Remote Terminal Unit (RTU)

The Remote Terminal Unit is a device for acquiring, processing, storing and transmitting information

Eaton developed this Remote Terminal Unit (RTU) especially focusing on Ring Main Units applications for the medium voltage grid.

The RTU enables utilities to reduce the duration of power outages. This reduces the downtime in three ways:

- Customers do not have to report an outage by phone anymore
- Service Engineers do not have to drive to the RMS
- A diagnosis can be made more efficiently

Measurement and control on the medium voltage (MV) and transformer side of a Ring Main Unit (RMU) will reduce the outage time and the possibility of outages. In more advanced applications with directional fault indicators and some logic, outages can be solved within seconds after a fault has occurred. After an anomaly has been detected, the RMU will automatically contact the operating center where the information is shown on a SCADA system and where actions can be taken to solve or prevent problems.

A RTU can also measure Current and Voltage at the low voltage (LV) side of the RMU. By comparing these figures with the information from smart meters, deviations can be detected easily which indicates either a fault or an illegal power tap.

Benefits of using RTU for Utilities

Nowadays, utility companies are mainly looking for automated medium voltage solutions due to the focus of these two goals:

- Improve standard IEEE reliability indices:
  - SAIDI: System Average Interruption Duration Index (SAIDI)
  - SAIFI: System Average Interruption Frequency Index (SAIFI)
- Overview of the grid (Voltage, Current, Direction, other parameters, etc.)

Functionality with a RTU

- Control and status monitoring up to 5 panels
- Alarming, event recording and data logging
- Programmable logic according to IEC 61131-3
- Communication (Ethernet and Wireless)
- IEC 61850 compliancy
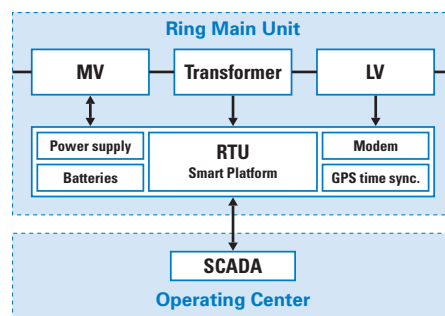- Web interface (monitoring)

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Types	Description
RTU	Remote Terminal Unit without modem
RTU-M	Remote Terminal Unit with modem

Eaton RTU General Specifications

Operating temperature	-25 .. + 70ºC
Medium voltage environment	IEC 62271-1 and IEC 61271-304 compliant
External storage memory	Secure Digital
Digital IN	24
Digital OUT	8
Soft PLC	Programmable logic according to IEC 61131-3
Web server	Web server and web pages available
Security	Firewall and VPN client
Extension interface	Add in additional digital I/O modules Add in additional analogue I/O modules
Reliability	High reliability DIN-rail mounted Pluggable connectors for I/O 195 x 90 x 60 mm
Communication connections	RS-485 Modbus master port RS-485 slave port Ethernet port
Communication connections (future)	RS-232 Port for time synchronization with GPS receiver
GSM/GPRS modem	Optional and suitable for the protocols IEC 60870-5-104 and NTP

Medium voltage system application

Communication protocols	Ethernet	GSM/GPRS	RS485 slave	RS485 master	RS232
Standard protocols					
IEC60870-5-104	●	●			
HTTP/HTTPS	●	●			
NTP	●	●			
Modbus RTU slave			●		
Modbus RTU master				●	
Suitable for					
IEC 61850	●	●			
DNP3	●	●			
Modbus TCP/IP	●	●			
FTP	●	●			
SNMP	●	●			
IEC 60870-5-101			●		
IEC 60870-5-103			●		
GPS time synch - NMEA					●

Electromagnetic Compatibility Standards

Electrostatic discharges, IEC 61000-4-2

Radiated electromagnetic field disturbance, IEC 61000-4-3

Fast transient, IEC 61000-4-4

Surge, IEC 61000-4-5

Conducted radio frequency interference, IEC 61000-4-6

Power frequency magnetic field, IEC 61000-4-8

Ripple on DC input power port immunity, IEC 61000-4-17

Damped ring waves, IEC 61000-4-18

Voltage dips, short interruption and Voltage variations on DC input power ports, IEC 61000-4-29

Dielectric test, IEC 61180-1

Environmental Standard

Cold, IEC 60068-2-1

Dry heat, IEC 60068-2-2

Damp heat, steady state, IEC 60068-2-78

Cyclic humidity, IEC 60068-2-30

Vibration response, IEC 60255-21-1

Seismic, IEC 60255-21-3

Shock, IEC 60068-2-27

Bump, IEC 60068-2-29

Ageing, IEC 62271-304

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