

# SIEMENS

## PolyBlend PB1000-4.5

05/07

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PolyBlend

Model #PB1000-4.5

## INSTALLATION, OPERATION, AND MAINTENANCE INFORMATION

### CONTENTS

|              |            |
|--------------|------------|
| Overview     | Warranty   |
| Installation | Appendixes |
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READ THIS MANUAL BEFORE YOU  
INSTALL, OPERATE, OR SERVICE THIS  
UNIT.

### OVERVIEW

#### SAFETY PRECAUTIONS

- ☐ Ensure that the control panel is grounded to avoid possible electrical shock or damage to equipment.
- ☐ Before servicing, turn off all power and assure power "lockout" to avoid possible electric shock.
- ☐ Disconnect external power to the control panel before removing or replacing fuses.

#### SPECIFICATIONS

|                   |                                |
|-------------------|--------------------------------|
| Pump              | Diaphragm                      |
| Inlet             | 1" FPT, Water Supply           |
|                   | 5/8" Hose Barb, Polymer Supply |
| Outlet            | 1" FPT, Solution Discharge     |
| Water Capacity    | 600 GPH Primary                |
|                   | 600 GPH Post Dilution          |
| Polymer Capacity  | 4.5 GPH                        |
| Pressure Rating   | 100 PSI                        |
| Electrical Supply | 120/1/60, 10 Amps              |
| Dimensions        | 35" H x 25" W x 15" D          |
| Weight            | 110 lbs.                       |
| Motor(s)          | (1) 1/3 HP, 120VAC, 6 AMPS     |

### INSTALLATION

#### LOCATION

Select a location that provides:

- Electrical Supply
- Potable Water (Clean)
- Proximity to the Point of Use
- Easy Handling and Storage of Polymer
- Access to Unit
- Protection Against Severe Weather

#### UNPACKING

Examine package contents for damage. Report any to freight forwarder. Check plastic bag(s) for contents against individual packing list(s).

***NOTE: Disregard any moisture; this unit was wet tested.***

#### CONNECTIONS

- Use Teflon tape on threads. Use joint compound (pipe dope) in small amounts, if necessary.
- Do not over-tighten fittings.
- Insure that supply water pressure is **less than 100 psi.**
- Install water isolation valve with unions.
- Insure that neat polymer feed line has a **flooded suction.**

***NOTE: To enhance performance, reduce the number of piping turns and elevation changes.***

#### STORAGE

Store in atmosphere controlled environment. Protect from extreme temperature (above 110°F, 52°C, below 32°F, 0°C) and wide ambient temperature fluctuations.

Protect from direct weather exposure, i.e., sun, rain, high wind, etc.

## OPERATION

### GENERAL

This PolyBlend unit will perform the following functions: meter polymer dosage, regulate mixing water, provide uniform dilution and activation, operate on-line continuously, and feed solution to the point of use.

Neat polymer from the metering pump and dilution water controlled by the solenoid valve enter the mixing chamber. Dilution and activation occur, yielding prepared solution ready for use.

Neat polymer dosage rate is adjusted at pump face or at electronic controller (REM-1E, SCR, etc.). Primary dilution (and post dilution) water are controlled by individual flow control valves.

### START-UP

Step 1: Switch pump to external mode at pump face.

Step 2: Prime polymer pump, using priming kit provided with unit.

Step 3: Place both power switches in Off position.

Step 4: Energize power circuit that feeds unit.

Step 5: Place main power switch in On position.

Solenoid opens. Allow mixing chamber to fill with water by opening primary dilution water control valve.

***NOTE: Do not turn mixer motor on until chamber is filled with water, running dry will damage mechanical seal.***

Step 6: Place mixer power switch in ON position.

Mixing chamber motor starts.

Step 7: Access REM-1E controller to turn pump On/Off for polymer output adjustment. Output can also be adjusted at pump face by varying the stroke length.

***NOTE: For optimum pump performance, keep stroke frequency as high as possible. This is done by decreasing the stroke length setting. More stroke repetition with a shorter length is better than fewer strokes with a long stroke length. If stroke length is too short, pump prime may be affected.***

Step 8: Adjust water flow at mixing chamber by turning control valve. (The other control valve should be turned for post-dilution adjustment, if applicable.)

***NOTE: Do not run polymer pump unless water flow is established. Polymer alone can plug discharge plumbing.***

### WATER PRESSURE

This unit is equipped with a differential pressure switch. It has been factory set. See Appendix for details.

### SOLUTION OUTPUT

Unit output is determined by setting pump stroke length and stroke frequency together with setting dilution water flow. Establish desired solution volume and solution concentration, then proceed.

EXAMPLE: 100 GPH (380 LPH) of .5% polymer solution desired. A 2 GPH (7.6 LPH) diaphragm pump is used.

— Determine neat polymer requirement.

$(100 \text{ GPH}) \times (.005) = 0.5 \text{ GPH neat polymer}$   
 $(380 \text{ LPH}) \times (.005) = 1.9 \text{ LPH neat polymer}$

— Determine pump usage.

$(0.5 \text{ GPH}) \div (2 \text{ GPH}) = 25\% \text{ pump capacity}$   
 $(1.9 \text{ LPH}) \div (7.6 \text{ LPH}) = 25\% \text{ pump capacity}$

— Set Controls

A 2 GPH (7.6 LPH) pump @ 100% stroke length and 25 strokes per minute will deliver 0.5 GPH (1.9 LPH). However, 2 GPH (7.6 LPH) pump @ 50% stroke length and 50 strokes per minute will also deliver 0.5 GPH (1.9 LPH) with a more homogeneous mix.

***NOTE: Do not exceed polymer concentrations of 1% in the PolyBlend.***

## MAINTENANCE

### SHUTDOWNS

If out of service more than one week, flush mixing chamber.

- Turn pump off.
- Place unit power switch in On position to establish water flow for five minutes.

If out of service for more than two weeks, flush pump and mixing chamber.

- Connect pump suction to a container of mineral oil (not water).
- Place unit power switch in On position to establish water flow.
- Turn pump on and run for three minutes.
- Turn pump off.
- Continue water flow for five additional minutes.
- Drain water from chamber and piping to prevent freezing.

### MAINTENANCE

1. Clean ancillary water and/or polymer strainers weekly.
2. Flush system monthly following one week procedure.
3. Refer to the appendix for specific information on drawings, part identification, and components.

### SPECIAL TOOLS

No special tools needed for operation, maintenance, and repair of components.

### LUBRICATION

No lubrication is required.

### PREDICTED LIFE SPAN

There is no predicted life span of wear parts as each application and operation varies.

## OPERATING PROCEDURES

For normal operation, once settings are adjusted based on operation parameters, the system can simply be turned ON or OFF. Special operating instructions for Seasonal operation do not apply.

### EMERGENCY OPERATING INSTRUCTIONS

Emergency operating instructions do not apply to Siemens Water Technologies – Stranco Products equipment. In case of an emergency, TURN OFF POWER TO STOP RUNNING.

### DISASSEMBLY, REPAIR, & REASSEMBLY

This equipment is an open-frame design. It allows for easy removal of all components. There are no special procedures for removal of parts. If assistance is required, contact Siemens Water Technologies – Stranco Products Technical Service at 800-882-6466.

### RECOMMENDED SPARE PARTS

| <u>QTY.</u> | <u>PART #</u> | <u>DESCRIPTION</u>        |
|-------------|---------------|---------------------------|
| 1           | K2341005      | Kit includes parts below: |
| 1           | SP-76PB       | Pump Liquid End           |
| 1           | 7802910       | Chamber Mechanical Seal   |
| 1           | 1450430       | Belt, Chamber             |
| 1           | 1411001       | Bearing, Chamber Base     |
| 1           | 1414001       | Bearing, Chamber Top      |
| 1           | 26040-1       | Pump Head                 |

### PUMP REPLACEMENT

| <u>QTY.</u> | <u>PART #</u> | <u>DESCRIPTION</u> |
|-------------|---------------|--------------------|
| 1           | BP31-76PB     | Pump               |

### TO ORDER PARTS

You may order parts by calling, faxing or mailing your order.

**Phone** 800.882.6466 and ask for PolyBlend Parts.  
Hours: 8 a.m. - 5 p.m., Central Time, M - F.

**Fax** Our fax number is 815.932.5634.

**E-mail** [stranco.water@siemens.com](mailto:stranco.water@siemens.com)

**Address** Siemens Water Technologies Corp.  
P.O. Box 389  
595 Industrial Drive  
Bradley, IL 60915

## PB1000 TROUBLESHOOTING GUIDE

| Symptom                                  | Possible Cause   | Corrective Action  |
|--|--|--|
| <b>No Water Flow</b>                     | <ul style="list-style-type: none"> <li>• Closed Valve on Water Supply</li> <li>• Blocked Solenoid Valve</li> <li>• Closed or clogged discharge line</li> <li>• Rate Control Valve Closed</li> </ul>          | <ul style="list-style-type: none"> <li>• Make sure valve is open</li> <li>• Dis-assemble and clean valve</li> <li>• Remove any blockages or open any closed valves</li> <li>• Make sure valve is open</li> </ul>   |
| <b>Pump won't pump<br/>Chemical</b>      | <ul style="list-style-type: none"> <li>• Pump is turned OFF</li> <li>• No Water Flow</li> <li>• Blocked Pump Discharge Line</li> <li>• Back Pressure is too high</li> <li>• Not enough water flow</li> </ul> | <ul style="list-style-type: none"> <li>• Make sure pump is in ON position</li> <li>• Make sure all water valves (supply and discharge) are open</li> <li>• Take discharge line apart, check for blockage and clean if necessary</li> <li>• Reduce Back pressure on unit</li> <li>• Increase water flow or adjust water monitoring device (flow switch, DP Switch, etc.) setpoint lower than the desired flow rate</li> </ul> |
| <b>Clogged Injection<br/>Check Valve</b> | <ul style="list-style-type: none"> <li>• Debris or Clumps in Polymer</li> <li>• Valve is stuck open allowing water into polymer line</li> </ul>  | <ul style="list-style-type: none"> <li>• Check polymer supply for contamination</li> <li>• Remove valve from chamber and clean it</li> </ul>   |
| <b>Pump won't stop</b>                   | <ul style="list-style-type: none"> <li>• Water flow is still established</li> <li>• Pump is in internal mode</li> </ul>  | <ul style="list-style-type: none"> <li>• Shut off water valve or power to the unit</li> <li>• Switch pump to external</li> </ul>   |



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#### **PolyBlend® Product Warranty**

Siemens Water Technologies Corp. warrants equipment of its manufacture and bearing its trademark to be free of defects in material and workmanship and to materially conform to any applicable specifications and drawings approved in writing by Siemens Water Technologies. If the customer gives Siemens Water Technologies Corp. prompt written notice of a breach of this warranty within twelve (12) months from the date of start-up by an authorized Siemens Water Technologies Corp. technician or eighteen (18) months from the date of shipment, whichever occurs first (the "Warranty Period"), Siemens Water Technologies Corp. will, at its sole option and as the customer's exclusive remedy, either repair or replace free of charge, or refund the purchase price paid with respect to, any material found to be defective during the Warranty Period. No repair or replacement of defective products shall extend the Warranty Period, but any such repaired or replaced product shall be covered by the balance of the original Warranty Period. If Siemens Water Technologies Corp. determines that any claimed breach is not, in fact, covered by this warranty, the customer shall pay Siemens Water Technologies Corp.'s then customary charges for any repair or replacement.

The foregoing warranty is conditioned upon the customer's (i) the customer shall have operated and maintained the equipment in accordance with all instructions provided by Siemens Water Technologies Corp. (ii) the customer shall not have made any unauthorized repairs or alterations; (iii) the customer shall not be in default of any payment obligation to Siemens Water Technologies Corp. (iv) if requested, the customer will deliver the equipment to a Siemens Water Technologies Corp. authorized service center and the customer shall pay all inbound and outbound freight costs; (v) the customer must provide a complete and detailed description of the problem including, without limitation, the Siemens Water Technologies Corp. job number, date of delivery, date of installation, date of start-up and the operating conditions of the unit(s); (vi) return a duly completed Start-Up and Field Test Report to Siemens Water Technologies Corp. within thirty (30) days of start-up; and (vii) for equipment which is destined for extended storage, such equipment must have been stored in accordance with the Storage Requirements

detailed in the operation and maintenance manual (storage of equipment does not extend the Warranty Period).

The foregoing warranty does not extend to, and Siemens Water Technologies Corp. assumes no responsibility for, (i) the installation quality or any service defects resulting therefrom unless a Siemens Water Technologies Corp. representative or designee supervised the installation; (ii) in the event that the unit size and location are predetermined by someone other than Siemens Water Technologies Corp. or our local representative, the serviceability and/or performance of the unit for the specified design and/or actual operating conditions (this exclusion shall not apply if all necessary design information is submitted to and approved in writing by Siemens Water Technologies Corp.); (iii) any auxiliary equipment or accessories supplied by Siemens Water Technologies Corp. but manufactured by others (the original manufacturer's warranty, if any, shall apply to such products); (iv) damage to the equipment or products resulting from normal wear, abuse, neglect or operation in a manner inconsistent with Siemens Water Technologies' recommendations; and (v) damage to equipment or products that have been modified, tampered with or altered without written consent from Siemens Water Technologies.

In addition to the foregoing conditions and limitations, the following product-specific limitations and conditions must be satisfied for the foregoing warranty to apply:

1. This warranty does not cover damage caused by chemical action or abrasive material (including, without limitation, particulates in the makeup water), damage caused by handling or during transportation, or damage arising from misuse, installation or any other cause beyond Siemens Water Technologies' control. Standard units not in outdoor configurations are not warranted in outdoor applications.
2. If a non-potable water source is used as primary or secondary dilution water to the PolyBlend® unit, the warranty period shall not exceed ninety (90) days from the date of shipment.

#### **HydroForce® Product Warranty**

The HydroForce® mixing assembly, part of the PolyBlend® product line, is covered for the life of the product by the limited warranty set forth herein, provided that the limited lifetime warranty extends only to the original user of the product.

THE WARRANTIES SET FORTH ABOVE ARE SIEMENS WATER TECHNOLOGIES CORP.'S SOLE AND EXCLUSIVE WARRANTIES. SIEMENS WATER TECHNOLOGIES CORP. MAKES NO OTHER WARRANTIES OF ANY KIND, EXPRESS OR IMPLIED,

INCLUDING WITHOUT LIMITATION, ANY WARRANTY OF MERCHANTABILITY OR OF FITNESS FOR A PARTICULAR PURPOSE, ALL WARRANTIES ARISING FROM COURSE OF DEALING AND USAGE OF TRADE AND ALL SUCH EXPRESS OR IMPLIED WARRANTIES ARE HEREBY DISCLAIMED.

THE REMEDIES PROVIDED ABOVE ARE THE CUSTOMER'S SOLE REMEDIES FOR SIEMENS WATER TECHNOLOGIES' FAILURE TO COMPLY WITH ITS OBLIGATIONS. CORRECTION OF ANY NONCONFORMITY IN THE MANNER AND FOR THE PERIOD OF TIME PROVIDED ABOVE SHALL CONSTITUTE COMPLETE FULFILLMENT OF ALL THE WARRANTY LIABILITIES OF SIEMENS WATER TECHNOLOGIES CORP. WHETHER THE CLAIMS OF THE PURCHASER ARE BASED IN CONTRACT, IN TORT (INCLUDING NEGLIGENCE) OR OTHERWISE WITH RESPECT TO OR ARISING OUT OF THE WORK PERFORMED HEREUNDER.

**LIMITATION OF LIABILITY:**

NOTWITHSTANDING ANYTHING ELSE TO THE CONTRARY, SIEMENS WATER TECHNOLOGIES CORP. AND ITS SUPPLIERS AND ANY AFFILIATED COMPANIES SHALL NOT BE LIABLE FOR ANY CONSEQUENTIAL, INCIDENTAL, SPECIAL, PUNITIVE OR OTHER INDIRECT DAMAGES, AND SIEMENS WATER TECHNOLOGIES' TOTAL LIABILITY ARISING AT ANY TIME FROM THE SALE OR USE OF THE EQUIPMENT SHALL NOT EXCEED THE PURCHASE PRICE PAID FOR THE EQUIPMENT. THESE LIMITATIONS APPLY WHETHER THE LIABILITY IS BASED ON CONTRACT, TORT, STRICT LIABILITY OR ANY OTHER THEORY.

Whether in or out of warranty, a Return Materials Authorization number (RMA) is required and can be obtained by calling our customer service department telephone at 800.882.6466. Have the make, model, and serial number of the item being returned. Reference the RMA number on the outside of the shipping container.

## Differential Pressure Switch

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### Location of Differential Pressure Switch

The high pressure port connects to the inlet manifold between the solenoid valve and the rotameter/rate-adjusting valve. The low pressure port connects to the discharge side of the rotameter.

### Function of Differential Pressure Switch

The differential pressure switch ensures sufficient water flow is present before the polymer pump is energized. This integral, automatic safety feature eliminates the problem of overfeeding neat polymer to an application without proper dilution.

In operation, the rate valve is adjusted to produce the desired flow through the system. This causes a pressure drop to occur across the valve which is applied to the differential pressure switch.

If supply pressure decreases enough to affect flow rate or if back pressure between the PolyBlend and the point of solution application increases enough to affect flow rate, the differential pressure across the rotameter and valve decreases. This causes power to be interrupted to the polymer pump and prevents damage to the mixing system caused by extremely high viscosity developing in the mixing chamber.

|  |
|--|
| <p><b>NOTICE:</b> If system pressure or flow are <u>not adequate</u>, investigate <b>the cause of lack of flow</b>. (For example, inadequately sized piping can produce inadequate flow.) To avoid undesirable water dilution conditions and damage to equipment, <b>do not</b> bypass or adjust the differential pressure switch for a lower pressure/flow setting.</p> |
|--|

**Question:** *Why doesn't the polymer pump turn off when I turn the water off using the rotameter?*

The differential pressure switch senses flow on either side of a pressure drop. Because the rotameter is the sensing point, the rotameter closing is the only cause of loss of flow that the differential pressure switch cannot see.

Test the differential switch by turning off the source water or the discharge flow. (See step 5 on the next page.)

## Differential Pressure Switch

---

### Adjusting the Differential Pressure Switch

Adjust the PolyBlend differential pressure switch only if pressure and flow to the system **are adequate**.

The adjustment logic is the **opposite** of what you might expect. The PolyBlend differential pressure switches have a red light (on the left side) that lights up whenever source water flow is too low and the polymer pump is disabled. The pump stops pumping when the flow is too low. Low flow may be from lack of incoming water or from too much back pressure on the outgoing side.

|    | Adjustment   |  | System Reaction   |
|----|--|--|---|
| 1. | Turn the PolyBlend rotameter until water flow is at <b>maximum</b> on the flow gauge.  |  |   |
| 2. | Screw in the <i>differential pressure knob</i> until the red alarm light goes on.  |  | Polymer pump is disabled.   |
| 3. | Back off the differential pressure knob until the red alarm light goes off.  |  | The pump starts again. ....   |
| 4. | 4a.<br>If you want very close control of flow, leave the knob at this setting.<br><br><i>At this setting, any loss of flow (as observed by the rotameter) results in the pump being disabled.</i>                                | 4b.<br>If you want to make the system "more forgiving" prior to shutdown, continue to turn the knob another 1-2 turns.<br><br><i>The further you turn the knob, the more flow can be lost before the pump is disabled.</i> | Step 4 determines how "forgiving" the system is before it shuts down due to inadequate flow.          |
| 5. | To test sensitivity and operation, turn off the water at the source or the solution at the discharge.<br><br>The float in the flow meter will fall more for the control knob setting described in step 4b) than, for 4a (above). |  | As the source or discharge is turned off, the float in the flow meter falls and the pump is disabled. |
| 6. | Set the rotameter for the desired flow.  |  | Retest (as in step 5).  |

Water Technologies

## REM-1E Digital Display Pump Controller

Product Sheet

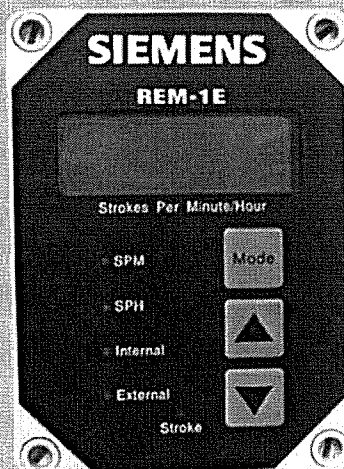
# SIEMENS

The REM-1E Digital Display Controller serves as either a pump remote control station or a proportional pump controller (4-20 mA input) or both. The REM-1E can be used to vary the output of any Liquid Metronics (LMI) Series AA7, A7, B7, or C7 metering pump when those pumps are placed in the external mode. This is truly a "plug-n-play" accessory. A simple connection of 4-conductor cable from the control unit to the external input jack of the LMI pump is all that is required for start-up. Power is supplied by a 15 VDC source from the LMI pump through the 4-conductor cable.

The controller output, in the form of contact closures of 80 ms duration, triggers the LMI pump. In the internal mode, output is 0-100 strokes-per-hour (sph) or 0-100 strokes-per-minute (spm). A touch of the pressure-sensitive keys varies the

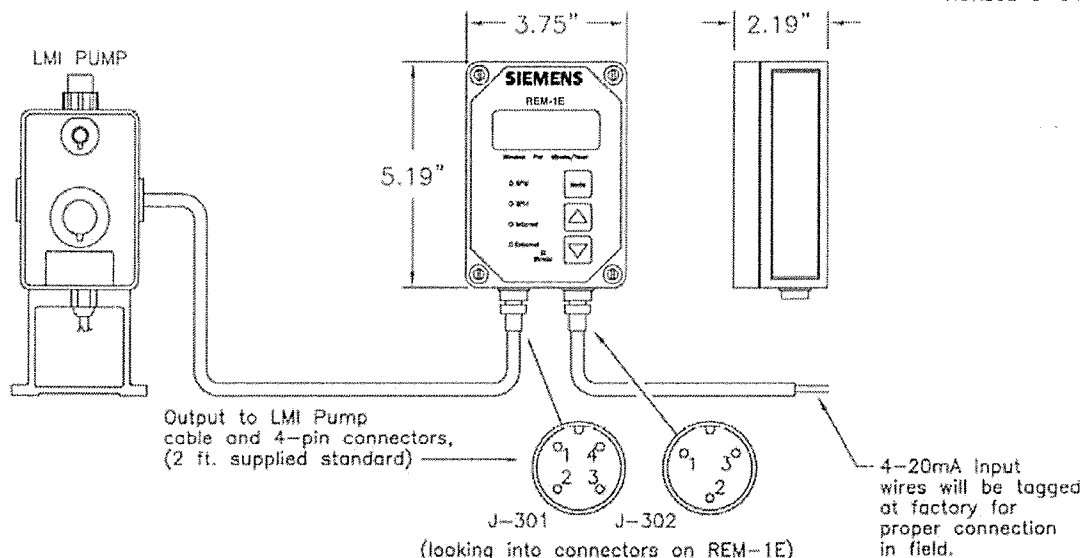
output, which is displayed in large, easy-to-read LCD digital format. Changes left for longer than 5 seconds are saved in non-volatile memory. In the external mode, output is from 0-100 sph or 0-100 spm directly proportional to the 4-20 mA analog input signal. Ten feet of 3-conductor cable and connectors are supplied as standard for the 4-20 mA application. Zero and span adjustments may be done through the outside keys of the controller.

In the "OFF" position, the 15 VDC power source will be present, but the controller output will be zero. The display will read OFF. The rugged, polycarbonate NEMA 4X enclosure is easily wall-mounted near the associated pump, or can be remotely located, using standard cable/connector sets available from Siemens.



### The REM-1E Digital Display Pump Controller Offers:

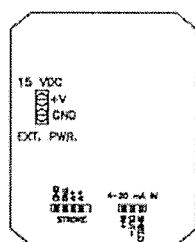
- Accurate Solid-State Microprocessor Core Technology
- Easy to Program Push-Button Control
- Multiple Control Options
- Durable, NEMA 4X Enclosure



## PART NOS.

RM1974183 CABLE  
2723001 3 PIN CONNECTOR  
25643 4 PIN CONNECTOR

NOTE: J-301 PIN NUMBERS CORRESPOND TO IDENTICAL PIN NUMBERS ON LMI PUMP REMOTE SIGNAL INPUT CONNECTORS.



| CONNECTIONS<br>INSIDE REM-1E | J-301, J-302<br>CONNECTORS |
|------------------------------|----------------------------|
| +V WHITE                     | J-301, Pin #1              |
| GND BLACK                    | J-301, Pin #3              |
| TRIG GREEN                   | J-301, Pin #2              |
| +V RED                       | J-301, Pin #4              |
| OUT BLACK                    | J-302, Pin #2              |
| SHIELD GREEN                 | J-302, Pin #1              |
| 4-20 IN RED                  | J-302, Pin #3              |

| CABLE<br>CONNECTIONS |                       |
|----------------------|-----------------------|
| RED                  | Future Use            |
| WHITE                | Power - (Common)      |
| GREEN                | Pump Trigger (+15VDC) |
| BLACK                | Power + (+15VDC)      |
| BLACK                | Signal Common         |
| WHITE                | Shield (mech. ground) |
| RED                  | 4-20 mA Signal        |

4-Pin Connector J-301

3-Pin Connector J-302  
External Control  
4-20mADC  
220Ω Input Impedance

## ZERO AND SPAN ADJUSTMENTS

1. Press MODE key to enter the off mode.
2. Pump output will stop. With OFF shown in the display, press and hold the MODE button until the display shows 'SPn'.
3. After three seconds, the upper span limit will be displayed. The default is 100 SPM, (and the maximum allowed if connected to an LMI metering pump).
4. Increase or decrease the upper limit by using the arrow keys.
5. Press MODE to accept the new value and advance to the minimum span limit adjustment.
6. The minimum span limit and default is 0. Use the arrow keys to change the lower span limit.
7. Then press MODE to continue to the CAL section and follow instructions at right starting at #3, or press MODE twice to return to the OFF mode.

## CALIBRATION

1. From the OFF mode press and hold the MODE button until the display changes to 'SPn', then to the upper span limit.
2. Press MODE twice until the display shows CAL.
3. Press one of the arrow keys  $\blacktriangle$  or  $\blacktriangledown$  (pressing MODE will skip the CAL sequence).
4. Display shows C4. (Calibration - 4mA)
5. Adjust input to a stable 4.00 mA signal for at least 10 seconds, then push both arrow  $\blacktriangle$   $\blacktriangledown$  buttons. 'ERR' means input is not near 4mA.
6. Display will change to C20.
7. Adjust input to 20.00 mA signal for at least 10 seconds, then push both arrow  $\blacktriangle$   $\blacktriangledown$  buttons.
8. After the calibration sequence is completed (or skipped), the display on the REM-1E will return to OFF.

\* NOTE: GASKET KIT P/N K7809901 AVAILABLE FOR PANEL MOUNTING.

The information provided in this brochure contains merely general descriptions or characteristics of performance which in case of actual use do not always apply as described or which may change as a result of further development of the products. An obligation to provide the respective characteristics shall only exist if expressly agreed in terms of the contract.

Siemens  
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595 Industrial Drive  
Bradley, IL 60915, USA  
www.usfilter.com  
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Literature No. ST-REM1E-DS-0606  
815.929.4101 tel.  
Bradley, IL 60915  
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## **DIAPHRAGM PUMP INFORMATION**

**WARNING:** ALWAYS wear protective clothing, face shield, safety glasses and gloves when working near or performing and maintenance or replacement on your pump. See MSDS Sheet from polymer supplier for additional precautions.

### **OUTPUT ADJUSTMENT CONTROLS**

In most external controlled pumps the uppermost knob serves as speed control. Graduations for the Speed Knob appear directly on the face of the control panel. The largest knob below is Stroke Control.

1. Speed adjustment: Speed control provides adjustment of the percent of maximum strokes per minute. Turning this clockwise increase stroke frequency. **Note AA7 Series Only:** When operating pump in the external mode, the speed control knob should be fully turned counter clockwise. A click indicates pump is in external mode.

2. Stroke Adjustment; Stroke control provides adjustment of percent of maximum Liquifram (diaphragm) travel. Turning this knob counterclockwise increases percent output per stroke. Only adjust while pump is running.

### **PRIMING THE PUMP**

Hold tip of syringe firmly in fitting with one hand while using the other hand to pull back on plunger. Repeat until a small amount of polymer is drawn into the syringe. The pump is now primed.

### **PUMP CALIBRATION**

Perform calibration if your system application requires it. Normally calibration is NOT required.

You will need:

- A watch
- A calculator
- Calibrated cylinder (with at least 1000 ml capacity).

- Length of hose or tubing (same I.D. as pump ports)

1. Maintain all usual connections to the PolyBlend unit except disconnect the polymer suction line at pump input. The flow meter and pump setting should be those used for normal service.

2. Connect hose or tubing to the pump input. Place the free end of the tubing in the graduated cylinder.

3. Fill the cylinder with polymer to its measured capacity (for example, 1000 ml etc.).

4. Turn on the metering pump. Allow the pump to run until all air has been exhausted from the tubing and pump and polymer is injected into the mixing chamber.

5. Stop the pump.

6. Refill the cylinder to the measured capacity.

7. Start the pump again, and start timing as the pump runs. For best results, let the pump run long enough to pump at least half of the polymer out of the graduated cylinder. (in general, the longer the calibration period, the greater the accuracy of the measurement).

8. Stop the pump. Record the time and level of the polymer remaining in the cylinder. Fill in the following equation to find the volume of polymer pumped per one unit of time (a minute, an hour, or a day).

$$\frac{\text{Starting ml} - \text{Remaining ml}}{\text{Calibration period}} = \text{ml/Time}$$

9. Compare the actual volume pumped to the desired volume, and adjust pump controls.

10. Check volume again to confirm the new settings.



## PRESSURE CONTROL (B and C series only)

A capped potentiometer is located on the face plate of the diaphragm pump. This potentiometer is for pressure control or power to the pump solenoid. Since the PolyBlend unit is equipped with a 20 PSI backpressure/check valve, the potentiometer should be set for full power or full clockwise.

**NOTE:** This is preset at the factory. In a case where obvious over-pumping is present, this potentiometer may be adjusted counter-clockwise.

### Liquifram (Diaphragm) Replacement

When replacing the Liquifram, valve balls, seal rings and the injection check valve spring should also be replaced.

1. Carefully depressurize, drain and disconnect the pump discharge and suction lines. Place the suction tubing into a container of mineral oil. Turn the pump on to flush the head assembly. Once the pump head has been flushed, lift the suction tubing out of the mineral oil and continue to pump air into the pump head until the pump head is purged.

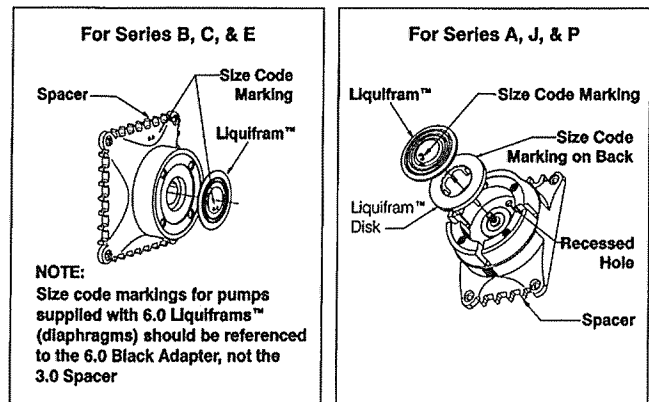
2. Start the pump. While running, set the stroke knob to zero and turn the pump off.

**NOTE:** See section on proper zeroing.

3. With the unit off, unscrew the Liquifram by carefully grasping the outer edge of the Liquifram and turning it counter clockwise. Discard old Liquifram disk if so equipped (locate behind the Liquifram) and check that the size code matches the size code on the replacement Liquifram (see illustration).

4. Reinstall the disk so alignment pin on the disk (if present) seats in the recessed hole in the EPU.

**WARNING:** Take care not to scratch the Teflon face of the new Liquifram.

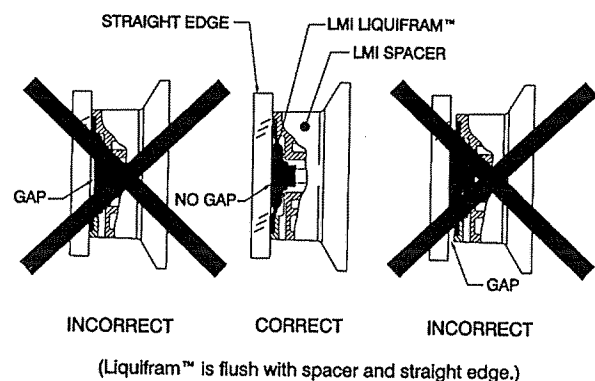


5. Start the pump and turn the stroke knob to the setting indicated on the Stroke Setting Chart which matches the pump model number located on the pump dataplate. With the pump stoking (running), screw on the new Liquifram clockwise until the center begins to buckle inward. Stop the pump.

### Liquifram Stroke Setting Chart

| <u>Pump Series</u> | <u>Stroke Knob Settings</u> |
|--------------------|-----------------------------|
| A11 AA, B72, C72,  | 90%                         |
| C77                | 70%                         |

6. Grasp the outer edge of the Liquifram and adjust by screwing it in or out so that the center of the Liquifram is flush with the outside of the spacer edge (see illustration).



7. Once the Liquifram is properly positioned, remount the pump head to the spacer using the four (4) screws. Tighten in a crisscross pattern. After one week of operation, recheck the screws and tighten if necessary.



### **Seal Ring, Ball and Injection Check Valve Spring Replacement**

1. Carefully depressurize, drain and disconnect the discharge and suction lines. Place the suction tubing into a container of mineral oil. Turn the pump on to flush the head assembly. After flushing, lift the suction tubing out of the mineral oil and continue to pump air into the pump head until the pump head is purged. If the liquid cannot be pumped due to Liquifram rupture, with protective gloves, carefully disconnect the tubing and four screws to remove the head. Immerse the head in mineral oil or other neutralizing solution.

**IMPORTANT:** Before disassembling valves, note the orientation of seal ring and ball. (See illustration):

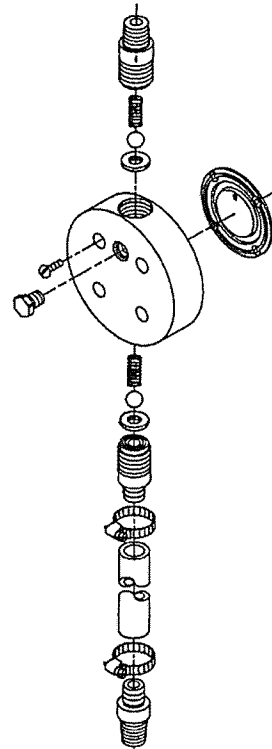
2. Carefully disconnect one tubing connection and fitting at a time and remove the worn seal ring and ball. Carefully loosen sealing by prying side to side using a small screw driver through the center hole of the seal ring.

3. Install new seal ring and ball in each location.

**IMPORTANT:** Note correct orientation.

4. Install the new spring valve in the Injection Check Valve.

### **Seal Ring, Ball and Injection Check Valve Spring Replacement**



**Order of Installation**

### **Check Pump for Proper Zeroing (Stroke Knob)**

1. With pump running, turn stroke knob counter clockwise toward zero or end of black or red band.

2. LISTEN to the clicking as the pump is running. The pump should operate quietly at the zero position (no clicking).

3. If the pump continues to click at zero or stops clicking before zero is reached, the pump must be reset.

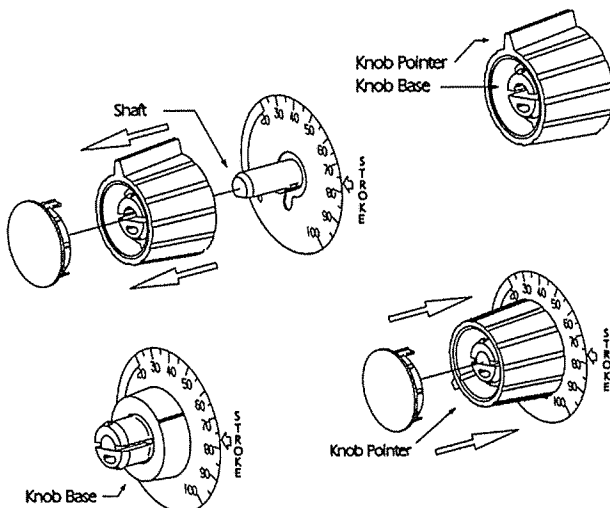
**Type I – Push on Knob**  
**Rezeroing and Stroke Knob Disassembly and Assembly**

1. Remove stroke knob from the pump by grasping the knob firmly and pulling it toward you.
2. Pry off the yellow cap.
3. Place the knob on a flat surface.
4. Using needle nose pliers, squeeze the inner section up together while lifting the outer section up.
5. Push the inner section back onto the “D” shaped stroke shaft.
6. With the pump running, zero the pump by turning the inner section of the knob counter clockwise until the pump stops clicking.
7. Position the outer section of the knob so that the pointer aligns with zero on the nameplate or end of the black or red band.
8. Push down on the outer section (a snap sound indicates parts are locked together).
9. Replace the yellow cap over the outer section of the knob, aligning the tabs on the cap with the slots inside the knob.

**Type III Collet Knob**  
**Rezeroing and Stroke Knob Disassembly and Assembly**

1. Remove yellow cap.
2. Hold knob with soft jaw pliers.
3. Disconnect knob by loosening 5/16” (8mm) collet nut. There is no need to remove nut.
4. Remove knob by pulling towards you.
5. With pump running, zero the pump using a screwdriver to turn the stroke shaft counter-clockwise until the pump just stops clicking.
6. Pump is now zeroed.
7. Position knob at zero, or the end of the low range band, and tighten 5/16” (8mm) collet nut.
8. Replace yellow cap.

**Stroke Knob Assembly (Type I)**





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**Integral Horsepower  
AC Induction Motors  
ODP, WPI, WP II Enclosure  
TEFC Enclosure  
Explosion Proof**

**Installation & Operating Manual**

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## Section 1

### General Information

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**Overview** This manual contains general procedures that apply to Baldor Motor products. Be sure to read and understand the Safety Notice statements in this manual. For your protection, do not install, operate or attempt to perform maintenance procedures until you understand the Warning and Caution statements. A Warning statement indicates a possible unsafe condition that can cause harm to personnel. A Caution statement indicates a condition that can cause damage to equipment.

**Important:** This instruction manual is not intended to include a comprehensive listing of all details for all procedures required for installation, operation and maintenance. This manual describes general guidelines that apply to most of the motor products shipped by Baldor. If you have a question about a procedure or are uncertain about any detail, Do Not Proceed. Please contact your Baldor distributor for more information or clarification.

Before you install, operate or perform maintenance, become familiar with the following:

- NEMA Publication MG-2, Safety Standard for Construction and guide for Selection, Installation and Use of Electric Motors and Generators.
- The National Electrical Code
- Local codes and Practices

#### Limited Warranty

1. Most Baldor products are warranted for 18 months from the date of shipment to Baldor's customer from Baldor's district warehouse or, if applicable, from Baldor's factory. Baldor Standard-E® standard efficient motors are warranted for 24 months. Standard-E is limited to three phase, general purpose, 1–200 HP ratings that fall under the Energy Policy Act (EPAct). Baldor Super-E® premium efficient motors are warranted for 36 months. Baldor IEEE841 motors are warranted for 60 months. All warranty claims must be submitted to a Baldor Service Center prior to the expiration of the warranty period.
2. Baldor will, at its option repair or replace a motor which fails due to defects in material or workmanship during the warranty period if:
  - a. the purchaser presents the defective motor at or ships it prepaid to, the Baldor plant in Fort Smith, Arkansas or one of the Baldor Authorized Service Centers and
  - b. the purchaser gives written notification concerning the motor and the claimed defect including the date purchased, the task performed by the Baldor motor and the problem encountered.
3. Baldor will not pay the cost of removal of any electric motor from any equipment, the cost of delivery to Fort Smith, Arkansas or a Baldor Authorized Service Center, or the cost of any incidental or consequential damages resulting from the claimed defects. (Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above exclusion may not apply to you.) Any implied warranty given by laws shall be limited to the duration of the warranty period hereunder. (Some states do not allow limitations on how long an implied warranty lasts, so the above limitation may not apply to you.)
4. Baldor Authorized Service Centers, when convinced to their satisfaction that a Baldor motor developed defects in material or workmanship within the warranty period, are authorized to proceed with the required repairs to fulfill Baldor's warranty when the cost of such repairs to be paid by Baldor does not exceed Baldor's warranty repair allowance. Baldor will not pay overtime premium repair charges without prior written authorization.
5. The cost of warranty repairs made by centers other than Baldor Authorized Service Centers **WILL NOT** be paid unless first authorized in writing by Baldor.
6. Claims by a purchaser that a motor is defective even when a failure results within one hour after being placed into service are not always justified. Therefore, Baldor Authorized Service Centers must determine from the condition of the motor as delivered to the center whether or not the motor is defective. If in the opinion of a Baldor Authorized Service Center, a motor did not fail as a result of defects in material or workmanship, the center is to proceed with repairs only if the purchaser agrees to pay for such repairs. If the decision is in dispute, the purchaser should still pay for the repairs and submit the paid invoice and the Authorized Service Center's signed service report to Baldor for further consideration.
7. This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

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**Safety Notice:**

This equipment contains high voltage! Electrical shock can cause serious or fatal injury. Only qualified personnel should attempt installation, operation and maintenance of electrical equipment.

Be sure that you are completely familiar with NEMA publication MG-2, safety standards for construction and guide for selection, installation and use of electric motors and generators, the National Electrical Code and local codes and practices. Unsafe installation or use can cause conditions that lead to serious or fatal injury. Only qualified personnel should attempt the installation, operation and maintenance of this equipment.

- WARNING:** Do not touch electrical connections before you first ensure that power has been disconnected. Electrical shock can cause serious or fatal injury. Only qualified personnel should attempt the installation, operation and maintenance of this equipment.
- WARNING:** Be sure the system is properly grounded before applying power. Do not apply AC power before you ensure that all grounding instructions have been followed. Electrical shock can cause serious or fatal injury. National Electrical Code and Local codes must be carefully followed.
- WARNING:** Avoid extended exposure to machinery with high noise levels. Be sure to wear ear protective devices to reduce harmful effects to your hearing.
- WARNING:** This equipment may be connected to other machinery that has rotating parts or parts that are driven by this equipment. Improper use can cause serious or fatal injury. Only qualified personnel should attempt to install operate or maintain this equipment.
- WARNING:** Do not by-pass or disable protective devices or safety guards. Safety features are designed to prevent damage to personnel or equipment. These devices can only provide protection if they remain operative.
- WARNING:** Avoid the use of automatic reset devices if the automatic restarting of equipment can be hazardous to personnel or equipment.
- WARNING:** Be sure the load is properly coupled to the motor shaft before applying power. The shaft key must be fully captive by the load device. Improper coupling can cause harm to personnel or equipment if the load decouples from the shaft during operation.
- WARNING:** Use proper care and procedures that are safe during handling, lifting, installing, operating and maintaining operations. Improper methods may cause muscle strain or other harm.
- WARNING:** Before performing any motor maintenance procedure, be sure that the equipment connected to the motor shaft cannot cause shaft rotation. If the load can cause shaft rotation, disconnect the load from the motor shaft before maintenance is performed. Unexpected mechanical rotation of the motor parts can cause injury or motor damage.
- WARNING:** Disconnect all electrical power from the motor windings and accessory devices before disassembly of the motor. Electrical shock can cause serious or fatal injury.
- WARNING:** Do not use non UL/CSA listed explosion proof motors in the presence of flammable or combustible vapors or dust. These motors are not designed for atmospheric conditions that require explosion proof operation.
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**Safety Notice Continued**

- WARNING:** Motors that are to be used in flammable and/or explosive atmospheres must display the UL label on the nameplate along with CSA listed logo.
- Specific service conditions for these motors are defined in NFPA 70 (NEC) Article 500.
- WARNING:** UL rated motors must only be serviced by authorized Baldor Service Centers if these motors are to be returned to a flammable and/or explosive atmosphere.
- Caution:** To prevent premature equipment failure or damage, only qualified maintenance personnel should perform maintenance.
- Caution:** Do not lift the motor and its driven load by the motor lifting hardware. The motor lifting hardware is adequate for lifting only the motor. Disconnect the load from the motor shaft before moving the motor.
- Caution:** If eye bolts are used for lifting a motor, be sure they are securely tightened. The lifting direction should not exceed a 20° angle from the shank of the eye bolt or lifting lug. Excessive lifting angles can cause damage.
- Caution:** To prevent equipment damage, be sure that the electrical service is not capable of delivering more than the maximum motor rated amps listed on the rating plate.
- Caution:** If a HI POT test (High Potential Insulation test) must be performed, follow the precautions and procedure in NEMA MG-1 and MG-2 standards to avoid equipment damage.

If you have any questions or are uncertain about any statement or procedure, or if you require additional information please contact your Baldor distributor or an Authorized Baldor Service Center.

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## **Receiving**

Each Baldor Electric Motor is thoroughly tested at the factory and carefully packaged for shipment. When you receive your motor, there are several things you should do immediately.

1. Observe the condition of the shipping container and report any damage immediately to the commercial carrier that delivered your motor.
2. Verify that the part number of the motor you received is the same as the part number listed on your purchase order.

## **Storage**

If the motor is not put into service immediately, the motor must be stored in a clean, dry and warm location. Several precautionary steps must be performed to avoid motor damage during storage.

1. Use a "Megger" periodically to ensure that the integrity of the winding insulation has been maintained. Record the Megger readings. Immediately investigate any significant drop in insulation resistance.
2. Do not lubricate bearings during storage. Motor bearings are packed with grease at the factory. Excessive grease can damage insulation quality.
3. Rotate motor shaft at least 10 turns every two months during storage (more frequently if possible). This will prevent bearing damage due to storage.
4. If the storage location is damp or humid, the motor windings must be protected from moisture. This can be done by applying power to the motors' space heater (if available) while the motor is in storage.

## **Unpacking**

Each Baldor motor is packaged for ease of handling and to prevent entry of contaminants.

1. To avoid condensation inside the motor, do not unpack until the motor has reached room temperature. (Room temperature is the temperature of the room in which it will be installed). The packing provides insulation from temperature changes during transportation.
2. When the motor has reached room temperature, remove all protective wrapping material from the motor.

## **Handling**

The motor should be lifted using the lifting lugs or eye bolts provided.

1. Use the lugs or eye bolts provided to lift the motor. Never attempt to lift the motor and additional equipment connected to the motor by this method. The lugs or eye bolts provided are designed to lift only the motor. Never lift the motor by the motor shaft or the hood of a WP11 motor.
2. When lifting a WP11 (weatherproof Type 2) motor, do not lift the motor by inserting lifting lugs into holes on top of the cooling hood. These lugs are to be used for hood removal only. A spreader bar should be used to lift the motor by the cast lifting lugs located on the motor frame.
3. If the motor must be mounted to a plate with the driven equipment such as pump, compressor etc., it may not be possible to lift the motor alone. For this case, the assembly should be lifted by a sling around the mounting base. The entire assembly can be lifted as an assembly for installation. Do not lift using the motor lugs or eye bolts provided.

If the load is unbalanced (as with couplings or additional attachments) additional slings or other means must be used to prevent tipping. In any event, the load must be secure before lifting.



## Section 2

### Installation & Operation

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#### Overview

Installation should conform to the National Electrical Code as well as local codes and practices. When other devices are coupled to the motor shaft, be sure to install protective devices to prevent future accidents. Some protective devices include, coupling, belt guard, chain guard, shaft covers etc. These protect against accidental contact with moving parts. Machinery that is accessible to personnel should provide further protection in the form of guard rails, screening, warning signs etc.

#### Location

It is important that motors be installed in locations that are compatible with motor enclosure and ambient conditions. Improper selection of the motor enclosure and ambient conditions can lead to reduced operating life of the motor.

Proper ventilation for the motor must be provided. Obstructed airflow can lead to reduction of motor life.

1. **Open Drip-proof/WPI** motors are intended for use indoors where atmosphere is relatively clean, dry, well ventilated and non-corrosive.
2. **Totally Enclosed and WPFL** motors may be installed where dirt, moisture or dust are present and in outdoor locations.

Chemical Duty enclosed motors are designed for installations with high corrosion or excessive moisture conditions. These motors should not be placed into an environment where there is the presence of flammable or combustible vapors, dust or any combustible material, unless specifically designed for this type of service.

#### Mounting

The motor must be securely installed to a rigid foundation or mounting surface to minimize vibration and maintain alignment between the motor and shaft load. Failure to provide a proper mounting surface may cause vibration, misalignment and bearing damage.

Foundation caps and sole plates are designed to act as spacers for the equipment they support. If these devices are used, be sure that they are evenly supported by the foundation or mounting surface.

After installation is complete and accurate alignment of the motor and load is accomplished, the base should be grouted to the foundation to maintain this alignment.

The standard motor base is designed for horizontal or vertical mounting. Adjustable or sliding rails are designed for horizontal mounting only. Consult your Baldor distributor or authorized Baldor Service Center for further information.

#### Alignment

Accurate alignment of the motor with the driven equipment is extremely important.

##### 1. **Direct Coupling**

For direct drive, use flexible couplings if possible. Consult the drive or equipment manufacturer for more information. Mechanical vibration and roughness during operation may indicate poor alignment. Use dial indicators to check alignment. The space between coupling hubs should be maintained as recommended by the coupling manufacturer.

##### 2. **End-Play Adjustment**

The axial position of the motor frame with respect to its load is also extremely important. The motor bearings are not designed for excessive external axial thrust loads. Improper adjustment will cause failure.

##### 3. **Pulley Ratio**

The pulley ratio should not exceed 8:1.

##### 4. **Belt Drive**

Align sheaves carefully to minimize belt wear and axial bearing loads (see End-Play Adjustment). Belt tension should be sufficient to prevent belt slippage at rated speed and load. However, belt slippage may occur during starting.

**Caution:** Do not over tension belts.

5. Sleeve bearing motors are only suitable for coupled loads.

---

## **Doweling & Bolting**

After proper alignment is verified, dowel pins should be inserted through the motor feet into the foundation. This will maintain the correct motor position should motor removal be required. (Baldor motors are designed for doweling.)

1. Drill dowel holes in diagonally opposite motor feet in the locations provided.
2. Drill corresponding holes in the foundation.
3. Ream all holes.
4. Install proper fitting dowels.
5. Mounting bolts must be carefully tightened to prevent changes in alignment. Use a flat washer and lock washer under each nut or bolt head to hold the motor feet secure. Flanged nuts or bolts may be used as an alternative to washers.

## **Power Connection**

### **Conduit Box**

Motor and control wiring, overload protection, disconnects, accessories and grounding should conform to the National Electrical Code and local codes and practices.

For ease of making connections, an oversize conduit box is provided. The box can be rotated 360° in 90° increments. Auxiliary conduit boxes are provided on some motors for accessories such as space heaters, RTD's etc.

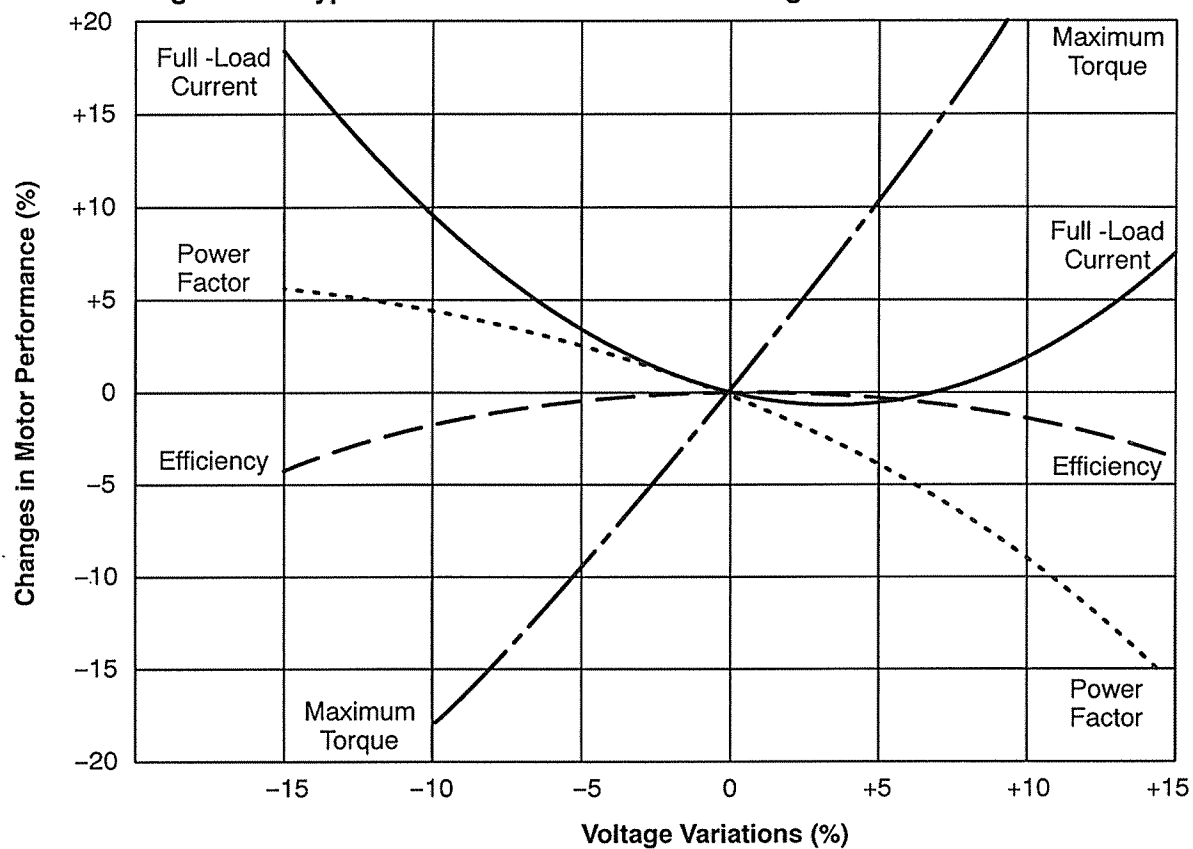
### **AC Power**

Connect the motor leads as shown on the connection diagram located on the name plate or inside the cover on the conduit box. Be sure the following guidelines are met:

1. AC power is within  $\pm 10\%$  of rated voltage with rated frequency. (See motor name plate for ratings).  
**OR**
2. AC power is within  $\pm 5\%$  of rated frequency with rated voltage.  
**OR**
3. A combined variation in voltage and frequency of  $\pm 10\%$  (sum of absolute values) of rated values, provided the frequency variation does not exceed  $\pm 5\%$  of rated frequency.

Performance within these voltage and frequency variations are shown in Figure 2-1.

**Figure 2-1 Typical Motor Performance VS Voltage Variations**



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### **First Time Start Up**

Be sure that all power to motor and accessories is off. Be sure the motor shaft is disconnected from the load and will not cause mechanical rotation of the motor shaft.

1. Make sure that the mechanical installation is secure. All bolts and nuts are tightened etc.
2. If motor has been in storage or idle for some time, check winding insulation integrity with a Megger.
3. Inspect all electrical connections for proper termination, clearance, mechanical strength and electrical continuity.
4. Be sure all shipping materials and braces (if used) are removed from motor shaft.
5. Manually rotate the motor shaft to ensure that it rotates freely.
6. Replace all panels and covers that were removed during installation.
7. Momentarily apply power and check the direction of rotation of the motor shaft.
8. If motor rotation is wrong, be sure power is off and change the motor lead connections. Verify rotation direction before you continue.
9. Start the motor and ensure operation is smooth without excessive vibration or noise. If so, run the motor for 1 hour with no load connected.
10. After 1 hour of operation, disconnect power and connect the load to the motor shaft. Verify all coupling guards and protective devices are installed. Ensure motor is properly ventilated.

### **Coupled Start Up**

This procedure assumes a coupled start up. Also, that the first time start up procedure was successful.

1. Check the coupling and ensure that all guards and protective devices are installed.
2. Check that the coupling is properly aligned and not binding.
3. The first coupled start up should be with no load. Apply power and verify that the load is not transmitting excessive vibration back to the motor through the coupling or the foundation. Vibration should be at an acceptable level.
4. Run for approximately 1 hour with the driven equipment in an unloaded condition.

The equipment can now be loaded and operated within specified limits. Do not exceed the name plate ratings for amperes for steady continuous loads.

### **Jogging and Repeated Starts**

Repeated starts and/or jogs of induction motors generally reduce the life of the motor winding insulation. A much greater amount of heat is produced by each acceleration or jog than by the same motor under full load. If it is necessary to repeatedly start or jog the motor, it is advisable to check the application with your local Baldor distributor or Baldor Service Center.

Heating - Duty rating and maximum ambient temperature are stated on the motor name plate. Do not exceed these values. If there is any question regarding safe operation, contact your local Baldor distributor or Baldor Service Center.

## Section 3 Maintenance & Troubleshooting

**WARNING:** UL rated motors must only be serviced by authorized Baldor Service Centers if these motors are to be returned to a flammable and/or explosive atmosphere.

### General Inspection

Inspect the motor at regular intervals, approximately every 500 hours of operation or every 3 months, whichever occurs first. Keep the motor clean and the ventilation openings clear. The following steps should be performed at each inspection:

**WARNING:** Do not touch electrical connections before you first ensure that power has been disconnected. Electrical shock can cause serious or fatal injury. Only qualified personnel should attempt the installation, operation and maintenance of this equipment.

1. Check that the motor is clean. Check that the interior and exterior of the motor is free of dirt, oil, grease, water, etc. Oily vapor, paper pulp, textile lint, etc. can accumulate and block motor ventilation. If the motor is not properly ventilated, overheating can occur and cause early motor failure.
2. Use a "Megger" periodically to ensure that the integrity of the winding insulation has been maintained. Record the Megger readings. Immediately investigate any significant drop in insulation resistance.
3. Check all electrical connectors to be sure that they are tight.

### Lubrication & Bearings

Bearing grease will lose its lubricating ability over time, not suddenly. The lubricating ability of a grease (over time) depends primarily on the type of grease, the size of the bearing, the speed at which the bearing operates and the severity of the operating conditions. Good results can be obtained if the following recommendations are used in your maintenance program.

#### Type of Grease

A high grade ball or roller bearing grease should be used. Recommended grease for standard service conditions is Polyrex EM (Exxon Mobil).

Equivalent and compatible greases include:

Texaco Polystar, Rykon Premium #2, Pennzoil Pen 2 Lube and Chevron SRI.

– Maximum operating temperature for standard motors = 110° C.

– Shut-down temperature in case of a malfunction = 115° C.

#### Lubrication Intervals

Recommended lubrication intervals are shown in Table 3-1. It is important to realize that the recommended intervals of Table 3-1 are based on average use.

Refer to additional information contained in Tables 3-2 and 3-3.

**Table 3-1 Lubrication Intervals \***

| NEMA / (IEC) Frame Size      | Rated Speed - RPM |           |             |            |            |            |
|------------------------------|-------------------|-----------|-------------|------------|------------|------------|
|                              | 10000             | 6000      | 3600        | 1800       | 1200       | 900        |
| Up to 210 incl. (132)        | **                | 2700 Hrs. | 5500 Hrs.   | 12000 Hrs. | 18000 Hrs. | 22000 Hrs. |
| Over 210 to 280 incl. (180)  |                   | **        | 3600 Hrs.   | 9500 Hrs.  | 15000 Hrs. | 18000 Hrs. |
| Over 280 to 360 incl. (225)  |                   |           | * 2200 Hrs. | 7400 Hrs.  | 12000 Hrs. | 15000 Hrs. |
| Over 360 to 5800 incl. (300) |                   |           | *2200 Hrs.  | 3500 Hrs.  | 7400 Hrs.  | 10500 Hrs. |

\* Lubrication intervals are for ball bearings. For vertically mounted motors and roller bearings, divide the lubrication interval by 2.

\*\* For motors operating in this speed range, contact Baldor for lubrication recommendations based on specific motor and application.

**Table 3-2 Service Conditions**

| Severity of Service | Hours per day of Operation | Ambient Temperature Maximum   | Atmospheric Contamination                                       |
|---------------------|----------------------------|-------------------------------|---|
| Standard            | 8                          | 40° C                         | Clean, Little Corrosion   |
| Severe              | 16 Plus                    | 50° C                         | Moderate dirt, Corrosion  |
| Extreme             | 16 Plus                    | >50° C* or Class H Insulation | Severe dirt, Abrasive dust, Corrosion, Heavy Shock or Vibration |
| Low Temperature     |                            | <-30° C **                    |   |

\* Special high temperature grease is recommended (Dow Corning DC44). Note that Dow Corning DC44 grease does not mix with other grease types. Thoroughly clean bearing & cavity before adding grease.

\*\* Special low temperature grease is recommended (Aeroshell 7).

**Table 3-3 Lubrication Interval Multiplier**

| Severity of Service | Multiplier |
|---------------------|------------|
| Standard            | 1.0        |
| Severe              | 0.5        |
| Extreme             | 0.1        |
| Low Temperature     | 1.0        |

**Table 3-4 Bearings Sizes and Types**

| Frame Size<br>NEMA (IEC)      | Bearing Description<br>(These are the "Large" bearings (Shaft End) in each frame size) |            |               |   |                                 |               |
|-------------------------------|--|------------|---------------|---|---------------------------------|---------------|
|                               | Bearing  | OD<br>D mm | Width<br>B mm | Weight of<br>Grease to<br>add *<br>oz (Grams) | Volume of grease<br>to be added |               |
|                               |  |            |               |   | in <sup>3</sup>                 | tea-<br>spoon |
| 56 to 180 incl. (63 to 112)   | 6206   | 62         | 16            | 0.19 (5.0)                                    | 0.3                             | 1.0           |
| 210 incl. (132)               | 6307   | 80         | 21            | 0.30 (8.4)                                    | 0.6                             | 2.0           |
| Over 210 to 280 incl. (180)   | 6311   | 120        | 29            | 0.61 (17)                                     | 1.2                             | 3.9           |
| Over 280 to 360 incl. (225)   | 6318   | 140        | 33            | 0.81 (23)                                     | 1.5                             | 5.2           |
| Over 360 to 449 incl. (280)   | 6319   | 200        | 45            | 2.12 (60)                                     | 4.1                             | 13.4          |
| Over 5000 to 5800 incl. (355) | 6328   | 300        | 62            | 4.70 (130)                                    | 9.2                             | 30.0          |
| Over 360 to 449 incl. (280)   | NU319  | 200        | 45            | 2.12 (60)                                     | 4.1                             | 13.4          |
| Over 5000 to 5800 incl. (355) | NU328  | 300        | 62            | 4.70 (130)                                    | 9.2                             | 30.0          |
| <b>Spindle Motors</b>         |  |            |               |   |                                 |               |
| 76 Frame                      | 6207   | 72         | 17            | 0.22 (6.1)                                    | 0.44                            | 1.4           |
| 77 Frame                      | 6210   | 90         | 20            | 0.32 (9.0)                                    | 0.64                            | 2.1           |
| 80 Frame                      | 6213   | 120        | 23            | 0.49 (14.0)                                   | 0.99                            | 3.3           |

\* Weight in grams = .005 DB

Note: Not all bearing sizes are listed. For intermediate bearing sizes, use the grease volume for the next larger size bearing.

### Lubrication Procedure

Be sure that the grease you are adding to the motor is compatible with the grease already in the motor. Consult your Baldor distributor or an authorized service center if a grease other than the recommended type is to be used.

**Caution:** To avoid damage to motor bearings, grease must be kept free of dirt. For an extremely dirty environment, contact your Baldor distributor or an authorized Baldor Service Center for additional information.

#### With Grease Outlet Plug

1. With the motor stopped, clean all grease fittings.
2. Remove grease outlet plug.

**Caution:** Overgreasing can cause excessive bearing temperatures, premature lubrication breakdown and bearing failure.

3. Add the recommended amount of grease.
4. Operate the motor for 15 minutes with grease plug removed. This allows excess grease to purge.
5. Re-install grease outlet plug.

#### Without Grease Provisions

**Note:** Only a Baldor authorized and UL or CSA certified service center can disassemble a UL/CSA listed explosion proof motor to maintain it's UL/CSA listing.

1. Disassemble the motor.
2. Add recommended amount of grease to bearing and bearing cavity. (Bearing should be about 1/3 full of grease and outboard bearing cavity should be about 1/2 full of grease.)
3. Assemble the motor.

### Sample Lubrication Determination

Assume - NEMA 206T (IEC 180), 1750 RPM motor driving an exhaust fan in an ambient temperature of 45° C and the atmosphere is moderately corrosive.

1. Table 3-1 list 9500 hours for standard conditions.
2. Table 3-2 classifies severity of service as "Severe".
3. Table 3-3 lists a multiplier value of 0.5 for Severe conditions.
4. Table 3-4 shows that 1.2 in<sup>3</sup> or 3.9 teaspoon of grease is to be added.

Note: Smaller bearings in size category may require reduced amounts of grease.

---

## **Accessories**

The following is a partial list of accessories available from Baldor.  
Contact your Baldor distributor for availability and pricing information.

Note: Space heaters and RTD's are standard on some motors.

### **Bearing RTD**

RTD (Resistance Temperature Detector) devices are used to measure or monitor the temperature of the motor bearing during operation.

### **Bearing Thermocouples**

Used to measure or monitor bearing temperatures.

### **Bearing Thermostat**

Temperature device that activates when bearing temperatures are excessive. Used with an external circuit to warn of excessive bearing temperature or to shut down a motor.

### **Conduit Boxes**

Optional conduit boxes are available in various sizes to accommodate accessory devices.

### **Cord & Plug Assembly**

Adds a line cord and plug for portable applications.

### **Drains and Breathers**

Stainless steel drains with separate breathers are available.

### **Drip Covers**

Designed for use when motor is mounted in a vertical position. Contact your Baldor distributor to confirm that the motor is designed for vertical mounting.

### **Fan Cover & Lint Screen**

To prevent build-up of debris on the cooling fan.

### **Nameplate**

Additional stainless steel nameplates are available.

### **Roller Bearings**

Recommended for belt drive applications with a speed of 1800 RPM or less.

### **Rotation Arrow Labels**

Rotation arrows are supplied on motors designed to operate in one direction only. Additional rotation arrows are available.

### **Space Heater**

Added to prevent condensation of moisture within the motor enclosure during periods of shut down or storage.

### **Stainless Hardware**

Stainless steel hardware is available. Standard hardware is corrosion resistant zinc plated steel.

### **Winding RTD**

RTD (Resistance Temperature Detector) devices are used to measure or monitor the temperature of the motor winding during operation.

### **Winding Thermocouples**

Used to measure or monitor winding temperatures.

### **Winding Thermostat**

Temperature device that activates when winding temperatures are excessive. Used with an external circuit to warn of excessive winding temperature or to shut down a motor.

Note: On some motors, leads for accessory devices are brought out to a separate conduit box located on the side of the motor housing (unless otherwise specified).



**Table 3-5 Troubleshooting Chart**

| Symptom              | Possible Causes   | Possible Solutions   |
|----------------------|---|--|
| Motor will not start | Usually caused by line trouble, such as, single phasing at the starter. | Check source of power. Check overloads, fuses, controls, etc.  |
| Excessive humming    | High Voltage.   | Check input line connections.  |
|                      | Eccentric air gap.  | Have motor serviced at local Baldor service center.  |
| Motor Over Heating   | Overload. Compare actual amps (measured) with nameplate rating.         | Locate and remove source of excessive friction in motor or load.<br>Reduce load or replace with motor of greater capacity.                                   |
|                      | Single Phasing.   | Check current at all phases (should be approximately equal) to isolate and correct the problem.  |
|                      | Improper ventilation.   | Check external cooling fan to be sure air is moving properly across cooling fins.<br>Excessive dirt build-up on motor. Clean motor.                          |
|                      | Unbalanced voltage.   | Check voltage at all phases (should be approximately equal) to isolate and correct the problem.  |
|                      | Rotor rubbing on stator.  | Check air gap clearance and bearings.<br>Tighten "Thru Bolts".   |
|                      | Over voltage or under voltage.  | Check input voltage at each phase to motor.  |
|                      | Open stator winding.  | Check stator resistance at all three phases for balance.   |
|                      | Grounded winding.   | Perform dielectric test and repair as required.  |
|                      | Improper connections.   | Inspect all electrical connections for proper termination, clearance, mechanical strength and electrical continuity. Refer to motor lead connection diagram. |
|                      |   |  |
| Bearing Over Heating | Misalignment.   | Check and align motor and driven equipment.  |
|                      | Excessive belt tension.   | Reduce belt tension to proper point for load.  |
|                      | Excessive end thrust.   | Reduce the end thrust from driven machine.   |
|                      | Excessive grease in bearing.  | Remove grease until cavity is approximately $\frac{3}{4}$ filled.  |
|                      | Insufficient grease in bearing.   | Add grease until cavity is approximately $\frac{3}{4}$ filled.   |
|                      | Dirt in bearing.  | Clean bearing cavity and bearing. Repack with correct grease until cavity is approximately $\frac{3}{4}$ filled.   |
| Vibration            | Misalignment.   | Check and align motor and driven equipment.  |
|                      | Rubbing between rotating parts and stationary parts.                    | Isolate and eliminate cause of rubbing.  |
|                      | Rotor out of balance.   | Have rotor balance checked and repaired at your Baldor Service Center.   |
|                      | Resonance.  | Tune system or contact your Baldor Service Center for assistance.  |
| Noise                | Foreign material in air gap or ventilation openings.                    | Remove rotor and foreign material. Reinstall rotor. Check insulation integrity. Clean ventilation openings.  |
| Growling or whining  | Bad bearing.  | Replace bearing. Clean all grease from cavity and new bearing. Repack with correct grease until cavity is approximately $\frac{3}{4}$ filled.                |

### Suggested bearing and winding RTD setting guidelines

Most large frame AC Baldor motors with a 1.15 service factor are designed to operate below a Class B (80°C) temperature rise at rated load and are built with a Class H winding insulation system. Based on this low temperature rise, RTD (Resistance Temperature Detectors) settings for Class B rise should be used as a starting point. Some motors with 1.0 service factor have Class F temperature rise.

The following tables show the suggested alarm and trip settings for RTDs. Proper bearing and winding RTD alarm and trip settings should be selected based on these tables unless otherwise specified for specific applications.

If the driven load is found to operate well below the initial temperature settings under normal conditions, the alarm and trip settings may be reduced so that an abnormal machine load will be identified.

The temperature limits are based on the installation of the winding RTDs imbedded in the winding as specified by NEMA. Bearing RTDs should be installed so they are in contact with the outer race on ball or roller bearings or in direct contact with the sleeve bearing shell.

**Winding RTDs – Temperature Limit In °C (40°C Maximum Ambient)**

| Motor Load              | Class B Temp Rise ≤ 80°C<br>(Typical Design) |      | Class F Temp Rise ≤ 105°C |      | Class H Temp Rise ≤ 125°C |      |
|-------------------------|--|------|---------------------------|------|---------------------------|------|
|                         | Alarm  | Trip | Alarm                     | Trip | Alarm                     | Trip |
| ≤ Rated Load            | 130  | 140  | 155                       | 165  | 175                       | 185  |
| Rated Load to 1.15 S.F. | 140  | 150  | 160                       | 165  | 180                       | 185  |

Note: • Winding RTDs are factory production installed, not from Mod-Express.

• When Class H temperatures are used, consider bearing temperatures and lubrication requirements.

**Bearing RTDs – Temperature Limit In °C with 40°C Max Ambient**

| Bearing Type<br>Oil or Grease | Anti-Friction |      | Sleeve |      |
|-------------------------------|---------------|------|--------|------|
|                               | Alarm         | Trip | Alarm  | Trip |
| Standard*                     | 95            | 100  | 85     | 95   |
| High Temperature**            | 110           | 115  | 105    | 110  |

Note: \* Bearing temperature limits are for standard design motors operating at Class B temperature rise.

\*\* High temperature lubricants include some special synthetic oils and greases.

Greases that may be substituted that are compatible with Polyrex EM (but considered as "standard" lubricants) include the following:

- Texaco Polystar
- Rykon Premium #2
- Chevron SRI #2

See the motor nameplate for replacement grease or oil recommendation. Contact Baldor application engineering for special lubricants or further clarifications.

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# Gold Ring™ Solenoid Valve

## Installation and Maintenance Instructions



2-Way Remote Pilot Operated  
Normally Open and Normally Closed  
NEMA 1

Series 24  
NPT 3/4, 1, 1-1/4, 1-1/2  
Orifice: 3/4, 1, 1-1/8, 1-1/4

Bulletin 7235      Effective 1 Nov 85  
Revision C        Revised 1 Mar 92

Parker Hannifin Corporation  
Fluid Control Division

Catalog Number: 16F24C2164AAF4C05  
Voltage: 120

### Warnings

1. If you purchase a Unit Valve and a Unit Solenoid, be sure the last two digits of the Unit Valve number match the first two digits of the Unit Solenoid number. If they do not match, do not install.  

08F24C2140AAF  
AFGC05

Unit Valve  
Unit Solenoid
2. Check data label for correct catalog number, pressure, voltage and service. Do not install if unsuitable.
3. For protection and proper operation of the solenoid valve, install a strainer or filter suitable for the service involved as close to the valve inlet as possible.
4. Solenoid valves requires periodic cleaning and inspection depending on the service. This should be done at least once every 12 months or every 500,000 cycles, whichever occurs first.
5. Turn off electrical power supply and line pressure to the valve. Bleed trapped pressure from the lines before inspecting, cleaning, servicing, or repairing the valve.
6. For proper operation be sure that the minimum operating pressure differential is maintained.

#### Description:

Series 24 offset or remote piloted solenoid valves require a minimum operating pressure for acceptable system operation but permit a greater flow (Cv) than Series 22 solenoid valves. Valves with watertight NEMA Type 4 or explosion-proof NEMA Type 7 enclosures are covered by I & M Instructions, Bulletin 7220.

#### Operation:

##### NORMALLY CLOSED

Closed when de-energized; open when energized.

##### ~~NORMALLY OPENED~~

~~Open when de-energized; closed when energized.~~

#### Installation:

##### 1. Application

Refer to Parker Gold Ring™ catalog for application information.

##### 2. Positioning

For best results mount with Unit Solenoid vertical and upright. Unit valve may be mounted in any position.

##### 3. Piping

Connect piping to valve according to markings on valve body. Apply pipe compound or sealing material sparingly to male pipe threads only. If applied to valve thread, it may enter valve and cause operational difficulties. Pipe strain should be avoided by proper support and alignment of piping. Do not use valve as a lever when tightening pipe.

#### 4. Wiring

Wiring must comply with local and national electrical codes. Housings for all solenoids are made with connections for 1/2-inch conduit. The enclosures may be rotated to facilitate wiring.

#### 5. Unit Solenoid Installation

Turn off electrical power supply. Slide unit solenoid over plunger tube. Place data label on top. Squeeze gold ring firmly together, pressing it against the data label. This compresses the anti-vibration fingers.

#### 6. Solenoid Temperature

Standard catalog valves are supplied with coils designed for continuous duty service. When the solenoid is energized for a long period, the solenoid enclosure becomes hot and can be touched with the bare hand for only an instant. This is a safe operating temperature. Excessive heating will be indicated by the smoke and odor of burning coil insulation.

#### Maintenance:

##### 1. Cleaning

Periodic cleaning of solenoid valves is recommended. Frequency will depend on fluid and service, but should never be less than every 12 months or 500,000 cycles whichever occurs first. In general, if the voltage to the coil is correct, sluggish operation, excessive leakage or noise will indicate cleaning or repair is required. Clean valve filter or strainer when cleaning valve. See valve disassembly and reassembly instructions below.

##### 2. Preventative Maintenance

- a. Keep media flowing through valve as free from dirt and foreign matter as possible.
- b. While not in service, operate valve at least once a month to insure proper opening and closing.
- c. Periodic inspection (depending on media and service conditions) of internal valve parts for damage or excessive wear is recommended. Inspect at least every 12 months or 500,000 cycles, whichever occurs first. Thoroughly clean all parts. Replace worn or damaged parts with Gold Ring™ Spare Parts Kit. Use all parts for best results. Clean valve filter or strainer when cleaning valve.

##### 3. Troubleshooting Guide

###### a. Faulty Controls Circuit

Check the electrical system by energizing the solenoid. A

metallic click signifies solenoid is operating. Absence of click indicates loss of power supply. Check for loose or blown out fuses, open-circuit or grounded coil, broken lead wires or splices.

###### b. Burned-Out Coil

Check for open-circuited coil. Replace Unit Solenoid if necessary.

###### c. Low Voltage

Check voltage across the coil lead. Voltage must be at least 85% of data label rating.

###### d. Incorrect Pressure

Check valve pressure. Pressure to valve must be within range specified on data label.

###### e. Excessive Leakage

Disassemble valve and clean all parts. Replace worn or damaged parts with a Gold Ring™ Spare Parts Kit. Use all parts for best results. Install filtration if indicated. See valve disassembly and reassembly instructions.

##### 4. Unit Solenoid Replacement

Turn off electrical power supply and disconnect coil lead wires. Refer to exploded view.

- a. Remove gold ring by inserting a 3/16" wide screwdriver in the curved slot. While holding the gold ring firmly against the unit solenoid gently twist screwdriver counterclockwise. Gold ring will open. Lift off data label and unit solenoid.
- b. Reassembly by sliding unit solenoid over plunger tube. Place data label on top. Press gold ring against data label to compress anti-vibration fingers. Squeeze the gold ring firmly together.

##### 5. Valve Disassembly and Reassembly (Refer to Exploded Views)

Turn off electrical power supply and line pressure. Disconnect coil lead wires. Bleed trapped pressure from lines.

- a. Remove gold ring by inserting a 3/16" wide screwdriver in the curved slot. While holding the gold ring firmly against the unit solenoid gently twist screwdriver counterclockwise. Gold ring will open. Lift off data label and unit solenoid.
- b. Unscrew the plunger tube assembly and remove plunger, spring and body gasket.

- c. Remove body bolts, body, diaphragm spring, diaphragm assembly and body gasket(s).
- d. All parts are now accessible for cleaning or replacement. Replace worn or damaged parts with Gold Ring™ Spare Parts Kit. Use all parts for best results.
- e. Inspect valve body seat for scratches, nicks, dents or other blemishes. Replace if damaged.
- f. Reassemble in reverse order or disassembly, paying careful attention to Exploded Views provided. Apply  $175 \pm 25$  inch pounds of torque to the bonnet and  $144 \pm 15$  inch pounds of torque to the cover screw in a crisscross pattern. The 3/4" NPT requires  $110 \pm 10$  inch pounds of torque when tightening the bonnet. Lubricate all gaskets with Dow Corning Corporation's Molykote® III compound or an equivalent high grade silicone grease.

- g. DO NOT alter, modify, or use parts not obtained in Spare Parts Kit from original manufacturer.

#### Parker Gold Ring™ Spare Parts Kit

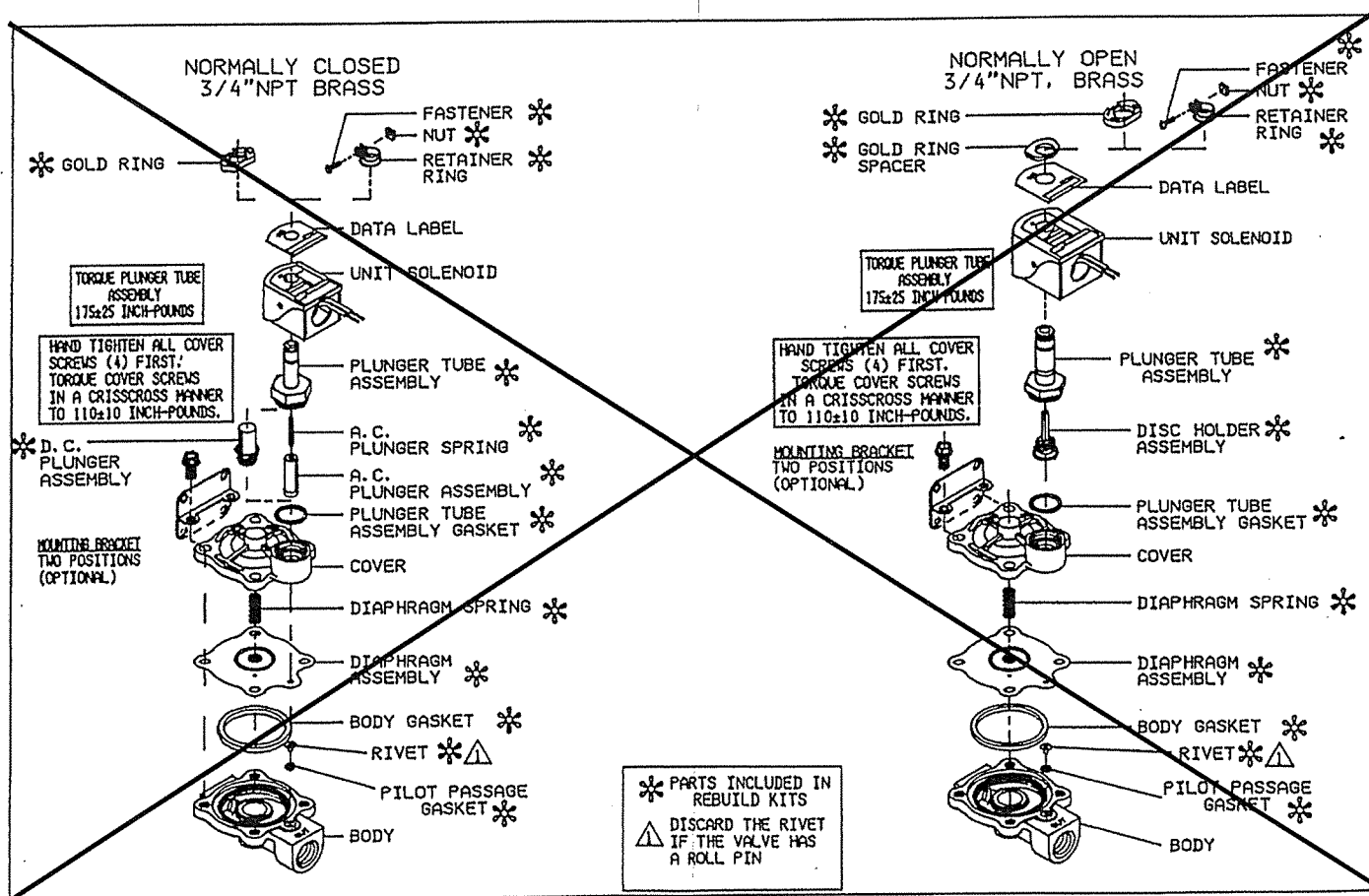
Spare Parts Kits and Unit Solenoids are available for Gold Ring™ Valves. Parts marked with an asterisk (\*) are included in Spare Parts Kits (See Exploded Views).

#### Ordering Information For Spare Parts Kits

When ordering Parker Gold Ring™ Spare Kits or Unit Solenoids, specify Valve Catalog Number, Serial Number and Voltage.

**Note:** This product may contain chemicals known to the state of California to cause cancer, birth defects, or other reproductive harm.

This warning is given in compliance with California Proposition 65, as detectable amounts of chemicals subject to Proposition 65 may be contained in this







# Gold Ring <sup>TM</sup> Solenoid Valve

## Installation and Maintenance Instructions



### Valves With NEMA 4 Solenoids

Parker Hannifin Corporation  
Fluid Control Division

Bulletin 7273  
Effective 15Oct92  
Revision A

#### Warnings

1. Check adhesive data label for correct catalog number, pressure, voltage and service. Do not install if unsuitable.
2. Turn off electrical power supply and line pressure to the valve. Bleed trapped pressure from the lines before inspecting, cleaning, servicing or repairing the valve.

#### Description:

These solenoids are epoxy encapsulated with an integral 1/2" conduit connector that meet the requirements for NEMA Type 4 enclosures. The requirements for the following NEMA enclosure Types are also met: Type 1-General Purpose, Type 2-indoor protection against falling water and dirt, Type 3-outdoor protection against dust, rain, sleet and external ice formation, Type 3R-outdoor protection against rain, sleet and external ice formation, Type 3S-same as Type 3 but in addition provides for operation of external mechanisms when ice laden. Type 4-indoor or outdoor protection against dust, rain, splashing water, hose-directed water and damage from external ice formation, Type 4X-same as Type 4 plus protection against corrosion.

#### Operation:

For specific valve operation, refer to the valve I & M Instructions.

#### Installation:

##### 1. Application

Refer to Parker Gold Ring <sup>TM</sup> catalog for application information.

##### 2. Positioning

The solenoid may be mounted in any position. It is recommended that the solenoid be mounted vertical and upright to prevent accumulation of debris in the plunger tube of the valve.

##### 4. Wiring

Wiring must comply with local and national electrical codes. These coils have a conduit hub for connecting 1/2" conduit. The enclosure may be rotated to facilitate wiring.

##### 5. Solenoid Temperature

Standard catalog valves are supplied with coils designed for continuous duty service. When the solenoid is energized for a long period, the solenoid enclosure becomes hot and can be touched with the bare hand for only an instant. This is a safe operating temperature. Any excessive heating will be indicated by the smoke and odor of burning coil insulation. Ambient and fluid temperature limitations for a solenoid valve depend on the solenoid and the valve materials.

#### Maintenance:

##### 1. Troubleshooting Guide

###### a. Faulty Controls Circuit

Check the electrical system by energizing the solenoid. A metallic click signifies the solenoid is operating. Absence of click indicates loss of power supply. Check for loose or blown out fuses, open circuit or grounded coil and broken lead wires.

###### b. Burned-Out Coil

Check for open-circuited coil. Replace coil if necessary.

c. Low Voltage

Check voltage across the coil lead. Voltage must be at least 85% of adhesive data label rating.

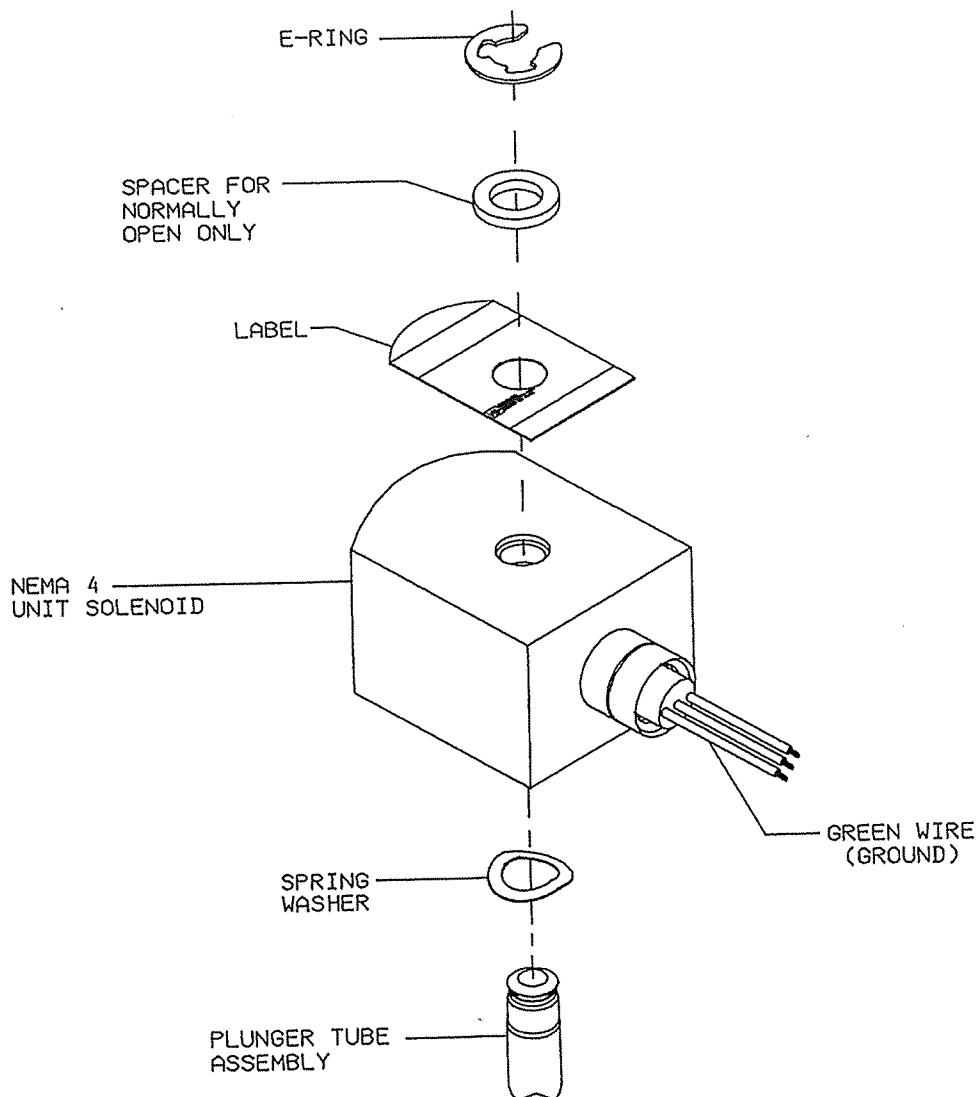
2. Coil Replacement

Turn off electrical power supply and disconnect coil lead wires. Refer to exploded view.

a. Remove retainer ring.

b. Replace old coil with new coil of correct wattage, voltage and class.

c. Reassemble by sliding new unit solenoid over plunger tube assembly. Slide E-ring into the enclosure tube retaining groove. Reconnect your electrical circuit.

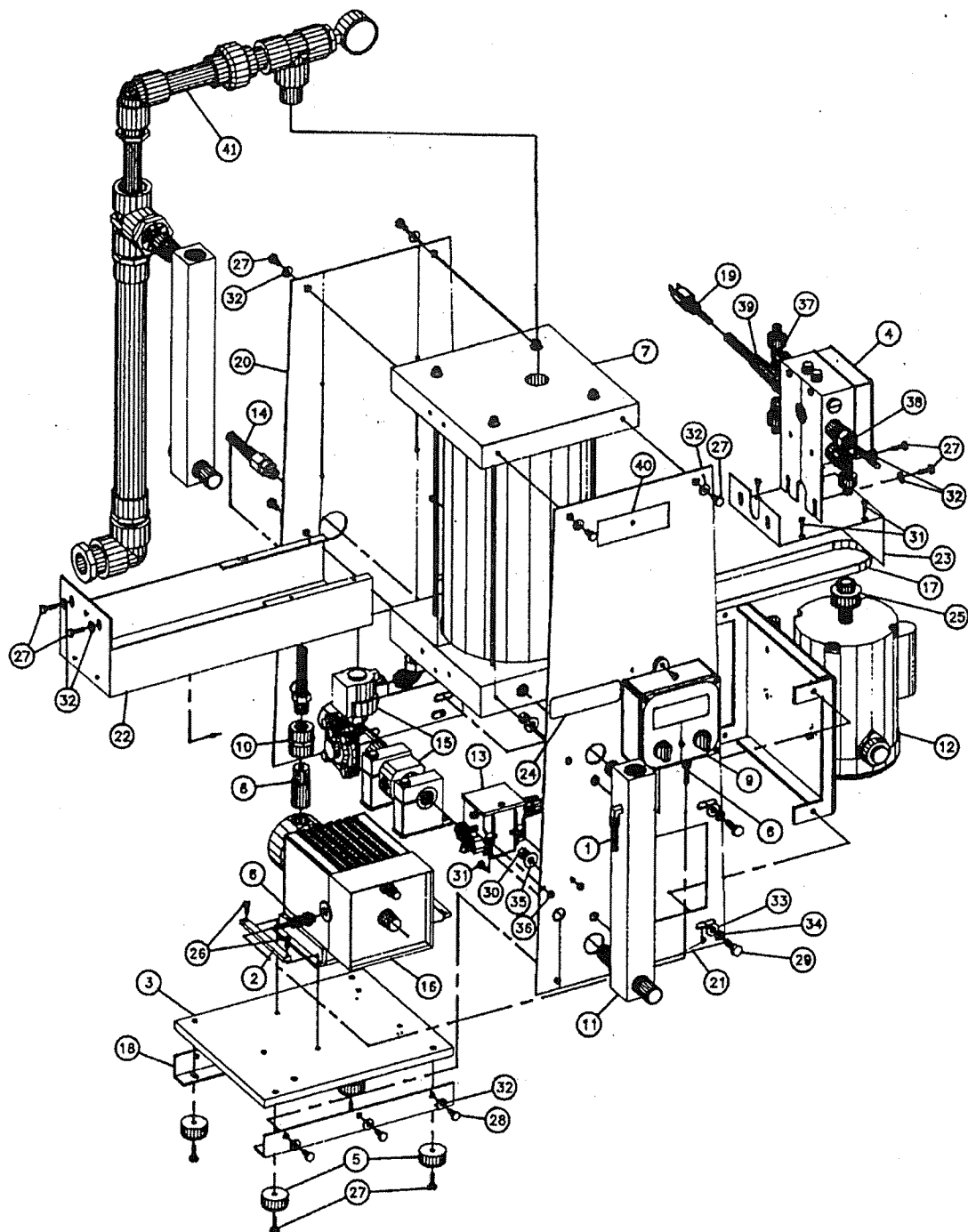


## OVERALL

| ITEM | P/N     | DESCRIPTION                                    | QTY   | UM |
|------|---------|--|-------|----|
| 1    | 10342   | TUBING, 3/8" OD X 1/4" ID, POLYETHYLENE        | 2.00  | FT |
| 2    | 10746   | BRACKET, PUMP                                  | 2.00  | EA |
| 3    | 1364002 | BASE SUB-ASSY., EC PB600-0                     | 1.00  | EA |
| 4    | 1672006 | BOX JUNCTION                                   | 1.00  | EA |
| 5    | 1890002 | BUMPER, RUBBER                                 | 4.00  | EA |
| 6    | 1984005 | CABLE ASSY.                                    | 1.00  | EA |
| 7    | *****   | CHAMBER ASSY, MIXING (SEE SECTION)             | 1.00  | EA |
| 8    | 26033   | VALVE  | 1.00  | EA |
| 9    | 2846006 | CONTROLLER, REM-1D                             | 1.00  | EA |
| 10   | 2930004 | CPLG, PVC, SCH 80 1/2" FPT                     | 1.00  | EA |
| 11   | *****   | FLOWMETER, SUB-ASSY. (SEE SECTION)             | 1.00  | EA |
| 12   | 5902002 | MOTOR  | 1.00  | EA |
| 13   | 8724903 | SWITCH, DIFF. PRESSURE                         | 1.00  | EA |
| 14   | 9414003 | TUBE BRAIDED SS, 1/2" MPT X 1/2" MPT X 18" LG* | 1.00  | EA |
| 15   | 9571341 | VALVE SOLENOID                                 | 1.00  | EA |
| 16   | *****   | PUMP (SEE SECTION)                             | 1.00  | EA |
| 17   | 1450430 | BELT   | 1.00  | EA |
| 18   | 1693007 | BRKT. CHASSIS                                  | 2.00  | EA |
| 19   | 1983001 | CABLE ASSY, 10V, 8FT GROUNDED, MALE PLG, 16/3  | 1.00  | EA |
| 20   | 2383003 | CHASSIS, BACK                                  | 1.00  | EA |
| 21   | 2383004 | CHASSIS, FRONT                                 | 1.00  | EA |
| 22   | 4684304 | GUARD BELT, BOTTOM                             | 1.00  | EA |
| 23   | 4685301 | GUARD BELT, TOP                                | 1.00  | EA |
| 24   | 5554000 | LABEL, SERIAL PLATE                            | 1.00  | EA |
| 25   | 7070100 | PULLEY   | 1.00  | EA |
| 26   | 7772508 | SCREW, MACH, 10-32 X 1/2 SLTD PH, SS           | 4.00  | EA |
| 27   | 1600312 | BOLT, HH, 1/4-20 X 3/4 SS                      | 8.00  | EA |
| 28   | 1600308 | BOLT, HH, 1/4-20 X 1/2 SS                      | 10.00 | EA |
| 29   | 1601316 | BOLT, HH, 5/16-18 X 1 SS                       | 4.00  | EA |
| 30   | 6020235 | NUT, 3/8-24, HEX, SS                           | 2.00  | EA |
| 31   | 7771558 | SCREW, MACH, SS PAN HD, PHIL, 8-32 X 1/2       | 6.00  | EA |
| 32   | 9740300 | WASHER, SS, FLAT 1/4"                          | 20.00 | EA |
| 33   | 9741300 | WASHER, SS, FLAT, 5/16"                        | 4.00  | EA |
| 34   | 9741315 | WASHER, SS, SPLIT, LOCK 5/16"                  | 4.00  | EA |
| 35   | 9742300 | WASHER, SS, FLAT, 3/8"                         | 2.00  | EA |
| 36   | 6020962 | NUT, 8-32, HEX                                 | 2.00  | EA |
| 37   | 2577264 | ELBOW, CONDUIT                                 | 3.00  | EA |
| 38   | 2726564 | CONNECTOR CORD GRIP                            | 1.00  | EA |
| 39   | 2726562 | CONNECTOR W/JACKET 1/2 MPT                     | 1.00  | EA |
| 40   | 5551210 | LABEL, POLYBLEND                               | 1.00  | EA |
| 41   | *****   | POST-DILUTION/STATIC MIXER (SEE SECTION)       | 1.00  | EA |

### SOURCE OF SUPPLY FOR PARTS

Siemens Water Technologies  
595 Industrial Drive  
Bradley, IL 60915  
PHONE: 800-882-6466  
FAX: 815-932-0674



1000  
D-015

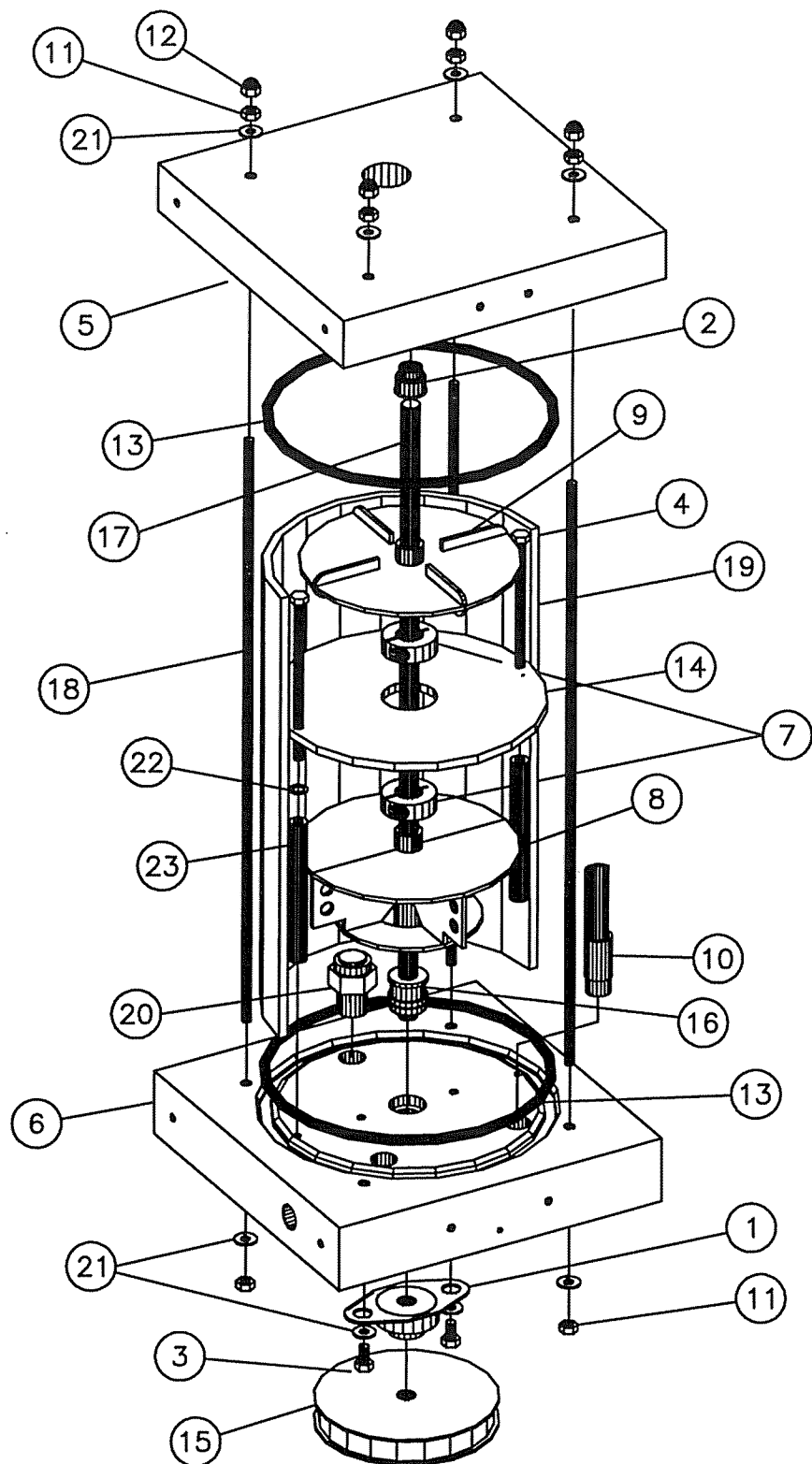
## MIXING CHAMBER 2341101

| ITEM | PART NO.  | DESCRIPTION                           | QTY. |
|------|-----------|---------------------------------------|------|
| 1    | 1411001   | BEARING                               | 1    |
| 2    | 1414001   | BEARING, THRUST                       | 1    |
| 3    | 1600308   | BOLT, HH, 1/4-20 X 1/2                | 2    |
| 4    | 1600341   | BOLT, HH, 1/4-20 X 5                  | 2    |
| 5    | 2124006   | CAP, TOP, MIXING CHAMBER              | 1    |
| 6    | 2124007   | CAP, BOTTOM, MIXING CHAMBER           | 1    |
| 7    | 2650002   | COLLAR                                | 2    |
| 8    | 5173601   | IMPELLER, PRIMARY                     | 1    |
| 9    | 5173602   | IMPELLER, SECONDARY                   | 1    |
| 10   | 5993002   | NOZZLE, MIX CHAMBER (MANNICH POLYMER) | 1    |
| 11   | 6020031   | NUT, 1/4-20, HEX, SS                  | 8    |
| 12   | 6023031   | NUT, ACORN, 1/4", S.S.                | 4    |
| 13   | 6091802   | O-RING                                | 2    |
| 14   | 6676001   | PLATE, BAFFLE                         | 1    |
| 15   | 7070412   | PULLEY                                | 1    |
| 16   | 7802910   | SEAL, MECHANICAL                      | 1    |
| 17   | 7854304   | SHAFT                                 | 1    |
| 18   | 8603001   | STUD                                  | 4    |
| 19   | 9412801   | TUBE, ACRYLIC                         | 1    |
| 20   | 9572323   | VALVE, INJ. CHECK                     | 1    |
| 21   | 9740300   | WASHER, FLAT, 1/4"                    | 10   |
| 22   | 9740330   | WASHER, SS, INT TOOTH, 1/4"           | 2    |
| 23   | RM6600021 | 1/4" S-80 PVC PIPE                    | 1    |

### SOURCE OF SUPPLY FOR PARTS

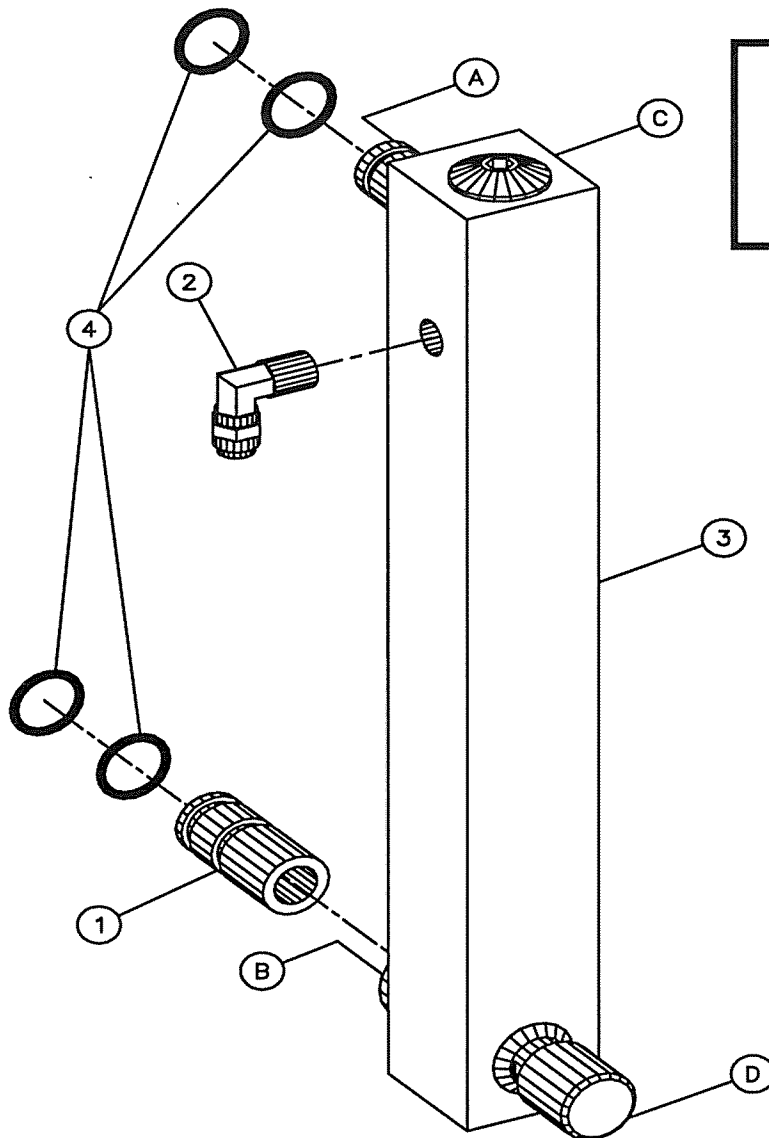
Siemens Water Technologies  
 595 Industrial Drive  
 Bradley, IL 60915  
 PHONE: 800-882-6466  
 FAX: 815-932-0674

# MIXING CHAMBER 2341101



## FLOWMETER ASSEMBLY – P/N 4303105

| ITEM | PART NO. | DESCRIPTION                           | QTY. | UM |
|------|----------|---------------------------------------|------|----|
| 1    | 1048005  | ADAPTER, SPUD                         | 1    | EA |
| 2    | 3581634  | ELBOW, BRASS, 1/4" MPT X 3/8" OD COMP | 1    | EA |
| 3    | 4293101  | FLOWMETER, KING, 10GPM                | 1    | EA |
| 4    | 6091302  | O-RING, BUNA N                        | 4    | EA |
| A    | 1040094  | ADAPTER, OUTLET, FLOWMETER            | 1    | EA |
| B    | 1048402  | ADAPTER                               | 1    | EA |
| C    | 6720702  | TOP PLUG, KING                        | 1    | EA |
| D    | 9579302  | VALVE, KING                           | 1    | EA |



Items with alphabetical callouts are components of Item #3. They are shown here in case you wish to order replacement parts.

### SOURCE OF SUPPLY FOR PARTS

Siemens Water Technologies  
 595 Industrial Drive  
 Bradley, IL 60915  
 PHONE: 800-882-6466  
 FAX: 815-932-0674

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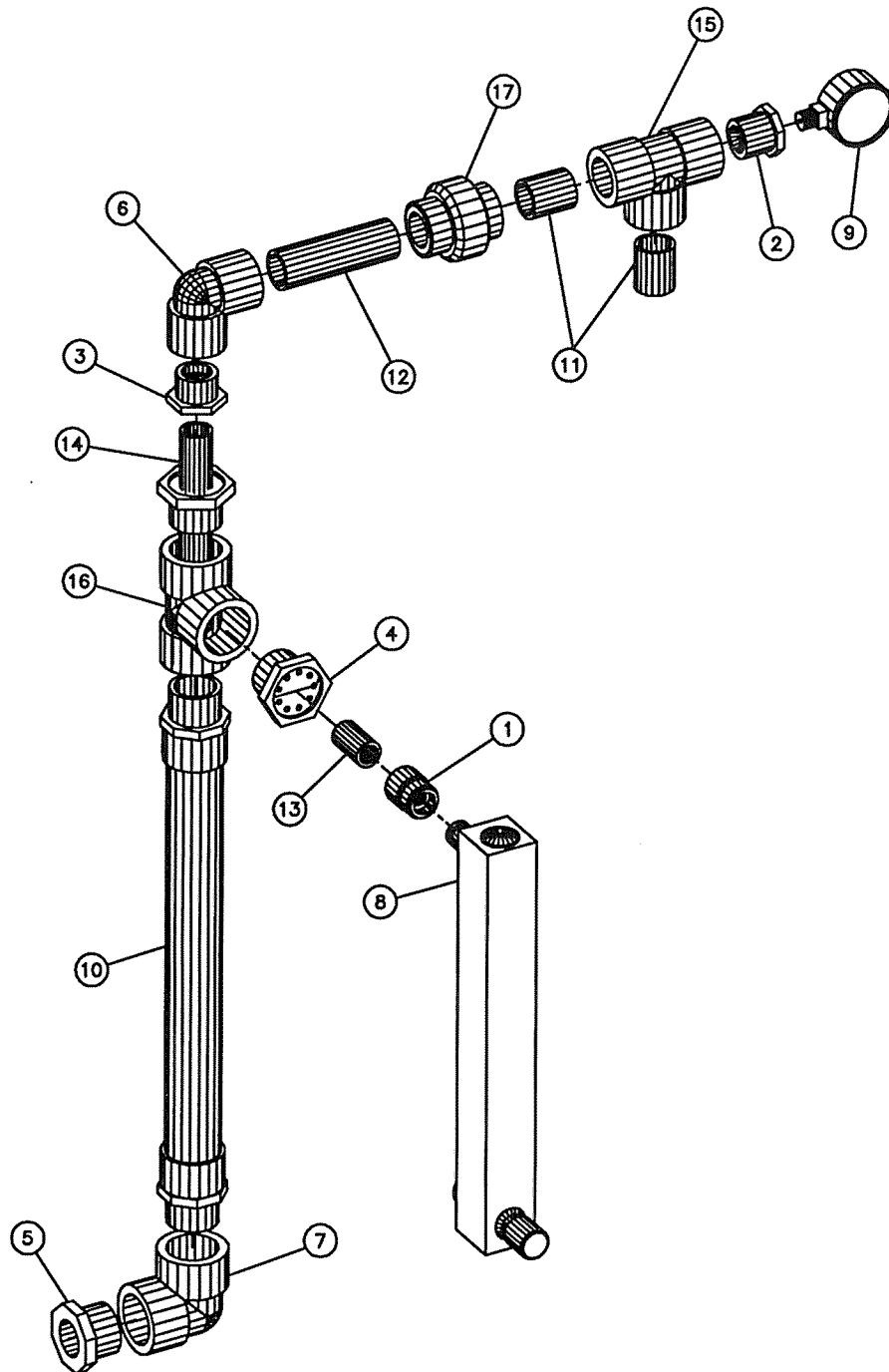
**POST DILUTION, STATIC MIXER ASSEMBLY - P/N 5860201**

| <b>ITEM</b> | <b>PART NO.</b> | <b>DESCRIPTION</b>             | <b>QTY.</b> |
|-------------|-----------------|--------------------------------|-------------|
| 1           | 1048402         | ADAPTER, BUSH, PVC TXT         | 1           |
| 2           | 1930012         | BUSH, PVC, TXT, 1" X 3/4"      | 1           |
| 3           | 1930015         | BUSH, PVC, TXT, 1" X 3/4"      | 1           |
| 4           | 1930018         | BUSH, PVC, TXT, 1-1/4" X 1/2"  | 1           |
| 5           | 1930020         | BUSH, PVC, TXT, 1-1/4" X 1"    | 1           |
| 6           | 3570006         | ELBOW, 90 PVC, TXT 1"          | 1           |
| 7           | 3570007         | ELBOW, 90, PVC, TXT 1-1/4"     | 1           |
| 8           | 4293101         | FLOWMETER, KING, 10GPM         | 1           |
| 9           | 4480001         | GAUGE, PRESSURE, 0-160PSI      | 1           |
| 10          | 5850004         | MIXER, STATIC                  | 1           |
| 11          | 5960101         | NIPPLE, PVC, 1" X CLOSE        | 2           |
| 12          | 5960108         | NIPPLE, PVC, 1" X 4"           | 1           |
| 13          | 5963063         | NIPPLE, SS, 1/2" X 1-1/2"      | 1           |
| 14          | 6619009         | PIPING SUB-ASSY., MIXER STATIC | 1           |
| 15          | 8850006         | TEE, PVC, 1" FPT               | 1           |
| 16          | 8850007         | TEE, PVC, 1-1/4" FPT           | 1           |
| 17          | 9500006         | UNION, PVC, 1" TXT, ESLON      | 1           |

**SOURCE OF SUPPLY FOR PARTS**

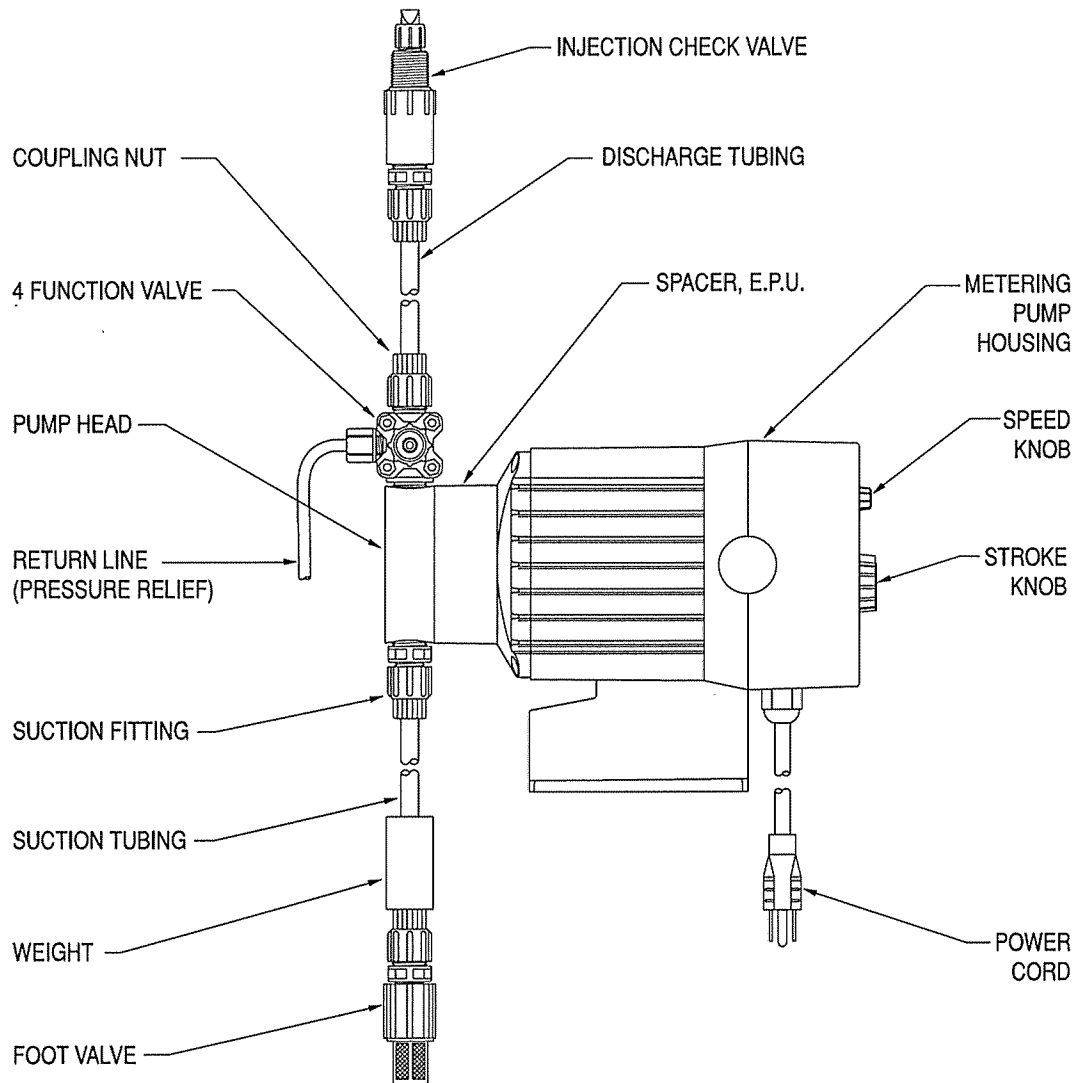
Siemens Water Technologies  
595 Industrial Drive  
Bradley, IL 60915  
PHONE: 800-882-6466  
FAX: 815-932-0674

Post Dilution, Static Mixer Assembly - P/N 5860201

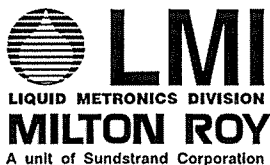


# Instruction **Supplement**

## Series B7 Electronic Metering Pump



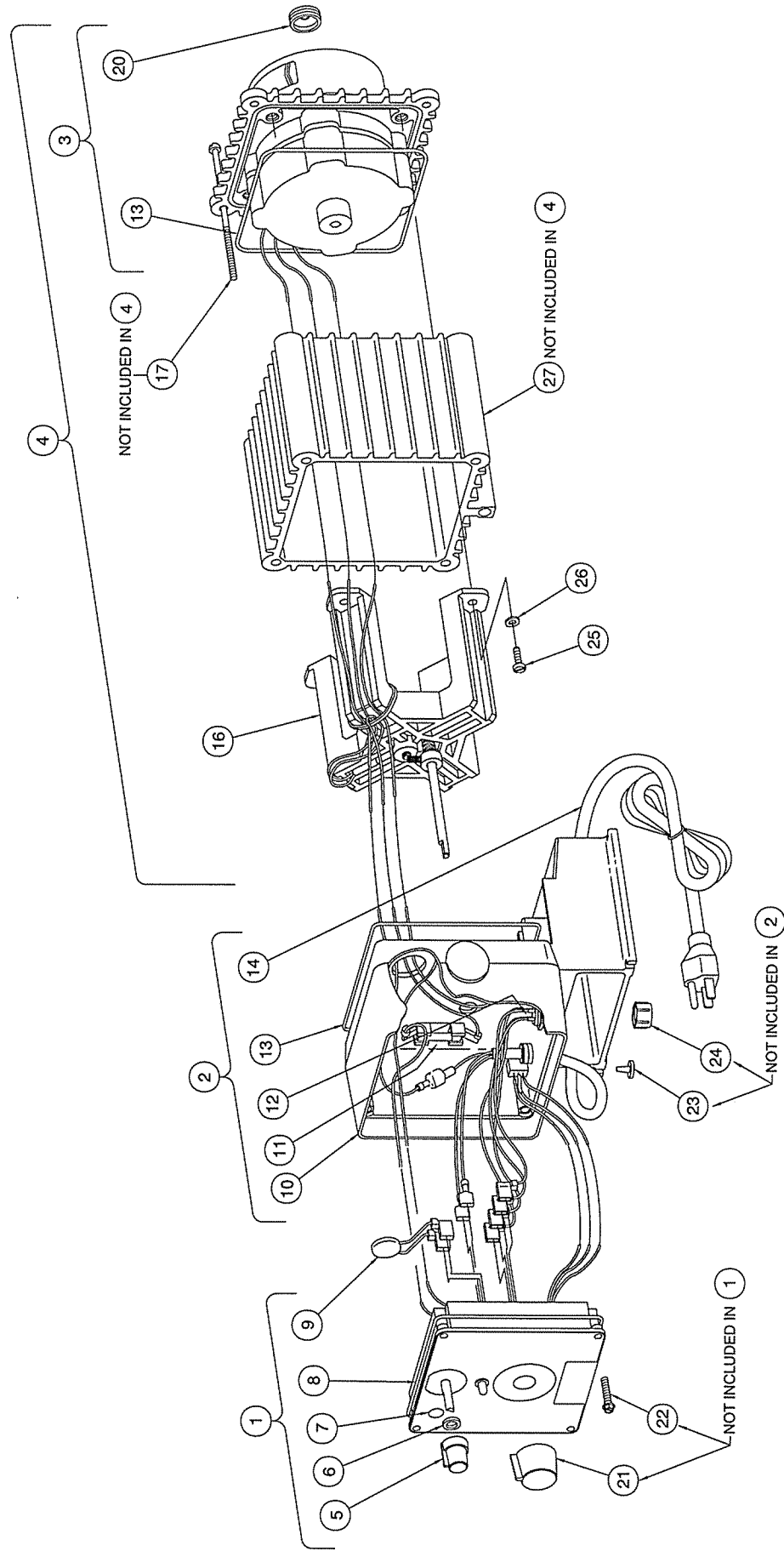
**Metering Pump Component Diagram**



8 Post Office Square  
Acton, MA 01720 USA  
TEL: (978) 263-9800  
FAX: (978) 264-9172  
<http://www.lmipumps.com>



Series B7 Drive Assembly Exploded View Diagram



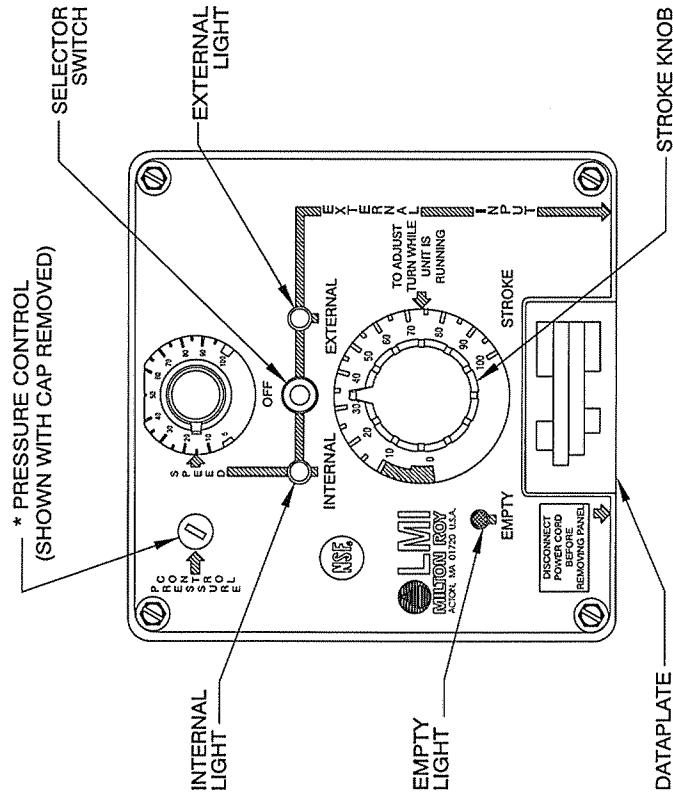
## Series B7 Drive Assembly Parts List

| Key No. | Model Series   | Part No. | Description                            | Qty. |
|---------|--|----------|--|------|
| 1       | B711, B721, B731, B741<br>B712, B713, B715, B716, B717<br>B722, B723, B725, B726, B727<br>B732, B733, B735, B736, B737<br>B742, B743, B745, B746, B747                 | 34093    | Control Panel Assembly, 120V           | 1    |
|         |  | 33211    | Control Panel Assembly, 120V           | 1    |
|         |  | 34094    | Control Panel Assembly, 230V           | 1    |
|         |  | 33212    | Control Panel Assembly, 230V           | 1    |
|         |  |          |  |      |
| 2       | B711, B721, B731, B741<br>B712, B722, B732, B742<br>B713, B723, B733, B743<br>B715, B725, B735, B745<br>B716, B726, B736, B746<br>B717, B727, B737, B747               | 28970    | Housing Assembly, 120V                 | 1    |
|         |  | 28980    | Housing Assembly, 230V                 | 1    |
|         |  | 28981    | Housing Assembly, 220-240V DIN         | 1    |
|         |  | 28982    | Housing Assembly, 220-240V UK          | 1    |
|         |  | 28983    | Housing Assembly, 220-240V AUST        | 1    |
|         |  | 28984    | Housing Assembly, 220-240V SWISS       | 1    |
|         |  | 26893    |  |      |
| 3       | B711, B721, B731, B741<br>B712, B713, B715, B716, B717<br>B722, B723, B725, B726, B727<br>B731<br>B732, B733, B735, B736, B737<br>B741<br>B742, B743, B745, B746, B747 | 26894    |  |      |
|         |  | 26897    | EPU and Spacer Assembly                | 1    |
|         |  | 26898    |  |      |
|         |  | 29618    |  |      |
|         |  | 29619    |  |      |
|         |  | 31927    |  |      |
|         |  | 31928    |  |      |
| 4       | B711, B721, B731, B741<br>B712, B713, B715, B716, B717<br>B722, B723, B725, B726, B727<br>B731<br>B732, B733, B735, B736, B737<br>B741<br>B742, B743, B745, B746, B747 | 31929    | EPU and Spacer Assembly w/ Stroke Adj. | 1    |
|         |  | 31930    |  |      |
|         |  | 31931    |  |      |
|         |  | 31932    |  |      |
|         |  | 30709    | Knob, Push On                          | 1    |
|         |  | 30803    | Gasket                                 | 1    |
| 5       | B7   | 29093    | Cap                                    | 1    |
| 6       | B7   | 10166    | O-Ring                                 | 1    |
| 7       | B7   |          |  |      |
| 8       | B7   |          |  |      |

| Key No. | Model Series   | Part No. | Description                | Qty. |
|---------|--|----------|----------------------------|------|
| 9       | B711, B721, B731, B741<br>B712, B713, B715, B716, B717<br>B722, B723, B725, B726, B727<br>B732, B733, B735, B736, B737<br>B742, B743, B745, B746, B747   | 10626    | Varistor Assembly, 120V    | 1    |
|         |  | 10627    | Varistor Assembly, 230V    | 1    |
|         |  |          |                            |      |
|         |  | 35404-1  | Housing                    | 1    |
|         |  | 25825    | Fuse, 4A Rectifier         | 2    |
| 11      | B711, B721, B731, B741<br>B712, B713, B715, B716, B717<br>B722, B723, B725, B726, B727<br>B732, B733, B735, B736, B737<br>B742, B743, B745, B746, B747   | 25824    | Fuse, 2A Rectifier         | 2    |
|         |  |          |                            |      |
|         |  |          |                            |      |
|         |  |          |                            |      |
|         |  |          |                            |      |
| 12      | B7   | 25907    | Jack Assembly              | 1    |
| 13      | B7   | 35269    | Seal                       | 2    |
| 14      | B711, B721, B731, B741<br>B712, B722, B732, B742<br>B713, B723, B733, B743<br>B715, B725, B735, B745<br>B716, B726, B736, B746<br>B717, B727, B737, B747 | 26293    | Power Cord, 120V           |      |
|         |  | 26296    | Power Cord, 230V           |      |
|         |  | 26297    | Power Cord, 220-240V DIN   | 1    |
|         |  | 26817    | Power Cord 220-240V UK     |      |
|         |  | 26818    | Power Cord, 200-240V AUST  |      |
|         |  | 27701    | Power Cord, 220-240V SWISS |      |
| 16      | B7   | 31898    | Stroke Adjustment Assembly | 1    |
| 17      | B7   | 25127    | Screw 10-24 x 4.56         | 4    |
| 20      | B7   | 10973    | Seal                       | 1    |
| 21      | B7   | 31891    | Stroke Knob                | 1    |
| 22      | B7   | 30306    | Screw, Self Tapping        | 4    |
| 23      | B7   | 30307    | Plug                       | 1    |
| 24      | B7   | 25930    | Cap Cover                  | 1    |
| 25      | B7   | 10590    | Screw                      | 4    |
| 26      | B7   | 10415    | Washer                     | 4    |
| 27      | B7   | 25068    | Sleeve                     | 1    |

# Series B7 Control Panel Detail



\*To adjust pressure control: Remove yellow cap. With small screwdriver, and the pump running, turn the pressure control adjustment slowly counterclockwise until pump just begins to stall. From this stall point, turn clockwise approximately 30 degrees. This is the optimum pressure control setting for your application.

# Series B7 Wiring Diagram

