Product Data Sheet
RXPS-002262, Rev B
March 2021

Roxar™ Retrievable Linear Polarization Resistance (LPR) Probes

Corrosion is a serious industrial problem, therefore corrosion control is important to avoid damage and loss of integrity in a plant or production site. Efficient corrosion mitigation requires fast and reliable tools for control and verification of protection programs, such as the use of corrosion inhibitors.

The Roxar Retrievable Linear Polarization Resistance (LPR) Probe is one of the standard methods for internal corrosion monitoring. These probes require a conductive electrolyte, and are recommended for water systems, oil systems with high and continuous watercut, and for detection of corrosion due to condensation of water.

The Roxar Retrievable LPR Probe:

- Provides an instant response for a fluid's corrosion rate changes
- Possesses either a flush or projecting design, depending on the operating conditions and applications
- Allows for use in combination with other electrochemical techniques such as polarization, AC impedance and electrochemical noise measurements
- Supports both Roxar Hydraulic and Roxar Mechanical Access Fitting Systems, or any traditional 2-inch system
- Provides immediate alerts when there is a change in the corrosion rates in order to take corrective actions before more extensive damage occurs
- Determines corrosion trends with speed and accuracy so that the correlation between process changes and resulting corrosion can be established quickly
- Is designed for a long service life

Operating principle

Corrosion rates are determined electrochemically from the measured polarization resistance. The method is based on measuring the current response to a small polarization (10 – 20 mV) of a steel electrode's corrosion potential. Electrochemical theory shows that corrosion rates can be calculated directly from the current response to such small, known polarization, and thus LPR measurements give an immediate corrosion rate value.

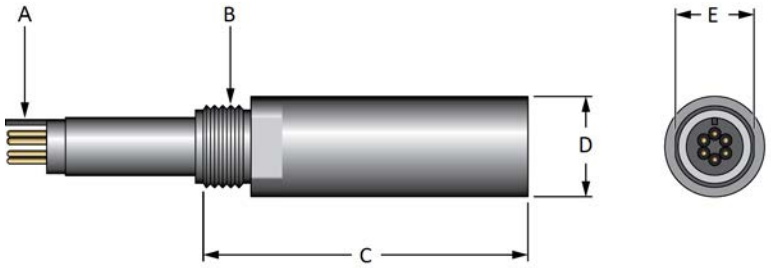
Quality of information and measurement accuracy depend on measurement frequency and instruments used. For best results, Emerson recommends that Roxar LPR Probes are used with Roxar transmitters high accuracy instruments, covering a wide range of configuration options.

Note
Because all measurements with LPR probes require a conducting electrolyte, consistent results are most easily obtained in water systems. In oil and water conditions and in particular where water conditions vary (such as slug or two-phase flow), the required electrolyte might be not present or might fluctuate, leading to results which are difficult to interpret correctly.

Roxar LPR Probe component dimensions

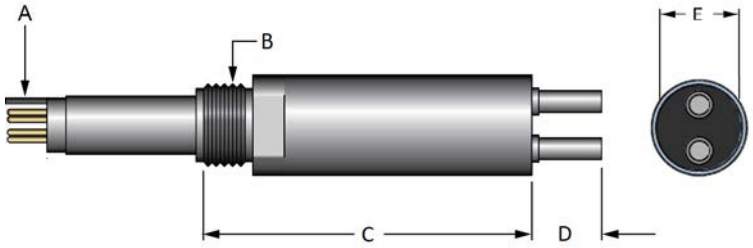
The following drawings display the dimensions of both the flushed and tubular probe.

Figure 1: Flushed probe dimension



A. 6-pin connector
B. 1-14 UNS L
C. Probe length L
D. ø 31.5 mm
E. 1 inch Key face

Figure 2: Projected probe dimensions



A. 6-pin Connector
B. 1-14 UNS L
C. Probe length L
D. ø 23 mm
E. 1 inch Key face

Element types

Emerson offers a wide variety of element types depending on operators' applications. The surface of the Roxar LPR probe may be either flush or projecting.

The Two Electrode B and Triple B are two and three electrodes LPR probes designed to be installed flush with the pipe wall.

Note
The LPR probe with 2 electrodes has one working element and one counter element. The LPR probe with 3 electrodes has one working element, one counter element, and one reference element.

Figure 3: Flush-mounted LPR Probes: Two Electrode B

Figure 4: Flush-mounted LPR Probes: Triple Electrode B

The Two Electrode C and Triple C are two and three electrode LPR probes designed for projecting into the fluid.

Figure 5: Projecting LPR Probe: Two Electrode C

Figure 6: Projecting LPR Probe: Triple Electrode C

The projecting design reduces the risk for deposits on the electrodes, which may otherwise influence the results, and also offer larger electrode area in the same application.

The electrodes of the Two Electrode C and Triple C LPR probes can be replaced.

Figure 7: Reinforced Probe Body with Reinforced Hollow Plug

A special reinforced probe design is available for conditions where velocities are high, sometimes in combination with the need for long probes. The need for reinforced design probes is normally evaluated based on wake frequency calculations. Wake frequency calculations determine the length of the probe required to withstand an installation's flow conditions.

Model code numbering system

Product description

Code	Product description
THCMPR	Corrosion monitoring probe

Measuring method

Code	Measuring method
2	Linear Polarization Resistance

Probe body type

Code	Probe body type
01	Standard design fixed length
05	Reinforced design, fixed length (no support ring)

Probe body material

Code	Probe body material
316B(1)	Stainless steel ASTM A479 UNS S31603 (316L), bar; NACE MR0175
318B(1)	Duplex ASTM A479 UNS S31803, bar; NACE MR0175
760B(1)	Super duplex ASTM A479 UNS S32760, bar; NACE MR0175
625B(1)	Inconel ASTM B446 UNS N06625, bar; NACE MR0175
825B(1)	Incolloy ASTM B425 UNS N08825, bar; NACE MR0175

(1) *Requires Special Tests and Certificates options MC or MT.*

Element type

Code	Element type
20(1)	Flush, double B
30(1)	Projected, double C
21(1)	Flush, triple B
31(1)	Projected, triple C

(1) *Available only with Measuring Method option 2, Linear Polarization Resistance.*

Element material

Code	Element material
Any element type	
S	Standard carbon steel S355J2 (EN10025), for general application
Element type 30 and 31	
A	For carbon steel pipes of A106 Gr. B, A333Gr. 6, API 5L Gr. X42
B	For carbon steel pipes of API 5L Gr. X52, API 5L Gr. X60, API 5L Gr. X65
C	For stainless steel pipes 316L (UNS S31603)
D	For duplex stainless steel pipes 22Cr (UNS S31803)

Probe length

Code	Probe length
000	Length must be defined befroe an order can be accepted
Probe body type 01 - Standard	
Element type 20, 21	
055-534	Probe length, *mm*
Element type 30, 31	
078-557	Probe length, *mm*
Probe body type 05 - Reinforced	
Element type 20, 21	
085-534	Probe length, *mm*
Element 30, 31	
108-557	Probe length, *mm*

Factory options

Code	Factory options
Z	Standard product

Certificates, tests, calibrations, and services (optional)

Code	Certificates, tests, calibrations, and services (optional)
Dye penetrant examination (select any from this group)	
D1	Dye penetrant test for probe housing
Positive material testing (select only one from this group)	
PM(1)	Positive material identification for probe housing (without C content)
PC(2)	Positive material identification for probe housing (with C content)
Pressure testing (select any from this group)	
PT	10000 psi (690 bar) test certificate
Additional raw material testing	
MC	Material inspection certificate 3.1 (supplier lot traceability per EN 10204)
MT	Material inspection certificate 3.2 (supplier lot traceability per EN 10204)
MN(3)	Material requirements according to NORSOK M-630
MR(4)	Material specification type 2

(1) *Not available with Special Tests and Certificates option PC.*
(2) *Not available with Probe Body Material options 625B, 825B.*
(3) *Not available with Probe Body Material option 825B.*
(4) *Not available with Special Tests and Certificates options MT, MN.*

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For more information: www.emerson.com

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