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## OMNI-AMP™ I, IIA, IIB Thermocouple Amplifiers

INSTRUCTION  
SHEET

M0012/1100

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OMNI-AMP IIB Amplifier shown

### Unpacking Instructions

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

OMNI-AMP Thermocouple Amplifier (1)  
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

Note any evidence of rough handling in transit. Immediately report any damage to the shipping agent.

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.

The OMEGA® OMNI-AMP thermocouple amplifier is designed to boost small thermocouple signals up to 100 times. The OMNI-AMP amplifies the millivolt signal generated by a thermocouple (almost always less than 75 millivolts), and drives meters or readouts that are not sensitive enough to be driven directly by the small output of the thermocouple.

There may be a temptation to use the sensitive amplifier to drive a second microvolt amplifier in order to achieve even higher gains. However, the inherent noise of the combined system will rule out such use. OMNI-AMP Amplifier is ideally suited for driving millivolt meters where the full scale range is not more sensitive than 100 millivolts without further amplification. For example, when used

with a meter having a full scale reading of 100 millivolts and OMNI-AMP Amplifier set at the 100 gain position, the full scale reading of the meter will represent 1.0 millivolt source voltage. This corresponds to 77°F using a Type K, CHROMEALOMEGA® thermocouple wire, referenced at 320°F. See the OMEGA Complete Temperature Measurement Handbook and Encyclopedia® which contains Temperature-EMF tables for thermocouples.

Keep in mind, when working with microvolt signals, that there is always a possibility of picking up stray EMFs; therefore, when using the high gain positions, shielding and grounding of the input and output leads is important. Be sure to observe the proper thermocouple input polarity. Note that the output range of your OMNI-AMP Amplifier is -1.5 to +2.0 Vdc. Thermocouples are used in the range of -450°F to +5000°F and the output signals from them range from -10 millivolts to +80 millivolts. Thus, your OMNI-AMP Amplifier is ideally ranged and designed for them.

It is recommended to try using lower gain settings first and use no greater gain setting than is required. When a gain setting of one (unity) is used, zero adjust is inoperative. If a small offset EMF is present, it is recommended that the zero adjust on the readout device be used to bring the instrument to zero. For example; all panel meters have an adjusting screw to set the pointer. When using unity gain, it is only necessary to turn this adjusting screw slightly to reset the meter. Use the zero adjust on the amplifier for all other gain settings.

Your OMNI-AMP Amplifier can drive both high and low impedance devices. Most meters and readout devices have high impedance; i.e., over 1,000 ohms. With

such meters, it is generally best to operate the OMNI-AMP Amplifier as a constant voltage device. With OMNI-AMP II Amplifier, this is achieved by placing the mode switch in the volt/volt position. In the case of the OMNI-AMP I Amplifier, it is set for constant voltage mode when it leaves the factory. Certain pyrometers are low impedance devices having a circuit resistance of only a few ohms. In such cases, the OMNI-AMP Amplifier should be operated as a constant current device. With OMNI-AMP II Amplifier, simply place the mode switch in the MA/VOLT position. With OMNI-AMP I Amplifier, it is necessary to remove the cover plate and throw the small internal switch to the position suggested in the instructions on the side of the OMNI-AMP Amplifier.

Your OMNI-AMP Amplifier has been designed to have an extremely low dc drift as a function of time and temperature. However, if your application is to amplify signals which are in the region below five millivolts, you will enhance the already low drift characteristics of this instrument by first allowing a 15-minute warm up period, and then by maintaining the temperature of the OMNI-AMP Amplifier as constant as possible.

Note: OMNI-AMP IIB Amplifier with reference junction. This unit contains a selfcompensating electrical bridge network incorporating a temperature sensitive resistance element that is powered by a 3.6V lithium battery to ensure a reference junction at 0°C or 32°F. Be certain that the thermocouple used in conjunction with OMNI-AMP IIB Amplifier is of the calibration designated on the input connector.

### **Important considerations when using your OMNI-AMP Millivolt Amplifier**

Before using an OMEGA® OMNI-AMP millivolt amplifier, please check your recorder, meter or oscilloscope for the following:

1. If you are using an oscilloscope and it has a sensitivity of 1 millivolt/centimeter or better (500 microvolts/centimeter, 100 microvolts/centimeter), then OMNI-AMP Amplifier SHOULD NOT BE USED as it will not amplify your thermocouple EMF without

excessive noise. If your oscilloscope has a sensitivity of less than 1 millivolt/centimeter (500 millivolts/centimeter, 1 volt/centimeter, etc.), then your OMNI-AMP Amplifier will be quite helpful in boosting the oscilloscope sensitivity. Keep in mind that the lower the gain or sensitivity of the oscilloscope, the higher the useful gain of your OMNI-AMP Amplifier.

2. If you are using a meter which has a full scale sensitivity of 10 millivolts or better (500 microvolts full scale, 100 microvolts full scale, etc.), then your OMNI-AMP Amplifier SHOULD NOT BE USED as it will not be able to amplify the EMF without excessive noise. If your readout meter has a sensitivity of less than 10 millivolts full scale; i.e., 1 volt full scale, then your OMNI-AMP Amplifier will be very helpful in boosting the meter's sensitivity. Keep in mind that the lower the gain or sensitivity of the readout meter, the higher the useful gain of your OMNI-AMP Amplifier.
3. If you are working with an oscillograph recorder and it has a sensitivity of 1 millivolt/centimeter or better, then the OMNI-AMP Amplifier should not be used as it will not be able to amplify the EMF without excessive noise. If your oscillograph recorder has a sensitivity of less than 1 millivolt/centimeter, then your OMNI-AMP Amplifier will be very helpful in boosting the oscillograph recorder's sensitivity considerably. As with meters and oscilloscopes, keep in mind that the lower the gain or sensitivity of the oscillograph recorder, the higher the useful gain of your OMNI-AMP Amplifier.
4. The OMNI-AMP Millivolt Amplifier is NOT RECOMMENDED for use with digital readout meters unless the maximum sensitivity is 1 millivolt. In any event, if a decision is made to use a OMNI-AMP Amplifier with a digital readout meter, the maximum sensitivity that can be achieved with a meter and OMNI-AMP Amplifier combination is 100 microvolts.

**Please read the operating instructions which are on the side of the OMNI-AMP I Amplifier and on the bottom of OMNI-AMP II Amplifier before using the instrument.**



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

**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's 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 in which wear is not warranted, include but are not limited to contact points, fuses, and triacs.

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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 the product, and
3. Repair instructions and/or specific problems relative to the product.

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