› Monitoring Relays
Phase Control Relays
Phase sequence & failure detection, undervoltage & asymmetry

- MWG and MWU relays control, on 3-phase networks: phase failure and phase sequence detection / undervoltage between phases (for MWU only)
- MWA and MWUA relay controls, on 3-phase networks: phase failure and phase sequence detection / Asymmetry
- Undervoltage and overvoltage between phases (for MWUA only)
- Wide measurement range from 183→ 528 V~
- True RMS measurement
- LED status indication

MWG *MWU - MWA* *MWUA*

Selection guide

Type	Function	Measuring range	Output	Power Supply	Part-Numbers
MWG	Phase sequence / Phase failure detection	183 → 528 V~	1 x 8A (changeover)	208 → 480 V~	**84873022**
MWU	Phase sequence / Phase failure detection / Undervoltage				**84873023**
MWA	Phase sequence / Phase failure detection / Asymmetry				**84873024**
MWUA	Phase sequence / Phase failure detection / Asymmetry / Over and under voltage in window mode				**84873025**

	MWG	MWU	MWA	MWUA
Timing				
Delay on threshold crossing (Tt)	0.1 →10 s (0, +10 %)			
Repetition accuracy with constant parameters (according to IEC/EN 60255-1)	± 3 %			
Power ON delay	≤ 650 ms			
Reset time max	1500 ms			
Alarm on delay time max Response time on appearance of a fault (Tr)	200 ms			
Supply				
Voltage type for actuating	AC			
Rated control supply voltage Un at AC	3 x 208 → 3 x 480 V			
AC supply voltage frequency 50/60HZ	± 10 %			
Voltage supply tolerance	-12 % / +10 %			
Operating range	183 → 528 V~			
Polarity with DC voltage	No			
Galvanic isolation of power supply/Input circuit	No			
Galvanic isolation of power supply/Output circuit	Yes			
Galvanic isolation of Input circuit/Output circuit	Yes			

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Description:

Crouzet's Monitoring Relays are essential for enhancing the safety and efficiency of electrical systems by providing continuous and precise monitoring. These relays help in detecting and alerting users to abnormalities such as overvoltage, undervoltage, phase failure, and phase sequence errors. The relays are designed to be compact and easy to use, making them suitable for an easy integration into various electrical panels without taking up excessive space.

For more information about **Monitoring Relays** please visit **www.crouzet.com**

	MWG	MWU	MWA	MWUA
Immunity from micro power cuts: typical	10 ms			
Maximum Power consumption at Un	10 VA @ 400 V~, 50 Hz			
Insulation				
Rated Insulation voltage (according to IEC/EN 60664-1)	400 V			
Insulation coordination (according to IEC/EN 60664-1)	Overvoltage category III; pollution degree 3			
Insulation resistance supply and Output circuit (according to IEC/EN 60664-1 and IEC/EN 60255-27)	> 500 MΩ (500 V⎓)			
Insulation resistance Input circuit and Output circuit (according to IEC/EN 60664-1 and IEC/EN 60255-27)	> 500 MΩ (500 V⎓)			
Dielectric strength (according to IEC/EN 60664-1 and IEC/EN 60255-27)	2 kV / 1min / 1mA / 50Hz			
Impulse voltage (according to IEC/EN 60664-1 and IEC/EN 60255-27)	4 kV wave 1.2 / 50 µs			
Input and measuring specifications				
Measurement range	183 → 528 V~			
Display accuracy (according to IEC/EN 60255-1)	± 3 % of the displayed value			
Measuring error with drift temperature	0.05 %/°C			
Measuring error with drift voltage	< 1 % across the whole range			
Repetition accuracy with constant parameters (according to IEC/EN 60255-1)	± 0.5 %			
Voltage threshold adjustment	-	Undervoltage -2 → -20 % of selected Un ▪ (-2 → -12 % across the 3 x 208 V~ range) ▪ (-2 → -17 % across the 3 x 220 V~ range)	-	Undervoltage -2 to -20 % of selected Un ▪ (-2 → -12 % across the 3 x 208 V~ range) ▪ (-2 → -17 % across the 3 x 220 V~ range) Overvoltage 2 →20 % of selected Un ▪ (+2 →+10 % across the 3 x 480 V~ range)
Frequency of measured signal	50 → 60 Hz ± 10 %			
Max. measuring cycle time	150 ms / True RMS measurement			
Voltage threshold hysteresis	-	Undervoltage: ▪ 2 % of the Un value of the selected network	-	2 % of fixed Un
Selection of phase-phase nominal voltage Un	208-220-380-400-415-440-480 V~			
Guaranteed phase failure detection threshold	N/A			
Asymmetry threshold hysteresis	N/A			
Asymmetry threshold adjustment	N/A			
Maximum regeneration (phase failure)	70 %			
Output specifications				
Maximum switching power (resistive)	2000 VA			
Maximum rate (at max switching power)	360 operations/hour at full load			
Maximum breaking current	▪ 8 AAC 250 V~ resistive ▪ 5 ADC 30 V⎓ resistive			
Minimum breaking current	10 mA / 5 V⎓			
Operating categories (according to IEC/EN 60947-5-1 and IEC/EN 60947-5-2)	AC 12, AC 13, AC 14, AC 15, DC 12, DC 13, DC 14			
Nominal rating	8 A			

	MWG	MWU	MWA	MWUA
Voltage breaking capacity (according to IEC/EN 60255-1)	▪ 250 V~ / 8 AAC resistive ▪ 30 V⎓ / 5 A resistive			
Electrical life (operations)	5 x 10^4			
Mechanical life (operations)	1 x 10^7			
1 or 2 changeover relays, AgNi (cadmium-free)	1 C/O			
Functions				
Phase Failure detection	True			
Phase sequence detection	True			
Asymmetry	False		True	
Overvoltage between phases monitoring	False			
Undervoltage between phases monitoring	False			
Under/overvoltage with independent settings	False			
Undervoltage	False	True	False	True
Overvoltage	False			True
Loss of neutral	False			
General characteristics				
Temperature limits use (°C) (according to IEC/EN 60068-2)	-20 → +50			
Temperature limits stored (°C) (according to IEC/EN 60068-2)	-40 → +70			
MTBF in hours (according to IEC/TR 62380)	1598784.3			
MTTF (according to IEC/TR 62380)	180 years			
Led status indicator	▪ Un: Green LED (power on) ▪ R: Yellow LED (relay status ON) ▪ OFF LED (phase sequence or total phase failure fault) ▪ Flashes during the threshold crossing delay ▪ ALL LEDs blink when changing the measurement range	▪ Un: Green LED (power on) ▪ R: Yellow LED (relay status ON) ▪ OFF LED (phase sequence or total phase failure fault) ▪ Flashes during the threshold crossing delay ▪ OFF LED in the event of undervoltage ▪ ALL LEDs blink when changing the measurement range	▪ Un: Green LED (power on) ▪ R: Yellow LED (relay status ON) ▪ OFF LED (phase sequence or total phase failure fault) ▪ Flashes during the threshold crossing delay ▪ ALL LEDs blink when changing the measurement range	▪ Un: Green LED (power on) ▪ R: Yellow LED (relay status ON) ▪ OFF LED (phase sequence or total phase failure fault) ▪ Flashes during the threshold crossing delay ▪ OFF LED in the event of undervoltage ▪ ALL LEDs blink when changing the measurement range
Creepage distance and clearance (according to IEC/EN 60664-1)	▪4 kV / 9.4 mm ▪Pollution degree 3			
IP degree of protection Terminal block (according to IEC/EN 60529)	IP20			
IP degree of protection Housing (according to IEC/EN 60529)	IP30			
IP degree of protection Front face (according to IEC/EN 60529)	IP50			
Vibration resistance (according to IEC/EN 60255-21-1)	▪20 m/s² ▪10 Hz →150 Hz			
Relative humidity no condensation (according to IEC/EN 60068-2-30)	2 x 24 hr cycle 95 % RH max. without condensation 55 °C			
Electromagnetic compatibility - Immunity to electrostatic discharges (according to IEC/EN 61000-4-2)	Level III (Air 8 kV / Contact 6 kV)			
Immunity to radiated, radio-frequency, electromagnetic field (according to IEC/EN 61000-4-3)	▪ Level I (1 V/m: 2.0 GHz →2.7 GHz) ▪ Level II (3 V/m: 1.4 GHz →2.0 GHz) ▪ Level III (10 V/m: 80 MHz →1 GHz)			

	MWG	MWU	MWA	MWUA
Immunity to rapid transient bursts (according to IEC/EN 61000-4-4)	Level III (direct 2 kV / Capacitive coupling clamp 1 kV)			
Immunity to shock waves on power supply (according to IEC/EN 61000-4-5)	Level III (2 kV / common mode 2 kV / residual current mode 1 kV)			
Immunity to radio frequency in common mode (according to IEC/EN 61000-4-6)	Level III (10V rms: 0.15 MHz → 80 MHz)			
Immunity to voltage dips and breaks (according to IEC/EN 61000-4-11)	▪ 0 % residual voltage, 1 cycle ▪ 70 % residual voltage, 25/30 cycles			
Mains-borne and radiated emissions (according to EN55032 (CISPR22), EN55011 (CISPR11))	Class B			
Fixing: Symmetrical DIN rail (according to IEC/EN 60715)	35 mm			
Mounting position	All positions			
Drop to concrete floor (according to IEC/EN IEC 60068-2-31)	High: 1m			
Rigid connecting capacity without ferrule	▪ 1 x 4² - 2 x 2.5² mm² ▪ 1 x AWG11 - 2 x AWG14			
Flexible connecting capacity with ferrule	▪ 1 x 2.5² - 2 x 1.5² mm² ▪ 1 x AWG14 - 2 x AWG16			
Tightening torque (according to IEC 60947-1)	0.5…0.6N.m			
Housing material (according to IEC/EN 60695-2-11)	▪ Self-extinguishing ▪ Incandescent wire test			
Shock and bump tests (according to IEC/EN 60255-21-2)	15 g - 11 ms			
Short interruption on power line (according to IEC/EN 61000-4-11)	0% residual voltage, 250/300 cycles			
Delivery: open terminals	True			
Type of electric connection	Screw connection			
Outline Dimensions				
Depth (mm)	69			
Height (mm)	90			
Weight (g)	80			
Width (mm) according to DIN 43880	17.5			
International Directives & Conformity Certification				
RoHS 2015/863/UE	Yes			
REACh regulation N°1907/2006/CE	Yes			
UK REACh regulation 2023 N°722	Yes			
LVD 2014/35/UE	Yes			
Directive 2012/19/EU	Yes			
European Directive 2005/20/CE	Yes			
ISO 14001: 2015	Yes			
Certification CE	Yes			
Certification UL	Yes			
Certification UKCA	Yes			
Certification CCC	Yes			

Principles

3-phase network control relays monitor:

- The correct sequence of phases L1, L2, L3 - Total phase failure,
- Undervoltage and overvoltage from 2 → 20 % of Un,
- Asymmetry rate from 5 → 15 % of Un,
- LEDs are used for fault signalling.

If a fault persists for longer than the threshold crossing delay configured by the user, the output relay opens and the LED R is extinguished.

Voltage selector switch:

Set the selector switch to the 3-phase network voltage Un.

The position of this selector switch is only taken into account when the unit is powered up.

If the switch position changes while the unit is operating, all the LEDs flash but the product continues to work normally with the voltage selected on energisation prior to the change of position.

The LEDs return to their normal state if the switch is reset to its initial position defined before the last energisation.

Definition of asymmetry setting = Nominal voltage between phases (Un) x asymmetry rate (%) displayed on front face.

Operating principles

MWG: Phase controller with voltage regeneration

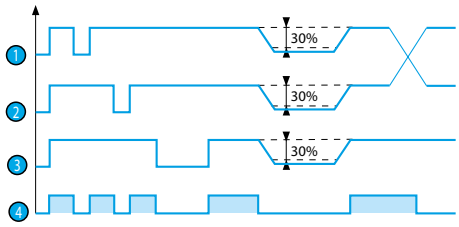
The relay monitors its own supply voltage.

The relay controls:

- Correct sequencing of the three phases
- Failure of one of the three phases (U measured < 0.7 x Un).

In the event of a phase sequence or failure fault, the relay opens instantaneously.

When the unit is powered up with a measured fault, the relay stays open.



1. Phase L1
2. Phase L2
3. Phase L3
4. Relay

MWU: Phase controller with voltage and undervoltage regeneration

The relay monitors its own supply voltage.

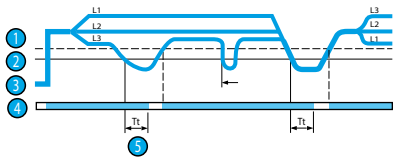
The relay controls:

- Correct sequencing of the three phases
- Failure of one of the three phases (U measured < 0.7 x Un).
- Undervoltage, adjustable from -2 → -20 % of Un (-2 → -12 % across the 3 x 208 V range and -2 → 17 % for the 3 x 220 V range due to the minimum voltage 183 V~).

In the event of a phase sequence or failure fault, the relay opens instantaneously.

In the event of a voltage fault, the relay opens at the end of the time delay set by the user.

When the unit is powered up with a measured fault, the relay stays open.



1. Hysteresis
2. Undervoltage
3. Phases L1, L2, L3
4. Relay
5. Temps de réponse à l'apparition d'un défaut (Tr)

MWA: Phase controller with voltage and asymmetry regeneration

The relay monitors its own supply voltage.

The relay controls:

- Correct sequencing of the three phases
- Failure of one of the three phases (U measured < 0.7 x Un).
- Asymmetry, adjustable from 5 → 15 % of Un.

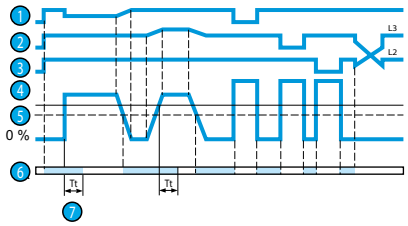
In the event of a phase sequence or failure fault, the relay opens instantaneously.

In the event of an asymmetry fault, the relay opens at the end of the time delay set by the user.

When the unit is powered up with a measured fault, the relay stays open.

Asymmetry is defined as follows: (Vrms max. - Vrms min.) /Vrms mains.

Vrms mains corresponds to the voltage selected by the switch on the front face.



1. Phase L1
2. Phase L2
3. Phase L3
4. Asymmetry threshold
5. Hysteresis
6. Relay
7. Delay on threshold crossing (Tt)

MWUA: Phase controller with voltage regeneration + Asymmetry + Under/Overvoltage

The relay monitors its own supply voltage.

The relay controls:

- Correct sequencing of the three phases
- Failure of one of the three phases (U measured < 0.7 x Un).
- Asymmetry, adjustable from 5 to 15 % of Un,

and the under and overvoltage drift adjustable from 2 → 20 % of Un (-2 → -12 % across the 3 x 208 V∿ range, -2 → -17 % across the 3 x 220 V∿ range due to the minimum voltage 183 V∿ ; +2 to +10 % across the 3 x 480 V∿ range due to the maximum voltage 528 V∿).

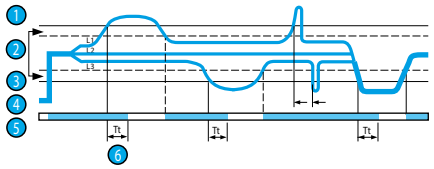
In the event of a phase sequence or failure fault, the relay opens instantaneously.

In the event of an asymmetry or voltage fault, the relay opens at the end of the time delay set by the user.

When the unit is powered up with a measured fault, the relay stays open.

Asymmetry is defined as follows: (Vrms max. - Vrms min.) /Vrms mains.

Vrms mains corresponds to the voltage selected by the switch on the front face.

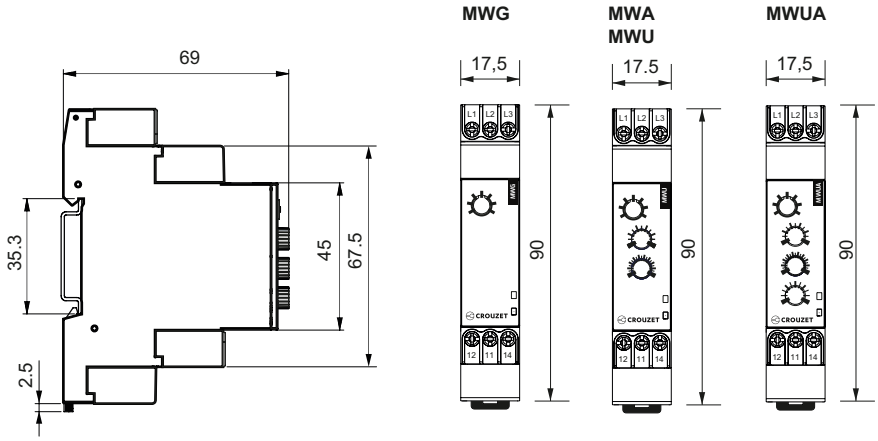


1. Overvoltage
2. Hysteresis
3. Undervoltage
4. Phase L1-L2-L3
5. Relay
6. Delay on threshold crossing (Tt)

Product Dimensions

Front and Side

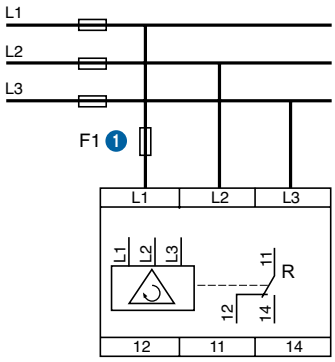
MWG-MWU-MWA-MWUA



Electronic & Wiring Diagrams

Connections

MWG-MWU-MWA-MWUA



1 100 mA fast-blow fuse