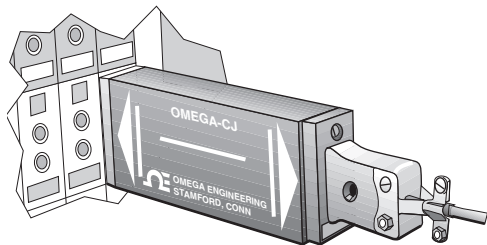


1 YEAR
WARRANTY



User's Guide



Shop online at

omega.com[®]

Ω OMEGA[®]

omega.com

e-mail: info@omega.com

**For latest product manuals:
omegamanual.info**



OMEGA[®] CJ

Thermocouple Cold-Junction Compensators

omega.com®

ΩOMEGA™

OMEGAnet® On-Line Service
omega.com

Internet e-mail
info@omega.com

Servicing North America:

U.S.A.: ISO 9001 Certified

OMEGA Engineering, Inc.

One Omega Drive, P.O. Box 4047

Stamford, CT 06907-0047 USA

Toll-Free: 1-800-826-6342

FAX: (203) 359-7700

TEL: (203) 359-1660

e-mail: info@omega.com

Canada:

976 Bergar

Laval (Quebec), H7L 5A1 Canada

Toll-Free: 1-800-826-6342 TEL: (514) 856-6928

FAX: (514) 856-6886

e-mail: info@omega.ca

For immediate technical or application assistance:

U.S.A. and Canada:

Sales Service: 1-800-826-6342/1-800-TC-OMEGA®

Customer Service: 1-800-622-2378/1-800-622-BEST®

Engineering Service: 1-800-872-9436/1-800-USA-WHEN®

Mexico/Latin America

En Español: 001 (203) 359-7803

FAX: 001 (203) 359-7807

info@omega.com.mx

e-mail: espanol@omega.com

Servicing Europe:

Benelux:

Managed by the United Kingdom Office

Toll-Free: 0800 099 3344 TEL: +31 20 347 21 21

FAX: +31 20 643 46 43 e-mail: sales@omegaeng.nl

Czech Republic:

Frystatska 184, 733 01 Karviná, Czech Republic

Toll-Free: 0800-1-66342 TEL: +420-59-6311899

FAX: +420-59-6311114 e-mail: info@omegashop.cz

France:

Managed by the United Kingdom Office

Toll-Free: 0800 466 342 TEL: +33 (0) 161 37 29 00

FAX: +33 (0) 130 57 54 27 e-mail: sales@omega.fr

Germany/Austria:

Daimlerstrasse 26, D-75392 Deckenpfronn, Germany

Toll-Free: 0800 6397678 TEL: +49 (0) 7056 9398-0

FAX: +49 (0) 7056 9398-29 e-mail: info@omega.de

United Kingdom:

ISO 9001 Certified

OMEGA Engineering Ltd., One Omega Drive,

River Bend Technology Centre, Northbank, Irlam,
Manchester M44 5BD United Kingdom

Toll-Free: 0800-488-488

TEL: +44 (0) 161 777-6611

FAX: +44 (0) 161 777-6622

e-mail: sales@omega.co.uk

It is the policy of OMEGA Engineering, Inc. 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 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, human applications.

SECTION	PAGE
SECTION 1 INTRODUCTION	1
1.1 General Description	1
1.2 Features	1
SECTION 2 UNPACKING	2
SECTION 3 OPERATION	2
3.1 Operating Procedure	2
3.2 Battery Replacement	4
3.2.1 Battery Life	4
3.2.2 Replacing the Battery	4
SECTION 4 THEORY OF OPERATION	5
SECTION 5 CALIBRATION	7
SECTION 6 SPECIFICATIONS	8

NOTES

SECTION 1 INTRODUCTION

1.1 GENERAL DESCRIPTION

The OMEGA-CJ is a portable, battery-powered automatic cold junction compensator for use in thermocouple circuits. It provides the physical and electrical equivalents of an ice bath reference thermocouple at 0°C or 32°F.

Thermocouples can be plugged directly into the OMEGA-CJ. A quick disconnect male plug and output jack with banana plugs are provided for connecting the CJ to potentiometers as well as to meters and recorders of high input impedance.

1.2 FEATURES

- High reliability - solid state circuitry with self contained battery
- Rugged construction
- Color coded thermocouple calibration
- Instantaneous warm-up
- High Stability - better than $\pm 0.2^{\circ}\text{C}$ at any stabilized temperature over its full $+10^{\circ}$ to 50°C range
- Extreme versatility - unit can be plugged directly into a thermocouple or into a jack panel.
- Long battery life - 1500 hours or longer depending on calibration.

SECTION 2 UNPACKING

Remove the Packing List and verify that you have received all equipment. If you have any questions about the shipment, please call OMEGA Customer Service Department at 1-800-622-2378 or (203) 359-1660.

When you receive the shipment, inspect the container and equipment for any 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 any claims unless all shipping material is saved for their examination. After examining and removing contents, save packing material and carton in the event reshipment is necessary.

SECTION 3 OPERATION

3.1 OPERATING PROCEDURE

The OMEGA-CJ comes complete with quick-disconnect male plug and output jack with banana plugs for connecting to potentiometers, meters and recorders of high impedance. Thermocouples can be plugged directly into the OMEGA-CJ.

Operation is instant; the OMEGA-CJ's solid-state design requires no warm-up.

1. Connect output to OMEGA-CJ (TO INSTRUMENT) to readout instrument. Copper wire extension leads must be used.
2. Connect thermocouple to other end of OMEGA-CJ (TO THERMOCOUPLE). If thermocouple probe is not directly coupled to OMEGA-CJ, it is necessary to use thermocouple extension wires from the thermocouple to the OMEGA-CJ.
3. Move ON-OFF slide switch to ON to energize unit.
4. The readout instrument will now indicate the actual temperature, unaffected by ambient temperature changes.

NOTE

OMEGA-CJ has an internal resistance of up to 250 ohms, depending on calibration; therefore, readout instruments of high input resistance (impedance) must be used to minimize errors. Following use, always move ON-OFF slide switch to OFF to conserve the battery.

3.2 BATTERY REPLACEMENT

3.2.1 Battery Life

The self-contained battery is a mercury cell - 1.35V Mallory RM401R, or equivalent. Designated life in continuous operation is as follows:

Calibration	Approximate Life (hours)
Chromel-Alumel	3000
Iron-Constantan	1500
Copper-Constantan	3800
Chromel-Constantan	1800
Pt/10% Rh-Pt	7800
Pt/13% Rh-Pt	7800
W-W/26% Re	5000
W/5% Re-W/26% Re	5000
W/3% Re-W/25% Re	5000

3.2.2 Replacing the Battery

The indicator on the face of the OMEGA-CJ, powered by depressing the BAT TEST push button, indicates when the battery replacement is necessary. The battery should be replaced when the indicator becomes dim.

To replace the battery, remove the cover plate by unscrewing the single flathead screw and snap out the battery. Follow correct polarity when installing the replacement battery.

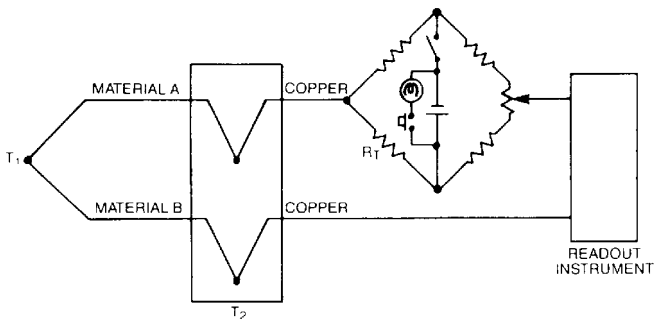


Figure 4-1. Wiring Diagram

As the ambient temperature surrounding the cold junction varies, a thermally generated voltage appears and produces an “error”. However, an equal and opposite voltage produced by the bridge is automatically introduced in series with the “error” voltage, canceling the “error”. This maintains the reference temperature over a wide ambient temperature range with a high degree of accuracy.

By integrating copper leads with the cold junction, the thermocouple material itself is not connected to the input terminals of the measurement instrument, thereby eliminating secondary errors.

SECTION 5 CALIBRATION

1. Remove the cover plate by unscrewing the single flathead screw located on the back of the unit (see Figure 5-1).

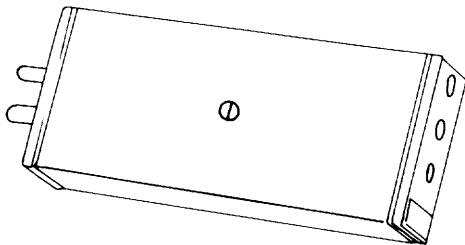


Figure 5-1. OMEGA-CJ

2. Connect CJ to the thermocouple probe and readout instrument.
3. Place the thermocouple probe into an icebath and wait about 10 minutes for system to stabilize.
4. Adjust the ZERO POTENTIOMETER (located on the printed circuit board inside the CJ) until the readout instrument shows "0" (zero).
5. Replace cover plate and secure with screw.

SECTION 6 SPECIFICATIONS

Reference Temperature Setting:	0°C or 32°F
Compensation Accuracy:	±1/4°C at 25°C ambient setting ±1/2°C from 15° to 35°C ambient ±3/4°C at 10° to 50°C ambient
Storage Temperature:	-25° to +75°C (without battery)
Internal Resistance (Impedance):	less than 250 ohms
Calibrations Available:	Chromega®-Alomega™ Iron-Constantan Copper-Constantan CHROMEGA-Constantan Pt/10% Rh-Pt Pt/13% Rh-Pt W-W/26% Re W/5% Re-W/26% Re W/3% Re-W/25% Re
Battery:	1.35V Mallory mercury cell (RM401R)
Dimensions (H x L W):	1¼" x 4¾" x ¾" (44.45 x 106.36 x 19.05 mm)
Weight:	12 oz (342.0 g)

NOTES

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'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.

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 the company 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.

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 the 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 2011 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!**

Shop online at omega.comSM

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

- ☑ Transducers & Strain Gages
- ☑ Load Cells & Pressure Gages
- ☑ 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