washers, and four bolts securing support assembly to actuator.

(2) Remove support assembly by removing bearing cap, support, bearing, and shims from actuator trunnion.

b. Install.

(1) Position bearings on actuator trunnion and install support so bearings rest in support groove. Using thickness gage, measure gap between bearing inner race and shoulder on actuator.

(2) Adjust thickness of shims to obtain 0.10mm with equal thickness of shims on each side of actuator. Remove support and bearings.

(3) Apply zinc chromate primer to mating surfaces of shims, bearings, grooves of support and bearing cap, and threads of bolts.

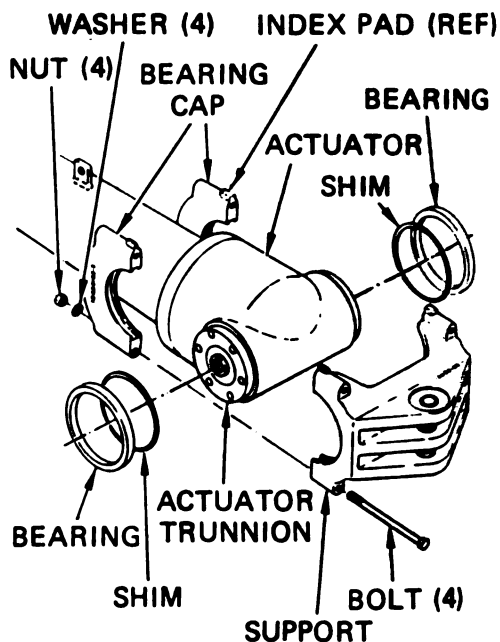
NOTE

Support and bearing caps are a matched set and must be replaced as an assembly.

(4) Locate index pad on support on same side as electrical connector on actuator. Aline index pad on cap with index pad on support.

(5) Install shims and bearings on actuator trunnion and secure with support and bearing caps. Install four bolts, four washers, and four nuts.

(6) Tighten nuts evenly to no more than 2.0 N•m over free running torque, maintaining equal gap on both sides of cap. When bearings are fully seated, increase torque in increments of 1.0 N•m until slight resistance is noted when support is rotated ± 20 degrees.



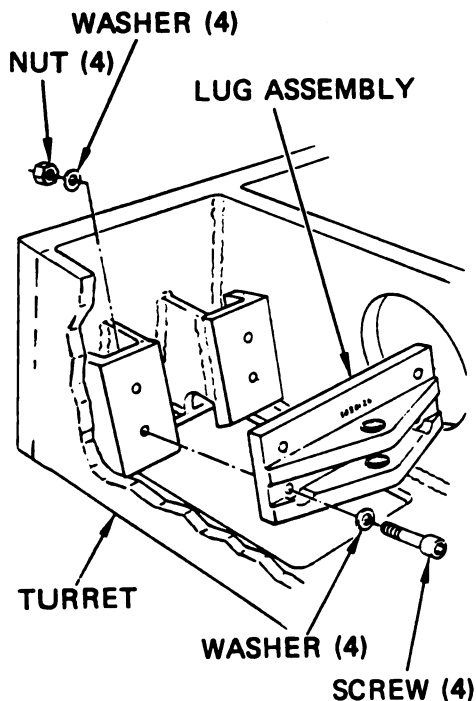
3. LUG ASSEMBLY.

a. Remove.

(1) Remove actuator-support assembly (item 1, a).

6-20. ELEVATION ACTUATOR-SUPPORT ASSEMBLY MAINTENANCE INSTRUCTIONS (CONT)

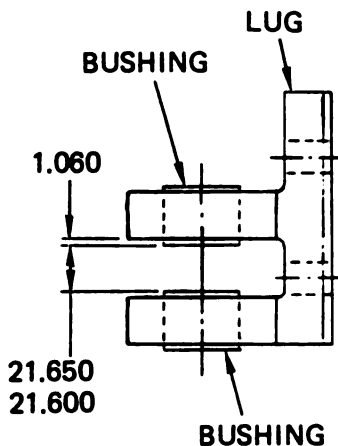
(2) Using 12mm socket head key and 22mm box end wrench, remove four nuts, eight washers, and four bolts securing lug assembly to turret. Remove lug assembly.



b. Repair.

(1) Using puller set, remove bushings from lug assembly.

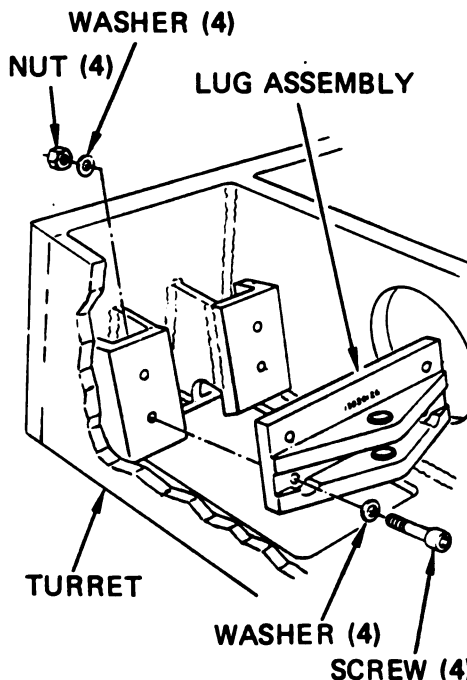
(2) Apply zinc chromate primer to outside diameter of bushing and install bushing in lug assembly. Use puller set to seat bushing.



c. Install.

(1) Apply zinc chromate primer to four bolts.

(2) Position lug assembly to turret and install four bolts, four washers, and four nuts. Using 12mm socket head key and 22mm box end wrench, tighten nuts.



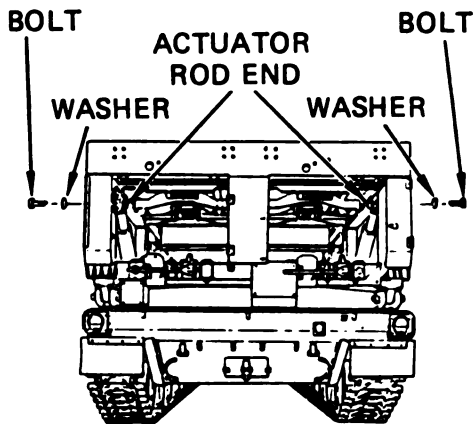
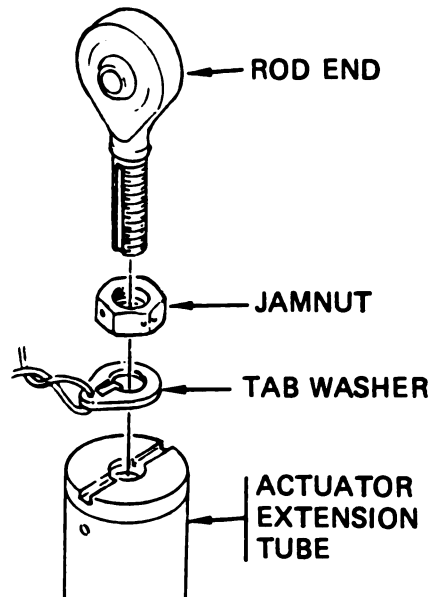
(3) Install actuator-support assembly (item 1, c).

6-20. ELEVATION ACTUATOR-SUPPORT ASSEMBLY MAINTENANCE INSTRUCTIONS (CONT)

4. ACTUATOR ROD END.

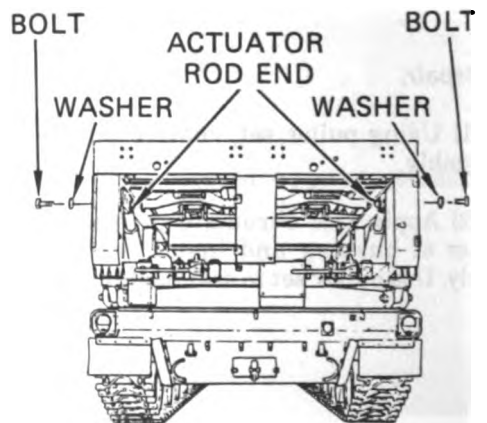
a. Remove.

- (1) Install jury struts (TM 9-1425-646-20).
- (2) Using 46mm socket, remove bolt and washer securing defective rod end to cage.
- (3) Using 1/4-inch socket attachment, remove four capscrews securing propeller shaft U-joint to actuator splined yoke.
- (4) Using actuator splined yoke, manually retract actuator far enough to remove rod end from cage structure.
- (5) Count number of threads on rod end above locknut. Record number.



(4) Using splined yoke, manually extend actuator until rod end is alined with holes in cage fitting.

(5) Install bolt and washer to secure rod end to cage. Using 46mm socket, torque bolt to 500 to 600 N•m.



(6) Using wire twister pliers, cut lockwire from locknut. Using 1-5/16 inch open end wrench, loosen jamnut until tab washer is free of actuator. Unscrew rod end and remove locknut and tab washer.

b. Install.

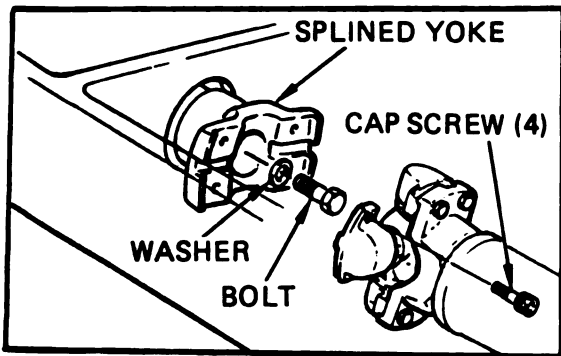
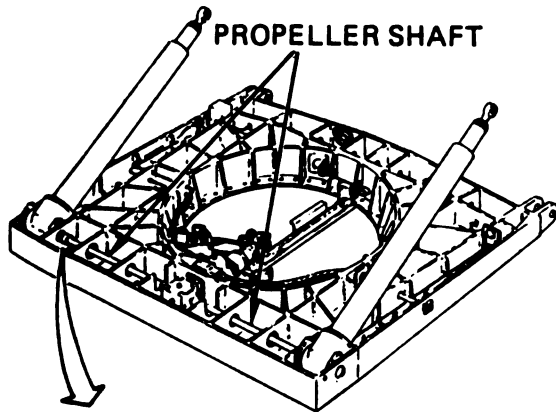
- (1) Install tab washer and locknut on new rod end.
- (2) Screw rod end into actuator until number of threads recorded during removal is obtained. Tighten locknut using 1-5/16 inch open end wrench.
- (3) Using lockwire, safety-wire locknut to tab washer.

(6) Install propeller shaft to actuator splined yoke. If propeller shaft cannot be connected to splined yoke within 1/8 turn, perform step (7).

6-20. ELEVATION ACTUATOR-SUPPORT ASSEMBLY MAINTENANCE INSTRUCTIONS (CONT)

(7) Using 13mm socket, remove bolt and washer securing splined yoke. Realign splined yoke. Apply zinc chromate primer to bolt and secure splined yoke with bolt and washer. Using 13mm socket, tighten bolt.

(8) Position propeller shaft to actuator splined yoke and install four capscrews. Using 1/4-inch socket attachment, torque capscrews to 27 to 32 N•m.



(9) Remove jury struts (TM 9-1425-646-20).

(10) Using BC, cycle LLM in elevation two times and check for smooth operation (TM 9-1425-646-20).

5. LIMIT SWITCH.

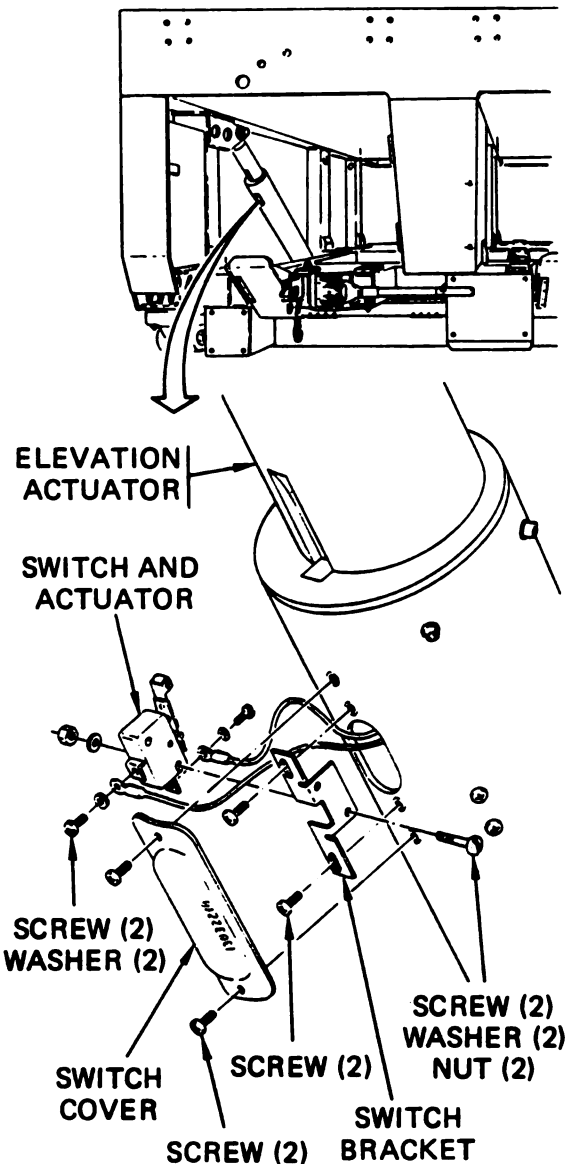
a. Remove.

(1) Using crosstip screwdriver, remove two screws securing switch cover. Remove cover.

(2) Using crosstip screwdriver, remove two screws securing switch bracket to actuator. Pull switch bracket and switch away from actuator.

(3) Tag wires to switch for identification during installation. Using flat tip screwdriver, disconnect two wires from switch.

(4) Using flat tip screwdriver and 1/4-inch box end wrench, remove two screws, washers, and nuts securing switch and switch actuator to bracket. Remove switch and retain screws, washers, nuts, and switch actuator.



6-20. ELEVATION ACTUATOR-SUPPORT ASSEMBLY MAINTENANCE INSTRUCTIONS (CONT)

b. Install.

(1) Position new switch and switch actuator on bracket and install two screws, washers, and nuts. Using flat tip screwdriver and 1/4-inch box end wrench, tighten nuts.

(2) Attach electrical wires to switch as identified during removal. Using flat tip screwdriver, tighten screws.

(3) Apply zinc chromate primer to two screws. Position switch bracket to actuator and secure with two screws. Do not tighten screws.

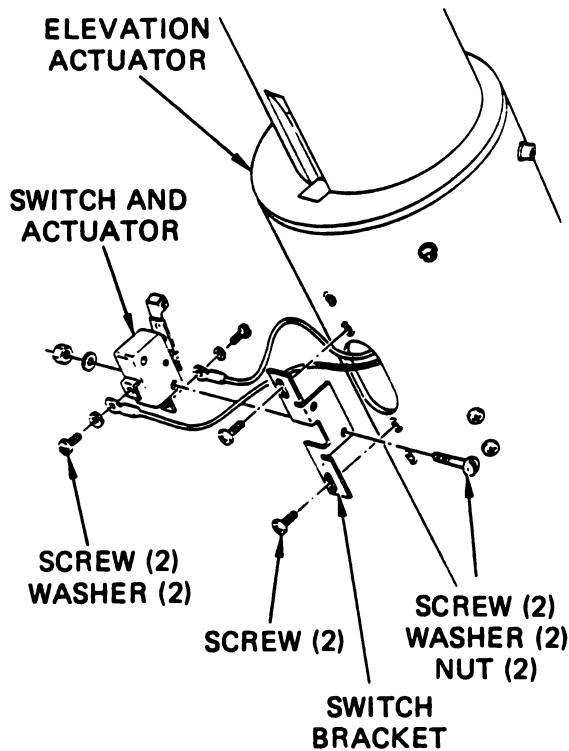
(2) Open FCU/SRP armor door. Using 5mm socket attachment, loosen two screws securing aim verification bracket to door. Remove aim verification bracket.

(3) Using 5mm socket attachment, loosen two screws on right side of cage. Install aim verification bracket on screws and tighten screws.

(4) Place fire control quadrant on aim verification bracket and zero fire control quadrant.

(5) Using BC, elevate LLM to full up position. Turn system power off (TM 9-1425-646-20).

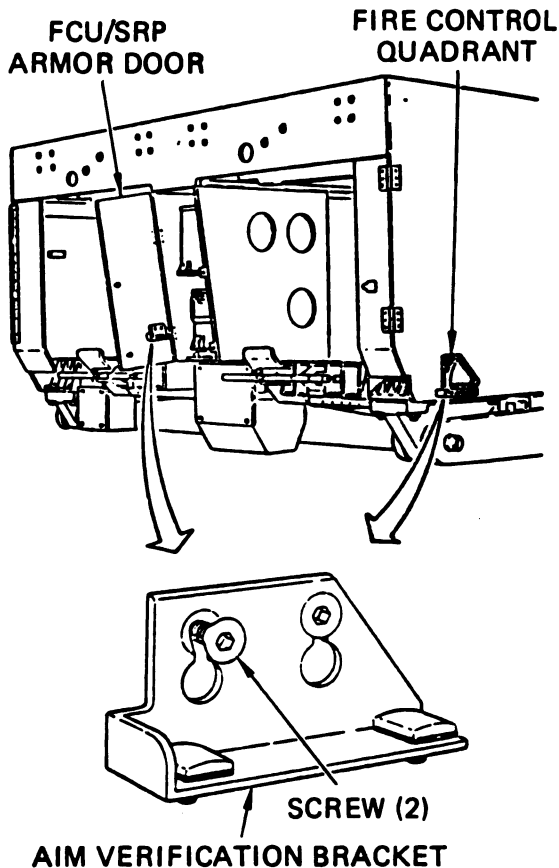
(6) Manually elevate LLM until fire control quadrant indicates 1106 mils (62.25 degrees) (TM 9-1425-646-20).



(4) Adjust switch.

c. Adjust Switch.

(1) Stow LLM (TM 9-1425-646-10).



6-20. ELEVATION ACTUATOR-SUPPORT ASSEMBLY MAINTENANCE INSTRUCTIONS (CONT)

WARNING

A wrecker and hoisting sling must be used to secure the LLM in position after being elevated to the proper angle. The wrecker cable must be tightened until cable slack is removed but the weight of LLM should be maintained on the elevation actuator to insure proper adjustment of the limit switch.

(7) Attach hoisting sling to LLM and wrecker. Tighten wrecker cable to remove cable slack.

(8) Disconnect W35P2 or W35P3 from elevation actuator connector.

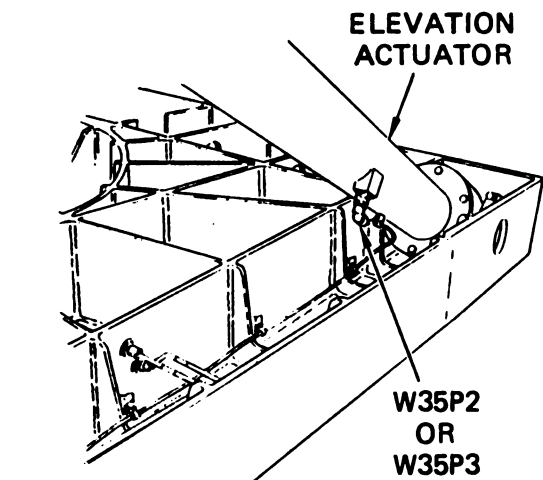
(9) Connect multimeter between pins A and B of elevation actuator connector.

(10) Slide switch bracket until multimeter indicates continuity, and then slide switch bracket in opposite direction until switch just actuates and multimeter indicates infinity.

(13) Apply zinc chromate primer to two screws. Position switch cover over switch and install two screws. Using crosstip screwdriver, tighten screws.

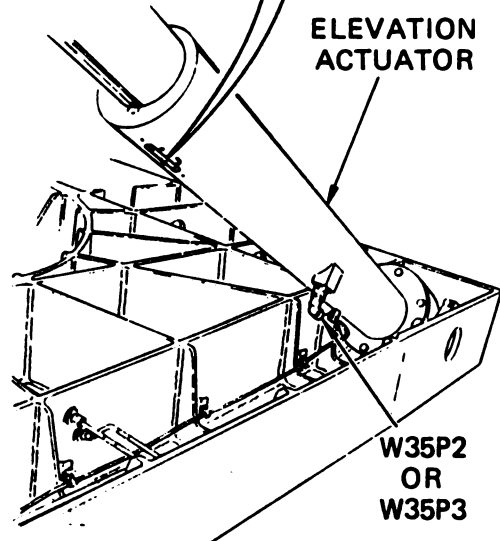
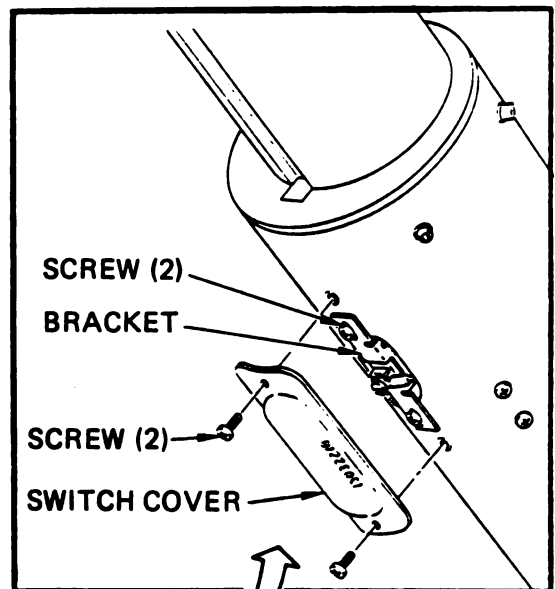
(14) Disconnect hoisting sling from LLM and wrecker. Remove sling and wrecker from SPLL.

(15) Manually lower LLM to approximately 1050 mils or until LLM will automatically stow.



(11) Using crosstip screwdriver, tighten two screws to secure bracket in position being careful not to change adjustment.

(12) Disconnect multimeter and connect W35P2 or W35P3 to actuator connector.

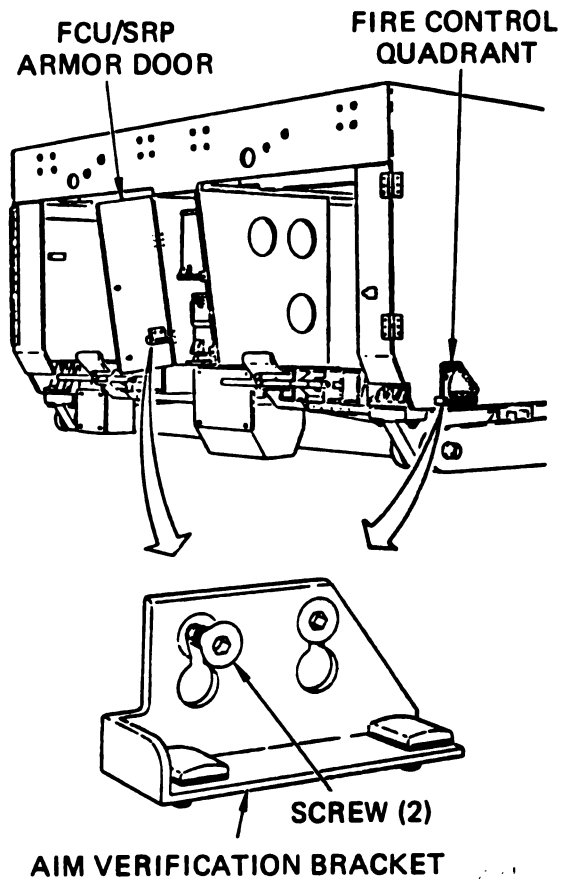


6-20. ELEVATION ACTUATOR-SUPPORT ASSEMBLY MAINTENANCE INSTRUCTIONS (CONT)

(16) Stow LLM (TM 9-1425-646-10).

(17) Remove fire control quadrant from aim verification bracket.

(18) Using 5mm socket attachment, loosen two screws and remove aim verification bracket from side of LLM and reinstall on FCU/SRP door. Tighten screws in both places.



6-21. ELEVATION POSITION MONITOR TRANSDUCER MAINTENANCE INSTRUCTIONS.

This paragraph covers the maintenance tasks for the following items:

<i>Item</i>	<i>Page</i>
1. Transducer	6-79
2. Alinement Hardware	6-81

INITIAL SETUP

Tools

Kit, tool, 13032302

Materials/Parts

- Cloth, cotton (6, Appendix B)
- Compound, sealing (15, Appendix B)
- Lockwire (23, Appendix B)
- Methyl-ethyl-ketone (25, Appendix B)
- Primer, zinc chromate (47, Appendix B)
- Varnish (71, Appendix B)

Personnel Required

MLRS Repairer MOS 27M
(MLRS Crewmember MOS 13M to assist as required)

References

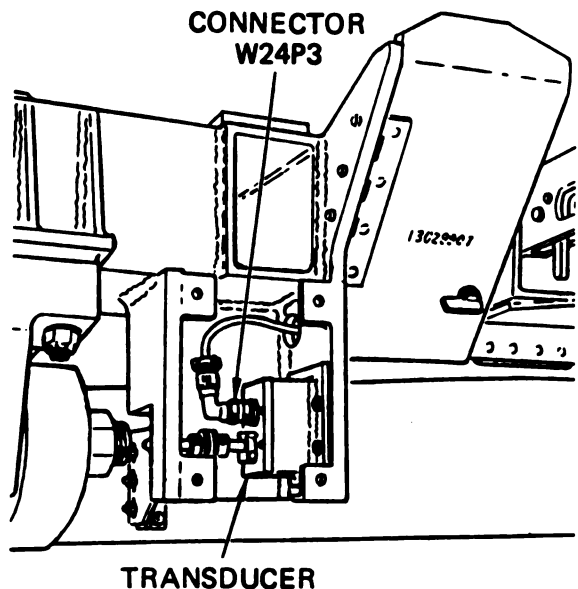
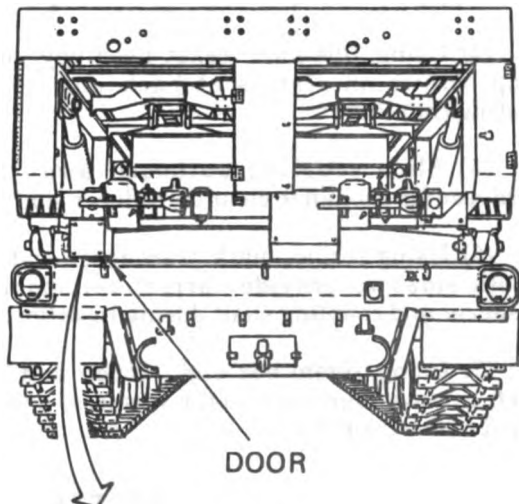
- TM 9-1425-646-10
- TM 9-1425-646-20

Troubleshooting
Paragraph 2-9

1. TRANSDUCER.

a. Remove.

- (1) Using crosstip screwdriver, unlatch four studs and remove door.
- (2) Disconnect electrical connector W24P3 from transducer connector J1.



6-21. ELEVATION POSITION MONITOR TRANSDUCER MAINTENANCE INSTRUCTIONS (CONT)

WARNING

Methyl-ethyl-ketone vapors are toxic. Avoid prolonged or repeated breathing of vapors or contact with skin. Use only with adequate ventilation. Methyl-ethyl-ketone is flammable and should not be used near open flame. Fire extinguisher should be available when solvent is used.

(3) Apply small amount of methyl-ethyl-ketone to clamp screw on transducer shaft and outboard coupling clamp screw. Allow methyl-ethyl-ketone to loosen sealing compound before loosening clamp screws.

(4) Using 7/64-inch socket head key, loosen clamp screws on clamps at each end of zero adjusting coupling.

(5) Slide coupling outboard away from transducer far enough to clear transducer shaft.

(6) Using scribe, mark transducer and cage on both sides to provide correct alignment of transducer and coupling shaft during installation.

(7) Using 10mm box end wrench and 7mm socket, remove four nuts, eight washers, and four bolts. Remove transducer.

b. Install.

(1) Position transducer on LLM noting scribe marks.

(2) Apply zinc chromate primer to four bolts. Install four bolts, eight washers, and four nuts.

(3) Using 10mm box end wrench and 7mm socket, tighten nuts.

(4) Connect electrical connector W24P3 to transducer connector J1.

(5) Turn on FCS and select RESOLVER READOUT on test menu (TM 9-1425-646-10).

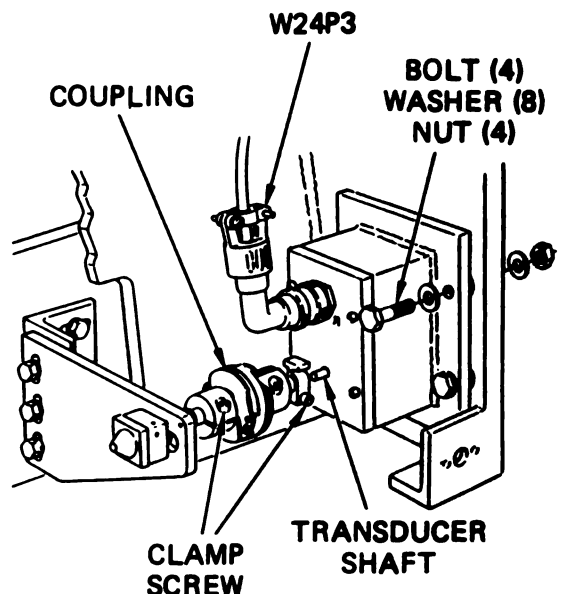
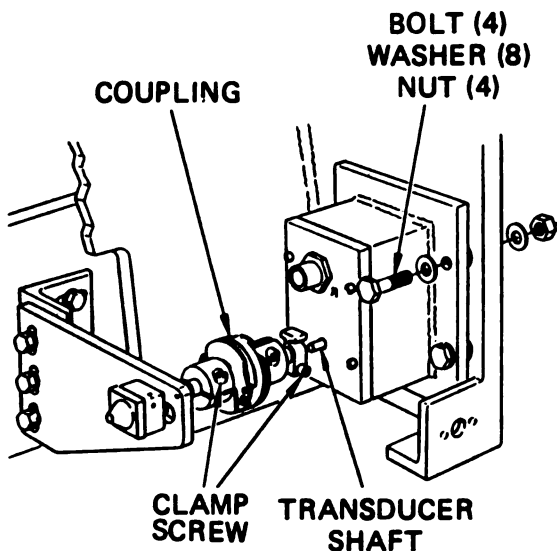
(6) Rotate transducer shaft until RESOLVER READOUT indicates -2.0 to +2.0.

(7) Turn off FCS (TM 9-1425-646-10).

(8) Apply sealing compound to transducer clamp screw. Position coupling clamp screws for easy access.

(9) Carefully slide coupling onto transducer shaft. Do not move transducer shaft.

(10) Remove coupling clamp screw. Apply four drops of sealing compound in screw hole. Apply one drop of sealing compound on threads of screw. Install screw, and using 7/64-inch socket head key, tighten clamp screws.



6-21. ELEVATION POSITION MONITOR TRANSDUCER MAINTENANCE INSTRUCTIONS (CONT)

c. Adjust

(1) Turn on FCS and select RESOLVER READOUT on test menu. If indication is still within -2.0 to +2.0 mils, no further action is required. If indication is not within tolerance, continue (TM 9-1425-646-10).

(2) Screw adapter screw out until tapered end of screw surface is fully seated into pivot bolt indentation.

(3) Cut and remove lockwire from coupling jamnut.

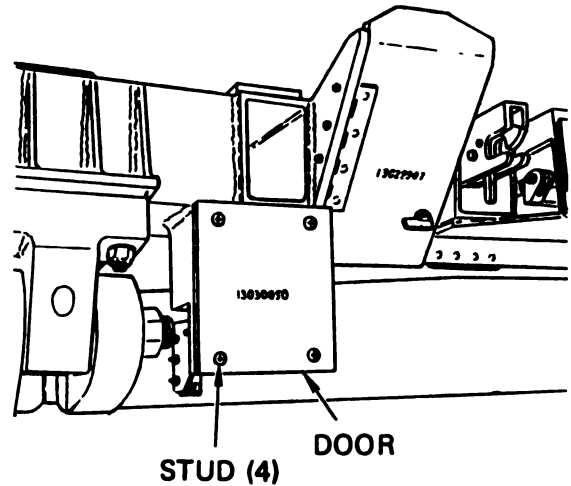
(4) Loosen jamnut just far enough to hand-turn coupling shaft until resolver readout indicates -2.0 to +2.0 mils. Using 3/4-inch open end wrench, tighten jamnut.

(5) Using lockwire, safety-wire jamnut and shaft.

(6) Screw adapter screw back into coupling shaft until hand-tight.

(7) Turn off FCS (TM 9-1425-646-10).

(8) Position door and using crosstip screwdriver, latch four studs to secure door.



(9) If no further maintenance is required, perform follow-on procedure (page 6-83).

2. ALINEMENT HARDWARE.

a. Remove.

(1) Using crosstip screwdriver, unlatch four studs and remove door.

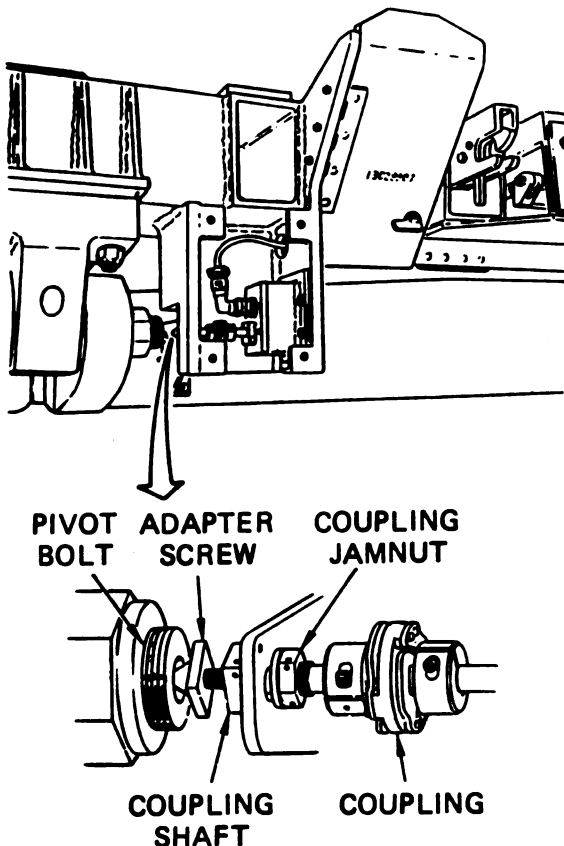
(2) Disconnect W24P3 from transducer J1.

WARNING

Methyl-ethyl-ketone vapors are toxic. Avoid prolonged or repeated breathing of vapors or contact with skin. Use only with adequate ventilation. Methyl-ethyl-ketone is flammable and should not be used near open flame. Fire extinguisher should be available when solvent is used.

(3) Apply small amount of methyl-ethyl-ketone to clamp screw on transducer and coupling clamp screws. Allow to loosen sealing compound before loosening screws.

(4) Using 7/64-inch socket head key, loosen clamp screws.



6-21. ELEVATION POSITION MONITOR TRANSDUCER MAINTENANCE INSTRUCTIONS (CONT)

(5) Cut and remove lockwire on coupling shaft jamnut. Using 3/4-inch open end wrench, loosen jamnut.

(6) Using 7mm socket and 10mm box end wrench, remove three bolts, six washers, and three nuts securing bracket. Slide bracket with hardware attached away from transducer and remove assembly.

(7) Remove transducer clamp, shaft adapter, coupling, jamnut, and washer and slide shaft out of bracket. Remove adapter screw from shaft.

b. Install.

(1) Install adapter screw fully into shaft. Position shaft in bracket and install washer and jamnut.

(2) Apply zinc chromate primer to three bolts. Position bracket to turret and secure with three bolts, six washers, and three nuts. Tighten nuts hand-tight.

(3) Install coupling onto threaded shaft with clamp screws up for easy access.

(4) Place clamp over shaft adapter and install unthreaded shaft into coupling.

(5) Screw adapter screw out until tapered end is fully seated into pivot bolt while moving bracket by hand as required for alignment with transducer shaft.

(6) Using 7mm socket and 10mm box end wrench, tighten bracket nuts.

(7) Connect cable connector W24P3 to transducer.

(8) Turn on FCS and select RESOLVER READOUT on test menu.

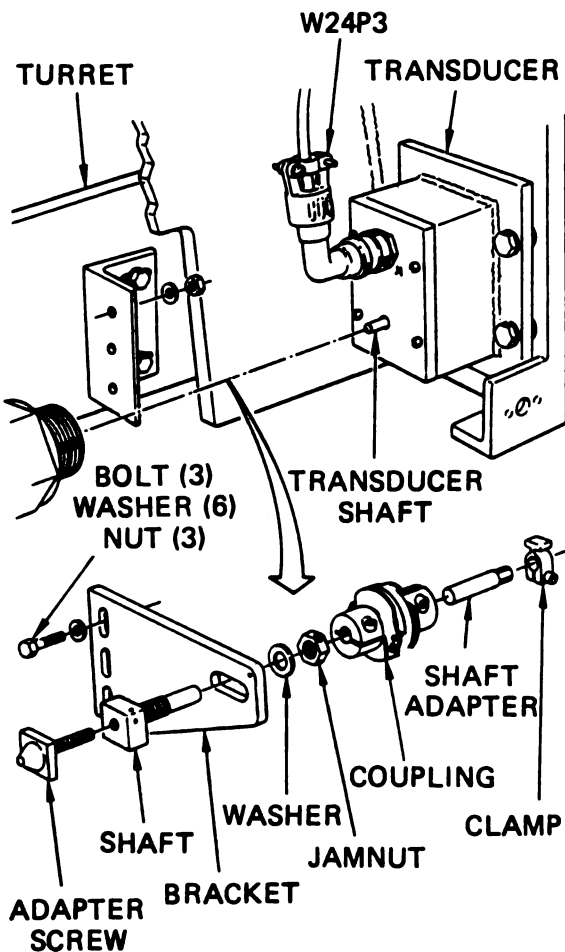
(9) Rotate transducer shaft until resolver readout on FCP indicates -2.0 to +2.0 mils.

(10) Turn off FCS.

(11) Position shaft adapter on transducer shaft without moving transducer shaft.

(12) Center coupling between shafts. Apply sealing compound to coupling and transducer clamp screws. Make sure coupling clamps are positioned for easy access. Using 7/64-inch socket head key, tighten clamp screws.

(13) Screw adapter screw back into shaft until hand-tight.

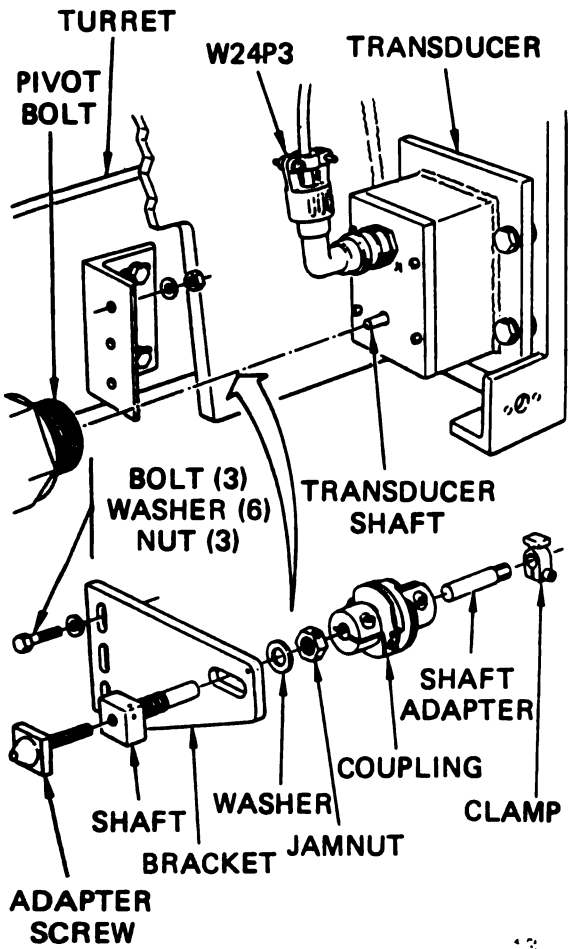


6-21. ELEVATION POSITION MONITOR TRANSDUCER MAINTENANCE INSTRUCTIONS (CONT)

(14) Perform transducer adjustment procedure (item 1, c).

FOLLOW-ON PROCEDURE

Using BC, cycle LLM two times in elevation and check for smooth operation (TM 9-1425-646-20).



6-22. ELEVATION HYDRAULIC VALVE MODULE MAINTENANCE INSTRUCTIONS. This paragraph covers the maintenance tasks for the following items:

<i>Item</i>	<i>Page</i>
1. 4-Way, 2-Position Solenoid Valve	6-84
2. Hydraulic Pressure Relief Valve	6-85
3. Hydraulic Pilot Check Valve	6-85
4. Hydraulic Shuttle Valve	6-86
5. Hydraulic Pressure Reducer Valve	6-86
6. Pilot Operated Hydraulic Valve	6-87
7. Cap and Coupling Assembly	6-88
8. Unions	6-88
9. Pressure Switch	6-88
10. Cap	6-89

INITIAL SETUP

Tools

Kit, tool, 13032302

Materials/Parts

- Fluid, hydraulic (17, Appendix B)
- Packing, preformed (27, Appendix B) (for items 5, 7, 9, 10, and 12)
- Packing, preformed (28, Appendix B) (for item 9)
- Packing, preformed (29, Appendix B) (for items 7 and 9)
- Packing, preformed (30, Appendix B) (for items 2, 3, 4, 6, 7, and 9)
- Packing, preformed (31, Appendix B) (for item 1)
- Packing, preformed (32, Appendix B) (for items 2, 3, 4, 6, and 7)
- Packing, preformed (33, Appendix B) (for items 4, 6, and 7)
- Packing, preformed (34, Appendix B) (for item 7)
- Packing, preformed (35, Appendix B) (for item 1)

- Packing, preformed (36, Appendix B) (for item 1)
- Packing, preformed (36, Appendix B) (for item 1)
- Retainer (48, Appendix B) (for item 1)
- Retainer (49, Appendix B) (for items 2, 3, 4, 6, and 7)
- Retainer (50, Appendix B) (for items 3, 4, 6, and 7)
- Retainer (51, Appendix B) (for item 7)
- Retainer (52, Appendix B) (for item 1)
- Retainer (53, Appendix B) (for item 1)

Personnel Required

MLRS Repairer MOS 27M

References

- TM 9-1425-646-10
- TM 9-1425-646-20

Troubleshooting

Paragraph 2-9

Equipment Condition

Jury struts installed (TM 9-1425-646-20)

1. 4-WAY, 2-POSITION SOLENOID VALVE.

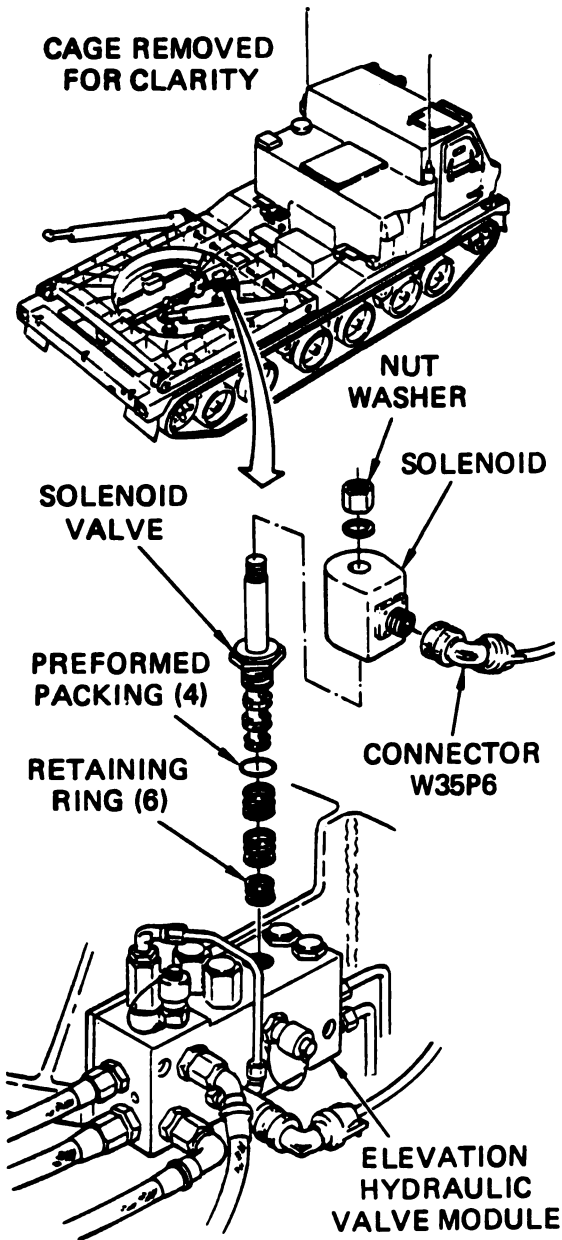
a. Remove.

- (1) Cut lockwire and disconnect electrical connector W35P6 from J1 on solenoid valve.
- (2) Using 7/8-inch open end wrench, remove nut securing solenoid on valve. Remove solenoid.
- (3) Using 1-5/8 inch open end wrench, remove solenoid valve, retaining ring, and preformed packing. Discard retaining ring and preformed packing.

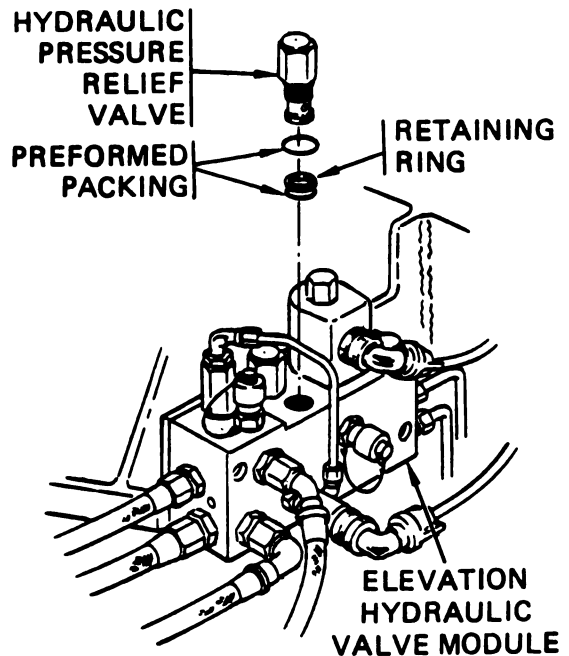
b. Install.

- (1) Apply hydraulic fluid to new packing. Install preformed packing and retaining ring on valve.
- (2) Install valve in module. Using 1-5/8 inch open end wrench, tighten valve.
- (3) Position solenoid on valve. Install nut and using 7/8-inch open end wrench, tighten nut.
- (4) Connect electrical connector W35P6 to J1 on solenoid valve. Lock-wire W35P6 to valve module.

6-22. ELEVATION HYDRAULIC VALVE MODULE MAINTENANCE INSTRUCTIONS (CONT)



(2) Discard retaining ring and preformed packing.



b. Install.

(1) Apply hydraulic fluid to new packing. Install preformed packing and retaining ring on valve.

(2) Install valve in module. Using 1-inch open end wrench, tighten valve.

(3) If no further maintenance is required, perform follow-on procedure (page 6-89).

(5) If no further maintenance is required, perform follow-on procedure (page 6-89).

2. HYDRAULIC PRESSURE RELIEF VALVE.

a. Remove.

(1) Using 1-inch open end wrench, remove relief valve, retaining ring, and preformed packing from module.

3. HYDRAULIC PILOT CHECK VALVE.

a. Remove.

(1) Using 1-inch open end wrench, remove check valve, retaining ring, and preformed packing from module.

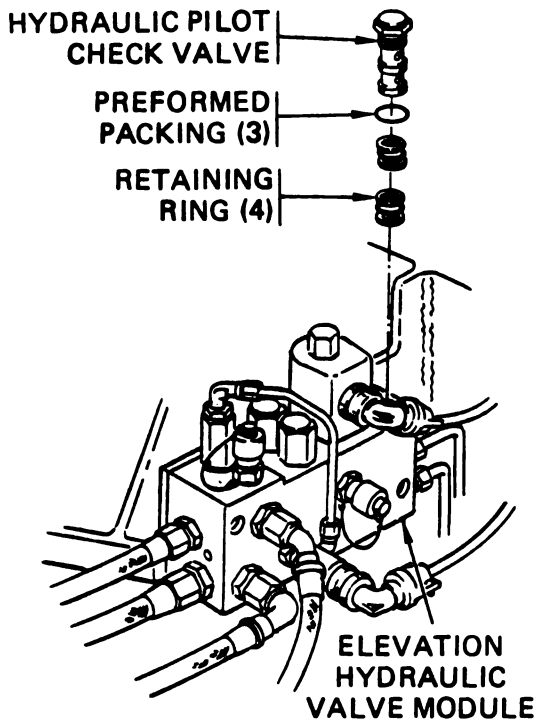
(2) Discard preformed packing and retaining ring.

6-22. ELEVATION HYDRAULIC VALVE MODULE MAINTENANCE INSTRUCTIONS (CONT)

b. Install.

(1) Apply hydraulic fluid to new packing. Install preformed packing and retaining ring on valve.

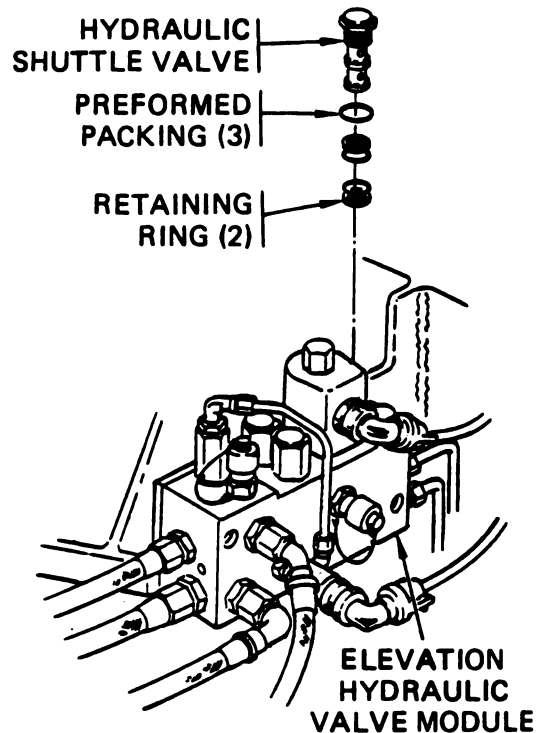
(2) Install valve in module. Using 1-inch open end wrench, tighten valve.



b. Install.

(1) Apply hydraulic fluid to new packing. Install preformed packing and retaining ring on valve.

(2) Install valve in module. Using 1-inch open end wrench, tighten valve.



(3) If no further maintenance is required, perform follow-on procedure (page 6-89).

4. HYDRAULIC SHUTTLE VALVE.

a. Remove.

(1) Using 1-inch open end wrench, remove shuttle valve, retaining ring, and preformed packing from module.

(2) Discard preformed packing and retaining ring.

(3) If no further maintenance is required, perform follow-on procedure (page 6-89).

5. HYDRAULIC PRESSURE REDUCER VALVE.

a. Remove.

(1) Using 1-inch open end wrench, remove reducer valve, retaining ring, and preformed packing from module.

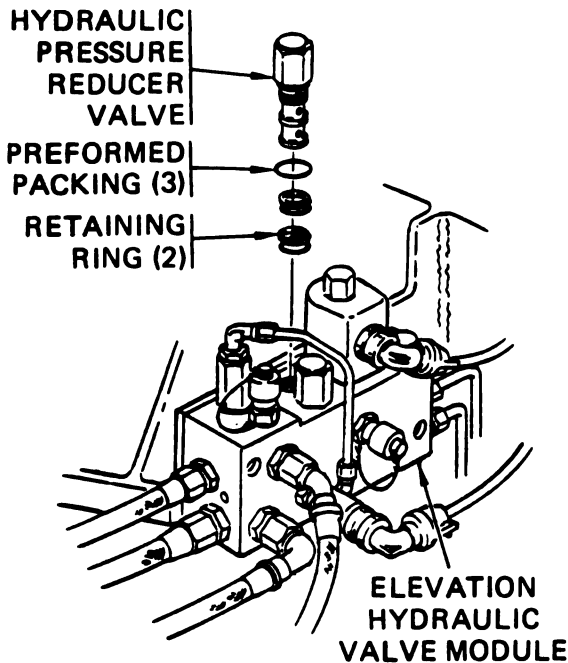
(2) Discard preformed packing and retaining ring.

6-22. ELEVATION HYDRAULIC VALVE MODULE MAINTENANCE INSTRUCTIONS (CONT)

b. Install.

(1) Apply hydraulic fluid to new packing. Install preformed packing and retaining ring on valve.

(2) Install valve in module. Using 1-inch open end wrench, tighten valve.



(3) If no further maintenance is required, perform follow-on procedure (page 6-89).

6. PILOT OPERATED HYDRAULIC VALVE.

a. Remove.

(1) Using 9/16-inch open end wrench, remove hydraulic tube from valve and module. Discard preformed packings and retaining rings.

(2) Remove elbow and reducer from valve. Discard preformed packings and retaining rings.

(3) Using 1-inch open end wrench, remove valve, retaining ring, and preformed packing.

(4) Discard preformed packing and retaining ring.

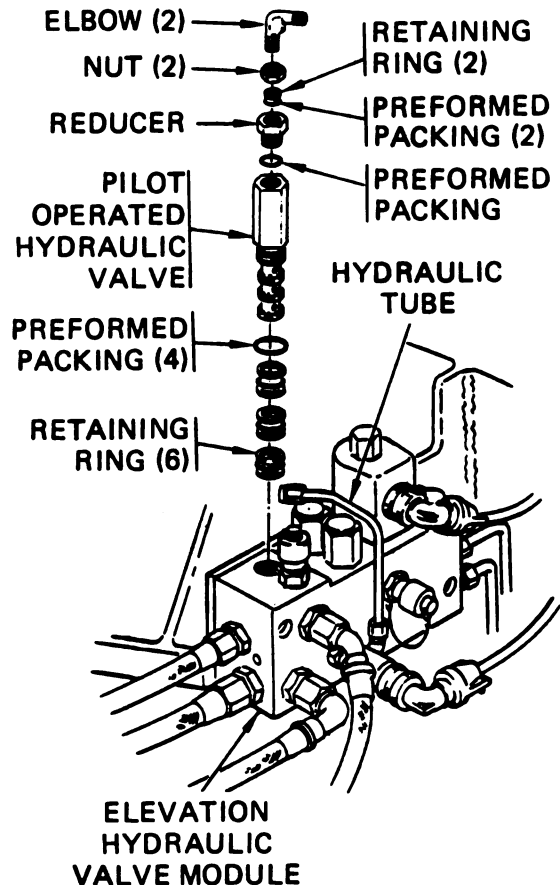
b. Install.

(1) Apply hydraulic fluid to new packing. Install preformed packing and retaining ring, supplied with new valve, on valve.

(2) Install valve in module. Using 1-inch open end wrench, tighten valve.

(3) Apply hydraulic fluid to new packing. Install new preformed packings and retaining rings on reducer and elbow. Install reducer and elbow in valve.

(4) Apply hydraulic fluid to new packing. Install tube with new preformed packings and retaining rings on valve and module. Using 9/16-inch open end wrench, tighten tube.



(5) If no further maintenance is required, perform follow-on procedure (page 6-89).

6-22. ELEVATION HYDRAULIC VALVE MODULE MAINTENANCE INSTRUCTIONS (CONT)

7. CAP AND COUPLING ASSEMBLY.

a. Remove.

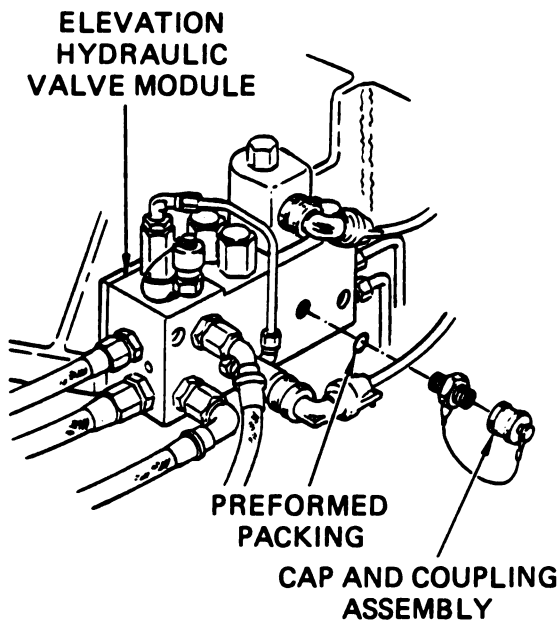
(1) Using 7/8-inch open end wrench, remove cap and coupling assembly and preformed packing from module.

(2) Discard preformed packing.

b. Install.

(1) Apply hydraulic fluid to new packing. Install preformed packing, supplied with new cap and coupling assembly, on coupling.

(2) Install cap and coupling assembly in module. Using 7/8-inch open end wrench, tighten assembly.



(3) If no further maintenance is required, perform follow-on procedure (page 6-89).

8. UNIONS.

a. Remove.

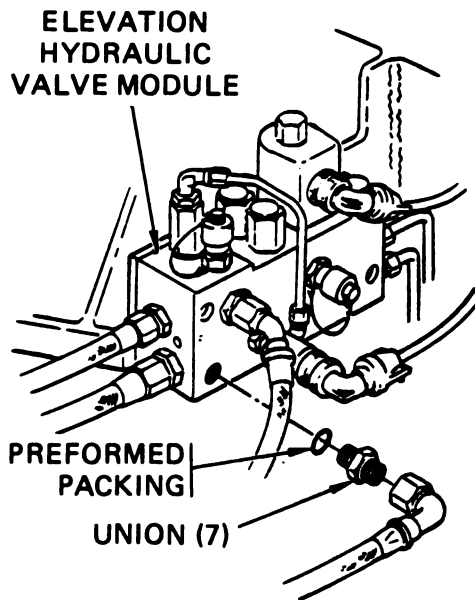
(1) Remove component from defective union.

(2) Using open end wrench as required, remove union from module. Discard preformed packing.

b. Install.

(1) Apply hydraulic fluid to new packing. Install new preformed packing on union. Install union in module and tighten with open end wrench as required.

(2) Install component in union.



(3) If no further maintenance is required, perform follow-on procedure (page 6-89).

9. PRESSURE SWITCH.

a. Remove.

(1) Cut lockwire and disconnect W35P7 from pressure switch.

(2) Using 3/4-inch open end wrench, remove pressure switch from valve module.

(3) Remove and discard preformed packing from pressure switch.

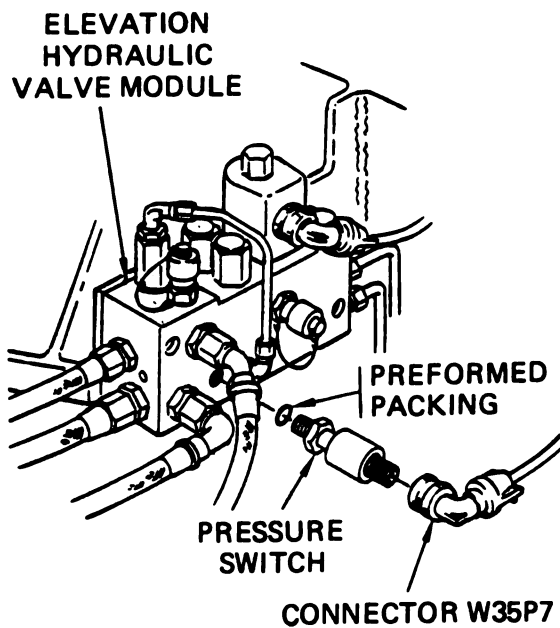
6-22. ELEVATION HYDRAULIC VALVE MODULE MAINTENANCE INSTRUCTIONS (CONT)

b. Install.

(1) Apply hydraulic fluid to new preformed packing and install packing on pressure switch.

(2) Install pressure switch in valve module. Using 3/4-inch open end wrench, tighten pressure switch.

(3) Connect W35P7 to pressure switch. Lock-wire W35P7 to valve module.



10. CAP.

a. Remove.

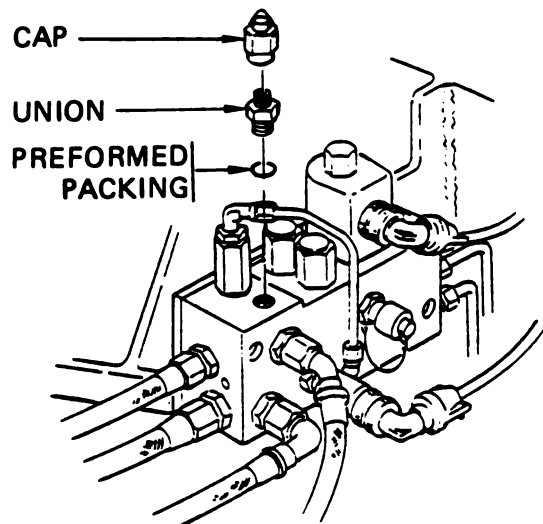
(1) Remove cap from union.

(2) Remove union from module. Discard preformed packing.

b. Install.

(1) Apply hydraulic fluid to new preformed packing. Install new packing on union and install union in module.

(2) Install cap on union.



FOLLOW-ON PROCEDURE

Service hydraulic system (TM 9-1425-646-20).

Remove jury struts (TM 9-1425-646-20).

Bleed hydraulic system (paragraph 6-3).

Using BC, cycle LLM two times in elevation and check for smooth operation (TM 9-1425-646-20).

Stow LLM (TM 9-1425-646-10).

6-23. HYDRAULIC HOSE AND TUBE MAINTENANCE INSTRUCTIONS. This paragraph covers the maintenance tasks for the following items:

<i>Item</i>	<i>Page</i>
1. Hydraulic Hose	6-90
2. Coupling Half	6-90
3. Hydraulic Tube	6-93
4. Bleed Valve	6-94
5. Bleed Valve Mounting Bracket	6-94

INITIAL SETUP

Tools

- Kit, tool, 13032302
- Set, shop, 13032303
- Wrench, torque, 0 to 125 N•m

Materials/Parts

- Primer, zinc chromate (47, Appendix B)

Personnel Required

- MLRS Repairer MOS 27M

References

- TM 9-1425-646-20

Equipment Condition

- Jury struts installed (TM 9-1425-646-20)

NOTE

There are different size hose assemblies, quick-disconnect coupling halves, and tube assemblies used in the launcher drive system. Each hose assembly, coupling half, and tube assembly is identified and located on figure 6-1. The hose assemblies are identified by a letter within a circle. The coupling halves are identified by a number within a square. Tube assemblies are identified by a letter within a triangle. Table 6-1 identifies the hose, what component the hose connects to, the wrenches used for that hose, the coupling half on the hose along with the wrench used on the coupling half and the torque value required during installation. Table 6-2 lists the tube assembly, the component it connects to, the required wrench, and the required torque. Observe all warnings and cautions listed in general maintenance procedures (paragraph 6-2).

1. HYDRAULIC HOSE.

a. Remove.

(1) Disconnect quick-disconnect coupling from component.

(2) Using open end wrench as required, disconnect other end of hose assembly.

(3) If clamps are installed on hose, use crosstip screwdriver and 6mm box end wrench to remove clamp. Remove clamp from hose and reinstall in position. Remove hose.

(4) Remove quick-disconnect coupling half from hose (item 2, a).

b. Install.

(1) Install quick-disconnect coupling on hose (item 2, b).

(2) Place hose in position and using wrench as required, connect and torque hose using required crowfoot wrench.

(3) Connect quick-disconnect coupling half to component. Turn coupling until ratchet lock begins to click, then turn 1/2 turn more.

(4) If required, use crosstip screwdriver and 6mm box end wrench to install hose clamps.

(5) If no further maintenance is required, perform follow-on procedure (page 6-94).

2. COUPLING HALF.

a. Remove.

(1) Disconnect coupling half from hydraulic component.

(2) Using required open end wrench, remove coupling half from hose.

b. Install.

(1) Install coupling half on hose. Using required crowfoot wrench, torque coupling half.

(2) Connect coupling half to component. Turn coupling until ratchet begins to click, then turn 1/2 turn more.

(3) If no further maintenance is required, perform follow-on procedure (page 6-94).

6-23. HYDRAULIC HOSE AND TUBE MAINTENANCE INSTRUCTIONS (CONT)

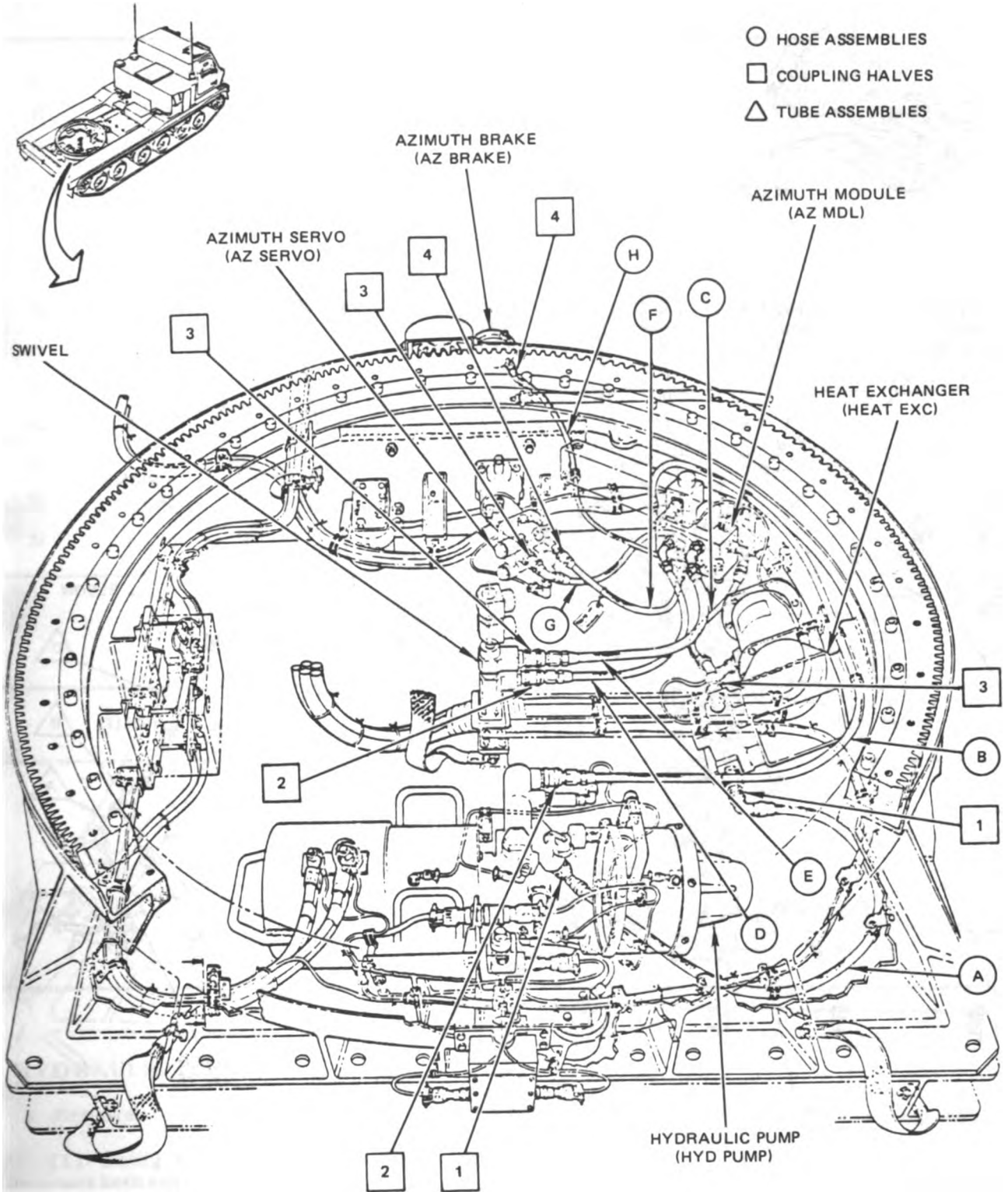


Figure 6-1. Hydraulic Hose and Tube Location (Sheet 1 of 2)

6-23. HYDRAULIC HOSE AND TUBE MAINTENANCE INSTRUCTIONS (CONT)

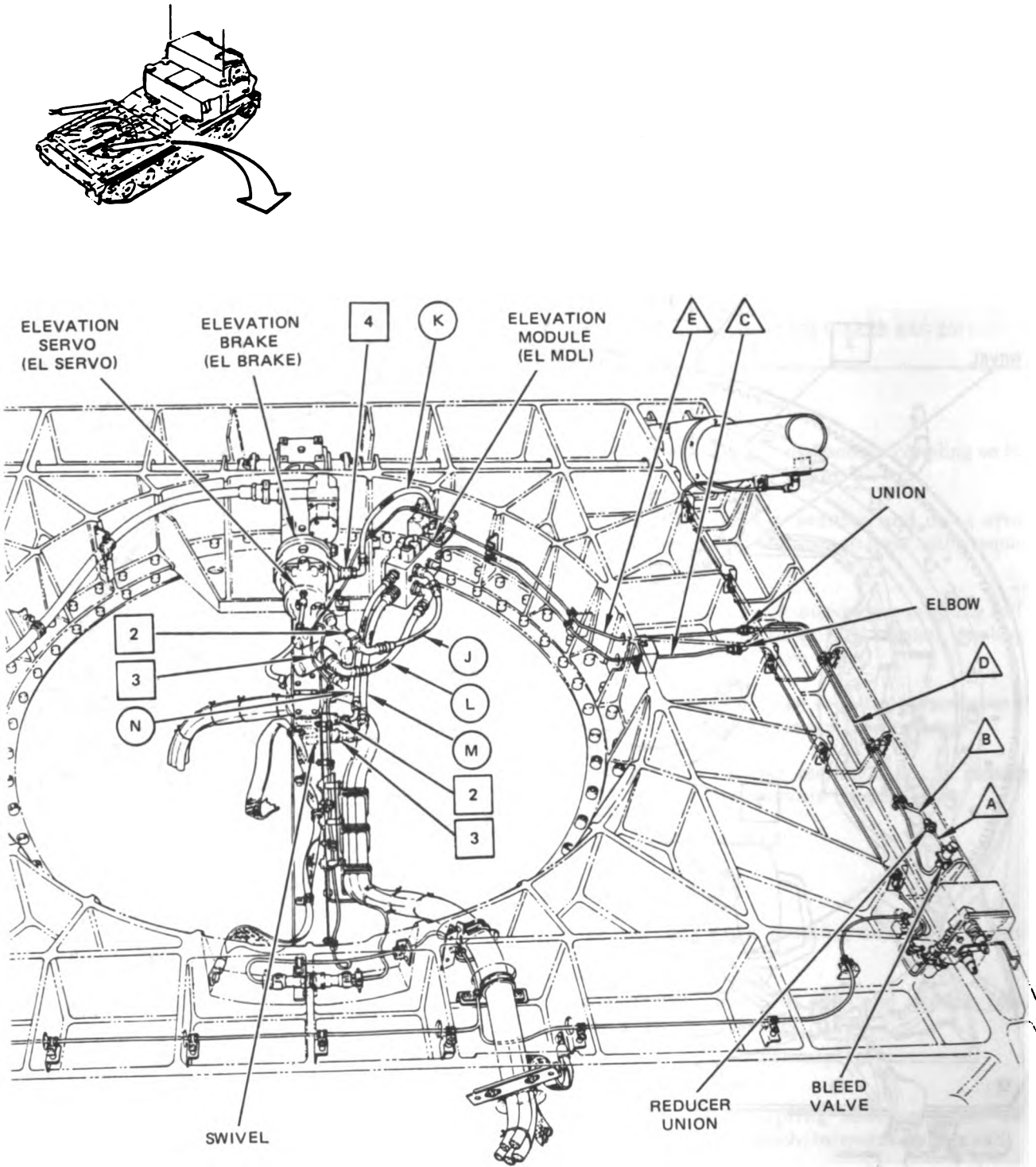


Figure 6-1. Hydraulic Hose and Tube Location (Sheet 2 of 2)

Table 6-1. Hose Assemblies and Coupling Halves

HOSE	FROM/TO	WRENCH (INCH)	COUPLING	WRENCH (INCH)	TORQUE (N•m)
A	HYD PUMP - HEAT EXC	1-1/4	1	1	
B	HYD PUMP - AZ MDL	7/8	2	7/8	37.0 to 56.5
C	HEAT EXC - AZ MDL	1	3	1-1/16	45.5 to 79.0
D	AZ MDL - SWIVEL	7/8	2	7/8	37.0 to 56.5
E	AZ MDL - SWIVEL	1	3	1-1/16	45.5 to 79.0
F	AZ MDL - AZ SERVO	11/16	4	3/4	20.0 to 33.5
G	AZ MDL - AZ SERVO	1	3	1-1/16	45.5 to 79.0
H	AZ MDL - AZ BRAKE	11/16	4	3/4	20.0 to 33.5
J	EL MDL - EL SERVO	11/16	2	7/8	20.0 to 33.5
K	EL MDL - EL BRAKE	11/16	4	3/4	20.0 to 33.5
L	EL MDL - EL SERVO	1	3	1-1/16	45.5 to 79.0
M	EL MDL - SWIVEL	1	3	1-1/16	45.5 to 79.0
N	EL MDL - SWIVEL	7/8	2	7/8	37.0 to 56.5

Table 6-2. Tube Assemblies

TUBE	FROM/TO	WRENCH (INCH)	TORQUE (N•m)
A	VALVE - REDUCER UNION	3/8	8.5 to 9.6
B	REDUCER UNION - ELBOW	9/16	11.5 to 16.5
C	ELBOW - EL MDL	9/16	11.5 to 16.5
D	VALVE - UNION	9/16	11.5 to 16.5
E	UNION - EL MDL	9/16	11.5 to 16.5

3. HYDRAULIC TUBE.**a. Remove.**

(1) Using required open end wrench, disconnect both end of hydraulic tube.

(2) Using crosstip screwdriver and 6mm box end wrench, remove clamps from tube. Remove tube and reinstall clamps to aid in installation.

b. Install.

(1) Place tube in position and using required crowfoot wrench, torque tube fittings.

(2) Using crosstip screwdriver and 6mm box end wrench, install clamps on tube.

(3) If no further maintenance is required, perform follow-on procedure (page 6-94).

6-23. HYDRAULIC HOSE AND TUBE MAINTENANCE INSTRUCTIONS (CONT)

4. BLEED VALVE.

a. Remove.

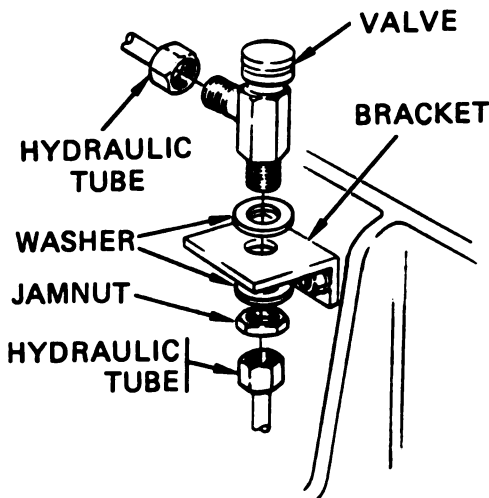
(1) Using 3/8-inch open end wrench, disconnect hydraulic tube from valve.

(2) Using 11/16-inch open end wrench, remove jamnut and washers securing valve to bracket. Remove valve.

b. Install.

(1) Position valve in bracket and install jamnut and washers. Using 11/16-inch open end wrench, tighten jamnut.

(2) Connect hydraulic tube to valve. Using 3/8-inch open end wrench, tighten tube nut.



(3) If no further maintenance is required, perform follow-on procedure.

5. BLEED VALVE MOUNTING BRACKET.

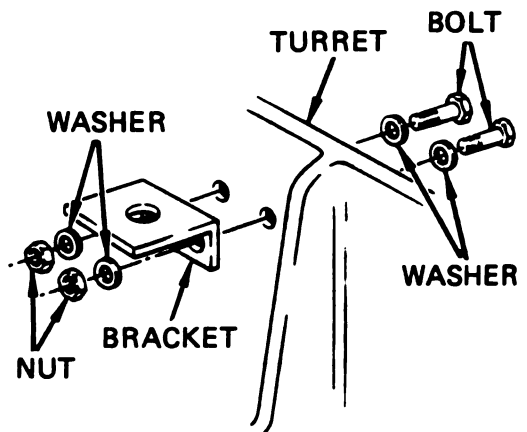
a. Remove.

(1) Remove bleed valve (item 4, a).

(2) Using 8mm box end wrench and 6mm socket, remove two bolts, four washers, and two nuts securing bracket to turret. Remove bracket.

b. Install.

(1) Apply zinc chromate primer to two bolts. Position bracket on turret and install two bolts, four washers, and two nuts. Using 8mm box end wrench and 6mm socket, tighten nuts.



(2) Install bleed valve (item 4, b).

FOLLOW-ON PROCEDURE

Perform hydraulic system bleeding (paragraph 6-3).

CHAPTER 7 FIRE CONTROL SYSTEM MAINTENANCE

CHAPTER CONTENTS

		<i>Paragraph</i>	<i>Page</i>
SECTION I.	GENERAL		7-1
	Introduction.	7-1	7-1
SECTION II.	MAINTENANCE PROCEDURES		7-1
	General Maintenance Procedures.	7-2	7-1
	Boom Controller (BC) Maintenance Instructions	7-3	7-2
	SRP Mounting/Adjusting Bolt Maintenance Instructions	7-4	7-6
	Encoder Maintenance Instructions	7-5	7-11

Section I. GENERAL

7-1. INTRODUCTION. This section contains the fire control system (FCS) maintenance procedures authorized for direct support by the Maintenance

Allocation Chart (MAC). The MAC is in Appendix B of TM 9-1425-646-20.

Section II. MAINTENANCE PROCEDURES

7-2. GENERAL MAINTENANCE PROCEDURES. The following inspection and cleaning procedures should be used when performing maintenance tasks. Special inspections and cleaning procedures, when required, are included with each maintenance task.

a. Inspection.

- (1) Check bolts, nuts, and screws for stripped threads or other damage. Repair or replace as necessary. Do not reuse self-locking nuts that do not meet minimum breakaway torque (Appendix D).
- (2) Check bearings and bushings for scored, galled, or other visual damage. Replace if damaged.
- (3) Check components for chipped paint, rust, broken welds, elongated holes, or other visual damage. Repair or replace as required.

(4) Check electrical cables and connectors for cracked or broken insulation, bare wires, and loose or damaged connectors. Repair or replace as required.

(5) Check hoses and fluid lines for frayed hoses, nicked or scratched fluid lines, and damaged connectors. Repair or replace as required.

b. Cleaning and Painting.

- (1) Using cotton wiping cloth and approved solvent, if required, clean all components before installation.
- (2) Spot paint all areas that have chipped or scratched paint.

7-3. BOOM CONTROLLER (BC) MAINTENANCE INSTRUCTIONS. This paragraph covers the maintenance tasks for the following items:

<i>Item</i>	<i>Page</i>
1. Boom Controller	7-2
2. Boom Controller Storage Box	7-3

INITIAL SETUP

Tools

Kit, tool, 13032302

Materials/Parts

Alcohol, isopropyl (2, Appendix B)
 Primer, zinc chromate (47, Appendix B)
 Sealant (59, Appendix B)

Personnel Required

MLRS Repairer MOS 27M

References

TM 9-1425-646-20

Troubleshooting

Paragraph 2-9

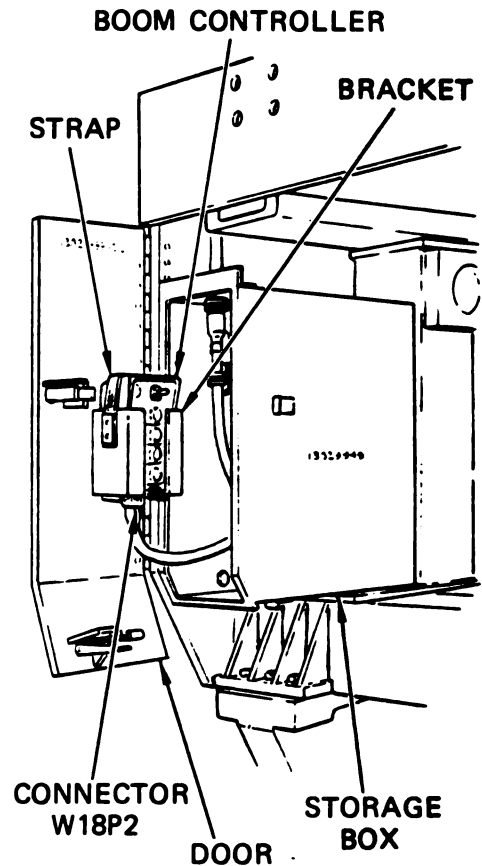
1. BOOM CONTROLLER.

a. Remove.

- (1) Open door on BC storage box.
- (2) Disconnect electrical connector W18P2 from BC.
- (3) Disconnect strap securing BC in bracket.
- (4) Slide BC up and remove from bracket.

b. Install.

- (1) Slide new BC down into bracket.
- (2) Position strap over top of BC and secure to bracket.
- (3) Connect electrical connector W18P2 to BC.
- (4) Close and secure door on BC storage box.



(5) If no further maintenance is required, perform follow-on procedure (page 7-5).

7-3. BOOM CONTROLLER (BC) MAINTENANCE INSTRUCTIONS (CONT)

2. BOOM CONTROLLER STORAGE BOX.

b. Repair.

a. Remove.

(1) Unlatch two latches and open door.

(2) Disconnect electrical connector W18P1 from W25J1 at top of storage box. Remove inner jamnut and remove bulkhead connector, install jamnut on connector W25J1. Disconnect W18P2 from BC.

(3) Using crosstip screwdriver and 6mm box end wrench, remove screw, two washers, and nut securing cable clamp. Remove clamp and cable W18.

(4) Using 4mm socket head key and 7mm socket, remove four screws, washers, and nuts securing storage box to cage. Remove storage box.

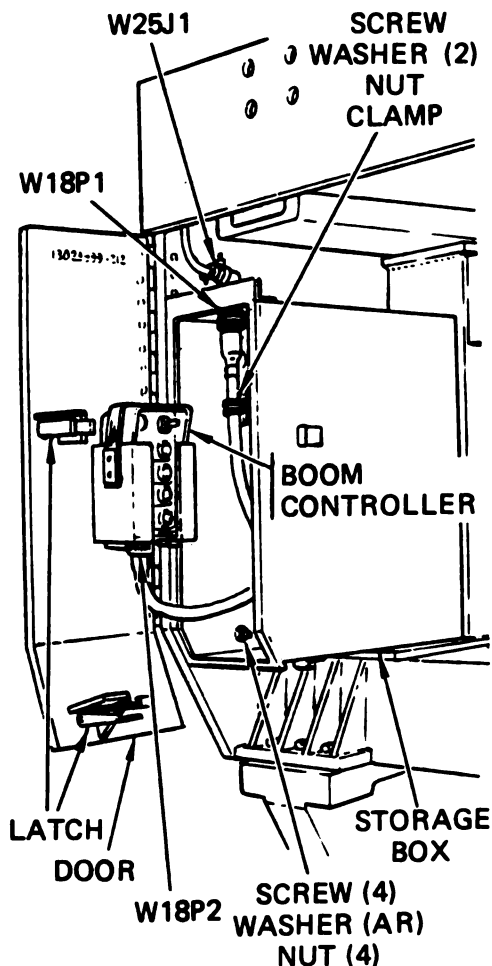
WARNING

Isopropyl alcohol vapors are toxic. Avoid prolonged or repeated breathing of vapors or contact with skin. Use only with adequate ventilation. Solvent is flammable and should not be used near open flame. Fire extinguishers should be readily available when isopropyl alcohol is used.

(1) Using scraping knife and isopropyl alcohol, remove defective gasket and clean bonding surface.

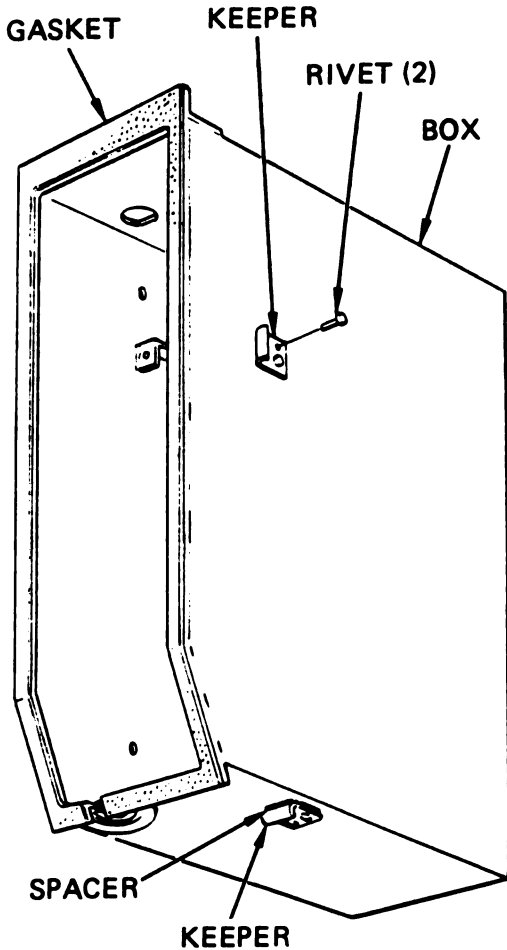
(2) Apply sealant to bonding surface and install gasket.

(3) Using electric drill and 3/16-inch twist drill, remove two rivets securing keeper to box. Remove keeper and spacer on bottom keeper.



7-3. BOOM CONTROLLER (BC) MAINTENANCE INSTRUCTIONS (CONT)

(4) Apply sealant to box and keeper mating surfaces. Position spacer and keeper to box. Apply zinc chromate primer to rivets and install rivets.



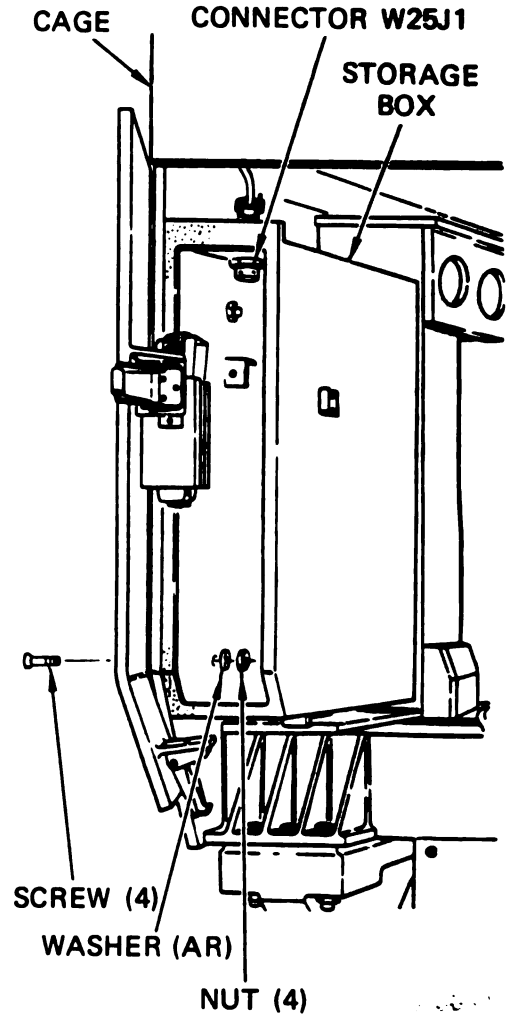
c. Install.

NOTE

Add washers, as required, under each nut so that screw threads do not protrude past end of nut.

(1) Apply zinc chromate primer to four screws. Position storage box to cage and install four screws, washers (as required), and nuts. Using 4mm socket head key and 7mm socket, tighten nuts.

(2) Install bulkhead connector W25J1 in top of storage box and tighten jamnuts.



(3) Connect electrical connector W18P1 to connector W25J1.

(4) Position cable clamp on cable W18 and install screw, two washers, and nut. Using crosstip screwdriver and 6mm socket, tighten nut.

(5) Connect electrical connector W18P2 to BC.

(6) Coil electrical cable W18 and place in storage box.

7-3. BOOM CONTROLLER (BC) MAINTENANCE INSTRUCTIONS (CONT)

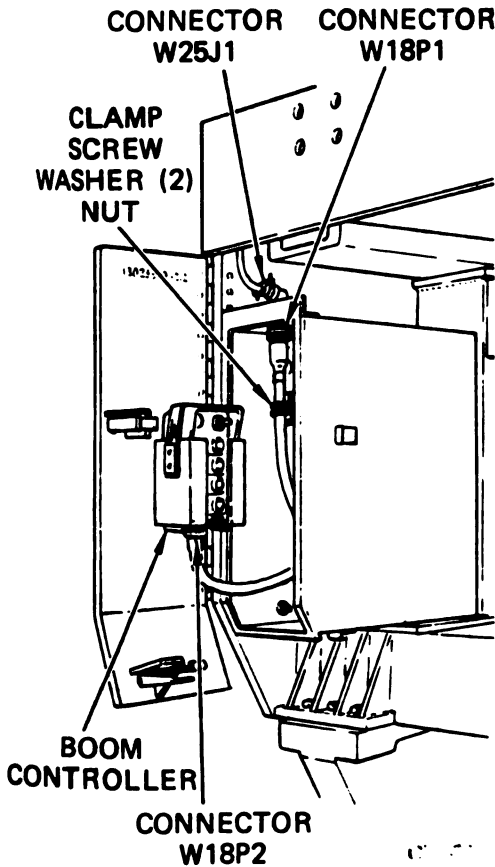
(7) Close door and adjust latches until door fits tight against BC storage box. Using 11mm open end wrench, tighten locknut on latch.

(8) If necessary, loosen storage box mounting screws and adjust box to make gasket contact door assembly.

(9) If no further maintenance is required, perform follow-on procedure.

FOLLOW-ON PROCEDURE

Using BC, cycle LLM in elevation and azimuth two times and check for smooth operation (TM 9-1425-646-20).



7-4. SRP MOUNTING/ADJUSTING BOLT MAINTENANCE INSTRUCTIONS. This paragraph covers the maintenance tasks for the following items:

<i>Item</i>	<i>Page</i>
1. SRP Guide	7-6
2. SRP Mounting/Adjusting Bolt	7-7
3. SRP Mounting/Adjusting Bolt Insert	7-10

INITIAL SETUP

Test/Support Equipment

- Gage, LP/C, 13025007
- Jack, hand screw, GGG-J-51TY1CL3
- Scale holder, magnetic, 71-6065
- Quadrant, fire control, 7197156
- Scale, optical alinement, 716010
- Theodolite, survey, T263MIL

Tools

- Kit, tool, 13032302
- Set, shop, 13032303
- Extractor, 1227-6
- Insertor, 7756-10
- Tool, tang breakoff, 4238-10

Materials/Parts

- Clay (4, Appendix B)
- Cloth, cleaning (6, Appendix B)
- Primer, zinc chromate (47, Appendix B)

Personnel Required

- MLRS Repairer MOS 27M
- MLRS Mechanic MOS 13M
- Field Artillery Surveyor MOS 82C

References

- TM 9-1425-646-10
- TM 9-1425-646-20

1. SRP GUIDE.

a. Remove.

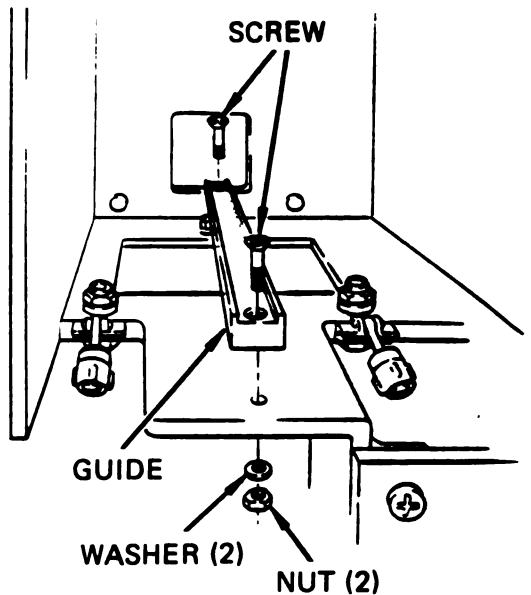
(1) Remove SRP (TM 9-1425-646-20).

(2) Using crosstip screwdriver and 8mm socket, remove two nuts, two washers, and two screws securing guide. Remove guide.

b. Install.

(1) Apply zinc chromate primer to two screws. Position guide to structure and secure with two screws, two washers, and two nuts.

(2) Using crosstip screwdriver and 8mm socket, tighten nuts.



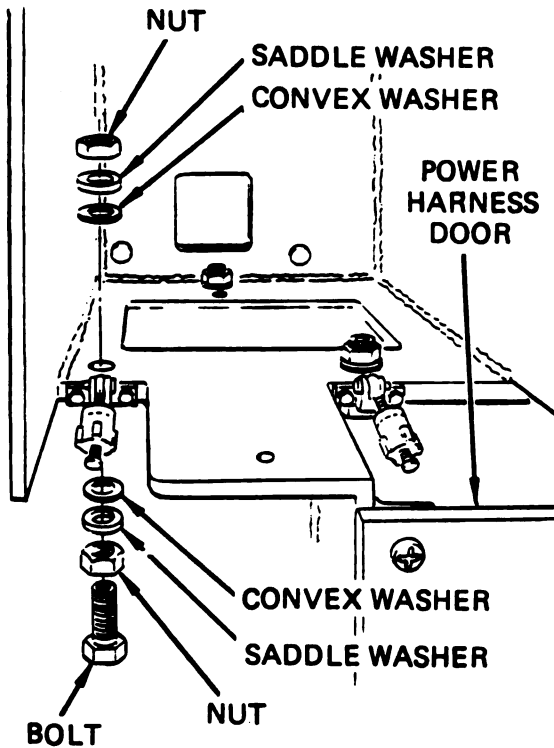
(3) Install SRP (TM 9-1425-646-20).

7-4. SRP MOUNTING/ADJUSTING BOLT MAINTENANCE INSTRUCTIONS (CONT)

2. SRP MOUNTING/ADJUSTING BOLT.

a. Remove.

- (1) Remove SRP guide (item 1, a).
- (2) Manually position LLM to 0 mils azimuth and 0 mils elevation (TM 9-1425-646-10).
- (3) Using crosstip screwdriver, unlatch four studs securing power harness door. Remove door.
- (4) Using 27mm box end wrench and 24mm socket, remove upper nut and two washers. Note position of washers.
- (5) Remove bolt with lower washers and nut. Note position of nut on bolt.

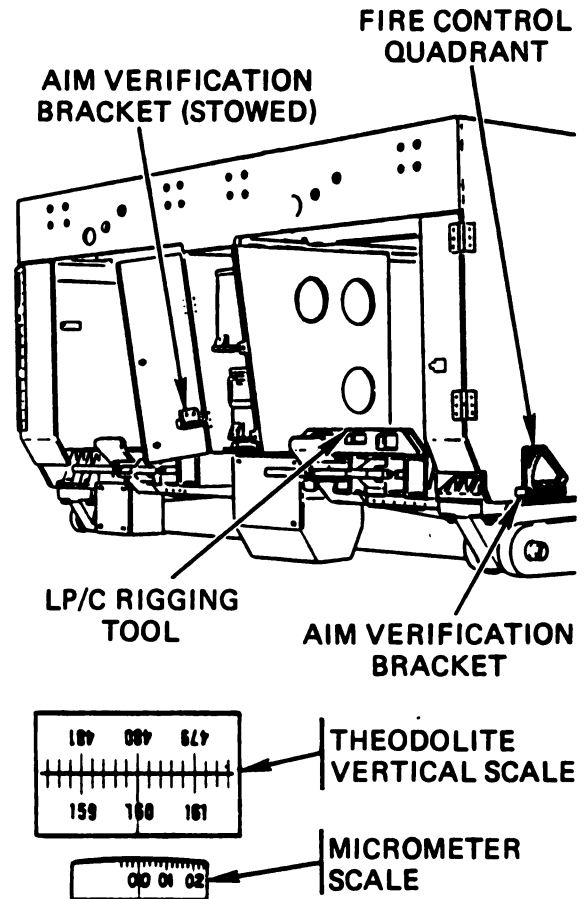


b. Level Cage.

- (1) Position SPLL so that front end is slightly downhill. Using fire control quadrant mounted on aim verification bracket, check level fore and aft.

- (2) Place LP/C rigging tool across LP/C pads and using fire control quadrant, determine which side of SPLL is low.

- (3) Set up and level theodolite behind SPLL in position that optical alinement scale can be seen on each LP/C mounting pad. The height of theodolite will be about 6 feet. Make sure theodolite vertical scale is always on 1600 mils when sighting optical alinement scales.



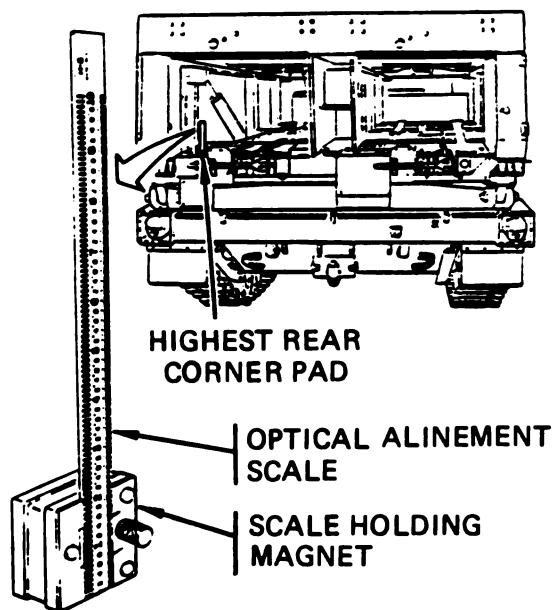
- (4) Position optical alinement scale in scale holding magnet and place on highest rear corner pad.

- (5) With theodolite level, note reading on scale. Make sketch of sight picture for future reference.

7-4. SRP MOUNTING/ADJUSTING BOLT MAINTENANCE INSTRUCTIONS (CONT)

(6) Move optical alinement scale to diagonally opposite corner pad and again take sight picture without disturbing vertical setting of theodolite.

(7) Manually elevate cage until sight picture matches that obtained in step (5).



(8) Place jack under gear housing on low side at rear of cage.

(9) Move optical alinement scale to corner pad above jack.

(10) Raise jack until sight picture on scale matches that obtained in step (5) on highest corner pad.

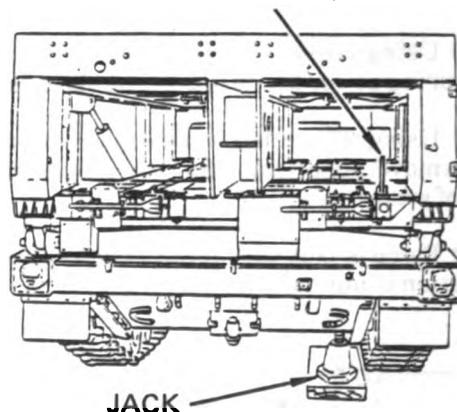
(11) Move optical alinement scale back to highest corner pad and recheck sight picture. If sight picture has changed, adjust jack while moving scale from one rear corner pad to the other until sight pictures are same.

NOTE

Due to racking and the difficulties in trying to level in one plane without changing the other plane, it may be necessary to compromise with two or three corner pads having the same readings and the other being off by not more than 0.25mm.

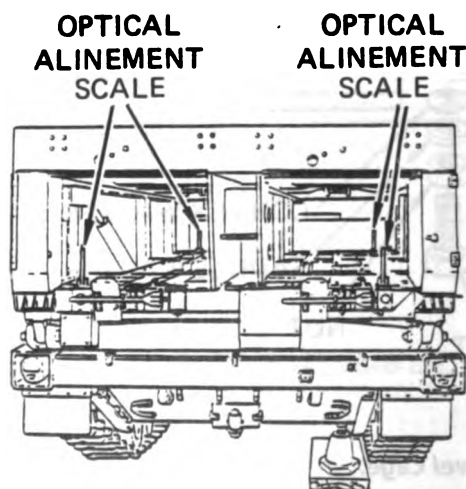
(12) Move optical alinement scale to pad in front and recheck sight picture. Manually elevate or depress cage until sight picture is identical to that finally used in step (11).

OPTICAL ALINEMENT SCALE



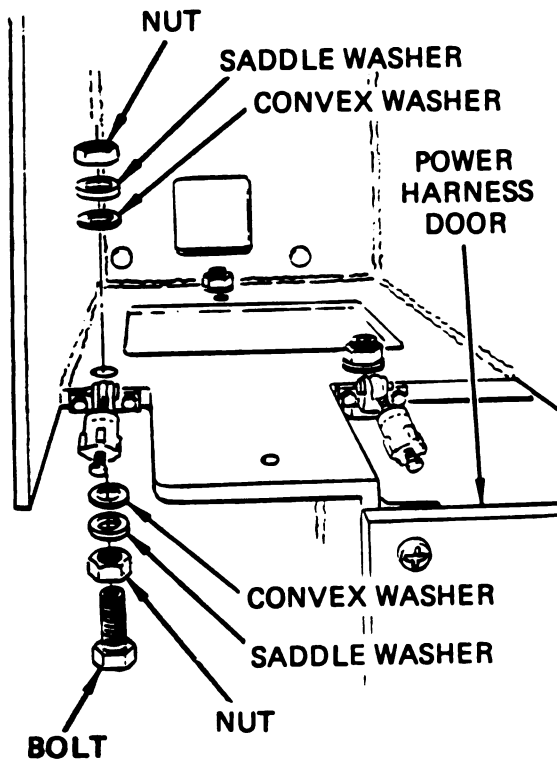
(13) Place optical alinement scale on each of four corner pads and verify that same sight picture is obtained on all four. Repeat steps (11) and (12) until sight pictures are same.

(14) Do not move or disturb theodolite.



7-4. SRP MOUNTING/ADJUSTING BOLT MAINTENANCE INSTRUCTIONS (CONT)**c. Install.**

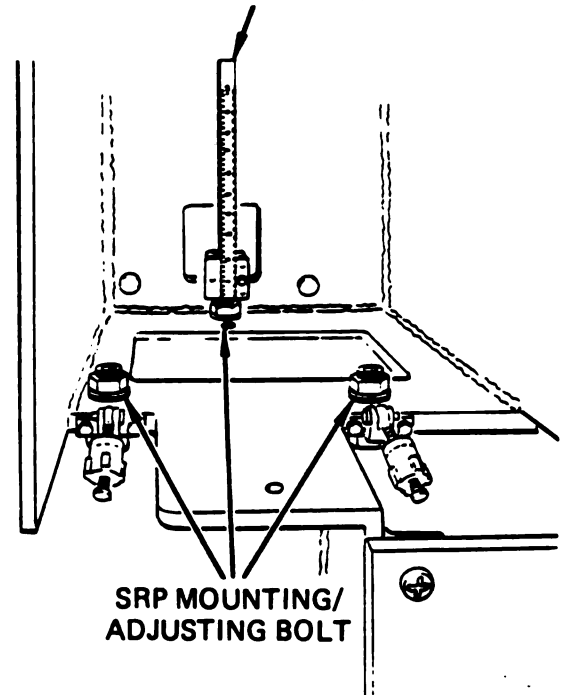
- (1) Install nut on bolt in position noted on removal.
- (2) Install saddle washer on bolt next to nut and then install convex washer.
- (3) Install bolt in structure and then install convex washer. Install saddle washer and nut. Tighten nut finger-tight.



(4) Place optical alinement scale on top of two mounting bolts not removed and note readings through theodolite. Make sketch of sight picture.

(5) Move optical alinement scale to the bolt just replaced and note sight picture.

(6) Adjust two nuts on replacement bolt until three readings are no more than 0.49mm between largest and smallest reading. Tighten nuts finger-tight.

OPTICAL ALINEMENT SCALE

(7) Install SRP guide but do not install SRP (item 1, b).

(8) Install SRP and secure with retainers (TM 9-1425-646-20).

(9) Install bolts into mounting/adjusting bolts which were not replaced.

NOTE

It may be necessary to move mounting/adjusting bolt around to line up with SRP mounting bolt.

(10) Install remaining bolt into replacement mounting/adjusting bolt. Tighten bolt finger-tight.

(11) Unscrew top three bolts and remove SRP.

(12) Place optical alinement scale back on replacement mounting/adjusting bolt and check that reading on theodolite has not changed.

7-4. SRP MOUNTING/ADJUSTING BOLT MAINTENANCE INSTRUCTIONS (CONT)

(13) Torque two nuts on mounting/adjusting bolt to 109 to 133 N•m while checking sight picture to make sure alinement is maintained.

3. SRP MOUNTING/ADJUSTING BOLT INSERT.

a. Remove.

NOTE

If threads of bolt base metal are damaged, replace the SRP mounting/adjusting bolt.

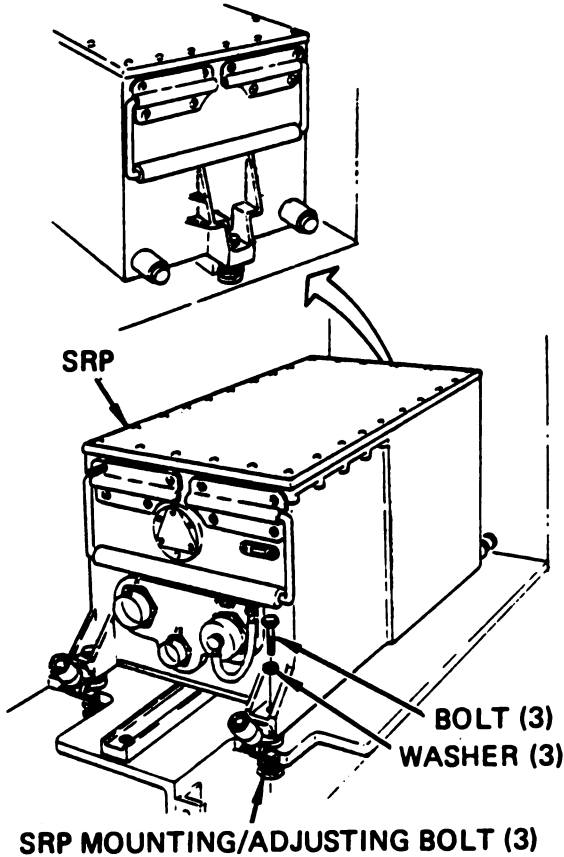
(1) Remove SRP (TM 9-1425-646-20).

(2) Using insert extractor, remove defective insert.

b. Install.

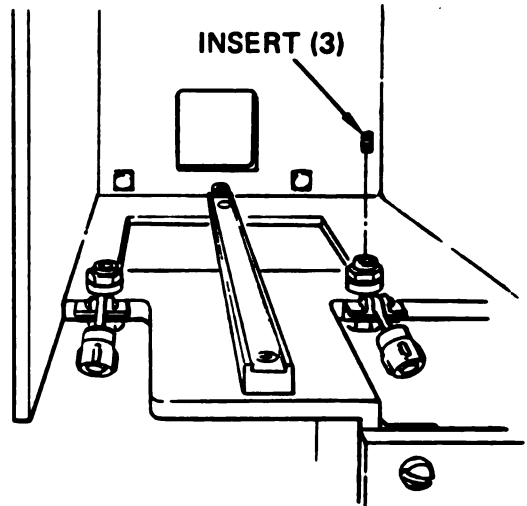
(1) Apply zinc chromate primer to new insert. Using insert inserter, install new insert until top of insert is slightly below top surface of tapped hole.

(2) Using tang breakoff tool, breakoff tang of insert. Remove tang.



(14) Install and secure power harness door.

(15) Install SRP (TM 9-1425-646-20).



(3) Install SRP/PDS (TM 9-1425-646-20).

7-5. ENCODER MAINTENANCE INSTRUCTIONS. This paragraph covers the replacement of the encoders.

INITIAL SETUP

Tools

Kit, tool, 13032302

Materials/Parts

Lockwire (23, Appendix B)

Personnel Required

MLRS Repairer MOS 27M

References

TM 9-1450-646-10

Troubleshooting

Paragraph 2-9

Equipment Condition

Carrier cab raised (TM 9-1450-646-10)

a. Remove.

(1) Cut lockwire and disconnect electrical connector W80P1 or W80P2 from defective encoder.

(2) Using crosstip screwdriver and 1/4-inch box end wrench, remove two screws, shim, washers, and nuts securing saddle clamp on encoder.

NOTE

Use extreme care when removing encoder to prevent losing the drive tip.

(3) Using 1-inch or 1-1/4 inch open end wrench, loosen nut securing encoder to adapter while supporting adapter with slip joint pliers. Remove encoder and retain drive tip.

(4) Using 9/16-inch socket, remove two bolts and washers securing bracket. Remove bracket.

b. Install.

(1) Position bracket on vehicle and secure with two bolts and two washers. Using 9/16-inch socket, torque bolts to 36.6 to 40.6 N•m (27 to 30 ft lb).

(2) Engage drive tip in the adapter and encoder. Install encoder and tighten nut using 1-inch or 1-1/4 inch open end wrench while supporting adapter with slip joint pliers.

(3) Position saddle clamp on encoder. Apply zinc chromate primer to two screws. Install two screws, shim, washers, and nuts. Using crosstip screwdriver and 1/4-inch box end wrench, tighten nuts.

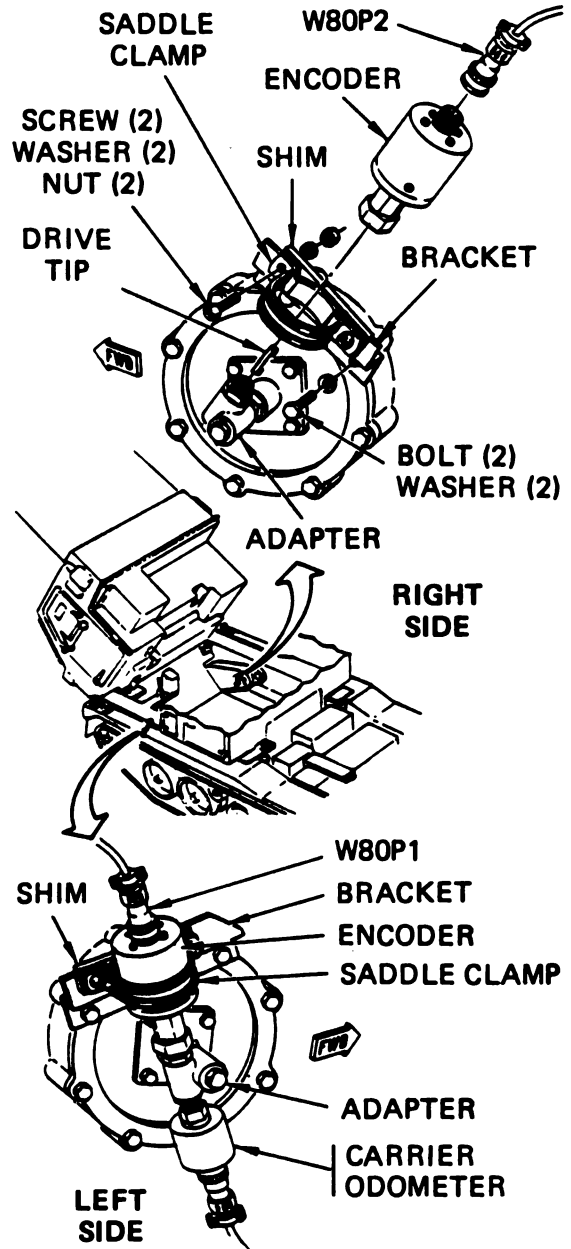
(4) Connect electrical connector W80P1 or W80P2 to encoder and lock-wire.

(5) If no further maintenance is required, perform follow-on procedure.

FOLLOW-ON PROCEDURE

Lower and lock carrier cab (TM 9-1450-646-10).

Perform PDS calibration (TM 9-1450-646-10).



APPENDIX A REFERENCES

A-1. GENERAL. This appendix lists all forms, field manuals, and technical manuals referenced in this manual. These publications will assist you in maintaining the SPLL. You should check them constantly for the latest changes and revisions.

A-2. FORMS.

DA Form 2028
Recommended Changes to Publications and Blank Forms

DA Form 2404
Equipment Inspection and Maintenance Worksheet

DA Form 2407
Maintenance Request

DA Form 2409
Equipment Maintenance Log

DA Form 285
Accident Report

DD Form 6
Packaging Improvement Report

SF 368
Quality Deficiency Report

A-3. FIELD MANUALS.

FM 21-11
First Aid

A-4. REGULATIONS.

AR 385-40
Accident Reporting and Records

AR 75-1
Logistics (General) Malfunctions Involving Ammunition and Explosives

A-5. TECHNICAL MANUALS.

TM 740-90-1
Administrative Storage of Equipment

TM 750-245-4
Direct and General Support, Quality Control Inspection Criteria (Guided Missile System)

TM 9-1300-206
Ammunition and Explosives Standard

TM 9-1425-646-10
Operator's Manual, SPLL, MLRS

TM 9-1425-646-20
Organizational Maintenance, SPLL, MLRS

TM 9-1425-646-34P
DS and GS Maintenance Repair Parts and Special Tools List for the MLRS

TM 9-1450-646-34
Direct and General Support Maintenance Manual, Carrier, GSRS

A-6. MISCELLANEOUS PUBLICATIONS.

DA Pamphlet 738-750
The Army Maintenance Management System (TAMMS)

TB 750-25
Maintenance of Supplies and Equipment Army Test, Measurement, and Diagnostic Equipment Calibration Repair Support Program

APPENDIX B EXPENDABLE/DURABLE SUPPLIES AND MATERIALS LIST

Section I. INTRODUCTION

B-1. GENERAL. This appendix lists expendable supplies and materials you will need to operate and maintain the SPLL. This listing is for informational purposes only and is not authorizing the requisitioning of the listed items. These items are authorized to you by CTA 50-970, Expendable/Durable Items (Except Medical, Class V, Repair Parts, and Heraldic Items), or CTA 8-100, Army Medical Department Expendable/Durable Items.

B-2. EXPLANATION OF COLUMNS.

a. Column 1 - Item Number. This number is assigned to the entry in the listing and is referenced in the narrative instructions to identify the material (e.g., Use grease, item 19, Appendix B).

b. Column 2 - National Stock Number. This is the national stock number assigned to the item. Use it to request or requisition the item.

c. Column 3 - Description. Indicates the federal item name and, if required, a description to identify the item. The last line for each item indicates the part number followed by the Federal Supply Code for Manufacturer (FSCM) in parentheses, if applicable.

d. Column 4 - Unit of Measure (U/M). Indicates the measure used in performing the actual maintenance function. This measure is expressed by a two-character alphabetical abbreviation (e.g., ea, in., pr). If the unit of measure differs from the unit of issue, requisition the lowest unit of issue that will satisfy your requirements.

Section II. EXPENDABLE/DURABLE SUPPLIES AND MATERIALS LIST

(1) ITEM NUMBER	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION	(4) U/M
1	8040-00-116-1437	Adhesive, MMM-A-132, Type 1, CL2	
2	6810-00-753-4993	Alcohol, isopropyl, TT1735	
3	5340-00-450-5718	Caps and plugs, plastic	
4		Clay, model, UC00451	
5	5350-00-221-0872	Cloth, abrasive	
6	7920-00-205-1711	Cloth, cleaning, DDD-R-30, CL2, Grade B	ea
7	7920-00-044-9281	Cloth, cleaning, MIRACLEWIPEL001	
8		Coating, ablative, M1S31865	
9	8010-00-131-6254	Coating, black, MIL-C-46168	
10	8010-01-128-6958	Coating, forest green, MIL-C-46168	
11	6850-00-319-0834	Compound, cleaning, MIL-C-81302TY2	
12	6850-01-L15-7695	Compound, cleaning, P-C-444TYPE 1 1GLEN	

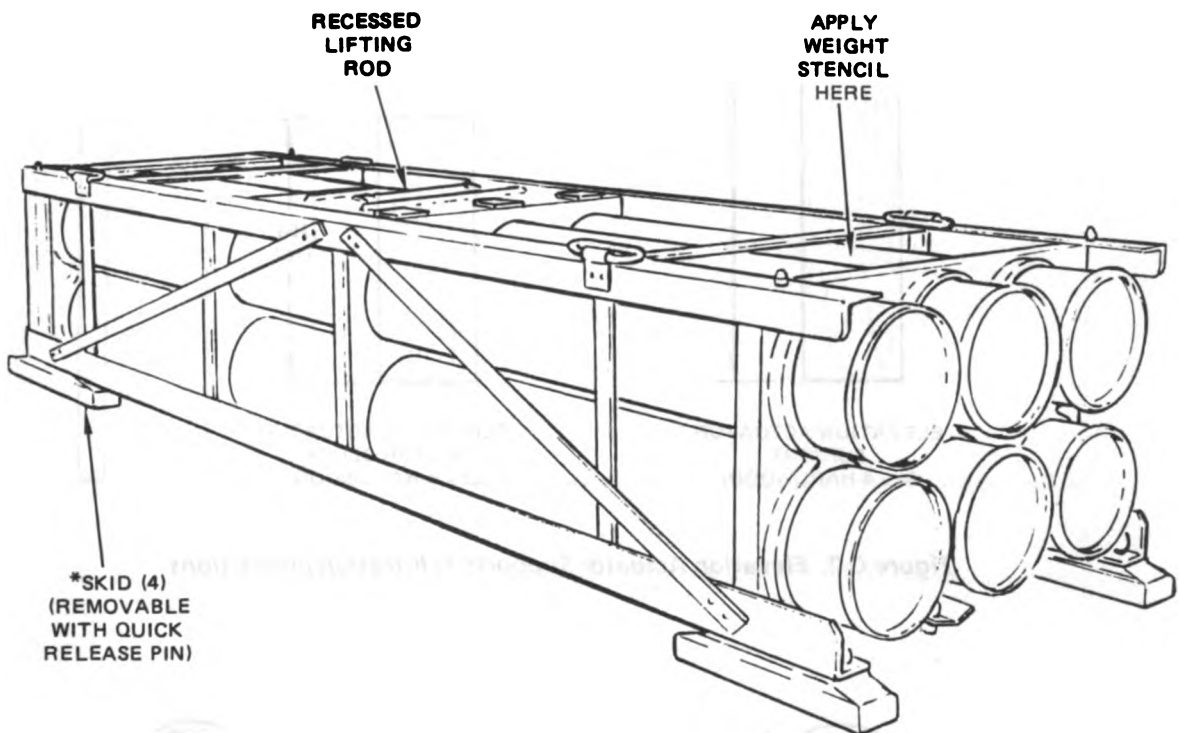
(1) ITEM NUMBER	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION	(4) U/M
13	8030-01-126-7486	Compound, corrosion preventive, MIL-C-81309TY1, CL2	
14	8045-00-225-1959	Compound, locking, Grade A, MIL-S-22473	
15	8030-01-069-3046	Compound, sealing, MIL-S-46163 TY2GRM5CCBT	
16		Cover, sleeve, 13029692	
17	9150-00-111-6254	Fluid, hydraulic, MIL-H-46170 TYPE 1	
18		Gasket, MS9135-01	
19	9150-00-190-0904	Grease, MIL-G-10924 LB	1 lb
20	9150-00-823-8048	Grease, MIL-G-25013-80ZTU	
21	9150-00-944-8953	Grease, MIL-G-81322	
22	8030-00-953-7757	Iridite, 14-2, clear	
23	9505-00-221-2650	Lockwire, MS20995C20	lb
24	9505-00-293-4208	Lockwire, MS20995C32	lb
25	6810-00-264-8983	Methyl-ethyl-ketone, 7527656	
26	9150-00-231-2361	Oil, lubricating, MIL-L-3150	1 qt
27	5330-00-167-5172	Packing, preformed, M83248/2-904	
28	5330-00-165-1981	Packing, preformed, M83248/2-906	
29	5330-00-167-5173	Packing, preformed, M83248/2-908	
30	5330-00-167-5174	Packing, preformed, M83248/2-910	
31	5330-00-167-5176	Packing, preformed, M83248/2-916	
32	5330-01-046-0629	Packing, preformed, M83461/1-014	
33	5330-01-046-0628	Packing, preformed, M83461/1-015	
34	5330-01-043-1419	Packing, preformed, M83461/1-016	
35	5330-01-050-1539	Packing, preformed, M83461/1-019	
36	5330-01-107-1149	Packing, preformed, M83461/1-021	
37	5330-01-107-4963	Packing, preformed, M83461/1-023	
38	5330-01-146-4563	Packing, preformed, M83461/1-132	
39	5330-01-112-4058	Packing, preformed, M83461/1-138	
40	5330-01-112-4059	Packing, preformed, M83461/1-146	
41	5330-00-891-1429	Packing, preformed, Y-1126-132	

(1) ITEM NUMBER	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION	(4) U/M
42	5330-00-702-4713	Packing, preformed, MS29561-115	
43		Packing, preformed, MS29561-118	
44	5350-01-127-6855	Paper, abrasive, PP121CL7GRIT240	
45	8030-00-065-0957	Primer, alodine, 1200	
46	8010-00-082-2450	Primer, epoxy, MIL-P-23377TY1	
47	8010-00-515-2208	Primer, zinc chromate, TT-P-1757, CMPSNL, Color Y	
48	5330-00-413-4520	Retainer, packing, MS28774-021	
49	5330-00-580-5055	Retainer, packing, MS28774-014	
50	5330-00-937-1332	Retainer, packing, MS28774-015	
51	5330-00-064-2570	Retainer, packing, MS28774-016	
52	5330-00-720-3652	Retainer, packing, MS28774-019	
53	5330-00-855-3430	Retainer, packing, MS28774-023	
54	4020-00-238-7732	Rope, manila	
55	4020-00-231-9021	Rope, manila	
56		Seal, 13027254	
57	8010-01-164-4609	Sealant, epoxy, MS31838	
58	8030-00-251-3391	Sealant, MIL-S-45180, TY2	
59	8030-00-723-2746	Sealant, MIL-S-8802 CLB2	
60	9535-00-596-3343	Shim stock, brass	
61	6850-00-231-1985	Solvent, drycleaning, P-D-680, TY1	
62	6850-00-512-1097	Solvent, freon, NMS-432-605-01	
63	5975-00-074-2072	Strap, electrical tiedown, MS3367-1-9	
64	5975-00-899-4606	Strap, electrical tiedown, MS3367-2-0	
65	7510-00-266-6711	Tape, masking, 232, 3/4-inch	
66	8010-00-181-8080	Thinner, aliphatic, MIL-T-81772	
67	8010-01-127-6867	Thinner, paint, TTT291TYIIGDA	
68		Tubing, clear plastic, 4.83mm ID ZZT831TYVICL6	
69		Tubing, clear plastic, 9.40mm ID ZZT831TYVICL6	
70	4020-01-006-5548	Twine, lacing, MIL-T-713, Type P	
71	8010-00-180-6345	Varnish, MIL-V-173	pt

APPENDIX C ILLUSTRATED LIST OF MANUFACTURED ITEMS

This appendix includes simplified line drawing illustrations for each item authorized to be

manufactured/fabricated by direct support personnel.



NOTES:

- (1) USE "EXPENDED" LP/C
- (2) FILL BOTTOM THREE TUBES WITH GRAVEL CONCRETE.
- (3) FILL TOP CENTER TUBE 80% FULL WITH CONCRETE, BE SURE FILL LEAVES 350-mm SPACE AT EACH END
- (4) AFTER FILLING, WEIGH AND STENCIL WEIGHT ON LP/C

WEIGHT WITH CONCRETE – 2848.25 KG (6274.9 LB)

WEIGHT EMPTY – 402 KG (888 LB)

WEIGHT WITH SKIDS – 2877.06 KG (6342.8 LB)

*OBTAIN FROM AMMO DUMP TO BE REMOVED DURING LOAD TEST

Figure C-1. Test Load Fabrication Instructions

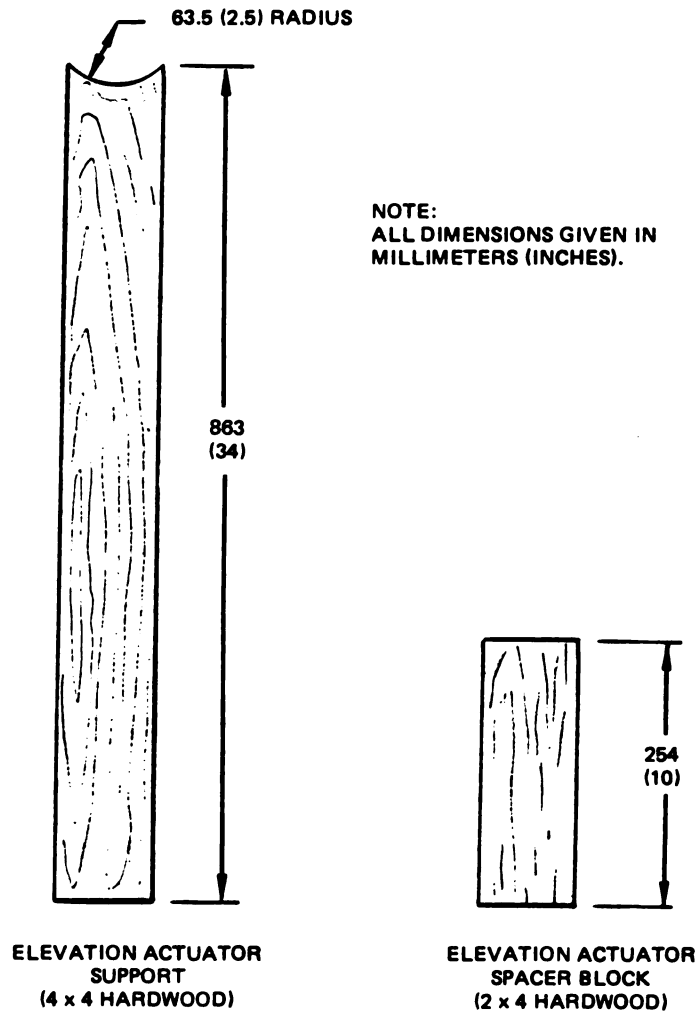
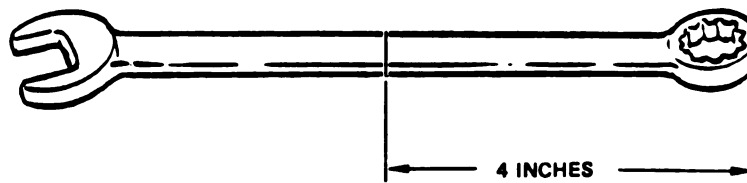


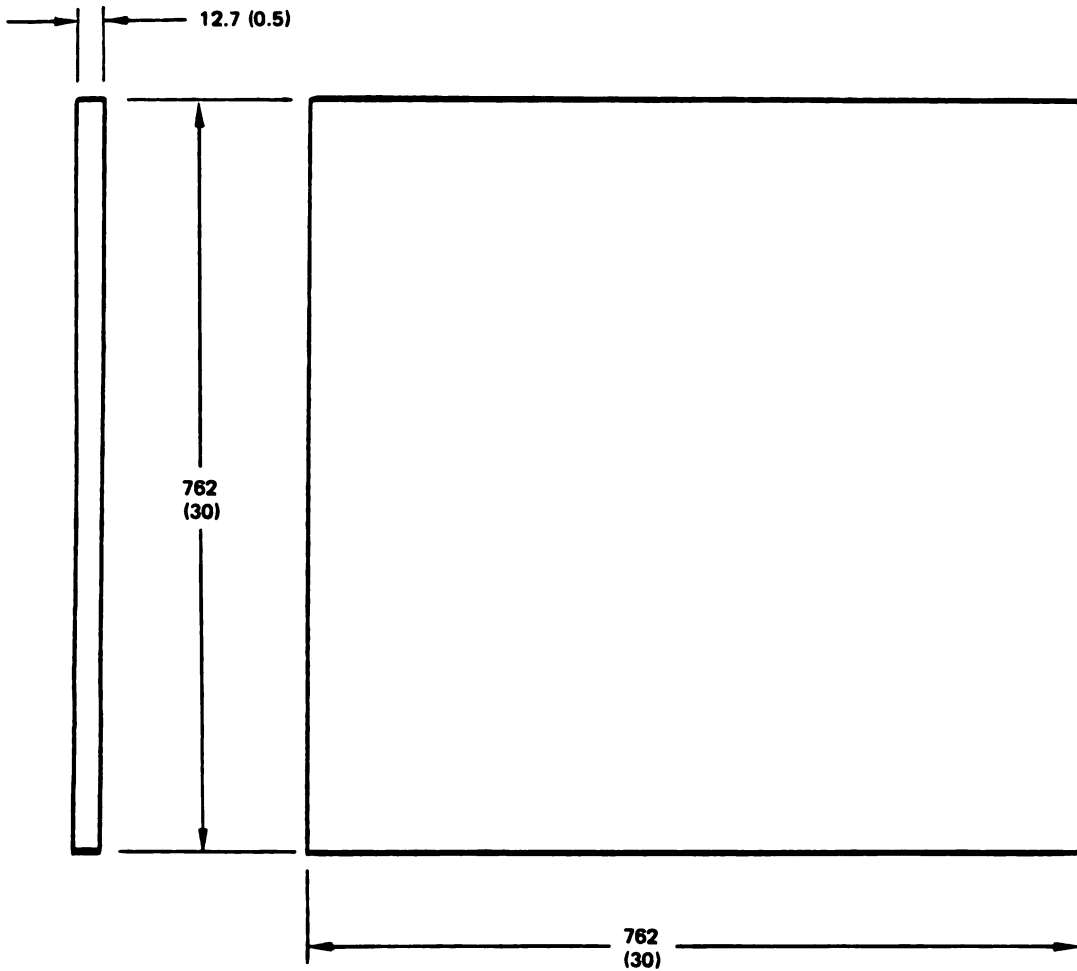
Figure C-2. Elevation Actuator Supports Fabrication Instructions



NOTE

USING ONE 24mm BOX END/OPEN END FROM TOOL KIT, SHORTEN WRENCH TO DIMENSION SHOWN. GRIND OFF SHARP EDGES.

Figure C-3. Short 24mm Box End Wrench



NOTE:

1. ALL DIMENSIONS GIVEN IN MILLIMETERS (INCHES).
2. MAKE FROM 1/2 INCH PLYWOOD.

Figure C-4. Portable Maintenance Cover

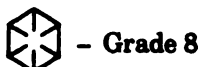
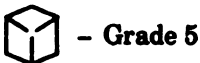
APPENDIX D TORQUE LIMITS

D-1. GENERAL. To safely maintain the SPLL, it is necessary to properly torque bolts, screws, and nuts. This appendix lists standard torque values, in newton meters, for different sizes of National Aerospace (NA) standard and German Standard (DIN) metric fasteners. It also lists standard torque values for nonmetric American fasteners. Special torque values are called out in individual maintenance procedures, as applicable, and have priority over values shown in this appendix. When no special torque value is listed in the maintenance procedures, fasteners will be torqued to values listed here.

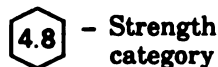
D-2. TORQUE TABLES. Table D-1 lists the recommended torque values for American Standard grade 5 bolt/nut combinations. Table D-2 lists values for grade 8 bolt/nut combinations. Table D-3 lists self-locking nut breakaway torque for American Standard nuts. It also contains an explanation on how to determine breakaway torque. Torque values for metric fasteners are listed in table D-4. Fastener sizes and strength categories are included for those metric fasteners you will find on the SPLL.

a. The grade or strength of a bolt can be determined by identification marks on bolthead. Other fasteners can be determined by their part number. Fastener strength influences torque as indicated in tables D-1 through D-4. An example of strength categories for American nonmetric grades 5 and 8, and metric bolts as marked on bolthead is as follows:

**AMERICAN
NONMETRIC**

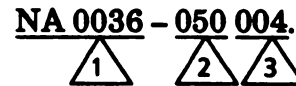


METRIC



b. If strength category does not appear on fastener, look up part number of fastener in RPSTL. Use the following explanation of part number to determine proper torque.

An example of National Aerospace (NA) standard part number is:



This group of letters and numbers identifies the standard that defines the requirements for manufacturing. The official title of the fastener is given in the standard. In this example, Bolt, Close Tolerance, Hex Head Alloy Steel 1100 MPa, Metric. Fasteners manufactured to this standard have a strength category of 12.9.

NOTE

All NA hex-head bolts and panhead screws used on the SPLL have a tensile strength of 1100 MPa and a strength category of 12.9 as shown in table D-4. Flush head screws used on the SPLL have a shear strength of 660 MPa and a strength category of 10.9.

These three numbers indicate the diameter of bolt shank in millimeters. In this example, diameter is 5mm. This is the number in the first column of table D-4.

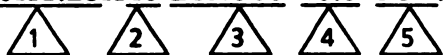
The three numbers indicate length of grip in millimeters. In this example, grip length is 4mm.

c. Therefore, in this example, 5mm diameter bolt with strength category of 12.9 must be torqued to 7 to 8 N•m in accordance with table D-4.

D-2. TORQUE TABLES (CONT)

An example of a German Standard (DIN) part number is

M10X1.25X40 DIN960-10.9-B3B.



1 This group of letters and numbers is thread size. M for metric, 10 for diameter code. The 1.25 indicates coarse or fine thread. For this 10mm bolt, 1.25 is fine thread and 1.5 would be coarse thread. The diameter code is the number in first column of table D-4.

2 This group of numbers indicate the length of the fastener in millimeters. In this example, length is 40mm.

3 This group of letters and numbers identifies the standard that defines requirements for manufacturing. The official title of fastener is given in the standard. In this example, Hexagon Bolt, Metric Fine Thread.

4 This group of numbers identifies the strength category. In this example, strength category of this bolt is 10.9.

5 When this group of letters appear in part number, it identifies finish code on fastener. In this example, bolt is cadmium plated.

Other codes that may appear are:

- St - Steel
- Ms - Brass
- A2 - Corrosion Resistant (Cres) Steel

Table D-1. Recommended Torque Values *Nom* (Grade 5 Bolt and Nut Combination)

THREAD SIZE	MIN	MAX
1/4-20	11	15
1/4-28	14	18
5/16-18	23	31
5/16-24	26	34
3/8-16	41	55
3/8-24	46	62
7/16-14	68	89
7/16-20	75	99
1/2-13	102	135
1/2-20	114	151
9/16-12	145	187
9/16-18	163	208
5/8-11	202	271
5/8-18	228	305
3/4-10	356	474
3/4-16	397	530
7/8-9	528	705
7/8-14	583	772
1-8	793	1057
1-12	867	1151
1-14	904	1199

Table D-2. Recommended Torque Values *Nom* (Grade 8 Bolt and Nut Combination)

THREAD SIZE	MIN	MAX
1/4-20	15	19
1/4-28	16	21
5/16-18	28	39
3/8-16	60	69
3/8-24	68	77
7/16-14	84	112
7/16-20	93	123
1/2-13	127	169
1/2-20	167	189
9/16-12	181	234
9/16-18	203	261
5/8-11	253	338
5/8-18	285	382
3/4-10	446	593
3/4-16	496	661
7/8-9	661	881
7/8-14	729	965
1-8	1081	1443
1-12	1179	1572

Table D-3. Self-Locking Nut Breakaway Torque Values

THREAD SIZE	MINIMUM BREAKAWAY TORQUE (N•m)	THREAD SIZE	MINIMUM BREAKAWAY TORQUE (N•m)
10-32	0.20	5/8-18	3.60
1/4-28	0.40	3/4-16	5.50
5/16-24	0.70	7/8-14	7.90
3/8-24	1.00	1-12	10.50
7/16-20	1.60	1-1/8-12	13.00
1/2-20	2.00	1-1/4-12	16.00
9/16-18	2.70		

NOTE

To determine breakaway torque, thread nut onto screw or bolt until at least two threads extend through the nut. The nut should not make contact with a mating part. The torque necessary to begin turning the nut again is the breakaway torque. Do not reuse self-locking nuts that do not meet minimum breakaway torque values.

Table D-4. Recommended Torque Values N•m (Metric Fasteners)

DIAMETER CODE OF FASTENER MM	STRENGTH CATEGORY								CRES FASTENERS CODED A2	
	4.8		8.8		10.9		12.9		MIN	MAX
	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX		
2	0.12	0.14	0.24	0.30	0.32	0.40	0.39	0.47	0.21	0.25
3	0.43	0.53	0.87	1.07	1.2	1.4	1.4	1.7	0.74	0.90
4	1.0	1.2	2.0	2.5	2.8	3.4	3.5	4.0	1.7	2.1
5	2.0	2.5	4.0	5.0	5.5	6.5	7.0	8.0	3.5	4.0
6	3.5	4.5	7.0	8.5	9.5	11.5	11.5	13.5	5.5	6.5
8	9.5	11.0	18.5	22.0	24.5	29.5	30.0	36.0	14	17
10	17.5	21.5	35.5	43.0	47.5	57.5	58.0	70.5	27.5	33
12	32.0	39.0	64.0	78.0	84.0	102.5	104	127	49.5	60
14	51	61.5	101	124	133	163	165	202	71	86
16	77.5	94	154	189	202	247	252	308	107	131

**Table D-4. Recommended Torque Values Nem
(Metric Fasteners) – Continued**

DIAMETER CODE OF FASTENER MM	STRENGTH CATEGORY								CRES FASTENERS CODED A2	
	4.8		8.8		10.9		12.9		MIN	MAX
	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX		
18	109	133	218	267	292	356	356	436	101	124
20	157	192	314	384	406	496	507	620	146	178
22	212	259	423	517	545	666	681	832	196	240
24	266	325	533	651	693	847	865	1057	247	302
27	387	473	774	946	1053	1287	1264	1544	359	439
30	538	658	1076	1316	1465	1791	1758	2148		
33	726	887	1452	1783	1975	2413	2369	2895		
39	1161	1491	2321	2837	3159	3861	3789	4631		

D-3. FREE RUNNING TORQUE.

a. The free running torque is torque required to turn a nut or bolt, after the nut has started turning, but before any clamping action is experienced by the structure being fastened. The free running torque is measured when the nut is installed on the bolt with the full threads of the bolt engaged and without any clamping torque being applied. Clamping torque is

the torque applied by the nut and bolt clamping object being fastened.

b. To measure free running torque, thread nuts onto bolts until nut is fully threaded onto bolt. Install torque wrench and measure torque required to turn nut. The nut should not be clamping bearing caps together when free running torque is being measured. The nut should be freely running on bolt.

GLOSSARY

Section I. ABBREVIATIONS

AZ - Azimuth	LP/C - Launch Pod/Container
BC - Boom Controller	LRU - Line Replaceable Unit
BIT - Built-In-Test	MAC - Maintenance Allocation Chart
CC - Cubic Centimeter	MDL - Module
EL - Elevation	MLRS - Multiple Launch Rocket System
EU - Electronic Unit	mm - Millimeters
Exc - Exchanger	MPa - Megapascals
FCP - Fire Control Panel	N•m - Newton meters
FCS - Fire Control System	Neg - Negative
FCU - Fire Control Unit	PDB - Power Distribution Box
Hyd - Hydraulic	PMCS - Preventive Maintenance Checks and Services
kg - Kilogram	POS - Positive
kPa - Kilopascals	psi - Pounds-Per-Square-Inch
Lb - Pound	SNVT - Short/No-Voltage Tester
LDS - Launcher Drive System	SPLL - Self-Propelled Launcher Loader
LLM - Launcher Loader Module	SRP - Stabilization Reference Package

GLOSSARY – Continued

Section II. DEFINITION OF UNUSUAL TERMS

Actuator

A mechanism that moves a part of the equipment; such as the actuator that elevates the LLM.

Adjust

Bring an out-of-tolerance condition into tolerance.

Assembly

A combination of parts that may be taken apart without destroying them; and when put together make a complete part of the equipment.

Audible

A sound you can hear.

Automatic

Something done without prompting.

Azimuth

Direction in a flat or horizontal plane, generally expressed in mils from SPL heading. Such as rotation of the LLM.

Clockwise

Rotate or turn to the right, in the direction the hands of a clock move as you look at it.

Component

An essential part of the equipment; a small part, that with other parts, make up the whole equipment.

Computer

An automatic electronic machine that does calculations; such as the fire control computer that figures rocket aiming angle (direction).

Counterclockwise

Rotate or turn to the left, in the opposite direction the hands of a clock move as you look at it.

Data

Factual information used as a basis for decisions or measuring.

Diagnostic

Identifying a problem from its symptoms; an analysis of the cause of the problem.

Digital

Calculations done by a numerical method; such as the fire control computer which operates with numbers expressed directly as digits.

Disengage

To release from, remove from, or detach.

Electrolyte

A nonmetallic electrical conductor; the liquid (acid) in battery cells.

Elevation

The angular distance above the horizon. Such as raising the LLM to aim the rockets.

Enable

To make possible; to turn on the equipment.

Fault Message

A short message on the fire control display panel telling you something is wrong with the equipment.

Go, No-Go Indicators

Go indicator tells you that it is safe to continue, or the item tested is within tolerance. No-Go indicates an unsafe or out-of-tolerance condition.

Heading

A compass direction in which the vehicle is traveling.

Initiate

To start or begin.

Inoperative

Does not work.

Interconnect

To connect with one another.

Malfunction

Failure of the equipment to operate properly.

Manual

Hand-operated; such as flexible drives requiring hand operation to rotate or elevate the LLM.

Material

The elements or parts of which equipment can be made.

GLOSSARY – Continued

Matériel

Equipment and supplies used by the Army, or any other organization.

Menu

A list of choices from which you may make a selection; such as the diagnostic menu displayed on the fire control display panel.

Mode

A method of operation.

Organizational Maintenance

Maintenance done on vehicle, limited by the support equipment, facilities, and skill level defined in the Maintenance Allocation Chart.

Pinion

A small gear designed to mesh with a large gear; such as the azimuth drive pinion gear.

Printed Circuit Board

Electronic circuit where the conductor is embedded in an insulated material.

Resolver

A device that detects the position of the LLM.

Splined

Parallel grooves in a shaft which mate with keys in a keyway of a connecting part.

Squib

Firing device for the rockets.

Toxic

Poisonous.

Transmission

The device that transmits power from the hydraulic power supply to the elevation actuators.

Vehicle

The carrier on which the rocket launcher is mounted and transported.

ALPHABETICAL INDEX

	<i>Paragraph</i>	<i>Page</i>
A		
Actuator, Boom Extension, Maintenance Instructions	5-6	5-12
Actuator, Travel Lock, Maintenance Instructions.	5-23	5-100
Actuator Fitting, Travel Lock, Maintenance Instructions.	5-23	5-100
Actuator Rod End, Elevation Actuator-Support Assembly, Maintenance Instructions	6-20	6-68
Actuator-Support Assembly, Elevation, Maintenance Instructions	6-20	6-68
Adapter Assembly, Azimuth Manual Drive, Maintenance Instructions.	6-13	6-50
Adapter Assembly, Elevation Manual Drive, Maintenance Instructions	6-17	6-62
Adapter Support, Hydraulic Swivel Assembly, Maintenance Instructions.	6-7	6-19
Adjust Azimuth Drive Brake	6-10	6-30
Alinement Hardware, Elevation Position Monitor, Maintenance Instructions	6-21	6-79
Angle-Drive Unit, Elevation, Maintenance Instructions	6-19	6-66
Armor Door Maintenance Instructions.	5-30	5-174
Boom Controller Door	5-30	5-174
Elevation Resolver Door	5-30	5-174
LH Harness Trough Door	5-30	5-174
LP/C Connector Door	5-30	5-174
PDB/SNVT Door Hinge	5-30	5-174
Power Harness Door.	5-30	5-174
RFU Door.	5-30	5-174
RH Harness Trough Door.	5-30	5-174
Wiring Harness Closure	5-30	5-174
Wiring Harness Door	5-30	5-174
AT2 Stowage Receptacle Maintenance Instructions	5-28	5-145
Azimuth Drive Bearing Inserts Maintenance Instructions	6-12	6-41
Azimuth Drive Brake, Adjust	6-10	6-30
Azimuth Drive Geared Bearing Maintenance Instructions	6-11	6-37
Azimuth Drive Speed Reducer Maintenance Instructions	6-10	6-30
Pinion Gear Cover	6-10	6-30
Speed Reducer	6-10	6-30
Azimuth Hydraulic Valve Module Maintenance Instructions	6-9	6-27
Pressure Relief Valve	6-9	6-27
2-Way, 2-Position Valve	6-9	6-27
Azimuth Manual Drive Assembly Maintenance Instructions	6-13	6-50
Adapter Assembly	6-13	6-50
Flexible Shaft	6-13	6-50
Azimuth Position Monitor Transducer Inserts Maintenance Instructions	6-12	6-41
Azimuth Position Monitor Transducer/Switch Maintenance Instructions	6-14	6-53
Azimuth Servomotor Assembly Maintenance Instructions	6-8	6-24
Azimuth ± 1.25 -Degree Switch Inserts Maintenance Instructions	6-12	6-41
B		
Ballnut Drive Assembly Maintenance Instructions	5-7	5-17
Bracket Assembly	5-7	5-17
Link Assembly.	5-7	5-17
Support Assembly	5-7	5-17
Yoke Assembly.	5-7	5-17

ALPHABETICAL INDEX – Continued

	<i>Paragraph</i>	<i>Page</i>
Base and Drive Assembly Maintenance Instructions	6-12	6-41
Azimuth Drive Bearing Inserts	6-12	6-41
Azimuth Position Monitor Transducer Inserts	6-12	6-41
Azimuth ± 1.25 -Degree Switch Inserts	6-12	6-41
Base and Drive Assembly	6-12	6-41
Base Felt Seal	6-12	6-41
Base Assembly, Boom Forward Roller Assembly Roller, Maintenance Instructions	5-11	5-29
Base Felt Seal Maintenance Instructions	6-12	6-41
Beam, Fixed, Maintenance Instructions	5-9	5-24
Beam, Intermediate, Maintenance Instructions	5-8	5-20
Beam, Slide Button Maintenance Instructions	5-10	5-27
Bearing, Azimuth Drive Geared, Maintenance Instructions	6-11	6-37
Bearing Inserts, Azimuth Drive, Maintenance Instructions	6-12	6-41
Bearing Plate, Travel Lock Torque Tube Maintenance Instructions	5-23	5-100
Bellcrank Assembly, LP/C Latch Assembly Maintenance Instructions	5-22	5-89
Blast Shield Assembly Maintenance Instructions	5-24	5-116
Blast Shield	5-24	5-116
Blast Shield Door	5-24	5-116
Blast Shield Extension	5-24	5-116
Cam Support	5-24	5-116
Door Close Cam	5-24	5-116
Door Hinge	5-24	5-116
Door Link	5-24	5-116
Door Open Cam	5-24	5-116
Link Assembly	5-24	5-116
Link Support	5-24	5-116
Track Roller	5-24	5-116
Bleeding, Hydraulic System	6-3	6-3
Bolt, SRP Mounting/Adjusting, Maintenance Instructions	7-4	7-6
Boom Controller Door Maintenance Instructions	5-30	5-174
Boom Controller Maintenance Instructions	7-3	7-2
Boom Controller	7-3	7-2
Boom Controller Storage Box	7-3	7-2
Boom Controller Storage Box Maintenance Instructions	7-3	7-2
Boom Drive Shaft Maintenance Instructions	5-5	5-11
Boom Electrical Control Assembly Maintenance Instructions	5-3	5-3
Boom Extension Actuator Maintenance Instructions	5-6	5-12
Boom Forward Roller Assembly Maintenance Instructions	5-11	5-29
Forward Roller	5-11	5-29
Roller Base Assembly	5-11	5-29
Roller Fork Assembly	5-11	5-29
Boom In Limit Switch Maintenance Instructions	5-12	5-32
Boom Motor and Brake Assembly Maintenance Instructions	5-4	5-5
Boom Motor and Reduction Gearbox Maintenance Instructions	5-4	5-5
Boom Motor and Brake Assembly	5-4	5-5
Boom Motor and Reduction Gearbox	5-4	5-5
Boom Out Limit Switch Maintenance Instructions	5-13	5-36
Box, Boom Controller Storage, Maintenance Instructions	7-3	7-2
Bracket Assembly, Ballnut Drive, Maintenance Instructions	5-7	5-17
Bracket Assembly, LP/C Latch Assembly Handle, Maintenance Instructions	5-22	5-89

ALPHABETICAL INDEX – Continued

	<i>Paragraph</i>	<i>Page</i>
Brake Assembly, Boom Motor and, Maintenance Instructions	5-4	5-5
Bumper Assembly, Travel Lock, Maintenance Instructions	5-23	5-100
Bushing, Turret Pivot, Maintenance Instructions.	5-29	5-163
Button, Beam Slide, Maintenance Instructions.	5-10	5-27
C		
Cable, LP/C Hoist, Maintenance Instructions	5-14	5-39
Cable Socket, LP/C Hoist Carriage Assembly Maintenance Instructions	5-18	5-60
Cable Support Assembly, Turret Assembly Electrical, Maintenance Instructions	5-29	5-163
Cage Assembly Maintenance Instructions	5-28	5-145
AT2 Stowage Receptacle	5-28	5-145
Centering Pin	5-28	5-145
Elevation Actuator Bushings	5-28	5-145
Elevation Actuator Nut Retainer	5-28	5-145
Fastener Receptacles	5-28	5-145
Fitting Assembly	5-28	5-145
LP/C Mounting Plate	5-28	5-145
LP/C Mounting Plate Adjustment.	5-28	5-145
PDB/SNVT Door Hinge	5-28	5-145
Wiring Troughs	5-28	5-145
Cage Down Limit Switch Maintenance Instructions	5-26	5-137
Cam, Blast Shield Assembly Door Close, Maintenance Instructions	5-24	5-116
Cam, Blast Shield Assembly Door Open, Maintenance Instructions	5-24	5-116
Cam Support, Blast Shield Assembly, Maintenance Instructions	5-24	5-116
Cap and Coupling Assembly, Maintenance Instructions	6-22	6-84
Carriage Assembly, LP/C Hoist Carriage Assembly, Maintenance Instructions	5-18	5-60
Carriage Rollers, LP/C Hoist Carriage Assembly, Maintenance Instructions	5-18	5-60
Centering Pin, Cage Assembly, Maintenance Instructions	5-28	5-145
Centering Socket, Travel Lock, Maintenance Instructions	5-23	5-100
Check Valve Maintenance Instructions	6-22	6-84
Close Cam, Blast Shield Assembly Door, Maintenance Instructions	5-24	5-116
Closure, Wiring Harness, Maintenance Instructions.	5-30	5-174
Connector Door, LP/C, Maintenance Instructions.	5-30	5-174
Contact Assembly Maintenance Instructions.	6-6	6-16
Container, Crew Equipment, Maintenance Instructions	5-28	5-145
Container, Duffel and Sleeping Bag, Maintenance Instructions	5-31	5-183
Container, Hygiene Kit, Maintenance Instructions	5-31	5-183
Container, LH Vehicle Bed, Maintenance Instructions	5-31	5-183
Container, RH Vehicle Bed, Maintenance Instructions	5-31	5-183
Control Assembly, Boom Electrical, Maintenance Instructions.	5-3	5-3
Control Assembly, LP/C Hoist Electrical, Maintenance Instructions.	5-19	5-79
Controller, Boom, Maintenance Instructions	7-3	7-2
Controller Door, Boom, Maintenance Instructions	5-30	5-174
Controller Storage Box, Boom, Maintenance Instructions.	7-3	7-2
Coupling Assembly, Caps and, Maintenance Instructions.	6-22	6-84
Coupling Half, Hydraulic, Maintenance Instructions	6-23	6-90
Cover, Pinion Gear, Azimuth Drive Speed Reducer, Maintenance Instructions	6-10	6-30

ALPHABETICAL INDEX – Continued

	<i>Paragraph</i>	<i>Page</i>
Cover, 267- and 480-MIL (15- and 27-Degree) Limit Switch, Maintenance Instructions	5-25	5-127
Crew Equipment Container Maintenance Instructions	5-31	5-183
Duffel and Sleeping Bag Container	5-31	5-183
Hygiene Kit Container	5-31	5-183
LH Vehicle Bed Container	5-31	5-183
RH Vehicle Bed Container	5-31	5-183

D

Door, Armor, Maintenance Instructions	5-30	5-174
Door, Blast Shield, Maintenance Instructions	5-24	5-116
Door, Boom Controller, Maintenance Instructions	5-30	5-174
Door, Elevation Resolver, Maintenance Instructions	5-30	5-174
Door, LH Harness Trough, Maintenance Instructions	5-30	5-174
Door, LP/C Connector, Maintenance Instructions	5-30	5-174
Door, Power Harness, Maintenance Instructions	5-30	5-174
Door, RH Harness Trough, Maintenance Instructions	5-30	5-174
Door, Wiring Harness, Maintenance Instructions	5-30	5-174
Door Close Cam, Blast Shield Assembly, Maintenance Instructions	5-24	5-116
Door Hinge, Blast Shield Assembly, Maintenance Instructions	5-24	5-116
Door Link, Blast Shield Assembly, Maintenance Instructions	5-24	5-116
Door Open Cam, Blast Shield Assembly, Maintenance Instructions	5-24	5-116
Drive Assembly, Azimuth Manual, Maintenance Instructions	6-13	6-50
Drive Assembly, Ballnut, Maintenance Instructions	5-7	5-17
Drive Assembly, Base and, Maintenance Instructions	6-12	6-41
Drive Assembly, Elevation Manual, Maintenance Instructions	6-17	6-62
Drive Bearing Inserts, Azimuth, Maintenance Instructions	6-12	6-41
Drive Geared Bearing, Azimuth, Maintenance Instructions	6-11	6-37
Drive Propeller Shaft, Elevation, Maintenance Instructions	6-18	6-64
Drive Shaft, Boom, Maintenance Instructions	5-5	5-11
Drive Speed Reducer, Azimuth, Maintenance Instructions	6-10	6-30
Drive System, Elevation Transmission/Brake Manual, Maintenance Instructions	6-16	6-59
Drive Unit, Elevation Angle, Maintenance Instructions	6-19	6-66
Driver Assembly, Turret Assembly, Maintenance Instructions	5-29	5-163
Duffel and Sleeping Bag Container Maintenance Instructions	5-31	5-183

E

Electric Motor, Hydraulic Pump, Maintenance Instructions	6-5	6-8
Electrical Cable Support Assembly, Turret Assembly, Maintenance Instructions	5-29	5-163
Electrical Control Assembly, Boom, Maintenance Instructions	5-3	5-3
Electrical Control Assembly, LP/C Hoist, Maintenance Instructions	5-19	5-79
Element, Filter, Hydraulic Power Supply	6-5	6-8
Elevation Actuator-Support Assembly Maintenance Instructions	6-20	6-68
Actuator-Support Assembly	6-20	6-68
Actuator Rod End	6-20	6-68
Limit Switch	6-20	6-68
Lug Assembly	6-20	6-68
Elevation Angle Drive Unit Maintenance Instructions	6-19	6-66
Elevation Drive Propeller Shaft Maintenance Instructions	6-18	6-64

ALPHABETICAL INDEX – Continued

	<i>Paragraph</i>	<i>Page</i>
Elevation Hydraulic Valve Module Maintenance Instructions	6-22	6-84
Cap	6-22	6-84
Cap and Coupling Assembly	6-22	6-84
Check Valve	6-22	6-84
Hydraulic Pressure Relief Valve	6-22	6-84
Hydraulic Shuttle Valve	6-22	6-84
Pilot Operated Hydraulic Valve	6-22	6-84
Pressure Reducer Valve	6-22	6-84
4-Way, 2-Position Solenoid Valve	6-22	6-84
Elevation Manual Drive Assembly Maintenance Instructions	6-17	6-62
Adapter Assembly	6-17	6-62
Flexible Shaft	6-17	6-62
Elevation Position Monitor Transducer Maintenance Instructions	6-21	6-79
Alinement Hardware	6-21	6-79
Transducer	6-21	6-79
Elevation Resolver Door Maintenance Instructions	5-30	5-174
Elevation Servomotor Assembly Maintenance Instructions	6-15	6-56
Elevation Transmission/Brake Maintenance Instructions	6-16	6-59
Manual Drive System	6-16	6-59
Transmission/Brake	6-16	6-59
Transmission Piston Seals	6-16	6-59
Encoder Maintenance Instructions	7-5	7-11
Equipment Container, Crew, Maintenance Instructions	5-31	5-183
Exchanger, Heat, Maintenance Instructions	6-4	6-6
Expendable/Durable Supplies and Materials List		B-1
Extension, Blast Shield, Maintenance Instructions	5-24	5-116
Extension Actuator, Boom, Maintenance Instructions	5-6	5-12

F

Fastener Receptacles, Cage Assembly, Maintenance Instructions	5-28	5-145
Felt Seal, Base, Maintenance Instructions	6-12	6-41
Filter Element, Hydraulic Power Supply	6-5	6-8
Fitting, Travel Lock Actuator, Maintenance Instructions	5-23	5-100
Fitting, Travel Lock Torque Tube, Maintenance Instructions	5-23	5-100
Fitting Assembly, Cage Assembly, Maintenance Instructions	5-28	5-145
Fixed Beam Maintenance Instructions	5-9	5-24
Rack Gear	5-9	5-24
Separator Strip	5-9	5-24
Flexible Shaft, Azimuth Manual Drive, Maintenance Instructions	6-13	6-50
Flexible Shaft, Elevation Manual Drive, Maintenance Instructions	6-17	6-62
Fork Assembly, Boom Forward Roller Assembly Roller, Maintenance Instructions	5-11	5-29
Forward Roller, Boom Forward Roller Assembly, Maintenance Instructions	5-11	5-29

G

Gear, Fixed Beam Rack, Maintenance Instructions	5-9	5-24
Gear, Intermediate Beam Pinion, Maintenance Instructions	5-8	5-20
Gear, LP/C Hoist Carriage Assembly Rack, Maintenance Instructions	5-18	5-60
Gear Cover, Pinion, Azimuth Drive Speed Reducer, Maintenance Instructions	6-10	6-30

ALPHABETICAL INDEX – Continued

	<i>Paragraph</i>	<i>Page</i>
Gearbox, Boom Motor and Reduction, Maintenance Instructions	5-4	5-5
Geared Bearing, Azimuth Drive, Maintenance Instructions	6-11	6-37
Glossary		Glossary-1
Guide Tube, Hoist Cable, Maintenance Instructions	5-18	5-60

H

Handle Assembly, LP/C Hoist Hook and Pulley Assembly Maintenance Instructions	5-16	5-49
Handle Bracket Assembly, LP/C Latch Assembly Maintenance Instructions	5-22	5-89
Harness Closure, Wiring, Maintenance Instructions	5-30	5-174
Harness Door, Power, Maintenance Instructions	5-30	5-174
Harness Door, Wiring, Maintenance Instructions	5-30	5-174
Harness Trough Door, LH, Maintenance Instructions	5-30	5-174
Harness Trough Door, RH, Maintenance Instructions	5-30	5-174
Heat Exchanger Maintenance Instructions	6-4	6-6
Hinge, Blast Shield Assembly Door, Maintenance Instructions	5-24	5-116
Hoist Assembly, LP/C, Maintenance Instructions	5-15	5-45
Hoist Cable, LP/C, Maintenance Instructions	5-14	5-39
Hoist Cable Guide Tube Maintenance Instructions	5-18	5-60
Hoist Carriage, LP/C, Maintenance Instructions	5-18	5-60
Hoist Down Limit Switch Maintenance Instructions	5-21	5-84
Hoist Electrical Control Assembly, LP/C	5-19	5-79
Hoist Hook and Pulley Assembly, LP/C, Maintenance Instructions	5-16	5-49
Hoist Pulleys, LP/C, Maintenance Instructions	5-17	5-55
Hoist Up Limit Switch Maintenance Instructions	5-20	5-80
Hook, LP/C Hoist Hook and Pulley Assembly, Maintenance Instructions	5-16	5-49
Hook, Travel Lock, Maintenance Instructions	5-23	5-100
Hook and Pulley Assembly, LP/C Hoist, Maintenance Instructions	5-16	5-49
Hook Assembly, LP/C Latch Assembly, Maintenance Instructions	5-22	5-89
Hose and Tube, Hydraulic, Maintenance Instructions	6-23	6-90
Hydraulic Hose and Tube Maintenance Instructions	6-23	6-90
Coupling Half	6-23	6-90
Hydraulic Hose	6-23	6-90
Hydraulic Tube	6-23	6-90
Hydraulic Power Supply Maintenance Instructions	6-5	6-8
Hydraulic Pump, Maintenance Instructions	6-5	6-8
Hydraulic Swivel Assembly Maintenance Instructions	6-7	6-19
Adapter Support	6-7	6-19
Swivel Assembly	6-7	6-19
Hydraulic System Bleeding	6-3	6-3
Hydraulic Valve Module, Azimuth, Maintenance Instructions	6-9	6-27
Hydraulic Valve Module, Elevation, Maintenance Instructions	6-22	6-84
Hygiene Kit Container, Maintenance Instructions	5-31	5-183

I

Idler Pulleys, LP/C Hoist Carriage Assembly, Maintenance Instructions	5-18	5-60
Illustrated List of Manufactured Items		C-1
Inserts, Azimuth Drive Bearing, Maintenance Instructions	6-12	6-41
Inserts, Azimuth Position Monitor Transducer, Maintenance Instructions	6-12	6-41
Inserts, Azimuth \pm 1.25-Degree Switch, Maintenance Instructions	6-12	6-41

ALPHABETICAL INDEX – Continued

	<i>Paragraph</i>	<i>Page</i>
Intermediate Beam Maintenance Instructions	5-8	5-20
Intermediate Beam	5-8	5-20
Pinion Gear	5-8	5-20
J		
Jacking Screw, LP/C Hoist Carriage Assembly, Maintenance Instructions	5-18	5-60
L		
Latch Assembly, LP/C, Maintenance Instructions	5-22	5-89
LH Harness Trough Door Maintenance Instructions	5-30	5-174
LH Vehicle Bed Container Maintenance Instructions	5-31	5-183
Limit Switch, Boom In, Maintenance Instructions	5-12	5-32
Limit Switch, Boom Out, Maintenance Instructions	5-13	5-36
Limit Switch, Cage Down, Maintenance Instructions	5-26	5-137
Limit Switch, Hoist Down, Maintenance Instructions	5-21	5-84
Limit Switch, Hoist Up, Maintenance Instructions	5-20	5-80
Limit Switch, 26.67-MIL (1.25-Degree), Maintenance Instructions	5-27	5-141
Limit Switch, 267-MIL (15-Degree), Maintenance Instructions	5-25	5-127
Limit Switch, 480-MIL (27-Degree), Maintenance Instructions	5-25	5-127
Limits, Torque		D-1
Link, Blast Shield Assembly Door, Maintenance Instructions	5-24	5-116
Link, Travel Lock, Maintenance Instructions	5-23	5-100
Link and Rod Assembly, LP/C Latch Assembly, Maintenance Instructions	5-22	5-89
Link Assembly, Ballnut Drive, Maintenance Instructions	5-7	5-17
Link Assembly, Blast Shield Assembly, Maintenance Instructions	5-24	5-116
Link Support, Blast Shield Assembly, Maintenance Instructions	5-24	5-116
Lock Assembly, LP/C Hoist Hook and Pulley Assembly Maintenance Instructions	5-16	5-49
Lockspring, LP/C Hoist Hook and Pulley Assembly, Maintenance Instructions	5-16	5-49
LP/C Connector Door Maintenance Instructions	5-30	5-174
LP/C Hoist Assembly Maintenance Instructions	5-15	5-45
LP/C Hoist Cable Maintenance Instructions	5-14	5-39
LP/C Hoist Carriage Assembly Maintenance Instructions	5-18	5-60
Cable Socket	5-18	5-60
Carriage Assembly	5-18	5-60
Carriage Rollers	5-18	5-60
Idler Pulleys	5-18	5-60
Jacking Screw	5-18	5-60
Rack Gear	5-18	5-60
LP/C Hoist Electrical Control Assembly Maintenance Instructions	5-19	5-79
LP/C Hoist Hook and Pulley Assembly Maintenance Instructions	5-16	5-49
Handle Assembly	5-16	5-49
Hook	5-16	5-49
Lock Assembly	5-16	5-49
Lockspring	5-16	5-49
Pulley Assembly	5-16	5-49
Spacer Assembly	5-16	5-49
Splice Assembly	5-16	5-49
Spreader Assembly	5-16	5-49

ALPHABETICAL INDEX – Continued

	<i>Paragraph</i>	<i>Page</i>
LP/C Hoist Pulleys Maintenance Instructions	5-17	5-55
Pulleys	5-17	5-55
Pulley Support Assembly	5-17	5-55
Spacers	5-17	5-55
LP/C Latch Adjustment	5-22	5-89
LP/C Latch Assembly Maintenance Instructions	5-22	5-89
Bellcrank Assembly	5-22	5-89
Handle Bracket Assembly	5-22	5-89
Hook Assembly	5-22	5-89
Link and Rod Assembly	5-22	5-89
Roller	5-22	5-89
Lug Assembly, Elevation Actuator-Support Assembly, Maintenance Instructions	6-20	6-68
M		
Manual Drive Assembly, Azimuth, Maintenance Instructions	6-13	6-50
Manual Drive Assembly, Elevation, Maintenance Instructions.	6-17	6-62
Manual Drive System, Elevation Transmission/Brake, Maintenance Instructions	6-16	6-59
Manufactured Items, Illustrated List of		C-1
Materials List, Expendable/Durable Supplies and		B-1
Module, Azimuth Hydraulic Valve, Maintenance Instructions	6-9	6-27
Module, Elevation Hydraulic Valve, Maintenance Instructions	6-22	6-84
Monitor Transducer, Elevation Position, Maintenance Instructions	6-21	6-79
Motor, Electric, Hydraulic Pump, Maintenance Instructions	6-5	6-8
Motor and Brake Assembly, Boom, Maintenance Instructions	5-4	5-5
Motor and Reduction Gearbox, Boom, Maintenance Instructions	5-4	5-5
O		
Open Cam, Blast Shield Assembly Door, Maintenance Instructions	5-24	5-116
P		
Pilot Operated Valve, Maintenance Instructions	6-22	6-84
Pin, Cage Assembly Centering, Maintenance Instructions	5-28	5-145
Pinion Gear, Intermediate Beam, Maintenance Instructions	5-8	5-20
Pinion Gear Cover, Azimuth Drive Speed Reducer, Maintenance Instructions	6-10	6-30
Piston Seals, Transmission, Elevation Transmission/Brake Maintenance Instructions	6-16	6-59
Pivot Bushing, Turret, Maintenance Instructions.	5-29	5-163
Plate, LP/C Hoist Hook and Pulley Assembly Splice, Maintenance Instructions	5-16	5-49
Plate, LP/C Mounting, Adjustment	5-28	5-145
Plate, LP/C Mounting, Maintenance Instructions	5-28	5-145
Plate, Travel Lock Torque Tube Bearing, Maintenance Instructions.	5-23	5-100
Position Monitor Transducer, Elevation, Maintenance Instructions	6-17	6-62
Position Transducer/Switch, Azimuth, Maintenance Instructions.	6-14	6-53
Power Harness Door Maintenance Instructions	5-30	5-174
Power Supply, Hydraulic, Maintenance Instructions	6-5	6-8
Pressure Reducer Valve, Maintenance Instructions	6-22	6-84
Pressure Relief Valve, Hydraulic, Maintenance Instructions	6-22	6-84

ALPHABETICAL INDEX - Continued

	<i>Paragraph</i>	<i>Page</i>
Pressure Relief Valve, Maintenance Instructions	6-9	6-27
Probe Assembly, Travel Lock, Maintenance Instructions	5-23	5-100
Pulley Assembly, LP/C Hoist Hook and Pulley Assembly, Maintenance Instructions	5-16	5-49
Pulley Support Assembly, LP/C Hoist Pulleys, Maintenance Instructions	5-17	5-55
Pulleys, LP/C Hoist, Maintenance Instructions	5-17	5-55
Pulleys, LP/C Hoist Carriage Assembly Idler, Maintenance Instructions	5-18	5-60
Pump, Hydraulic, Maintenance Instructions	6-5	6-8
R		
Rack Gear, Fixed Beam, Maintenance Instructions	5-9	5-24
Rack Gear, LP/C Hoist Carriage Assembly, Maintenance Instructions	5-18	5-60
Receptacle, AT2 Stowage, Maintenance Instructions	5-28	5-145
Receptacles, Cage Assembly Fastener, Maintenance Instructions	5-28	5-145
Reducer, Azimuth Drive Speed, Maintenance Instructions	6-10	6-30
Reducer Valve, Pressure, Maintenance Instructions	6-22	6-84
Reduction Gearbox, Boom Motor and, Maintenance Instructions	5-4	5-5
References		A-1
Relief Valve, Hydraulic Pressure, Maintenance Instructions	6-22	6-84
Relief Valve, Pressure, Maintenance Instructions	6-9	6-27
Resolver Door, Elevation, Maintenance Instructions	5-30	5-174
RFU Door Maintenance Instructions	5-30	5-174
RH Harness Trough Door Maintenance Instructions	5-30	5-174
RH Vehicle Bed Container Maintenance Instructions	5-31	5-183
Rod Assembly, LP/C Latch Assembly Link and, Maintenance Instructions	5-22	5-89
Rod End, Elevation Actuator-Support Actuator, Maintenance Instructions	6-20	6-68
Roller, Blast Shield Assembly Track, Maintenance Instructions	5-24	5-116
Roller, Boom Forward Roller Assembly Forward, Maintenance Instructions	5-11	5-29
Roller, LP/C Latch Assembly, Maintenance Instructions	5-22	5-89
Roller, Travel Lock, Maintenance Instructions	5-23	5-100
Roller Assembly, Boom Forward, Maintenance Instructions	5-11	5-29
Roller Assembly, Travel Lock, Maintenance Instructions	5-23	5-100
Roller Base Assembly, Boom Forward Roller Assembly, Maintenance Instructions	5-11	5-29
Roller Fork Assembly, Boom Forward Roller Assembly Maintenance Instructions	5-11	5-29
Rollers, LP/C Hoist Carriage, Maintenance Instructions	5-18	5-60
S		
Screw, LP/C Hoist Carriage Assembly Jacking, Maintenance Instructions	5-18	5-60
Seal, Base Felt, Maintenance Instructions	6-12	6-41
Seals, Transmission Piston, Elevation Transmission/Brake, Maintenance Instructions	6-16	6-59
Separator Strip, Fixed Beam, Maintenance Instructions	5-9	5-24
Servomotor Assembly, Azimuth, Maintenance Instructions	6-8	6-24
Servomotor Assembly, Elevation, Maintenance Instructions	6-15	6-56

ALPHABETICAL INDEX – Continued

	<i>Paragraph</i>	<i>Page</i>
Shaft, Azimuth Manual Drive Flexible, Maintenance Instructions	6-13	6-50
Shaft, Boom Drive, Maintenance Instructions	5-5	5-11
Shaft, Elevation Drive Propeller, Maintenance Instructions	6-18	6-64
Shaft, Elevation Manual Drive Flexible, Maintenance Instructions	6-17	6-62
Shield Assembly, Blast, Maintenance Instructions	5-24	5-116
Shuttle Valve, Brake, Maintenance Instructions	6-22	6-84
Shuttle Valve, Stow Pressure, Maintenance Instructions	6-22	6-84
Slide Button, Beam, Maintenance Instructions	5-10	5-27
Socket, LP/C Hoist Carriage Assembly Cable, Maintenance Instructions	5-18	5-60
Socket, Travel Lock Centering, Maintenance Instructions	5-23	5-100
Spacer Assembly, LP/C Hoist Hook and Pulley Assembly, Maintenance Instructions	5-16	5-49
Spacers, LP/C Hoist Pulleys, Maintenance Instructions	5-17	5-55
Speed Reducer, Azimuth Drive, Maintenance Instructions	6-10	6-30
Splice Plate, LP/C Hoist Hook and Pulley Assembly, Maintenance Instructions	5-16	5-49
Spreader Assembly, LP/C Hoist Hook and Pulley Assembly, Maintenance Instructions	5-16	5-49
Spring, LP/C Hoist Hook and Pulley Assembly, Maintenance Instructions	5-16	5-49
SRP Mounting/Adjusting Bolt, Maintenance Instructions	7-4	7-6
Storage Box, Boom Controller, Maintenance Instructions	7-3	7-2
Stowage Receptacle, AT2, Maintenance Instructions	5-28	5-145
Strip, Fixed Beam Separator, Maintenance Instructions	5-9	5-24
Support, Blast Shield Assembly Cam, Maintenance Instructions	5-24	5-116
Support, Blast Shield Assembly Link, Maintenance Instructions	5-24	5-116
Support, Hydraulic Swivel Assembly Adapter, Maintenance Instructions	6-7	6-19
Support, Travel Lock Roller, Maintenance Instructions	5-23	5-100
Support Assembly, Ballnut Drive, Maintenance Instructions	5-7	5-17
Support Assembly, LP/C Hoist Pulleys, Maintenance Instructions	5-17	5-55
Support Assembly, Turret Assembly Electrical Cable, Maintenance Instructions	5-29	5-163
Switch, Boom In Limit, Maintenance Instructions	5-12	5-32
Switch, Boom Out Limit, Maintenance Instructions	5-13	5-36
Switch, Cage Down Limit, Maintenance Instructions	5-26	5-137
Switch, Hoist Down Limit, Maintenance Instructions	5-21	5-84
Switch, Hoist Up Limit, Maintenance Instructions	5-20	5-80
Switch, 26.67-MIL (1.25-Degree) Limit, Maintenance Instructions	5-27	5-141
Switch, 267-MIL (15-Degree) Limit, Maintenance Instructions	5-25	5-127
Switch, 480-MIL (27-Degree) Limit, Maintenance Instructions	5-25	5-127
Switch Cover, 267- and 480-MIL (15- and 00-Degree) Limit, Maintenance Instructions	5-25	5-127
Switch Inserts, Azimuth \pm 1.25-Degree, Maintenance Instructions	6-12	6-41
Swivel Assembly, Hydraulic, Maintenance Instructions	6-7	6-19

T

Torque Limits		D-1
Torque Tube, Travel Lock, Maintenance Instructions	5-23	5-100
Torque Tube Bearing Plate, Travel Lock, Maintenance Instructions	5-23	5-100

ALPHABETICAL INDEX – Continued

	<i>Paragraph</i>	<i>Page</i>
Torque Tube Fitting, Travel Lock, Maintenance Instructions	5-23	5-100
Track Roller, Blast Shield Assembly Maintenance Instructions	5-24	5-116
Transducer, Elevation Position Monitor, Maintenance Instructions	6-21	6-79
Transducer Inserts, Azimuth Position Monitor, Maintenance Instructions	6-12	6-41
Transducer/Switch, Azimuth Position, Maintenance Instructions	6-14	6-53
Transmission/Brake, Elevation, Maintenance Instructions	6-16	6-59
Travel Lock Maintenance Instructions	5-23	5-100
Actuator	5-23	5-100
Actuator Fitting	5-23	5-100
Bumper Assembly	5-23	5-100
Centering Socket	5-23	5-100
Hook	5-23	5-100
Link	5-23	5-100
Probe Assembly	5-23	5-100
Roller	5-23	5-100
Roller Assembly	5-23	5-100
Torque Tube	5-23	5-100
Torque Tube Bearing Plate	5-23	5-100
Torque Tube Fitting	5-23	5-100
Travel Lock System Adjustment	5-23	5-100
Trough, Cage Assembly Wiring, Maintenance Instructions	5-28	5-145
Tube, Hydraulic Hose and, Maintenance Instructions	6-23	6-90
Tube, Travel Lock Torque, Maintenance Instructions	5-23	5-100
Turret Assembly Maintenance Instructions	5-29	5-163
Driver Assembly	5-29	5-163
Electrical Cable Support Assembly	5-29	5-163
Turret Assembly	5-29	5-163
Pivot Bushing	5-29	5-163

V

Valve, Check, Maintenance Instructions	6-22	6-84
Valve, Hydraulic Pressure Relief, Maintenance Instructions	6-22	6-84
Valve, Pilot Operated, Maintenance Instructions	6-22	6-84
Valve, Pressure Reducer, Maintenance Instructions.	6-22	6-84
Valve, Pressure Relief, Maintenance Instructions.	6-22	6-84
Valve, Pressure Relief, Maintenance Instructions.	6-9	6-27
Valve, Shuttle, Maintenance Instructions	6-22	6-84
Valve, 2-Way, 2-Position, Maintenance Instructions.	6-9	6-27
Valve Module, Azimuth Hydraulic, Maintenance Instructions	6-9	6-27
Valve Module, Elevation Hydraulic, Maintenance Instructions	6-22	6-84

W

Wiring Harness Closure Maintenance Instructions	5-30	5-174
Wiring Harness Door Maintenance Instructions	5-30	5-174
Wiring Trough, Cage Assembly, Maintenance Instructions	5-28	5-145

Y

Yoke Assembly, Ballnut Drive, Maintenance Instructions	5-7	5-17
--	-----	------

ALPHABETICAL INDEX – Continued

	<i>Paragraph</i>	<i>Page</i>
Numeric		
26.67-MIL (1.25-Degree) Limit Switch, Maintenance Instructions	5-27	5-141
267- and 480-MIL (15- and 27-Degree) Limit Switch Maintenance Instructions	5-25	5-127
Switch Cover	5-25	5-127
267-MIL (15-Degree) Limit Switch	5-25	5-127
480-MIL (27-Degree) Limit Switch	5-25	5-127
267-MIL (15-Degree) Limit Switch Maintenance Instructions	5-25	5-127
480-MIL (27-Degree) Limit Switch Maintenance Instructions	5-25	5-127

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9-19		9-5	
21-2	step 1C		21-2

IN THIS SPACE TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT:

"B" Ready Relay K11 is shown with two #9 contacts. That contact which is wired to pin 8 of relay K16 should be changed to contact #10.

Reads: Multimeter B indicates 600 K ohms to 9000 K ohms.

Change to read: Multimeter B indicates 600 K ohms minimum.

Reason: Circuit being checked could measure infinity. Multimeter can read above 9000 K ohms and still be correct.

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