

Teleprotection Signaling Equipment



Reliable power supply from conventional and renewable sources are faced with various challenges. In the case of a power line failure, the faulty part of the network has to be isolated as fast as possible, in order to prevent the power system from damage and preserve it stable.

The teleprotection system represents a solution for identifying and selectively disconnecting the faulty part of the high-voltage grid, by transferring command signals within the shortest possible time.

The TZ-600 teleprotection signaling equipment has been entirely designed, developed and produced by IMP-Telecommunications. The TZ-600 is in compliance with IEC 60834-1 standard.

TZ-600 – fast and reliable

TZ-600 enables information exchange between the ends of protected power lines merging all crucial requirements for teleprotection devices – short transmission time (< 10 ms, typically 2 – 4 ms when using optical fiber links), high dependability, security, and availability. These parameters are essential for the proper operation of the teleprotection system.

Teleprotection over different medium and communication technologies

TZ-600 enables transfer up to 8 independent commands (distance protection) via optical fiber links (favorite medium, diagram I), shared communication links (diagram II) or telecommunication network (both via E12 or Ethernet interface, diagram III). Required high availability can be achieved by distance protection signal transmission over two independent links, main and backup (diagram IV).

TZ-600 can be used in direct tripping, permissive tripping or blocking application schemes.

Monitoring and Configuring using a standard PC

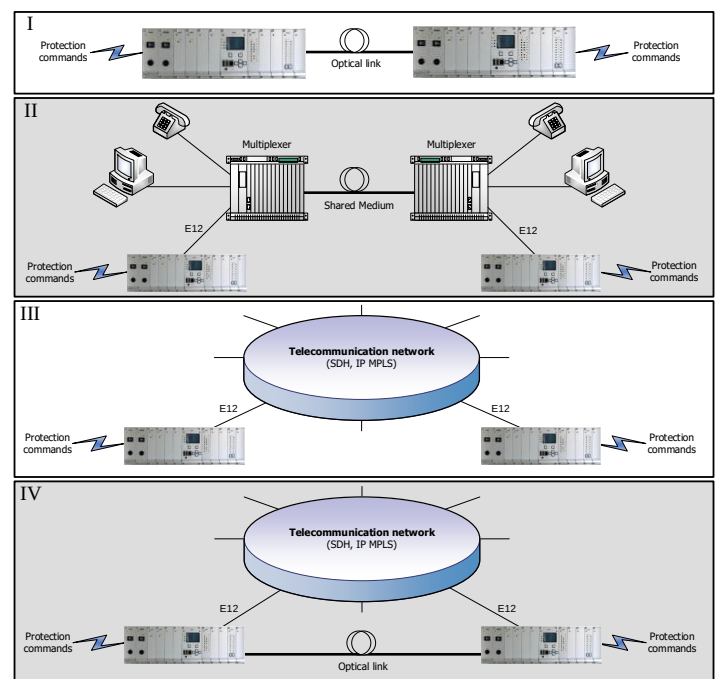
TZ-600 is easy and fast to install. It is configurable from a USB flash drive via USB interface. There is no need for additional configuration software.

Within the TZ-600 equipment two kinds of databases are generated and stored on SD card: the status and the events database. In the status database events like “start”, “system up”, “power down” or “no signal”, and local and remote statuses belonging to all kind of system parameters are stored. In the event database all tripping events are stored. All events have time stamp.

In addition to the light signalization and touch-screen display, providing fast and easy monitoring, a special monitoring application was developed, that can access the TZ-600 equipment via Ethernet network, as well as centralized monitoring of all TZ-600 devices in the same telecommunication network. Both databases (event and status) can be downloaded locally from the TZ-600 device manually using the monitoring application, and automatically on the servers for the centralized monitoring. Users can access the servers from any connection point of the network and display the equipment status and databases in the web browser.

Time synchronization

NTP time synchronization is enabled on the basic version of TZ-600 equipment by default. In addition, two devices can be mutually synchronized in cases when the network is unavailable for one or both devices.



Teleprotection over different medium and communication technologies

Easy to use

TZ-600 user interface is very intuitive and easy to handle. The basic equipment's modular structure comprises several modules: power supply, input and output teleprotection interface module, universal channel module, central processing module (including touch-screen display), line unit (with Ethernet interface), and optical and G.703/E12 interface module, and teleprotection diagnostics module. All modules are equipped with LED signalization to provide status monitoring.

Modular design - to meet our customers' special needs

The basic function of the TZ-600 is teleprotection signal transmission. But this is also a multifunctional device, enabling realization of other operational services such as connection to

SCADA, operational telephony, etc. One of the main features of the TZ-600 device is flexibility: new functions of teleprotection and other services are easily implemented to meet the customer's needs. The best example is the teleprotection diagnostics unit developed for the "Serbian Transmission System and Market Operator" (JSC "Elektromreža Srbije"). This unit provides realtime monitoring of all channels state by LED signalization on the front panel of the device. Alongside with excellent performances, the TZ-600 equipment has an outstanding quality-to-cost ratio and long-time serviceability. For IMP-Telecommunications good service is self-evident – in case of any help needed our customers profit from our strong support.



Technical data of the basic configuration*

Digital signals (distance protection):

- Number of input channels: up to 8
- Number of output channels: up to 8
- Voltage of input command contacts: 20 Vdc - 250 Vdc
- Nominal voltage of output command contacts: 220 Vdc
- Independence of input voltage polarity
- Output relay contact: 35 W max
- Output contact type (adjustable): open or closed
- Maximal switching current of output commands 2A

Line interface:

- Optical transmission (1550 nm*)
- E12 („E1“: ITU-T G.703-2 Mbps)
- Ethernet
- Two independent transmission links (main and backup) with automatic switching over up to 2 ms

Command transmission time

(in accordance with IEC 60834-1; 1999 Recommendation)

- Optical transmission < 10 ms (< 3 ms typically)
- E12 („E1“: ITU-T G.703-2 Mbps) < 10 ms (< 2-4 ms typically)
- Ethernet < 10 ms

Optical transmission with 1550 nm wavelength laser diodes

- Optical range ~120km (basic version) and more (*booster*)
- Maximum line attenuation 37 dB
 - Optical transmitter power > -2 dBm (basic version)
 - Optical receiver sensitivity -39.0 dBm
- Optical binary transfer rate 2 Mb/s
- Optical connector SC

Modular design

- Up to 2 power modules
- CPU module (with various options*)
- Possibility of using up to 8 user modules (for distance protection signals, teleprotection diagnostics unit, teleprotection input/output interface)

Power supply

- Wide range of input supply voltages 48-350 Vdc, 90-260 Vac
- Redundant power supply from one or two independent sources
- Power consumption up to 18 W

Environmental conditions

- Temperature range 0°C do 45 °C
- Humidity < 95%

Equipment monitoring and configuring

- Local monitoring (via direct connection or via network) with „TZ-600 monitoring“ application
- System for centralized (remote) monitoring of all TZ 600 teleprotection equipment in the network
- Configuring using USB flash drive
- Equipment monitoring using LED signalization on the front panel of the device (power supply status, modules status, transmission line status, critical alarms, loop operation, etc.)
- Automatic testing during operation without affecting the basic function
- Touch-screen display for local monitoring
- Automatic event recording in the memory
- Event history overview
- Report export to Excel file
- Diagnostics unit for channel state indication (continuous and triggering monitoring mode) with the LED indicator test option
- Blocking of teleprotection signal transmission during critical alarm (transmission path loss, power supply failure, etc.)
- Pairing connected devices using unique identification numbers (IDs)

Alarm signaling through relay contacts

- Transmit side errors to the line
- Receive side errors (loss of signal, loss of synchronization, BER > 10⁻³,...)
- Power supply failure
- Irregular command signals (short or long duration)
- Common alarm settings according to the required alarms for signaling

Time synchroization

- NTP

IP protection class

- IP20

Mechanical solution

- EMC 19“ rack of 3U height
- Dimension (W x H x D) 482.6 x 132 x 285 mm
- Weight 5.6 kg

Standards

- IEC 60834-1 – equipment characteristics
- IEC 61000-4-2, IEC 61000-4-3, IEC 61000-4-4 – electromagnetic compatibility (immunity)
- SRPS EN 60060-1, IEC 60255-27 – isolation voltage withstand

* at the user's request, the configuration can be adapted, with optional IEC 61850 support