MetriCorr

Corrosion & Cathodic Protection
Remote Monitoring

ONSHORE PIPELINE SYSTEM

The MetriCorr Solution

MetriCorr offers a complete solution for remote monitoring of corrosion and cathodic protection of buried pipelines and associated structures. A range of loggers can be configured to monitor every aspect of modern pipeline CP operation, all the way from rectifiers and anodes to the smallest coating defects (probes) under strong AC or DC interference. This allows an operator to optimize CP performance on every level and offers easy-to-use tools for documentation of regulatory compliance

A Powerful Portfolio

The logger portfolio from MetriCorr is small but extremely powerful for corrosion and cathodic protection remote monitoring. The product selection matrix below illustrates the wide applicability of MetriCorr's four logger units.

- TRM: Transformer rectifier monitor
- VL100: 1 channel voltage logger
- ICL: Interference corrosion logger
- ICL-C: Line-current and corrosion logger

Product selection matrix

	Rectifier output current	Rectifier output voltage	Rectifier interruption	Pipeline on-potential	Pipeline AC voltage	Pipeline off-potential*	Galvanic anode output	Line current	Corrosion rate (ER)	IR-free potential*	Coupon off-potential*	Coupon DC current density	Coupon AC current density	Spread resistance	Native and pol. potential	Casing - isolation	Isolating joint	Bond current
TRM	x	x	x	x	x	x												
VL100				x	x	x	x									x	x	x
ICL				x	x	x			x	x	x	x	x	x	x			
ICL-C				x	x	x		x	x	x	x	x	x	x				

Interference Test Station

- ICL and ER probes for corrosion rate monitoring.
- AC/DC interference.
- Intensive mode,1 Hz (e.g. for passing trains).
- Connected/native option.

Potential Test Station

- VL100 logger for potential monitoring.
- Isolating joint monitoring.
- Current (shunt) monitoring.
- Intensive mode for short term interference patterns.

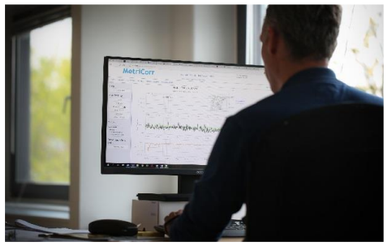
T/R Test Station

- TRM logger for rectifier monitoring and control.
- Alarms (tamper, power, output levels).
- Remote interrupt of relay for GPS time-synchronized instant-off potential measurements.

Corrosion Rate as the No. 1 Parameter

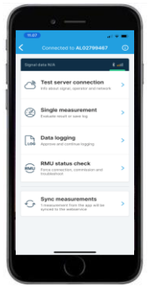
Cathodic protection is an extremely complex working area that often requires skills in several technical fields such as electrical and mechanical engineering, chemistry and physics. But in the end the sole purpose of CP is to prevent corrosion and thereby maintain safe pipeline operation. At MetriCorr we believe the easiest way to evaluate a corrosion risk, is to measure it!

Electrical resistance (ER) probes from MetriCorr are extremely sensitive and can detect a corrosion rate above 1 mpy (25 µm/y) within only 24 hours, while simultaneously monitoring electrical fingerprints such as potentials, current densities, interference levels, etc. This allows for fast analysis and immediate action in order to resume to safe CP operation.



Field Tested, Field Proven Technologies

Loggers and probes from MetriCorr are designed for field use and easy installation. The Slimline™ loggers from MetriCorr (VL100, ICL, ICL-C) are IP65 rated and can be implemented in a variety of test station designs, including a Big Fink station. MetriCorr offers custom-built power supply units (battery/solar) for >3 years of uninterrupted remote monitoring. The MetriCorr App is designed for easy commissioning of RMU's in the field.



CP*Manage Web

Data from all loggers and manual measurements is collected and visualized in the CP*Manage Web suite. Here it can be analyzed and organized for easy documentation and reporting. Alarms can be configured for logged parameters as well.

Casing Test Station

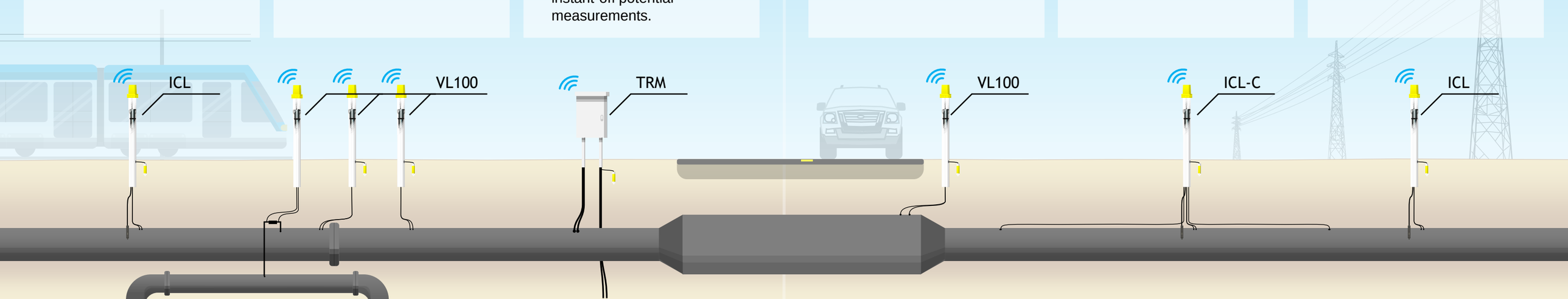
- VL100 logger for potential monitoring.
- Casing potential monitoring.
- Current (shunt) monitoring.
- Intensive mode for short term interference patterns.

Line Current Test Station

- ICL-C logger for line current monitoring.
- ER probe for corrosion rate monitoring.
- Detection of coating damage by a change in the line current.

Interference Test Station

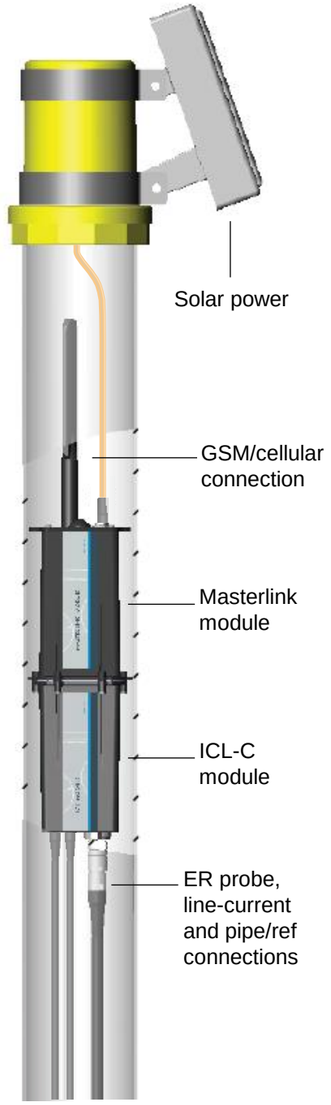
- ICL and ER probes for corrosion rate monitoring
- Ideal for AC interference analysis and AC corrosion mitigation
- Connected/native option



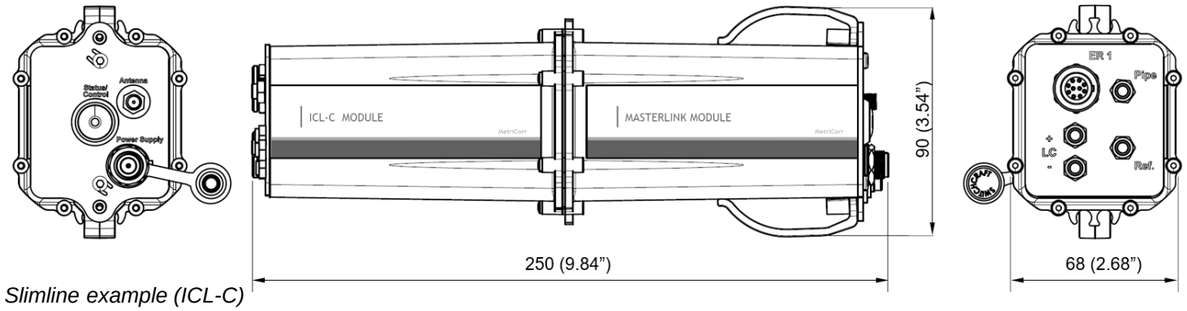
Technical specifications

Slimline loggers

Technical data		
Storage capacity	+200 000 readings	
Logging interval	10 min – ∞, Typically 1 hour 1s (intensive mode)	
Power supply options	- Mains adapter 100–240 V AC / 12 V DC - Solar Power (MetriCorr types available) - Battery Module	
Battery Lifetime	+3 years @ hourly logging, weekly upload +10 years @ 6 times daily	
Casing **Humidity** **Temperature**	IP65 0 to 100% RH condensing conditions -40ºC to +85ºC	
Transient protection	1100 V for 150 ms – 20 kA @ 8/20 µs 12.5 kA @ 10/350 µs (optional)	
Test Station Options	- Big Fink (example shown on p. 1) - MetriCorr Type Test Station - Junction Box - Customers' own spec	
Size L x W x H	250 x 70 x 81 mm (ICL, ICL-C and VL100 w. battery) 130 x 70 x 80 mm (VL100)	
Communication	- Cellular 4G with 3G and 2G fall back - Satellite (option) - Android or iOS App - Bluetooth - Ethernet (option) - GPS Time Synchronization - GNSS (Position)	
Voltage (Edc, Uac)	Input resistance	+10.0 MΩ
	Range	100 V
	Resolution	1 mV
	DC accuracy	± 1 mV ± 0.3% reading
	AC accuracy	± 1 mV ± 1% reading
Line Current mV Channel (ICL-C)	Range	± 20 mV
	Resolution	0.1 µV
	Accuracy	± 0.5 µV ± 0.1% reading
	AC rejection	110 dB



Installation example (ICL-C)



Slimline example (ICL-C)

Power supply options

Power Options				
Solution	Battery top-hat for Big Fink	Solar top-hat for Big Fink	Battery pack (long/short)	Junction Box w. solar
Power supply	Li-Thionyl-Chloride battery	Solar + lead crystal battery	Alkaline battery	Solar + lead acid/crystal battery
Solar panel output	-	3 W	-	10 W
Battery voltage	7.2 V	12 V	15 V	12 V
Capacity (Ah) (nom/useful)	42 / 21	1.2 / ∞	16 / 8	12 / ∞
Standby current	0.07 mA	0.07 mA	0.07 mA	0.07 mA
Measurement	0.6 mAh	0.4 mAh	0,3 mAh	0.4 mAh
Transmission*	15 mAh	10 mAh	8 mAh	10 mAh
Expected operating time (years)	6.3 / 3.2 ** 3.7 / 1.9 ***	-	4.4 / 2.2 ** 2.6 / 1.3 ***	-
Temperature range	-20°C – +60°C	-15°C – +45°C	-15°C – +45°C	-20°C – +45°C -40°C – +65°C****

** Highly dependent on connectivity*
*** Hourly measurement – weekly transmission*
**** Hourly measurement – daily transmission*
***** Low temperature options are available*

ER probes

Options	
Element material	Steel (preferred) Iron* Zinc* custom*
Housing material	PVC (soil/water/atmospheric applications) Steel (high temperature applications) custom*
Element thickness	Standard: 100 µm, 500 µm, 1000 µm, custom*
Probe sensitivity	See chart
Probe lifetime	Depending on thickness and corrosion
Cable length	Standard: 6 m, 9 m, 12 m, custom*
Cable type	Soil, seawater, high temperature
Temperature range	Standard/seawater: Up to 80°C High temperature: Up to 200°C
Area	Standard: 1 cm^2, 10 cm^2, 31 cm^2, custom*

** Ask for availability: info@metricorr.com*

Chart (below) illustrates the sensitivity of different common MetriCorr probes in terms of the detectable corrosion rate over a period, or a probe's response time at different corrosion rates.

For example, our recommended probe for AC interference monitoring (Steel, 500 µm, 1 cm^2, PVC, standard cable 6m) will be able to detect a corrosion rate of 25 µm/y (1 mpy) within 24 hours!