11.0 LIMITED WARRANTY STATEMENT

Your new X-Change-R® Oil Change System is warranted by Advanced Marine Technologies, Inc., Attention: Customer Service. This Warranty is extended to original purchasers only. This Warranty gives you specific legal rights, and you may also have other rights which may vary from State to State.

The oil change system (including any and only parts supplied by Advanced Marine Technologies, Inc.) is warrant(ed to be free of defects in material or workmanship under normal use and service. The warranty period shall commence upon the installation of the system by the original purchaser through authorized dealers, or if installed in a new vessel, the date of the initial launching, and shall end twelve (12) months thereafter. This limited warranty does not cover contingent or consequential liabilities of any kind. Our entire liability is limited to replacement or repair in the manner set forth below.

NEITHER THIS WRITTEN WARRANTY NOR ANY OTHER EXPRESS OR IMPLIED WARRANTY, INCLUDING THE IMPLIED WARRANTY OF MERCHANTABILITY, SHALL EXTEND BEYOND THE WARRANTY PERIOD. (Some states do not allow limitations on how long an implied warranty lasts, or the exclusion or limitations of incidental or consequential damages, so the above limitation may not apply to you).

No system will be accepted for return or replacement without prior authorization from Advanced Marine Technologies, Inc.. Upon such authorization, and in accordance with instructions from Advanced Marine Technologies, Inc., the product will be returned, shipping charges prepaid by the buyer, to: Customer Service Department, Advanced Marine Technologies, Inc., 212 Yacht Club Drive, St. Augustine, FL 32084. Delivery by United Parcel Service (UPS) is recommended. The unit will be repaired or replaced within a reasonable length of time and returned postage paid.

Do not attempt to repair unit as warranty may be affected.

12.0 RETURN GOODS PROCEDURE

Prior to returning product to ADVANCED MARINE TECHNOLOGIES, INC. under warranty, please obtain a return goods authorization number (claim number) by calling customer service at 1-866-922-4804 or 904-829-1800. Once you have received an authorization number, be sure to label goods with the following:

a) your name, address and phone
b) the authorization number
c) the make and model year of your boat
d) purchase date, if different from the model year

Please address the returned goods as follows:

Customer Service Department
Advanced Marine Technologies, Inc.
212 Yacht Club Drive
St. Augustine, FL 32084

Send To:
X-Change-R®
Advanced Marine Technologies, Inc.
212 Yacht Club Drive
St. Augustine FL 32084

Advanced Marine Technologies, Inc.
212 Yacht Club Drive
St. Augustine, FL 32084
866-922-4804 / 904-829-1800 / FAX 904-829-2800
E-MAIL : pumps@x-change-r.com

THIS PRODUCT IS NOT TO BE USED TO TRANSFER GASOLINE!
NOTE: The 946DT is not recommended for use with engines having transmissions that use specially designed fluids as a lubricant.

The X-Change-R® is housed in a fire retardant, high impact, high gloss case. The solid brass pump has a nitride impeller, is self-priming and pumps immediately, whether in the "drain" or "fill" mode.

### 1.0 GENERAL DESCRIPTION

Your X-Change-R® Oil change unit is one of the following:

**MODEL 946D** - designed to remove crankcase oil from two engines and a generator in either gas or diesel powered vessels, and to refill each crankcase oil pan with fresh oil.

**MODEL 946DT** - designed to remove crankcase oil from two engines, a generator and two transmissions in diesel powered vessels, and to refill each crankcase oil pan and transmissions with fresh oil. These models are recommended for use only with transmissions which utilize motor oil as a lubricant.

### 1.1 SPECIFICATIONS OF THE X-CHANGE-R® SYSTEMS

| MOTOR: Heavy duty DC 15 AMP, 12 Volt (24 Volt Available) |
| PUMP: Solid Brass, Self-Priming, Nitrile Impeller, Stainless Steel Shaft |
| HOUSING: Non-Corrosive, High-Impact |
| HOSE: Reinforced, Rubber 200 psi, 200°F |
| FITTINGS: All Brass 3/8" NPT |
| FUSE: Built In |

**DIMENSIONS**

<table>
<thead>
<tr>
<th>MODEL</th>
<th>WIDTH</th>
<th>HEIGHT</th>
<th>DEPTH</th>
<th>WEIGHT</th>
</tr>
</thead>
<tbody>
<tr>
<td>946D</td>
<td>8.6&quot;</td>
<td>10.1&quot;</td>
<td>6.6&quot;</td>
<td>6.2 lbs.</td>
</tr>
<tr>
<td>956DT</td>
<td>8.9&quot;</td>
<td>12.8&quot;</td>
<td>6.6&quot;</td>
<td>7.2 lbs.</td>
</tr>
</tbody>
</table>

### 1.2 INSTALLATION OF THE X-CHANGE-R® SYSTEMS

This is a permanent system for wall or bulkhead installation. Installing the unit requires only general knowledge of hose fitting shapes and sizes, and electrical wiring techniques. If you are not familiar with basic pipe fitting or wiring techniques, it is recommended an experienced mechanic be engaged to install the X-Change-R®.

Because of the wide variety of oil pan connections (as well as engine room layouts), the quantity of hose and type of fittings is difficult to estimate. The average installation requires approximately the following:

**946D** - 12 feet of approved oil line hose for the engines, 7 stainless steel hose clamps and 3 brass hose barbs to replace the drain plugs in each engine serviced.

**946DT** - 12 feet of approved oil line hose for the engines, 10 feet of hose for the transmissions, 11 stainless steel hose clamps and 5 brass hose barbs to replace the drain plugs in each engine serviced.

All of the above is supplied with your unit.

Should you require additional hose or different fittings, check with your dealer, or call Advanced Marine Technologies, Inc. at 1-866-922-4804, to order parts.

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**TABLE OF CONTENTS**

1.0 General Description .......................... 2
1.1 Specifications of X-Change-R® 2
2.0 Installation of the X-Change-R® 2
3.0 Mounting the X-Change-R® Pump/ Motor Unit 3
4.0 Electrical Wiring Procedure 3
5.0 Installation of the X-Change-R® Hose 3
6.0 Operating the X-Change-R® 4
7.0 Draining Used Oil 4
7.1 Port Engine (all models) 4
7.2 Starboard Engine (all models) 4
7.3 Generator (Model 946D) 4
7.4 Generator (Model 946DT) 4
7.5 Transmissions (Model 946DT) 5
8.0 Filling with New Oil 5
8.1 Port Engine (all models) 5
8.2 Starboard Engine (all models) 5
8.3 Generator (Model 946D) 5
8.4 Generator (Model 946DT) 5
8.5 Transmissions (Model 946DT) 6
9.0 Impeller Installation ......................... 6
10.0 Trouble Shooting Chart ...................... 7
11.0 Limited Warranty Statement ................. 8
12.0 Return Goods Procedure ........................ 8

**TROUBLE SHOOTING CHART**

<table>
<thead>
<tr>
<th>SYMPTOM</th>
<th>POSSIBLE CAUSE(S)</th>
<th>CORRECTIVE ACTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pump will not run</td>
<td>1. No power</td>
<td>1. Replace</td>
</tr>
<tr>
<td></td>
<td>2. Impeller is jammed</td>
<td>2. Replace</td>
</tr>
<tr>
<td></td>
<td>3. Motor has an open circuit</td>
<td>3. Check and replace fuse</td>
</tr>
<tr>
<td>Seal leaks</td>
<td>1. Seal worn out</td>
<td>1. Replace</td>
</tr>
<tr>
<td></td>
<td>2. Shaft grooved</td>
<td>2. Replace Motor</td>
</tr>
<tr>
<td></td>
<td>3. Pump head loose on motor</td>
<td>3. Repair</td>
</tr>
<tr>
<td>Motor runs too hot</td>
<td>1. Voltage incorrect</td>
<td>1. Supply to be 12V DC</td>
</tr>
<tr>
<td></td>
<td>2. Excessive discharge pressure</td>
<td>2. Reduce pressure</td>
</tr>
<tr>
<td></td>
<td>3. Impeller swolen</td>
<td>3. Replace</td>
</tr>
<tr>
<td></td>
<td>4. Liquid too viscous</td>
<td>4. Reduce viscosity of liquid</td>
</tr>
<tr>
<td></td>
<td>5. Plugged or kinked discharge</td>
<td>5. Examine and repair</td>
</tr>
<tr>
<td></td>
<td>6. Insufficient air flow to motor</td>
<td>6. Be sure ample fresh air is available to the motor</td>
</tr>
<tr>
<td>Flow rate is low</td>
<td>1. Piping or hose is fouled or damaged</td>
<td>1. Clean or replace</td>
</tr>
<tr>
<td></td>
<td>2. Clogged impeller</td>
<td>2. Clear obstruction</td>
</tr>
<tr>
<td></td>
<td>3. Worn impeller</td>
<td>3. Replace</td>
</tr>
<tr>
<td></td>
<td>4. Voltage is incorrect</td>
<td>4. Supply to be 12V DC</td>
</tr>
<tr>
<td>Pump will not run</td>
<td>1. Voltage is incorrect</td>
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<td>2. Excessive discharge pressure</td>
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<tr>
<td></td>
<td>6. Insufficient air flow to motor</td>
<td>6. Be sure ample fresh air is available to the motor</td>
</tr>
</tbody>
</table>

Please fill out and return by mail or fax (#904-829-2800) to Advanced Marine Technologies, Inc. within 30 days of purchase and we will send you an X-Change-R® service kit, which includes a replacement impeller & gasket.

**Customer's Name**

**Address**

City State Zip

**Boat Manufacturer**

Length Hull Number/Model Year

**Dealer/Marine Service Facility's Name**

**Boat Manufacturer**

Length Purchase Date
8.2 Filling the Starboard Engine (All Models)

1. Repeat each of the steps outlined in "Filling the Port Engine" after directing the arrow-shaped tip on the valve handle to the "STARBOARD" engine.
2. When the oil pan nears its filled capacity, flip the pump motor control switch to the "OFF" position and check the proper oil level with the engine's dip stick (or other measuring device supplied with the engine). If filling is completed, place the fail-safe switch in the "OFF" position.

8.3 Filling the Generator (Model 946D only)

1. Repeat each of the steps outlined in "Filling the Port Engine" after directing the arrow-shaped tip on the valve handle to the "GENERATOR" engine.
2. When the oil pan nears its filled capacity, flip the pump motor control switch to the "OFF" position and check the proper oil level with the engine's dip stick (or other measuring device supplied with the engine). If filling is completed, place the fail-safe switch in the "OFF" position.

8.4 Filling the Generator (Model 946DT only)

1. Repeat each of the steps outlined in "Filling the Port Engine" after directing the arrow-shaped tip on the valve handle to the "GENERATOR" engine.
2. Treating the selector handle on the externally mounted valve as a pointer, point the tip of the handle toward the hose barb connected to the generator. (See Figure 4)
3. Flip the pump motor control switch on the X-Change-R® to the "FILL" position.
4. 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 about one gallon each 90 seconds.
5. When the oil pan nears its filled capacity, flip the pump motor control switch to the "OFF" position and check the proper oil level with the engine's dip stick (or other measuring device supplied with the engine). If filling is completed, place the fail-safe switch in the "OFF" position.

9.0 IMPELLER INSTALLATION

Replace impeller every 500 hours, unless the impeller has been damaged by foreign objects, improper liquid, or dry running prior to the 500 hours of normal operation. Service impellers and gaskets available, call 1-866-922-4804.

1. Remove four screws (Ref. #1).
2. Remove the cover plate (Ref. #2) and old gasket (Ref. #3).
3. Using your fingers, remove damaged or worn impeller (Ref. #4).
4. Clean the inside of the pump head and remove any foreign materials which will obstruct the impeller's operation. (Note: Also check for foreign material in the brass hose barbs and/or tubing leading from the pump.)
5. Apply Vaseline or a similar lubricant to both the inside of the pump head (Ref. #5) and to the outside of the impeller (Ref. #4).
6. Align the flat surface on the inside of the new impeller with the flat surface on the motor shaft. Push into place while twisting blades in a clockwise direction.
7. Place the new gasket (Ref. #3) on the pump body face, align holes and replace cover (Ref. #2).
8. Tighten all four screws evenly and snugly.

5.0 INSTALLATION OF THE HOSES

Because oil is a viscous fluid (particularly when cool) every attempt should be made to keep the length 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 exposure to hot surfaces. When installing the hoses, design the layout symmetrically. It is easier to determine the location of the lines and presents a neat appearance.

5.1 Connecting Engine Oil Pan Hoses (All Models)

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 1/2" ID hose drain line. An adapter may be required.
6.0 OPERATING THE X-CHANGE® R® SYSTEMS

6.1 System Start-up Procedures
When starting the system for the first time, air will be in all of the lines. Operating the X-Change® R® without oil or lubricant will damage the pump’s impeller. Although your X-Change® R® Pump/Motor Unit was tested prior to shipping, the amount of oil surrounding the impeller may not be sufficient to insure proper starting lubrication and vacuum. To avoid damage, the following procedure is advised:

1. Insert the PVC wand of the Drain/ Fill Hose into a container containing a small amount (about 1/2 quart) of fresh oil.
2. Release the fail-safe lock device on the Pump/Motor Unit valve handle and direct the arrow-shaped tip to “STARBOARD”.
3. Flip the motor control switch to the “FILL” position.
4. The pump will start immediately and you will observe the oil moving through the clear plastic tubing toward the Pump/Motor Unit. You should hear a noticeable change in the speed (sound) of the pump motor when the oil enters the pump.
5. Continue to operate the pump for 5 to 10 seconds after pumping action begins, then return the Pump/Motor switch to the “OFF” position and secure the oil filler cap.

CAUTION
If oil does not move quickly through the clear tubing towards the pump, turn the switch to the OFF position, elevate the clear tubing until it nears the entrance of the pump, then flip the switch to the “FILL” position again. This will lubricate the pump and insure a good starting vacuum.

7.0 DRAINING USED OIL FROM THE ENGINES
To insure the oil maintains proper viscosity during the removal process, it is recommended that the operator run the engines long enough to permit the engine block to become warm at least 140°F. Shunt the engines down and allow ample time for the circulated oil to return to the oil pan.

7.1 Draining the Port Engine (All Models)
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 fail-safe lock device on the Pump/Motor Unit valve handle and direct the arrow-shaped tip to “PORT ENGINE”.
5. 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.
6. Continue to operate the pump until there is a noticeable change in the sound (speed) of the pump, 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 one gallon each 22 seconds.
7. Return the pump motor control switch to the “OFF” position when crankcase is empty and place the fail-safe switch in the “OFF” position.

7.2 Draining the Starboard Engine (All Models)
1. Repeat each of the steps outlined in “Draining the Port Engine” after directing the arrow-shaped tip on the valve handle to the “STARBOARD” engine.
2. Flip the motor control switch to the “DRAIN” position.
3. Once the crankcase is emptied, return the pump motor control switch to the “OFF” position and place the fail-safe switch in the “OFF” position.

7.3 Draining the Generator (Model 946D only)
1. Repeat each of the steps outlined in “Draining the Port Engine” after directing the arrow-shaped tip on the valve handle to the “GENERATOR” engine.
2. Flip the motor control switch to the “DRAIN” position.
3. Once the crankcase is emptied, return the pump motor control switch to the “OFF” position and place the fail-safe switch in the “OFF” position.

7.4 Draining the Generator (Model 946DT only)
1. Repeat each of the steps outlined in “Draining the Port Engine” after directing the arrow-shaped tip on the valve handle to the “GENERATOR” engine.

8.0 FILLING THE ENGINES
If you are using the system to fill the engines for the first time, be sure you have carefully followed the “Start-Up” instructions on Page 4.

1. 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.
2. Next, determine the type and the amount of oil recommended by the manufacturer for each engine. Remember, FOUR QUARTS = ONE GALLON.
3. 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 oil through the system varies primarily with the viscosity and temperature of the oil. Under normal conditions (75°F to 85°F), the system pumps four quarts of 40 weight oil (1 gallon) in approximately 90 seconds. Filling time is a function of several factors, including the oil temperature and weight. Oil (40 weight) at 85°F pumps approximately 20% faster than the same oil at 75°F.

FRESH OIL SHOULD BE 75°F OR WARMER BEFORE PUMPING!

8.1 Filling Port Engine (All Models)
1. Loosen the oil filler cap on the engine or remove the dip stick to allow air to enter the crankcase.
2. Insert the PVC wand of the Drain/ Fill Hose into a container of fresh oil.
3. Release the fail-safe lock device on the Pump/ Motor Unit valve handle and direct the arrow-shaped tip to “PORT ENGINE”.
4. Flip the pump motor control switch on the X-Change® R® to the “FILL” position. The pump will start immediately and you will observe the oil moving through the clear tubing toward the Pump/ Motor Unit. You should hear a noticeable change in the sound (speed) of the pump motor when the oil enters the pump.
5. 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 about one gallon each 90 seconds.
6. Flip the pump motor control switch to the “OFF” position when the oil pan nears its filled capacity and check the proper oil level with the engine’s dip stick (or other measuring device supplied with the engine). If filling is completed, place the fail-safe switch in the “OFF” position.

If you have over-filled an engine, you may simply flip the motor control switch to the “DRAIN” position for a few seconds to remove the overage.