

LogR

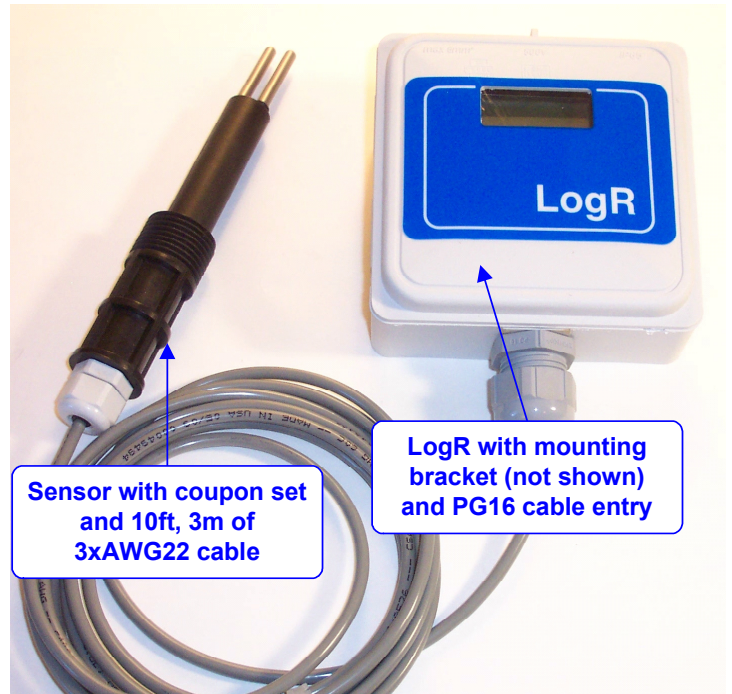
Corrosion Rate Sensor

1.1 Component Set

Part Numbers **LPR_CS** (Carbon Steel) , **LPR_CU** (Copper) and **LPR_AM** (Admiralty) include the corrosion rate sensor , 3/4" entry, **LogR** module & power supply.

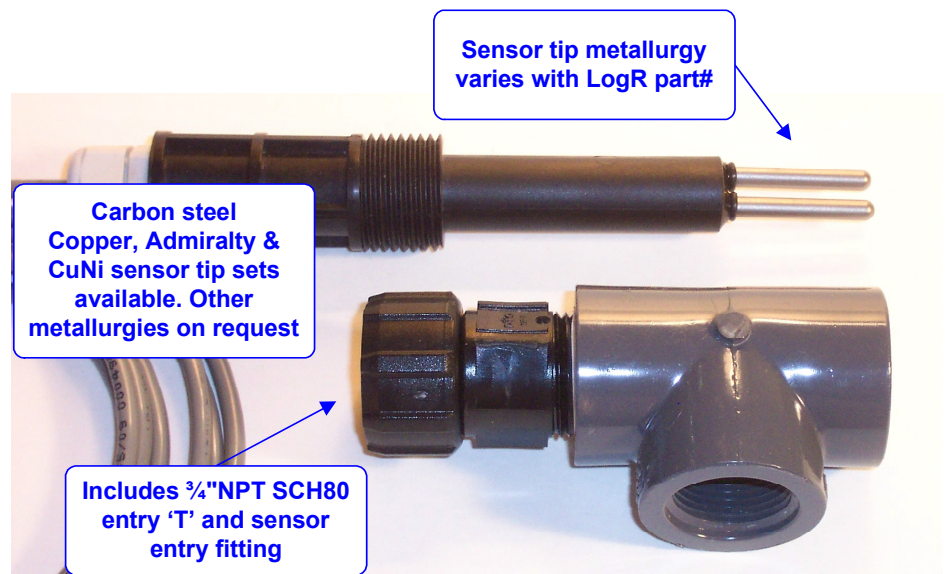
Users powering the LogR from a controller typically will not require or use the included 12VDC power supply.

Sensor electrodes may be exchanged-replaced on-site. Selecting the new metallurgy using the LogR menu, modifies the corrosion rate for the new electrodes.



The **LogR** may be used to:

1. Provide a 4-20mA proportional to corrosion rate.
2. Generate a contact set alarm on a high corrosion rate.
3. Log the corrosion rate every 5 minutes. Upload a year's log via a USB thumb drive.



1.2 Specification

Sensor	Specification	Explanation / Detail
LPR Sensor (Linear Polarization Resistance)	Non-metallic sensor rated 50C, 125F max, 125 psi max. Immersed components ABT, nylon & epoxy.	Digital, DC isolated 3 wire sensor, Power, Common & Data. Sensor supplied with ¾" SCH 80 threaded PVC 'T' fitting with ¾" non-metallic sensor entry fitting and 3m, 10ft of 3xAWG 22 PVC jacketed cable.
LPR_CS LPR_CU LPR_AM	1010 Carbon Steel CDA 110 Copper CDA 443 Admiralty	1¼"L x 3/16"D electrode set supplied installed. Sensor accepts standardized LPR electrodes threaded #4-40 UNC

LogR	Specification	Explanation / Detail
Corrosion Rate Measure & Display	0.01 to 50.0 mpy for steel Updates every 150 seconds.	LogR CE compliant under 89/336/EEC Electrode metallurgy user selectable.
4-20mA Output	Three wire: Power, Ground & 4-20mA out Resolution nominally 1 part in 4000.	User selectable 4-20mA range from 2 to 100 mpy. Adjustable loop Span & Zero.
Data Logging	1Year @ 5 minute intervals.	Log auto-uploaded via USB thumb drive in .CSV format (Comma Separated Variable)
Alarm Contacts	Normally closed Rated 24VDC, 250mA Thermally fused 300mA	User adjustable alarm trip point. Alarm contacts also open on loss of power.
Display & Data Link	2x8 LCD Display. USB Host emulation.	Battery backed clock time & date stamps data log.
UP-DOWN & Mode Switches	UP & DOWN push buttons 8 Selectable display modes, 0 to 7.	0: Corrosion 1:Metallurgy 2: Conductivity 3: Diagnostic 4: 4-20mA Current 5: Date-Time 6: Alarm Contacts 7: Loop Span
Conductivity	50 to 2000 uS	Autoranging. 1uS resolution. Corrects corrosion rate for water resistivity.
Power	9-24VDC, 100mA max. Polarity Protected.	Use included 12VDC, 500mA power cube or site 9-24VDC power. Power cube CUL Listed, CE approved with international plug set.
LogR Enclosure	Non-metallic, Rated IP65 4 3/8" x 4 3/8" x1 ¾", 110mm x 110mm x45mm	PG16 cable entry for sensor & current loop cabling included. Wall mount 3-point bracket included.
Wiring Terminal Blocks	Rated AWG16-26 3.5mm spacing.	Power, 4-20mA, sensor and alarm contacts, 2 piece, removable wiring blocks

1.3 Operation

LogR Menu Mode switch 0 to 7	Displays	UP/DOWN Scroll
0: Corrosion Rate	Corrode 0.01 mpy Corrode 50.0 mpy (See Note 0.)	Displays measurement state Measure OK or Low uS Limit or High Pitting Updated every 150 seconds, 2 ½ minutes
1: Sensor Type	Steel Sensor Copper Sensor Admrlty Sensor CuNi Sensor Zinc Sensor	Selects sensor electrode metallurgy. Changing Mode with new metallurgy selected changes corrosion rate measurement.
2: Conductivity	Conduct 50 uS Conduct 2000 uS Conduct >2000 uS (See Note 2.).	No UP/DOWN response
3: Diagnostic	Update@ 126 sec Anodic 123mV Cathodic 106mV Pitting 12.6 LogSize 14682** (See Note 3).	Selects diagnostic display **Press UP & DOWN at the same time to clear log, LogSize 0
4: Loop Current	Loop 16.74mA Loop 4.00 mA	Adjust 4-20mA loop span if not at 4.00mA. Adjust 4-20mA loop zero if at 4.00mA. Disconnect the sensor for 4.00mA
5: Time & Date	28/09/10 13:29:08	UP moves the underline cursor right DOWN changes the underlined value Pressing UP & DOWN at the same time saves your Time-Date changes.
6: Alarm Contacts	Alarm@ 12mpy Alarmed! >12mpy	Adjusts the corrosion rate that opens the alarm contact set OR displays an active alarm
7: Loop Span	20mA = 20 mpy 20mA = 2mpy 20mA = 100 mpy	Adjusts the mpy value at 20mA, the 4-20mA loop span. 2 mpy loop span minimum 100 mpy loop span minimum
0-7: Log Upload User inserts USB thumb drive	USB Drive detected Log Upload 12 sec Remove Drive or Upload Fails	Overrides display when thumb drive inserted. Auto uploads current log onto USB drive. Counts down log upload time remaining 'Remove' on success or error message on incompatible drive, drive full, write protected drive ...

1.3 Operation continued

Notes

0. The maximum measured corrosion rate is 50 mpy (mils per year, 1 mil = 0.001") for Carbon Steel and 100 mpy for Copper. The maximum measurable corrosion rate for other metallurgies is between 50 and 100 mpy.

At corrosion rates less than 10mpy, the LogR displays 2 digits after the decimal point.

2. Below a limiting conductivity, Linear Polarization Resistance cannot measure a useable corrosion rate because all of the polarization voltage is used to overcome the low process water conductivity. The actual limiting conductivity varies with corrosion rate. Low corrosion rates can be measured at lower conductivities than high corrosion rates. For cooling water applications the limit is typically in the 200uS range. The LogR detects this limitation & displays a warning on the **Mode 0** display.

Between the limiting low conductivity and 2000uS, the LogR corrects the displayed & logged corrosion rate for the error due to the measured conductivity of the cooling water stream.

Above 2000uS, conductivity has minimal effect the LPR measurement at cooling water corrosion rates & the LogR displays >2000uS.

NOTE:

The LogR corrects corrosion rate for the resistance of the water stream not the TDS so the LogR measured and displayed conductivity is not temperature corrected.

Your conductivity meter & water treatment controller both temperature correct conductivity because you are interested in controlling TDS.

You should therefore expect some difference between the LogR conductivity and other devices as water temperature varies.

3. A linear polarization measurement consists of 4 separate measurements; the currents that flow when the two sensor electrodes are polarized in each polarity (**Anodic & Cathodic**), the current that flows when the sensor tips are connected together (**Pitting**) and the conductivity measured between sensor tips. The measured values in each step are displayed when **Mode 3** is selected & UP or DOWN is pressed.

When **Mode 3** is initially selected, the seconds remaining in the current measurement cycle is displayed so that the user will know when the **Mode 0** display is going to be updated.