Chapter 3. Operator Interface

Introduction

Interface to the control may be performed through the 505's service panel (located on the front of the control), remote switch contacts, analog inputs, meter readouts, relays, or a Modbus communications line to an operator interface device.

Keypad and Display

The control's service panel consists of a keypad and LED display (two lines, 24 characters each) located on the front of the control.

	WOODWARD GC 505 Versi)VERNOR CO. ion x.xx	
PRGM RUN STOP RESET	ALARM F1 UVERSPECT F2 F3 SELECT F4	SPEED AUX 7 8 CAS RMT 4 5 YES ACTR 1 2 NII EXT/ADM 0 ·	KW 9 LMTR 6 CONT 3 CLEAR DYN +/- ENTER

850-084 96-02-06 KDW

Figure 3-1. 505 Keypad and Display

The system operator uses the service panel to communicate with the 505 system. The service panel can be used only occasionally to communicate with the system, or it can continuously monitor a value for the operator to view.

The Service Panel, shown in Figure 3-1, includes the 30 key keypad and the split screen display. An overview of the software and information arrangement scheme for the Service Panel is shown in Figure 3-2.

Service Panel Modes

The 505 Service Panel operates in several access modes, each of which has a different purpose. These modes are: SERVICE, CONFIGURE, DEBUG, OS_FAULTS, and SYS_INFO. See Figure 3-2, Software Structure Overview.

The SERVICE mode can be used while the turbine is running. The SERVICE mode permits displaying the value of any SERVICE mode block, and changing the value of any of those blocks that are tunable. Entry into the SERVICE mode requires a password.

The CONFIGURE mode is also referred to as the PROGRAM mode and is used to set up the parameters for a specific application prior to operation of the unit. The turbine must be shut down (and the password entered correctly) to change any CONFIGURE values. If the control is not shutdown, pressing the PRGM key will allow viewing of CONFIGURE, but will not permit any changes to be made.

The DEBUG mode is used to troubleshoot a system during development and is not intended for general use. It should be used only by properly trained Woodward personnel or when expressly authorized by Woodward Governor Company. Entry into the DEBUG mode requires a password.

The OS_FAULTS mode displays any operating system faults or alarms that have occurred, and permits resetting (clearing) the list of detected alarms. Entry into the OS_FAULTS mode requires a password.

The SYS_INFO mode is used to display system information, change passwords, or download a configuration file into the control.

Using the Service Mode

Information that can be displayed by the SERVICE mode and CONFIGURE mode is all arranged in the same way. There are three tiers or levels: modes, headers, and blocks. The modes each have a number of headers under them and each header usually has many blocks under it. The DEBUG mode, the OS_FAULTS mode, and the SYS_INFO use different arrangements and will be described later.

Top Level/Root System Block

This is normally the first block to appear on the display after power up, but may be overwritten by the application program. To get to the Root System block at any time push the CLEAR key once or sometimes twice depending where the user is in the programmable service. The block looks like this:

> WOODWARD GOVERNOR CO. 505 Version X.X

Pressing the scroll _ key takes the system to the first level, the mode level.



Program Mode and Debug Mode

Select Mode Level

This first level (below the Top Level/Root System block) contains the five different programmable service mode blocks. The five mode blocks are arranged within the first level as shown in Figure 3-3. Scroll left (\triangleleft) or right (\triangleright) to display each mode.





IMPORTANT When entering the mode level, the SERVICE mode will always be the one displayed first in the mode-level message.

Header Level

The second level is the header level. This level contains the programmable service header blocks as shown in Figure 3-4. Scroll left (\triangleleft) or right (\triangleright) to get to each header. Press CLEAR to get back to the Select Mode Level. Scroll down (\checkmark) to get to any block under a header.





Block Level

The third level, the block level, is shown in Figure 3-5. The programmable service blocks containing the values to be monitored or changed are found at this level. Scroll down (\checkmark) or up (\blacktriangle) to get to a different block. Push CLEAR to get back to the header level.



Figure 3-5. Block Level

Service Mode

The SERVICE mode can be used while the engine/turbine is running or shut down. The SERVICE mode permits displaying the value of any SERVICE mode block, and changing the value of any of those blocks that are tunable. Entry into the SERVICE mode requires a password.

In the SERVICE mode, the value displayed for a block can be changed by using either the ADJ _ or ADJ _ keys. The value can be changed if it is a tunable variable; in this case there will be a * before the value.

505 Digital Governor

This mode can also be used to make direct numeric entries. However, because this mode is intended to be used while the turbine is running, the Service Panel will accept the entry of numeric values for a block only if the proposed change is very small. The block value proposed for entry must be within 1 percent of the current displayed value of that block, unless that current displayed value is between -0.1 and +0.1. If the current displayed value is between -0.1 and +0.1, the system will accept any entry between -0.1 and +0.1.

To make direct numeric entries, first bring the displayed value to within 1% of the value to be entered. Press the ENTER key. Press the numerical keys to input the value and press ENTER again.

If the value entered is less than the value displayed by more than 1% or greater than the value displayed by more than 1%, an appropriate message will be displayed indicating the value entered is too large or too small.

When using the SERVICE mode, refer to the Service Mode worksheet in Appendix B.

Entering the Service Mode

1. At the select mode level, the following message will appear on the display.



(MMMMMMM = name of mode: SERVICE, CONFIGURE, DEBUG, OS_FAULTS or SYS_INFO)

- Press the scroll right (►) key until the message indicates the SERVICE mode (unless it already does).
- 3. Press the ENTER key. The following message will be on the display.

Password SERVICE

IMPORTANT

For password information see Appendix C at the back of this manual. If the password information is not in this manual, see the supervisor or equipment engineer.

4. Enter the password on the numeric keys, then press the ENTER key. The display will show a SERVICE mode header. An example is shown below.

IMPORTANT

The headers and blocks are assigned their names by the application programmer; this is only an example.

- 5. The @ indicates which half of the split screen display that key entry will affect. Use the SELECT key to select either the top or bottom of the split screen display. (The Xs indicate another header or block which is being shown on the bottom half of the split screen display.)
- Use the scroll right (►) or scroll left (◄) key to select the desired SERVICE mode header.
- Use the scroll up (▲) key or scroll down (▼) key to select the desired SERVICE mode block. A message similar to the one below will be displayed.



(The * indicates this block contains a tunable variable).

8. Use the ADJ _ or ADJ _ keys to increase or decrease the value of the block being displayed. If a faster rate of change is desired simply hold the key down and the rate of change will increase after two seconds and again after six seconds. If a slower rate of change is desired, repeatedly release the key after holding one second then press again.



- 9. When setting the value of the block has been completed, either go to another block or exit out of the mode.
 - To scroll to another block under the same header, use the scroll down (▼) or scroll up (▲) keys.
 - To go back to the same header, press the CLEAR key.
 - From header level, to go to a block under a different header, scroll to the new header by using the scroll right (►) or scroll left (◄) key, then scroll to the new block by using the scroll down (▼) or scroll up (▲) key.

• To exit the mode, use the CLEAR key to get back to the header. Then press CLEAR again to get back to the Top Level/Root block. The values of all variables that were changed will then be stored in EEPROM.

IMPORTANT If the display will not be used for a while, it is a good idea to return to the Top Level/Root display and permit the system to blank the screen to save power and prolong the life of the display.

Exiting Modes

When leaving the SERVICE mode or the CONFIGURE mode and returning to the Root level (by pressing CLEAR), the values of all variables that were changed (while in SERVICE mode or CONFIGURE mode) are stored in EEPROM.

If variables are tuned or changed but not stored in EEPROM by pressing CLEAR to return to the root level, then those changes will be lost if power is removed from the control or if the control is reset.



When the display is showing the Top Level/Root block (shown below) the display will turn off if approximately 5 minutes elapse without a key being pressed. If the unit is powered up but the display is blank, press the CLEAR, scroll down (\mathbf{v}), PRGM, or any hot key to turn the display on. This will turn the display block on.

Configure Mode

The CONFIGURE mode is used to set a system up for a specific application, before actual operation of that system starts. The engine/turbine must be shut down when using the CONFIGURE mode, and numeric entries of any value (within the allowed range for that block) may be made.

Entry into the CONFIGURE mode requires a password. If the control is not shutdown, pressing the PRGM key will allow viewing of CONFIGURE, but will not permit changing the value of a block.

The structure of the CONFIGURE mode is identical to that of the SERVICE mode (see Figure 3-5).

NOTICE Entry into the CONFIGURE mode will cause an automatic shutdown of all control outputs. The control will prompt "SHUTDOWN CONTROL? Y/N". Entering YES will cause all milliamps outputs will go to zero and all relays will de-energize. Entering NO will abort the shutdown.

When using the CONFIGURE mode, refer to CONFIGURE/PROGRAM MODE worksheet in Appendix A of Volume 1.

Since configuring a control or viewing how a control is configured is such a commonly used mode the PRGM (program) key has been designed to take the user directly to step 4 below from anywhere in programmable service except DEBUG, OS_FAULTS, or SYS_INFO. The CONFIGURE mode can also be reached like the other modes by following the steps below.

1. At the mode level the following message will appear on the display.



- 2. Press the scroll right (►) or scroll left (◄) key until the message indicates the CONFIGURE mode.
- 3. Press the ENTER key. The following message will be on the display.



For password information see Appendix C at the back of this manual. If the password information is not in this manual, see the supervisor or equipment engineer.

4. Enter the password on the numeric keys, then press the ENTER key. The system will display the following message.

SHUTDOWN CONTROL? Y/N

If the NO key is pressed, the system will return to the mode level. If the YES key is pressed, the system will enter the CONFIGURE mode; all control outputs will shut off. The display will show a CONFIGURE mode header. An example is shown below.

CONFIGURATION HEADER

IMPORTANT

The headers and blocks are assigned their names by the application programmer; this is only an example. The CONFIGURE mode does not use the split-screen as does SERVICE, and DEBUG mode. In the CONFIGURE mode the prompt is displayed on the top line and the variable to be configured is displayed on the second line.

- 5. Use the scroll right (\blacktriangleright) or scroll left (\blacktriangleleft) key to select the desired CONFIGURE mode header.
- 6. Use the scroll down (\mathbf{v}) key or scroll up (\mathbf{A}) key to select the desired CONFIGURE mode block.
- 7. Enter the desired value on the numeric keys and press the ENTER key.
- 8. When setting the value of the block has been completed, either go to another block or exit out of the mode.
 - To scroll to another block under the same header, use the scroll down • $(\mathbf{\nabla})$ or scroll up ($\mathbf{\Delta}$) keys.
 - To go back to the header, press the CLEAR key. •
 - From header level, to go to a block under a different header, scroll to the new header by using the scroll right (\triangleright) or scroll left (\triangleleft) key, then scroll to the new block by using the scroll down (\mathbf{v}) or scroll up (\mathbf{A}) key.
 - To exit the mode, use the CLEAR key to get back to the header. Then press CLEAR again to get back to the Top Level/Root block. The values of all variables that were changed will then be stored in EEPROM.

If the display is not going to be used for a while, it is a good idea to IMPORTANT return to the Top Level/Root display and permit the system to blank the display to save power and prolong its life.

DEBUG Mode

The DEBUG mode is used to troubleshoot a system during development and is not intended for general use. It should be used only by properly trained Woodward personnel or when expressly authorized by Woodward Governor Company. Entry into the DEBUG mode requires a password.

IMPORTANT

For password information see Appendix C at the back of this manual. If the password information is not in this manual, see the supervisor or equipment engineer.

WARNING

The DEBUG mode is intended for use only by authorized and trained personnel to maintain and troubleshoot the system. Use of the DEBUG mode by untrained or unauthorized personnel could result in inadvertently changing critical system values; changing critical system values could cause equipment damage or personnel injury or death. Do not permit unauthorized personnel to use the DEBUG mode.

The information in the DEBUG mode is arranged as shown in Figure 3-6. Scroll down to go from a MOE category to a MOE block; scroll up or down to go to another MOE block. Scroll left or right to go from a MOE block to a field of that MOE block, or from one field to another field of the same MOE block.

All tunable values that are used in SERVICE or CONFIGURE modes will not show up in DEBUG mode. Any value that is tunable but is not used in SERVICE mode or CONFIGURE mode will appear as a tunable, and can be tuned, in DEBUG mode.

When exiting the DEBUG mode, all tunable values that have been changed will be stored in EEPROM memory.



Figure 3-6. Debug Information Arrangement

Pressing the '.' key while in the DEBUG mode will switch the display to the SERVICE mode; pressing the '.' key again will switch the display back to the DEBUG mode.

OS_FAULTS Mode

The OS_FAULTS mode displays all operating system faults or alarms that have occurred since the last Faults Reset operation. It also permits resetting (clearing) the alarm list.

The OS_FAULTS mode headers are:

- Faults Detected–Displays faults detected since the last power down.
- Alarms Detected–Displays alarms detected since the last time the alarm list was cleared.
- Clear Alarms Detected–Clears the alarm list.

The information in the OS_FAULTS mode is arranged as shown in Figure 3-7.

Appendix C. Password Information

General

The 505 Series control system requires a password to be entered before access can be given to the SERVICE, CONFIGURE, DEBUG, or OS_FAULTS modes. The Download Configuration function also requires a password. These passwords are intended to help prevent unauthorized or untrained personnel from accessing these modes and possibly making changes that could cause damage to the turbine or associated process. If only certain people are to know these passwords, remove this appendix and keep it in a separate place, apart from the manual.

Service Mode Password

When the display reads:

Password SERVICE

The password for your control is: 1 1 1 1

Press the keys on the 505 front panel in this sequence followed by ENTER to gain access to the SERVICE mode.

Debug Mode Password

When the display reads:

Password DEBUG

The password for your control is: 1 1 1 2

Press the keys on the 505 front panel in this sequence followed by ENTER to gain access to the DEBUG Mode.

Configure Mode Password

When the display reads:

Password CONFIGURE

The password for your control is: 1 1 1 3

Press the keys on the 505 front panel in this sequence followed by ENTER to gain access to the CONFIGURE mode.

OS_FAULTS Mode Password

When the display reads:

Password OS_FAULTS

The password for your control is: 1 1 1 4

Press the keys on the 505 front panel in this sequence to gain access to the OS_FAULTS mode.

Download Configuration Function Password

When the display reads:

To Load Configuration Enter Password

The password for your control is: 1 1 1 6

Press the keys on the 505 front panel in this sequence followed by ENTER to gain access to the Load Configuration function.