

CHAPTER 5

FUEL CONTROLLER

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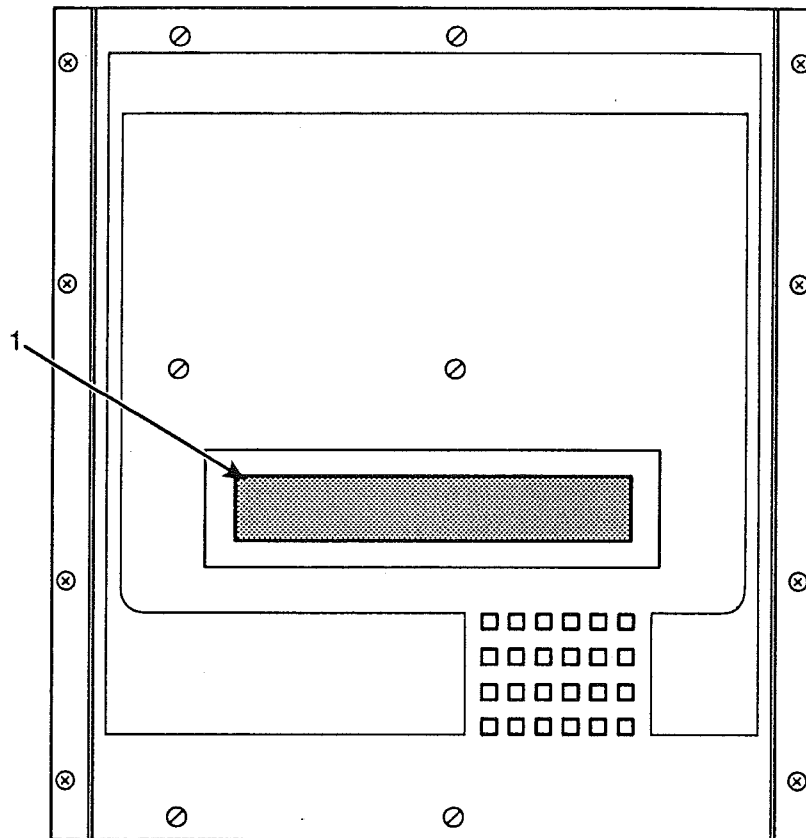


Figure 5.1 - Fuel Controller Front Panel

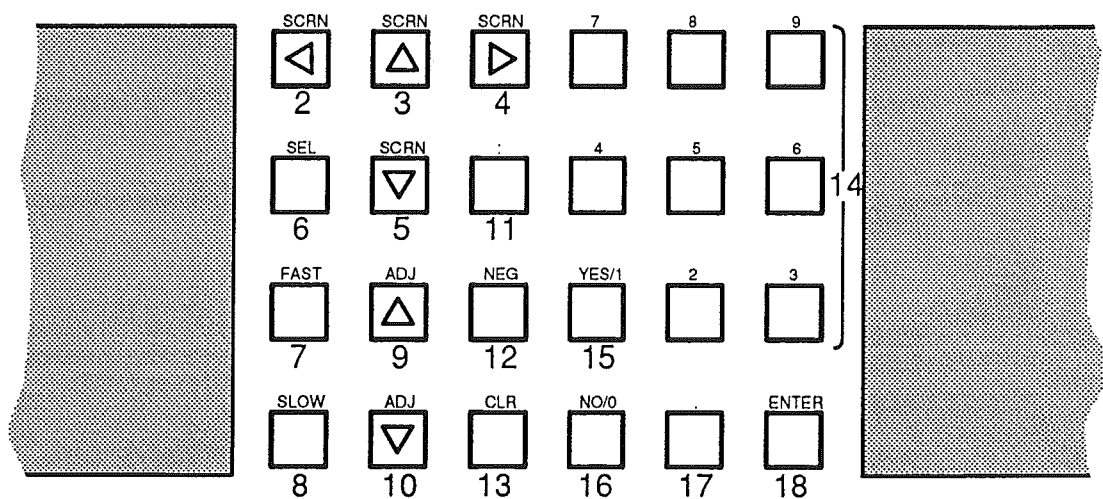


Figure 5.2 - Fuel Controller Keypad

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1 GENERAL

The Fuel Controller inputs the monitored operating conditions for the Gas Turbine and the demands from the Turbine Control System. This unit will calculate the response to changes, based upon pre-programmed information and control curves, to make the necessary operating adjustments. The adjustments, according to the enabled options set by the Operator, will be to:

- » Adjust the supply of the gaseous fuel
- » Activate and control the intake air pre-heat system to maintain the inlet temperature to 6°C
- » Activate and adjust the steam injection to control the NO_x level in the exhaust
- » Control the fuel flow during start-up and at periods of rapid changes in gas generator speeds
- » Maintain the electrical generator load at a constant value

The unit has, as an Operator interface, five modes of operation 'Monitoring', 'Service', 'Configuring', 'Debug' or 'Faults'. The Operator will normally use the monitoring mode to bring to the units display panel the current operating values. The other four modes of operation all require the entry of a security code and 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**DISPLAY PANEL (1)**

This Display Panel comprises two rows of alpha-numeric displays each with 40 characters.

Operation of this Fuel Controller Unit is built up on a network of menus that can be called up to this display. Selection of the menus and items are made by using the appropriate Keypad Keys.

When operating in a mode that enables changes to be made, to the setpoint values, the selected line is identified by a '@' character at the left of the line.

KEYPAD

The Keypad comprises 24 keys that provide for a function or the entry of a numeric value. Momentarily depressing a Key will provide that function or numeric value; holding the key depress will cause that Key's function to be repeated until the Key is released.

SCREEN LEFT 'SCRN ←' KEY (2)

When depressed will scroll the display to the menu screen or other screen to the left, of the present screen, in the structure of the operating program.

SCREEN UP 'SCRN ↑' KEY (3)

When depressed will scroll the display to the menu screen or other screen above the present screen in the structure of the operating program.

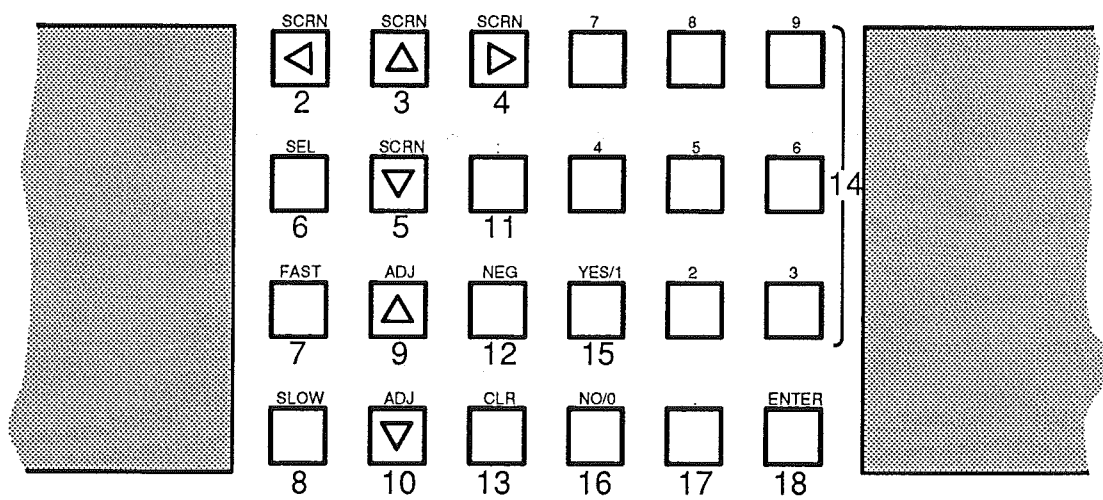


Figure 5.2 - Fuel Controller Keypad

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SCREEN RIGHT 'SCRN →' KEY (4)

When depressed will scroll the display to the menu screen or other screen to the right, of the present screen, in the structure of the operating program.

SCREEN DOWN 'SCRN ↓' KEY (5)

When depressed will scroll the display to the menu screen or other screen below the present screen in the structure of the operating program.

SELECT 'SEL' KEY (6)

Used to select which line of the screen display is to be amended from the Keyboard.

The facility to change the on screen item is available in the Service, Configure, Fault and Debug modes. These modes may only be accessed upon entry of a code sequence that prevents unauthorized adjustments.

FAST KEY (7)

This Key is depressed at the same time as the respective ADJUST Key (9 or 10), whilst in the Service or Debug modes, to change a value in steps of 1%.

SLOW KEY (8)

This Key is depressed at the same time as the respective ADJUST Key (9 or 10), whilst in the Service or Debug modes, to change a value in steps of 0.01%.

ADJUST UP 'ADJ ↑' KEY (9)

This Key is depressed, whilst in the Service or Debug modes, to change a value in 0.1% increments. When depressed simultaneously with the FAST Key (7) the value will increase in 1% steps; whereas when depressed with the SLOW Key (8) the increments will be in 0.01% steps.

ADJUST DOWN 'ADJ ↓' KEY (10)

This Key is depressed, whilst in the Service or Debug modes, to change a value in decrements of 0.1%. When depressed simultaneously with the FAST Key (7) the value will decrease in 1% steps; whereas when depressed with the SLOW Key (8) the decrements will be in 0.01% steps.

COLON ':' KEY (11)

This key is used to set the system clock. Whilst in Service and Debug modes enables the Operator to switch between these two modes of operation as required.

NEGATIVE 'NEG' KEY (12)

This key is used in the entry of a negative value whilst operating in a mode that permits adjustments.

CLEAR ENTRY 'CLR' KEY (13)

This Key is used to clear an incorrect entry that has not been confirmed to the system by depressing the ENTER Key (18). Whilst in Service and Debug modes of operation, when depressed, will return the screen respectively to the Service Header or Category level.

NUMERIC '2 - 9' KEYS (14)

These keys are used to enter their numeric values.

YES/1 KEY (15)

This key is used to enter the numeric value of 1 and at display prompts requiring a 'Yes/No' answer is used to enter a 'Yes' affirmation.

NO/0 KEY (16)

This key is used to enter the numeric value of 0 and at display prompts requiring a 'Yes/No' response is used to enter a 'No' answer.

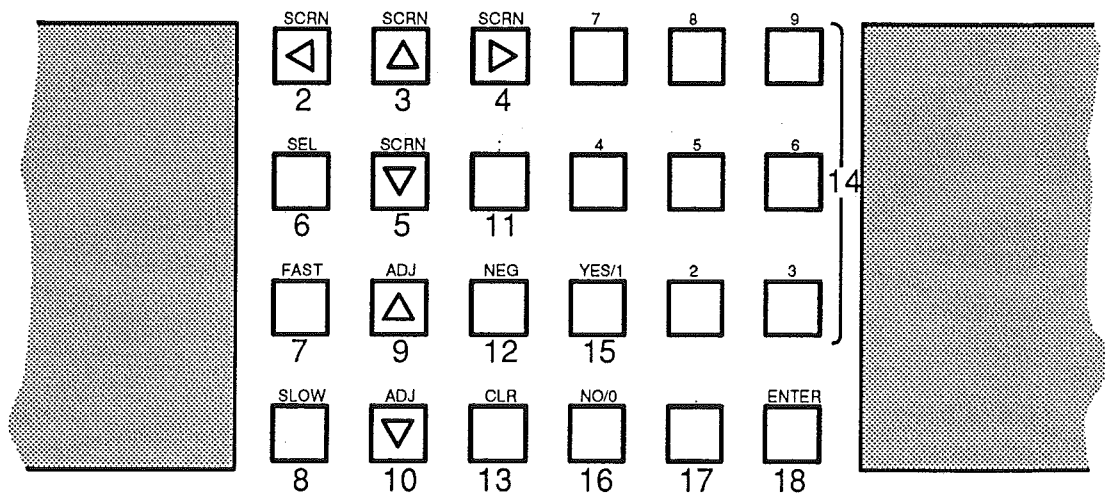


Figure 5.2 - Fuel Controller Keypad

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POINT '.' KEY (17)

This key is used to enter the decimal point in a numeric entry.

ENTER KEY (18)

This key is depressed to confirm the entry of new values. Also this key may be used as a response to a display prompt.

RESET SWITCH

This switch is mounted within the Fuel Controller Unit and is used when restoring power to the unit after a period of disconnection. To gain access to this switch it is necessary to unlatch and swing open the front panel of the Fuel Controller Unit. Ensure the power is switched on with the internal Power Module Switches and then set the Reset Switch momentarily to the left to initiate the system self-test. It will take a few minutes for the unit to complete the self-test and be in operational condition.

3 SOFTWARE FACILITIES AND OPERATION

After completing the self-test procedures the display panel will show the message 'WOODWARD GOVERNOR COMPANY - DCS ver 4.x' to indicate that it is functioning. To prolong the life of the display, after an inactive period of five minutes, the display will extinguish.

NOTE: This extinguishing of the display is only relevant to this screen display. To obtain the display extinguishing feature it is necessary to return to this screen display.

To enter the 'Mode' level of selection depress any key on the Keypad and the display screen will show a mode level page. Where the screen had previously been extinguished depressing any key will bring to the display a mode level page. The screen message will be similar to:

Press SCREEN to change selection
Press ENTER to select SERVICE

To select the operating mode required depress the SCREEN RIGHT (SCRN →) Key to scroll through the mode pages; i.e. Monitor; Configure; Debug or Faults. To return to a previous page depress the SCREEN LEFT (SCRN ←) Key

When the desired mode page is displayed depress the ENTER Key to enter that mode.

NOTE: To prevent unauthorized adjustments to be made to operating parameters all modes, with the exception if the Monitor mode, will then require a security code to be entered. Each mode requires it's own password before allowing Operator access to that mode. The display will show an 'Enter password for XXXXXX' message where 'XXXXXX' represents the name of the selected mode.

WARNING: The Configure mode is used prior to starting the Gas Turbine/Generator Unit to enter the setpoint values at the time of initially. Therefore the mode must not be entered whilst the unit is operating. If this mode is selected whilst the Gas Turbine/Generator Unit is operating an shut-down will be instigated.

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To prevent a shut-down in the Configure mode a supplementary screen display will be presented with the message 'SHUT-DOWN UNIT? Y/N'. Depress the numeric key '1' if it is desired to enter a 'Yes' acknowledgement. To abandon the Configure mode and return to the mode level page depress the numeric key '0' to enter the negative response.

Once within the mode level of operation where a 'header' (sub-menu) screen is presented on the display. Observe the position of the '@' indicator at the left-hand side of the display. The indicator has to be positioned alongside the name of the required mode block name. To move the indicator to the alternative block depress the SELECT (SEL) Key as appropriate. To activate the selection depress either the SCREEN RIGHT (SCRN →) or SCREEN LEFT (SCRN ←) Key.

Use the SCREEN DOWN (SCRN ↓) Key to scroll down through the blocks to the desired block. When in a mode that enables changes to the setpoints displayed enter the numeric value from the Keypad and depress the ENTER Key to register the new value.

The SCREEN UP (SCRN ↑) Key will scroll up through the blocks and from the first mode block screen depressing this Key will return to the Header screen. The Operator may then choose:

- » To move to another Header screen using the SCREEN LEFT (SCRN ←) and SCREEN RIGHT (SCRN →) Keys and then select other blocks

or

- » Move to a higher level screen by depressing the SCREEN UP (SCRN ↑) Key.

Depressing the SCREEN UP (SCRN ↑) Key will return the screen to successively higher levels until the screen first displayed at the time of power-up is viewed. After approximately five minutes the screen will extinguish to extend the life of the display screen.