User's Guide

CE

OMEGA
An OMEGA Technologies Company
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CCT-01, CCT-04, CCT-08, CCT-32

Voltage and Current Input Signal Conditioners

M2215/1201

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OPEN THE HOUSING

PROCEDURE

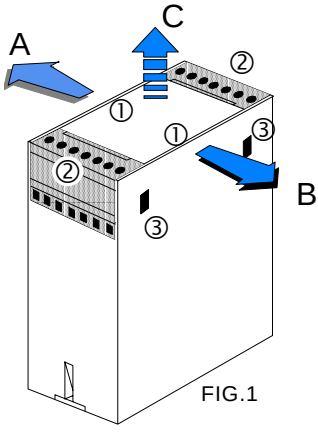


FIG.1

1. Insert a screwdriver or similar tool in the points marked ①.
2. Turn the screwdriver until the case walls begin to separate towards **A** and **B**, so the two side lugs ③, are free.
3. Grab the Signal Conditioner body, at the points marked ②, and pull it towards **C**, until the two side lugs ③ are out of their housing and the internal circuits are visible. See the sketch below for the disassembly of the circuit boards.
4. Before reinserting the Signal Conditioner body into the case, the following must be checked :

-The front label (blue color) must be in its correct position, with terminals 1 and 7 (power supply) separated from the other terminals.

-The three internal modules must be inserted correctly in their internal case guides.

INTERNAL OVERVIEW

A. "ME" Input module.
B. "MS" Output module.
C. "MA" Power supply module.
D. "MP" Input Board.

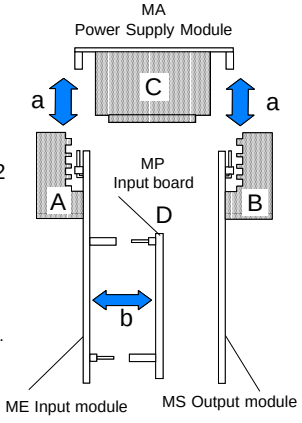


FIG.2

PROCEDURE FOR DISASSEMBLY

1. Pull out the "ME" input module towards "a".
2. Pull out the "MS" output module towards "a".
3. Pull out the "MP" input board towards "b".
4. To assemble reverse the procedure.

POWER SUPPLY

RECOMENDED WIRING

The power supply must be connected to terminals 1 and 7. The characteristics of the power supply are shown on the side label.

WARNING.- If the power supply is dc voltage, be careful with the polarity indicated for each terminal.

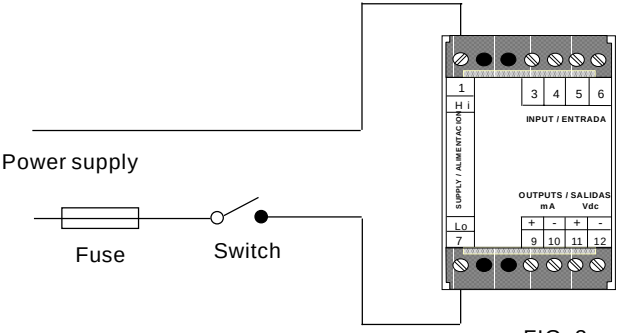


FIG. 3

PRECAUTIONS

The installation must incorporate safety devices to protect the operator and the process when using the Transmitter to control a machine or process where injury to personnel or damage to equipment or process, may occur as a result of failure of the Transmitter.

PROTECTIONS

See on table 1 the recommended value of the fuse for the different power supply availables.

Power supply	Fuse value
230 Vac	50 mA
115 Vac	100 mA
48 Vac	150 mA
24 Vac	300 mA
24 Vdc	300 mA

TABLE 1

CHANGING THE POWER SUPPLY

The unit is not provided with a system to change the power supply. Therefore if the power supply must be modified to other value, please replace the module MA for another one appropriate to the new characteristics. Contact your local distributor for instructions.

SIGNAL OUTPUT module MS

The signal conditioner provides two different analog output signals, both proportional to the signal input.

Output in Current: 4 to 20 mA, terminals 9 - 10
Output in Voltage: 0 to 10 Vdc, terminals 11 - 12

Do not use both outputs simultaneously. Only one selection can be made.
The side label shows which one is selected.

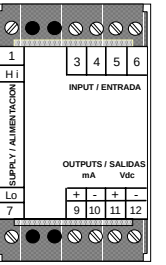


FIG.5

CHANGING THE SIGNAL OUTPUT

All signal conditioners are delivered as a standard version, with the analog output selected as 4 to 20 mA, unless specified otherwise. To select a 0 to 10 V output, remove jumpers E and F as shown in Figure 6. Other non-standard output voltage and current ranges may be obtained by adding and/or replacing resistors given in Tables 2 and 3.

NON STANDARD OUTPUT VOLTAGES

TABLE 2

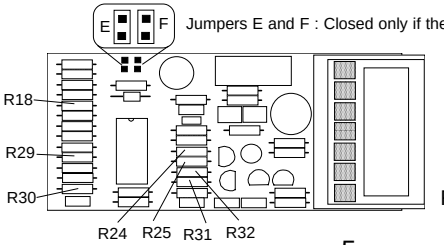
Output in V.	Value in KΩ for : R29	R30	R31	R32
±10	49.9	-----	200	----
0 to 1	-----	-----	11	100
0 to 5	-----	-----	100	100
1 to 5	-----	100	66.5	100

NON STANDARD OUTPUT CURRENTS

TABLE 3

Output in mA.	Value in Ω for : R18	R24	R25
0 to 5	-----	100	-----
0 to 10	-----	49.9	-----
1 to 5	100 K	124	-----
0 to 20	-----	-------	24.9

"-----" means "Resistor must not be installed"



Jumpers E and F : Closed only if the output is 4 to 20 mA.

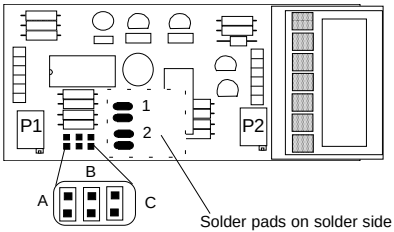
Replace or add the indicated resistors with the values shown in Tables 2 and 3 for the desired output.

FIG.6

SIGNAL INPUT, module ME
OVERVIEW

This module together with the "MP" input board, performs all the input signal conditioning (see Fig. 2). This module contains the trimmers and jumpers for the amplifier gain and the low level output (offset).
The signal input connections are made at Terminals 3, 4, 5 and 6.
Each model may use some of these terminals, see the Connections Section.

FIG.7



P1 : Output zero adjustment.
P2 : Gain amplifier adjustment.

OFFSET ADJUST

Solder pad 1 if closed : Adjust the low range level of the output (Offset positive coarse).
Solder pad 2 if closed : Adjust the low range level of the output (Offset negative coarse).
Jumper A if closed : Adjust the low range level of the output (Offset negative fine).

AMPLIFIER GAIN

Jumper B if closed : Gain at maximum level
Jumper C if closed : Gain at medium level.
Jumpers B and C opened : Gain at minimum level.

CCT-01: DC VOLTAGE and CCT-08: AC VOLTAGE.
ELECTRICAL FEATURES

INPUT

Table 4 indicates all the standard available ranges for these models and their electrical specifications. The position of the jumpers are indicated in Fig. 8.
For different signal ranges, contact the engineering department for more information.

Reference	A	B	C	D	E
Range	0 to 100 mV	0 to 1 V	0 to 10 V	0 to 100 V	0 to 650 V
Min. input span *	10 mV	0.1 V	1 V	10 V	100 V
Impedance	100 KΩ	100 KΩ	1 MΩ		
Overvoltage	25 V	75 V	1,000 V for dc / 750 V for ac		

* The Minimum Input Span is the minimum difference between the maximum and minimum input for a full scale output (4 to 20 mA or 0 to 10 Vdc) .

TABLE 4

OUTPUT

0 to 20 mA or 4 to 20 mA	R_L < 600 Ω max. 22 mA ±3%
0 to 10 Vdc	R_L > 1000 Ω max. 11 V ±3%
ACCURACY	≤ 0.2 % FS for Model CCT-01 ≤ 0.3 % FS for Model CCT-08
RESPONSE TIME	≤ 250 mS
GALVANIC ISOLATION	Input, Output and Power Supply are all isolated to 2 kVeff 50 Hz/1 m.

GENERAL SPECIFICATIONS

RIPPLE	≤ 0.5 %
BAND PASS	1.5 Hz (-3 dB)
STORAGE TEMPERATURE	-30° to +80°C
OPERATING TEMPERATURE	-10° to +60°C
TEMPERATURE COEFFICIENT	≤ 0.015 %/°C
STANDARD POWER SUPPLY	115 Vac (±10%) 50/60 Hz
POWER CONSUMPTION	≤ 1.5 VA
TEST VOLTAGE	5 kVeff. 50 Hz/1m.

SIGNAL INPUT RANGE SELECTION

Set the jumpers to the position indicated in Table 5 for each range. The jumpers are located on the "MP" input board. See Fig. 8.
If the signal input range is modified, follow the adjustment and calibration procedure.

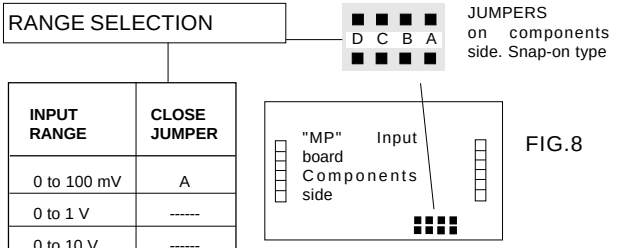


FIG.8

INPUT RANGE	CLOSE JUMPER
0 to 100 mV	A
0 to 1 V	------
0 to 10 V	------
0 to 100 V	D
0 to 650 V	B

TABLE 5

ADJUSTMENT AND CALIBRATION PROCEDURE

1. When input and output signal values are determined, remove the conditioner case. (Fig. 2).
2. Check if the power supply value is correct. (See the characteristics label).
3. Select on the input board the desired Voltage range, according to Table 5.
   Caution : Do not confuse the jumpers on the "MP" board with the jumpers on the "ME" module, (all of the jumpers on the "ME" board must be opened).
   Select the desired output (voltage or current), on the "MS" output module, using jumpers "E" and "F". (Fig. 6).
4. Connect the calibrator to the conditioner terminals : 4 and 6 for signal > 1 V.
   : 5 and 6 for signal < 1 V.
5. Connect a digital multimeter, to the signal output terminals : 11 and 12 for Voltage output.
   : 9 and 10 for Current output.
6. Power up the signal conditioner with the appropriate power supply.
7. Adjust the calibrator until it generates the low signal level.
8. Turn the "ZERO" trimmer (P1), located on the "ME" input module, until the multimeter shows the desired low level signal output. (For example: 0 Vdc).
9. Adjust the calibrator until it generates the high signal level.
10. Turn the "GAIN" trimmer (P2), located on the "ME" input module, until the multimeter shows the desired high level signal output. (For example: 10 Vdc).
11. Repeat steps 7 to 10, until the two values are correct.

CCT-04: AC CURRENT, ELECTRICAL FEATURES

SIGNAL INPUT

Table 6 indicates two standard available ranges for the CCT-04 and its electrical specifications. Using the jumpers located on the "MP" Input board, 5 different ranges may be selected. (Table 7) For other signal ranges, contact the engineering department for more information.

Reference	A	B
Input range	0 to 50 mAac	0 to 5 Aac
Min. input Span *	5 mAac	500 mAac
Impedance	20 KΩ	0.02 Ω
Overload	100 mAac	7.5 Aac

TABLE 6

* The Minimum Input Span is the minimum difference between the maximum and minimum input for a full scale output (4 to 20 mA or 0 to 10 Vdc) .

OUTPUT

0 to 20 mA or 4 to 20 mA	R_L < 600 Ω max. 22 mA ±3%
0 to 10 Vdc	R_L > 1000 Ω max. 11 V ±3%
ACCURACY	≤ 0.3 % FS
RESPONSE TIME	≤ 250 mS
GALVANIC ISOLATION	Input, Output and Power Supply are all isolated to 2 kVeff 50 Hz/1 m.

GENERAL SPECIFICATIONS

RIPPLE	≤ 0.5 %
BAND PASS	1.5 Hz (-3 dB at 3Hz)
STORAGE TEMPERATURE	-30° to +80°C
OPERATING TEMPERATURE	-10° to +60°C
TEMPERATURE COEFFICIENT	≤ 0.015 %/°C
STANDARD POWER SUPPLY	115 Vac (±10%) 50/60 Hz
POWER CONSUMPTION	≤ 1.5 VA
TEST VOLTAGE	4 kVeff. 50 Hz/1m.

SIGNAL INPUT RANGE SELECTION

Set the jumpers to the position indicated in table below for each range. The jumpers are located on the "MP" input board. See Fig. 9.

Certain input ranges require the addition of a shunt resistor. Resistor values are listed in Table 7.

If the signal input range is modified, follow the adjustment and calibration procedure described below.

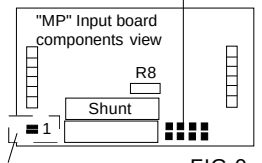
RANGE SELECTION

D C B A

JUMPERS on components side. Snap-on type

INPUT RANGE	CLOSE JUMPER/ SOLDER PAD	RESISTANCE OF SHUNT
0 to 5 mAac	A & D	20 Ω (R8)
0 to 50 mAac	D	20 Ω (R8)
0 to 500 mAac	A & 1	0.2 Ω 3 W
0 to 1 Aac	A & 1	0.1 Ω 3 W
0 to 5 Aac	A & 1	0.02 Ω 3 W

TABLE 7



SOLDER PAD 1 located on solder side.

FIG.9

20 Ω shunt resistor (R8) are factory installed. Please DO NOT remove when resistance shunts for other ranges are installed.

ADJUSTMENT AND CALIBRATION PROCEDURE

1. When input and output signal values are determined, remove the conditioner case (Fig. 2).
2. Check if the power supply value is correct. (See the characteristics label).
3. Select the desired Voltage range, according to the Table 7, using jumpers "A", "D" and 1. Caution : Do not confuse with the jumpers on "ME" module (all of those must be opened). Select the desired output (voltage or current), on the "MS" output module, using jumpers "E" and "F". (Fig. 6).
4. Connect a calibrator to the conditioner Terminals 5 - 6
5. Connect a digital multimeter, to the signal output terminals : 11 and 12 for Voltage output.

   : 9 and 10 for Current output.
6. Power up the conditioner with the appropriate power supply.
7. Adjust the calibrator until it generates the low signal level.
8. Turn the "ZERO" trimmer (P1), located on the "ME" input module, until the multimeter shows the desired low level signal output. (For example: 0 Vdc).
9. Adjust the calibrator until it generates the high signal level.
10. Turn the "GAIN" trimmer (P2), located on the "ME" input module, until the multimeter shows the desired high level signal output. (For example: 10 Vdc).
11. Repeat steps 7 to 10, until the two values are correct.

CCT-32: DC CURRENT, ELECTRICAL FEATURES

SIGNAL INPUT

Table 8 indicates two standard available ranges for the CCT-32 and its electrical specifications. Using the jumpers located on the "MP" input board and "ME" input module, 4 different ranges may be selected. (Table 9)
For other signal ranges, contact the engineering department for more information.

Reference	A	B
Input range	0 to 5 mAdc	0 to 50 mAdc
Min. input Span *	0.5 mAdc	5 mAdc
Impedance	20 Ω	20 Ω
Overload	100 mAdc	100 mAdc

TABLE 8

* The Minimum Input Span is the minimum difference between the maximum and minimum input for a full scale output (4 to 20 mA or 0 to 10 Vdc) .

OUTPUT

0 to 20 mA or 4 to 20 mA	R_L < 600 Ω max. 22 mA ±3%
0 to 10 Vdc	R_L > 1000 Ω max. 11 V ±3%
ACCURACY	≤ 0.2 % FS
RESPONSE TIME	≤ 250 mS
GALVANIC ISOLATION	Input, Output and Power Supply are all isolated to 2 kVeff 50 Hz/1 m.

GENERAL SPECIFICATIONS

RIPPLE	≤ 0.5 %
BAND PASS	1.5 Hz (-3 dB)
STORAGE TEMPERATURE	-30° to +80°C
OPERATING TEMPERATURE	-10° to +60°C
TEMPERATURE COEFFICIENT	≤ 0.015 %/°C
STANDARD POWER SUPPLY	115 Vac (±10%) 50/60 Hz
POWER CONSUMPTION	≤ 1.5 VA
TEST VOLTAGE	4 kVeff. 50 Hz/1m.

SIGNAL INPUT RANGE SELECTION

Set the jumper to the position indicated in the table below for each range. The jumpers are located on the "MP" input board. See Fig. 10.
If the signal input range is modified, follow the adjustment and calibration procedure.

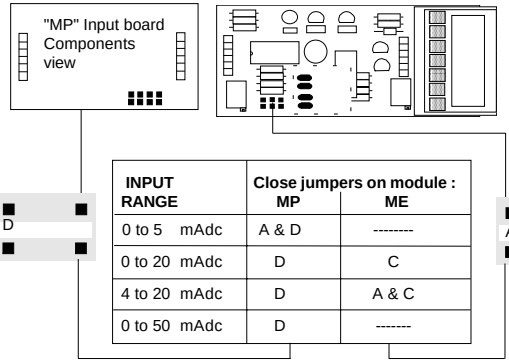


FIG.10

INPUT RANGE	Close jumpers on module : MP	ME
0 to 5 mAdc	A & D	--------
0 to 20 mAdc	D	C
4 to 20 mAdc	D	A & C
0 to 50 mAdc	D	-------

TABLE 9

ADJUSTMENT AND CALIBRATION PROCEDURE

1. When input and output signal values are determined, remove the conditioner case. (Fig. 2).
2. Check if the power supply value is correct. (See the characteristics label).
3. Select on the input board the desired Voltage range, according to Table 9, using jumpers "A", "D" (Fig. 10).
   Caution : Do not confuse with the jumpers on the "ME" module (all of those must be opened).
   Select on the "MS" output module the desired output (voltage or current), using jumpers "E" and "F". (Fig. 6 page 5).
4. Connect a calibrator to the appropriate conditioner input terminals.
5. Connect a digital multimeter, to the signal output terminals : 11 and 12 for Voltage output.
   : 9 and 10 for Current output.
6. Power up the conditioner with the appropriate power supply.
7. Adjust the calibrator until it generates the low signal level.
8. Turn the "ZERO" trimmer (P1), located on the "ME" input module, until the multimeter shows the desired low level signal output. (For example: 0 Vdc).
9. Adjust the calibrator until it generates the high signal level.
10. Turn the "GAIN" trimmer (P2), located on the "ME" input module, until the multimeter shows the desired high level signal output. (For example: 10 Vdc).
11. Check terminals 3 and 6, for the auxiliary voltage value of +24 Vdc (To power the current-loop, @ 25 mA)
12. Repeat steps 7 to 10, until the two values are correct.

CONNECTIONS

CCT-01 and 08

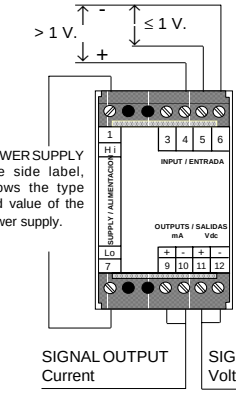


FIG.11

CCT-04

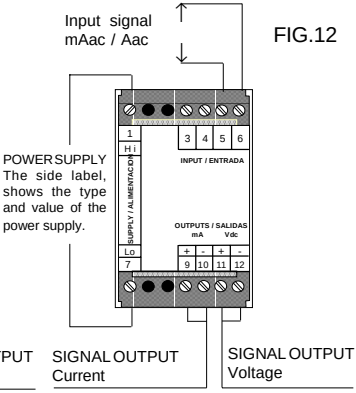


FIG.12

CCT-32

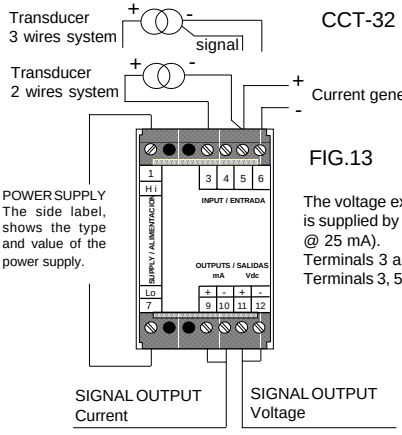
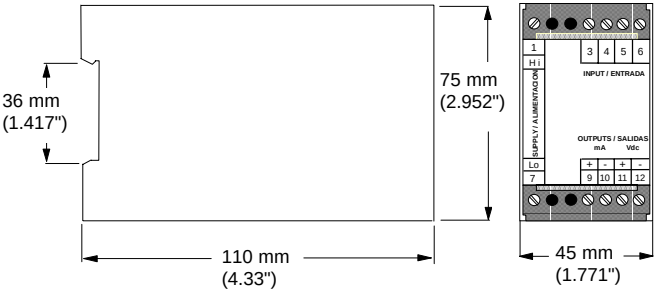


FIG.13

The voltage excitation for the current loop, it is supplied by the signal conditioner (24 Vdc @ 25 mA).
Terminals 3 and 5, for 2 wires transducers.
Terminals 3, 5 and 6 for 3 wires transducers.

MECHANICAL

DIMENSIONS



TECHNICAL DATA

WEIGHT . . . . . 270 g.
HOUSING BASE . . . . . Polycarbonate, RAL 7032, UL 94 V-1 light grey, IP-40
TERMINAL HOUSING, COVER
AND BLIND PLUGS . . . . . Polycarbonate, UL 94 V-2 dark grey, IP-20
WIRE CROSS SECTION : . . . . . 4 mm^2
Provided with a snap fastener for attaching to DIN 46277 and DIN EN 50022 (35 x 7.5 mm) assembly rails.

NOTES

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 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. 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 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 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, 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.

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

1. P.O. 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.

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TEMPERATURE

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

PRESSURE, STRAIN AND FORCE

- Transducers & 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