# Trip amplifier for monitoring AC/DC circuits

<table>
<thead>
<tr>
<th>Trip amplifier for monitoring AC/DC circuits</th>
<th>WAVESERIES – Limit value monitoring</th>
<th>PLUGCONTROL – Current monitoring</th>
<th>WAVESERIES – Voltage monitoring</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trip amplifier for monitoring AC/DC circuits - Overview</td>
<td>E.2</td>
<td>E.6</td>
<td>E.8</td>
</tr>
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</table>

Contents
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
<table>
<thead>
<tr>
<th>Monitoring Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Threshold monitoring of analogue standard signals</td>
</tr>
<tr>
<td>Current monitoring</td>
</tr>
<tr>
<td>Voltage monitoring</td>
</tr>
</tbody>
</table>
**Relay output**
- 3-way isolation
- Low trip / high trip
- FAILSAFE / NON-FAILSAFE
- 2 relay outputs 250 V AC / 3 A

**Technical data**

**Input**
- Input voltage
- Input current
- Input resistance, voltage/current

**Output**
- Contact assembly
- Contact material
- Switching thresholds
- Hysteresis
- Max. switching voltage, AC
- Continuous current
- Function
- Temperature coefficient
- Status indicator

**General data**
- Configuration
- Supply voltage
- Power consumption
- Current-carrying capacity of cross-connect
- Ambient temperature
- Default setting
- Approvals

**Insulation coordination**
- Standards
- EMC standards
- Rated voltage
- Impulse withstand voltage
- Pollution degree
- Overvoltage category
- Clearance & creepage distances
- Insulation voltage

**Dimensions**
- Clamping range (nominal / min. / max.)
- Length x width x height

**Switch position/setting options**

**DC/Alarm**

- **Function**
  - Channel A High Trip
  - Channel A Low Trip
  - Channel B High Trip
  - Channel B Low Trip
  - FAILSAFE, Channel 1 & 2
  - NON-FAILSAFE, Channel 1 & 2

- **SW 1**
  - □ = on
  - □ = off

**Technical data**

**Input**
- Input voltage
- Input current
- Input resistance, voltage/current

**Output**
- Contact assembly
- Contact material
- Switching thresholds
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- Max. switching voltage, AC
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**Ordering data**
- Screw connection
- Tension-clamp connection

**Accessories**
- Cross-connector for power supplies and markers – refer to Accessories
Trip amplifier for monitoring AC/DC circuits
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

Technical data
Input
Input current
Max. current
Making current threshold
Input resistance, current
Secure off
Pulse duration
Output
Switching current
Switching voltage AC / Switching voltage DC
Max. switching frequency
Contact assembly
Contact material
General data
Configuration
Ambient temperature
Humidity
Approvals
Insulation coordination
Standards
EMC standards
Rated voltage
Impulse withstand voltage
Insulation voltage
Overvoltage category
Pollution degree
Clearance & creepage distances

<table>
<thead>
<tr>
<th>Input</th>
<th>PAS CMR 0.5...2.5 A DC</th>
<th>PAS CMR 2.0...5.0 A DC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input current</td>
<td>0.5...2.5 A DC</td>
<td>2.0...5.0 A DC</td>
</tr>
<tr>
<td>Max. current</td>
<td>7.5 A for 10 s</td>
<td>15 A for 10 s</td>
</tr>
<tr>
<td>Making current threshold</td>
<td>≤ 500 mA</td>
<td>≤ 2 A</td>
</tr>
<tr>
<td>Input resistance, current</td>
<td>≤ 2 A</td>
<td>≤ 50 mA</td>
</tr>
<tr>
<td>Secure off</td>
<td>≤ 50 mA</td>
<td>≤ 300 mA</td>
</tr>
<tr>
<td>Pulse duration</td>
<td>1 NO contact</td>
<td>min. 1 ms</td>
</tr>
<tr>
<td>Output</td>
<td>100 mA</td>
<td>1 NO contact</td>
</tr>
<tr>
<td>Switching current</td>
<td>≤ 50 mA</td>
<td>RH/Rd (Reed contact)*</td>
</tr>
<tr>
<td>Switching voltage AC / Switching voltage DC</td>
<td>≤ 50 mA</td>
<td>none</td>
</tr>
<tr>
<td>Max. switching frequency</td>
<td>≤ 100 mA</td>
<td>5–95% rel. humidity, TH = 40°C, no condensation</td>
</tr>
<tr>
<td>Contact assembly</td>
<td>7 V, 100 V, 100 V</td>
<td>DE, cULus, EAC</td>
</tr>
<tr>
<td>Contact material</td>
<td>15 Hz</td>
<td>DIN EN 50718 (secure separation)</td>
</tr>
<tr>
<td>General data</td>
<td>1 NO contact</td>
<td>EN 50011, EN 61000-6-1, 2, 3, 4</td>
</tr>
<tr>
<td>Configuration</td>
<td>RH/Rd (Reed contact)*</td>
<td>300 V</td>
</tr>
<tr>
<td>Ambient temperature</td>
<td>none</td>
<td>6 kV</td>
</tr>
<tr>
<td>Humidity</td>
<td>0 °C, 65 °C</td>
<td>4 kV_{eff} / 1 min.</td>
</tr>
<tr>
<td>Approvals</td>
<td>5–95% rel. humidity, TH = 40°C, no condensation</td>
<td>III</td>
</tr>
<tr>
<td>Insulation coordination</td>
<td>DE, cULus, EAC</td>
<td>2</td>
</tr>
<tr>
<td>Standards</td>
<td>DIN EN 50718 (secure separation)</td>
<td>≥ 5 mm (grout encapsulated)</td>
</tr>
<tr>
<td>EMC standards</td>
<td>EN 50011, EN 61000-6-1, 2, 3, 4</td>
<td>Screw connection</td>
</tr>
<tr>
<td>Rated voltage</td>
<td>300 V</td>
<td>1.5 / 2.5 / 2.5</td>
</tr>
<tr>
<td>Impulse withstand voltage</td>
<td>6 kV</td>
<td>92 / 15.3 /</td>
</tr>
<tr>
<td>Insulation voltage</td>
<td>4 kV_{eff} / 1 min.</td>
<td>* The peak current should be limited to 100 mA when under capacitive loads.</td>
</tr>
<tr>
<td>Overvoltage category</td>
<td>II</td>
<td>1.5 / 2.5 / 2.5</td>
</tr>
<tr>
<td>Pollution degree</td>
<td>2</td>
<td>92 / 15.3 /</td>
</tr>
<tr>
<td>Clearance &amp; creepage distances</td>
<td>≥ 5 mm (grout encapsulated)</td>
<td>* The peak current should be limited to 100 mA when under capacitive loads.</td>
</tr>
</tbody>
</table>

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

Note
Screw connection

Ordering data
Type | Qty. | Order No. | Type | Qty. | Order No. |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>PAS CMR 0.5...2.5 A DC</td>
<td>10</td>
<td>8742610000</td>
<td>PAS CMR 2.0...5.0 A DC</td>
<td>10</td>
<td>8742620000</td>
</tr>
</tbody>
</table>

Accessories
Cross-connectors and markers - refer to WAVESERIES accessories

Note
Cross-connectors and markers - refer to WAVESERIES accessories

* The peak current should be limited to 100 mA when under capacitive loads.
### 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 4.5...10 A DC

**Technical data**

<table>
<thead>
<tr>
<th>Input</th>
<th>4.5...10 A DC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input current</td>
<td>30 A for 10 s</td>
</tr>
<tr>
<td>Max. current</td>
<td>≤ 4.5 A</td>
</tr>
<tr>
<td>Making current threshold</td>
<td>≤ 50 mA</td>
</tr>
<tr>
<td>Input resistance, current</td>
<td>≤ 600 mA</td>
</tr>
<tr>
<td>Secure off</td>
<td>≤ 1 ms</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Output</th>
<th>100 mA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Switching current</td>
<td>/ 1 V...100 V</td>
</tr>
<tr>
<td>Switching voltage AC</td>
<td>/ Switching voltage DC</td>
</tr>
<tr>
<td>Max. switching frequency</td>
<td>1 NO contact</td>
</tr>
<tr>
<td>Contact assembly</td>
<td>RV/Rd (Reed contact)*</td>
</tr>
<tr>
<td>Contact material</td>
<td>none</td>
</tr>
</tbody>
</table>

**General data**

- Configuration
- Ambient temperature
- Humidity
- Approvals

**Insulation coordination**

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

**Dimensions**

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

**Screw connection**

- 1.5 / 2.5 / 2.5 |
- 92 / 153 / 95

**Ordering data**

<table>
<thead>
<tr>
<th>Type</th>
<th>Qty.</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>PAS CMR 4.5...10 A DC</td>
<td>10</td>
<td>8742630000</td>
</tr>
</tbody>
</table>

**Note**

- Cross-connectors and markers - refer to WAVESERIES accessories

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* The peak current should be limited to 100 mA when under capacitive loads.
**WAVESERIES - Voltage monitoring**

**Trip amplifier for monitoring AC/DC circuits**

### 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

### Technical data

**Input**
- Input voltage
- Input frequency
- Max. voltage

**Output**
- Max. switching voltage, AC
- Switching current
- Continuous current
- Hysteresis
- Temperature coefficient
- Step response time
- Repeat accuracy
- Status indicator

**General data**
- Supply voltage
- Reset input voltage, min./max.
- Pulse duration
- Configuration

**Default setting**
- DIP switches: ON = 1, 2, 5, 8 / OFF = 3, 4, 6, 7
- Ambient temperature
- Storage temperature
- Approvals

**Insulation coordination**
- Standards
- EMC standards
- Rated voltage
- Impulse withstand voltage
- Insulation voltage
- Overvoltage category
- Pollution degree
- Clearance & creepage distances

**Dimensions**
- Clamping range (nominal / min. / max.)
- Length x width x height

### Ordering data

**Screw connection**

### Accessories

**Note**

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**VMR V AC / DC**

**Single-phase**

### Technical data

#### Input
- 24...70 / 70...140 / 140...210 / 210...260 V AC / DC
- 50...60 Hz
- 260 V AC / DC
- 250 V
- 8 A
- 3 A
- 24...70 V AC, small = 5 V / large = 10 V, 70–260 VAC, small = 8 V / large = 16
- ≤ 250 ppm/K
- < 0.3 % of set range
- LED green = OK / LED yellow/red = alarm status

#### Output
- Max. switching voltage, AC
- Switching current
- Continuous current
- Hysteresis
- Temperature coefficient
- Step response time
- Repeat accuracy
- Status indicator

#### General data
- Supply voltage
- Reset input voltage, min./max.
- Pulse duration
- Configuration

### Ordering data

#### Screw connection

### Accessories

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### Table of setting options

<table>
<thead>
<tr>
<th>Input</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>24 V AC/DC...70 V AC/DC</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td></td>
</tr>
<tr>
<td>70 V AC/DC...140 V AC/DC</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>140 V AC/DC...210 V AC/DC</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>210 V AC/DC...260 V AC/DC</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td></td>
</tr>
</tbody>
</table>

**Trip**
- High Trip
- Low Trip

**Memory**
- Memory on
- Memory off
- Hysteresis

### 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.)
Trip amplifier for monitoring AC/DC circuits

- 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

Technical data

Input
- Input voltage
- Input current

Output
- Contact assembly
- Max. switching voltage, AC
- Continuous current
- Monitoring of low and surge voltages
- Detects loss of phase
- 2 relay modules with CO contact

Table of setting options

<table>
<thead>
<tr>
<th>Input</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 phases 80 V AC/DC...250 V AC/DC</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 phase 200 V AC/DC...400 V AC/DC</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Limit value</td>
<td>Setting to upper switching point</td>
<td>Setting to lower switching point</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hysteresis</td>
<td>Hysteresis, small</td>
<td>Hysteresis, large</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fault tolerance</td>
<td>Operating current method</td>
<td>Closed-circuit current method</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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 = 205 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 = 180 V
  - The device operates with the closed-circuit current principle.
  - All 3 phases monitored in parallel

Screw connection
- 2.5 / 0.5 / 2.5
- 9.5 / 22.5

Ordering data

<table>
<thead>
<tr>
<th>Type</th>
<th>Qty.</th>
<th>Order No.</th>
</tr>
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<tbody>
<tr>
<td>WAS2 VMR 3ph</td>
<td>1</td>
<td>8705630000</td>
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</tbody>
</table>

Accessories
- Markers – refer to Accessories.

Relay output

VMR V AC

Three-phase

200...400 V AC/DC

- Input voltage
- Input current

Contact assembly
Max. switching voltage, AC
Continuous current
Monitoring of low and surge voltages
Detects loss of phase
2 relay modules with CO contact

Technical data

Input
- Input voltage
- Input current

Output
- Contact assembly
- Max. switching voltage, AC
- Continuous current
- Monitoring of low and surge voltages
- Detects loss of phase
- 2 relay modules with CO contact

Table of setting options

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<td></td>
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</tr>
<tr>
<td>Hysteresis</td>
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<td>Hysteresis, large</td>
<td></td>
<td></td>
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  - Setting limit value to lower operating point: 150 V, Hysteresis 5% = -12.5 V
  - Upper operating point 20% greater 150 V = 180 V
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  - All 3 phases monitored in parallel

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- 9.5 / 22.5

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