









Application area

iZAZ300 is a series of powerful, communication-enabled, multifunctional digital protection relays with up to 8 measurement inputs. These devices are characterised by high accuracy and reliable operation. They can be used in automatic control systems as advanced and functional power, voltage, current, frequency and earth-fault protection devices. Automatic controls for automatic frequency load shedding, automatic reclosing, automatic voltage load shedding as well as breaker failure protection are supported in applicable hardware and software configurations. This device can be also used as a supplement for generator or generator-transformer block protection. Apart from the protection and automatic control functions, the devices enable measurements, recording, emergency control and signalling. RS-485 serial port and mini-USB port may be used for communication with the relay. Components of the device are installed in an aluminium enclosure suitable for flush-mounting. If mounting on the panel is required, an ANT300 adapter shall be used.

The universal hardware and software enable easy and intuitive changing of the configuration and adaptation to various facilities. With the application base developed by the manufacturer, default solutions can be used. Moreover, it is possible to modify the configuration to match the specifics of the protected facility, and the user needs. The modification of the configuration can include adding protective functions or automatic controls and the change of logic-time dependencies (e.g. means of controlling diodes on the panel, signalling on the display, controlling signalling relays and means of emergency control).

Recorders

The unit is provided with three different logs that enable keeping records on events that may happen to the facilities to be protected with further analysis of stored data.

Events recorder – the basic recorder that is meant to keep records about status of the equipment and stored in the chronological log of events with the increment of 1 ms. It represents a LIFO memory with the capacity of 500 events and dedicated to store information about activation and deactivation of inputs as well as tripping of protections, changes in statuses of binary inputs, automatic functions and other events originated from the internal logic. Each event is subject to individual edition of names and comments, thus it is possible to adapt the system to any specific application, which facilitates analysis of historical disturbances by the system user.

Actuation recorder - enables quantitative analysis of the interferences. This recorder allows the review of interference time and threshold parameters of analogue signals measured from the moment of excitation to the reactivation of the function after its operation. The type and amount of recorded data depend on the nature of the function, e.g. for overcurrent protection it is the interference duration and maximum current value in this period. This recorder enables quick assessment of the event by presenting information on criterion values associated with the interference, giving the user the opportunity to verify settings. For a typical record of three analogue values (e.g. maximum current, voltage), the internal buffer allows recording up to 60 records in the circular buffer.

Disturbance recorder – a set of recorders of analogue and binary waveforms with criterion recorder function enabling full analysis of interfering phenomena. The device allows programming of one or two fully independent configurable recorders. The function of criterion recorder offers the opportunity of recording any of the criterion values available in the device (analogue and binary). The standard settings of pre-run, post-run and maximum recording time enable proper shaping of the log window for the phenomenon of interest. In order to optimize the recording of long term low-frequency phenomena, it is possible to lower the sampling rate with the option of controlling rarefaction of the recorder log using a chosen binary signal (e.g. circuit-breaker open, start-up status, etc.). The capacity of the internal buffer depends on the number of active recorders, programmed analogue and binary channels, and the maximum duration of the individual recording. For a single recorder, a single analogue channel, and 16 binary channels it is possible to record a 280-second file.



Functional advantages

- Broad set of functions for protection of electric power systems and automatic control
- Extensive list of available measurements, including measurements of all currents and voltages and parameters derived from measurements (e.g. power or energy, frequency or temperature on the basis of the adopted thermal model),
- Programmable controller provided with a clear and legible graphic HMI to enable presentation of various logic sequences and timings and the basis of all signals measured by the device,
- Counters that enable diagnostic function for the bay status (e.g. number of protection tripping events, actuation of automatic functions, outages, accumulated meter of the currents for the bay switch),
- Field programmed logic of the unit operation with a graphic HMI,
- Configurable and system events recorder,
- Actuation recorder,
- Recorder of actuation events,
- Disturbances recorder with the function of the criteria recorder,
- Up to 8 measuring inputs (hardware-configurable)
- 12 output relays, including 11 fully programmable ones, and an efficiency signalling relay
- 9 programmable binary inputs for use with external protection devices, for interlocks or external signal cancelling
- 8 programmable LEDs on the front panel
- Enhanced self-test system with possible warnings of defects,
- Real-time clock with possible synchronization against an external source,
- Communication with a PC computer or a supervising system via RS-485 interface as well as via a standard USB port on the front panel,
- Control panel with an alphanumeric 2×16 LCD display and a simplified keyboard on the front panel for basic control of the device
- Standard package of application software iZAZ Tools,
- Digital technology to enable high robustness, accuracy and reliability of operation,
- Protection against unauthorized access (with change of settings or configuration).



Operation software iZAZ Tools

iZAZ Tools is an application software that has been developed to handle units from the iZAZ family. The software runs on any PC computer under control of such operation systems as Microsoft Windows XP / VISTA / 7/8 / 10 / 11.

The software package enables comprehensive handling the iZAZ unit in terms of configuration and settings, with possible edition of the device configuration in the graphic mode, self-test of the device and monitoring of the facilities to be protected and control of the facilities.



The software package enables comprehensive handling the iZAZ unit in terms of configuration and settings, with possible edition of the device configuration in the graphic mode, self-test of the device and monitoring of the facilities to be protected and control of the facilities.

The access to the device data log enable diagnostics of events that may occur on the facilities to be protected, including presentation of the recorded data in the form of graphs and analysis of files with disturbances recorded.

The device can communicate locally via the USB port or remotely via the RS-485 interface of the LAN network.

The intuitive HMI of the software enables simple viewing of all information about the device itself and about the facilities to be monitored and protected as well as making changes in the device settings or configuration, when necessary, with maintaining the multi-level structure of access rights and protection against unauthorized tampering.



Tabel 1 summarizes the full library of the protection and automatic control	functions.
Tabel 1	

No.	Specification of protection functions	TYPE	ANSI CODE
1.	Overcurrent	>	50/51
2.	Inverse time overcurrent	lp>inv	51
3.	Inverse time overcurrent	IR>inv	49R
4.	Inverse time overcurrent	lc>inv	49M
5.	Negative sequence overcurrent	IA>	46
6.	Inverse time negative sequence termal	IA>inv	46
7.	Undercurrent	<	37
8.	Directional overcurrent	IK>	67
9.	Overvoltage	U>	59
10.	Undervoltage	U<	27
11.	Residual overvoltage	Uo>	59N
12.	Negative sequence overvoltage	UA>	47
13.	Positive sequence undervoltage	U1f<	27D
14.	Rate-of-voltage-change	dU	59S/27S
15.	Incremental rate-of-voltage-change	ΔU	59SA/27SA
16.	Integral rate-of-voltage-change	CU	59SI/27SI
17.	Ground fault overcurrent	lo>	50N/51N
18.	Ground fault inverse time overcurrent	lo>inv	51N
19.	Ground fault directional (MV)	loKs>	59N/67N
20.	Ground fault directional (HV)	loKw>	59N/67N
21.	Earthfault non-directional (admittance)	Yo>	21N
22.	Earthfault directional (conductance), (0÷90) ° capacitive	YoK>	21N
23.	Earthfault directional (susceptance), (0÷90) ° capacitive	YoK>	21N
24.	Frequency	f	81H/81L
25.	Rate-of-frequency-change	df	81S
26.	Incremental rate-of-frequency-change	Δf	81SA
27.	Overexcitation	Uf>inv	24
28.	Directional power supervision	P>	32R
29.	Mocowe, od zrzutu mocy	P<	32L
30.	External bistable signal	Zew	62
31.	Load-jam motor	IR>0	51LR
32.	Starting-time supervision	IR>1	48
33.	Strartup monitoring	IR>2	66
34.	Rotor stall monitoring	IU>	51LR
35.	Phase-sequence voltage	Usp>	47
36.	Loss-of-excitation	Zuw<	40/27
37.	Underimpedance	Z<	21
38.	Against switch on non-excited generator	Inw>	50/27
39.	Loss-of-synchronism (RMS current pulsations)	lws>	51S
40.	Differential (generator, transformer, generator-transformer blocks), blocking for 2 nd	∠اک	87G/87T/87B
41.	Power factor monitorng (tgφ)	tg>	55
42.	Automatic underfrequency load shedding	UFLS	
43.	Automatic Reclosing	AR	79
44.	Automatic undervoltage load shedding	UVLS	
45.	Local breaker failure	BF	50BF

NOTE: Upon request, the device hardware can be customized according to individual needs, with the set of functions different from the foregoing list. In such a case please contact our engineering department.

The set of automatic functions and relay protections depends on configuration of analog channels and is limited by the maximum number of objects available for software configuration of the iZAZ300 device. The software version is compiled by selection of a set from the library of basic application with the option to compose the selected group of relay protections – see Table 2 (page 11).



General connection scheme



Fig. 1. iZAZ300 connection scheme



Input and output circuits

Analog inputs

Eight analog inputs.

The following hardware options are available:

 $C - I1_{3f}$, 3Io, $U1_{3f}$, 3Uo (rys. 1C) $D - I1_{3f}$, $I2_{3f}$, $U1_{L12}$, 3Uo (rys. 1D)

Connection terminals - spring-loaded for wires with cross-section up to 6 mm2

Binary inputs

Nine binary inputs (option C, D) in two groups (We1, We2) and (We3÷We9) with galvanic isolation to each other (optical isolation 2 kV).

All these inputs are user-defined and each of them can be configured as an input to present status of switching equipment, to collaborate with external relay protection or to acknowledge internal signals or to other purposes. Binary inputs are triggered by DC voltage with the level that corresponds to the Usn power supply voltage for control circuits.

Inputs of RS-485 serial ports

The RS-485 serial ports can be used for communication with a PC computer or for remote communication with a supervising system with MODBUS RTU transmission protocol, the port is protected by separating phototransistors with the strength of 2 kV.

USB port

The mini-USB port incorporates the B-type socket (USB 1.1) and is designed for local communication with a PC computer. The application software included into the device package enables local communication within the scope similar to the RS-485 port.

Relay-type outputs

—	quantity	12		
_	type	RM699		
_	anti surge protection	YES		
_	galvanic isolation	YES - sections (2 kV)		
_	programmability	YES (Wy1÷Wy11)		
_	connection terminals	spring-loaded for wires with cross-section up to 2,5 mm ²		

Indication outputs

type of indication	LED indicators (L1+L8, Uz, Ok.)
programmability	YES (L1÷L8)
power supply backup	programmable



Technical Data	
Nominal auxiliary voltage U _{aux}	24 / 48 / 60 V DC
	220 V DC / 230 V AC
Permissible auxiliary voltage ranges U _{aux} Power input of auxiliary voltage U _{aux}	$(0,8\div1,1) U_{pn} \le 6 W$
Current inputs I1, 3Io (HV option)	
- nominal current In	5 A albo 1 A
- measuring range (protection range) - measuring range (measurement range)	40 In 8 In
- nominal frequency fn	50 Hz
- burden I=In	\leq 0,5 VA / per phase
- continuous load	4 In
- dynamic current overload capability (1 sec)	250 In
Current zero-sequence input 3lo (MV option)	
- measuring range	6 A 50 Hz
- burden I=1A	< 0.1 VA
- continuous load	10 A
- thermal current overload capability (1 sec)	400 A
- dynamic current overload capability	1250 A
Voltage inputs U1, 3Uo	100 V alba 400 V
- measuring range	120 V albo 500 V
- nominal frequency fn	50 Hz
- burden U=Un	≤ 0,5 VA
- thermal voltage overload capability (10 sec)	1,50 Un 1,20 Un
- merina voltage continuous capability	1,20 811
- voltage range	in accordance with Upn
- burden	\leq 1 W / 3 VA
Assigned error of current I1L1, I1L2, I1L3, 3Io(SN) (protection range)	2,5% ± 0,01 ln
Assigned error of current I1L1, I1L2, I1L3, (measurement range)	1% ± 0,01 ln
Assigned error of zero-sequence current 310 Assigned error of zero-sequence voltage 1111, 1112, 1112, 310, in range	2,5% ± 1 mA
$U=(0.76 \div 1.20)$ Un	0.5%
$U = (0,21 \div 0,75) U_n$	1%
U=(0,05 ÷ 0,20) Un	2,5% ± 0,001 Un
Assigned error of current power and energy (protection range)	5% 2.5%
Assigned error of direction of current	± 1°
Assigned time error	1% ± 5 ms
Assigned internal clock error (without synchronization)	1min/ month
Switching capability tripping outputs	
admissible current per contact (continuous)	6 A
breaking capacity AC1 load DC1: 28 V/ 220 V	1500 VA / 250 V
• load $U/R < 40 \text{ ms}$	0 1 A / 250 VDC
	(253÷328) K (-20÷55) °C
Storage temperature range	(248÷343) K, (-25÷70) °C
Relative humidity of the air	do 80%
Relative humidity of the air (56 days, 40 C without condensation)	do 95%
Ingress protection degree	IP40 (connectors IP20)
Case Weight of the relay	benind-board, aluminum
Dimensions (width, height, depth)	90,2 / 138,2 / 117 mm

9 / 12



Dimension installation drawings



For installation on the board assembly by using a dedicated adapter.

Conformity with requirements of standards

The equipment meets essential requirements set out in the Low Voltage Directive (LVD2014/35/WE) and the EMC Directive (EMC2014/30/WE) by means of conformity with the following standards:

LVD: PN-EN 60255-27:2014-06

EMC: PN-EN 60255-26:2014-01

PN-EN 60255-1: 2010

6

- PN-EN 60255-149: 2014-03
- > PN-EN 60255-151: 2010
- > PN-EN 60255-21-1: 1999
- > PN-EN 60255-21-2: 2000
- PN-EN 60255-21-3: 1999
- PN-EN 60255-26: 2014-01
- PN-EN 60255-27: 2014-06
- PN-IEC 255-12: 1994
- PN-EN 60529:2003+A2:2014-07
- > PN-IEC 61810-2: 2018-01
- PN-EN 60255-127: 2014-04
- PN-EN 60255-151: 2010
- PN-EN 60255-181: 2019-07

	iZAZ300	10 / 12	CATALOG
Order	ing	iZAZ300 –	
Hardw C – I13f D – I13f	v are configuration : f, 3Io, U13f, 3Uo f, I23f, U1L12, 3Uo		
Type o 1 – 11n= 2 – 11n= 3 – 11n= 4 – 11n= 5 – 11n= 6 – 11n= 7 – 11n= 9 – 11n=	f analog inputs range (p)-protection 40ln, (m)- =1A(z); l2n=1A(z); lon=100mA =1A(z); l2n=1A(m); lon=1A(z) =1A(z); l2n=5A(z); lon=5A(z) =5A(z); l2n=1A(z); lon=1A(z) =5A(z); l2n=5A(z); lon=100mA =1A(m); l2n=1A(z); lon=100mA =5A(m); l2n=5A(z); lon=100mA =5A(z); l2n=5A(m); lon=5A(z)	measurement 8In:	
Type o 1 – Un= 4 – Un=	of voltage inputs: =100 V =400 V		
Auxilia 024 – L 110 – L 220 – L	ary voltage of (power and control) supply: Jpn=24 VDC Jpn=110 VDC Jpn=220 VDC / 230 VAC		

Examples orders:

iZAZ300-C51-220 – iZAZ300 protection set. Hardware configuration ($I1_{3f}$, $3I_0$, $U1_{3f}$, $3U_0$), with nominal currents 5A and nominal voltages 100V. Nominal auxiliary voltage of power supply: Upn = 220 VDC / 230 VAC.

iZAZ300-D11-024 – iZAZ300 protection set. Hardware configuration (I1_{3f}, I2_{3f}, U1_{L12}, 3Uo), with nominal currents 1A and nominal voltages 100V. Nominal auxiliary voltage of power supply: Upn = 24 VDC.

NOTE: This document should be used as information about the products, and do not offer.

Orders should be sent to:

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11 / 12





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