



STS 6000 P-35



The STS 6000 P-35 is a programmable, fully automated, fuel maintenance system that removes water, sludge, and other contaminants from fuel storage tanks. Once installed, the STS 6000 P-35 system operates in coordination with an external pump to passively filter out contaminants from the passing fuel. The system's fuel polishing process stabilizes diesel and bio-fuels, eliminates microbial contamination, and ensures fuel remains clean. The STS system's NEMA rated enclosure allows for both outdoor and indoor installations by protecting the system from falling rain, sleet, snow, and external ice formation.



STS 6000 P-35 SPECIFICATIONS:

Nominal Flow Rate	30 GPM/1800 GPH (113.6 LPM/6,814 LPH)
Primary Filter	1, 5, 10 or 25µ Coalescing Filter Element
Secondary Filter	3, 10 or 25µ Fine Filter or 3, 10µ Water Block
Fuel Conditioner	LG-X 4000 Inline Magnetic Conditioner
System Controller	SFC80 Smart Filtration Controller with Safety and Alarm Features
Power	120V/60Hz/1Ph, 230V/50Hz/1Ph, or 208-230V/60Hz/1Ph
Plumbing	Black Iron
Ports	1.5" NPT In, 1.5" NPT Out
System Enclosure	NEMA 3R Rated Powder Coated (Standard), NEMA 4, or NEMA 4X Rated Stainless Steel
Controller Enclosure	NEMA 4 and UL508a Rated
Dimensions	≈ 56" x 72" x 17" (H x W x D) (142 x 183 x 43 cm)
Weight	≈ 404 lbs (183.3 kg)
Not for use with fluids that have a flash point below 100°F (37.8°C).	

STS 6000 P-35 FEATURES:

- Smart Filtration Controller
- Fully Automated and Programmable Operation
- Integration with External Monitoring Systems
- Unique Safety & Alarm Features
- System Upgrade Options

For safe operation, the STS 6000 P-35 is equipped with alert indication to notify users of when the system requires servicing.

REPLACEMENT FILTER OPTIONS:

Primary Filter	Part No.
1µ Coalescing Filter Cartridge	FBO-60336
5µ Coalescing Filter Cartridge	FBO-60337
10µ Coalescing Filter Cartridge*	FBO-60356
25µ Coalescing Filter Cartridge	FBO-60338

Secondary Filters	Part No.
3µ Water Block Filter	WB-3
10µ Water Block Filter	WB-10
3µ Fine Filter*	FF-3
10µ Fine Filter	FF-10
25µ Fine Filter	FF-25
3µ X-Glass Media Fine Filter	FFZ-3

**Standard-issue filter element unless requested otherwise*



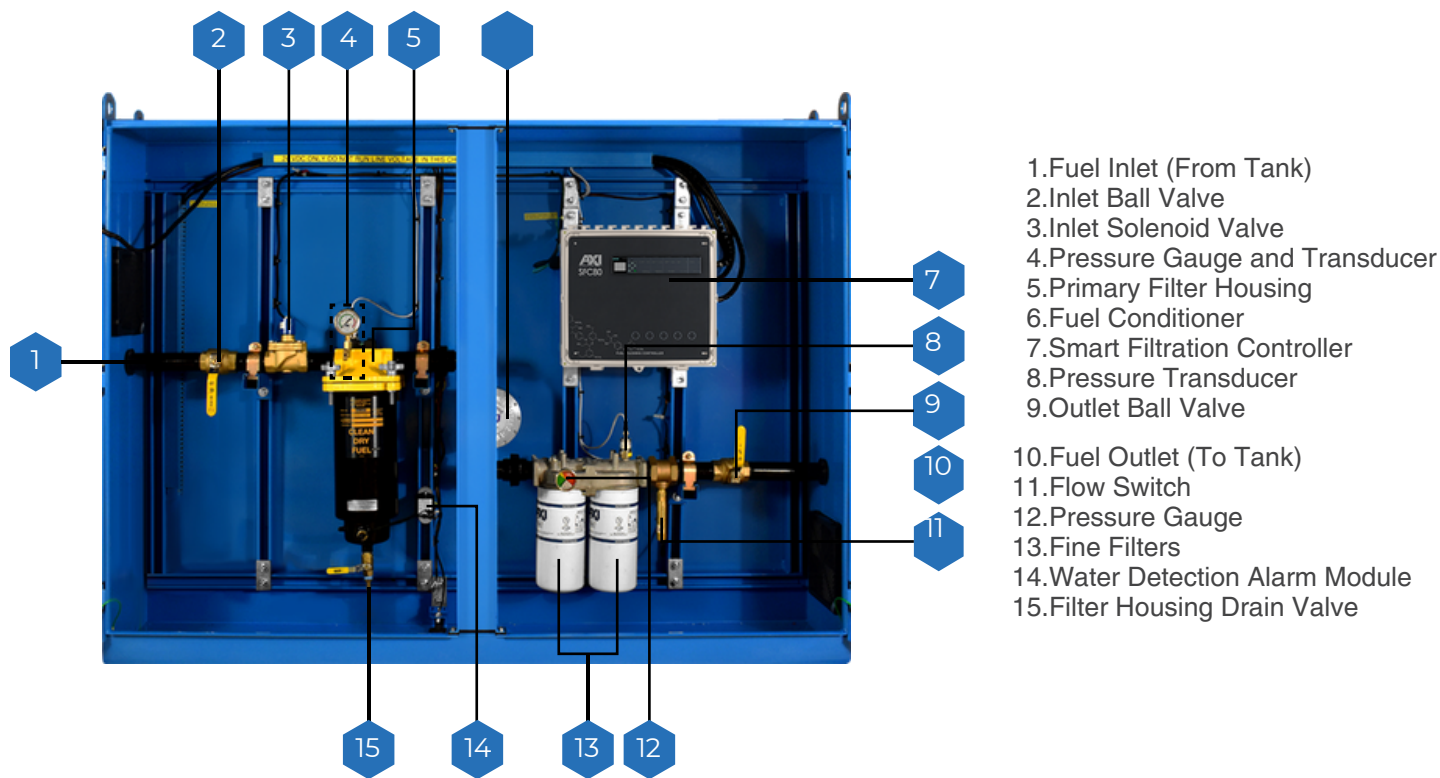
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AXI STS 6000 P-35

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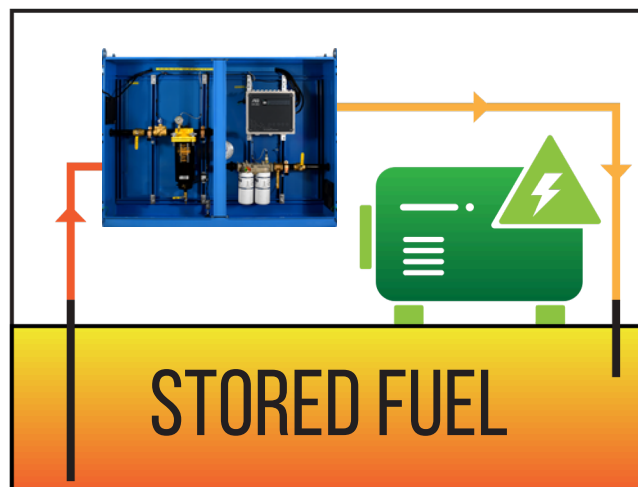


STS 6000 P-35 SYSTEM OPTIONS:

NEMA 4 Rated Enclosure	Gain additional protection against falling dirt, windblown dust, and splashing and hose-directed water
NEMA 4X Rated Enclosure	Gain additional protection against corrosion with a stainless steel enclosure
Enclosure Heater	Prevent the build up of condensation inside the system enclosure due to temperature changes
Auto Water Drain (AWD)	Automatically drain water separator of collected water for decreased frequency of maintenance
Pressure Transmitter	Replace standard pressure switch for detailed monitoring of pressure levels in the system
Flow Control	Control fuel flow rate within the system

System upgrade may be required for certain combinations of options

STS SYSTEM INTEGRATION:



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STS 6000 P-35 | 7000 P-35

Instruction, Operating, & Maintenance Manual

ENCLOSED FUEL MAINTENANCE SYSTEM

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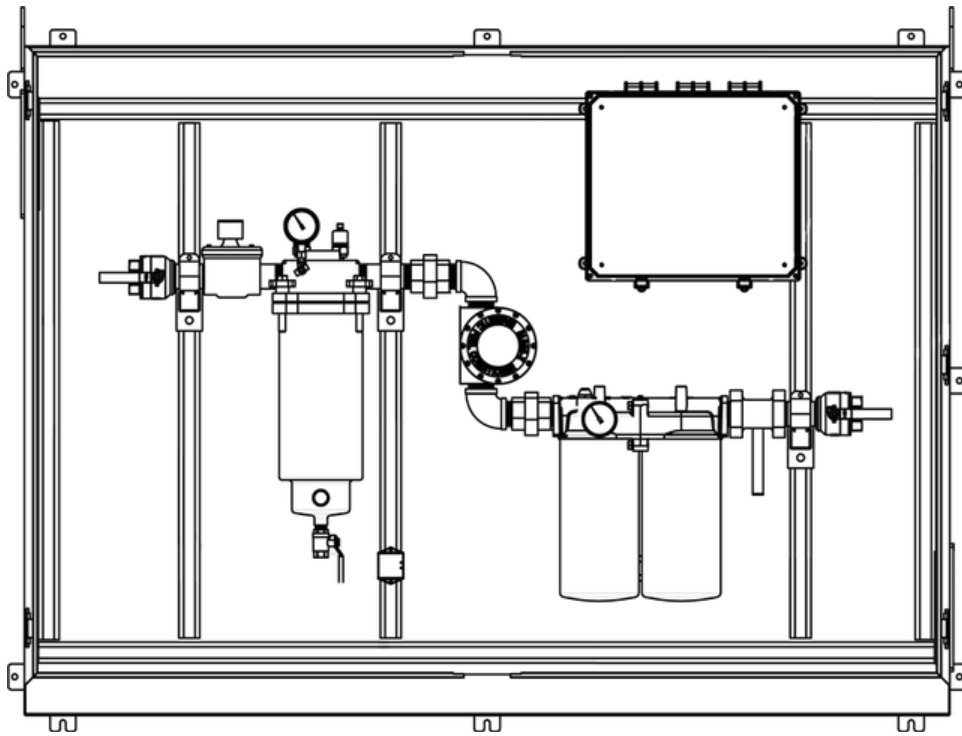


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General Overview

STS 6000 P-35 | 7000 P-35 Specifications

Nominal Flow Rate.....	30 GPM/1,800 GPH (113.6 LPM/6,813.7 LPH) 14,400 gallons (54,510 liters) per 8-hour shift 43,200 gallons (163,530 liters) per 24-hour shift
Primary Filter.....	1, 5, 10, or 25µ Coalescing Filter Element
Secondary Filters.....	1, 3, 10, or 25µ Fine Filter or 3, 10µ Water Block
Fuel Conditioner.....	LG-X 4000 Inline Magnetic Conditioner
Plumbing.....	Black Iron
Inlet Port.....	1.5" NPT
Outlet Port.....	1.5" NPT
System Enclosure.....	NEMA 3R Rated Powder Coated (Standard), NEMA 4, or NEMA 4X Rated Stainless Steel
Operating Temperature (6000 Series).....	41 - 104°F (5 - 40°C)
Operating Temperature (7000 Series).....	41 - 122°F (5 - 50°C)
Electrical.....	120V/60Hz/5A/1Ph or 230V/50Hz/5A/1Ph
Timer.....	Incorporated PLC-based timer
Maximum Fluid Viscosity.....	5 cSt
Outline Dimensions.....	≈ 56" x 72" x 17" (142 x 183 x 43 cm) (H x W x D)
System Weight.....	≈ 404 lbs (183.3 kg)

*Note: It is the user's responsibility to ensure safe operating conditions for the system to be ran.

!WARNING! This system is not meant for use with gasoline or any other flammable liquids having a flash point less than 100°F (37.8° C). Use with gasoline or any flammable liquids at a temperature exceeding their flash point presents an immediate explosion and fire hazard.

System Components

Control and Safety Devices

- System Controller
 - Incorporated PLC-based Timer
 - Memory retention during power outages
 - Alarm Indicator Light(s)
 - Control Circuit Breakers (CB1, CB2)
 - Pump Control Selector Switch {Hand (Manual) / Off / Auto}
 - Alarm Reset Push Button
 - Pump Running Indicator Light
 - System Power Indicator Light
 - Emergency Stop (E-Stop) Push Button
 - **6000 Series Controller:**
 - § Smart Filtration PLC with LCD Display
 - **7000 Series Controller:**
 - § HMI Touchscreen Control
- Water Detection Alarm Module
- Pressure Transducers
- Paddle-type Flow Switch
- Leak Detection Float Switch
- Inlet and Outlet Isolation Ball Valves
- Inlet Isolation Solenoid Valve

Fuel Conditioner

- Inline Magnetic Fuel Conditioner

Primary Filter/Water Separator

- Standard-issue 10μ coalescing filter cartridge (other filter elements available)
- Water Detection Sensor Probe
- Drain Valve

Secondary Filter

- Two standard-issue 3μ fine filter cartridges (other filter elements available)

Plumbing

- Black Iron

Multi-Tank Assembly – *If Applicable*

- External Straight Port Ball Valves
 - Enables system to service multiple tanks
- Tank Fuel Level Float Switches (**Customer provided**)

Auto Water Drain (AWD) Assembly – *If Applicable*

- Accessory Pump
- Additional Water Detection Alarm Module
- Additional Water Detection Sensor Probe
- Solenoid Drain Valve

- 
- Basket Strainer
 - Water Collection Drum
 - o High Water Level Float Switch

Manual Additive Injection – *If Applicable*

- System Ball Valve
- Additive Injection Port
- Injection Port Ball Valve

Auto Additive Injection Assembly – *If Applicable*

- Accessory Pump
- Flexible Suction/Return Lines
- Additive Injection Flow Sensor
- Solenoid Valve
- Additive Container
- Float Switch/Container Port Assembly

System Operation

Apply control power to unit. Place control breakers (CB1, CB2) for the System Controller in the “ON” position.

Inlet Solenoid Operation

Automatic Mode:

Switch the system to “Auto” mode via the selector switch on the system enclosure. During the time intervals set up by the user, the inlet solenoid valve will open and remain open until the scheduled runtime has ended. See the Controller section for setting scheduled run times.

Note: The user must set the same runtime schedule for both the STS system and the submersible pump(s) in order to polish the fuel and avoid a “No Flow” alarm.

Manual Mode:

Switch the system to “Manual” mode via the selector switch on the system enclosure. The inlet solenoid valve will open and remain open until the system is switched off, into “Auto” mode, or an alarm has been tripped.

Alarms

Alarms featured on the system include:

- Leak Detection (system shutdown, alarm indication)
 - Activated when the Float Switch in the system’s drip tray detects a raised liquid level. The system will go into an alarm state and the pump will not be allowed to run until the alarm is addressed and cleared.

Note: Disposal of fuel and associated waste should be done in accordance with Federal, State and Local regulations.

- No Flow (system shutdown, alarm indication)
 - Activated when the Flow Switch detects no flow during a scheduled runtime. Once the alarm debounce timer is expired, the system will go into an alarm state and the Inlet Solenoid will not be allowed to open until the alarm is addressed and cleared.
- High Pressure (system shutdown, alarm indication)
 - Activated when the pressure transducer(s) detect a maximum or a differential pressure reading above the factory set points. The system will go into an alarm state and the Inlet Solenoid will not be allowed to open until the alarm is addressed and reset.
- High Water (system shutdown, alarm indication)
 - Activated when water level trips the Water Detection Alarm Module via the Water Detection Sensor Probes located on the Primary Filter.
- Auto Water Drain Float Switch (halts auto water drain functionality, alarm indication) – ***If Applicable***
 - Activated when the float switch on the Auto Water Drain’s Water Collection Drum is triggered due to a high water level.
- Tank Overflow (system shutdown, alarm indication) – ***If Applicable***
 - Activated when one of the customer provided tank fuel level float switches is triggered due to a high fuel level in one of the connected tanks of a multi-tank configuration.

Note: If the Pump Overload Alarm triggers, please contact AXI International.

Once triggered alarms are addressed, each alarm can be reset via the Alarm Reset button on the enclosure door panel.

Note: For information on factory set points or timer delays please refer to the “Accessories and Additional Configuration Parameters” subsection in the “Technical Assistance and Ordering” section.

Multi-Tank – *If Applicable*

1. From the Main Menu screen select “CONFIG”
2. Enter password (9999)
3. Enter the correct number of connected tanks in the box under “Number of Tanks”.
4. To see actual valve positions, select “VALVES”
 - a. Press the “Open” and “Close” buttons to manually test the valves. If the “Open” or “Closed” rectangular box is GREEN, that status is active. The opposite is true if said background is RED.
5. Return to Main Menu screen
6. To control Pump in Manual Mode, turn the selector switch on the enclosure door to the “MANUAL” position
7. Select “MANUAL CONTROL” from the Main Menu screen
8. Select the desired tank for manual operation
9. Pump will run when valves have reached correct positions
10. To stop pump operation, select “Cancel Manual” or turn the selector switch on the enclosure door to the “OFF” position
11. For automatic fuel cleaning, turn the selector switch on the enclosure door to the “AUTO” position
12. Select “AUTO TIMER CONFIG” from the Main Menu screen
13. Program the timer start and stop times for each tank.
 - a. Use the “Next” and “Prev” buttons in the bottom corners of the screen to navigate between timer screens for the tanks

Note: Please ensure the start and stop times for any of the tanks do not overlap or an error message will be displayed.

!WARNING! Do not start-up or operate system without high fuel level alarms from both tanks tied into the control panel. Frequently test overflow alarms for proper functionality and pump shutdown.

Auto Water Drain (AWD) – *If Applicable*

1. When the Primary Filter’s High-Water Sensor is triggered, the system will shutdown
2. The system will remain shut down for 60 seconds, allowing water to be completely separated from the fuel
3. After 60 seconds, the Auto Water Drain Solenoid Drain Valve opens and the Auto Water Drain Accessory Pump turns on, draining the Secondary Filter’s housing
4. Once the water level has dropped below the Primary Filter’s Low-Water Sensor, the system automatically turns back on and resumes normal operation

Manual Additive Injection – *If Applicable*

Note: Manual Additive Injection operation may vary depending on the vertical and horizontal distance between the additive holding container and fuel polishing system.

1. With the system running, place flexible hose between the Additive Injection Port and Additive Container
2. Ensure sufficient additive is present in the container and that the flexible hose reaches the bottom
3. Open the Injection Port Ball Valve to begin injecting additive
4. To start or increase flow of additive into the system, slowly close the System Ball Valve to create a higher vacuum as indicated on the vacuum gauge
5. Monitor the system’s vacuum gauge to avoid creating a vacuum higher than the system’s set point

Note: If a high vacuum alarm is triggered, return the System’s Ball Valve to the fully open position and reset the alarm by pushing the Alarm Reset button on the enclosure door panel

6. Monitor the additive level in the holding container to gauge proper dosing
7. After injecting the desired amount of additive, close the Injection Port Ball Valve and return the System Ball Valve to the fully open position



Auto Additive Injection – *If Applicable*

1. To start Auto Additive Injection, navigate from the Main Menu to the Additive Injection screen on the HMI.
2. On the screen there are two fields to input information, Gallons to Treat and Treatment Ratio.
3. There are two other non-editable fields that show the last treatment date and also the amount of additive that was added from the last treatment.
4. Enter the gallons of fuel to treat.
5. Then enter the treatment ratio (For example: 5 Gallon Jug of AFC treats 25,000 gallons of fuel, so enter 1:5000)
6. Once this information is entered, press the START button to begin the injection process.
7. There is a progress bar that will display the total amount of additive to be added (full red bar), and as the additive is injected the red bar will decrease.
8. Once the bar is depleted, the process will stop.
9. If at any point the process needs to be manually stopped, press STOP on the screen.
10. After the injection is completed, the data is stored in the log, which can be accessed by pressing LOG on the Additive Injection screen.
11. When the additive level reaches low, a “LOW ADDITIVE WARNING” will be displayed.
12. In order to run the process again, the additive must be refilled and the alarm reset by clearing all alarms.



Primary Inspection

Upon arrival, the system and accessories must be visually inspected before installation. Improper handling during shipping may cause physical or electrical problems. Immediately report or note any damages to the shipper.

Checklist

- If the packing crate shows signs of damage inspect the system for damage.
- Check the entire system for damage that could indicate internal mechanical or electrical problems.
- Check all plumbing connections for tightness.
- Check all electrical terminals and connections for tightness.

Installation

Note: It is recommended that only qualified, experienced personnel, familiar with this type of equipment, who have read and understood all the instructions in this manual should install, operate, and maintain the system.

Mounting

The unit should be permanently wall mounted on a hard, level surface. Use provided mounting holes located on the enclosure for proper fastening (Refer to mechanical drawing(s) for Mounting Hole Diameter). Ensure the system is level and secure, enabling water to be more accurately sensed in the Primary Filter Housing. Be sure to secure the system in a location that allows all piping and electrical wiring to be safely routed to the system. This unit is designed for well-ventilated outdoor and indoor use within the specified temperature range and should be located as close to the tank as possible.

Electrical

!WARNING!: To avoid the risk of electric shock, make sure that the power supply to the system is disconnected and ensure that the system is at zero volts, before working on any of the system's electrical parts.

Make sure that the system's power requirements and rated voltage/frequency match your electrical system (see wiring diagram). The system may only be connected to properly grounded power sources for operator safety. Connect all components to the ground studs provided as shown on the provided drawings.

!WARNING!: The whole system (enclosure, plumbing, electric sub panel) must be properly grounded for operator safety.

Depending on length of run, use wiring according to specification in wiring diagram and connect system to a separate UL listed breaker (not included) appropriate for branch circuit protection.

Note: Wiring and electrical installation must be in accordance with all applicable federal, state, and local rules, laws, standards, and regulations.

Field Connections – *If Applicable*

Remote Monitoring – Dry Contacts:

The System Controller provides two Normally Open (N.O.) dry contacts for remote alarm monitoring. Please see wiring diagram for contact rating, connection, and location.

1. "Summary Alarm" – dry alarm contact for high vacuum, high pressure, no flow, or water detection
2. "Leak Detection" – dry alarm contact for leak detection

Remote Shutdown – Interlocks:

The customer can provide interlocks connected to the System Controller in order to establish external shutdown capabilities of the system's pump.

Note: The 24 V DC provided by the power supply in the electrical box of the system must be used for remote shutdown.

Plumbing

Note: Please ensure to check all of the plumbing (joints, unions, miscellaneous fittings) for tightness prior to completion. Also, do not put any stress on plumbing of STS 7000-P35 and use a backing wrench when connecting external plumbing to the system.



Use proper quality approved fuel line materials with similar inner diameter (ID) to the inlet/outlet of the system. For extended suction side plumbing runs, it is recommended to install oversized pipe, (1/4" to 1/2" increased ID).

Note: Flexible plumbing is strongly recommended for system inlet and outlet connections to external plumbing in order to avoid issues with thermal expansion, prevent putting any stress on the internal fittings of the system, and enable ease of maintenance/installation.

The supply line(s) should originate from the lowest point of the tank to ensure all water is removed. Also, it should be connected directly to the system's inlet port (located on the left-hand side of the system)

The return line(s) should be plumbed to the system's outlet port (located on the right-hand side of the system) and enter the tank as far as possible away from the pick-up tube, close to the tank bottom.

Multiple supply and/or return lines may be connected to a manifold outside the system.

Note: Anti-Siphon or other external plumbing devices may be required by state and/or local regulations & code. Also, plumbing installation must be in accordance with all applicable federal, state, and local rules, laws, standards, and regulations.

Note: Additionally, if the system must share a fuel oil supply (FOS) line with a generator, we recommend check valves be installed after the split in the line, before the landing/entrance into the generator tank and the fuel polishing system. Also, it is highly recommended that the "External Shut Down" contacts on the PLC are utilized as well in this scenario.

Typical Plumbing Installation (Schematically)

See provided P&ID drawing(s).

Important Installation Precautions

The supply line of the system should be independent and separate from the supply line of the engine. If that is not possible, appropriate valves must be installed to completely separate the system from the engine's fuel system to prevent any possible interference with safe engine operation (please see note(s) above).

Also, it is highly recommended to plumb the discharge line independent and separate of the engine's fuel return line back to the tank. If the return line from the engine and the discharge line of the system must be combined in any way, adequate valves should be installed to prevent any possible interference with safe engine operation.

Multi-Tank Installation – *If Applicable*

Please connect each tank's dedicated supply and return lines according to the provided drawings. Use approved flexible lines to avoid issues with thermal expansion, prevent putting stress on plumbing connections, and enable ease of maintenance/installation. Additionally, please be sure to plumb each supply and return ball valve in parallel (on separate lines) leading to their respective tank(s). See the provided P&ID drawing for more information.

Ensure all external electrical connections are linked to their corresponding ball valve as indicated by labels on the sides of the system's enclosure.

The provided external High Tank Fuel Level Alarm Inputs (see provided electrical drawings) must be wired to the Normally Closed High Level Alarm Contacts on each tank to avoid overfilling and potential spills. This is a very important safety feature that will close the fuel polisher Inlet Solenoid Valve in case a tank reaches an unsafe fuel level.

Controller

Setting the Current Date and Time (6000 Series Controller)

- Please make sure the selector switch is set to “OFF” and push the Alarm Reset button on the enclosure door panel.
- When power is first applied to the system, the display of the PLC will show (blinking) the date and time.
- Hit the “ESC” button.
- Select ‘Stop’ and press “OK”.
- Select ‘Yes’ (use down arrow key) and press “OK”.
- Select ‘Setup’ (use down arrow key) and press “OK”.
- Select ‘Clock’ and press “OK”.
- Select ‘Set Clock’ and press “OK” (**must be in military format**).
- Using the arrow keys, set the current day of the week, time and date as indicated in the display and press “OK”. Use the up and down arrow keys to change values, and use the left and right arrow keys to change between week, day, time, and date.
- When finished entering press “OK” to confirm.
- Press “ESC” until the base menu is displayed.
- Select ‘Start’ and press “OK” – correct time and date should be displayed (when prompted, select “YES” to proceed).

Programming the Timer (6000 Series Controller)

1. Hit the “ESC” button from the time and date display. If they are not shown, hit the down arrow button until they are displayed.
2. Select ‘Program’ and press “OK”.
3. Select ‘Set Param’ (use arrow keys) and press “OK”.
4. Use the arrow key to select the ‘Timer’ and Press “OK”.
5. Use the arrow keys to select the desired field and press “OK” to edit.
6. Use the left and right arrow keys to select the day/days of the week the system should automatically turn on, and the up or down arrow key to activate the selected day.
7. Use the arrow keys in same manner to program the ‘On’ time for when the system will switch on (on the selected day/days).
8. Use the arrow keys in same manner to program the ‘Off’ time – when the system will switch off.
9. Press “OK” to confirm the entry when finished setting all desired parameters.
10. If required, you can set up to 3 Timers by using the up and down arrow keys.
11. Press “ESC” until the time and date screen is displayed.

Setting the Current Date and Time (7000 Series Controller)

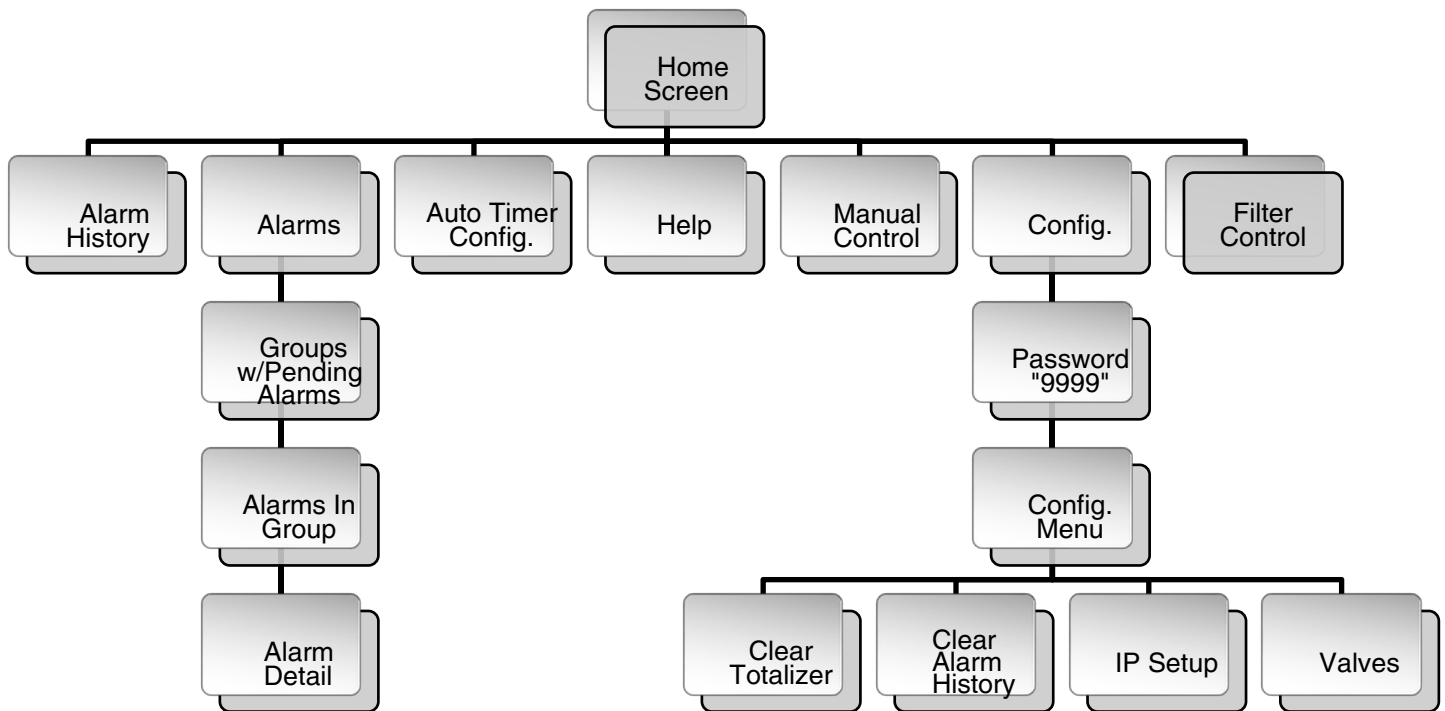
1. Please make sure the pump is set to “OFF”.
2. On the home screen, long-press (for a few seconds) to the right of the AXI logo until a new screen appears.
3. Select ‘Enter Info Mode’.
4. Once prompted, enter ‘1111’ for the password.
5. Select ‘Time and Date’.
6. Select and set the current time and date in military format.
7. Once finished, continually press ‘ESC’ until you are returned to the home screen. The updated information should be shown in the header of the touch screen pages.

Programming the Timer (7000 Series Controller)

1. From the home screen, select ‘Auto Timer Config’.
2. Once on the ‘Timers’ screen, you can set up to 1 run timer for each day of the week.

3. To set up a runtime simply enter a 'Start' and 'Stop Time' (using military format) in one of the timer boxes for the desired weekday.
4. To toggle between tanks (if applicable), simply press the available buttons on the bottom left or right hand side of the screen.

Touchscreen Menu Structure (7000 Series Controller)



Modbus TCP/IP Communication (7000 Series Controller)

Setting up the IP Address:

1. From the Main Menu, press the "CONFIG" button.
2. Input "9999" and press the enter key ("↵").
3. Push "IP Config" and continue onto the next page.
4. Enter the desired values for the PLC IP Address, PLC IP Mask, PLC IP Gateway, PLC Remote IP, and Network ID.
5. Power cycle the touchscreen HMI/PLC.

Note: When communicating via Modbus TCP/IP (Port 3 – Ethernet Cable Slot), the PLC Remote IP and Network ID do not need to be utilized for the proper functionality.

Commissioning/Initial Start-Up

Gauge Venting

After shipment, gauge pointers may not rest at zero due to internal case pressure build-up, which is caused by temperature and/or pressure variations. As a result, their accuracies may be significantly reduced. To restore the gauges to operating condition, move the yellow lever of the fill plug to the open position or remove the black rubber piece from the top of the gauge and leave it open to vent.

Initial Test Procedures

With breakers and power turned on, and the system in manual mode, check all alarms for proper operation:

- **Leak Detection**—Manually raise the float switch located at the bottom of the leak-basin. The Inlet Solenoid Valve should close and the “Leak Detection” alarm should be indicated on the System Controller. Reset the alarm by lowering the float switch and pushing the Alarm Reset button on the enclosure door panel.
- **High Pressure Alarm**—With the pump running and the suction side to the system unimpeded, slowly, partially close the outlet ball valve. The Inlet Solenoid Valve should close and a “High Pressure” alarm should be indicated on the System Controller. Open the outlet ball valve again. Reset the alarm by pushing the Alarm Reset button on the enclosure door panel.

!WARNING!: Please ensure that an alternate path is routed from the pump, so when the inlet solenoid valve is closed, the pump is not “dead-headed”.

- **Water Sensor**—Jump the Water Detection Sensor(s) by unplugging the electrical spade connectors between the water sensing module(s) and the water detection probes and placing a conductor across the spades from the water sensing modules. The Inlet Solenoid Valve should close after 10 seconds and a “High Water Alarm” should be indicated on the System Controller/Enclosure. Remove the conductor(s), reconnect the spades as they were originally configured, and reset the alarm by pushing the Alarm Reset button on the enclosure door panel.

Note: Systems with the Auto Water Drain (AWD) functionality have two sets of water sensing probes and water sensing modules on the primary filter. Please refer to the AWD section in this manual for additional information.

- **No Flow Alarm**—With no pump(s) running, switch the system into Manual Mode via the selector switch on the enclosure door panel. After 15 seconds of no flow, the Inlet Solenoid Valve should close and a “No Flow Alarm” should be indicated on the System Controller. Switch the system to Off or Auto Mode and reset the alarm by pushing the Alarm Reset button on the enclosure door panel.
- **Auto Water Drain Float Switch (If Applicable)**—Manually raise the “HIGH” float switch located on the Auto Water Drain’s Water Collection Drum. An alarm should be indicated on the System Controller. Reset the alarm by pushing the Alarm Reset button on the enclosure door panel.
- **Tank Overflow (If Applicable)**—Manually raise the “HIGH” float switch located on each of the connected tanks. The Inlet Solenoid Valve should close and the “Tank Overflow” alarm should be indicated on the System Controller. Reset the alarm by pushing the Alarm Reset button on the enclosure door panel.

Note: If any of the above described alarm test procedures fail or if any alarm trip value deviates, immediately contact AXI International.

Maintenance

The system should be visually inspected and tested a minimum of every six (6) months according to the procedure below during light duty cycles. Monthly inspections are recommended for systems that are being used in excess of an average of eight (8) hours a day and five (5) days a week.

Preventative Maintenance

Prior to performing the maintenance procedure ensure that:

1. The electrical sub-panel mounted main disconnect switch is operating properly.
2. The user supplied remote circuit breaker is in the "OFF" position.
3. All sources of power are isolated from the unit.

Note: Proceed only after this has been verified and properly tagged.

4. Drain visible water and sediment from the primary and secondary filter (see Servicing Primary/Secondary Filters).
5. Check system and all parts for corrosion and rust.
6. Check mounting hardware – tighten as necessary.
7. Check bolts on the pump/motor hardware for tightness, as pump/motor hardware can loosen after normal operation for extended durations of time, due to vibration.
8. The hardware uses lock nuts – check all bolts for secure nuts.
9. Check all electrical terminals and connections for tightness.
10. All motors are permanently lubricated and do not require any lubrication.
11. Check all plumbing joints for leaks, tighten fittings and joints as necessary, and remove accumulated fuel in leak-basin as necessary.
12. Inspect all filter(s).

Note: All filter elements should be replaced at least every six (6) months.

Servicing the Primary Filter/Water Separator

Clogged filter elements restrict the flow of fuel, resulting in the system's pressure gauge(s) indicating a pressure spike. The gauge is mounted between the pump and the fine filter. At a maximum pressure of 44 PSI or at differential pressure(s) of 22 PSI across the filtration housings, the pump will automatically shut off and generate a High Pressure Alarm. This signal indicates that it is time to change the filter element(s).

Changing the Primary Filter Element:

1. Turn the enclosure door panel selector switch to the "OFF" position – making sure the pump will not turn on.
2. Close the inlet and outlet ball valves.
3. Place an appropriate container underneath the filter.
4. Open the drain valve at the bottom of the filter housing to allow all fluid to drain from the filter.
5. Open the vent valve on the cover of the filter housing to allow the unit to vent thoroughly before opening.
6. Loosen the 4 knobs on top of the filter housing.
7. Remove the head gasket and expended filter cartridge and discard in accordance with local and national regulations.
8. Flush the interior of the housing with clean, processed, filtered product or a suitable solvent. A non-metallic bristle brush may help to remove caked debris. Rinse the housing and unit cover with a clean solvent and dry with soft, lint-free wiping cloths.
9. Lightly lubricate new head gasket with Vaseline or Petroleum Jelly and position it on the head. If Vaseline is not available, lubricate the gasket with the fuel or oil it will be used in.
10. Insert a new filter cartridge into the housing.
11. Position the housing with cartridge underneath the filter head. Push and twist the cartridge into the head spigot. The head "conical spring" will seat/seal the cartridge in the housing.

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12. Rotate the filter housing into the collar bolts and hand tighten the knobs until the head is “snug” to the housing.

Note: A torque wrench is recommended. Tighten all collar bolts to 100 in lbs.

13. Close the drain valve at the bottom of the filter housing.
14. **SLOWLY**, open the inlet and outlet ball valves to allow the unit to fill completely.
15. Leave the vent valve on the top of the housing open to allow air to escape while the unit completely fills.
16. When a small amount of fluid flows out of the vent, close the vent valve tightly.
17. Push the Alarm Reset button on the enclosure door panel to acknowledge the alarm and reset it.
18. Return the selector switch on the enclosure door control panel to its original position.
19. During the initial filling, after the above maintenance is performed, and while the unit is in operation, examine the housing and all connections for leaks (including head/flange junction).
20. Check for leaks when re-starting and pressurizing the system.

Servicing the Fine Filter(s)

Clogged filter elements restrict the flow of fuel, resulting in the system’s pressure gauge(s) indicating a pressure spike. The gauge (specific to the fine filters) is mounted between the pump and the fine filters. At a maximum pressure of 44 PSI or at differential pressure(s) of 22 PSI across the filtration housings, the pump will automatically shut off and generate a High Pressure Alarm. This signal indicates that it is time to change the filter element(s).

Changing the Fine Filter(s):

1. Turn the enclosure door panel selector switch to the “OFF” position – making sure the pump will not turn on.
2. Close the inlet and outlet ball valves.
3. Place an appropriate container underneath the filters.
4. Remove the old spin-on filters with a filter wrench by turning the cartridges counter-clockwise (CCW), seen from the bottom of the enclosure.
5. Apply a film of lubricating oil to the gasket of the new filters.
6. Screw the new filter canisters to the filter head until the gaskets are tight and secure (rotate the elements an additional 0.5-1.0 turn after the filters make contact with the gaskets).
7. Open the inlet and outlet ball valves.
8. Push the Alarm Reset button on the enclosure door panel to acknowledge the alarm and reset it.
9. Return the enclosure door panel selector switch to its original position.
10. Check for leaks when re-starting and pressurizing the system.

Note: Disposal of fuel, associated waste, and filters must be in accordance with all applicable federal, state, and local rules, laws, standards, and regulations.

!WARNING!: Some fuels may have been treated with biocides. Biocides are extremely toxic and may enter the body through the skin. It is recommended to use adequate protection and proper precautions if the fuel at-hand contains biocide type products.

Replacement Filter Chart

STS SERIES FILTERS

ALL FILTERS ARE ABSOLUTE, UNLESS OTHERWISE NOTED | WB: WATERBLOCK | SS: STAINLESS STEEL SCREEN

	1μ	5μ	10μ	25μ
COALESCING	FB0-60336	FB0-60337	FB0-60356	FB0-60338
PARTICULATE	FB0-60339	FB0-60340	FB0-60357	FB0-60341
WATER BLOCK	FB0-60342	FB0-60343	FB0-60358	FB0-60344

SPIN-ON FILTERS				
	3μ	10μ	25μ	3μ X-GLASS
PARTICULATE	FF-3	FF-10	FF-25	FFZ-3
WATER BLOCK	WB-3	WB-10		

Auto Water Drain (AWD) – *If Applicable*

Servicing Auto Water Drain Strainer:

1. Turn the enclosure door panel selector switch to the “OFF” position – making sure the pump will not turn on.
2. Close the system’s Inlet and Outlet Isolation Ball Valves.
3. Place a fuel waste container below the strainer and Manual Drain Port.
4. Ensure the AWD’s Isolation Ball Valve is closed by opening the Manual Drain Port.
5. Open the bleed screw on top of the Filter Housing to break vacuum.
6. Remove and clean the AWD’s strainer.
7. Reattach and secure the strainer to the AWD assembly.
8. Continue to “Servicing Water Collection Drum”.

Servicing Water Collection Drum:

1. Keep a fuel waste container below the Manual Drain Port (Please see Step 3).
2. Remove the Float Switch from the Water Collection Drum.
3. Properly dispose contents of the Water Collection Drum in accordance with the proper AHJ.
4. Replace the Float Switch to its original state on the Water Collection Drum.

Troubleshooting

Symptom Troubleshooting Guide

No fuel delivery

1. Pump does not run
2. Pump is not primed
3. Fuel supply line blocked
4. Excessive lift
5. Air leak in fuel supply to pump
6. Intake or outlet valve closed
7. Check valve installed backwards

Insufficient fuel delivered

1. Air leak at inlet
2. Defective pressure relief valve or check valve
 3. Excessive lift
 4. Pump worn
 5. Inoperative foot valve
 6. Piping improperly installed or dimensioned
 7. Wye-Strainer plugged

Rapid pump wear

1. Worn pump/motor coupler
2. Pump has been run dry or with insufficient fuel for extended periods of time
3. Plumbing on inlet side not appropriately dimensioned

Alarm “HIGH PRESSURE ALARM” comes on with clean or new filter element installed

1. Heavily contaminated fuel/excessive water in tank
2. Restriction in plumbing on discharge side too high
3. Head on discharge side too high
4. Check valve stuck or defective
5. Check valve installed backwards
6. Outlet ball valve not fully open
7. Discharge line clogged

Pump requires too much power

1. Liquid too viscous
2. Bent pump shaft, binding rotor
3. Misalignment of pump/motor coupler

Alarm “NO FLOW ALARM” comes on or pump requires frequent re-priming

1. Inoperative foot valve
2. Inoperative check valve
3. Inoperative solenoid valve
4. Pump cavitation
5. Plumbing air leaks
6. Lift too high
7. Leaking pump seal
8. Pump's internal bypass/pressure relief valve cracking pressure is under 48-50 PSI.

Motor does not turn or turns intermittently

1. Control power not available
2. Supply voltage is too low and/or incorrect
3. Motor thermal overload condition
4. Pump failed and seized
5. Motor failure

Pump leaks fuel

1. Loose pump plumbing fittings
2. Worn pump shaft seal
3. Pump pressure relief valve failure
4. Fuel leak elsewhere and fuel dripping or running towards the pump
5. Excessive head from overhead storage tank
6. Worn pump O-rings or seals

Note: The pump and motor assembly (as well as other ancillary plumbing/piping items such as foot or check valves) are generally not provided by AXI International. Therefore, AXI International does not assume responsibility for products provided by other vendors.

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