Trip amplifier for monitoring AC/DC circuits

Trip amplifier for monitoring AC/DC circuits

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

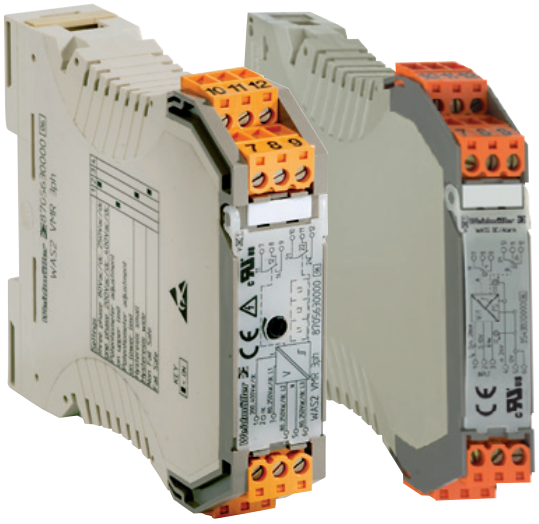
Some WAVESERIES products provide the function of monitoring voltage and current. Typical uses include low voltage distribution applications. This includes the monitoring of phase voltages and current while controlling actuators. Another application is in monitoring dropouts of a power supply, or accumulators and feed-in systems within industrial production lines. There are many applications for threshold monitoring (trip amplifier) products in process automation. Typically they are used to generate alarms when „out-of-limits" signals are detected with fill levels, flow quantities or temperature signals.

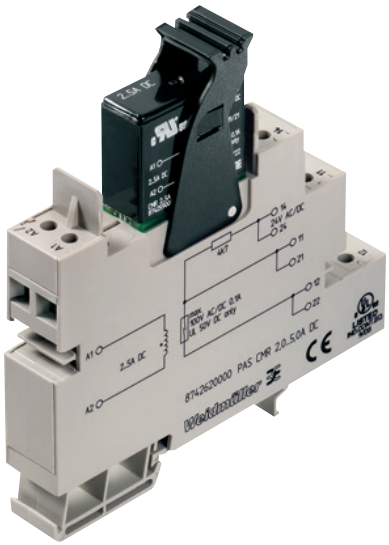
The PLUGCONTROL series of current monitoring products monitor DC current up to 10 amps. They can be used in applications to monitor the functioning of valves, servo-controls and DC motors. The pluggable detector uses the same socket (base) as Weidmüller PLUGSERIES relays and optos socket base so it uses the same quick-and-easy to use pluggable ZQV cross-connections for saving wiring time. A lever is provided to quickly release or instal the detector.

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
- Fully adjustable switching thresholds
- Relay outputs for monitoring threshold
- Versatile pluggable connection method – screw or spring

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





Threshold monitoring of analogue standard signals

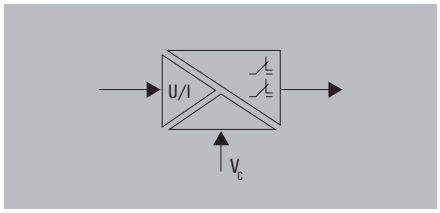
Current monitoring

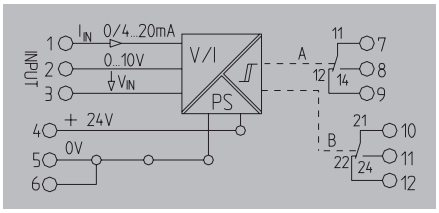
Voltage monitoring

Relay output

- 3-way isolation
- Low trip / high trip
- FAILSAFE / NON-FAILSAFE
- 2 relay outputs 250 V AC / 3 A

DC/Alarm





Switch position/setting options

	SW 1			
function	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 modules fails
Low Trip: Alarm is triggered if the signal is under the threshold.
High Trip: Alarm is triggered if the signal is over 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.
Hysterese: Adjustments of the hysteresis (1...10)% are made for channel 1 with the potentiometer P3, and separately for channel 2 via potentiometer P3.

Technical data

Input	
Input voltage	0...10 V
Input current	0...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)
Max. switching voltage, AC	250 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	
Configuration	DIP switch, Potentiometer
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
Default setting	Channel A/B: low trip and FAILSAFE
Approvals	CE; cULus; EAC
Insulation coordination	
Standards	DIN EN 50178
EMC standards	EN 61000-4-2, -3, -4, -5, -6
Rated voltage	300 V
Impulse withstand voltage	4 kV
Pollution degree	2
Overvoltage category	III
Clearance & creepage distances	≥ 3 mm
Insulation voltage	2 kV_{eff} / 5 s

Dimensions		**Screw connection**	**Tension clamp connection**
Clamping range (nominal / min. / max.)	mm^2	2.5/0.5/2.5	1.5/0.5/2.5
Length x width x height	mm	92.4/17.5	92.4/17.5
Note			

Ordering data

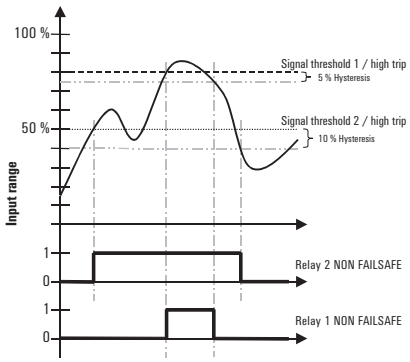
	Type	**Qty.**	**Order No.**
Screw connection	WAS5 DC/Alarm	1	**8543820000**
Tension-clamp connection	WAZ5 DC/Alarm	1	**8543880000**
Note			

Accessories

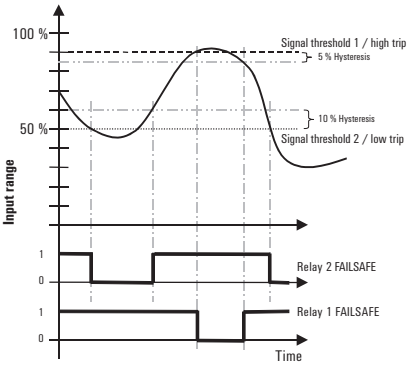
Note	Cross-connector for power supplies and markers – refer to Accessories

WAVEANALOG DC/Alarm – Alarm indication

Example 1



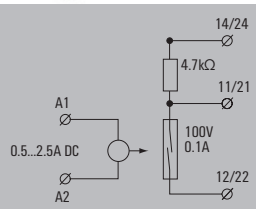
Example 2



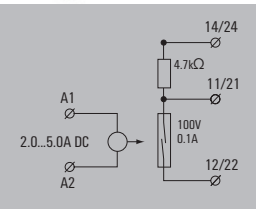
Relay output

- Monitors currents up to 10 A DC
- Used with valves, servo-controls or DC motors
- Pull-up / pull-down resistor 4.7 kΩ

PAS CMR 0.5...2.5 A DC



PAS CMR 2.0...5.0 A DC



Technical data

Input		
Input current	0.5...2.5 A DC	2...5.0 A DC
Max. current	7.5 A for 10 s	15 A for 10 s
Making current threshold	≤ 500 mA	≤ 2 A
Input resistance, current	< 50 mΩ	< 50 mΩ
Secure off	≤ 50 mA	≤ 300 mA
Pulse duration	min. 1 ms	min. 1 ms
Output		
Switching current	100 mA	100 mA
Switching voltage AC / Switching voltage DC	/ 1 V...100 V1 V...100 V	/ 1 V...100 V1 V...100 V
Max. switching frequency	15 Hz	15 Hz
Contact assembly	1 NO contact	1 NO contact
Contact material	RH/Rd (Reed contact)*	RH/Rd (Reed contact)*
General data		
Configuration	none	none
Ambient temperature	0 °C...55 °C	0 °C...55 °C
Humidity	5–95% rel. humidity, T_u = 40°C, no condensation	5–95% rel. humidity, T_u = 40°C, no condensation
Approvals	CE; cULus; EAC	CE; cULus; EAC
Insulation coordination		
Standards	DIN EN 50178 (secure separation)	DIN EN 50178 (secure separation)
EMC standards	EN 55011, EN 61000-6-1, 2, 3, 4	EN 55011, EN 61000-6-1, 2, 3, 4
Rated voltage	300 V	300 V
Impulse withstand voltage	6 kV	6 kV
Insulation voltage	4 kV_{eff} / 1 min.	4 kV_{eff} / 1 min.
Overvoltage category	III	III
Pollution degree	2	2
Clearance & creepage distances	≥ 5 mm (grout encapsulated)	≥ 5 mm (grout encapsulated)

Dimensions	**Screw connection**	**Screw connection**
Clamping range (nominal / min. / max.)	1.5 / 2.5 / 2.5	1.5 / 2.5 / 2.5
Length x width x height	92 / 15.3 /	92 / 15.3 /
Note	* The peak current should be limited to 100 mA when under capacitive loads.	* The peak current should be limited to 100 mA when under capacitive loads.

Ordering data

	Type	Qty.	Order No.	Type	Qty.	Order No.
Screw connection	PAS CMR 0,5...2,5 A DC	10	**8742610000**	PAS CMR 2,0...5,0 A DC	10	**8742620000**

Note

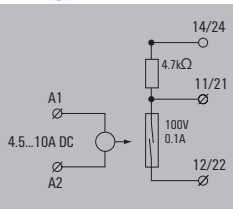
Accessories

Note	Cross-connectors and markers - refer to WAVESERIES accessories	Cross-connectors and markers - refer to WAVESERIES accessories

Relay output

PAS CMR 4.5...10 A DC

- Monitors currents up to 10 A DC
- Used with valves, servo-controls or DC motors
- Pull-up / pull-down resistor 4.7 kΩ



Technical data

Input	
Input current	4.5...10 A DC
Max. current	30 A for 10 s
Making current threshold	≤ 4.5 A
Input resistance, current	< 50 mΩ
Secure off	≤ 600 mA
Pulse duration	min. 1 ms
Output	
Switching current	100 mA
Switching voltage AC / Switching voltage DC	/ 1 V...100 V1 V...100 V
Max. switching frequency	15 Hz
Contact assembly	1 NO contact
Contact material	RH/Rd (Reed contact)*
General data	
Configuration	none
Ambient temperature	0 °C...55 °C
Humidity	5–95% rel. humidity, T_u = 40°C, no condensation
Approvals	CE; cULus; EAC
Insulation coordination	
Standards	DIN 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.
Overvoltage category	III
Pollution degree	2
Clearance & creepage distances	≥ 5 mm (grout encapsulated)

Dimensions	**Screw connection**
Clamping range (nominal / min. / max.)	1.5 / 2.5 / 2.5
Length x width x height	92 / 15.3 / 95
Note	* The peak current should be limited to 100 mA when under capacitive loads.

Ordering data

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

Note	

Accessories

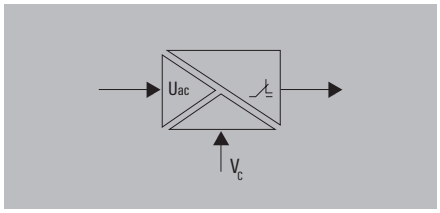
Note	Cross-connectors and markers - refer to WAVESERIES accessories

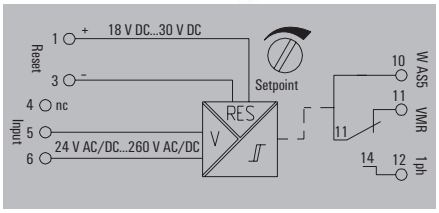
Relay output

- 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 module 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	
Max. switching voltage, AC	250 V
Switching current	8 A
Continuous current	3 A
Hysteresis	24...70 V AC, small = 5 V / large = 10 V, 70–260 VAC, small = 8 V / large = 16
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
Configuration	DIP switch, Potentiometer, Alarm status reset via reset input or button
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	CE; cULus; EAC
Insulation coordination	
Standards	DIN 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 degree	2
Clearance & creepage distances	≥ 3 mm
Dimensions	**Screw connection**
Clamping range (nominal / min. / max.)	2.5 / 0.5 / 2.5
Length x width x height	96.5 / 17.5 /
Note	

Ordering data

	Screw connection	**Type**	**Qty.**	**Order No.**
		WAS5 VMR 1ph	1	**8705640000**
Note				

Accessories

Note	Markers - refer to Accessories.

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.)

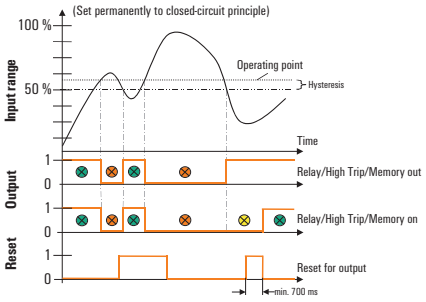
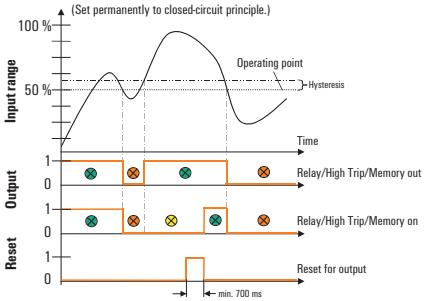


Abb.2: Undervoltage monitoring
Alarm set to "low trip"
(Set permanently to closed-circuit principle.)

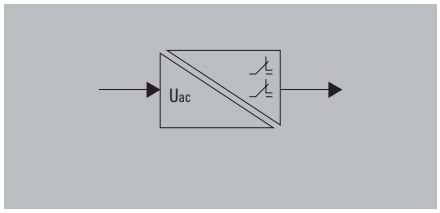


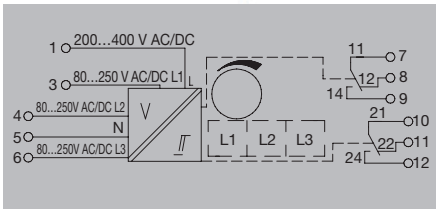
Relay output

- 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 loss of phase
- 2 relay modules 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
Max. switching voltage, AC	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	
Configuration	DIP switch, Potentiometer, Alarm status reset via reset input or button
Supply voltage	from the measuring circuit
Default setting	DIP switches: ON = 1,2,4 / OFF = 3
Ambient temperature	0 °C...50 °C
Approvals	CE; cULus; EAC
Insulation coordination	
Standards	DIN 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.
Overvoltage category	III
Pollution degree	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	**Screw connection**
Clamping range (nominal / min. / max.)	2.5 / 0.5 / 2.5
Length x width x height	96.5 / 22.5 /
Note	

Ordering data

	Screw connection	**Type**	**Qty.**	**Order No.**
		WAS2 VMR 3ph	1	**8705630000**
Note				

Accessories

Note	Markers - refer to Accessories.

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: Overvoltage and undervoltage monitoring, example of setting

- 3-phase monitoring
- Setting limit value 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

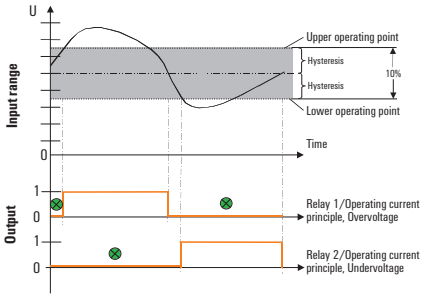


Fig. 2: Overvoltage and undervoltage monitoring, example of setting

- 3-phase monitoring
- Setting limit value 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