

KONPRO 2

Numerical protection relay

Thanks to our rich experience in development and application of protection relays, the research and development team of the company KONČAR – Electronics and informatics, Inc., has developed a series of devices, which answer all requests set for this sort of equipment. The protection relay type RFX 7 is a sequel of KONPRO generation of protection relays, built for protection of distribution and industrial medium voltage electrical power installations.

RFX offers the complete range of protection functions necessary for reliable protection of medium voltage busbar feeders and ability of oversight and control of complete switchgear. Thanks to its circuit architecture and modular software support, it is suitable for protection of power grids with all types of grounding. Integrated directional protection with energy flow supervision allows swift protection of radial and looped grids.

Aside from its primary protective role, RFX enables several other options required from present-day protection relays, allowing reduction of devices needed in the station, which in turn reduces equipment maintenance costs. Key options include local and remote display of all current measured values, supervision of devices connected in the field, switchgear management, and fault record of electric values during the time of failure, energy measurement, THD measurement, circuit breaker wear monitoring, fault location, Arc flash detection and transfer of data to the SCADA system.

Delayed operation time characteristics in accordance with IEC and IEEE standards allow simple integration of the relay into existing protection systems, while retaining time selectivity applied in the system. Six groups of protective functions parameters allow quick protection adaptation to changes in the system.

High level of programmability using the integrated program matrix allows simple signal interconnection to binary inputs and relay outputs of the device.

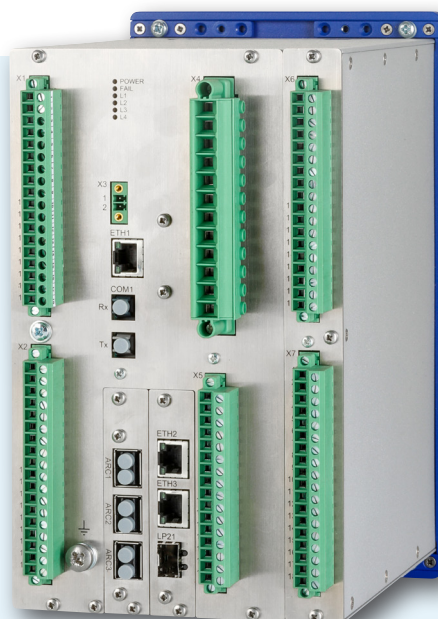
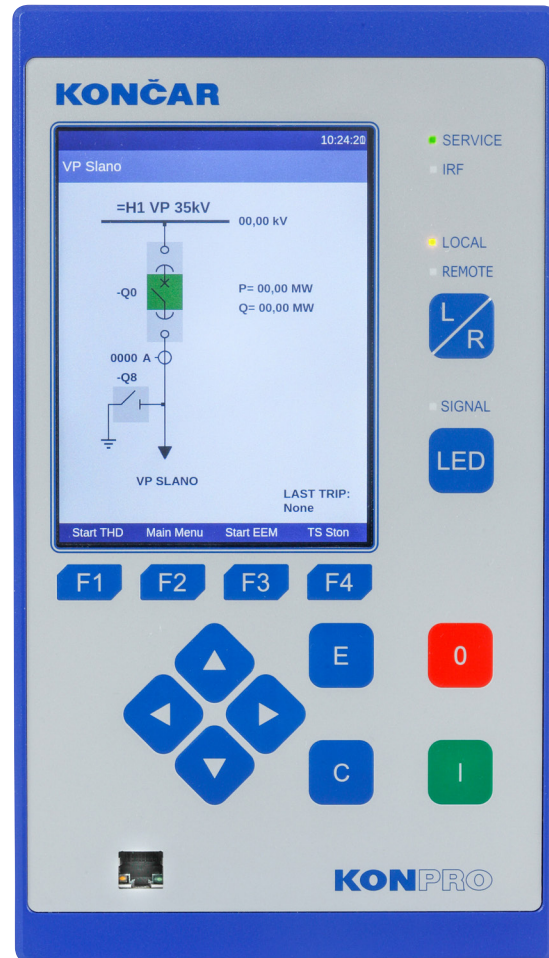
Configurable switchgear SLD add to the simplicity of relay configuration. Modular design of the circuits and software architecture of the relay allow implementation of additional protection functions along with implementation of basic protection functions, which are part of the common programming package of the device, in accordance with customer needs. Integrated software support allows change of most parameters of protection functions using the control panel. Complete parameterization and parameter read-out is achieved using a computer.



MULTIFUNCTION PROTECTION RELAYS FOR MEDIUM VOLTAGE

Protective functions

- Overcurrent protection (ANSI No. 50, 51)
- Phase Instantaneous Overcurrent (ANSI No. 50P, 51P)
- Directional overcurrent protection (ANSI No. 67)
- Earthfault protection (ANSI No. 50N, 51N)
- Directional earthfault protection (ANSI No. 67N)
- Sensitive directional earthfault protection (ANSI No. 67Ns)
- Transient earthfault protection (ANSI No. 67Ntr)
- Wattmetric based earthfault protection (ANSI No. 32N)
- Admittance based earth-fault protection (ANSI No. 21YN)
- Overvoltage protection (ANSI No. 59)
- Undervoltage protection (ANSI No. 27)
- Earthfault (U0) protection (ANSI No. 59N)
- Volts per Hertz Relay (ANSI No. 24)
- Synchronism-check device (ANSI No. 25)
- Frequency protection (ANSI No. 81, 81R)
- Negative sequence overcurrent protection (ANSI No. 46)
- Broken conductor detection (ANSI No. 46BC)
- Phase unbalance protection (ANSI No. 46DP)
- Cable thermal overload protection (ANSI No. 49F)
- Breaker Failure (ANSI No. 50BF)
- 2nd harmonic blocking when the transformer is energized (Inrush)
- Cold Load Pickup (CLP)
- Automated reclosing (ANSI No. 79)
- Fault locator (ANSI No. 21FL)
- Trip circuit supervision (ANSI No. 74TCS)
- ARC flash detection (ANSI No. AFD)
- Line differential protection (ANSI No. 87L)
- Transformer differential protection (ANSI No. 87T)
- Lock-Out Relay (ANSI No. 86)



Management/supervision functions

- Programmable binary inputs & relay outputs for switchgear control and signalization,
- Programmable binary inputs for signal acquisition,
- Programmable signalization output relays
- Management of relay outputs for switch energization, local and remote.

Measurement functions

- Current: IL1, IL2, IL3, I4, IE, IEs
- Voltage: UL1N, UL2N, UL3N, UE, US, UL1L2, UL2L3, UL3L1
- Symmetric components: I1, U1, I2, U2
- Power P, Q, S, power factor $\cos \varphi$
- Energy Wp+, Wp-, Wq+, Wq-, Ws
- Total harmonic distortion: THD
- Frequency

Failure analysis functions

- Event registration:
 - Event recorder
 - Trip recorder
 - Overview on device display nad using PC software support
- Disturbance registration:
 - Disturbance recorder
 - Overview using PC software support,
 - Triger possibility using binary input, PC software support od SCADA system
- Fault locator

Communications

- Local:
 - Front panel (foil keypad, LCD)
 - Front user interface: RJ45
- Remote:
 - Back interfaces:
 - COM1 (POF serial comm., main conf.)
 - ETH1 (RJ45 eth. comm., main conf.)
 - ETH2 (module eth. comm., optional conf.)
 - ETH3 (module eth. comm., optional conf.)
 - LP21 (module KONPRO, optional conf.)
 - COM2 (RS232 serial comm., optional conf.)
 - COM3 (RS232 serial comm., optional conf.)
 - AFD (3x POF for AFD, optional conf.)
 - X3 (IRIG-B wired time synchronization)
- Supported communication protocol:
 - IEC 60870-5-103, 104
 - IEC 61850 (MMS, GOOSE, SMV)
 - Modbus TCP, RTU
 - IEEE 1588v2
 - IRIG-B (005, 007, PPS)

Other functions

- Time synchronisation: IRIG B, internal clock, SNTP, SCADA, ...
- Continuous self-supervision
- Graphic programmable logic
- RSTP, PRP, HSR
- Possibility of testing via PC software
- 6 predefined LEDs on the back (diagnostic)

User interface

- Graphic color LCD – 480*640 pixels 5,6"
- Local display of the switchgears status on the LCD
- Possibility to create single-pole schemes
- Apparatus position signaling
- 5 predefined LED's
- General signaling performed on the color LCD
- Possible signalization of more than 50 programmable three color signals on front panel
- Separate password protected parameter setting and switch management
- Control buttons (O/I, select of control level), navigation buttons
- programmable function buttons with up to 12 functions

Measurement inputs

- 5 current inputs – 1A i 5A (SW change)
- 1 sensitive current input – 0,1A i 0,5A (SW change)
- 5 voltage inputs – 100V
- Other options available

Binary inputs and outputs

- 12 binary inputs
- 8 relay outputs (7 programmable, IRF)
- possible adding one BI/BO type A, B, C or D
- A type – 16 binary inputs and 10 relay outputs
- B type – 24 binary inputs i 5 relay outputs
- C type – 16 binary inputs, 5 relay outputs and 3 RTD
- D type – 16 binary inputs, 2 analog inputs and 2 analog outputs

Modular hardware and software architecture allows the optimization of relay function to the place of use (protecting). (A detailed description of the differences can be seen from the ordering tags and tables with a list of functions)

Device enclosure & connectivity

The device enclosure is designed for mounting plate installation or on door installation, with foil keypad on front and terminals on the rear side. All terminals are on pull-out connectors.

Size (dimensions)

(H x W x D = 265 x 146 x 210 mm).

The cut out dimensions are 241x142mm. Possibility of mechanical connection of 3 relays into 6U single 19" frame.

RELAY DIMENSIONS

