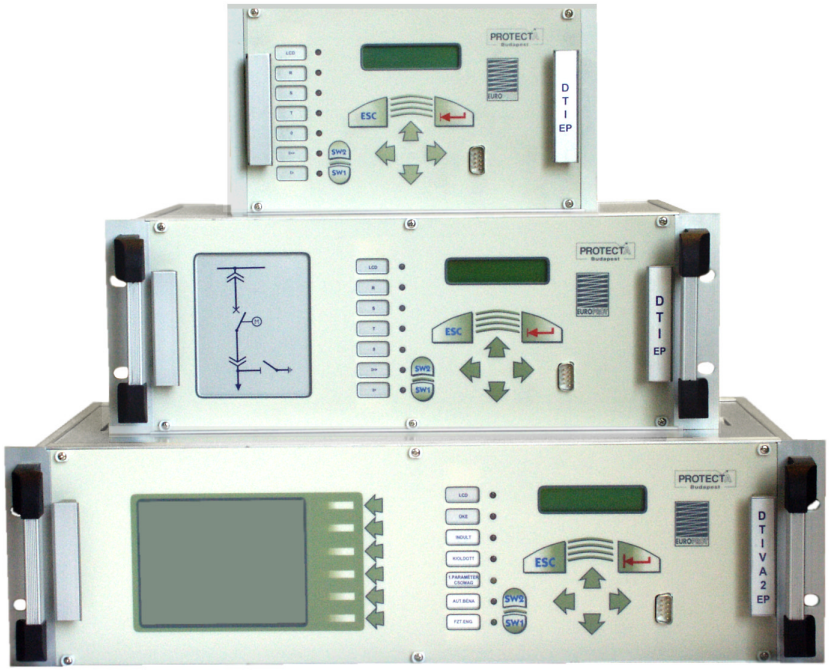
PROTECTA
Electronics Co. Ltd

EUROPROT

EuroProt system information



The EuroProt devices

The EuroProt device family of Protecta Electronics Co. Ltd. has been designed to perform all protection and control automatics functions of the electric power system.

The ***EuroProt*** type complex protection, in respect of hardware and software is a modular device. The modules must be assembled and configured – using up-to-date computer aided design methods – according to the requirements, then the functions of the device are determined by the software and the parameter setting.

Protecta Electronics Co. Ltd. assembles for the usual protective tasks factory configurations, performing all protection and control automatics functions for the network elements individually. In these devices the user activates the loaded software modules, then the parameters and the required additional services of the device must be set.

The table below summarises the most frequent factory configurations:

ID	Functions
DTVA	Distance protection with automatic reclosing functions for high voltage networks;
DKTVA	Distance protection with automatic reclosing functions for medium voltage networks;
DTD	Transformer differential protection;
DSZV	Line differential protection;
DGSZV	Line differential protection using galvanic connection;
DTIVA	Overcurrent protection with automatic reclosing functions;
DTI	Overcurrent protection;
DMV	Complex protection for motors;
OGYD	Bus-bar differential protection with fibre optic connections.

The most frequent EuroProt factory configurations

Several versions of the factory configurations above can be ordered according to the application requirements. Additionally the users are free to configure the devices using the available hardware and software modules of the EuroProt system.

The available hardware modules

All EuroProt devices must contain the following hardware modules:

HW module	Function
CPU	Central processing unit containing: - the main processor with the additional electronic elements, - the signal processor performing the protections functions, - additional signal processor for the communication and SCADA functions, - integrated disturbance recorder and event recorder.
T	Power supply unit.

The usual modules for most devices:

HW module	Function
AV	Analogue input module with current transformers;
FV	Analogue input module with voltage transformers;
R	Output module with relays;
O	Digital input module with optical couplers.

Optional modules to be applied according to the requirements:

HW module	Function
U	Module for checking the CB operating circuits;
OX	Optically isolated communication modules for large distant data communication
ZI	Independent disturbance recorder module;
TA	4…20 mA signal transmitter module;
AnInp	4…20 mA signal receiver module;
Pt100	Pt100 signal input module;
xx	Special module for the SCADA system, produced by other firms.

The hardware modules of the EuroProt system

The choice of the hardware modules is continuously extending, according to the user's requirements. The number and sequence of the applied modules depend on the tasks to be performed. The different requirements can be fulfilled using devices of different sizes, in special cases the co-operation of several devices can be organised for a complex application (e.g. complex protection system for a generator transformer unit).

The most frequent software modules

The software modules can be program units performing a partial functions (e.g. Fourier filter, calculation of RMS values, timers, …) and they can be modules for usual protective tasks (which are compiled of several partial functions). The table below lists some software modules for the most common protective functions:

SW module	Function
ANSI 50	Definite time overcurrent basic function
ANSI 50	Three-phase definite time overcurrent function
ANSI 67	Directional overcurrent function
ANSI 59/27	Undervoltage/overvoltage function
ANSI 21	Distance protection for solidly grounded networks
ANSI 21	Distance protection for not solidly grounded networks
ANSI 87	Differential protection function
ANSI 87	Line differential protection with fibre optic connection
ANSI 87	Line differential protection with galvanic connection
ANSI 46/47	Negative phase sequence protection
ANSI 26/49	Thermal overload („thermal replica") function
ANSI 37	Special motor protection functions (locked rotor, undercurrent)
ANSI 79	Multi-shot automatic reclosing
ANSI 81	Over/underfrequency protection

The most frequent software modules

The choice of the software modules is continuously extending, according to the user's requirements. These modules are grouped in „libraries" according to the usual protective functions of individual electric power system elements. The libraries can be changed dynamically according to the requirements. The factory configuration or the users can select the needed functions.

Operation of the devices

The local basic operation of the devices is performed using the integrated man-machine interface of the devices (push-buttons, alphanumeric display, LED signals). The most important tasks are parameter setting and displaying, event listing, acknowledgement of the displayed messages, on-line displaying the measured values.

The high-resolution graphic display – as an option – serves displaying the scheme of the protected network element with the symbolical status signals and measured analogue values.

This display helps generation of local switching commands for the circuit breaker and disconnectors.

The RS232 serial connector on the front side of the device can connect a PC to make the local supervision of the device more convenient.

The fibre optic connectors on the rear side of the device support the above basic operating functions and request of recorded disturbances as well. This connector supports the program downloading and the documentation of the downloaded programs too. Using this connectors the devices can be connected to a communication loop which is the way to supervise all devices in a substation from a central location. To increase the security a dual loop can be established as well.

Using an additional fibre optic connector the devices can be connected to the substation SCADA system. In this connection the device can act as the bay unit of the control system. To increase the security a dual loop can be established here as well. The realised protocols are IEC 60870-5-101, IEC 60870-5-103 and ABB SPA.

Special services of EuroProt devices

The EuroProt devices fulfil the basic protection tasks, and can perform all services, which are characteristic to the numerical devices. Among them the most important services are:

- self-check, which can be extended to the circuits of the measuring transformers and to the CB circuits as well;
- event recording with 1 ms resolution time stamps;
- disturbance recording for all available analogue signals and for external and internal binary signals;
- convenient operation with a connected external PC;
- connection to the substation SCADA system;
- technical data according to the modern requirements.
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Design

The EuroProt devices are produced in two designs and in three sizes. All versions are mounted in standard 19” racks. The two designs are the relay panel mounted version and the flash-mounted version. The sizes are determined by the number of applied modules. The table below show the sizes of the EuroProt devices.

Cabinet mounted or flash-mounted design (mm)		
Width	Height	Depth
269	132.5	201
376		
483		
Relay panel mounted design (mm)		
Width	Height	Depth
277	250	250
384		
490		

Sizes of the EuroProt devices

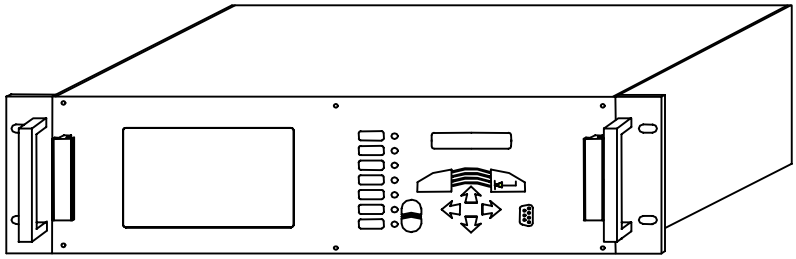


Fig1. Front view

Fig. 1. shows front view of the standard 19" cabinet mounted or flash-mounted device (width 483 mm).

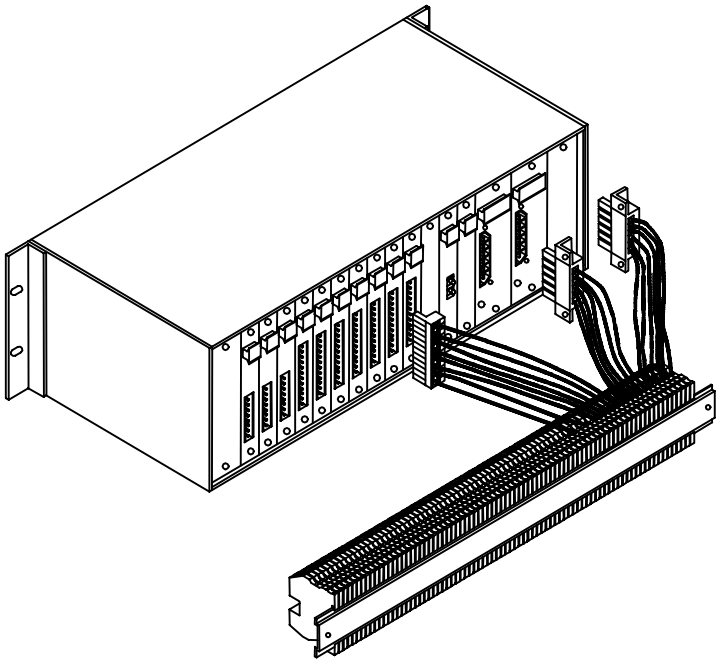


Fig. 2. Rear view

Fig. 2. shows rear view of the standard 19" cabinet mounted or flash-mounted device (width 483 mm).

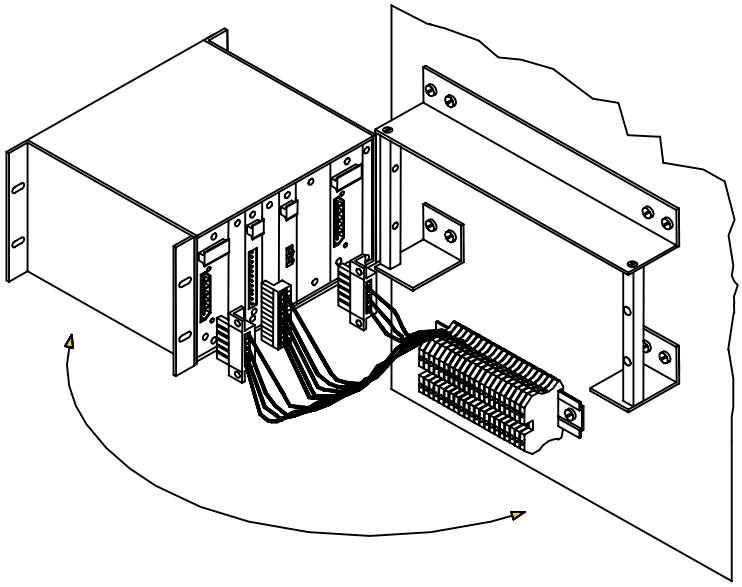


Fig. 3. Rear view of the relay panel mounted version

Fig. 3. shows rear view of the relay panel mounted version device (width 277 mm).

Technical data

Parameter	Data
Rated secondary current, I_n	1 A or 5 A,
Rated zero sequence secondary current, I_{n0}	0.1 A, 1 A, 5 A or as specified
Rated voltage (line-to-line), U_n	100 V or 200 V
Rated frequency	50 Hz (60 Hz on request)
Overload capacity, VT circuits, thermal rating, continuous CT circuits, thermal rating, continuous 1 s	 $1,2xU_n$ $4xI_n$ $100xI_n$ (if I_n = 1 A) $50xI_n$ (if I_n = 5 A)
Overload capacity, dynamic	$100xI_n$
Accuracy of current relays (I>50% I_n)	± 2 %
Accuracy of time delay, step 10 ms step 1 s	 ± 3 ms ± 12 ms
Burden per phase, current inputs 5 A 1 A high sensitivity $3I_0$> inputs	 <0,5 VA < 0,1 VA ≤1 VA
Burden per phase, voltage inputs	< 1,5 VA
Load on station battery, complex version small configuration one relay energised	 ≈ 15 W ≈ 10 W + 0,3 W
Output contacts: rated operating voltage continuous current rating making capacity DC breaking capacity at 220 V DC for resistive load for L/R = 40 ms load *option*, for L/R = 40 ms load	 250 V 8 A 16 A 0,25 A 0,14 A 4 A
External communication	RS 232 or fibre optic cable
Fibre optic connection	radial or loop
Baudrate of the serial communication	150...19200 Baud
Station code	0...254
Device code	0...254
Rated DC voltage (same power supply unit) voltage range	220 V, 110 V 88...310 V
Temperature range in operation	-5°...50°C

Technical data of the EuroProt devices

Type tests

Electrical type tests		
Insulation tests	IEC 255-5: 1994	
Ambient conditions	IEC 68-2-1 : 1990 IEC 68-2-2 : 1974	
Climatic tests	IEC 68-2-30 : 1980	
Impulse voltage test	IEC 255-5 : 1994	
Electrostatic discharge tests	IEC 801-2 IEC 255-22-2 : 1989, level 4	EN 61000-4-2
Radiated radio-frequency tests	IEC 801-3	EN 61000-4-3
Immunity against radio-frequency disturbances	IEC 255-22-3 : 1989	EN 61000-4-6
Fast transient (Burst) test	IEC 801–4 IEC 255-22-4	EN 61000-4-4
High frequency 1 MHz disturbance test	IEC 255-22-1 : 1988 IEEE C37.90.1 : 1989	
Impulse voltage disturbance test	IEC 255-5 : 1997	EN 61000-4-5
Mains frequency magnetic field disturbance test	EN 61000-4-8 : 1993, level 5	EN 61000-4-8
Impulse form magnetic field disturbance test		EN 61000-4-9
Decaying high frequency magnetic filed disturbance test		EN 61000-4-10
Disturbance test for short voltage dips and voltage variations	IEC 255-11	EN 61000-4-11
Disturbance test with oscillating waves		EN 61000-4-12
Disturbance test for input port DC ripples	IEC 255-11	EN 61000-4-17
Disturbance test for mains frequency changes		EN 61000-4-28
Disturbance test for short voltage dips and voltage variations of the DC input port		EN 61000-4-29

Type tests

Mechanical stress tests		
Shock test:	IEC 255-21-1 : 1988	
	immunity: class 1	
	response: class 2	
Acceleration:	IEC 255-21-2 : 1988	
	bump: Class 1	
	response: Class 2	
Earth quake test:	IEC 255-21-3 : 1993, Level 2	
Environmental test	IEC 60068-2-1,2,78	
Protection	IEC 529	

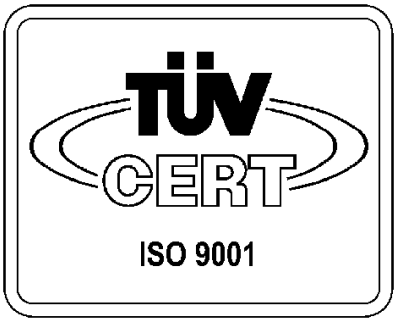
Mechanical stress tests

Qualification

ISO: production according to ISO-9001 quality assurance programs.
CE: CE Certificate of Conformity
The device is designed and manufactured for application in industrial environment.

Ordering information

- Device type
- Selected hardware version
- Rated current [1 A, 5 A]
- rated voltage [100V, 200V]
- Current interruption capability of the contacts [2 A - 4 A]
- Type and turns ration of the zero sequence CT [main CT/toroidal CT]
- NC or NO relay contact configuration
- Design [19" rack, relay housing], flash-mounted, cabinet mounted, relay panel mounted
- Options (additional disturbance recorder, control system module type, special modules)



Protecta Electronics Co. Ltd. is qualified since July 1996.
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ISO 9001 quality management system

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