OPERATION MANUAL

FOR BOOSTER PUMP CONTROLLERS

Table of Contents

1. Introduction

1.1 Scope

This operation manual provides the necessary resources to start up, commission and operate AMT Booster Pump Controllers. Start-up and commissioning of AMT Booster Pump Controllers must be performed by authorized representatives or by trained factory technicians. Operation of these systems must be restricted to authorized operators on site.

This manual is restricted to the program version referenced in the header.

1.2 Application

The AMT Booster Pump Controllers skids are intended for pressure boosting in potable water applications. These systems are allowed for use in residential, industrial and commercial environments and are compliant with UL 508a for Industrial Control Panels. If sold as a packaged Booster System, the systems are also compliant with UL QCZJ for Packaged Pumping Systems and NSF 61/ANSI 372 for potable water applications.

1.3 System Type Code Identification and Operating Parameters

The AMT Booster Pump Controllers can be easily identified by a 13 digit alpha numeric type code, starting with '00BP'. This model number, along with the operating parameter information for the controller is printed on the electrical data sticker and on the documentation supplied with the Booster Pump Controller. This type code contains information about product configuration and operational parameters refer to section 7 for type code information.

1.4 Additional Resources

User training, start-up and commissioning can be organized by contacting the authorized manufacturer's representative:

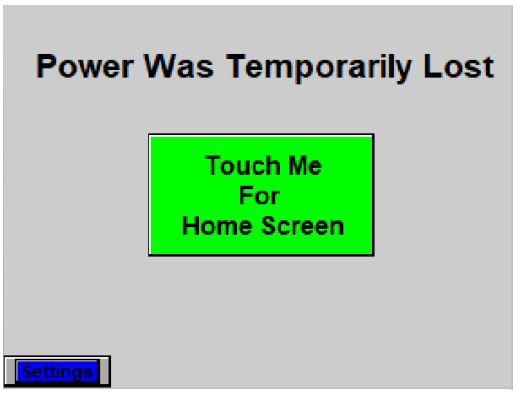
Additional resources and technical support can be obtained by contacting the factory:

Advanced Mechanical Technologies
201 W Gibson Lane,
Phoenix, AZ 85003
602.283.2220 · www.amechtech.com ·
sales@amechtech.com

2. Touchscreen Operation

2.1 Initial Start Up Screen

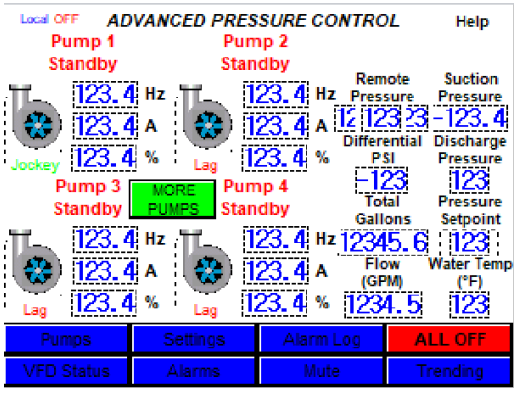
Upon initially powering up the controller, the touchscreen will display a notification screen (ref. *Screen 1 Startup/Power Lost*)



Screen 1 Startup/Power Lost

indicating initial start-up or that the power was lost to the system.

The home screen can be reached to by pressing the 'Touch Me for Home Screen' button on this screen. If initial configuration has not been performed on the system, the settings menu can be accessed by the "Settings" button and with the corresponding password.

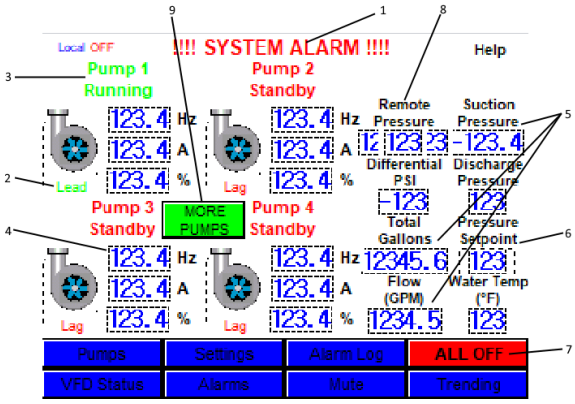


Screen 2 Home Screen

2.2 Home Screen

The Home Screen (ref. Screen 2 Home Screen) displays the current operating parameters and current setpoint for the system. It is accessible from most screens by pressing the “Home” button.

The home screen presents the following information (ref. Screen 3 Home Screen Details):



Screen 3 Home Screen Details

System Alarm indication – indicates that the system currently has an active alarm condition. Active alarms can be accessed by the ‘Alarm’ Button and an alarm log can be accessed by the ‘Alarm Log’ Button. This text reads ‘ADVANCED PRESSURE CONTROL’ when there are no active alarms.

Lead – Lag indication – indicates whether a pump is lead or lag. Pumps are set on an alternation cycle that determines this status.

Pump run indication – indicates that the pump is running. This text reads ‘Pump _ Standby’ while pump is not running.

VFD operating characteristics – this section displays the operating characteristics of the pumps currently running, based on the readings from the respective VFD. If the pump is not running, these characteristics will display a 0.

System operating characteristics – this section displays the system operating characteristics, namely the system suction and discharge pressures (in psi), the current and total flow (in gpm), fluid temperature (in °F) and level of water readings (in ft). The flow, temperature and water level readings are only displayed if the system is configured with the requisite sensors.

System pressure setpoint – this reading displays the current setpoint of the system in psi.

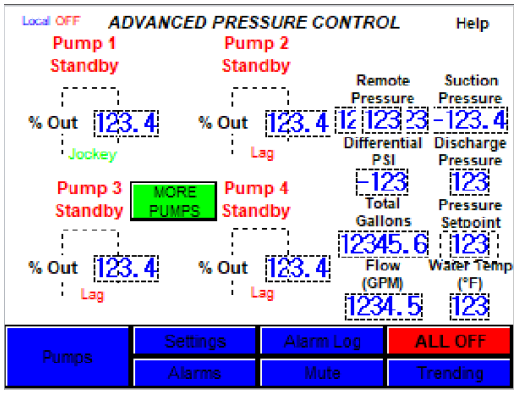
E-Stop – the ‘ALL OFF’ button acts as a software E-Stop button. Press and hold this button for two seconds to stop all pumps.

Remote Pressure – if the system is configured with a remote pressure sensor, this readout is displayed with pressure at the remote sampling point in psi.

MORE PUMPS – if the system is configured with more pumps, an additional screen accessible by pressing the ‘MORE PUMPS' button is available that displays the information on this screen along with the information for the additional pumps.

2.3 Home Screen for across the line starter control

In some cases, the controller may have been ordered with across the line starter controls in lieu of VFDs. In these cases, the Home Screen will be displayed as shown in ref. Screen 4 Home Screen Alternative. Some functionality and safeties are lost in this case. Consult the factory for more information on across the line starter



Screen 4 Home Screen Alternative

equipped controls.

2.4 Help Screen

While on the home screen, touching the ‘Help’ button will display the Help Screen (ref. Screen 5 Help Screen). This screen will display the contact information for help with the system. This screen also provides the serial number of the system and the program version of the system. Ensure that the system program version matches the version this manual is intended for.

Screen 5 Help Screen

Contact the local representative or the Factory for any assistance with the system. Always provide the serial number and program version when seeking help with the system.

2.5 Accessing Settings

The next few sections cover settings that govern the system operation and can only be accessed with the correct passwords. Each settings screen will have its own password. The settings

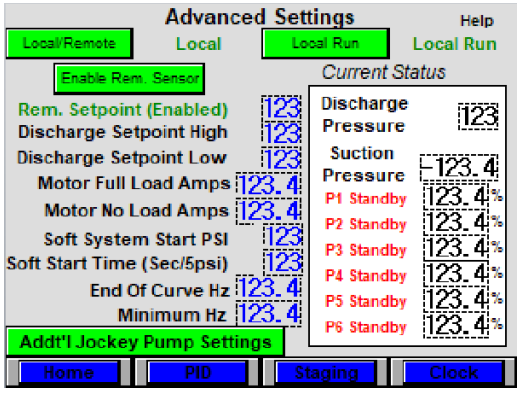
screen can be accessed by pressing the 'Settings' button on the Home Screen, which will bring up the password entry screen.

Screen 6 Password Entry Screen

Entering the correct password will display the settings screens detailed in the next few sections. The information on these screens must be modified by a trained operator or under the supervision of the building manager. Consult the local representative for more information and training.

2.6 Advanced Settings

The Advanced Settings Screen (ref. Screen 7 Advanced Settings) can be used to change the system setpoint and modify other system behaviors. The status of the system is displayed on the right of the screen. The Advanced Settings Screen group is comprised of the Advanced Settings, PID Settings, Staging Settings and Clock Settings pages and can all be accessed



Screen 7 Advanced Settings

together.

2.6A Discharge Setpoint

The Advanced Settings Screen can be used to change the setpoint. AMT controllers make use of Friction Loss Optimization (FLO) technology and require two setpoints – Discharge Setpoint Low and Discharge Setpoint High. As higher flow is required in the system, the adjusted setpoint will automatically increase based on these Low and High Setpoints to account for the additional friction losses from higher fluid velocity.

2.6B Motor Full Load and No Load Amperage

These values are set at the factory unless the controller is supplied without pumps. The values should always match the motor nameplate and are used for end of curve and no load detection.

2.6C Soft System Start PSI

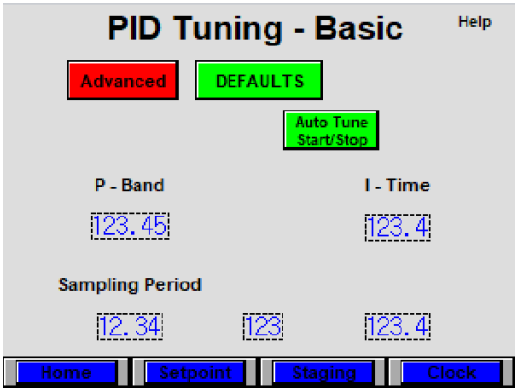
This is the pressure value below the Discharge Pressure in psi. If the system discharge pressure falls below this value, it allows the system to adjust the system pressure back to setpoint slower, to avoid water hammer. This value is typically set 20-30 psi below the discharge setpoint.

2.6D Soft Start Time (Sec/5psi)

This setting allows the user to define the time over which the soft start is in effect. The time defines how long every 5 psi increase in the system is spread out over.

2.7 PID Settings

The PID Settings page (ref. Screen 8 PID Settings) can be accessed from the Advanced Settings Page group by pressing the 'PID' button. These settings affect the pump ramp up and speed behavior, relative to the setpoint and the current discharge



Screen 8 PID Settings

pressure.

AMT controllers use a PI loop for pressure boosting applications:

2.7A P-Band

This value sets the proportional gain of the controller's PID loop. This affects how slowly or quickly the controller responds to the difference between the setpoint and the process value (discharge pressure).

2.7B I-Time

This value sets the integral time of the controller's PID loop. This affects how much the controller compensates to account deviations from the setpoint. A higher integral value factors in deviations from the setpoint over a larger period. A higher integral value can sometimes alleviate 'hunting' behavior in PID loops.

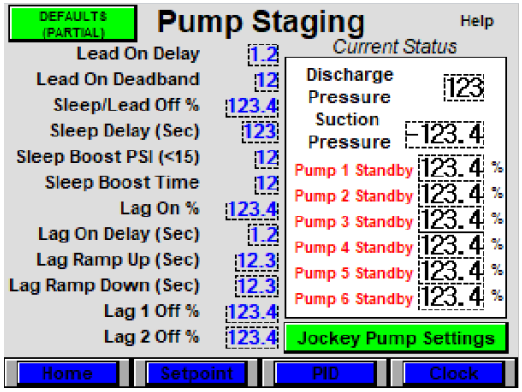
2.7C Sampling Period

This value specifies the sampling interval for the PID loop.

It is recommended consult the local representative for PID tuning. PID tuning should be performed by authorized representatives or by trained factory personnel.

2.8 Staging Settings

Staging Settings Screen (ref. Screen 9 Staging Settings) displays the Pump Staging settings for the controller. This screen can be accessed from the Advanced Settings Screen group by the 'Staging' Button.



Screen 9 Staging Settings

2.8A Lead On Delay

The Lead On Delay sets the time in seconds the controller delays bringing the lead pump on when the discharge pressure drops below the setpoint.

2.8B Lead On Deadband

The Lead On Deadband sets in psi, the amount of drop in pressure under the setpoint the controller allows before bringing on the lead pump.

Lead On Delay and Lead On Deadband Settings are intended to prevent frequent starts of the pumps and conserve energy with minimal impact to functionality.

2.8C Sleep/Lead Off %

The Sleep/Lead Off % setting is intended to conserve energy in a no-flow situation and ensures continuation of pump run status while there is still flow in the system.

To determine the value of this setting, restrict the flow through the discharge by closing a valve, downstream from the system (note, do not close the pump isolation valve for this operation). Monitor the output % and set the Sleep/Lead Off % value slightly above this value.

2.8D Sleep Delay (Sec)

The Sleep Delay setting sets in seconds, the time the controller allows the pumps to run after the demand is met. This setting ensures proper pressurization of the hydro-pneumatic tank and reduces the energy consumption overall. This value is typically set to 60 seconds.

2.8E Sleep Boost PSI (<15)

The Sleep Boost PSI sets in psi, the amount of over pressurization the controller affects on the system after the setpoint is met. This setting reduces frequent system starts when the discharge pressure falls below the setpoint.

2.8F Sleep Boost Time

The Sleep Boost Time setting determines the time in seconds, the controller waits before turning off the lead pump.

2.8G Lag On %

Lag On % determines when a lag pump is turned on. This setting is specified as a % of the lead pump running. Once the capacity of the lead pump surpasses this value, a lag pump is brought online. Refrain from setting this value at 100% to prevent inefficient operation. Typically, this setting is set at factory between 90-95%, but it can be adjusted in the field.

2.8H Lag On Delay (Sec)

Lag On Delay setting determines in seconds the time the controller waits to bring the lag pump on, after satisfying the Lag On % threshold.

2.8I Lag Ramp Up (Sec) and Lag Ramp Down (Sec)

Lag Ramp Up and Lag Ramp Down settings influence lag pump ramp behaviors. The ramp up setting is set to 2 seconds and ramp down is set to 1 second at the factory. For pumps over 10 hp, the ramp up setting can be higher for a smoother response.

2.8J Lag 1 Off % and Lag 2 Off %

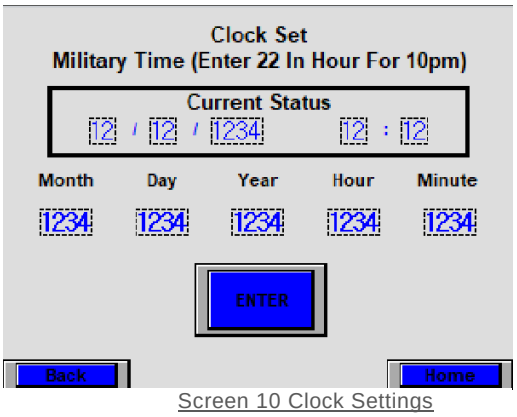
The Lag 1 Off % and Lag 2 Off % settings determine the % capacity of the respective lag pump at which it is taken to standby. These values can vary depending on the pump curve, but need to be between Lead Off % and Lag On % and can be adjusted as seen fit to deter rapid staging.

Consult the local authorized representative for help with these settings.

2.9 Clock Settings

The Clock Settings Screen (ref. Screen 10 Clock Settings) can be accessed from the Advanced Settings Screen group by the 'Clock' button.

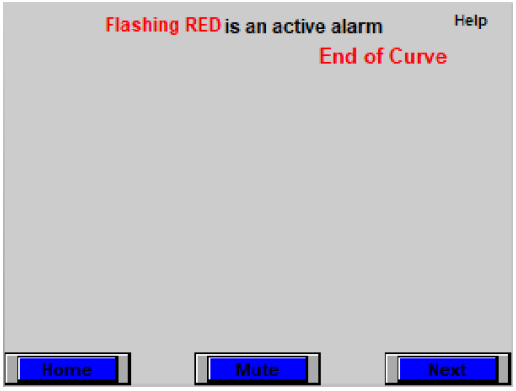
To set the date and time, touch the numerical indicators and enter the values on the keypad, followed by the 'ENT' button. Once all values have been set, press 'ENTER' button to store the values.



Screen 10 Clock Settings

2.10 Active Alarms Screen

The Active Alarms Screen (ref. Screen 10 Active Alarms Screen) displays all currently active alarm conditions. It can be accessed from the home screen by using the 'Alarms' button.

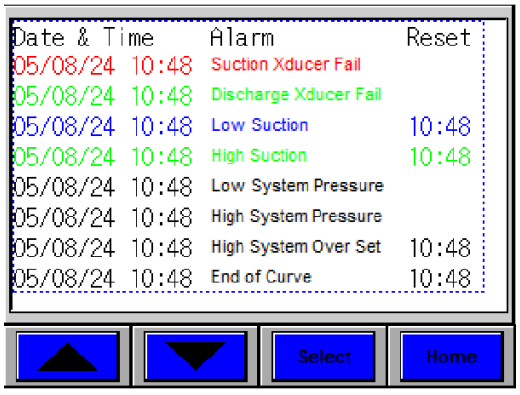


Screen 11 Active Alarms Screen

When an alarm is active, it will be displayed on the screen, flashing in red. The words "Flashing RED" on the screen will also be displayed and flashing. When no active alarm conditions exit, the words "Flashing RED" remain static in black color. If one or more alarms are active, flashing and the buzzer is sounding, the buzzer can be muted using the 'Mute' button on the Active Alarms Screen. Note that if no active alarms are visible on the current screen, yet the system is indicating an active alarm, you may find them on the next screen by using the 'Next' button.

2.11 Alarm Log

All currently active alarms, past records of alarm incidences can be accessed from the Alarm Log Screen (ref. Screen 12 Alarm Log Screen)

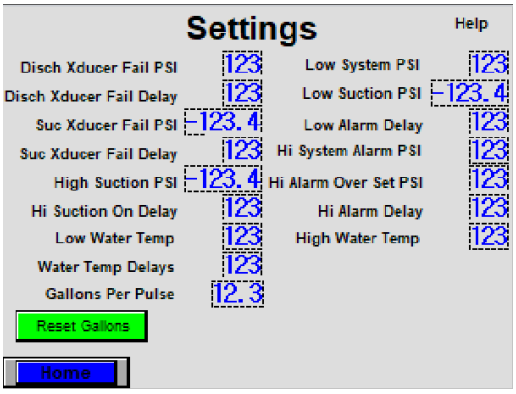


Screen 12 Alarm Log Screen

This screen will display the date and time of occurrence of the alarm, the type of alarm and the time of recovery. Use the navigation button to scroll through the list of alarms and the 'Home' button to return to the home screen.

2.12 Alarm Threshold Settings

The Alarm Threshold Settings Screen (ref. Screen 13 Alarm Threshold Settings Screen) allows you to configure the alarm triggers and delays. This screen can be accessed from the home screen using the 'Settings' button and by inputting the correct password.



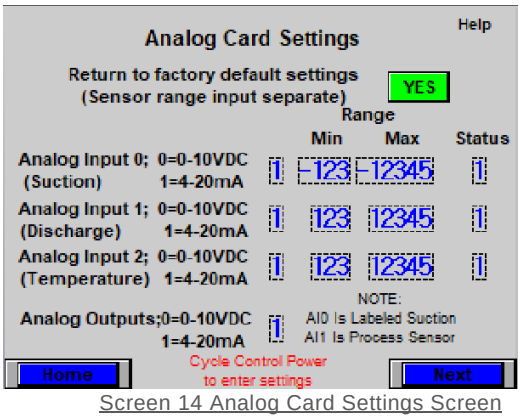
Screen 13 Alarm Threshold Settings Screen

This screen has the trigger thresholds for the Suction and Discharge Transducer failure pressures, High and Low Suction Alarm pressures, Low and High System Alarm pressures and a High Alarm over the setpoint pressure. All these settings also have delays, which are set at the factory to 5 seconds. Depending on the system configuration, this page may also display the High and Low Water Temperature settings, the respective Water Temperature Delay settings (also set to 5 seconds as factory default) and a Gallons Per Pulse for a flowmeter.

If assistance is required with these settings, you may contact your local factory representative.

2.13 Analog Card Settings/Sensor Scaling

The Analog Card Settings Screen (ref. Screen 14 Analog Card Settings Screen) defines the sensor scaling and monitors the behavior of the sensors connected to the system. This screen can also be accessed from the home screen using the 'Settings' button and typing in the correct password. The Analog Card



Screen 14 Analog Card Settings Screen

Settings are spread out over two screens and the next screen can be accessed using the 'Next' Button.

The first screen displays the Analog Input 0, labelled Suction and Analog Input 1 labelled Discharge, Analog Input 2 labelled Temperature and Analog Outputs for VFD control. For all the Input Settings, the data is displayed in four columns for the type of signal, minimum signal scaling, maximum signal scaling and sensor status. Except for the Suction sensor, all other sensor values must match the ranges of the transducers/sensors. For the Suction transducer, the minimum and maximum values are multiplied by 10.

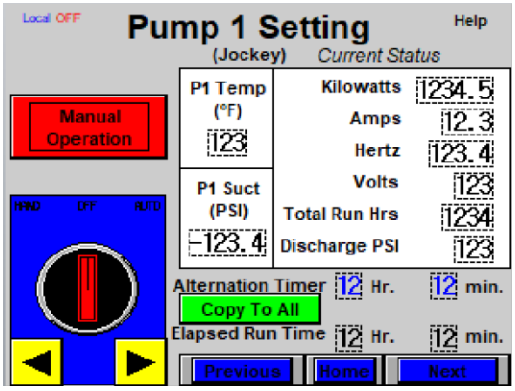
The status column monitors the status of each of the transducers and can be interpreted by the following table:

Table 1 Analog Input Status

Status	Description
0	Normal Operation
1	Converting Data (occurs during first data conversion after power up)
2	Initializing
3	Invalid parameter or analog input channel not available on the installed module
4	Hardware failure (external power supply failure)
5	Incorrect wiring (input data over valid range)
6	Incorrect wiring (input data below valid range or current loop open)

2.14 Pump Control

Each individual pump controls can be accessed on the Pump Settings Screen corresponding to the pump number (ref. Screen15 Pump 1 Setting Screen). This screen can be accessed from the home screen by tapping on the corresponding pump icon or by tapping the 'Pumps' button on the home screen. This screen displays the controls to operate each pump as well as the real time characteristics of the pump. If configured with additional sensors for each pump such as a temperature sensor or a suction pressure sensor, the data would be displayed on this screen. Use



Screen 15 Pump 1 Setting Screen

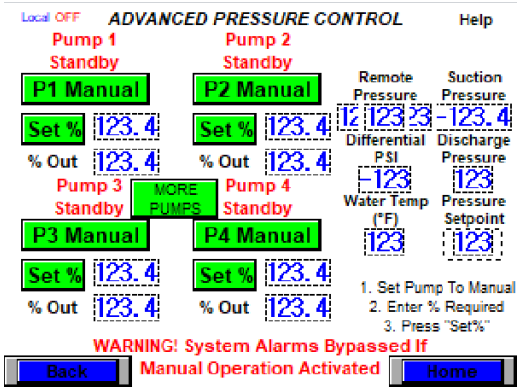
the 'Next' and 'Previous' buttons to cycle between the settings page for each pump.

To operate a pump, touch the right arrow on the HOA (Hand-Off-Auto) switch to move the digital toggle to the 'Auto' position. The 'Auto' position places the pumps in an alternation cycle and cycles them on and off based on the pump staging settings to optimize energy consumption. It also alternates the pumps to exert even wear on all pumps. Note that the alternation timer must be set to operate the pumps in 'Auto' mode – this is typically set to 6, 12, 24 or 48 hours. This value is set individually for each pump, but it can be copied to all pumps using the 'Copy To All' button.

Setting the pump operation to 'Hand' will run the pump constantly so long as there is not an active alarm that would prevent the pump from running.

2.15 Manual Override of Pump Control

If a complete failure of sensors or VFD communication occurs, you can force a manual override of the Pump Control. The Manual Operation Screen (ref. Screen 16 Manual Operation Screen) can be accessed from the Pump Settings page, using the 'Manual Operation' button.



Screen 16 Manual Operation Screen

Each pump can be manual overridden by the following steps:

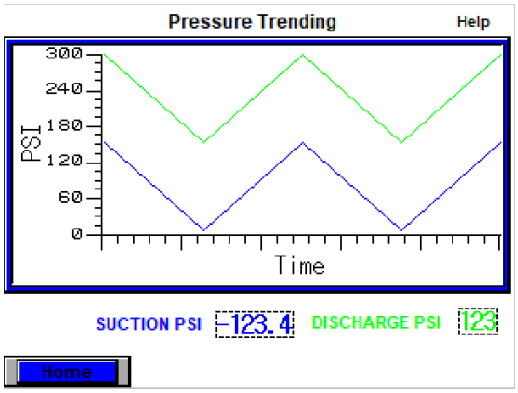
1. Override the desired pump to run manually by pressing the 'Px Manual' button, where 'x' indicates the pump number.
2. The run percentage is set based on the minimum run frequency by default. To override this value, input the desired run percentage as a decimal number by tapping on the numbers to the left of 'Set %' button for the corresponding pump. Press the 'Set %' button to change the output percentage.

It is not recommended to lower the Set % value below the minimum.

2.16 Pressure Trending

The Trending screen (ref. Screen 17 Trending Screen) plots the system parameter history as a graph. This screen indicates the suction and discharge pressure (in psi) as a line graph.

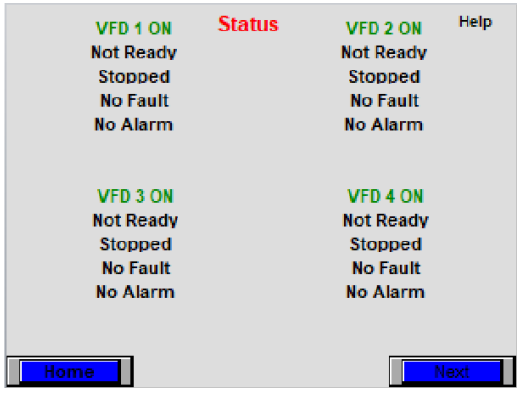
The Trending Screen can be accessed from the 'Home' screen using the 'Trending' Button



Screen 17 Trending Screen

2.17 VFD Status

The VFD Status Screen (ref. Screen 18 VFD Status Screen) indicates the current status of the each VFD that controls the pumps. It is accessible from the 'Home' Screen by the 'VFD Status' button. If there is a VFD Fault/Off condition in the system, more information on this error can be found on this screen.

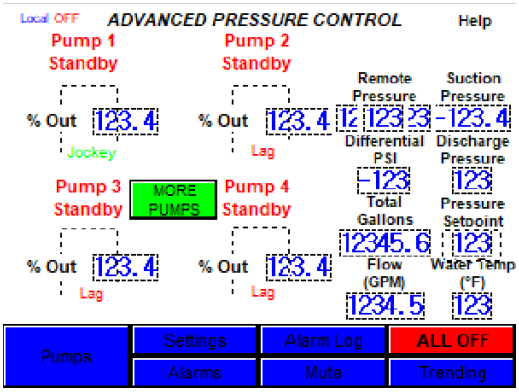


Screen 18 VFD Status Screen

Note that a VFD fault may occur if the HOA button present on the VFD is not set to Auto and the pump is run.

2.18 Loss of System Configuration

AMT boosters are factory configured as ordered and this information is stored in the volatile memory, retained using the power from the battery located inside the controller. If the system is powered down for a period of more than 12 months, the battery may drain, and system may lose its configuration. If this occurs an alternative home screen (ref. Screen 19 Loss of configuration) will appear. To restore the system configuration, please contact your local authorized representative.



Screen 19 Loss of Configuration

3. List of Alarms

This section lists the possible alarms that may occur on an AMT Booster Pump Controller, their purpose and possible mitigation of these alarms.

Alarm	Possible Cause	Mitigation
Discharge Transducer Fail	Discharge transducer failure/Discharge pressure below alarm threshold.	Check discharge pressure. If discharge pressure matches, gauge pressure on discharge, the transducer needs replacement
Suction Transducer Fail	Suction transducer failure/Suction pressure below alarm threshold.	Check suction pressure. If discharge pressure matches, gauge pressure on discharge, the transducer needs replacement
Low Suction	Suction pressure below alarm threshold	Check water supply and ensure there are no interruptions
High Suction	Suction pressure over alarm threshold	Check water supply. Ensure pressure transducer is functional and isolate booster if necessary to prevent damage to pumps.
Low System	Discharge pressure below alarm threshold	Check pump function and that the discharge transducer is functional. If problem persists, contact the authorized factory representative.
High System	Discharge pressure is above alarm threshold	Check pump function and that the discharge transducer is functional. If problem persists, contact the authorized factory representative.
High System Over Setpoint	Discharge pressure is over the setpoint, and the difference is over the alarm threshold.	Check the Setpoint and staging settings to ensure that the system is not overshooting the setpoint. Check the PID to ensure that the system is not overshooting the setpoint. Check for pump manual operation.
Enclosure High Temperature	Enclosure thermostat is reading high temperature	Ensure enclosure fan (or AC if equipped) is functional. Supply more air to enclosure. Ensure ambient temperature is not excessively high. Check thermostat functionality
Low Water Temperature	Water temperature is below the alarm threshold	Check water supply. Shut off and isolate system to prevent damage.
Hi Water Temperature	Water temperature is above the alarm threshold	Check water supply. Shut off and isolate system to prevent damage.
Dry Suction	Dry run prevention sensor has detected loss of water supply.	Check water supply. Ensure that the suction side plumbing is free of Debris
End of Curve	Pump is unable to meet the duty point	Check water discharge. Ensure there are no open fittings or damage to plumbing. Contact factory if problem persists.
Px Underload	Pump ‘x’ is operating with no load	Check water discharge. If there isn’t enough flow, check to see if there is damage to plumbing. Consider reducing the setpoint. Contact factory if problem persists
VFDx Fault	VFD is displaying a fault for pump ‘x’	Check VFD display to identify the fault code. Consult supplied VFD manual for drive specific fault information. Ensure VFD is enabled, powered on and is in Auto mode. Consult factory if problem persists.
Low Tank Level	Controller level transmitter has detected a low level condition	Check tank levels and tank supply. Check level transmitter functionality.
High Tank Level	Controller level transmitter has detected a high level condition	Check tank levels and tank supply. Check level transmitter functionality.
Px Low Temperature	Temperature transmitter for Pump ‘x’ is indicating a low temperature	Check water supply for Pump ‘x’.
Px High Temperature	Temperature transmitter for Pump ‘x’ is indicating a high temperature	Check water supply for Pump ‘x’. Pump inspection may be required to ensure that there is no damage to the impellers.
Px Low Suction	Pump ‘x’ has a low suction pressure.	Check water supply to pump ‘x’. Check pressure transmitter for pump ‘x’.
Suction Transducerx Fail	Suction pressure transducer has failed for pump ‘x’.	Check water supply to pump ‘x’. Check pressure transmitter for pump ‘x’.
Px Not Primed	Pump ‘x’ is currently not primed and is at risk of cavitation.	Check water supply to pump ‘x’. Ensure pump volute is free of air.
Remote Sensor x Fail	Remote sensor ‘x’ has failed	Check remote sensor ‘x’. Replace if necessary.
Remote Sensor Error	Remote sensor values out of range	Check remote sensor range in sensor scaling settings. Check wiring for remote sensor
Low Tank Level Float	Controller float has detected a low level condition	Check tank levels and tank supply. Check float functionality.
High Tank Level Float	Controller float has detected a high level condition	Check tank levels and tank supply. Check float functionality.
Prime Pump Fail	Prime pump has failed to run	Check prime pump. Check prime pump motor overload and contactor for failure
Tank Fill Pump Fail	Tank fill pump has failed to run	Check tank fill pump. Check tank fill pump motor overload and contactor for failure.

4. BACnet Points Reference

Some AMT Booster Pump Controllers may be equipped with a BACnet communication module. This section provides information to map information relayed from these BACnet modules. For more information on BACnet modules and communication, please contact your authorized local representative or the factory.

Description	Data Type	Database Start Address	Number of Objects	Data Type	Size per Object	Multiplier
Real-time Clock	**Clock**	0	8	8-Bit Unsigned	1	1
Discharge Press	Analog	0	1	16-Bit Unsigned	2	1
Press Setpoint	Analog	2	1	16-Bit Unsigned	2	1
Suction Press	Analog	4	1	16-Bit Signed	2	0.1
Temperature	Analog	6	1	16-Bit Unsigned	2	1
General Alarm	Analog	8	1	16-Bit Unsigned	2	1
P1 %	Analog	26	1	16-Bit Unsigned	2	0.1
P1 Hz	Analog	28	1	16-Bit Unsigned	2	0.1
P1 kW	Analog	30	1	16-Bit Unsigned	2	0.1
P1 Amps	Analog	32	1	16-Bit Unsigned	2	0.1
P1 Volts	Analog	34	1	16-Bit Unsigned	2	1
P1 Hours	Analog	36	1	16-Bit Unsigned	2	1
P2 %	Analog	38	1	16-Bit Unsigned	2	0.1
P2 Hz	Analog	40	1	16-Bit Unsigned	2	0.1
P2 kW	Analog	42	1	16-Bit Unsigned	2	0.1
P2 Amps	Analog	44	1	16-Bit Unsigned	2	0.1
P2 Volts	Analog	46	1	16-Bit Unsigned	2	1
P2 Hours	Analog	48	1	16-Bit Unsigned	2	1
P3 %	Analog	50	1	16-Bit Unsigned	2	0.1
P3 Hz	Analog	52	1	16-Bit Unsigned	2	0.1
P3 kW	Analog	54	1	16-Bit Unsigned	2	0.1
P3 Amps	Analog	56	1	16-Bit Unsigned	2	0.1
P3 Volts	Analog	58	1	16-Bit Unsigned	2	1
P3 Hours	Analog	60	1	16-Bit Unsigned	2	1
P4 %	Analog	62	1	16-Bit Unsigned	2	0.1
P4 Hz	Analog	64	1	16-Bit Unsigned	2	0.1
P4 kW	Analog	66	1	16-Bit Unsigned	2	0.1
P4 Amps	Analog	68	1	16-Bit Unsigned	2	0.1
P4 Volts	Analog	70	1	16-Bit Unsigned	2	1
P4 Hours	Analog	72	1	16-Bit Unsigned	2	1
P5 %	Analog	74	1	16-Bit Unsigned	2	0.1
P5 Hz	Analog	76	1	16-Bit Unsigned	2	0.1
P5 kW	Analog	78	1	16-Bit Unsigned	2	0.1
P5 Amps	Analog	80	1	16-Bit Unsigned	2	0.1
P5 Volts	Analog	82	1	16-Bit Unsigned	2	1
P5 Hours	Analog	84	1	16-Bit Unsigned	2	1
P6 %	Analog	86	1	16-Bit Unsigned	2	0.1
P6 Hz	Analog	88	1	16-Bit Unsigned	2	0.1
P6 kW	Analog	90	1	16-Bit Unsigned	2	0.1
P6 Amps	Analog	92	1	16-Bit Unsigned	2	0.1
P6 Volts	Analog	94	1	16-Bit Unsigned	2	1
P6 Hours	Analog	96	1	16-Bit Unsigned	2	1
Remote Pressure Sensor	Analog	98	1	16-Bit Unsigned	2	1
Level (ft)	Analog	100	1	16-Bit Unsigned	2	0.1
Flow (GPM)	Analog	102	1	16-Bit Unsigned	2	1
Total Gallons	Analog	104	1	32-Bit Unsigned	4	1
Remote Sensor 2	Analog	108	1	16-Bit Unsigned	2	1
Pump 1 Run	Binary	10	1	8-Bit Unsigned	1	n/a
Pump 2 Run	Binary	10	1	8-Bit Unsigned	1	n/a
Pump 3 Run	Binary	10	1	8-Bit Unsigned	1	n/a
Pump 4 Run	Binary	10	1	8-Bit Unsigned	1	n/a
Pump 5 Run	Binary	10	1	8-Bit Unsigned	1	n/a
Pump 6 Run	Binary	10	1	8-Bit Unsigned	1	n/a
Suct Transducer Fail	Binary	12	1	8-Bit Unsigned	1	n/a
Disc Transducer Fail	Binary	12	1	8-Bit Unsigned	1	n/a
Low Suction PSI	Binary	12	1	8-Bit Unsigned	1	n/a
High Suction PSI	Binary	12	1	8-Bit Unsigned	1	n/a
Low System PSI	Binary	12	1	8-Bit Unsigned	1	n/a
High System PSI	Binary	12	1	8-Bit Unsigned	1	n/a
High Sys Over SP	Binary	12	1	8-Bit Unsigned	1	n/a
End Of Curve	Binary	12	1	8-Bit Unsigned	1	n/a

Underload Pump 1	Binary	13	1	8-Bit Unsigned	1	n/a
Underload Pump 2	Binary	13	1	8-Bit Unsigned	1	n/a
Underload Pump 3	Binary	13	1	8-Bit Unsigned	1	n/a
Underload Pump 4	Binary	13	1	8-Bit Unsigned	1	n/a
Underload Pump 5	Binary	13	1	8-Bit Unsigned	1	n/a
Underload Pump 6	Binary	13	1	8-Bit Unsigned	1	n/a
Low Water Temp	Binary	13	1	8-Bit Unsigned	1	n/a
High Water Temp	Binary	14	1	8-Bit Unsigned	1	n/a
Sys Not Primed	Binary	14	1	8-Bit Unsigned	1	n/a
P1 Not Primed	Binary	14	1	8-Bit Unsigned	1	n/a
P2 Not Primed	Binary	14	1	8-Bit Unsigned	1	n/a
P3 Not Primed	Binary	14	1	8-Bit Unsigned	1	n/a
P4 Not Primed	Binary	14	1	8-Bit Unsigned	1	n/a
P5 Not Primed	Binary	14	1	8-Bit Unsigned	1	n/a
P6 Not Primed	Binary	14	1	8-Bit Unsigned	1	n/a
VFD1 Fault/Off	Binary	15	1	8-Bit Unsigned	1	n/a
VFD2 Fault/Off	Binary	15	1	8-Bit Unsigned	1	n/a
VFD3 Fault/Off	Binary	15	1	8-Bit Unsigned	1	n/a
VFD4 Fault/Off	Binary	15	1	8-Bit Unsigned	1	n/a
VFD5 Fault/Off	Binary	15	1	8-Bit Unsigned	1	n/a
VFD6 Fault/Off	Binary	15	1	8-Bit Unsigned	1	n/a
Enclosure OT	Binary	16	1	8-Bit Unsigned	1	n/a
Manual Operation	Binary	16	1	8-Bit Unsigned	1	n/a
Rem Sens 1 Fail	Binary	16	1	8-Bit Unsigned	1	n/a
Rem Sens 2 Fail	Binary	16	1	8-Bit Unsigned	1	n/a
Rem Sens Error	Binary	16	1	8-Bit Unsigned	1	n/a
Low Tank Level	Binary	17	1	8-Bit Unsigned	1	n/a
High Tank Flt	Binary	17	1	8-Bit Unsigned	1	n/a
Fill Pump Fail	Binary	17	1	8-Bit Unsigned	1	n/a
Prime Pump Fail	Binary	17	1	8-Bit Unsigned	1	n/a
P1 Low Temp	Binary	18	1	8-Bit Unsigned	1	n/a
P2 Low Temp	Binary	18	1	8-Bit Unsigned	1	n/a
P3 Low Temp	Binary	18	1	8-Bit Unsigned	1	n/a
P4 Low Temp	Binary	18	1	8-Bit Unsigned	1	n/a
P5 Low Temp	Binary	18	1	8-Bit Unsigned	1	n/a
P6 Low Temp	Binary	18	1	8-Bit Unsigned	1	n/a
P1 High Temp	Binary	19	1	8-Bit Unsigned	1	n/a
P2 High Temp	Binary	19	1	8-Bit Unsigned	1	n/a
P3 High Temp	Binary	19	1	8-Bit Unsigned	1	n/a
P4 High Temp	Binary	19	1	8-Bit Unsigned	1	n/a
P5 High Temp	Binary	19	1	8-Bit Unsigned	1	n/a
P6 High Temp	Binary	19	1	8-Bit Unsigned	1	n/a
P1 Low Suction	Binary	20	1	8-Bit Unsigned	1	n/a
P2 Low Suction	Binary	20	1	8-Bit Unsigned	1	n/a
P3 Low Suction	Binary	20	1	8-Bit Unsigned	1	n/a
P4 Low Suction	Binary	20	1	8-Bit Unsigned	1	n/a
P5 Low Suction	Binary	20	1	8-Bit Unsigned	1	n/a
P6 Low Suction	Binary	20	1	8-Bit Unsigned	1	n/a
P1 Suction Fail	Binary	21	1	8-Bit Unsigned	1	n/a
P2 Suction Fail	Binary	21	1	8-Bit Unsigned	1	n/a
P3 Suction Fail	Binary	21	1	8-Bit Unsigned	1	n/a
P4 Suction Fail	Binary	21	1	8-Bit Unsigned	1	n/a
P5 Suction Fail	Binary	21	1	8-Bit Unsigned	1	n/a
P6 Suction Fail	Binary	21	1	8-Bit Unsigned	1	n/a

5. Storage

During transport and storage, the Booster Pump Controller must be securely stowed and strapped down at must be at a temperature between 0°C – 50°C and a relative humidity of maximum 95%, with no condensation.

Before installation, carefully check for damage and debris.

6. Maintenance and Care

Your AMT Booster Pump Controller is a self-monitoring automated control system requiring minimal periodic maintenance. Ensuring periodic maintenance as prescribed below prolongs the life of the controller.

Component	Maintenance Interval	Maintenance Procedure
Enclosure inlet filers	6 months	The enclosure is equipped with inlet air filters on both sides of the enclosures. These filters clog up over time with debris and need to be cleaned. To remove these filters, simply push the filter up and swing it out. The filters are washable and can be subjected to pressurized sprays of water. Before re-installing filters, ensure they are completely dry
Backup Battery	1 year	The backup battery is located in a tray on the top of the Programmable Logic Controller (PLC). When the battery is low, a red status LED on the front face of the PLC, adjacent to 'BAT' begins to flash every second. If LED is continuously illuminated, the battery is depleted and needs to be replaced immediately. The battery tray can be safely ejected while the system is powered on. Simply pry it open with a small flathead screwdriver and replace old battery with a new one. Battery model: BR2032/CR2032A/CR2032B/CR2032X/CR2032W **WARNING:** If the system is powered down to replace the battery, the system needs to be powered back on within 1 minute to prevent loss of configuration data. Alternatively, the battery replacement can also be performed with the system powered on or the PLC is powered from the front USB port.
Enclosure internal cleaning	6 months	Every 6 months, power down the controller, visually inspect the interior of the enclosure to ensure it is free from dirt and debris. Clean out the interior if necessary and wipe down with a soft cloth. Do not use harsh industrial cleaners. Some amount of dust is acceptable and is not a cause for alarm.

7. AMT Booster Controller Type Code Detail

00BP	A	2	C	V	H	D	A	N	F
Booster Pump Controller	**Type of Water Feed** A – City Water Feed B – Break Tank Feed C – Suction Lift Feed	**Number of Pumps**	**Style of Touchscreen** B – 4.3" color touchscreen C – 5.7" color touchscreen	**Speed Control** O – Across the line control V – Variable speed control	**Horsepower Rating** A - ⅓ B - ½ C - ¾ D - 1 E - 1½ F - 2 G - 3 H - 5 I - 7½ J - 10 K - 15 L - 20 M - 25 N - 30 O - 40 P - 50 Q - 60 R - 75 S - 100 T - 125 U - 150 V - 175 W - 200	**Electrical Supply** A - 230V, 1Ph B - 208V, 3Ph C - 230V, 3Ph D - 480V, 3Ph E - 115V, 1Ph F - 208V, 1Ph	**Environmental Rating** A - UL Type 1 B - UL Type 3R C - UL Type 4 D - UL Type 4X	**Dead Front** Cover Y - Yes N - No	**Climate Control Option** A - Air Conditioner F - Fan H - Heater X - No Climate Control