

HMF2 Series Filter System Operating & Maintenance Manual

Process Efficiency Products (PEP) filtration equipment has been designed to give long, trouble-free service when properly installed, operated and maintained. This manual includes installation and start-up procedures, and instructions for shutting down the HMF2 filter.

Note: Recommendations for service frequency are minimums. For severe applications, more frequent service intervals are required.

It is important that maintenance personnel review this manual carefully, including the safety precautions and warnings located on page 8 prior to performing service on HMF2 filters.

For each required service, follow the procedures outlined in the Maintenance Procedures section. HMF2 construction details are shown on the manual cover with major points of inspection and service identified. If further information is required that is not covered in this manual, please contact PEP or your local PEP Representative.

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GENERAL DESCRIPTION

PEP HMF2 Series Industrial Water Filters are permanent media type units specifically designed to remove suspended particulates from industrial and process water. HMF2 filters are suitable for both side-stream and in-line applications on pressurized systems. The standard pressure rating for HMF2 filter systems is 100 psig (700kPa). Optional higher pressure ratings and ASME coded vessels are available.

Filter Operation

Unfiltered system water is pumped through the HMF2 filter inlet and over-drain assembly at the top of the filter tank where it is distributed evenly over the media. Suspended particles are entrapped within the filter media. The resulting filtered water then passes from the vessel through the under-drain assembly at the bottom of the filter and is returned to the system.

When trapped particles cause the pressure differential across the media bed to reach a pre-determined pressure of approximately 16 psig, the valves are automatically or manually repositioned and the media is backwashed with a rigorous scouring action for approximately two minutes. The accumulated particulate exits the filter vessel via the over drain assembly and flows to drain. After which, the valves are returned and filtration continues.

Installation

Unpacking

Immediately upon receipt, the PEP HMF2 filter should be checked thoroughly to ensure that all required items have been received and the filter equipment is free of any shipping damage prior to signing the bill of lading.

The filter model number appears on a nameplate located on the unit and should be checked against the invoice/packing list.

Rigging

1. The PEP HMF2 units should be lifted with a forklift or overhead crane. If these units are lifted with an overhead crane, lifting straps must be located below the filter skid and should not come in contact with filter components. For non-skidded filters, use lifting lugs located at the top of the filter vessel.
2. All PEP water filters should be rigidly anchored to the floor or support steel by means of anchor bolts. The HMF2 has holes suitable for 3/4" anchor bolts.

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3. After the unit has been installed, the pressure gauge and air relief valves should be installed on the top of the filter vessel (some units will have vents already installed). The filter media (sand, gravel, etc.) should be loaded into the filter at this time. Refer to the "Loading Media" section in this manual for a description on how to load the media into the filter tank and the quantity of media necessary for each filter size.

Piping

The PEP HMF2 filter should be installed as follows (refer to Table 2 for connection sizes on filter models):

1. Connect a feed water line from the system sump or piping to the connection labeled "Inlet" on the pump. If the inlet connection is located above the operating water level of the system sump, install a foot/check valve to prevent pump suction loss.
2. Connect the return line from the connection labeled "Outlet" to the system sump or piping.
3. A service valve should be installed on the inlet, outlet, and city water line (if city water is used) to allow servicing of the filter. For units using a backwash source other than the system sump, refer to Table 3 to determine the required backwash flow. Connect this line to the fitting labeled "City Water". The maximum city water backwash supply pressure on the HMF filters should never exceed the pressure rating of the filter vessel. If public or municipal water is used for backwash, a reduced pressure back-flow prevention or check valve is required in the line (refer to local codes).

Connect a backwash waste line to the connection labeled "Waste". This line carries the backwash wastewater to the drain. Do not put a valve in the backwash line and never reduce the backwash line size. Refer to Table 3 for minimum and maximum backwash flow rates.

Note: If the drain is not large enough to handle the backwash flow rate, it may be necessary to use a backwash holding tank to collect the wastewater, and regulate the flow from the holding tank to drain.

4. All interconnecting piping, fittings, valves, or other accessories connected to the filter system (whether supplied by PEP or others) must be independently supported to eliminate stress on piping.

Check with local, county, or other government authorities to ensure compliance with applicable government or industry codes.

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Note: The $\frac{3}{4}$ " (20 mm) drain plug on HMF2 units is located on the tank bottom.

Actuator Requirements

PEP HMF2 filters utilize electric actuators to control the valve action between the filtration and backwash cycles. The electric actuator is designed for 110 VAC control. Air operated actuators are available as an option.

Wiring

HMF2 filters are supplied with a pump and automatic backwash controls and the following system components: NEMA 4X control enclosure containing an on/off disconnect switch, motor overload protection, transformer to provide 110 VAC control voltage, adjustable backwash timer, 24 hour time clock, pressure differential switch to initiate backwash, valve actuator to reposition valves for backwash, and push button for manual backwash initiation. Units are provided with 460 VAC, 3 ϕ close-coupled pump/motor assembly (110 VAC single phase panel if pump is not furnished).

Units supplied with city or other source backwash are provided with a magnetic motor starter. Units supplied with manual backwash are provided with no motor control.

The following recommendations conform to the 2003 National Electric Code. Check with local authorities for specific requirements.

Note: Refer to the pump/motor nameplate for horsepower and current draw.

Single Phase Manual Units

1. Install a separate power supply with circuit breaker protection between the closest branch distribution panel and the pump motor. The full load current for standard models is listed in Table 4.
2. Install an externally operated switch with fuse protection and door interlock in plain sight of the filter and not more than 50ft (15m) away. The thermal overload protection, if required, must be sized for full load amp draw listed on the pump motor nameplate.

Three Phase Manual Units

1. Install a separate power supply line with circuit breaker protection between the closest branch distribution panel and the pump motor. The full load

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current for standard models is listed in Table 5.

2. Install a service disconnect switch in plain sight of the filter and not more than 50ft (15m) away.
3. Install an externally operated manual or magnetic starter with thermal overload and fuse protection. If the unit is to be controlled remotely with a time clock, switch, or other device, a magnetic starter must be used. The thermal overload protection (if required) must be sized for the full load amp draw listed on the pump motor nameplate.

Single and Three Phase Automatic Units

Install a separate power supply line with circuit breaker protection between the closest branch distribution panel and the control box. The full load current for standard single and three phase units is listed in Tables 4 & 5. The control box contents are pre-wired and include a service disconnect switch, thermal overload/short circuit protection, and a transformer to convert the power supply to single phase 110 VAC for controls (for pump motor voltages other than 110 VAC). Wire the power supply lines to the disconnect switch. All incoming power supply lines must connect to the door interlock disconnect.

Loading Filter Media

The specially manufactured spherical silica sand media used in PEP media filters is designed to remove suspended solids 10 micron and larger, typically up to 90% by volume. Optional media is available to remove up to 90% by volume of suspended solids down to 5 and 0.5 micron and larger. The media will ship to the job site in 1/2 cubic ft. drums (50 lbs/23 kg) or 1 cubic ft. bags (100 lbs/46 kg) for easy handling during the media loading process.

The garnet media is packaged in 1/2 cu.ft. containers and weighs approximately 70 lbs/32kg.

Actual quantities may vary slightly with vessel pressure ratings. Correct quantities will be noted on the shipping and inspection records for each system.

The fill gravel must be loaded into the filter tank before the silica sand media.

Never load gravel into a dry filter vessel. Fill the vessel one-third full with water before loading. Always check integrity of filter internals **before** loading media.

Media Loading Order

Identify the media pack that was furnished with the filter, and fill in the sequence indicated below:

1. Unigran 85	1. Unifill 475	1. Unifill 475	1. Unifill 475	1. Unifill 475
	2. Unigran 85	2. Unigran 55	2. Unigran 55	2. Unigran 55
		3. Unigran 85	3. Unigran 85	3. Unigran 20
			4. Unigran 20	

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Operation And Maintenance

Initial And Seasonal Start-Up

Before initial start-up or after a shut down period, the HMF2 filter should be thoroughly inspected and cleaned.

Caution: Perform the first five of the following recommendations with power off. Refer to the Safety Precautions on Page 8, regarding the safeguarding of maintenance personnel from biological contaminants, prior to initial and seasonal start-up.

1. On PEP HMF2 filters, loosen the bolts around the pump pre-strainer tank lid. Remove the lid, inspect the O-ring seal and lubricate. Clean debris from the pump pre-strainer basket. Prime the pump suction line by filling the strainer basket housing. Replace the basket, lid and bolts.
2. Turn the pump and motor shaft by hand to ensure free rotation (if possible).
3. On manual systems only, rotate the valves manually by moving the valve linkage up and down to ensure free operation. Make sure the valves and linkage are in the correct position before start-up.
4. On PEP filters, loosen the access bolts on access port lid, remove lid and lubricate the bolts as necessary.
5. Inspect the over drain assembly and media pack. If the media pack is contaminated, remove the foreign material or replace the media, and replace the access port.
6. Open manual air relief valve on top of the filter tank. Start the pump motor briefly and check the arrow on the pump volute for proper rotation. Turn the pump motor off. Do **not** operate the pump for an extended period of time with the pump rotating backwards. Have a qualified electrician change leads to correct rotation.
7. With the air relief valve open on top of filter tank, check the shut-off valves in the filter inlet and outlet water lines to verify they are open. Make sure the pump is primed. Start the pump and allow the filter vessel to fill. Wait for all air in vessel to be released before closing the manual air relief valve.
8. Check the voltage and current of all leads on the pump motor. The current amp draw should not exceed the pump motor nameplate rating.
9. Check the unit for any unusual noise or vibration and contact your local PEP Representative if noise or vibration occurs.
10. Check the unit for any air or water leaks. Leaks must be repaired. Failure to

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do so could result in poor performance and/or personal injury.

11. Backwash the filter. After back washing the filter, check and record the inlet and outlet pressure gauge readings. The media should be back washed whenever the pressure drop across the filter (the difference between the two gauges) reaches approximately 10 psig over starting pressure.

After First Hour Of Operation

1. Open the air relief valve on top of the filter tank. Close the valve after the air has been purged from the system. Excessive air release represents a leak in the pump suction piping, and must be repaired. Air accumulation in the filter tank can result in an unsafe condition due to excessive pressure within the tank.
2. Check the unit for any unusual noise or vibration and contact your local PEP Representative if noise or vibration occurs.
3. Check unit for any air or water leaks.

Operation

During operation, PEP HMF2 filters should be inspected, cleaned and lubricated on a regular basis. The required services and recommended frequency minimums for each are summarized on in the Operation and Maintenance Schedule in this manual.

Cold Weather Operation

HMF2 filters exposed to below freezing ambient temperatures require freeze protection. Installation in a heated indoor space is the best means of preventing the water from freezing in a filter. Where indoor installation is impractical because of filter location or space limitations, supplementary heat must be supplied through the use of electrical heat tape and insulation. The parts of the filter that must be heat traced and insulated are: pre-strainer tank, pump, piping, valves, pressure switch tubing, and filter vessel. The unit should be drained when shut down for any period of time. Refer to the Seasonal Shutdown section of the manual for recommendations.

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Seasonal Shutdown

The following services should be performed if the unit is shut down for a prolonged time period.

1. Shut off all electrical power.
2. Close the shut-off valves in the filter inlet and outlet water lines. For units using a backwash source other than the system, close the shut-off valve in the line from that source.
3. Drain all external piping to and from the filter.
4. Open the manual vent valves and the drain line to the filter tank and piping. After the water has drained, close the drain and vent.
5. On manual units only, rotate the valves manually by moving the linkage up and down to ensure operation without obstruction.
6. Loosen the bolts that hold the filter access lid in place and remove the inspection port cover. Lubricate the bolt and replace the port gasket if necessary.
7. Inspect the over drain assembly and media pack. If the media is contaminated, remove the foreign material and replace the media if necessary. Install the filter access port and secure the bolts.

Maintenance Procedures

Pump Pre-Strainer

Warning: Disconnect all electrical power prior to performing pump maintenance. The filter pre-strainer basket on the pump inlet must be kept clean and free of debris. Shut off the power, close the valves, open the air relief valve, remove bolts and lid. Remove and clean the basket. Replace basket, lubricate O-ring, and tighten bolts.

Backwashing

The filter media must be backwashed when the differential pressure is reaches approximately 10 psig. Since the units with automatic controls perform this function as necessary, a detailed backwash procedure is only provided with manual units. The backwash cycle on automatic units can be manually initiated by pushing the button on the control panel unit the valves change position. The valves will then be automatically repositioned after two minutes. HMF2 **filters should be back washed once a week minimum.**

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For manual control units using a backwash water source other than the system:

1. Shut off the electrical power to the pump motor.
2. Move the handle on the linkage to position the valves in backwash mode.
3. Allow the filter to backwash for approximately two minutes.
4. Move the handle on the linkage to position the valves in the filtration mode.
5. Re-start the pump motor.

For manual control units using the system water for backwash:

1. Shut off the electrical power to the pump motor.
2. Move the handle on the linkage to position the valves in the backwash mode.
3. Re-start the pump motor.
4. Allow the filter to backwash for approximately two minutes.
5. Shut off the electrical power to the pump motor.
6. Move the handle on the linkage to position the valves in filtration mode.
7. Re-start the pump motor.

Filter Tank

The filter tank internal components should be visually inspected annually or whenever back washing does not reduce the pressure of the filter tank to the starting media gauge pressure. On HMF2 filters, remove the access port on top of the tank to inspect internal components.

Note: Always use care and follow proper shutdown procedures. Inspect the over drain assembly for any debris blockage or damage and clean or replace if necessary. Remove and inspect the media. HMF2 filters have hand access ports located on the side of the tank for easy media removal under drain inspection. Over a period of time, foreign matter may become embedded in the media pack that will not back wash. Contaminated media should be discarded. Unscrew the under drain laterals and inspect for blockage or damage. Clean or replace if necessary. Refill tank with the proper amount of new media, following the media loading instructions found in Table 6.

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Water Treatment

Filtration is an effective way of reducing suspended particulates in fluids but is only one component of a water treatment program. Dissolved solids originally present in water remaining after evaporation cannot be eliminated by filtration. The concentration of these dissolved solids increases rapidly and can cause scale and corrosion. In addition, airborne impurities and biological contaminants, including Legionella, may be introduced into the re-circulating water through the cooling equipment being filtered.

To control all potential contaminants a water treatment program must be employed. In many cases a simple bleed-off in the system may be adequate for control of scale and corrosion. The filter backwash can be used to constitute a portion of the bleed. However, biological contamination can be controlled through the use of biocides and such treatment should be initiated at system start-up and be incorporated into the total treatment system regime.

For specific recommendations on water treatment contact a competent water treatment supplier.

Factory Authorized Parts

PEP maintains a stock of replacement parts. Parts usually ship within three business days after receipt of order. In emergency situations, shipment can usually be made within 24 hours (if stock). **To expedite your parts order, please include the unit serial number and model when ordering parts.**

Recommended Spare Parts

- O-ring/gasket for filter tank to access port, hand hole and manhole gaskets.
- O-ring seal/gasket for pump pre-strainer lid (if applicable).
- Seal kit for pump (if applicable).
- Transformer fuse (automatic units only).
- Replacement media.

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Safety Precautions

All electrical, mechanical and rotating machinery constitute a potential hazard, particularly for those not familiar with its design, construction, and operation. Accordingly, adequate safeguards should be taken whenever working with or near HMF2 filter systems.

Equipment operation, maintenance and repair should be undertaken by qualified personnel only. All such personnel should be thoroughly familiar with the equipment, the associated system and controls, and the procedures set forth in this manual. Proper care, procedures, and tools must be used in handling, lifting, installing, operating, maintaining, and repairing the HMF filter system.

For the protection of authorized service and maintenance personnel, the pump motor associated with this equipment should be installed with a lockable disconnect switch located in close proximity and within sight of the HMF2 filter. No service work should be performed on or near the pump motor without first ensuring that the pump motor has been electrically disconnected and locked out.

The re-circulating water system may contain chemicals or biological contaminants that could be harmful if inhaled or ingested. Accordingly, personnel exposed to the mist produced by water jets or compressed air (should these be used to clean portions or components of the HMF filter) should wear half-face respirators with HEPA filter cartridges, NIOSH/MSHA approved number TC-21C-142/TC-21C-182.

Warranty Policy

All products manufactured by PEP are warranted to be free from defects in materials and workmanship for a period of 12 months from date of startup or 18 months after shipment, whichever is sooner. Contact PEP Filters for further warranty information.

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OPERATION AND MAINTENANCE SCHEDULE

TYPE OF SERVICE	START-UP	MONTHLY	SEMI-ANNUALLY	SHUTDOWN	ANNUALLY
Inspect General Condition of Unit	X	X			
Check & Lubricate Clamp on Strainer Lid (SMF Filter)	X	X		X	X
Clean Basket in Pre-Strainer Tank (SMF Filters only)	X	X	X	X	
Inspect O-ring Gasket (SMF2)	X			X	
Check Pump Shaft for Free Rotation	X		X		
Check Operation of Valves	X	X		X	
Check, Lubricate Clamp on Filter Tank Access Port (HMF2 & BMF)	X			X	X
Inspect Over-drain Assembly and Media Pack	X			X	X
Check Pump Motor for Proper Rotation	X				
Prime Pump	X				
Check Motor Voltage & Current	X	X	X		
Check Pressure Gauge Reading (Top of Filter Tank)	X	X			
Check Unit for Unusual Noise or Vibration	X	X			
Check Unit for Leaks	X	X			
Drain Filter and Piping				X	

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Table 1 Inspection Chart	
PART	HMF MODEL
Filter Tank	X
Valves & Linkage	X
Filter Inter-connection Piping	X
Pump Pre-strainer tank & basket	X
Pump	X
NEMA 4X Box (Auto only)	X
Filter Skid	X
Pressure gauge, air relief valves, & tees	X
Media (shipped Loose)	X

Table 2 Connection Sizes				
HMF2 Model	System Water Backwash			City Water Backwash
	Pump Inlet	Filter Outlet	Waste Outlet	Inlet City Water
HMF	Inches/mm			
12	2/50.8	1/25.4	1/25.4	1/25.4
18	2/50.8	2/50.8	2/50.8	2/50.8
24	2/50.8	2/50.8	2/50.8	2/50.8
30	2.5/63.5	2/50.8	2/50.8	2/50.8
36	2.5/63.5	3/76.2	3/76.2	3/76.2
42	3/76.2	3/76.2	3/76.2	3/76.2
48	3/76.2	3/76.2	3/76.2	3/76.2

Table 3 Filter Flow Rates			
HMF2 Model	Forward Flow gpm / lps	Minimum Backwash Flow Rate gpm / lps	Maximum Backwash Flow Rate gpm/lps
12	16/.96	12.8/.78	16/.96
18	35/2.2	28/1.8	35/2.2
24	63/3.8	47/3.0	63/3.8
30	98/6.2	74/4.6	98/6.2
36	141/4.0	107/6.7	141/4.0
42	192/13.0	144/9.1	192/13.0
48	251/15.8	188/11.9	251/15.8

Table 4 Electrical Requirements (1ϕ, 60 Hz.)		
PUMP HP/KW	Voltage 1ϕ 60/50HZ	Full Load Current (Amps)
1/0.75	110, 208, 240	16, 8.8, 8
2/1.5	115, 208, 230	24, 13.2, 12
3/2.25	208, 230	18.7, 17

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Table 5a Electrical Requirements (3ϕ, 60Hz)		
PUMP HP/KW	Voltage 3 ϕ 60 HZ	Full Load Current (AMPS)
2 / 1.5	208, 230, 460, 575	7.5, 6.8, 3.4, 2.7
3 / 2.2	208, 230, 460, 575	10.6, 9.6, 4.8, 3.9
5 / 3.7	208, 230, 460, 575	16.7, 15.2, 7.6, 6.1
7.5 / 5.6	208, 230, 460, 575	24.2, 22, 11, 9

Table 5b Electrical Requirements (3ϕ, 50Hz)		
PUMP HP/KW	Voltage 3 ϕ \emptyset 50 HZ	Full Load Current (AMPS)
2 / 1.5	380, 415	3.4, 3.1
3 / 2.2	380, 415	5.2, 4.7
5 / 3.7	380, 415	8.0, 7.1

Table 6 Media Quantities for HMF2 Filters (non-code vessels)		
HMF2 Filtration System Size / Model	Fill Gravel 1 Pail = .5 ft ³ Unifill 475	Filter Media (total quantity)
12	1 pail	1 pail
18	2 pails	2 pails
24	3 pails	4 pails
30	6 pails	6 pails
36	9 pails	9 pails
42	14 pails	12 pails
48	20 pails (or 10 bags)	16 pails (or 8 bags)

***Note:** Please check your inspection report for exact amount. LOADING: Fill the filter 1/3 ~ 1/2 full with water before loading the media. Load media in order described in "Media Loading" section of this manual. Taking care to distribute the lower fill material around the under drain system, filling all voids.

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<i>DESCRIPTION</i>	<i>PART NUMBER</i>
Filter Parts	
Gauge Kit (Includes: 4 way cross, pressure gauge, air vent & petcock)	A-Z-VNT-GA-HMF-100
Top Manway Gasket 4 X 6 HMF2 12	G-GSKT-04X06-NE-OVAL
Top Manway Gasket 6 X 8 HMF2 18, 24 & 30	G-GSKT-06X08-NE-OVAL
Top Manway Gasket 12 X 16 HMF2 36, 42 & 48	G-GSKT-12X16-NE-OVAL
Side Handhole Gasket 6 X 8 HMF2 24, 30, 36, 42, & 48	G-GSKT-06X08-NE-OVAL
Overdrain HMF2 12	O-PVC80-SCS-12
Overdrain HMF2 18	O-PVC80-HMF-18
Overdrain HMF2 24	O-PVC80-HMF-24
Overdrain HMF2 30	O-PVC80-HMF-30
Overdrain HMF2 36	O-PVC80-HMF-36
Overdrain HMF2 42	O-PVC80-HMF-42
Overdrain HMF2 48	O-PVC80-HMF-48

Underdrain HMF2 12	P-LAT-0100-HM12-PV80
Underdrain HMF2 18	U-PVC80-HMF-18
Underdrain HMF2 24	U-PVC80-HMF-24
Underdrain HMF2 30	U-PVC80-HMF-30
Underdrain HMF2 36	U-PVC80-HMF-36
Underdrain HMF2 42	U-PVC80-HMF-42
Underdrain HMF2 48	U-PVC80-HMF-48

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SET OF LATERALS ONLY HMF2 12 (Quantity = 1)	P-LAT-0100-HM12-PV80
HMF2 18 (Quantity = 6)	P-LAT-0075-HM18-PV80
HMF2 24 (Quantity = 8)	P-LAT-0075-HM24-PV80
HMF2 30 (Quantity = 8)	P-LAT-0075-HM30-PV80
HMF2 36 (Quantity = 16)	P-LAT-0075-HM36-PV80
HMF2 42 (Quantity = 16)	P-LAT-0075-HM42-PV80
HMF2 48 (Quantity = 16)	P-LAT-0075-HM48-PV80

LATERAL KIT [TO CONSIST OF: 1 PVC LATERAL, HEADER ADAPTOR, CAP & GLUE] CUSTOMER TO CUT TO SIZE.	I-LAT-007X0181-PVC80
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LINKAGE KITS SELECT EITHER "C" OR "T" FOR CITY OR TOWER WATER BACKWASH	-C OR -T
AUTOMATIC City or Tower Water HMF2 12	L-LA-HMF-012-A-C- OR -T
Manual City or Tower Water HMF2 12	L-LA-HMF-012-A-C- OR -T
AUTOMATIC City or Tower Water HMF2 18	L-LA-HMF-018-A-C- OR -T
Manual City or Tower Water HMF2 18	L-LA-HMF-018-A-C- OR -T
AUTOMATIC City or Tower Water HMF2 24	L-LA-HMF-024-A-C- OR -T
Manual City or Tower Water HMF2 24	L-LA-HMF-024-A-C- OR -T
AUTOMATIC City or Tower Water HMF2 30	L-LA-HMF-030-A-C- OR -T
Manual City or Tower Water HMF2 30	L-LA-HMF-030-A-C- OR -T
AUTOMATIC City or Tower Water HMF2 36	L-LA-HMF-036-A-C- OR -T
Manual City or Tower Water HMF2 36	L-LA-HMF-036-A-C- OR -T
AUTOMATIC City or Tower Water HMF2 42	L-LA-HMF-042-A-C- OR -T

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Manual City or Tower Water	HMF2 42	L-LA-HMF-042-A-C- OR -T
AUTOMATIC City or Tower Water	HMF2 48	L-LA-HMF-048-A-C- OR -T
Manual City or Tower Water	HMF2 48	L-LA-HMF-048-A-C- OR -T

ACTUATOR-Filter Models		Unitorq
Electric Actuator	HMF2 12, 18, 24 & 30	Q-ACT-E-0600-110-R600
Electric Actuator	HMF2 36	Q-ACT-E-0600-110-R600
Electric Actuator	HMF2 42, 48	Q-ACT-E-0600-110-R600
3-WAY VALVES		
1" BRASS 3-WAY VALVE	HMF2 12	V-VLV-010-BL-3WY-BR
2" BRASS 3-WAY VALVE	HMF2 18,24 & 30	V-VLV-020-BL-3WY-BR
3" BRASS 3-WAY VALVE	HMF2 36 ,42 & 48	V-VLV-030-BL-3WY-BR

Filter Model				Pump/Motor Assembly
1 HP	HMF2 12	17 gpm	460/3/60	R010-S001750-TC46036
1 HP	HMF2 18	35 gpm	110,220/60	R010-S003550-TC22016
1 HP	HMF2 18	35 gpm	460/3/60	R010-S003550-TC46036
2 HP	HMF2 24	63 gpm	110,220/60	R020-S006350-TC22016
2 HP	HMF2 24	63 gpm	220,460/3/60	R020-S006350-TC46036
3 HP	HMF2 30	98 gpm	460/3/60	R030-S009850-TC46036
3 HP	HMF2 36	142 gpm	460/3/60	R030-S014250-TC46036
5 HP	HMF2 42	192 gpm	460/3/60	R050-S019250-TC46036
5 HP	HMF2 48	251 gpm	460/3/60	R050-S025250-TC46036

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PUMP PARTS:	
2" Cast Iron Pre-Strainer w/ Basket HMF 12, 18, 24 & 30	P-STR-0200-FLG-CI125
2" Stainless Steel Perforated Pre-Strainer Basket only	P-STR-0200-BKST-125
2½" Cast Iron Pre-Strainer w/ Basket HMF 36	P-STR-0250-FLG-CI125
2½" Stainless Steel Perforated Pre-Strainer Basket only	P-STR-0250-BSKT-125
3" Cast Iron Pre-Strainer w/ Basket HMF 42, 48	P-STR-0300-FLG-CI125
3" Stainless Steel Perforated Pre-Strainer Basket Only	P-STR-0300-BSKT-125

Electrical Components

Differential Pressure Switch	E-SWTC-DFP-150-165
Backwash Timers:	
3 minute backwash timer	E-TIMR-600-DIV
Replacement for Omron Backwash Timer	E-TIMR-600-OMR-REPLC
Syrelec (Conversion kit to SSAC)	E-TIMR-600-SYR
24 Hour Time Clock / Grasslin 60HZ only	E-CLCK-24H-120
24 Hour Time Clock 50HZ only	E-CLCK-24H-QTZ
STEPDOWN TRANSFORMER	[VERIFY VA RATING BEFORE ORDERING]
208/120 VOLT – SINGLE & TRIPLE PHASE	E-TRAN-100-208-120
220/460 VOLT	E-TRAN-100-460-120
380 VOLT	E-TRAN-100-380-120