

## AUTOMATIC FUEL OIL FILTRATION SET

Recommended by NFPA 110 Standard for Emergency and Standby Power Systems

The Automatic Fuel Oil Filtration Set Model PF are the most complete, efficient and reliable engine protection systems you can install. These self-contained, fully automatic systems remove water, suspended rust, dirt and other contaminants in order to maintain the quality and purity of stored diesel fuel.

### Standard Equipment

- Microprocessor-based control with color touch screen
- Pump “Hand-Off-Auto” switch
- Control power “On-Off” switch
- Leak detector switch
- Pump and motor assembly
- Simplex strainer
- Primary filter
- Secondary filter
- Primary/secondary filter DP switch/gauge

Water enters fuel systems through vents, leaks, and sometimes with the delivered fuel. Microorganisms can grow in fuel, especially in the presence of moisture. The resulting sludge left in the system can cause tank, fuel line, strainer, pump and engine injectors to clog. Water induced corrosion (rusting) can reduce tank life expectancy and reliability of the emergency diesel generator or boiler.

The Model PF Automatic Fuel Oil Filtration Set combines microprocessor-based control and monitoring with a “three stage” fuel oil de-watering and cleaning process:

1. Fuel Straining: Large contaminates are removed
2. Filtration: Fuel filtration to 5 micron
3. Water Removal: Removes water through special filter design.

### Key Benefits

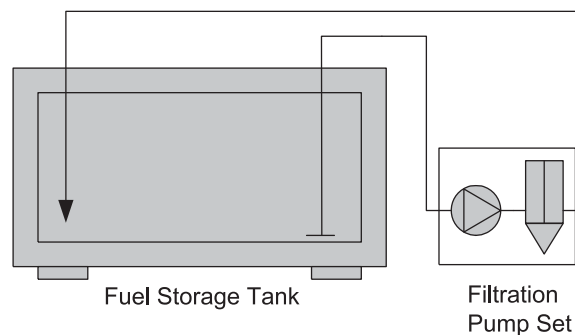
- Standard flows from 180 to 1200 GPH
- Cleans and de-waters fuel with:
  - Nearly 100% water removal
  - 99% particulate removal (to 5 micron)
- Automatic cycling based on the time of day and the day of the week ensures continuous fuel maintenance.
- Alarm and Safety Shutdown for filter water level “High”, filter “Saturated”, system base “Leak” detected
- Microprocessor-based
- Factory mounted and wired control cabinet
- NEMA 4 cabinet (Standard)
- Available for Biodiesel applications



Model PF Automatic Fuel Oil Filtration Set

The separated contaminants and water are monitored by an integral filter water level detector. Depending on the size of the system, this waste water is piped to an optional Waste Water Holding & Removal System or connected directly to the customer's waste tank (by others). A differential pressure switch/indicator is installed around the filter units to provide a visual indication of filter element condition. An alarm notifies plant personnel when the filter elements require replacement.

Systems are available in standard sizes ranging from 180 to 1200 gallons per hour, to custom units for processing 50 gallon per minute or more.



Automatic Fuel Oil Filtration Set Application Example

# AUTOMATIC FUEL OIL FILTRATION SET

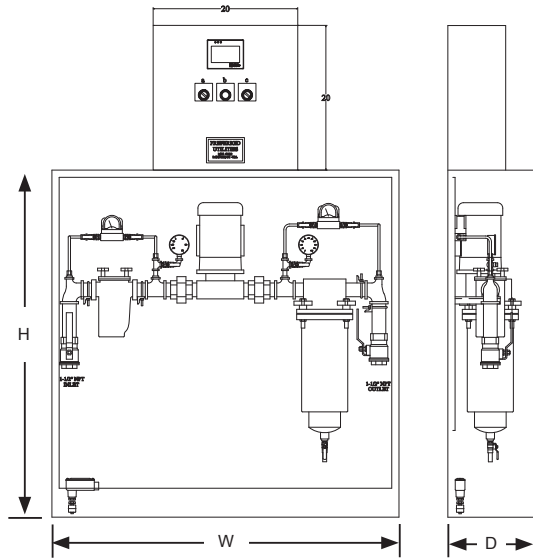
## Specifications

For best results, use in conjunction with the waste water removal and storage option (WR-1) and Preferred fuel additives system (CA-1) option.

### Specifications

- Power: 120 VAC (external)
- Fluid: No. 2 Fuel Oil (diesel fuel) is standard.  
Consult factory for other fuel types.
- Pump: Positive displacement type with cast iron housings:  
Model PF-401, 402 & 403 are Spur Gear;  
Model PF-404 & 405 are internal gear
- Motors: Base mounted, Totally Enclosed Fan Cooled (TEFC) construction
- Strainer: Simplex 1" , or 1½" (according to inlet line size) complete with 100 mesh perforated basket

- Automatic Controls: - Adjustable run-time period (4, 8, 12, or 24 hour operation)
- Indications/Alarms:
    - Control Power On
    - Pump Run
    - Excess Water in Fuel
    - Filter Saturated
    - Filter Water Level High
    - System Basin Leak Detected



### Tank Turnover Time In Hours (Rounded to Nearest Hour)

	Storage Tank Size (Gallons)					
	1,000	2,000	4,000	8,000	16,000	20,000
PF-401	6	11	22	44	89	111
PF-402	2	4	8	17	33	42
PF-403	2	3	7	13	27	33
PF-404	1	2	4	9	18	22
PF-405	1	2	3	7	13	16

#### Notes:

1. Shaded hours are not recommended.
2. Due to the mixing of filtered fuel with unfiltered fuel, a minimum of three tank turnovers are recommended to ensure fuel quality.

### Ordering Information

Select Catalog Number from the table below.

Catalog Number	G.P.H. Oil #2	P.S.I.	Motor		Dimension			Connection Size	Shipment
			R.P.M.	H.P.	W	H	D	Inlet - Outlet	
PF-401	180	15	1725	¼"	48"	48"	12"	¾" - 1½"	2-3 Weeks
PF-402	480	15	3450	⅓"	48"	48"	12"	¾" - 1½"	2-3 Weeks
PF-403	600	30	1725	½"	48"	48"	12"	¾" - 1½"	2-3 Weeks
PF-404	900	30	1725	¾"	48"	48"	12"	1½" - 1½"	2-3 Weeks
PF-405	1200	25	1725	¾"	48"	48"	12"	1½" - 1½"	2-3 Weeks

Note: All pumps are 115V 60 Hz 1 phase

#### Optional Accessories

##### 1. Waste Water Holding & Removal System:

A gear pump automatically pumps water from the secondary filter housing to the holding tank based on an integral filter water detector signal. Automatic isolating valves prevent water leakage into the fuel or fuel into the water holding tank when the system is idle. The holding tank is equipped with a high level switch to alarm and shutdown the fuel maintenance system until the tank is emptied. A hand pump is provided for periodic removal of waste water from the holding tank. Requires mounting skid. Specify P/N-WR-01.

##### 2. Chemical Additive Holding Tank & Injection System:

Chemical treatment helps to prevent fuel degradation and improve cetane rating. Higher cetane rating improves cold starting, reduces white smoke, and maximizes engine efficiency. A gear metering pump injects additives into the oil while the oil is circulating in order to ensure complete mixing. The additive feed pump operating cycle runs biannually, or it can be activated when new fuel is delivered. A welded steel chemical additive holding tank is provided. Separate skid if ordered in conjunction with standard PF series. Specify P/N-CA-01.

**AUTOMATIC FUEL OIL FILTRATION SET****Suggested Specifications****1. Enclosure, Piping And Mounting**

Provide a Fuel Oil Filtration System as recommended by NFPA 110 Standard for Emergency and Standby Power Systems. The filtration system shall be factory assembled with components piped and mounted inside a continuously welded steel enclosure. The enclosure shall be constructed of 14 gauge steel as minimum, continuously welded and constructed to NEMA 4 standards and have an integral 2" steel containment basin with plugged drain options. The basin shall be sized to contain (capture) potential leaks from all factory installed piping and components. Doors shall be fully gasketed with a turned edge, piano hinges, and a three point lockable latching mechanism. The enclosure interior shall be primed and finished in a white gloss, chemical resistant enamel. The enclosure exterior shall be primed and finished in a durable, chemical resistant, textured gray enamel, suitable for industrial environments. Pipe shall be schedule 40 ASTM A-53 Grade "A" with ANSI B16.3 Class 150 malleable iron threaded fittings. The Fuel Oil Filtration System shall be Preferred Utilities Mfg. Corp. Danbury, CT Model PF-\_\_\_\_ rated at \_\_\_\_ GPH of No. 2 fuel oil.

**2. Containment Basin Leak Detection Switch**

Provide, mount and wire a float operated Containment Basin Leak detection Switch to shut off the pumps and energize an audible and visual alarm should a leak be detected. The level sensor shall be a plasma welded stainless steel construction. Electrical connections shall be contained in a weatherproof junction box.

**3. Strainer**

Oil strainer shall have cast iron body, threaded connection, size shall be suitable for the required flow and suitable for working pressures to 150 PSI. Clamped cover and handle shall permit easy removal of the basket. Basket shall be constructed of 100 mesh stainless steel.

**4. Pump and Motor Assembly**

A base mounted, TEFC motor and positive displacement pump with cast iron housing shall be provided. Pumps that have aluminum, brass, or bronze housing or rotors or centrifugal pumps are not acceptable. The pump shall be an industrial type intended for continuous heavy-duty service.

**5. Filtration**

One filter element shall provide both particulate and water removal. Filtration provided to 5 micron.

**6. Element Replacement**

No special tools are required to change the filter.

**7. Filter Monitoring**

Both filter stages shall have a differential pressure switch piped across them to indicate when the filters needs to be changed. The switch shall provide indication on the main filtration control cabinet to alert operators and sound a horn. The differential pressure switch shall provide clear indication of strainer basket status with the use of a Tri-Colored Scale Plate with GREEN denoting Clean, YELLOW denoting Change and RED denoting dirty strainer. This shall have one piece cast-iron body and shall be suitable for pressure to 200 PSI.

**8. Control Hardware**

The control strategy shall be microprocessor-based. RELAY LOGIC SHALL NOT BE ACCEPTABLE. The control strategy shall be factory configured and stored on a EEPROM, and shall be safeguarded against re-configuration by un-authorized/un-qualified personnel. Control hardware shall include combination magnetic motor starter with overload protection and circuit breaker. The control system shall provide common alarm dry contacts to be interfaced with the Building Maintenance System as required.

**9. Automatic Operation**

In order to ensure automatic fuel maintenance the filtration system shall have an adjustable automatic start and run time. The operator shall be able to set the system to run at a certain time every day or week.

**10. Safety Interlocks**

Provide safety interlocks to shutdown pump when a "leak" is detected.

**11. Operator Interface**

All operator interface shall be cabinet front door mounted. As a minimum, the following indications, alarms, control switches and pushbuttons shall be provided:

1. Alarm Silence, Manual Reset, Lamp/Alarm Test Pushbuttons
2. Pump "Hand-off-Auto" control switch
3. "Pump On", indicator
4. "Filter Saturated", "Filter Water Level High" and "System Basin Leak Detected" Alarms

**12. Quality Assurance Inspection, Labeling and Testing**

The Control Cabinet shall be manufactured in accordance with UL508A. Simply supplying UL recognized individual components is not sufficient. The assembled control cabinet as a whole must be inspected for proper wiring methods, fusing, etc., and must be labeled as conforming to UL508A (CSA C22.2 #14 for use in Canada). Inspection and labeling shall be supervised by UL or other OSHA approved Nationally Recognized Test Lab (NRTL). The system must be manufactured by a nationally recognized Trade Union (I.B.E.W. or similar trade union). Lack of an NRTL certified UL508A wiring methods inspection and label or lack of a Trade Union label will be grounds for rejection.