



REMOTE TERMINAL UNIT DT-10TSp

Monitoring and Control Program

NU-140015E

Application

Remote terminal unit DT-10 TSp is a part of the range of remote terminal units series DT-10TS, custom developed for control complex distribution and industrial substations, distribution switchgears 10 (20) kV. Remote terminal unit DT-10TSp is used in modular expandable switchgears for remote monitoring and control of complex switchgear. The monitoring and control functions can be extended with functions of earth and short-circuit fault indication, measurement, protection, automation, registration and analysis of power quality and alarming. Info terminal IT-3, as a central unit in the system, ensures dynamic display of the plant's state on the graphic LCD display and allows remote and local control of the switchgear. Switchgear control can be performed remotely from remote control center (radio link, Ethernet connection, GPRS or optical connection). Depending on the plant's complexity, besides Info terminal IT-3, Remote Terminal Unit contains various

number of local terminals, measurement and protection devices (e.g. UST-3, NR-300, IK-5(10,20), MT-30(40), TP-10). Besides data acquisition, each local terminal has its own indication, with display of the monitored values.

Local terminals can be located, depending on the plant's demands, in low voltage, medium voltage or remote part of the plant (separate cabinet) and connected together by optical or RS485 communication. Figure 1. shows the Remote terminal unit DT-10TSp for monitoring and control grid connection of renewable energy source. The system includes remote monitoring, control, fault indication and protection.

As the Remote Terminal Unit is a distributed system, and each local terminal represents an autonomous unit (own microprocessor, own indications-display, own power supply), Remote Terminal Unit meets the most demanding reliability and availability specifications.

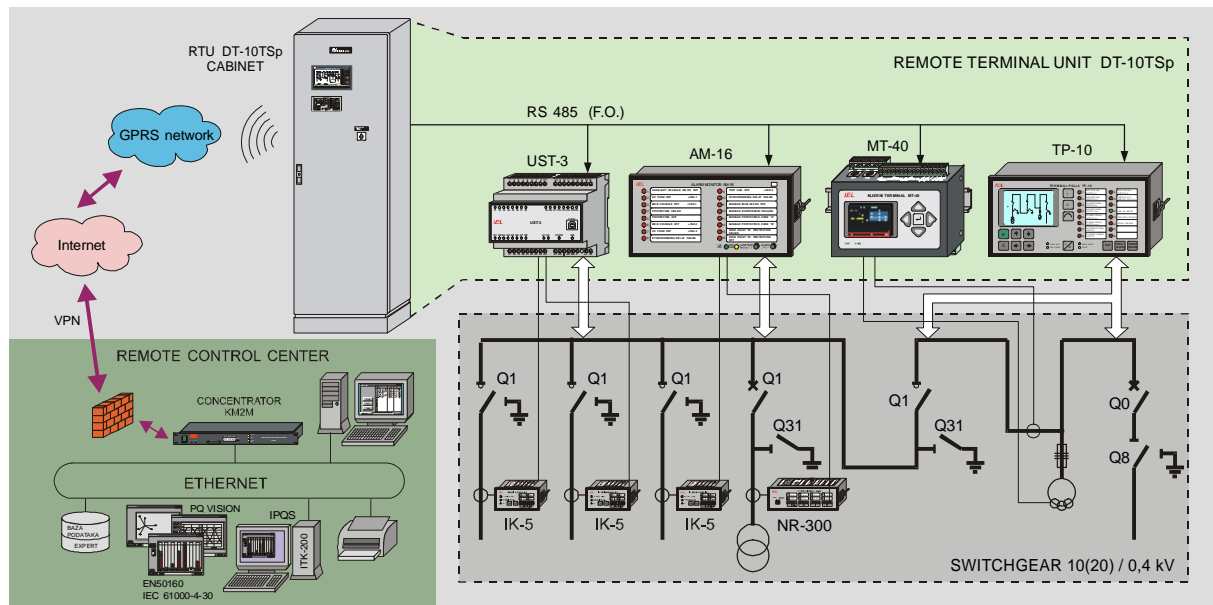


Figure 1. Remote Terminal Unit DT-10TSp for monitoring and control grid connection of renewable energy source

Main features

- multiprocessor distributed system
- plant's size and distribution of equipment defines the number and the disposition of the local terminals
- the system can be easily expanded
- optical or RS 485 communication link between Info Terminal IT-3 and local terminals
- communication between the remote control center and Remote Terminal Unit via different media (radio link, Ethernet, GPRS, optical line)
- event logging with 1ms time resolution
- communication protocol MODBUS RTU (TCP), IEC 870-5-101(104), IEC 61850
- data polling and event driven communication with the control center
- self-test and availability indication of each local terminal and central unit
- local indication of the plant states and measuring values (alphanumeric or graphic LCD display and LED segments)
- own power supply of every local terminal (optional redundant power supply)

Functional Description

Remote Terminal Unit DT-10TSp (Fig. 2) is a multiprocessor distributed system. Basic system components are: Info terminal, local terminals, power supply unit and communication unit. Local terminals used in DT-10TSp are: Monitoring and Control Terminal UST-3, Measuring Terminals series MT, Fault indicator IK, Alarm Monitor AM, protection relay NR and Feeder Terminal TP-10.

Monitoring and control terminal UST-3 is used for remote control and indication of the status of switching devices in expandable switchgear.

Measuring terminal series MT is used for measurement and registration of electric quantities in the low voltage and medium voltage part of the switchgear and power quality monitoring (EN 50160, IEC 61000-4-30).

Alarm monitors series AM are used for continuous monitoring of the alarm contacts in the switchgear. The plant size defines the number and the size of Alarm Monitors.

Protection relay NR-300 is used for power transformers over current protection.

Fault indicator IK-5(10,20) is used for earth fault and short circuit fault indication.

Power supply unit provides an uninterruptible power supply for the Remote Terminal Unit even in case of the main power supply failure.

Info Terminal IT-3 is a multiprocessor device equipped with touch screen LCD. IT-3 is connected via RS 485 or optical link with local terminals. Graphic LCD dynamically displays the complete plant's state and the communication state. It is possible to configure additional local alarming for the most important signals on the LCD (12 channels). Software IT DIALOG is intended for local and remote monitoring and control of complex switchgears. The software provides measurement and registration functions for power system quantities and power quality analysis.

It is possible to select different communication units (radio-modem, Ethernet switch, GPRS, optical link etc.) depending on the type of communication medium between the control center and Remote Terminal Unit.

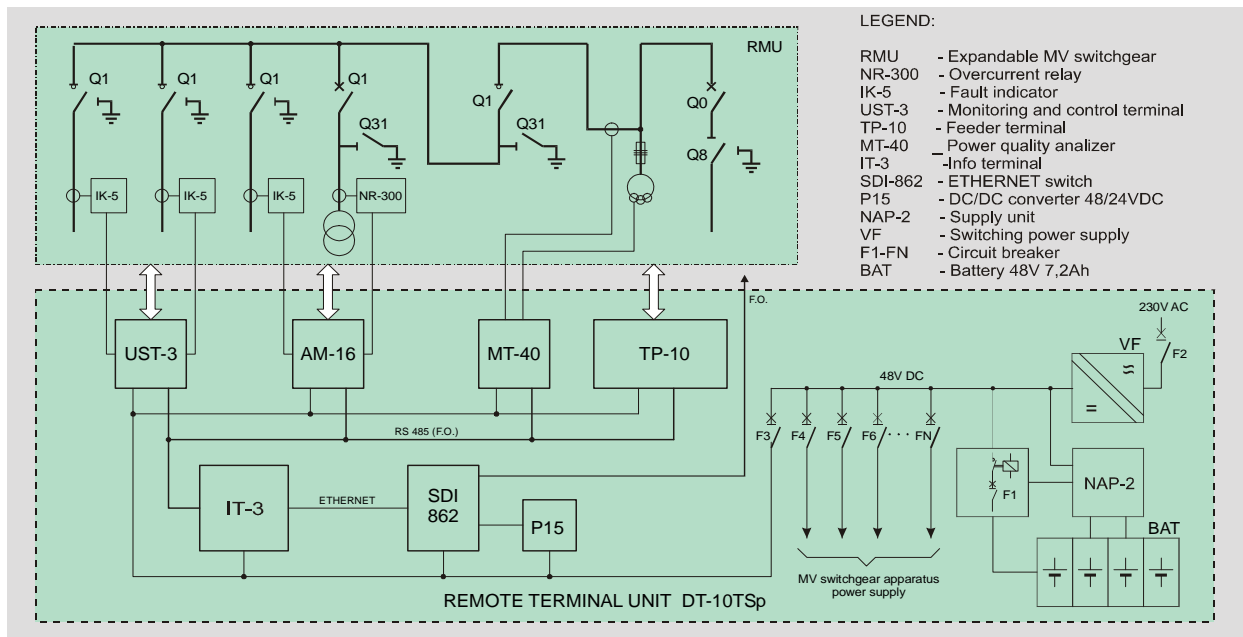


Figure 2. Remote monitoring and control in MV switchgear 10(20)/0,4kV

Technical specifications

System architecture: multiprocessor distributed system

Control center

communication: radio link, telephone line, GPRS, optical link, Ethernet

Communication among

Info Terminal and local terminals: RS 485 or F.O.

Communication protocols

with control center: MODBUS RTU(TCP), IEC 60870-5-101(104), IEC 61850

Power supply: each local terminal and Info Terminal has its own power supply (AC or DC)

- double power supply is optional

Operation temperature: standard 0°C...+50°C

extended -20°C...+60°C

Dimensions: for TS 10(20)/0.4kV typically 500x500x210 mm

System components:

Info terminal **IT-3** multiprocessor unit for communication between local terminals and control center (HMI)

Monitoring and Control Terminal **UST-3** monitoring, control, signaling

Feeder Terminal **TP-10** measurement, monitoring, control, feeder protection

Measuring terminal **MT-10SQ** power values measurement and analysis: 3x phase voltage (RMS), 3x line voltage (RMS), 3x phase current (RMS), MD currents, current histogram, current daily diagram, power (P, Q, S), power factor (cos φ), energy (active and reactive), frequency

Measuring terminal **MT-30(40)** power quality analysis, EN 50160, IEC 61000-4-30 class S, class A

Overcurrent relay **NR-100(300)** transformer overcurrent protection

Sensor Conditioning Unit **PP-10** non-conventional voltage transformer

Alarm monitor **AM-8(16)** state signaling by means of 8(16) LED components

Detailed technical specifications can be found in the leaflets of separate devices.



Development, Production and Engineering
of Industrial Electronics

10020 Zagreb, Froudeova 56, tel/fax +385 1 6520 688