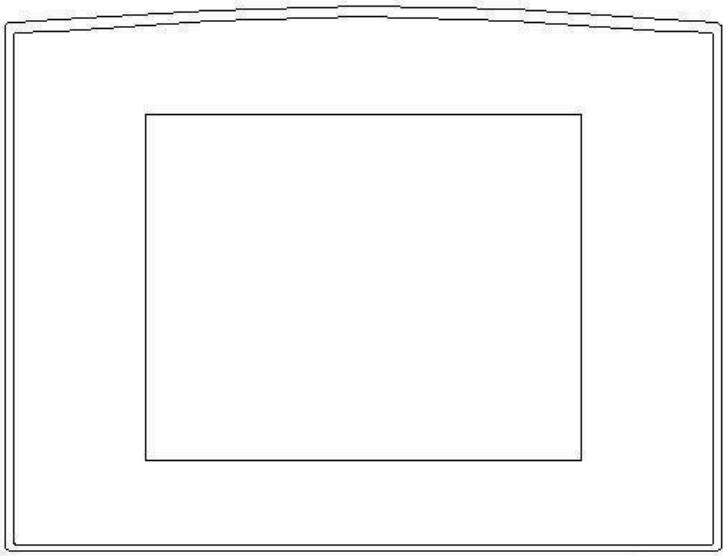
AID MP5A CONTROLLER

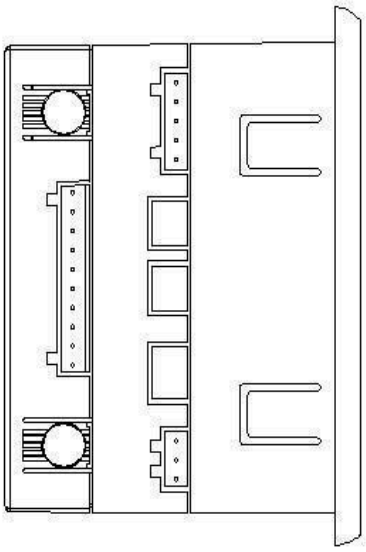
SUCTION OR DISCHARGE

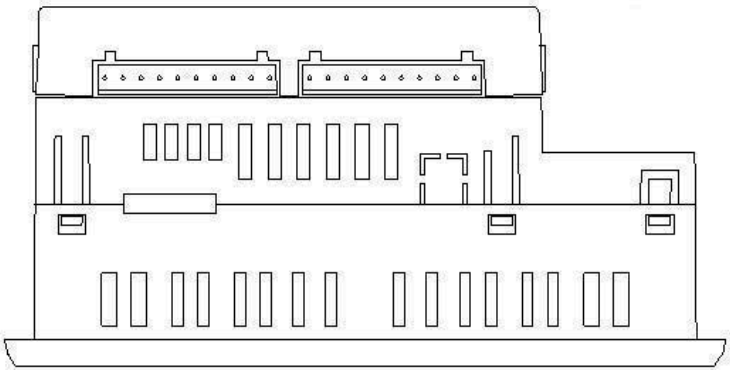
VFD OR ACROSS THE LINE

H-PUMP CONTROLLER

Users Manual







Overall Discussion

Your AID MP5A has been designed to be both a process controller and an alarm annunciator. The AID H-pump controller can control the starting and stopping of the H-pump under normal operating conditions, VFD speed control, modulating outlet flow control valve and charge pump operation.

The integrated 5.7" color touch screen tells the user if the system is operating problem free, operating but with a specific non shutdown alarm, or is shutdown with a specifically annunciated alarm that may or may not require a manual reset of the system before it will be allowed to operate again.

There are limit inputs, control inputs, and inputs that can be programmed to be either one or the other. The system has been designed with the intent of making it as flexible as possible and allows for the deletion of certain inputs to accommodate the large differences that can be found from one H-pump system to the next. An example of such flexibility is the AID MP5A's ability to be programmed for inputs to be running alarms, shut down alarms, or used as process control inputs.

The AID H-pump controller has been made to allow the use of 4-20ma inputs that allow the user to defined 5 analog inputs. All of these inputs can be information only, operational start/stop points, alarms or shutdowns.

There are two distinct control modes for this H-pump. Manual and Automatic mode.

MANUAL MODE:

The main control panel has a three position switch mounted on the door. When the switch is put into the manual position as long as there are no shutdown conditions the H-pump will immediately go into a charge pump run countdown. After the pre run timer expires the H-pump will start and run until either the switch is turned back to the off position or a shutdown alarm becomes active. The speed of the H-pump speed is set by the potentiometer on the control panel door when in manual mode with the one limitation of the "initial starting conditions". (See section below)

As long as there is a working discharge pressure transducer the controller will control the output flow control valve even in manual mode to the settings that have been put into the controller.

Off/Reset Position:

The off position on the three position switch on the door serves two functions. First it will stop the H-pump if it is running and second the off position is required to reset any active shutdown fault. If a shutdown fault is active the system will reset the fault after the switch has been in the Off/Reset position for more than 4 seconds. If the fault has not been corrected the fault will just return when the switch is turned to either the manual or automatic positions.

Automatic mode:

In automatic mode the control of the starting and stopping of the H-pump will be determined by the suction pressure settings made by the user.

Starting:

When the suction pressure/tank level climbs over the set point (and no shutdown faults are present) the H-pump will start the pre run process of starting the charge pumps. Also if the H-pump was running when last turned off and the suction pressure/tank level has never fallen below the stop point the system will start the pre run process as well. After the charge pump timer has timed out the H-pump will start the run process.

Regular stop:

If the suction pressure/tank level ever falls below the set minimum run operating point then the H-pump will stop until such time as the suction pressure/tank level rises above the set start pressure.

Shutdown fault:

A shutdown fault will cause the immediate stop of the H-pump and the system will not restart until the shutdown fault has been cleared.

Electrical Connections

The AID MP5A controller is designed to only accept dry contact switches and the 5 analog inputs. All limit switch inputs are expected to be 24 VDC and you can chose if you want all inputs to be sink or source by how the AID H-pump controller is wired. Care needs to be taken when installing wires to mitigate any exposed conductors and stray strands of wire that may touch adjoining terminals. The use of appropriate insulated ferrules is helpful to facilitate clean wiring connections. Any limit/alarm switches that are not needed for a particular installation can be programmed to be normally open connections so that the controller will ignore the missing inputs and or you can program the controller to specifically know that there is no input to a particular input terminal. The controller has several extra limit inputs available than what is typically used. All digital inputs have preset names assigned to them. The user can chose to use the inputs at their pre-sets or over-write these inputs and call them whatever they want and save these new settings. The following list is the pre-set purposes that the inputs have been assigned to be used for.

24 VDC inputs (I0-I17)

0)	Main motor/pump run proof	Indicates the H-pump is running
1)	Charge pump/pump run proof	Indicates the charge pump motor is running
2)		Main motor VFD fault if a VFD is on the system this is the indication that the VFD has faulted and needs to be reset.
3)		Low Suction Pressure Switch If there is a suction pressure sensor installed on the system the pressure point where a low suction pressure event happens is completely programmable in the setup screens. (see paragraph above about digital and analog signals used for the same limit)
4)		High Suction Pressure Switch If there is a suction pressure sensor installed on the system the pressure point where a high suction pressure event happens is completely programmable in the setup screens. (see paragraph above about digital and analog signals used for the same limit)
5)		Low Lubrication Oil Level If the lubrication oil level is too low then fault the H-pump,
6)		Low Crank Case Oil Level If the oil level in the crank case becomes too low then a fault happens.
7)		High Crank Case Oil Level If the oil level in the crank case becomes too high then a fault happens.
8)		Low Gear Reducer Oil Level If the gear reducer oil level fall too low then a fault happens.
9)		High Gear Reducer Oil Level If the gear reducer oil level rises too high then a fault happens.
10)		High Motor Vibration If high vibration is seen in the H-pump motor then fault the H-pump.
11)		High Pump Vibration If high vibration is seen in the H-pump motor then fault the H-pump.
12)		Low Motor Amperage If low motor amperage is maintained on the H-pump fault the H-pump.
13)		Low Discharge Pressure Low discharge pressure is only looked at after the H-pump has started and the low discharge pressure ignore timer has timed out.
14)		High Discharge Pressure High discharge pressure indication will fault the H-pump.
15)		Tank Level 4-20ma Sensor
16)		Manual side of HOA switch Runs the H-pump in manual mode. There are no start stop points and the H-pump will run until a shutdown occurs.
17)		Automatic Side of the HOA Switch All start stop points are in effect and all shutdowns are in effect also. (if the HOA switch is turned off for more than 5 seconds all faults will be reset.

Relay Outputs (O2-O12)

2) H-pump Motor Start (VFD start)	Start the VFD or RVSS or X-line starter
3)	Charge Pump Start Start the charge pumps
4)	Separator Dump Valve Open Switches VFD from Potentiometer to 4-20ma reference for speed control.
5) Not Used	
6) Not Used	
7) Alarm/Shutdown	Active when an alarm or shut down are present.
8) Not Used	
9) Not Used	
10) Not Used	
11) Not Used	
12) Not Used	
13) Not Used	
14) Not Used	
15) Not Used	
16) Not Used	

Analog Inputs (All analog inputs can the turned off)

AN0) Suction Pressure	Gives the suction pressure to the H-pump (4-20ma signal)
AN1) Pump RPM	Gives the H-pump rotational speed (4-20ma signal)
AN2) Discharge Pressure	Discharge pressure from the H-Pump
AN3) Tank Level	Tank level feeding the H-pump system if used

AN4) Vibration	The overall vibration level of the H-pump.

Analog Outputs

AN0) VFD reference speed	The user can export either from the current terminal or the voltage terminal. The current terminal is a 4-20ma signal and the voltage terminal is a 0-10Vdc signal. **DO NOT CONNECT TO BOTH I AND V PERMENANT DAMAGE TO THE SYSTEM CAN OCCUR.**
AN1) Output flow control valve	The user can export either from the current terminal or the voltage terminal. The current terminal is a 4-20ma signal and the voltage terminal is a 0-10Vdc signal. **DO NOT CONNECT TO BOTH I AND V PERMENANT DAMAGE TO THE SYSTEM CAN OCCUR.**

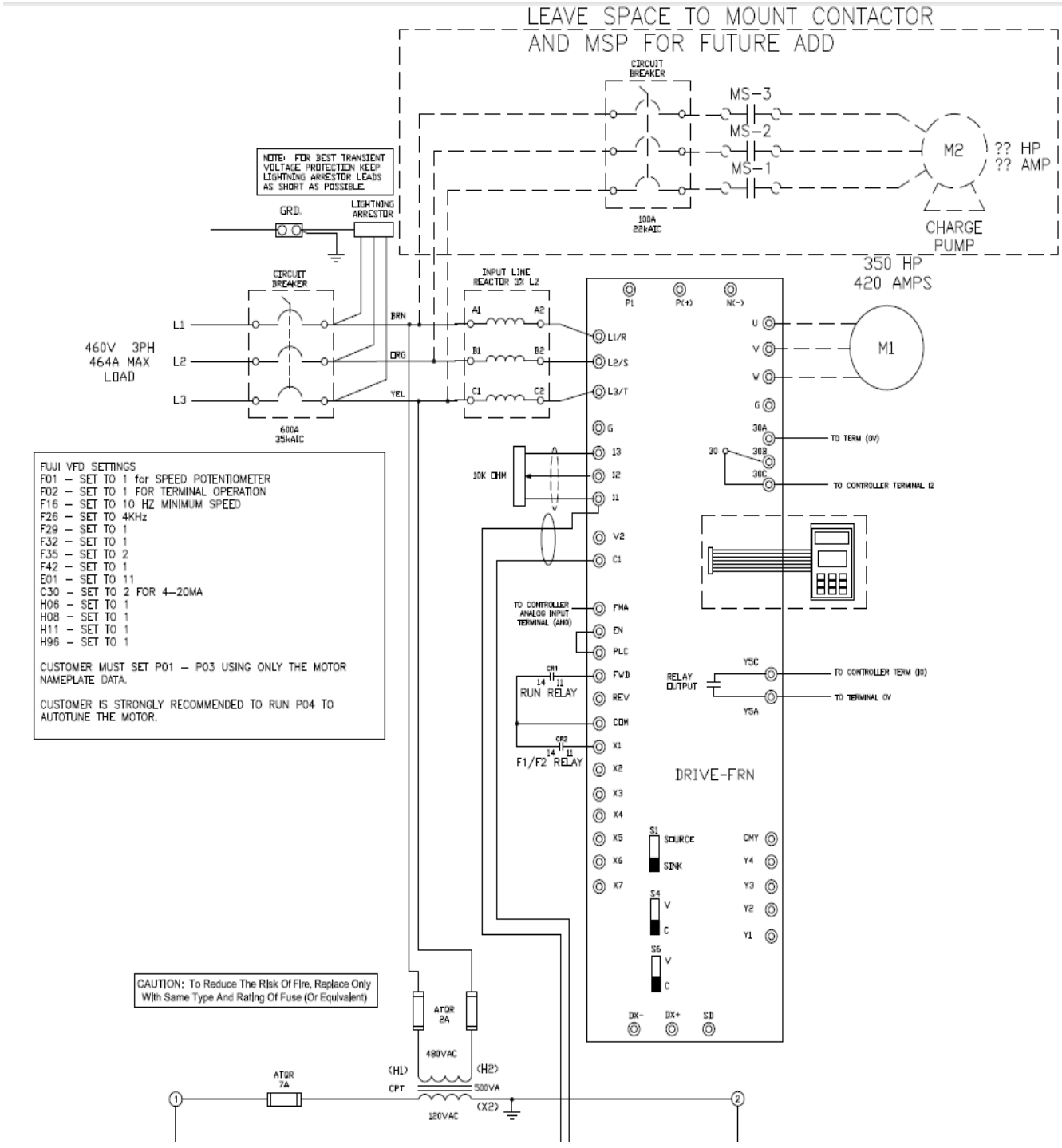

LEAVE SPACE TO MOUNT CONTACTOR
AND MSP FOR FUTURE ADD
CIRCUIT BREAKER
MS-3
MS-2
MS-1
M2
?? HP
?? AMP
100A
22kAIC
CHARGE PUMP
350 HP
420 AMPS
NOTE: FOR BEST TRANSIENT VOLTAGE PROTECTION KEEP LIGHTNING ARRESTOR LEADS AS SHORT AS POSSIBLE.
GRD.
LIGHTNING ARRESTOR
CIRCUIT BREAKER
INPUT LINE REACTOR 3% LZ
460V 3PH
464A MAX
LOAD
L1
L2
L3
BRN
ORG
YEL
A1
A2
B1
B2
C1
C2
600A
35kAIC
L1/R
L2/S
L3/T
P1
P(+)
N(-)
U
V
W
G
M1
30A
30B
30C
TO TERM (0V)
TO CONTROLLER TERMINAL 12
10K OHM
13
12
11
V2
C1
FUJI VFD SETTINGS
F01 – SET TO 1 for SPEED POTENTIOMETER
F02 – SET TO 1 FOR TERMINAL OPERATION
F16 – SET TO 10 HZ MINIMUM SPEED
F26 – SET TO 4KHz
F29 – SET TO 1
F32 – SET TO 1
F35 – SET TO 2
F42 – SET TO 1
E01 – SET TO 11
C30 – SET TO 2 FOR 4–20MA
H06 – SET TO 1
H08 – SET TO 1
H11 – SET TO 1
H96 – SET TO 1
CUSTOMER MUST SET P01 – P03 USING ONLY THE MOTOR NAMEPLATE DATA.
CUSTOMER IS STRONGLY RECOMMENDED TO RUN P04 TO AUTOTUNE THE MOTOR.
TO CONTROLLER ANALOG INPUT TERMINAL (AM0)
FMA
EN
PLC
CR1
14
11
RUN RELAY
FWD
REV
COM
CR2
F1/F2 RELAY
X1
X2
X3
X4
X5
X6
X7
Y5C
RELAY OUTPUT
TO CONTROLLER TERM (I0)
TO TERMINAL 0V
Y5A
DRIVE-FRN
S1
SOURCE
SINK
S4
V
C
S6
CMY
Y4
Y3
Y2
Y1
DX-
DX+
SD
CAUTION; To Reduce The Risk Of Fire, Replace Only With Same Type And Rating Of Fuse (Or Equivalent)
ATQR 2A
480VAC
(H1)
(H2)
CPT
500VA
120VAC
(X2)
ATQR 7A
1
2

Figure 1

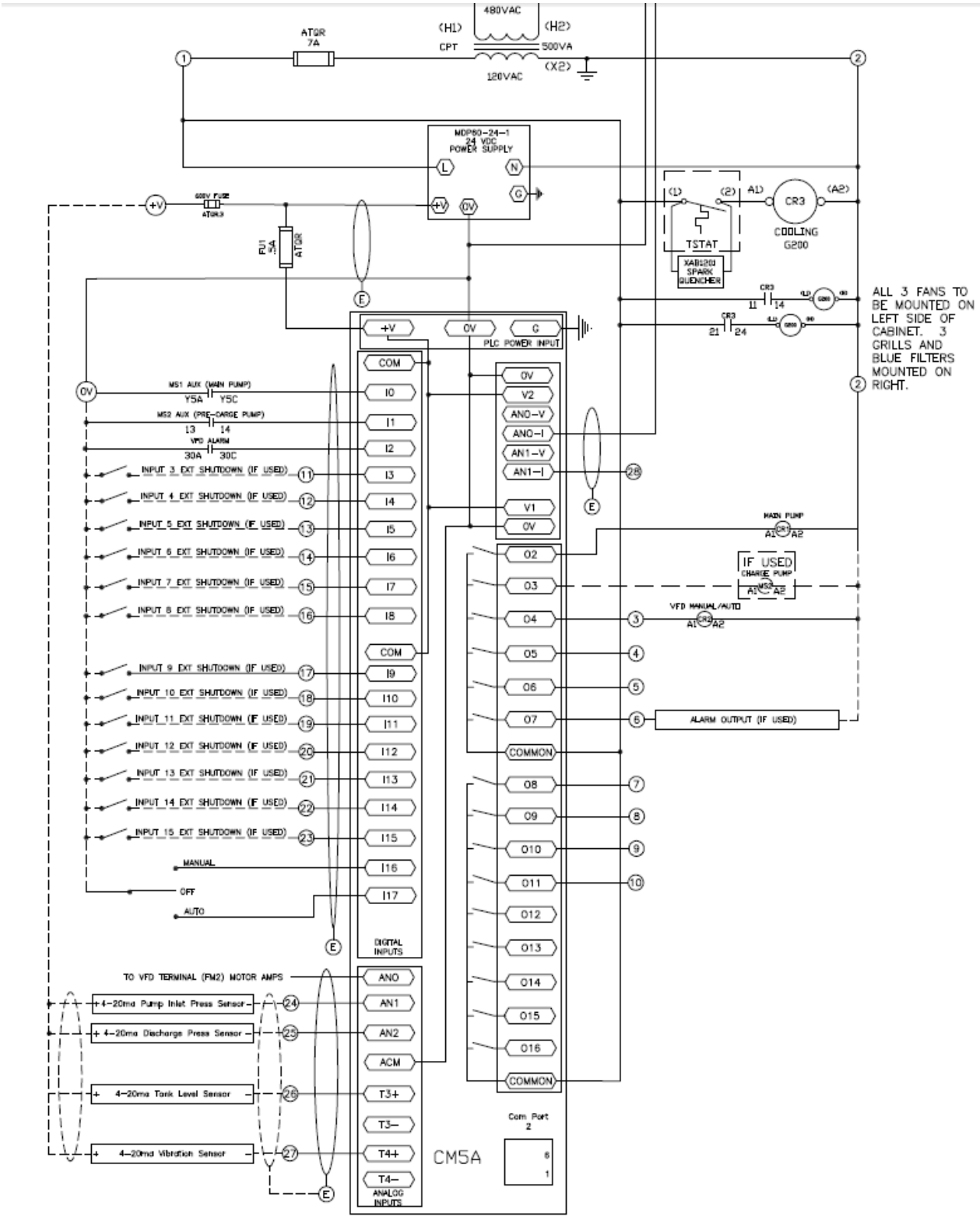

480VAC
(H1)
(H2)
CPT
500VA
(X2)
120VAC
ATQR 7A
MDP60-24-1 24 VDC POWER SUPPLY
CR3
COOLING
G200
TSTAT
XAB1201 SPARK QUENCHER
ALL 3 FANS TO BE MOUNTED ON LEFT SIDE OF CABINET. 3 GRILLS AND BLUE FILTERS MOUNTED ON RIGHT.
PLC POWER INPUT
MS1 AUX (MAIN PUMP)
MS2 AUX (PRE-CARGE PUMP)
VFD ALARM
INPUT 3 EXT SHUTDOWN (IF USED)
INPUT 4 EXT SHUTDOWN (IF USED)
INPUT 5 EXT SHUTDOWN (IF USED)
INPUT 6 EXT SHUTDOWN (IF USED)
INPUT 7 EXT SHUTDOWN (IF USED)
INPUT 8 EXT SHUTDOWN (IF USED)
INPUT 9 EXT SHUTDOWN (IF USED)
INPUT 10 EXT SHUTDOWN (IF USED)
INPUT 11 EXT SHUTDOWN (IF USED)
INPUT 12 EXT SHUTDOWN (IF USED)
INPUT 13 EXT SHUTDOWN (IF USED)
INPUT 14 EXT SHUTDOWN (IF USED)
INPUT 15 EXT SHUTDOWN (IF USED)
MANUAL
OFF
AUTO
DIGITAL INPUTS
MAIN PUMP
IF USED
CHARGE PUMP
VFD MANUAL/AUTO
ALARM OUTPUT (IF USED)
COMMON
TO VFD TERMINAL (FM2) MOTOR AMPS
4-20ma Pump Inlet Press Sensor
4-20ma Discharge Press Sensor
4-20ma Tank Level Sensor
4-20ma Vibration Sensor
ANALOG INPUTS
Com Port 2
CM5A

Figure 2

- All limit inputs expected to be dry contacts. The same power source that is used to power the AID controller should be used as the power source for switch inputs. Any **alarm limits** not used should be programmed to be normally open contacts so that limit alarm will be ignored.
- See input descriptions on page 3 for all other inputs
- All relays have 3A resistive rating (Fuse each output for protection)
- Each relay bus has an 8A maximum rating

● OUTPUT CONNECTIONS

WARNING!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!

- The outputs for your AID H-pump controller only have two common bus connections for all of the available outputs. It is imperative that all devices connected to these outputs all require the same voltages and come from the same power source. Mixing power sources (even if they are the same voltage) can destroy any parts and equipment connected to a single common bus.

● If different voltages are needed (for example the H-pump start output would probably be a 24 VDC requirement when using a VFD while the charge pump motor starter might need 120 VAC) for any of the first 6 outputs (or the two outputs on the second common), then interposing relays will be required to separate the different voltages from each other. And all relays used would need to have activating coils that can use the same voltage (and voltage source) as other items driven directly without a relay. **FAILURE TO DO THIS MAY DESTROY ALL CONNECTED COMPONENTS AND YOUR AID H-PUMP CONTROLLER!!!!!!!!**

Throttling Valve

If a throttling valve is used. Provisions can been made to allow a fully modulating valve using either a 4-20ma or 0-10Vdc output from the MP5A controller off of analog output AN1. This can be either a 4-20ma or a 0-10Vdc output depending on what terminals you wire to. Do not attempt to connect to both the voltage and current output from a single output at the same time. Damage to your MP5A will occur.

Variable Speed Drive

If a VFD is used. Provisions have been made to allow a fully modulating motor control using a 4-20ma or 0-10Vdc output from the MP5A controller off of analog output AN0. This can be either a 4-20ma or a 0-10Vdc output depending on what terminals you wire to. Do not attempt to connect to both the voltage and current output from a single output at the same time. Damage to your MP5A will occur.

If you have a VFD but do not want to run the VFD in a fully modulating manner based off of either the suction or discharge pressure from the H-pump you can set the system to operate from the 10K Ohm potentiometer on the panel door by pressing the button found on the "H-pump PID setup" screen. Changing from PID to fixed speed will make the VFD take its speed command only from the potentiometer and not from the H-pump controller. Showing all connections to a VFD are not possible in this manual given the large proliferation of VFD controls and how they wire and control.

Analog Outputs

- Shields should be earthed, connected to the earth of the cabinet.
- An output can be wired to either current or voltage, use the appropriate wiring as shown below.
- Do not use current and voltage from the same source channel.

current/voltage

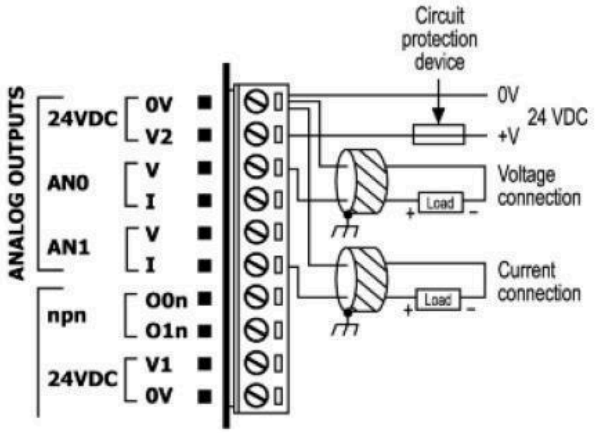


Figure 5

Power Requirements

The AID H-pump controller requires a 24 VDC power source to operate the controller. The amperage requirements are a maximum of .2 amps for the controller alone and the input power should be fused at a maximum of 1 amp (fast blow) for the protection of the controller. The power supply used to power your AID H-pump controller can be used to also power any other 24 VDC devices if the power supply is sized correctly.

Relay outputs are rated for 3 amps resistive load and 1 amp inductive load. To increase the life of relay contacts a diode can be placed in parallel on inductive DC loads and an RC snubber circuit in parallel with the load on AC inductive loads. If any loads are greater than the relay contacts can operate at then and interposing relay will be required to separate the high amperages from your AID H-pump controller.

Any panels installed outside should have lightening arrestors and surge suppressors installed. A maximum of 25 Ohms of resistance should be maintained on earth ground connections per NEC code. All local codes and regulations supercede any recommendations set forth in this manual.

Noise Mitigation

Electrical noise can be a serious problem on some installations and can prevent electronic equipment from working correctly. While your AID H-pump controller is designed to operate in most environments as is, when placed in a high noise environment extra steps may be required to mitigate the noise affecting the control.

1) Separate 24 VDC wiring from all higher voltage wiring as much as possible. Including separate conduits for power wiring and low voltage wiring. If required use shielded wire.

2) Rout each signal group along with a dedicated common wire. Do not use earth ground to conduct signals back and forth to the PLC.

3) For analog and high speed IO, shielded twisted pair wires should be used.

4) Ground only one end of shield, and ground this shield as close as possible to the PLC. If this does not work try connecting the ground at the opposite end or not connecting the shield ground at all. NEVER CONECT BOTH ENDS OF A SHIELD WIRE TO GROUND.

5) Do not use shield as a conductor or ground return

6) Wire DC power supply lines to the closest PLC component and branch out power to other PLC components (if present) from this point.

7) If the incoming power line needs filtering then use a grounded filtering device. The power filter should be placed in the main supply power line before the first termination of power to any PLC component.

8) A diode can be placed in parallel on inductive DC loads and an RC snubber circuit in parallel with the load on AC inductive loads to help with noise also.

Physical Installation (in mm)

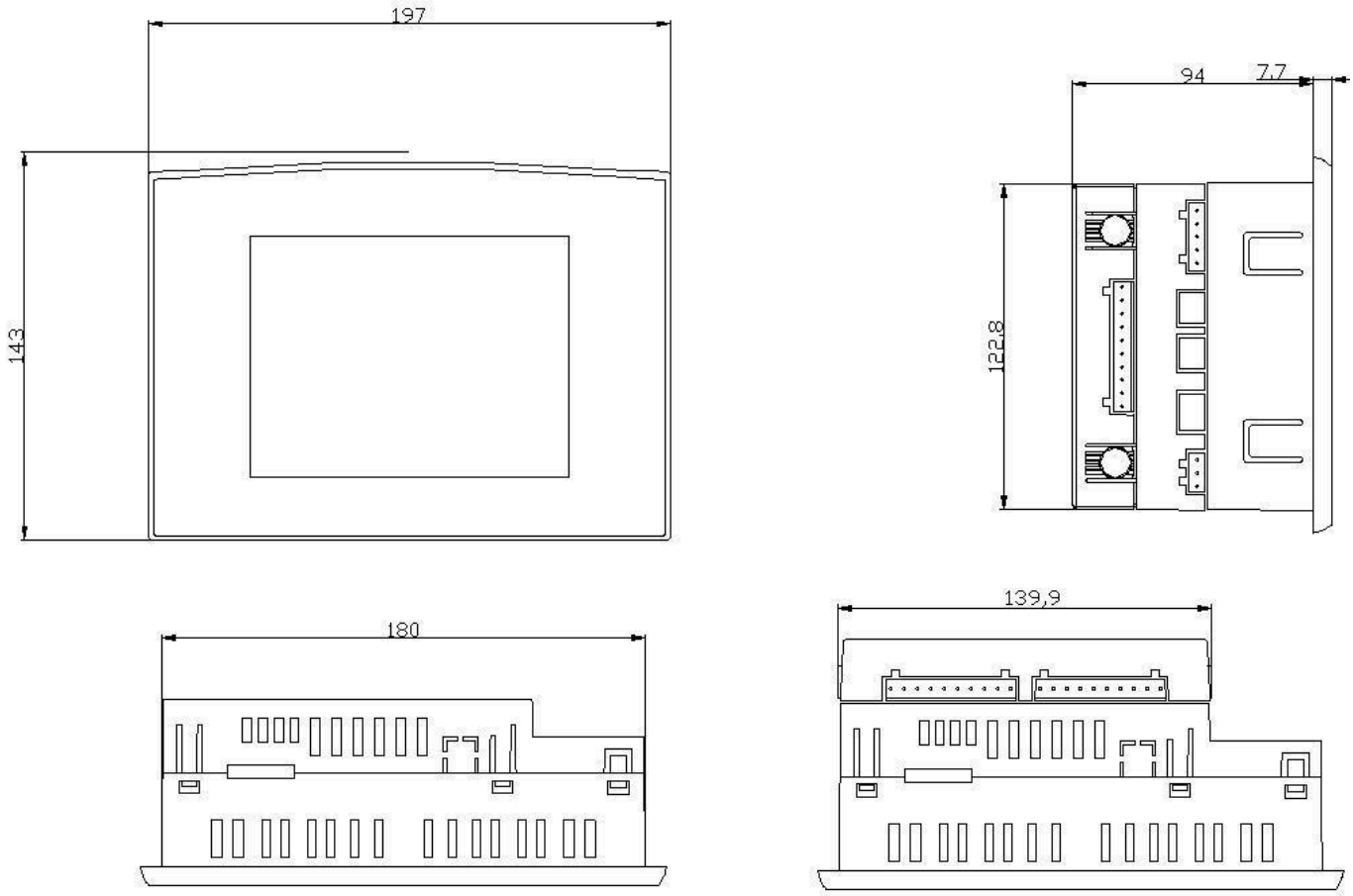


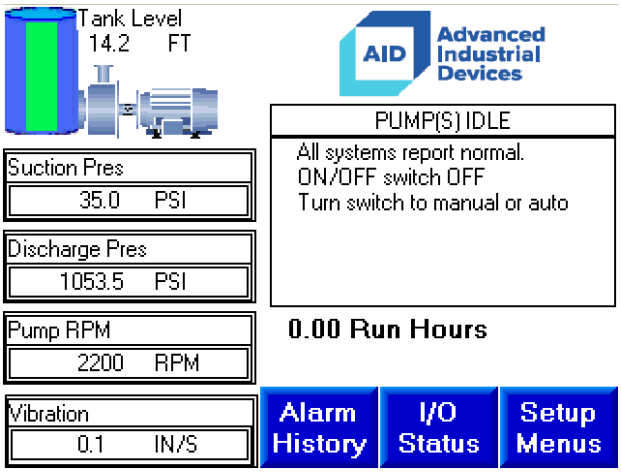
Figure 6

- Panel Mount is NEMA 4x but is not UV stabilized for extended direct sunlight. If installed outside a sunshield or UV blocked cover will extend the life of your controller.
- A Foam gasket (included with unit) must be installed between the controller and the control panel to maintain a water tight rating.
- Tighten the four hold brackets equally to obtain a quality seal on the foam gasket

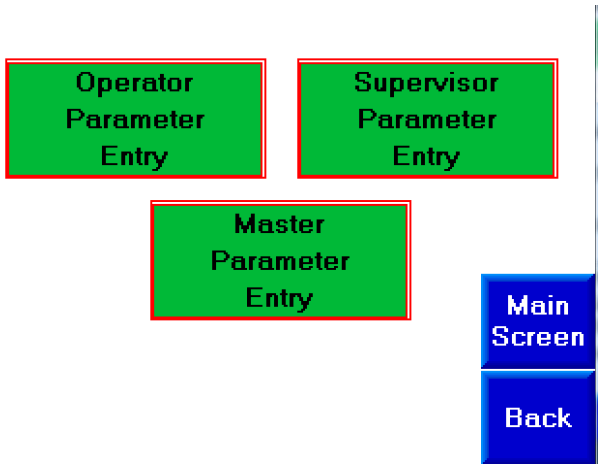
AID H-PUMP CONTROLLER Programming

Most of the inputs on the AID H-pump controller are programmable as to how the system reacts to different pieces of information. There is exception to this programmability. The main on/off switch has been fixed in its purpose and is required in your system. This switch must be closed to allow your H-pump to run and this switch must be open for 4 seconds before and condition that has caused a shutdown fault can be reset. Non shutdown alarms can be reset simply by touching the flashing "ALARM ACKNOWLEDGE" button so that the system does not need to be stopped to clear the alarm

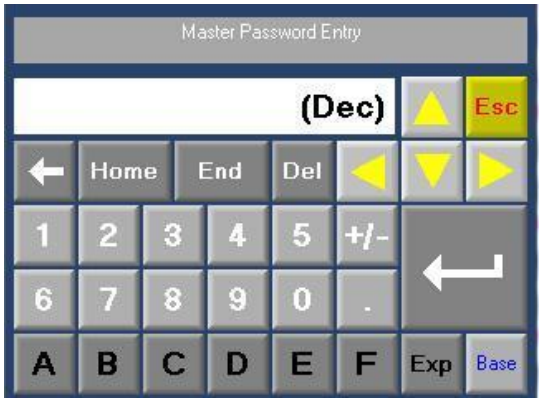
Entering and exiting the programming screens

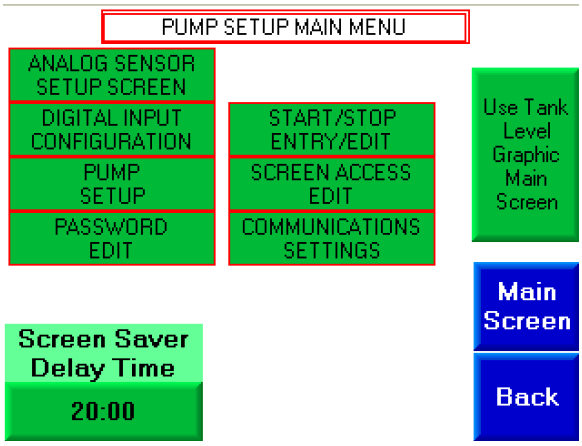


Entering the programming screens requires the use of a password. Press the "Setup Menus" button to go to the operator level entry selection screen. There are three levels of passwords User, supervisor, or Master. If the touch screen has not been touched for several minutes the controller will force the main view screen to come back up.

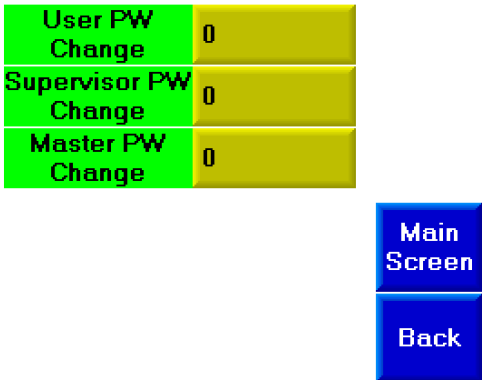


By touching one of the entry buttons an on screen keypad will pop up to allow entry of the required password.



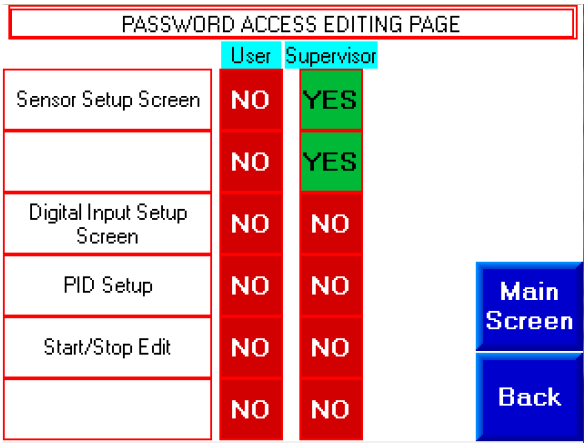


If a correct password is entered you will progress to the programming distribution menu. Depending on which level of password has been entered you will see either more or less programming screens to go to. What screens are available to the user and supervisor password level is set by anyone who has access to the master password level. The passwords can be any number between 0 – 4294967295.

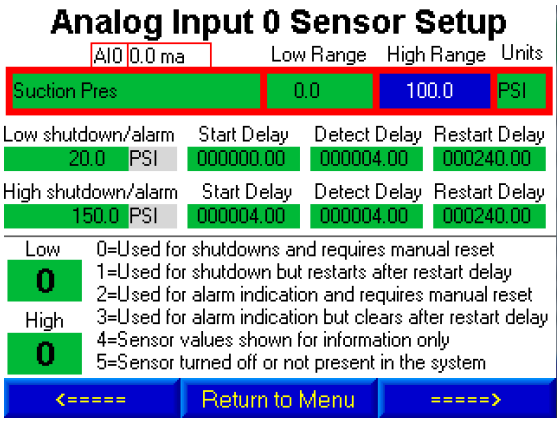


Save your password in a safe place.

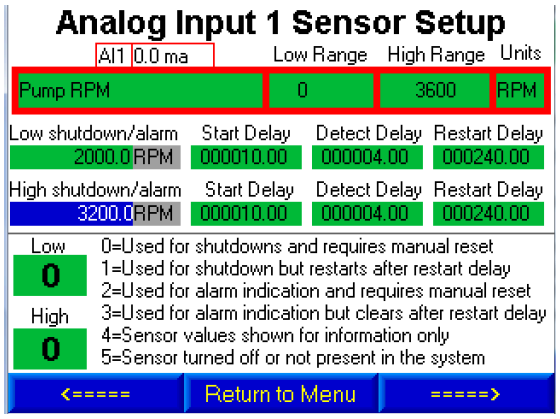
The master user can also determine what screens the two non-master passwords to have access to. To do this as a master level user you just go to the “Screen Access Edit” and touch the boxes to turn access on or off.



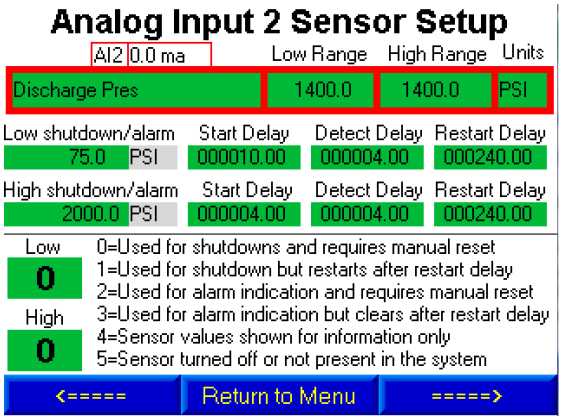
Analog Sensor Setup



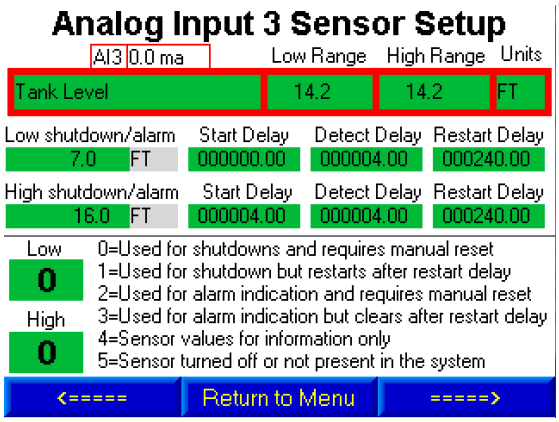
You have the ability to set the range of all of the 4-20ma sensors. If you decide to use the "VFD Rated Amperage" it is not motor amperage it is whatever the maximum operating amps of the VFD is times 2 for FUJI VFDs. The standard FUJI MEGA unit sends an output 0-200% of rated amperage over a 4-20ma signal.



In addition to setting the analog sensor ranges you can make custom names for the sensor input as well. Just touch the green box with the current name being used and a QWERTY keypad will pop up allowing you to set whatever name is meaningful to your process.



The engineering units are also programmable for what shows on screen. If you enter a value of 5 for high and low shutdown reactions the system will know that the sensor is disabled and will not be used. All indications of the sensor in question will disappear from the main viewing screen. As long as the sensor is not one you are using for starting, stopping, or controlling the throttling valve then the system can operate without that sensor.

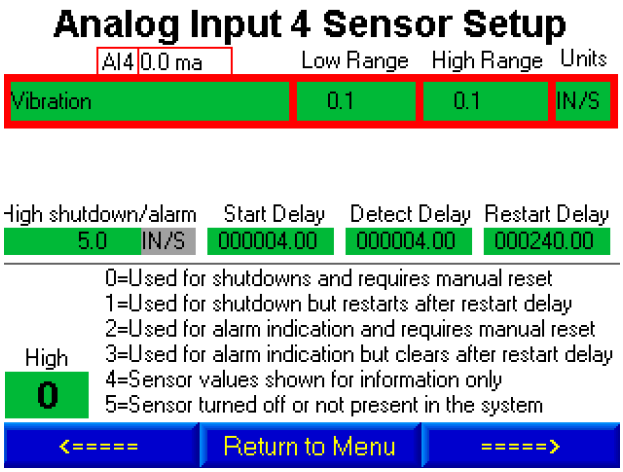


You are able to select:

Start delay-(how long to wait after main motor startup to look at the high or low values. shutdown or alarm indicator which may be useful for emergency operation if you are using redundant pressure/temperature switches and a transducer fails.

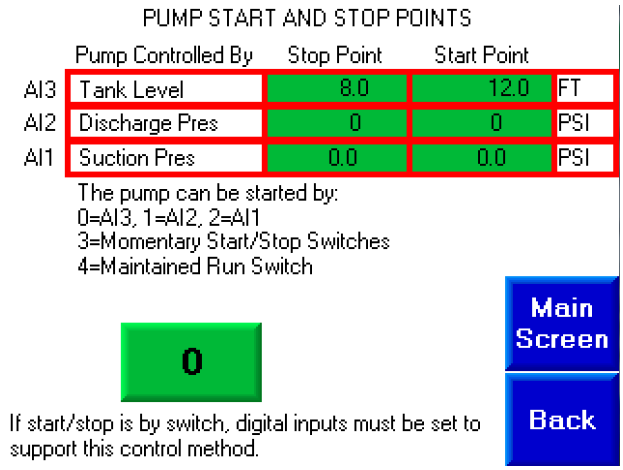
Detect Delay- After the start up timer is complete how long will the system allow a failed condition to occur before a shutdown or alarm.

Restart Delay-After an alarm or shutdown has been recorded you can have the system automatically reset the system if desired. This timer is the amount of time to wait before resetting the system after that type of alarm or shutdown.



Start/Stop Entry

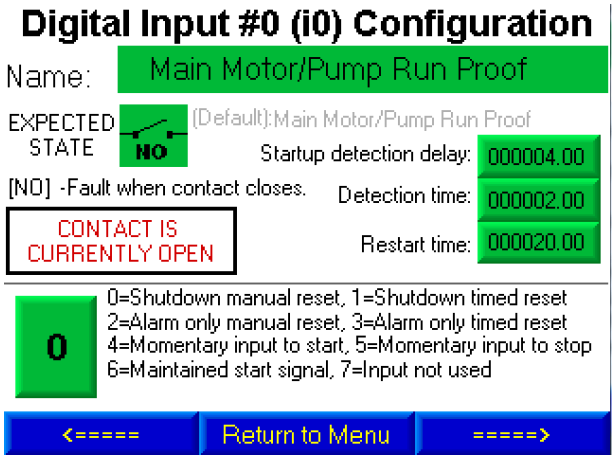
The start stop entry/edit screen is where you set the starting and stopping points for your H-pump operation. You can set values for several of the analog inputs or one or more of the digital inputs



Digital Inputs

The digital input configuration screens are where you are able to set the reaction of the controller to almost every digital input in the system. If a sensor is not present this will allow the system to ignore the missing input to the controller. Inputs 16 and 17 are special and not available for change.

The name of the input can be changed simply by touching the top green box and then entering the name you want that input to be. The name of that input will automatically change everywhere in the program.

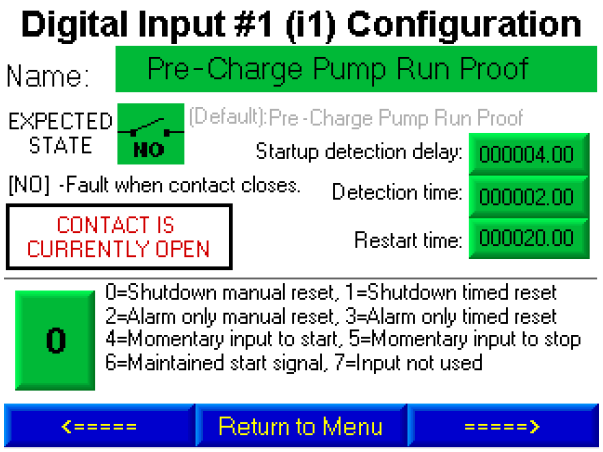


Just like all of the analog inputs the digital inputs have the three settable timers to Taylor system reaction to the inputs.

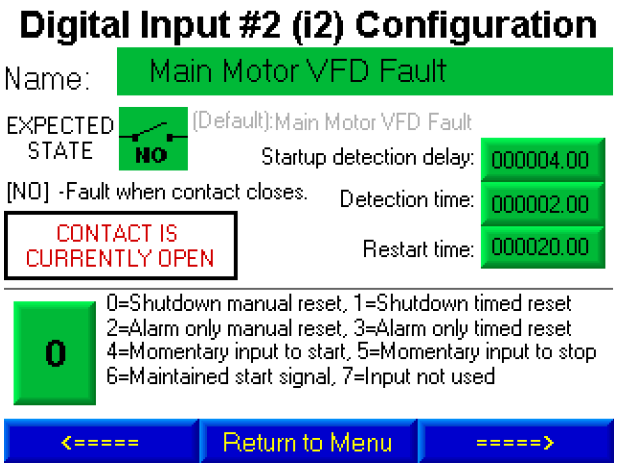
Start delay-(how long to wait after main motor startup to look at the high or low values. shutdown or alarm indicator which may be useful for emergency operation if you are using redundant pressure/temperature switches and a transducer fails.

Detect Delay- After the start up timer is complete how long will the system allow a failed condition to occur before a shutdown or alarm.

Restart Delay-After an alarm or shutdown has been recorded you can have the system automatically reset the system if desired. This timer is the amount of time to wait before resetting the system after that type of alarm or shutdown.



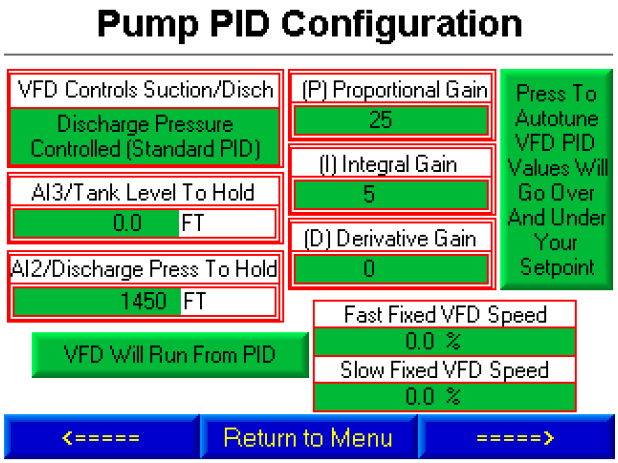
In addition to setting reactions you can determine if any of the digital inputs to the controller need to be either normally open or normally closed. By touching the green box on the expected state the input can be changed from normally open to normally closed.



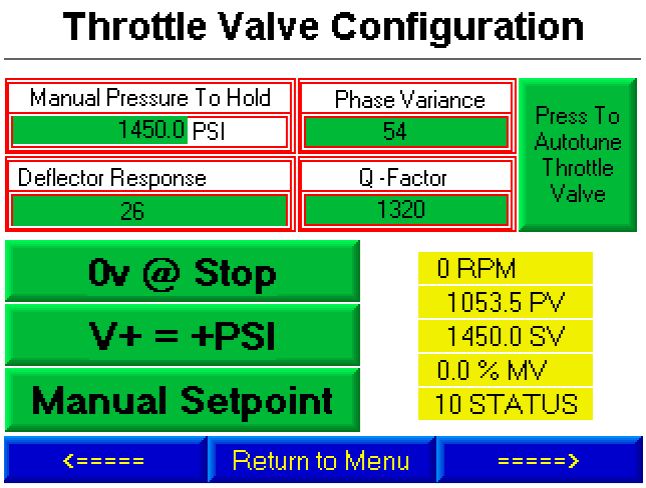
The lowest green box is where you set how the system is to react to this input. If you set an input to be used for starting and stopping the system you must also set this desire on the start stop settings page to match.

VFD Control Setting

If you have a fully modulating VFD these settings are found in the “Pump Setup”. On this screen you are able to choose if the VFD will be controlled from either discharge or suction pressure and what pressure point you want to hold.



In addition if you are choosing to have a VFD but not run it in a fully modulating manner you can choose that you want to run the VFD in a fixed mode. If selected, you will control the speed of the VFD with the potentiometer mounted on the door. You must set P and I values of some kind to get modulation. If no values are set (all set to 0) then there will be no modulation of any kind. A reasonable guess as to a beginning set of values for P and I are either 50 and 10 or 25 and 5. If you are setting PID values manually do not set a D value (D values make tuning by hand remarkably difficult at best). You have a PID auto-tune button available to you. Before you attempt an auto-tune you need to understand that the pressure you are controlling will go significantly over and under your actual set points (3 times) and that this is normal **and required** to perform an auto-tune. (so set your alarm values and start stop values accordingly out of the way to prevent shutting down while making an auto-tune). If the system stops or faults before the auto tuning process is complete the values will be worthless and the process will have to be started over again.



Throttle Valve Configuration Screen:

Manual Pressure to Hold: If not using pump curve, this is the discharge pressure the controller will attempt to maintain.

Deflector Response: This is the variable in the valve control process that takes into accommodation the response of the valve constriction. This should not be adjusted manually.

Phase Variance: This is the variable in the valve control process that adjusts the amplitude of response by the controller when the discharge pressure changes.

Q-factor: This is a variable in the valve control process that adds delay to its response.

Valve Auto tune Button: When initially configuring the throttle valve, Set your Phase Variance at 100, Q-factor at 50 and press the Auto tune Button. When you run the pump, the discharge pressure will modulate above and below the set point several times after which the controller will select better values for the above three variables and the auto tune button will turn itself off.

"0v @ Stop" / "10v @ Stop" button: This controls what voltage is sent to the modulating

throttle valve while the pump is OFF.

"V+ = +PSI" / "V+ = -PSI" button: This controls if a voltage increase to the modulating valve raises or lowers the discharge pressure.

"Manual Set point" / "Use Pump Curve" button: This controls whether the controller maintains a manual set point or uses a pump curve defined on the next screen in conjunction with the deflector, Phase and Q variables on the earlier page together to make the system work.

There are also several monitor values displayed on this screen to aid in troubleshooting:

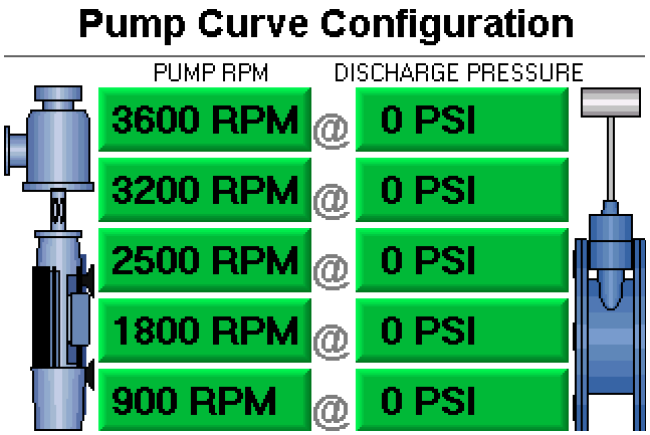
RPM - Pump Speed

PV - Current Discharge Pressure

SV - Current desired Discharge Pressure

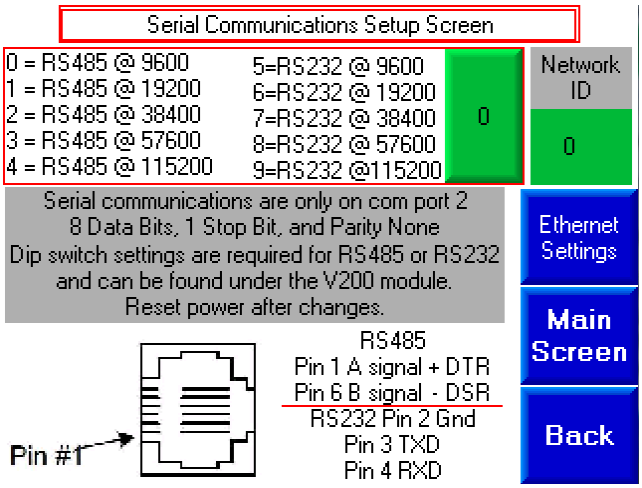
MV - Current percent of signal being sent to modulating throttle valve.

Status - For use when using AID Phone tech support.

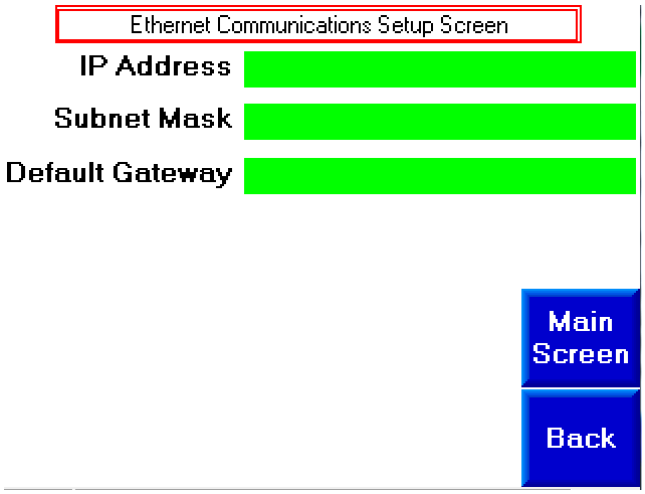


Communications Setup:

The MP5A controller comes standard with two 232/485 isolated communications ports. The ports are set as RS232 ports as a standard. If RS485 communications is needed there are a series of dip switches under the V200-18-E6B I/O board on the back of the display that need to be set per the label next to the switches. Once settings have been made for communications type, speed, and network ID the power must be cycled one time to make the changes work.

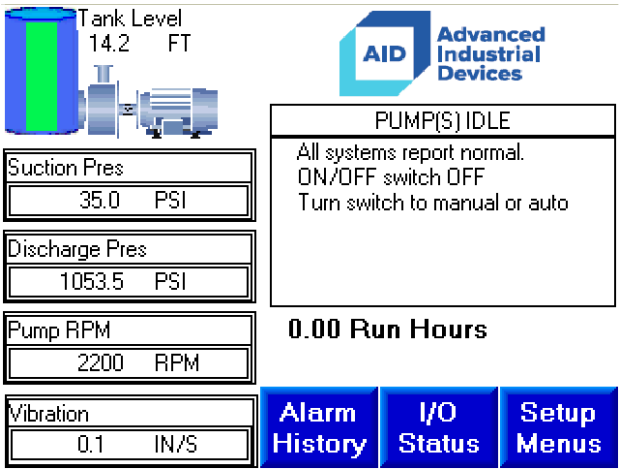


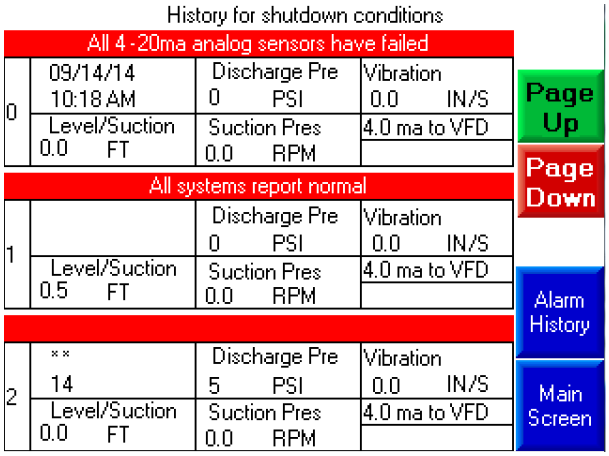
If the end user prefers and Ethernet connection then the MP5A must be fitted with the optional Ethernet card adapter. The Unit does NOT support Ethernet IP and only supports Modbus TCP over the Ethernet connection.



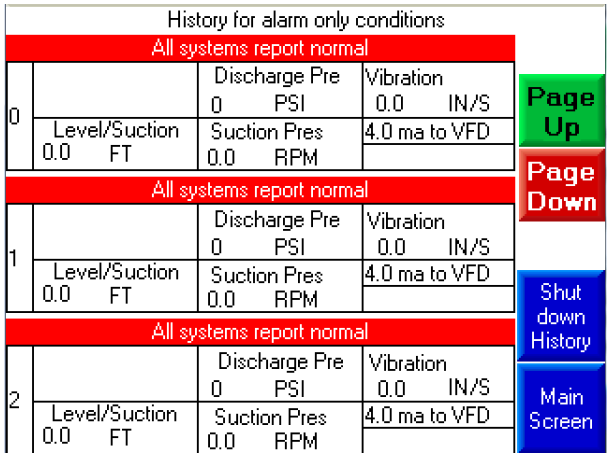
Shutdown/Alarm History

From the main screen touch the “Alarm History” button to go to the shutdown and alarm history pages. The system stores the detailed information for the last 100 faults and the last 100 alarms.

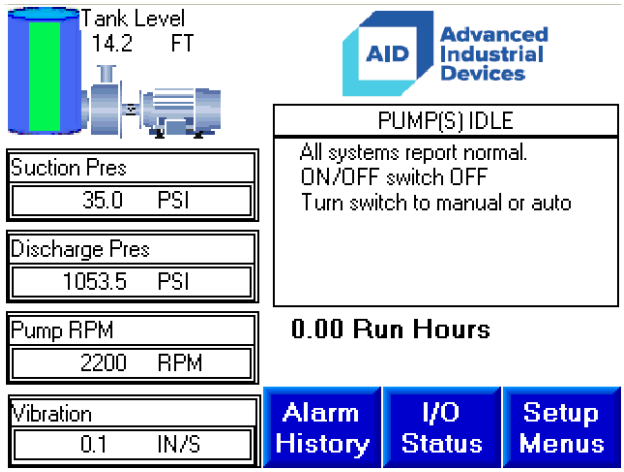




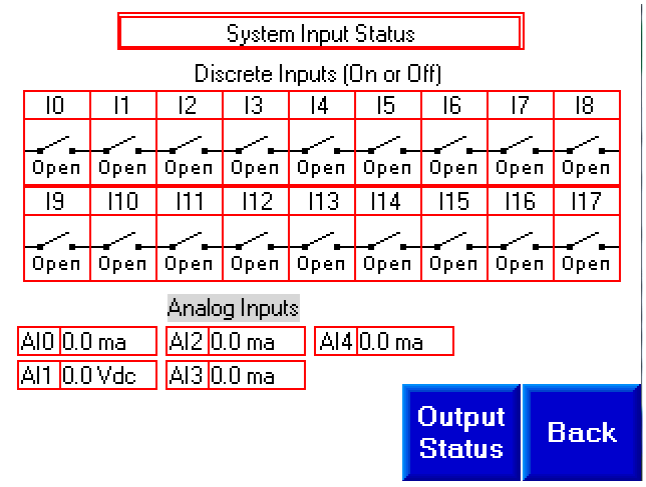
Press the page up/page down buttons to navigate forward and backward through the alarm history. After 100 samples have been stored the 101st event will push out the oldest shutdown from history.

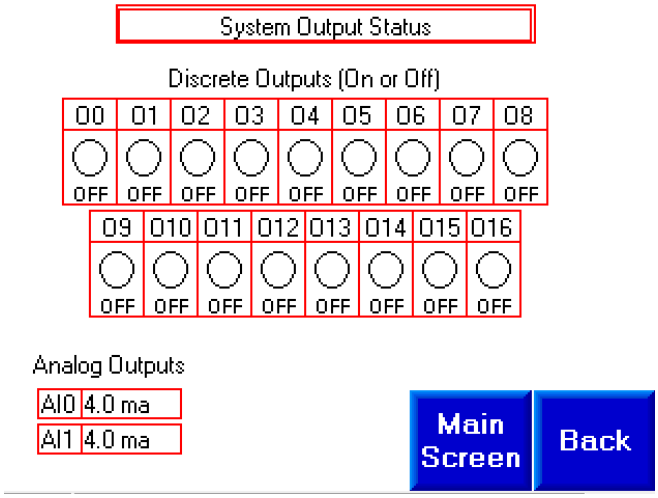


System I/O Status



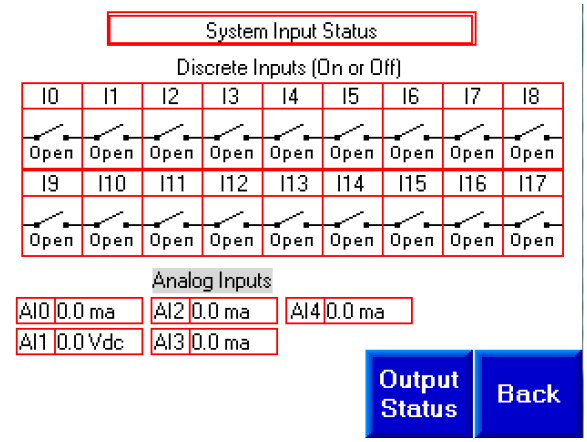
Press the I/O status button to see the live status of all digital and analog inputs on one page and all digital and analog outputs on another.

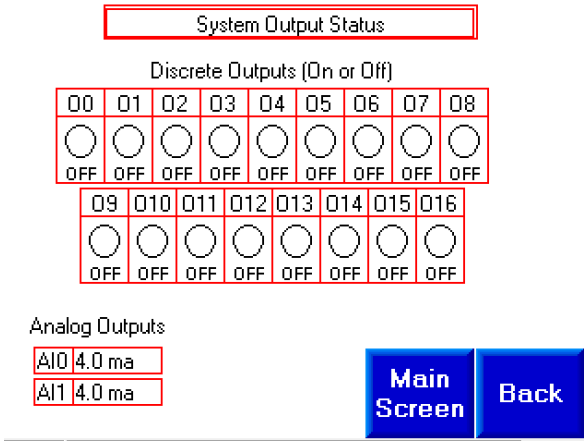


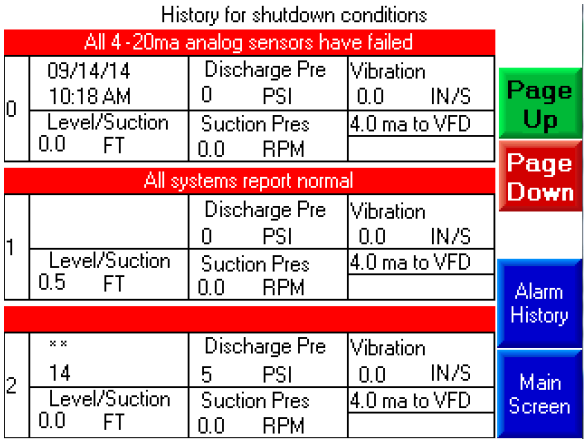


Troubleshooting

There are input and output diagnostic screens to help you see what switches are open and closed and what all of the analog input and output values are. There are also history screens that will allow you to see the main operating conditions for both the last 100 shutdown faults and the last 100 non shutdown alarms.







The following is a list of common troubleshooting issues.

Nothing shows on the AID MP5A screen	● 24 VDC power has failed and is not present on terminals +V and 0V. ● Fuse in the 24 VDC power line is blown. ● Positive and negative power lines are connected incorrectly. ● The controller has failed and should be replaced. ● There was a noise spike of enough size that it froze the controller and noise suppression needs to be installed on all inductive devices,
The AID MP5A lights up and text is on the screen but my H-pump will not run. The screen says that nothing is wrong.	● The start point must be met before the controller will operate the H-pump. ● The HOA switch must be in the hand or auto position.
I have a fault indicated on the screen but I can't figure out how to make it clear correctly	● The HOA switch that should be wired to inputs 16 & 17 of the AID H-pump controller must open and stay open for 5 seconds to reset an alarm. When you open the on/off switch the screen will continue to show whatever alarm is active until 4 seconds has passed.
My AID H-pump controller has the required inputs to start the H-pump but there is a long time delay before the H-pump starts	● The AID H-pump controller has a built in pre-charge pump run time. Even if you do not have a pre-charge pump the time delay is still active. ● The charge pump delay timer resets and runs every time the H-pump is stopped and restarted for any reason.
My H-pump starts, but then shuts down on either low discharge pressure or low oil pressure.	● Your H-pump is not building pressure on either the oil pressure or the discharge pressure fast enough before the delay timer times out for either of these inputs.

	Check your timer settings and extend them if reasonable. ● There is something really wrong with the H-pump and a repair needs to take place. ● The input switch(s) or the analog sensors for oil pressure and discharge pressure should be indicating a pressure greater than your set points when adequate pressure is present for either input. Check the wiring on the appropriate input and correct if necessary. ● There is a digital input to be one or both of these faults and you need to check the operation of the switches.
My H-pump and/or my charge pump does not run but AID H-pump controller says the system is running correctly.	● Is an auxiliary contact on motor wired correctly and programmed correctly for the digital input. ● Is the overload of the motor starter wired correctly to open the motor contactor in the case of an overload?
My H-pump starts normally but quickly shuts down indicating an H-pump motor run failure.	● If using a motor contactor, is an auxiliary contact wired on the motor contactor to complete the required input to your AID H-pump controller? ● If using a VFD, are the run indication contacts of the VFD wired/programmed to be a closed contact whenever the VFD is running and wired to your run input.
My H-pump starts normally but quickly shuts down and indicates a charge pump motor run failure.	● If using a motor contactor, is an auxiliary contact wired on the motor contactor to only be closed when the motor contactor

	is closed, and is it wired correctly to the AID H-pump controller? ● If using a VFD is the run indication of the VFD wired/programmed to be a closed contact whenever the VFD is running.
The VFD for my H-pump motor has faulted but as soon as I reset the VFD fault my H-pump starts back up on its own.	● Since VFDs are capable of resetting certain types of faults automatically your AID H-pump controller has been programmed to allow the restart of the H-pump even when the H-pump running signal has been lost if the reason for that loss is the VFD being faulted. ● If you do not want an automatic restart on VFD reset then program the VFD failed parameter to make a VFD fault require either a manual or timed restart
My throttling valve opens but never closes	The throttling valve will open if it is set to respond to a different type of signal than you are exporting from the MP5A to the valve. For example if you wire a 0-10V signal to a 4-20ma input on a valve it would stay at maximum signal to the valve forever unless the output from the MP5A is 0V. The throttling valve is working in reverse from the programming you have in your MP5A. Check the valve operation compared to the programming on the throttling valve to see if they are correct.
I cannot get the PID loop to work the way I want for the VFD. What the heck is a PID loop anyway!!	● A PID loop allows an electrical device to be better controlled through a mathematical calculation of how far away you are from

	your set point and how fast the system reacts to changes to the VFD or valve. This can be a very difficult thing to get correct. The actual calculations will not be covered here, but you can look online for many theoretical explanations of PID loops Your MP5A controller has an auto-tune function for both the VFD setup and the throttling valve setup. ● Whenever you are going to run a PID auto-tune you need to take some pre-steps before you try to run the auto-tune. Change the points where your H-pump will start and stop well outside of their normal settings so that the H-pump will be able to run even if the suction or discharge pressures are outside of their normal settings. PID tuning requires that the output to the modulating device be forced to un-normal operating conditions so that the controller can see what the effects are. You will also need to disable and low and high level pressure shutdowns that could cause the H-pump to stop during the process. ● To run an auto-tune set up the controller to temporarily prevent a shutdown then press the auto-tune button on the PID setup screens. Only auto-tune one function at a time and never both at the same time. After pressing the auto-tune button the controller will cause the speed/position of the modulating device to move radically so that the controller can see the rates of change and be able to make the math calculations. It will do this three times and then it will record the needed values and populate the P, I, D values with the ones the auto-tune thinks will work for you. Auto-tuning is not 100%

	effective, but even if it does not work exactly it will get you close enough that you can manually alter the values of P,I,D to get where you need to be. Sometimes running an auto-tune more than once will get better results. If after 3 attempts it still does not work try manual manipulation of the values.
My H-pump controls are working but the amount of amperage needed to start my H-pump motor is very high. (possible overloading)	● Check your VFD settings. ● Check the operation and settings on your throttling valve if you have one. The throttling valve may need to be open to a specific position to prevent hard starting. ● Mechanical problem: repair the H-pump and or motor.
I don't have one or more of the limit inputs that are available for use on the AID H-pump controller. What should I do?	● Your AID H-pump controller has been made to allow what is the maximum number of limit switches a system would regularly have. It is not required to use all of the listed limit switches to make the system function correctly. ● Any limit shutdowns that are not used can be disabled by setting their system reaction setting to 7 or by making the switch contact consider an open circuit to be a good running condition.
The relay contacts provided on the AID H-pump controller do not have enough amperage to operate the device I want to connect. What should I do?	● Your relay outputs will drive most devices you want to connect, but if you need more amperage then have the control output activate a relay with higher amperage capability and drive your higher amperage device off of a normally open set of contacts from that relay.
I have plenty of amperage available to me on my relay outputs from the AID H-pump controller, but the voltage I need to feed to my VFD start or other	● You only have two common lines for the relay outputs available to your controller. If you need to accommodate other voltages you will need to install

devices are not the same as other devices on the same common for these relays.	intermediary relays that all have coils that use the same voltage as other items driven on these outputs. Then use the normally open contact set(s) from your relay to activate the devices with the different voltage requirements. ● **FAILURE TO KEEP ALL VOLTAGES THE SAME ON A SINGLE OUTPUT POWER BUS WILL DAMAGE SOME OR ALL OF THE CONNECTED DEVICES AND YOUR AID H-PUMP CONTROLLER.**
I customized my password, but now I can't remember what it is. What do I do?	● If the password you are using is either the user or supervisor password then contact whoever has access to the master password to go into the controller and tell you want your level of password is. ● You will need to send your AID H-pump controller into the factory to have the password reset. To mail the controller, pull out connectors from the controller (do not unwire any connections), remove the controller, and ship to the required address.

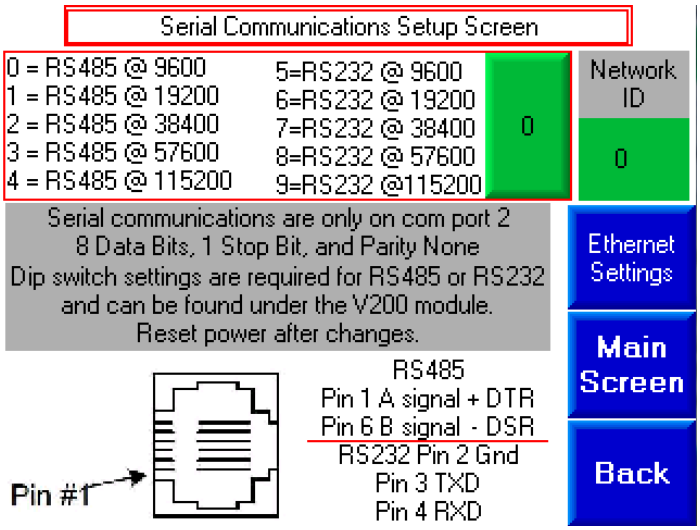
AID H-PUMP CONTROLLER Screen Messages

Message number	Message	Message Meaning

MODBUS RTU COMMUNICATIONS

Port 2 of your MP5A has been designated as an RS485 Modbus RTU communications port. The port is a slave port and will allow an outside master to read and write to data locations. To configure the MP5A communications settings you must log into MP5A master password section and then you will be able to designate what you want the MP5A ID number to be (0-99) and what communications speed you want on the channel. You can choose between 9600, 19200. 38400, 57600, or 115200 baud. There are 8 data bits, one stop bit, and parity none.

You can also set the comm8unications to be RS232. Jumpers on the back on your MP5A must also be set to support the communications style you want to use.



Available Modbus codes are:

01	Read coils the maximum read is 1900 bits
03	Read holding registers the maximum read is 124 integers
15	Force coils the maximum write is 1900 bits
16	Preset holding registers the maximum write is 124 integers

INPUTS

Modbus Address Information								
						Implied	Read/	Modbus
Decimal	Hex	Description	Type	Low Range	High Range	Decimal	Write	Function Code
24576	6000	Controller Input I0	Binary	0	1	None	R	01
24577	6001	Controller Input I1	Binary	0	1	None	R	01
24578	6002	Controller Input I2	Binary	0	1	None	R	01
24579	6003	Controller Input I3	Binary	0	1	None	R	01
24580	6004	Controller Input I4	Binary	0	1	None	R	01
24581	6005	Controller Input I5	Binary	0	1	None	R	01
24582	6006	Controller Input I6	Binary	0	1	None	R	01
24583	6007	Controller Input I7	Binary	0	1	None	R	01
24584	6008	Controller Input I8	Binary	0	1	None	R	01
24585	6009	Controller Input I9	Binary	0	1	None	R	01
24586	600A	Controller Input I10	Binary	0	1	None	R	01
24587	600B	Controller Input I11	Binary	0	1	None	R	01
24588	600C	Controller Input I12	Binary	0	1	None	R	01
24589	600D	Controller Input I13	Binary	0	1	None	R	01
24590	600E	Controller Input I14	Binary	0	1	None	R	01
24591	600F	Controller Input I15	Binary	0	1	None	R	01
24592	6010	Controller Input I16	Binary	0	1	None	R	01
24593	6011	Controller Input I17	Binary	0	1	None	R	01

OUTPUTS

						Implied	Read/	Modbus
Decimal	Hex	Description	Type	Low Range	High Range	Decimal	Write	Function Code
16384	4000	Controller output 0	Binary	0	1	None	R	01
16385	4001	Controller output 1	Binary	0	1	None	R	01
16386	4002	Controller output 2	Binary	0	1	None	R	01
16387	4003	Controller output 3	Binary	0	1	None	R	01
16388	4004	Controller output 4	Binary	0	1	None	R	01
16389	4005	Controller output 5	Binary	0	1	None	R	01
16390	4006	Controller output 6	Binary	0	1	None	R	01
16391	4007	Controller output 7	Binary	0	1	None	R	01
16392	4008	Controller output 8	Binary	0	1	None	R	01
16393	4009	Controller output 9	Binary	0	1	None	R	01
16394	400A	Controller output 10	Binary	0	1	None	R	01
16395	400B	Controller output 11	Binary	0	1	None	R	01
16396	400C	Controller output 12	Binary	0	1	None	R	01
16397	400D	Controller output 13	Binary	0	1	None	R	01
16398	400E	Controller output 14	Binary	0	1	None	R	01
16399	400F	Controller output 15	Binary	0	1	None	R	01
16400	4010	Controller output 16	Binary	0	1	None	R	01

INTERNAL SYSTEM NOTIFICATIONS

Decimal	Hex	Description	Type	Low Range	High Range	Implied Decimal	Read/ Write	Modbus Function Code
126	7E	System has an alarm	Binary	0	1	None	R	01
127	7F	system has a shutdown	Binary	0	1	None	R	01
300	12C	Input 0 fault indication	Binary	0	1	None	R	01
301	12D	Input 1 fault indication	Binary	0	1	None	R	01
302	12E	Input 2 fault indication	Binary	0	1	None	R	01
303	12F	Input 3 fault indication	Binary	0	1	None	R	01
304	130	Input 4 fault indication	Binary	0	1	None	R	01
305	131	Input 5 fault indication	Binary	0	1	None	R	01
306	132	Input 6 fault indication	Binary	0	1	None	R	01
307	133	Input 7 fault indication	Binary	0	1	None	R	01
308	134	Input 8 fault indication	Binary	0	1	None	R	01
309	135	Input 9 fault indication	Binary	0	1	None	R	01
310	136	Input 10 fault indication	Binary	0	1	None	R	01
311	137	Input 11 fault indication	Binary	0	1	None	R	01
312	138	Input 12 fault indication	Binary	0	1	None	R	01
313	139	Input 13 fault indication	Binary	0	1	None	R	01
314	13A	Input 14 fault indication	Binary	0	1	None	R	01
315	13B	Input 15 fault indication	Binary	0	1	None	R	01
400	190	Input 0 alarm indication	Binary	0	1	None	R	01
401	191	Input 1 alarm indication	Binary	0	1	None	R	01
402	192	Input 2 alarm indication	Binary	0	1	None	R	01
403	193	Input 3 alarm indication	Binary	0	1	None	R	01
404	194	Input 4 alarm indication	Binary	0	1	None	R	01
405	195	Input 5 alarm indication	Binary	0	1	None	R	01
406	196	Input 6 alarm indication	Binary	0	1	None	R	01
407	197	Input 7 alarm indication	Binary	0	1	None	R	01
408	198	Input 8 alarm indication	Binary	0	1	None	R	01
409	199	Input 9 alarm indication	Binary	0	1	None	R	01
410	19A	Input 10 alarm indication	Binary	0	1	None	R	01
411	19B	Input 11 alarm indication	Binary	0	1	None	R	01
412	19C	Input 12 alarm indication	Binary	0	1	None	R	01
413	19D	Input 13 alarm indication	Binary	0	1	None	R	01
414	19E	Input 14 alarm indication	Binary	0	1	None	R	01
415	19F	Input 15 alarm indication	Binary	0	1	None	R	01

INTEGER DATA

Decimal	Hex	Description	Type	Low Range	High Range	Implied Decimal	Read/ Write	Modbus Function Code
0	0	Analog Input 3 Raw Data	Integer	0	16384	0	R	03
1	1	Analog Input 2 Raw Data	Integer	0	1024	0	R	03
2	2	Analog Input 0 Raw Data	Integer	0	1024	0	R	03
3	3	Analog Input 4 Raw Data	Integer	0	16384	0	R	03
4	4	Analog Input 1 Raw Data	Integer	0	1024	0	R	03
8	8	Analog Input 4 engineering (Vibration)	Integer	-32768	32767	1	R/W	03/16
9	9	Analog input 1 low alarm/shutdown point	Integer	-32768	32767	1	R/W	03/16
10	A	Analog input 1 high alarm/shutdown point	Integer	-32768	32767	1	R/W	03/16
13	D	AN out 0 4-20ma output to main pump VFD	Integer	0	4096	1	R	03
16	10	System Operational Status	Integer	0	4	*	R/W	03/16
17	11	Pump System Start Method	Integer	0	4	**	R/W	03/16
19	13	AN out 1 throttling valve 4-20ma output	Integer	0	4096	1	R	03
20	14	Analog input 3 Low sensor range (tank level)	Integer	-32768	32767	1	R/W	03/16
21	15	Analog input 3 High sensor range (tank level)	Integer	-32768	32767	1	R/W	03/16
24	18	Analog input 4 low sensor range (Vibration)	Integer	-32768	32767	1	R/W	03/16
25	19	Analog input 4 high sensor range (Vibration)	Integer	-32768	32767	1	R/W	03/16
26	1A	Analog input 0 low sensor range (amps)	Integer	-32768	32767	1	R/W	03/16
27	1B	Analog input 0 high sensor range (amps)	Integer	-32768	32767	1	R/W	03/16
32	20	Analog input 1 low sensor range (Suction)	Integer	-32768	32767	1	R/W	03/16
33	21	Analog input 1 high sensor range (Suction)	Integer	-32768	32767	1	R/W	03/16
74	4A	Analog input 3 engineering (tank level)	Integer	-32768	32767	1	R	03
76	4C	Analog input 2 Engineering (Discharge Pressure)	Integer	-32768	32767	1	R	03
78	4E	Analog input 0 Engineering (amps)	Integer	-32768	32767	1	R	03
80	50	Analog Input 1 engineering (Inlet Suction)	Integer	-32768	32767	1	R	03
100	64	Analog input 3 Low alarm point (tank level)	Integer	-32768	32767	1	R/W	03/16
101	65	Analog input 3 High alarm point (tank level)	Integer	-32768	32767	1	R/W	03/16
102	66	Analog input 2 low alarm point (Discharge Pressure)	Integer	-32768	32767	1	R/W	03/16
103	67	Analog input 2 high alarm point (Discharge Pressure)	Integer	-32768	32767	1	R/W	03/16
104	68	Analog input 4 high alarm point (Vibration)	Integer	-32768	32767	1	R/W	03/16
105	69	Analog input 0 low alarm point (amps)	Integer	-32768	32767	1	R/W	03/16
106	6A	Analog input 0 high alarm point (amps)	Integer	-32768	32767	1	R/W	03/16
107	6B	Analog input 3 Low stop point (tank level)	Integer	-32768	32767	1	R/W	03/16
108	6C	Analog input 3 High start point (tank level)	Integer	-32768	32767	1	R/W	03/16
109	6D	Analog input 1 low stop point (Suction)	Integer	-32768	32767	1	R/W	03/16
110	6E	Analog input 1 high start point (Suction)	Integer	-32768	32767	1	R/W	03/16
121	79	Analog input 3 PID point to hold (tank level)	Integer	-32768	32767	1	R/W	03/16
122	7A	Analog input 2 PID point to hold (Discharge Pressure)	Integer	-32768	32767	1	R/W	03/16
125	7D	Main pump PID loop P value	Integer	-32768	32767	0	R/W	03/16
126	7E	Main pump PID loop I value	Integer	-32768	32767	0	R/W	03/16
127	7F	Main pump PID loop D value	Integer	-32768	32767	0	R/W	03/16
148	94	Fixed VFD Fast Speed Setting in 0.0 to 100.0%	Integer	0	1000	1	R/W	03/16
149	95	Fixed VFD Slow Speed Setting In 0.0 to 100.0%	Integer	0	1000	1	R/W	03/16
151	97	System Alarm/Shutdown messaging	Integer	0	254	***	R	03
171	AB	Current communications speed	Integer	0	9	1	R	03
172	AC	Network ID	Integer	0	254	1	R	03
191	BF	Throttling valve Phase varience	Integer	-32768	32767	0	R/W	03/16
192	C0	Trottling valve Q-factor	Integer	-32768	32767	0	R/W	03/16
193	C1	Throttling valve Deflector response	Integer	-32768	32767	0	R/W	03/16
206	CE	Throttling valve manual setting	Integer	-32768	32767	1	R/W	03/16
210	D2	RPM curve 1 for throttling valve	Integer	-32768	32767	1	R/W	03/16
211	D3	RPM curve 2 for throttling valve	Integer	-32768	32767	1	R/W	03/16
212	D4	RPM curve 3 for throttling valve	Integer	-32768	32767	1	R/W	03/16
213	D5	RPM curve 4 for throttling valve	Integer	-32768	32767	1	R/W	03/16
214	D6	RPM curve 5 for throttling valve	Integer	-32768	32767	1	R/W	03/16
220	DC	Pressure on curve 1 for throttling valve	Integer	-32768	32767	1	R/W	03/16
221	DD	Pressure on curve 2 for throttling valve	Integer	-32768	32767	1	R/W	03/16
222	DE	Pressure on curve 3 for throttling valve	Integer	-32768	32767	1	R/W	03/16
223	DF	Pressure on curve 4 for throttling valve	Integer	-32768	32767	1	R/W	03/16
224	E0	Pressure on curve 5 for throttling valve	Integer	-32768	32767	1	R/W	03/16

3000	BB8	Historical Fault codes (1 of 100) Newest First	Integer	0	30	+++	R	03
3001	BB9	Historical Fault codes (2 of 100) Newest First	Integer	0	30	+++	R	03
.			Integer	0	30	+++	R	03
.			Integer	0	30	+++	R	03
.			Integer	0	30	+++	R	03
3099	C1B	Historical Fault codes (100 of 100) Newest First	Integer	0	30	+++	R	03
3100	C1C	Historical Alarm codes (1 of 100) Newest First	Integer	0	30	+++	R	03
3101	C1D	Historical Alarm codes (2 of 100) Newest First	Integer	0	30	+++	R	03
.			Integer	0	30	+++	R	03
.			Integer	0	30	+++	R	03
.			Integer	0	30	+++	R	03
3199	C7F	Historical Alarm codes (100 of 100) Newest First	Integer	0	30	+++	R	03
4004	FA4	VFD Output amps	Integer	-32768	32767	1	R	03
32 BIT LONG								
28690	7012	Total Main Pump run hours	Long	Signed +/- 2,147,483,647			R	03
28692	7014	Analog input 2 low sensor range (discharge press)	Long	Signed +/- 2,147,483,647			R/W	03/16
28693	7015	Analog input 2 high sensor range (discharge Press)	Long	Signed +/- 2,147,483,647			R/W	03/16
28696	7018	Analog Input 2 32 bit register engineering units	Long	Signed +/- 2,147,483,647			R	03
28703	701F	Analog Input 2 high alarm/shutdown point	Long	Signed +/- 2,147,483,647			R/W	03/16
28708	7024	Analog input 2 stop point (discharge press)	Long	Signed +/- 2,147,483,647			R/W	03/16
28709	7025	Analog input 2 start point (discharge Press)	Long	Signed +/- 2,147,483,647			R/W	03/16

* Pump System Operation Status Messages

0 Pump(s) Idle
1 Pre-Charge Pump Started
2 Main Pump Is Running
3 The Pump System has Faulted
4 Pump Running With Alarm

** Pump System Start/Stop System

0 Analog Input 3
1 Analog Input 2
2 Analog Input 1
3 Momentary start and momentary stop switches (using Di inputs)
4 Maintained start/stop using single Di input

*** System Messages Alarms And Shutdowns

0 All systems report normal
1 Analog Input AN3 sensor failure
2 Analog Input AN2 sensor failure
3 Analog Input AN1 sensor failure
4 Analog Input AN4 sensor failure
5 Analog Input AN0 sensor failure
6 All analog sensors have failed
7 Digital Input Di0 faulted
8 Digital Input Di1 faulted

9 Digital Input Di2 faulted
10 Digital Input Di3 faulted
11 Digital Input Di4 faulted
12 Digital Input Di5 faulted
13 Digital Input Di6 faulted
14 Digital Input Di7 faulted
15 Digital Input Di8 faulted
16 Digital Input Di9 faulted
17 Digital Input Di10 faulted
18 Digital Input Di11 faulted
19 Digital Input Di12 faulted
20 Digital Input Di13 faulted
21 Digital Input Di14 faulted
22 Digital Input Di15 faulted
23 The on/off switch is off and all faults reset
24 Analog Input AI3 low alarm/shutdown trip
25 Analog Input AI3 high alarm/shutdown trip
26 Analog Input AI2 low alarm/shutdown trip
27 Analog Input AI2 high alarm/shutdown trip
28 Analog Input AI0 low alarm/shutdown trip
29 Analog Input AI0 high alarm/shutdown trip
30 Analog Input AI4 high alarm/shutdown trip
31 Analog Input AI1 low alarm/shutdown trip
32 Analog Input AI1 high alarm/shutdown trip
33 Not used
34 Not used
35 Not used
36 Not used
37 Not used
38 Not used
39 Messaging Error

01 Read coils the maximum read is 1900 bits
03 Read holding registers the maximum read is 124 integers
15 Force coils the maximum write is 1900 bits
16 Preset holding registers the maximum write is 124 integers

Communication Ports

This series comprises 2 RS232/RS485 serial ports and a CANbus port.

⚠	▪ Turn off power before making communications connections.
Caution	▪ Always use the appropriate port adapters.

The serial ports are type RJ-11 and may be set to either RS232 or RS485 via DIP switches, in accordance with the table shown below.

Use RS232 to download programs from a PC, and to communicate with serial devices and applications, such as SCADA.

Use RS485 to create a multi-drop network containing up to 32 devices.

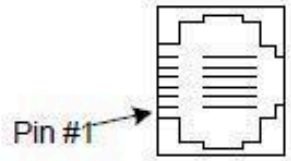
Pinouts

The pinouts below show PLC port signals.

To connect a PC to a port that is set to RS485, remove the RS485 connector, and connect the PC to the PLC via the programming cable. Note that this is possible only if flow control signals are not used (which is the standard case).

RS232	
Pin #	Description
1*	DTR signal
2	0V reference
3	TXD signal
4	RXD signal
5	0V reference
6*	DSR signal

RS485**		Controller Port
Pin #	Description	
1	A signal (+)	
2	(RS232 signal)	
3	(RS232 signal)	
4	(RS232 signal)	
5	(RS232 signal)	
6	B signal (-)	



*Standard programming cables do not provide connection points for pins 1 and 6.

**When a port is adapted to RS485, Pin 1 (DTR) is used for signal A, and Pin 6 (DSR) signal is used for signal B.

RS232 to RS485: Changing DIP Switch Settings

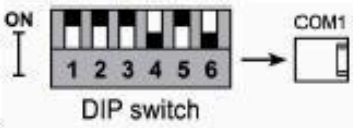
The ports are set to RS232 by factory default.

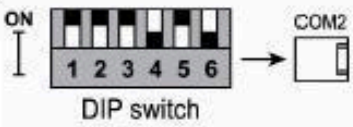
To change the settings, first remove the Snap-in I/O Module, if one is installed, and then set the switches according to the following table.

RS232/RS485: DIP Switch Settings

The settings below are for each COM port.

	Switch Settings					
	1	2	3	4	5	6
RS232*	ON	ON	ON	OFF	ON	OFF
RS485	OFF	OFF	OFF	ON	OFF	ON
RS485 with termination**	ON	ON	OFF	ON	OFF	ON





*Default factory setting

**Causes the unit to function as an end unit in an RS485 network

The TCP/IP settings are enterable on the Ethernet screen found inside the “Communications” section. You are able to specify the IP address, the subnet mask, and the default gateway. The Modbus ID number is fixed and cannot be changed (255) and the port number is fixed and cannot be changed (502).