

# User's Guide



<http://www.omega.com>  
[e-mail:info@omega.com](mailto:info@omega.com)



**DMD-480 Series RS232/485 Bridgesensor  
AC Powered Strain Gage to RS232/485  
Computer Interface Module**



<b>OMEGAnet® On-Line Service</b> <a href="http://www.omega.com">http://www.omega.com</a>	<b>Internet e-mail</b> <a href="mailto:info@omega.com">info@omega.com</a>
---	--

**Servicing North America:**

**USA:**  
ISO 9001 Certified  
One Omega Drive, Box 4047  
Stamford, CT 06907-0047  
Tel: (203) 359-1660 FAX: (203) 359-7700  
e-mail: [info@omega.com](mailto:info@omega.com)

**Canada:**  
976 Bergar  
Laval (Quebec) H7L 5A1  
Tel: (514) 856-6928 FAX: (514) 856-6886  
e-mail: [info@omega.ca](mailto:info@omega.ca)

**For immediate technical or application assistance:**

**USA and Canada:** Sales Service: 1-800-826-6342 / 1-800-TC-OMEGASM  
Customer Service: 1-800-622-2378 / 1-800-622-BESTSM  
Engineering Service: 1-800-872-9436 / 1-800-USA-WHENSM  
TELEX: 996404 EASYLINK: 62968934 CABLE: OMEGA

**Mexico and Latin America:**  
Tel: (95) 800-826-6342 FAX: (95) 203-359-7807  
En Español: (95) 203-359-7803 e-mail: [espanol@omega.com](mailto:espanol@omega.com)

**Servicing Europe:**

**Benelux:** Postbus 8034, 1180 LA Amstelveen, The Netherlands  
Tel: (31) 20 6418405 FAX: (31) 20 6434643  
Toll Free in Benelux: 0800 0993344  
e-mail: [nl@omega.com](mailto:nl@omega.com)

**Czech Republic:** ul. Rude armady 1868, 733 01 Karvina-Hranice  
Tel: 420 (69) 6311899 FAX: 420 (69) 6311114  
Toll Free: 0800-1-66342  
e-mail: [czech@omega.com](mailto:czech@omega.com)

**France:** 9, rue Denis Papin, 78190 Trappes  
Tel: (33) 130-621-400 FAX: (33) 130-699-120  
Toll Free in France: 0800-4-06342  
e-mail: [france@omega.com](mailto:france@omega.com)

**Germany/Austria:** Daimlerstrasse 26, D-75392 Deckenpfronn, Germany  
Tel: 49 (07056) 3017 FAX: 49 (07056) 8540  
Toll Free in Germany: 0130 11 21 66  
e-mail: [info@omega.de](mailto:info@omega.de)

**United Kingdom:**  
ISO 9002 Certified  
One Omega Drive, River Bend Technology Centre  
Northbank, Irlam, Manchester  
M44 5EX, England  
Tel: 44 (161) 777-6611 FAX: 44 (161) 777-6622  
Toll Free in the United Kingdom: 0800-488-488  
e-mail: [info@omega.co.uk](mailto:info@omega.co.uk)

It is the policy of OMEGA to comply with all worldwide safety and EMC/EMI regulations that apply. OMEGA is constantly pursuing certification of its products to the European New Approach Directives. OMEGA will add the CE mark to every appropriate device upon certification.

The information contained in this document is believed to be correct, but OMEGA Engineering, Inc. accepts no liability for any errors it contains, and reserves the right to alter specifications without notice.

**WARNING:** These products are not designed for use in, and should not be used for, patient-connected applications.

## Models DMD-482-S2, DMD-483-S2, DMD-485-S2

### Description

The Models DMD-482-S2, DMD-483-S2, DMD-485-S2 is a self contained, AC powered strain gage to RS232 computer interface module. Each model contains a precision differential instrumentation amplifier, A/D converter, microprocessor and a highly regulated bridge excitation source. The unit is completely encapsulated for use in rugged environments.

### Features

- RS232 Output
- 15 Bit Resolution
- 10V Bridge Excitation Supply Capable of Driving 4 Load Cells
- Rugged Epoxy Encapsulated Design with Screw Terminals and DB9 Connector for Easy Hookup to PC
- Basic Software Program Supplied with Unit for Calibration and Data Logging
- Up to 64 addresses
- AC Powered

### Applications

- Weighing with Load Cells
- Low Frequency Strain Measurements
- Can Be Used with All Types of Low Output Sensors

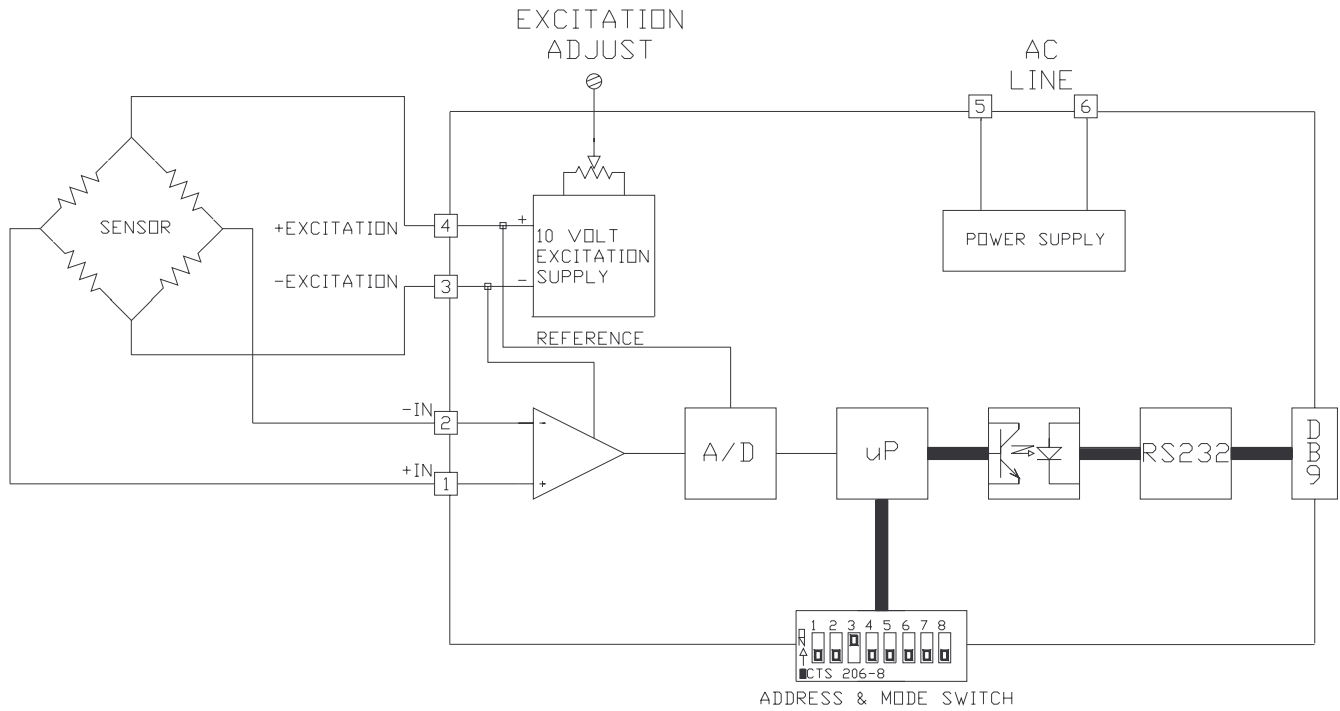
### Specifications

#### AC Powered Bridgesensors - RS232 Interface

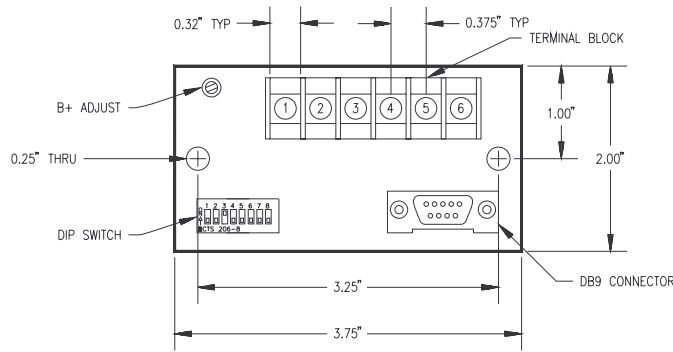
Input	Model DMD-482-S2	Model DMD-483-S2	Model DMD-485-S2
Voltage, Full Scale	±25 mV	±30 mV	±50 mV
Resistance, Differential	> 100 megohm		
Current	100 pA		
Common Mode Voltage	0 to +5 Volts		
<b>Analog to Digital Conversion</b>			
Ratiometric w/r Bridge Excitation Single Channel Input			
Resolution	1 part in 41,000		
Conversion Rate	5 times / second		
Linearity - Referred to Input	±0.01% of Full Scale		
Temperature Coefficient (0 to 55°C)			
Zero Drift - Typical	±0.75 µV / °C		
Span - Typical	±0.005% / °C		
<b>Bridge Excitation Supply</b>			
+10 Volts			
Adjustment Range	±3%		
Load Current	120 mA Maximum		
Load Regulation	1 mV Typical		
Temperature Coefficient	±0.006% / °C Typical		
<b>Isolation</b>			
Analog & Microprocessor Common to Line	500 Volts RMS		
Analog & Microprocessor Common to Serial Output	500 Volts RMS		
<b>Power Requirements</b>	115 VAC ±10V Volts 50/60 Hz 6 VA (220 VAC ±20V Available)		

# Models DMD-482-S2, DMD-483-S2, DMD-485-S2

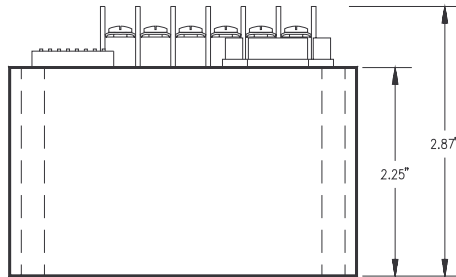
## Block Diagram



## Mechanical Specifications



TOP VIEW



SIDE VIEW

Address Switches Table

SW	1	2	3	4	5	6
ON	0	0	0	0	0	0
OFF	1	2	4	8	16	32

Mode Selection Table

SW 7	SW 8	Mode	Description
ON	ON	0	OPERATE MODE
OFF	ON	1	TEST MODE
OFF	OFF	3	TEST MODE

Terminal Strip Assignments

Screw Terminal	Function
1	+ INPUT
2	- INPUT
3	- EXCITATION
4	+ EXCITATION
5	AC
6	AC

## **Models DMD-482-S2, DMD-483-S2, DMD-485-S2**

### **RS232 Protocol**

Standard DB9 connector

Pin 2 - RX - Data Transmitted by DMD-480 Series Model

Pin 3 - TX - Data Received by DMD-480 Series Model

Pin 5 - GND

Baud Rate - 4800

Parity - None

Data Bits - 8

Stop Bits - 1

ASCII code

### **Message Structure:**

To request a measurement - 5 characters

1st - "T" = Alpha command character

2nd thru 4th - unit address - 3 ASCII decimal digits 000 to 063

5th - CR terminator = 0DH

Returned data - Sign if negative, 5 digits, CR and LF.

### **Test Modes:**

Test Mode 1 - Same as returned data above

Test Mode 3 - Unit sends a 37 character string.

The last two characters are a CR LF.

- "Mode 3: Version 941101  
address: 01" CR LF

## **Models DMD-482-S2, DMD-483-S2, DMD-485-S2**

### **A/D Conversion**

The A/D converter is ratiometric with respect to the bridge excitation supply. The 15 bit A/D provides 0.0024% resolution and is linear to 0.01% up to 10% over range input.

### **Transducer Excitation**

The bridge excitation is provided by an AC powered, regulated, low noise power supply. The excitation voltage is factory set to 10.00V and is adjustable  $\pm 3\%$  by means of a molded in potentiometer. Precisely setting the excitation to 10.00V at the bridge is not necessary due to the ratiometric A/D. If the unit is used without the built in excitation supply driving the bridge the low side of the external power supply must be connected to pin 3.

### **Software**

The 4500.BAS basic program is provided with each unit and allows the user to custom program each application. Each unit may be set up in a "Test Mode" to perform internal diagnostic tests to assist in setting up a complete system. After the system is up and running correctly, the unit may be programmed to deliver continuous data streams or to send data only on command from the host computer. Up to 64 addresses are possible with the DMD-482-S2, DMD-483-S2 or DMD-485-S2

### **Setup Procedure**

Each unit is shipped with a step by step users manual that covers the setup procedure and walks the user through the 4500.BAS program. In the event that there are any questions, OMEGA applications engineers are available to assist you on our toll free number.

## Models DMD-482-S4, DMD-483-S4, DMD-485-S4

### Description

The Models DMD-482-S4, DMD-483-S4, and DMD-485-S4 are self contained, AC powered strain gage to RS485 computer interface modules. Each model contains a precision differential instrumentation amplifier, A/D converter, microprocessor and a highly regulated bridge excitation source. Each unit is completely encapsulated for use in rugged environments.

### Features

- RS485 Output
- 15 Bit Resolution
- 10V Bridge Excitation Supply Capable of Driving 4 Load Cells
- Rugged Epoxy Encapsulated Design with Screw Terminals for Easy Hookup
- Basic Software Program Supplied with Unit for Calibration and Data Logging
- Up to 64 addresses
- AC Powered

### Applications

- Weighing with Load Cells
- Low Frequency Strain Measurements
- Can Be Used with All Types of Low Output Sensors

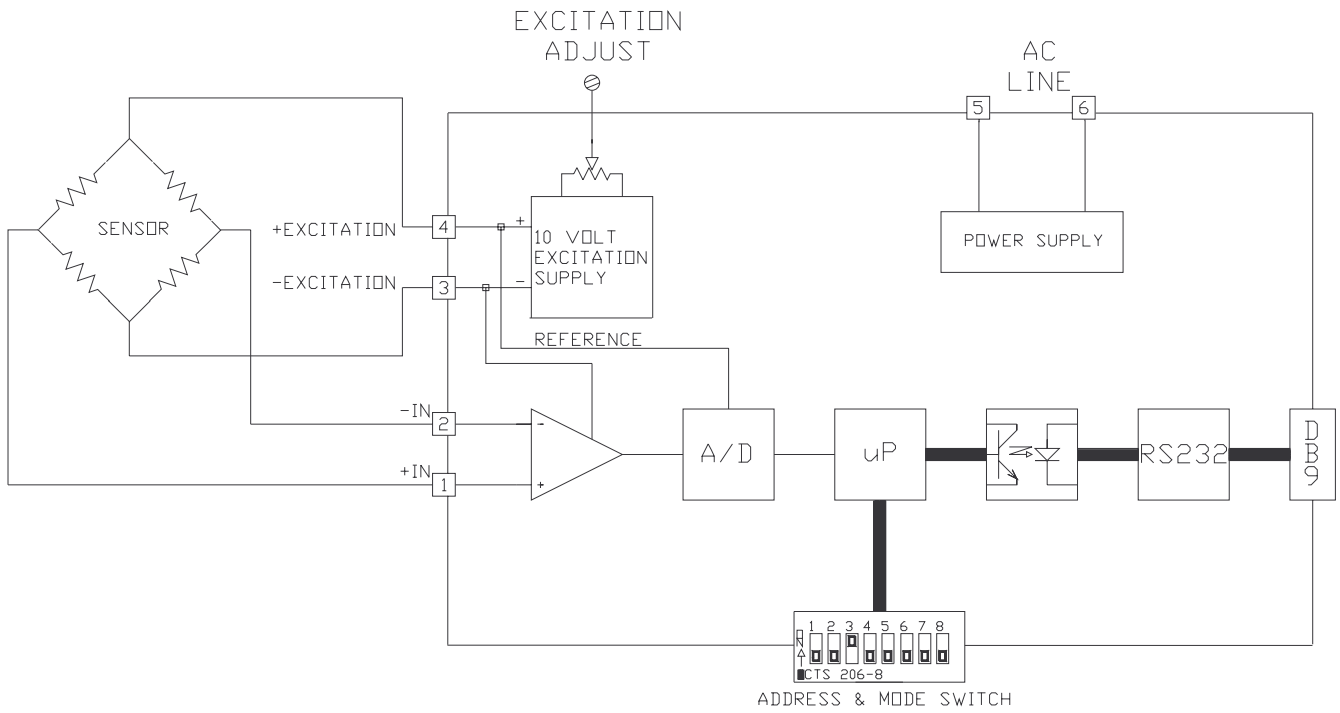
### Specifications

#### AC Powered Bridgesensors - RS485 Interface

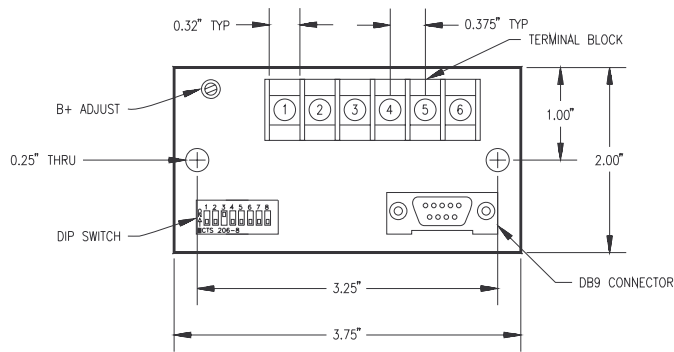
Input	DMD-482-S4	DMD-483-S4	DMD-485-S4
Voltage, Full Scale	±25 mV	±30 mV	+50 mV
Resistance, Differential	> 100 megohm		
Current	100 pA		
Common Mode Voltage	0 to +5 Volts		
<b>Analog to Digital Conversion</b>			
Ratiometric w/r Bridge Excitation Single Channel Input			
Resolution	1 part in 41,000		
Conversion Rate	5 times / second		
Linearity - Referred to Input	±0.01% of Full Scale		
Temperature Coefficient (0 to 55°C) Zero Drift - Typical	±0.75 µV / °C		
Span - Typical	±0.005% / °C		
<b>Bridge Excitation Supply</b>			
+10 Volts			
Adjustment Range	±3%		
Load Current	120 mA Maximum		
Load Regulation	1 mV Typical		
Temperature Coefficient	±0.006% / °C Typical		
<b>Isolation</b>			
Analog & Microprocessor Common to Line	500 Volts RMS		
Analog & Microprocessor Common to Serial Output	500 Volts RMS		
<b>Power Requirements</b>	115 VAC ±10V Volts 50/60 Hz 6 VA (220 VAC ±20V Available)		

# Models DMD-482-S4, DMD-483-S4, DMD-485-S4

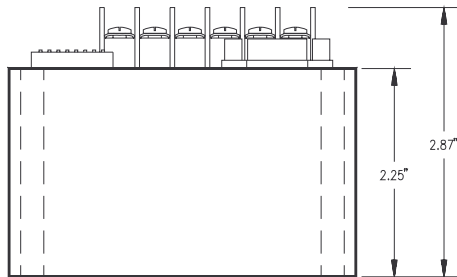
## Block Diagram



## Mechanical Specifications



TOP VIEW



SIDE VIEW

Address Switches Table

SW	1	2	3	4	5	6
ON	0	0	0	0	0	0
OFF	1	2	4	8	16	32

Mode Selection Table

SW 7	SW 8	Mode	Description
ON	ON	0	OPERATE MODE
OFF	ON	1	TEST MODE
OFF	OFF	3	TEST MODE

Terminal Strip Assignments

Screw Terminal	Function
1	+ INPUT
2	- INPUT
3	- EXCITATION
4	+ EXCITATION
5	AC
6	AC



## **Models DMD-482-S4, DMD-483-S4, DMD-485-S4**

### **RS485 Protocol**

#### Terminal Block

Terminal 1 = Common

Terminal 2 = +RX *Data Received by DMD-480 Series Model*

Terminal 3 = -RX

Terminal 4 = +TX *Data Transmitted by DMD-480 Series Model*

Terminal 5 = -TX

Terminal 6 = +RX

Terminal 7 = -RX

Terminal 8 = +TX

Terminal 9 = -TX

Baud Rate = 4800

Parity = None

Data Bits = 8

Stop Bits = 1

ASCII code

#### **Message Structure:**

To request a measurement - 5 characters

1st - "T" = Alpha command character

2nd thru 4th - unit address - 3 ASCII decimal digits 000 to 063

5th - CR terminator = 0DH

Returned data - Sign, 5 digits, CR and LF

#### **Test Modes:**

Test Mode 1 - Same as returned data above

Test Mode 3 - Unit sends a 37 character string.

The last two characters are a CR LF.

- "Mode 3: Version 941101

address: 01" CR LF

## **Models DMD-482-S4, DMD-483-S4, DMD-485-S4**

### **A/D Conversion**

The A/D converter is ratiometric with respect to the bridge excitation supply. The 15 bit A/D provides 0.0024% resolution and is linear to 0.01% up to 10% over range input.

### **Transducer Excitation**

The bridge excitation is provided by an AC powered, regulated, low noise power supply. The excitation voltage is factory set to 10.00V and is adjustable  $\pm 3\%$  by means of a molded in potentiometer. Precisely setting the excitation to 10.00V at the bridge is not necessary due to the ratiometric A/D. If the unit is used without the built in excitation supply driving the bridge the low side of the external power supply must be connected to pin 3.

### **Software**

The 4500.BAS basic program is provided with each unit and allows the user to custom program each application. Each unit may be set up in a "Test Mode" to perform internal diagnostic tests to assist in setting up a complete system. After the system is up and running correctly, the unit may be programmed to deliver continuous data streams or to send data only on command from the host computer. Up to 64 addresses are possible with the DMD-482-S4, DMD-483-S4, DMD-485-S4.

### **Setup Procedure**

Each unit is shipped with a step by step users manual that covers the setup procedure and walks the user through the 4500.BAS program. In the event that there are any questions, CALEX applications engineers are available to assist you on our toll free number.

## WARRANTY/DISCLAIMER

OMEGA ENGINEERING, INC. warrants this unit to be free of defects in materials and workmanship 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 malfunctions, 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. OMEGA's WARRANTY does not apply to defects resulting from any action of the purchaser, including but not limited to mishandling, improper interfacing, operation outside of design limits, improper repair, or unauthorized modification. This WARRANTY is VOID if the unit shows evidence of having been tampered with or shows evidence of having been 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 are not warranted, including but not limited to contact points, fuses, and triacs.

**OMEGA is pleased to offer suggestions on the use of its various products. However, OMEGA neither assumes responsibility for any omissions or errors nor assumes liability for any damages that result from the use of its products in accordance with information provided by OMEGA, either verbal or written. OMEGA warrants only 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, EXPRESS 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.**

CONDITIONS: Equipment sold by OMEGA is not intended to be used, nor shall it be used: (1) as a "Basic Component" under 10 CFR 21 (NRC), used in or with any nuclear installation or activity; or (2) in medical applications or used on humans. Should any Product(s) be used in or with any nuclear installation or activity, medical application, used on humans, or misused in any way, OMEGA assumes no responsibility as set forth in our basic WARRANTY / DISCLAIMER language, and, additionally, purchaser will indemnify OMEGA and hold OMEGA harmless from any liability or damage whatsoever arising out of the use of the Product(s) in such a manner.

## RETURN REQUESTS/INQUIRIES

Direct all warranty and repair requests/inquiries to the OMEGA 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.

The purchaser is responsible for shipping charges, freight, insurance and proper packaging to prevent breakage in transit.

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

1. Purchase Order 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, consult OMEGA for current repair charges. Have the following information available BEFORE contacting OMEGA:

1. Purchase Order number to cover the COST of the repair,
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.

©Copyright 1999 OMEGA ENGINEERING, INC. All rights reserved. This document may not be copied, photocopied, reproduced, translated, or reduced to any electronic medium or machine-readable form, in whole or in part, without the prior written consent 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 AND FORCE**

- ☑ Transducer & Strain Gauges
- ☑ 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 & 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