



## CABLEMATIX RECEIVER TYPE RXTX 01

### INTRODUCTION

The receiver unit Type RXTX01 is a fault current sensing unit combined with a receiver to record data sent by the remote TXOO units on the cable feeder. The unit provides indication of fault incidents including past history and the current status of transmitter units on the cable feeder. The receiver unit is designed for mounting at a primary substation adjacent to the 11kV switchgear.

### OPERATION

The RXTX01 incorporates a fault passage measurement circuit set at a less sensitive level than the Transmitters on the cable feeder; this guarantees operation of all the transmitters when the detector at the receiver operates. The fault detection characteristic is an inverse time curve with a definite minimum operating time of 60mS at 20 times pick-up setting (normally set to 80 primary Amps)



When the unit detects a cable fault, the high frequency receiver circuit monitors the HF detectors (Voltage transducer and CT) for data from the transmitter (TXOO01) units located along the length of the cable. As the data is received it is validated against the receiver settings for the particular cable feeder, only valid transmitters are recognised and recorded. When the communication period is completed the transmitter signalling data is presented on the multi-character LCD panel and also communicated to the SCADA interface unit via the communications bus.

The LCD panel indicates which transmitters detected the fault current flow at each of the RMU points along the cable, from this information the position of the faulted cable section can be located.

Indications (LEDs) are provided to show 'healthy' state and data transmission in progress.

### ADDITIONAL FEATURES

The unit records a history of the last 10 cable faults each identified with the elapse period since the fault, displayed in days, hours and minutes.

The unit also continuously monitors the test transmissions from the transmitters (TXOO01) at the RMUs on the cable. The receiver retains a count of each test transmission from each Transmitter if the Receiver fails to receive 14 successive test transmissions (56 hours) an alarm is raised by sending data to the SCADA interface indicating the feeder and which transmitter has failed.

## **SETTINGS**

The following settings are input to the receiver unit using the Keypad and Liquid Crystal Display.

- Initial setting of date and time ( Note – relative time recording is used for fault record information)
- Feeder Identity – to indicate to the SCADA interface which receiver unit data has been sent from.
- Transmitter list - a list of the Transmitter addresses for which the receiver is responsible this also sets the transmitter position identification on the SCADA interface and local display.

Other values set using jumper plugs are receiver address code and transmission time slot

## **INSTALLATION**

Connections to the unit are

- Local 110/250 Vac auxiliary supply (5A fused) e.g. lighting circuit. This provides power for the automatic test function and for an internal anti-condensation heater.
- Local 110V dc supply (5A fused) for operation of the inter-unit communications during a mains ac supply failure.
- Fault current sensing CT
- Signalling CT
- Voltage transducer (VTI01) for receiving data when the primary circuit breaker is open.

The connections to the fault current sensing CT and signalling CT are non-intrusive requiring no primary system outage during installation.

- The current sensing CT is of split core construction. This is clamped around the 11kV cable, the internal diameter of the CT is >110mm.
- The signalling CT is of solid core construction, this is connected to the power system by passing the earth strap from the cable through the CT, this can easily be achieved on site with the use of a temporary earth clamp.

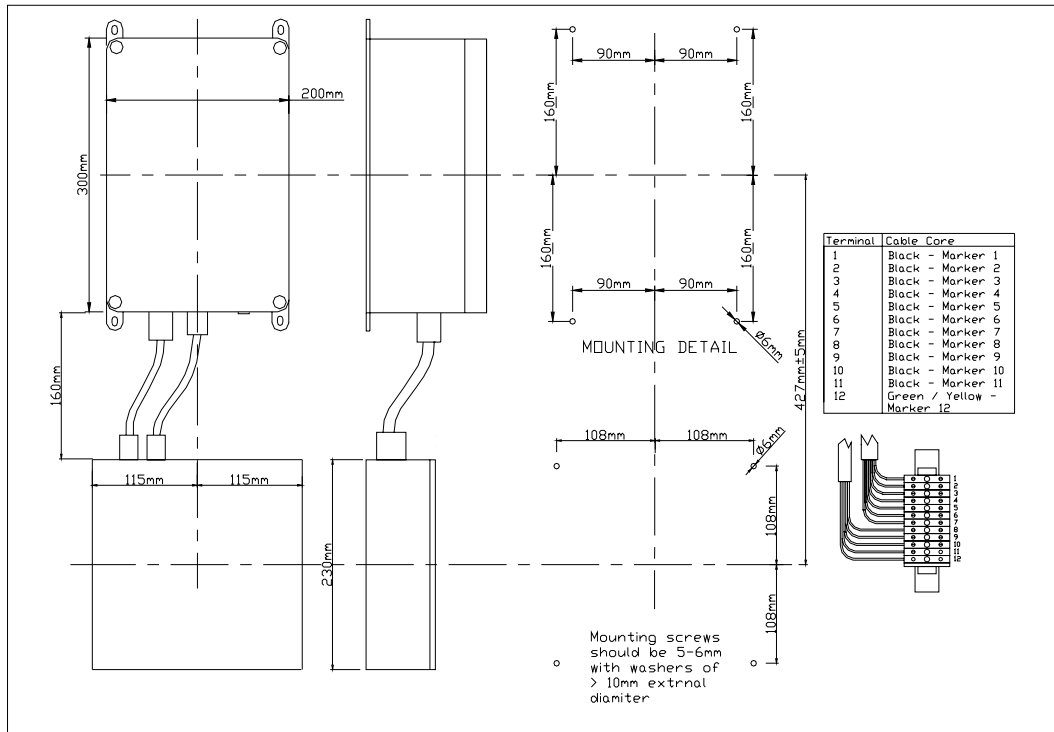
The voltage transducer is connected in series with the earth to the CT screens, this point is usually within the LV compartment of the 11kV switchgear.

## **COMMISSIONING**

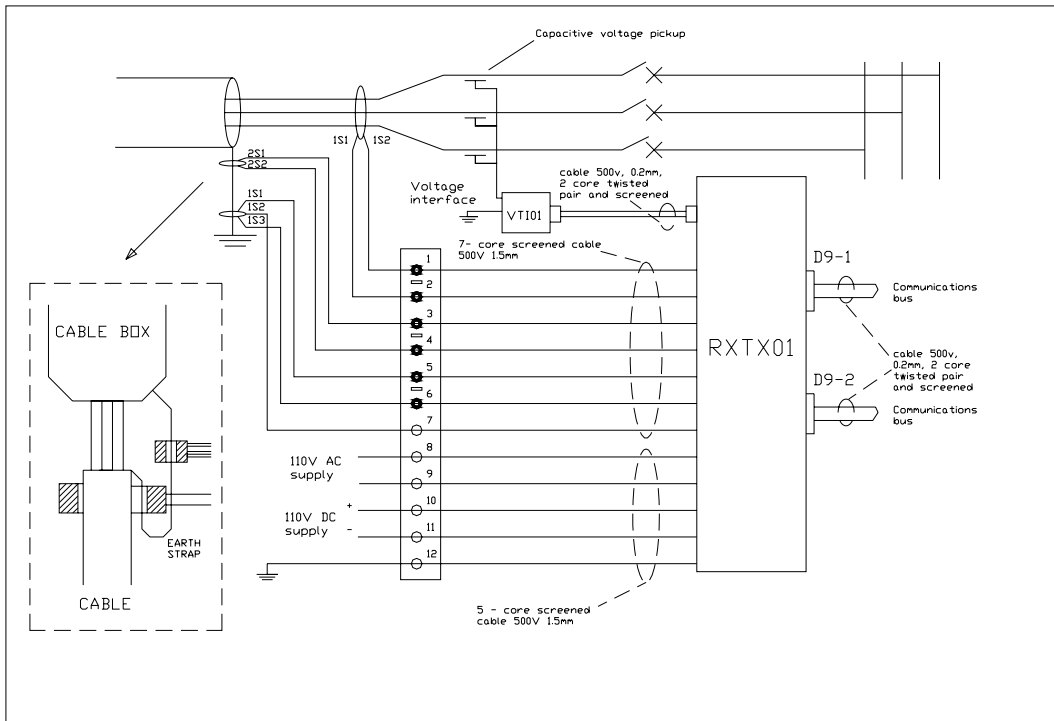
The unit has been designed for rapid installation and commissioning. Following installation and connection of the supplies, CTs and Voltage Transducer interfaces the unit settings are entered using the Keypad and LCD.

In conjunction with a current injection test set, portable test equipment is available to confirm that the RXTX01 unit is transmitting and receiving the correct data when simulated fault current is injected. Also the test equipment provided confirmation that the communication bus to the SCADA interface unit is operating correctly.

## MOUNTING DETAIL



## CONNECTION DETAIL



## TECHNICAL DATA:

### SETTINGS

Receiver Current Setting Ip: 80Amps rms  
Accuracy  $\pm 10\%$   
Address Codes: 1 to 254

### CT REQUIREMENTS.

Solid core CT for signalling, max earth bar 50mmx5mm  
Core balanced, split core CT, max cable diameter 110mm

### VOLTAGE TRANSDUCER

Voltage signal sensing transducer type VT101

### RATINGS

Auxiliary Voltage (Vn): 110V ac or 240V ac  
Operative range 88-132V or 184 – 275V  
Frequency : 50/60Hz  
Operative range 47 to 62Hz  
DC Auxiliary supply (Vx): 110/125V  
Operative range 88 to 150V

### BURDENS

AC Voltage (Vn) at rated Voltage <6.5VA  
DC Auxiliary supply (Vx) <2.8W at rated voltage

### ELECTRICAL ENVIRONMENT

- Insulation  
IEC60255-5 :1977  
2kV for 1 minute between case terminals and earth  
2kV for 1 minute between independent circuits
- Insulation Resistance  
IEC60255-5: 1977 >100M $\Omega$
- DC Interruption  
IEC60255-11: 1979  
20ms without de-energising.
- Ripple on DC  
IEC60255-11: 1979  
Withstand 12% ripple
- Electrostatic Discharge  
IEC60255-22-2: 1989  
Class III (8.0kV)- discharge in air with cover in place  
Class III (6.0kV) – point contact discharge
- Radiated Immunity

IEC61000-4-3:1995  
80 to 1000MHz, level 3 10V/m  
ENV50204:1995  
900MHz and 1.89GHz, level 10V/m

- Radiated Emissions  
EN55011:1991
- Conducted Emissions  
EN55011:1991
- Power frequency  
IEC60255-22-7: Draft

### ATMOSPHERIC ENVIRONMENT

- Temperature  
IEC60255-6:1988  
Operating -25°C to 70°C  
Storage -25°C to 70°C  
IEC60068-2-2: 1990/A2 1994  
Cold (96 hours)  
IEC60068-2-2: 1974/A2 1994  
Dry heat (96 hours)
- Humidity  
IEC60068-2-30:1980
- Enclosure protection  
IEC60529:1989  
IP56

### MECHANICAL ENVIRONMENT

- Vibration  
IEC60255-21-1:1996  
Response class I, Endurance class I
- Shock and Bump  
IEC60255-21-2:1995  
Shock response class I, Shock endurance class I  
Bump class I
- Seismic  
IEC60255-21-3:1995 Class 1

### TIMING

- Fault detection time at setting 10 seconds
- Fault detection time, minimum 10mS at 100 times setting
- Location transmission time 3.5 sec max from end of fault

## HOW TO SPECIFY

The information to specify a systems requirement is as follows

- Number of Primary substation cable feeders to be equipped
- Rated voltage for receiver units 110V or 240V ac

### Associated equipment

- Signalling CT type CCT01A
- Current measurement CT type MCT01A
- Voltage transducer type VT101A