

AXI MTC-3000

INTERNATIONAL



AXI International's MTC-3000 system is an amobile fuel polishing systemdesigned to efficiently clean and restore diesel and bio-fuels to pristine condition. The MTC-3000 system features multi-stage filtration process that includes a magnetic fuel conditioner for the collection of ferrous metals and a water separator and fine filter for the filtration of sludge, particulates, water, and other diesel fuel contaminants. The fuel polishing system's cart-based design allows for maximum portability and ease of transportation from tank to tank.



Over time, stored fuel can begin to degrade and even harbor contaminants such as water, sediment, and microbes upon delivery. On-board fuel filters should last thousands of hours. However, frequent filter changes and fuel replacement have become common maintenance practices that only address the symptoms of poor fuel quality.

MTC-3000 SPECIFICATIONS

Nominal FlowRate	26GPM/1,560GPH(98.4LPM/5,905 LPH)
Primary Filter	Mechanical Water Separator
Secondary Filter	1, 3, 10, 25μ Particulate or 3, 10μ Water Block
Fuel Conditioner	LG-X 3000 Inline Magnetic Conditioner
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" Out
Clear Suction Hose	1.5", 25 ft (7.6 m)
Discharge Hose	1.25", 25 ft (7.6 m)
Dimensions	48" x 22.5" x 25" (H x W x D) (122 x 57 x 63 cm)
Weight	≈ 200 lbs (90.7 kg)
Not for use with fluids that have a flash point below 100°F (37.8°C).	

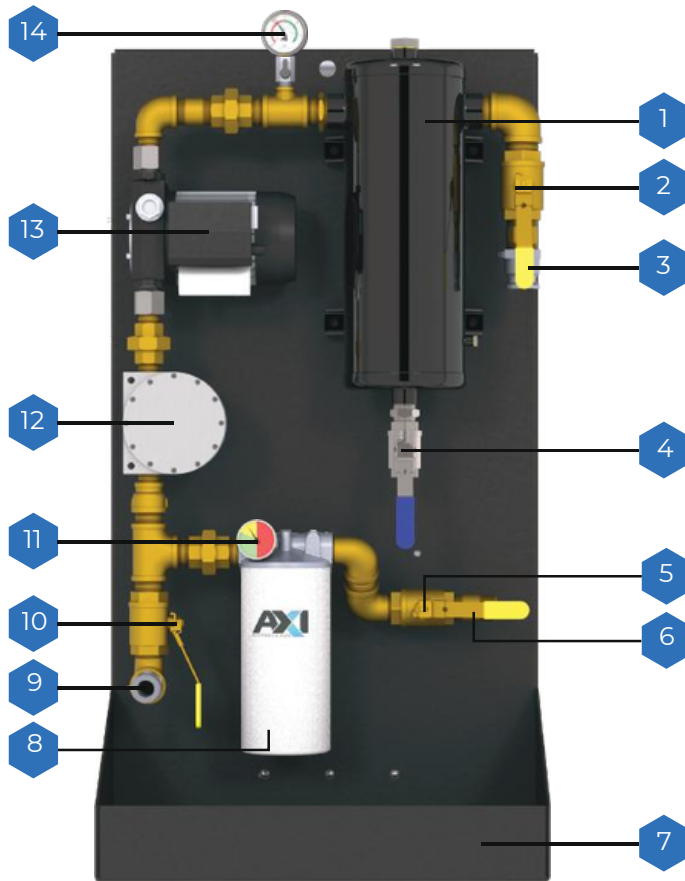
*At 50 Hz, nominal flow rate decreases from 26 GPM to 20.8 GPM

MTC-3000 SYSTEM FEATURES:

- Multi-Stage Fuel Filtration
- Portable System Design
- Locking Cam and Groove Connections
- Spill Containment Tray
- Fine Filter Bypass Capability

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- 1. Mechanical Water Separator
- 2. Inlet Ball Valve
- 3. Fuel Inlet (From Tank)
- 4. Water Separator Drain Valve
- 5. Outlet Ball Valve (Discharge Port 2)
- 6. Fuel Discharge Port 2
- 7. Spill Containment Tray
- 8. Fine Filter
- 9. Fuel Discharge Port 1
- 10. Outlet Ball Valve (Discharge Port 1)
- 11. Pressure Gauge
- 12. Fuel Conditioner
- 13. Motor with Coupled Vane Pump
- 14. Vacuum Gauge

◆ MTC SYSTEM INTEGRATION:

◆ REPLACEMENT FILTER OPTIONS:

Spin-On Filter	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





MTC-3000 Instruction, Operating, & Maintenance Manual

MOBILE FUEL POLISHING SYSTEM

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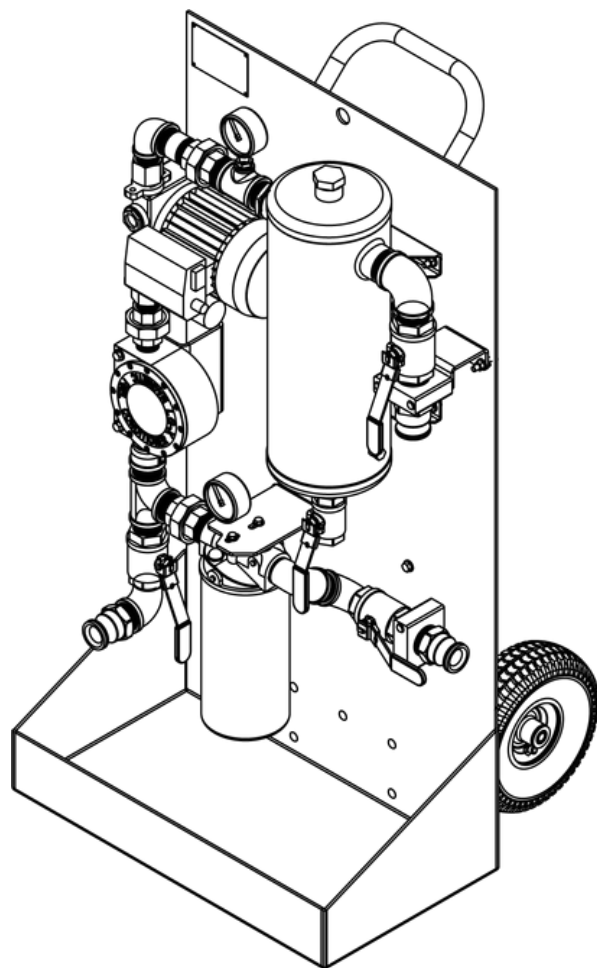




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General Overview

MTC-3000 Specifications

Nominal Flow Rate.....	26 GPM/1,560 GPH (98.4 LPM/5,905 LPH) 12,480 gallons (47,242 liters) per 8-hour run 37,440 gallons (141,726 liters) per 24-hour run
Primary Filter.....	Mechanical Water Separator
Secondary Filter.....	1, 3, 10, or 25μ Fine Filter or 3, 10μ Water Block
Fuel Conditioner.....	LG-X 3000 Inline Magnetic Conditioner
Plumbing.....	Black Iron
Inlet Port.....	1.5" Cam & Groove
Outlet Ports.....	1 ¼" Cam & Groove
Operating Temperature.....	41 - 104° (5 - 40°C)
Electrical.....	120V/60Hz/15A or 230V/50Hz/15A*
Pump/Motor.....	¾ HP Rotary Vane Pump
Suction Capability (Primed).....	15ft. Vertical lift or 100ft. horizontal run (lines >1.5", primed)
Maximum Fluid Viscosity.....	5 cSt
Clear Suction Hose.....	1.5", 25 ft. (7.6 m)
Discharge Hose.....	1¼", 25 ft. (7.6 m)
Outline Dimensions.....	≈48" x 22.5" x 25" (122 x 57 x 63 cm) (H x W x D)
Weight.....	≈200 lbs. (90.7 kg)

*At 50 Hz., nominal flow rate decreases from 26 GPM/1,560GPH to 20.8 GPM/1,248 GPH.

!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

- Vacuum & Pressure Gauges
- Inlet and Outlet Ball Valves
 - Inlet Ball Valve
 - Outlet Ball Valve (Discharge Port 1)
 - Outlet Ball Valve (Discharge Port 2)

Pump/Motor

- 3/4 HP Rotary Vane Pump
- Pump Strainer

Primary Filter/Water Separator

- Water Separator
- Drain Valve

Fuel Conditioner

- Inline Magnetic Fuel Conditioner

Fine Filter

- Standard-issue 3μ fine 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 establish either fuel polishing mode, the user must attach both system hoses to the system in the proper configuration. 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.

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.

Bypass Mode:

In bypass mode, the fuel bypasses the system's Fine Filter(s) only to be ran through the Primary Filter/Water Separator for the bulk removal of water, sludge, and particulate. To establish bypass mode:

1. Attached the quick disconnect end of black Discharge Hose to Discharge Port 1 (located to left of the fine filter).
2. Before running the pump, ensure the Inlet Ball Valve and proper discharge ball valve (Discharge Port 1) are in the open position.
3. Also, ensure the other discharge ball valve (Discharge Port 2) and the Primary Filter/Water Separator drain ball valve are in the closed position.

Fine Filtration Mode:

In fine filtration mode, the fuel is run through the system's high efficiency spin-on Fine Filter(s) to remove free water and fine particulate as small as 1 micron. To establish fine filtration mode:

1. Attached the quick disconnect end of black Discharge Hose to Discharge Port 2 (located to right of the fine filter).
2. Before running the pump, ensure the Inlet Ball Valve and proper discharge ball valve (Discharge Port 2) are in the open position.
3. Also, ensure the other discharge ball valve (Discharge Port 1) and the Primary Filter/Water Separator drain ball valve are in the closed position.

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. Watch for a steady flow of fuel into the container.

1. Setup up the system in the Bypass Mode configuration (see the Setup Procedures – Bypass Mode).
2. Place the Discharge Hose into a separate discharge waste container.

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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. Turn on the Pump and be prepared to immediately switch it off once the fluid begins to fill the discharge container.
 5. Inspect the discharged fluid and resume pumping until the bulk water and sludge have been removed from the tank bottom and only fuel is primarily discharged from the return hose.
 6. Switch off the Pump and drain all water and debris from the hose and the Primary Filter/Water Separator (via the drain valve) into an appropriate waste bucket or container.

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 removing the worst of the contaminants first.

1. Before turning on the Pump, ensure the system is still setup in the Bypass Mode configuration (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 and that the ball valves on the system are in the correct position, switch on the pump and watch the clear suction hose for fuel flow.

Note: Depending on the amount of contaminants in the tank, we recommend you stop the pump shortly after priming and check for free water and sludge by draining the water separator. It may be necessary to depress the air purge valve on top of the separator after opening the drain valve. Repeating this process and observing the fuel flow will indicate how long the pump should run before it is necessary to drain the separator.

5. The system should be kept running until clean fuel samples can be drained from the Primary Filter/Water Separator. Once this is achieved, switch off the pump to prepare for the final polishing phase.

Phase 3

Phase Three is the most important phase in meeting specific cleanliness codes. Unlike the Primary Filter/Water Separator, 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 the Fine Filtration Mode configuration (see the Setup Procedures – Fine Filtration Mode).
2. After verifying that both hoses are properly placed in the fuel tank and that the ball valves on the system are in the correct position, start the pump and monitor the Pressure Gauge on the Fine Filter head.
3. When the pressure reaches 20 – 25 PSI or the needle reaches the red area on the Pressure Gauge it is time to change the Fine Filter (see the Maintenance – Servicing the Fine Filters section).

Draining and Storing the System

1. Remove the suction hose from the tank while the pump is still running and wait until system is purged of any remaining fuel.
2. Place an appropriate container under the Primary Filter/Water Separator and Discharge Port 1.
3. Open their respective ball valve and use the air purge valve on top of the separator to make sure all of the fluid can be drained from the system.



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 Servicing Primary Filter/Water Separator).
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/Water Separator

It is recommended the Primary Filter/Water Separator be periodically serviced to prevent excessive water buildup. In the case of a severely contaminated tank, the Primary Filter/Water Separator can also become clogged with sludge and debris resulting in restricted fuel flow. The vacuum gauge reads the condition between the Primary Filter/Water Separator and the pump and should provide some indication of a clogged filter via a pressure drop reading.

Servicing of Water Separator:

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.

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

Clogged filter elements restrict the flow of fuel, resulting in the system's pressure gauge indicating a pressure spike. The pressure gauge is mounted between the pump and the fine filter. A pressure reading of 20 - 25 PSI or when the needle reaches the red area on the pressure gauge will indicate when a filter change should be made on the system.

Changing the fine filter:

1. Ensure the system's pump is turned off.
2. Close the inlet and outlet ball valves.
3. Place an appropriate container underneath the filter.
4. Remove the old spin-on filter with a filter wrench
5. Apply a film of lubricating oil to the gasket of the new filter. 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).
6. Open the inlet and outlet ball valves.
7. Check for leaks when re-starting and pressurizing the system.

Replacement Filter Chart

MTC SERIES FILTERS				ALL FILTERS ARE ABSOLUTE, UNLESS OTHERWISE NOTED WB: WATERBLOCK SS: STAINLESS STEEL SCREEN			
	1µ B100/BIO	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

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 at 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/Water Separator/Strainer/LG-X Fuel Conditioner clogged

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 (W/B 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. Air or gas in fuel on the suction side
4. Excessive pump load (vacuum > 15" HG)

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

SALES CONTACT



CONTACT

✉ sales@rajkotmarine.ae
☎ +971 6 7487580
🌐 www.rajkotmarine.com

RAJKOT MARINE LLC

Jerf Industrial Area 1,
P.O Box 5861
Ajman, UAE

