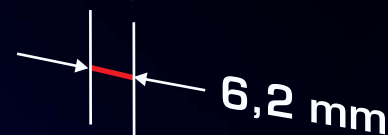


NEW TIME



Automation is our passion



For dozens of years now, Relpol S.A.

has been a worldwide known supplier of components

used in industrial and power automation, power electronics,
industrial and applied electronics, telecommunication, etc.



Apart from complete delivery of components, Relpol S.A. provides its partners with technical consultancy based upon **extensive knowledge of the application of the components.**

Taking into account **the significant role of the products of Relpol S.A.**, we have made their quality improvement our priority strategic goal.

You are welcome to review our catalogs which present a very wide line of products for industrial automation.

Due to the wide line of products, orders of non-standard products should be consulted with the manufacturer or distributor.



The leading position

of the manufacturer of electromagnetic relays in Europe

provides for Relpol's presence
in markets worldwide.

Commercial Partnerships of Relpol S.A.

RELPOL M Minsk / Belarus

RELPOL BG Varna / Bulgaria

RELPOL HUNGARY Budapest / Hungary

RELPOL BALTIJA Vilnius / Lithuania

RELPOL ELTIM Sankt-Petersburg / Russia

RELPOL ALTERA Kiev / Ukraine

RELPOL FRANCE Paris / France

RELPOL LTD. London / England



The standards quality guaranteed

Taking into account the high requirements of the market and our customers' full satisfaction, Relpol S.A. constantly strives for improvement of the quality of the products and services we offer. Our own technological, designing and research facilities remarkably help us to achieve our goals.

The modern production profile and high quality of the products that comply with the requirements of the European Union are confirmed by the ISO 9001 : 2001, ISO 14001 : 2005 CERTIFICATES.

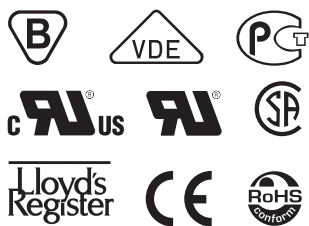
ISO 9001 : 2001

ISO 14001 : 2005

The Gold Statuette of the Business Centre Club 1995 / EUROPRODUCT 2002 / EUROPRODUCT 2003 / the Statuette of the Minister of Economic Affairs, Labor and Social Policy 2003 / GOLD EUROPRODUCT 2003 / ELECTROPRODUCT 2003 / GOLD MEDAL Automaticon 2004 / the Statuette for the Pillar of the Polish Economy 2004 / Product of the Year 2005

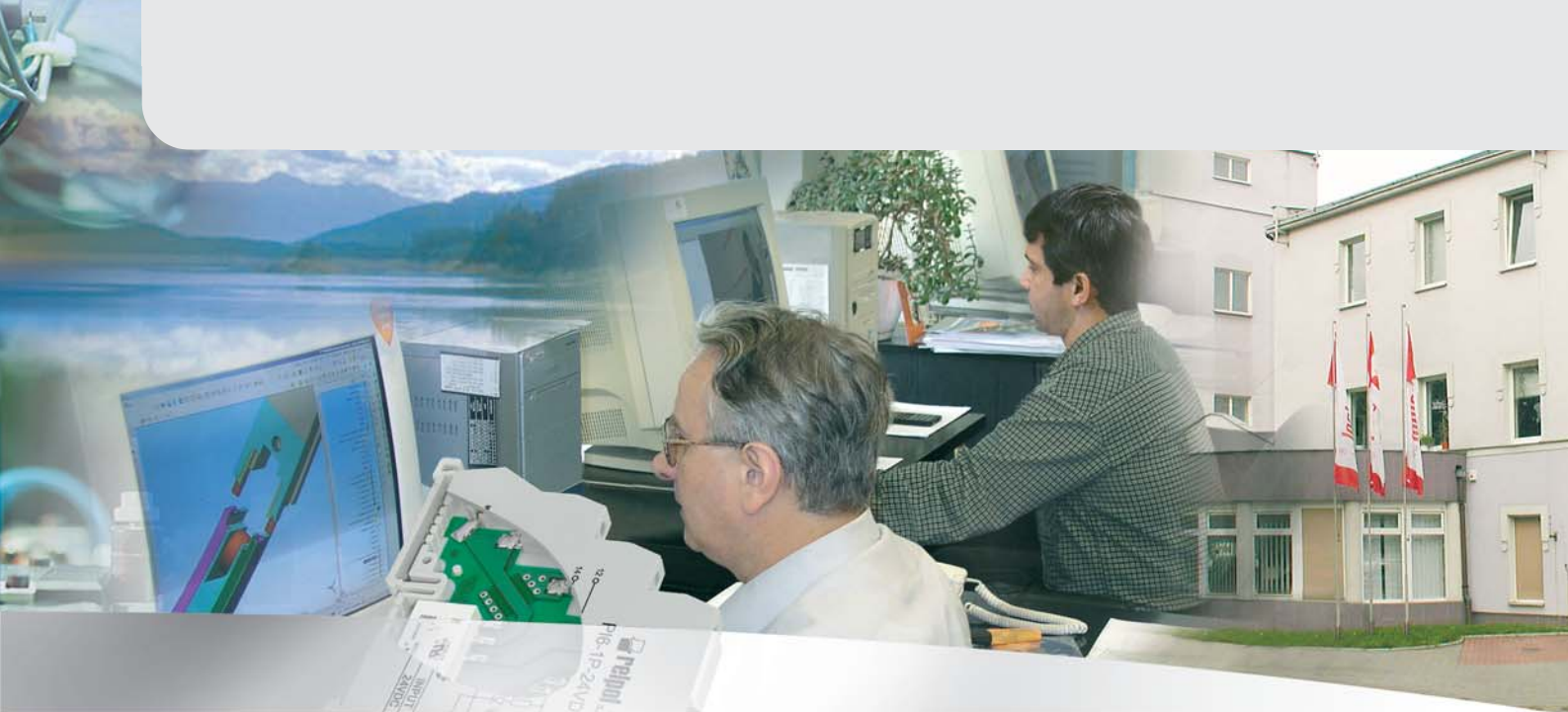
The innovative features of our technological solutions

and the reliability of our products



are confirmed by numerous recognitions and certifications BBJ, VDE, UL, CSA, GOST, LR, RoHS and by prizes and awards.





Relations and trust

Our co-operation with numerous renowned suppliers of materials and components necessary for the production process allows us to realize even complex deliveries quickly and smoothly. We build long-term partnership relations with our customers.

Owing to regular consultations and steady contribution of our Partners to our activities, we gain the knowledge necessary for reliable and professional services.

Relpol S.A. runs its own Research and Development Department which designs new products to follow the worldwide trends and solutions in the electrotechnical industry.

The permanent development of our staff along with human resources stabilization provide our customers with professional service.

Relpol S.A. Technical Support Department advises the Client and helps to solve the problems of electrical applications and, thus, enhances their satisfaction at cooperation with ourselves.

The long years of experience, the knowledge of the electrotechnical industry and the market activities of Relpol S.A. have been proved by co-operation with the largest corporations worldwide.

Environment protection

With the development of technology we shall not forget

about the issues of the environment protection.

Reduction of the natural environment pollution with regard to the production process and the products of Relpol S.A. is a constant process aimed at minimizing of the environmental impact.

Our products meet the requirements of the RoHS Directive.



Time relays



TR4N 4 C/O

Technical data	5
Dimensions, diagrams	6
Ordering codes	6
Time functions	20



TR4N 1 C/O, 2 C/O

Technical data	7
Dimensions, diagrams	8
Ordering codes	8
Time functions	20



T-R4

Technical data	9
Dimensions, diagrams	10
Ordering codes	12
Time functions	20



PIR15...T

with time module T(COM3)

Technical data	13
Dimensions, diagrams	15
Ordering codes	16
Time functions	20



PIR6WT-1Z

Technical data	17
Dimensions, diagrams	18
Ordering codes	19
Time functions	20



Series TR-E...

TR-EM1P-UNI	22
TR-EM2P-UNI	24
TR-EI1P-UNI	26
TR-EI2P-UNI	28
TR-ES2P-UNI	30

Monitoring relays



Series MR-E...

MR-EU3M1P	32
MR-EU31UW1P	34
MR-EU1W1P	36
MR-EI1W1P	38
MR-ET1P	40



Series MR-G...

MR-GI1M2P-TR2	42
MR-GI3M2P-TR2	44
MR-GU1M2P-TR2	46
MR-GU32P-TR2	48
MR-GU3M2P-TR2	50
MR-GU3M2P	52
MR-GT2P-TR2	54
MR-GP2P	56
TR2 supply transformers	58



NEW
product

- Voltage monitoring in 3-phase mains
- Monitoring of phase sequence and phase failure
- Monitoring of asymmetry ❶
- Connection of neutral wire optional
- Supply voltage = measuring voltage
- 1 changeover contact: 1 C/O
- Rated load: 5 A / 250 V AC at cat. AC1
- Installation design: width 17,5 mm
- Recognitions, certifications, directives: **CE**

Type of relay

MR-EU3M1P

Output circuit

Number and type of contacts		1 C/O - changeover	
Rated load	AC1	5 A / 250 V AC	
Max. breaking capacity	AC1	1 250 VA	
Max. operating frequency		3 600 cycles/hour	PN-EN 60947-5-1
• at 100 VA resistive load		360 cycles/hour	
• at 1 000 VA resistive load			

Input circuit

Supply voltage U		= measuring voltage; terminals (N)-L1-L2-L3	
Rated voltage U _n		3(N)-400/230 V	
Drop-out voltage		AC: $\geq 0,2 U_n$	
Operating range of supply voltage		$0,7 < U_n < 1,3$	
Rated power consumption		8,0 VA / 0,8 W	
Rated frequency		AC: 48...63 Hz	
Duty cycle		100%	
Measuring circuit	<ul style="list-style-type: none"> • terminals • measuring variable • measuring input • overload capacity • asymmetry 	(N)-L1-L2-L3 3(N)~, sinus, 48...63 Hz = supply voltage determined by tolerance specified for supply voltage 5...25%	

Insulation

Rated surge voltage	4 000 V AC
Overvoltage category	III PN-EN 60664-1
Insulation pollution degree	2, if built-in 3 PN-EN 60664-1

General data

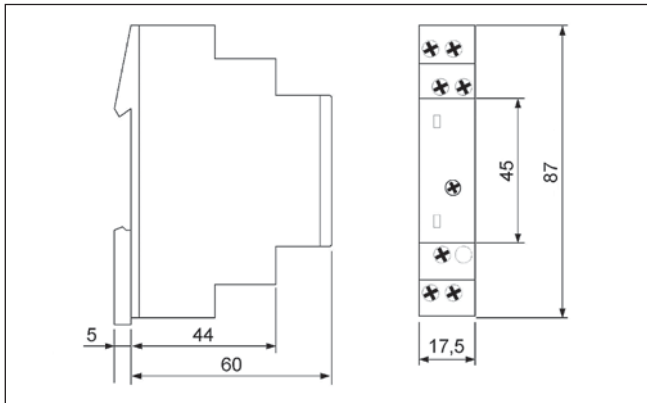
Electrical life	• resistive AC1	$\geq 2 \times 10^5$ 1 000 VA
Mechanical life (cycles)		$\geq 2 \times 10^7$
Dimensions (L x W x H)		87 x 17,5 x 60 mm
Weight		63 g
Ambient temperature	<ul style="list-style-type: none"> • storage, transport • operating 	-25...+70 °C -25...+55 °C PN-EN 60068-1
Housing protection category		IP40
Relative humidity		15...85% PN-EN 60721-3-3 class 3K3
Shock resistance		15 g 11 ms PN-EN 60068-2-27
Vibration resistance		0,35 mm DA 10...55 Hz PN-EN 60068-2-6

Measuring circuit data

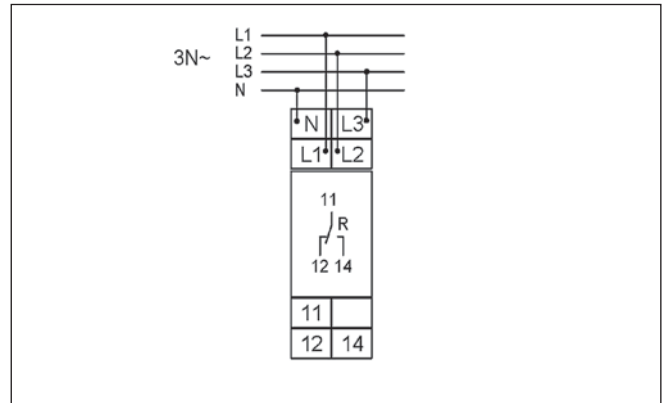
Functions	monitoring of phase sequence, phase failure and asymmetry with adjustable asymmetry ❶, connection of neutral wire optional
Time intervals	tripping delay (fixed, approx. 0,1 s)
Base accuracy	$\pm 5\%$ (calculate from final range value)
Setting accuracy	$\pm 5\%$ (calculate from final range value)
Repeatability	$\pm 2\%$
Temperature influence	$\pm 0,05\% / ^\circ\text{C}$
Recovery time	500 ms
LED indicator	green LED U/T ON - indication of supply voltage yellow LED R ON/OFF - indication of output relay

❶ By means of evaluating the asymmetry.

Dimensions



Connections diagram

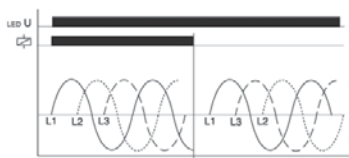


Mounting, mechanical design

Relays **MR-EU3M1P** are designed for direct mounting on 35 mm DIN rail mount, EN 50022. Mounting position: any. Self-extinguishing plastic housing, IP 40. Shockproof terminal connection according to VBG 4 (PZ1 required), IP 20. Maximum screw torque: 1,0 Nm. Terminal capacity: 1 x 0,5 do 2,5 mm² with/without multicore cable end, 1 x 4 mm² without multicore cable end, 2 x 0,5 do 1,5 mm² with/without multicore cable end, 2 x 2,5 mm² flexible without multicore cable end.

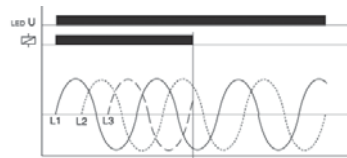
Functions

Phase sequence monitoring



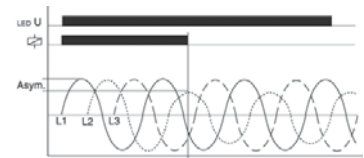
When all the phases are connected in the correct sequence and the measured asymmetry is less than the fixed value, the output relay R switches into on-position (yellow LED illuminated). When the phase sequence changes, the output relay R switches into off-position (yellow LED not illuminated).

Phase failure monitoring



The output relay R switches into off-position (yellow LED not illuminated), when one of the three phases fails.

Asymmetry monitoring



The output relay R switches into off-position (yellow LED not illuminated) when the asymmetry exceeds the value set at the ASYM-regulator. Reverse voltages of a consumer (e.g. a motor which continues to run on two phases only) do not effect the disconnection.

U - supply voltage; R - output relay



- Voltage monitoring in 3-phase and 1-phase mains ❶
- Multifunctions monitoring relays
- Monitoring of phase sequence ❷ and phase failure
- Connection of neutral wire optional
- Supply voltage = measuring voltage
- 1 changeover contact: 1 C/O
- Rated load: 5 A / 250 V AC at cat. AC1
- Installation design: width 17,5 mm
- Recognitions, certifications, directives:

Type of relay

MR-EU31UW1P

Output circuit

Number and type of contacts		1 C/O - changeover	
Rated load	AC1	5 A / 250 V AC	
Max. breaking capacity	AC1	1 250 VA	
Max. operating frequency		3 600 cycles/hour	PN-EN 60947-5-1
• at 100 VA resistive load		360 cycles/hour	
• at 1 000 VA resistive load			

Input circuit

Supply voltage U		= measuring voltage; terminals (N)-L1-L2-L3	
Rated voltage U _n		3(N)-400/230 V	
Drop-out voltage		AC: $\geq 0,2 U_n$	
Operating range of supply voltage		$0,7 < U_n < 1,3$	
Rated power consumption		8,0 VA / 1,0 W	
Rated frequency		AC: 48...63 Hz	
Duty cycle		100%	
Measuring circuit	<ul style="list-style-type: none"> • terminals • measuring variable • measuring input • overload capacity • switching threshold U_s 	(N)-L1-L2-L3 3(N)-, sinus, 48...63 Hz = supply voltage determined by tolerance specified for supply voltage max.: $0,8 < U_n < 1,3$ min.: $0,7 < U_n < 1,2$	

Insulation

Rated surge voltage	4 000 V AC
Overvoltage category	III PN-EN 60664-1
Insulation pollution degree	2, if built-in 3 PN-EN 60664-1

General data

Electrical life	• resistive AC1	$\geq 2 \times 10^5$ 1 000 VA
Mechanical life (cycles)		$\geq 2 \times 10^7$
Dimensions (L x W x H)		87 x 17,5 x 60 mm
Weight		72 g
Ambient temperature	<ul style="list-style-type: none"> • storage, transport • operating 	-25...+70 °C -25...+55 °C PN-EN 60068-1
Housing protection category		IP40
Relative humidity		15...85% PN-EN 60721-3-3 class 3K3
Shock resistance		15 g 11 ms PN-EN 60068-2-27
Vibration resistance		0,35 mm DA 10...55 Hz PN-EN 60068-2-6

Measuring circuit data

Functions	UNDER, UNDER+SEQ, WIN, WIN+SEQ ❸ monitoring of phase sequence ❷ and phase failure, connection of neutral wire optional
Time intervals (timing adjustment)	tripping delay (0,1...10 s)
Base accuracy	$\pm 5\%$ (calculate from final range value)
Setting accuracy	$\pm 5\%$ (calculate from final range value)
Repeatability	$\pm 2\%$
Temperature influence	$\pm 0,05\% / ^\circ\text{C}$
Recovery time	500 ms
LED indicator	red LED ON/OFF - indication of failure ❹ red LED flashes - indication of tripping delay ❹ yellow LED R ON/OFF - indication of output relay

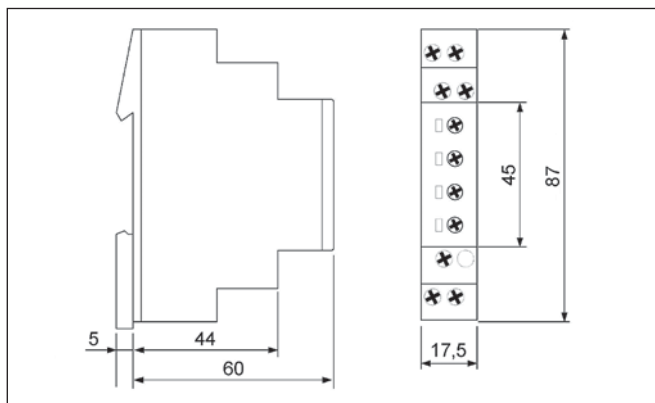
❶ With adjustable thresholds.

❷ Selectable.

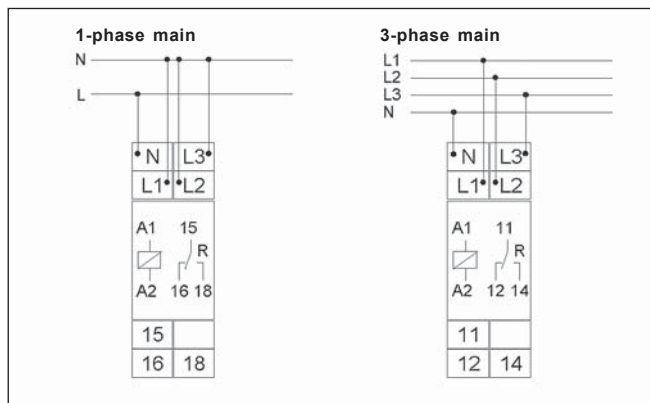
❸ Selectable by means of rotary switch.

❹ Of the corresponding threshold.

Dimensions



Connections diagrams



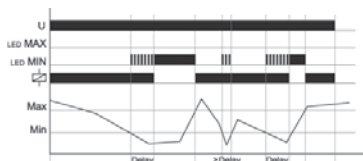
Mounting, mechanical design

Relays **MR-EU31UW1P** are designed for direct mounting on 35 mm DIN rail mount, EN 50022. Mounting position: any. Self-extinguishing plastic housing, IP 40. Shockproof terminal connection according to VBG 4 (PZ1 required), IP 20. Maximum screw torque: 1,0 Nm. Terminal capacity: 1 x 0,5 do 2,5 mm² with/without multicore cable end, 1 x 4 mm² without multicore cable end, 2 x 0,5 do 1,5 mm² with/without multicore cable end, 2 x 2,5 mm² flexible without multicore cable end.

Functions

For all functions the LED's MIN and MAX are flashing alternating (the relay is fallen off), when the minimum value for the measured voltage was chosen to be greater than the maximum value. If a failure already exists, when the device is activated, the output relay R remains in off-position and the LED for the corresponding threshold is illuminated. The device includes separately every phase voltage (L-N) and monitors it according to the selected function (UNDER or WINDOW).

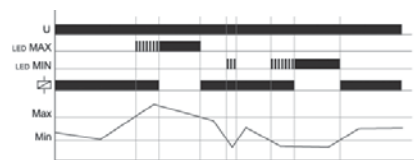
UNDER, UNDER+SEQ - undervoltage monitoring, undervoltage monitoring and monitoring of phase sequence



When the measured voltage (one of the phase voltages) falls below the value adjusted at the MIN-regulator, the set interval of the tripping delay (Delay) begins (red LED MIN flashes). After the interval has expired (red LED MIN illuminated), the output relay R switches into off-position (yellow LED not illuminated). The output relay R switches into on-position again (yellow LED illuminated), when the measured voltage (all phase voltages) exceeds the value adjusted at the MAX-regulator.

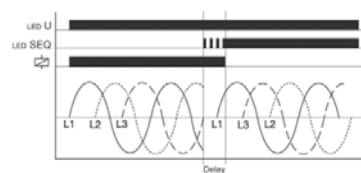
U - supply voltage; R - output relay

WIN, WIN+SEQ - voltage monitoring in windowfunction between MIN and MAX values, voltage monitoring in windowfunction between MIN and MAX values and monitoring of phase sequence



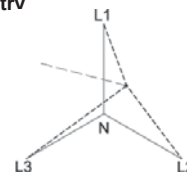
The output relay R switches into on-position (yellow LED illuminated), when the measured voltage (all phase voltages) exceeds the value adjusted at the MIN-regulator. When the measured voltage (one of the phase voltages) exceeds the value adjusted at the MAX-regulator, the set interval of tripping delay (Delay) begins (red LED MAX flashes). After the interval has expired (red LED MAX illuminated) the output relay R switches into off-position (yellow LED not illuminated). The output relay switches into on-position again (yellow LED illuminated) when the measured voltage falls below the value adjusted at the MIN-regulator (red LED MIN not illuminated). When the measured voltage (one of the phase voltage) falls below the value adjusted at the MAX-regulator, the set interval of tripping delay (Delay) begins again (red LED MIN flashes). After the interval has expired (red LED MIN illuminated), the output relay R switches into off-position (yellow LED not illuminated).

SEQ - phase sequence monitoring



Phase sequence monitoring is selectable for all functions. In single phase circuit, the phase sequence monitoring must be disconnected. If a change in phase sequence is detected (red LED SEQ illuminated), the output relay R switches into off-position after the set interval of tripping delay (Delay) has expired (yellow LED not illuminated).

Loss of neutral wire by means of evaluation of asymmetry



The device monitors every phase (L1, L2 and L3) against the neutral wire N. A shift of neutral point occurs by an asymmetrical phase load if the neutral wire breaks in the power line. If one of the phase voltages exceeds the value adjusted at the trip point, the set interval of tripping delay (Delay) begins (red LED MIN or MAX flashes). After the interval has expired (red LED MIN or MAX illuminated), the output relay switches into off-position (yellow LED not illuminated).



- AC/DC voltage monitoring in 1-phase mains ❶
- Multifunctions monitoring relays
- Minimum value supervision with the hysteresis mode
- Supply voltage = measuring voltage
- 1 changeover contact: 1 C/O
- Rated load: 5 A / 250 V AC at cat. AC1
- Installation design: width 17,5 mm
- Recognitions, certifications, directives:

Type of relay

MR-EU1W1P

Output circuit

Number and type of contacts		1 C/O - changeover	
Rated load	AC1	5 A / 250 V AC	
Max. breaking capacity	AC1	1 250 VA	
Max. operating frequency		3 600 cycles/hour	PN-EN 60947-5-1
• at 100 VA resistive load		360 cycles/hour	
• at 1 000 VA resistive load			

Input circuit

Supply voltage U		= measuring voltage; terminals: 230 V AC: E-F3 24 V AC: E-F2 24 V DC: E-F1	
Rated voltage U _n		24 V AC/DC, 230 V AC	
Drop-out voltage		determined by undervoltage detection (see measured circuit)	
Operating range of supply voltage		0,75 < U _n < 1,2	
Rated power consumption		230 V AC: 10,0 VA / 0,6 W 24 V AC: 1,3 VA / 0,8 W 24 V DC: 0,6 W	
Rated frequency \ wave form		AC: 48...63 Hz \ DC, AC sinus	
Duty cycle		100%	
Measuring circuit	<ul style="list-style-type: none"> • terminals • measuring variable • measuring input • overload capacity • switching threshold U_s • hysteresis H 	230 V AC: E-F3 24 V AC: E-F2 24 V DC: E-F1 DC or AC sinus, 48...63 Hz = supply voltage ≥ 1,2 U _n max.: 0,8 < U _n < 1,2 min.: 0,75 < U _n < 1,15 see table ordering information or printing on the unit	

Insulation

Rated surge voltage	4 000 V AC
Overvoltage category	III PN-EN 60664-1
Insulation pollution degree	2, if built-in 3 PN-EN 60664-1

General data

Electrical life	• resistive AC1	≥ 2 x 10 ⁵ 1 000 VA
Mechanical life (cycles)		≥ 2 x 10 ⁷
Dimensions (L x W x H)		87 x 17,5 x 60 mm
Weight		72 g
Ambient temperature	<ul style="list-style-type: none"> • storage, transport • operating 	-25...+70 °C -25...+55 °C PN-EN 60068-1
Housing protection category		IP 40
Relative humidity		15...85% PN-EN 60721-3-3 class 3K3
Shock resistance		15 g 11 ms PN-EN 60068-2-27
Vibration resistance		0,35 mm DA 10...55 Hz PN-EN 60068-2-6

Measuring circuit data

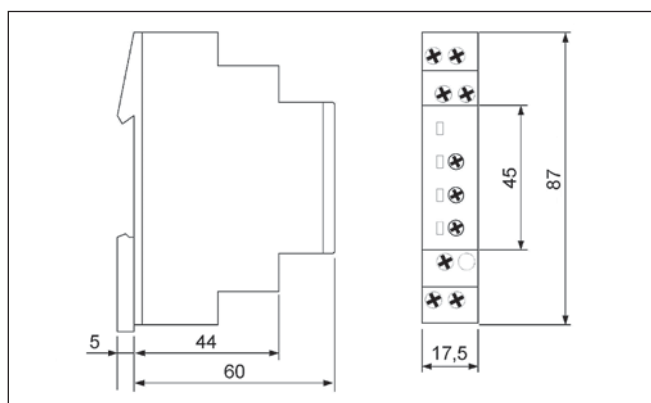
Functions	UNDER, WIN ❷
	minimum value supervision with the hysteresis mode
Base accuracy	± 5% (calculate from final range value)
Setting accuracy	± 5% (calculate from final range value)
Repeatability	± 2%
Temperature influence	± 1% / °C
Recovery time	500 ms
LED indicator	green LED ON/OFF - indication of supply voltage red LED ON/OFF - indication of failure ❸ yellow LED R ON/OFF - indication of output relay

❶ With adjustable threshold.

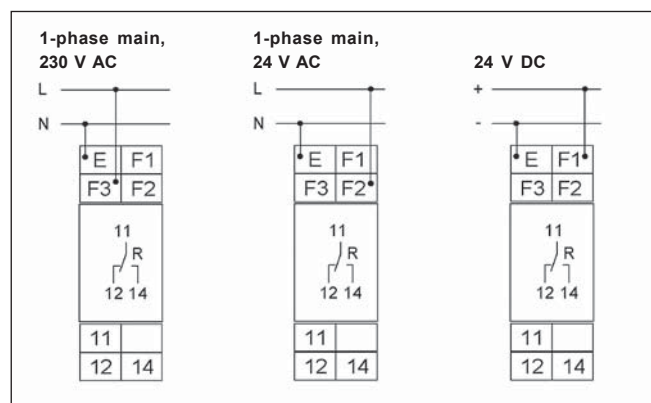
❷ Selectable by means of rotary switch.

❸ Of the corresponding threshold.

Dimensions



Connections diagrams

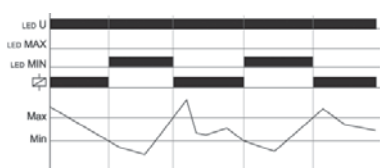


Mounting, mechanical design

Relays **MR-EU1W1P** are designed for direct mounting on 35 mm DIN rail mount, EN 50022. Mounting position: any. Self-extinguishing plastic housing, IP 40. Shockproof terminal connection according to VBG 4 (PZ1 required), IP 20. Maximum screw torque: 1,0 Nm. Terminal capacity: 1 x 0,5 do 2,5 mm² with/without multicore cable end, 1 x 4 mm² without multicore cable end, 2 x 0,5 do 1,5 mm² with/without multicore cable end, 2 x 2,5 mm² flexible without multicore cable end.

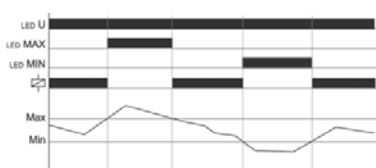
Functions

UNDER - undervoltage monitoring



When the supply voltage U is applied, the output relay R switches into on-position, if the measured voltage is beyond the MIN-value. When the measured voltage falls below the MIN-value, the output relay R switches into off-position. The output relay R switches into on-position again, if the voltage exceeds the MAX-value.

WIN - voltage monitoring in windowfunction between MIN and MAX values



When the supply voltage U is applied, the output relay R switches into on-position, if the measured voltage is within the adjusted window. When the measured voltage left the window between MIN and MAX, the output relay R switches into off-position. The output relay R switches into on-position again, if the voltage re-enter the adjusted window.

U - supply voltage; R - output relay



NEW
product

- AC current monitoring in 1-phase mains ❶
- Multifunctions monitoring relays
- Hysteresis mode and the possibility of setting the tripping delay
- Supply voltage 230 V AC
- 1 changeover contact: 1 C/O
- Rated load: 5 A / 250 V AC at cat. AC1
- Installation design: width 17,5 mm
- Recognitions, certifications, directives: **CE**

Type of relay

MR-EI1W1P

Output circuit

Number and type of contacts		1 C/O - changeover	
Rated load	AC1	5 A / 250 V AC	
Max. breaking capacity	AC1	1 250 VA	
Max. operating frequency		3 600 cycles/hour	PN-EN 60947-5-1
• at 100 VA resistive load		360 cycles/hour	
• at 1 000 VA resistive load			

Input circuit

Supply voltage U		230 V AC; terminals (N)-Li	
Rated voltage U _n		230 V AC	
Drop-out voltage		AC: $\geq 0,2 U_n$	
Operating range of supply voltage		$0,85 < U_n < 1,15$	
Rated power consumption		5,0 VA / 0,8 W	
Rated frequency \ wave form		AC: 48...63 Hz \ AC sinus	
Duty cycle		100%	
Measuring circuit	<ul style="list-style-type: none"> • terminals • measuring variable • measuring input • overload capacity • starting current • input resistance • switching threshold U_s • hysteresis H 	(N)-Li-Lk AC sinus, 48...63 Hz 10 AAC 13 A 1 s: 100 A 3 s: 50 A 3 mΩ max.: $0,1 < I_n < 1,0$ min.: $0,05 < I_n < 0,95$ adjustable	

Insulation

Rated surge voltage	4 000 V AC
Overvoltage category	III PN-EN 60664-1
Insulation pollution degree	2, if built-in 3 PN-EN 60664-1

General data

Electrical life	• resistive AC1	$\geq 2 \times 10^5$ 1 000 VA
Mechanical life (cycles)		$\geq 2 \times 10^7$
Dimensions (L x W x H)		87 x 17,5 x 60 mm
Weight		72 g
Ambient temperature	<ul style="list-style-type: none"> • storage, transport • operating 	-25...+70 °C -25...+55 °C PN-EN 60068-1
Housing protection category		IP 40
Relative humidity		15...85% PN-EN 60721-3-3 class 3K3
Shock resistance		15 g 11 ms PN-EN 60068-2-27
Vibration resistance		0,35 mm DA 10...55 Hz PN-EN 60068-2-6

Measuring circuit data

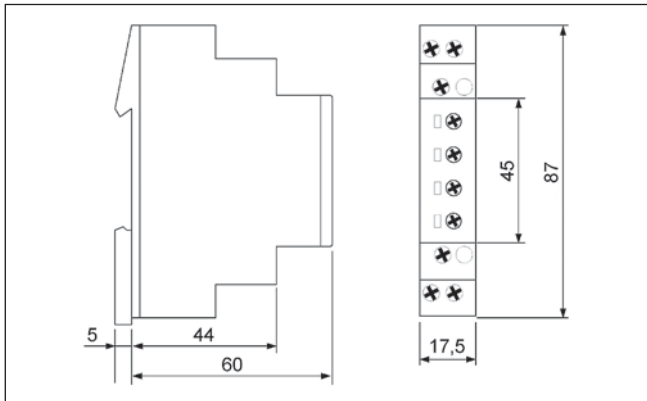
Functions	OVER, OVER+LATCH, UNDER, UNDER+LATCH, WIN, WIN+LATCH ❷ hysteresis mode and the possibility of setting the tripping delay
Time intervals (timing adjustment)	tripping delay (0,1...10 s)
Base accuracy	$\pm 5\%$ (calculate from final range value)
Setting accuracy	$\pm 5\%$ (calculate from final range value)
Repeatability	$\pm 2\%$
Temperature influence	$\pm 0,05\% / ^\circ\text{C}$
Recovery time	500 ms
LED indicator	green LED U/T ON - indication of supply voltage red LED ON/OFF - indication of failure ❸ red LED flashes - indication of tripping delay ❸ yellow LED R ON/OFF - indication of output relay

❶ With adjustable thresholds.

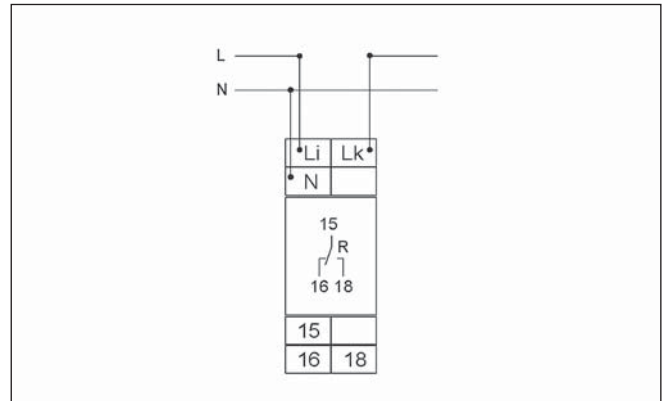
❷ Selectable by means of rotary switch.

❸ Of the corresponding threshold.

Dimensions



Connections diagram

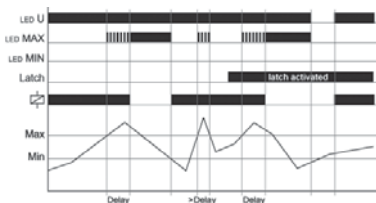


Mounting, mechanical design

Relays **MR-EI1W1P** are designed for direct mounting on 35 mm DIN rail mount, EN 50022. Mounting position: any. Self-extinguishing plastic housing, IP 40. Shockproof terminal connection according to VBG 4 (PZ1 required), IP 20. Maximum screw torque: 1,0 Nm. Terminal capacity: 1 x 0,5 do 2,5 mm² with/without multicore cable end, 1 x 4 mm² without multicore cable end, 2 x 0,5 do 1,5 mm² with/without multicore cable end, 2 x 2,5 mm² flexible without multicore cable end.

Functions

OVER, OVER+LATCH - overcurrent monitoring, overcurrent monitoring with fault latch

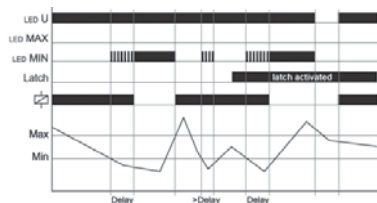


When the supply voltage U is applied, the output relay R switches into on-position, if the measured current is below the MAX-value. When the measured current exceeds the MAX-value, the output relay R switches into off-position after the interval of the tripping delay (Delay) has expired.

OVER: the output relay R switches into on-position again, if the current falls below the MIN-value.

OVER+LATCH: the output relay R switches only into on-position again by interrupting and re-applying of the supply voltage, provided that the measured current is below the MAX-value.

UNDER, UNDER+LATCH - undercurrent monitoring, undercurrent monitoring with fault latch

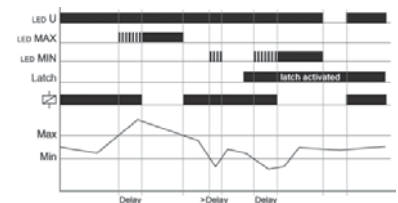


When the supply voltage U is applied, the output relay R switches into on-position, if the measured current is beyond the MIN-value. When the measured current falls below the MIN-value, the output relay R switches into off-position after the interval of the tripping delay (Delay) has expired.

UNDER: the output relay R switches into on-position again, if the current exceeds the MIN-value.

UNDER+LATCH: the output relay R switches only into on-position again by interrupting and re-applying of the supply voltage, provided that the measured current is beyond the MIN-value.

WIN, WIN+LATCH - current monitoring in windowfunction between MIN and MAX values, current monitoring in windowfunction between MIN and MAX values with fault latch



When the supply voltage U is applied, the output relay R switches into on-position, if the measured current is within the adjusted window. When the measured current leaves the window between MIN and MAX, the output relay R switches into off-position after the interval of the tripping delay (Delay) has expired.

WIN: the output relay R switches into on-position again, if the current re-enter the adjusted window.

WIN+LATCH: the output relay R switches only into on-position again by interrupting and re-applying of the supply voltage, provided that the measured current is within the threshold values.

U - supply voltage; R - output relay



NEW
product

- Monitoring of motor temperature
- The relay responds to short circuit or wire break ❶
- Test function with integrated Test/Reset key
- Rated isolated voltage on the sensor circuit up to 690 V
- 1 changeover contact: 1 C/O
- Rated load: 5 A / 250 V AC at cat. AC1
- Installation design: width 35 mm
- Recognitions, certifications, directives:

Type of relay

MR-ET1P

Output circuit

Number and type of contacts		1 C/O - changeover	
Rated load	AC1	5 A / 250 V AC	
Max. breaking capacity	AC1	1 250 VA	(thermal constant current 5 A)
Max. operating frequency		3 600 cycles/hour	PN-EN 60947-5-1
• at 100 VA resistive load		360 cycles/hour	
• at 1 000 VA resistive load			

Input circuit

Supply voltage U		230 V AC; terminals A1-A2	
Rated voltage U _n		230 V AC	
Drop-out voltage		AC: $\geq 0,3 U_n$	
Operating range of supply voltage		$0,85 < U_n < 1,1$	
Rated power consumption		1,3 VA / 1,0 W	
Rated frequency		AC: 48...63 Hz	
Duty cycle		100%	
Measuring circuit	<ul style="list-style-type: none"> • terminals • initial resistance • response value • release value • disconnection • measuring voltage T1-T2 	T1-T2 or T1-T3 $< 1,5 \text{ k}\Omega$ relay in OFF-position: $\geq 3,6 \text{ k}\Omega$ relay in ON-position: $\leq 1,65 \text{ k}\Omega$ short circuit thermistor: yes (T1-T2); no (T1-T3) $\leq 7,5 \text{ V}$ at $R \leq 4 \text{ k}\Omega$ PN-EN 60947-8	
Control contact	<ul style="list-style-type: none"> • function • loadable • max. line length • control pulse length • Reset 	connection of an external Reset key no R1-R2: 10 m (twisted pair) min. 50 ms contact 1 NO; terminals R1-R2 ❷	

Insulation

Rated surge voltage		6 000 V AC	
Overvoltage category		III PN-EN 60664-1	
Insulation pollution degree		2, if built-in 3 PN-EN 60664-1	

General data

Electrical life	• resistive AC1	$\geq 2 \times 10^5$ 1 000 VA	
Mechanical life (cycles)		$\geq 2 \times 10^7$	
Dimensions (L x W x H)		87 x 35 x 60 mm	
Weight		100 g	
Ambient temperature	<ul style="list-style-type: none"> • storage, transport • operating 	-25...+70 °C -25...+55 °C PN-EN 60068-1	
Housing protection category		IP40	
Relative humidity		15...85% PN-EN 60721-3-3 class 3K3	

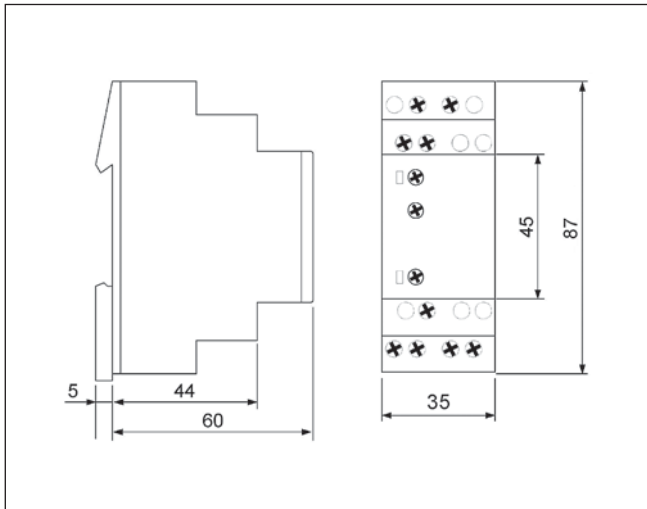
Measuring circuit data

Functions	monitoring of temperature of the motor winding (max. 6 PTC) with fault latch, for temperature sensors DIN 44081, short circuit monitoring of the thermistor line ❶, test function with integrated Test/Reset key	
Base accuracy	$\pm 5\%$ (calculate from final range value)	
Repeatability	$\pm 1\%$	
Temperature influence	$\pm 0,15\% / ^\circ\text{C}$	
Recovery time	250 ms	
Residual ripple to DC	50 ms	
LED indicator	green LED ON - indication of supply voltage red LED ON/OFF - indication of failure	

❶ Selectable by means of terminals.

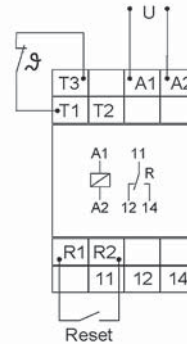
❷ Terminals R2-T2 are internal affiliated with each other.

Dimensions

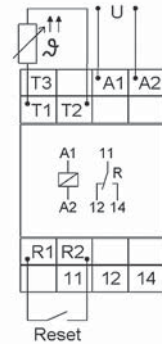


Connections diagrams

Temperature sensor monitoring



Thermal contact monitoring



Note: only one of this circuit versions (either monitoring of the temperature sensor or monitoring of the thermal contact) can be executed.

Mounting, mechanical design

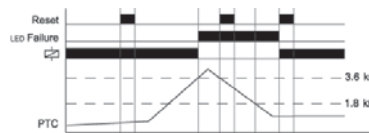
Relays **MR-ET1P** are designed for direct mounting on 35 mm DIN rail mount, EN 50022. Mounting position: any. Self-extinguishing plastic housing, IP 40. Shockproof terminal connection according to VBG 4 (PZ1 required), IP 20. Maximum screw torque: 1,0 Nm. Terminal capacity: 1 x 0,5 do 2,5 mm² with/without multicore cable end, 1 x 4 mm² without multicore cable end, 2 x 0,5 do 1,5 mm² with/without multicore cable end, 2 x 2,5 mm² flexible without multicore cable end.

Functions

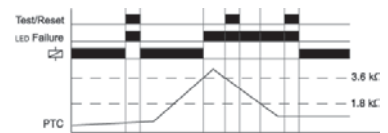
Monitoring of motor temperature with fault latch

If the supply voltage U is applied (green LED illuminated) and the cumulative resistance of the PTC-circuit is less than 3,6 k Ω (standard temperature of the motor), the output relay R switches into on-position. Pressing the Test/Reset key under this conditions forces the output relay R to switch into off-position. It remains in state as long as the Test/Reset key is pressed and thus the switching function can be checked in case of fault. The test function is not effective by using an external Reset key. When the cumulative resistance of the PTC-circuit exceeds 3,6 k Ω (at least one of the PTCs has reached the cut-off temperature), the output relay R switches into off-position (red LED illuminated). The output relay R switches into on-position again (red LED not illuminated), if the cumulative resistance drops below 1,65 k Ω by cooling down of the PTC and either a Reset key (internal or external) was pressed or the supply voltage was disconnected and re-applied.

Application of an external Reset key



Application of internal Test/Reset key



U - supply voltage; R - output relay



- AC/DC current monitoring in 1-phase mains ❶
- Multifunctions monitoring relays (16,6...400 Hz)
- Timing adjustment for start-up suppression time and tripping delay ❷
- Fault latch mode
- Relay supply via the supply transformer of TR2 type ❸ - see page 58
- 2 changeover contacts: 2 C/O
- Rated load: 5 A / 250 V AC at cat. AC1
- Installation design: width 22,5 mm
- Recognitions, certifications, directives:

Type of relay

MR-GI1M2P-TR2**Output circuit**

Number and type of contacts		2 C/O - changeover	
Rated load	AC1	5 A / 250 V AC	
Max. breaking capacity	AC1	1 250 VA	
Max. operating frequency		3 600 cycles/hour	PN-EN 60947-5-1
• at 100 VA resistive load		360 cycles/hour	
• at 1 000 VA resistive load			

Input circuit

Supply voltage U		12...400 V AC; terminals A1-A2 (galvanically separated) ❶	
Drop-out voltage		AC: $\geq 0,3 U_n$	
Operating range of supply voltage		as per the specification of TR2 supply transformer	
Rated power consumption		2,0 VA / 1,5 W	
Rated frequency		as per the specification of TR2 supply transformer	
Duty cycle		100%	
Measuring circuit	<ul style="list-style-type: none"> • terminals • measuring variable • measuring input • overload capacity • input resistance • switching threshold U_s 	0,1 A AC/DC: K-I1 1 A AC/DC: K-I2 10 A AC/DC: K-I3 (distance > 5 mm) DC or AC sinus, 16,6...400 Hz (frequency response: -10...+5%) 0,1-1-10 AAC/DC 0,1 A AC/DC: 0,8 A 1 A AC/DC: 3 A 10 A AC/DC: 12 A 0,1 A AC/DC: 470 mΩ 1 A AC/DC: 47 mΩ 10 A AC/DC: 5 mΩ max.: $0,1 < I_n < 1,0$ min.: $0,05 < I_n < 0,95$	

Insulation

Rated surge voltage	4 000 V AC
Overvoltage category	III PN-EN 60664-1
Insulation pollution degree	3 PN-EN 60664-1

General data

Electrical life	• resistive AC1	$\geq 2 \times 10^5$ 1 000 VA
Mechanical life (cycles)		$\geq 2 \times 10^7$
Dimensions (L x W x H)		90 x 22,5 x 103 mm
Weight		100 g
Ambient temperature	<ul style="list-style-type: none"> • storage, transport • operating 	-25...+70 °C
Housing protection category		IP 40
Relative humidity		15...85% PN-EN 60721-3-3 class 3K3
Shock resistance		15 g 11 ms PN-EN 60068-2-27
Vibration resistance		0,35 mm DA 10...55 Hz PN-EN 60068-2-6

Measuring circuit data

Functions	OVER, OVER+LATCH, UNDER, UNDER+LATCH, WIN, WIN+LATCH ❺ timing adjustment for start-up suppression time and tripping delay ❷
Time intervals (timing adjustment)	start-up suppression time (0...10 s) tripping delay (0,1...10 s)
Base accuracy	$\pm 5\%$ (calculate from final range value)
Setting accuracy	$\pm 5\%$ (calculate from final range value)
Repeatability	$\pm 2\%$
Temperature influence	$\pm 0,1\% / ^\circ\text{C}$
Recovery time	500 ms
LED indicator	green LED ON - indication of supply voltage green LED flashes - indication of start-up suppression time red LED ON/OFF - indication of failure ❻ red LED flashes - indication of tripping delay ❸ yellow LED ON/OFF - indication of output relay

❶ With adjustable threshold.

❷ Separately adjustable.

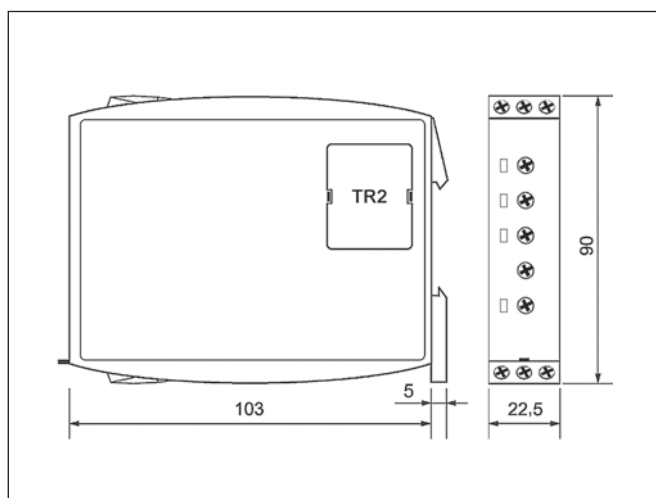
❸ TR2 transformers shall be ordered separately.

❹ Selectable via supply transformers TR2.

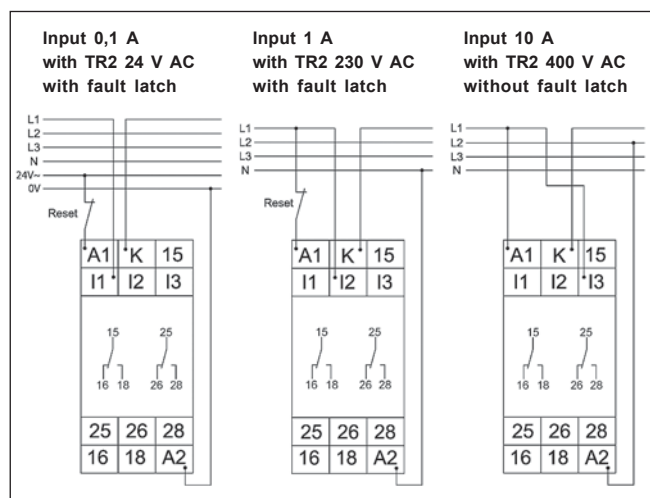
❺ Selectable by means of rotary switch.

❻ Of the corresponding threshold.

Dimensions



Connections diagrams



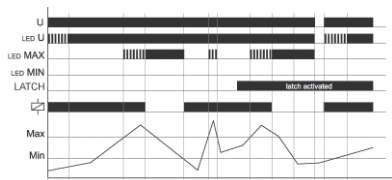
Mounting, mechanical design

Relays **MR-GI1M2P-TR2** are designed for direct mounting on 35 mm DIN rail mount, EN 50022. Mounting position: any. Self-extinguishing plastic housing, IP 40. Shockproof terminal connection according to VBG 4 (PZ1 required), IP 20. Maximum screw torque: 1,0 Nm. Terminal capacity: 1 x 0,5 do 2,5 mm² with/without multicore cable end, 1 x 4 mm² without multicore cable end, 2 x 0,5 do 1,5 mm² with/without multicore cable end, 2 x 2,5 mm² flexible without multicore cable end.

Functions

When the supply voltage U is applied, the output relay R switches into on-position (yellow LED illuminated) and the set interval of the start-up suppression (START) begins (green LED U flashes). Changes of the measured current during this period do not affect the state of the output relay R . After the interval has expired the green LED is illuminated steadily. For all the functions the LEDs MIN and MAX are flashing alternating, when the minimum value for the measured current was chosen to be greater than the maximum value.

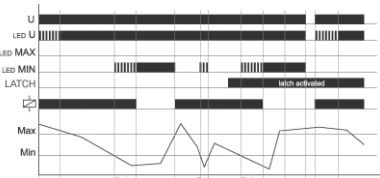
OVER, OVER+LATCH - overcurrent monitoring, overcurrent monitoring with fault latch



When the measured current exceeds the value adjusted at the MAX-regulator, the set interval of the tripping delay (Delay) begins (red LED MAX flashes). After the interval has expired (red LED MAX illuminated), the output relay R switches into off-position (yellow LED not illuminated). The output relay R again switches into on-position (yellow LED illuminated), when the measured current falls below the value adjusted at the MIN-regulator (red LED MAX not illuminated). If the fault latch is activated (OVER+LATCH) and the measured current remains above the MAX-value longer than the set interval of the tripping delay, the output relay R remains in the off-position even if the measured current falls below the value adjusted at the MIN-regulator. After resetting the failure (interrupting and re-applying the supply

voltage), the output relay R again switches into on-position and a new measuring cycle begins with the set interval of the start-up suppression (START).

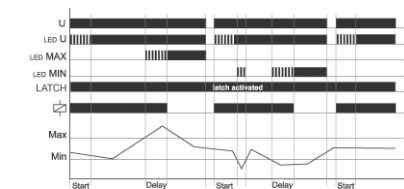
UNDER, UNDER+LATCH - undercurrent monitoring, undercurrent monitoring with fault latch



When the measured current falls below the value adjusted at the MIN-regulator, the set interval of the tripping delay (Delay) begins (red LED MIN flashes). After the interval has expired (red LED MIN illuminated), the output relay R switches into off-position (yellow LED not illuminated). The output relay R again switches into on-position (yellow LED illuminated), when the measured current exceeds the value adjusted at the MAX-regulator.

If the fault latch is activated (UNDER+LATCH) and the measured current remains below the MIN-value longer than the set interval of the tripping delay, the output relay R remains in the off-position even if the measured current exceeds the value adjusted at the MAX-regulator. After resetting the failure (interrupting and re-applying the supply voltage), the output relay R switches into on-position and a new measuring cycle begins with the set interval of the start-up suppression (START).

WIN, WIN+LATCH - current monitoring in windowfunction between MIN and MAX values, current monitoring in windowfunction between MIN and MAX values with fault latch



When the measured current exceeds the value adjusted at the MAX-regulator, the set interval of the tripping delay (Delay) begins (red LED MAX flashes). After the interval has expired (red LED MAX illuminated), the output relay R switches into off-position (yellow LED not illuminated). The output relay R again switches into on-position (yellow LED illuminated) when the measured current falls below the value adjusted at the MAX-regulator (red LED MAX not illuminated). When the measured current falls below the value adjusted at the MIN-regulator, the set interval of the tripping delay (Delay) begins again (red LED MIN flashes). After the interval has expired (red LED MIN illuminated), the output relay R switches into off-position (yellow LED not illuminated). If the fault latch is activated (WIN+LATCH) and the measured current remains below the MIN-value longer than the set interval of the tripping delay, the output relay R remains in the off-position even if the measured current exceeds the value adjusted at the MIN-regulator. If the measured current remains above the MAX-value longer than the set interval of the tripping delay, the output relay R remains in the off-position even if the measured current falls below the value adjusted at the MAX-regulator. After resetting the failure (interrupting and re-applying the supply voltage), the output relay R switches into on-position and a new measuring cycle begins with the set interval of the start-up suppression (START).



- Current monitoring in 3-phase mains ❶
- Multifunctions monitoring relays
- Timing adjustment for start-up suppression time and tripping delay ❷
- Fault latch mode
- Relay supply via the supply transformer of TR2 type ❸ - see page 58
- 2 changeover contacts: 2 C/O
- Rated load: 5 A / 250 V AC at cat. AC1
- Installation design: width 22,5 mm
- Recognitions, certifications, directives:

Type of relay

MR-GI3M2P-TR2

Output circuit

Number and type of contacts		2 C/O - changeover	
Rated load	AC1	5 A / 250 V AC	
Max. breaking capacity	AC1	1 250 VA	
Max. operating frequency		3 600 cycles/hour	PN-EN 60947-5-1
• at 100 VA resistive load		360 cycles/hour	
• at 1 000 VA resistive load			

Input circuit

Supply voltage U		12...400 V AC; terminals A1-A2 (galvanically separated) ❶	
Drop-out voltage		AC: $\geq 0,3 U_n$	
Operating range of supply voltage		as per the specification of TR2 supply transformer	
Rated power consumption		2,0 VA / 1,5 W	
Rated frequency		as per the specification of TR2 supply transformer	
Duty cycle		100%	
Measuring circuit	<ul style="list-style-type: none"> • terminals • measuring variable • measuring input • overload capacity • input resistance • switching threshold U_s 	K-I1 or K-I2 or K-I3 (distance > 5 mm) AC sinus, 48...63 Hz 5 AAC 6 AAC 10 m Ω max.: $0,1 < I_n < 1,0$ min.: $0,05 < I_n < 0,95$	

Insulation

Rated surge voltage	4 000 V AC
Overvoltage category	III PN-EN 60664-1
Insulation pollution degree	3 PN-EN 60664-1

General data

Electrical life	• resistive AC1	$\geq 2 \times 10^5$ 1 000 VA
Mechanical life (cycles)		$\geq 2 \times 10^7$
Dimensions (L x W x H)		90 x 22,5 x 103 mm
Weight		100 g
Ambient temperature	<ul style="list-style-type: none"> • storage, transport • operating 	-25...+70 °C -25...+55 °C PN-EN 60068-1 -25...+40 °C UL 508
Housing protection category		IP40
Relative humidity		15...85% PN-EN 60721-3-3 class 3K3
Shock resistance		15 g 11 ms PN-EN 60068-2-27
Vibration resistance		0,35 mm DA 10...55 Hz PN-EN 60068-2-6

Measuring circuit data

Functions	OVER, OVER+LATCH, UNDER, UNDER+LATCH, WIN, WIN+LATCH ❺ timing adjustment for start-up suppression time and tripping delay ❷
Time intervals (timing adjustment)	start-up suppression time (0...10 s) tripping delay (0,1...10 s)
Base accuracy	$\pm 5\%$ (calculate from final range value)
Setting accuracy	$\pm 5\%$ (calculate from final range value)
Repeatability	$\pm 2\%$
Temperature influence	$\pm 0,1\% / ^\circ\text{C}$
Recovery time	100 ms
LED indicator	green LED ON - indication of supply voltage red LED ON/OFF - indication of failure ❸ red LED flashes - indication of tripping delay ❹ yellow LED ON/OFF - indication of output relay

❶ With adjustable threshold.

❷ Separately adjustable.

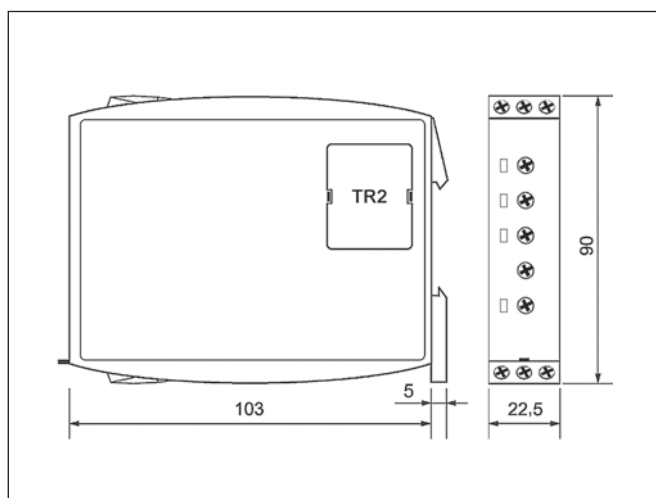
❸ TR2 transformers shall be ordered separately.

❹ Selectable via supply transformers TR2.

❺ Selectable by means of rotary switch.

❻ Of the corresponding threshold.

Dimensions



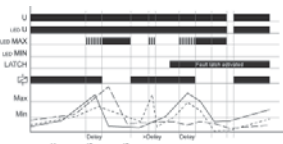
Mounting, mechanical design

Relays **MR-GI1M2P-TR2** are designed for direct mounting on 35 mm DIN rail mount, EN 50022. Mounting position: any. Self-extinguishing plastic housing, IP 40. Shockproof terminal connection according to VBG 4 (PZ1 required), IP 20. Maximum screw torque: 1,0 Nm. Terminal capacity: 1 x 0,5 do 2,5 mm² with/without multicore cable end, 1 x 4 mm² without multicore cable end, 2 x 0,5 do 1,5 mm² with/without multicore cable end, 2 x 2,5 mm² flexible without multicore cable end.

Functions

For all functions the LED's MIN and MAX are flashing alternating, when the minimum value for the measured current was chosen to be greater than the maximum value. If a failure already exists, when the device is activated, the output relay R remains in off-position and the LED for the corresponding threshold is illuminated.

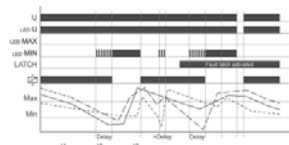
OVER, OVER+LATCH - overcurrent monitoring, overcurrent monitoring with fault latch



When the measured current of one of the phases exceeds the value adjusted at the MAX-regulator, the set interval of the tripping delay (Delay) begins (red LED MAX flashes). After the interval has expired (red LED MAX illuminated), the output relay R switches into off-position (yellow LED not illuminated). The output relay R again switches into on-position (yellow LED illuminated), when the measured current of all the phases falls below the value adjusted at the MIN-regulator (red LED MAX not illuminated).

If the fault latch is activated (OVER+LATCH) and the measured current of one of the phases remains above the MAX-value longer than the set interval of the tripping delay, the output relay R remains in the off-position even if the measured current of all the phases falls below the value adjusted at the MIN-regulator. After resetting the failure (interrupting and re-applying the supply voltage), the output relay R switches into on-position and a new measuring cycle begins with the set interval of the start-up suppression (START).

UNDER, UNDER+LATCH - undercurrent monitoring, undercurrent monitoring with fault latch



When the measured current of one of the phases falls below the value adjusted at the MIN-regulator, the set interval of the tripping delay (Delay) begins (red LED MIN flashes). After the interval has expired (red LED MIN illuminated), the output relay R switches into off-position (yellow LED not illuminated). The output relay R again switches into on-position (yellow LED illuminated), when the measured current of all the phases exceeds the value adjusted at the MAX-regulator.

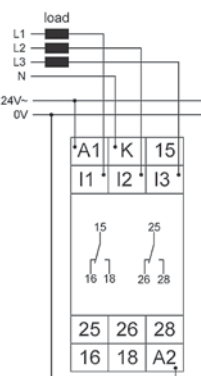
If the fault latch is activated (UNDER+LATCH) and the measured current of one of the phases remains below the MIN-value longer than the set interval of the tripping delay, the output relay R remains in the off-position even if the measured current of all the phases exceeds the value adjusted at the MAX-regulator. After resetting the failure (interrupting and re-applying the supply voltage), the output relay R switches into on-position and a new measuring cycle begins with the set interval of the start-up suppression (START).

WIN, WIN+LATCH - current monitoring in windowfunction between MIN and MAX values, current monitoring in windowfunction between MIN and MAX values with fault latch

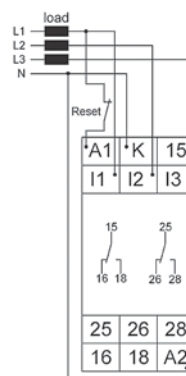
The output relay R switches into on-position (yellow LED illuminated) when the measured current of all the phases exceeds the value adjusted at the

Connections diagrams

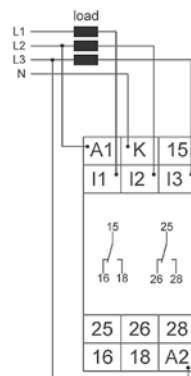
Input 5 A with TR2 24 V AC without fault latch



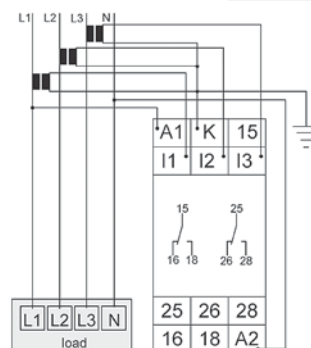
Input 5 A with TR2 230 V AC with fault latch



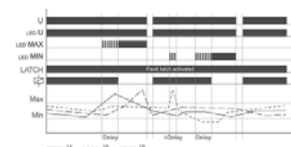
Input 5 A with TR2 400 V AC without fault latch



Input 5 A with TR2 230 V AC and current transformer



MIN-regulator. When the measured current of one of the phases exceeds the value adjusted at the MAX-regulator, the set interval of the tripping delay (Delay) begins (red LED MAX flashes). After the interval has expired (red LED MAX illuminated), the output relay R switches into off-position (yellow LED not illuminated). The output relay R again switches into on-position (yellow LED illuminated) when the measured current of all the phases falls below the value adjusted at the MAX-regulator (red LED MAX not illuminated). When the measured current of one of the phases falls below the value adjusted at the MIN-regulator, the set interval of the tripping delay (Delay) begins again (red LED MIN flashes). After the interval has expired (red LED MIN illuminated), the output relay R switches into off-position (yellow LED not illuminated).



If the fault latch is activated (WIN+LATCH) and the measured current of one of the phases remains below the MIN-value longer than the set interval of the tripping delay, the output relay R remains in the off-position even if the measured current of all the phases exceeds the value adjusted at the MIN-regulator. If the measured current of one of the phases remains above the MAX-value longer than the set interval of the tripping delay, the output relay R remains in the off-position even if the measured current of all the phases falls below the value adjusted at the MAX-regulator. After resetting the failure (interrupting and re-applying the supply voltage), the output relay R switches into on-position and a new measuring cycle begins with the set interval of the start-up suppression (START).



- AC/DC voltage monitoring in 1-phase mains ❶
- Frequency of supply voltage (16,6...400 Hz)
- Timing adjustment for start-up suppression time and tripping delay ❷
- Fault latch mode
- Relay supply via the supply transformer of TR2 type ❸ - see page 58
- 2 changeover contacts: 2 C/O
- Rated load: 5 A / 250 V AC at cat. AC1
- Installation design: width 22,5 mm
- Recognitions, certifications, directives:

Type of relay

MR-GU1M2P-TR2

Output circuit

Number and type of contacts		2 C/O - changeover	
Rated load	AC1	5 A / 250 V AC	
Max. breaking capacity	AC1	1 250 VA	
Max. operating frequency		3 600 cycles/hour	PN-EN 60947-5-1
• at 100 VA resistive load		360 cycles/hour	
• at 1 000 VA resistive load			

Input circuit

Supply voltage U	12...400 V AC; terminals A1-A2 (galvanically separated) ❶
Drop-out voltage	AC: $\geq 0,3 U_n$
Operating range of supply voltage	as per the specification of TR2 supply transformer
Rated power consumption	2,0 VA / 1,5 W
Rated frequency	as per the specification of TR2 supply transformer
Duty cycle	100%
Measuring circuit	<ul style="list-style-type: none"> • fusing • terminals • measuring variable • measuring input • overload capacity • input resistance • switching threshold U_s
	max. 20 A UL 508 30 V AC/DC: E-F1 60 V AC/DC: E-F2 300 V AC/DC: E-F3 DC or AC sinus, 16,6...400 Hz (frequency response: -10...+5%) 30-60-300 V AC/DC 30 V AC/DC: 100 V _{eff} 60 V AC/DC: 150 V _{eff} 300 V AC/DC: 440 V _{eff} 60 V AC/DC: 47 k Ω 60 V AC/DC: 100 k Ω 300 V AC/DC: 470 k Ω max.: $0,1 < U_n < 1,0$ min.: $0,05 < U_n < 0,95$

Insulation

Rated surge voltage	4 000 V AC
Overvoltage category	III PN-EN 60664-1
Insulation pollution degree	3 PN-EN 60664-1

General data

Electrical life	• resistive AC1	$\geq 2 \times 10^5$ 1 000 VA
Mechanical life (cycles)		$\geq 2 \times 10^7$
Dimensions (L x W x H)		90 x 22,5 x 103 mm
Weight		100 g
Ambient temperature	• storage, transport • operating	-25...+70 °C -25...+55 °C PN-EN 60068-1 -25...+40 °C UL 508
Housing protection category		IP40
Relative humidity		15...85% PN-EN 60721-3-3 class 3K3
Shock resistance		15 g 11 ms PN-EN 60068-2-27
Vibration resistance		0,35 mm DA 10...55 Hz PN-EN 60068-2-6

Measuring circuit data

Functions	OVER, OVER+LATCH, UNDER, UNDER+LATCH, WIN, WIN+LATCH ❺ timing adjustment for start-up suppression time and tripping delay ❷
Time intervals (timing adjustment)	start-up suppression time (0...10 s) tripping delay (0,1...10 s)
Base accuracy	$\pm 5\%$ (calculate from final range value)
Setting accuracy	$\pm 5\%$ (calculate from final range value)
Repeatability	$\pm 2\%$
Wpływ napięcia	$\pm 0,5\%$
Temperature influence	$\pm 0,1\% / ^\circ\text{C}$
Recovery time	500 ms
LED indicator	green LED ON - indication of supply voltage green LED flashes - indication of start-up suppression time red LED ON/OFF - indication of failure ❸ red LED flashes - indication of tripping delay ❸ yellow LED ON/OFF - indication of output relay

❶ With adjustable thresholds.

❷ Separately adjustable.

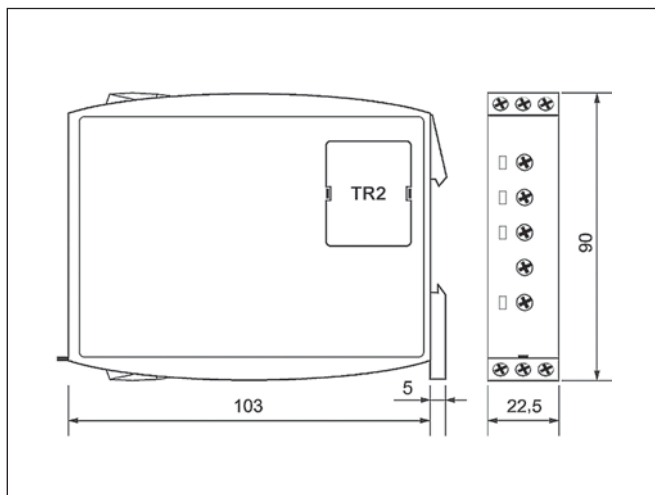
❸ TR2 transformers shall be ordered separately.

❹ Selectable via supply transformers TR2.

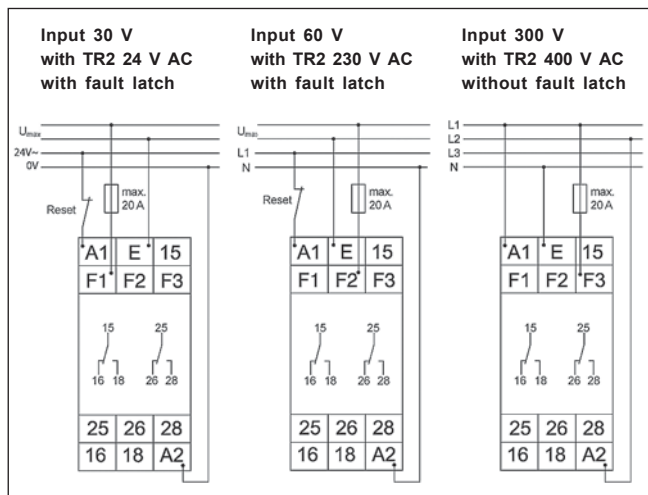
❺ Selectable by means of rotary switch.

❻ Of the corresponding threshold.

Dimensions



Connections diagrams



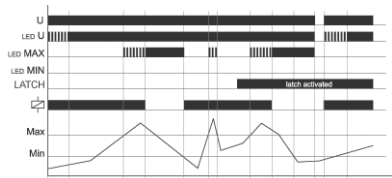
Mounting, mechanical design

Relays **MR-GU1M2P-TR2** are designed for direct mounting on 35 mm DIN rail mount, EN 50022. Mounting position: any. Self-extinguishing plastic housing, IP 40. Shockproof terminal connection according to VBG 4 (PZ1 required), IP 20. Maximum screw torque: 1,0 Nm. Terminal capacity: 1 x 0,5 do 2,5 mm² with/without multicore cable end, 1 x 4 mm² without multicore cable end, 2 x 0,5 do 1,5 mm² with/without multicore cable end, 2 x 2,5 mm² flexible without multicore cable end.

Functions

When the supply voltage U is applied, the output relay R switches into on-position (yellow LED illuminated) and the set interval of the start-up suppression (START) begins (green LED U flashes). Changes of the measured voltage during this period do not affect the state of the output relay R . After the interval has expired the green LED is illuminated steadily. For all the functions the LEDs MIN and MAX are flashing alternating, when the minimum value for the measured voltage was chosen to be greater than the maximum value.

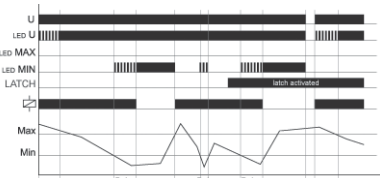
OVER, OVER+LATCH - overvoltage monitoring, overvoltage monitoring with fault latch



When the measured voltage exceeds the value adjusted at the MAX-regulator, the set interval of the tripping delay (Delay) begins (red LED MAX flashes). After the interval has expired (red LED MAX illuminated), the output relay R switches into off-position (yellow LED not illuminated). The output relay R again switches into on-position (yellow LED illuminated), when the measured voltage falls below the value adjusted at the MIN-regulator (red LED MAX not illuminated). If the fault latch is activated (OVER+LATCH) and the measured voltage remains above the MAX-value longer than the set interval of the tripping delay, the output relay R remains in the off-position even if the measured voltage falls below the value adjusted at the MIN-regulator. After resetting the failure (interrupting and re-applying the supply

voltage), the output relay R again switches into on-position and a new measuring cycle begins with the set interval of the start-up suppression (START).

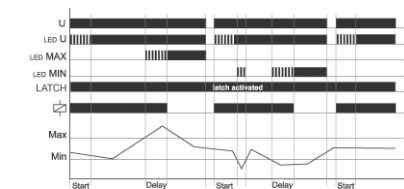
UNDER, UNDER+LATCH - undervoltage monitoring, undervoltage monitoring with fault latch



When the measured voltage falls below the value adjusted at the MIN-regulator, the set interval of the tripping delay (Delay) begins (red LED MIN flashes). After the interval has expired (red LED MIN illuminated), the output relay R switches into off-position (yellow LED not illuminated). The output relay R again switches into on-position (yellow LED illuminated), when the measured voltage exceeds the value adjusted at the MAX-regulator.

If the fault latch is activated (UNDER+LATCH) and the measured voltage remains below the MIN-value longer than the set interval of the tripping delay, the output relay R remains in the off-position even if the measured voltage exceeds the value adjusted at the MAX-regulator. After resetting the failure (interrupting and re-applying the supply voltage), the output relay R switches into on-position and a new measuring cycle begins with the set interval of the start-up suppression (START).

WIN, WIN+LATCH - voltage monitoring in windowfunction between MIN and MAX values, voltage monitoring in windowfunction between MIN and MAX values with fault latch



When the measured voltage exceeds the value adjusted at the MAX-regulator, the set interval of the tripping delay (Delay) begins (red LED MAX flashes). After the interval has expired (red LED MAX illuminated), the output relay R switches into off-position (yellow LED not illuminated). The output relay R again switches into on-position (yellow LED illuminated) when the measured voltage falls below the value adjusted at the MAX-regulator (red LED MAX not illuminated). When the measured voltage falls below the value adjusted at the MIN-regulator, the set interval of the tripping delay (Delay) begins again (red LED MIN flashes). After the interval has expired (red LED MIN illuminated), the output relay R switches into off-position (yellow LED not illuminated). If the fault latch is activated (WIN+LATCH) and the measured voltage remains below the MIN-value longer than the set interval of the tripping delay, the output relay R remains in the off-position even if the measured voltage exceeds the value adjusted at the MIN-regulator. If the measured voltage remains above the MAX-value longer than the set interval of the tripping delay, the output relay R remains in the off-position even if the measured voltage falls below the value adjusted at the MAX-regulator. After resetting the failure (interrupting and re-applying the supply voltage), the output relay R switches into on-position and a new measuring cycle begins with the set interval of the start-up suppression (START).

U - supply voltage; R - output relay



NEW
product

- Voltage monitoring in 3-phase mains ❶
- Multifunctions monitoring relays • Timing adjustment for tripping delay ❷
- Fault latch mode
- Connection of neutral wire necessary
- Relay supply via the supply transformer of TR2 type ❸ - see page 58
- 2 changeover contacts: 2 C/O
- Rated load: 5 A / 250 V AC at cat. AC1
- Installation design: width 22,5 mm
- Recognitions, certifications, directives: **CE**

Type of relay

MR-GU32P-TR2

Output circuit

Number and type of contacts		2 C/O - changeover	
Rated load	AC1	5 A / 250 V AC	
Max. breaking capacity	AC1	1 250 VA	
Max. operating frequency		3 600 cycles/hour	PN-EN 60947-5-1
• at 100 VA resistive load		360 cycles/hour	
• at 1 000 VA resistive load			

Input circuit

Supply voltage U		12...400 V AC; terminals A1-A2 (galvanically separated) ❶	
Drop-out voltage		AC: $\geq 0,3 U_n$	
Operating range of supply voltage		as per the specification of TR2 supply transformer	
Rated power consumption		2,0 VA / 1,5 W	
Rated frequency		as per the specification of TR2 supply transformer	
Duty cycle		100%	
Measuring circuit	<ul style="list-style-type: none"> • fusing • terminals • measuring variable • measuring input • overload capacity • input resistance • switching threshold U_s 	max. 20 A UL 508 (N)-L1 or (N)-L2 or (N)-L3 AC sinus, 48...63 Hz 230 V AC 440 V AC 3(N)-400/230 V: 470 k Ω max.: $-0,2 < U_n < 0,3$ min.: $-0,3 < U_n < 0,2$	

Insulation

Rated surge voltage	4 000 V AC
Overvoltage category	III PN-EN 60664-1
Insulation pollution degree	3 PN-EN 60664-1

General data

Electrical life	• resistive AC1	$\geq 2 \times 10^5$ 1 000 VA
Mechanical life (cycles)		$\geq 2 \times 10^7$
Dimensions (L x W x H)		90 x 22,5 x 103 mm
Weight		100 g
Ambient temperature	<ul style="list-style-type: none"> • storage, transport • operating 	-25...+70 °C -25...+55 °C PN-EN 60068-1 -25...+40 °C UL 508
Housing protection category		IP40
Relative humidity		15...85% PN-EN 60721-3-3 class 3K3
Shock resistance		15 g 11 ms PN-EN 60068-2-27
Vibration resistance		0,35 mm DA 10...55 Hz PN-EN 60068-2-6

Measuring circuit data

Functions	OVER, OVER+LATCH, UNDER, UNDER+LATCH, WIN, WIN+LATCH ❺
Time intervals (timing adjustment)	timing adjustment for tripping delay ❷
Base accuracy	tripping delay (0,1...10 s)
Setting accuracy	$\pm 5\%$ (calculate from final range value)
Repeatability	$\pm 5\%$ (calculate from final range value)
Temperature influence	$\pm 2\%$
Recovery time	$\pm 0,1\% / ^\circ\text{C}$
LED indicator	100 ms
	green LED ON - indication of supply voltage
	red LED ON/OFF - indication of failure ❻
	red LED flashes - indication of tripping delay ❸
	yellow LED ON/OFF - indication of output relay

❶ With adjustable thresholds.

❷ Adjustable.

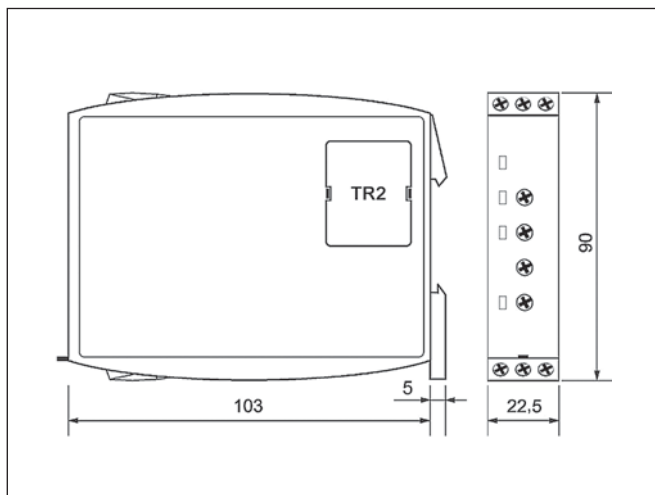
❸ TR2 transformers shall be ordered separately.

❹ Selectable via supply transformers TR2.

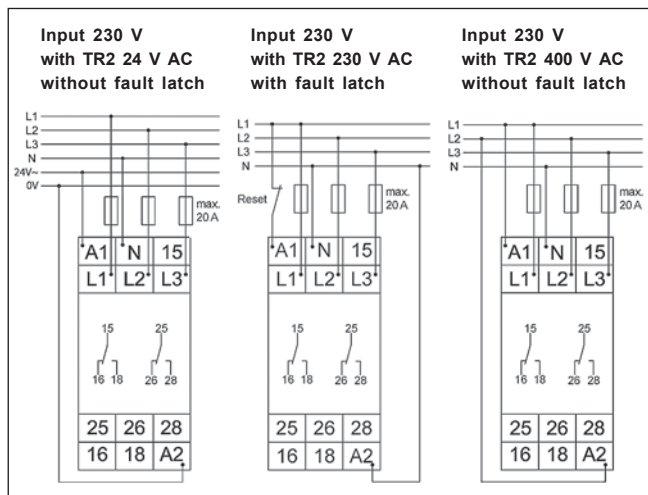
❺ Selectable by means of rotary switch.

❻ Of the corresponding threshold.

Dimensions



Connections diagrams



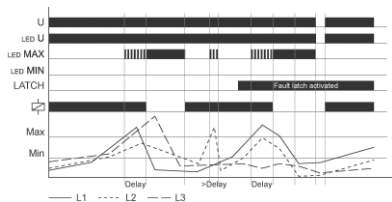
Mounting, mechanical design

Relays **MR-GU32P-TR2** are designed for direct mounting on 35 mm DIN rail mount, EN 50022. Mounting position: any. Self-extinguishing plastic housing, IP 40. Shockproof terminal connection according to VBG 4 (PZ1 required), IP 20. Maximum screw torque: 1,0 Nm. Terminal capacity: 1 x 0,5 do 2,5 mm² with/without multicore cable end, 1 x 4 mm² without multicore cable end, 2 x 0,5 do 1,5 mm² with/without multicore cable end, 2 x 2,5 mm² flexible without multicore cable end.

Functions

For all functions the LED's MIN and MAX are flashing alternating, when the minimum value for the measured voltage was chosen to be greater than the maximum value. If a failure already exists, when the device is activated, the output relay R remains in off-position and the LED for the corresponding threshold is illuminated.

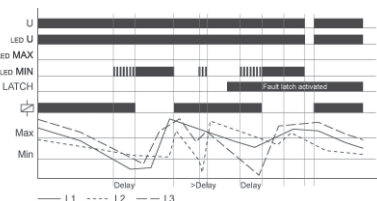
OVER, OVER+LATCH - overvoltage monitoring, overvoltage monitoring with fault latch



When the measured voltage of one of the phases exceeds the value adjusted at the MAX-regulator, the set interval of the tripping delay (Delay) begins (red LED MAX flashes). After the interval has expired (red LED MAX illuminated), the output relay R switches into off-position (yellow LED not illuminated). The output relay R again switches into on-position (yellow LED illuminated), when the measured voltage of all the phases falls below the value adjusted at the MIN-regulator (red LED MAX not illuminated).

If the fault latch is activated (OVER+LATCH) and the measured voltage of one of the phases remains above the MAX-value longer than the set interval of the tripping delay, the output relay R remains in the off-position even if the measured voltage of all the phases falls below the value adjusted at the MIN-regulator. After resetting the failure (interrupting and re-applying the supply voltage), the output relay R switches into on-position and a new measuring cycle begins with the set interval of the start-up suppression (START).

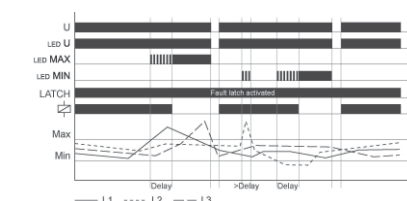
UNDER, UNDER+LATCH - undervoltage monitoring, undervoltage monitoring with fault latch



When the measured voltage of one of the phases falls below the value adjusted at the MIN-regulator, the set interval of the tripping delay (Delay) begins (red LED MIN flashes). After the interval has expired (red LED MIN illuminated), the output relay R switches into off-position (yellow LED not illuminated). The output relay R again switches into on-position (yellow LED illuminated), when the measured voltage of all the phases exceeds the value adjusted at the MAX-regulator.

If the fault latch is activated (UNDER+LATCH) and the measured voltage of one of the phases remains below the MIN-value longer than the set interval of the tripping delay, the output relay R remains in the off-position even if the measured voltage of all the phases exceeds the value adjusted at the MAX-regulator. After resetting the failure (interrupting and re-applying the supply voltage), the output relay R switches into on-position and a new measuring cycle begins with the set interval of the start-up suppression (START).

WIN, WIN+LATCH - voltage monitoring in windowfunction between MIN and MAX values, voltage monitoring in windowfunction between MIN and MAX values with fault latch



The output relay R switches into on-position (yellow LED illuminated) when the measured voltage of all the phases exceeds the value adjusted at the MIN-regulator. When the measured voltage of one of the phases exceeds the value adjusted at the MAX-regulator, the set interval of the tripping delay (Delay) begins (red LED MAX flashes). After the interval has expired (red LED MAX illuminated), the output relay R switches into off-position (yellow LED not illuminated). The output relay R again switches into on-position (yellow LED illuminated) when the measured voltage of all the phases falls below the value adjusted at the MAX-regulator (red LED MAX not illuminated). When the measured voltage of one of the phases falls below the value adjusted at the MIN-regulator, the set interval of the tripping delay (Delay) begins again (red LED MIN flashes). After the interval has expired (red LED MIN illuminated), the output relay R switches into off-position (yellow LED not illuminated).

If the fault latch is activated (WIN+LATCH) and the measured voltage of one of the phases remains below the MIN-value longer than the set interval of the tripping delay, the output relay R remains in the off-position even if the measured voltage of all the phases exceeds the value adjusted at the MIN-regulator. If the measured voltage of one of the phases remains above the MAX-value longer than the set interval of the tripping delay, the output relay R remains in the off-position even if the measured voltage of all the phases falls below the value adjusted at the MAX-regulator. After resetting the failure (interrupting and re-applying the supply voltage), the output relay R switches into on-position and a new measuring cycle begins with the set interval of the start-up suppression (START).

U - supply voltage; R - output relay



- Voltage monitoring in 3-phase mains ❶ • Multifunctions monitoring relays
- Monitoring of phase sequence, phase failure and asymmetry ❷
- Timing adjustment for tripping delay ❸
- Connection of neutral wire optional, detection of loss of neutral wire
- Relay supply via the supply transformer of TR2 type ❹ - see page 58
- 2 changeover contacts: 2 C/O
- Rated load: 5 A / 250 V AC at cat. AC1
- Installation design: width 22,5 mm
- Recognitions, certifications, directives: CE

Type of relay

MR-GU3M2P-TR2

Output circuit

Number and type of contacts		2 C/O - changeover	
Rated load	AC1	5 A / 250 V AC	
Max. breaking capacity	AC1	1 250 VA	
Max. operating frequency		3 600 cycles/hour	PN-EN 60947-5-1
• at 100 VA resistive load		360 cycles/hour	
• at 1 000 VA resistive load			

Input circuit

Supply voltage U		12...400 V AC; terminals A1-A2 (galvanically separated) ❶	
Drop-out voltage		AC: $\geq 0,3 U_n$	
Operating range of supply voltage		as per the specification of TR2 supply transformer	
Rated power consumption		2,0 VA / 1,5 W	
Rated frequency		as per the specification of TR2 supply transformer	
Duty cycle		100%	
Measuring circuit	<ul style="list-style-type: none"> • fusing • terminals • measuring variable • measuring input • overload capacity • input resistance • switching threshold U_s • asymmetry 	max. 20 A UL 508 (N)-L1-L2-L3 AC sinus, 48...63 Hz 3(N)-400/230 V 3(N)-600/346 V 3(N)-400/230 V: 1 M Ω max.: $-0,2 < U_n < 0,3$ min.: $-0,3 < U_n < 0,2$ 5...25%	

Insulation

Rated surge voltage	4 000 V AC
Overvoltage category	III PN-EN 60664-1
Insulation pollution degree	3 PN-EN 60664-1

General data

Electrical life	• resistive AC1	$\geq 2 \times 10^5$ 1 000 VA
Mechanical life (cycles)		$\geq 2 \times 10^7$
Dimensions (L x W x H)		90 x 22,5 x 103 mm
Weight		100 g
Ambient temperature	<ul style="list-style-type: none"> • storage, transport • operating 	-25...+70 °C -25...+55 °C PN-EN 60068-1 -25...+40 °C UL 508
Housing protection category		IP40
Relative humidity		15...85% PN-EN 60721-3-3 class 3K3
Shock resistance		15 g 11 ms PN-EN 60068-2-27
Vibration resistance		0,35 mm DA 10...55 Hz PN-EN 60068-2-6

Measuring circuit data

Functions	UNDER, UNDER+SEQ, WIN, WIN+SEQ ❶ monitoring of phase sequence, phase failure and asymmetry ❷ timing adjustment for tripping delay ❸
Time intervals (timing adjustment)	tripping delay (0,1...10 s)
Base accuracy	$\pm 5\%$ (calculate from final range value)
Setting accuracy	$\pm 5\%$ (calculate from final range value)
Repeatability	$\pm 2\%$
Wpływ napięcia	$\pm 0,5\%$
Temperature influence	$\pm 0,1\%$ / °C
Recovery time	500 ms
LED indicator	red LED ON/OFF - indication of failure ❷ red LED flashes - indication of tripping delay ❷ yellow LED ON/OFF - indication of output relay

❶ With adjustable thresholds. ❷ Asymmetry - with adjustable threshold.

❸ Adjustable.

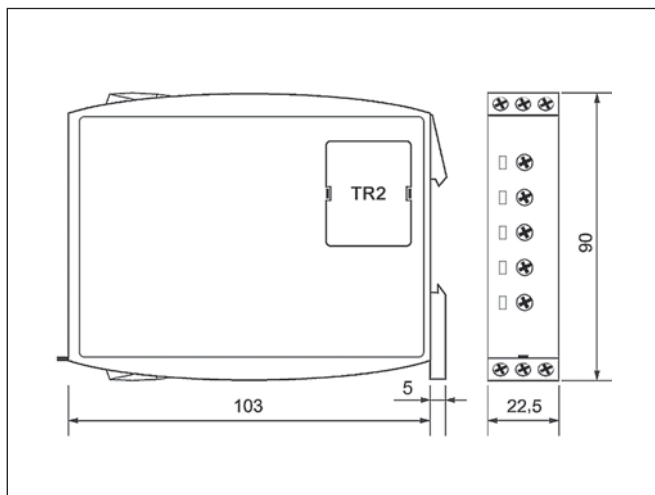
❹ TR2 transformers shall be ordered separately.

❺ Selectable via supply transformers TR2.

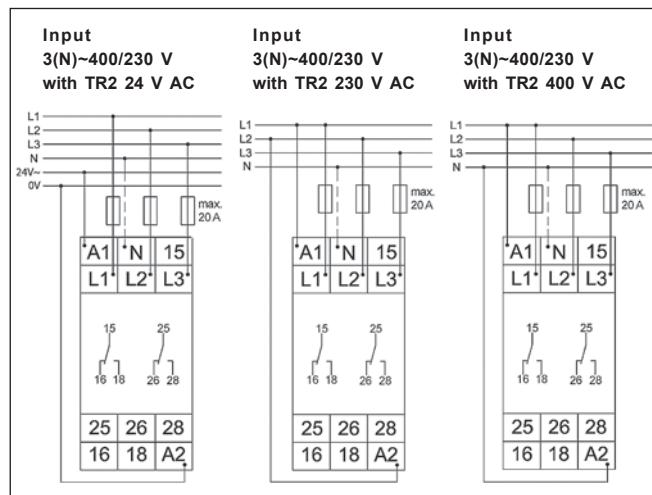
❻ Selectable by means of rotary switch.

❼ Of the corresponding threshold.

Dimensions



Connections diagrams



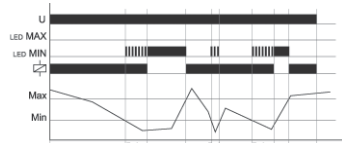
Mounting, mechanical design

Relays **MR-GU3M2P-TR2** are designed for direct mounting on 35 mm DIN rail mount, EN 50022. Mounting position: any. Self-extinguishing plastic housing, IP 40. Shockproof terminal connection according to VBG 4 (PZ1 required), IP 20. Maximum screw torque: 1,0 Nm. Terminal capacity: 1 x 0,5 do 2,5 mm² with/without multicore cable end, 1 x 4 mm² without multicore cable end, 2 x 0,5 do 1,5 mm² with/without multicore cable end, 2 x 2,5 mm² flexible without multicore cable end.

Functions

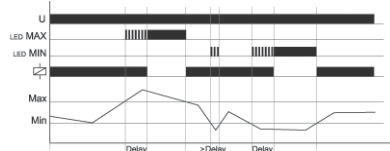
For all functions the LED's MIN and MAX are flashing alternating, when the minimum value for the measured voltage was chosen to be greater than the maximum value. If a failure already exists, when the device is activated, the output relay R remains in off-position and the LED for the corresponding threshold is illuminated.

UNDER, UNDER+SEQ - undervoltage monitoring, undervoltage monitoring and monitoring of phase sequence



When the measured voltage (mean value of phase-to-phase voltages) falls below the value adjusted at the MIN-regulator, the set interval of the tripping delay (Delay) begins (red LED MIN flashes). After the interval has expired (red LED MIN illuminated), the output relay R switches into off-position (yellow LED not illuminated). The output relay R again switches into on-position (yellow LED illuminated), when the measured voltage exceeds the value adjusted at the MAX-regulator.

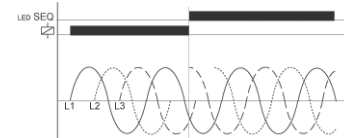
WIN, WIN+SEQ - voltage monitoring in window-function between MIN and MAX values, voltage monitoring in window-function between MIN and MAX values and monitoring of phase sequence



The output relay R switches into on-position (yellow LED illuminated) when the measured voltage (mean value of phase-to-phase voltages) exceeds the value adjusted at the MIN-regulator.

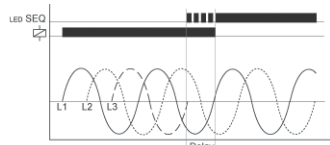
When the measured voltage exceeds the value adjusted at the MAX-regulator, the set interval of the tripping delay (Delay) begins (red LED MAX flashes). After the interval has expired (red LED MAX illuminated), the output relay R switches into off-position (yellow LED not illuminated). The output relay R again switches into on-position (yellow LED illuminated) when the measured voltage falls below the value adjusted at the MAX-regulator. When the measured voltage falls below the value adjusted at the MIN-regulator, the set interval of the tripping delay (Delay) begins again (red LED MIN flashes). After the interval has expired (red LED MIN illuminated), the output relay R switches into off-position (yellow LED not illuminated).

SEQ - phase sequence monitoring



Phase sequence monitoring is selectable for all functions. If a change in phase sequence is detected (red LED SEQ illuminated), the output relay R switches into off-position immediately (yellow LED not illuminated).

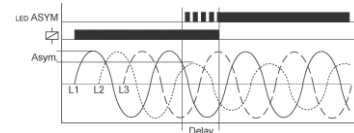
SEQ - phase failure monitoring



If one of the phase voltages fails, the set interval of the tripping delay (Delay) begins (red LED SEQ flashes). After the interval has expired (red LED SEQ illuminated), the output relay R switches into off-position (yellow LED not illuminated). Reverse voltages of a consumer (e.g. a motor which continues to run on two phases only) do not effect

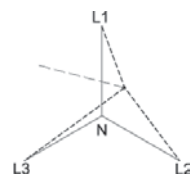
the disconnection but can be monitored by using a proper value for the asymmetry.

Asymmetry monitoring



If the asymmetry of the phase-to-phase voltages exceeds the value set at the ASYM-regulator, the set interval of the tripping delay (DELAY) begins (red LED ASYM flashes). After the interval has expired (red LED ASYM illuminated), the output relays switch into off-position (yellow LED not illuminated). If the neutral wire is connected to the device, the asymmetry of the phase voltages referred to the neutral wire (Y-voltage) is monitored also. In that case both values of the asymmetry are evaluated and if one of the values exceeds the value set at the ASYM-regulator, the set interval of the tripping delay (DELAY) begins (red LED ASYM flashes). After the interval has expired (red LED ASYM illuminated), the output relays switch into off-position (yellow LED not illuminated).

Loss of neutral wire by means of evaluation of asymmetry: a break of the neutral wire between power line and machinery is detected as soon as asymmetry between phase-to-phase voltage and neutral wire occurs. If the asymmetry exceeds the value set at the ASYM-regulator, the set interval of the tripping delay (Delay) begins (red LED ASYM flashes). After the interval has expired (red LED ASYM illuminated), the output relays switch into off-position (yellow LED not illuminated). A break of the neutral wire between our device and the machinery can not be detected.



U - supply voltage; R - output relay



- Voltage monitoring in 3-phase mains
- Monitoring of phase sequence and phase failure
- Detection of reverse voltage ❶
- Connection of neutral wire optional
- Supply voltage = measuring voltage
- 2 changeover contacts: 2 C/O
- Rated load: 5 A / 250 V AC at cat. AC1
- Installation design: width 22,5 mm
- Recognitions, certifications, directives:

Type of relay

MR-GU3M2P**Output circuit**

Number and type of contacts		2 C/O - changeover	
Rated load	AC1	5 A / 250 V AC	
Max. breaking capacity	AC1	1 250 VA	
Max. operating frequency		3 600 cycles/hour	PN-EN 60947-5-1
• at 100 VA resistive load		360 cycles/hour	
• at 1 000 VA resistive load			

Input circuit

Supply voltage U	= measuring voltage; terminals (N)-L1-L2-L3 (galvanically separated)		
Drop-out voltage		AC: $\geq 0,2 U_n$	
Operating range of supply voltage		3(N)~ 342...457 V	
Rated power consumption		2,0 VA / 1,5 W	
Rated frequency		AC: 48...63 Hz	
Duty cycle		100%	
Measuring circuit	<ul style="list-style-type: none"> • terminals • measuring variable • measuring input • overload capacity • input resistance • asymmetry 	(N)-L1-L2-L3 AC sinus, 48...63 Hz = supply voltage 3(N)~ 457/264 V 3(N)~400/230 V: 15 k Ω fixed, typical value 30%	

Insulation

Rated surge voltage	4 000 V AC
Overvoltage category	III PN-EN 60664-1
Insulation pollution degree	3 PN-EN 60664-1

General data

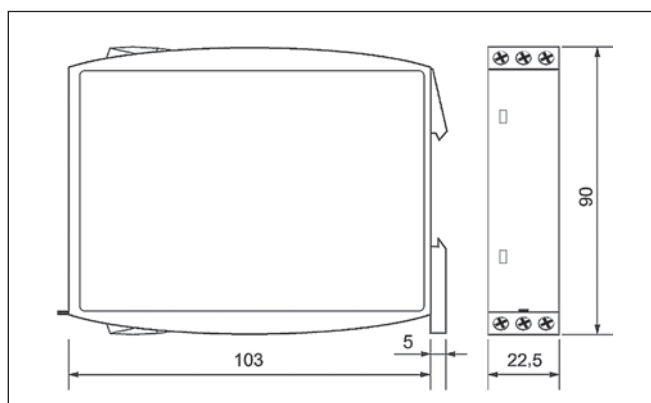
Electrical life	• resistive AC1	$\geq 2 \times 10^5$ 1 000 VA
Mechanical life (cycles)		$\geq 2 \times 10^7$
Dimensions (L x W x H)		90 x 22,5 x 103 mm
Weight		100 g
Ambient temperature	<ul style="list-style-type: none"> • storage, transport • operating 	-25...+70 °C -25...+55 °C PN-EN 60068-1 -25...+40 °C UL 508
Housing protection category		IP 40
Relative humidity		15...85% PN-EN 60721-3-3 class 3K3
Shock resistance		15 g 11 ms PN-EN 60068-2-27
Vibration resistance		0,35 mm DA 10...55 Hz PN-EN 60068-2-6

Measuring circuit data

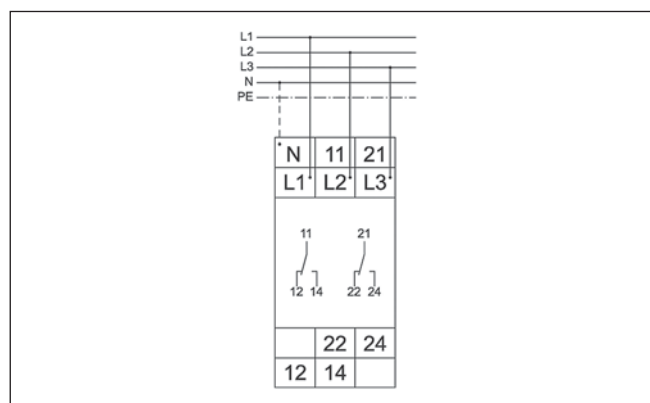
Functions	monitoring of phase sequence and phase failure detection of reverse voltage ❶
Time intervals	start-up suppression time (stała, max. 0,5 s) tripping delay (stała, max. 0,35 s)
Recovery time	100 ms
LED indicator	green LED ON - indication of supply voltage yellow LED ON/OFF - indication of output relay

❶ By means of evaluating the asymmetry.

Dimensions



Connections diagram

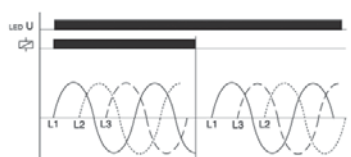


Mounting, mechanical design

Relays **MR-GU3M2P** are designed for direct mounting on 35 mm DIN rail mount, EN 50022. Mounting position: any. Self-extinguishing plastic housing, IP 40. Shockproof terminal connection according to VBG 4 (PZ1 required), IP 20. Maximum screw torque: 1,0 Nm. Terminal capacity: 1 x 0,5 do 2,5 mm² with/without multicore cable end, 1 x 4 mm² without multicore cable end, 2 x 0,5 do 1,5 mm² with/without multicore cable end, 2 x 2,5 mm² flexible without multicore cable end.

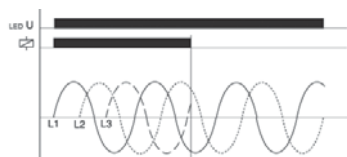
Functions

Phase sequence monitoring



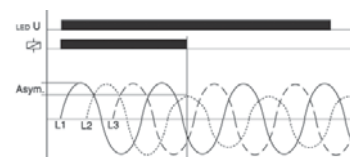
When all the phases are connected in the correct sequence and the measured asymmetry is less than the fixed value, the output relay R switches into on-position (yellow LED illuminated). When the phase sequence changes, the output relay R switches into off-position (yellow LED not illuminated).

Phase failure monitoring



The output relay R switches into off-position (yellow LED not illuminated), when one of the three phases fails.

Detection of reverse voltage (by means of evaluation of asymmetry)



The output relay R switches into off-position (yellow LED not illuminated) when the asymmetry between the phase voltages exceeds the fixed value of the asymmetry in monitoring relay. An asymmetry caused by the reverse voltage of a consumer (e.g. a motor which continues to run on two phases only) does not effect the disconnection.

U - supply voltage; R - output relay



NEW
product

- Monitoring of motor temperature
- Test function with integrated Test/Reset key
- External Reset key connectable
- Relay supply via the supply transformer of TR2 type ❶ - see page 58
- 2 changeover contacts: 2 C/O
- Rated load: 5 A / 250 V AC at cat. AC1
- Installation design: width 22,5 mm
- Recognitions, certifications, directives:

Type of relay

MR-GT2P-TR2

Output circuit

Number and type of contacts		2 C/O - changeover	
Rated load	AC1	5 A / 250 V AC	
Max. breaking capacity	AC1	1 250 VA	
Max. operating frequency		3 600 cycles/hour	PN-EN 60947-5-1
• at 100 VA resistive load		360 cycles/hour	
• at 1 000 VA resistive load			

Input circuit

Supply voltage U		12...400 V AC; terminals A1-A2 (galvanically separated) ❷	
Drop-out voltage		AC: $\geq 0,3 U_n$	
Operating range of supply voltage		as per the specification of TR2 supply transformer	
Rated power consumption		2,0 VA / 1,5 W	
Rated frequency		as per the specification of TR2 supply transformer	
Duty cycle		100%	
Measuring circuit	<ul style="list-style-type: none"> • terminals • initial resistance • response value • release value • disconnection • measuring voltage T1-T2 	T1-T2 $< 1,5 \text{ k}\Omega$ relay in OFF-position: $\geq 3,6 \text{ k}\Omega$ relay in ON-position: $\leq 1,8 \text{ k}\Omega$ no $\leq 2,5 \text{ V}$ at $R \leq 4 \text{ k}\Omega$ PN-EN 60947-8	
Control contact	<ul style="list-style-type: none"> • function • loadable • max. line length • Reset 	connection of an external Reset key no R1-R2: 10 m (twisted pair) contact 1 NO; terminals R-T2	

Insulation

Rated surge voltage	4 000 V AC
Overvoltage category	III PN-EN 60664-1
Insulation pollution degree	3 PN-EN 60664-1

General data

Electrical life	• resistive AC1	$\geq 2 \times 10^5$ 1 000 VA
Mechanical life (cycles)		$\geq 2 \times 10^7$
Dimensions (L x W x H)		90 x 22,5 x 103 mm
Weight		100 g
Ambient temperature	<ul style="list-style-type: none"> • storage, transport • operating 	-25...+70 °C -25...+55 °C PN-EN 60068-1 -25...+40 °C UL 508
Housing protection category		IP 40
Relative humidity		15...85% PN-EN 60721-3-3 class 3K3
Shock resistance		15 g 11 ms PN-EN 60068-2-27
Vibration resistance		0,35 mm DA 10...55 Hz PN-EN 60068-2-6

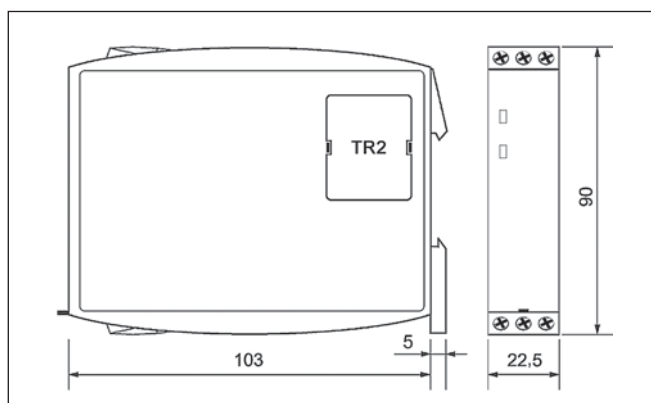
Measuring circuit data

Functions	monitoring of temperature of the motor winding (max. 6 PTC) with fault latch, for temperature sensors DIN 44081, test function with integrated Test/Reset key
Base accuracy	$\pm 10\%$ (calculate from final range value)
Repeatability	$\pm 1\%$
Wpływ napięcia	$\pm 2,2\%$
Temperature influence	$\pm 0,1\% / ^\circ\text{C}$
Recovery time	500 ms
LED indicator	green LED ON - indication of supply voltage red LED ON/OFF - indication of failure

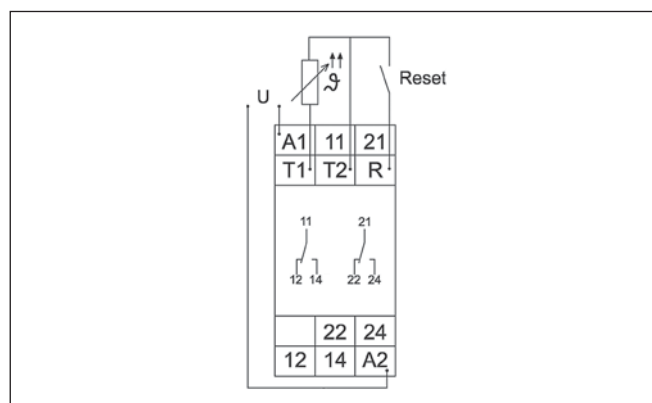
❶ TR2 transformers shall be ordered separately.

❷ Selectable via supply transformers TR2.

Dimensions



Connections diagram



Mounting, mechanical design

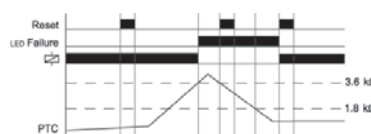
Relays **MR-GT2P-TR2** are designed for direct mounting on 35 mm DIN rail mount, EN 50022. Mounting position: any. Self-extinguishing plastic housing, IP 40. Shockproof terminal connection according to VBG 4 (PZ1 required), IP 20. Maximum screw torque: 1,0 Nm. Terminal capacity: 1 x 0,5 do 2,5 mm² with/without multicore cable end, 1 x 4 mm² without multicore cable end, 2 x 0,5 do 1,5 mm² with/without multicore cable end, 2 x 2,5 mm² flexible without multicore cable end.

Functions

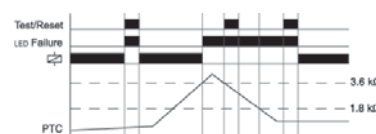
Monitoring of motor temperature with fault latch

If the supply voltage U is applied (green LED illuminated) and the cumulative resistance of the PTC-circuit is less than 3,6 k Ω (standard temperature of the motor), the output relay R switches into on-position. Pressing the Test/Reset key under this conditions forces the output relay R to switch into off-position. It remains in state as long as the Test/Reset key is pressed and thus the switching function can be checked in case of fault. The test function is not effective by using an external Reset key. When the cumulative resistance of the PTC-circuit exceeds 3,6 k Ω (at least one of the PTCs has reached the cut-off temperature), the output relay R switches into off-position (red LED illuminated). The output relay R switches into on-position again (red LED not illuminated), if the cumulative resistance drops below 1,8 k Ω by cooling down of the PTC and either a Reset key (internal or external) was pressed or the supply voltage was disconnected and re-applied.

Application of an external Reset key



Application of internal Test/Reset key



U - supply voltage; R - output relay



- Level monitoring of conductive liquids MIN, MAX
- Multifunctions monitoring relays
- Timing adjustment for tripping delay (Delay ON) and turn-off delay (Delay OFF) ❶
- Secure isolation of the measuring circuit
- 2 changeover contacts: 2 C/O
- Rated load: 5 A / 250 V AC at cat. AC1
- Installation design: width 22,5 mm
- Recognitions, certifications, directives:

Type of relay

MR-GP2P

Output circuit

Number and type of contacts		2 C/O - changeover
Rated load	AC1	5 A / 250 V AC
Max. breaking capacity	AC1	1 250 VA
Max. operating frequency		3 600 cycles/hour
• at 100 VA resistive load		360 cycles/hour
• at 1 000 VA resistive load		PN-EN 60947-5-1

Input circuit

Supply voltage U	24-110-230 V AC; terminals A1-A2 (galvanically separated)
Drop-out voltage	AC: $\geq 0,3 U_n$
Operating range of supply voltage	24-110 V AC: $-0,15 < U_n < 0,1$ 230 V AC: $-0,15 < U_n < 0,15$
Rated power consumption	2,0 VA / 1,5 W
Rated frequency	AC: 48...63 Hz
Duty cycle	100%
Measuring circuit	<ul style="list-style-type: none"> • terminals • sensitivity • sensor voltage • sensor current • wiring distance
	probes (type SK1, SK2, SK3); terminals E1-E2-E3 0,25...100 k Ω (4 mS...1 μ S) 12 V AC max. 7 mA capacity of cable 100 nF/km: max. 1000 m (set value < 50%) max. 100 m (set value 100%)

Insulation

Rated surge voltage	6 000 V AC
Overvoltage category	III PN-EN 60664-1
Insulation pollution degree	3 PN-EN 60664-1

General data

Electrical life	• resistive AC1	$\geq 2 \times 10^5$ 1 000 VA
Mechanical life (cycles)		$\geq 2 \times 10^7$
Dimensions (L x W x H)		90 x 22,5 x 103 mm
Weight		100 g
Ambient temperature	<ul style="list-style-type: none"> • storage, transport • operating 	-25...+70 °C -25...+55 °C PN-EN 60068-1 -25...+40 °C UL 508
Housing protection category		IP 40
Relative humidity		15...85% PN-EN 60721-3-3 class 3K3
Shock resistance		15 g 11 ms PN-EN 60068-2-27
Vibration resistance		0,35 mm DA 10...55 Hz PN-EN 60068-2-6

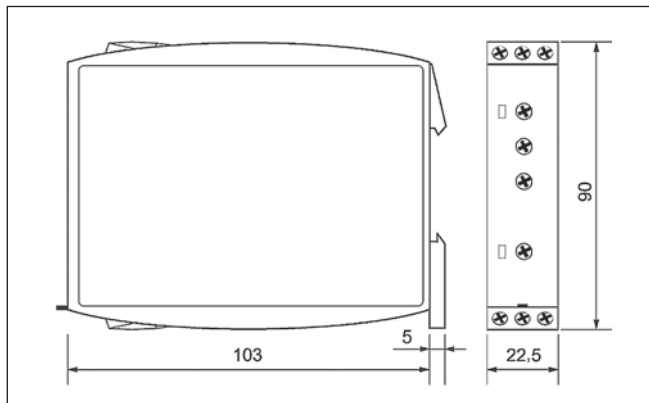
Measuring circuit data

Functions	PUMPUP, PUMPDOWN ❷ timing adjustment for tripping delay (Delay ON) and turn-off delay (Delay OFF) ❶
Time intervals (timing adjustment)	tripping delay (0,5...10 s) turn-off delay (0,5...10 s)
Recovery time	500 ms
LED indicator	green LED ON - indication of supply voltage yellow LED ON/OFF - indication of output relay

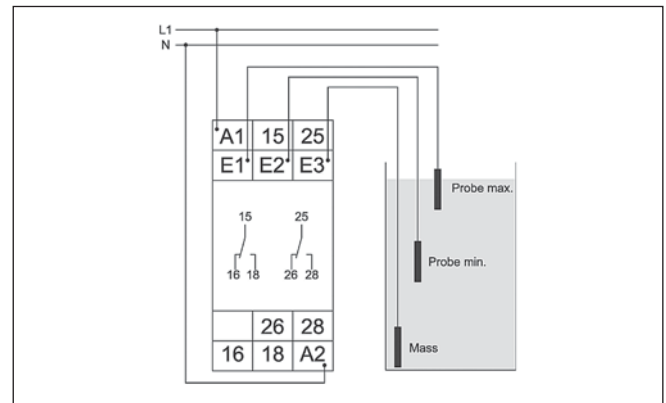
❶ Separately adjustable.

❷ Selectable by means of rotary switch.

Dimensions



Connections diagram

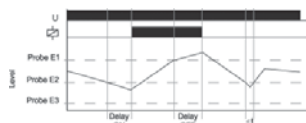


Mounting, mechanical design

Relays **MR-GP2P** are designed for direct mounting on 35 mm DIN rail mount, EN 50022. Mounting position: any. Self-extinguishing plastic housing, IP 40. Shockproof terminal connection according to VBG 4 (PZ1 required), IP 20. Maximum screw torque: 1,0 Nm. Terminal capacity: 1 x 0,5 do 2,5 mm² with/without multicore cable end, 1 x 4 mm² without multicore cable end, 2 x 0,5 do 1,5 mm² with/without multicore cable end, 2 x 2,5 mm² flexible without multicore cable end.

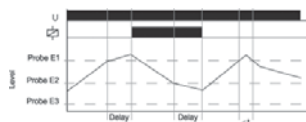
Functions

PUMP UP



Connection of the probe rods E1, E2 and E3. Alternatively the electrically conducting container can be connected in lieu of the test probe E3. When the air-fluid level falls below the minimum probe E2 the set interval of the tripping delay (Delay ON) begins. After the expiration of the interval the output relay R switches into on-position (yellow LED illuminated). When the air-fluid level again rises above the maximum probe E1, the set interval of the turn-off delay (Delay OFF) begins. After the expiration of the interval the output relay R switches into off-position (yellow LED not illuminated).

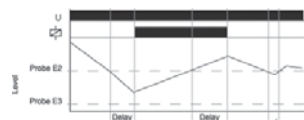
PUMP DOWN



Connection of the probe rods E1, E2 and E3. Alternatively the electrically conducting container can be connected in lieu of the test probe E3. When the maximum probe E1 gets moistened the set interval of the tripping delay (Delay ON) begins. After the expiration of the interval the output relay R switches into on-position (yellow LED illuminated). When the air-fluid level falls below the minimum probe E2, the set interval of the turn-off delay

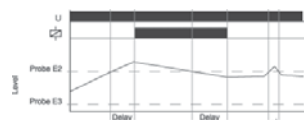
(Delay OFF) begins. After the expiration of the interval the output relay R switches into off-position (yellow LED not illuminated).

Minimum monitoring (PUMP UP)



Connection of probe rods E2 and E3 (bridge E1-E3). Alternatively the electrically conducting container can be connected in lieu of the test probe E3. When the air-fluid level falls below the probe E2 the set interval of the tripping delay (DELAY ON) begins. After the expiration of the interval the output relays switch into on-position (yellow LED illuminated). When the air-fluid level again rises above the probe E2, the set interval of the turn-off delay (DELAY OFF) begins. After the expiration of the interval the output relays switch into off-position (yellow LED not illuminated).

Maximum monitoring (PUMP DOWN)



Connection of probe rods E2 and E3 (Bridge E1-E3). Alternatively the electrically conducting container can be connected in lieu of the test probe E3. When the max. probe E2 gets moistened the set interval of the tripping delay (Delay ON) begins. After the expiration of the interval the output relay R switches into

on-position (yellow LED illuminated). When the air-fluid level sinks below the probe E2, the set interval of the turn-off delay (Delay OFF) begins. After the expiration of the interval the output relay R switches into off-position (yellow LED not illuminated).

Note: use cables with low capacity for wiring the probes especially with extended wiring length.

Following processes are suggested for the adjustment:

- the existent time delay should be to minimum (0,5 s),
- the function selector switch must be in position pump down,
- turn the sensitivity controller slowly clockwise from min. to max. until the relays switch into on-position (probes must be in dipped state),
- the moistened probes should be taken out of the liquid to control if the relays switch into off-position; if the relays doesn't switch into off-position, turn the sensitivity controller slightly back to min. (counter clockwise),
- set the existent time delay to desired value to fade out a short term moisten the probes by waves in the liquid,
- set the function selector switch to desired position (either pump up or pump down).

U - supply voltage; R - output relay



- Separating supply transformers TR2... for the monitoring relays of MR-G... series to reduce the input voltage applied to the terminals A1 and A2 of monitoring relays to the internal level of 24 V AC
- TR2 transformers shall be ordered separately.

Type of transformer

TR2

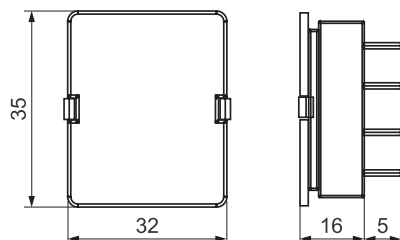
Input circuit

Supply voltage U	12-24-42-48-110-127-230-400 V AC
Operating range of supply voltage	$0,85 < U_n < 1,1$
Rated power consumption	0,5...2,0 VA
Rated frequency	AC: 50/60 Hz
Duty cycle	100%

General data

Dimensions (L x W x H)	32 x 35 x 16 mm
Weight	40 g
Ambient temperature	<ul style="list-style-type: none"> • storage, transport -25...+70 °C • operating -25...+55 °C PN-EN 60068-1 -25...+40 °C UL 508
Housing protection category	IP40
Relative humidity	15...85% PN-EN 60721-3-3 class 3K3

Dimensions



Mounting, mechanical design

TR2 supply transformers are designed for mounting in MR-G... monitoring relays and they are inseparable for their operation. MR-G... relays will not operate without the TR2... transformers. In order to mount the TR2... transformer in the monitoring relay, it is necessary to remove the protective cap from the relay, which protects the terminals of TR2... Then, TR2... shall be placed in the assembly opening of the MR-G... relay. The housing of TR2... is made of self-extinguishing plastic. When mounted, the tightness of TR2... is IP 40.

Ordering codes

Ordering codes: **TR2-12VAC**, **TR2-24VAC**, **TR2-42VAC**, **TR2-48VAC**, **TR2-110VAC**, **TR2-127VAC**, **TR2-230VAC**, **TR2-400VAC**.

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