

Operating, Installation and Maintenance

Installation *(continued)*

e) Motor protection:

- For 3HP motors, a built-in auto-cut is used and will be activated when motor becomes overheated due to abnormal conditions such as locked rotor or single phasing. There is no external wiring for this feature.
- For 5HP to 30HP motors, a normally closed built-in thermal protector is used. When motor winding becomes over-heated, the circuit is opened, shutting the motor down and allowing it to cool. An external sensor cable is provided for this feature and must be connected to a thermal relay in the control panel. Failure to do so will void the warranty. Specifications for the thermal protector are listed below:

Contact rating: AC 230V, 13A (Max)
 Contact type: Break contact (normally closed)

Operation

1. After completing installation, measure the insulation resistance again, using the procedure described in the "Installation" section.
2. Check to make sure there is an adequate amount of water in the wet well. Continuous operation of the pump in a dry condition will cause the motor protector to be activated.
3. Check the direction of rotation by turning on pump. If the discharge volume is low or unusual sounds are heard, it is likely that rotation has been reversed. If this happens, reverse two of the three power cable wires. (see Figure 4)

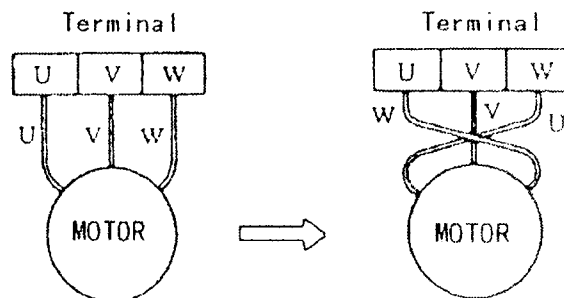


Figure 4

4. After confirming that the direction of rotation is correct, gradually open the discharge valve and allow the pump to run in continuous operation. Check the voltage, current and discharge pressure to make sure they are within allowable limits.
5. If voltage, current and discharge pressure are acceptable, you may continue to operate the pump on a continuous basis. Please refer to "Troubleshooting" section of the manual or contact your local EBARA distributor if one of these items is outside of allowable limits.
6. Do not allow the motor to start more than 20 times per hour.

Operating, Installation and Maintenance

Maintenance

Note: Disassembly and repair of the pump should only be performed by factory trained service centers. Errors made by unqualified personnel can result in improper assembly and operation, therefore resulting in possible injury.

⚠ WARNING

Always turn the power OFF before inspecting and repair the pump. Failure to do so can result in serious injury.

1. Recommended daily inspections:
 - a.) Check the motor current and its fluctuation. If there is a great deal of fluctuation, something may be clogging the pump.
 - b.) Check to make sure the pump is providing the correct amount of flow. If the discharge decreases dramatically, something may be clogging the pump.
2. Recommended monthly inspections:
 - a.) Measure the insulation resistance. The value should be more than 1 meg-ohm. If the resistance falls rapidly even with an initial reading of more than 1 meg-ohm, further inspection and possible repair may be required.
3. Recommended annual inspections:
 - a.) Check the oil in the seal chamber. If the oil has turned white it is an indication that water has mixed with the oil and the mechanical seal needs to be replaced. The service life of the mechanical seal can be prolonged by replacing the oil in the seal chamber on an annual basis. See the recommended amount of oil below in Figure 5. Replace the oil by laying the pump on its side as illustrated in Figure 6.

Motor Size (HP)	3	5	7.5	10	15	20	30
Mechanical seal (mm)	30		40		45		
Lubricating oil (oz) Turbine oil ISO VG32	38		58		102		

Figure 5

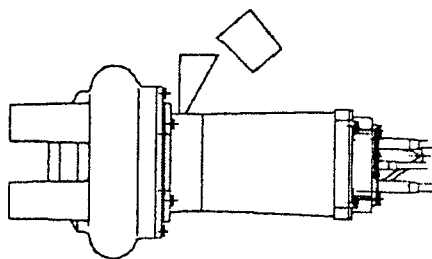


Figure 6

4. Extended storage:
 - a.) Keep pump in a dry environment, out of direct sunlight.
 - b.) Every 30 days, check the insulation resistance and rotate the impeller by hand to prevent rotating parts from seizing together.

Operating, Installation and Maintenance

Troubleshooting

Trouble	Cause	Remedy
<p>Motor won't turn. Starts, but immediately stops.</p>	<p>(1) Foreign matter hinders level control float from functioning properly. (2) Power failure. (3) Large voltage unbalance. (4) Significant drop in voltage (5) There is an open phase (6) Faulty circuit connection (7) Blown fuse (8) Faulty starter (9) Defective float (10) Malfunctioning circuit breaker (11) Foreign matter clogging pump (12) Motor is shorted out (13) Motor bearings are frozen</p>	<p>(1) Remove foreign matter (2 - 3) Contact electric power company for remedy (4) Check power supply (5) Check power supply; Inspect starter and connections (6) Correct wiring (7) Replace with correct size fuse (8) Replace with correct starter (9) Repair or replace float (10) Repair location of circuit (11) Remove clog from pump (12) Repair or replace (13) Repair or replace</p>
<p>Operates, but stops after a while. Thermal protector is activated.</p>	<p>(1) Prolonged dry operation has activated motor protector and caused pump to stop (2) High liquid temperature has activated motor protector and caused pump to stop</p>	<p>(1) Raise the off float level (2) Lower liquid temperature</p>
<p>Does not pump. Inadequate volume.</p>	<p>(1) Reverse rotation (2) Valve is closed or partially clogged. (3) Significant drop in voltage (4) Discharge head is too high (5) Large piping loss (6) Low water level during operation causes vortexing (air suction) (7) Leak in discharge piping (8) Clog in discharge piping (9) Foreign matter clogging pump (10) Worn impeller</p>	<p>(1) Correct rotation (2) Open valve (3) Check power supply (4) Recalculate and adjust (5) Recalculate and adjust (6) Raise water level or lower pump (7) Inspect, repair (8) Remove foreign matter (9) Remove foreign matter (10) Replace impeller</p>
<p>Overcurrent</p>	<p>(1) Large discrepancy between power source and voltage (2) Significant voltage drop (3) There is an open phase (4) Reverse rotation (5) Low head; pumping too much liquid (6) Foreign matter clogging pump (7) Motor bearing is worn or damaged</p>	<p>(1) Contact power company for remedy (2) Contact power company for remedy (3) Check power supply Inspect starter & electrical connections (4) Check rotation (5) Adjust discharge valve to desired flow (6) Remove clog from the pump (7) Repair or replace</p>
<p>Pump vibrates; excessive noise during operation.</p>	<p>(1) Reverse rotation (2) Pump clogged with foreign matter (3) Piping vibrates</p>	<p>(1) Correct rotation (2) Remove clog from pump (3) Install support for discharge piping</p>

Operating, Installation and Maintenance

Disassembly and Reassembly

1. Disassembly:
 - a.) Unscrew and remove the bolts (120-2), and lift the motor out of the pump casing. Lay it down on its side carefully.
 - b.) Unscrew and remove the impeller bolt (275), then pull the impeller (021) off the motor shaft.
 - c.) Unscrew and remove the oil plug (193) and drain oil from seal chamber.
 - d.) Unscrew and remove the bolts (120-1), and remove the mechanical seal cover (016) carefully. Take care as there may be oil remaining in the seal chamber.
 - d.) Remove the mechanical seal carefully to keep from damaging the seal faces.

2. Reassembly:
 - a.) Perform the above instructions in reverse order, replacing the o-ring, seal washer and gasket.

Note 1: After reassembly to the point of installing impeller on the shaft, turn the impeller by hand to make sure that it rotates smoothly.

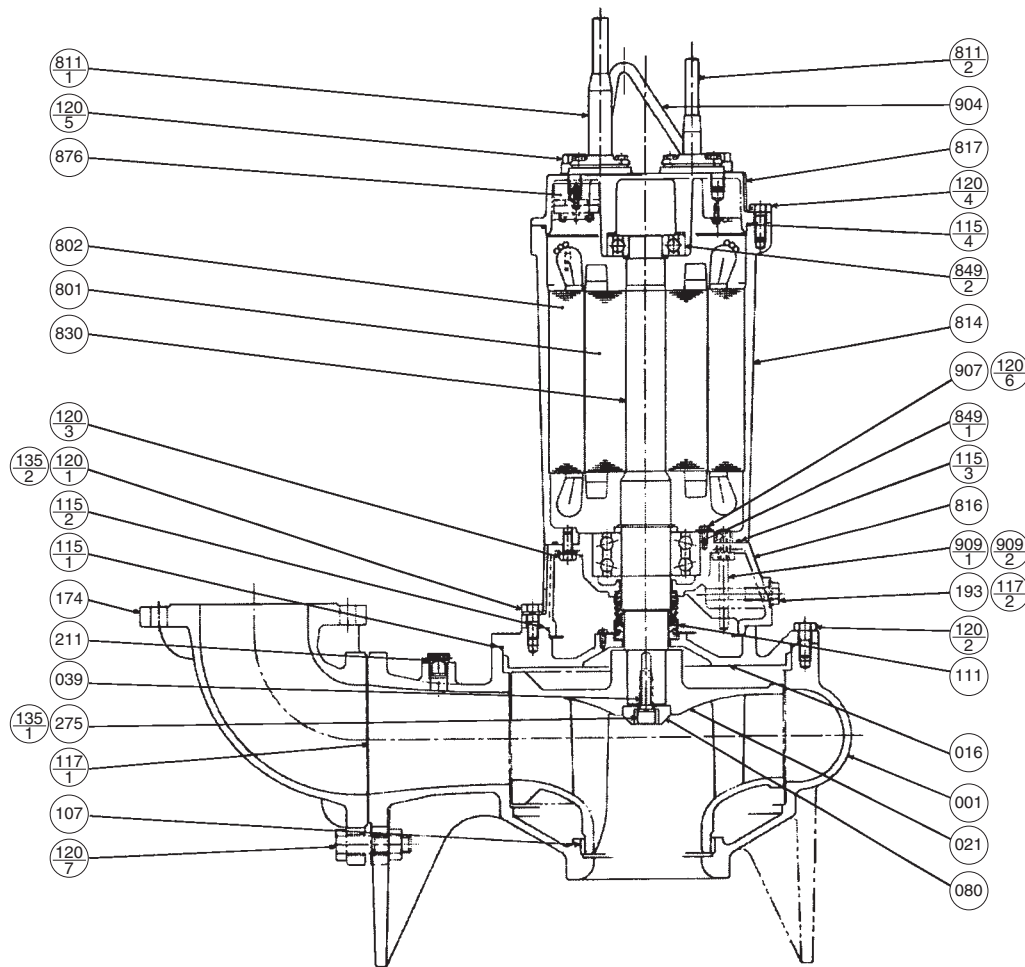
Note 2: It is recommended to use a screw adhesive (LOCTITE 271) on the impeller bolt (275) during reassembly.

Note 3: After installing casing back onto pump, turn the impeller by hand through the pump suction to make sure that it rotates smoothly without rubbing against the wear ring.



Operating, Installation and Maintenance

80DMLE62.2

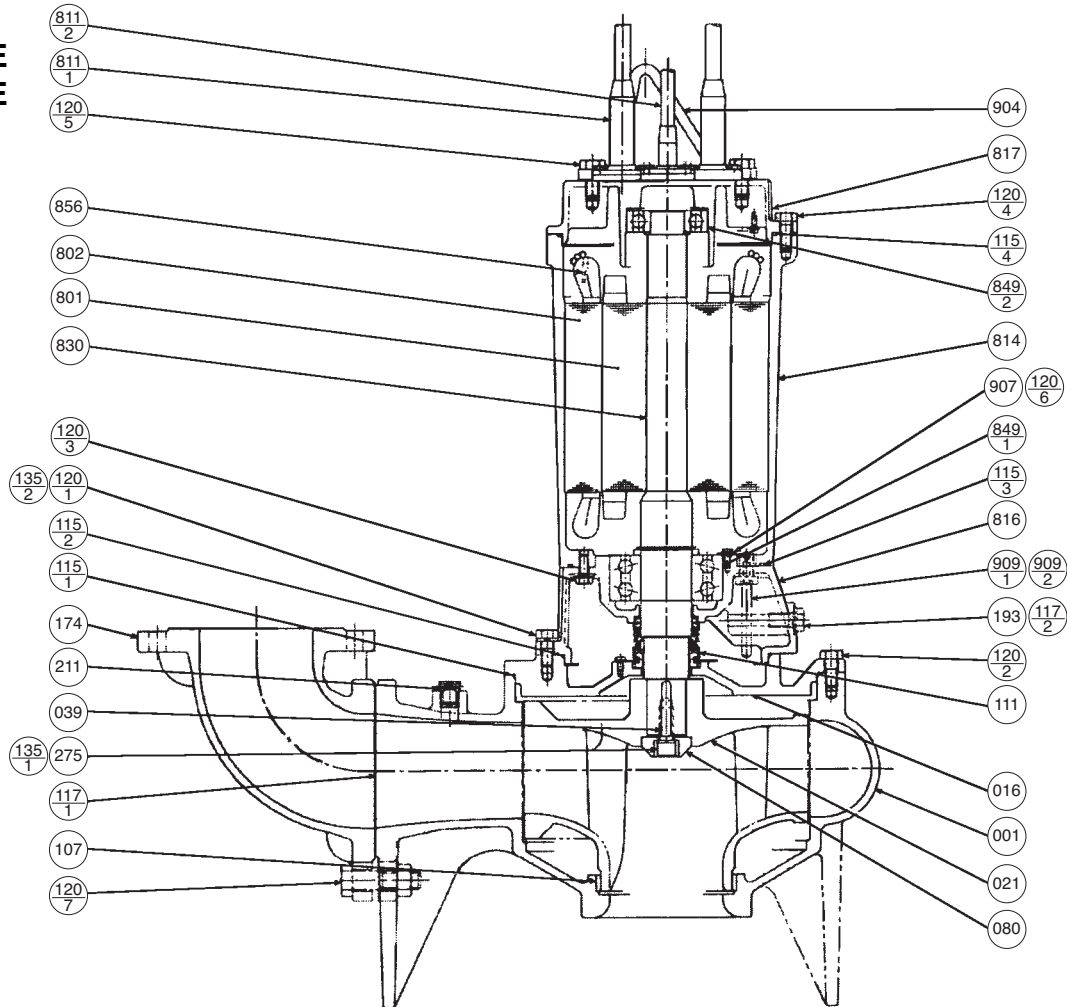


PART NO.	PART NAME	MATERIAL	NO. FOR 1 UNIT
909-2	ELECTRODE HOLDER	PVC	1
909-1	ELECTRODE	SUS304	1
907	BEARING COVER	SPCC	1
904	LIFTING HANGER	SS400	1
876	AUTO CUT	—	1
849-2	BALL BEARING	—	1
849-1	BALL BEARING	—	1
830	SHAFT	SUS403	1
817	OPPOSITE SIDE BRACKET	FC200	1
816	POWER SIDE BRACKET	FC200	1
814	MOTOR FRAME	FC200	1
811-2	SUBMERSIBLE CABLE	—	1
811-1	SUBMERSIBLE CABLE	—	1
802	STATOR	—	1
801	ROTOR	—	1
275	IMPELLER BOLT	SUS304	1
211	AIR VENT VALVE	C3604	1
193	OIL PLUG	SUS304	1
174	DISCHARGE PIPE	FC200	1
135-2	WASHER	SUS304	4
135-1	WASHER	SUS304	1

PART NO.	PART NAME	MATERIAL	NO. FOR 1 UNIT
120-7	BOLT	SUS304	4
120-6	BOLT	SUS304	3
120-5	BOLT	SUS304	2
120-4	BOLT	SUS304	4
120-3	BOLT	SUS304	4
120-2	BOLT	SUS304	8
120-1	BOLT	SUS304	4
117-2	SEAL WASHER	NBR/304	1
117-1	FLANGE GASKET	—	1
115-4	O-RING	NBR	1
115-3	O-RING	NBR	1
115-2	O-RING	NBR	1
115-1	O-RING	NBR	1
111	MECHANICAL SEAL	—	1
107	WEARING RING	CAC406	1
080	BUSHING	SS400	1
039	KEY	SUS420J2	1
021	IMPELLER	FC200	1
016	MECHANICAL SEAL COVER	FC200	1
001	CASING	FC200	1

Operating, Installation and Maintenance

5 to 10 HP
80DMLE
100DMLE
150DMLE

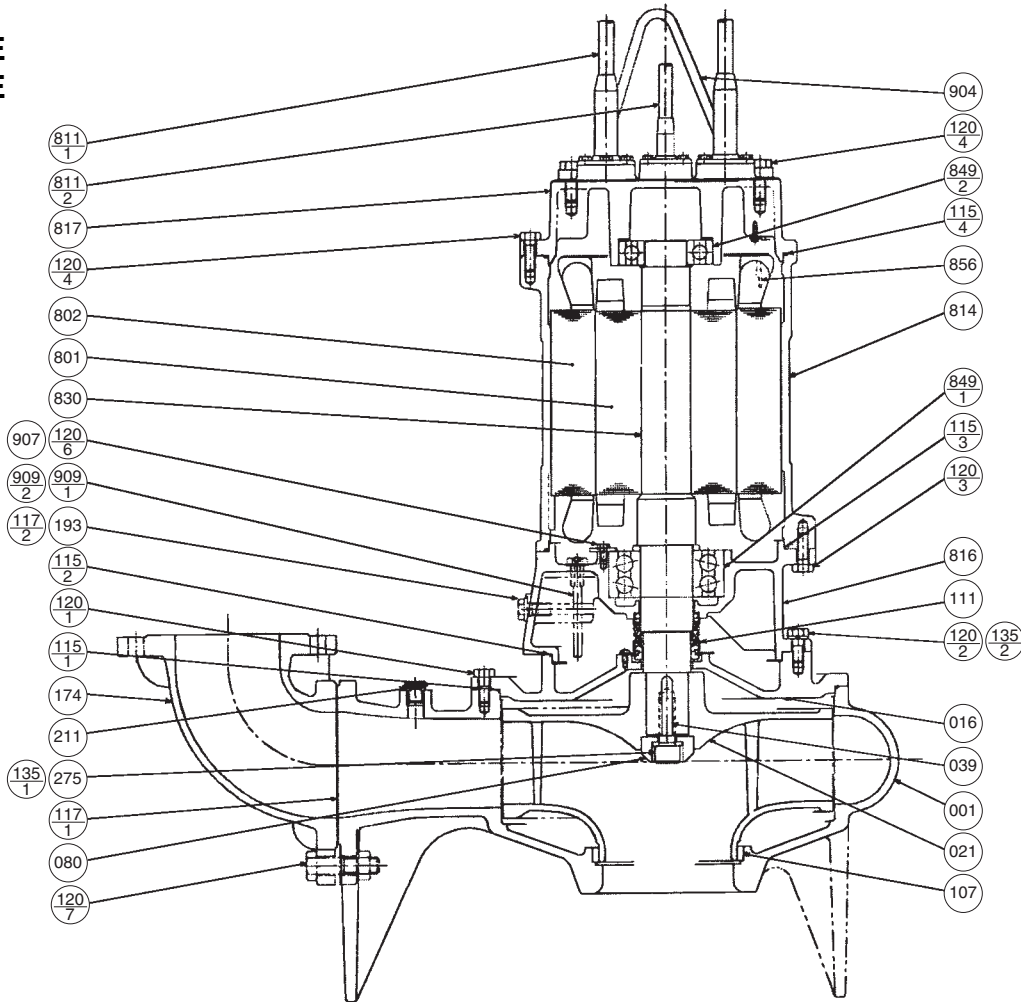


PART NO.	PART NAME	MATERIAL	NO. FOR 1 UNIT
909-2	ELECTRODE HOLDER	PVC	1
909-1	ELECTRODE	SUS304	1
907	BEARING COVER	SPCC	3
904	LIFTING HANGER	SS400	1
856	THERMAL PROTECTOR	—	2
849-2	BALL BEARING	—	1
849-1	BALL BEARING	—	1
830	SHAFT	SUS403	1
817	OPPOSITE SIDE BRACKET	FC200	1
816	POWER SIDE BRACKET	FC200	1
814	MOTOR FRAME	FC200	1
811-2	SUBMERSIBLE CABLE	—	1
811-1	SUBMERSIBLE CABLE	—	2
802	STATOR	—	1
801	ROTOR	—	1
275	IMPELLER BOLT	SUS304	1
211	AIR VENT VALVE	C3604	1
193	OIL PLUG	SUS304	1
174	DISCHARGE PIPE	FC200	1
135-2	WASHER	SUS304	4
135-1	WASHER	SUS304	1

PART NO.	PART NAME	MATERIAL	NO. FOR 1 UNIT
120-7	BOLT	SUS304	4
120-6	BOLT	SUS304	3
120-5	BOLT	SUS304	2
120-4	BOLT	SUS304	4
120-3	BOLT	SUS304	4
120-2	BOLT	SUS304	8
120-1	BOLT	SUS304	4
117-2	SEAL WASHER	NBR/304	1
117-1	FLANGE GASKET	—	1
115-4	O-RING	NBR	1
115-3	O-RING	NBR	1
115-2	O-RING	NBR	1
115-1	O-RING	NBR	1
111	MECHANICAL SEAL	—	1
107	WEARING RING	CAC406	1
080	BUSHING	SS400	1
039	KEY	SUS420J2	1
021	IMPELLER	FC200	1
016	MECHANICAL SEAL COVER	FC200	1
001	CASING	FC200	1

Operating, Installation and Maintenance

**15 to 30HP
80DMLE
100DMLE
150DMLE**



PART NO.	PART NAME	MATERIAL	NO. FOR 1 UNIT
909-2	ELECTRODE HOLDER	PVC	1
909-1	ELECTRODE	SUS304	1
907	BEARING COVER	SPCC	3
904	LIFTING HANGER	SS400	1
856	THERMAL PROTECTOR	—	2
849-2	BALL BEARING	—	1
849-1	BALL BEARING	—	1
830	SHAFT	SUS403	1
817	OPPOSITE SIDE BRACKET	FC200	1
816	POWER SIDE BRACKET	FC200	1
814	MOTOR FRAME	FC200	1
811-2	SUBMERSIBLE CABLE	—	1
811-1	SUBMERSIBLE CABLE	—	2
802	STATOR	—	1
801	ROTOR	—	1
275	IMPELLER BOLT	SUS304	1
211	AIR VENT VALVE	C3604	1
193	OIL PLUG	SUS304	1
174	DISCHARGE PIPE	FC200	1
135-2	WASHER	SUS304	4
135-1	WASHER	SUS304	1

PART NO.	PART NAME	MATERIAL	NO. FOR 1 UNIT
120-7	BOLT	SUS304	4
120-6	BOLT	SUS304	3
120-5	BOLT	SUS304	2
120-4	BOLT	SUS304	6
120-3	BOLT	SUS304	4
120-2	BOLT	SUS304	4
120-1	BOLT	SUS304	8
117-2	SEAL WASHER	NBR/304	1
117-1	FLANGE GASKET	—	1
115-4	O-RING	NBR	1
115-3	O-RING	NBR	1
115-2	O-RING	NBR	1
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111	MECHANICAL SEAL	—	1
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039	KEY	SUS420J2	1
021	IMPELLER	FC200	1
016	MECHANICAL SEAL COVER	FC200	1
001	CASING	FC200	1

Operating, Installation and Maintenance

All specifications subject to change without notice.

Ebara Pumps Americas Corporation
1651 Cedar Line Drive
Rock Hill, SC 29730

STANDARD CONDITIONS OF SALE

These STANDARD CONDITIONS OF SALE ("Conditions") exclusively define the contractual relationship between EBARA PUMPS AMERICAS CORPORATION ("EPAC") and the Purchaser, and no terms proposed by the Purchaser in conflict with or additional to these Conditions shall become a part of the contract of sale unless expressly accepted in writing by EPAC. Any EPAC proposal to which these Conditions are attached shall be for information purposes only, and Purchaser's order is subject to acceptance and acknowledgment by EPAC as the supplier of the equipment ordered in accordance with these conditions.

TERMS OF PAYMENT

Terms of Payment for any order based on these Conditions shall be included in the EPAC Proposal of which these Conditions are a part.

PRICE ADJUSTMENT

The price clauses applicable to the contract of sale of which these Conditions are a part are included in the EPAC Proposal and are based on the proposed shipping date of the equipment cited. In the event of delays in release to manufacture or in shipment for any reason, the contract price shall be adjusted to the price in effect at the time of shipment. Some equipment to be provided hereunder which is not manufactured by EPAC ("Other Equipment") may be subject to different pricing adjustment policies than those stated for the EPAC-manufactured equipment ("EPAC Products"), which Other Equipment shall be identified in the Proposal of which these Conditions are a part and which shall be incorporated in the contract.

I. WARRANTY, REMEDY, DISCLAIMER

EPAC warrants for a period of twelve months from the date of initial startup or eighteen months from the date of shipment, whichever shall first occur (the "Warranty Period") the EPAC Products to be delivered hereunder against defects in material and workmanship, under normal use and service when installed, used and maintained in accordance with instructions supplied by EPAC. This is EPAC's sole and exclusive warranty. It applies only to EPAC Products and specifically excludes Other Equipment, whether or not such Other Equipment is included in EPAC's scope of supply hereunder. Such Other Equipment is warranted only by its manufacturer. If such a defect appears in EPAC Products within the Warranty Period and Purchaser has given EPAC immediate written notice of same, EPAC will either repair the part, or at its option replace the part, by shipping a similar part F.O.B. EPAC's shipping point, or at its option refund an equitable portion of the purchase price. EPAC may require the return of the defective part, transportation prepaid, to establish the claim. All costs of removal, reinstallation, field labor and transportation shall be borne by the Purchaser. No allowance will be made for repairs without EPAC's written consent or approval, and the Warranty Period shall not be suspended upon stopping operation for warranty repairs, nor recommence upon completion of the warranty repairs, but shall run continuously from commencement until normal expiration. Repair parts shall carry no greater warranty than the remaining balance of the underlying EPAC Product into which they may be installed, expiring at the same time as said underlying warranty.

Any descriptions of the EPAC Products or Other Equipment, any specifications, and any samples, models, bulletins, or similar material used in connection with this sale are for the sole purpose of identifying the said Equipment and are not to be construed as express or implied warranties. Unless during the warranty period all repairs or replacements or parts or components for EPAC Products are with EPAC-approved parts or components, and all warranty service is performed by EPAC or its authorized distributor or representative, the warranty responsibility of EPAC shall immediately terminate.

EPAC MAKES NO OTHER WARRANTY OF ANY KIND WHATSOEVER, EXPRESS OR IMPLIED; AND ALL WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE HEREBY DISCLAIMED BY EIC AND EXCLUDED FROM THESE CONDITIONS. The Purchaser's sole and exclusive remedy, whether upon warranty, contract or tort, including negligence, will be to proceed under this warranty. All liability of EPAC shall terminate no later than the expiration of the Warranty Period.

N.B.: If the Equipment being sold hereunder is designated "Municipal: Permanent Installations," there is attached hereto, incorporated by reference herein and made a part hereof, as Attachment A., EPAC's "5 Year (10,000 Hour) Pump Warranty" (hereinafter, "Municipal Warranty"). Said Municipal Warranty replaces and supersedes in its entirety this Warranty, Remedy, Disclaimer Paragraph I. All other terms and conditions of these STANDARD TERMS AND CONDITIONS OF SALE remain unchanged.

II. INSPECTIONS, TESTS

Any Purchaser inspections or shop testing of EPAC Product at EPAC's facilities prior to its shipment must be authorized by EPAC in writing at least ten (10) days prior to such inspection, and shall be subject to EPAC's manufacturing cycle availability and facility security requirements. Field testing of EPAC Products may be conducted by Purchaser to confirm mechanical compatibility of the EPAC Product and that there has been no damage in transit, but compliance with specifications shall be conclusively established by shop tests at EPAC's facilities.

III. LIMITATION OF LIABILITY

EPAC shall not in any event be liable for special, indirect, incidental or consequential damages, including liquidated damages in any amount. EPAC's liability on any claim of any kind, including negligence, for any loss or damage arising out of, connected with, or resulting from a contract based on these Conditions, or the performance or breach thereof, or the design, manufacturer, sale, delivery, resale, installation, technical direction of installation, inspection, repair, operation or use of any EPAC Products covered by or furnished hereunder shall in no case exceed the price paid by the Purchaser for the Equipment. EPAC also disclaims liability, whether in contract, tort, warranty or otherwise, to any party other than Purchaser, and EPAC's sole responsibilities with respect to Other Equipment furnished hereunder shall be to ensure mechanical compatibility of EPAC Equipment with the Other Equipment and to pass through to the Purchaser whatever warranty the Other Equipment manufacturer has provided to EPAC.



Operating, Installation and Maintenance

IV. SHIPPING DATES/FORCE MAJEURE

The time for shipment given herein is approximate and is estimated from the date of receipt of order with complete manufacturing information and approval of drawings as may be necessary. EPAC shall not be liable for any loss or damage for delay or non-delivery due to the acts of civil or military authority, acts of the Purchaser or by reason of "force majeure", which shall be deemed to mean all causes whatsoever not reasonably within the control of EPAC, including, but not limited to, acts of God, war, riot or insurrection, blockades, embargoes, sabotage, epidemics, fires, strikes, lockouts or other industrial disturbances, delays of carriers and inability to secure materials, labor or manufacturing facilities.

V. PAYMENTS

The prices quoted herein are specified in U.S. Dollars and shall be payable to EPAC free of all exchange, conversion and collection fees or charges. Pro rata payments shall be made for partial shipments. If shipment is temporarily suspended or postponed at the Purchaser's request, or prevented per paragraph IV., above, then all dates of payment based on date of shipment shall relate instead to the date of completion of manufacture. Letters of credit or other credit instruments established for the Equipment specified herein shall provide for such payment on completion of manufacture where shipment is prevented or postponed under such circumstances. In the event delay in shipment is requested by Purchaser, all costs and risk of storage and reinspection to make Equipment ready for shipment shall be borne by Purchaser. When in the opinion of EPAC the financial condition of the Purchaser renders it prudent, EPAC may require cash payment or satisfactory security before shipment. Interest at the highest legal rate permitted, not to exceed one and one-half (1 1/2%) percent per month, will apply to all invoices not paid when due.

VI. CHANGES AND DRAWINGS

EPAC reserves the right to change or modify the design and construction of Equipment and to substitute materials of construction. Such changes, modifications or substitutions, however, shall not affect EPAC's commitment to Purchaser to provide Equipment in accordance with specifications as accepted by EPAC. If drawings are furnished, they are submitted to show general style and arrangement of the Equipment offered.

VII. CANCELLATION, SUSPENSION, TERMINATION FOR CONVENIENCE OF PURCHASER

The Purchaser may terminate this order for the convenience of the Purchaser at any time upon written notice and payment to EPAC of cancellation charges as shall be specified by EBARA, which charges may include reasonable anticipated profits and unabsorbed burden costs for EPAC. EPAC shall use its best efforts to mitigate these latter costs to Purchaser, but shall be under no obligation to act to its overall detriment thereby.

If EPAC's performance of the work is delayed for a period of more than three (3) months either by reason of the request or acts of the Purchaser, acts of civil or military authority or by "force majeure," upon removal of the cause of any such delay EBARA's performance shall be resumed, delivery will be rescheduled, and the purchase price shall be adjusted to that in effect at the time of resumption of performance, as may then be notified by EPAC to Purchaser. If Purchaser is unwilling to accept the adjustment price and/or projected delivery date, he may cancel his order by giving written notice thereof to EPAC within ten (10) days after EPAC's notification. In such event, Purchaser shall be liable for payment of reasonable cancellation charges as specified by EPAC, but such charges shall be equitably determined, based on the reason for such termination and EPAC's reasonable ability to reutilize such terminated Equipment. In no event shall EPAC be liable hereunder for cover or other consequential damages.

VIII. RISK OF LOSS, SECURITY

The Purchaser shall bear all risk of loss of or damage to the Equipment after delivery to EPAC's transportation facility at shipping point. Purchaser agrees that EPAC shall retain a security interest in the Equipment only until the purchase price has been paid, and Purchaser agrees to perform all acts necessary and/or require to perfect and assure EPAC's security interest.

IX. TAXES, DUTIES, FREIGHT

The Purchaser shall pay to EPAC, in addition to the purchase price, the amount of all Customs duties, fees and charges, Sales, Use, Privilege, Occupation, Excise or other taxes, Federal, state, local, or foreign, which EPAC may be required to pay in connection with furnishing Equipment or services to the Purchaser. Purchaser shall also be responsible for payment of all transportation charges, including such increases in cost as may be imposed from rate changes between the time of quotation and shipment, and any additional costs required by changes in Purchaser's shipping requirements.

X. DISPUTES

The parties shall use their best efforts to resolve any disputes amicably, in realization that costs associated with litigation of differences may be disproportionate to the matter in dispute. Should amicable resolution prove unsuccessful, the parties hereby consent to the jurisdiction of the Nevada Courts and the application of Nevada laws, rules and regulations in adjudication of any such dispute. By mutual agreement the parties may elect to submit any dispute to binding arbitration in lieu of litigation, in which event such arbitration shall be conducted in Reno or Carson City, Nevada before the American Arbitration Association in accordance with its Rules of Conciliation and Arbitration and applying the laws of the State of Nevada. Each party shall bear its own costs of arbitration.

XI. MISCELLANEOUS

In the event any of the Conditions herein is determined to be legally unenforceable, such Condition shall be deemed severed from these Conditions, and the balance shall remain in full force and effect. In the event, however, that such severing materially alters the nature of the relationship between the parties hereto, then at the option of EPAC the contract of sale of which these Conditions are a part may be terminated for the convenience of EPAC, and an equitable adjustment shall be made for any funds previously paid by Purchaser for which Equipment has not yet been shipped.

These Conditions constitute the entire agreement relating to Conditions of Sale between the parties hereto, and all previous negotiations, discussions and agreements are deemed merged into and superseded by these Conditions.



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



EBARA Pumps Americas Corporation

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www.pumpsebara.com

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