

# REMOTE MONITORING UNIT (RMU)

**Remote Monitoring equipment** is used to monitor Cathodic Protection Systems, gathering and providing valuable information. **RMU's** are generally installed near a *Cathodic Protection Rectifier* but can also be installed at critical structure-to-soil potential test stations, depending on the application requirements.

The **Cathtect Remote Monitoring Unit** is a programmable remote controller that provides remote monitoring and control of the Rectifier Unit. This Monitoring Unit uses GSM and GPRS to navigate & monitor corrosion around pipelines and tank structures. This enables personnel to request and collect Cathodic Protection performance information from any location around the world using cellular networks.

Personnel no longer need to travel to a site, not only is this ideal in that it saves time and travel expenses but it can also be beneficial where sites are not easily accessible. The **RMU** does not only measure the performance of the *Cathodic Protection System*, it can also pick up any faults that might occur so that it can be repaired.

The Cathtect RMU is designed to make Cathodic Protection monitoring simpler whilst still providing all the benefits. This innovative unit allows you to;

- Instantaneously request information i.e. 24-hour logs, values for control modes or alarms.
- Remotely change control settings
- Have an SMS or TEXT sent to the master station should there be any kind of fault or tampering.

The Cathtect RMU is sufficient and reliable for all monitoring and Cathodic Protection applications and needs.

## Features

### Power Supply/UPS Module.

- Power Input: 220V AC 50Hz
- Power Outputs: 15-0-15V AC, Regulated +/-15VDC @ 100mA
- Battery Charging: 10mA trickle charger for 12VDC SLA Battery
- Provides UPS supply to the multi-mode controller and GSM module.
- Sets the "AC Supply failure to Monitoring Unit" Alarm signal on interruption of the 220 V AC supply.

### GSM Module (plus antenna).

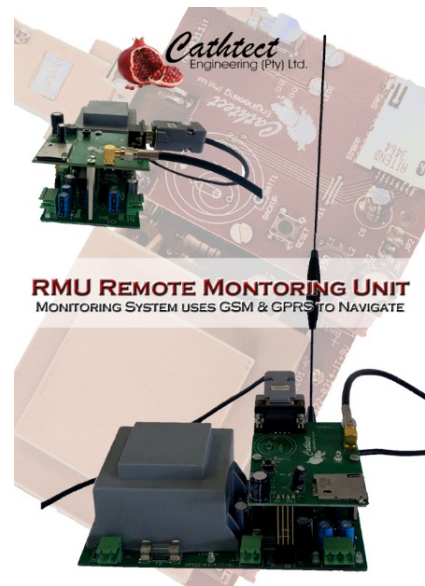
- GSM/GPRS SMS enabled Modem.
- Power Input: 12 VDC
- Standard Sim card slot (MTN/CELLC/ Vodacom/Telkom)
- Din rail mount

### 12V SLA Rechargeable Battery.

- Provide up to 150 hours of backup supply.

### Power and signal line protection.

- 220 V AC power is protected by 275 V 15kA MOV
- TRU output voltage signal: 275 V 15kA MOV
- TRU output current signal: bidirectional diode across shunt input on PCB.
- Reference Potential signal: 60-0-60V 1.5kA bipolar transorb with 90V spark gap to earth.
- Digital inputs protected to 20V continuous



## Functional Description.

- To continuously monitor the important outputs of the TRU.
- To detect TRU fault conditions
- To provide local automatic TRU control capability in one of four selectable modes.
- To continuously log TRU operating (and fault) conditions with the following parameters.
- To transmit via a single SMS the latest recorded 24-hour log to the Master Station including the following data.
- When polled by the Master Station or any personal cell phone, the outstation must transmit via a single SMS  
to the polling personal cell phone or Master station the following data.
- To transmit via SMS the following ALARM data to the Master Station.

## Master Station hardware and Software

- This will consist of a desktop PC, for continuous runtime use, fitted with the following items:
- Power Supply module (socket-mounted).
- GSM Module (plus antenna).

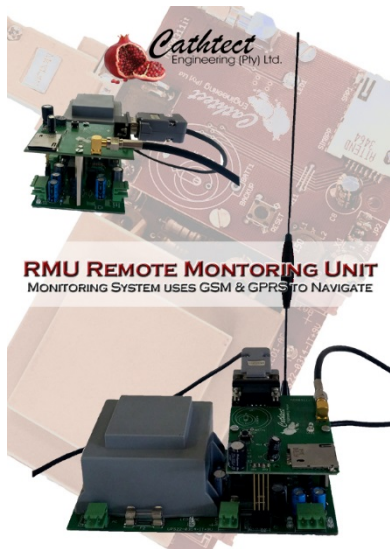
## Master Station Functional Description

The Master Station should be able to operate, manage and control up to 250 remote Transnet Pipelines Remote field units, all of which communicate via GSM SMS.

- To poll any selected Outstation for the following.
- Visual Display of selected TRU latest polled data.
- Visual Display of selected TRU setup parameters.
- Visual Display of selected TRU setup parameters cont.
- Visual Display Chart of selected TRU latest received Log data.
- To receive, unsolicited, from any selected Outstation the following.
- Visual Display of Alarm data from Outstation. Such as
- Data file creation and management.
- Visual Display of Support Service Contact Information
- Documentation for remote monitoring and control system.

For more about this Unit [CLICK HERE](#)

## REMOTE MONITORING UNIT (RMU)



**Cathtect** is a Technical Market Leader in the *Cathodic Protection* Industry. we have dedicated and experienced engineers who design and manufacture monitoring equipment for the use in *Cathodic Protection*. One being our [Remote Monitoring Unit \(RMU\)](#) which is a programmable remote controller that provides remote monitoring and control of the **Rectifier Unit**. This Monitoring system uses GSM and GPRS to navigate and monitor Corrosion around pipelines and tank structures. Integrated Cathodic Protection uses cellular networks by sending SMS /text messages from the field to the control facilities (GSM) and it utilises GPRS communication protocols to facilitate data transfer between field and control facilities.

**Remote monitoring equipment** enables personnel to collect *Cathodic Protection* performance from a distant location.

Personnel do not need to travel to a site, not only is this ideal but it can also be beneficial when sites are not easily accessible. The **RMU** does not only measure the performance of the *Cathodic Protection system* but it can also pick up any faults that might occur, so that it can be repaired. **RMU's** are generally installed near a *Cathodic Protection Rectifier* but can also be installed at critical structure-to-soil potential test stations.

### Benefits of Cathtect's RMU

- Request for instantaneous values for control mode and alarm
- Request for 24 Hour log
- Remotely changing control settings
- 12V SLA Rechargeable battery which can provide up to 150 hours of backup supply
- Transmit an SMS/ Text to the Master Station if there is any kind of fault or tampering
- Uses the Newest technology
- Can receive instantaneous values of your Cathodically Protected system anywhere around the world over an SMS/ Text

### Remote Field Unit Hardware.

#### 1.1.1 Multi-mode Monitoring & Control Module.

- Measure, store and display on local LCD screen TRU output voltage (0 to 100V DC)
- Measure, store and display on local LCD screen TRU output current (0 to 650A DC, derived from 50mV shunt)
- Measure, store and display on local LCD screen Reference Potential (+10V to -50V DC) Input impedance >1GΩ.
- Current Drainage (0 to 650A DC, derived from 50mV shunt)
- AC Measurement across
- Measure, store and report on status of 8 Digital I/O inputs currently set up as follows;
  - Mains Healthy/Fail
  - AC Fuse Healthy / Fail
  - DC Fuse Healthy / Fail

- Rectifier Stack Temperature Healthy / Fail
- User defined (Intruder Alarm)
- User defined (Door Tamper)
- User defined (etc)
- User defined
- User defined
- Set 4 Digital outputs
- Control output of 0V to 5V DC voltage.
- RS232 port (9600Baud) for program updates and GSM module communications.
- I2C bus
- Minimum of 64kB of EEPROM memory for storage of log and other data.
- Power Supply requirements: 15-0-15V AC 50Hz.
- Real time Clock (YY-MM-DD-hh-mm-ss).

### 1.1.2 Power Supply/UPS Module.

- Power Input: 220V AC 50Hz
- Power Outputs: 15-0-15V AC, Regulated +/-15VDC @ 100mA
- Battery Charging: 10mA trickle charger for 12VDC SLA Battery
- Provides UPS supply to the multi-mode controller and GSM module.
- Sets the "AC Supply failure to Monitoring Unit" Alarm signal on interruption of the 220 V AC supply.

### 1.1.3 GSM Module (plus antenna).

- GSM/GPRS SMS enabled Modem.
- Power Input: 12 VDC
- Standard Sim card slot (MTN/CELLC/ Vodacom/Telkom)
- Din rail mount

### 1.1.4 12V SLA Rechargeable Battery.

- Provide up to 150 hours of backup supply.

### 1.1.5 Power and signal line protection.

- 220 V AC power is protected by 275 V 15kA MOV
- TRU output voltage signal: 275 V 15kA MOV
- TRU output current signal: bidirectional diode across shunt input on PCB.
- Reference Potential signal: 60-0-60V 1.5kA bipolar transorb with 90V spark gap to earth.
- Digital inputs protected to 20V continuous

## 1.2 Remote Field Unit Functional Description.

### 1.2.1 To continuously monitor the important outputs of the TRU.

- DC Voltage
- DC Current
- Reference Potential.

### 1.2.2 To detect TRU fault conditions.

- AC Supply failure to Monitoring Unit (mandatory)
- Door tampering trigger
- Diode heat sink over temperature

- AC and DC fuse failure
- Phase failure

**1.2.3 To provide local automatic TRU control capability in one of four selectable modes.**

- Constant Voltage
- Constant Current
- Constant Potential.
- Instant-Off
- In addition, the following TRU operating limits are also to be configurable:
- Voltage limit
- Current limit
- Reference Potential Set point
- Instant-Off Mode ON-time
- Voltage Alarm set point
- Current Alarm set point
- Reference Potential Alarm set point

**1.2.4 To continuously log TRU operating (and fault) conditions with the following parameters.**

- Storage of hourly readings 24 times daily, with accurate start date and time stamp for each day's log.
- Cumulative roll-around storage of 366 (1 year) daily records
- Reference Potential set point
- Voltage Alarm set point
- Current Alarm set point
- Reference Potential Alarm set point

**1.2.5 To transmit via a single SMS the latest recorded 24-hour log to the Master Station including the following data.**

- 24 hourly-sampled DC Voltages
- 24 hourly-sampled DC Currents
- 24 hourly-sampled Reference Potentials
- Last monitored TRU fault status
- Log Start Date and Time stamp (YY-MM-DD-hh-mm-ss)
- Unit ID

The Outstation is to be remotely configured to transmit the daily log at a preselected hour and minute of the day and will continue to do so until a change in configuration is received from the Master Station. The latest recorded log can also be polled at any time of the day by the Master Station.

Should the Outstation's system processor be reset or shut down for any reason, upon restart, the monitoring and logging will resume according to pre-set conditions so as to maintain synchronicity. This is to include multiple power outages in one 24-hour period.

**1.2.6 When polled by the Master Station or any personal cell phone, the out station must transmit via a single SMS to the polling personal cell phone or Master station the following data.**

- DC Voltage
- DC Current

- AC Voltage
- Reference Potential.
- AC Supply failure to Monitoring Unit status
- Door tampering trigger status
- Diode heat sink over temperature status
- AC and DC fuse failure status
- Phase failure status
- Poll Date/Time stamp (YY-MM-DD-hh-mm-ss)
- Unit ID

#### 1.2.7 To transmit via SMS the following ALARM data to the Master Station.

- Voltage Alarm set point exceeded
- Current Alarm set point exceeded
- Reference Potential Alarm set point exceeded
- AC Supply failure to Monitoring Unit
- Door tampering trigger
- Over temperature
- AC and DC fuse failure
- Phase failure
- Alarm Date/Time stamp
- Unit ID

### 1.4 Master Station Functional Description

The Master Station should be able to operate, manage and control up to 250 remote field units, all of which communicate via GSM SMS.

#### 1.4.1 To poll any selected Outstation for the following.

- Current TRU Voltage, Current, Reference Potential and fault status.
- Latest recorded Log data.

#### 1.4.2 Visual Display of selected TRU latest polled data.

- DC Voltage
- DC Current
- Reference Potential.
- AC Supply failure to Monitoring Unit status
- Door tampering trigger status
- Diode heat sink over temperature status
- AC and DC fuse failure status
- 3-phase failure status
- Poll Date/Time stamp (YY-MM-DD-hh-mm-ss)
- Unit ID

For the operator's convenience, the analogue readings must also be displayed graphically as analogue meters, if selected.

#### 1.4.3 Visual Display of selected TRU setup parameters.

- Control Mode (Constant current, voltage, etc., including Monitor Only mode)
- Voltage limit
- Current limit
- Reference Potential set point
- Instant-Off Mode ON-time (if selected)

- Remote Relay output setting for 4 relays, including name/description data.

#### 1.4.3 Visual Display of selected TRU setup parameters cont.

- Current Alarm set point
- Reference Potential Alarm set point
- Outstation ID
- Outstation Name/Description
- Authorized User 1: personal cell phone number
- Authorized User 2: personal cell phone number
- Outstation Log time in hours and minutes (hh-mm).

This information, once completed must be transmitted to the selected Outstation and saved to a setup file which will be reloaded on restarting the SCADA software program. The setup file is to be saved automatically once the setup data has been transmitted, or it can be manually saved.

#### 1.4.4 Visual Display Chart of selected TRU latest received Log data.

- 24 hourly-sampled DC Voltages
- 24 hourly-sampled DC Currents
- 24 hourly-sampled Reference Potentials
- Calculated output Power and Impedance (optional)
- Log Start Date and Time stamp (YY-MM-DD-hh-mm-ss)
- Outstation ID
- Outstation name and description.

#### 1.4.5 To receive, unsolicited, from any selected Outstation the following.

- Alarm message, including the TRU Voltage, Current, Reference Potential and fault information.
- Latest daily Log data.

#### 1.4.6 Visual Display of Alarm data from Outstation. Such as

- DC Voltage
- DC Current
- Reference Potential.
- AC Supply failure to Monitoring Unit status
- Door tampering trigger status
- Diode heat sink over temperature status
- AC and DC fuse failure status
- 3-phase failure status
- Poll Date/Time stamp (YY-MM-DD-hh-mm-ss)
- Outstation ID

As soon as the Alarm message has been received, the SCADA must be able to echo the message to one or both of the "Authorized User" cell phone numbers, to enable rapid response to the problem.