

The MTC-X is a mobile fuel polishing system designed to efficiently remove water, sludge, and other contaminants from fuel storage tanks. Once on site, the MTC-X can be operated to ensure fuel reliability through routine servicing of the fuel tank(s). The system's fuel polishing process stabilizes diesel and bio-fuels by eliminating various contaminants, ensuring the fuel remains clean. These mobile systems feature a cart-based design that allows for maximum portability and ease of transportation between the various fuel tanks that require routine servicing.



MTC-X SPECIFICATIONS:

Nominal Flow Rate	26 GPM/1,560 GPH (98.4 LPM/5,905 LPH)
Primary Filter	Bag Filter Vessel, Liner Basket for use with 1-800µ Filter Bags
Secondary Filters	3, 10 or 25µ Fine Filter or 3, 10µ Water Block
Pump	3/4 HP Rotary Vane Pump
Power	120V/60Hz/15A or 230V/50Hz/15A
Plumbing	Black Iron
Ports	1.5" Cam & Groove In 1.25" Cam & Groove Out
Suction Hose	Clear, 25ft (7.6 m), 1.5" Diameter
Discharge Hose	25ft (7.6 m), 1.25" Diameter
Dimensions	≈ 48" x 22.5" x 25" (H x W x D) (122 x 57 x 63 cm)
Weight	≈ 185 lbs (84 kg)
Not for use with fluids that have a flash point below 100°F (37.8°C).	

REPLACEMENT FILTER OPTIONS:

Primary Filter	Part No.	Secondary Filters	Part No.
1µ Filter Bag	PFB-30-1	3µ Water Block Filter	WB-3
5µ Filter Bag	PFB-30-5	10µ Water Block Filter	WB-10
10µ Filter Bag	PFB-30-10	3µ Fine Filter	FF-3
25µ Filter Bag	PFB-30-25	10µ Fine Filter*	FF-10
75µ Filter Bag	PFB-30-75	25µ Fine Filter	FF-25
250µ Filter Bag	PFB-30-250		
800µ Filter Bag	PFB-30-800		

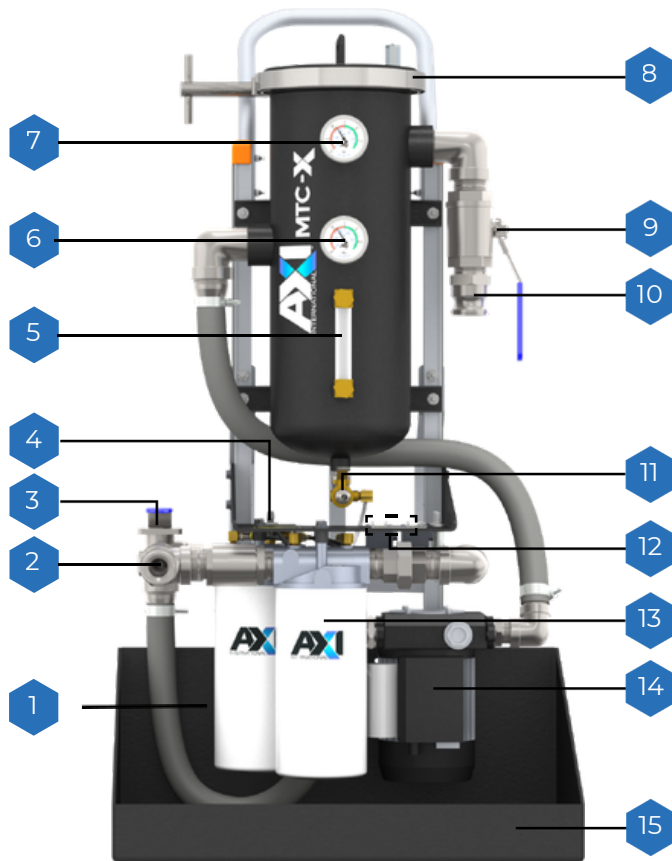
**Standard-issue filter element unless requested otherwise*

MTC-X SYSTEM FEATURES:

- Multi-Stage Fuel Filtration
- Portable System Design
- Locking Cam and Groove Connections
- Spill Containment Tray
- Fine Filter Bypass Capability
- Filter Drain/Purge Capability
- Manual Additive Injection

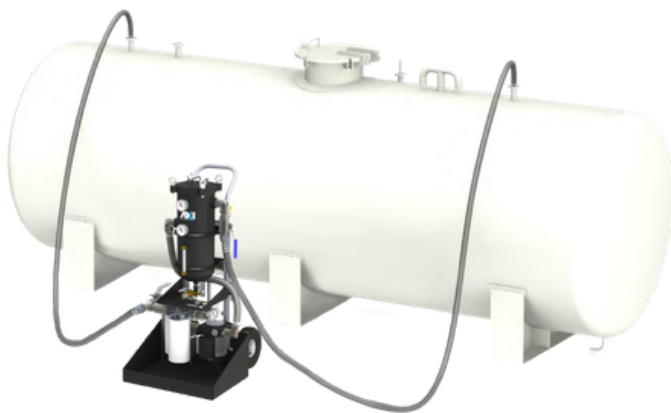
AXI MTC-X

INTERNATIONAL



1. Fine Filter #1
2. Fuel Discharge Port
3. Diverter Ball Valve
4. Accessory Selector Valve
5. Water Level Sight Glass
6. Pump Vacuum Gauge
7. Static Head Vacuum Gauge
8. Primary Filter Vessel
9. Inlet Ball Valve
10. Fuel Inlet (From Tank)
11. Primary Filter Drain Valve
12. Pressure Gauges
13. Fine Filter #2
14. Motor with Coupled Vane Pump
15. Spill Containment Tray

● MTC SYSTEM INTEGRATION:





MTC-X Instruction, Operating, & Maintenance Manual

MOBILE FUEL POLISHING SYSTEM

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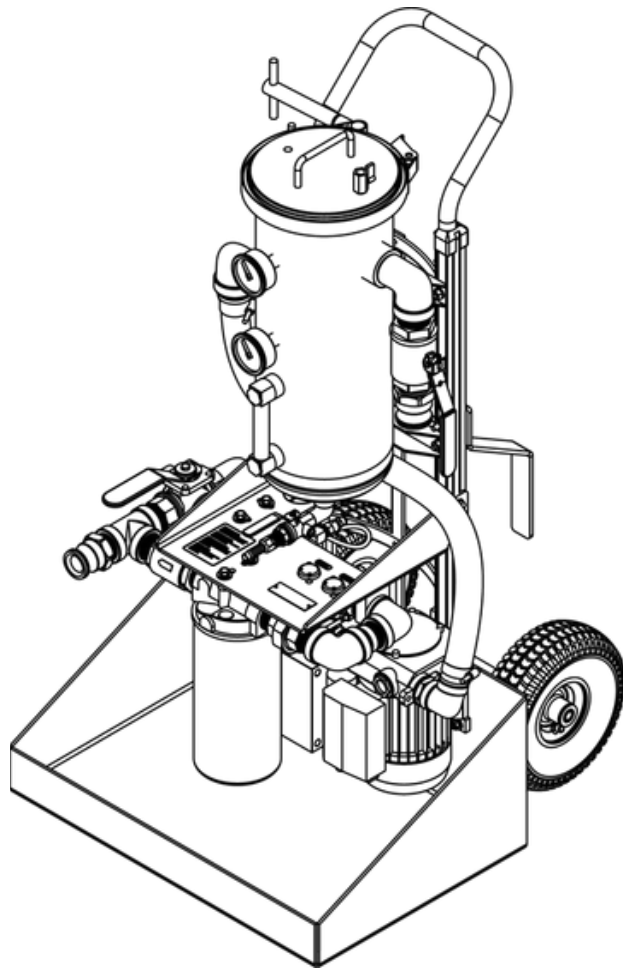


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General Overview

MTC-X Specifications

Nominal Flow Rate.....	26 GPM/1,560GPH(98.4 LPM/5,905 LPH) 12,480gallons(47,242 liters) per 8-hour run 37,440gallons(141,726 liters) per 24-hour run
Primary Filter.....	BagFilterVessel,Liner Basket for use with 1-800μ Water Block
Secondary Filters.....	1, 3,10,or25μFineFilter or 3, 10μ Water Block
Plumbing.....	BlackIron
Inlet Port.....	1.5"Cam&Groove
Outlet Port.....	1¼"Cam&Grove
Operating Temperature.....	41-104°(5-40°C)
Electrical.....	120V/60Hz/15Aor230V/50Hz/15A*
Pump/Motor.....	3/4HPRotaryVanePump
Suction Capability (Primed).....	15ft.Verticalliftor100ft. horizontal run (lines > 1.5", primed)
Clear Suction Hose.....	1.5",25ft.(7.6m)
Discharge Hose.....	1¼",25ft.(7.6m)
Outline Dimensions.....	≈48"x22.5"x25"(122 x 57 x 63 cm) (H x W x D)
Weight.....	≈185lbs.(84kg)

*At 50Hz., nominal flow rate decreases from 26 GPM/1,560GPHto20.8GPM/1,248 GPH

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



System Components

Control and Safety Devices

- Vacuum & Pressure Gauges
- Water Level Sight Glass (Primary Filter)
- Inlet Ball Valve
- Outlet Diverter Ball Valve
- Accessory Selector Valve

Pump/Motor

- 3/4 HP Rotary Vane Pump
- Pump Strainer

Primary Filter

- Bag filter element (purchased separately)
- Drain Valve

Fine Filters

- One standard-issue 3μ fine filter cartridge (other filter elements available)
- One standard-issue void filter cartridge (other filter elements available)

Plumbing

- Black Iron

System Operation

!WARNING! The whole system must be properly grounded for operator safety.

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

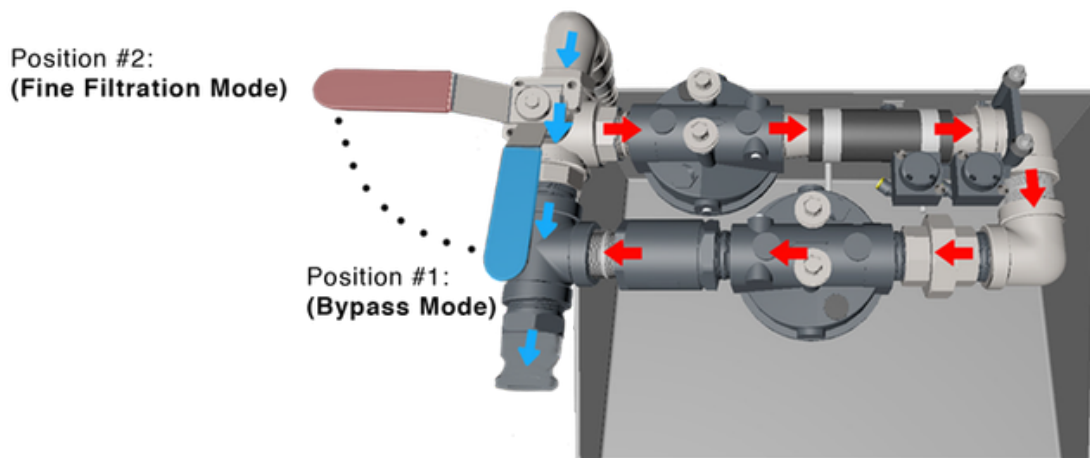
Setup Procedures

To prepare for fuel polishing, the user must first attach both system hoses. The Intake/Suction Hose is clear and see-through while the Discharge Hose is black and opaque. Both hoses are equipped with quick disconnect cam & groove couplings.

1. First, attach the quick disconnect end of the clear Suction Hose to the Inlet Port of the system.
2. We highly recommend attaching a straight wand or pipe (cut at an angle) to the end of the Suction Hose in order to reach the lowest part of the tank bottom.
3. The straight wand or pipe should be no less than the inner diameter of the Suction Hose.
4. Next, attach the quick disconnect end of the black Discharge Hose to the Outlet Port of the system.

Note: Never restrict the flow on the suction side of an MTC; e.g. by using a smaller ID hose or pipe attachment. This will lead to excessive pump load, noisy operation, and ultimately pump damage.

The MTC-X system has two modes of operation: **Bypass Mode** and **Fine Filtration Mode**.



Bypass Mode:

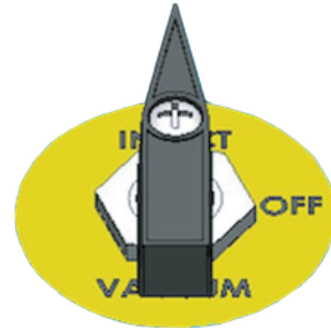
In bypass mode, the fuel bypasses the system's Fine Filters only to be ran through the Primary Filter for the bulk removal of water, sludge, and particulate. To establish bypass mode simple turn the Outlet Diverter Ball Valve to Position #1 as depicted above.

Fine Filtration Mode:

In fine filtration mode, the fuel is run through the system's high efficiency spin-on Fine Filters to remove free water and fine particulate as small as 1 micron. To establish fine filtration mode turn the Outlet Diverter Ball Valve to Position #2 as depicted above.

The MTC-X also features an Accessory Selector Switch located below the Primary Filter Vessel which is used for both the additive injection and fine filter drain procedures.

- **OFF Position** – Default setting for all standard fuel polishing phases (see System Operation – Polishing Procedure - Phase 1 – 3)
- **INJ Position** – Creates a vacuum on the clear accessory hose to be inserted in the additive container for the additive injection procedure (see System Operation – Manual Additive Injections)
- **VAC Position** – Creates a vacuum on the fine filtration branch for the filter drain procedure (see System Operation – Purging the Fine Filters)



Fuel Polishing Procedure - Phase 1

AXI recommends 3 phases to successfully polish a fuel tank. This will ensure all contaminants are removed and the fuel is in optimal condition.

The goal of Phase One is to remove any free water and sludge from the bottom of the tank without mixing the water into an emulsified state within the fuel. The Pump will start pumping as long as the system is primed (See Priming the System section) and the suction lift is not excessive. The flow of the fuel can be observed in the see-through suction hose.

1. Setup up the system in Bypass Mode (see Setup Procedures – Bypass Mode).
 2. Place the Discharge Hose into a separate discharge waste container.
 3. To remove as much of the free water and sludge as possible, the Suction Hose (with a straight wand or pipe attachment) should be placed at the deepest part of the tank.
 4. Before starting the pump, ensure the Inlet Ball Valve is in the open position, the Accessory Selector Switch (located on the base below the Primary Filter) is in the “OFF” position, and Primary Filter is equipped with a filter bag (see Maintenance – Servicing the Primary Filter).
 5. Turn on the Pump and be prepared to immediately switch it off once the fluid begins to fill the discharge container.
 6. Inspect the discharged fluid before resuming the filtration process.
 7. While pumping, regularly check the Water Level Sight Glass on front of Primary Filter to see any water buildup.
- Switch off the Pump and drain the Primary Filter as often as needed using the drain valve.

Note: It may be necessary to depress the air purge valve on top of the Primary Filter after opening the drain valve.

8. Monitor the Vacuum Gauges on the Primary Filter vessel to know when to replace the Primary Filter bag. A differential pressure of 15” HG between the two gauges will indicated when the Primary Filter needs to be serviced (see Maintenance – Servicing the Primary Filter).
9. Continue pumping until the bulk water and sludge have been removed from the tank bottom and only fuel is primarily discharged from the return hose.
10. Switch off the Pump and drain all water and debris from the hose and the Primary Filter (via the drain valve) into an appropriate waste bucket or container.

Fuel Polishing Procedure - Phase 2

The goal of Phase Two is to remove any additional free water, sludge, and large contaminants within the tank. This phase will further clean the fuel and should be a precursor to using the more expensive spin-on filters. It should be noted that meeting required cleanliness codes is typically not possible with Phase One and Two alone. Phase Two is simply used to extend the life of the spin-on filters by remove the worst of the contaminants first.

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1. Before turning on the Pump, ensure the system is still setup in Bypass Mode (see the Setup Procedures – Bypass Mode).
 2. Remove the Discharge Hose from the waste container and place it into the tank.
 3. If possible, ensure the Suction and Discharge Hoses are placed as far apart as possible but note that in many cases both hoses may have to be inserted through the same tank opening.
 4. After verifying that both hoses are properly placed in the fuel tank, the ball valves on the system are in the correct position, and the Accessory Selector Switch is in the “OFF” position, switch on the pump and watch the clear suction hose for fuel flow.
 5. While pumping, regularly check the Water Level Sight Glass on front of Primary Filter to see any water buildup. Switch off the Pump and drain the Primary Filter as often as needed using the drain valve.
 6. Monitor the Vacuum Gauges on the Primary Filter vessel to know when to replace the Primary Filter bag. A differential pressure of 15” HG between the two gauges will indicate when the Primary Filter must be serviced (see Maintenance – Servicing the Primary Filter).
 7. Run several cycles of the entire tank volume, continuously reducing the micron rating of the Primary Filter’s filter bags. This will remove the majority of large contaminants from your fuel.
 8. Once clean samples can be drawn from the Primary Filter vessel (via the drain valve), switch off the pump to prepare for the final polishing phase.

Fuel Polishing Procedure - Phase 3

Phase Three is the most important phase in meeting specific cleanliness codes. Unlike the Primary Filter, the spin-on Fine Filter typically uses an absolute rated media. Absolute filters have a very high efficiency and will ensure that fuel leaving the system is clean to specification.

1. Before turning on the Pump, ensure the system is setup in Fine Filtration Mode (see the Setup Procedures – Fine Filtration Mode).
2. After verifying that both hoses are properly placed in the fuel tank, the ball valves on the system are in the correct position, and the Accessory Selector Switch is in the “OFF” position, switch on the pump and watch the clear suction hose for fuel flow.
3. In addition to the Water Level Sight Glass and Vacuum Gauge, monitor the Pressure Gauges for the Fine Filters (located on the base below the Primary Filter). When the gauge needle on either filter gauge reaches the red area, be sure to change the corresponding filter (see Maintenance – Servicing the Fine Filters).
4. Additionally, if the third overall or absolute Pressure Gauge reads a combined pressure of 20 - 25 PSI, be sure to service the Fine Filters in order to protect the system pump.

Draining the System

Upon the completion of fuel polishing and/or prior to servicing the filters, it is necessary to drain the system of residual fuel in order to avoid spillage.

1. Allow the fuel to drain out of the hoses by removing the suction hose from the tank while the pump is still running.
2. Once the system is mostly purged of the remaining fuel, turn off the pump and drain the primary filter (see Maintenance – Servicing the Primary Filter).

Manual Additive Injection

1. With the pump running, place the provided flexible hose (hanging from the accessory selector in drip tray) into a fuel additive container.
2. Ensure sufficient additive is present in the container and that the flexible hose reaches the bottom.
3. Now, twist the Accessory Selector Switch (located on the base below the Primary Filter) to the “INJ” position.
4. To start or increase the flow of additive into the system, slowly close the Inlet Ball Valve to create a higher vacuum as indicated on the Vacuum Gauges.
5. Monitor the additive level in the holding container to gauge proper dosing.
6. After injecting the desired amount of additive, twist the Accessory Selector Switch back to the “OFF” position.



Fine Filter Drain Procedure

1. Before beginning the procedure, ensure the Primary Filter Vessel is free of water (see Maintenance – Servicing the Primary Filter).
2. While the pump is running, turn the Outlet Diverter Ball Valve to Position #1 (Bypass Mode).
3. Remove the suction hose from the tank and close the Inlet Ball Valve.
4. Twist the Accessory Selector Switch (located on the base below the Primary Filter) to the “VAC” position in order to begin purging the Fine Filters of fuel.
5. Ensure the top Vacuum Gauge reads approximately 10” HG for optimal filter drain effectiveness.
6. When the flow from the accessory suction tube (Installed between the Primary Filter and Accessory Selector Switch) visibly decreases and starts to be mostly air, turn off the pump.



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 pump/motor hardware and all plumbing connections for tightness.
- Check all electrical terminals and connections for tightness.



Priming the System

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

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

Priming Procedure

Before turning on the pump make sure the entire suction side of the system (suction hose, primary filter/water separator, plumbing, and pump) is primed and filled with oil/diesel fuel. Running the pump dry could cause pump damage and pump to not operate properly.

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. All sources of power are isolated from the unit

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

2. Drain visible water and sediment from the Primary Filter (see Maintenance - Servicing Primary Filter).
3. Check system and all parts for corrosion and rust.
4. 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.
5. Check all plumbing joints for leaks, tighten fittings and joints as necessary, and remove accumulated fuel in the leak-basin as necessary.
6. Inspect all filter(s) and separator.

Servicing the Pump

Check pump for leaks and worn vanes. We highly recommend carrying a spare pump. The MTC pump can be easily changed in a matter of minutes by opening the unions and/or short hose connections. Spare part kits are also available for all MTC pumps.

Keep the pump lubricated by pouring oil into pump head for storage.

Over time, the pump's strainer can collect debris. It is good practice to frequently check the pump strainer and clean it to prevent any flow restrictions.

Cleaning the Pump Strainer:

1. With the pump off, remove pump strainer cap on the pump/motor assembly with an adjustable wrench.
2. Once the cap is removed, fish out the mesh basket and rinse it off.
3. Once fully cleaned and dried, return the mesh basket to its original position and securely tighten the strainer cap.

Servicing the Primary Filter

It is recommended the Primary Filter be periodically serviced to prevent excessive water buildup. The Primary Filter filter bag can also become clogged with sludge and debris resulting in restricted fuel flow. The Vacuum Gauges read the condition between the Primary Filter and the pump and should provide some indication of a clogged filter via a pressure drop reading or when the needle on red.

Draining the Primary Filter:

1. Ensure the system's pump is turned off.
2. Close the inlet and outlet ball valves.
3. Place an appropriate container under the drain valve.
4. Remove the top plug to allow air in and fuel to flow out.
5. Open the drain valve and allow the water and sludge to drain.
6. Close the drain valve when you begin observing clean fuel.

Changing the Filter Bag:

1. With pump turned off and Primary Filter drained, loosen the band clamp on the top of the Primary Filter vessel.

2. Remove the filter bag and place it in a bucket to prevent spillage.
3. Replace the bag filter ensuring the bag is completely extended into the vessel.
4. Re-secure the Primary Filter lid by tightening the band clamp.

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.

Servicing the Fine Filter(s)

Clogged filter elements restrict the flow of fuel, resulting in the system's Pressure Gauge indicating a pressure spike. The MTC-X features a total of three Pressure Gauges. Two gauges display the individual pressure reading of each fine filter. The third Pressure Gauge displays the overall system pressure. If either of the fine filter Pressure Gauges has their needle in the red area, it is time to change the corresponding filter. Additionally, if the overall system pressure has a reading of 20 - 25 PSI, it is time to change one or both the fine filters in order to protect the pump.

Changing the Fine Filter(s):

1. Before servicing the Fine Filter(s), ensure you have drained the system (see Operation – Draining the System) and purged the fine filters (see Operation –Fine Filter Drain Procedure).
2. While in system is either off or running in Bypass Mode, place an appropriate container underneath the Fine Filter(s).
3. Remove the old spin-on filter(s) with a filter wrench
4. Apply a film of lubricating oil to the gasket of the new filter(s). Screw the new filter canister to the filter head until the gasket is tight and secure (rotate the element an additional 0.5 – 1 turn after the filter makes contact with the gasket).

Filter Replacement Chart

MTC SERIES FILTERS			ALL FILTERS ARE ABSOLUTE, UNLESS OTHERWISE NOTED WB: WATERBLOCK SS: STAINLESS STEEL SCREEN				
SPIN-ON FILTERS							
	1µ B100/B10	3µ	3µ WB	10µ	10µ WB	25µ	3µ X-GLASS
MTC-1000	FF-1	FF-3	WB-3	FF-10	WB-10	FF-25	FFZ-3
MTC-3000	FF-1	FF-3	WB-3	FF-10	WB-10	FF-25	FFZ-3
MTC-X	FF-1	FF-3	WB-3	FF-10	WB-10	FF-25	FFZ-3

BAG FILTERS							
	1µ	5µ	10µ	25µ	75µ	250µ	800µ
MTC-X	PFB-30-1	PFB-30-5	PFB-30-10	PFB-30-25	PFB-30-75	PFB-30-250	PFB-30-800

Troubleshooting

Symptom Troubleshooting Guide

No fuel delivery

1. Pump does not run
2. Pump is not primed
3. Fuel supply or return line blocked
4. Primary filter is clogged
5. Excessive lift
6. Air leak in fuel supply to pump
7. Intake or outlet valve closed
8. Liquid too viscous (thick)

Insufficient fuel delivered

1. Air leak in inlet
2. Defective pressure relief
3. Excessive lift
4. Pump worn
5. Flow restriction in hose/plumbing
6. Liquid too viscous
7. Filter plugged

Rapid pump wear

1. Pipe strain on pump causing bind
2. Worn pump/motor coupler
3. Pump has been run dry or with insufficient fuel
4. Plumbing on inlet side not appropriately dimensioned

Vacuum Gauge shows more than 15" HG

1. Restriction on inlet side too high
2. Lift too high
3. Inlet ball valve not fully open
4. Suction line, Primary Filter clogged
- 5.

Pressure Gauge in red area or more than 20–25 PSI with clean or new filter element installed

1. Restriction on discharge side too high
2. Head (lift) on discharge side too high
3. Check filter for water saturation (WB only)
4. Outlet ball valve not fully open
5. Discharge line clogged

Pump requires too much power

1. Air in plumbing lines
2. Liquid too viscous
3. Bent pump shaft, binding rotor
4. Misalignment of pump/motor coupler

Noisy operation

1. Insufficient fuel supply
2. Air leaks in the inlet pipe
3. Excessive pump load (vacuum > 15" HG)
4. Air or gas on the suction side

Pump requires frequent re-priming

1. Pump cavitation
2. Plumbing air leaks
3. Lift too high
4. Leaking pump seal

Motor does not turn or turns intermittently

1. Control power not available
2. Motor thermal overload condition
3. Pump failed and seized
4. Motor failure
5. Vanes are binding

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

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