

**CHAPTER 6****STEAM FLOW COMPUTER**

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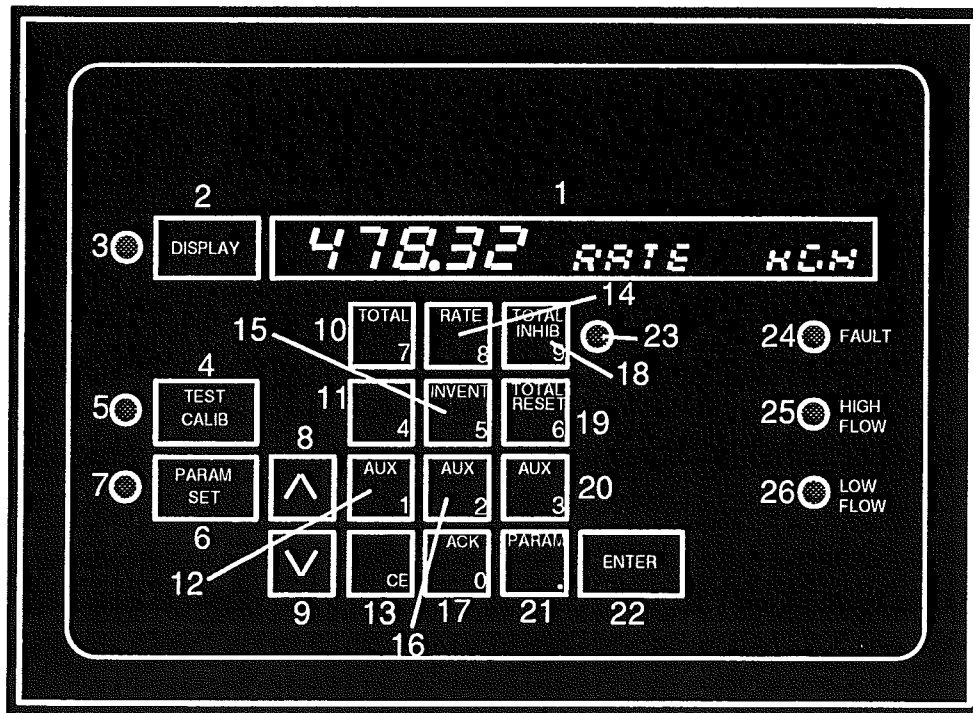


Figure 6.1 - Steam Flow Computer Front Panel

**DRESSER-RAND-POWER**

DR61G(000)-1-2-6

**1 GENERAL**

The Steam Flow Computer monitors the various parameters of the steam flow and calculates the true flow value to enable the Fuel Controller to precisely control the steam injection into the Gas Turbine.

The unit has, as an Operator interface, three modes of operation 'Display', 'Test/Calibration' and 'Parameter Set'. The Operator will normally use the display mode to bring to the units display panel the current operating values. The 'Test and Calibration' and 'Parameter Set' modes of operation require the entry of a security code to allow changes to the system setpoints.

**NOTE:** No adjustments to operating parameters must be made without the authorization of Dresser-Rand Power. Any unauthorized changes may invalidate any warranty then currently in force on the unit.

For full information refer to the manufacturer's information inserted into Part 7 of the Technical Manual.

**2 OPERATOR FACILITIES**

The operator facilities on the units front panel comprises eighteen touch sensitive keys, six light emitting diode indicators and a display panel.

**DISPLAY PANEL (1)**

This light emitting diode (L.E.D.) Display Panel shows alpha-numeric characters.

Selection of the menus and items are made by using the appropriate Keypad Keys.

**DISPLAY KEY (2)**

Depressing this Key selects the 'Display' mode.

**DISPLAY INDICATOR (3)**

This red indicator will be illuminated whilst the 'Display' mode is active. This mode is selected by depressing the DISPLAY Key.

**TEST/CALIBRATION KEY (4)**

Depressing this Key selects the 'Test and Calibration' mode.

**TEST/CALIBRATION INDICATOR (5)**

This red indicator will be illuminated whilst the 'Test and Calibration' mode is active. This mode is selected by depressing the TEST/CALIBRATION Key.

**PARAMETER SET KEY (6)**

Depressing this Key selects the 'Parameter Set' mode.

**PARAMETER SET INDICATOR (7)**

This red indicator will be illuminated whilst the 'Parameter Set' mode is active. This mode is selected by depressing the PARAMETER SET Key.

**RAMP/STEP UP '∧' KEY (8)**

When depressed this key performs one of two functions:

- It will scroll the display upward in the herical structure of the program screens
- or
- Trim values in an incremental direction when calibrating output.

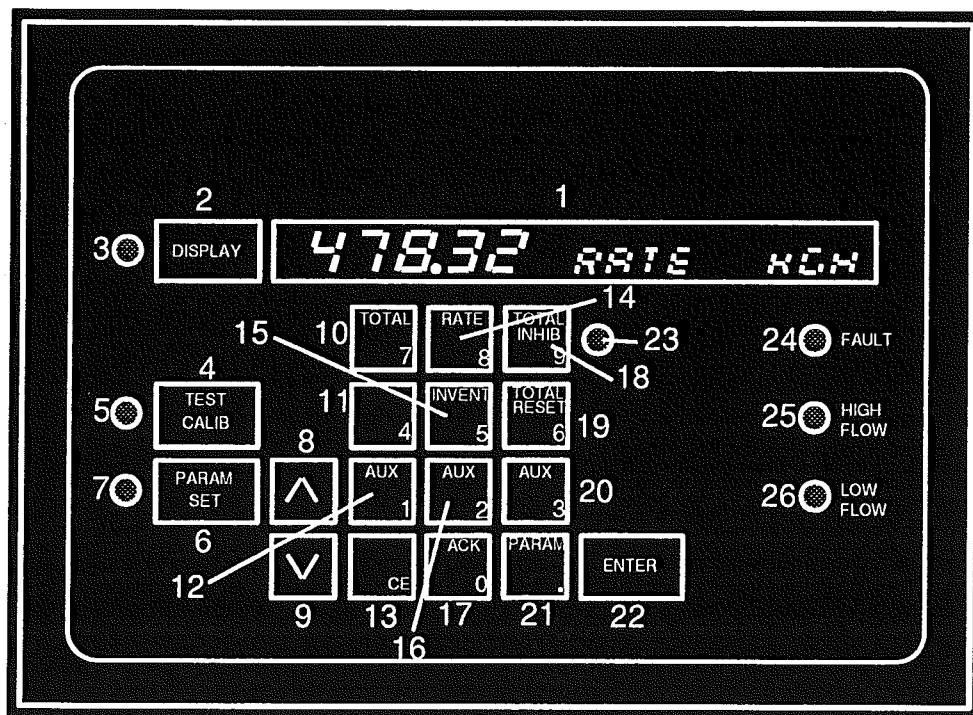


Figure 6.1 - Steam Flow Computer Front Panel

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**RAMP/STEP DOWN 'v' KEY (9)**

When depressed this key performs one of two functions:

- It will scroll the display downward in the herical structure of the program screens
- or
- Trim values in an decremental direction when calibrating output.

**TOTAL/7 KEY (10)**

When depressed this key performs one of two functions:

- It will call the running total to the display screen
- or
- Will enter the numeric value 7 when in the parameter set mode.

**4 KEY (11)**

Will enter the numeric value 4 when in the parameter set mode.

**AUX 1 KEY (12)**

When depressed this key performs one of two functions:

- It will call the auxiliary input 1 value (temperature) to the display screen
- or
- Will enter the numeric value 1 when in the parameter set mode.

**CLEAR ENTRY 'CE' KEY (13)**

This Key is used to clear an incorrect entry whilst in the Parameter Set mode that has not been confirmed to the system by depressing the ENTER Key (22).

**RATE/8 KEY (14)**

When depressed this key performs one of two functions:

- It will call the computed flow rate to the display screen
- or
- Will enter the numeric value 8 when in the parameter set mode.

**INVENT/5 KEY (15)**

When depressed this key performs one of two functions:

- It will call the Inventory Total to the display screen
- or
- Will enter the numeric value 5 when in the parameter set mode.

**AUX 2 KEY (16)**

When depressed this key performs one of two functions:

- It will call the auxiliary input 2 value (pressure) to the display screen
- or
- Will enter the numeric value 2 when in the parameter set mode.

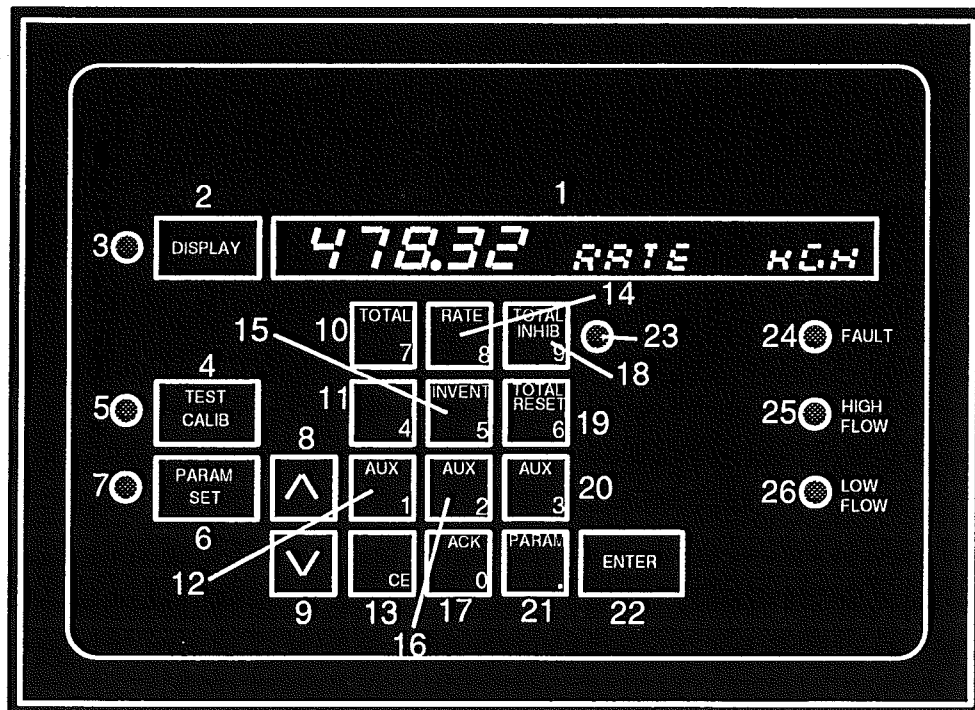


Figure 6.1 - Steam Flow Computer Front Panel

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**ACK/0 KEY (17)**

When depressed this key performs one of two functions:

- It will acknowledge a flow alarm indicated by an external alarm and the respective flow alarm indicator flashing
- or
- Will enter the numeric value 0 when in the parameter set mode.

**TOTAL INHIB/9 KEY (18)**

When depressed this key performs one of two functions:

- It acts as a push-on push-off switch to enable/disable the inventory and running totals. The status is indicated by the TOTALIZER INHIBITED Indicator (23) being illuminated when the totalizers are inhibited.
- or
- Will enter the numeric value 9 when in the parameter set mode.

**TOTAL RESET/6 (19)**

When depressed this key performs one of two functions:

- It will zero the running total on the display screen
- or
- Will enter the numeric value 6 when in the parameter set mode.

**AUX 3 (20)**

When depressed this key performs one of two functions:

- It will call the auxiliary input 3 value (density) to the display screen
- or
- Will enter the numeric value 3 when in the parameter set mode.

**PARAM '.' KEY (21)**

When depressed this key performs one of two functions:

- It will call the parameter list to the display screen whilst in the display mode.
- or
- This key is used to enter the decimal point in a numeric entry.

**ENTER KEY (22)**

This key is depressed to confirm the entry of new values while in the Parameter Set mode. Also this key may be used in the Test/Calibration mode to initiate or stop a test or to initiate calibration.

**TOTAL INHIBIT INDICATOR (23)**

This red light emitting diode will be illuminated when the inventory and running totals are inhibited. The status is controlled by the TOTALIZER INHIBITED Switch (18).

**FAULT INDICATOR (24)**

This red light emitting diode will illuminate when a fault has been detected with the Steam Flow Computer and/or monitoring systems.

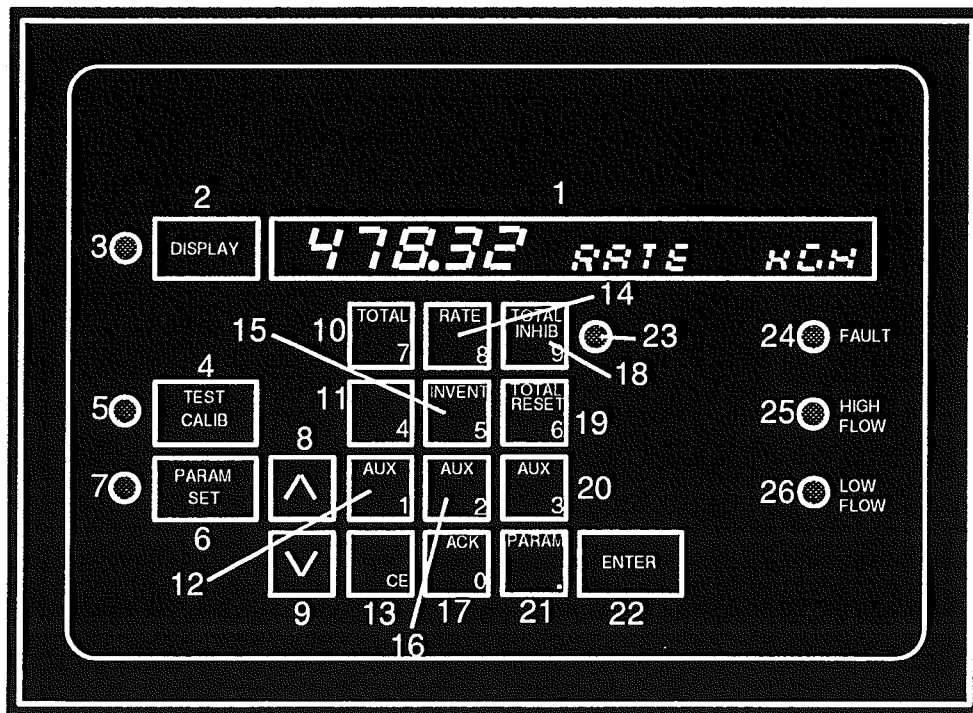


Figure 6.1 - Steam Flow Computer Front Panel



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**HIGH FLOW INDICATOR (25)**

This red light emitting diode will illuminate when a steam flow exceeding the maximum setpoint value has been detected.

**LOW FLOW INDICATOR (26)**

This red light emitting diode will illuminate when the monitored steam flow falls below the minimum setpoint.

**3 POWER-UP TESTS**

When power is first supplied to the Steam Flow Computer the unit performs a series of system tests which have an artificial delay between each test to enable the Operator time to read the series of messages on the Display Panel.

As each test is successfully completed the display will show the message 'TEST' on the left-hand side of the display and the code for the completed test to the right-hand side. If a test detects a fault the message on the left-hand side of the display will show 'FAIL'. There are four stages to the test, which are:-

- » Data Base This test checks for the existence of a valid data base for the installation. If a fault is detected the right-hand side of the display will show the message 'DATA LOST'.
- » Stack RAM An address and read/write test. When completed the message RAM1 will be displayed on the right-hand side of the display panel.
- » EPROM Checksum verification. When completed the message ROM will be displayed on the right-hand side of the display panel.
- » Workspace RAM A read/write and address test. When completed the message RAM2 will be displayed on the right-hand side of the display panel.

When the test is successfully completed the display will show the message:-

'TEST - HDWR PASS'

After two seconds the display will change to show a power failure message as part of the test program. The message will read:-

'ERROR - PWR LOST'

To complete the power up tests depress the Display Key.

**4 SOFTWARE FACILITIES AND OPERATION**

Once the power-up test sequence has been completed the three modes of operation may be entered by depressing the respective switch for that mode.

**4.1 DISPLAY MODE**

Depress the DISPLAY Key and observe that the DISPLAY Indicator illuminates. There are seven different displays available to the Operator by depressing the respective key.

The Display Panel will show the information in the format where the first six characters are reserved for the numeric data. The next four characters provide a description of the type of data displayed. The eleventh character of the display can be a multiplier where the value 1 represents a multiplier of 10; 2 represents 100 and 3 represents 1000. The remaining three characters indicates the unit of measurement that the data value is presented in.

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**4.2 TEST/CALIBRATION MODE**

Depress the TEST/CALIBRATION Key and observe that the TEST/CALIBRATION Indicator illuminates. The display will then request a security code with the message 'SEC CODE'. The code is entered by the respective numeric keys and then the ENTER Key is depressed.

There are two test and two calibration functions available to the Operator through the program.

Once the program is successfully entered the Display Panel will show the message 'TEST LAMP 1' which is the indicator test function. To commence this test procedure depress the ENTER Key and observe that all the indicators illuminate and the display will show an alternating sequence of characters for 30 seconds. At the end of this time period the test will terminate automatically.

To terminate this test before the end of the timed period depress the ENTER Key. The display will revert to the message 'TEST LAMP 1'.

To advance to the next test depress the RAMP/STEP-UP '^' Key.

**NOTE:** Where it is not required to perform this test or any other function in the series they can be by-passed by depressing the RAMP/STEP-UP '^' Key.

The next test in the series is to check the functioning of the alarm indications on the unit and the exterior alarm system. The message on the display will be 'TEST ALARM 2'. To carry out this test depress the ENTER Key and observe that the FAULT, HIGH FLOW and LOW FLOW Indicators will illuminate and the exterior alarm will be activated. Terminate the test by depressing the ENTER Key.

To advance to the next stage depress the RAMP/STEP-UP '^' Key.

**NOTE:** The Calibration functions enable the high and low points for each of Current Loop Inputs and Outputs to be calibrated. These procedures should only be carried out by authorized personnel. For details of the procedures refer to the manufacturers information inserted in Part 7 of the Technical Manual.

To exit the Test/Calibration program depress any mode select key, this will normally be the DISPLAY Key.

**4.3 PARAMETER SET MODE**

The parameter set mode allows configuration parameters to be displayed and/or configured.

Depress the PARAMETER SET Key and observe that the PARAMETER SET Indicator illuminates. The display will then request a security code with the message 'SEC CODE'. The code is entered by the respective numeric keys and then the ENTER Key is depressed.

**NOTE:** The Parameter Set functions enable the adjustment of operating parameters. These procedures should only be carried out by authorized personnel. For details of the procedures refer to the manufacturers information inserted in Part 7 of the Technical Manual.

To exit the Parameter Set program depress any mode select key, this will normally be the DISPLAY Key.