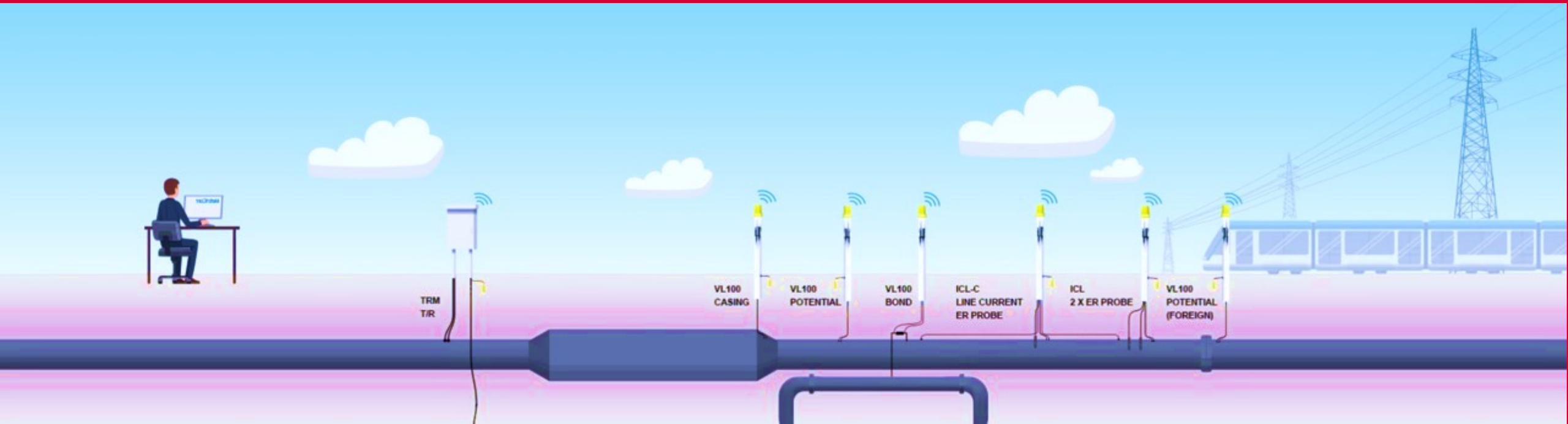


External Corrosion Monitoring_



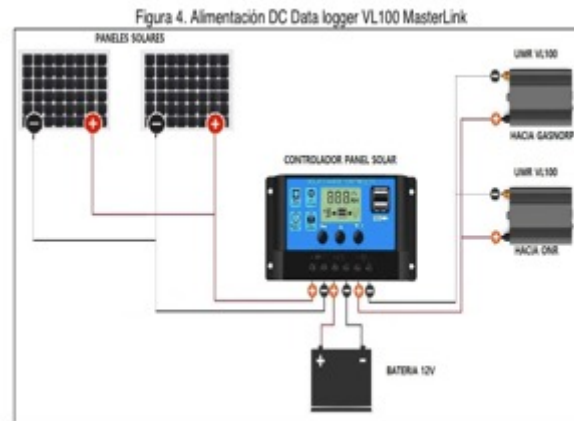


Product: ER Probes_

1. The probe simulates a coating defect. Measuring the electrical resistance of the exposed coupon element and a protected reference element rates the specimen by using simple mathematical algorithms.
2. The simultaneous recording of the corrosion rate and electrical fingerprints enables efficient analysis of, for example, interference conditions. Measuring all parameters (corrosion rate, AC/DC potentials, AC/DC current densities, and propagation resistance) on the same metal surface ensures that all interacting chemical and electrochemical reactions are part of the analysis.



UMR Tipo I_



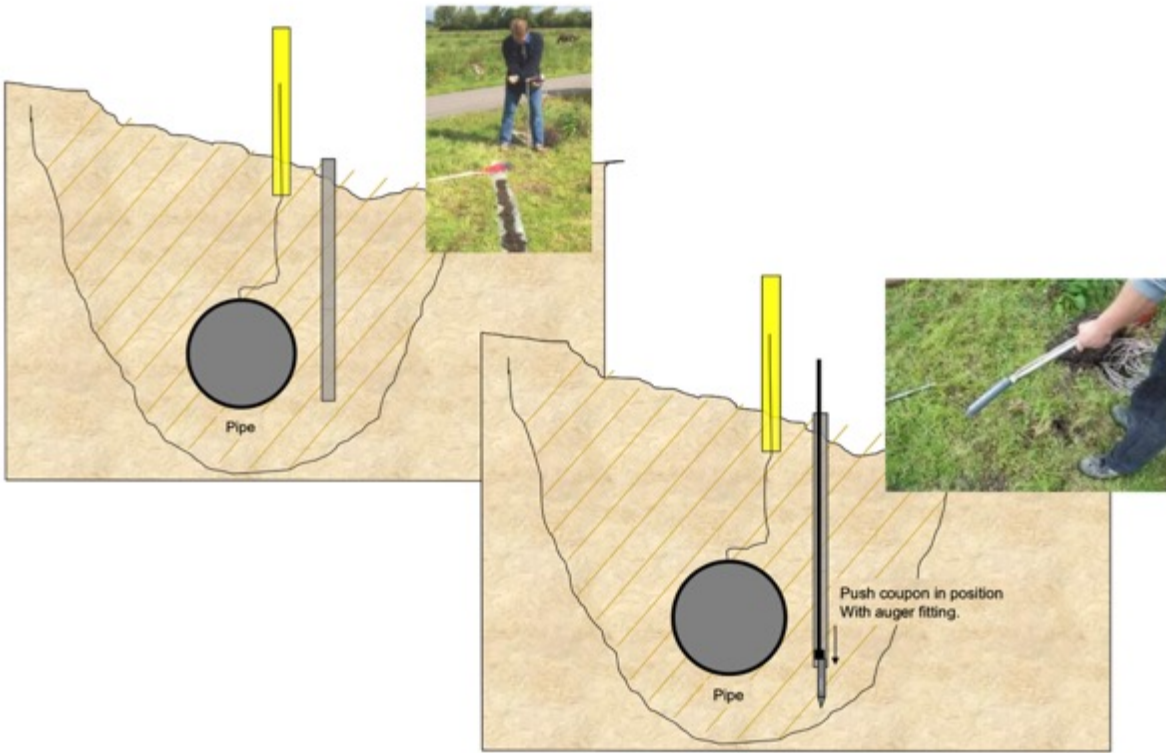
What's included?_

- ✓ Potential ON

What's included?_

- ✓ UMR
- ✓ Battery
- ✓ Solar Power





UMR Type II_

- ✓ Corrosion Rate
- ✓ Potential OFF
- ✓ IR Compensated Potential
- ✓ AC or DC current density
- ✓ Difference in resistance over time

What's included?_

- ✓ UMR
- ✓ 1 ER specimen
- ✓ CSE Reference Electrode
- ✓ Solar Power + Battery



UMR Type II Characteristics _

1. Corrosion rate: the highest resolution enabling corrosion diagnostics
2. Coupon Measurements: AC/DC Current Densities, Polarized Potentials, Propagation Resistance
3. Built-in certificate data – no paperwork required
4. Engineering design: especially suitable for AC or DC interference corrosion monitoring
5. Temperature Compensation – Heat Sink – Reference Element – Patented Compensation
6. Rugged design available for soil/high temperature/offshore



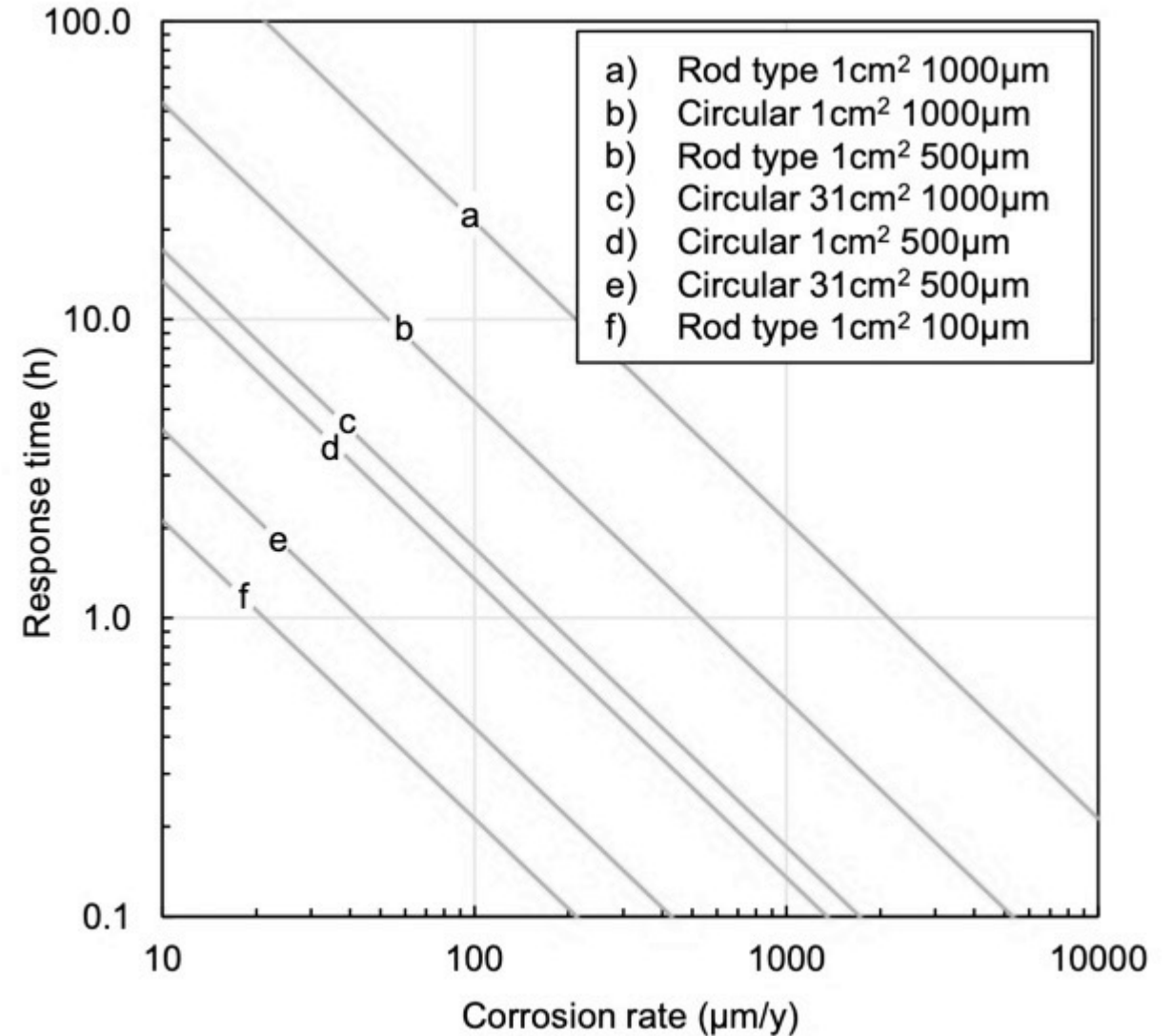
Class: ER Probes_



Measuring all parameters (corrosion rate, AC/DC potentials, AC/DC current densities, and propagation resistance) on the same metal surface ensures that all interacting chemical and electrochemical reactions are part of the analysis.

Sensitivity_

- Response time of a specimen to different corrosion rates. This sensitivity should be divided by the attenuation factor based on the length of the cable (below).
- For example, the specimen recommended for AC interference monitoring will be able to detect a corrosion rate of $25 \mu\text{m}/\text{y}$ (1 mpy) within 24 hours.



RMU Rectifier_



Synergistic remote monitoring units for on/off potential inspection campaigns that allow a better understanding of the behavior of the PC system.

RMU Rectifier_



Capacity_

- ✓ Current Measurement and DC Output Voltage
- ✓ Alarm for no AC power
- ✓ Rectifier or door opening alarm
- ✓ Potential On/Off
- ✓ PC System Interrupt (Cycling)

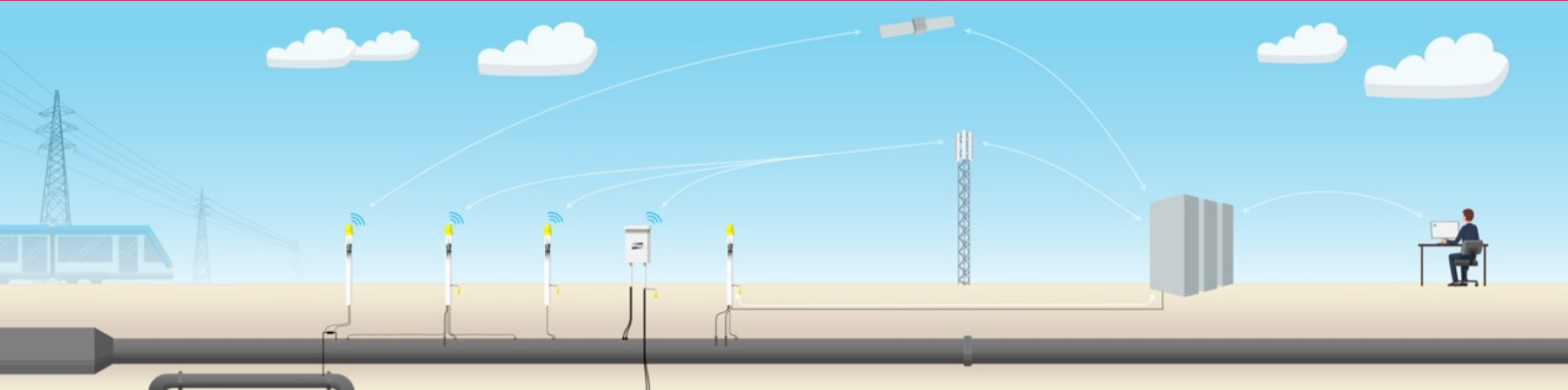
What's included?_

- ✓ UMR
- ✓ Enclosures & Accessories
- ✓ CSE Reference Electrode
- ✓ Solar Power + Battery



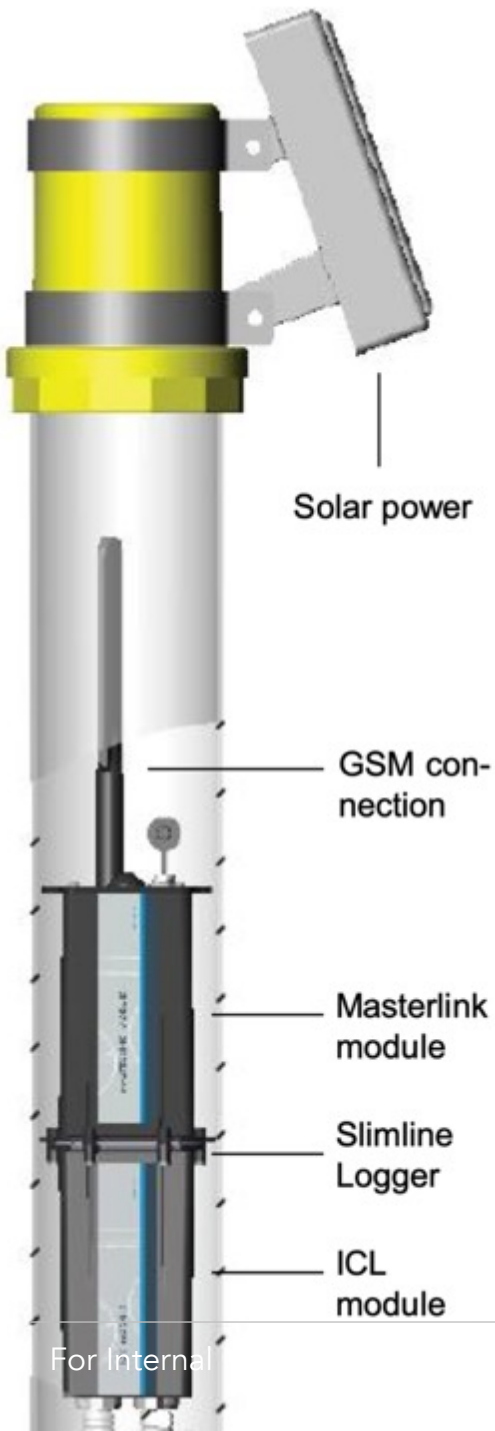


Remote Monitoring Integration & Compatibility



Product: Remote Monitoring_

1. GPS or GPRS monitoring units
2. Directly compatible with ER specimens
3. Allows ON/OFF potentials, current densities and corrosion rate to be taken
4. Powered by long-lasting battery backup with additional internal solar source option
5. Cavity Test Stations for UMR Location



Data: Communication Ecosystem_

The image is a composite illustrating a data communication ecosystem. It is divided into several sections:

- Top Left:** A software interface for data filtering. It includes sections for "Site Filter" (Pipeline, Tag, Probe), "Time Filter" (Average values, Alerts), and "Text Filter". Below these is a map of a city with a red line and markers indicating a specific path or area of interest.
- Top Center:** A photograph of a man in a light blue shirt sitting at a desk in a server room, looking at multiple computer monitors displaying data and charts.
- Top Right:** Another software interface for configuring a campaign. It includes sections for "Select Pipeline", "Campaign Parameters", "Select Interruptions", and "Select Loggers". It features various input fields for campaign details and a graph showing a step function with labels T_{off} , T_{on} , and T_{int} .
- Bottom:** A diagram of the physical communication ecosystem. It shows a train on the left, power lines, and several ground-based sensors (antennas) connected to a central server rack. A person is shown sitting at a desk on the right, interacting with the system.

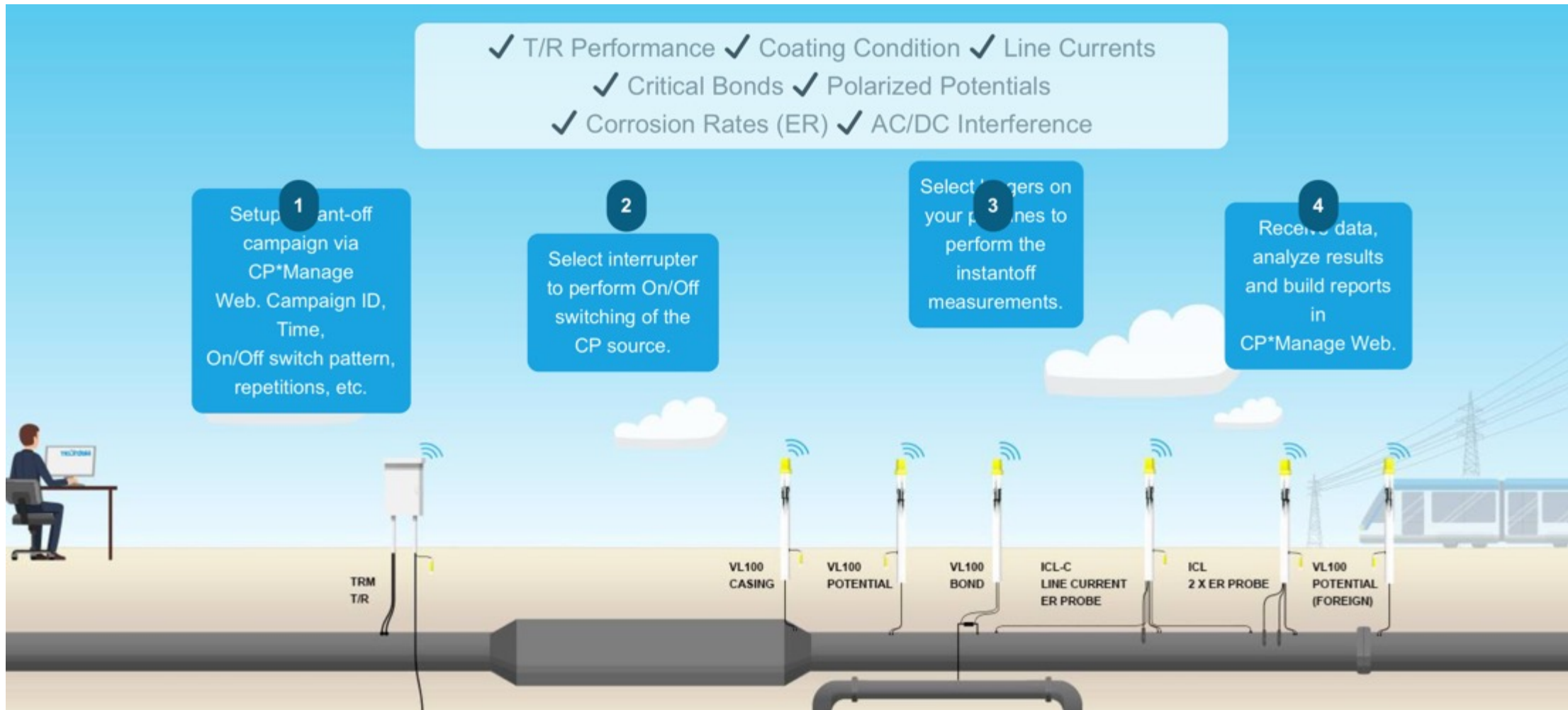


Advantages_

1. Location in remote or problematic areas
2. Remote operation of the URPC
3. Minimizes excavations
4. Operation with any permanent CSE
5. Long-lasting
6. User-friendly platform that integrates all systems



Remote Monitoring: Types



Units: Offer

ER PROBE
 -2 specimens per point are considered, with their facilities for installation on existing pole



Added Value
 - Installation of permanent reference electrode for measurement of ON and OFF potentials in coupon (additional value in economic offer)



Measurement
 Base Offer: Corrosion Rate
 Additional: Corrosion Rate, On/Off Potentials, AC & DC Current Densities, AC Potentials





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