

# *SMART FPS DX*

## *Fuel Polishing System*

### Installation, Operating and Maintenance Manual



- Improves Engine Reliability
- Removes Water & Sludge
- Prevents Tank Sediments
- Optimizes Fuel Quality
- Stabilizes Fuel

**Optimal Fuel Quality Provides Peak Engine Performance**

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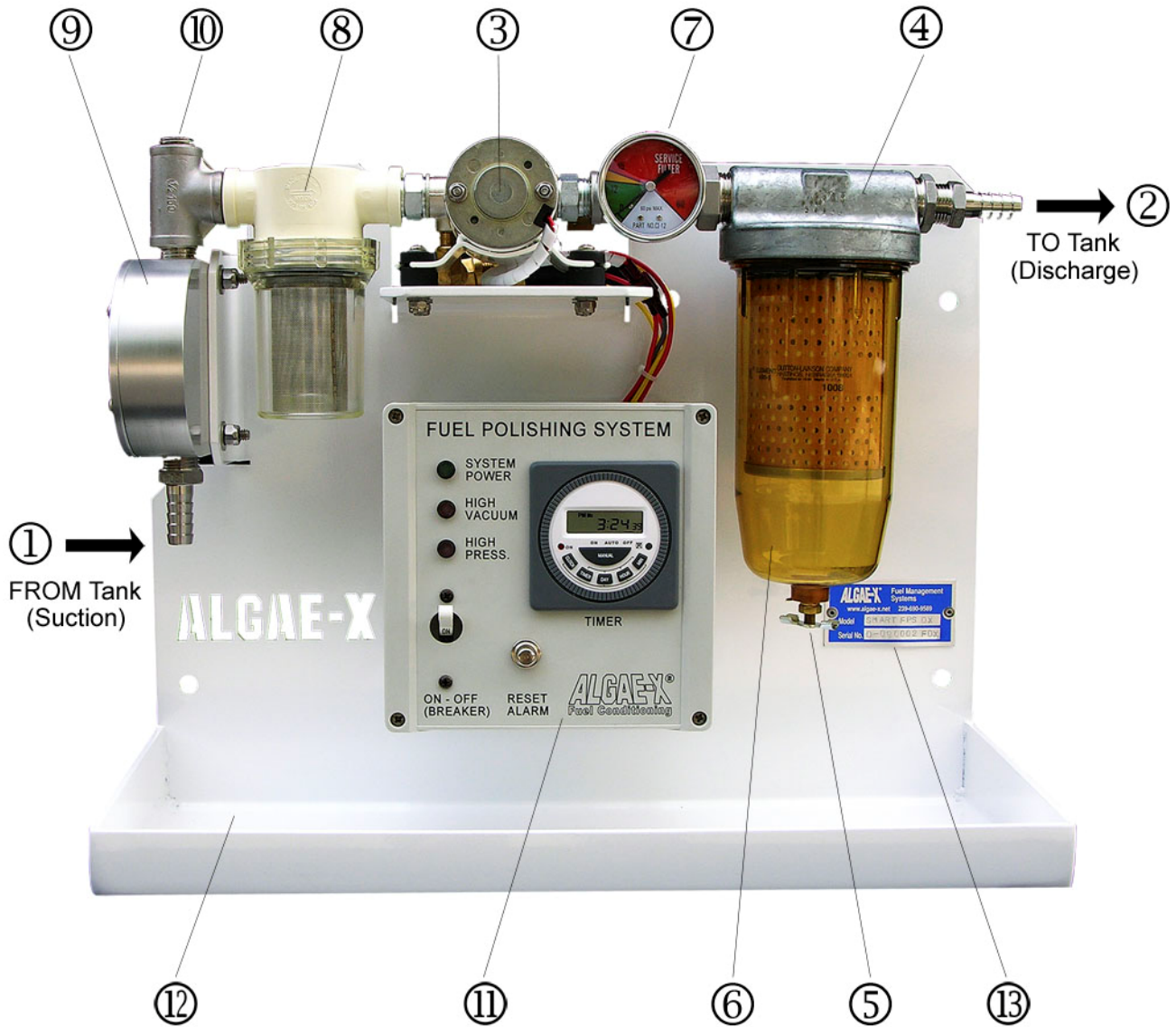


# INSTALLATION, OPERATING AND MAINTENANCE MANUAL

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## SMART FPS DX OVERVIEW – BASIC SYSTEM COMPONENTS



- |  |                              |
|--|------------------------------|
| 1) Fuel Inlet (From Tank)                    | 8) Strainer                  |
| 2) Fuel Outlet (To Tank)                     | 9) ALGAE-X® Fuel Conditioner |
| 3) Motor with coupled Gear Pump              | 10) Priming Tee              |
| 4) Fine Filter with Water Blocking Cartridge | 11) Control Panel            |
| 5) Drain Valve                               | 12) Drip Tray                |
| 6) Sight Bowl                                | 13) Serial Plate             |
| 7) Pressure Gauge                            |                              |

# GENERAL SPECIFICATIONS

## Smart FPS DX series

Control Interface .....	DX	Analog Timer (6h – spring wound)
	DX-D	Digital Programmable Timer
Outline Dimensions .....	15" x 18.5" x 7.5" (H x W x D)	
System Weight .....	approx. 20 lbs	
Operating Temperature .....	32 - 104° F; 0 - 40° C	
Electrical .....	12 V DC (10 A breaker)	
	24 V DC (5 A breaker)	
Pump .....	Gear Pump	
Flow rate .....	80 GPH	
Suction capability (primed) .....	12"HG (max. inlet vacuum)	
Max. Fluid Viscosity .....	5 cSt	
Inlet .....	1/2" hose barb (other connections available)	
Outlet .....	1/2" hose barb (other connections available)	

**Note:** The Smart FPS is designed to meet environmental standards for safe operation.  
(NOT for use with fluids that have a flash point below 100°F (38°C), e.g.: gasoline, alcohol, ...)

## SYSTEM COMPONENTS

### Control and Safety Devices

- Control Panel in electrical sub enclosure
- Mechanical Timer (DX) or Programmable Digital Timer (DX-D) – Battery backup to retain program memory during power outages
- Alarm Reset - push button
- System power indicator
- Alarm indicator lights
- Breaker (Power On – Off switch)
  
- High vacuum alarm indicator and system shutdown (vacuum sensor)
- High pressure alarm indicator and system shutdown (pressure sensor)

### Strainer

- 40 Mesh (380 Micron) stainless steel screen
- Clear Bowl

### Fuel Conditioner

- Inline Fuel Conditioner breaks down naturally forming sediments and solids found in diesel fuel to submicron levels

### Fine Filter

- Fuel Filter with clear bowl and drain
- 15 Micron water blocking cartridge (other filter elements available)
- Filter Wrench for easy filter change
- Pressure gauge

**Powder-coated, corrosion-resistant, aluminum back plate and spill tray**

**Stainless steel plumbing**

## PRIMARY INSPECTION

Upon arrival, the Smart FPS Fuel Polishing 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 (also concealed ones) to the shipper.

### Checklist:

- If the packing crate shows signs of damage inspect the Smart FPS for damage. Check the cover, back plate and electrical enclosure for damage that could indicate internal mechanical or electrical problems.
- Inspect filter for cracks or missing parts.
- Check gauges for spilled liquid.
- Check all plumbing connections for tightness.
- Check all electrical terminals and connections for tightness.

## INSTALLATION



**! IMPORTANT ! 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 Smart FPS should be **permanently wall mounted on a hard, level surface**. Use provided **mounting holes for proper fastening**. This unit is designed for well-ventilated **indoor use** within 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 systems power requirements and rated voltage matches your electrical system** (See wiring diagram and / or marking on FPS). Do not run over, crush or pull the power supply cable otherwise it may be damaged. Protect the cables from oil, heat and sharp edges.

The system connects to either 12 V DC or 24 V DC with the positive lead from your power source to the red wire and the negative lead to the grey wire. After the initial wiring of the system check operation to insure that it is running in the correct direction. If the motor is running in the wrong direction reverse the two electrical leads.



**! WARNING ! Check for correct voltage and direction of flow.**

Depending on length of run, use proper wire size as indicated in wiring diagram and connect system to a separate breaker (not included) or protected power supply for appropriate circuit protection.

**Note: Wiring and electrical installation must be in accordance with all applicable Federal, State and Local rules, laws, standards and regulations.**

## PLUMBING

Use proper quality approved fuel line materials with at least 1/2" (3/8" possible depending on total friction losses) inner diameter on the suction side from the tank and at least 3/8" inner diameter on the return / discharge side back to the tank. Do not put any stress on the plumbing connection and use a backing wrench when connecting.

A full flow, **shut-off ball valve** should be installed on the inlet and outlet port / line of the Smart FPS system.

The **pick-up tube/line(s)** should originate from the **lowest point of the tank** (to remove all water), should be connected directly to the system's inlet port (Algae-X® Fuel Conditioner) located on the left hand side and **kept as short as possible**. For optimal performance, insure that the inlet (suction) line(s) are free and nothing is restricting their flow.

It is recommended to install an **oversized, low restriction foot valve** to keep the system primed, especially if the inlet port of the system is located above the lowest possible fuel level in the tank.

The **return line(s)** should be plumbed to the outlet port (on the right side of the system) and enter the tank **as far as possible from the pick up tube** close to the tank bottom. For optimal performance, insure that the outlet (discharge or return) line(s) are free and nothing is restricting their flow.

Multiple suction and/or return lines may be connected to a manifold.

Anti-Siphon or other external plumbing devices may be required – please check local regulations / code.

The system capabilities are maximum 12" HG pump inlet vacuum. Keep suction plumbing short and straight with as little as possible restrictions. For continuous optimal performance, make sure suction and discharge lines are free and that nothing is blocking the flow of fuel and that the **suction line always stays primed**.

**Note: Plumbing and Installation must be in accordance with all applicable Federal, State and Local rules, laws, standards and regulations.**

## IMPORTANT INSTALLATION PRECAUTIONS

The **suction line** of the system **should be independent and separate from the suction line of the engine**. If that is not possible, appropriate valves must be installed to completely separate the Smart FPS from the engine fuel system to prevent any possible interference with safe engine operation.

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 of the Smart FPS have to be combined in any way, adequate valves should be installed to prevent any possible interference with safe engine operation.

**Note: If any of the Smart FPS system's fuel lines are used in combination with the engine's fuel system, the Smart FPS should be disabled during engine operation.**

## PRIMING THE SYSTEM

The pump supplied with the Smart FPS is **NOT** automatically self-priming and must not be run dry.



**! WARNING ! If the pump is allowed to run without fuel, pump damage will occur.**

### Priming procedure:

The pump head of the Smart FPS unit is shipped from the factory filled with oil to facilitate initial lubrication. This will not eliminate the necessity to prime the complete system. The Smart FPS is primed by using the provided priming tee. The strainer as well as the suction line(s) have to be completely filled with fuel (no trapped air) prior to the initial system start-up.

## SMART FPS INTERFACE / ALARM FEATURES



Smart FPS DX (mechanical timer)



Smart FPS DX-D (digital, programmable timer)

The system is equipped with a vacuum switch on the input side of the pump. When the pump inlet vacuum reaches 12" HG the system will shutdown and activate the high vacuum alarm. This indicates excessive debris in the strainer (or a flow restriction or too high suction height and therefore pressure drop in the suction line).

**Note: 12" HG vacuum = clogged strainer or suction line flow restriction / excessive lift.**

The system's pressure gauge on the fine filter should show 15 PSI maximum pressure under normal conditions (.433 PSI = 1' vertical head pressure). Pressure gauge readings in excess of 15 PSI indicate excessive filter, or fuel line restrictions and/or friction and will trigger the high-pressure alarm, automatically shutting down the pump.

## INITIAL START-UP / COMMISSIONING CHECKLIST

### INITIAL TEST PROCEDURE

- With breakers and power turned on and pump running **check all alarms** for proper operation:
  - 1) Slowly partially close inlet ball valve. At 12"HG pump should turn off and red indicator light "HIGH VACUUM" will illuminate. Open inlet ball valve again. Reset alarm by pushing the "RESET ALARM" button.
  - 2) Slowly partially close outlet ball valve. At 15 PSI pump should turn off and the red indicator light "HIGH PRESSURE" will illuminate. Open outlet ball valve again. Reset alarm by pushing the "RESET ALARM" button.

**Note: If any of the above described alarm test procedures fail or if any alarm trip value deviates immediately contact Algae-X International.**

## OPERATION



**! WARNING ! This System is not meant for use with gasoline nor with other flammable liquids having a flash point less than 100°F. Use with gasoline or use with any flammable liquids at a temperature exceeding their flash point, presents an immediate explosion and fire hazard. Never use the Smart FPS at a temperature exceeding the flash point of its contents.**

### SMART FPS DX

Apply control power to unit. Place breaker in the “ON” position. Turn mechanical timer to desired run time. Pump will run until timer expires unless there is an alarm condition that stops the systems operation. Once the alarm condition is removed (e.g. filter services, strainer cleaned, ...) push “RESET” to clear alarm.

### SMART FPS DX-D

The digital, programmable timer offers a variety of weekly programs. It is equipped with a replaceable Lithium CR2032 battery for to retain the program and memory backup.

#### System operation:

Apply control power to unit. Place breaker in the “ON” position. The ‘**MANUAL**’ button switches the system between ON, AUTO and OFF mode as indicated in the display.

#### Adjust Clock:

Press and hold ‘**CLOCK**’ and then press sequentially ‘**DAY**’, ‘**HOURL**’ and ‘**MIN**’ button to adjust clock of timer to correct date, hour and minute

#### Programming the timer:

There are 8 weekly timers with on/off times possible. At least one needs to be set for automatic operation.

1. Press the ‘**TIMER**’ button. LCD screen will switch to the first timer (1<sup>ON</sup>)
2. Press ‘**DAY**’ as often as required to select any of the 15 combinations of days that suit your application
3. Press ‘**HOURL**’ and ‘**MIN**’ respectively to set desired start time for 1<sup>ON</sup>
4. Press ‘**TIMER**’ to switch to 1<sup>OFF</sup>
5. Press ‘**DAY**’ as often as required to select the same combinations of days as in step 2 (must be consistent)
6. Press ‘**HOURL**’ and ‘**MIN**’ respectively to set desired stop time for 1<sup>OFF</sup>
7. Repeat procedure (step 1 through 6) if you would like to set several timers
8. When finished programming press ‘**CLOCK**’

To review the program press ‘**TIMER**’ button repeatedly to go through all 8 timers.

To activate the timer program make sure to press ‘**MANUAL**’ button will the display indicated you are in AUTO mode.

Please call Algae-X International with any questions.

### STABILIZING AND OPTIMIZING FUEL QUALITY

We recommend treating the fuel with the **ALGAE-X® Fuel Catalyst (AFC-705)**. This will enhance and accelerate the tank cleaning process by breaking down and dissolving existing tank sludge. AFC-705 will decontaminate compartments of the tank that are out of reach of the suction line. Depending on the condition of the fuel and the amount of sludge build-up, it is recommended to initially use a double dose of one to twenty-five hundred (1:2500) instead of one to five thousand (1:5000) This has proven to be essential in accelerating the tank cleaning process. AFC-705 contains detergent, surfactant, dispersant, corrosion inhibitor, lubricity enhancer and combustion catalyst. It does not contain biocides. AFC-705 should always be used periodically in particular to stabilize fuel that is stored for longer periods of time.

**Note: In cases of severe tank contaminant build-up (sludge) and high water level in bottom, it is recommended to clean the tank (vacuum bottom) and polish the fuel before initial use of a Smart FPS system.**

## MAINTENANCE



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



**! IMPORTANT !** Always disconnect the system from the electric power supply before working or servicing it. Do not proceed with any maintenance unless the pressure or vacuum has been released, the system has been allowed to reach ambient temperature and all fluids have been drained.

### PREVENTATIVE MAINTENANCE

The Smart FPS Automated Fuel Filtration System should be visually **inspected and tested a minimum of every six months according to the procedure below** during light duty cycles.

- 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, and
  - 3) that all sources of power are isolated from the unit.
  - 4) Proceed only after this has been verified and properly tagged.
- Drain / remove visible water and sediment from strainer and fine filter / water separator.
- Check all parts for corrosion and rust.
- Check mounting hardware. Tighten as necessary.
- Check pump/motor hardware for tightness. Pump/motor hardware will loosen after normal operation due to vibration. This hardware is lock nutted, check all bolts for secure nuts.
- Check all electrical terminals and connections for tightness.
- All motors are permanently lubricated and do not require any lubrication.
- Check all plumbing joints for leaks. Tighten fittings and joints as necessary. Remove accumulated fuel in drip tray as necessary.
- Inspect all filters and separators. See section below on filter inspection and service.
- With breakers and power turned on again and pump running **check all alarms** for proper operation:
  - 1) Slowly partially close inlet ball valve. At 12”HG pump should turn off and red indicator light “HIGH VACUUM” will illuminate. Open inlet ball valve again. Reset alarm by pushing the “RESET ALARM” button.
  - 2) Slowly partially close outlet ball valve. At 15 PSI pump should turn off and the red indicator light “HIGH PRESSURE” will illuminate. Open outlet ball valve again. Reset alarm by pushing the “RESET ALARM” button.

**Note:** If any of the above described alarm test procedures fail or if any alarm trip value deviates immediately contact Algae-X International.

**Note:** All filter elements should be replaced at least every six months.

## SERVICING STRAINER

A clogged strainer restricts the flow of fuel. At a pressure drop of 12" HG, the pump will automatically shut off and activate the red indicator light and display "HIGH VACUUM". The signal indicates that it is time to clean the strainer.

### Servicing the strainer:

1. Close the inlet and outlet ball valve (not provided)
2. Place an appropriate fuel waste container below the strainer
3. Remove clear bowl of strainer and dispose sediment, particulate and water
4. Clean strainer screen and reinstall
5. Check gasket and reinstall bowl of strainer
6. Prime system if necessary
7. Open the inlet and outlet ball valve
8. Push the "ALARM RESET" button on the control panel to acknowledge the alarm and reset it
9. Check for leaks when re-starting and pressurizing the system. Your system is now ready to resume normal operation

## SERVICING FINE FILTER

Clogging filter elements and saturation of the water block filter restrict the flow of fuel and the system's pressure gauge will indicate a pressure drop. The gauge is mounted on top of the secondary filter. At a pressure drop of 15 PSI (red dial area of the gauge) the pump will automatically shut off and activate the "HIGH PRESSURE" alarm indicator light. The signal indicates that it is time to change the filter element.

There are two types of filters available; we recommend using the TK-82 (15 micron water block fine filter).

### Changing the secondary filter:

1. Close the inlet and outlet ball valve (not provided)
2. Place an appropriate fuel waste container underneath the filter
3. Drain filter bowl (if necessary loosen clear bowl slightly to allow air to enter)
4. Remove clear bowl and filter cartridge by turning counter clock wise seen from the bottom of the bowl / cartridge (Please use provided filter wrench to remove bowl)
5. Apply a film of lubricating oil to the new gasket of the new filter cartridge. Screw the new cartridge filter to the filter head until the gasket is tight and secure – do not over tighten
6. Clean and reinstall clear bowl using the new bowl gasket supplied with the filter
7. Make sure drain valve is closed
8. Open the inlet and outlet ball valve
9. Push the "ALARM RESET" button on the control panel to acknowledge the alarm and reset it
10. Check for leaks when re-starting and pressurizing the system

Your system is now ready to resume normal operation

**Note: Disposal of fuel, associated waste and filters should be done in accordance with Federal, State and Local 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 fuel contains biocide type products.**

# TROUBLESHOOTING

## **No fuel delivery**

1. Pump does not run
2. Pump is not primed
3. Fuel supply line blocked / no fuel in tank
4. Excessive lift
5. Air leak in fuel supply to pump
6. Pump rotation direction incorrect
7. Intake or outlet valve closed
8. Check valve installed backwards

## **Insufficient fuel delivered**

1. Air leak at inlet
2. Excessive lift
3. Pump worn
4. Inoperative foot valve
5. Piping improperly installed or dimensioned
6. Strainer plugged

## **Rapid pump wear**

1. Pump has been run dry or with insufficient fuel
2. Plumbing on inlet side not appropriately dimensioned

## **Alarm “HIGH VACUUM” comes on with clean strainer**

1. Heavily contaminated fuel in tank
2. Restriction in plumbing on inlet side too high
3. Excessive lift
4. Inoperative foot valve
5. Inlet ball valve not fully open
6. Suction line clogged

## **Alarm “HIGH PRESSURE” 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 (lift) on discharge side too high
4. Check valve stuck or defective
5. Outlet ball valve not fully open
6. Discharge line clogged

## **Pump requires too much power**

1. Air in plumbing lines
2. Liquid too viscous

## **Noisy operation**

1. Insufficient fuel supply
2. Air leaks in the inlet pipe
3. Air or gas in fuel on the suction side

## **Pump requires frequent re-priming**

1. Inoperative foot valve
2. Inoperative check valve
3. Inoperative solenoid valve
4. Pump cavitations
5. Plumbing air leaks
6. Lift too high
7. Leaking pump seal

## **Motor does not turn or turns intermittently**

1. No Power / power failure / low voltage or bad power connection
2. Pump failed and seized
3. Motor failure

## **Pump leaks fuel**

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

# **AUTOMATED FUEL FILTRATION SYSTEMS WARRANTY**

## **LIMITED WARRANTY**

ALGAE-X® International makes every effort to assure that its products meet high quality and durability standards and expressly warrants the products described herein, against defects in material and workmanship for a period of one (1) year from the date of purchase. This warranty is not intended to supplant normal inspection, care and service of the products covered by the user, and shall not obligate ALGAE-X® to provide free service during the warranty period to correct breakage, maladjustment or other difficulties arising out of abuse, misuse, or improper care and maintenance of such products. Our express warranty is subject to the following terms and conditions:

1. This warranty shall only extend to and is only for the benefit of original purchasers who use the products covered hereby
2. Any warranty claim received by ALGAE-X® after one (1) year from the date of purchase will not be honored even if it is claimed that the defect occurred prior to one (1) year from the date of purchase.
3. This warranty shall not apply to products (1) which have been tampered with, altered or repaired by anyone other than ALGAE-X® without the express prior written consent of ALGAE-X® (2) which have been installed improperly or subject to misuse, abuse, accident, negligence of others, improper operation or maintenance, neglect or modification, or (3) which have had the serial number altered, defaced or removed.
4. The liability of ALGAE-X® under this warranty is limited to the repair or replacement of the defective product. ALGAE-X® assumes NO LIABILITY for labor charges or other costs incurred by any purchaser incidental to the service, adjustment, repair, return, removal or replacement of products. ALGAE-X® ASSUMES NO LIABILITY FOR ANY GENERAL, SPECIAL, INCIDENTAL, CONSEQUENTIAL, CONTINGENT OR OTHER DAMAGES UNDER ANY WARRANTY, EXPRESS OR IMPLIED, AND ALL SUCH LIABILITY IS HEREBY EXPRESSLY EXCLUDED.
5. ALGAE-X® MAKES NO WARRANTIES, EXPRESS OR IMPLIED, OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR OTHERWISE, WITH RESPECT TO THE PRODUCTS COVERED BY THIS WARRANTY POLICY, EXCEPT AS EXPRESSLY PROVIDED FOR HEREIN. NO EMPLOYEE, AGENT, REPRESENTATIVE OR DISTRIBUTOR IS AUTHORIZED TO MAKE ANY WARRANTY ON BEHALF OF ALGAE-X® OTHER THAN THE EXPRESS WARRANTY PROVIDED FOR HEREIN.
6. ALGAE-X® reserves the right at any time to make changes in the design, material, function and specifications of its products. Any such changes shall not obligate ALGAE-X® to make similar changes in such products that were previously manufactured.

## **WARRANTY CLAIM PROCEDURE**

To make a claim under this warranty, please call our ALGAE-X® at (239) 690 9589 or (877) 425-4239, and provide: Name and location where unit was purchased, the date and receipt of purchase, model number, serial number, and a detailed explanation of the problem you are experiencing. The Customer Service Representative may, at the discretion of ALGAE-X®, arrange for a Field Engineer to inspect your system. If the inspection discloses a defect covered by its limited warranty, ALGAE-X® will either repair or replace the defective parts or products. ALGAE-X® assumes no liability, if upon inspection, ALGAE-X® or its representative determines that there is no defect or that the damage to the system resulted from causes not within the scope of this limited warranty. For service and sales, please contact ALGAE-X®:

ALGAE-X® International  
5400-1 Division Drive, Fort Myers, FL 33905 • 877-425-4239 • Fax: 239-690-1195  
Internet: [www.algae-x.net](http://www.algae-x.net) • Email: [algae-x@algae-x.net](mailto:algae-x@algae-x.net)

## TECHNICAL ASSISTANCE AND ORDERING

**Please write to, fax, email or call:**

ALGAE-X® International  
5400-1 Division Drive  
Fort Myers, FL 33905  
Tel: 239-690-9589  
Fax: 239-690-1195  
Email: algae-x@algae-x.net  
Internet: www.algae-x.net

**Please provide the following information:**

Serial Number of your Smart FPS, the required part numbers and quantity.

### REPLACEMENT FILTER ELEMENTS

**Fine Filter:**

TK-081	10 Micron replacement filter cartridge (not water blocking)
TK-082	15 Micron replacement water block filter cartridge
TK-088	Filter Wrench

**Also available:**

- Larger or smaller capacity, custom designed systems for higher or lower flow rates
- Digital Flow Meter
- Foot Valves
- Rotor Sight Glass

### SMART FPS SYSTEM IDENTIFICATION

Serial Number: \_\_\_\_\_ (e.g. B 090010 – FDX)

**System Specification:**

Voltage:

- 12 V DC
- 24 V DC

Inspected by: \_\_\_\_\_ Date: \_\_\_\_\_

## APPENDIX A - ABBREVIATIONS USED IN THIS MANUAL

Abbreviations of terms used with Automated Fuel Filtration Systems. When following a drawing utilize this guide to define abbreviated system and component names. This is a master list. The drawings and text pertaining to your equipment may not contain all these terms.

<b>AC</b>	Alternating Current	<b>N.C.</b>	Normally Closed
<b>AHR</b>	Alarm Horn Relay	<b>NEC</b>	National Electric Code
<b>AH</b>	Alarm Horn	<b>NEMA</b>	National Electric Manufacturers Assoc.
<b>BPRV</b>	Back Pressure Regulating Valve	<b>N.O.</b>	Normally Open
<b>BRK</b>	Motor/Pump Bracket	<b>NP</b>	Nameplate
<b>BV</b>	Ball Valve	<b>NPT</b>	National Pipe Thread
<b>C</b>	Contactors	<b>O.D.</b>	Outside Diameter
<b>CB</b>	Circuit Breaker	<b>OLR</b>	Over Load Relay
<b>CSR</b>	Check Strainer Relay	<b>OPT</b>	Option
<b>CV</b>	Check Valve	<b>PCB</b>	Printed Circuit Board
<b>DC</b>	Direct Current	<b>PCRX</b>	Pump Control Relays
<b>DPDT</b>	Double Pole Double Throw	<b>PG</b>	Pressure Gauge
<b>F</b>	Fuse	<b>PLR</b>	Pipe Leak Relay
<b>FLWS</b>	Flow switch	<b>PRV</b>	Pressure Relief Valve
<b>FS</b>	Float switch	<b>PRS</b>	Pressure Switch
<b>GA</b>	Gauge	<b>PS</b>	Power Supply
<b>GAL</b>	Gallons	<b>PSI</b>	Pounds Per Square Inch
<b>GPM</b>	Gallons Per Minute	<b>PSR</b>	Pressure Switch Relay
<b>HFL</b>	High Fuel Level Relay	<b>PRR</b>	Pump Running Relay
<b>HG</b>	Mercury	<b>SC</b>	Swing Check Valve
<b>HP</b>	Horsepower	<b>SOL</b>	Solenoid
<b>HZ</b>	Hertz	<b>TB</b>	Terminal Block
<b>I.D.</b>	Inside Diameter	<b>T</b>	Control Transformer
<b>JB</b>	Junction Box	<b>TDR</b>	Time Delay Relay
<b>“ HG</b>	Inches of Mercury	<b>TEFC</b>	Totally Enclosed, Fan Cooled
<b>L</b>	Lamp	<b>THR</b>	Tank Heater Control Relay
<b>L.E.D.</b>	Light Emitting Diode	<b>TS</b>	Transducer Pressure Switch
<b>LFF</b>	Loss of Flow Relay	<b>V</b>	Voltage
<b>LFL</b>	Low Fuel Level Relay	<b>VAC</b>	Voltage, Alternating Current
<b>LPR</b>	Low Pressure Relay	<b>VDC</b>	Voltage, Direct Current
<b>MDB</b>	Main Distribution Block	<b>VG</b>	Vacuum Gauge
<b>MDS</b>	Main Disconnect Switch		
<b>MOT</b>	Motor		