

Where Do I Find Everything I Need for Process Measurement and Control?

OMEGA...Of Course!

Shop online at www.omega.com

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

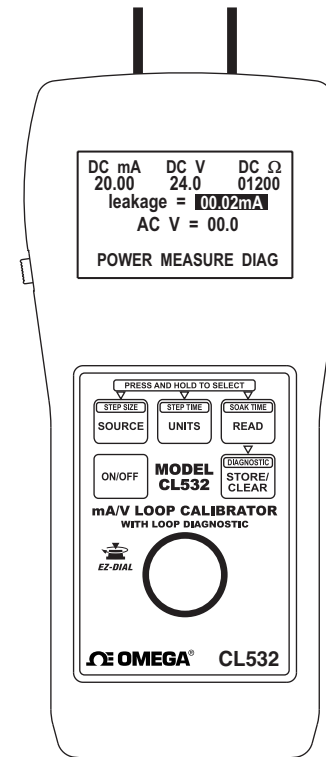
- ☑ Metering & Control Instrumentation
- ☑ Refractometers
- ☑ Pumps & Tubing
- ☑ Air, Soil & Water Monitors
- ☑ Industrial Water & Wastewater Treatment
- ☑ pH, Conductivity & Dissolved Oxygen Instruments

3 YEAR
WARRANTY

MADE IN
USA



User's Guide



Shop online at

[omega.com](http://www.omega.com)

Ω OMEGA

www.omega.com

e-mail: info@omega.com



CL532 mA/V Loop Calibrator with Loop Diagnostic



OMEGAnet® Online Service www.omega.com	Internet e-mail info@omega.com
---	--

Servicing North America:

USA: One Omega Drive, P.O. Box 4047
Stamford CT 06907-0047
TEL: (203) 359-1660 FAX: (203) 359-7700
e-mail: info@omega.com
ISO 9001 Certified

Canada: 976 Bergar
Laval (Quebec) H7L 5A1, Canada
TEL: (514) 856-6928 FAX: (514) 856-6886
e-mail: info@omega.ca

For immediate technical or application assistance:

USA 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®
TELEX: 996404 EASYLINK: 62968934 CABLE: OMEGA

Mexico: En Español: (001) 203-359-7803 e-mail: espanol@omega.com
FAX: (001) 203-359-7807 info@omega.com.mx

Servicing Europe:

Benelux: Postbus 8034, 1180 LA Amstelveen, The Netherlands
TEL: +31 (0)20 3472121 FAX: +31 (0)20 6434643
Toll Free in Benelux: 0800 0993344
e-mail: sales@omegaeng.nl

Czech Republic: Frystatska 184/46, 733 01 Karviná, Czech Republic
TEL: +420 (0)59 6311899 FAX: +420 (0)59 6311114
Toll Free: 0800-1-66342 e-mail: info@omegashop.cz

France: 11, rue Jacques Cartier, 78280 Guyancourt, France
TEL: +33 (0)1 61 37 29 00 FAX: +33 (0)1 30 57 54 27
Toll Free in France: 0800 466 342
e-mail: sales@omega.fr

Germany/Austria: Daimlerstrasse 26, D-75392 Deckenpfronn, Germany
TEL: +49 (0)7056 9398-0 FAX: +49 (0)7056 9398-29
Toll Free in Germany: 0800 639 7678
e-mail: info@omega.de

United Kingdom: One Omega Drive, River Bend Technology Centre
Northbank, Irlam, Manchester
M44 5BD United Kingdom
TEL: +44 (0)161 777 6611 FAX: +44 (0)161 777 6622
Toll Free in United Kingdom: 0800-488-488
e-mail: sales@omega.co.uk
ISO 9002 Certified

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, human applications.



WARRANTY/DISCLAIMER

OMEGA ENGINEERING, INC. warrants this unit to be free of defects in materials and workmanship for a period of **37 months** from date of purchase. OMEGA's WARRANTY adds an additional one (1) month grace period to the normal **three (3) 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 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 2003 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.

CL532 Field Calibration Procedure Continued

Two Wire Simulation Calibration:

Verify the CL532 is in Two Wire Simulation mode by press the SOURCE Button until mA 2W SIM appears on the bottom right side of the display.

Two Wire Simulation:

LO Calibration:

1. Connect the CL532 terminals in series to a Voltage Source (Set at 10V) and Current Meter.
2. Slide the EZ-Check™ switch to the LO Position indicated by displaying a LO on the left side of the display.
3. Dial the CL532 so the meter reads 4.000mA.
4. Press the STORE/CLEAR button.
5. The display will flash “STORED” to confirm that the displayed value was stored.

HI Calibration:

1. Slide the EZ-Check™ switch to the HI position indicated by displaying a HI on the left side of the display.
2. Dial the CL532 so the meter reads 20.000mA.
3. Press the STORE/CLEAR button.
4. The display will flash “STORED” to confirm that the displayed value was stored.

Source Voltage Calibration:

Verify the CL532 is in source Voltage mode by press the SOURCE Button until V SOURCE appears on the bottom right side of the display.

Source Voltage:

LO Calibration:

1. Connect the CL532 terminals to a Voltage Meter.
2. Slide the EZ-Check™ switch to the LO Position indicated by displaying a LO on the left side of the display.
3. Dial the CL532 so the meter reads 0.000V.
4. Press the STORE/CLEAR button.
5. The display will flash “STORED” to confirm that the displayed value was stored.

HI Calibration:

1. Slide the EZ-Check™ switch to the HI position indicated by displaying a HI on the left side of the display.
2. Dial the CL532 so the meter reads 24.000V.
3. Press the STORE/CLEAR button.
4. The display will flash “STORED” to confirm that the displayed value was stored.

Completion of Calibration:

Turn the CL532 off. Next time the unit is turned on the CL532 will be Calibrated and in normal operational mode.

CL532

mA/V Loop Calibrator

with Loop Diagnostic

Quickstart Instruction

This instrument was shipped with advanced features disabled.

Press the EZ-Dial™ Knob while turning on the CL532 to access the configuration menu. Select configuration options by turning the EZ-Dial™ Knob. Change options by pressing the knob. Exit configuration mode by turning the CL532 off or waiting 8 seconds without touching the EZ-Dial™ Knob.

➔ AUTO OFF	ON
EZ-STEP	OFF
HART MODE	OFF
EZ-CHECK	OFF
LOOP DIAG	ON
FACTORY RESET	OFF

Configuration Option	Description
Auto Off	The CL532 turns itself off after 30 minutes without pressing a button or turning the knob. This feature may be turned OFF for continuous operation until the end of battery life.
EZ-Step™	Access to step/ramp functions is disabled by default. This advanced feature may be enabled to allow access to manual and automatic step/ramp functions.
HART® Compatability	A 250Ω series resistor may be enabled to provide HART compatability. This feature is disabled, by default, to give maximum battery life.
EZ-Check™	EZ-Check™ HI/LO readings is disabled by default. Enabling this feature allows read mode (Read mA, Power/Measure, and Read V) recall of maximum and minimum readings.
Loop Diagnostic	Entry into loop diagnostic is enabled. This may be disabled if diagnostic mode is not needed.
Factory Reset	Set Factory Reset to ON to return the CL532 to its factory configuration. This includes source mode EZ-Check™ HI/LO settings, default dial positions, and configuration options. Exit configuration mode by turning the CL532 off or waiting 8 seconds without touching the EZ-Dial™ Knob.

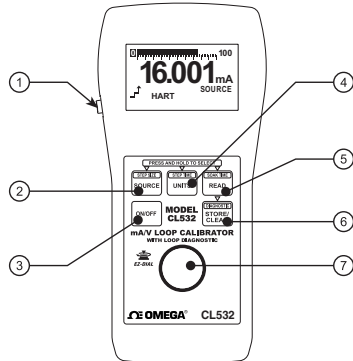
CL532 Operating Instructions

A.

Basic Keypad Operations

EZ-Check™ Switch/EZ-Step™ Pushbutton

Slide the switch to select the user stored values for calibration points. Press the button to adjust the output by the user defined step size. Press and hold the button to activate the auto step/ramp mode.



SOURCE/STEP SIZE Button

Press and release **SOURCE/STEP SIZE** to change source modes. These are:

- Source Milliamps
- 2-Wire Transmitter Simulate
- Source Volts

Press and hold **SOURCE/STEP SIZE** to change step size. Refer to section H.

ON/OFF Button

Press **ON/OFF** to turn the CL532 on or off.

UNITS/STEP TIME Button

Press and release **UNITS/STEP TIME** to change how current is displayed: either in milliamperes or % of 4-20 mA. Voltage is only displayed in volts.

Press and hold **UNITS/STEP TIME** to change step size. Refer to section H.

READ/SOAK TIME Button

Press and release **READ/SOAK TIME** to change read modes. These are:
Read Milliamps
Power and Measure 2-Wire Transmitter
Read Volts

Press and hold **READ/SOAK TIME** to change soak time. Refer to section H.

STORE/CLEAR/DIAGNOSTIC Button

In any source mode:
Press **STORE/CLEAR/DIAGNOSTIC** to save the current reading in the EZ-Check™ HI or LO position. The EZ-Check™ switch must be set to HI or LO. The display will flash "STORED" to confirm.

In any read mode:
Press **STORE/CLEAR/DIAGNOSTIC** to clear the values saved in the EZ-Check™ HI and LO positions. The display will flash "CLEARED" to confirm.

Press and hold **STORE/CLEAR/DIAGNOSTIC** to activate diagnostic mode. See section I.

EZ-Dial™ Knob

Turn the EZ-Dial™ knob to adjust the output level. Press and turn to adjust 100X faster.

B.

CL532 Configuration

Press the EZ-Dial™ Knob while turning the CL532 on to access the configuration mode. Turn the EZ-Dial™ Knob to select configuration items. Press the EZ-Dial™ Knob to change configuration items. Turn the unit off or just wait approximately 8 seconds to exit the configuration mode.

➔ AUTO OFF	ON
EZ-STEP	OFF
HART MODE	OFF
EZ-CHECK	OFF
LOOP DIAG	ON
FACTORY RESET	OFF

Auto Off - ON (default)/OFF

Auto Off is ON, by default, to save battery life by turning the unit off after 30 minutes of inactivity. Turn Auto Off to OFF to prevent automatic shutdown. This is typically useful for manual loading or continuous use.

EZ-Step™ - ON/OFF (default)

If EZ-Step™ is ON manual and automatic stepping/ramping is available. If EZ-Step™ is OFF the EZ-Step™ pushbutton will be disabled and the step direction indicator will not be displayed.

CL532 Field Calibration Procedure Continued

Read DC Voltage Calibration:

Verify the CL532 is in Read Volts mode by press the READ Button until V Read appears on the bottom right side of the display.

Read DC Voltage Calibration:

LO Calibration:

1. Connect the CL532 terminals to a DC Voltage Source.
2. Slide the EZ-Check™ switch to the LO Position indicated by displaying a LO on the left side of the display.
3. Set the Voltage Source to 0.000V.
4. Press the STORE/CLEAR button.
5. The display will flash "STORED" to confirm that the displayed value was stored.

HI Calibration:

1. Slide the EZ-Check™ switch to the HI Position indicated by displaying a HI on the left side of the display.
2. Set the Voltage Source to 60.000V.
3. Press the STORE/CLEAR button.
4. The display will flash "STORED" to confirm that the displayed value was stored.

Read AC Voltage Calibration:

Verify the CL532 is in Read AC Volts mode by press the READ Button until VAC Read appears on the bottom right side of the display.

Read AC Voltage Calibration:

LO Calibration:

1. Connect the CL532 terminals to an AC Voltage Source.
2. Slide the EZ-Check™ switch to the LO Position indicated by displaying a LO on the left side of the display.
3. Set the AC Voltage Source to 0.000V.
4. Press the STORE/CLEAR button.
5. The display will flash "STORED" to confirm that the displayed value was stored.
6. The display will flash "STORED" to confirm that the displayed value was stored.

HI Calibration:

1. Slide the EZ-Check™ switch to the HI Position indicated by displaying a HI on the left side of the display.
2. Set the AC Voltage Source to 60.000V.
3. Press the STORE/CLEAR button.
4. The display will flash "STORED" to confirm that the displayed value was stored.

Source mA Calibration:

Verify the CL532 is in source mA mode by press the SOURCE Button until mA SOURCE appears on the bottom right side of the display.

Source mA:

LO Calibration:

1. Connect the CL532 terminals to a Current Meter.
2. Slide the EZ-Check™ switch to the LO Position indicated by displaying a LO on the left side of the display.
3. Dial the CL532 so the meter reads 0.000mA.
4. Press the STORE/CLEAR button.
5. The display will flash "STORED" to confirm that the displayed value was stored.

HI Calibration:

1. Slide the EZ-Check™ switch to the HI position indicated by displaying a HI on the left side of the display.
2. Dial the CL532 so the meter reads 20.000mA.
3. Press the STORE/CLEAR button.
4. The display will flash "STORED" to confirm that the displayed value was stored.

CL532 Specifications Continued

Voltage Specifications (Read Range):

Read Range:	0.000 to 24.000 VDC then 24.01 to 30.00 (with 4X over range) Auto Ranging
Resolutions	0.001 V up to 24 V, 0.01 V up to 30.00 V
Temperature Effect	$\leq \pm 100$ ppm/ $^{\circ}$ C of range
Input Resistance	≥ 1 M Ω
Accuracy	0.000 to 24.000 VDC $\leq \pm (0.012\%$ RDG + 0.004 V) 24.01 to 30.00 VDC $\leq \pm (0.025\%$ of reading ± 0.04 V)

Voltage Specifications (Source Range):

Source Range:	0.000 to 24.000 VDC
Output Resistance	≤ 0.3 Ω
Source Current	≥ 20.000 mA with Flashing indicator for over range
Accuracy	$\leq \pm (0.012\%$ RDG + 0.004 V) ± 50 ppm/ $^{\circ}$ C of range
Battery life	> 40 hour typical

Calibration Certificate:

	NIST Traceable Certificate provided
Option:	Test data available upon request at additional charge.

Available Options:

Option:	Part Number:
AC adaptor	CL530-ADAPTOR
Carrying Case	SC530

CL532 Field Calibration Procedure

Suggested Equipment:

1. Precision Current Meter with accuracy of $\pm 0.0055\%$ at 20mA.
2. Precision Current Source with accuracy of $\pm 0.0055\%$ at 20mA.
3. Precision DC Voltage Source with accuracy of $\pm 0.0047\%$ at 60VDC.
4. Precision AC Voltage Source with accuracy of $\pm 2.5\%$ at 60VAC.
5. Precision Voltage Meter with accuracy of $\pm 0.0072\%$ at 24V.

Enabling Calibration:

Install a fresh battery and allow 15 minutes for the CL532 to stabilize to ambient temperature. Remove the battery cover and the six phillips head screws. While holding the CL532 face down in one hand, carefully separate the top and bottom of the housing. Place the unit into calibration mode by shorting the calibration via labeled on the PCB with tweezers while turning the CL532 on. Verify the CL532 is in Calibration mode by viewing the bottom Right of the LCD for the word CAL.

Read mA Calibration:

Verify the CL532 is in Read mA mode by pressing the READ Button until mA Read appears in the bottom right corner of the display.

Read mA:

LO Calibration:

1. Connect the CL532 terminals to a Current Source.
2. Slide the EZ-Check™ switch to the LO Position indicated by displaying a LO on the left side of the display.
3. Set the Current Source to 0.000mA
4. Press the STORE/CLEAR button.
5. The display will flash "STORED" to confirm that the displayed value was stored.

HI Calibration:

1. Slide the EZ-Check™ switch to the HI Position indicated by displaying a HI on the left side of the display.
2. Set the Current Source to 20.000mA.
3. Press the STORE/CLEAR button.
4. The display will flash "STORED" to confirm that the displayed value was stored.

CL532 Operating Instructions

B.

CL532 Configuration Continued

HART® Compatibility Mode - ON/OFF (default)

The CL532 has a HART® compatibility mode. This mode is useful when the devices being powered communicate using the HART® protocol. In this mode the CL532 connects a 250 Ω load resistor in series with the output in both Source and Power Measure 2-Wire transmitter modes. This eliminates the requirement of an external 250 Ω load resistor. This resistor is typically shown in connection diagrams and manuals for HART® devices.

If HART® Compatibility Mode is ON, a 250 Ω load resistor is automatically switched in series with the output in Source and Power Measure 2-Wire Transmitter modes. The output compliance with HART® Compatibility Mode ON is 950 Ω at 20 mA.

If HART® Compatibility Mode is OFF there is no 250 Ω load resistor in series with the output. This will increase the output compliance voltage to drive 1200 Ω at 20 mA.

EZ-Check™ HI/LO Readings ON/OFF (default)

If the EZ-Check™ HI/LO Readings option is ON, the highest and lowest readings will automatically be saved in the HI and LO EZ-Check™ positions.

If this option is OFF the HI and LO positions will show the current reading.

Loop Diagnostic ON (default)/OFF

Loop Diagnostic may be turned off to prevent entry into diagnostic mode. This may make the CL532 simpler to operate by eliminating accidental entry into diagnostic mode.

Factory Reset ON/OFF (default)

If Factory Reset is ON, the unit will restore all factory defaults when the CL532 is turned OFF and back ON. This will reset any changes made in the CL532 Configuration options, returning the unit to its simplest factory configuration.

C.

EZ-Dial™ Knob

Adjust the output up and down with the EZ-Dial™ knob. The increment is 0.001 mA (or 0.01 % if display units are % of 4-20 mA.) Press while turning to adjust 100X faster – 0.100 mA (or 1.00 %.)

D.

EZ-Check™ Switch

The EZ-Check™ switch has three positions -- high, set, and low. Its position is shown at the left edge of the display with "HI" and "LO" indicators. Use of the EZ-Check™ switch depends on mode:

Source Modes:

Slide the EZ-Check™ switch to the HI and LO positions to recall the settings stored in those positions. While in the HI and LO positions, dial the EZ-Dial™ knob to change the display. Press **STORE/CLEAR** to save new settings in the HI and LO positions. The display will flash "STORED" to confirm.

Hint: For faster calibrations, the position of the switch can be felt. This feature allows continuous monitoring of the device being calibrated without looking back at the CL532 display. This is also useful in poor lighting or under difficult operating conditions.

Read Modes:

In read modes, the CL532 calibrator records the maximum and minimum readings observed in each mode. Slide the EZ-Check™ switch to the HI and LO positions to display the readings. Press **STORE/CLEAR** to clear the readings. The display will flash "CLEARED" to confirm.

By default, the CL532 has EZ-Check™ HI/LO Readings OFF. Refer to CL532 Configuration, section B.

CL532 Operating Instructions

E. EZ-Step™ Pushbutton/ Manual Step

The EZ-Step™ pushbutton is a feature only in source modes.

Press and hold the EZ-Step™ pushbutton for less than one second to cause the output to step up or down by the EZ-Step™ size.

The EZ-Step™ direction is indicated on the display (\downarrow or \uparrow). Press the EZ-Dial™ knob to change the step direction.

Stepping and auto step/ramp limits are defined by the EZ-Check™ HI and LO settings. The step direction changes when a limit is reached.

The step size is computed as the difference between the EZ-Check™ HI and the EZ-Check™ LO divided by the number of steps. See section H.

By default, the CL532 has EZ-Step™ OFF. Refer to CL532 Configuration, section B.

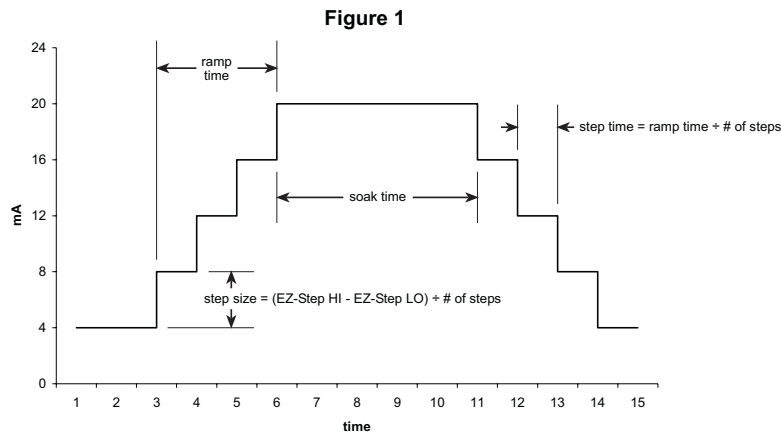
F. Auto Step/Ramp

Press the EZ-Step™ pushbutton for more than one second to activate auto step/ramp mode. The CL532 will automatically step by the selected EZ-Step™ size and time. Press the EZ-Step™ pushbutton again to deactivate auto step/ramp mode.

The EZ-Step™ direction is indicated on the display (\downarrow or \uparrow). Press the EZ-Dial™ knob to change the step direction. The step direction can be changed while automatically stepping/ramping.

Stepping and auto step/ramp limits are defined by the EZ-Check™ HI and LO settings. The step direction changes when a limit is reached.

Figure 1 shows how the Step/Ramp Parameters are used to configure automatic stepping/ramping.



Note: The CL532's ability to detect overload/undervoltage conditions may be limited by the rate of change in the output when using automatic stepping/ramping. Turn auto step/ramp off while connecting or disconnecting the CL532.

G. Quick Reference Bar Graph

The Quick Reference Bar Graph indicates the input and output level on the CL532 in % of 4-20 mA with 1% resolution.

CL532 Specifications

General Specifications:

(Unless otherwise indicated all specifications are rated from a nominal 23 °C, 70 % RH for 1 year from calibration)

Operating Temperature Range	-20 to 60 °C (-5 to 140 °F)
Storage Temperature Range	-30 to 60 °C (-22 to 140 °F)
Relative Humidity Range	10% ≤RH ≤90% (0 to 35 °C), Non-condensing 10% ≤RH ≤70% (35 to 60 °C), Non-condensing
Size	7.00 X 3.30 X 2.21 inches (177.8 x 83.8 x 56.1mm)
Weight	12.0 oz (340 grams)
Battery	9V Alkaline
Miscellaneous	Optional 120 VAC 50/60 Hz AC adaptor available Low battery indication with nominal 1 hour of operation left Over-voltage protection to 120 Vrms (rated for 30 seconds) or 240 Vrms (rated for 15 seconds) Bar graph display with 1% resolution of 4-20 mA signal scale High contrast graphic liquid crystal display with 0.45" (11.4 mm) high digits

Common Specifications for all Current Modes:

Ranges	0.000 to 24.000 mA, -25.00 to 125.00% of 4-20 mA
Accuracy	≤ ± (0.012 % of reading + 0.002 mA)
Temperature Effect	≤ ± 50 ppm/°C of range
Resolution(s)	0.001 mA and 0.01 %

Source/Power and Measure 2-Wire Transmitter Specifications:

Loop Compliance Voltage	≥24 Volts
Loop Drive Capability	1200Ω at 20 mA for entire battery life, 950Ω w/HART® mode enabled
Miscellaneous	Open loop or out of compliance conditions are indicated by appropriate error display Battery life in: Source mode ≥18 hrs at 12mA typical (HART® disabled) Power measure ≥10 hrs at 12mA typical HART® protocol mode is a selectable option at turn on. HART® protocol mode places a 250Ω resistor in series with the output Selectable EZ-Step(s) for Source Mode/2-Wire Transmitter Simulation: 2 to 16 selectable step settings Step size is determined by the selected high & low ranges Selectable time settings for stepping and soak: STEP: 5 to 900 seconds SOAK: 0 to 900 seconds

Read mA Specifications:

Voltage Burden	≤2V at 20 mA
Overload/Current Limit Protection	nominal ≤24 mA
Battery Life	typical ≥40 Hours

2-Wire Transmitter Simulation Specifications:

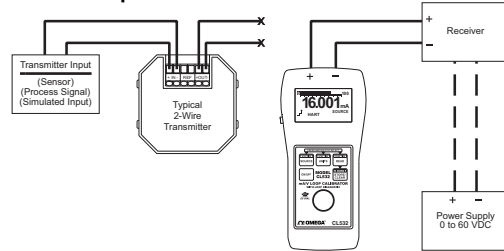
Voltage Burden	≤2 V at 20 mA
Overload/Current Limit Protection	nominal ≤24 mA
Loop Voltage Limits	2-60 VDC
Miscellaneous	Open loop or out of compliance conditions are indicated by appropriate error display Battery life ≥40 hour typical Selectable EZ-Step(s) for Source Mode/2-Wire Transmitter Simulation: 2 to 16 selectable step settings Step size is determined by the selected high & low ranges Selectable time settings for stepping and soak: STEP: 5 to 900 seconds SOAK: 0 to 900 seconds

CL532 Operating Instructions

J. Modes of Operation

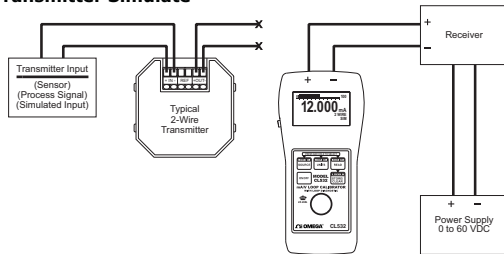
Source Milliamp

Connect the CL532 directly to 4-20 mA receiver equipment, alarms, panel meters, etc. Use the EZ-Dial™ Knob and EZ-Check™ Switch to adjust loop current. The display flashes "HIGH Ω" when the loop resistance is too high or the leads are open.

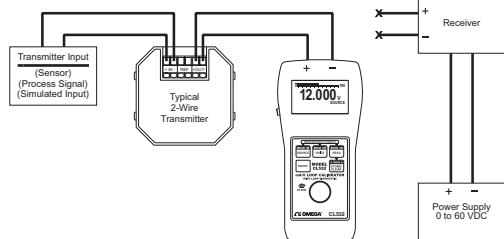


2 Wire Transmitter Simulate

Substitute the CL532 for a 2 wire transmitter. Use the EZ-Dial™ Knob and EZ-Check™ Switch to adjust loop current. At least 2 volts of loop power is required, else the display flashes "CHECK LOOP SUPPLY."



Source Volts



The CL532 sources 0.000-24.000 volts. This is useful for powering transmitters and receiver equipment. Use the EZ-Dial™ Knob and EZ-Check™ Switch to adjust output voltage. The display flashes "LOW Ω" when the output is overloaded.

CL532 Operating Instructions

H. Manual Step and Auto Step/Ramp Parameter

To Change the EZ-Step™ Size:

1. Press and hold the SOURCE/STEP SIZE button for more than $\frac{3}{4}$ of a second.
2. The display will flash "EZ-STEP SIZE".
3. Turn the EZ-Dial™ knob to select from 2 to 16 steps between the EZ-Check™ limits.
4. Turn the EZ-Dial™ clockwise past 16 steps to select continuous ramp mode.
5. Press the SOURCE/STEP SIZE button again to return to the normal display.

EZ-STEP SIZE
04.000mA to 20.000mA
04 steps
04.000mA per step

Note: If the EZ-Step™ option is turned off, the display will flash "EZ-STEP OFF". Refer to CL532 Configuration, section B.

To Change the EZ-Step™ Time:

1. Press and hold the UNITS/STEP TIME button for more than $\frac{3}{4}$ of a second.
2. The display will flash "EZ-STEP TIME".
3. Turn the EZ-Dial™ knob to select from 5 to 900 second ramp time. The time per step is calculated based on the selected EZ-Step™ size.
4. Press the SOURCE/STEP SIZE button to return to the normal display.

EZ-STEP TIME
04.000mA to 20.000mA
005s ramp
001.250s per step

To Change the Soak Time:



1. Press and hold the READ/SOAK TIME button for more than $\frac{3}{4}$ of a second.
2. The display will flash "SOAK TIME".
3. Turn the EZ-Dial™ knob to select from 0 to 900 second soak time.

Note: A soak time of 0 defeats the soak period. The step time will be used instead.

4. Press the READ/SOAK TIME button again to return to the normal display.

EZ-STEP SOAK TIME
04.000mA to 20.000mA
005s soak
001.250s per step

To Change the EZ-Step™ Direction:

1. Press and release the EZ-Dial™ knob without turning.
2. The display will change to show the EZ-Step™ direction selected ( or ).

CL532 Operating Instructions

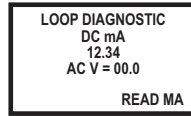
I. Loop Diagnostic

Press and hold the **STORE/CLEAR/DIAGNOSTIC** button for more than $\frac{3}{4}$ of a second to activate loop diagnostic mode. This is available in each of the CL532's operating modes.

Read Modes:

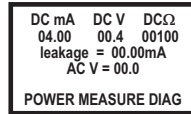
Read Milliamps

Loop current is displayed.



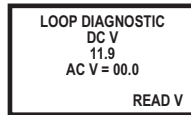
Power and Measure 2-Wire Transmitter

Loop current, voltage, and resistance is displayed.



Read Volts

Voltage is displayed.

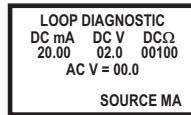


Source Modes:

The EZ-Dial™ knob, EZ-Check™ switch, and EZ-Step™ pushbutton function normally when the loop diagnostic is activated.

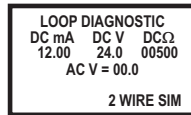
Source Milliamps

Loop current, voltage, and resistance is displayed. The resistance is highlighted if it exceeds the CL532's output capability (1200 Ω at 20 mA with HART® Compatibility disabled.)



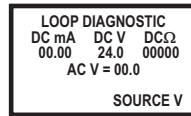
2-Wire Transmitter Simulate

Loop current is displayed. The CL532 automatically performs a test every 7 seconds to compute the loop power supply voltage and loop resistance. The CL532 requires approximately 2 volts across its terminals to operate in 2 Wire Simulate mode. The voltage display is highlighted if there is less than 2 volts present.



Source Volts

Loop current, voltage, and resistance is displayed. The resistance is highlighted if it exceeds the CL532's output capability (20 mA into 1200 Ω with HART® Compatibility disabled.)



In all loop diagnostic modes, AC voltage is displayed. If more than 2 VAC is present on the CL532's terminals, the display is highlighted to alert the user of a potential problem.

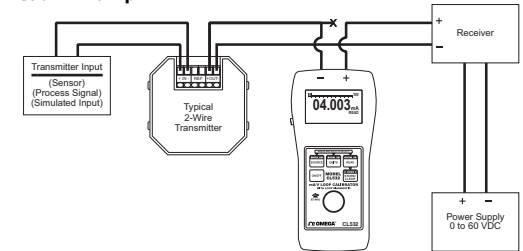
In all loop diagnostic modes, HART® activity is indicated with "♥ HART DETECTED ♥". The ♥ symbols flash on and off with the actual HART® messages.

CL532 Operating Instructions

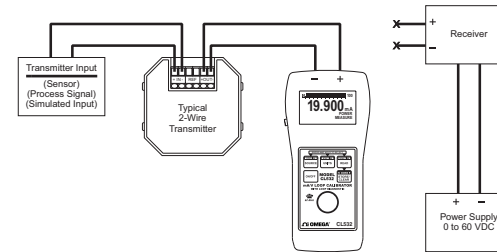
J. Modes of Operation

Read Milliamp

Connect the CL532 in series with the process loop to monitor current. Observe correct polarity. Current limiting above 24.000 mA is indicated by a flashing "CURRENT LIMITED" display.



Power and Measure 2 Wire Transmitter



The CL532 provides power to the process loop while displaying output current. Use this mode to test a transmitter's ability to control loop current. Current limiting above 24.000 mA is indicated by a flashing "CURRENT LIMITED" display.

Read Volts

The CL532 measures +/- 30 VDC with 4X overrange ability. The display flashes "OVERRANGE" when the 30 volt limit is exceeded. 0.001 volt resolution below 24.00 volts provides the ability to calibrate 1-5 volt instrumentation.

