ZPrAE Sp.z o.o.

RE line®
ENERGETIC STANDARDS

RT-22 TIME

APPLICATION

The RT-22 relay is meant for use in the automation and protection circuits as a programmable time delay element. It enables realisation of five operating modes:

1. OZ – delay of operation,
2. OP – delay of release (drop-off),
3. OZP – delay of operation and release (impulse shifting),
4. PC – cyclic operation (impulse generator).
5. IMP – impulse operation (available from software ver. 1.7).

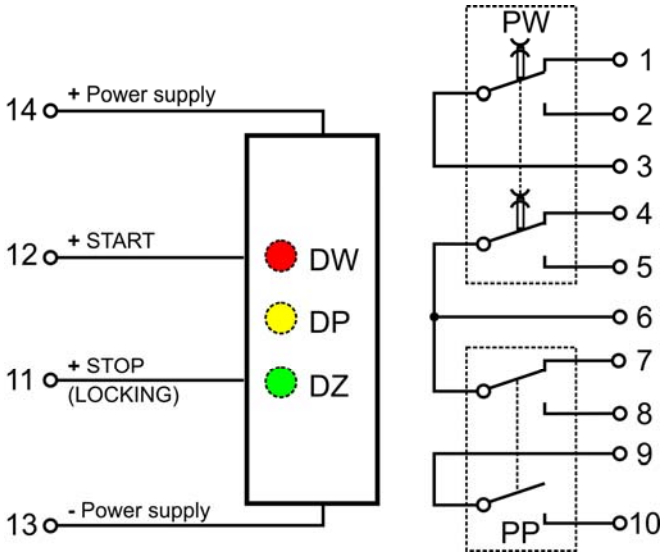
CONSTRUCTION

The relay has one instantaneous make contact, one instantaneous changeover contact of activation relay (PP), two time-delay changeover contacts of the operating relay (PW). The scheme of connections (terminations) is presented on picture 1. The relay is equipped with an LCD display and 4 buttons for the following functions.

- setting of the required value (accessible in the „PROGRMMING" mode)
- Information about the software version, and return to one level up in the "PROGRMMING" mode
- Confirmation of setting (accessible in „ PROGRMMING" mode)
- Reset (both pushbuttons pressed down simultaneously)

The relay informs about the status of operation with three LEDs of different colour:

LED diode	no light	continuous light	Blinking light
DW (RED)	RT-22 is not and has not been activated, and the PW relay is not and has not been in operation since the last reset or loss of power supply.	RT-22 is activated, and the PW relay is in operating state.	RT-22 is not activated, but the PW relay has been in operation. The DW diode is blinking till manual reset or loss of power supply .
DP (YELLOW)	RT-22 is not and has not been activated, and the PP relay is not and has not been in operation since the last reset or loss of power supply .	RT-22 is activated, and the PP relay is in operating state.	RT-22 is not activated, but the PP relay has been in operation. The DP diode is blinking till manual reset or loss of power supply .
DZ (GREEN)	RT-22 has no power supply	RT-22 has power supply and is not blocked	RT-22 has power supply and is blocked



- **DW** – red diode signalling operation of the final controlling element,
- **DP** – yellow diode representing status of the „START" input,
- **DZ** – green diode signalling presence of the power supply and locking of the relay, representing state of the „STOP" input,
- **PW** – operating relay executing one of 5 operating modes accordingly to the choice of the user;
- **PP** – relay representing status of the „START" input.

Picture 1. The time relay – RT22 - functional scheme.

The relay is mounted in a typical CN 55 AK housing, sizes 110 × 55 × 77 mm, with 14 terminations in a form of a plug, suitable to be mounted in a GZ-14 socket (plate-mounting), GZ-14U (bus-mounting) or GZ14Z - to be mounted in a relay chassis type R8614Z. Dimensions of the relay are presented on Picture 4.

OPERATION

When supply voltage is applied to the input terminals ("+" to the 14, "-" to the 13) the relay is ready for operation accordingly to settings read in from a non-volatile memory EEPROM. The relay starts operating according to programmed operating mode, upon application of voltage on terminal 12 "START". The relay can be blocked any time, by applying voltage on terminal 11 "STOP".

Realization of all five operating modes of the relay is ensured by independent seting of two times t_z (time to operate) and t_p (release time), which can be set in four available sub-ranges:

1. „ms": 10 ms ÷ 999 ms, every 1ms (for t_p) and 20 ms ÷ 999 ms every 1ms (for t_z)
2. „s": 0,1 s ÷ 59 s 900 ms every 0,1 s (for t_p i t_z)
3. „min": 10 s ÷ 59 min 50 s every 10 s (for t_p i t_z)
4. „godz":10 min ÷ 99 hours 50 min every 10 min (for t_p i t_z)

Key points:

- *Power supply of the relay is performed via terminals 14 („+"Un) i 13 („-"Un) – it is applicable for all operating modes and settings*
- *Resetting the relay can be achieved in two ways:*
  - *by simultaneous pressing the pushbuttons placed on the front panel marked "i" and „■" for more than 2 seconds;*
  - *by disconnecting the power supply*
- *In case the relay operates in the OZ mode, and terminals 12 and 14 are connected:*
  - *The relay is automatically reset after loss of voltage on the "START" terminal*
- *Additional embedded delay of the relay - t_w, app 5 ms, should be included during setting up of the relay. (Time $t_z = t - t_w$ should be set up, where t_z is the required time to operate of the relay),*

- *Application of voltage on the "STOP" terminal – terminal 11, results with blocking the system and drop-out of the final operating relay (PW). In such case, the system does not react to changes on the "START" terminal.*
- *In the setup edit mode of the relay:*
  - o *programming and setting up of the relay is possible with pushbuttons on the front panel;*
  - o *the relay does not react to application of voltage on the "START" terminal*
  - o *application of voltage to "STOP" terminal results with blocking the relay*

SOFTWARE VERSION

When the relay has power supply but is not activated it is possible to check software version of the device. In order to do so, press button *"i"* for app. 2,5 sec. After this time, the LCD shows welcome menu (Picture 1.1) and software version (Picture 1.2) alternately with a 2 sec. interval.

	-	R	T	2	2	-	
Z	P	r	A	E	.	P	L

Picture 1.1. Welcome menu

R	T	2	2	-	*	*	*
	v	.	1	.	8		

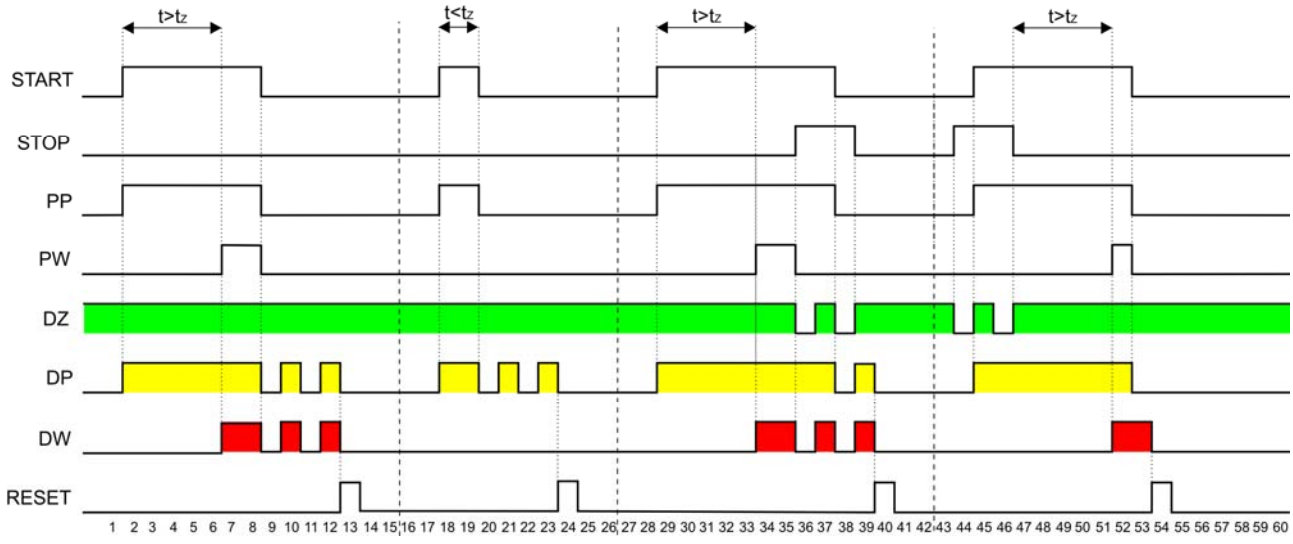
Picture. 1.2. Sof

(*** - OZ/OP/OZP/PC/IMP)

AVAILABLE OPERATING MODES

OZ MODE – delayed operation

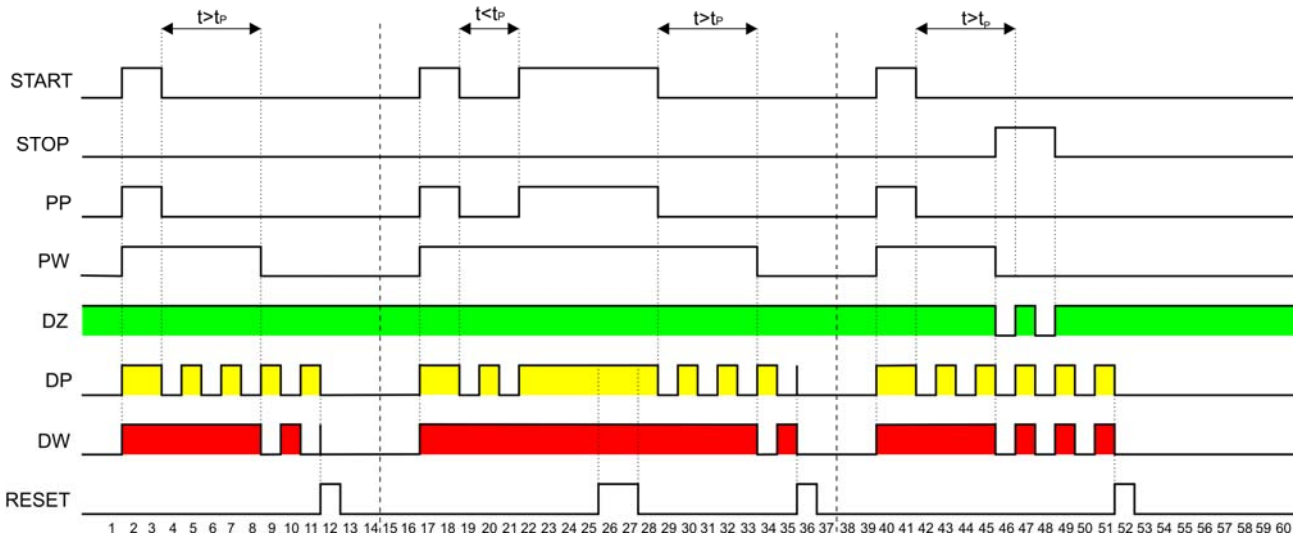
Upon application of voltage to the START terminal ("+" to terminal 12) the relay starts countdown of the t_z time, the relay (PP) becomes activated, the DP diode lights up with continuous light signalling its activated status. After countdown of the t_z time the operation relay (PW) operates and the DW diode lights up. The PP relay is held up as long, as pick up voltage to the "START" terminal is applied.
If during the countdown pick up voltage on START terminal decays, the DP diode turns to blinking light, and the PP relay returns. DP and DW diodes blink till manual reset. The operation cycle of the relay is presented by time pulse sequences on Picture 2.1



Picture 2.1. Time pulse sequences in the OZ mode.

OP MODE – delayed release

Upon application of voltage to the START terminal the relays PP and PW are activated, the DP and DW diodes light up. From that moment the system waits for loss of pick up voltage. After identifying loss of pick up voltage on the START terminal the PP relay drops off, and the DP diodes change continuous light into blinking. The countdown of programmed time t_p begins. After countdown the PW relay releases and the DW diode changes light into blinking.
If during countdown the pick-up voltage will be reapplied to the START terminal the DW and DP diodes change light into continuous, the PP relay is activated and the system turns back to the initial state with the initial time setup.
DP and DW diodes blink till reset.
The operation cycle of the relay is presented by time pulse sequences on Picture 2.2.



Picture 2.2. Time pulse sequences in the OP mode

OZP MODE – delayed operation and release

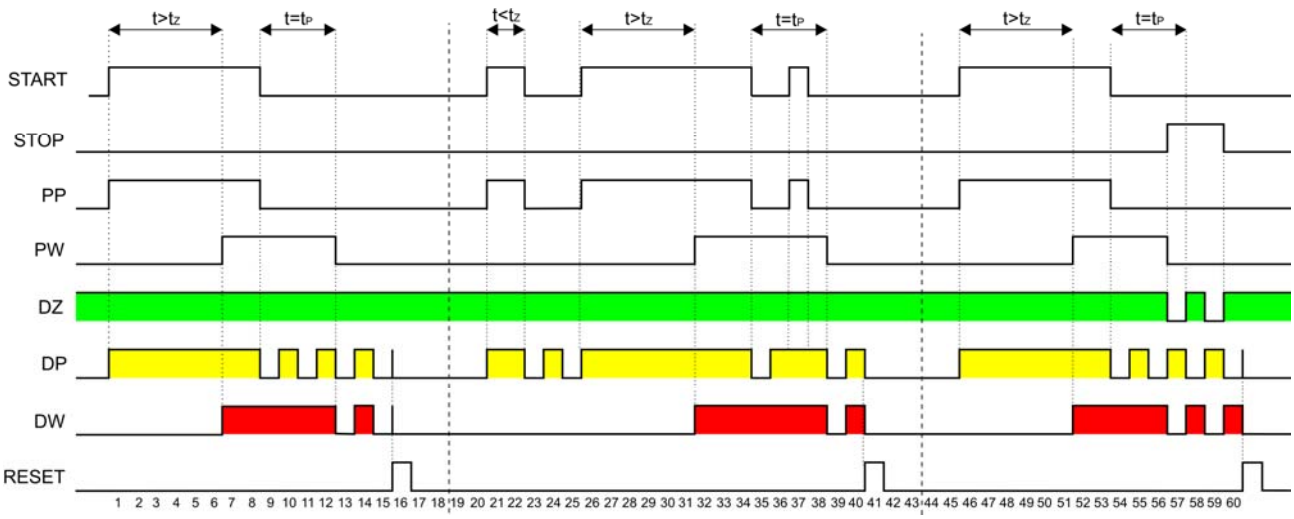
This mode can be used for creating a programmable “impulse extension”.

Upon application of voltage to the START terminal the PP relay is activated, the DP diode lights up and the system begins countdown of programmed time t_z.

After countdown of the t_z time the PW relay activates and the DW diode lights up. The PP relay remains activated for as long as pick up voltage to the START terminal is applied. If during the countdown pick up voltage on the START terminal decays, the DP diode changes light into blinking, the PP relay returns and the system returns to the initial state.

After countdown of the t_z time, the relay changes setup into t_p time and waits for loss of pick up voltage. After identifying loss of pick up voltage the PP relay returns, countdown of the programmed t_p time begins, and the DP diode starts blinking signalling decay of pick up voltage. After time t_p the PW relay deactivates, the DW diode changes light into blinking and the system changes set up into tz time and waits for another pick up voltage application to the START terminal. Application of pick up voltage on the START terminal during countdown of the t_p time does not result with any changes, the countdown of t_p time continues till the end.

DP and DW diodes blink till reset. The operation cycle of the relay is presented by time pulse sequences on Picture 2.3.



Picture 2.3. Time pulse sequences in the OZP mode

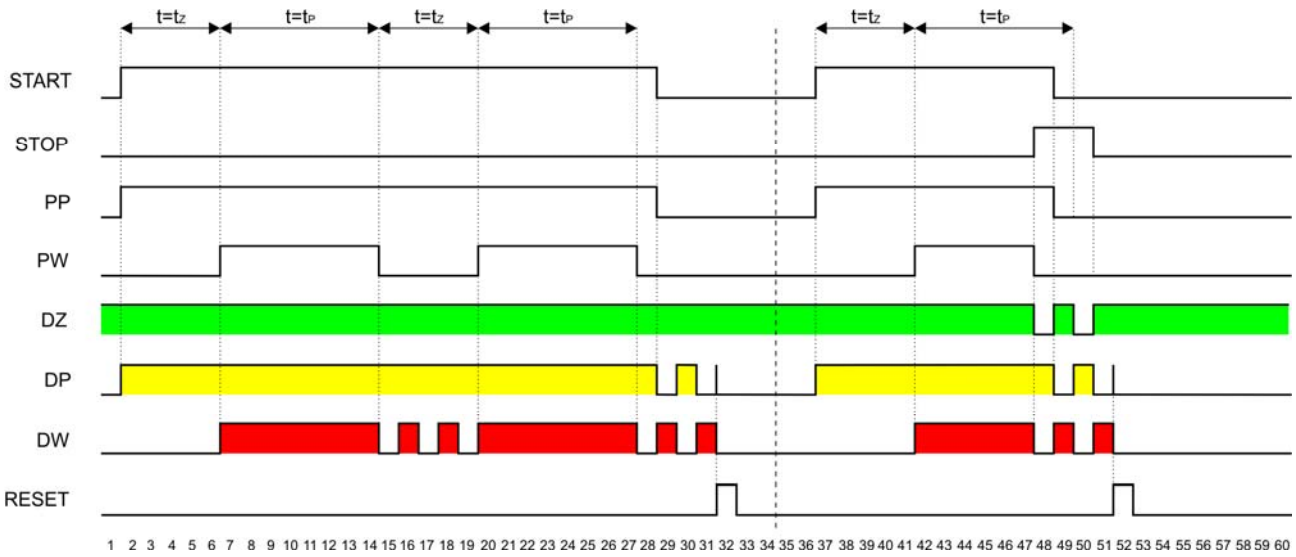
PC MODE – cyclical operation

This operating mode can be used to create programmable generator of i.e. blinking light.

Upon application of pick up voltage to the START terminal the relay begins cyclic operation consisting in generating of rectangular pulse according to the setup of time t_z and t_p, where t_z is the time when PW relay is not activated, and t_p – the time when PW relay is activated.

Upon countdown of time t_p, a new cycle begins automatically with countdown of the time t_z.

After countdown of time t_p the PW relay deactivates and DW diode changes light into blinking. The PP relay is activated for as long as pick up voltage is applied to the START terminal. The operating cycle of the relay is presented by time pulse sequences on Picture 2.4.



Picture 2.4. Time pulse sequences in the PC mode

IMP MODE – impulse operation

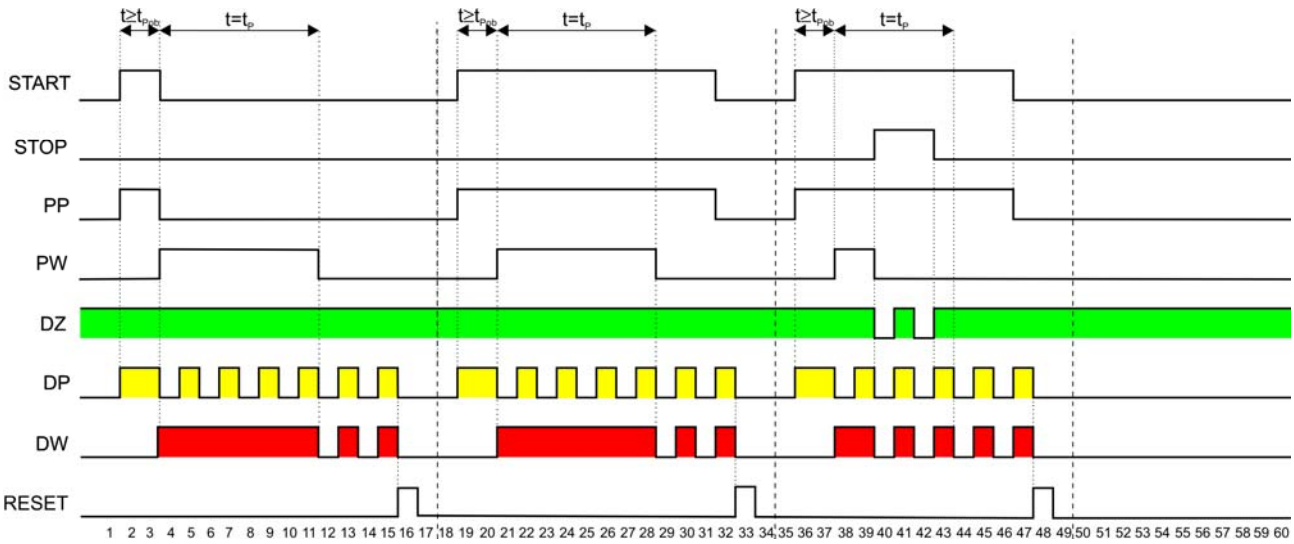
This mode can be used to generate single programmable impulse (for example in signalling or recording circuits). After application of pick up voltage to the START terminal the PP relay is activated and the DP diode lights up (minimal duration of pick up voltage is 10ms) the system starts to generate impulse lasting for time t_p.

The PW relay turns on and the DW diode lights up. The PP relay is activated for as long, as pick up voltage is applied to the START terminal.

If during countdown of the t_p time pick up voltage on the START terminal decays, the DP diode changes into blinking light, the PP relay drops off, and the PW relay picks the impulse up for the time set t_p. After countdown of the time t_p the DW diode changes light into blinking and the relay waits to be activated. Application of pick up voltage to START terminal during countdown of the time t_p does not result with any changes, the countdown of t_p time continues till the end.

DP and DW diodes blink till reset or loss of supply voltage.

The operating cycle of the relay is presented by time pulse sequences on Picture 2.5.



Picture 2.5. Time pulse sequences in the IMP mode

SETTINGS PREVIEW

When the relay has power supply the LCD shows welcome menu (Picture 3.1) and set up of the relay (Picture 3.2) alternately with 2 sec. interval. For OPZ and PC modes times t_z and t_p are presented alternately.

	-	R	T	2	2	-	
Z	P	r	A	E	.	P	L

Rys. 3.1. Welcome menu

R	T	2	2	-	O	Z	
T	z	=	0	4	,	1	s

Rys. 3.2. Preview of setup for OZ mode

PROGRAMMING MODE – programming of the relay and setup change

Choosing the operating mode is possible only after entering the setup edit mode. This can be done by simultaneous pressing down and holding for app. 2,5 sec. the pushbuttons *„kasowanie”* and „◄”. After that time operating mode of the relay is presented on the display (Picture 3.3). In order to change the operating modes (OZ;OP;OZP;PC;IMP) use „◄” or „►”.

T	R	Y	B	-	O	Z	
←		→					■

Pict. 3.3. Choice of the operating mode

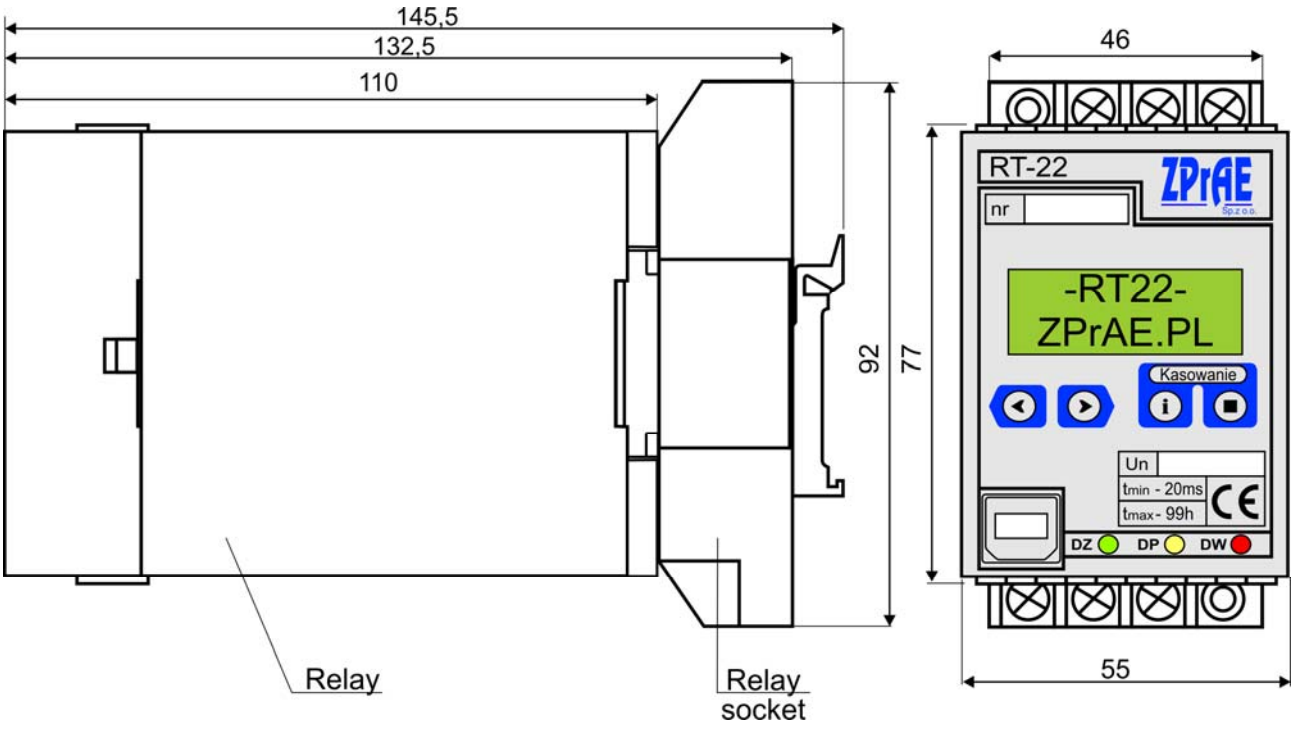
Z	A	P	I	S	A	N	O
N	A	S	T	A	W	Y	

Pict. 3.4. setup saved

In order to choose the time range press „■” for app. 2,5 sec. There is a possibility to choose from four time ranges: hours, minutes, seconds, milliseconds. Setup of the time accordingly to the chosen time range is done with pushbuttons „◄” or „►”. In order to confirm the setup press „■” for app. 2,5 sec.

Pressing down the button marked “*i*” gives possibility to move back one step.

Pressing down the button marked „■” for the last time in the edit mode saves the whole setup of the relay in the non-volatile memory. Completion of the time setup process is confirmed with a communicate on the LCD display as presented on Picture 3.4.



Picture 4.Diemnsions of the RT-22 relay.

TECHNICAL INFORMATION (for U_{pn} = 220 V DC)

Auxiliary power supply	
Rated voltage U_{pn}	DC 220 V or other as ordered
Operate range	0,8 U_{pn} ÷ 1,15 U_{pn}
Power consumption	≤ 2,5 W
Steering inputs	
Number of inputs	2 - START, STOP
Rated voltage U_{in}	DC 220 V
Activation threshold	0,7 U_{in} ± 10% U_{in}
Power consumption	≤ 0,5 W
Contacts of the relay	
Operate and release time to be set up in 4 sub-ranges	„ms" t_z – 20 ms÷999 ms by each 1 ms t_p – 10 ms÷999 ms by each 1 ms
	„s" 0,1s ÷ 59,9 s; by each 0,1 s
	„min" 10 s ÷ 59 min, 50s; by each 10 s
	„godz." 10 ÷ 99 godz., 50 min; by each 10 min
Maximal breaking capacity DC	I = 0,2 A for U = 220 V; L/R = 40 ms
Maximal continuous current	I = 5 A
Insulation	
Rated insulation voltage	250 V
Rated impulse voltage (1,2/50 μs) between the coil and the contacts	4000 V
Overvoltage category	III
Proof voltage between the coil and the contacts	2 kV; 50 Hz; 1 min
Proof voltage of the contact gap	1 kV; 50 Hz; 1 min
General Data	
Enclosure protection degree	IP40
Temperature Range for storage	248K ÷ 343 K (from -25^{0}C to +70^{0}C)
Temperature Range for operation	263K ÷ 328 K (from -10^{0}C to +55^{0}C)
Mechanical strength	Class 1 acc to PN-EN 60255-21-(1,2)
Ambient temperature	od -5 °C do +40 °C
Ambient protection	RT II
Signalisation of Operation	2 LEDs
Terminations (socket / plug)	GZ14
Dimensions	77 × 55 × 110 mm (W×S×G)
Mounting	as R15 4P to the mounting socket

Attention:
We have prepared a vast offer of auxiliary equipment in order to support mounting of our relays (cases, sockets, plugs). The auxiliary equipment is designed based on our clients suggestions and many years of our own experience. More information can be found in catalogue: "GZ-14/GZ-14Z, R-8614/R8614Z, ZAS-55, ZAS-70, plugs, sockets and relay-chassis" available at www.zprae.pl

RT-22

OFFER

RSH-3, RSH-3S - tripping

RS-6, RPD-2, RPP-4, RPP-6 - interposing

RMS-2 - signalling

RCW-3, RCDW-1 - circuit continuity monitoring

RKO-3 - power supply circuit continuity monitoring

RB-1, RBS-1, RBS-2 - bistable

RT-22 - time

RUT-2, RUT-3 - time-voltage

RJT-1, RJT-3 - time-current

RKU-1, RKS-1 - final controlling

LZ-1, LZ-2 - operation counters

RPZ-1 - supply source switching

GPS-1 - time synchronisation

MDD-6, MDS-12 - Diode modules

PH-XX, PS-XX - Modules of switches, pushbuttons and control lamps

Relay racks

Busbar protections and breaker failure protections type TSL-9r, TSL-11

Auxiliary and signalization relays

Reserve Central Signalling System type MSA-9, MSA-12, MSA-24

Protection relays type AZT-9, APP-9

Disturbance recorder RZS-9

Energy measurement system and event recorder ZRZ-28

Load Resistors for measuring transformers

DC and AC auxiliary power supply switchgears

Cubicle-contained sets of control and supervision protections

Modular power supplies, measuring suitcases, measuring and registering system RFQ-8

PROFIL-L cubicles

Periodical and post-failure tests, as well as repairs and overhauls of busbar protections TSL

Servicing, strting-up and post assembly tests

ZPrAE Sp.z o.o.

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