

OmegaProt system information



The OmegaProt devices

The **OmegaProt** compact devices belong to the smallest, numerical type device family produced by PROTECTA Co. Ltd. Due to the compact design the place requirement is small, so they can be applied in narrow locations as well. The application is more economic than the complex products of other types, if the protection requirement allows usage of few inputs and outputs. Because of the small size, the hardware configuration has considerable limitations as compared to the modular *EuroProt* devices.

Main characteristics of the OmegaProt compact devices are as follows:

- compact microprocessor-based devices,
- easy mounting on Ω rails,
- smaller and more economic as compared of other product families,
- the design is realised with compromises:
 - it has only maximum three analogue signal inputs (for voltage and currents),
 - it has only maximum four independent relay outputs, which can be freely programmed with the software matrix, and can be latched as well,
 - the man-machine interface is limited to a fibre optic connector pair, which can connect an external PC or the SCADA system,
 - the setting, checking of the parameters, the readout of the on-line information and the recorded events is possible only via this fibre optic interface,

- the seven LED-s on the front panel can display some basic information about the internal state of the device and of the protection functions,
- the push-button on the front panel acknowledges the LED signals and resets the latched outputs.
- the connectors are located on the front pane of the device, the wires are fixed with screwed connection.

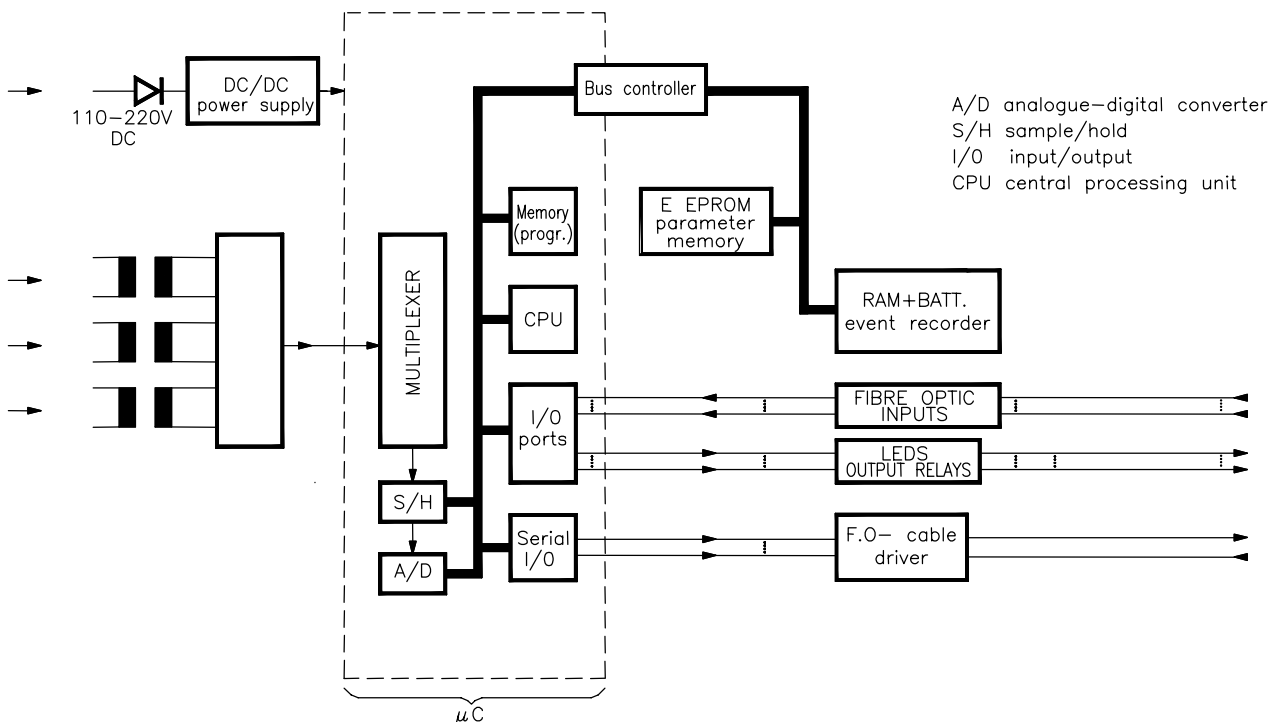
Design of the OmegaProt compact devices

The OmegaProt compact devices are microprocessor based numerical devices. The electronic circuits are mounted on printed circuit boards, and these hardware modules are mounted in a steel-sheet relay case, which protects the elements against dust, moisture and electromagnetic noises. The mounting of the device is easy on Ω rails, the connection is performed with 16 connectors located on the front side of the device. The wires are fixed with screwed connections; the fibre optic connectors are mounted on the upper left corner of the front panel. The protection functions downloaded into the devices can perform several protection functions, automatic tasks in case of normal operations and alert states for high and medium voltage networks, power stations and industrial networks.

The protection functions are grouped in function libraries, where the collected functions are prepared to perform all tasks related to a specified area. The stored functions must be activated by parameter setting. The details of the applications are described in the configuration manuals of the devices.

The hardware structure of the device

The principal scheme of the OmegaProt compact devices is as follows:



The elements of the central processing unit are:

- “main processor” (80C196KD), for organising the cooperation of the system elements, with clock, “watch-dog” circuits, drivers, interface elements,
- EEPROM memory for storing the parameter values,
- battery supported RAM for storing recorded events and clock information,
- multiplexer and A/D converter,
- fibre optic interface.

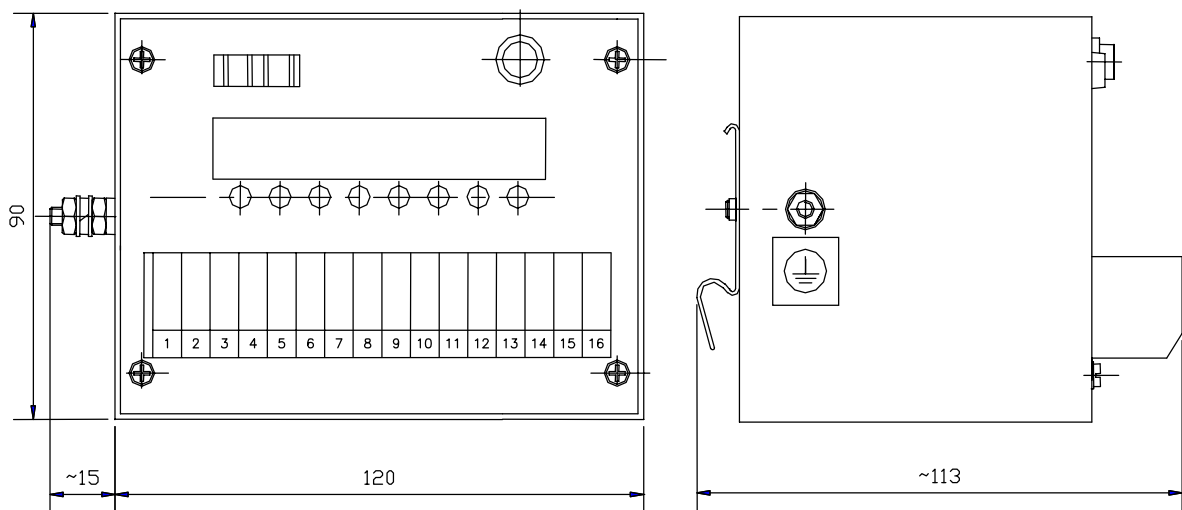
The CPU module performs the full-scale hardware and software supervision of the system as well. The main processor is supervised continuously by the „watch –dog” circuit, the other supervision functions are assigned to the main processor. The continuous supervision covers the internal supply voltages and the A/D converter as well. In case of any changes, all kinds of memory chips are supervised using the stored check-sum values.

The protection functions

The protection functions downloaded into the devices can perform several protection functions, automatic tasks in case of normal operations and alert states for high and medium voltage networks, power stations and industrial networks.

The protection functions are grouped in function libraries, where the collected functions are prepared to perform all tasks related to a specified area. The stored functions must be activated by parameter setting. The details of the applications are described in the configuration manuals of the devices.

Design



The OmegaProt devices are compact devices. The following Table shows the sizes:

Width	Height	Depth
120 mm	90 mm	113 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	1,2x U_n 4x I_n 100x I_n (if $I_n = 1$ A) 50x I_n (if $I_n = 5$ A)
Overload capacity, dynamic	100x I_n
Accuracy of current relays ($I > 50\% I_n$)	$\pm 2\%$
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	250 V 8 A 16 A 0,25 A 0,14 A
External communication	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	0°...50°C

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	
	5 kV0.5j	
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 field 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

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	
Protection	IEC 529	
Operating temperature range	0°C ...+50°C	

Qualification

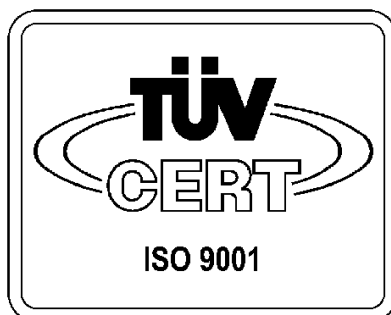
ISO: production according to ISO-9001 quality management programs.

CE: CE Certificate of Conformity

The device is designed and manufactured for application in industrial environment.

Ordering information

- Device type
- Rated current [1 A, 5 A]
- Rated voltage [100V, 200V]
- Type and rated currents of the zero sequence current transformer
- NC or NO relay contact configuration



Protecta Electronics Co. Ltd. is qualified since July 1996.

by TÜV CERT

ISO 9001 quality management system

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