



ELECTRO-CHEMICAL DEVICES, INC.

MODEL R350D

REMOTE DISPLAY

INSTALLATION & SERVICE MANUAL



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PREFACE

Purchasing products from Electro-Chemical Devices, Inc. provides you with the finest liquid analytical instrumentation available. If this is your first purchase from ECD, please read this manual before installing and commissioning your new equipment.

If there are any questions concerning this equipment, please contact your local ECD representative, or the factory directly at:

Electro-Chemical Devices, Inc.

23665 Via Del Rio

Yorba Linda, CA 92887 USA

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WARRANTY

Electro-Chemical Devices, Inc. (ECD) warrants all products it manufactures to be free from defect in materials and factory workmanship, and agrees to repair or replace any product that fails to perform, as specified, within one (1) year after date of shipment. This warranty shall not apply to any product that has been:

1. Subjected to misuse, negligence or accident;
2. Connected, installed, adjusted or otherwise used not in accordance with the instructions furnished by ECD;
3. Repaired, modified or altered by persons not authorized by ECD, resulting in injury to the performance, stability or reliability of the product.

This warranty is in lieu of any other warranty, expressed or implied. ECD reserves the right to make changes in the design or construction of its products at any time, without prior notification, and without incurring any obligation to make any changes in previously delivered products.

Seller's sole liabilities and the buyer's sole remedies under this agreement shall be limited to a refund in the purchase price, or at ECD's discretion, to the repair or replacement of any product that proves, upon ECD's examination, to be defective, when returned to the factory, transportation prepaid by the buyer, within one (1) year of the product's original shipment date. Seller shall not be liable for damages consequential or incidental to defects in any product, for failure of delivery in whole or in part, for injuries resulting from its use, or for any other cause.

This warranty and the writing attached constitute the full understanding of seller and the buyer, and no terms, conditions, understanding, or agreement purporting to modify or vary the terms hereof shall be binding unless hereafter made in writing and signed by an authorized official of Electro-Chemical Devices, Inc.

This warranty does not cover pH, ORP or Specific Ion measurement, reference or combination electrodes or electrode cartridges that have been commissioned in service.

Record Shipment Date, Serial Number and Model number for future reference.

REGISTRATION DATE.....

SERIAL NUMBER.....

MODEL NUMBER.....

IMPORTANT SERVICE INFORMATION

Use only factory authorized components for repair. Tampering or unauthorized substitution of components may adversely affect the operation of this product and may void the warranty.

If service or repair is required, please obtain the serial number(s) or sales order number of the product(s) in question and contact ECD's Service Department at:

+1-800-729-1333 (USA/Canada) or +1-949-336-6060
or email Service@ecdi.com

A Return Material Authorization (RMA) number must be obtained from the service department before returning any material to ECD. All material returned to ECD shall be shipped prepaid to the factory.

UNPACKING THE INSTRUMENT

Your Electro-Chemical Devices instrument has been carefully packaged to protect it from damage during shipment and dry storage. Upon receipt please follow the procedure outlined below.

1. Before unpacking, inspect the condition of the shipping container to verify proper handling by the carrier. If damage is noted, save the shipping container as proof of mishandling for the carrier.
2. Check the contents of the shipping container with the items and quantities shown on the packing list. Immediately report any discrepancies to ECD.
3. Save the original packing material until you are satisfied with the contents. In the event the product(s) must be returned to ECD, the packing material will allow you to properly ship it to ECD.
4. Familiarize yourself with the instrument before installation, and follow proper installation and wiring procedures.

1.0 GENERAL DESCRIPTION

The R350D 3 1/2 digit liquid crystal display (LCD) is calibrated to directly read any process variable between of -1999 and +1999. The display is loop powered by any 4 to 20 milliamp loop and responds to the current being driven through the loop. The display is housed in a windowed, corrosion resistant, weatherproof enclosure (rated NEMA 4x). The reflective LCD does not wash out, or fade in intense direct light. As the incident light is increased, the display becomes sharper with greater visibility, making it an ideal indicating device for outdoor installations.



Access to the wiring is made available through a 1/2-inch conduit knockout in the bottom of the enclosure. The wiring information is located on the PCB. Mounting hardware is available for wall, pipe or panel as standard factory installed options. For convenience during installation, the complete electronic assembly lifts out of the enclosure via the keyed hinging arrangement leaving only the essentials for mechanical installation.

Although the circuit board has a conformal coating to endure highly corrosive and humid environments, the wiring port must be sealed to protect the display surface itself. The screws that hold the cover on the enclosure are captive to the cover, preventing misplacement or loss of small hardware during routine maintenance.

1.1 Features

- 12.7 mm (0.5") Digit Height
- 4-20mA Loop Powered Indication
- Low Volt Drop
- Programmable Decimal Points
- LED Backlighting (30mA @ 5V typ.)
- Band gap Reference
- Wide Adjustment Range
- Auto-polarity on Display
- IP67 / NEMA 4X Protection via BEZ 700-IP

1.2 Electrical Specifications

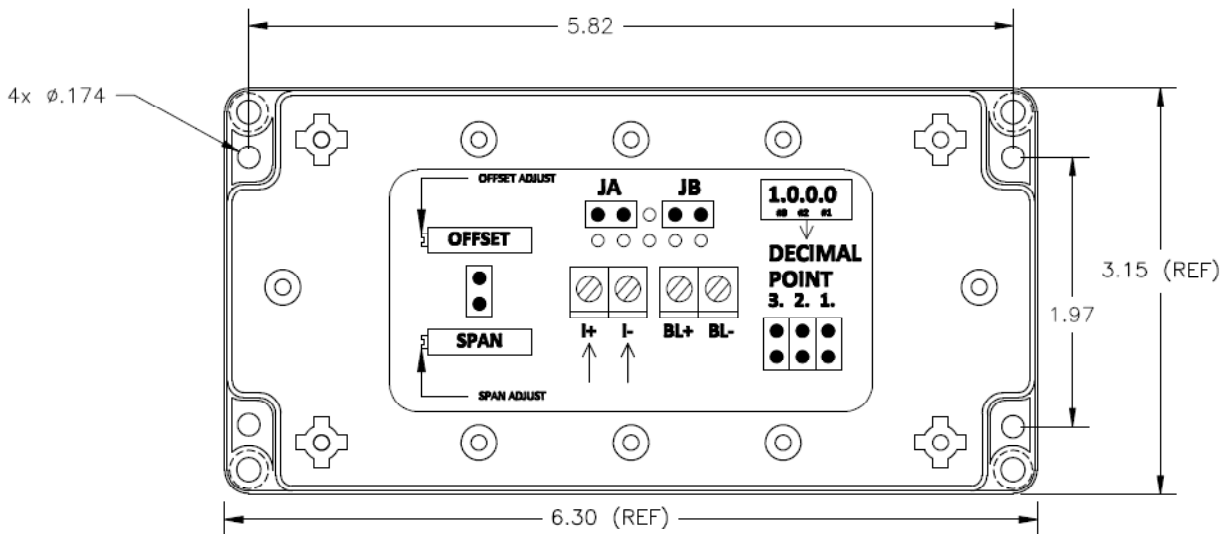
Specification	Minimum	Typical	Maximum	Unit
Accuracy*	0.05		0.1	% (±1 count)
Linearity			±1	Count

Sample Rate		2.5		Samples/sec
Operating Range	0 (32)		50 (122)	°C (°F)
Temperature Stability		200		ppm/°C
Loop Volt Drop	5	5.6		V
Supply Current	4		20	mA
Backlight Supply Voltage	4.75	5.0	**	VDC
Backlight Supply Current @ 5VDC		30	50***	mA
Full Scale Reading (20 mA)	0		1999	Count
Offset Adjustment Range	-1999		+1999	Count

* To ensure maximum accuracy, re-calibrate periodically.

** An external series resistor is required if the power supply is above 5V.

*** This specification linearly de-rates to 30mA @ 50°C.

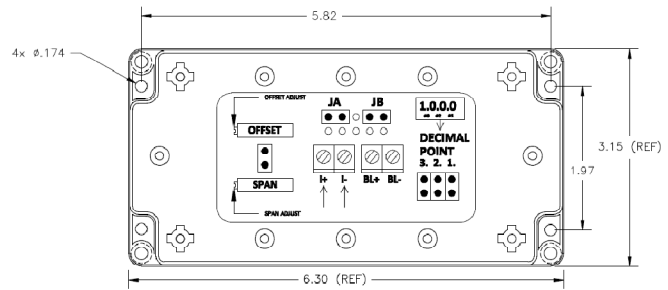


2.0 INSTALLATION

Choose a location with easy access and out of the direct sunlight. Mind the temperature range when choosing the installation location.

2.1 MOUNTING

The R350 D remote display is designed for wall mounting using #6 threaded screws. See attached drawing for the hole dimensions.



2.2 WIRING

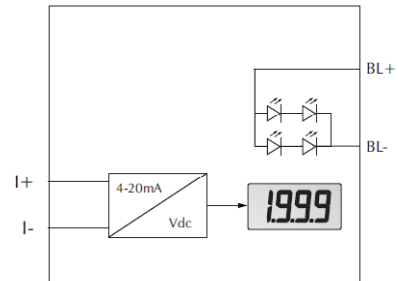
Warning!

- The electrical connection must only be carried out by authorized technical personnel.
- Technical personnel must have read and understood the instructions in this manual.
- Ensure that there is no voltage at the power cable before beginning the connection work.

2.2.1 Wire Connections:

1. I+ → positive 4-20 mA current input
2. I- → negative 4-20 mA current input
3. BL+ → 5V Positive power supply connection to the optional LED backlighting.
4. BL- → 5V Negative power supply connection to the optional LED backlighting.

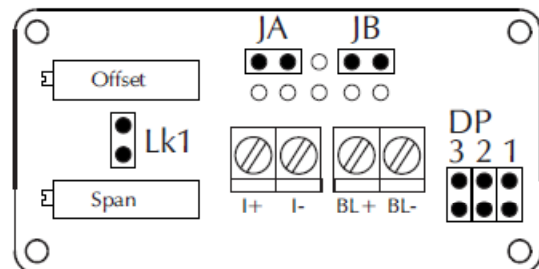
The optional LED backlighting requires a separate 5V DC power supply. Ensure correct polarity when connecting.



2.2.2 Jumper Connections

A Jumper Link is used for setting the decimal point position on the display and for disabling the Offset adjustment during a Calibration.

1. No Jumper Link on DP 1, 2, or 3 → Display has no decimal point, 1000
2. Jumper Link on DP 1 → Display shows 100.0
3. Jumper Link on DP 2 → Display shows 10.00
4. Jumper Link on DP 3 → Display shows 1.000
5. Jumper Link on LK1 during Span Calibration only



3.0 CALIBRATION

The meter is supplied calibrated to read 000 for 4mA loop current and 1000 for 20mA.

To re-calibrate, place the Jumper Link across LK1. This disables the Offset adjustment to enable Span adjustment to be made first. After Span adjustment is complete, the Jumper Link is removed and the Offset adjustment is made. The Jumper Link is then used to display one of the decimal points if necessary.



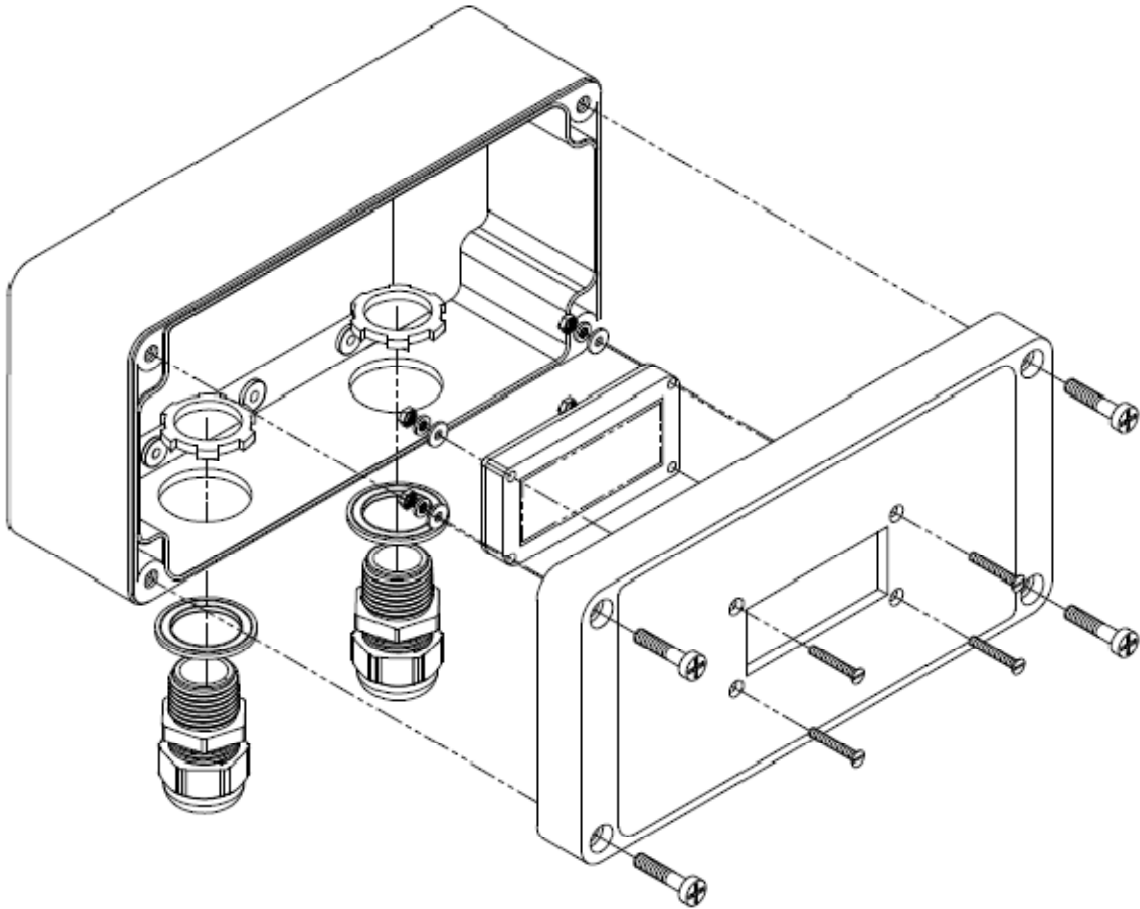
Example to re-calibrate: Meter to read 02.00pH at 4mA and 12.00pH at 20mA.

1. Calculate the Span by subtracting the desired reading at 4mA from the desired reading at 20mA:
 $12.00 - (2.00) = 10.00$
2. Remove the Jumper Link used to select the Decimal Point and place it across Link Lk1. Link Lk1 is located to the left of the screw terminals.
3. Apply 16mA between the + and - screw terminals.
4. Adjust the Span potentiometer so the R350D indicates 1000.
5. Remove Jumper Link Lk1 and place it back on the desired Decimal Point (DP2 in this case).
6. Apply 4mA between the + and - screw terminals.
7. Adjust the Offset potentiometer so the R350D indicates the desired reading at 4mA: 2.00
8. Adjust the Span and Offset as necessary for optimum accuracy. First apply 20mA and adjust Span until the reading is 12.00. Then apply 4mA and adjust Offset until the reading is 2.00.

Repeat step 8 until correct readings are obtained at 4mA and at 20mA.



4.0 ENGINEERING DOCUMENTATION



4.1 SPECIFICATIONS

Specification	Minimum	Typical	Maximum	Unit
Accuracy*	0.05		0.1	% (± 1 count)
Linearity			± 1	Count
Sample Rate		2.5		Samples/sec
Operating Range	0 (32)		50 (122)	$^{\circ}\text{C}$ ($^{\circ}\text{F}$)
Temperature Stability		200		ppm/ $^{\circ}\text{C}$
Loop Volt Drop	5	5.6		V
Supply Current	4		20	mA
Backlight Supply Voltage	4.75	5.0	**	VDC
Backlight Supply Current @ 5VDC		30	50***	mA
Full Scale Reading (20 mA)	0		1999	Count
Offset Adjustment Range	-1999		+1999	Count

* To ensure maximum accuracy, re-calibrate periodically.

** An external series resistor is required if the power supply is above 5V.

*** This specification linearly de-rates to 30mA @ 50 $^{\circ}\text{C}$.