# 04.12.2023

# R2N miniature industrial relays

## R2N (AC) R2N (DC)





12 A / 250 V AC

- · General purpose relays, designed for continuous operation\*
- For plug-in sockets: on 35 mm rail mount acc. to EN 60715; on panel mounting; with terminals for soldering
- AC and DC coils, insulation class F: 155 °C
- WT (mechanical indicator + lockable front test button)
- standard equipment of relays. Relays may be provided with the test buttons (no latching) and plugs page 8
- · Recognitions, certifications, directives: RoHS,

<ul> <li>Recognitions, certifications, directives: RoHS,</li> </ul>
( ; <b>%)</b>
200
AgNi, AgNi/Au flash gold plating
250 V / 440 V
10 V
12 A / 250 V AC
3 A / 120 V 1,5 A / 240 V (B300)
12 A / 24 V DC (see Fig. 3)
0,22 A / 120 V 0,1 A / 250 V (R300)
1/2 HP 240 V AC, 4,9 FLA, single-phase motor <b>1</b>
0,37 kW 240 V AC, single-phase motor
5 mA
24 A
12 A
3 000 VA
0,3 W
≤ 100 mΩ
1 200 cycles/hour
12 000 cycles/hour
6, 12, <b>24</b> , 42, 48, 60, 80, 110, 115, 120, 127, 220, <b>230</b> , 240 V
5, 6, <b>12</b> , <b>24</b> , 48, 60, 80, 110, 125, <b>220</b> V
$AC: \ge 0,2 \ U_n$ $DC: \ge 0,1 \ U_n$
see Tables 1, 2 and Fig. 4, 5
50 Hz: 1,6 VA 60 Hz: 1,3 VA
0,9 W
250 V AC
4 000 V 1,2 / 50 μs
III
3
2 500 V AC type of insulation: basic
1 500 V AC type of clearance: micro-disconnection
2 500 V AC type of insulation: basic
≥ 2,5 mm
≥ 4 mm
AC: 10 ms / 8 ms DC: 13 ms / 3 ms
> 10 <sup>5</sup> 12 A, 250 V AC
see Fig. 2
> 2 x 10 <sup>7</sup>
27,4 x 21 x 35,5 mm
35 g
-40+85 °C
coil AC: -40+55 °C coil DC: -40+70 °C
I IP 40 EN 60529
IP 40 EN 60529  RTI EN 61810-1
IP 40 EN 60529  RTI EN 61810-1  10 g / 5 g

The data in bold type relate to the standard versions of the relays. \*The relays are designed for continuous operation while maintaining the parameters declared in the data sheet. • • For single phase motors for 110-120 V AC do not use motors with higher FLA than given for 240 V AC.



#### Design



Improvement of the functionality of the mechanical indicator (W): it is mounted on an insulation base of the unit of the movable contacts; the changes provide the appropriate position in the window in the upper side of the housing irrespectively of the number of operations performed by the relay.



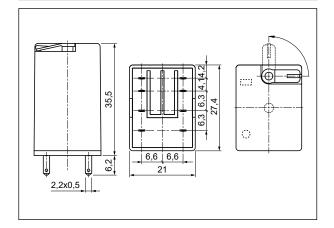
Application of electronics made in the SMD technology: additional equipment L (LED diode) and D (diode) are located on the printed circuit board; the change of the position of the LED diode and optimization of the quality and intensity of its light provide certainty that the relay is in operation status when the LED is on.



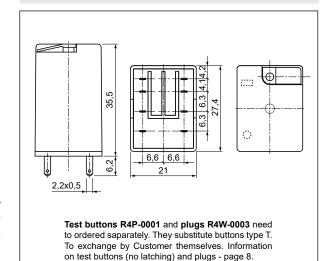
Improvement of the efficiency of the electromagnet: an innovational technology of connecting elements has been introduced, which guarantees more reliable operation of the relay.

Strengthening of the insulation in the area of the contact plate: polyamide PA66 has been applied; it has very good mechanical and electrical parameters and best thermal properties.

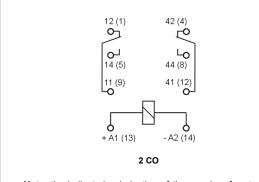
# **Dimensions** - plug-in version (WT), with lockable front test button type T



Dimensions - plug-in version, with test button (no latching) or with plug (no manual operation)



# Connection diagram (pin side view)



Note: the indicated polarization of the supply refers to the relays with extra equipment  $\boldsymbol{\mathsf{D}}$  - surge suppression element (diode) - for DC coils only.

2

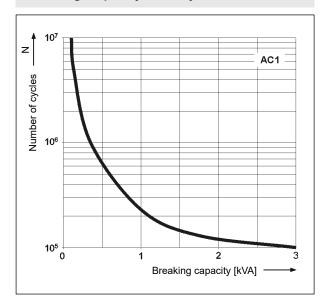
## Mounting, sockets and accessories for relays

Relays R2N are designed for mounting in plug-in sockets. With WT equipment as standard (W - mechanical indicator + T - lockable front test button). In these relays is possibility self-exchange of button type T for test button R4P-0001 (no latching) or on plug R4W-0003 (no manual operation). The buttons R4P-0001 and the plugs R4W-0003 need to ordered saparately.

Sockets	Retainer	Spring	Description	Additional	
for R2N	/ retractor clips	wire clips	plates	equipment	
Screw terminals	sockets, 35 mm rail mo	unt (acc. to EN 60715)	or on panel mounting (t	wo M3 screws)	
GZT2	GZT4-0040, GZP4-0400	G4 1052	GZT4-0035	M ❸, ZGGZ4 ❹	
GZM2	GZT4-0040, GZP4-0400	G4 1052	GZT4-0035	M ❸, ZGGZ4 ❹	
Push-in terminals	Push-in terminals sockets, 35 mm rail mount (acc. to EN 60715) or on panel mounting (two M3 screws)				
GZP4 ❷	GZP4-0400, GZT4-0040	G4 1052	MP15	M <b>❸</b> , ZGZP4-8, ZGZP4-2, ZGZP-2 <b>❹</b>	
Sockets for PCB	Sockets for PCB				
SU4/2D	-	G4 1053	-	_	
G4D/2	_	G4 1053	_	-	
Solder terminals sockets					
SU4/2L	_	G4 1053	_	G4 1040 <b></b>	
G4/2	_	G4 1053	_	_	

② Sockets GZP4: wire connection - see page 10. ③ Signalling / protecting modules type M... - see page 12.

# Electrical life at AC resistive load. Fig. 1 Switching frequency: 1 200 cycles/hour



# Electrical life reduction factor at AC inductive load

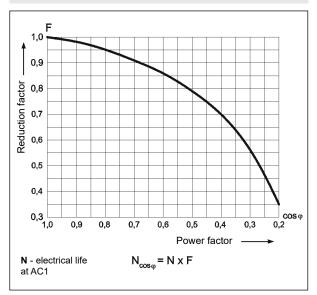
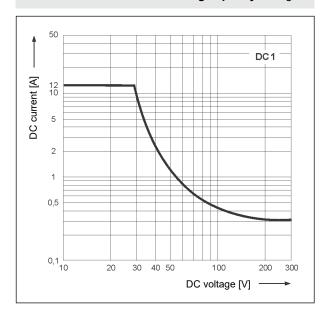


Fig. 2

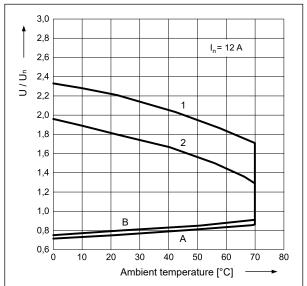
Interconnection strips ZGGZ4, ZGZP... - see pages 13-14.Spring clamps G4 1040.

#### Max. DC resistive load breaking capacity



## Coil operating range - DC

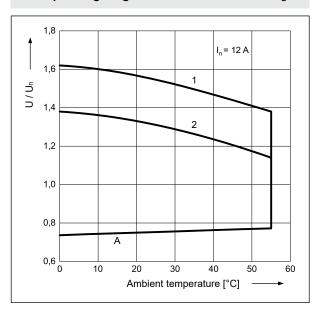
Fig. 4



## Coil operating range - AC 50 Hz



Fig. 3



### Description of Fig. 4 and 5

- **A** relations between make voltage and ambient temperature at no load on contacts. Coil temperature and ambient temperature are equal before coil energizing. Make voltage is not higher than the value read on Y axis (multiplication of rated voltage).
- $\boldsymbol{B}$  relations between make voltage and ambient temperature after initial coil heating up with 1,1 Un, at continues load of In on contacts. Make voltage is not higher than the value read on Y axis (multiplication of rated voltage).
- 1, 2 values on Y axis represent allowed overvoltage on coil at certain ambient temperature and contact load:
- 1 no load
- 2 rated load

## GZP4

Push-in terminals plug-in sockets for R2N, R4N - see page 10





# Contact material selection for different load types

- AgNi for resistive or inductive loads,
- AgNi/Au flash gold plating Au protects the contact surface during storage.

## Coil data - DC voltage version

Table 1

Coil code	Rated voltage V DC	Coil resistance at 20 °C	Acceptable resistance		ating range DC
		Ω		min. (at 20 °C)	max. (at 70 °C)
1005	5	28	± 10%	4,0	5,5
1006	6	40	± 10%	4,8	6,6
1012	12	160	± 10%	9,6	13,2
1024	24	640	± 10%	19,2	26,4
1048	48	2 600	± 10%	38,4	52,8
1060	60	4 000	± 10%	48,0	66,0
1080	80	7 100	± 10%	64,0	88,0
1110	110	13 600	± 10%	88,0	121,0
1125	125	16 000	± 10%	100,0	137,5
1220	220	54 000	± 10%	176,0	242,0

The data in bold type relate to the standard versions of the relays.

# Coil data - AC 50/60 Hz voltage version

Table 2

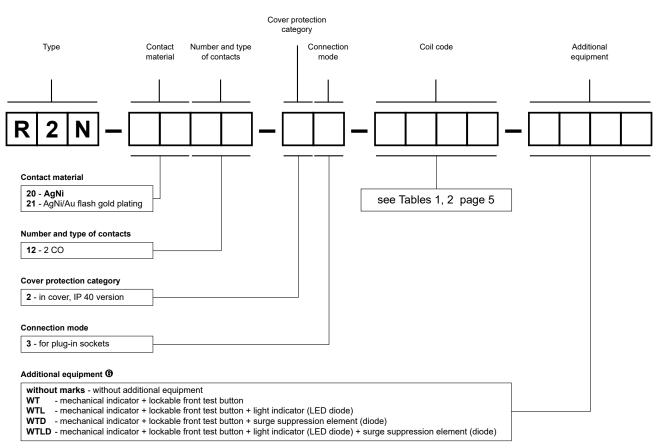
Coil code	Rated voltage V AC	Coil resistance at 20 °C	Acceptable resistance		ating range AC
		Ω		min. (at 20 °C)	max. (at 55 °C)
5006	6	9,8	± 10%	4,8	6,6
5012	12	39,5	± 10%	9,6	13,2
5024	24	158	± 10%	19,2	26,4
5042	42	470	± 10%	33,6	46,2
5048	48	640	± 10%	38,4	52,8
5060	60	930	± 10%	48,0	66,0
5080	80	1 720	± 10%	64,0	88,0
5110	110	3 450	± 10%	88,0	121,0
5115	115	3 610	± 10%	92,0	127,0
5120	120	3 770	± 10%	96,0	132,0
5127	127	4 000	± 10%	101,6	139,0
5220	220	15 400	± 10%	176,0	242,0
5230	230	16 100	± 10%	184,0	253,0
5240	240	16 800	± 10%	192,0	264,0

The data in bold type relate to the standard versions of the relays.

# Relays for railroad industry



### **Ordering codes**



T - orange colour (AC coils), green (DC coils). WT - standard equipment of relays. WTD, WTLD - available only in relays with DC coils.

**Test buttons (no latching) and plugs** need to ordered saparately. They substitute buttons type T. To exchange by Customer themselves. Information on test buttons (no latching) and plugs - page 8.

- Button R4P-0001-A orange colour (AC coils)
- Button R4P-0001-D green colour (DC coils)
- Plug R4W-0003-A orange colour (AC coils)
- Plug R4W-0003-D green colour (DC coils)

#### Note:

While the relay operates, the test button of the **T** type becomes heated. In order to push the test button manually, you should first turn the supply voltage off, and wait some time until the button becomes colder (or push the button immediately using a protective glove or an insulated tool). The button shall be pushed smoothly and quickly. The normally open contacts are closed with the button for the time during which the button is pushed. Releasing the button opens the normally open contacts. Normally open contacts may be closed with the blocking function of the button (it shall be turned by 90°). When the button is turned back, the normally open contacts are opened.

For relays with additional equipment  $\bf D$  - surge suppression element (diode) (versions WTD and WTLD) - fixed supply polarization compulsory for the DC load of coils: +A1(13) / -A2(14). The polarization is indicated on the relay cover. For other versions of the relays with DC coils any polarization is possible.

Example of ordering codes:

R2N-2012-23-1024-WT

relay **R2N**, for plug-in sockets, two changeover contacts, contact material AgNi, coil voltage 24 V DC, with mechanical indicator and lockable front test button, in cover IP 40



# Additional equipment for industrial relays

Industrial relays for plug-in sockets: R2N, R3N, R4N, R15 - 2 CO ②, R15 - 3 CO ② with WT equipment as standard (W - mechanical indicator + T - lockable front test button). **Detailed information** on additional equipment of individual relays can be found in the data sheets on the side of "Ordering codes".

#### Note:

While the relay operates, the test button of the T type becomes heated. In order to push the test button manually, you should first turn the supply voltage off, and wait some time until the button becomes colder (or push the button immediately using a protective glove or an insulated tool). The button shall be pushed smoothly and quickly. The normally open contacts are closed with the button for the time during which the button is pushed. Releasing the button opens the normally open contacts. Normally open contacts may be closed with the blocking function of the button (it shall be turned by  $90^{\circ}$ ). When the button is turned back, the normally open contacts are opened.

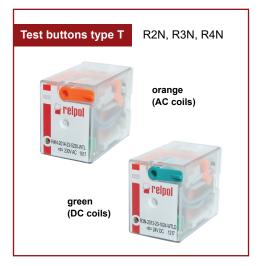
Type •	Description	For industrial relays
W	mechanical indicator	R2N, R3N, R4N, (R15 - 2 CO, 3 CO ❷)
Т	lockable front test button, orange (AC coils), green (DC coils)	R2N, R3N, R4N, (R15 - 2 CO, 3 CO ❷)
L	light indicator (LED diode), located inside the relay	R2N, R3N, R4N, (R15 - 2 CO, 3 CO, 4 CO @) RUC, RUC-M
D	surge suppression element (diode) - only for DC coils	R2N, R3N, R4N, (R15 - 2 CO, 3 CO, 4 CO 2)
V	surge suppression element (varistor) - only for AC coils	(R15 - 2 CO, 3 CO ❷)
κ	test button without block function, orange (AC coils), green (DC coils)	(R15 - 4 CO ❷), RUC

1 Available combinations:

WT, WTL, WTD, WTLD - in relays R2N, R3N, R4N for plug-in sockets WT, WTL, WTD, WTLD, WTV, WTLV - in relays R15 - 2 CO, 3 CO for plug-in sockets K, L, D, KL, KD, LD, KLD - in relays R15 - 4 CO for plug-in sockets

**K**, **L**, **KL** - in relays RUC **L** - in relays RUC-M

Voltage versions, in covers



**Test buttons (no latching)** are recommended for R2N...WT, R3N...WT, R4N...WT, R15...WT 2 CO, R15...WT 3 CO relays - **for applications that do not allow permanent contact latching**. By manual operation (pressing the button) relay contacts can get switched for as long time as long the button is pressed. Contacts return to initial position as soon as pressure is released from the button. Those operations can be done while the coil is deenergized **6**.

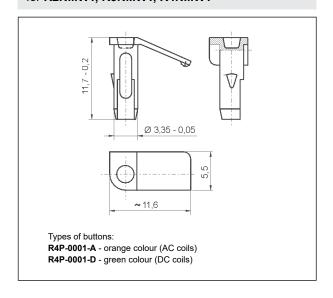
Button R4P-0001 or R15-M404 can be easily inserted by the Customer after removal of button type T (see Fig. 2). Button type T can be removed with screwdriver as shown on Fig. 1.

While the relay operates, the test button becomes heated. In order to push the test button manually, you should first turn the supply voltage off, and wait some time until the button becomes colder (or push the button immediately using a protective glove or an insulated tool). The button shall be pushed smoothly and quickly.

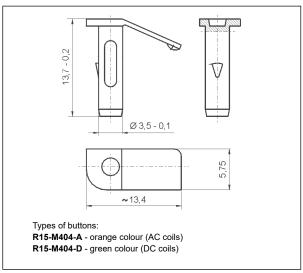




# Dimensions - test button R4P-0001 for R2N...WT, R3N...WT, R4N...WT

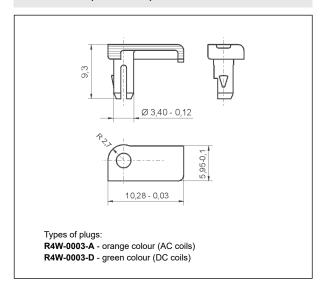


# Dimensions - test button R15-M404 for R15...WT 2 CO, R15...WT 3 CO

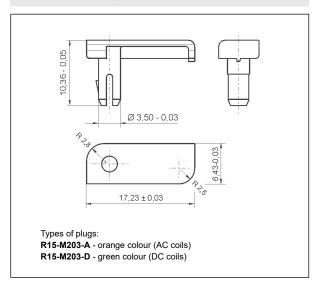


Plugs R4W-0003 or R15-M203 can substitute button type T if manual operation (latching and testing) is not allowed. Changing button type T for plug can be done by Customer themselves in the same way as changing button type T for button (no latching).

### Dimensions - plug R4W-0003 for R2N...WT, R3N...WT, R4N...WT

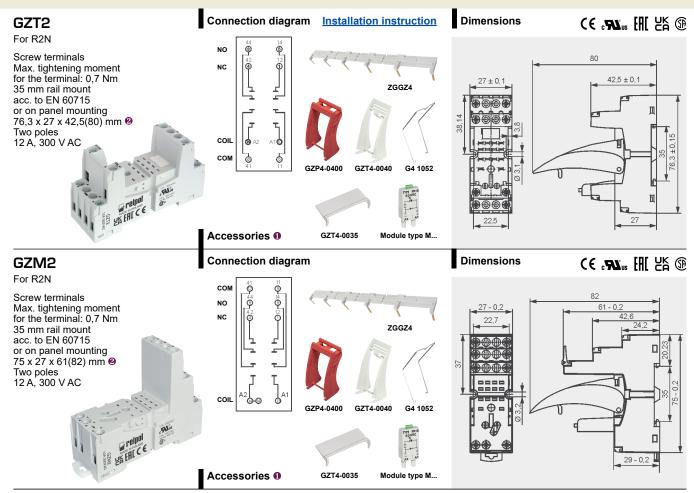


### Dimensions - plug R15-M203 for R15...WT 2 CO, R15...WT 3 CO



relpol ®

# Sockets and accessories

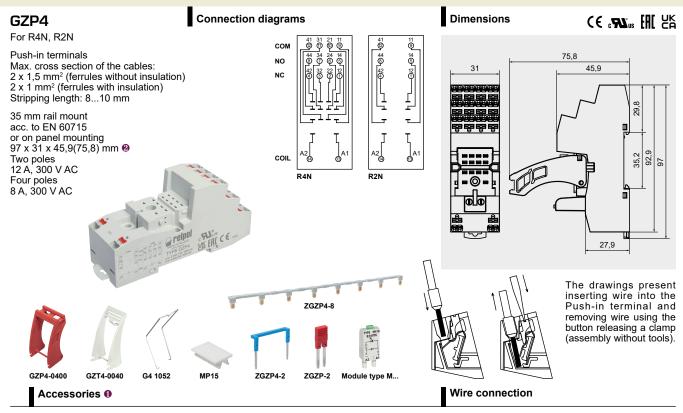


- Mounting and sub-assemblies of accessories in the socket see page 9. Signalling / protecting modules type M... see page 12.
- In the bracket the height of socket with retainer / retractor clip is shown.

# Mounting and sub-assemblies of the relay and accessories in the socket

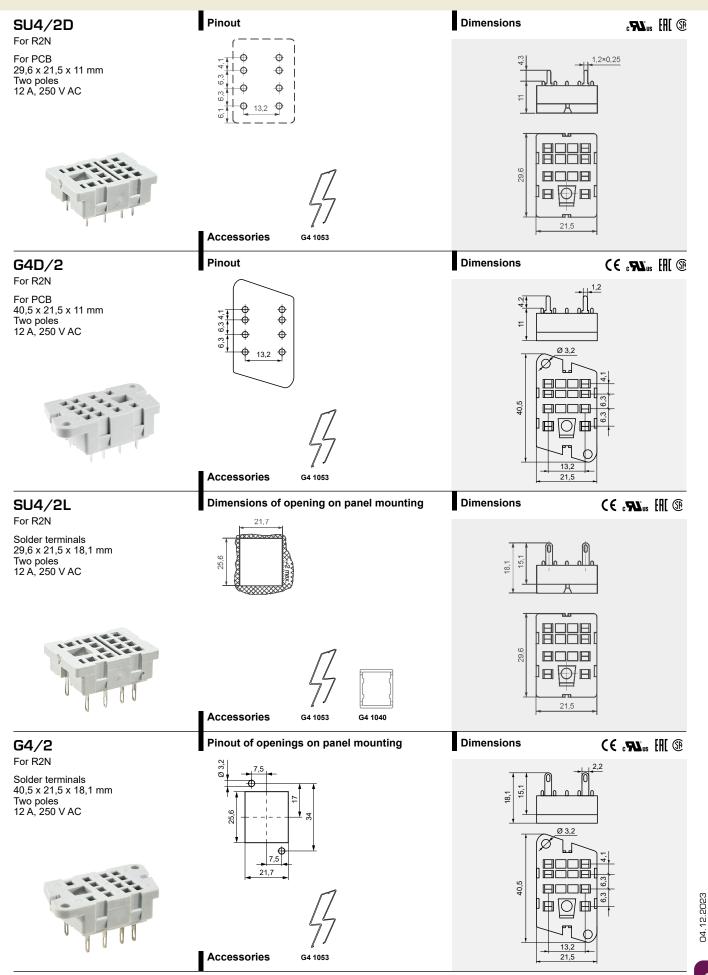


# Sockets and accessories



- Mounting and sub-assemblies of accessories in the socket see page 9. Signalling / protecting modules type M... see page 12.
- 2 In the bracket the height of socket with retainer / retractor clip is shown.

# Sockets and accessories



## For sockets type:

GZT80, GZM80, GZS80, GZP80, GZT92, GZM92, GZS92, ES 32, GZT2, GZM2, GZT3, GZM3, GZT4, GZM4, GZP4

Modules type M... are parallely connected with relay coil. Polarization P: -A1/+A2. Polarization N: +A1/-A2.







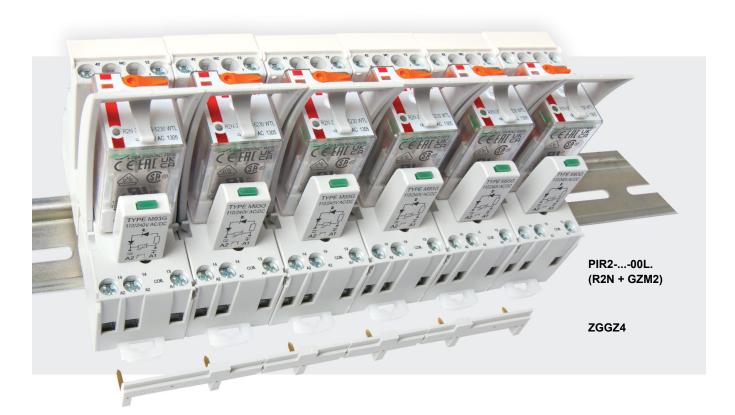
Modules type M	Layout	Voltage	Type of module • •
Module D (polarization P) It limits overvoltage on DC coils.	+A2 •	6/230 V DC	M21P
Module D (polarization N) It limits overvoltage on DC coils.	-A2 • +A1 •	6/230 V DC	M21N
Module LD (polarization P) It limits overvoltage on DC coils. Coil energizing indication.	+A2	6/24 V DC 24/60 V DC 110/230 V DC	M31R, M31G M32R, M32G M33R, M33G
Module LD (polarization N) It limits overvoltage on DC coils. Coil energizing indication.	-A2 ************************************	6/24 V DC 24/60 V DC 110/230 V DC	M41R, M41G M42R, M42G M43R, M43G
Module RC It protects against EMC disturbance. It limits overvoltage.	A2 •—II— A1 •———	6/24 V AC/DC 24/60 V AC/DC 110/240 V AC/DC	M51 M52 M53
Module L Coil energizing indication.	≂ A2 ⊶ ★	6/24 V AC/DC 24/60 V AC/DC 110/240 V AC/DC	M61R, M61G M62R, M62G M63R, M63G
Module LV It limits overvoltage on AC and DC coils. Coil energizing indication.	= A2	6/24 V AC/DC 24/60 V AC/DC 110/240 V AC/DC	M91R, M91G M92R, M92G M93R, M93G
Module V It limits overvoltage on AC coils. No indication.	A2	6/24 V AC 110/130 V AC 220/240 V AC	M71 M72 M73
<b>Module R</b> It limits harmful voltage on AC coils induced in long lines which causes unwanted making of the relay.	A1 A2	110/240 V AC	M103

- 1 M...R LED red, M...G LED green
- When ordering modules indicate their color: gray or black.



### PRECAUTIONS:

1. Ensure that the parameters of the product described in its specification provide a safety margin for the appropriate operation of the device or system and never use the product in circumstances which exceed the parameters of the product. 2. Never touch any live parts of the device. 3. Ensure that the product has been connected correctly. An incorrect connection may cause malfunction, excessive heating or risk of fire. 4. In case of any risk of any serious material loss or death or injuries of humans or animals, the devices or systems shall be designed so to equip them with double safety system to guarantee their reliable operation.

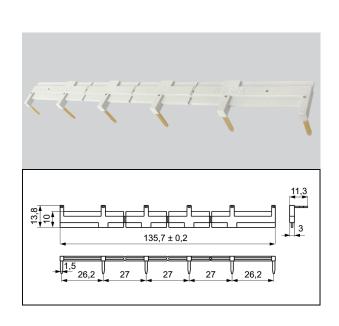


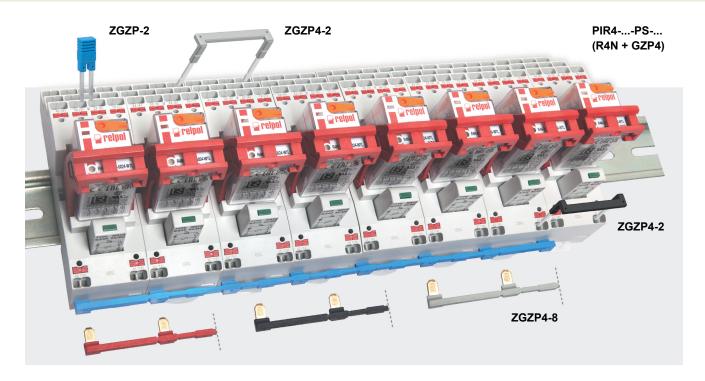
# ■ ZGGZ4 for:

Plug-in sockets	Relays for plug-in sockets	Interface relays ®	
GZM2	R2N	PIR200L. (R2N + GZM2)	
GZT2			
GZM3	R3N	PIR300L. (R3N + GZM3)	
GZT3			
GZM4	R4N	PIR400L. (R4N + GZM4)	
GZT4			

# ■ Interconnection strip ZGGZ4

- designed for the co-operation with plug-in sockets of miniature industrial relays and with interface relays PIR2, PIR3 and PIR4, which are equipped with screw terminals; sockets and relays are mounted on 35 mm rail mount acc. to EN 60715,
- bridges common input signals (coil terminals A1 or A2) or output signals - see photo at the top,
- maximum permissible current is 10 A / 250 V AC,
- possibility of connection of 6 sockets or relays,
- colours of strips: ZGGZ4-1 grey, ZGGZ4-2 black.





# ■ ZGZP... for:

Plug-in sockets	Relays for plug-in sockets	Interface relays o	
GZP4	R2N	PIR2PS (R2N + GZP4)	
	R4N	PIR4PS (R4N + GZP4)	

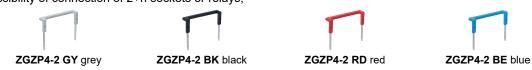
<sup>1</sup> Interface relay PIR2 (PIR4) is offered as a set: electromagnetic relay R2N (R4N) + plug-in socket GZP4 + signalling / protecting module type M... + retainer / retractor clip GZP4-0400.

# ■ Interconnection strips ZGZP...

- · designed for the co-operation with plug-in sockets of miniature industrial relays and with interface relays PIR2 and PIR4, which are equipped with screw terminals; sockets and relays are mounted on 35 mm rail mount acc. to EN 60715,
- strip ZGZP4-8 bridges common input signals (coil terminals A1 or A2), maximum permissible current is 10 A / 250 V AC, possibility of connection of 8 sockets or relays,



- strip ZGZP4-2 bridges common input signals (coil terminals A1 or A2) or output signals, possibility of connection of 2+n sockets or relays,



- jumper ZGZP-2 bridges the neighboring poles of single socket GZP4.



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