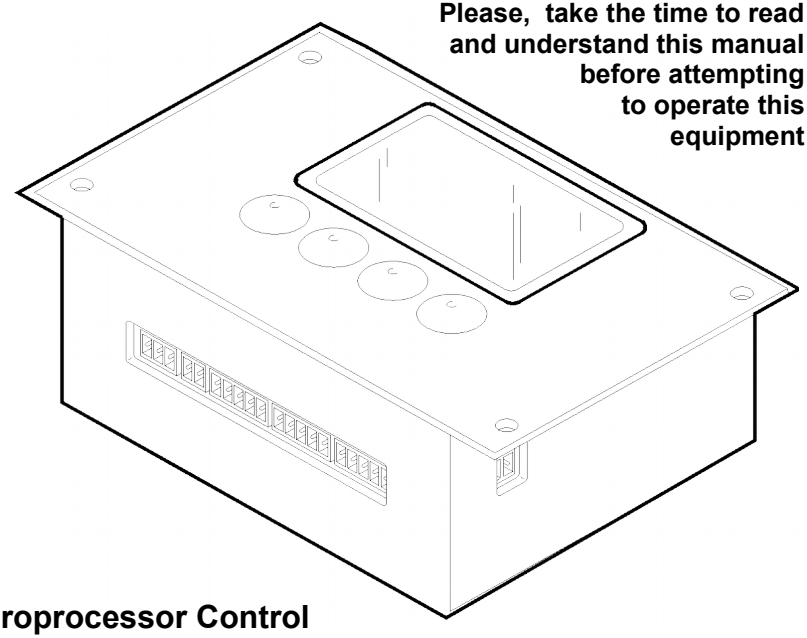
Time Mark Corporation

Model 430 Pump Controller

Installation and Operation Manual

Please, take the time to read and understand this manual before attempting to operate this equipment



- **Microprocessor Control**
- **Easy to read side-lit LCD screen**
- **User friendly interface menu**
- **Configurable through Front Panel or USB**

Made in the U.S.A.

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

Table of Contents

1. Controller Package Contents

1.1. Package Contents

(1) Model 430 Pump Controller
(1) 5.08mm, 2 Pin Power Supply Connector
(2) – 5.08mm, 6 Pin Output (Contact) Connectors
(1) – 3.5mm, 2 Pin RS485 Comm Port Connector
(3) – 3.5mm, 5 Pin Pump Connectors
(1) – 3.5mm, 3 Pin Analog In Connector
(1) – 3.5mm, 2 Pin Analog Out Connector
(1) – Installation and Operation Manual (this manual)
(1) – Model TMC-430 Specification Sheet

1.2. Optional Contents

(1) – 24Vdc Out Power Supply, attached
(1) – 35mm Din Rail Mounting Kit
(1) – In Door/Panel mounting hardware Kit
(1) – 6 ft. standard USB-A to USB-B cable

1.3. Missing / Broken Parts

If a part(s) is missing or broken, please do not hesitate to contact a Time–Mark Representative at:
Tel. 800–862–2875
Monday through Friday 8:00 AM to 5:00 PM Central Time
or by e–mail at: **sales@time-mark.com**

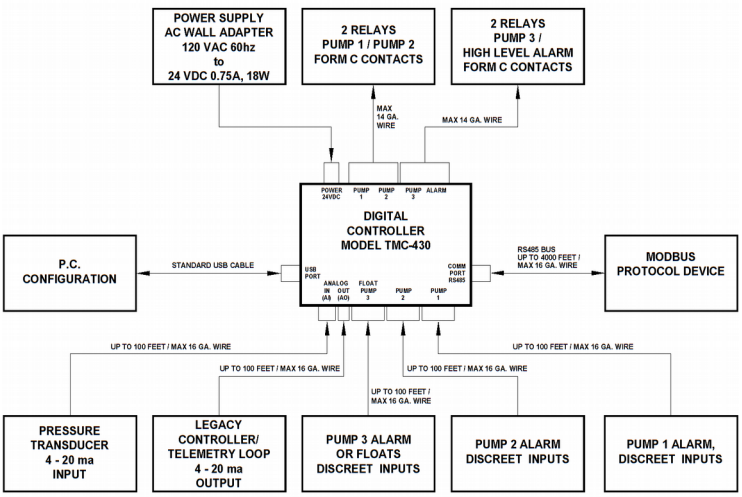
2. Introduction

2.1. Description

1) An Advanced pump management and control unit with powerful out of the box features that make it a snap to setup and customize using the on screen menus or USB communication port and a laptop computer.
2) All pump alarms are logged to the Model 430 with the pump identification number, alarm type (seal fail, over temperature, contactor fail or high level alarm), date, time and can be accessed instantly with just a click of the LOG menu button.
3) Each alarm may be disabled (for all pumps) via the menu if not used.

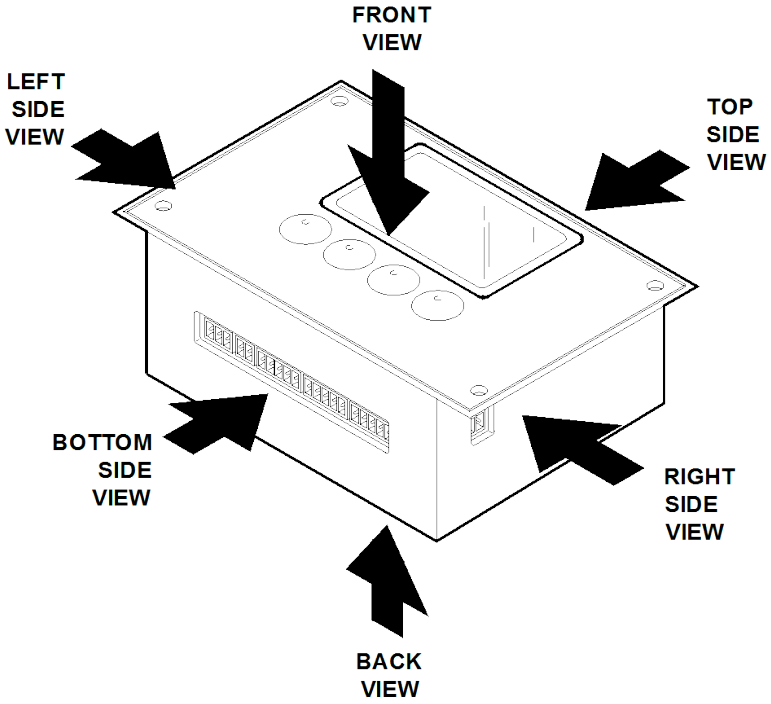
4) The pump alarm logs may be downloaded, using the Windows program, to a laptop in .CSV format for use in spreadsheet applications.
5) With (3) sets of discreet pump alarm inputs and a full range of pump and sensor configurable menu options.
6) HOA (Hand-Off-Auto) is allowed for each pump from the menu buttons, as well as from the Windows software
7) Separately configurable on-delay time, and off-delay time to prevent very large in-rush currents when multiple pumps need to be activated at the same time. Both may be adjusted from 0.0 to 10.0 seconds.
8) The Windows program not only allows for easier setup of a single controller, but will also allow the configuration to be saved to a laptop in the event that multiple controllers need the same settings, or of a fault such as the internal battery becoming too low to maintain the settings.

2.2. Overview



3. Controller Orientation

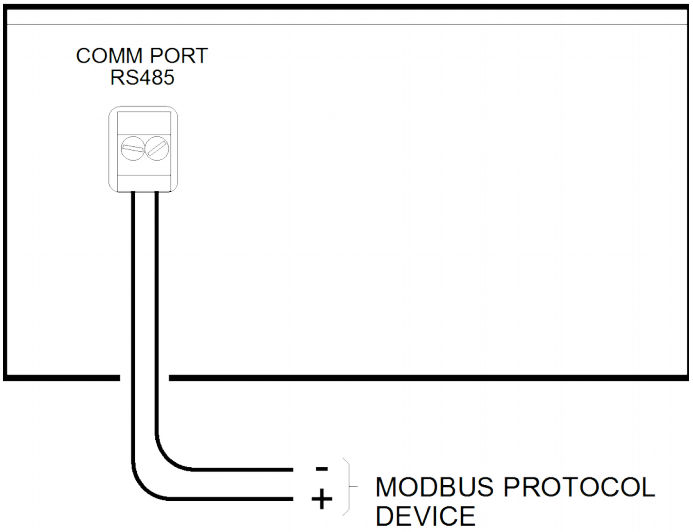
3.1. This section looks at the orientation of the Model 430 and how we will be using this as a reference of views described in this manual.

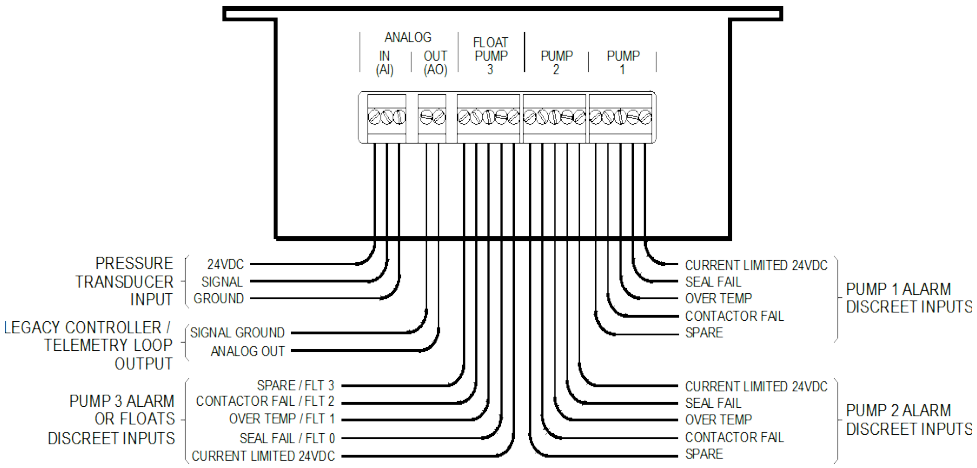


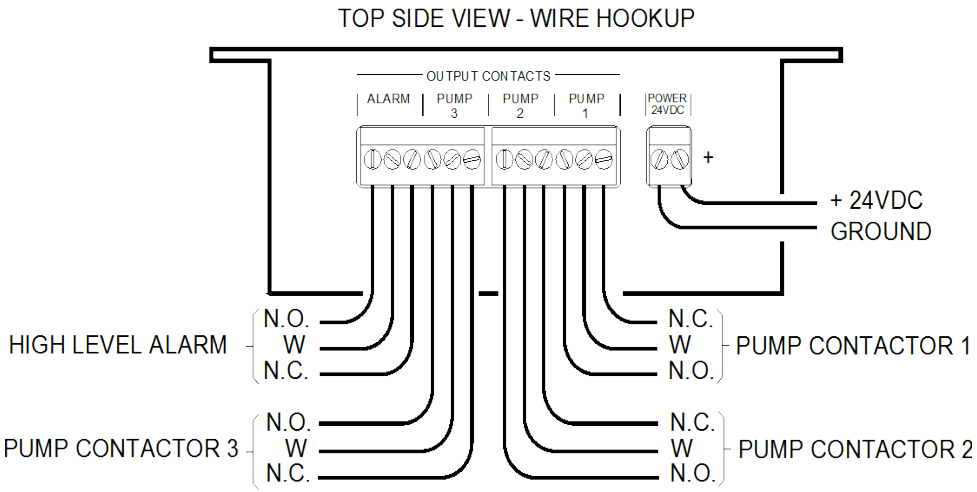
3.2. Model 430 Connections

1) Wire hookup to the connectors should be done before powering on the Model 430 for the first time.
2) Provide plenty of wire or cable slack between the Model 430 and their terminating connections.
3) Keep all wires bundled and secured away from hinges and other moving parts where wires might get cut or crushed.

RIGHT SIDE VIEW - WIRE HOOKUP



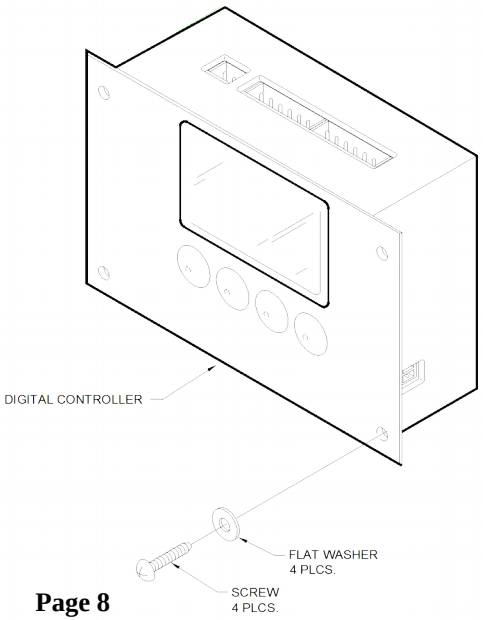




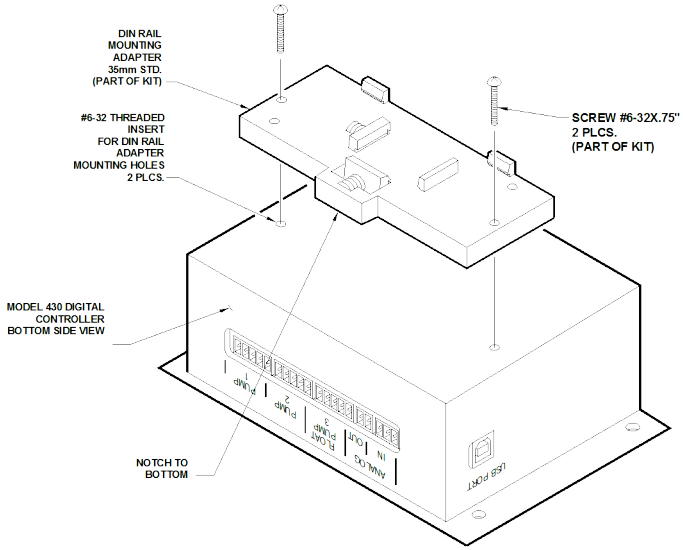
3.2.2. For left side of the Model 430 cable hookup, see page 4, Overview.

4. Mounting Hardware

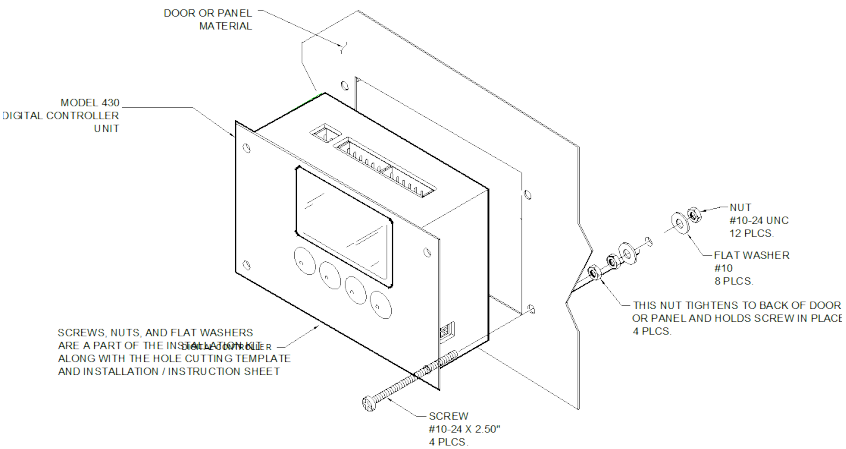
4.1. Panel Mount



4.2. Din Rail Mount, 35mm



4.3. Flush Mount

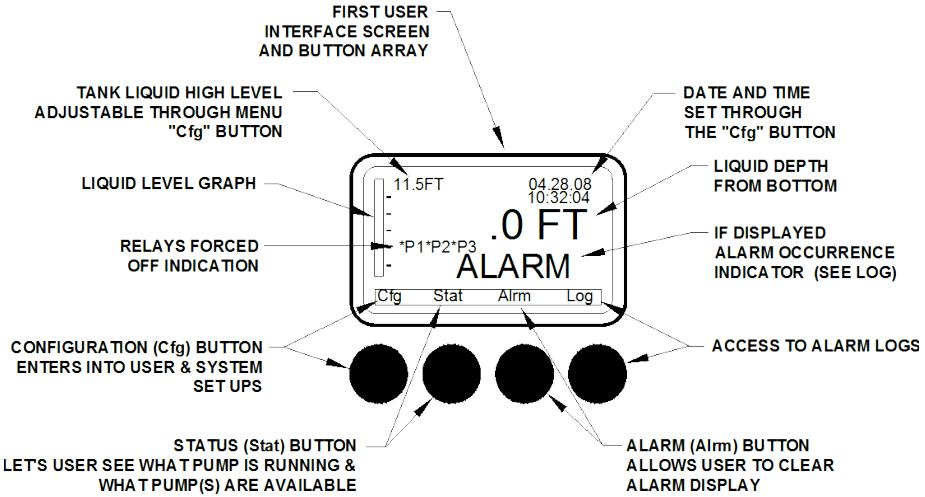


5. Getting Started

5.1. Power Supply Connection

- A facility provided 24V power connection may be used via the 5.08mm, 2 Pin connector that came in your installation kit, in the event that 24V power is not provided, a 110V (100~240 input) to 24V (output) plug-in power adapter has been provided.
- Install the 5.08mm 2 Pin connector, See page 6, Top Side View – Wire Hookup
- Apply power to the 24V connector into the Model 430, the screen will light and show a boot-loader screen – **DO NOT PRESS ANY BUTTONS UNLESS TOLD TO DO SO BY TECH SUPPORT –** then the Time–Mark logo will be shown followed by the First User Interface Screen, with the exception of the Alarm indication. At this time, you may begin to set up the controller.

5.2. Top Screen Menu



6. Configuration

NOTE: If no key is pressed for 60 seconds, the controller will reset back to the First User Interface Screen.

6.1. Calibration

NOTE: Under normal conditions, calibration should never be necessary, it is only included if the configuration of the controller is such that the default or standard calibration is unacceptable. This procedure requires a multimeter capable of measuring current.

1) Press **Cfg** once. Screen will change to the CONFIG SCREEN.
2) On the CONFIG SCREEN the selections are:
   - Pump Config
   - System Config
   - Display Options
   - Communications
   -
   - Calibration

3) Press ↓ until the selection is on the “Calibration” option and then press **Selct**.
4) On the CONTROLLER CALIBRATE screen the selections are:
   - Input Calibration
   - **Output Calibration**
5) Press **Exit** to get back to the CONFIG SCREEN.
6) Press **Exit** a second time to get back to the First User Interface Screen.

6.1.2. Input Calibration

1) Press **Selct** to select the input calibration, you will be presented with the following options:
   - Zero xxxx @ 4mA
   - Span xxxx @ 20mA
2) Using a current meter, or a device such as **Time-Mark model 680**, make sure the input is 4mA. (The ADC value above should read approximately 185 ~ 195.) Press **Selct** to lock in the value.
3) Press the down arrow to adjust the span, and be sure that the input is 20mA. (The ADC value above should read approximately 925 ~ 935.) Press the **Selct** button to lock in the value.
4) Press **Exit** once to get back to the CONTROLLER CALIBRATE screen.

6.1.3. Output Calibration

1) Press ↓ to select “Output Calibration”
2) Press **Selct** to enter the output calibration, you will be presented with the following options:
   - Zero xxxx @ 4mA
   - Span xxxx @ 20mA
3) Press **Selct** and adjust the DAC value, using the +1, -1, and *10 keys. (The *10 key must be held while using either the +1 or -1 keys.)
   - The DAC value for 4mA should be approximately 8000
4) Press **Enter** to lock in the value

5) Press ⇩ to select the Span
   - The DAC value for 20mA should be approximately 65535

6) Press **Enter** to lock in the value
7) Press **Exit** once to get back to the CONTROLLER CALIBRATE screen.

6.2. Communications Setup (MODBUS configuration)

1) Press **Cfg** once. Screen will change to the CONFIG SCREEN.
2) On the CONFIG SCREEN the selections are:
   - Pump Config
   - System Config
   - Display Options
   - Communications
   -
   - Calibration
3) Press ⇩ until the selection is on the "Communications" option and then press **Selct**.
4) The CONFIG – COMM screen presents the following choices:
   - Modbus Address xxx
   - Baud Rate 9600
5) Press **Exit** to get back to the CONFIG SCREEN.
6) Press **Exit** a second time to get back to the First User Interface Screen.

6.2.2. Modbus Address

1) Press **Selct** and adjust the MODBUS address. This should be a unique address on the RS-485 bus that this controller will answer to. It can range from 1 to 240. For more information consult with the administrator of the MODBUS system.
2) Press **Enter** to lock in the value

6.2.3. Baud Rate

1) Press  and **Selct** to adjust the baud rate. This can be set to 9600, 19200, 38400, 57600, 115200. **Note: the 115200 setting should be reserved for very short runs of the RS-485 bus.**
2) Press **Enter** to lock in the value

6.3. Display Options

1) Press **Cfg** once. Screen will change to the CONFIG SCREEN.
2) On the CONFIG SCREEN the selections are:
   - Pump Config
   - System Config
   - Display Options
   - Communications
   -
   - Calibration
3) Press ⇩ until the selection is on the “Display Options” option and then press **Selct**.
4) The CONFIG DISPLAY screen presents the following:
   - BackLight Level xx
   - Contrast Level xx
5) Press **Exit** to go back to the CONFIG SCREEN
6) Press **Exit** to go back to the first user interface screen

6.3.2. Backlight Adjust

1) Press **Selct** and adjust the BackLight level. Adjustable from 1 (no backlight) to 63 (full backlight).
2) Press **Enter** to lock in the value.

6.3.3. Contrast Adjust

1) Press ⇩ and then **Selct** and adjust the Contrast level. Adjustable from 17 (very light) to 37 (very dark).
2) Press **Enter** to lock in the value.

6.4. System Configuration

1) Press **Cfg** once. Screen will change to the CONFIG SCREEN.
2) On the CONFIG SCREEN the selections are:
   - Pump Config
   - System Config
   - Display Options
   - Communications
   -
   - Calibration
3) Press ⇩ until the selection is on the “System Config” option and then press **Selct**.
4) The CONFIG-SYSTEM menu presents more choices:
   - Time/Date
   - Password OFF
   - Reset Run Times
   - Version Number
   - Clear Log
5) Press **Exit** to get back to the CONFIG SCREEN
6) Press **Exit** a second time to get back to the first user interface screen.

6.4.2. Clear Logs

1) Press ⇩ until the selection is on the “Clear Log” option and then press **Selct**.
2) A confirmation screen will appear showing “CLEAR LOGS”.
3) Press **OK** to clear the current logs from the controller
4) Press **Exit** to cancel and return to the previous menu

6.4.3. Version Number

Note: This menu has no select-able options; it is for troubleshooting and providing information to tech support when/if required. This allows tracking of the current version of firmware in the controller.

1) Press ⇩ until the selection is on the “Version Number” option and then press **Selct**.

2) The following options will be displayed:
   - Build date dd-mmm-yy
   - Build time hh:mm:ss

3) Press **Exit** to get back to the CONFIG-SYSTEM menu

6.4.4. Reset Run Times

1) Press ⇩ until the selection is on the “Reset Run Times” option and then press **Selct**.
2) The following choices are presented on the RESET RUN TIMES screen:
   - P1 xxxx.x
   - P2 xxxx.x
   - P3 xxxx.x

3) Use ⇧ or ⇩ to select the pump run time to be reset, and press **Selct.**
4) Press **OK** to clear the run time to 0.0.
5) Press **Exit** to cancel.
6) Press **Exit** to get back to the CONFIG-SYSTEM menu

6.4.5. Password Selection

1) Press ⇩ until the selection is on the “Password OFF” option and then press **Selct**.
2) The SYSTEM-PASSWORD screen presents two choices:
   - OFF
   - ON

3) If **ON** is selected, the password digits will be presented and using the **–** and **+** keys each digit may be adjusted from 0 to 9. **Note: if ON is selected and a password is entered, this password will be required to enter the CONFIG SCREEN.**
4) Press **Exit** to get back to the CONFIG-SYSTEM screen.

6.4.6. Time and Date Setting

1) Press **Selct** while the selection is on the “Time/Date” option.
2) Two choices will be presented:
   - Time hh:mm:ss
   - Date mm.dd.yy

3) Press **Exit** to get back to the CONFIG-SYSTEM screen.

6.4.7. Time Setting

1) Press **Selct** while the selection is on the “Time” option.
2) Use the **–** and **+** keys to adjust the hours – in 24 hour time (0 to 23).
3) Press **Next** to switch to the minutes
4) Use **–** and **+** to adjust the minutes.
5) Press **Next** to switch to the seconds
6) Use **–** and **+** to adjust the seconds.
7) Press **Enter** to lock in the value and leave the time adjustment mode

6.4.8. Date Setting

1) Press  until the selection is on the “Date” option and then press **Selct**.
2) Use the **–** and **+** keys to adjust the month (1 to 12).
3) Press **Next** to advance to the date.
4) Use **–** and **+** to adjust the date.
5) Press **Next** to advance to the year.
6) Use **–** and **+** to adjust the year.
7) Press **Enter** to lock in the value and leave the date adjustment mode

6.5. Pump Configuration

1) Press **Cfg** once. Screen will change to the CONFIG SCREEN.
2) On the CONFIG SCREEN the selections are:
   - Pump Config
   - System Config
   - Display Options
   - Communications
   -
   - Calibration
3) Press **Selct** while the selection is on the “Pump Config” option.
4) A confirmation screen will appear: STOP SYSTEM.

5) Press **Exit** to cancel and return to the first user interface screen.

6) Press **OK** to advance into the pump configuration menu
Note: all relays (pumps) will be disabled while in the pump configuration menu, and will not be re-enabled until the last option has been set, however, if no key is pressed for 60 seconds, the controller will revert to the first user interface screen and re-enable the relays.

7) The PUMP CONFIGURATION screen presents the following:
- DOWN
- UP
- Selct Num Pumps x

This is where the choice of Pump Up, or Pump down may be selected, as well as selecting the number of pumps in the system.

8) Use  or  to select DOWN or UP, and press **Selct**. The current choice will be highlighted in reverse.

9) Press  to move the selection to “Selct Num Pumps” and press **Selct**.

10) Use the **-** and **+** to adjust the number of pumps (1 to 3)

11) Press **Enter** to lock in the value.

12) Press **Next** to continue to input type configuration.

13) The next choice is “INPUT TYPE”:
- FLOAT
- 4-20 ma
- 4-20 ma → Float

This is where you may choose the type of input that the controller will be using to decide when to turn the pumps on. The FLOAT option will use only float inputs and will ignore the 4-20mA input. The 4-20mA option will use only a transducer and ignore the floats. The “4-20ma→Float” option will use a transducer normally, but should the input drop below 4mA, then the Floats will take over. **Note: if you selected to use three (3) pumps, you should not use the “4-20ma → Float” option, unless you also plan to disable the pump alarms. As the floats will use the same inputs as the alarms for pump #3.**

14) Press **Next** to continue to unit of measure configuration.

15) The UNIT OF MEASURE screen presents the following:
- FT FEET
- IN INCHES
- M METER
- PI PSI

Select the units that you would like the controller to display on the first user interface screen. **Note: if the FLOAT option was selected, this menu will be skipped.**

16) Press **Next** to continue to AI (analog input) configuration. **Note: if the FLOAT option was selected, this menu will be skipped.**

17) The CONFIG-AI-RANGE screen has the following choices:
- 4ma = xx.x FT
- 20ma = xx.x FT

The units displayed will match the choice selected in option 15 above.

18) Press **Selct** to adjust the 4mA value (usually 0). This should match the lowest level of the tank, at which the transducer is outputting 4mA.

19) Use the **-1** and **+1** buttons along with the ***10** button to adjust the value. Press **Enter** to lock in the value. Note: the ***10** button must be held in conjunction with the **-1** or **+1** buttons.

20) Press ⇩ and **Selct** to adjust the 20mA value. This should match the highest level where the transducer will output 20mA.

21) Use the **-1** and **+1** buttons along with the ***10** button to adjust the value. Press **Enter** to lock in the value. Note: the ***10** button must be held in conjunction with the **-1** or **+1** buttons.

22) The CONFIG SET POINTS screen will have these options:
- STOP = xx.x FT
- LEAD = xx.x FT
- LAG1 = xx.x FT
- LAG2 = xx.x FT
- ALARM = xx.x FT

The units displayed will match the choice selected in option 15 above. The order displayed will change depending on if UP or DOWN was selected as the pump method. The shown order is for the Pump UP selection. If only one pump is selected for operation, then only the STOP, LEAD and ALARM choices will be shown. If two pumps are selected, then LAG1 will be added. Only if three pumps are selected to be operational will LAG2 be shown. **Note: if the FLOAT option was selected, this menu will be skipped.**

23) Press **Selct** to adjust the first value.
24) Use the **-1** and **+1** buttons along with the ***10** button to adjust the value. Press **Enter** to lock in the value. Note: the ***10** button must be held in conjunction with the **-1** or **+1** buttons.
25) Use  or  and **Selct** buttons to adjust the other values as needed. Press **Enter** to lock in each value.
26) Press **Next** to continue to the config AO range selection.
27) The CONFIG-AO RANGE screen presents the following options:
    - 4ma = xx.x FT
    - 20ma = xx.x FT

    The units displayed will match the choice selected in option 15 above. **Note: if the FLOAT option was selected, this menu will be skipped.**
28) Press **Selct** to adjust the first value. This will be the value at which the controller will output 4mA (usually 0).
29) Use the **-1** and **+1** buttons along with the ***10** button to adjust the value. Press **Enter** to lock in the value. Note: the ***10** button must be held in conjunction with the **-1** or **+1** buttons.
30) Press  and **Selct** to adjust the second value. This will be the value at which the controller will output 20mA. This will usually match the input selection.
31) Press **Next** to continue to the config alarm enable screen.
32) The CONFIG-ALARM ENABLE options are:

- Seal Fail = ON
- Over Temp = ON
- Contactor = ON
- Spare = OFF

The choices here will affect the alarms for ALL pumps; if one alarm is disabled, that alarm is disabled for ALL pump outputs. **Note: if the FLOAT option was selected, this menu will be skipped.**

33) Press **Selct** to adjust the Seal Fail alarm
34) Use the **–** or **+** key to turn the alarm on or off.
35) Press **Enter** to lock in the choice
36) Press ⇩ to select each of the other alarms.
37) Press **Selct** to adjust each alarm.
38) Use the **–** or **+** key to turn the alarm on or off.
39) Press **Enter** to lock in the choice
40) Press **Next** to continue on to the Float error correction option
41) The FLOAT ERR CORRECTION screen presents:
    - OFF
    - ON

    Note: if the 4-20ma option was selected, this menu will be skipped. This allows the controller to self-correct should an error be detected with the floats, such as if the floats activate out of sequence (generating an “out of sequence” alarm in the logs). If Float error correction is set to OFF, the floats will not self-correct and must be checked manually.
42) Press **Enter** to lock in the choice
43) Press **Next** to continue on to the Lead pump selection screen.
44) The CONFIG-PUMP ALTERNATE screen will show:
    - Pump 1 Lead
    - Pump 2 Lead
    - Pump 3 Lead
    -
    -
    - ALTERNATE PUMPS

    The number of pumps shown will depend on the number of pumps selected for operation. The ALTERNATE option will

allow the pumps to pump approximately equal amounts of time by switching the lead pump after each activation.

45) Use  or  to select the lead pump choice.
46) Press **Selct** to lock in the choice.
47) Press **Next** to continue on to the Reset on cont. fail option
48) The RESET ON CONT. FAIL screen presents the following:
- OFF
- ON

If set to ON, will allow the next pump to continue operation upon a contact failure on the currently activated pump (Lead or Lag1).

49) Use  or  to select the choice.
50) Press **Selct** to lock in the choice.
51) Press **Next** to continue on to the reset cont. fail HOA screen.
52) The RESET CONT FAIL HOA screen will show:
- OFF
- ON

If set to ON, will allow the controller to switch the HOA status of a relay back to AUTO upon a correction to the contact fail alarm. If OFF, the HOA status will stay OFF and must be reset manually.

53) Use  or  to select the choice.
54) Press **Selct** to lock in the choice.
55) Press **Next** to continue on to the Delay between pumps screen
56) The DELAY BETWEEN PUMPS choices are:
- On Delay (sec) xx.x
- Off Delay (sec) xx.x

This will allow for a delay to occur between activating multiple pumps, should that be required. If set to 0.0 then no delay will happen. Can be adjust from 0.0 to 10.0.

57) Use  or  to select the choice.
58) Press **Selct** to adjust that value.
59) Use the **-** and **+** keys to adjust from 0.0 to 10.0.
60) Press **Enter** to lock in the value.
61) Press **Next** to finish the pump configuration menu and return to the CONFIG SCREEN. Note: the relays/pumps will be re-enabled at this point.

7. Status Screen

7.1. Press **Stat** to see the pump/relay status

1) The SYSTEM STATUS screen will show:
   - P1 H O A ERR xxxx.x
   - P2 H O A ERR xxxx.x
   - P3 H O A ERR xxxx.x

   This screen shows the status of the pumps (up to 3), if ERR is shown, a pump contact fail alarm has been activated. The current HOA status will be shown in reverse, and the current run time for each pump will be shown to the right – in hours (so the reading will only update every 6 minutes).
2) Press **HOA** to enter the Pump HOA menu:
   - P1 HOA
   - P2 HOA
   - P3 HOA
3) Use the  or  to select the pump to change
4) Press **Selct** to change that pump
5) Use the  or  to change the status. (H = Hand, or Forced on; O = Off, or Forced off; A = Auto, or controlled)
6) Press **Exit** to go back to the SYSTEM STATUS screen
7) Press **Exit** a second time to go back to the first user interface screen

8. Alarm Screen

8.1. To see the current active alarms, press **Alrm**

1) The ALARM STATUS screen:
   - P1 Alrms: SF OT CF SP
   - P2 Alrms: SF OT CF SP
   - P3 Alrms: SF OT CF SP
   - Level Alarm
   - Improper Sequence Alarm

   This screen shows the various alarms that are currently active. SF = Seal Fail; OT = Over Temperature; CF = Contact Failure; SP = Spare. These alarms activate whenever their corresponding switches activate. The Level alarm will activate whenever the level goes above/below the alarm float/set point.

The Improper Sequence Alarm will activate if the floats activate out of their “normal” sequence, such as the Lag 1 float activating before the Lead float.

2) Press **Exit** a second time to go back to the first user interface screen

9. Log Screen

1) Press the **Log** key to display the currently saved logs of past alarms since the last time they were cleared.
   This screen will show “No Alarms” at the top whenever the logs have been cleared, and no new alarm has been active.
2) Press **Exit** a second time to go back to the first user interface screen

10. Restoring Settings

Note: this is usually only required if something has gone wrong and the controller is not responding in a “normal” way.

10.1. Factory Defaults

To Reload ALL factory defaults, and lose all user adjustable settings:

1) Hold the 1st and 4th buttons (outside buttons) down when powering up the controller. Wait until the logo screen is shown. The logo screen will stay for as long as the two buttons are held.
2) Move the indicators to select “YES”
3) Press **Next** and all values have been restored bringing up the input calibration screen.
4) If no calibration is required, simply press **Next** to advance.
5) The output calibration screen will appear.
6) If no calibration is required, simply press **Exit** to go to the first user interface screen.

10.2. Factory Input Calibration

This is an alternative method to calibrate the input. See section 6.1.2 above.

1) Hold the 1st and 4th buttons (outside buttons) down when powering up the controller. Wait until the logo screen is shown. The logo screen will stay for as long as the two buttons are held.
2) Leave “No” selected
3) Press **Next** to bring up the Input Calibration screen.
4) Proceed to calibrate as per section 6.1.2.
5) Press **Enter** after setting the values.
6) Press **Next** to switch to the Output Calibration screen.
7) Press **Exit** if no calibration is required to the 4-20mA output.

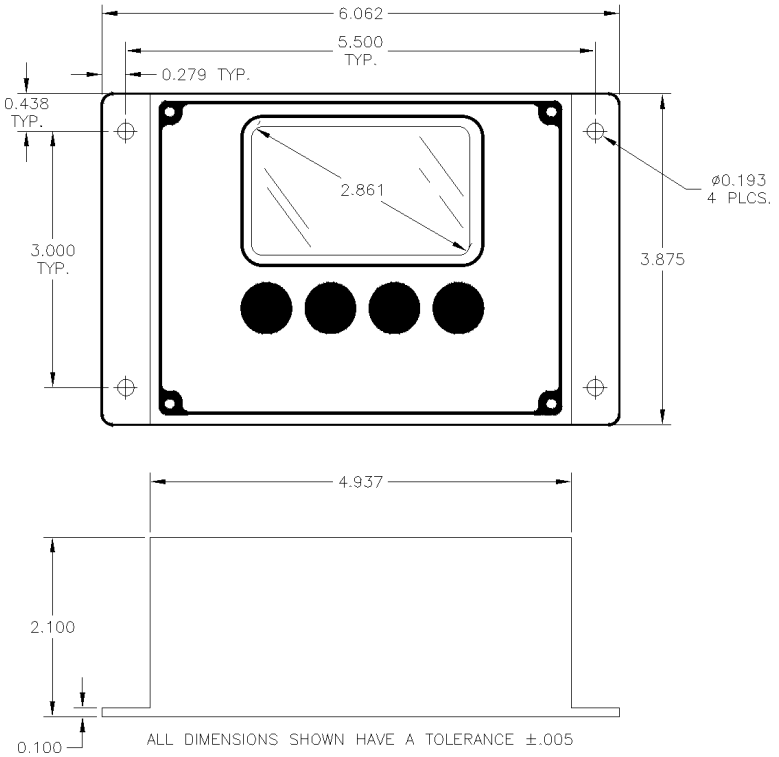
10.3. Factory Output Calibration

This is an alternative method to calibrate the input. See section 6.1.3 above.

1) Hold the 1st and 4th buttons (outside buttons) down when powering up the controller. Wait until the logo screen is shown. The logo screen will stay for as long as the two buttons are held.
2) Leave “No” selected
3) Press **Next** to bring up the Input Calibration screen.
4) Press **Next** to bring up the Output Calibration screen.
5) Proceed to calibrate as per section 6.1.3.
6) Press **Enter** after setting the values.
7) Press **Exit** if no calibration is required to the 4-20mA output.

11. Specifications

11.1. Controller Specs



- Unit weight: 15 oz. (with 35mm din kit installed)
- Installation environment: Cabinet (indoors, protected)
- Voltage requirement: 24VDC @ 200mA
- Operating Temperature: -20°C to +70°C
- Power Consumption: 170mA (0.17A) @ 24VDC
- Contact Rating: 10A @ 240VAC resistive
- Contact Life: (relays)
    - 10 million operations (no load)
    - 100,000 operations at rated load
- Case Material: ABS plastic
- Termination: Removable terminal plugs

12. MODBUS Register Map (RS-485 communication)

12.1. Holding Registers

- Read: 0x03
- Write: 0x06
- Format: 4xxxx

Addr	Memory Location	Description	R/W	Notes
0000	0x40	Setpoint [0]	R/W	Implied Decimal Place (ex. 20 is 2.0)
0001	0x42	Setpoint [1]	R/W	Implied Decimal Place (ex. 20 is 2.0)
0002	0x44	Setpoint [2]	R/W	Implied Decimal Place (ex. 20 is 2.0)
0003	0x46	Setpoint [3]	R/W	Implied Decimal Place (ex. 20 is 2.0)
0004	0x48	Setpoint [4]	R/W	Implied Decimal Place (ex. 20 is 2.0)
0005	0x4A	AIZeroFt	R/W	Implied Decimal Place (ex. 20 is 2.0)
0006	0x4C	AIRangeFt	R/W	Implied Decimal Place (ex. 20 is 2.0)
0007	0x4E	AOZeroFt	R/W	Implied Decimal Place (ex. 20 is 2.0)
0008	0x50	AORangeFt	R/W	Implied Decimal Place (ex. 20 is 2.0)
0009	0x52	AIZeroCnts	R/W	Implied Decimal Place (ex. 20 is 2.0)
0010	0x54	AIRangeCnts	R/W	Implied Decimal Place (ex. 20 is 2.0)
0011	0x56	AOZeroCnts	R/W	Implied Decimal Place (ex. 20 is 2.0)
0012	0x58	AORangeCnts	R/W	Implied Decimal Place (ex. 20 is 2.0)
0013	0x5A	RTC – Date month/year	R/W	-- Month, Year in BCD
0014	0x5C	RTC – Date/Time	R/W	-- Day, Hours in BCD
0015	0x5E	RTC – Time min/sec	R/W	-- Minutes, Seconds in BCD
0016	0x60	RunTimeMeter [0] Hi	R/O	
0017	0x62	RunTimeMeter [0] Low	R/O	-- Run times are the number of seconds run
0018	0x64	RunTimeMeter [1] Hi	R/O	-- Hi holds bytes 4 and 3
0019	0x66	RunTimeMeter [1] Low	R/O	-- Low holds bytes 2 and 1
0020	0x68	RunTimeMeter [2] Hi	R/O	-- Up to 4,294,967,296 seconds
0021	0x6A	RunTimeMeter [2] Low	R/O	
0022	0x6C	Number of Current Pumps	R/O	maximum of 3 pumps per controller
0023	0x6E	Number of Pumps On	R/O	
0024	0x70	PumpStatus[0]	R/O	-- bit 0; Pump On – bit 1; Available
0025	0x72	PumpStatus[1]	R/O	-- bit 2; Error bit – bit 3; Error Latch for Alarm
0026	0x74	PumpStatus[2]	R/O	-- bit 4; Hand/Off/Auto - Auto – bit 5; Hand/Off/Auto - Hand
0027	0x76	PumpAlarm[0]	R/O	-- bit 0; Spare – bit1; Contactor Fail – bit 2; Seal Fail
0028	0x78	PumpAlarm[1]	R/O	– bit 3; Over Temp -- bit 4; Previous Spare Condition – bit 5; Previous Seal Fail Condition
0029	0x7A	PumpAlarm[2]	R/O	-- bit 6; Previous Over Temp Condition

*RTC values expressed in BCD (Binary Coded Decimal)

RTC: Date – Month, Year

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

RTC: Date – Time

Day	Hours
High Nibble – 10's	High Nibble
Low Nibble – 1's	Low Nibble

12.2. Coils

- Read: 0x01
- Write: 0x05
- Format: 0xxxx

Addr Range	Notes	Bit	R/W	Addr
1-8	Local Pump 1 Relay	0	R/O	1
	Local Pump 2 Relay	1	R/O	2
	Local Pump 3 Relay	2	R/O	3
	Local Hi Level Relay	3	R/O	4
9-16	Password Enabled	0	R/W	9
	Contact Fail Reset HOA	1	R/W	10
	On Demand Option	2	R/W	11
	Auto Reset Option	3	R/W	12
	Pump Up/Down Option	4	R/W	13
	Float Err Check Opt	5	R/W	14
	Xdcr Fail to Floats	6	R/W	15
	Level Mode Floats	7	R/W	16

12.3. Discrete Inputs

- Read: 0x02
- Write: Read only – cannot write
- Format: 1xxxx

Addr	Description	Notes	Address
1-8	Pump 1 4-1 bits	Low Nibble	
	Pump 2 8-5 bits	High Nibble	
	Pump 1 Spare	Bit 0	1
	Pump 1 Contactor	Bit 1	2
	Pump 1 Over Temp	Bit 2	3
	Pump 1 Seal Fail	Bit 3	4
	Pump 2 Spare	Bit 4	5
	Pump 2 Contactor	Bit 5	6
	Pump 2 Over Temp	Bit 6	7
	Pump 2 Seal Fail	Bit 7	8
9-16	Pump 3 4-1 bits	Low Nibble	
	Bits 8-5 unused	High Nibble	
	Pump 3 Spare	Bit 0	9
	Pump 3 Contactor	Bit 1	10
	Pump 3 Over Temp	Bit 2	11
	Pump 3 Seal Fail	Bit 3	12

12.4. Input Registers

- Read: 0x04
- Write: Read only – cannot write
- Format: 3xxxx

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

13. Connecting to a computer

13.1. Compatible Systems

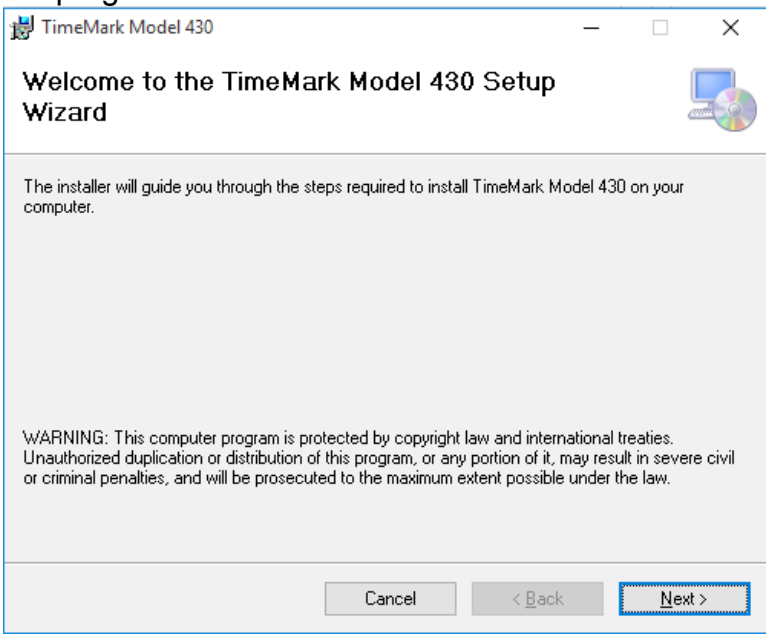
The software to connect to the Model 430 controller was designed for the Windows operating system. It has been designed to work with 64-bit systems, though 32-bit systems should work as well.

13.2. Application Download

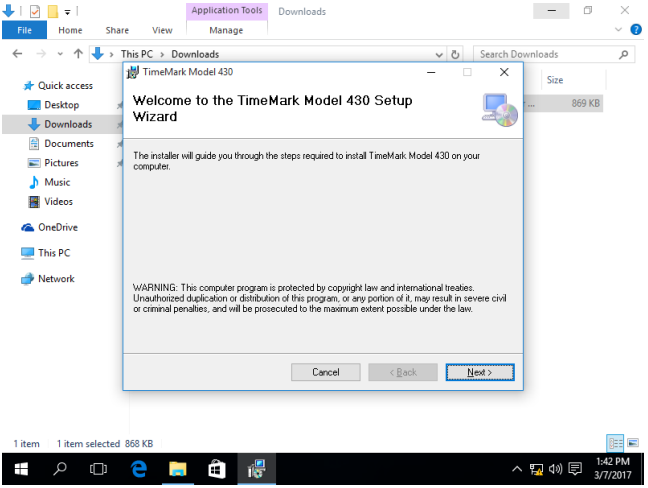
1) Contact Time-Mark corporation for a download link

13.3. Application Setup (Windows 10)

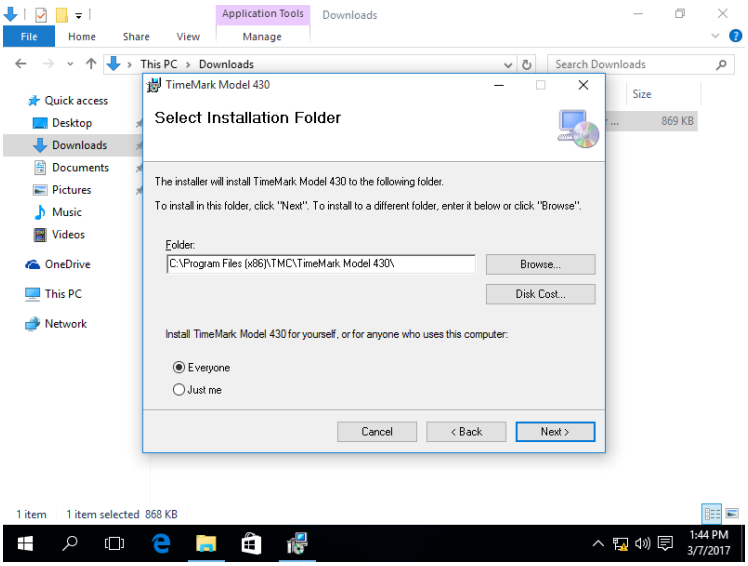
1) After downloading the setup file, double click to install the program.



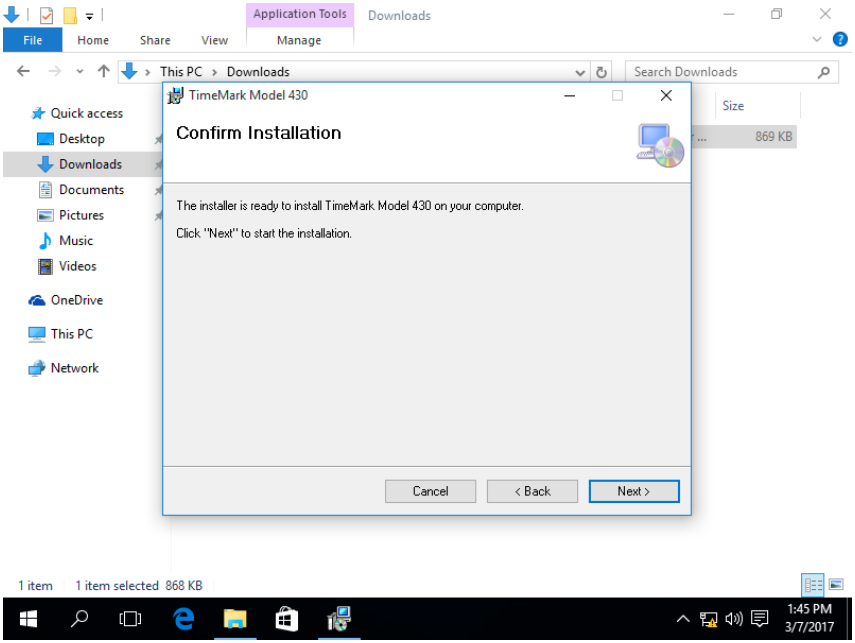
2) Click “Next” to continue the installation.



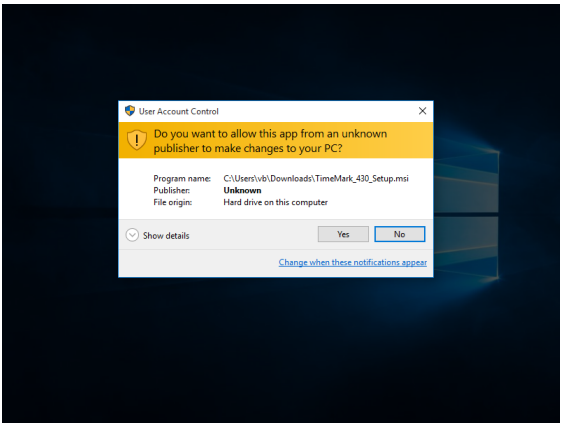
3) Click “Next” to continue the installation.



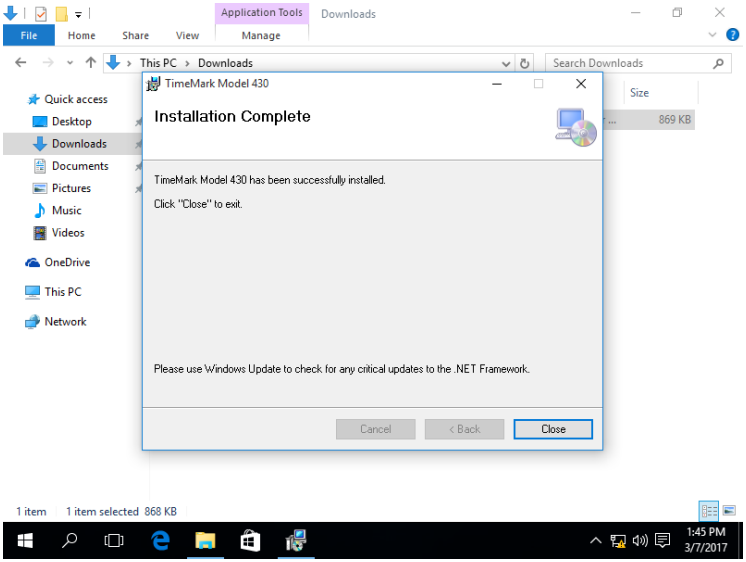
4) Choose the installation folder, and click “Next”. Note: if you change the installation folder then the drivers will be located in that folder rather than the one below. (Selecting “Everyone” may need an administrator password to the computer.)



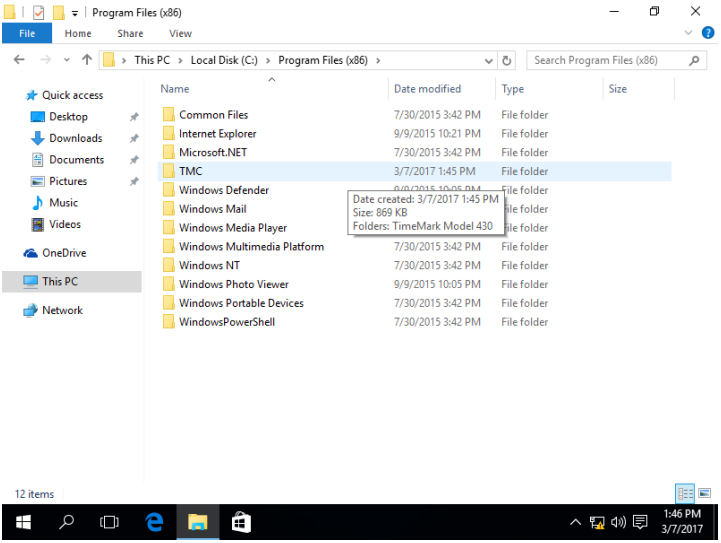
5) Click “Next” to confirm installation



6) Click “Yes” in the User Access Control dialog to approve installation.



7) If everything installed correctly, you should see the Installation Complete dialog. Click “Close” to finish the install.

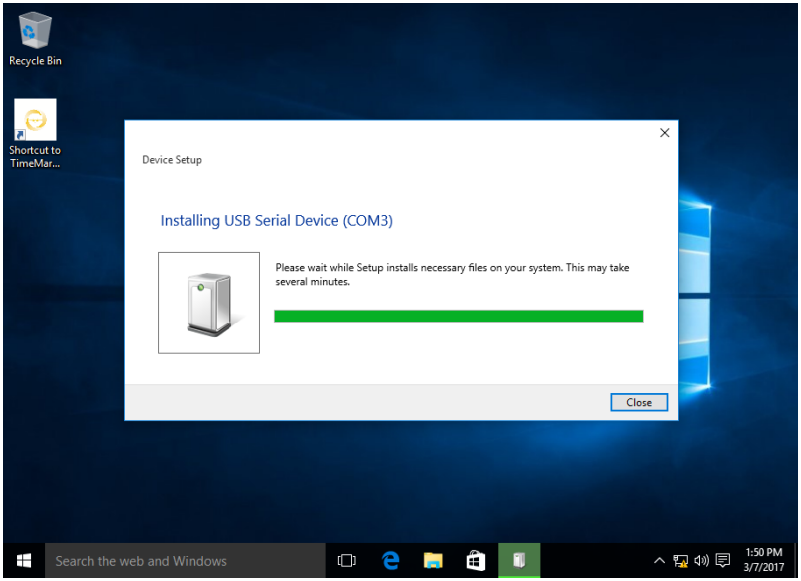


8) The default installation directory (on a 64-bit system) is “C:\Program Files (x86)\TMC\TimeMark Model 430” (without quotes)

   On a 32-bit system it will be: “C:\Program Files\TMC\TimeMark Model 430” (without quotes)

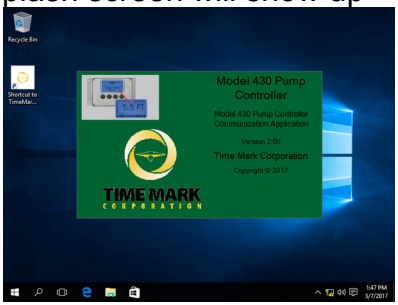
   The hardware drivers for the controller will be inside of this directory.

9) Connect the USB cable between the controller and the computer, you may (or may not) see the following screen

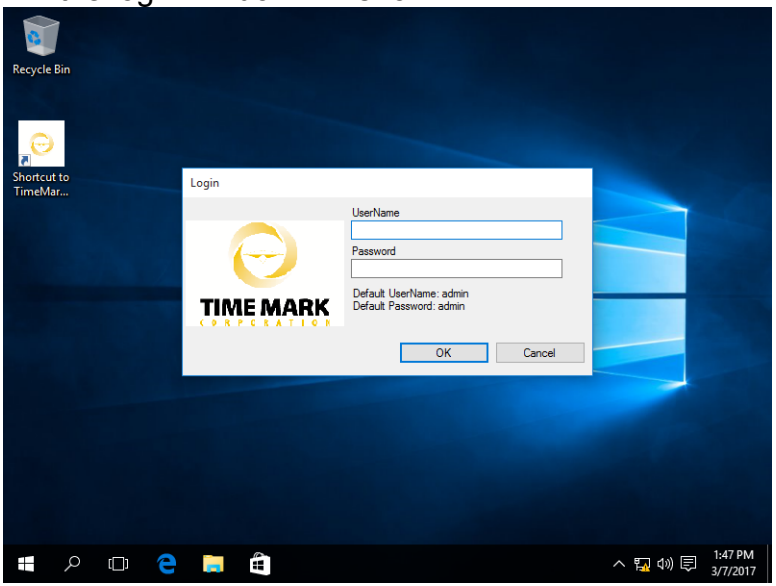


10) Once the correct driver is installed – it should be called "USB Serial Device" and be assigned a COM port

11) Double click to launch the TimeMark TMC-430 software, and the splash screen will show up

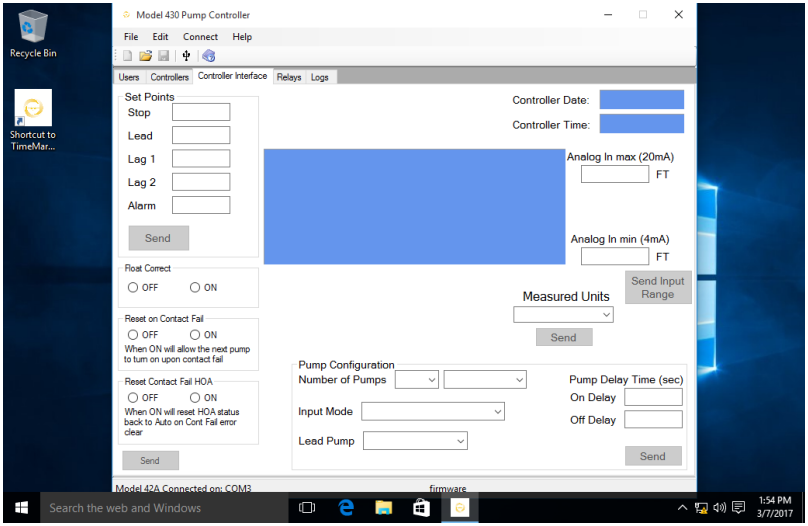


12) This screen will show for about 2 ~ 3 seconds and then the login window will show:



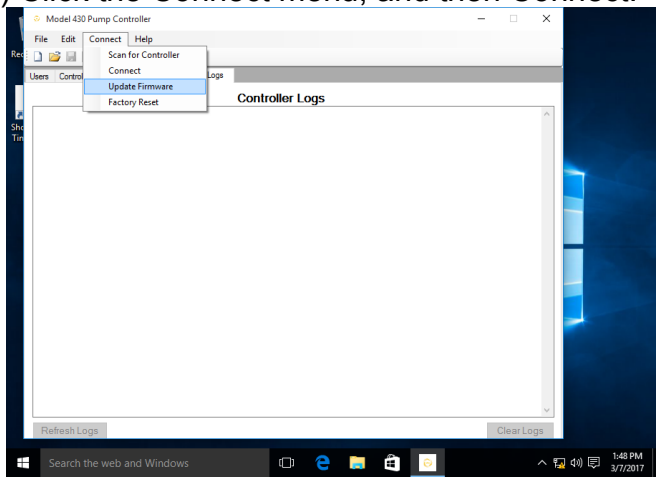
13) The default UserName and Password is “admin” - without the quotes (as stated in the window).
If you want or need more security with the program, this user may be deleted, however, to recover a lost password will require deleting all users.

14) Enter the UserName and Password and click “OK” to open the program:

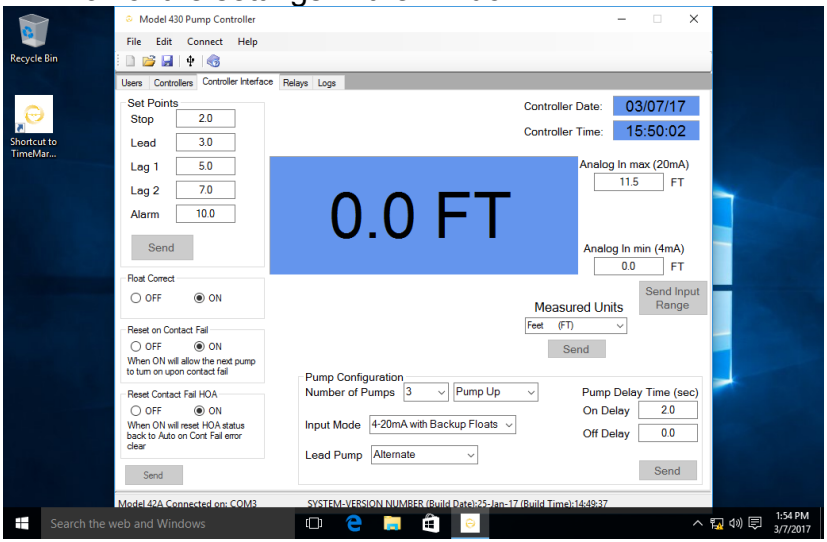


15) The first screen is the main controller interface screen
16) In the lower left corner, the detected controller should be displayed. (“Model 430 Connected on COM?”) The “COM?” should show the number from the driver install (step 22).

17) Click the Connect menu, and then Connect:

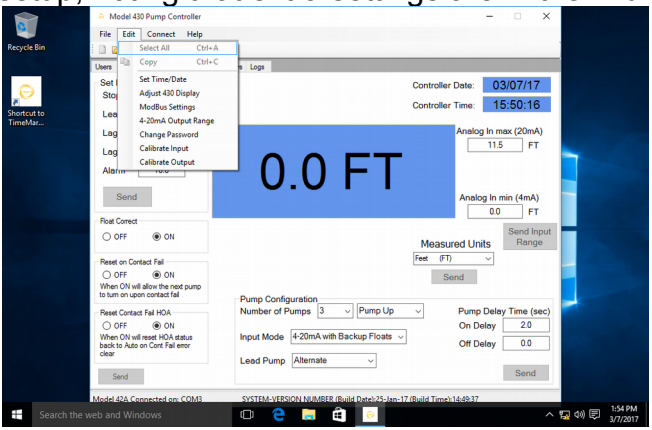


18) The software will connect to the controller and update all of the settings in the window

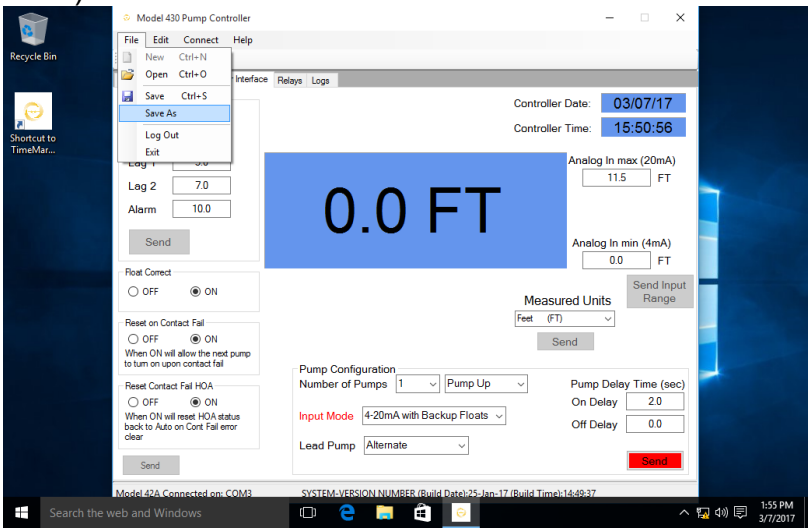


19) The readings on this screen will update approximately every 1 ~ 2 seconds.

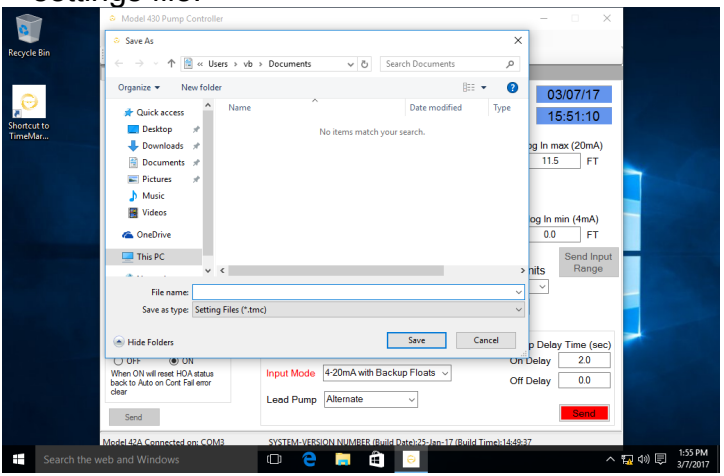
20) Adjust any settings as needed to get the controller setup, noting that extra settings are in the “Edit” menu:



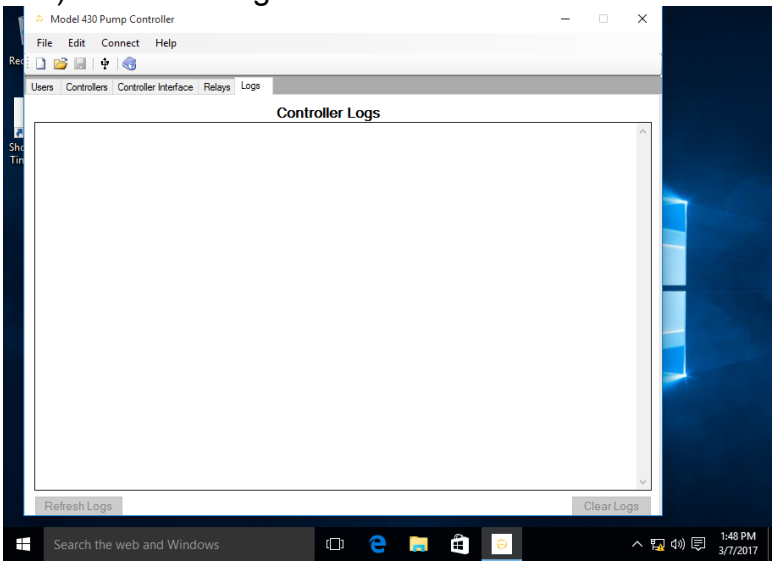
21) Click “File” then “Save As”



22) This will bring up a dialog and allow the Settings to be saved to a file on the computer. To restore these to a controller, simply connect to the new controller and choose “Open” from the file menu, and select the settings file.

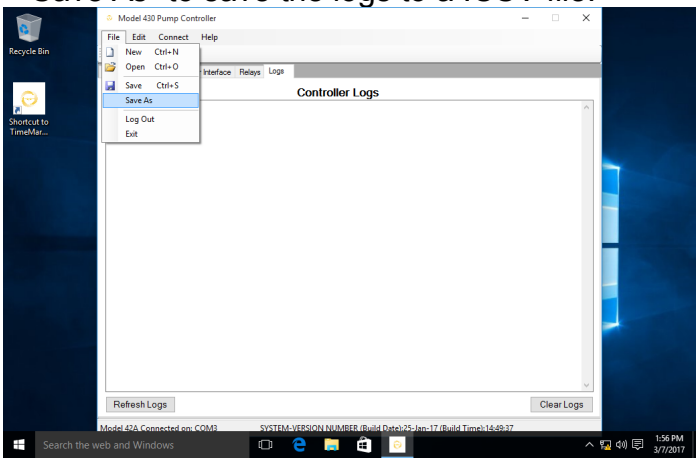


23) Click the “Log” tab

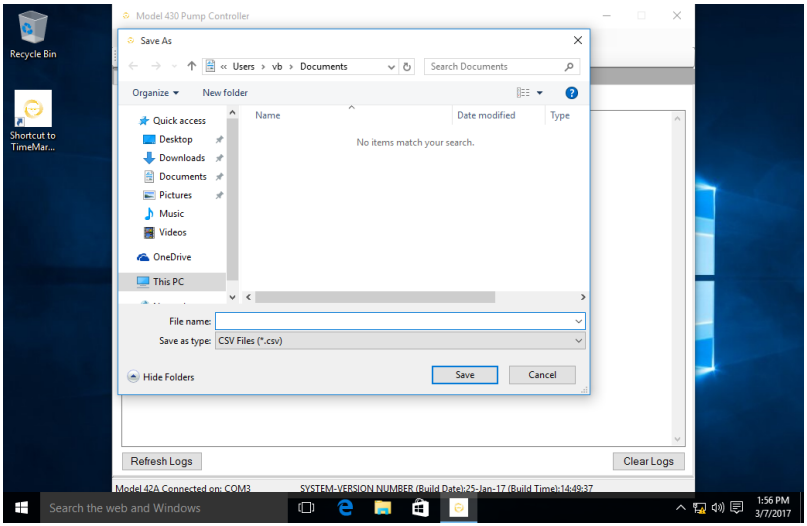


24) Click the “Refresh Logs” in the lower left to load the logs from the currently connected controller. (The logs may also be cleared from this screen, if desired.)

25) The logs will load into the window, click the “File” then “Save As” to save the logs to a .CSV file.

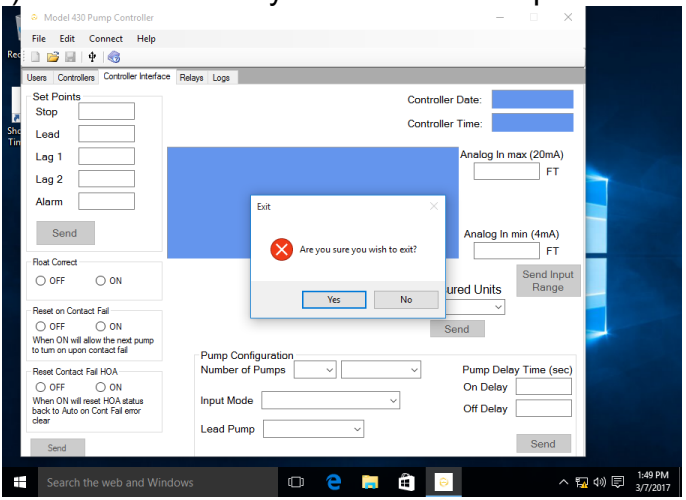


26) This file may be opened in a spreadsheet application such as Excel

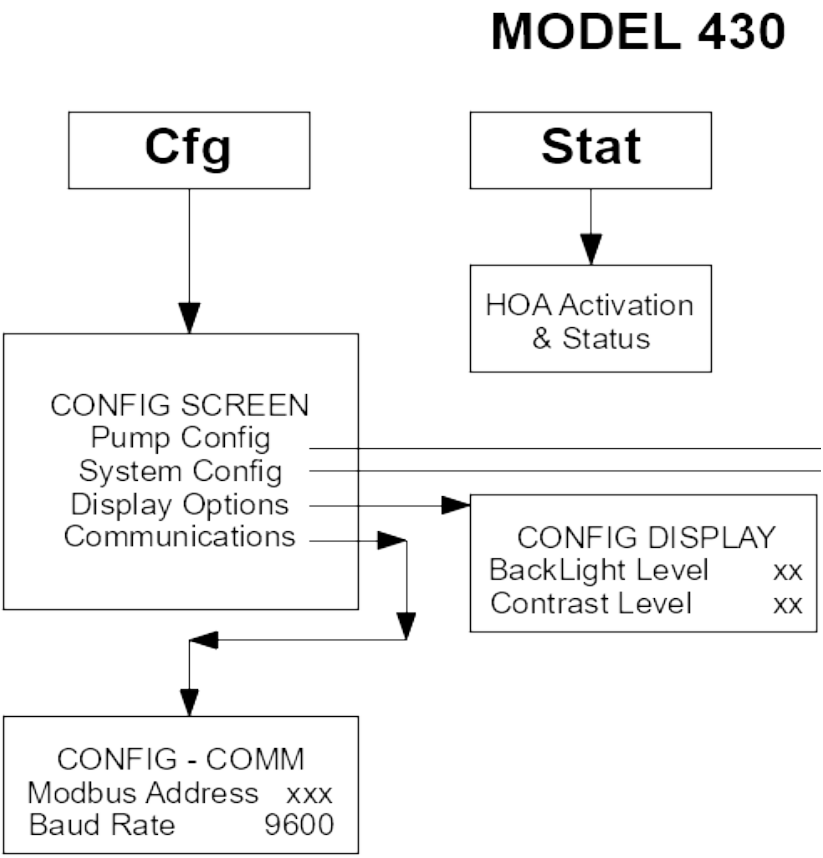


27) To disconnect the controller, click “Connect” and then click “Disconnect” from the menu

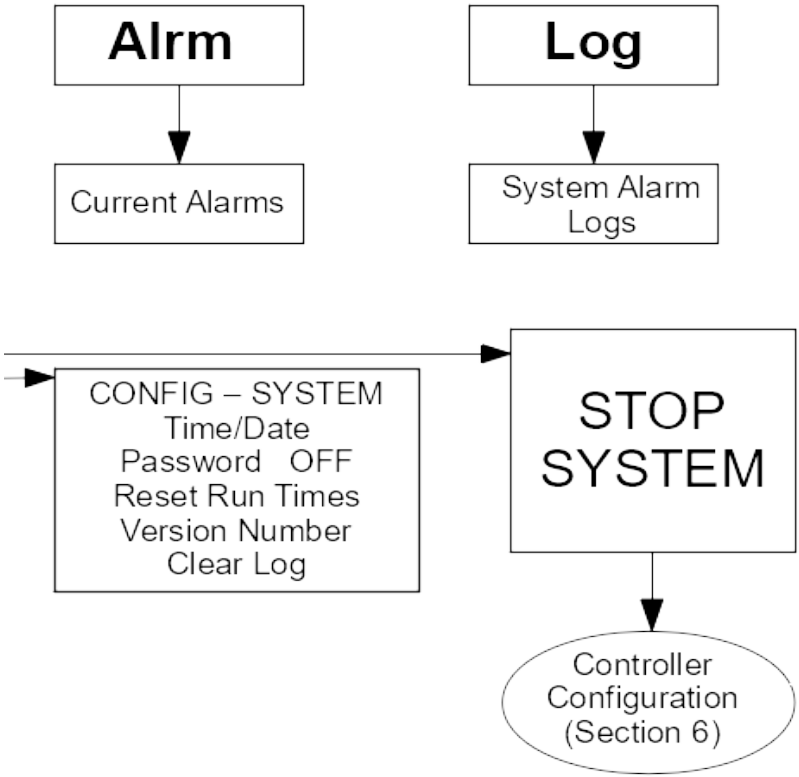
28) The software may be closed at this point



14. Menu Tree


MODEL 430
Cfg
Stat
HOA Activation
& Status
CONFIG SCREEN
Pump Config
System Config
Display Options
Communications
CONFIG DISPLAY
BackLight Level xx
Contrast Level xx
CONFIG - COMM
Modbus Address xxx
Baud Rate 9600

MENU TREE


Alrm
Current Alarms
Log
System Alarm Logs
CONFIG – SYSTEM
Time/Date
Password OFF
Reset Run Times
Version Number
Clear Log
STOP SYSTEM
Controller Configuration (Section 6)

15. Miscellaneous

15.1. Glossary

1) Pump **UP**: Operation to keep level high (e.g. water tower)
2) Pump **DOWN**: Operation to keep level low (e.g. sump)
3) **Flt Err Corr:** Float Error Correction – method to detect stuck floats (e.g. if float gets stuck when level is below it)**On Demand:** refers to pump operation (e.g. if level requires two pumps operating and one faults out, next available pump will start)

TIME MARK
CORPORATION

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