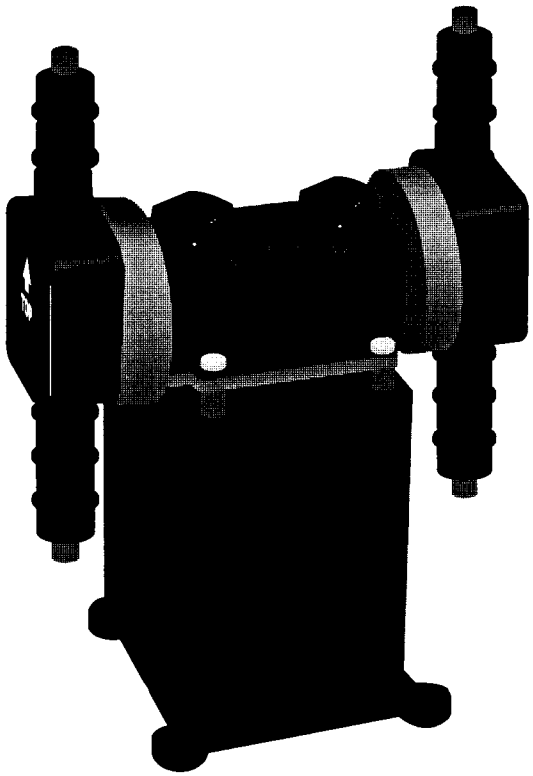
FPUDX1700 Series

Dual Head Injector Metering Pump



OMEGA®
An OMEGA Technologies Company

Operator's Manual

Unpacking Information

Remove the Packing List and verify that you have received all equipment, including the following (quantities in parentheses):

FPUDX1700 Series Dual Head Injector Pump (1)
5 Ft. of clear PVC flexible suction tubing (3/8" OD) with flow indicator (2)
5 Ft. opaque high pressure discharge tubing (3/8" OD) (2)
Injector Fittings (2)
Foot Valve Strainers (2)
Ceramic Weights (2)
Operator's Manual (1)

If you have any questions about the shipment, please call the OMEGA Customer Service Department.
When you receive the shipment, inspect the container and equipment for signs of damage. Note any evidence of rough handling in transit. Immediately report any damage to the shipping agent.

NOTE

The carrier will not honor damage claims unless all shipping material is saved for inspection. After examining and removing contents, save packing material and carton in the event reshipment is necessary.

Table of Contents

Chapter 1 Introduction

1.1 Description

Your chemical injector is a positive displacement type pump. This little pump is very strong and will inject the fluid in substantially equal amounts even though the line being treated may have varying pressures. This is a positive displacement pump so the chemical, once in the pump head cannot flow backwards, but must go forward. Be aware, if the flow is blocked the pump will stall and the gearing will be overworked. Some models are protected from burning out by a "thermal protection" automatic reset switch, and others by impedance coil windings. The latter is not quite as powerful. The feed rate can be easily adjusted from "0" to full by increasing or decreasing the stroke length.

Protect yourself (wear glasses) against the high pressure that may be present when you disconnect a discharge line. There is always danger of electrical shock when plugging, switching, or just fumbling with electrical instruments. Make sure your three wire cord receptacle is grounded as required.

1.2 Features

- Output adjustment is made by turning a knob that varies the length of the reciprocating diaphragm yoke.
- Motor shaft, output gear shaft and camshaft bearings are sealed ball bearings with lifetime lubrication. No further gear box or motor bearings lubrication is necessary.
- All controls are at the top or side so pumps may be wall or shelf mounted.
- Each pumphead is independently adjustable for output.

1.3 Available Models

Part Number	MAX GPD	mL /min	Strokes/Min	Max. PSI
FPUDX1701	29	77	14	125
FPUDX1702	66	174	30	125
FPUDX1703	127	337	60	60
FPUDX1704	252	670	125	20

For 230 Vac/60 Hz voltage, add suffix "-230V60" to part number
For 220 Vac/50 Hz voltage, add suffix "-220V50" to part number
For 24 Vac/60 Hz voltage, add suffix "-24V60" to part number
For 12 Vdc, add suffix "-12V" to part number

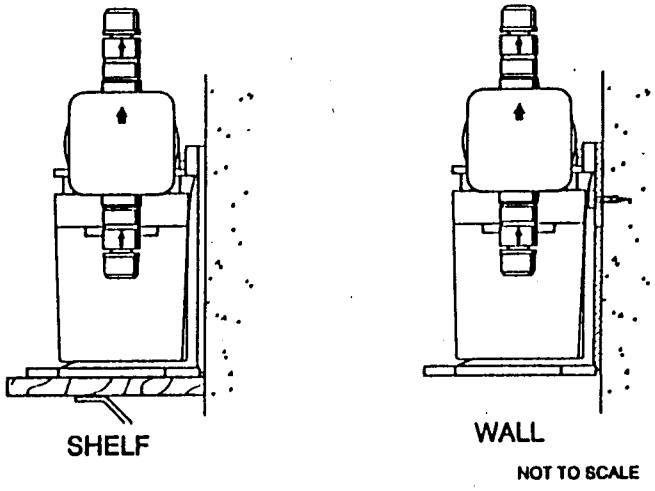
Chapter 2 Locating the Pump

2.1 Shelf Mounting

A sturdy shelf near the supply is optimal. The pump should be mounted in a sheltered, non freezing, but ventilated area. Before you choose the exact spot be sure the chemical container is located near the installation. Keep the suction line as short as practical. The unit should be offset to one side of any removable chemical tank lid. Keep the pump low for best control (priming etc), about 42" above the floor level. Avoid placing pump directly on top of the chemical supply tank.

2.2 Wall Mounting

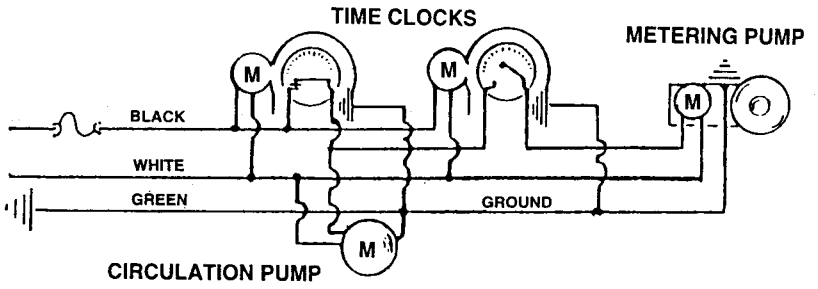
It is imperative the unit is firmly attached to its support. Wall board or plaster alone will not carry the weight and vibration. Find a wall stud for best results, or if necessary, use a wall anchor.



2.3 Electrical requirements

WARNING RISK OF ELECTRIC SHOCK

- Make sure you connect the unit to the proper power supply.
- Using the incorrect voltage will cause severe damage to the motor.
- The voltage requirement is printed on the serial number label.
- To reduce the risk of electric shock, be certain that the pump is properly grounded.

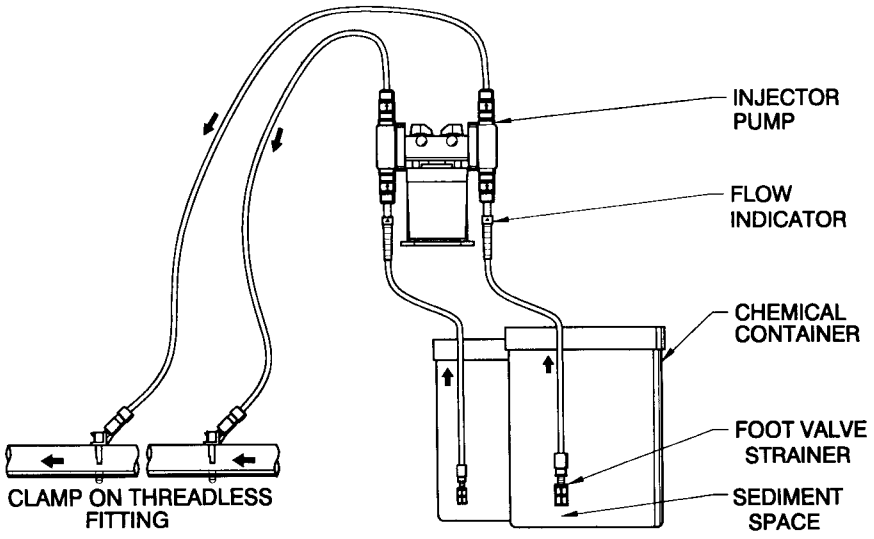


The electrical hookup is very important. The injector must never operate when treated line is shut down. The above diagram shows the injector wired within the cycle of the circulation pump or any system where chemical is used within any cycle but does or does not run a full system cycle. If your system is complicated be sure your electrician knows what is required. Remember chemicals fed to a stopped system can ruin it. The time clocks are not required or furnished. A flow or pressure switch may actuate the metering pump.

2.4 Supply Tank for Chemicals

Plastic chemical containers must be designed and manufactured for this purpose. Refuse containers must never be used. Your container must be designed for whatever chemical you are using. Also, never place the container in bright sunlight; ultra-violet rays, (UV) attack many materials which makes them become brittle.

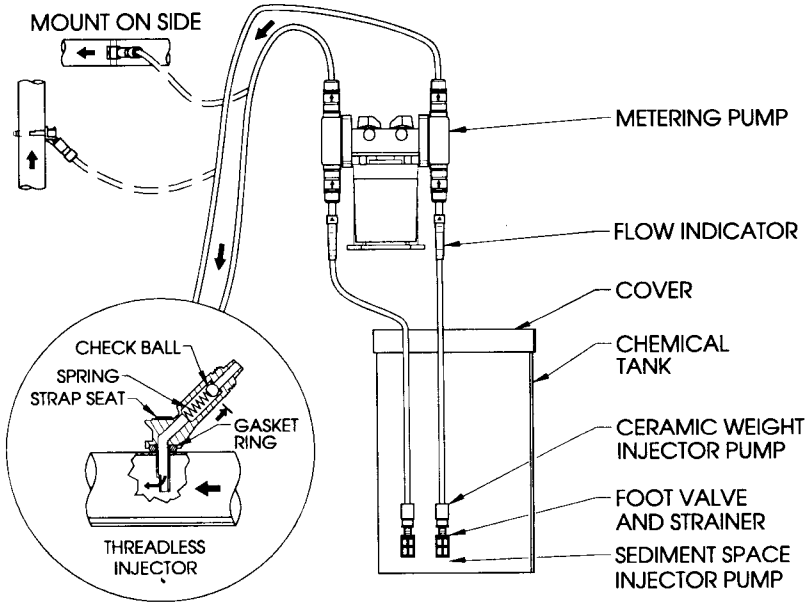
Chapter 3 Installing the Pump



Chapter 4 Operating the Pump

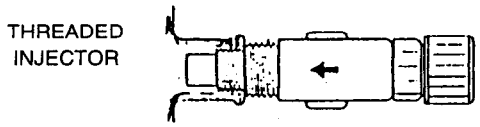
4.1 Operation

When the injector pump is shut down it does not prevent the chemical from flowing forward when suction (negative pressure) is applied to the discharge line. You must be aware that sometimes the treated line will have negative pressure. This will happen when a circulation pump shuts down and the treated water level is lower than the supply tank. So whenever you have a negative line pressure, even though the pump is shut down, the chemical will attempt to flow downwards to the lower surface (liquid seeks its own level). To prevent the chemical from siphoning downward or forward the anti-siphon valve must be used. See the following diagram.



4.2 Threadless and Threaded Connectors

To install the threadless connector, drill a 3/8" diameter hole on top or side of treated line. After removing all burrs, sandpaper the surface around the hole nice and smooth, then attach the connector (fitting) as shown. Do not over tighten the clamp. On overhead pipes install the fitting on the bottom or side, as shown. Fits $1\frac{1}{4}$", $1\frac{1}{2}$", and 2" I.P.S. only. NOTE: $\frac{1}{4}$" and/or $\frac{1}{2}$" N.P.T. injectors are available.



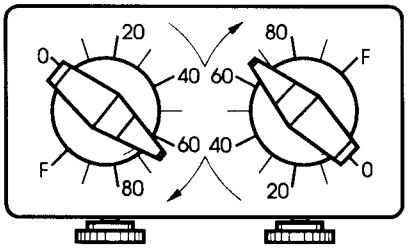
NOTE: These anti-siphon valves have no high vent.

The pump is designed to perform in a wide variety of installations. However, the service life of each part in the pump will vary, depending on many factors such as fluid, temperature, pressure, altitude, etc. Because of the wide variety of installations, the pump has been factory-tested for pressure and performance using water only. Do not use chemicals if you are not satisfied they are compatible with the pump's construction. Contact OMEGA's Engineering Department if you need assistance.

The most common problem is calcium and/or lime build up inside the injector, foot valve and tubing. This is basic material and can easily be removed by running a weak solution of muriatic acid through it. After flushing the pump with clear water place the injector fitting and foot valve with the tubing attached in a container of weak (1-5) solution of commercial grade muriatic, then pump it. After flushing out the wetted parts with clear water again, return the pump to service. CAUTION! do not allow acid and chlorine products to come in contact with each other. It is VERY DANGEROUS to your health!

4.3 Output Adjustment

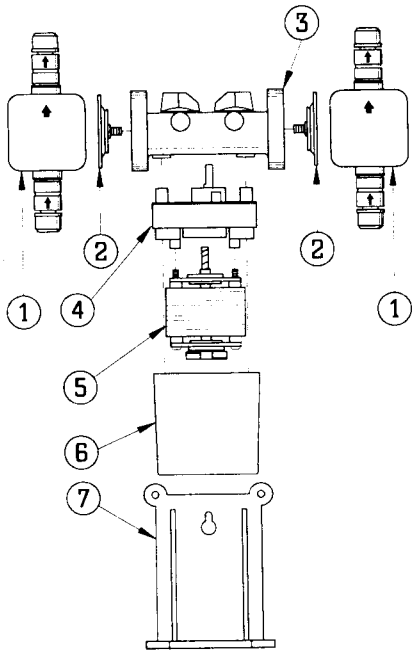
The required feed rate is usually determined by trial and error - the divisions on the dial are for percentages of full rate at given pressures. See the pump label. The dial will help you return to any previous setting. The pump is delivered to you with the adjustment set at full and the pump head may contain water used when testing it. It is suggested you start and run your pump with water, then while running turn the thumb screw counter-clockwise to loosen the adjustment knob, turn the knob to a lesser feed then up again to get the feel of it. In the beginning pump less chemical than you estimate you need then re-adjust it. After setting the dial knob you must lock it in place by turning the thumb screw clockwise.



If your installation is at a high altitude, priming may be more critical since the atmospheric pressure is decreased. If the suction line is dry, the diaphragm may not create enough pull. If this is the case, remove the tube from bottom of the head and fill with water. While the pump is running, slip the tube over the fitting. When pumping starts, place the foot valve in the chemical. You have four valves that prevent the fluid from running backwards and losing prime when pump is shut down.

Chapter 5 Replacement Parts

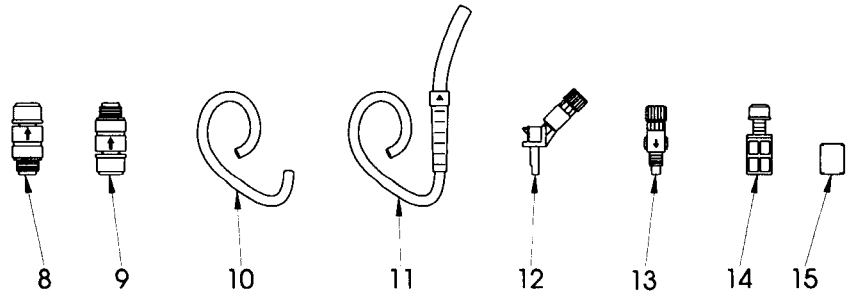
5.1 Sub Assemblies



1. PUMP HEAD ASSY. C-535A6-6
2. DIAPHRAGM C-406T
3. MOTOR BRACKET C-1701
4. GEAR BOX
   - C-618P 14 RPM
   - C-618P 30 RPM
   - C-618P 45 RPM
   - C-618P 60 RPM
   - C-618P 125 RPM
5. MOTOR
   - A-309-1 24AC
   - A-309-2 115AC
   - A-309-3 230AC
   - A-309-4 220AC 50Hz
6. BRACKET PLASTIC C-1521
7. HOUSING
   - C-1508P (115V)
   - C-608 (230V)
8. TOP VALVE FITTING C-537-6V
9. BOTTOM VALVE FITTING C-538-6V
10. POLY TUBING C-334-6-10 10FT
11. P.V.C. CLEAR TUBING 76000-618 10FT WITH FLOW INDICATOR
12. T.I. A/S VALVE FITTING T140-6V
13. 1/4 AND 1/2 N.P.T. A/S VALVE A-014HD-6V
14. FOOT VALVE C-340N-6V
15. CERAMIC WEIGHT C-346

NOTE: When replacing diaphragm be sure drive assembly is in neutral (centered), put pointer on 5. Finger tighten diaphragm to yoke's threaded hole. When re-attaching pump head tighten the four screws a little at a time. Do not oversqueeze diaphragm. Pump head assembly #1 includes top and bottom valves.

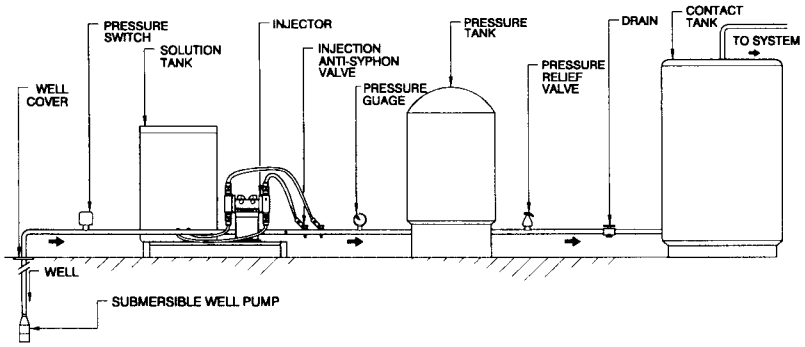
5.2 Accessories



Chapter 6 Helpful Hints

1. Chemical containers must be made for that purpose - Trash containers of any kind are not acceptable.
2. Caution: protect ourself when working with chemicals being pumped under pressure. Spraying can occur when tubes are disconnected.
3. Never attach your system to the potable city water supply - cross connections are illegal! If you have questions ask a certified plumber.
4. **Never** store chlorine and acid in the same area!
5. Treating well water with chlorine does not necessarily render it safe to drink. It may need filtering or additional treatment.
6. Do not over chlorinate - pool water requirement is 2-4 parts per million.
   NOTE: one part per million is the same proportion as one inch is to fifteen and three-quarter miles!

WATER WELLS



Chapter 7 Specifications

Pump Head Material:	Molded Polypropylene standard; Acrylic, Polyethylene, Teflon and Nylon optional
Diaghragm Material:	EP/Teflon standard; Viton and Viton/Teflon optional
O-Ring and Check Valves:	Viton Standard; Ethylene Propylene, Silicone optional
Motors:	14, 30, 60, 125 RPM
Voltage:	115Vac/60 Hz standard; 230Vac/60 Hz, 220Vac/50Hz, 24Vac/60 Hz, 12Vdc optional
Dimensions (H x W x D):	9.5" x 7.5" x 4" (241 x 191 x 102mm)
Shipping Weight:	12 lbs (5.5 kg)

Chapter 8 Pump Accessories

In-line Check Valve

In-line check valves are installed on the discharged side of the line and prevent the liquid being pumped from flowing backward. Constructed of durable polypropylene, PVC or brass, with Viton O-rings.

Model No.	Tube Size OD	O-Ring
FPUCV1	3/8"	Viton

Anti-siphon Injection Valve

Designed to prevent liquid being pumped from siphoning through the pump head during both the On and Off cycles, and to keep the liquid in the system from flowing backward through lines and fittings.

Model No.	Tube Size OD	O-Ring
FPURV1	1/4"	EP
FPURV2	1/4"	Viton
FPURV3	3/8"	EP
FPURV4	3/8"	Viton

Pressure Relief Valve

In the event of excessive line pressure, the adjustable valves automatically opens, protecting your pump from damage from excessive pressure. An added feature is the priming valve, which eliminates problems caused by line pressure.

Model No.	Tube Size OD	O-Ring
FPRV1	1/4"	EPDM
FPRV2	1/4"	Viton
FPRV3	3/8"	EPDM
FPRV4	3/8"	Viton

Foot Valve Strainers

Foot valve strainers are constructed of molded polypropylene with polypropylene screens. The screens act as filters (strainers) to keep particles from entering the suction lines and fouling the pump head. They may be used either as a foot valve or as a bulkhead fitting when equipped with adapter nut and gasket.

Part Number	Tube Size OD	O-Ring	Bulkhead Fitting
FPUSV1	1/4"	EP	FPUBV1
FPUSV2	1/4"	Viton	FPUBV2
FPUSV3	3/8"	EP	FPUBV3
FPUSV4	3/8"	Viton	FPUBV4
FPUSV5	5/8"	-	FPUBV5

Feed Indicator

Verify solution feed at a glance, no matter how cloudy or discolored tubing becomes. The rhythmic rising and falling of the float indicates positive flow, while the appearance of air bubbles is an excellent trouble shooting and diagnostic tool. Available individually or in packages of 12.

Individual Unit Part Number	Package of 12 Part Number	Tube Size OD	Float
FPUSG1	FPUSGK1	3/8"	Glass
FPUSG2	FPUSGK2	1/4"	Glass
FPUSG3	FPUSGK3	3/8"	316SS
FPUSG4	FPUSGK4	1/4"	316SS

NOTES

NOTES

NOTES

WARRANTY

OMEGA warrants this unit to be free of defects in materials and workmanship and to give satisfactory service for a period of **13 months** from date of purchase. OMEGA Warranty adds an additional one (1) month grace period to the normal **one (1) year product warranty** to cover handling and shipping time. This ensures that OMEGA's customers receive maximum coverage on each product. If the unit should malfunction, it must be returned to the factory for evaluation. OMEGA's Customer Service Department will issue an Authorized Return (AR) number immediately upon phone or written request. Upon examination by OMEGA, if the unit is found to be defective it will be repaired or replaced at no charge. However, this WARRANTY is VOID if the unit shows evidence of having been tampered with or shows evidence of being damaged as a result of excessive corrosion; or current, heat, moisture or vibration; improper specification; misapplication; misuse or other operating conditions outside of OMEGA's control. Components which wear or which are damaged by misuse are not warranted. These include contact points, fuses, and triacs.

OMEGA is glad to offer suggestions on the use of its various products. Nevertheless, OMEGA only warrants that the parts manufactured by it will be as specified and free of defects.

OMEGA MAKES NO OTHER WARRANTIES OR REPRESENTATIONS OF ANY KIND WHATSOEVER, EXPRESSED OR IMPLIED, EXCEPT THAT OF TITLE AND ALL IMPLIED WARRANTIES INCLUDING ANY WARRANTY OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE HEREBY DISCLAIMED.

LIMITATION OF LIABILITY: The remedies of purchaser set forth herein are exclusive and the total liability of OMEGA with respect to this order, whether based on contract, warranty, negligence, indemnification, strict liability or otherwise, shall not exceed the purchase price of the component upon which liability is based. In no event shall OMEGA be liable for consequential, incidental or special damages.

Every precaution for accuracy has been taken in the preparation of this manual; however, OMEGA ENGINEERING, INC. neither assumes responsibility for any omissions or errors that may appear nor assumes liability for any damages that result from the use of the products in accordance with the information contained in the manual.

SPECIAL CONDITION: Should this equipment be used in or with any nuclear installation or activity, purchaser will indemnify OMEGA and hold OMEGA harmless from any liability or damage whatsoever arising out of the use of the equipment in such a manner.

RETURN REQUESTS / INQUIRIES

Direct all warranty and repair requests/inquiries to the OMEGA ENGINEERING Customer Service Department. BEFORE RETURNING ANY PRODUCT(S) TO OMEGA, PURCHASER MUST OBTAIN AN AUTHORIZED RETURN (AR) NUMBER FROM OMEGA'S CUSTOMER SERVICE DEPARTMENT (IN ORDER TO AVOID PROCESSING DELAYS). The assigned AR number should then be marked on the outside of the return package and on any correspondence.

FOR **WARRANTY** RETURNS, please have the following information available BEFORE contacting OMEGA:

1. P.O. number under which the product was PURCHASED,
2. Model and serial number of the product under warranty, and
3. Repair instructions and/or specific problems relative to the product.

FOR **NON-WARRANTY** REPAIRS OR **CALIBRATION,** consult OMEGA for current repair/calibration charges. Have the following information available BEFORE contacting OMEGA:

1. P.O. number to cover the COST of the repair/calibration,
2. Model and serial number of product, and
3. Repair instructions and/or specific problems relative to the product.

OMEGA's policy is to make running changes, not model changes, whenever an improvement is possible. This affords our customers the latest in technology and engineering.

OMEGA is a registered trademark of OMEGA ENGINEERING, INC.

Where Do I Find Everything I Need for Process Measurement and Control? OMEGA...Of Course!

TEMPERATURE

- Thermocouple, RTD & Thermistor Probes, Connectors, Panels & Assemblies
- Wire: Thermocouple, RTD & Thermistor
- Calibrators & Ice Point References
- Recorders, Controllers & Process Monitors
- Infrared Pyrometers

PRESSURE/STRAIN FORCE

- Transducers & Strain Gages
- Load Cells & Pressure Gauges
- Displacement Transducers
- Instrumentation & Accessories

FLOW/LEVEL

- Rotameters, Gas Mass Flowmeters & Flow Computers
- Air Velocity Indicators
- Turbine/Paddlewheel Systems
- Totalizers & Batch Controllers

pH/CONDUCTIVITY

- pH Electrodes, Testers & Accessories
- Benchtop/Laboratory Meters
- Controllers, Calibrators, Simulators & Pumps
- Industrial pH & Conductivity Equipment

DATA ACQUISITION

- Data Acquisition and Engineering Software
- Communications-Based Acquisition Systems
- Plug-in Cards for Apple, IBM & Compatibles
- Datalogging Systems
- Recorders, Printers & Plotters

HEATERS

- Heating Cable
- Cartridge & Strip Heaters
- Immersion & Band Heaters
- Flexible Heaters
- Laboratory Heaters

ENVIRONMENTAL MONITORING AND CONTROL

- Metering & Control Instrumentation
- Refractometers
- Pumps & Tubing
- Air, Soil & Water Monitors
- Industrial Water & Wastewater Treatment
- pH, Conductivity & Dissolved Oxygen Instruments

M2054/0695