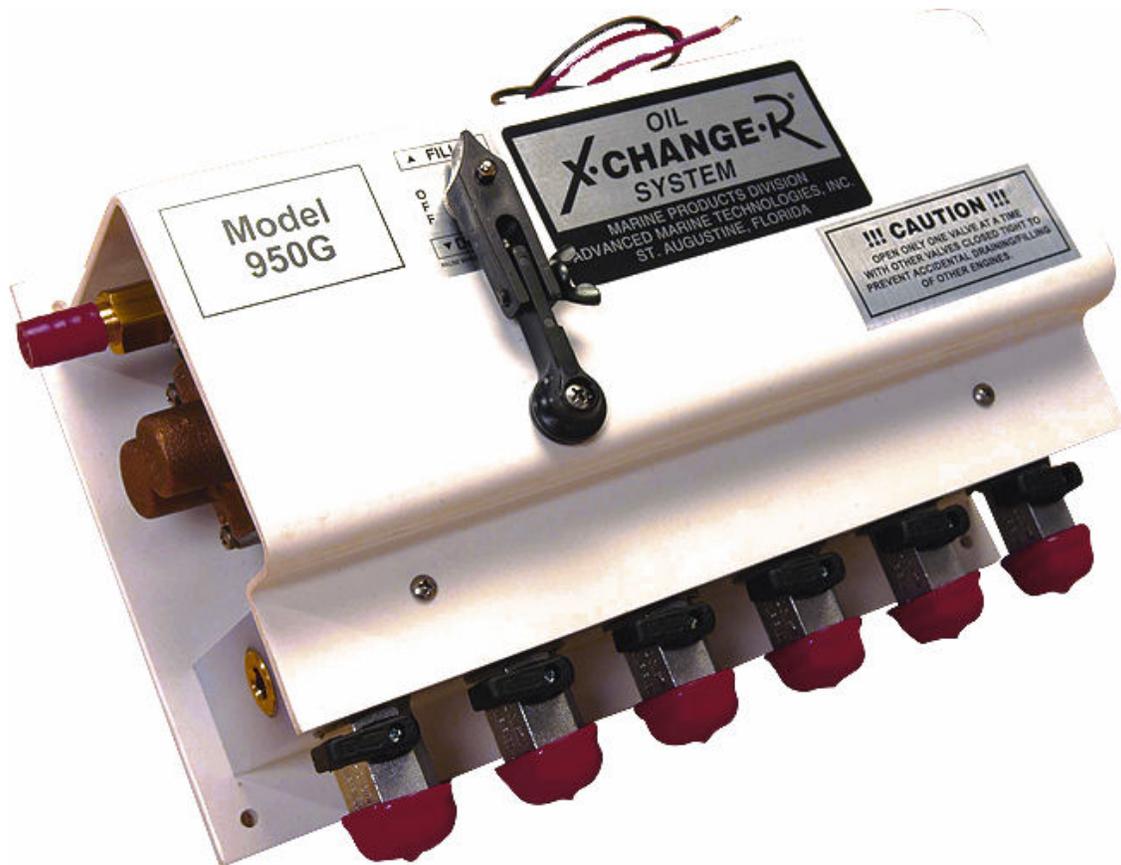


# OIL **X-CHANGE-R**<sup>®</sup> SYSTEM

Models 950G & 950GV



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INSTALLATIONS AND OPERATING INSTRUCTIONS

## 1.0 DESCRIPTION

The Model 950G/950GV was designed specifically for larger diesel vessels with multiple engines. Particularly, the 950G/950GV was designed to service a vessel's two main diesel engines, each transmission or gear and one or two generators. However, the system is capable of servicing any combination up to eight ports. The oil flow from each main engine is controlled by an individual shut off valve manifold which designates the flow from the engine, its transmission and a designated generator(s).

## 2.0 CONSTRUCTION

The 950G/950GV is constructed with the highest quality materials selected for both wear and resistance and service life. The 950G/950GV utilizes a heavy-duty reversible bronze body motor and rotary gear pump which has self-lubricating carbon bearings and drip-proof lip seals. Powered by a single phase, 1/10 HP 12, 24 or 32 volt corrosion resistant motor which is overload protected, the pump is driven directly from the motor shaft by means of a flexible coupling. The motor is controlled by a three pole, double throw switch with FILL-OFF-DRAIN positions. Housed in an easy to clean enclosure allows direct access to the motor, pump and manifold system.

## 3.0 SPECIFICATIONS

### 950G

| Phase | HP   | Voltage | Length | Width | Height | Weight | GPM |
|-------|------|---------|--------|-------|--------|--------|-----|
| 1     | 1/10 | 12V     | 12.5"  | 8"    | 6"     | 16 lb. | 4*  |
| 1     | 1/10 | 24V     | 12.5"  | 8"    | 6"     | 16 lb. | 4*  |
| 1     | 1/10 | 32V     | 12.5"  | 8"    | 6"     | 16lb.  | 4*  |

### 950GV

| Phase | HP   | Voltage | Length | Width | Height | Weight | GPM |
|-------|------|---------|--------|-------|--------|--------|-----|
| 1     | 1/10 | 12V     | 16.5"  | 8"    | 6"     | 17 lb. | 4*  |
| 1     | 1/10 | 24V     | 16.5"  | 8"    | 6"     | 17 lb. | 4*  |
| 1     | 1/10 | 32V     | 16.5"  | 8"    | 6"     | 17 lb. | 4*  |

\*Flow rates are approximate and may vary due to the temperature and/or viscosity of the oil.

## 4.0 LOCATION AND INSTALLATION

This is a permanent system for mounting on a horizontal surface in the engine room. The system should be located in a readily accessible location to allow easy operation and service. The Model 950G/950GV has excellent priming characteristics and is capable of lifting liquids on the suction side as high as 15 feet. However, as a general rule, the suction lift should be kept as limited as possible by placing the system as central to all engine sources as possible.

Installing the unit requires general knowledge of engine service and electrical wiring skills. If you are not familiar with these techniques, it is recommended an experienced marine mechanic be engaged to install the X-Change-R®. The Model 950G/950GV is delivered with the enclosure attached with access to the four mounting holes on the backing plate. Secure the system to a flat surface through the mounting holes which accommodate ¼" X 20 mechanical screws.

## 5.0 ELECTRICAL WIRING REQUIREMENTS

The Model 950G/950GV is designed for use with a 12V, 24V or 32V DC power source. When wiring the system, choose UL approved marine-grade wire and connectors.

A built in fuse holder is located on the right side of the housing and utilizes a ¼" X 1 ¼" glass, fast action **15 amp fuse**. Replacement fuses are available at any marine or automotive outlet. The motor will safely operate with fuses rated 15 to 20 amps. **Do not exceed 20 amps.**

Connecting the power leads:

1. Connect the BLACK (negative or -) lead to the negative side of a properly ground DC power source.
2. Connect the RED (positive or +) lead to the positive side of the suitable DC power source.

## 6.0 INSTALLATION OF THE HOSES

Because oil is a viscous fluid (particularly when cool) every attempt should be made to keep the length of the hose runs at a minimum. When changing engine oil or transmission oil, a small amount of waste oil will return to the system along with the fresh oil. This is acceptable for hose runs of 15 feet or less. Hose runs of 20 feet or more should be avoided, especially when connected to transmissions or small engines. Care should also be taken to avoid sharp bends in the hose and direct exposure to hot surface. When installing the hoses, design the layout symmetrically. It is easier to determine the location of the lines and presents a neat appearance.

### 6.1 Connecting Engine Oil Pan Hoses

1. Drain oil from each engine
2. If the engines are not equipped with a factory installed oil pan drain hose, replace each oil pan drain plug with a drain hose assembly supplied by the engine manufacturer, or install a compatible fitting that will accommodate a ½" ID oil drain hose, an adapter may be required.
3. Connect properly measured lengths of approved ½" ID hose from each engine's oil pan drain to the appropriate manifold on the X-Change-R®.
4. After completing the hose installation, carefully inspect the hose to insure each connection includes a hose clamp and that the clamp is in place and secure.

## 6.2 Connecting Transmission Hoses

1. Drain oil from each transmissions
2. If the transmissions are not equipped with a factory installed drain hose, replace each oil pan drain plug with a drain hose assembly supplied by the transmission manufacturer, or install a compatible fitting that will accommodate a ½" ID oil drain hose, an adapter may be required.
3. Connect properly measured lengths of approved ½" ID hose from each transmission's oil pan drain to the appropriate manifold on the X-Change-R®.
4. After completing the hose installation, carefully inspect the hose to insure each connection includes a hose clamp and that the clamp is in place and secure.

## 6.3 Connecting Generator Hose

1. Drain oil from each generator(s).
2. If the generator(s) is not equipped with a factory installed drain hose, replace the oil pan drain plug with a drain hose assembly supplied by the engine manufacturer, or install a compatible fitting that will accommodate a ½" ID oil drain hose, an adapter may be required.
3. Connect properly measured lengths of approved ½" ID hose from each engine's oil pan drain to the appropriate manifold on the X-Change-R®.
4. After completing the hose installation, carefully inspect the hose to insure each connection includes a hose clamp and that the clamp is in place and secure.

## 6.4 Connecting Drain/Fill Clear Hose (Wand) 950G

1. Connect the Drain/Fill Clear Hose (Wand) provided with your X-Change-R® to the drain/fill outlet found on the left side of the unit.

## 6.5 Connecting Input/Output Valves 950GV

1. Connect the Input/Output Valves to either New/Used Oil Reservoirs or Cockpit (external connection) and Engine Room access - the Drain/Fill Clear Hose (Wand).
2. If the Reservoirs are not equipped with a factory installed drain hose, replace the oil pan drain plug with a drain hose assembly supplied by the manufacturer, or install a compatible fitting that will accommodate a ½" ID oil drain hose, an adapter may be required.
3. Cockpit (external connection) is best connected to a quick disconnect and used for main oil change. Engine Room access is best used to top off.
4. Connect properly measured lengths of approved ½" ID hose from each connection to the appropriate manifold on the X-Change-R®.
5. After completing the hose installation, carefully inspect the hose to insure each connection includes a hose clamp and that the clamp is in place and secure.

## 7.0 DRAINING USED OIL FROM THE ENGINES / TRANSMISSIONS / GENERATOR(S)

To insure the oil maintains proper viscosity during the removal process, it is recommended the operator run the engines long enough to permit the engine block to become warm – at least 140°. Shut the engines down and allow ample time for the circulated oil to return to the oil pan.

### 7.1 Draining the Engine

1. Warm engine to at least 140°F, then turn engine off.
2. Insert the PVC wand of the Drain/Fill hose into a container suitable for waste oil collection. (Remember, it is a legal requirement to dispose of waste oil in a responsible manner).
3. Loosen the oil filler cap on the engine or remove the dip stick to allow air to enter the crankcase.
4. **Release the safe lock device on the toggle switch. Do not turn.**
5. Select the individual shut off valve handle of the engine, transmission or generator you wish to service. (SPECIAL NOTE: Open only one shut off valve at a time with other valves closed tight to prevent accidental draining of other engines.)
6. Flip the motor control switch to the “DRAIN” position. The pump will start immediately. You should hear a noticeable change in the sound (speed) of the pump motor when the used oil enters the pump.
7. Continue to operate the pump until there is a noticeable change in the sound (speed) of the pump motor, which is an indication air is being drawn into the crankcase oil hose and that the specified crankcase is now empty. Oil is drained at the rate of about a gallon each 15 seconds (4 gallons a minute).
8. Return the pump motor control switch to the “OFF” position when the crankcase is empty and shut the individual shut off valve handle.
9. When you have completed the service, be sure to cover the safe lock handle over the toggle switch.

## 8.0 FILLING THE ENGINES / TRANSMISSIONS / GENERATOR(S)

Before attempting to fill an engine, make certain the engine has been completely drained or is in need of a measured amount of additional oil. **DO NOT OVER FILL!** Next, determine the type and the amount of oil recommended by the manufacturer for each engine. Remember, **FOUR QUARTS = ONE GALLON.**

There are two commonly used methods to determine when the proper amount of oil has been delivered to the engine.

Pre-measured Method – this method requires the operator to set aside a known quantity of oil prior to filling. For example, if the engine requires 22 quarts of oil, the operator may want to pump from a 5-gallon container, adding 2 additional quarts, as the container empties.

**Timed Method** – the timed method is used when pumping from a container of unknown capacity or a reservoir. The flow of the oil through the system varies primarily with the viscosity and temperature of the oil. Under normal conditions (75° - 85°), the system pumps approximately 4\* gallons per 60 seconds. Filling time is a function of several factors, including oil temperature and weight.

### 8.1 Filling the Engine

1. Insert the PVC wand of the Drain/Fill hose into a container of fresh oil. (Remember, it is a legal requirement to dispose of waste oil in a responsible manner.)
2. Loosen the oil filler cap on the engine or remove the dip stick to allow air to vacate the crankcase.
3. **Release safe lock devise on the toggle switch. Do not turn.**
4. Select the individual shut off valve handle of the engine, transmission or generator you wish to service. (SPECIAL NOTE: Open only one shut off valve at a time with other valves closed tight to prevent accidental filling of other engines.)
5. Flip the motor control switch to the “FILL” position. The pump will start immediately. You should hear a noticeable change in the sound (speed) of the pump motor when the used oil enters the pump.
6. Continue to operate the pump until a measured amount of oil has been pumped into the engine’s crankcase. Fresh oil is pumped at the rate of approximately 4\* gallons per minute. If you do over fill an engine, you may simply flip the motor control switch to the “DRAIN” position for a few seconds to remove the overage.
7. Once filled, return the pump motor control switch to the “OFF” position when the crankcase is empty and shut the individual shut off valve handle. When you have completed the service, be sure to cover the safe lock handle over the toggle switch.

## 9.0 TROUBLESHOOTING

| SYMPTOM                | POSSIBLE CAUSE(S)              | CORRECTIVE ACTION                         |
|------------------------|--------------------------------|---|
| No Liquid Delivery     | 1) Closed valves               | 1) Open valves                            |
|                        | 2) Plugged suction             | 2) Eliminate restriction                  |
|                        | 3) Air leak at suction         | 3) Locate and repair leak                 |
|                        | 4) Suction lift too high       | 4) Do not exceed vapor pressure of liquid |
|                        | 5) Motor wired incorrectly     | 5) Check wiring instructions              |
| Low Liquid Delivery    | 1) Pump shaft speed incorrect  | 1) Check driver speed                     |
|                        | 2) Discharge pressure too high | 2) Reduce downstream pressure             |
|                        | 3) Air leak at suction         | 3) Locate and repair leak                 |
|                        | 4) Worn or damaged pump        | 4) Inspect and repair as required         |
|                        | 5) Low viscosity               | 5) Verify original application conditions |
| Gradually Losses Prime | 1) Suction lift too high       | 1) Improve suction pressure               |
|                        | 2) Air or gas in fluid         | 2) Eliminate air or gas from fluid        |
|                        | 3) Air leak at suction         | 3) Locate and repair leak                 |
|                        | 4) Worn or damaged pump        | 4) Inspect and repair as required         |

|                             |  |   |
|-----------------------------|--|---|
| Noisy                       | 1) Cavitations                           | 1) Improve system suction pressure                |
|                             | 2) Solid particles in fluid              | 2) Install suction strainer                       |
|                             | 3) Air or gas in Fluid                   | 3) Eliminate air or gas in fluid                  |
|                             | 4) Worn or damaged pump                  | 4) Inspect and repair as required                 |
| Motor Runs Hot or Overloads | 1) Discharge pressure too high           | 1) Reduce downstream pressure                     |
|                             | 2) Shaft speed too fast                  | 2) Reduce speed                                   |
|                             | 3) Fluid viscosity higher than expected  | 3) Change to larger horsepower                    |
|                             | 4) Incorrectly wired motor               | 4) Check wiring instructions                      |
|                             | 5) Binding internal pump parts           | 5) Inspect and correct condition                  |
|                             | 6) Motors normally feel hot              | 6) Verify if actual amperage draw is within range |
| Seal Leaks                  | 1) Dry running                           | 1) Open valves, prime pump                        |
|                             | 2) Solids in fluids                      | 2) Add suction strainer                           |
|                             | 3) Seal material incompatible with fluid | 3) Verify original application conditions         |