Time Mark Corporation
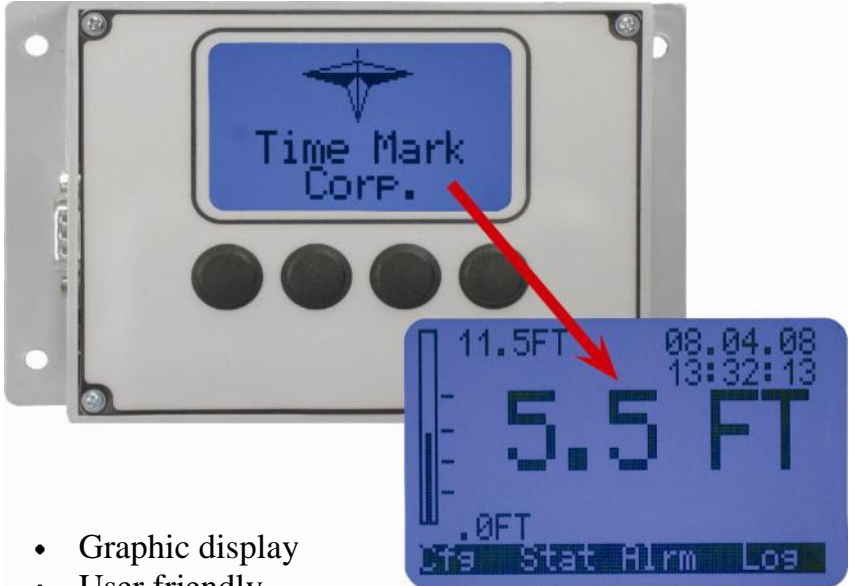# Model 42A
Pump Controller
User's Guide

- Graphic display
- User friendly
- Expandable
- Communications capable

Table of Contents

Table of Contents (Continued)

1.0 Package Contents

1.1 Package Contents

Box Contents :
(1) – Model 42A Pump Controller
(1) – 5.08mm, 2 Pin Power Supply Connector
(2) – 5.08mm, 6 Pin Output (Contact) Connectors
(1) – 3.81mm, 2 Pin RS485 Comm Port Connector
(3) – 3.81mm, 5 Pin Pump Connectors
(1) – 3.81mm, 3 Pin Analog In Connector
(1) – 3.81mm, 2 Pin Analog Out Connector
(1) – Installation and Operation Manual
24VDC Power Supply

35mm Din Rail Mounting Kit
In Door/Panel Mounting Hardware Kit

1.2 Missing/Broken Parts

If a part(s) is missing or broken, please contact a Time Mark Representative at (800) 862-2875 between 8am-5pm CT Monday through Friday.

2.0 Introduction

2.1 Description

1. An advanced pump management and control system with powerful features, easy setup, and customization.
2. All pump alarms are logged to the Model 42A with the pump identification number, alarm type (seal fail, over temperature, or contactor fail), date and time.
3. The 42A is equipped with (3) sets of pump alarm inputs and a full range of pump and sensor configurable menu options.
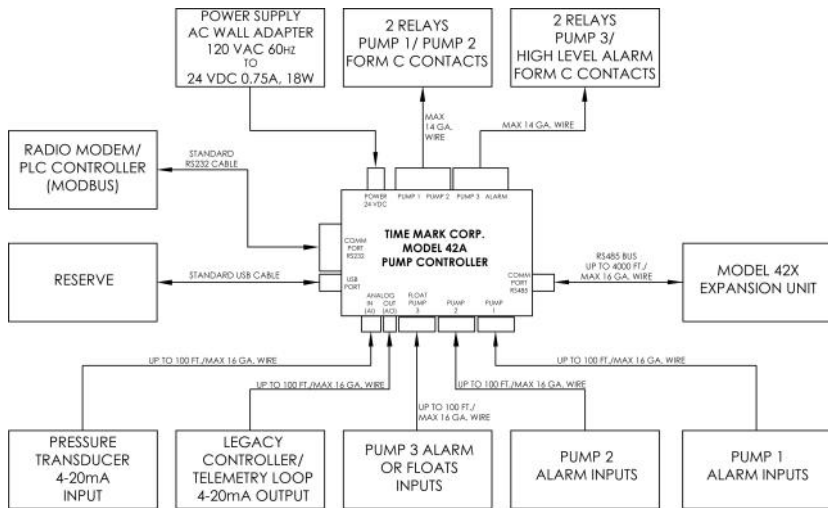
3.0 Model 42A Connections

ALARM INPUT - CONNECTIONS

PUMP 1

CURRENT LIMITED 24VDC
SEAL FAIL
OVER TEMP
CONTACTOR FAIL
SPARE

JUMPER ALL UNUSED
ALARM INPUTS TO
CURRENT LIMITED 24VDC

NORMAL USEAGE - CONNECTIONS

PUMP 1

CURRENT LIMITED 24VDC
SEAL FAIL
OVER TEMP
CONTACTOR FAIL
SPARE

PUMP

SEAL FAIL

OVERTEMP
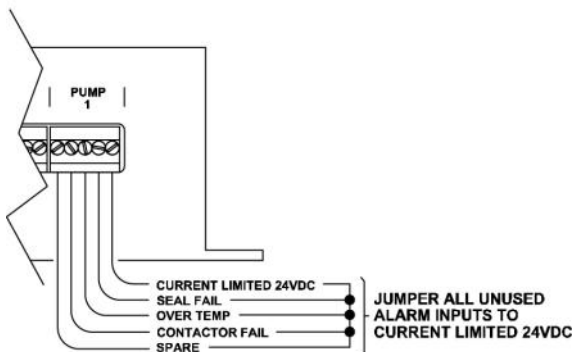
NOTE:
NORMALLY CLOSED CONTACTS
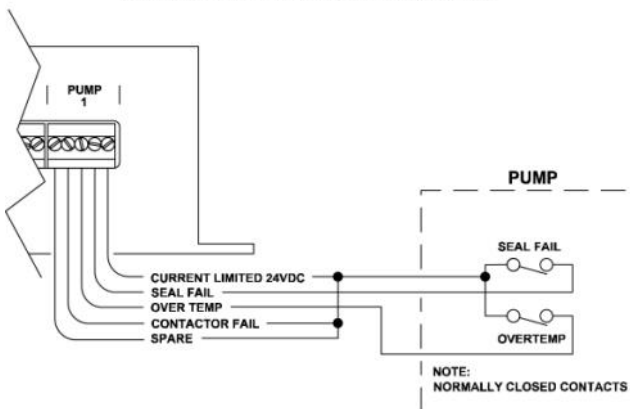
*WARNING: Do **NOT** power on the Model 42A before completing wire connections.*

BOTTOM SIDE VIEW - CONNECTIONS

| | ANALOG IN (AI) | OUT (AO) | FLOAT PUMP 3 | PUMP 2 | PUMP 1 | |

PRESSURE TRANSDUCER INPUT
- 24VDC
- SIGNAL
- GROUND

PUMP 1 ALARM INPUTS
- CURRENT LIMITED 24VDC
- SEAL FAIL
- OVER TEMP
- CONTACTOR FAIL
- SPARE

LEGACY CONTROLLER / TELEMETRY LOOP OUTPUT
- SIGNAL GROUND
- ANALOG OUT

PUMP 3 ALARM OR FLOATS INPUTS
- SPARE / FLT 3
- CONTACTOR FAIL / FLT 2
- OVER TEMP / FLT 1
- SEAL FAIL / FLT 0
- CURRENT LIMITED 24VDC

PUMP 2 ALARM INPUTS
- CURRENT LIMITED 24VDC
- SEAL FAIL
- OVER TEMP
- CONTACTOR FAIL
- SPARE

TOP SIDE VIEW - CONNECTIONS

OUTPUT CONTACTS

| ALARM | PUMP 3 | PUMP 2 | PUMP 1 | POWER 24VDC |

+ 24VDC
GROUND

HIGH LEVEL ALARM
- N.C.
- C.
- N.O.

PUMP CONTACTOR 1
- N.O.
- C.
- N.C.

PUMP CONTACTOR 3
- N.C.
- C.
- N.O.

PUMP CONTACTOR 2
- N.O.
- C.
- N.C.

7

COMM PORT
RS485

COMMUNICATIONS
FOR MODEL 42X
EXPANSION UNIT

4.0 Mounting Hardware

4.1 Panel Mount

FLAT WASHER
4 PIECES

SCREW
4 PIECES
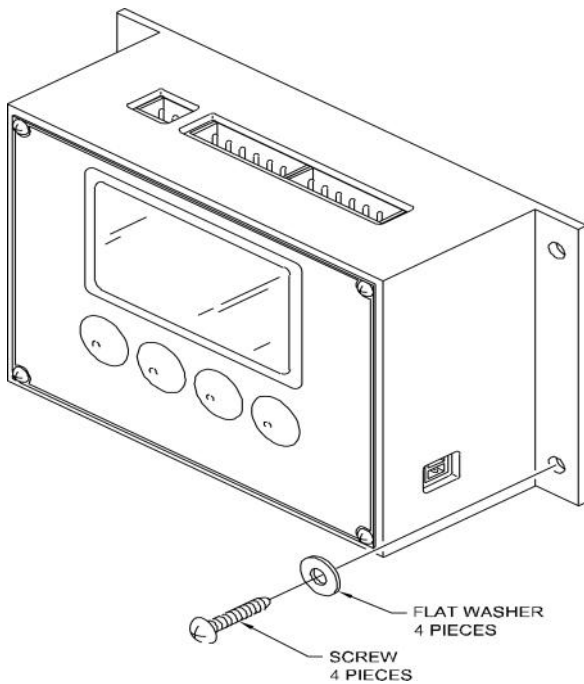
4.2 Din Rail Mount, 35mm
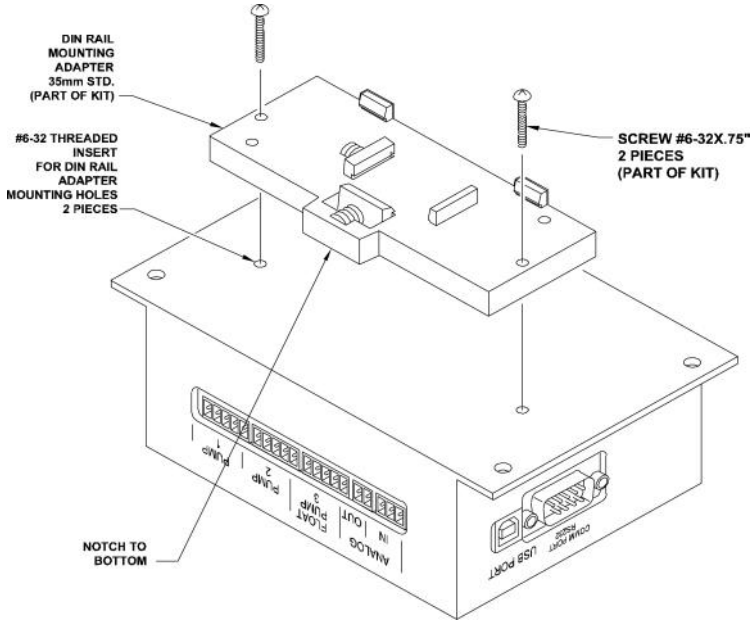
4.3 Flush Mount
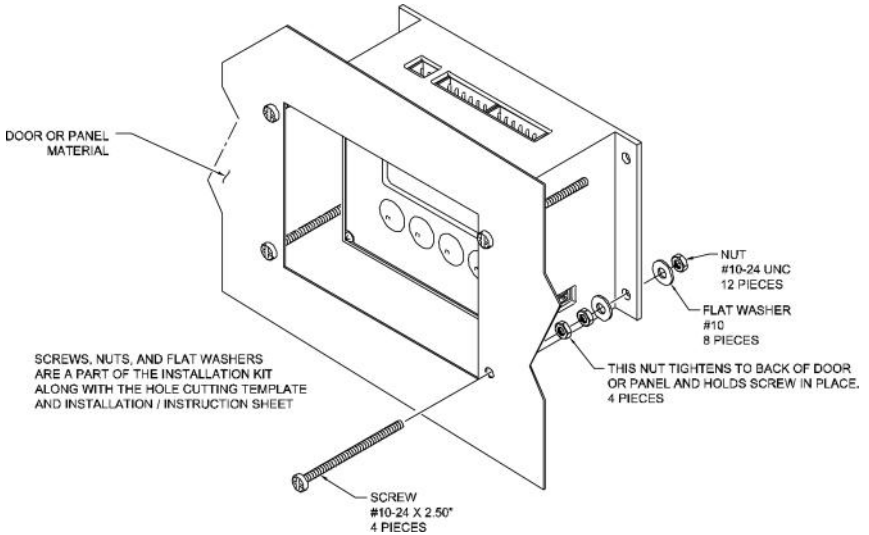
5.0 Getting Started

5.1 Power Supply Connection

STEP 1: Locate the 5.08mm, 2 Pin connector in your installation kit. Install the 5.08mm 2 Pin connector (see page 5).

STEP 2: Plug the 24VDC connector into the Model 42A. The 42A hardware display will illuminate showing the Time Mark logo and then the **HOME** screen.

5.2 **HOME** Screen Menu Description

FIRST USER INTERFACE SCREEN AND BUTTON ARRAY

TANK LIQUID HIGH LEVEL ADJUSTABLE THROUGH MENU "Cfg" BUTTON

LIQUID LEVEL GRAPH

TANK LIQUID LOW LEVEL ADJUSTABLE THROUGH MENU THE "Cfg" BUTTON

DATE AND TIME SET THROUGH THE "Cfg" BUTTON

LIQUID DEPTH FROM BOTTOM

IF DISPLAYED ALARM OCCURRENCE INDICATOR (SEE LOG)

11.5FT   04.28.08 10:32:04
.0 FT
ALARM
.0FT
Cfg   Stat   Alrm   Log

CONFIGURATION (Cfg) BUTTON ENTERS INTO USER & SYSTEM SET UPS

ACCESS TO ALARM LOGS

STATUS (Stat) BUTTON LET'S USER SEE WHAT PUMP IS RUNNING & WHAT PUMP(S) ARE AVAILABLE

ALARM (Alrm) BUTTON ALLOWS USER TO CLEAR ALARM DISPLAY

6.0 Connecting to Your Computer

6.1 Compatible Systems/Programs

The 42A is compatible with the following programs:

A) **Windows 98/2000/XP/Vista/7** using the HyperTerminal program already installed into Windows.

To access the HyperTerminal program in Windows, click **Start—>All Programs—>Accessories —>Communications—>HyperTerminal.

B) For **Linux** users, download a terminal program such as GtkTerm (http://linux.softpedia.com/get/Terminals/GtkTerm-15223.shtml).

C) For **MAC** users, download a terminal program such as ZTerm (http://homepage.mac.com/dalverson/zterm).

6.2 Driver Download

1. Open Internet Explorer on your computer. Make sure you are connected to an Internet Service Provider (ISP).

2. Type in http://www.Time-Mark.com and hover your mouse over the "Products" tab on the left side of the screen until the pop-up menu is displayed. Select the option "Downloads"

3. Using the drop down menu, select the model 42A. A list of downloads should be listed. Select the driver "**cdc_TMC** " from the list.

4. Download the driver named "**cdc_TMC"** from the Time Mark website (www.time-mark.com/downloads/42x_driver) and save in an easy to locate destination.

<u>6.3</u> Hardware Setup

1. After you have downloaded all the 42A Drivers and saved into a locatable folder, plug the USB Type A to Type B Cable from the unit to the computer USB port.
2. The "Found New Hardware " screen should pop-up if you are using a Windows Operating System.

3. Select the option "No, not this time" (as shown above). Then click **Next.**

<u>6.3.1</u> The next screen should appear.

Select "Install from a list or specific location (Advanced)" option. Then click **Next**.

<u>6.3</u> Hardware Setup (Continued)

    <u>6.3.2</u> The next screen will appear (see below).

Do not change any settings on this screen. Click **Next** to search for the downloaded drivers. The next screen may take a few minutes to find the driver.

  <u>6.3.3</u> The next screen should appear.

Click the "Continue Anyway" button then wait for the wizard to install the hardware (see screen shot on page 14).

Hardware Setup (Continued)

The installation process should take a few minutes.

6.3.4 When the setup is complete, the following screen will appear.

Click "Finish". The 42A hardware has been successfully installed into your computer.

7.0 Status Screens

7.1 Initial Screen

Very first screen when Model 42A hardware is connected to your computer.
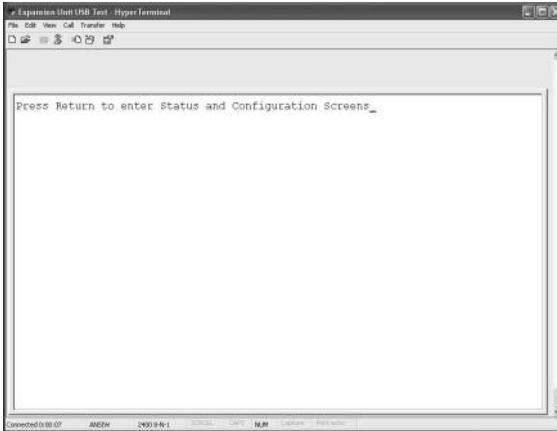
7.2 Current Status Screen

Shows the current status and settings of your Model 42A Pump Controller. This screen updates consistently to the current settings of your Model 42A as you change them.
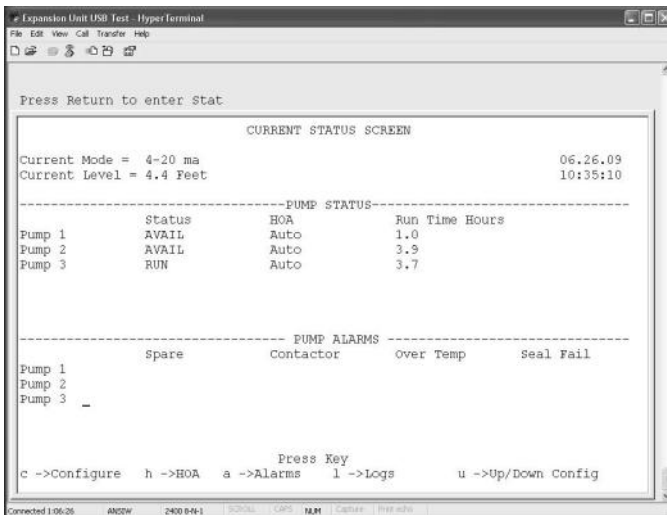
8.0 Basic Configuration

Shows the menu to change settings for the Model 42A Pump Controller.
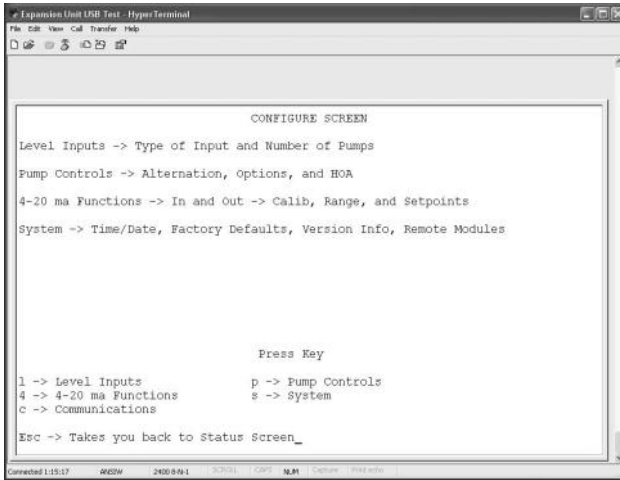
8.1 **System Configure Screen—Input Type and Number of Pumps**

This screen shows the current input type and number of pumps available.
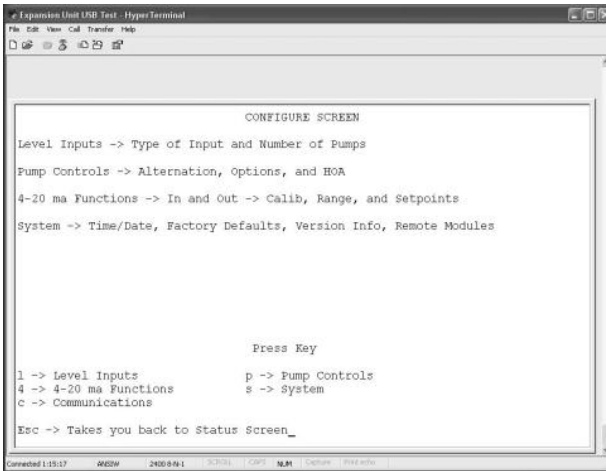
To change the Current Input Type, use the "t" key and toggle until the correct setting appears. Then hit **Enter**.

To change the Current Number of Pumps, use the "n" key and toggle until the correct setting appears. Then hit **Enter**.

Use the **ESC** key at any time and it will take you back to the Configure Screen.

*All commands are shown at the bottom of the screen.

8.2 Pump Controls Configuration

This screen gives the user the ability to change the settings for Pump Alternation, Pump Options, and Pump Hand-Off-Auto (HOA). Screen shot on page 16.

To change the Pump Alternation settings, use the "a" key and toggle until the correct setting appears. Then hit **Enter**.

To change the Pump Options, use the "o" key and toggle until the correct setting appears. Then hit **Enter**.

To change the Pump HOA settings, use the "h" key and toggle until the correct setting appears. Then hit **Enter**.

Use the **ESC** key at any time and it will take you back to the Configure Screen.

*All commands are shown at the bottom of the screen

8.2.1 Pump Alternation Configuration

Shows the menu to change Alternation Configuration settings for the Model 42A Pump Controller.

To select the Pump Number, use the "1","2", or "3" key. Then hit **Enter**.

To alternate the pumps, use the "a" key and toggle until the correct setting appears. Then hit **Enter**.

To return to the Pump Controls Screen, press the "p" key. Then hit **Enter**.

Use the **ESC** key at any time and it will take you back to the Pump Controls Screen.
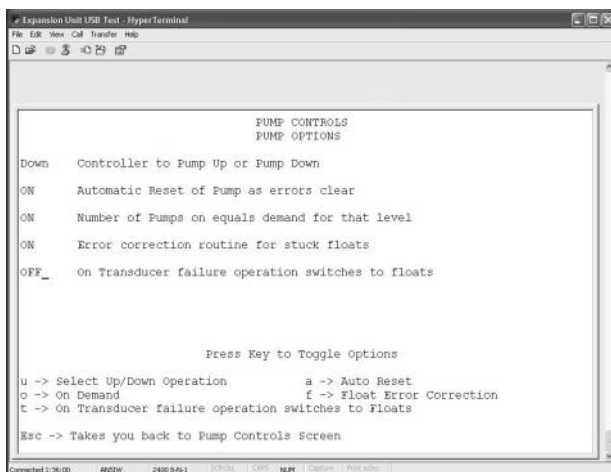
*All commands are shown at the bottom of the screen.

8.2.2 Pump Options Configuration

Shows the menu to change the Pump Option settings for the Model 42A Pump Controller.

*See screen shot on page 19

To change the <u>Up/Down Operation</u> settings, use the "u" key and toggle until the correct setting appears. Then hit **Enter**.

To change the <u>On Demand</u> setting, use the "o" key and toggle until the correct setting appears. Then hit **Enter**.

To change the <u>On Transducer failure operation switches to Floats</u> setting, use the "t" key and toggle until the correct setting appears. Then hit **Enter**.

To change the <u>Auto Reset</u> settings, use the "a" key and toggle until the correct setting appears. Then hit **Enter**.

To change the <u>Float Error Correction</u> settings, use the "f" key and toggle until the correct setting appears. Then hit **Enter**.

Use the **ESC** key at any time and it will take you back to the Pump Controls Screen.

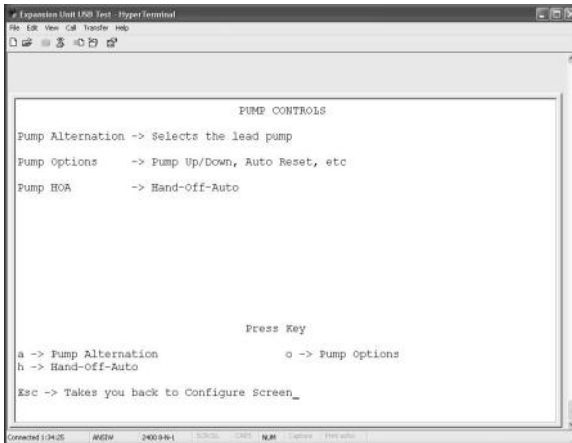*All commands are shown at the bottom of the screen.

8.2.3 Pump Hand-Off-Auto Configuration

Shows the menu to change the Pump Hand-Off-Auto settings for the Model 42A Pump Controller.

*See screenshot on page 20

To select the <u>Pump Number</u>, use the "1","2", or "3" key. Toggle the number pressed until the correct setting is highlighted. Then hit **Enter**.

Use the **ESC** key at any time and it will take you back to the Pump Controls Screen.

*All commands are shown at the bottom of the screen.

8.3 **4 to 20mA Functions Configuration**

Shows the menu to change the 4 to 20mA Functions settings for the Model 42A Pump Controller.
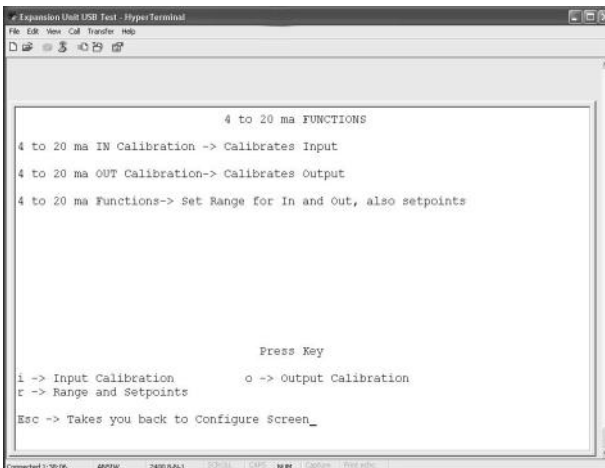
8.3 4 to 20mA Functions Configuration (Continued)

To change the Input Calibration settings, use the "i" key. Then hit **Enter**.

To change the Range and Set points settings, use the "r" key. Then hit **Enter**.

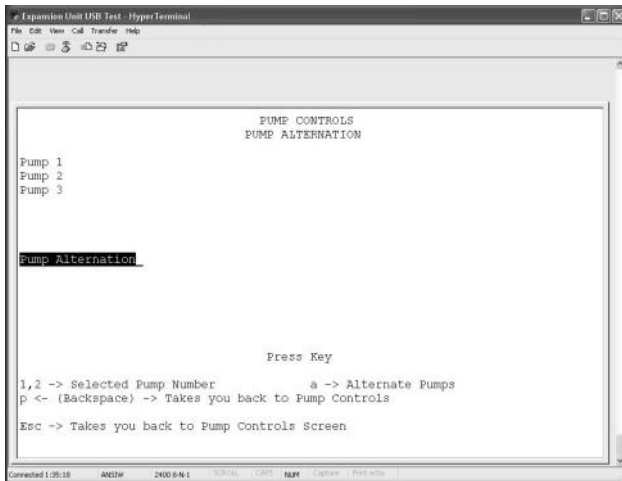To change the Output Calibration settings, use the "r" key. Then hit **Enter**.

Use the **ESC** key at any time and it will take you back to the Configure Screen.

*All commands are shown at the bottom of the screen.

8.3.1 4 to 20mA Input Calibration

Shows the menu to change the 4 to 20mA Input Calibration settings for the Model 42A Pump Controller.
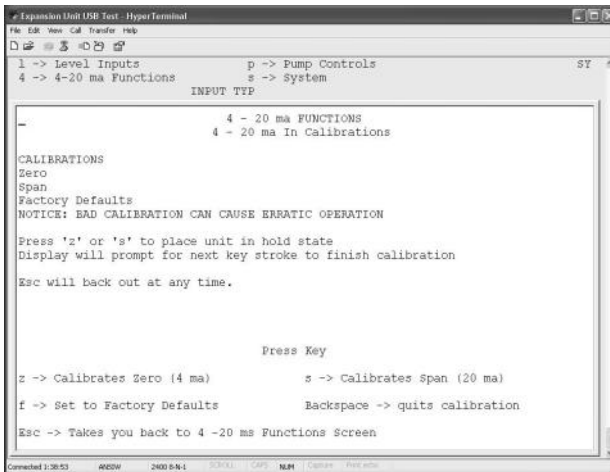
Press "z" or "s" to place the unit in a hold state. The display will then prompt you for the next key stroke to finish calibration. The **ESC** key will back out of this setting at any time.

To Calibrate Zero (4mA), use the "z" key. Then hit **Enter**.

8.3.1 4 to 20mA Input Calibration (Continued)

To change the <u>Set to Factory Defaults</u>, use the "f" key. Then hit **Enter**.

To <u>Calibrates Span (20mA)</u>, use the "s" key. Then hit **Enter**.

Press the **Backspace** key at any time to quit calibration.

Use the **ESC** key at any time and it will take you back to the 4-20mA Functions Screen.

*All commands are shown at the bottom of the screen.

8.3.2 4 to 20mA Output Calibration

Shows the menu to change the 4 to 20mA Output Calibration settings for the Model 42A Pump Controller.
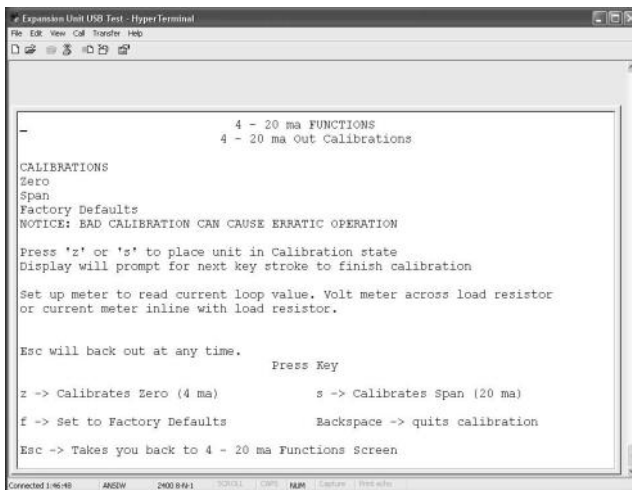
Press "z" or "s" to place the unit in a calibration state. The display will then prompt you for the next key stroke to finish calibration. The **ESC** key will back out of this setting at any time.

To <u>Calibrate Zero (4mA)</u>, use the "z" key. Then hit **Enter**.

To change the <u>Set to Factory Defaults</u>, use the "f" key. Then hit **Enter**.

To <u>Calibrates Span (20mA)</u>, use the "s" key. Then hit **Enter**.

Press the **Backspace** key at any time to quit calibration.

Use the **ESC** key at any time and it will take you back to the 4-20mA Functions Screen.

*All commands are shown at the bottom of the screen.

_8.3.3_ 4 to 20mA Options

Shows the menu to change the 4 to 20mA Functions Options settings for the Model 42A Pump Controller.

To change the 4-20mA Input to Zero, use the "z" key to toggle between the 4mA and 20mA selections. Then enter the amount (in feet) and hit **Enter**.

To change the 4-20mA Input Range settings, use the "r" key to toggle between the 4mA and 20mA selections. Then enter the amount (in feet) and hit **Enter**.

To change the Set points settings, use the "1, 2, 3,or 4" key (number which you are changing). Then enter the amount (in feet) and hit **Enter**.

To change the 4-20mA Output to Zero, use the "e" key to toggle between the 4mA and 20mA selections. Then enter the amount (in feet) and hit **Enter**.

8.3.3 4 to 20mA Options (Continued)

To change the 4-20mA Output Range settings, use the "a" key to toggle between the 4mA and 20mA selections. Then enter the amount (in feet) and hit **Enter**.

Use the **ESC** key at any time and it will take you back to the 4-20mA Functions Screen.

*All commands are shown at the bottom of the screen.

8.4 System Configure Screen
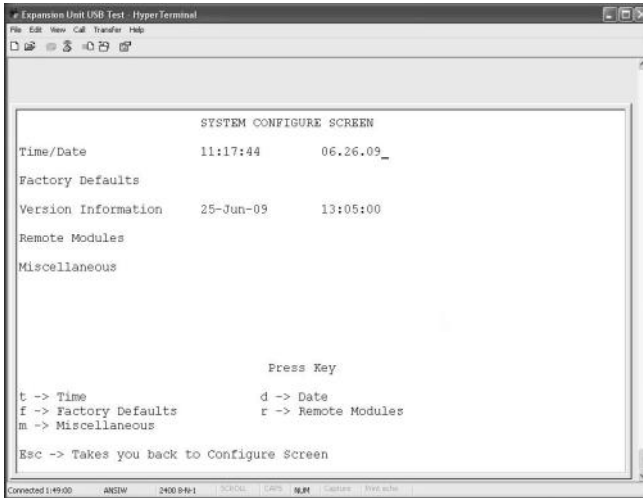
To change the Time, use the "t" key to toggle between the hours, minutes, and seconds. Then enter the correct number and hit **Enter** when finished.

To change the Date, use the "d" key to toggle between the month, day, and year. Then enter the correct number and hit **Enter** when finished.

To access the Factory Defaults main menu, press the "f" key and hit **Enter**.

To access the Miscellaneous main menu, press the "m" key and hit **Enter**.

To access the Remote Modules main menu, press the "r" key and hit **Enter**.

Use the **ESC** key at any time and it will take you back to the Configure Screen.

*All commands are shown at the bottom of the screen.

Shows the menu to change the System Configuration—Factory Defaults settings for the Model 42A Pump Controller.

To clear <u>Alarm Logs</u>, press the "l" key and then hit **Enter**.

To restore the <u>General Configuration</u> to factory defaults, press the "g" key and hit **Enter**.

To clear the <u>Pump Run Times</u>, press the "p" key and hit **Enter**.

To restore General Configuration and to clear Alarm Logs and Pump Run Times using the <u>All of the Above</u> feature, press the "a" key and hit **Enter**.

> You will then be prompted *"Are you sure you want to reset All Configurations? Any other key to exit All Configurations Reset."*
> • Press **Enter** to continue with All Configurations Reset.
> • Select **another key** to exit All Configurations Reset.

Use the **ESC** key at any time and it will take you back to the System Configure Screen.

*All commands are shown at the bottom of the screen.

8.4.2 System Configure—Remote Modules Menu

Shows the menu to change the System Configuration—Remote Modules settings for the Model 42A Pump Controller.

*See page 26 for screenshot.
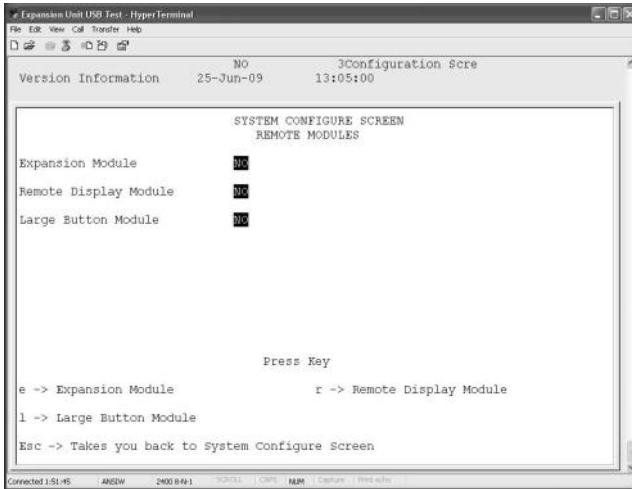
To change the Expansion Module settings from "YES" to "NO", toggle the "e" key until the selection you desire is highlighted. Then hit **Enter**.

To change the Large Button Module settings from "YES" to "NO", toggle the "l" key until the selection you desire is highlighted. Then hit **Enter**.

To change the Remote Display Module settings from "YES" to "NO", toggle the "r" key until the selection you desire is highlighted. Then hit **Enter**.

Use the **ESC** key at any time and it will take you back to the System Configure Screen.

*All commands are shown at the bottom of the screen.

8.5 **Alarms Screen**

Shows the menu to view the Alarms Screen for the Model 42A Pump Controller.

Use the **ESC** key at any time and it will take you back to the Status Screen.

*All commands are shown at the bottom of the screen.

**See page 27 for screen shot.

8.5 **Alarms Screen (Continued)**
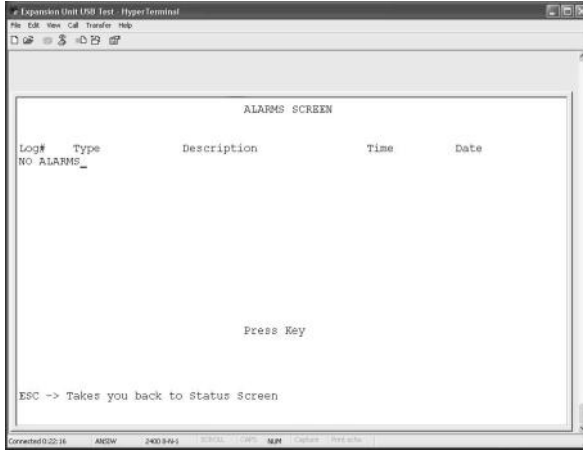
8.6 **Alarm Logs Screen**

Shows the Alarm Logs for the Model 42A Pump Controller.
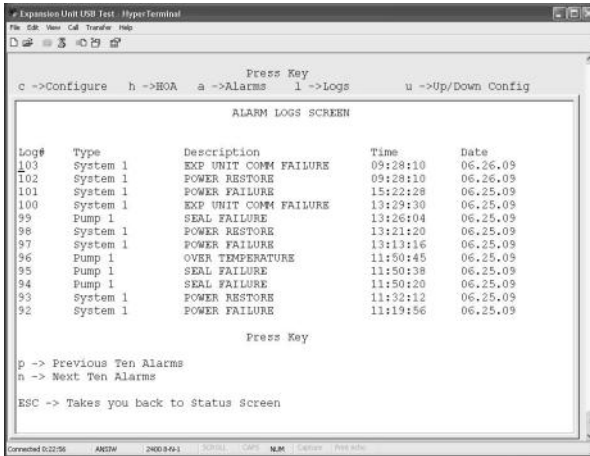
To view the <u>Previous Ten Alarms</u>, press the "p" key and hit **Enter**.

To view the <u>Next Ten Alarms</u>, press the "n" key and hit **Enter**.

Use the **ESC** key at any time and it will take you back to the Status Screen.

*All commands are shown at the bottom of the screen.

8.7 Up-Down Load Configuration

Shows the menu to upload the System Configuration into the user's personal computer and download new configurations into the Model 42A controller.

To Upload Configuration to your PC, press the "u" key and hit **Enter**.

To Download Configuration into the Model 42A, press the "d" key and hit **Enter**.

Use the **ESC** key at any time and it will take you back to the System Configure Screen.

*All commands are shown at the bottom of the screen.

9.0 Setup Instructions

6.1 Time Setup

1. Press **CFG** button to go to the "CONFIG" screen.

2. "CONFIG SCREEN" selections are:
   - Level Input Select
   - Pump Controls
   - Analog I/O Funct
   - Communications
   - Misc
   - System

3. Press **CFG** button then use the ⬇ until "System" is highlighted. Then press **SELCT**. The following options will be displayed:
   - Time/Date
   - Password
   - Delays
   - Factory Defaults
   - Version Number
   - Remote Modules

4. Press ⬇ until "Time/Date" is highlighted, then press **SELCT.** The following options will be displayed in military time:
   - Time
   - Date

5. Menu item "Time" is highlighted then press **SELCT**. Toggle between Hours/Minutes/Seconds (e.g. 09 05 19) by using the ⬆ and ⬇ to make changes to the highlighted areas.

6. Press **EXIT** to save changes and return to CONFIG SCREEN.

7. Press **EXIT** once more to return HOME.

Note: All time is set to Central Standard Time (CST) by default.

9.2 Date Setup

1. Please follow Time Setup steps 1 through 4 for date setup.

2. Press ⬇ until "Date" is highlighted, then press **SELCT**. Then make changes using the **SELCT**, ⬆ and ⬇ buttons.

Press **EXIT** to save changes and return to CONFIG SCREEN.

Press **EXIT** once more to return HOME. The date and time will be displayed in the upper right corner of the HOME screen.

<u>9.3</u> Level Input Setup

1. Press **CFG** once to go to the CONFIG SCREEN.

2. Press ⬇ until "Level Input Select" is highlighted. Then press **SELCT**. The following options will be displayed:

```
   *CONFIG*Level Input*
   Select In        Num Pump
   Type             Available
 ➜FLOAT                2◄
   4-20ma              3
 ➜Select Num Pumps  2◄
```

> Reverse video shows current configuration

3. Press ⬇ until the type of level device that is being used is indicated with arrows on each side then press **SELCT**.

4. Press ⬇ until "Select Num Pumps" is indicated by arrows on each side.

5. Press **SELCT** again, then use ⬆ and ⬇ to change number of pumps.

6. Press **EXIT** to save your selection.

<u>9.4</u> Pump Control Setup

1.   Press the **CFG** once to go to the CONFIG SCREEN.

2. Press ⬇ until "Pump Controls" is highlighted. Then press **SELCT**. The following options will be displayed:

 A) "<u>Pump Alternation</u>" Setup

   • Pump 1
   • Pump 2
   • Pump 3
   • AUTO SELECT (at bottom of screen)
     *After making selection, press **EXIT** to save changes.

 B) "<u>Pump Options</u>" Setup

   • Pump U/D (Select "Up" or "Down")
   • Auto Reset (Select "ON" or "OFF")
   • On Demand (Select "ON" or "OFF")

30

- Flt Err Corr (Select "ON" or "OFF")
- Xducer Fail (Set 0 to 10 times by using ⬆ and ⬇).

      *After making selection, press **EXIT** to save changes.

C)   <u>"Pump H O A Controls" Setup </u>(Press **SELCT** to change defaults)

- "Pump 1   H O **A**"⬅·········
- "Pump 2   H O **A**"
- "Pump 3   H O **A**"

> **Reverse video shows current configuration**

> ⇒ Press **SELCT** multiple times for each selection to highlight H (Hand), O (Off), or A (Auto).
> ⇒ Use ⬆ and ⬇ to highlight selections.

      *After making selection, press **EXIT** to save changes.

<u>*Note:</u> If selecting "H" (Hand), pump runs until it reaches the low liquid level (OFF=1.9 FT). See Section 6.5 Analog In – Set Pts.

<u>9.5</u> Analog I/O Functions Setup

    <u>*Caution:</u> This is a 4-20mA loop. Incorrect calibration could cause erratic operation.

1. Press **CFG** once to go to the CONFIG SCREEN.

2. Press ⬇ until "Analog I/O Funct" is highlighted. Then press **SELCT**. The following options will be displayed:

    A) <u>Analog In – Calib</u> (Press SELCT to change defaults)
- Zero
  - ◊ Press **SELCT** to select "Zero". Using the ⬆ and ⬇ buttons, toggle between "Exit" and "Zero" depending on your selection.
  - ◊ After choosing "Zero", press **SELCT** make changes and save.
- Span
  - ◊ Press ⬇ and **SELCT** to select "Span". Using the ⬆ and ⬇ buttons, toggle between "Exit" and "Zero" depending on your selection.
  - ◊ After choosing "Zero", press **SELCT** to make changes and save.

B) <u>Analog In – Range</u> (Press SELCT to change defaults)
- "4mA = X.X FT"
  - ⇒ Press SELCT to highlight.
  - ⇒ Use ⬆ and ⬇ to change FT.

- "20mA = X.X FT"
  - ⇒ Press SELCT to highlight.
  - ⇒ Use ⬆ and ⬇ to change FT.

  *After making selection, press EXIT to save changes.

C) <u>Analog In – Set Pts</u> (Press **SELCT** to change defaults)

Pump Down	Pump Up
"Hi Lvl = X.X" ⇒ Press **SELCT** to highlight. ⇒ Use ⬆ and ⬇ to change amount.	"Off = X.X" ⇒ Press **SELCT** to highlight. ⇒ Use ⬆ and ⬇ to change amount.
"Lag2 = X.X" ⇒ Press **SELCT** to highlight. ⇒ Use ⬆ and ⬇ to change amount.	"Lead = X.X" ⇒ Press **SELCT** to highlight. ⇒ Use ⬆ and ⬇ to change amount.
"Lag1 = X.X" ⇒ Press **SELCT** to highlight. ⇒ Use ⬆ and ⬇ to change amount.	"Lag1 = X.X" ⇒ Press **SELCT** to highlight. ⇒ Use ⬆ and ⬇ to change amount.
"Lead = X.X" ⇒ Press **SELCT** to highlight. ⇒ Use ⬆ and ⬇ to change amount.	"Lag2 = X.X" ⇒ Press **SELCT** to highlight. ⇒ Use ⬆ and ⬇ to change amount.
"OFF = X.X" ⇒ Press **SELCT** to highlight. ⇒ Use ⬆ and ⬇ to change amount.	"Lo Lvl = X.X" ⇒ Press **SELCT** to highlight. ⇒ Use ⬆ and ⬇ to change amount.

*After making selection, press EXIT to save changes.

<u>9.6</u> Float Backup Setup (when Transducer has failed)

- Unit requires setup as Analog Input (4-20mA) duplex. (Refer to Section 6.3)
  - ⇒ Under "Pump Option" turn "Xducr Fail" to **ON**
  - ⇒ Floats are connected to Pump 3/Floats connector (See Drawing 3.2 on page 3).
  - ⇒ Four floats are used: off, lead, lag, High Alarm
  - ⇒ When out of range (<2mA and/or >21mA) the controller will use the floats as an input sensor.

D) <u>Analog Out – Calib</u> (Press SELCT to change defaults)
- Zero
  - ◊ Press **SELCT** to select "Zero". Using the ⬆ and ⬇ buttons, toggle between "Exit" and "Zero" depending on your selection.
  - ◊ After choosing "Zero", press **SELCT** to make changes and save.
- Span
  - ◊ Press ⬇ and **SELCT** to select "Span". Using the ⬆ and ⬇ buttons, toggle between "Exit" and "Zero" depending on your selection.
  - ◊ After choosing "Zero", press **EXIT** to make changes and save.

  *After making selection, press EXIT to save changes.

E) <u>Analog Out – Range</u> (Press SELCT to change defaults)
- "4mA = X.X FT"
  - ⇒ Press **SELCT** to highlight.
  - ⇒ Use ⬆ and ⬇ to change amount.

- "20mA = X.X FT"
  - ⇒ Press **SELCT** to highlight.
  - ⇒ Use ⬆ and ⬇ to change amount.

  *After making selection, press **EXIT** to save changes.

*<u>**Caution:**</u> *This is a 4-20mA loop. Incorrect calibration could cause erratic operation. For professional use only.*

9.7 Communications
⇒ *Please see **Index 8.1 (pg. 17)** for more information on communications.*

9.8 Password Protection

1. To set a password, press **CFG** to go to the "CONFIG" screen.

2. Using the ⬇ key, scroll down to "System" then press **SELCT**. The "CONFIG-SYSTEM" screen will appear. Select "Password" from the menu.

3. Using the ⬇ key, select "On". Then press the ⬇ key to select a 4-digit numerical password. After each number is entered, press **SELCT**.

4. Press **EXIT** to save and return to the previous menu.

33

9.9   Restoring Factory Defaults

1. Press **CFG** to go to the "CONFIG" screen.

2. Using the ↓ key, scroll down to "System" then press **SELCT**. The "CONFIG-SYSTEM" screen will appear. Select "Factory Defaults" from the following menu items:
   - Time/Date
   - Password
   - Delays
   - Factory Defaults
   - Version Number
   - Remote Modules

3. The following menu will be displayed:
   - Alarm Log
   - Pump Run Times
   - Gen Config
   - All of the above

   Selecting any of these items will take you to another screen.

4. When "Alarm Log" is selected, the following menu items will be displayed:
   - Exit
   - Yes

      Selecting "Yes" will clear all the alarm logs.

5. When "Pump Run Times" is selected, the following menu items will be displayed:
   - Pump 1.0
   - Pump 2.0
   - Pump 3.0

      Caution: *Selecting a pump will zero the run time.*

6. When "Pump Run Times" is selected, the following menu items will be displayed:
   - Exit
   - Yes

7. When "All of the above" is selected, the following menu items will be displayed:
   - Exit
   - Yes

         *Press **EXIT** to cancel and **SELCT** to save
            then return to the previous menu.

10.0 Specifications

7.1 Unit Specifications

ALL DIMENSIONS SHOWN HAVE A TOLERANCE ±.005
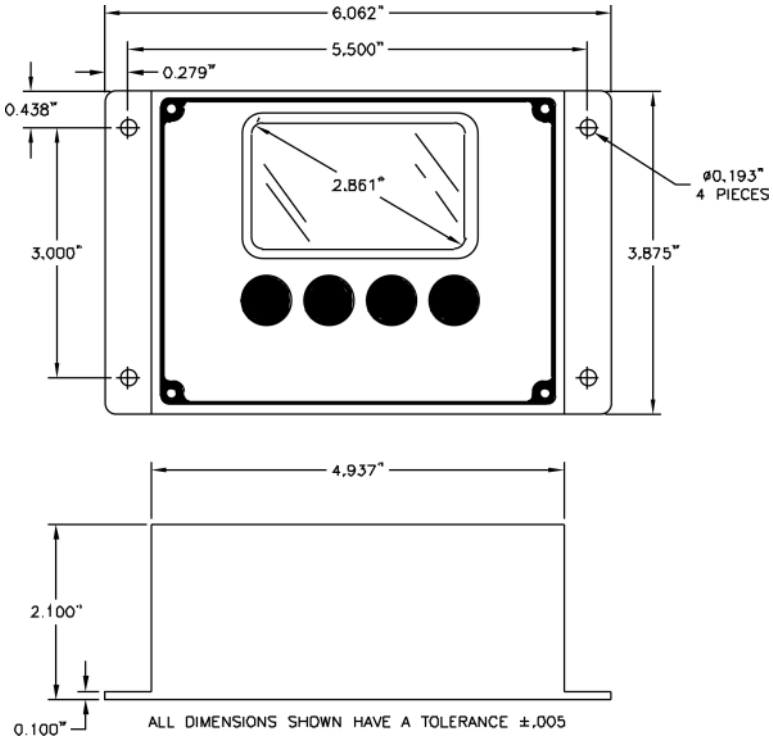
- Unit weight: 15 oz. (with 35mm din kit installed)
- Installation environment: Cabinet (indoors, protected)
- Voltage requirement: 24VDC@200mA
- Operating temperature: –20C to 70C
- Power consumption: 164mA @ 24VDC
- Contact rating: 10A at 240VAC resistive
- Floating switch potential: 24VDC at 9.6mA
- Transient protection: PTC resettable Fuse
- Display: 128 x 64 pixels
- Expected relay life:
  - ⇒ Mechanical: 10 million operations (no load)
  - ⇒ Electrical: 100,000 operations at rated load
- Case Material: ABS plastic
- Termination: Removable terminal plugs
- 5 second delay time

11.0 Index

1) Press **CFG** one time and the CONFIG SCREEN will appear.
2) Press ⬇ until "Communications" is highlighted with arrows on both sides of the selection then press **SELCT**.
3) Press ⬆ or ⬇ until the item is highlighted with arrows on both sides of the selection then press **SELCT**.
4) "Option" will highlight in Reverse Video.
5) Use ⬆ or ⬇ to change the default settings.

OPTIONAL SETTINGS:

Items	*Range*
Modbus Address	1 to 240
Baud rate	19200, 9600, 4800, 2400, 1200
Parity	NONE, EVEN, ODD

DEFAULT SETTINGS:

Items	*Range*
Modbus Address	16
Baud rate	19200
Parity	EVEN

11.2 Communications for Your Computer
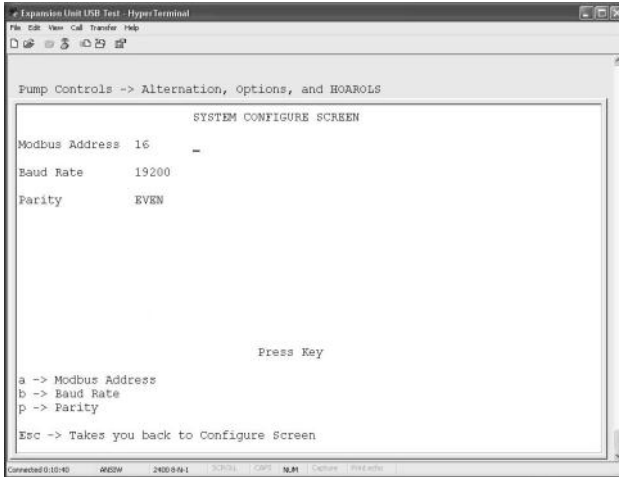
*Default factory settings shown in window.

To define <u>Modbus Address</u>, press "a" then hit **Enter**.

To define <u>Baud Rate</u>, press "b" then hit **Enter**.

To define <u>Parity</u>, toggle the "p" key then hit **Enter**.

***ESC** will take you back to <u>Configure Screen</u> at any time.

11.3 Modbus Register Map (for Communications)

Read Holding Registers – 0x03
Write Holding Registers – 0x06
<u>Format:</u> 4xxxx

Addr	Description	R/W	Notes:
0001	SetPoint [0]	R/W	Implied decimal place (ex. 20 is 2.0)
0002	SetPoint [1]	R/W	Implied decimal place (ex. 20 is 2.0)
0003	SetPoint [2]	R/W	Implied decimal place (ex. 20 is 2.0)
0004	SetPoint [3]	R/W	Implied decimal place (ex. 20 is 2.0)
0005	SetPoint [4]	R/W	Implied decimal place (ex. 20 is 2.0)
0006	SetPoint [5]	R/W	Implied decimal place (ex. 20 is 2.0)
0007	SetPoint [6]	R/W	Implied decimal place (ex. 20 is 2.0)

11.3 Modbus Register Map (CONTINUED)

Addr	Description	R/W	Notes:
0008	SetPoint [7]	R/W	Implied decimal place (ex. 20 is 2.0)
0009	SetPoint [8]	R/W	Implied decimal place (ex. 20 is 2.0)
0010	AIZeroFt	R/W	Implied decimal place (ex. 20 is 2.0)
0011	AIRangeFt	R/W	Implied decimal place (ex. 20 is 2.0)
0012	AOZeroFt	R/W	Implied decimal place (ex. 20 is 2.0)
0013	AORangeFt	R/W	Implied decimal place (ex. 20 is 2.0)
0014	AIZeroCnts	R/W	Implied decimal place (ex. 20 is 2.0)
0015	AIRangeCnts	R/W	Implied decimal place (ex. 20 is 2.0)
0016	AOZeroCnts	R/W	Implied decimal place (ex. 20 is 2.0)
0017	AORangeCnts	R/W	Implied decimal place (ex. 20 is 2.0)
0018	RTC-Date -Mon/Year	R/W	--Month Year in BCD
0019	RTC-Date/Time	R/W	--Day Hours in BCD
0020	RTC-Time -Min/Sec	R/W	--Minute Second in BCD
0021	RunTimeMeter [0] Hi	R/O	
0022	RunTimeMeter [0] Low	R/O	--Run times are the number of sec run
0023	RunTimeMeter [1] Hi	R/O	--High holds bytes 4 and 3
0024	RunTimeMeter [1] Low	R/O	--Low holds bytes 2 and 1
0025	RunTimeMeter [2] Hi	R/O	--32 bit holds4.294967296 Giga sec
0026	RunTimeMeter [2] Low	R/O	--or 71.58278827 Million minutes
0027	RunTimeMeter [3] Hi	R/O	--or 1.193046471 Million hours
0028	RunTimeMeter [3] Low	R/O	--or 49.71026963 Thousand days
0029	RunTimeMeter [4] Hi	R/O	--or 136.1925195 years
0030	RunTimeMeter [4] Low	R/O	
0031	RunTimeMeter [5] Hi	R/O	
0032	RunTimeMeter [5] Low	R/O	
0033	RunTimeMeter [6] Hi	R/O	
0034	RunTimeMeter [6] Low	R/O	
0035	Number of Cur Pumps	R/O	
0036	Number of Pumps On	R/O	

Addr	Description	R/W	Notes:
0037	PumpStatus [0]	R/O	--bit 0 Pump On
0038	PumpStatus [1]	R/O	--bit 1 Available
0039	PumpStatus [2]	R/O	--bit 2 Error Bit
0040	PumpStatus [3]	R/O	--bit 3 Error Latch for Alarm
0041	PumpStatus [4]	R/O	--bit 4 Hand/Off/Auto – Off
0042	PumpStatus [5]	R/O	--bit 5 Hand/Off/Auto – Hand
0043	PumpStatus [6]	R/O	
0044	PumpAlarm [0]	R/O	--bit 0 Spare
0045	PumpAlarm [1]	R/O	--bit 1 Contractor Failure
0046	PumpAlarm [2]	R/O	--bit 2 Over Temp
0047	PumpAlarm [3]	R/O	--bit 3 Seal Failure
0048	PumpAlarm [4]	R/O	--bit 4 Prev Spare Condition
0049	PumpAlarm [5]	R/O	--bit 5 Prev Over Temp Condition
0050	PumpAlarm [6]	R/O	--bit 6 is prev Seal Fail condition

*NOTES on RTC. Values expressed as BCD. Example is month – high nibble.

RTC Date Year/Month

Month	Year
High nibble – 10's	High nibble – 10's
Low nibble – 1's	Low nibble – 1's

RTC Date Time

Day	Hours
High nibble – 10's	High nibble – unused
Low nibble – 1's	Low nibble – 24 hour

11.3 Modbus Register Map (CONTINUED)

Formats for Addresses:	Read:	Write:
0xxxx Read/Write Discrete Outputs or Coils	0x01	0x05
1xxxx Read Discrete Inputs	0x02	
3xxxx Read Input Registers (16 bit)	0x04	
4xxxx Read/Write Output or Holding Reg (16 bit)	0x03	0x06

Function:	Code:
Read Coils	0x01

Addr Range	Notes	Bit	R/W	Addr
1-8	Local Pump 1 Relay	Bit 0	R/O	1
	Local Pump 2 Relay	Bit 1	R/O	2
	Local Pump 3 Relay	Bit 2	R/O	3
	Local Hi Level Relay	Bit 3	R/O	4
	Remote Pump 1 Relay	Bit 4	R/O	5
	Remote Pump 2 Relay	Bit 5	R/O	6
	Remote Pump 3 Relay	Bit 6	R/O	7
	Remote HiLevel Relay	Bit 7	R/O	8
9-16	Modes – from Flags Unused	Bit 0		9
	Expansion Module	Bit 1	R/W	10
	OnDemand Option	Bit 2	R/W	11
	AutoReset Option	Bit 3	R/W	12
	PumpUp/Down Option	Bit 4	R/W	13
	Float Err Check Opt	Bit 5	R/W	14
	Xdcr Fail to Floats	Bit 6	R/W	15
	Level Mode Flts/Pr	Bit 7	R/W	16

Addr Rnge	Notes	Bit	R/W	Address (P=Pumps)						
				P1	P2	P3	P4	P5	P6	P7
17-72	PumpStatus [MAX_NUM_PMPS]									
	PmpOn	Bit 0	R/O	17	25	33	41	49	57	|
	Avail	Bit 1	R/O	|	|	|	|	|	|	|
	ErrBit	Bit 2	R/O	|	|	|	|	|	|	|
	ErrLatch	Bit 3	R/O	|	|	|	|	|	|	|
	SwPmpOff	Bit 4	R/W	21	29	37	45	53	61	70
	SwPmpHand	Bit 5	R/W	22	30	38	46	54	62	71
	Unused	Bit 6		|	|	|	|	|	|	|
	Unused	Bit 7		|	|	|	|	|	|	|
73-128	PumpAlarm [MAX_NUM_PMPS]									
	Spare	Bit 0	R/O	73	81	89	97	105	113	121
	AuxCont	Bit 1	R/O	|	|	|	|	|	|	|
	OverTemp	Bit 2	R/O	|	|	|	|	|	|	|
	SealFail	Bit 3	R/O	|	|	|	|	|	|	|
	PrevSpare	Bit 4	R/O	|	|	|	|	|	|	|
	PrevAuxCont	Bit 5	R/O	|	|	|	|	|	|	|
	PrevOverTemp	Bit 6	R/O	|	|	|	|	|	|	|
	PrevSealFail	Bit 7	R/O	80	88	96	104	112	120	128

Read Discrete Inputs – 0x02

*Note: These are *READ-ONLY.*

Format: 1xxxx

Addr	Description		Notes	Address
1-8	Pump 1	4 – 8 bits	Low nibble	
	Pump 2	8 – 5 bits	High nibble	
	Local Pump 1 Spare		Bit 0	1
	Local Pump 1 AuxCont		Bit 1	2
	Local Pump 1 OverTemp		Bit 2	3

11.3 Modbus Register Map (CONTINUED)

Addr	Description	Notes	Address
1-8	Local Pump 1 SealFail	Bit 3	4
	Local Pump 2 Spare	Bit 4	5
	Local Pump 2 AuxCont	Bit 5	6
	Local Pump 2 OverTemp	Bit 6	7
	Local Pump 2 SealFail	Bit 7	8
9 – 16	Pump 3 4 – 1 bits	Low nibble	
	Exp Pump 4 16 – 13	High nibble	
	Local Pump 3 Spare	Bit 0	9
	Local Pump 3 AuxCont	Bit 1	10
	Local Pump 3 OverTemp	Bit 2	11
	Local Pump 3 SealFail	Bit 3	12
	Remote Pump 1 Spare	Bit 4	13
	Remote Pump 1 AuxCont	Bit 5	14
	Remote Pump 1 OverTemp	Bit 6	15
	Remote Pump 1 SealFail	Bit 7	16
17–24	Exp Pump 5 20 – 17	Low nibble	
	Exp Pump 6 24 – 21	High nibble	
	Remote Pump 2 Spare	Bit 0	17
	Remote Pump 2 AuxCont	Bit 1	18
	Remote Pump 2 OverTemp	Bit 2	19
	Remote Pump 2 SealFail	Bit 3	20
	Remote Pump 3 Spare	Bit 4	21
	Remote Pump 3 AuxCont	Bit 5	22
	Remote Pump 3 OverTemp	Bit 6	23
	Remote Pump 3 SealFail	Bit 7	24

- -

Read Discrete Inputs – 0x02
*Note: These are *READ-ONLY.*
Format: 1xxxx

Address	Description
1	Fluid Level – implied decimal place
2	Raw A/D counts

12.0 Menu Tree

MENU TREE

CFG   STAT   ALRM   LOG
                |
              H O A

CONFIG SCREEN

| **Level Input   Num Pump**
| **Type   Available**
|——FLOAT   2
|
|——4-20ma   3
|
|——Select Num Pumps   2

— Pump Controls

|——Pump Alternation
| Pump 1
| Pump 2
| Pump 3
| Auto Select
|
|——Pump Options
| |—— Pump U/D   Down
| |—— Auto Reset   ON
| |—— On Demand   ON
| |—— Flt Err Corr ON
| |—— Xducr Fail   OFF
|
|——H O A
       |—— Pump 1 H O A
       |—— Pump 2 H O A
       |—— Pump 3 H O A

≋

MENU TREE

```
CFG                STAT            ALRM            LOG
 ≈
    ├── Analog I/O Funct
    │       ├── Analog In—Calib
    │       │       ├── Zero
    │       │       └── Span
    │       │
    │       ├── Analog In—Range
    │       │       ├── 4 mA    =        .0 FT
    │       │       └── 20 mA   =     11.5 FT
    │       │
    │       ├── Pump Options
    │       │       ├── Hi Lvl   =    9.5 FT
    │       │       ├── Pump 3   =    7.6 FT
    │       │       ├── Pump 2   =    5.7 FT
    │       │       ├── Pump 1   =    3.8 FT
    │       │       └── OFF      =    1.9 FT
    │       │
    │       ├── Analog Out—Calib
    │       │       ├── Zero
    │       │       └── Span
    │       │
    │       └── Analog Out—Range
    │               ├── 4 mA    =        .0 FT
    │               └── 20 mA   =     11.5 FT
    │
    ├── Communications
    │
    └── Misc
            ├── Backlight Level
            └── Contrast Level
 ≈
```

MENU TREE

```
CFG              STAT            ALRM              LOG
 ≈
 └── System
       ├── Time/Date
       │     ├── Time
       │     └── Date
       │
       ├── Password
       │     ├── Exit
       │     ├── OFF
       │     └── ON
       │
       ├── Delays
       │
       └── Factory Defaults
             ├── Alarm Logs
             │     ├── Exit
             │     └── Yes
             │
             ├── Pump Run Times
             │     ├── Pump 1
             │     ├── Pump 2
             │     └── Pump 3
             │
             ├── Gen Config
             │     ├── Exit
             │     └── Yes
             │
             └── All of the Above
                   ├── Exit
                   └── Yes
 ≈               ≈
```

45

MENU TREE

```
CFG              STAT           ALRM           LOG
≋
│
├── Version Number
│       ├── Build Date
│       └── Build Time
│
├── System (Cont'd)
│       │
│       ├── Remote Modules
│       │       ├── Pump Expansion Module
│       │       ├── Remote Display Module
│       │       └── Large Button Module
│       │
│       │
```

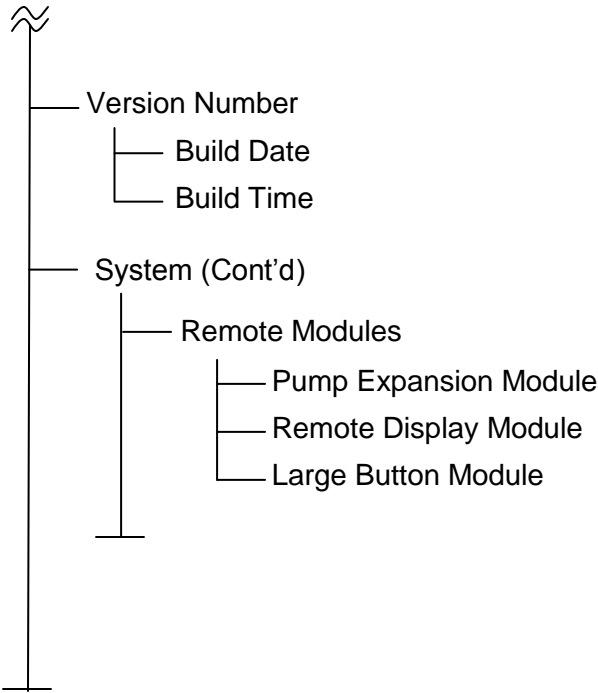## 13.0 Glossary

13.1 Terminology and Definitions

1. **"Pump U/D"** – Pump Up/Down
    (a) Pump Up – Operation to keep level high (e.g. water tower)
    (b) Pump Down – Operation to keep level low (e.g. sump pit)

2. **"Auto Reset"** – Pump alarm. When alarm clears, pump is   available for use.

3. **"Flt Err Corr"** – Float Error Correction
    (a) Method to detect stuck floats (e.g. float will get stuck when level is below it).

4. **"On Demand"** – refers to pump operation (e.g. if level requires two pumps operating and one faults out, next pump available will start).

13.2 Cleaning

1.   Use a non-abrasive cloth with alcohol to clean the unit.

Notes

TIME MARK
C O R P O R A T I O N

Time Mark Corporation ∞ 11440 E. Pine Street ∞ Tulsa, OK 74116
Sales: (800) 862-2875 ∞ Fax: (918) 437-7584
www.Time-Mark.com ∞ Email: Sales@Time-Mark.com