Remote Monitoring Unit & Web-based Software

- Communication Options to suit Worldwide Locations
- CP & Corrosion Monitoring
- Web-based Software for Internet or Intranet Operation
- Lightning Protection on Inputs and Power Supply

The Remote Monitoring Unit (RMU) is designed primarily for monitoring of Cathodic Protection (CP) rectifiers and additional inputs of corrosion monitoring transmitters. Interchangeable communication cards provide for worldwide coverage through satellite links to license-free spread spectrum radio for local applications.

Communication Options

- Inmarsat Satellite
- GSM Cellular
- 2.4 GHz License Free Spread Spectrum Mesh Radio
- RS-485 Hardwired
- 10/100 GB Ethernet

The basic RMU has four switchable range analog input channels (±100V, ±10V, ±100mV, 4-20mA), all with optional lightning protection. In the most common configuration, Channel 1 is used for rectifier voltage (±100V), Channel 2 is for rectifier current (±100mV) and Channels 3/4 are for reference electrodes (±10V) or multi-purpose use (4-20mA). In larger multi-RMU configurations, each channel is separately configured as the user application requires. An RS-485 channel provides for the connection of digital transmitters such as Microcor or wired interconnection of multiple RMU’s. Additional digital I/O channels are available for other status communications.

Multiple RMU rectifier interruption to ±5 ms synchronization accuracy is available for Over-the-Line surveys through the optional GPS card and antenna. The interruption schedules are programmable through the web-based software. On-board data logging also permits de-polarization testing. Rectifier interruption is provided by separate Solid State Relays (requiring <50mA drive current).

The RMU permits the choice of multiple communication options with a simple change of the communication card for a unified network that allows the most appropriate and economic communications channel for each RMU, to span from the world’s most remote areas to the most densely populated areas all in one system.

Web-based software available over an RCS maintained Internet Server permits easy hassle-free access to your CP and corrosion data anywhere, anytime, and with e-mail, text messaging of alarm conditions that need your immediate attention. If you prefer the increased security of your own network instead of the Internet, then the Web-based software may be installed on your own servers.
RMU Unit

The RMU unit is housed in a polycarbonate NEMA 4X enclosure (IP67) with special controlled venting to prevent condensation issues in high humidity areas. Extensive lightning protection options are available on all of the external inputs including communication, GPS antennas, analog inputs, and mains input power to prevent damage in exposed areas.

The RMU is typically line powered from the same source as the rectifier when monitoring CP systems. Alternatively, external 24 VDC or solar power may be used where required. An on-board back-up battery provides safety communication in the case of line power failure. All data and configuration information are stored in non-volatile memory.

Remote Equipment Control

Through the Web-based software, remote equipment, such as chemical injection pumps and the like, can be controlled and adjusted to provide optimum performance in 1% steps with two ranges of output control – 0-5VDC and 0-10VDC.

GPS Precision Timing

The optional GPS provides precision timing to synchronize multiple RMU rectifier interruption to within ±5 millisecond accuracy, without the need for separate interrupters. This allows remote programming of interruption schedules without the need to visit the site.

Inmarsat Global Satellite Data Link

The Inmarsat Geo-Synchronous orbit satellite communication board and antenna provide worldwide coverage for communication between the RMU and the Web Server.

Data transfer is compressed to provide the most economical communication costs, while providing coverage for the remotest areas of the world. Geo-Synchronous satellites provide a constant stationary communication window that is always available for on-demand communication.
GSM Cellular Data Link

For less remote areas, the GSM data communications card may be used for a more cost-effective communication option.

2.4 GHz Spread Spectrum Mesh Radio Data Link

For plant operation or areas such as CP protection in upstream oil and gas operations, 2.4 GHz license-free spread spectrum radios provides a mesh network for medium range communications but without the monthly communication costs of other methods. These units can even be used with a base station to other communication channel links, to allow for multiple radio units to connect through a base station to satellite converter so that only one charged communication link is required per site instead of per rectifier. The radio base station can also be connected via existing internet link to the remote server to avoid all communication charges. In this case the RMU is reconfigured as a base station.

RS-485 Wired Data Link

Alternatively, for limited area applications using wired interconnection instead of wireless links, the RS-485 wired connection provides for links of up to 4000 ft (1200 m), without repeaters. The RS-485 input is also suitable for providing digital communication with digital corrosion transmitters such as the Microcor range. Other Corrosometer transmitters with 4-20 mA data transmission may be brought in through the RMU.

The RMU may also be connected to the RCS R-1420 Wireless gateway to provide remote communications for the RCS range of wireless corrosion management systems.

Web-Based Software

Following your company and individual login to the RCS Web Server -

A general status of all of the rectifiers and equipment in your control is presented, similar to that shown. A map shows the individual locations of the RMU units, which may be selected to see the full details. An immediate overview of the RMU units within the users control is presented along with the status.
RMU data is viewable in several forms, including multi-unit summary of all channels, a log of readings on each unit, and graphical displays over data over time.

Detailed screens are available to view in the basic information for each RMU, channel configurations, interruptions schedules, alarm and data communication histories.
Technical Specification

Enclosure: Polycarbonate NEMA 4X (IP66)

Dimensions: 302 x 232 x 90 mm (11.89 x 9.13 x 3.54 in)

Power Supply: Input: 90-240 VAC 50/60 Hz, Output: 24 VDC, 20 Watts

Battery Backup: Rechargeable Lithium, 2+ Hours Capacity (Typical Max Comms Time < 5 mins)

Operating Temperature: -40C to +70C (-40F to 158F)

Analog Input Channels: 4 Channels each switchable for the following ranges:
- ±0-100 VDC, Input Impedance > 22 MΩ, Accuracy 0.05% FS
- ±0-10 VDC, Input Impedance > 22 MΩ, Accuracy 0.05% FS
- ±0-100 mVDC, Input Impedance > 230KΩ, Accuracy 0.05% FS
- ±0-5 VDC, Input Impedance > 22 MΩ, Accuracy 0.05% FS
  (4-20 mA with 250Ω resistor)

  All channels relay isolated to 1KV+ except during measurement (< 1s)

Serial Input: RS-485 (2-wire / 4-wire) for Digital Corrosion Transmitters, or Modbus Comms

Front End Communication Interface: 2.4 GHz wireless license free mesh network to interconnect remote RMU’s to RMU configured as a Base Station. Up to 10 mile line-of-sight range unit to unit.

Channel Isolation: >1000V between each channel

Digital Input: 2 Channels, Switch Contact

Digital Output: 2 Channels, Remote Equipment Control, 0-5V or 0-10V in 1% steps

Interruption Output: <50 mA Solid State Switch Drive Current (Short Circuit Protection)

GPS Synchronization and Positioning: GPS (American) or Glonass (Russian) Networks
- UTC Synchronization ± 5 msec
- Accuracy Horizontal Position <6 meters (50%)
  <9 meters (90%)
- Accuracy Altitude Position <11 meters (50%)
  <18 meters (90%)

Back-Haul Communication Interfaces: Ethernet 10/100 Mb Dynamic DNS Address to Open Client TCP/IP Network
- GSM Quad Band 850/900/1800/1900 MHz Transceiver for Worldwide GSM TCP/IP Connection
- SkyWave / Inmarsat Communications – IsatM2M

Antenna RF Lightning Protection: To IEC-61463-21 Specification

Analog Input Lightning Protection Option: To IEC-61000-4-5, -4, -2 Specifications
- < 1uA TVS Diode Reverse Current Leakage

Optional Input Power Lightning Protection: To IEC 61643-1, IEC 61312-1 Specifications
## Ordering Information

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
</tr>
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<tbody>
<tr>
<td>RMU1</td>
<td>Remote Monitoring Unit</td>
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</table>

### Code | Number of Channels
---|---
4 | 4 Channels

### Code | Interruption
---|---
0 | No
1 | Yes

### Code | Data Communication Link
---|---
1 | Inmarsat Satellite
2 | GSM Data
3 | 2.4 GHz License-Free Spread Spectrum Radio
4 | RS-485 Wired
5 | TCP/IP

### Code | Power supply
---|---
1 | 100 to 240 VAC
2 | 24 VDC / Solar

### Code | Input Lightning Protection
---|---
1 | Input Isolation Relay
2 | Input Relay and Input Surge Protection

### Code | Power Supply Lightning Protection
---|---
0 | None
1 | 100/240 VAC Lightning Surge Protection

RMU1 — 4 — 1 — 2 — 1 — 1 — 0

Solid state Interruption device is ordered separately.