Safety

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Safety
100mV DC maximum on field wiring terminals.
24 VDC maximum on internal card surfaces.

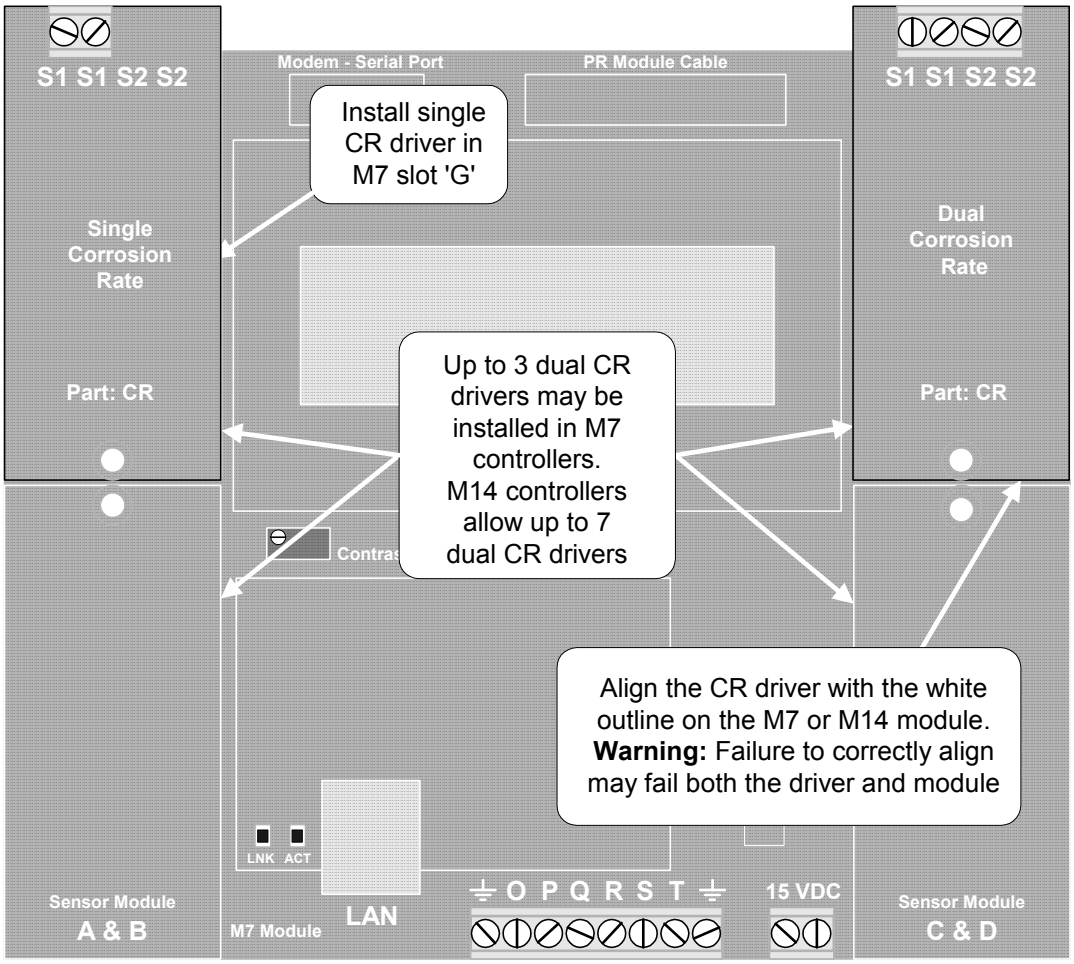
1. Installation

1.1 CR:Services

The CR driver measures one or two corrosion rates using Linear Polarization Resistance.
Dual CR drivers allow two alloys, copper & steel for example, to be monitored concurrently..
Up to three dual and one single 'CR' drivers may be installed in an M7 controller and up to seven dual 'CR' drivers in an M14 controller.

1.2 Driver Card Installation

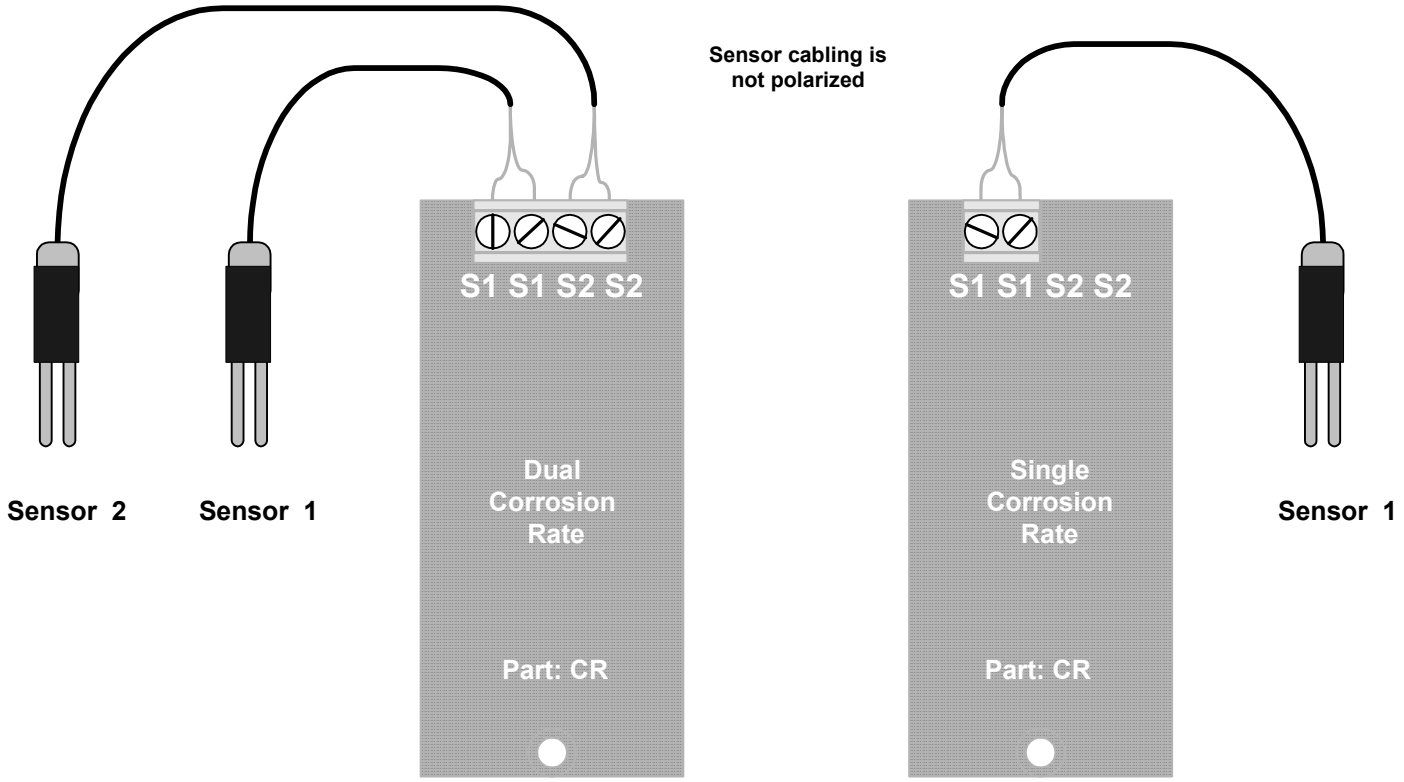
1. Enable both of the analog inputs at the driver socket location.
2. Turn OFF the controller AC power
3. The single and dual CR drivers may be installed in any of the seven M14 controller slots and in any of the M7 slots. The M7 '**G**' slot is limited to single CR drivers..
4. Turn ON the controller after installing the CR Driver and the controller will auto-configure, displaying one or both corrosion rates on the LCD display and browser.



1.3 Sensor Types

Aquatrac type CRS-SEN corrosion rate sensors.
Alloy sensor sets available in steel, copper, admiralty and cupro-nickel

1.4 Sensor Wiring



Corrosion rate sensor cabling may be extended up to 200ft / 60m, using single pair AWG22 / 0.25 mm^2, cable spliced to the sensor cable using wire nuts or crimped connectors located in an electrical fitting or enclosure.

Do not install sensor cabling in the same conduit as any AC power cabling.

Corrosion Rate sensor cabling may share a common conduit with other sensors, water meter and contact set cabling.

2. Configuration - Operation

2.1 Setup-Calibration

Alloy Number:
The Alloy Number is used to convert the Linear Polarization Current to a rate of metal loss in mils/year.
The default Alloy Number is 1.000, Carbon Steel.
Common alloy numbers are Copper @ 2.00, 90/10 Cupro-Nickel @ 1.80, Zinc @ 1.29, Admiralty @ 1.67

Conductivity Sensor:
If the controller includes a conductivity sensor installed in the same sample stream at the corrosion rate sensor, the corrosion rate measurement may be corrected for conductivity.
Conductivity correction has little effect at 1000uS with correction increasing as conductivity falls.
At low conductivities, LPR faults and alarms.

Calibration:
The CR driver can operate without calibration with nominally 0.5 mpy of static error caused by component offsets in the driver card.
If you disconnect the sensor and calibrate for 0 mpy, the controller will correct the Offset for the static error.
This is a one-time calibration unless you move the CR driver to another controller slot. A new slot, resets the offset calibration.

2.2 Diagnostics

Parameter	LCD Display	Browser	Value : Use
Sensor Location		OK	E: Installation slot. LCD displays slot letter on screen.
Input Card Type	OK	OK	Corrosion Rate: verifies driver card type
Current State	OK	OK	Operational / Alarmed:
Displayed Value	OK	OK	1.23 mpy: Current measured corrosion rate, Displayed with user set resolution Updates every 16 seconds
Period Maximum		OK	1.28 mpy: Data from current log interval.
Period Minimum		OK	1.21 mpy:
Period Average		OK	1.22 mpy:
Sample Size		OK	106: Samples in Period Max. Min. & Average
Current Period		OK	26 minutes: Elapsed time in current log period
Log Period		OK	60 minutes: User set log period 5 to 1440 minutes
Compensation	OK	OK	Corrosion Rate: Sequences through six steps, repeating every 16 seconds
Anodic Level	OK	OK	52.1 mV: Anodic & Cathodic levels should be opposite in sign and nominally the same value.
Cathodic Level	OK	OK	-48.6 mV:
Pitting Level	OK	OK	1.2 mV: Pitting should be less than either Anodic or Cathodic. A high pitting level is an invalid corrosion rate measurement.
Measured Level	OK	OK	6.8 mV: Raw sensor level in mV Displayed in real time as the CR driver sequences.
Gain Multiplier	OK	OK	1.0000: User set Gain.
Default Gain	OK	OK	1.0000: Factory default Gain. Gain selected by Input Card ID
Offset Adjust	OK	OK	-0.532: Offset. Calibration adjusts Offset for hardware error.
Default Offset	OK	OK	0.0000: Factory default Offset. Offset selected by Input Card ID
Input Card ID	OK	OK	1614 mV: Dual Design level = 1611mV. Single Design level = 1548mV
Drive Level	OK	OK	1209.9 mV: Offset correction allied to measured values. Inserted by driver card optical isolation.

Driver Verification Test:
Connect 10K ohm resistor to ‘S1’ & ‘S1‘ or ‘S2’ & ‘S2’.
Configure with Alloy Number =1.000 & no conductivity sensor.
Controller will display nominally 5mpy.
Anodic & Cathodic Levels will be nominally +/-50mV with pitting level +/-2mV.

3. Specifications

Function		Notes
Resolution	0.1mpy	Linear Polarization Resistance, LPR is applicable where general corrosion is the dominant corrosion mode. LPR is useful in measuring relative corrosion rates, process upsets and the immediate effect of changing treatment programs or operating conditions. LPR is not an applicable technique for processes where pitting is the dominant corrosion mechanism. Aluminum alloys and Stainless steels in cooling water and waste water stream usually pit.
Sensor Drive	DC Isolated.	Each sensor drive is separately electrically isolated from controller common and electrical ground.
Uncalibrated Error	0.5 mpy Nominal	Calibration with sensor disconnected removes The effect of Uncalibrated Error

Notes:

1. Accuracy with respect to weight loss measurements is typically 50% to 200%.