

1 YEAR
WARRANTY



OMEGA® User's Guide

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Model CL-300 Portable Thermocouple Source

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Section 1 Introduction

1.1 Description

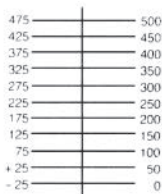
The OMEGA® Model CL-300 Thermocouple Source provides 22 precise temperature equivalent millivolt signals to transmitters, recorders, controllers, alarms, data acquisition, and computer systems. Model CL-300 is cold-junction compensated for ambient temperature variations and provides a thermocouple connector output. Cables are available in the desired length and terminal types to exactly duplicate the thermocouples in the system being tested. Conformity to the particular thermocouple vs millivolt curve is in accordance with the latest ASTM and IPTS standards for exact temperature simulation. Linear millivolt models are also available.

Thermocouple types E, J, K, and T are available in both °F and °C. Table 1-1 lists the standard ranges. Resolution is 25°, 50°, or 100° corresponding to full scale output of 500°, 1000°, and 2100° respectively.

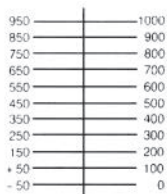
Dual ranges, with an individual “ON” position for each range, allow quick, easy settings for any output. Calibrated accuracy is $\pm 0.1\%$ of span ± 1 degree. For negative temperatures, add ± 2 degrees.

Two internal AA cells provide power for approximately one year of everyday use. A front panel LED pulses every time the unit is turned on to indicate proper battery voltage.

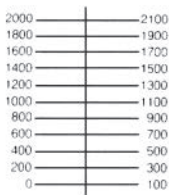
Table 1-1
Model CL-300 Standard Ranges



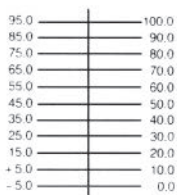
TYPE E, J, K, T °F
 TYPE E, J, K, °C



TYPE E, J, K °F
 TYPE E, J, K °C



TYPE J, K, °F



+ 0.1%
 MILLIVOLT SOURCE

1.2 Features

- Calibrate and Troubleshoot Temperature Systems
- Simulates Thermocouples J, K, E, T, R, S, or mV Source
- Choice of Cable Length and Type
- Twenty-two Precise Test Points
- Portable, Long Battery Life
- Simple to Use, Inexpensive to Own

Section 2 Installation

2.1 Unpacking

Remove the Packing List to check off actual equipment received. If you have any questions about the shipment, please call OMEGA's Customer Service Department.

Upon receipt of shipment, inspect the container for any signs of damage in transit. Take particular note of 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 shipment is necessary.

Section 3 Operation

3.1 Operating Instructions

Select the Model CL-300 for the correct thermocouple type, the desired temperature scale (F or C), and range, the ordered lead type(s).

Connect the Thermocouple Source to the thermocouple input terminals of the instrument or system to be tested.

Cold-junction compensation and instantaneous automatic standardization are built into the instrument.

Set the temperature selection switch to the desired temperature and slide the "ON" switch left or right to the selected scale. The battery check LED will pulse once indicating proper battery voltage. If no pulse is seen, the batteries should be replaced with two AA cells. Alkaline cells are preferred for longest life and widest operating temperature range.

End point calibration temperatures of the instrument are then selected on the Model CL-300 and any required adjustments are made. Intermediate points may then be selected to verify instrument linearity or check critical points.

Section 4 Service Information

4.1 Maintenance

The OMEGA CL-300 Thermocouple Source requires little servicing. Should measurement inaccuracies be discovered, perform the adjustment and calibration procedure to recalibrate the instrument.

4.2 Equipment Required for Calibration

Digital thermometer, $\pm 0.5^\circ$ accuracy with 0.1° resolution or equivalent.
Digital voltmeter, 0.05% accuracy, 10-microvolt resolution or equivalent.

The recommended technique for calibrating a Model CL-300 requires two meters. The digital thermometer is used to calibrate the output. The digital voltmeter is needed to calibrate the built-in cold-junction compensation.

4.3 Calibration Procedure

It is suggested that each time a unit is recalibrated, fresh AA batteries (MN-1500-2) should be substituted for used batteries.

- 1 Switch the unit to each "ON" positions, making sure that the battery check LED flashes.
- 2 Connect the digital thermometer, using the proper type thermocouple wire, directly to the exposed ends of the Model CL-300's output wires.

3. Connect the DVM to calibrate the cold-junction compensation as follows: The meter's positive input is connected to the negative output of the Model CL-300 and the negative lead of the meter is connected to the outermost lead. Resistor R17 at the opposite end of the board. See Figure 4-1.
4. Before the cold-junction compensation can be adjusted, the ambient temperature of the Model CL-300 must be obtained. For highest accuracy, this is done by taking a reading on the meter that is already connected to the thermocouple output leads. With the range/power switch in the center "OFF" position, the meter will read the temperature at the internal Model CL-300 terminals.
5. To set the cold-junction compensation, move the range/power switch to the right-hand "ON" position, and the temperature selector to the highest output position.
6. The compensation potentiometer is then adjusted to the value shown in Table 4-1. The span (highest mV output) of the unit is now adjusted by means of the span potentiometer for the highest temperature reading of the unit being calibrated. See figure 4-1.
7. The cold-junction compensation should again be checked, and if readjusted, the span should be rechecked.
8. There are two separate zero (lowest mV output) adjustments. With the range/power switch still in the right-hand "ON" position, move the temperature selector switch to the lowest output position. The right-hand zero is then adjusted by means of the right-hand zero potentiometer. See Figure 4-1.

9. To calibrate the left-hand zero, select the left-hand “ON” position. For the highest accuracy, the left-hand zero should be calibrated at the second lowest setting (+25° on 500° units; +50° on 1000° units, +200° on 2100° units). The left-hand zero is then adjusted by means of the left-hand zero potentiometer. (See Figure 4-1).
10. Recheck the span at the highest output. When the span and both zeros have been calibrated, check the other output positions to assure that the Model CL-300 is operating properly.
- The allowable variation in 2100° and 3100° units is $\pm 3^\circ$. For 1000° units, it is $\pm 2^\circ$. For the 500° units, the allowable tolerance is $\pm 1.5^\circ$. Add 1° to tolerances for negative temperatures.

Table 4-1
Cold Junction Compensation Set Points

Degrees C	Type E	Type J	Type K	Type T	Type R & S
20	18.151	15.409	12.071	12.130	1.788
21	18.211	15.460	12.111	12.170	1.794
22	18.272	15.512	12.152	12.211	1.800
23	18.333	15.564	12.192	12.252	1.806
24	18.394	15.615	12.233	12.292	1.812
25	18.455	15.667	12.273	12.333	1.818
26	18.516	15.719	12.314	12.374	1.824
27	18.577	15.770	12.354	12.414	1.830
28	18.638	15.822	12.395	12.455	1.836
29	18.699	15.874	12.435	12.496	1.842
30	18.760	15.926	12.476	12.537	1.848

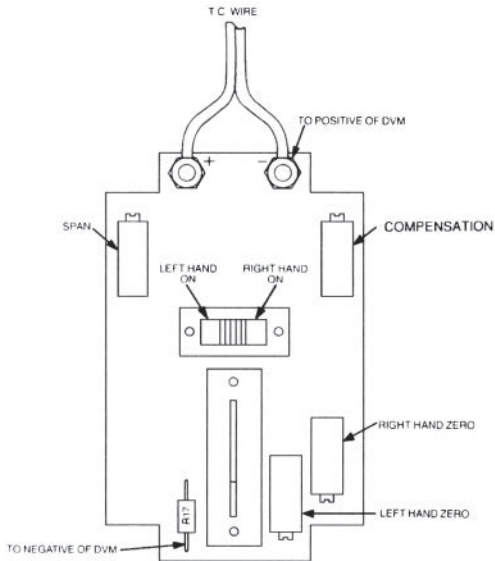
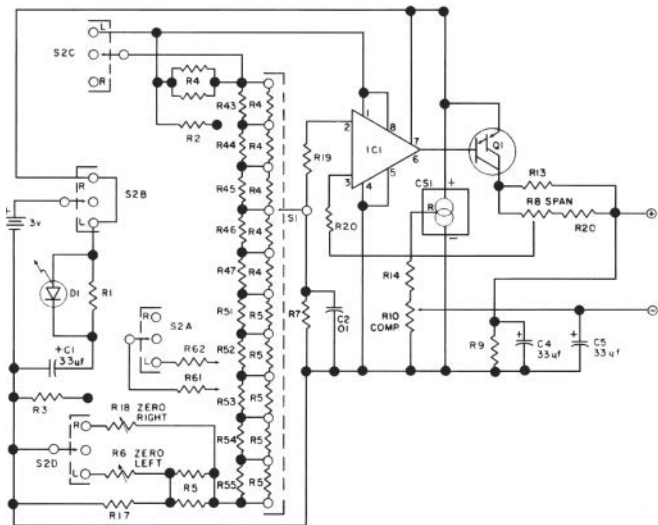


Figure 4-1. Calibration Hook-Up, Model CL-300

Section 5 Specifications CL-300

Batteries:	Two "AA" alkaline cells provide approximately one year of use
Battery Indicator:	LED light pulse at turn-on in either range
Accuracy:	$\pm 0.1\%$ of span $\pm 1^\circ$. For negative temperatures, add $\pm 2^\circ$.
Cold-junction Compensation:	Built-in for specified thermocouple type
Cold-junction Temperature Effect:	Within ± 0.25 degrees at 75°F (20°C) ± 0.025 degrees/degree change in ambient
Operating Ambient Temperature:	-10° to $+130^\circ\text{F}$ (-25° to $+55^\circ\text{C}$)
Ambient Temperature Effect:	Zero included in cold-junction effect. Span: $\pm 0.01\%$ of span/degree
Storage Temperature Limits:	-40° to $+160^\circ\text{F}$ (-40° to $+70^\circ\text{C}$)
Output Impedance:	Fixed, 50 ohms nominal
Dimensions:	H: 4" (101 mm) x W: $2 \frac{1}{8}$ " (54 mm) x D: $2 \frac{1}{4}$ " (57 mm)
Weight:	6 oz. (0.15 kg)



Schematic-OMEGA Model CL-300

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Model CL-301 Portable RTD Simulator

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Section 1 Introduction

1.1 Description

The OMEGA® Model CL-301 Platinum RTD Simulator provides eleven precise temperatures for inputs to transmitters, recorders, controllers, alarms, data acquisition, and computer systems. Model CL-301 allows 2, 3, or 4-wire connections. Conformity to the particular RTD curve is in accordance with the latest DIN 43760 standard.

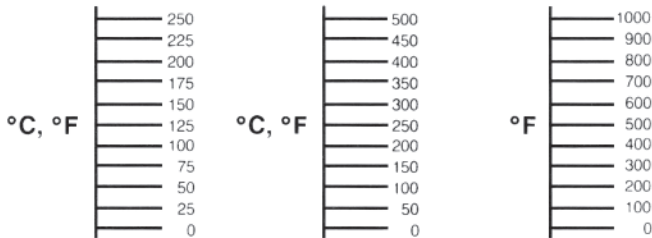
Calibrations are available in both °F and °C and standard ranges are listed in Table 1-1. Other ranges and curves are available as options. Resolution is 25°, 50°, or 100°, corresponding to the full scale output of 250°, 500°, and 1000° respectively.

Positive switch selection allows quick, easy settings for any output. Calibrated accuracy is $\pm 0.05\%$ of span $\pm 0.25^\circ$.

1.2 Features

- Calibrate and Troubleshoot 2, 3, or 4-wire RTD systems
- Simulates 100 ohm RTD, $\alpha = .00385$
- * Choice of Output Terminal
- Eleven Precise Test Points
- Portable, No Battery or Power Required
- Simple to Use, Inexpensive to Own

Table 1-1
Model CL-301 Standard Ranges



Section 2 Installation

2.1 Unpacking

Remove the Packing List to check off actual equipment received. If you have any questions about the shipment, please call OMEGA's Customer Service Department.

Upon receipt of shipment, inspect the container for any signs of damage in transit. Take particular note of 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 shipment is necessary.

Section 3 Operation

3.1 Operating Instructions

Select the particular OMEGA Model CL-301 for the desired temperature scale (F or C), and appropriate temperature range. Then choose the cable type (2, 3, or 4-wire) that is equivalent to the RTD you are simulating . See Figure 3-1.

Connect the RTD Simulator leads to the input terminals of the instrument or system to be tested. Typically the CL-301 might feed a recording system, a controller, a datalogger, and a computer interface.

Set the temperature selection switch on the CL-301 to the desired temperature. End point calibration temperatures of the instrument are then selected on the CL-301 and any required adjustments are made. Intermediate points on the CL-301 may then be selected to verify instrument linearity or to check critical points.

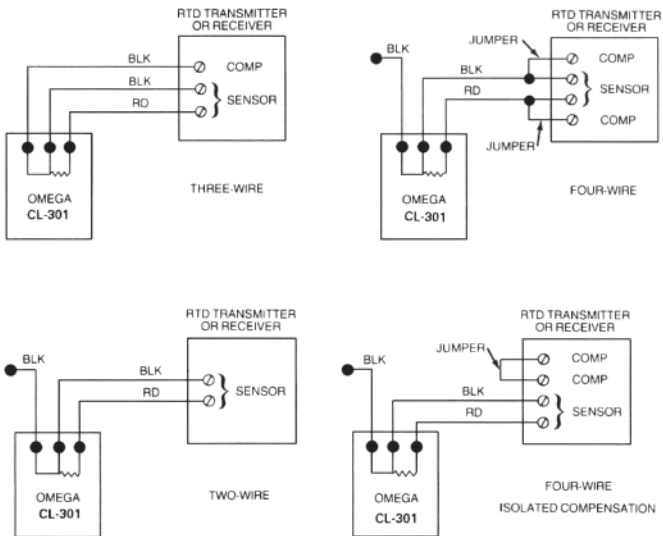


Figure 3-1. Connecting the RTD Simulator to Transmitter or Receiver

Section 4 Service Information

4.1 Maintenance

The OMEGA CL-301 RTD Simulator requires little servicing. Should measurement inaccuracies be discovered, perform the adjustment and calibration procedure to recalibrate the instrument.

4.2 Equipment Required for Calibration

Digital ohmmeter, 0.025% accuracy with 4-wire ohm connections (OMEGA Model 881 or equivalent).

4.3 Calibration Procedure

Calibrate the instrument in the following manner:

1. Connect the unit to the meter in a 3-wire hookup.
2. Move the slide switch to the lowest temperature position (position 1) and adjust corresponding potentiometer (Pot 1, Figure 4-1) according to the resistance value obtained from Table 4-1.
3. Move the switch to the next temperature position (2) and adjust corresponding potentiometer (Pot 2).
4. Continue this procedure for all remaining temperature positions in ascending order.

- Upon completion, move the switch back to position 1. Check and readjust potentiometer (Pot 1), if necessary. In increasing order, check and readjust each position as necessary to obtain specified accuracy.

CAUTION

Each time a position is adjusted, ALL higher number positions must be rechecked.

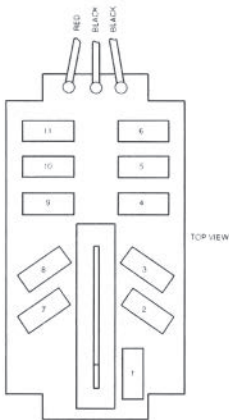


Figure 4-1. Potentiometer Adjustments, Model CL-301

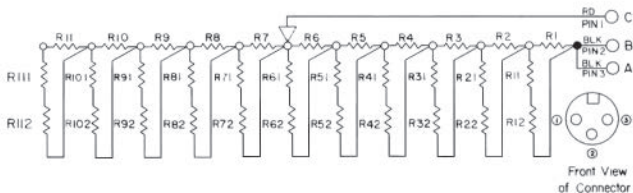
**Table 4-1
Adjustment Values**

Material and Nominal Resistance	Alpha (α) R (100°C)/R (0°C)
Platinum (PT.)* 100 OHM 200 OHM 500 OHM	1.3850 (DIN Standard 43760) 1.3926 (U.S. Laboratory) 1.3889 (Canadian) 1.3911 (U.S. Industrial) 1.3902 (U.S. Industrial)
Nickel 120 OHM 600 OHM	1.6720
Nickel-Iron 604 OHM	1.5188
Copper 9.035 OHM (10 OHMS at 25°C) 234 OHM 421.2 OHM 1000 OHM 2000 OHM (at 70°F)	1.4274

*If not specified DIN standard curve 43760 will be supplied.

Section 5 Specifications CL-301

Accuracy:	$\pm 0.05\%$ of span ± 0.25 degree
Operating Ambient Temperature:	-10° to $+130^{\circ}\text{F}$ (-25° to $+55^{\circ}\text{C}$)
Ambient Temperature Effect:	$\pm 0.01\%$ degree (% of span)
Storage Temperature Limits:	-40° to $+160^{\circ}\text{F}$ (-40° to $+70^{\circ}\text{C}$)
Dimensions:	H: 4" (101 mm) x W: 2 1/8" (54 mm) x D: 2 1/2" (38 mm)
Weight:	3 oz. (0.12 kg)



Schematic—OMEGA Model CL-301

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Model CL-302 Portable Transmitter Simulator

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Section 1 Introduction

1.1 Description

The OMEGA® Model CL-302 Transmitter Simulator provides lab accuracy for a wide range of settings. Instant availability of data is assured; no internal batteries or line cords are ever needed. Latest microcircuitry includes a precision reference, ultra-stable comparator, and a high-gain power Darlington output. Switch settings of 0%, 25%, 50%, 75%, and 100% allow fast full range check out of the instrument to be calibrated. Low minimum voltage drop enables other devices to remain in the loop while the receiving device is being calibrated.

1.2 Features

- Calibrate or Test, 4-20 mA Systems
- Simulates Loop Powered Transmitter
- Five Precise Test Points
- Portable, 0.1% Accuracy
- No Batteries of Power Required

Section 2 Installation

2.1 Unpacking

Remove the Packing List to check off actual equipment received. If you have any questions about the shipment, please call OMEGA's Customer Service Department.

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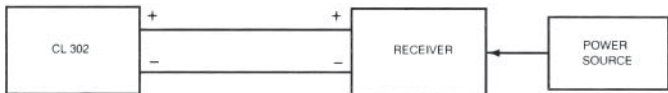
Section 3 Operation

3.1 Operating Instructions

First disconnect the transmitter from the loop, leaving the power source and receiver in place.

Connect the two clip leads of the Simulator to the positive (+) and the negative (-) field connections of the receiver or controller (to be checked or calibrated) in place of the field 2-wire transmitter. See Figure 3-1. An LED indicates current flowing through the calibrator. The selector switch is then positioned at the 0% point. Exactly 4 mA will pass through the loop. At this time, the zero of the receiver is adjusted. Move the switch to allow 100% to pass and make the required full scale adjustment. When both span and zero are correct, the 25%, 50% and 75% settings are used to check linearity. Selected settings are accurate within $\pm 0.1\%$ of span.

As a 2-Wire Simulator with Self
Powered Unit



As a 2-Wire Simulator With
External Power

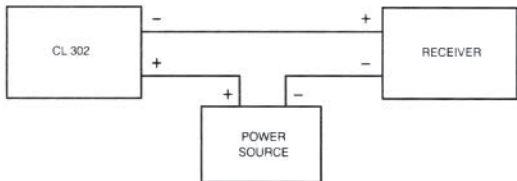


Figure 3-1. Alternative Hookup Methods

Section 4 Service Information

4.1 Maintenance

The OMEGA CL-302 Transmitter Simulator is long-lasting and requires little servicing. Should measurement inaccuracies be discovered, perform the adjustment and calibration procedures, specified below, to recalibrate the instrument.

4.2 Equipment Required for Calibration

Digital voltmeter, 4 1/2 digit, 0.05% (or better) accuracy with a precision ($\pm 0.05\%$) 250-ohm resistor.

4.3 Calibration Procedure

Calibration requires a hookup protocol, span and zero adjustments, and a linearity test.

4.3.1 Calibration Hookup Protocol

- 1 Set the calibrating meter to a range which covers the 1 to 5 V dc spectrum with sufficient resolution.
2. Place the 24 to 30 V dc power supply in series with the 250 ohm ($\pm 0.05\%$) resistor and the Simulator which is to be calibrated. The meter will read 1 to 5 volts corresponding to 4-20 mA through the resistor. See Figure 4-1. The LED on the Simulator should be lit, indicating that the connections are correct and that the unit is functioning..

4.3.2 Span and Zero Adjustment Procedures

- 1 Set the switch on the Model CL-302 to the 209 mA (100%) position.
2. The span potentiometer is adjusted so that the meter reads 5.000 volts. See Figure 4-2.
3. The switch is now moved to position 4 mA (0%).
4. The zero potentiometer is adjusted until the meter reads 1.000 volts.
5. Check and readjust the span and the zero controls until they are within $\pm 0.1\%$ accuracy ($\pm 0.02\%$ typical).

4.3.3 Linearity Test Protocol

- 1 Move the switch to position 8 mA (25%). The meter should read between 1.996 V and 2.004 V.
2. With the meter set at 12 mA (50%), the meter should read between 2.996 V and 3.004 V.
3. Setting the meter at 16 mA ((75%), the meter should read between 3.996 V and 3.004 V.

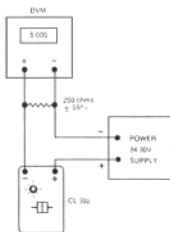


Figure 4-1. Calibration Check

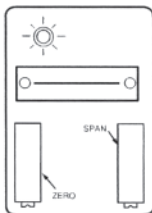
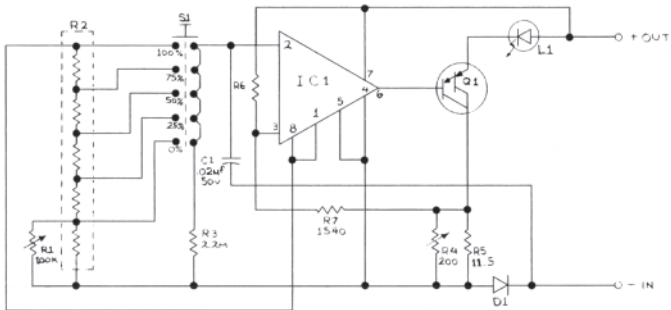


Figure 4-2. Zero and Span Controls, Model CL-302

Section 5 Specifications CL-302

Calibrated Accuracy:	±0.1% of span
Precise Switch Settings:	0, 25, 50, 75, 100% of full scale equivalent to 4, 8, 12, 16, 20 mA
Temperature Effect:	±0.01%/°C
Loop Voltage Rating:	Any between 6 and 45 volts
Voltage Drop:	6 V and 20 mA
Dimensions:	H: 3 1/4" (82 mm) x W: 2 1/8" (54 mm) x D: 1 1/8" (29 mm)
Weight:	3 oz. (85 grams)



Schematic-OMEGA Model CL-302

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Section 1 Introduction

1.1 Description

The dual function OMEGA® CL303 Simulator combines a self-contained 4-20 mA source with a 2-wire Simulator in one pocket-sized instrument.

Internal batteries are used in the source mode to provide continuously adjustable 4-20 mA into any load from 0-800 ohms. An optional ac adaptor allows full-time bench use.

The 2-wire Simulator mode utilizes external loop power to pass precisely adjustable 4-20 mA. Loop power may vary from 6 to 45 V dc.

In addition to the 0.1% accurate digital dial adjustments, switch selected signals are provided at 4.00 mA (00.0%) and 20.00 mA (100%) for "quick check" zero and full scale settings in both modes (refer to Table 1-1).

Small size is made possible through state-of-the-art design which includes a precision reference, an ultra-stable amplifier, and high-gain power Darlington output. Accuracy, stability and low power consumption are combined through the use of the latest microcircuitry.

Continuous adjustability with memory lock assures fast, precise settings of current trips, recorders, data loggers, controllers, computers, and final control elements. Long life batteries allow complete portability for checkout and calibration of all milliamp input devices.

Table 1-1
CL-303 Dial Settings and Output

Dial Setting %	Output Current Milliamps
00.0	4.00
05.0	4.80
10.0	5.60
15.0	6.40
20.0	7.20
25.0	8.00
30.0	8.80
35.0	9.60
40.0	10.4
45.0	11.2
50.0	12.0
55.0	12.8
60.0	13.6
65.0	14.4
70.0	15.2
75.0	16.0
80.0	16.8
85.0	17.6
90.0	18.4
95.0	19.2
100.0	20.0

NOTE: Decimal point not shown on instrument's dial.

1.2 Features

- Calibrate or Test 4-20 mA dc Systems
- Precise 4-20 mA dc Source
- Simulates Loop Powered Transmitter
- Continuous 0 to 100% settings
- Quick Check 0% to 100% switch

Section 2 Installation

2.1 Unpacking

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Section 3 Operation

3.1 Operating Instructions

Outlined below is the operating protocol for the two modes of operation.

3.1.1 Directions for 2-Wire Simulator Mode

Disconnect any existing 2-wire transmitter from the loop to be checked or calibrated. (Only one of the two wires need be disconnected). Leave the power source and the receiver in place.

Place the mode selector switch into the 2-wire position. Connect the red clip lead of the Model CL-303 to the positive (+) terminal of the field connections. Connect the black lead to the negative (-) terminal. See Figure 3-1.

The LED will glow steadily when current flows. If no glow appears, recheck all external connections. Internal batteries are not used in this mode.

The 00.0% (4.00 mA) and 100% (20.00 mA) Dial adjustments are selected with the right-hand switch. Fast zero and full scale checks can be made by means of the 00.0% and the 100% positions. A third quick check position may be established by adjusting the digital dial to the desired percent value and locking it in place. The continuous adjustment dial reads directly in percent of the 4-20 mA signal. For example, a dial setting of 750 is 75% of span or 16mA. Complete the adjustments and turn the instrument off.

3.1.2 Directions for Source Mode

Disconnect any existing input wires from the device to be checked or calibrated. Turn the mode selector switch (left-side) to the mA out position. The LED will pulse brightly once if the battery voltage is sufficient. If the LED does not pulse, turn it off and check the batteries.

Connect the red positive (+) lead to the positive input of the device to be checked or calibrated. Connect the black negative (-) lead to the negative terminal. See Figure 3-2. The LED will glow steadily when current is flowing. If no glow appears, check the hookup and connections.

The 00.0% (4.00 mA) and 100% (20.00 mA) Dial adjustments are selected with the right-hand switch. Fast zero and full scale checks can be made by means of the 00.0% and the 100% positions. A third quick check position may be established by adjusting the digital dial to the desired percent value and locking it in place. The continuous adjustment dial reads directly in percent of the 4-20 mA signal. For example, a dial setting of 500 is 50% of span or 12mA. Complete the adjustments and turn the instrument off. Reconnect any wires that were removed for the check out.



Figure 3-1. As a 2-Wire Simulator with Self Powered Unit



Figure 3-2. As a Milliamp Source

Section 4 Service Information

4.1 Maintenance

The CL-303 mA Source / 2-wire Simulator requires little servicing. Should measurement inaccuracies be discovered, perform the adjustment and calibration procedures to recalibrate the instrument.

4.2 Equipment Required for Calibration

Digital voltmeter, 4 1/2" digit, 0.05% or better accuracy, with a precision ($\pm 0.5\%$) 250 ohm resistor. As a less accurate alternative, a dc millimeter may be used directly—which eliminates the 250 ohm resistor.

4.3 Calibration Procedure

Both the mA output and the span and zero adjustments must be calibrated, as specified below.

4.3.1 mA Output, Source Mode Calibration

Proceed as follows:

1. Before any adjustments to the Model CL-303 are made, fresh alkaline batteries MN1604, should be placed in the unit.
2. Switch the left-hand switch to position mA OUT while observing the LED. The LED should flash once, indicating proper battery voltage. If the LED does not flash, check each battery for proper voltage and for correct connection.
3. Set the meter to a range which covers one to five V dc with sufficient resolution.
4. Place the 250 ohm ($\pm 0.05\%$) resistor in series with the Model CL-303 output. The meter will read 1 to 5 volts corresponding to 4-20 mA through the resistor. See Figure 4-1.

4.3.2 Span and Zero Adjustments

Make the necessary calibration adjustments as indicated below.

1. Set the left-hand switch to position mA OUT and the right-hand switch to position 100%.

2. The span potentiometer (Figure 4-2) should now be adjusted so that the meter reads 5,000 volts.
3. The right-hand switch is now moved to the 00.0% position.
4. The zero potentiometer should now be adjusted so that the meter reads 1.000 volts.
5. Check and readjust the span and zero controls until no further adjustments are necessary.
6. Move the right-hand switch to the Dial position. The meter should read between 1.996 V and 2.004 V when the dial is set at 25.0 (Note: decimal points are not shown on the dial). Other readings are 2.996 V to 3.004 V at a setting of 50.0% and 3.98 V to 4.004 V at a setting of 75.0%. The dial has been mechanically set at the factory and should need no adjustment under normal operating conditions.

4.3.2.1 2-Wire Simulator Mode Check

To check the 2-wire Simulator of the CL-303:

1. Reconnect the test set-up to that shown in Figure 4-3.
2. Move the left-hand switch to the “2-wire” position.
3. Place a 24-30 V dc power source in series with the Model CL-303 and the 250 ohm resistor. The 100%, 00.0% and dial readings should all be within $\pm 0.1\%$ F.S. $\pm 1^\circ$ of those found in the source mode.

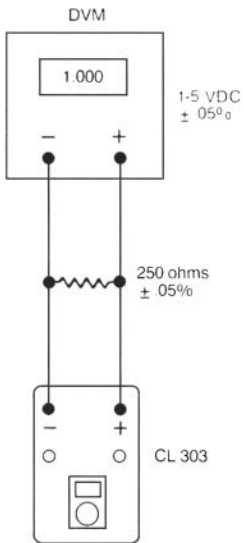


Figure 4-1. Measuring mA Output

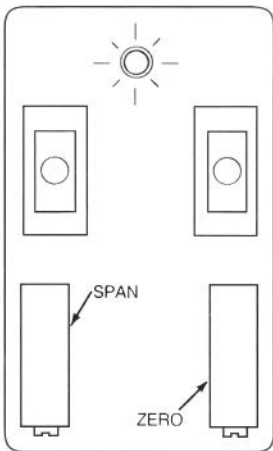


Figure 4-2. Adjustment of Span Potentiometer, Model CL-303

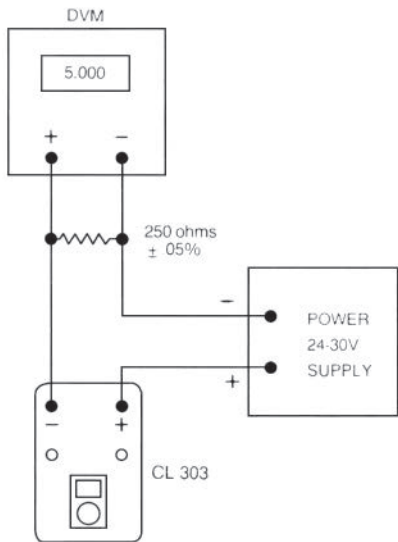
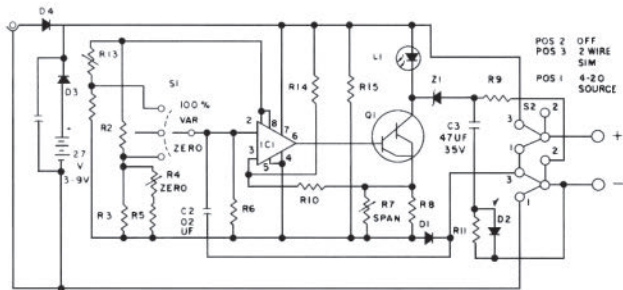


Figure 4-3. 2-Wire Simulator Hookup

Section 5 Specifications CL-303

Internal Batteries:	Three 9 Volt Alkaline, MN1604 or equivalent
Battery Life:	Source; 25-hours at 20 mA continuous output, 2-wire Simulator infinite
Battery Status Indicator:	LED pulse at turn-on, in source mode
Calibrated Accuracy:	±0.1%
Resolution:	0.02%
Temperature Effect:	0.01%/°C
Output Drive Capability:	1200 ohms with fresh batteries, or with optional ac adaptor; 800 ohms at battery low limit
Power Supply Effect:	0.005%/Volt
Operating Ambient Temperature:	-10° to +140° F (-25 to +60°C)
Storage Temperature Limits:	-40° to +160°F (-40° to +70°C). Remove batteries if stored for extended period.
Warm-up Time:	2-seconds to rated accuracy
Dimensions:	H: 4" (101 mm) x W: 2 1/8" (54 mm) x D: 2 1/4" (57 mm)
Weight:	11 oz. (0.3 kg)



Schematic-OMEGA Model CL-303



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.

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