Operator Interface Terminal Manual
Standard Two or Three Pump VFD Booster

The Operator Interface Terminal (OIT) allows the operator to monitor the status of the pump system as well as change system variables to improve or modify the performance of the pump system. All system variables can be changed while the system is operating, with proper password entry. This allows the operator to observe the effects of the changes immediately.

The OIT consists of a LCD display with a sealed switch keypad. The keys are labeled by category. The operation of the OIT can be summarized into 2 modes of operation:

      I.   Display Information
      II.   Modify System Variables

These two modes will be referred to as DISPLAY MODE and MODIFY MODE throughout this document.

All of the OIT functions are grouped into 11 major categories, which are selected by using the appropriate key on the keypad. All of the yellow captioned buttons are password protected. Once the main category has been selected, the *Page Up, Page Down, Clear, Enter* and *Toggle* keys are used to navigate within the selected category and change variable values.

Display Mode

To display a particular message or variable, simply press one of the category keys (green, blue, red, or yellow keys) to select the desired category, then use the *Page Up* or *Page Down* keys to scroll through the messages within the category until the desired message is displayed. The *Page Down* key scrolls forward through the messages and the *Page Up* key scrolls backward. The category keys can be used at nearly any time to switch to a different category of messages. The lone exception is when a password-protected category has been selected and the password is being requested. In this instance, it is necessary to press the *Clear* button first before selecting a new category.

When an alarm occurs, an alarm message will be displayed on the OIT describing the alarm and displaying the two-character event code associated with it. This event code is shown in Event History to indicate what alarm has occurred. If multiple alarms occur, the messages will automatically scroll, with a new message being displayed every second. To stop the automatic scrolling, press the alarm silence/reset push button on the control panel door. This button serves as a toggle to disable or enable the scrolling function. Once the automatic scrolling has been stopped, the operator can manually review the status of each alarm or the sequence in which the alarms occurred. The procedure for doing this is described in the Alarms and Event History sections of this manual. To restart the automatic scrolling, press the alarm silence/reset push button a second time.

Modify Mode

To modify a system variable, follow these steps:

1) Display the variable to be modified using the method described above.

2) When changing to a password protected menu (yellow key), you will be prompted for a password. Once the last digit of the correct password is entered, the menu will be accessed. Press *Clear* if you do not wish to enter the password and select another category.

3) *Page Up* or *Page Down* to the applicable screen, then use the arrow keys to move the cursor to the set point to be changed. Press *Clear* and then type in the new value and press *Enter* to accept the change. The operator may also use the *+* and *-* keys to adjust set points.

4) The range through which each adjustable set point can be set is listed in Appendix 1 of the Operational Overview and Controls Guide.

> To ABORT a modification, press *Clear* and then the *Enter* key or press one of the category keys.

Menu Buttons

The OIT has 12 function keys, eleven of which can be used by the operator. When pressed, these keys will display different data values for viewing or changing. All of the yellow keys are password protected. Once a password-protected key is pressed, the password must be entered before the OIT will change to the appropriate menu. Note that if an attempt is made to switch to a given menu in error, the *Clear* key

must be pressed before another menu is selected or an error will occur. The various menus and their sub-elements are described as follows:

1.   STATUS

Pressing this key will display the main screen. This screen displays the flow rate, suction pressure (if equipped), system pressure, system pressure set point, VFD output speed, and the VFD mode of operation. The next screen shows the operator whether the following circuits are enabled or not: lead pump shut down, HydroCumulator charge (if applicable), limited auto-reset of low suction, and limited auto-reset of high system pressure alarms. The following screen allows the operator to test the alarm condition light and horn for five seconds using the *Toggle* key.

2.   ALARMS

This menu allows the operator to manually check the status of each alarm condition, using the *Page Down* and *Page Up* keys.

3.   EVENT HISTORY

This menu allows the operator to view the sequence in which alarms have occurred as well as the system operating conditions when each alarm occurred. The operator can use the *+* and *-* keys to scroll through the event records or use *Clear* and *Enter* to view specific records. It should be noted that the events are numbered in reverse chronological order so that the most recent event is record 0. The *Help* screen also describes how to search through the records.

4.   SYSTEM PERFORMANCE

This menu allows the operator to view the peak system flow rate, flow totals of the current day and the overall flow total, the number of pump starts, and the run hours for each pump. These can be reset under the *RESTORE DEFAULTS AND SETUP* key.

5.   CLOCK SETTINGS (PASSWORD = 0001)

Pressing this key will display the clock set points. Please note that changing the clock value will reset system performance data, except for "AUTO" pump run hours. To set the clock, make sure the cursor (an underline) is under the word "VIEW". Then press *Toggle* to change it to "SET". Next, use the arrow keys on the numeric keypad to move the cursor to the value to be changed and use the *Clear* and *Enter* or *+* and *-* keys to change the value. When done, cursor back to "SET" and change it back to "VIEW".

6.   **PRESSURE SET POINTS (PASSWORD = 0001)**

Pressing this key will display the system pressure set point and the pressure sequencing deadband set point (the pressure drop below the system pressure set point to start the pumps). This is followed by the speed setting for starting the lag pump. The operator may effectively disable the speed consideration by setting a low start speed, in which case the lag pump will start on low pressure alone as normal. The next screen shows the low and high system pressure alarm deadband set points. If a suction pressure transmitter is supplied, the low suction pressure alarm set point and high suction pressure shut down set point will also be displayed.

7.   **FLOW SET POINTS (PASSWORD = 0001)**

Pressing this key will display the starting and stopping flow rates of the lag pump(s). The set points may be adjusted as previously described.

8.   **TIME SET POINTS (PASSWORD = 0001)**

The pump minimum run times, lag pump sequencing delays, lead pump shutdown delay, and alarm delays can be adjusted under this menu using the *Clear*, *Enter*, *+*, *-*, *Page Down*, and *Page Up* keys as previously described.

9.   **P.I.D. SET POINTS (PASSWORD = 0001)**

The following parameters can be changed here:

1) Sampling Time
2) Input Filter
3) Proportional Gain
4) Integral Time Constant
5) Derivative Gain
6) Derivative Time Constant

10.   **SPEED CONTROL (PASSWORD = 0001)**

This menu allows the operator to choose between automatic and manual modes of VFD speed control. The operator may adjust the minimum, maximum, manual, lag pump start, and lead pump stop speeds. The lag pump start speed augments pressure sequencing by requiring the VFD speed to be sufficiently high before the lag pump will start. This ensures that the running pump(s) are at near capacity to prevent unnecessary lag pump starts. Entering a low lag pump start speed can effectively disable this.

11. RESTORE DEFAULTS AND SETUP (PASSWORD = 1110)

Pressing this key will display the restore defaults screen. The operator may restore either the factory defaults or the latest version of saved field defaults. To restore defaults simply press the *Toggle* key to display "YES". The OIT will display "DONE" for several seconds when completed.

CURRENT SETTINGS WILL BE LOST. MAKE NOTES BEFORE DOING.

The next screens allow the operator to enable or disable the following circuits: lead pump shut down, HydroCumulator charge (if applicable), limited auto-reset of low suction, and limited auto-reset of high system pressure alarms. This is followed by screens allowing the operator to reset the peak flow rate, pump starts, pump run hours, today's total flow, and the overall total flow.