› Monitoring Relays
Voltage Control Relays
Voltage (under and over) detection with memory function

- › Overvoltage or undervoltage control with Selectable latching (memory) function
- › Adjustable time delays
- › Control of AC and DC voltages
- › True RMS measurement
- › LED status indication

MUS12

Selection guide					
Type	**Function**	**Measuring range**	**Output**	**Power Supply**	**Part-Numbers**
MUS12	Over and Undervoltage / Selectable latching memory function	9→ 15 V⎓	1 x 5 A (changeover)	12 V⎓	**84872140**

	MUS12
Timing	
Timing	0.1 → 10 s (0, +10 %)
Repetition accuracy with constant parameters (according to IEC/EN 60255-1)	± 0.5 %
Power ON delay	500 ms in AC / 1 s in DC
Reset time max (ms)	1500
Supply	
Voltage type for actuating	DC
Rated control supply voltage Un at DC	12 V
Operating range	7 → 20 V⎓
Polarity with DC voltage	Yes
Galvanic isolation of power supply/Input circuit	No
Galvanic isolation of power supply/Output circuit	Yes
Galvanic isolation of Input circuit/Output circuit	Yes
Immunity from micro power cuts: typical	10 ms
Maximum Power consumption at Un	DC: 1 W
Insulation	
Rated Insulation voltage (according to IEC/EN 60664-1)	250 V
Insulation coordination (according to IEC/EN 60664-1)	Overvoltage category III; pollution degree 3
Insulation resistance between supply and Input circuit (according to IEC/EN 60664-1 and IEC/EN 60255-27)	> 1 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

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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**

	MUS12
Input and measuring specifications	
Measurement range	9 → 15 V⎓
Display accuracy (according to IEC/EN 60255-1)	± 10 % of full scale
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	9 →15 V⎓
Frequency of measured signal	0 Hz
Max. measuring cycle time	250 ms / True RMS measurement
Voltage threshold hysteresis	5 →20 % of threshold
Output specifications	
Maximum switching power (resistive)	2500 VA / 300 W
Maximum rate (at max switching power)	360 operations/hour at full load
Maximum breaking current	10 AAC 250 V∿ resistive 10 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	5 A
Voltage breaking capacity (according to IEC/EN 60255-1)	250 V∿ / 8 AAC resistive 125 V⎓ / 0.3 A resistive
Electrical life (operations)	1 x 10^5
Mechanical life (operations)	1 x 10^7
1 or 2 changeover relays, AgNi (cadmium-free)	1 C/O
Functions	
Automatic recognition of AC/DC	False
Overvoltage and undervoltage control	False
Overvoltage or undervoltage control Selectable latching (memory) function	True
Control of AC and DC voltages	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)	2051292.44
MTTF (according to IEC/TR 62380)	230 years
Led status indicator	▪ Un: Green LED (power on) ▪ R: Yellow LED (relay status ON) ▪ OFF LED (under/overvoltage) ▪ Flashing LED during time delay ▪ Un, R: Flashing LED (Position error) ▪ No Tt LED
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

	MUS12
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)
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)	63.1
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
Recycling notice	Yes
Certification UK CA	Yes
Certification CCC	Yes

Principles

MUS voltage control relays monitor single-phase DC network voltages.

These products monitor their own supply voltage.

MUS relays allow the user to choose between two operating modes:

- Under/overvoltage
- With or without fault latching

An adjustable time delay, on threshold crossing, provides immunity from transient phenomena, thus preventing spurious triggering of the output relay.

Operating principles

MUS12 - Under/Overvoltage controller

The operating mode is set by the user.

A switch is used to select under or overvoltage modes, with or without latching.

The switch position, and hence the operating mode, is read by the product on energisation.

If the switch is set to a non-conforming position, the product goes into fault mode, the output relay stays open, and the LEDs flash to signal the position error.

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.

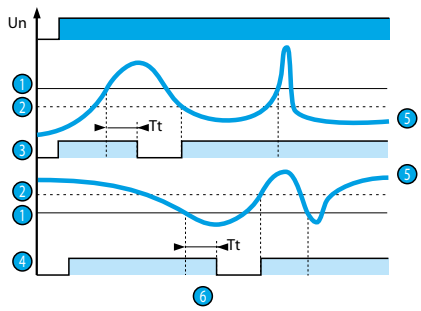
The under or overvoltage threshold value is set by a graduated potentiometer by reading the Un scale to be monitored directly. The hysteresis is set by a graduated potentiometer from 5 to 20 % of the preset threshold.

The hysteresis value cannot be higher than the extremes of the measurement range. In overvoltage mode, if the controlled voltage exceeds the preset threshold for longer than the time set on the front face (0.1 to 10 s), the output relay opens and LED R is extinguished. During the time delay, this LED flashes.

Once the voltage falls below the threshold value minus the hysteresis, the relay closes instantaneously. In undervoltage mode, if the controlled voltage falls below the preset threshold for longer than the time set on the front face (0.1 to 10 s), the output relay opens and LED R is extinguished. During the time delay, this LED flashes.

Once the voltage rises above the threshold value plus the hysteresis, the relay closes instantaneously.

MUS - With Memory OFF

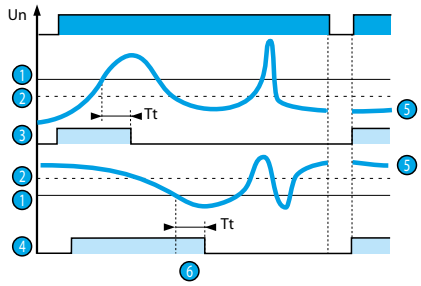


1. Threshold
2. Hysteresis
3. Overvoltage function relay
4. Undervoltage function relay
5. Controlled signal
6. Delay on threshold crossing (Tt)

MUS - Under/Overvoltage controller

MUS - With Memory ON

If "with memory" mode has been selected, the relay opens and stays in this position when threshold crossing is detected. The power supply must be disconnected to reset the product.



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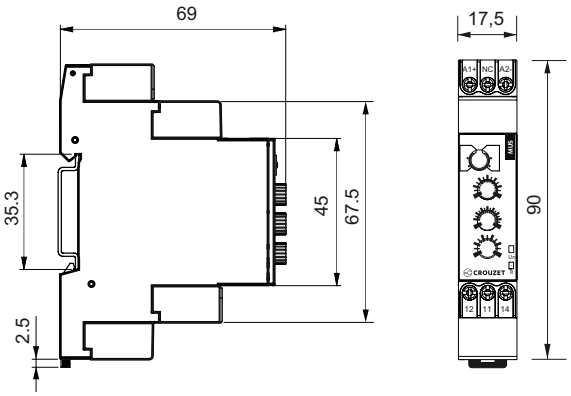
6. Delay on threshold crossing (Tt)

Product Dimensions

Front and Side

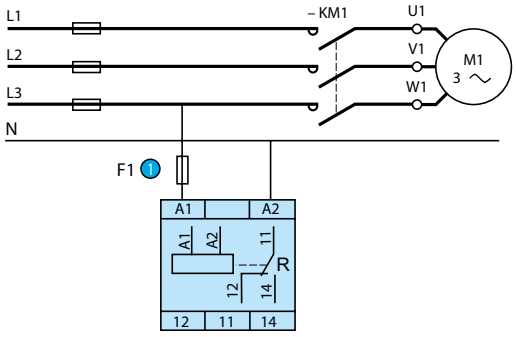
MUS12



Electronic & Wiring Diagrams

Connections

MUS12



1. 1A fast-blow fuse or cut-out