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# Oil Smart® Pump System

## Model ESS100, ESSIM30-MD, ESSIMTP3-MD



Operating Instructions, Installation & Maintenance Manual

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*\*Note: UL and CSA listed; Model Optima UL certified only.*



**EBARA Fluid Handling**

EBARA International Corporation



Thank you for purchasing this EBARA Oil Smart® Pump System. We hope you are pleased with your purchase and that our pumps will provide you with long service life and exceptional performance.

To ensure satisfactory service life, there are several considerations regarding proper installation, operation and power source. Please review the recommendations outlined within the installation and operation manual.

Please contact your supplier (supplying dealer or contractor) if service is necessary or if you have any questions or need further assistance.

Please retain the following information for your records and to help expedite service:

**Purchase Date:** \_\_\_\_\_

**Purchased From:** \_\_\_\_\_

\_\_\_\_\_

**Serial No:** \_\_\_\_\_

*(Located on the pump nameplate)*

*Note: For assistance locating the serial number and name plate, please refer to page 17 of the EPD/Optima installation manual (with the pump).*

## Important Safeguards

To reduce risk of injury, **always** follow these instructions and safety precautions when using this pump and to maintain warranty.

### ***Read All Instructions Prior to Installation (SAVE THESE INSTRUCTIONS)***

#### **Installation/Operation:**

- Never lift or carry pump by the electrical cord. Use a chain or rope affixed on handle to install/remove pump. To reduce potential damage to the pump from inadvertent lifting by the electrical cord, please refer to “Proper Lifting” located on the following page.
- This pump must be operated fully submerged. Pump must be shutdown if sump, pit or pond level drops below the motor housing.
- Pump is designed to pump clean water (maximum temperature of 122° F) with suspended solids up to 3/8 of an inch. Larger solids will clog the suction strainer plate leading to dry running and subsequent failure (**Note: Pumping sand, gravel, and other hard debris will shorten the life of the pump**). Elevate the pump with bricks or other support above the sump, pit or pond bottom if debris is present. Consult dealer for other fluids.
- Clean filter basin when cleaning inlet filter media when pump is shutdown.
- Pump should be mounted upright only (vertical). Never lay the pump on its side.

#### **Electrical Requirements:**

- Pump must be operated with a GFI breaker of at least 20 amps.
- High OR Low Voltage can damage the pump. Power from your utility or generator set cannot be more or less than  $\pm 5\%$  of the rated voltage on the pump.
- Maximum distance from power source and pump must not exceed 100 feet using 16/3 electrical cables. This distance is from the breaker box and includes the pump cord. If the run is longer, consult a qualified electrician or your dealer.
- Lightning strikes can destroy the capacitor in your pump. Ensure proper protection is provided.
- Consult operator manual for other operation and application information.



## Contents

Section	Page
General Application Information . . . . .	6
Safety Information and Introduction & Specifications . . . . .	8
Materials & Installation Instructions . . . . .	9
Pump Inspection & Installation Instructions . . . . .	11
Manual Operation Type Motor Wiring Diagram . . . . .	12
Notice for Corded Pumps . . . . .	14
Troubleshooting Checklist . . . . .	15
Date Code Information . . . . .	16
Sectional View & Parts Reference . . . . .	17
Oil Smart® Pump Switch (ESS100) Features . . . . .	21
Oil Smart® Pump Switch (ESS100) Wiring Diagram . . . . .	21
Oil Smart® Simplex Panel (ESSIM30-MD) Features . . . . .	22
ESSIM30-MD Wiring Diagram . . . . .	23
Oil Smart® Simplex Panel (ESSIMTP3-MD) Features . . . . .	24
ESSIMTP3-MD Wiring Diagram . . . . .	25
Oil Smart® Pump System – Installation Instructions . . . . .	26
Oil Smart® Pump System – Installation Diagram . . . . .	27
Oil Smart® Pump System – Testing/Preventive Maintenance . . . . .	28
Oil Smart® Pump System – Troubleshooting . . . . .	29
Warranty Information . . . . .	33

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## General Application Information

### The Sump and Installation

If your basement does not currently have a sump installed, it would be necessary to check local plumbing codes as to the acceptable type of sump that may be used. Materials commonly specified are: clay tile, fiberglass, steel, concrete and polyethylene. It may be necessary to cut a hole in the basement floor and excavate for the sump. Plumbing and electrical contractors could advise you on proper installations of drain tiles, sump, pump and electrical service. EBARA recommends that a solid sump base be provided. The sump is fed by drain tile placed around the outside and/or inside basement walls at the footings. In applications where a gravel base must be used to relieve hydraulic pressure under the basement floor, be sure to provide a permanent and solid base for the pump (bricks or a steel plate). A sump cover capable of supporting 200 pounds should be employed to contain odors and for obvious safety reasons.

### Electrical Installation

Electrical service for any sump pump installation must be grounded and separately fused or breakered directly from the entrance box with a single grounding type receptacle at



### General Application Information (cont.)

the pump. The receptacle should not be less than four feet above the basement floor for safety reasons. You should never touch a sump pump or discharge piping while the pump is connected to electrical power and water is present. The pump should be disconnected from the electrical source before handling in all cases.

#### Discharge Piping Installation

To assure the maximum performance from your sump pump, the discharge pipe size and piping fittings should not be smaller than the discharge port of the pump. Smaller pipe will add to friction losses and reduce the capacity of the pump. Normally accepted materials are galvanized pipe, rigid plastic pipe or acceptable flexible pipe or hose. A piece of flexible hose between the pump discharge and the discharge piping will provide for ease in alignment, reduce vibration and noise, and will act as a union when it is necessary to remove the pump. Where the discharge pipe is long, a check valve is often employed to prevent the water from flowing back into the sump when the pump turns off. If the discharge is directed into a sanitary sewer, a suitable anti-siphon device or a free flow check valve should be inserted in the line to prevent backflow into the pit. Sump pumps are not designed to handle raw sewage. Do not attempt to adapt one for this type of application. A sewage ejector pump especially designed to handle solids must be used.

#### Pump Installation

When the sump, electrical and discharge plumbing installation is complete and ready for the pump, clean all solid debris from the pit. Complete the plumbing connection to the pump and then plug the pump into the electrical outlet. A few extra minutes to test the sump pump installation are now in order. Fill the sump with water, note the turn on and turn off level of the pump, and the pumping cycle. This will allow you to calculate the approximate discharge flow of the pump system. If everything is operating properly, install the sump cover.

#### Pump Selection

The pump should be of sufficient capacity and head to satisfy anticipated use requirements. Capacity is determined by a fixture unit value if effluent is drained to sump basin. Your local Wholesaler can assist you in fixture unit values.

Basement perimeter water intrusion varies by area and region. Typically a 1/3 HP or 1/2 HP DRAINAGE PUMP WILL EVACUATE MOST HOME SUMP PITS.

Commercial and industrial drainage applications require that calculations of pumping volume and pumping head be performed to determine the proper size pump is applied.

**NOTE:** Pumping volume may vary seasonally due to rainfall and area run-off.



## **General Application Information (cont.)**

### **Basin and Cover**

The basin should not be less than 18 inches in diameter and 24 inches deep. Larger diameters are advisable in instances of increased pump capacity requirements:

<b>Required Pump Capacity</b>	<b>Minimum Basin Diameter</b>
up to 35 GPM	18"
over 35 GPM	24"
over 60 GPM	30"
over 100 GPM	36"
over 150 GPM	48"

The basin should be located such that all water flows into the basin due to gravity. Outdoor installations should be at a sufficient depth to ensure protection from freezing.

### **Maintenance Tips**

- **Every three or four months:**

- 1) Clean the pump screen or inlet opening. If your sump collects the discharge from an automatic washing machine, cleaning will be required more often. (Before removing the pump be sure to disconnect the unit from electrical power; and reconnect after completion of cleaning);
- 2) Pour enough water into the sump to cycle the pump and assure its proper functioning.

- **Annually:**

Remove and clean the pump. Clean the sump pit also.

## **Safety Information and Introduction**

### **! WARNING**



**Before handling this pump, always disconnect the power first.**

This pump should only be serviced by a qualified person or a factory trained person.

### **! CAUTION**

This instruction manual includes necessary items for installation, operation and maintenance. Read this manual carefully to ensure correct installation, operation and maintenance.

Be sure to keep this instruction manual on hand for future reference.



### Materials Needed

- PVC or ABS pipe cement (*read manufacturer's instructions carefully*)
- PVC or ABS pipe;
  - 1<sup>1</sup>/<sub>4</sub>" for Optima-3 & EPD-3
  - 1<sup>1</sup>/<sub>2</sub>" for EPD-5,7,10 & 15
- PVC adapter
  - 1<sup>1</sup>/<sub>4</sub>" for Optima-3 & EPD-3
  - 1<sup>1</sup>/<sub>2</sub>" for EPD-5, 7, 10 & 15
- In line check valve
- Sump basin 18" or larger diameter plastic, fiberglass or concrete.  
(See page 8 for minimum diameter basin size by pump capacity.)

### Installation Instructions

**Step 1** Inspection: Your pump has been carefully packaged to prevent damage during shipping. However, occasional damage does occur due to rough handling. Carefully inspect the pump for damage that could cause it to fail.

**Step 2:** Attach desired length of PVC or ABS discharge pipe to pump outlet, using PVC adapter (1<sup>1</sup>/<sub>4</sub>" pipe and adapter for Optima-3 & EPD-3 1<sup>1</sup>/<sub>2</sub>" for EPD-5, 7, 10 & 15). Make sure open end of pipe will be above top of basin.

**Step 3:** Clear sump basin of any water, debris or sediment.

**Step 4:** Lower pump into basin.

**Step 5:** Attach in line check valve to discharge pipe 12" to 18" above pump discharge with arrow pointing away from the pump (with the flow). Connect other end of check valve securely to drain pipe and tighten clamps.

**Note:** Do not put check valve directly into pump discharge opening.

**Step 6:** Drill a 1/8" relief hole in the discharge pipe 5" above pipe connection to pump.

**Step 7:** Plug in pump and fill sump basin with water to test unit. Pump should turn on at 13" to 14" water level. Allow pump to go through several ON-OFF cycles to assure satisfactory operation.

**Note:** If pump does not operate properly, see the troubleshooting checklist on page 12.

### Septic Tank Installation

Optima and EPD pumps can be used to pump septic tank effluent, but must be installed as follows:

- Install pump in separate compartment at the discharge side of the septic tank. Never install pump in main tank where sludge collects.
- Use with a junction box.

**WARNING:** Sump basin must be vented in accordance with local plumbing codes. These pumps are not designed for and CANNOT be installed in locations classified as hazardous in accordance with the National Electric Code, ANSI/NEPA 70-1984.



### Electrical information – Single Phase *(Refer to page 13 for Three phase information)*

- Pumps are 115 V, 60 Hz and are grounded to prevent electrical shock.

**WARNING:** Risk of electric shock—this pump is supplied with a grounding conductor and grounding-type attachment plug. To reduce the risk of electric shock, be certain that it is connected only to a properly grounded, grounding-type receptacle.

- Use a separate 20 amp circuit breaker or 20 amp fuse block with the pump.
- **Do not** use an extension cord with the pump.
- **Do not** cut off the ground pin or use an adapter fitting.
- **Do not** work on the pump or switch until any or all power cords are unplugged.

### **IMPORTANT INSTRUCTIONS BEFORE INSTALLATION**

**Failure to follow these instructions may cause serious bodily injury and/or property damage.**

1. Before installing or servicing your pump, BE CERTAIN pump power source is disconnected.
2. Installation and electrical wiring must adhere to state and local codes and must be complete before priming pump. Check appropriate community agencies, or contact local electrical and pump professionals.
3. **CALL AN ELECTRICIAN WHEN IN DOUBT.** Pump should be connected to a separate 20 amp circuit breaker or 20 amp fuse block. Plugging into existing outlets may cause low voltage at motor, causing blown fuses, tripping of motor overload, or burned out motor.
4. Do not connect pump to a power supply until permanently grounded. For maximum safety, ground pump to a circuit equipped with a fault interrupter device.
5. Voltage of power supply must match the voltage of the pump.
6. Before installing pump, clear sump basin of any water, debris, or sediment.  
**WARNING: Sump basin must be vented in accordance with local plumbing codes. EBARA PRO•DRAINERS are not designed for and CANNOT be installed in locations classified as hazardous in the National Electric Code, ANSI/NFPA 70.**
7. The sump basin should be between 18" and 24" in diameter and made of plastic, fiberglass, or concrete.
8. The following may cause severe damage to pump and will void warranty:
  - Using an extension cord.
  - Cutting off the ground pin or using an adapted fitting.
  - Working on pump or switch while plugged in.
  - Removing motor housing, unscrewing impeller, or otherwise removing impeller seal.

### PIPING

Plastic PVC pipe is shown in the illustrations, but galvanized steel or copper pipe may be used if desired. All piping must be clean and free of all foreign matter to prevent clogging. Use thread compound on all threaded joints unless specified otherwise.





## Submersible Pump Installation

### General Materials Needed

- One can PVC cement (read instructions carefully)
- One can thread compound (read instructions carefully)
- One male PVC adaptor: 1 1/4" for 1/3 HP; 1 1/2" for 1/2, 3/4, 1 & 1 1/2 horsepower models.
- Enough rigid PVC pipe and couplings to reach from bottom of sump basin to discharge: 1 1/4" for 1/3 HP; 1 1/2" for 1/2, 3/4, 1 & 1 1/2 horsepower models.
- One Check Valve.

### Tools Needed for all pump installations:

Pipe wrench, slot screwdriver, 24-tooth hacksaw, knife or round file.

**Step 1** – Thread male PVC adaptor into pump discharge opening.

**Step 2** – Cement a 15" piece of PVC pipe to adaptor. Use appropriate diameter piping. Drill a 1/8" relief hole in the pipe 5" above pump connection. This hole prevents pump from air-locking.

**Step 3** – Clamp Check Valve to top of 15" PVC pipe with water flow arrow pointing away from pump.

**Step 4** – Lower pump into basin. Clamp needed PVC discharge pipe and fittings to open end of Check Valve.

**Step 5** – Plug in pump and fill sump basin with water. Pump should turn on at 13" to 14" water level. Perform several ON-OFF cycles to assure satisfactory operation.

## Performance Table (Capacity in Gallons per Minute)

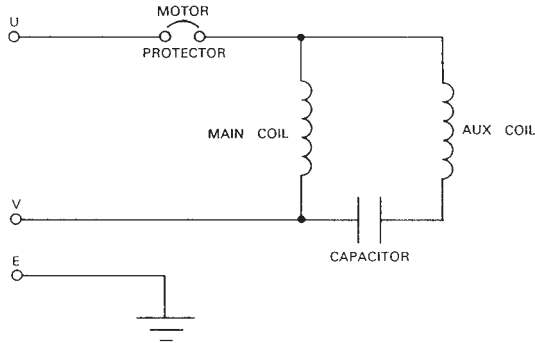
TOTAL HEAD ITEM NO	5	10	15	20	25	30	35	40	45	50	55
Optima-3 1/3 HP	40	33	25	14							
EPD-3 1/3 HP	45	38	31	20	7						
EPD-5 1/2 HP		66	67	49	40	29	17				
EPD-7 3/4 HP				63	54	45	35	25	14		
EPD-10 1 HP				74	65	56	46	36	26	15	
EPD-15 1 1/2 HP				85	77	68	58	48	38	26	15



## Motor Wiring Diagram

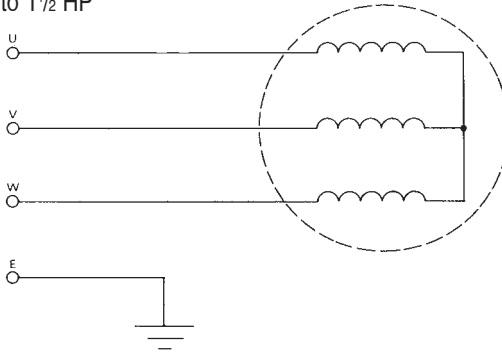
### Manual Operation Type Output (Single Phase)

- Output  $\frac{1}{3}$  to  $\frac{3}{4}$  HP



### Manual Operation Type Output (Three Phase)

- Output  $\frac{1}{2}$  to  $1\frac{1}{2}$  HP



## Electrical Wiring – Three Phase



### WARNING



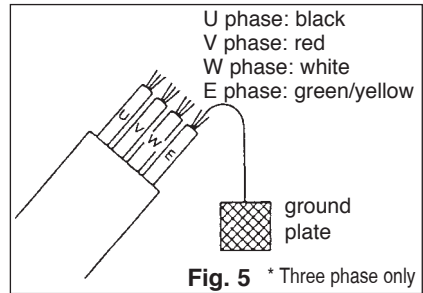
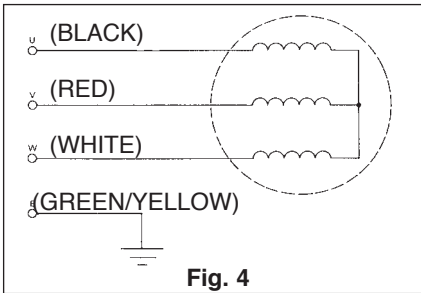
Check that the power is locked off and disconnected before working on pump. All electric work should be performed by a qualified electrician and all national and local electrical codes must be observed.

#### (1) Wiring

- Wire as indicated for the appropriate start system as shown in Fig. 4
- Loose connections will stop the pump. Make sure all electrical connections are secure.

#### MOTOR WIRING DIAGRAM

- Output ½ to 1½ HP



#### NOTE:

Use with approved motor control that matches motor input in full load amperes with overload element(s) selected or adjusted in accordance with control instructions.

*Utiliser un démarreur approuvé convenant au courant à pleine charge du moteur et dont les éléments thermiques sont réglés ou choisis conformément aux instructions qui l'accompagnent.*

#### (2) Cable

- Never let the end of the cable contact water.
- If the cable is extended, do not immerse the splice in water.
- Fasten the cable to the discharge piping with tape or vinyl strips.
- Install the cable so that it will not overheat. Overheating is caused by coiling the cable and exposing it to direct sunlight.

#### (3) Grounding

As shown in Fig. 5 ground the green/yellow wire (label E). Under no circumstances should the green/yellow wire be connected to the power supply.

#### (4) Use short circuit breakers to prevent danger of electrical shock.

#### OPERATION

##### 1. Before starting the pump:

##### (1) Check water level.

If the pump is operated continuously for an extended period of time in a dry condition or at the lowest water level, the motor protector will be activated. Constant repetition of this action will shorten pump service life. Do not start the pump again in such a situation until after the motor has completely cooled.



## SPECIAL NOTICE

### *for Cord Connected Pumps*

EBARA EPD / Optima PRO Drainer pumps are NOT designed for and **CANNOT be installed** in any location classified as ***hazardous*** by the National Electric Code ANSI/NFPA 70.

- Connection devices shall provide for a watertight connection to the power supply and provide adequate strain relief for the cord.
- Installation of the box shall be a Listed watertight connection box used with a Listed, liquid-tight fitting suitable for the cord.
- Connection boxes should be sized in accordance with National Electric Code specifications and installed as intended for the application.
- All connection devices are to be provided by the installer.
- Only qualified personnel shall service and install the pump.



## Troubleshooting Checklist

PROBLEM	POSSIBLE CAUSES
Pump does not run or hums.	<ul style="list-style-type: none"> <li>• Line circuit breaker is off, or fuse is blown or loose.</li> <li>• Water level in sump has not reached turn-on level as indicated in installation drawing.</li> <li>• Pump cord is not making contact in receptacle.</li> <li>• If all of the above are OK, then the motor winding may be open.</li> </ul>
Pump runs but does not deliver water.	<ul style="list-style-type: none"> <li>• Check valve is installed backwards. Arrow on valve should point in direction of flow.</li> <li>• Discharge shut-off valve (if used) may be closed.</li> <li>• Pump is air-locked. Start and stop several times by plugging and unplugging cord. Check for clogged vent hole in pump case.</li> <li>• Impeller or volute openings are fully or partially clogged. Remove pump and clean.</li> <li>• Inlet holes in pump base are clogged. Remove pump and clean the openings.</li> <li>• Vertical pumping distance is too high. Reduce distance or resize pump.</li> </ul>
Pump runs but delivers only a small amount of water.	<ul style="list-style-type: none"> <li>• Pump is air-locked. Start and stop several times by plugging and unplugging cord. Check for clogged vent hole in pump case.</li> <li>• Vertical pumping distance is too high. Reduce distance or resize pump.</li> <li>• Inlet holes in pump base are clogged. Remove pump and clean the openings.</li> <li>• Impeller or volute openings is fully or partially clogged. Remove pump and clean.</li> </ul>
Fuse blows or circuit breaker trips when pump starts.	<ul style="list-style-type: none"> <li>• Pump impeller is partially clogged with tar or paint, causing motor to run slow and overload. Remove pump and clean.</li> <li>• Pump impeller is partially clogged with tar or paint, causing motor to run slow and overload. Remove pump and clean.</li> <li>• Motor stator may be defective.</li> <li>• Fuse size or circuit breaker may be too small.</li> <li>• Impeller or volute openings are fully or partially clogged. Remove pump and clean.</li> </ul>
Motor runs for a short time, then stops.	<ul style="list-style-type: none"> <li>• Inlet holes in pump base are clogged. Remove pump and clean the openings.</li> <li>• Pump impeller is partially clogged with tar or paint, causing motor to run slow and overload. Remove pump and clean.</li> <li>• Motor stator may be defective.</li> <li>• Impeller or volute openings are fully or partially clogged. Remove pump and clean.</li> </ul>



## Maintenance and Service

**WARNING:** Pump warranty becomes void if you remove motor housing, unscrew impeller, or otherwise remove impeller seal.

If pump does not operate properly, follow the steps shown under Troubleshooting.

**For any work on pump or switch, always unplug power cord(s). Do not just turn off circuit breaker or unscrew fuse.**

### Cleaning impeller and volute case

Remove screws that hold lower base to housing.

**CAUTION:** Do not remove motor housing or unscrew impeller. Use screwdriver to pry base from housing. Pry in several places.

Be sure impeller turns freely after cleaning. Clean out holes in the pump base and wash thoroughly before replacing.

## Manufacturing Year and Month (Pump)

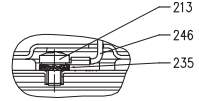
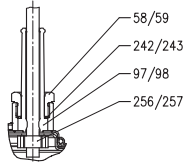
YEAR	INDICATION
2002	C
2003	D
2004	E
2005	F
2006	G
2007	H
2008	J
2009	K
2010	L
2011	M
2012	N
2013	O
2014	P
2015	Q

MONTH	INDICATION
JAN.	1
FEB.	2
MAR.	3
APR.	4
MAY	5
JUN.	6
JUL.	7
AUG.	8
SEP.	9
OCT.	X
NOV.	Y
DEC.	Z

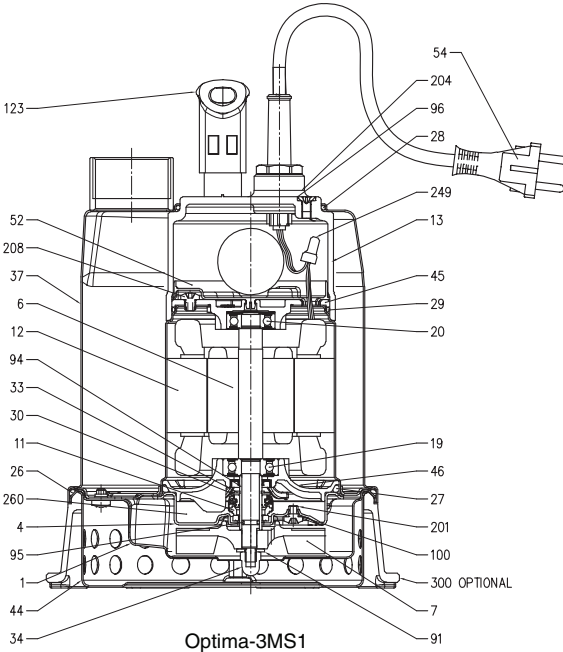


**Sectional View – Optima-3MS1, EPD-3MS1**

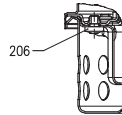
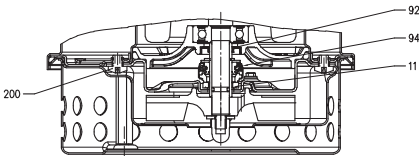
Manual Type Output



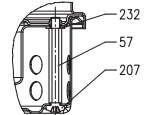
Ground Wire



Optima-3MS1



Suction Cover



Strainer

*Refer to page 29 for Material Details.*



Sectional View – Optima-3MS1, EPD-3MS1

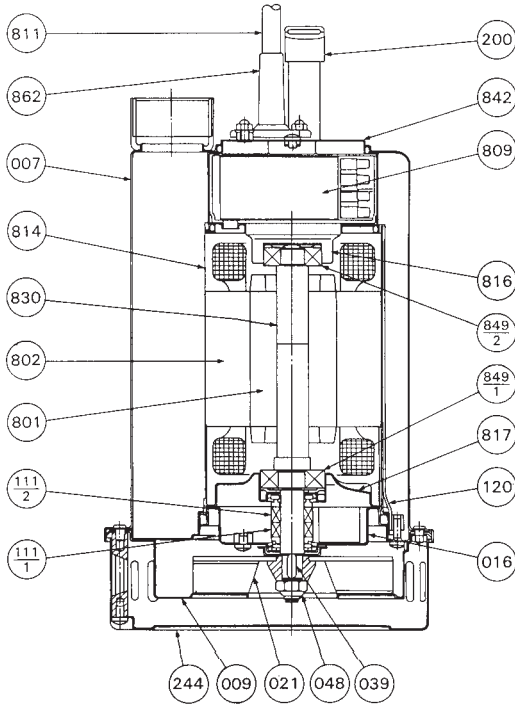
N°	PART NAME	MATERIAL	STANDARD	Qty.
1	Suction cover	EN 1.4301 (AISI 304)	-	1
4	Casing cover	EN 1.4301 (AISI 304)	-	1
6	Shaft with rotor	EN 1.4305 (AISI 303)	-	1
7	Impeller	PPE+PS-HI-GF20	-	1
11	Mechanical seal		-	1
12	Motor frame with stator	EN 1.4301 (AISI 304)	-	1
13	Motor cover	PP-GF30	-	1
19	Lower ball bearing	-	-	1
20	Upper ball bearing	-	-	1
21	Adjusting ring	-	-	1
23	Capacitor	-	-	1
26	O-ring	NBR	-	1
27	O-ring	NBR	-	1
28	O-ring	NBR	-	1
29	O-ring	NBR	-	1
30	Washer	EN 1.4301 (AISI 304)	-	1
33	Seeger ring	Carbon steel TC80	UNI 7435	1
34	Impeller nut	A2 - 70 UNI 7323	UNI 5721	1
37	Outer casing	EN 1.4301 (AISI 304)	-	1
44	Strainer	EN 1.4301 (AISI 304)	-	1
45	Upper bearing housing	EN 1706 AC-46000 D	-	1
46	Lower bearing housing	EN 1706 AC-46000 D	-	1
52	Terminal insulating base	PA6	-	1
54	Power cable	-	-	1
55	Switch	-	-	1
57	Spacer	EN 1.4301 (AISI 304)	-	2
58	Power cable connector	PA66-GF30	-	1
59	Switch cable connector	PA66-GF30	-	1
91	Washer	EN 1.4301 (AISI 304)	-	1
92	Lip seal	NBR	-	1
94	Shaft sleeve	EN 1.4305 (AISI 303) ceramic coated	-	1
95	O-ring	NBR	-	1
96	O-ring	NBR	-	1
97	Power cable boot	NBR	-	1
98	Switch cable boot	NBR	-	1
100	O-ring	NBR	-	1
123	Handle	PP	-	1
200	Screw	A2 - 70 UNI 7323	UNI 7687	4
201	Screw	A2 - 70 UNI 7323	UNI 7687	1
204	Screw	A2 - 70 UNI 7323	UNI 7687	1
206	Screw	A2 - 70 UNI 7323	UNI 7687	3
207	Screw	A2 - 70 UNI 7323	UNI 7687	2
208	Screw	A2 - 70 UNI 7323	UNI 7687	3
213	Screw	A2 - 70 UNI 7323	UNI 7687	1
232	Washer	PA6	-	2
235	Washer	Zinked Steel	UNI 8842	1
242	Washer	EN 1.4301 (AISI 304)	-	1
243	Washer	EN 1.4301 (AISI 304)	-	1
246	Ground wire	-	-	1
256	Cable holder	-	-	1
257	Cable holder	-	-	1
260	Oil	Esso Marcol 152	-	40 cc
300	Minimum suction system	Thermoplastic elastomer vulcanizate	-	-





**Sectional View – EPD-5MS1, EPD-7MS1**

Manual Type Output 1/2 to 3/4 HP (Single Phase)

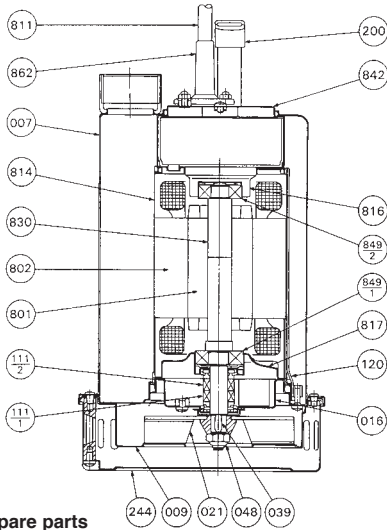


**\* Recommended spare parts**

Part No.	Part Name	Material	ASTM, AISI Code	No. for 1 Unit	Part No.	Part Name	Material	ASTM, AISI Code	No. for 1 Unit
007	Outer Casing	304 Stainless	AISI 304	1	802	Stator	—		1
009	Inner Casing	304 Stainless	AISI 304	1	809	Capacitor	—		1
016	Seal Cover	304 Stainless	AISI 304	1	811	Submersible Cable	—		1
021	Impeller	304 Stainless	AISI 304	1	814	Motor Frame	304 Stainless	AISI 304	1
039	Key	304 Stainless	AISI 304	1	816	Bracket	304 Stainless	AISI 304	1
048	Impeller Nut	304 Stainless	AISI 304	1 set	817	Bracket	304 Stainless	AISI 304	1
*111-1	Mechanical Seal	—		1 set	830	Shaft	303 Stainless	AISI 303	1
*111-2	Mechanical Seal	—		1 set	842	Motor Cover			1
120	Connection Band	304 Stainless	AISI 304	1	*849-1	Ball Bearing	—		1
200	Lifting Hanger	304 Stainless	AISI 304	1	*849-2	Ball Bearing	—		1
244	Strainer	304 Stainless	AISI 304	1	862	Cable Boot	NBR		1
801	Rotor	—		1					

**Sectional View – EPD-5MT2(4), 7MT2(4), 10MT2(4), 15MT2(4)**

Manual Type Output 1/2 to 1 1/2 HP (Three Phase)



**\* Recommended spare parts**

Part No. No.	Part Name	Material	ASTM, AISI Code	No. for 1 Unit
007	Outer Casing	304 Stainless	AISI 304	1
009	Inner Casing	304 Stainless	AISI 304	1
016	Seal Cover	304 Stainless	AISI 304	1
021	Impeller	304 Stainless	AISI 304	1
039	Key	304 Stainless	AISI 304	1
048	Impeller Nut	304 Stainless	AISI 304	1 set
*111-1	Mechanical Seal	—		1 set
*111-2	Mechanical Seal	—		1 set
120	Connection Band	304 Stainless	AISI 304	
200	Lifting Hanger	304 Stainless	AISI 304	1
244	Strainer	304 Stainless	AISI 304	1
801	Rotor	—		1
802	Stator	—		1
811	Submersible Cable	SOW-A/SO		1
814	Motor Frame	304 Stainless	AISI 304	1
816	Bracket	304 Stainless	AISI 304	1
817	Bracket	304 Stainless	AISI 304	1
830	Shaft	303 Stainless	AISI 303	1
842	Motor Cover			1
*849-1	Ball Bearing	—		1
*849-2	Ball Bearing	—		1
862	Cable Foot	NBR		1




## Oil Smart® Pump Switch (ESS100)

The Oil Smart® Pump Switch is a stand-alone, plug and play pump controller that differentiates between oil and water and will operate any pump up to 3/4HP or 16FLA. The system is complete with visible mounted features and dry contacts for remote monitoring. The alarm will activate with the presence of any liquid/substance and will identify if oil or water is present. It is an industrial grade switch that differentiates between oil and water used to control pumps in elevators, transformer oil containment areas, underground vaults, marine, and other applications. Installation of the Oil Smart Alarm System allows you to comply with State and Federal regulations while reducing the risk of adverse publicity, fines and expensive cleanup costs.

### Features:


- No Moving Parts. Patented Liquid Smart® Control and 20' cord. Optional length available up to 100'.
- Indoor/Outdoor NEMA 4X Heavy Duty Polycarbonate Enclosure: 6"x5"x2.5", Color Gray Material 94V-2, Polycarbonate, IP-56 Rating
- Voltage: 115VAC Single Phase 60Hz
- CSA International Certified No. 229294
- External Mounting Feet: Quick Installation
- High Liquid Alarm with Test and Silence Features, Red Beacon Alarm Light, White Light for Water Present, Yellow Light for Oil Present, High 85 Decibel Audible Alarm Complete Dry Contacts for Each Alarm Condition
- 10' Heavy Duty Power Cord
- Easy Accessible Terminal Block (remove back panel)

**! WARNING**



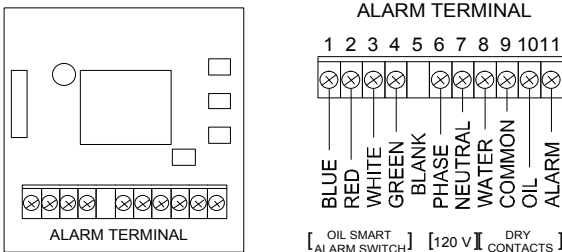
All installations must be in accordance with the National Electrical Code, and any other applicable state and local electrical requirements.

**! WARNING**



The switch and pump are not rated for explosive environments. This product is intended for hydraulic oils.

## ESS100 Wiring Diagram



\*All components are pre-wired for plug and play installation. To access alarm circuit board and dry contacts for remote monitoring, remove back panel. The dry contacts are rated for 60V AC or DC, 1 amp maximum.



## **Oil Smart® Simplex Panel (ESSIM30-MD)**

The Oil Smart® System incorporates pump controls and alarm sensors that differentiate between oil and water, allowing companies to responsibly discharge the water without worrying about contamination. Installation of the Simplex Panel keeps companies in compliance with Elevator Code ASME A17.1 and State/Federal regulations while reducing the risk of adverse publicity, fines and expensive cleanup costs.

### **Features:**

- Patented Oil Smart® and Liquid Smart® Controls with 20' cords and mounting brackets.
- Indoor/Outdoor NEMA 4X Heavy Duty Polycarbonate Enclosure: 10"x8"x4", Color Gray Material 94V-2, Polycarbonate, IP-56 Rating
- Voltage: 115 VAC Single Phase 60Hz
- CSA International Certified No. 229294
- UL Listed for the United States and Canada
- External Mounting Feet: Quick Installation
- High Liquid Alarm with Test and Silence Features, Red Beacon Alarm Light, White Light for Water Present, Yellow Light for Oil Present, High 85 Decibel Audible Alarm Complete Dry Contacts for Each Alarm Condition
- HOA Switch, Green Light for Pump Run
- Local, lockable disconnect



### **WARNING**



All installations must be in accordance with the National Electrical Code, and any other applicable state and local electrical requirements.



### **WARNING**

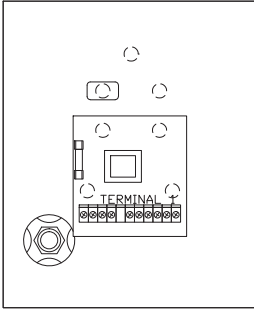


The switch and pump are not rated for explosive environments. This product is intended for hydraulic oils.

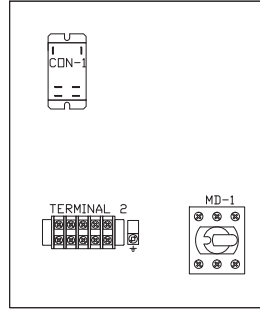


**Oil Smart® Simplex Panel (ESSIM30-MD) — Wiring Diagram**

BACK OF FRONT PLATE

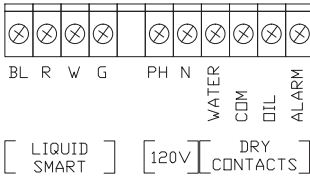


BACK PLATE

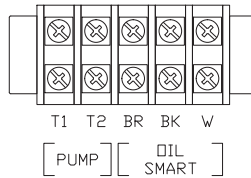


Use Copper Conductors Only  
 Temperature ratings of conductors is to be 60°C (167°F)  
 Branch circuit protection shall be provided by the installer.  
 Must be sized according to pump/motor manufacturing specifications.

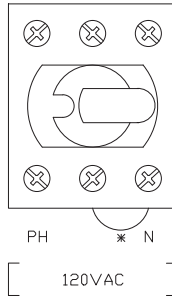
TERMINAL 1



TERMINAL 2



MD-1



\*FOR 208/240V, REMOVE JUMPER

VERIFY CORRECT OPERATION OF  
 CONTROL PANEL AFTER INSTALLATION  
 IS COMPLETE.



## **Oil Smart® Simplex Panel (ESSIM30-MD)**

The Oil Smart® System incorporates pump controls and alarm sensors that differentiate between oil and water, allowing companies to responsibly discharge the water without worrying about contamination. Installation of the Simplex Panel keeps companies in compliance with Elevator Code ASME A17.1 and State/Federal regulations while reducing the risk of adverse publicity, fines and expensive cleanup costs.

### **Features:**

- Patented Oil Smart® and Liquid Smart® Controls with 20' cords and mounting brackets.
- Indoor/Outdoor NEMA 4X Heavy Duty Polycarbonate Enclosure: 10"x8"x4", Color Gray Material 94V-2, Polycarbonate, IP-56 Rating
- Voltage: 115 VAC Single Phase 60Hz
- CSA International Certified No. 229294
- UL Listed for the United States and Canada
- External Mounting Feet: Quick Installation
- High Liquid Alarm with Test and Silence Features, Red Beacon Alarm Light, White Light for Water Present, Yellow Light for Oil Present, High 85 Decibel Audible Alarm Complete Dry Contacts for Each Alarm Condition
- HOA Switch, Green Light for Pump Run
- Local, lockable disconnect

### **! WARNING**



All installations must be in accordance with the National Electrical Code, and any other applicable state and local electrical requirements.

### **! WARNING**



The switch and pump are not rated for explosive environments. This product is intended for hydraulic oils.





## **Oil Smart® Pump System – Installation Instructions**

1. Inspection: Your system has been carefully packaged to prevent damage during shipping. However, occasional damage does occur due to rough handling. Carefully inspect all parts of the system that could cause it to fail.
2. Refer to the pump installation instructions on page 9 to begin. After completing the pump installation steps, continue here.
3. **Caution:** To maintain the NEMA 4X rating, make all wiring connections with seal tight cable grips or conduit connections to be supplied by end user.
4. Determine mounting location for control panel. Mount panel using mounting feet supplied.
5. Determine hole location on panel for liquid-tight or conduit connections. Attach connectors and conduits.
6. It is important that the alarm circuit is independent of the pump to assure that the alarm will activate if pump circuit fails.
7. Run pump cable, Liquid Smart® cable, and Oil Smart® cable through conduit. Make field connections as shown on wiring diagram (See page 21, 23, or 25).
8. Run power line conductor through conduit. Wire to terminals per enclose schematic. Branch circuit protection to be provided by end-user.
9. For 1-1/2" pipe: Attach the Oil Smart® Pump Switch and Oil Smart® Liquid Alarm Switch to the Quick Mount Brackets using the screws and nuts provided. Snap the pump switch bracket onto the discharge pipe with the end of the long sensor 2" above the top of the pump. Snap the alarm bracket onto the discharge pipe with sensor end 2" above the pump switch "on" position. Place hose clamps under the quick mount brackets as a reference locator for the switch. Mount switches clear of the basin inlet, so they will stay clean. Note: Keep sensors 1" to 2" away from any metallic material.
10. For other than 1-1/2" pipe: Attach the Oil Smart® Pump Switch and Oil Smart® Liquid Alarm Switch to the universal bracket. Place the supplied hose clamp through the slots in the bracket before mounting the switch with the screws and nuts provided. Clamp the Oil Smart® Pump Switch to the discharge pipe with the end of the long sensor 2" above the top of the pump. Attach the Oil Smart® Liquid Alarm Switch onto the discharge pipe with the sensor end 2" above the pump switch "on" position. Mount switches clear of the basin inlet, so they will stay clean. Note: Keep sensors 1" to 2" away from any metallic material.

### **Start up:**

1. When the power is applied, the red power light locate on the white front swing panel shall light.
2. The Pump HOA Switch shall be placed to the A (auto) position to ensure the system will pump. The pump can be tested or turned on manually if the HOA switch is in the H (Hand-Manual) position.

To test the alarm circuit, push the test button on the front panel, the audible alarm shall sound and the high red beacon will light.

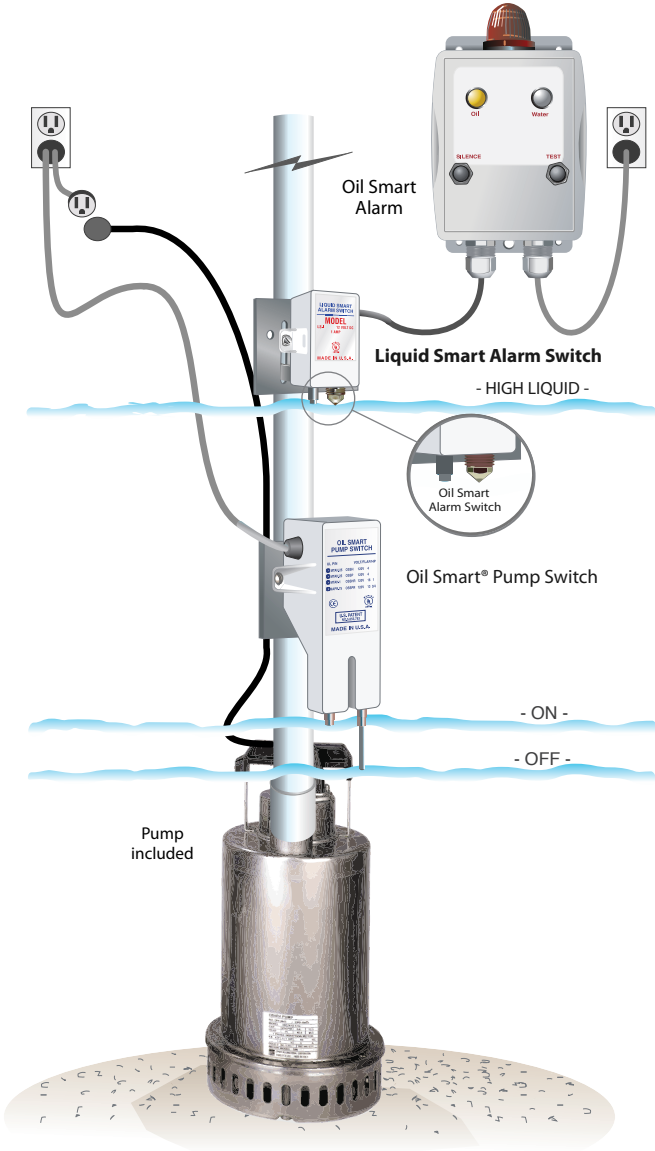
### **Service:**

**Caution:** Before checking electrical connections within the control or attempting to replace any components, turn off all branch circuits supplying power to the main control panel.





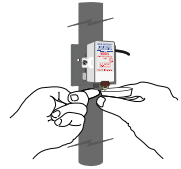
# Oil Smart® Pump System – Installation Diagram



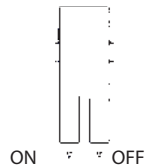
## Oil Smart® Simplex Panel

### Testing:

**Liquid Smart® Alarm Sensor:** Fill small cup supplied with oil. Submerge only the plastic lens (optic sensor) into oil, the alarm will activate showing oil present (yellow light). Now touch finger to the exposed stainless steel sensor, the alarm will show water present (white light) will turn on.

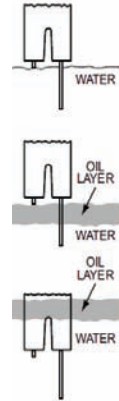


**Oil Smart® Switch:** Place HOA switch on control panel in the automatic position. Place your thumb on the short sensor of Oil Smart® Pump Switch and the pump will turn on. While touching the short sensor, touch the long sensor "off" with your fingers. Remove your thumb from on sensor and begin to move your fingers down the off sensor. Remove your fingers from off sensor and the pump will turn off. Or fill sump with water, when water reaches on sensor, the pump will turn on and remain on until water clears the off sensor.



### Operation:

When water comes in contact with the short (on) sensor, the pump will turn on. The pump will remain on until water clear the long (off) sensor. If oil comes in contact with the on sensor, the pump will not turn on; however the pump switch will activate and pump water from under the oil. Oil does not harm the system in anyway.



### Preventive Maintenance:

The Oil Smart® Pump and the Liquid Smart Alarm Switches must be kept clean. If units are submerged in water during initial installation, the switches must be cleaned. Clean with a rag and household rubbing alcohol or kerosene. Consistent inspection and preventive maintenance ensures longevity and proper operation of components.



## Troubleshooting Guide

<b>Problem</b>	<b>Possible Cause</b>	<b>Solution</b>
Pump Control does not activate the pump. Pump does not run.	Incorrect Polarity	Make sure phase and neutral are not reversed.
	Loose connection in control panel. or electrical system.	Confirm all connections are tight and secure.
	Non-Conductive Water (Highly Filtered Water)	Test pump switch with fingers per the instructions
	Defective Control	Replace Control
Pump Control is not operating properly; not consistent or staying on.	Problem with electrical system	Check electrical circuits for common neutrals; may cause switch to not function correctly.
	Improper Field Wiring	Do not run DC conductors through same conduit as AC conductors.
	Control is not clean of conductive material.	White plastic case must be kept clean. Clean with alcohol or an oil base product: kerosene, solvent.
	Improper Mounting of Components	Keep control (1" to 2") clear of any metallic material. Mount to pvc pipe or if mounting to metal pipe, make sure to mount with See Water quick mount PVC bracket.
	Float switch attached to pump	Float switch must be removed, secured in manual operation, or replaced with correct pump.
	Defective Control and/or Pump(s)	Replace Control and/or Pump(s)
Alarm will not activate	Power supply failure	Confirm separate 120V power to circuit board. Can be jumpered from incoming power on pump terminal if 120v is available.
	Defective Alarm Sensor	Replace Alarm Sensor
	Loose connection in control panel. or electrical system.	Confirm all connections are tight and secure.
Pump will not turn on or pump is not functioning properly.	Incorrect match on control panel and pump.	Confirm correct pump voltage and wires matched to correct control panel
	Loose connection in control panel. or electrical system.	Confirm all connections are tight and secure.
	Defective Pump(s)	Replace Pump(s)



## **Warranty**

**EBARA FLUID HANDLING  
ROCK HILL, SOUTH CAROLINA  
MODEL Optima NO FAULT LIMITED WARRANTY  
(MODELS 3MS-1 AND 3AS-1 ONLY)**

EBARA FLUID HANDLING, Rock Hill, SC (EFH-RH) warrants to the original purchaser only ("Customer") that the EFH-RH Commercial Pump/Product ("Pump") Model 3MS-1 and/or 3AS-1 ONLY will be free of defects in workmanship and material for a period of twelve (12) months from the date of installation or eighteen (18) months from the date of shipment by EFH-RH, whichever comes first, provided that notification of any such defect is promptly given in writing to EFH-RH. Customer may be required at EFH-RH's request to verify that it is the Customer of the Pump and that the Pump was installed and operated in accordance with EFH-RH's instructions for sump pumps noted in the furnished instruction manual.

EFH-RH's sole obligation under this MODEL Optima NO FAULT LIMITED WARRANTY will be to replace the Pump or at EFH-RH's sole option, to refund the Customer an equitable part or the entire purchase price. In no event shall EFH-RH's cost responsibility exceed the initial purchase price paid by the Customer for the Pump. Freight charges for replacement Pumps under this MODEL Optima NO FAULT LIMITED WARRANTY are the responsibility of the Customer.

To obtain MODEL Optima NO FAULT LIMITED WARRANTY consideration, the original Pump label sticker affixed to the Pump must be removed, submitted and received by EFH-RH before replacement Pump or refund is provided at:

Ebara International Corporation  
Attn: Optima Claims Processing  
1651 Cedar Line Drive  
Rock Hill, SC 29730  
803-327-5005 Phone  
803-327-5097 Fax

EFH-RH shall be liable only for the cost of the replacement Pump. Customer shall be responsible for labor, cost of removal and installation at Customer's premises, transportation and insurance costs to EFH-RH and any other incidental costs. This warranty is void and does not apply if damage is caused by improper installation, improper maintenance, accident, alteration, abuse, or misuse.

THE FOREGOING WARRANTY IS THE SOLE AND EXCLUSIVE WARRANTY ON THIS PUMP, AND ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, ARE DISCLAIMED AND EXCLUDED FROM THE TERMS OF THIS WARRANTY. EFH-RH'S SOLE OBLIGATION IN CASE OF ANY DEFECT WILL BE TO PROVIDE THE WARRANTY SERVICE SPECIFIED ABOVE. THE FOREGOING IS CUSTOMER'S SOLE AND EXCLUSIVE REMEDY, WHETHER IN CONTRACT, TORT OR OTHERWISE AND EFH-RH SHALL NOT BE LIABLE FOR ANY CONSEQUENTIAL OR INCIDENTAL DAMAGES OF ANY KIND WHATSOEVER.



## **Warranty**

### **COMMERCIAL PUMP/ PRODUCTS LIMITED WARRANTY**

EbaraFluid Handling, Rock Hill, SC (“EFH-RH”) warrants to the original purchaser only (“Customer”) that the EFH-RH Commercial Pump/Product (“Pump”) will be free of defects in workmanship and material for a period of twelve (12) months from the date of installation or eighteen (18) months from the date of shipment by EFH-RH, whichever comes first, provided that notification of any such defect is promptly given in writing to EFH-RH. Customer may be required at EFH-RH’s request to verify that it is the Customer of the Pump and that the Pump was installed and operated in accordance with EFH-RH’s instructions.

EFH-RH’s sole obligation under this warranty will be to repair or replace with a new or reconditioned Pump, such Pump as has failed or has been found to be defective during the warranty period, or at EFH-RH’s sole option, to refund to the customer an equitable part of the purchase price. In no event shall EFH-RH’s cost responsibility exceed the initial purchase price paid by the Customer for the Pump.

EFH-RH shall be liable only for the cost of the Pump, or the cost of repair or replacement of any defective Pump. Customer shall be responsible for labor, cost of removal and installation at Customer’s premises, transportation and insurance costs to EFH-RH and any other incidental costs.

This warranty is void and does not apply if damage is caused by improper installation, improper maintenance, accident, alteration, abuse, misuse or if the Pump has been disassembled prior to warranty evaluation without written authorization from EFH-RH.

Warranty service and information for return procedures will be provided by EFH-RH upon receipt of written notice describing the defect or problem to:

Ebara International Corporation  
Warranty/Claims  
1651 Cedar Line Drive  
Rock Hill, SC 29730  
803-327-5005 (Phone) • 803-327-5097 (Fax)

THE FOREGOING WARRANTY IS THE SOLE AND EXCLUSIVE WARRANTY ON THIS PUMP, AND ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, ARE DISCLAIMED AND EXCLUDED FROM THE TERMS OF THIS WARRANTY. EFH-RH’S SOLE OBLIGATION IN CASE OF ANY DEFECT WILL BE TO PROVIDE THE WARRANTY SERVICE SPECIFIED ABOVE. THE FOREGOING IS CUSTOMER’S SOLE AND EXCLUSIVE REMEDY, WHETHER IN CONTRACT, TORT OR OTHERWISE AND EFH-RH SHALL NOT BE LIABLE FOR ANY CONSEQUENTIAL OR INCIDENTAL DAMAGES OF ANY KIND WHATSOEVER.





*Contact your dealer or supplier  
for more information about other EBARA products:*



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## **EBARA Fluid Handling**

1651 Cedar Line Drive • Rock Hill, SC 29730

(t) 803 327 5005 • (f) 803 327 5097

[www.pumpsebara.com](http://www.pumpsebara.com)

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