



- 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:

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"> <li>• fusing</li> <li>• terminals</li> <li>• measuring variable</li> <li>• measuring input</li> <li>• overload capacity</li> <li>• input resistance</li> <li>• switching threshold <math>U_s</math></li> <li>• asymmetry</li> </ul>	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 $\Omega$ 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"> <li>• storage, transport</li> <li>• operating</li> </ul>	-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	$\pm 0,1\% / ^\circ\text{C}$	
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.

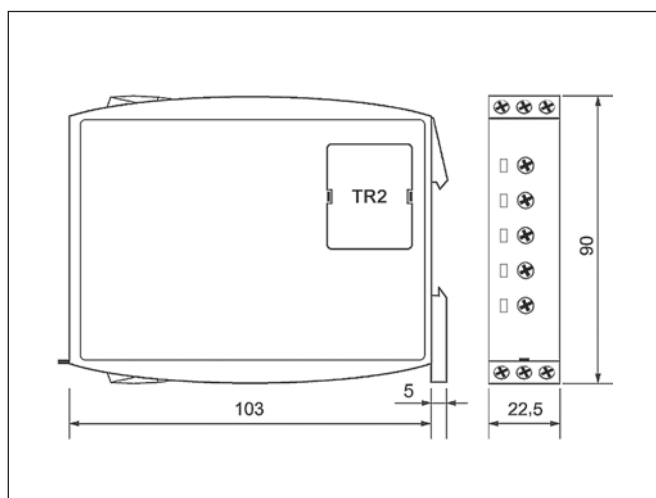
❹ TR2 transformers shall be ordered separately.

❺ Selectable via supply transformers TR2.

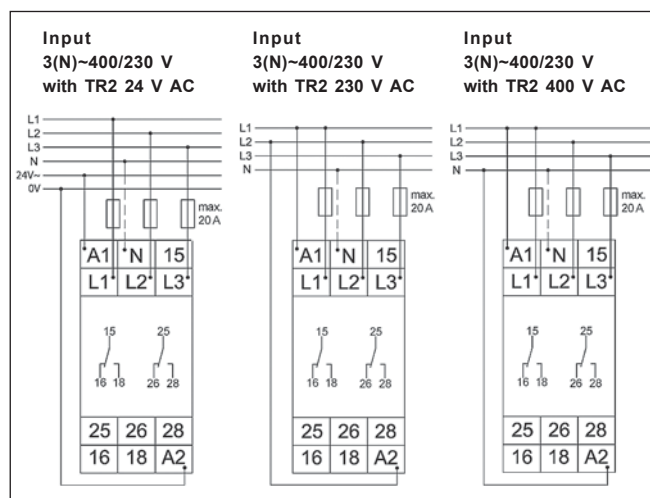
❻ Selectable by means of rotary switch.

❼ Of the corresponding threshold.

## Dimensions



## Connections diagrams



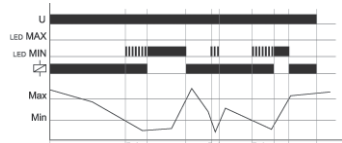
## Mounting, mechanical design

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 mm<sup>2</sup> with/without multicore cable end, 1 x 4 mm<sup>2</sup> without multicore cable end, 2 x 0,5 do 1,5 mm<sup>2</sup> with/without multicore cable end, 2 x 2,5 mm<sup>2</sup> flexible without multicore cable end.

## Functions

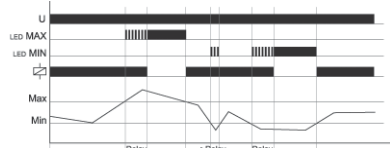
For all functions the LED's MIN and MAX are flashing alternating, when the minimum value for the measured voltage was chosen to be greater than the maximum value. If a failure already exists, when the device is activated, the output relay R remains in off-position and the LED for the corresponding threshold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

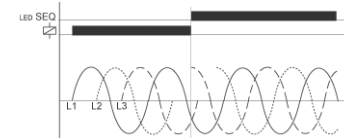
**WIN, WIN+SEQ** - voltage monitoring in window-function between MIN and MAX values, voltage monitoring in windowfunction between MIN and MAX values and monitoring of phase sequence



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

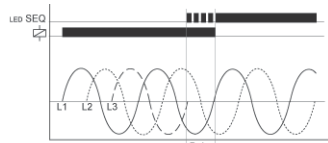
When the measured voltage exceeds the value adjusted at the MAX-regulator, the set interval of the tripping delay (Delay) begins (red LED MAX flashes). After the interval has expired (red LED MAX illuminated), the output relay R switches into off-position (yellow LED not illuminated). The output relay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

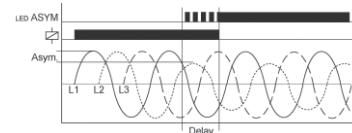
**SEQ** - phase failure monitoring



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