

Trip amplifier for monitoring AC/DC circuits

Trip amplifier for monitoring AC/DC circuits	Trip amplifier for monitoring AC/DC circuits – Overview	D.2
	WAVESERIES – Threshold monitoring	D.4
	PLUGCONTROL – Threshold monitoring	D.8

Trip amplifier for monitoring AC/DC circuits

Monitoring AC/DC currents and voltages within single-phase and three-phase power nets.

Some WAVESERIES products provide the function of monitoring the voltage and current. Typical uses include low voltage distribution applications. The includes the monitoring of phase voltages and current while controlling actuators. Another use is monitoring dropouts of on power supply units, accumulators and feed-in systems within industrial production flows. There are many possible uses for a threshold monitoring component in process automation. It can be used to process standard signals in order to monitor fill levels, flow quantities or standardised temperature signals.

The PLUGCONTROL series of current monitoring components can monitor DC current up to 10 amps. They can be used in applications to monitor the functioning of valves, servo-controls and DC motors. The monitoring plug is designed so that it can be plugged onto the PLUGSERIES socket base. This makes it quick and easy to bridge the potentials in input and output circuits using the pluggable ZQV cross-connection. The multi-purpose lever can be used to quickly attach and release.

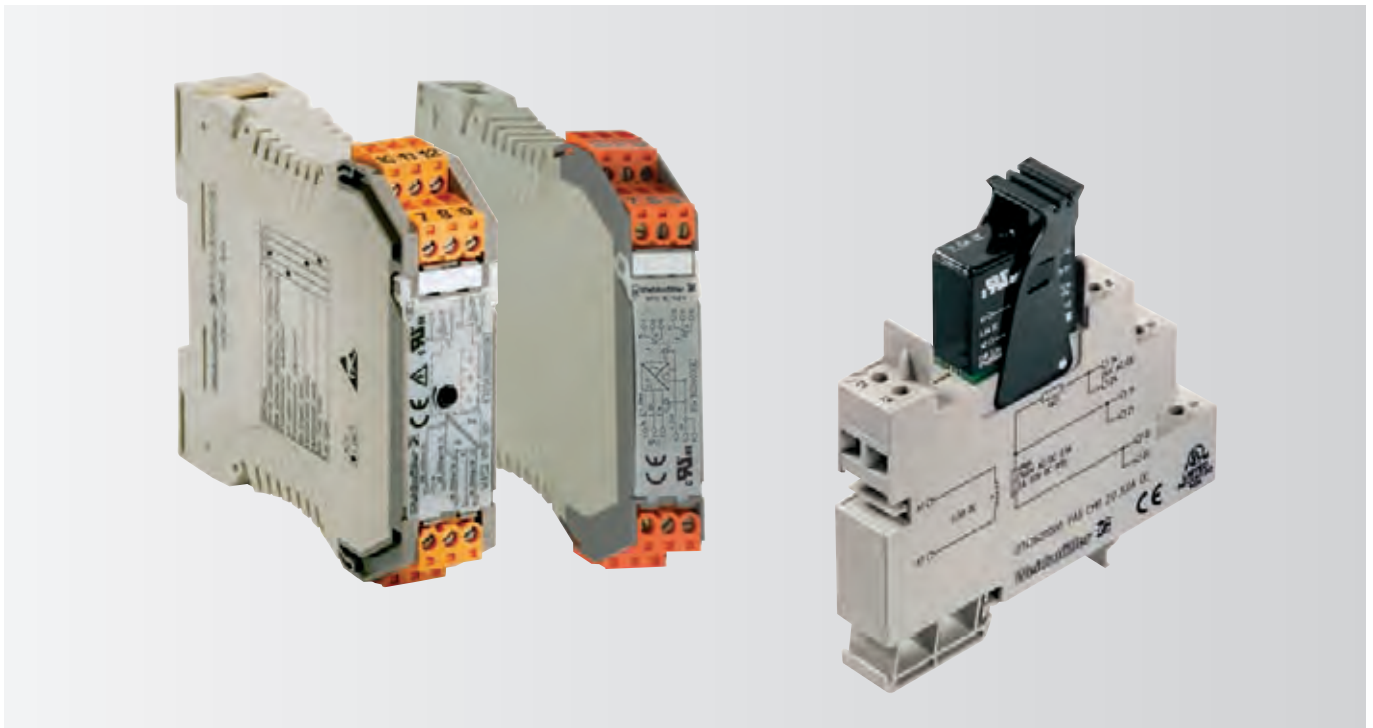
Features

WAVECONTROL:

- Threshold monitoring of analogue standard signals
- Measuring AC currents ranging from 1 to 30 A
- Monitoring DC and AC voltages up to 400 V
- Universal adjustable switching thresholds
- Relay outputs for monitoring threshold
- Versatile pluggable connection method – screw or spring
- Tool-free installation

PLUGCONTROL:

- Monitoring for DC currents ranging from 0.5 to 10 A
- Very small, pluggable monitoring unit
- Reed relay contact for monitoring and measuring current
- Install on standard base
- Quick initial commissioning – with replaceable electronics
- Minimal wiring effort – with pluggable ZQV 2,5N cross-connector



Trip amplifier for monitoring AC/DC circuits



DC/Alarm

Threshold monitoring of analogue standard signals



CMR

Current monitoring for AC currents from 1 to 30 A



VMR V AC 1ph

Voltage monitoring for DC and single-phase AC circuits



VMR V AC 3ph

Voltage monitoring for three-phase circuits



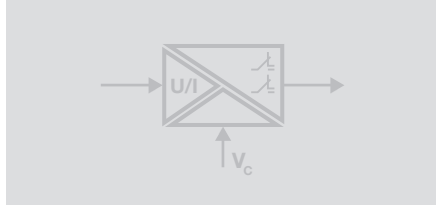
PAS CMR

Current monitoring for DC circuits

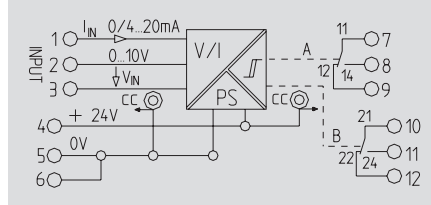
WAVESERIES - Threshold monitoring

Relay output

- 3-way isolation
- Low trip / High trip
- FAILSAFE / NON-FAILSAFE
- 2 Relay outputs



DC/Alarm



Switch position/setting options

function	SW 1			
	1	2	3	4
Channel A High Trip	■			
Channel A Low Trip	□			
Channel B High Trip		■		
Channel B Low Trip		□		
FAILSAFE, Channel 1 & 2			□	□
NON FAILSAFE, Chan. 1 & 2			■	■

■ = on
□ = off

NON FAILSAFE: The relay picks up when the alarm is triggered

FAILSAFE: The relay drops out when the alarm is triggered. An alarm is also triggered in the FAILSAFE mode, if for example, the operating voltage to the moduls fail

Low Trip: Alarm is triggered if the signal is undershoot the threshold.

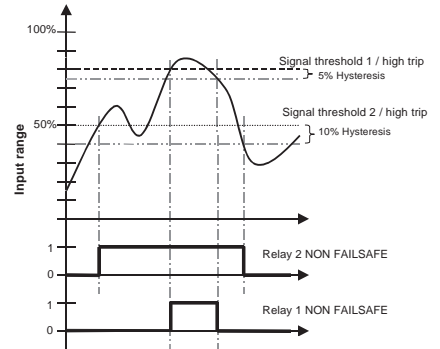
High Trip: Alarm is triggered if the signal is overshoot the threshold.

Signal threshold: Adjustments of the signal threshold (1...90)% are made for channel 1 with the potentiometer P1, and separately for channel 2 via potentiometer P2.

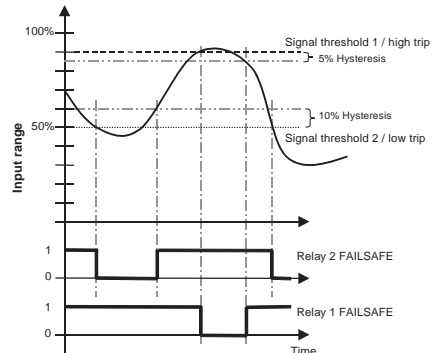
Hysteresis: Adjustments of the hysteresis (1...10)% are made for channel 1 with the potentiometer P3, and separately for channel 2 via potentiometer P3.

WAVEANALOG DC/Alarm - Alarm indication

Example 1



Example 2



Technical data

Input	
Input voltage	0...10 V
Input current	0(4)...20 mA
Input resistance, voltage/current	≥ 100 kΩ / ≤ 110 Ω
Output	
Contact assembly	2 CO contacts
Contact material	AgNi 90/10
Switching thresholds	1...90% (independently for channel 1 and channel 2)
Hysteresis	1...10% (independent for channel 1 and channel 2)
Switching voltage AC, max.	253 V
Continuous current	3 A
Function	Open-circuit/closed-circuit principle
Temperature coefficient	≤ 500 ppm/K
Status indicator	LED green ON: OK, LED red ON: alarm (per channel)
General data	
Supply voltage	24 V DC ± 25 %
Power consumption	Typically 1 W both relays picked up
Current-carrying capacity of cross-connect.	≤ 2 A
Ambient temperature	0 °C...+55 °C
Storage temperature	-20 °C...+85 °C
Default setting	Channel A/B: low trip and FAILSAFE
Approvals	cULus; GOSTME25; CE
Insulation coordination	
Standards	EN 50178
EMC standards	EN 61000-4-2, -3, -4, -5, -6
Rated voltage	300 V
Impulse withstand voltage	4 kV
Pollution severity	2
Overtoltage category	III
Clearance & creepage distances	≥ 3 mm
Insulation voltage	2 kV _{eff} / 5 s

Dimensions	
Clamping range (nominal / min. / max.)	mm ²
Length x width x height	mm
Note	

Ordering data

	Screw connection
	Tension clamp connection

Note

Accessories

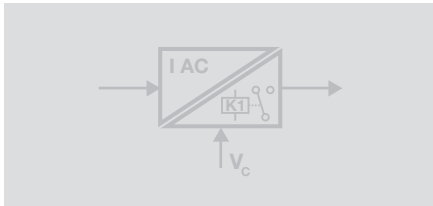
Screw connection	Tension clamp connection
2.5 / 0.5 / 2.5	1.5 / 0.5 / 2.5
92.4 / 17.5 / 112.4	92.4 / 17.5 / 112.4

Type	Qty.	Order No.
WAS5 DC/Alarm	1	8543820000
WAZ5 DC/Alarm	1	8543880000

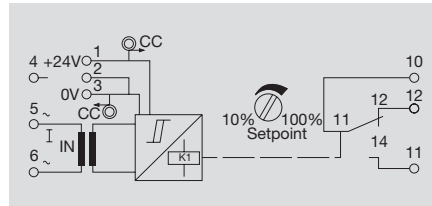
Cross-connector for power supplies and markers – refer to Accessories

Relay output

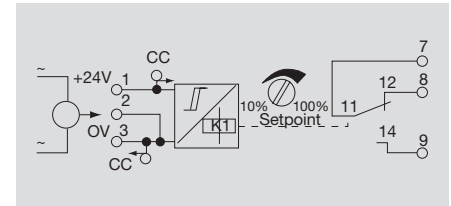
- Current ranges adjustable via DIP switch
- Switchable hysteresis
- Operating or closed-circuit current principle



1/5/10 A AC



20/40/60 A AC



Technical data

Input	
Input current	0...1 A AC / 0...5 A AC / 0...10 A AC
Input frequency	50...60 Hz
Max. current	100 A for 1s
Max. voltage	250 V AC
Sensor	Transforming (internally)
Diameter of cable feed-through	
Output	
Switching thresholds	Adjustable 10...100% with front potentiometer
Contact assembly	1 CO contact
Hysteresis	5% or 10% of threshold value
Switching voltage AC / Switching voltage DC	6 V...250 V / 6 V...60 V
Switching current	≤ 7 mA, ≥ 100 mA
Continuous current	3 A
Step response time	typ. 700 ms
Temperature coefficient	≤ 800 ppm/K
Status indicator	Green LED
General data	
Supply voltage	24 V DC ± 10 %
Ambient temperature / Storage temperature	0 °C...+50 °C / -20 °C...+70 °C
Default setting	0...5 A / 10 % hysteresis / open-circuit principle
Approvals	cULus; GOSTME25; CE
Insulation coordination	
EMC standards	EN 55011, EN 61000-6
Rated voltage	300 V
Impulse withstand voltage	4 kV
Pollution severity	2
Overvoltage category	III
Clearance & creepage distances	≥ 3 mm
Insulation voltage	4 kV _{eff} / 5 s

Screw connection		Tension clamp connection	
2.5 / 0.5 / 2.5		1.5 / 0.5 / 2.5	
92.4 / 22.5 / 112.4		92.4 / 22.5 / 112.4	

Screw connection		Tension clamp connection	
2.5 / 0.5 / 2.5		1.5 / 0.5 / 2.5	
92.4 / 22.5 / 112.4		92.4 / 22.5 / 112.4	

Dimensions	
Clamping range (nominal / min. / max.)	mm ²
Length x width x height	mm
Note	

Ordering data

Type	Qty.	Order No.
WAS2 CMR 1/5/10A ac	1	8516560000
WAZ2 CMR 1/5/10A ac	1	8516570000

Note

Accessories

Cross-connector for power supplies and markers – refer to Accessories

Type	Qty.	Order No.
WAS2 CMR 20/40/60A ac	1	8513340000
WAZ2 CMR 20/40/60A ac	1	8526600000

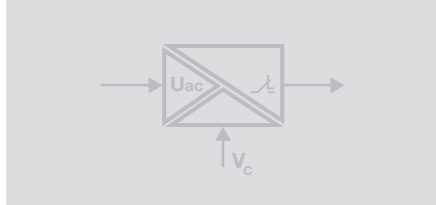
Note

Cross-connector for power supplies and markers – refer to Accessories

WAVESERIES - Threshold monitoring

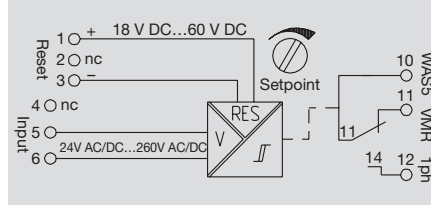
Relay output

- 3-way isolation
- Monitoring of single-phase systems up to 260 V AC/DC
- 4 input ranges per DIP switch can be selected
- 1 relay with CO contact
- Switchable hysteresis
- Switch adjusted via potentiometer
- Reset input



VMR V AC / DC

Single-phase



Technical data

Input	
Input voltage	24...70 / 70...140 / 140...210 / 210...260 V AC / DC
Input frequency	50...60 Hz
Max. voltage	260 V AC / DC
Output	
Switching voltage AC, max.	250 V
Switching current	8 A
Continuous current	3 A
Hysteresis	24...70 V AC, small = 5 V / large = 10 V
Temperature coefficient	≤ 250 ppm/K
Step response time	< 300 ms
Repeat accuracy	< 0.3% of set range
Status indicator	LED green = OK / LED yellow/red = alarm status
General data	
Supply voltage	from the measuring circuit
Reset input voltage, min./max.	18 V DC / 30 V DC
Pulse duration	≤ 700 ms
Default setting	DIP switches: ON = 1,2,5,8 / OFF = 3,4,6,7
Ambient temperature	-10 °C...+55 °C
Storage temperature	-20 °C...+70 °C
Approvals	cULus; CE
Insulation coordination	
Standards	EN 50178
EMC standards	EN 55011, EN 61000-6, EN 61326
Rated voltage	input/output, input/reset input, reset input/output: 300 V
Impulse withstand voltage	Input/output, input/reset input, reset input/output: 4 kV
Insulation voltage	2 kV _{eff}
Overvoltage category	III
Pollution severity	2
Clearance & creepage distances	≥ 3 mm

Dimensions	
Clamping range (nominal / min. / max.)	mm ²
Length x width x height	mm
Note	

Ordering data	
Type	Screw connection

Note	
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Accessories	
Markers – refer to Accessories.	

Screw connection		
2.5 / 0.5 / 2.5		
96.5 / 17.5 / 112.5		

Type	Qty.	Order No.
WAS5 VMR 1ph	1	8705640000

Table of setting options

Input	1	2	3	4	5	6	7	8
24 V AC/DC...70 V AC/DC			■	□	□	□		
70 V AC/DC...140 V AC/DC				□	□	□	■	
140 V AC/DC...210 V AC/DC					□	■	□	
210 V AC/DC...260 V AC/DC						□	□	□
Trip								
High Trip			■					
Low Trip			□					
Memory								
Memory on				□				
Memory out			■					
Hysteresis								
Hysteresis small				□				
Hysteresis large					■			
Input voltage								
AC voltage								■
DC voltage								□

■ = on
□ = out

Status indicator

- Set value not exceeded.
- ⊗ Alarm status.
- ⊗ Alarm status can be reset because set value has been exceeded.

Abb.1: Overvoltage monitoring
Alarm set to "high trip"
(Set permanently to closed-circuit principle.)

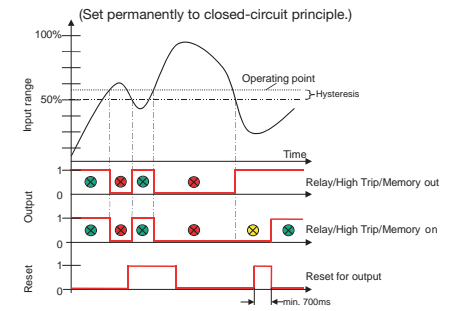
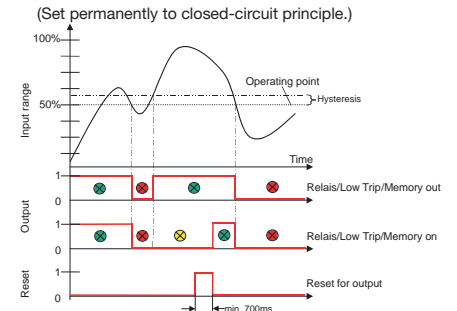
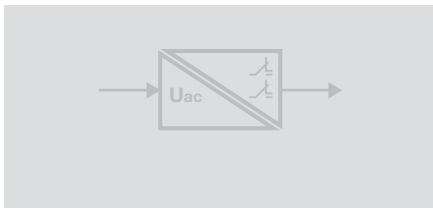


Abb.2: Undervoltage monitoring
Alarm set to "low trip"
(Set permanently to closed-circuit principle.)



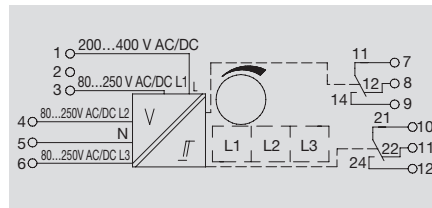
Relay output

- 2-way isolation
- Monitoring of 1- and 3-phase systems from 80 to 400 V AC/DC
- Adjustable by DIP switches
- Monitoring of low and surge voltages
- Detects phase loss
- 2 relays with CO contact



VMR V AC

Three-phase



Technical data

Input	
Input voltage	200...400 V AC/DC 1~, 80...250 V AC/DC 3~
Input current	< 10 mA DC; 15 mA AC
Output	
Contact assembly	2 CO contacts
Switching voltage AC, max.	250 V
Continuous current	3 A
Hysteresis	5% of final value
Temperature coefficient	≤ 300 ppm/K
Step response time	< 300 ms
Repeat accuracy	< 0.3% of set range
Status indicator	Green LED
General data	
Supply voltage	from the measuring circuit
Default setting	DIP switches: ON = 1,2,4 / OFF = 3
Ambient temperature	0 °C...+50 °C
Storage temperature	-25 °C...+85 °C
Approvals	cULus; CE
Insulation coordination	
Standards	EN 50178
EMC standards	EN 55011, EN 61000-6, EN 61326
Rated voltage	600 V
Impulse withstand voltage	6 kV
Insulation voltage	4 kV _{eff} / 1 min.
Overtoltage category	III
Pollution severity	2
Clearance & creepage distances	Output circuit: 1.8 mm; input circuit, output circuit 1/output circuit 2: 3 mm; input/output: 5.5 mm

Dimensions	
Clamping range (nominal / min. / max.)	mm ²
Length x width x height	mm
Note	

Ordering data

Screw connection

Note

Accessories

Markers – refer to Accessories.

Screw connection		
2.5 / 0.5 / 2.5		
96.5 / 22.5 / 112.5		
Type	Qty.	Order No.
WAS2 VMR 3ph	1	8705630000

Table of setting options

Input	1	2	3	4
3 phases 80 V AC/DC...250 V AC/DC		■		
1 phase 200 V AC/DC...400 V AC/DC			□	
Limit value				
Setting to upper switching point		■		
Setting to lower switching point			□	
Hysteresis				
Hysteresis, small			■	
Hysteresis, large				□
Fault tolerance				
Operating current method				■
Closed-circuit current method				□

■ on
□ off

Status indicator

- Voltage is in set range

Fig. 1: Overtoltage and undervoltage monitoring, example of setting

- 3-phase monitoring
- Setting threshold to upper operating point: 230 V Hysteresis 5% = -12,5 V
- Lower operating point 10% less 230 V - 25 V = 205 V Hysteresis 5% = +12,5 V
- The device operates with the operating current principle.
- All 3 phases monitored in parallel

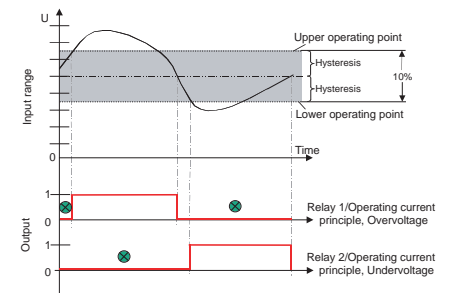
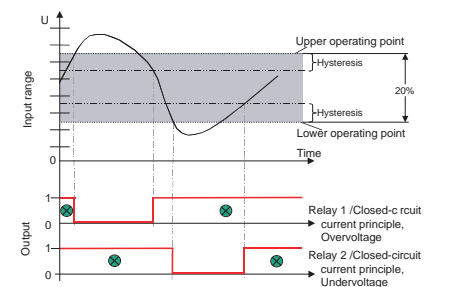


Fig. 2: Overtoltage and undervoltage monitoring, example of setting

- 3-phase monitoring
- Setting threshold to lower operating point: 150 V Hysteresis 5% = +12,5 V
- Upper operating point 20% greater 150 V + 50 V = 200 V Hysteresis 5% = -12,5 V
- The device operates with the closed-circuit current principle.
- All 3 phases monitored in parallel

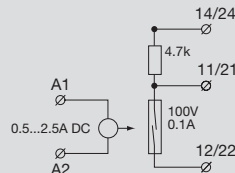


PLUGCONTROL - Threshold monitoring

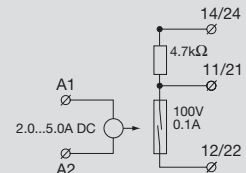
Relay output

- Monitoring of currents up to 10 A DC
- For use with valves, servocontrols or DC motors
- Pull-up / pull-down resistor 4.7 k Ω

PAS CMR 0.5...2.5 A DC



PAS CMR 2.0...5.0 A DC



Technical data

Input

Input current
Max. current
Making current threshold
Resistance of sensor circuit
Secure off
Pulse duration

Output

Switching current
Switching voltage AC / Switching voltage DC
Max. switching frequency
Contact assembly
Contact material

General data

Ambient temperature
Storage temperature
Humidity

Approvals

Insulation coordination

Standards
EMC standards
Rated voltage
Impulse withstand voltage
Insulation voltage
Overvoltage category
Pollution severity
Clearance & creepage distances

0.5...2.5 A DC
7.5 A for 10 s
 ≤ 500 mA
50 Ω
 ≤ 50 mA
min. 1 ms

≤ 100 mA
1 V...100 V / 1 V...100 V
15 Hz
1 NO contact
RH/Rd (Reed contact)*

0 °C...+55 °C
-40 °C...+85 °C
5...95 % rel. humidity
 $T_s = 40^\circ\text{C}$, no condensation
cULus; CE

EN 50178 (secure separation)
EN 55011, EN 61000-6-1, 2, 3, 4
300 V
6 kV
4 kV_{eff} / 1 min.
III
2
 ≥ 5 mm (grout encapsulated)

2...5.0 A DC
15 A for 10 s
 ≤ 2 A
50 Ω
 ≤ 300 mA
min. 1 ms

≤ 100 mA
1 V...100 V / 1 V...100 V
15 Hz
1 NO contact
RH/Rd (Reed contact)*

0 °C...+55 °C
-40 °C...+85 °C
5...95 % rel. humidity
 $T_s = 40^\circ\text{C}$, no condensation
cULus; CE

EN 50178 (secure separation)
EN 55011, EN 61000-6-1, 2, 3, 4
300 V
6 kV
4 kV_{eff} / 1 min.
III
2
 ≥ 5 mm (grout encapsulated)

Dimensions

Clamping range (nominal / min. / max.) mm²
Length x width x height mm

Note

Screw connection

1.5 / 2.5 / 2.5
92 / 15.3 / 95

* The peak current should be limited to 100mA when under capacitive loads

Screw connection

1.5 / 2.5 / 2.5
92 / 15.3 / 95

* The peak current should be limited to 100mA when under capacitive loads

Ordering data

Screw connection

Type	Qty.	Order No.
PAS CMR 0,5...2,5 A DC	10	8742610000

Type	Qty.	Order No.
PAS CMR 2,0...5,0 A DC	10	8742620000

Note

Accessories

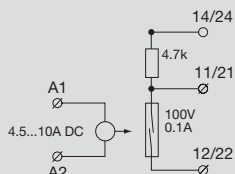
Cross-connectors and markers - refer to WAVESERIES accessories

Cross-connectors and markers - refer to WAVESERIES accessories

Relay output

- Monitoring of currents up to 10 A DC
- For use with valves, servocontrols or DC motors
- Pull-up / pull-down resistor 4.7 k Ω

PAS CMR 4.5...10 A DC



Technical data

Input	
Input current	4.5...10 A DC
Max. current	30 A for 10 s
Making current threshold	≤ 4.5 A
Resistance of sensor circuit	50 Ω
Secure off	≤ 600 mA
Pulse duration	min. 1 ms
Output	
Switching current	≤ 100 mA
Switching voltage AC / Switching voltage DC	1 V...100 V / 1 V...100 V
Max. switching frequency	15 Hz
Contact assembly	1 NO contact
Contact material	RH/Rd (Reed contact)*
General data	
Ambient temperature	0 °C...+55 °C
Storage temperature	-40 °C...+85 °C
Humidity	5...95 % rel. humidity
	T _s = 40°C, no condensation
Approvals	cULus; CE
Insulation coordination	
Standards	EN 50178 (secure separation)
EMC standards	EN 55011, EN 61000-6-1, 2, 3, 4
Rated voltage	300 V
Impulse withstand voltage	6 kV
Insulation voltage	4 kV _{eff} / 1 min.
Overtoltage category	III
Pollution severity	2
Clearance & creepage distances	≥ 5 mm (grout encapsulated)

Dimensions	
Clamping range (nominal / min. / max.)	mm ²
Length x width x height	mm
Note	

Screw connection	
Clamping range (nominal / min. / max.)	mm ²
Length x width x height	mm
Note	
* The peak current should be limited to 100mA when under capacitive loads	

Ordering data

Type	Qty.	Order No.
PAS CMR 4,5...10 A DC	10	8742630000

Note
Screw connection

Accessories

Cross-connectors and markers - refer to WAVESERIES accessories
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