



■ Close supervision



■ Simplicity of use



■ Productivity gains



Control relays

C-Lynx

Instinctive control

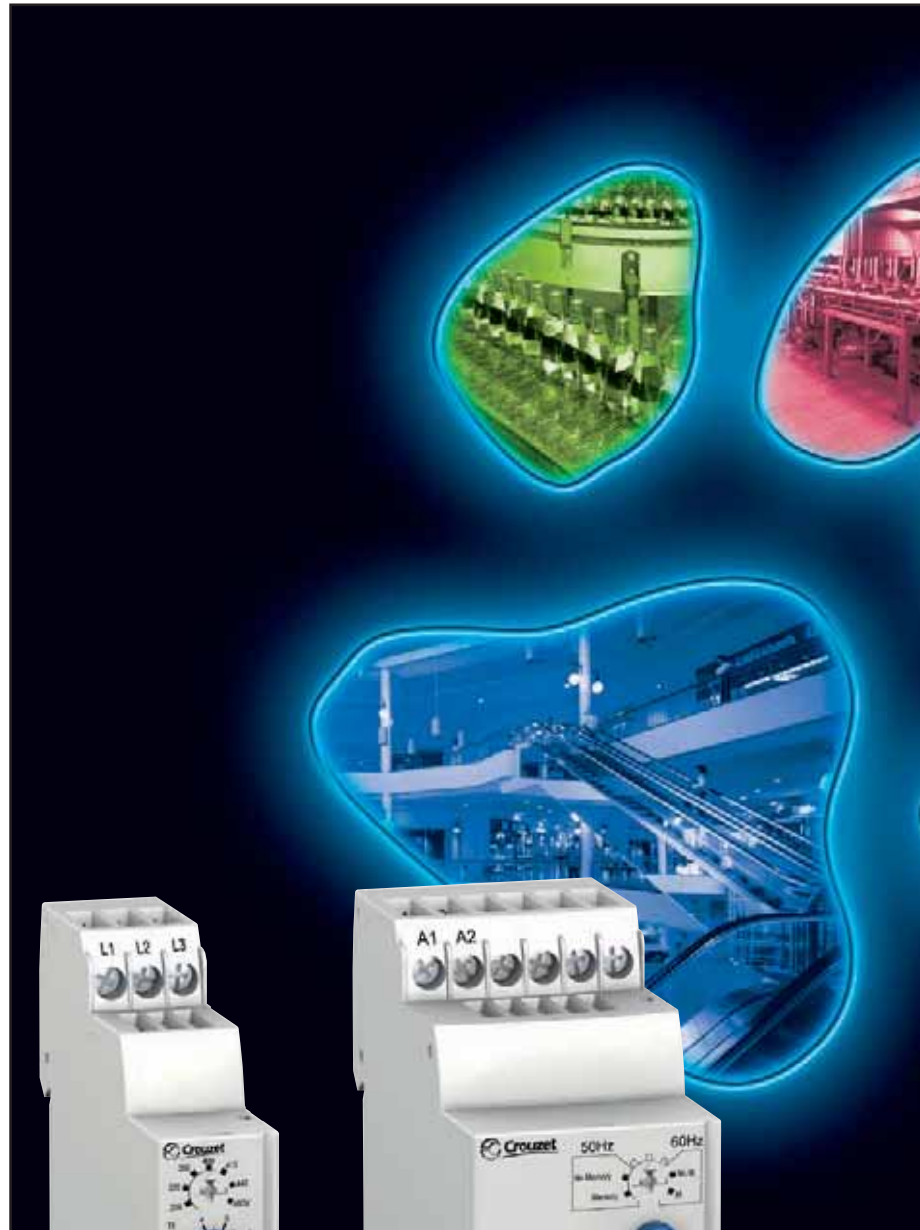


3 good reasons for installing

1 Close-up protection for total availability of equipment!

By installing a control relay, the user can be informed of abnormal operating conditions, and is therefore able to take the necessary action to correct the fault by stopping the machine briefly before expensive breakdowns occur.

A major challenge for industry is to improve the availability of production tools, for which the close supervision and protection offered by **C-Lynx** is the perfect solution. It therefore makes sense for every device to be monitored by a **C-Lynx** control relay. Each device or machine would therefore be able to complete its allotted task at the appropriate time.



MWA



HHZ



a control relay in your equipment



2 All anomalies are detected!

Control relays monitor and detect abnormal operating conditions of an electrical or physical value (voltage, current, phase, level) in any device, even the most specialised (hoist, machine, motor, conveyor, etc).

If an anomaly is detected, the control relays emit a visible signal and trigger a change in the output contacts.

3 Optimise continuity of service

In industrial and commercial installations, every device should be monitored by a **C-Lynx** control relay so as to optimise continuity of service.

The control relay enables the operator to initiate maintenance operations or corrective actions to avoid production shutdowns.

Result:
**Improved operation and
productivity for your
installation!**

**By using control relays,
you optimise your
production management
and reduce incidents which
could adversely affect
your productivity.**

C-Lynx, control relays dedicated

Supervision of motors, lifts, hoists, conveyor belts, packaging and air extraction, pumping... from standard products to bespoke products, **C-Lynx** control relays adapt to a multitude of applications, to meet all your requirements.

1 Supervision of Motors

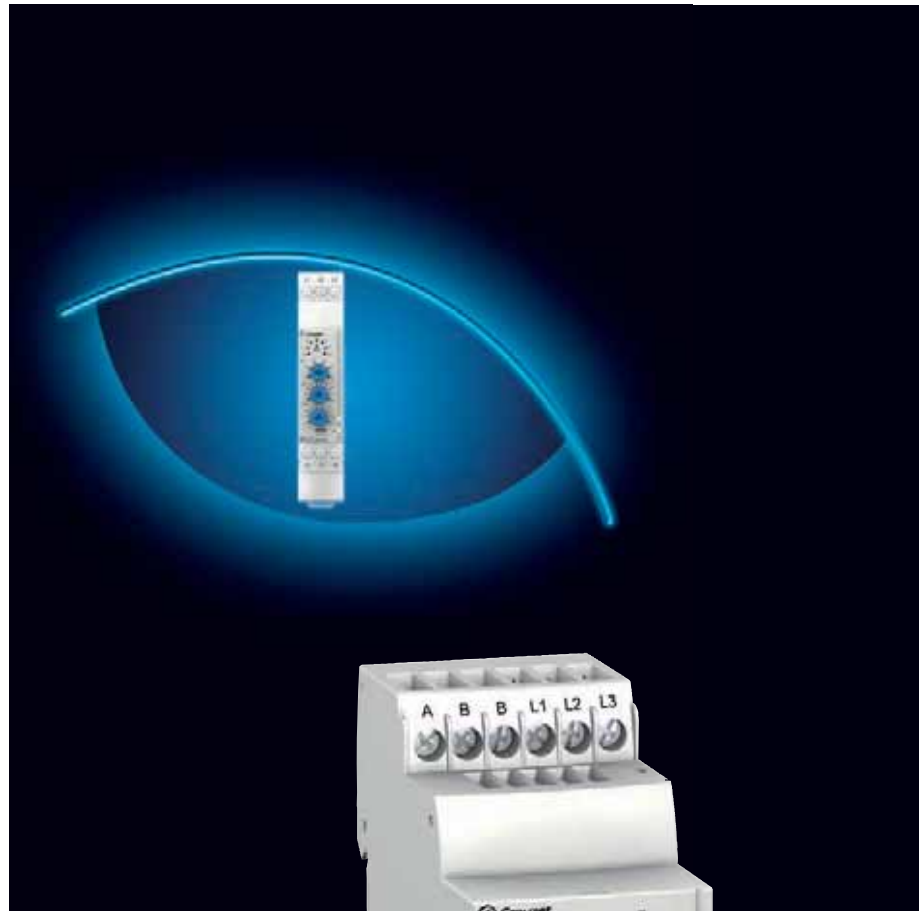
On 3-phase supplies, **C-Lynx** control relays check phase sequence and phase failure preventing a change in direction of rotation, and single-phase operating modes. They therefore avoid overheating faults linked to phase imbalance.

2 Temperature control in lifts

C-Lynx temperature control relays monitor the ambient temperature of service rooms or lift pulley rooms, to check that it remains with the statutory limits (between 5°C and 40°C) in compliance with **standard EN 81**.

3 HVAC

Heating, cooling, air conditioning or extraction... **C-Lynx** control relays stop the motor to protect the unit in the event of current, phase and/or supply voltage faults.



■ Lifts

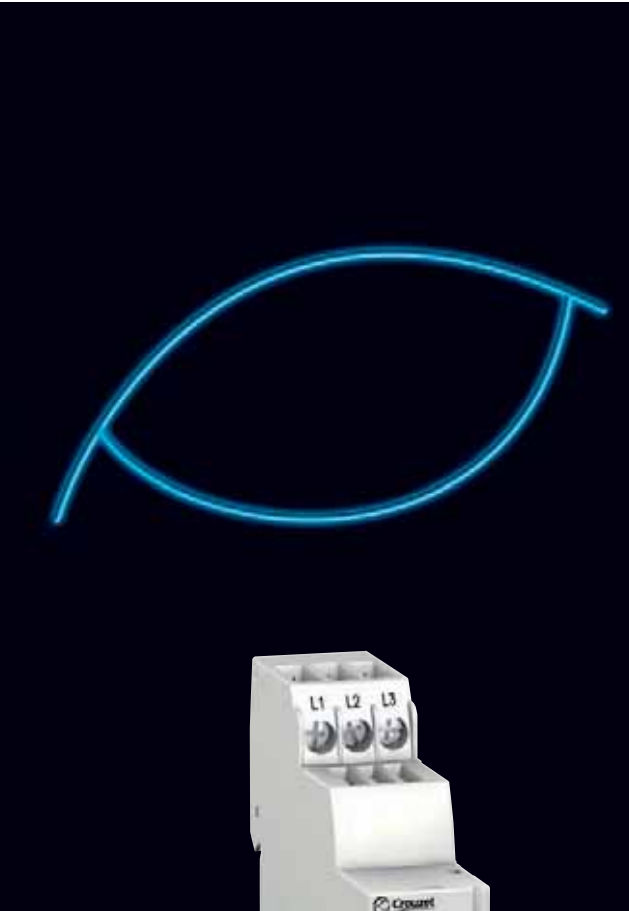


■ Air conditioning units



HWT81

to your applications



MWG

4 Pump and level control

Agricultural applications, watering, irrigation, drying, pressure surge, lift pumps and fire pumps, distribution and treatment of water, etc. **C-Lynx** control relays are used to manage and protect equipment by current measurement and phase monitoring. **C-Lynx** control relays can also be used to control emptying and filling levels.



Pumps

5 Load monitoring

Conveying, packaging, assembly or bottling lines, grinders, crushers, etc. **C-Lynx** control relays monitor overloads on driving motors and detect any jamming.



Conveyors

6 Speed monitoring

Whatever the application, **C-Lynx** control relays react and alert the operator if the machine operating rate is abnormally high or low.



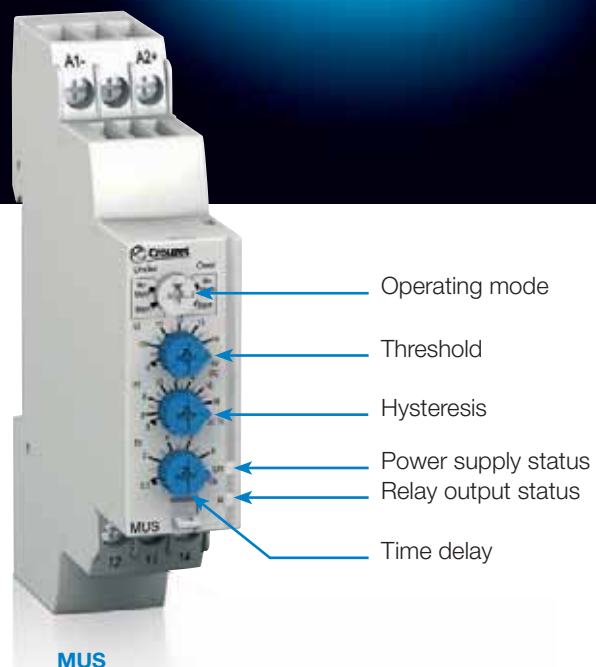
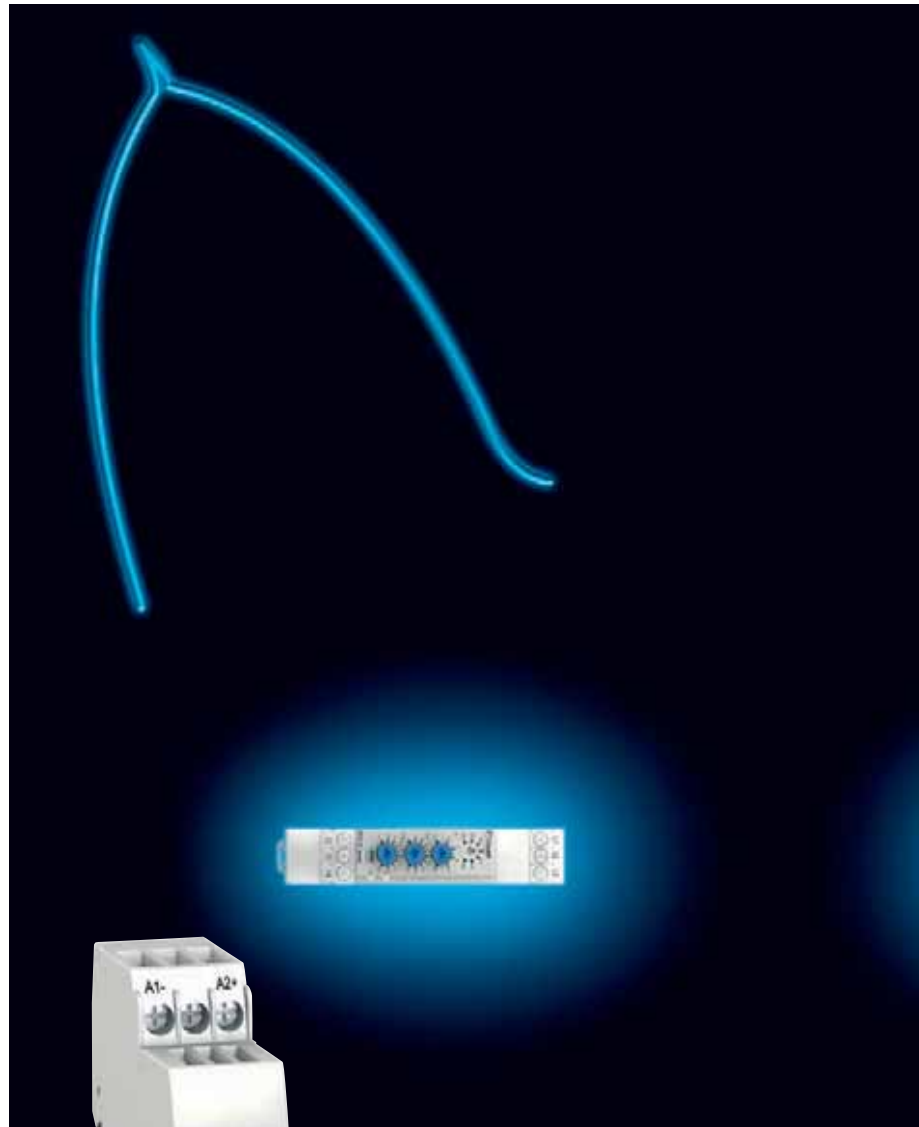
Escalators

C-Lynx control relays can adapt to both standard and specialist applications.

C-Lynx, all functions ready

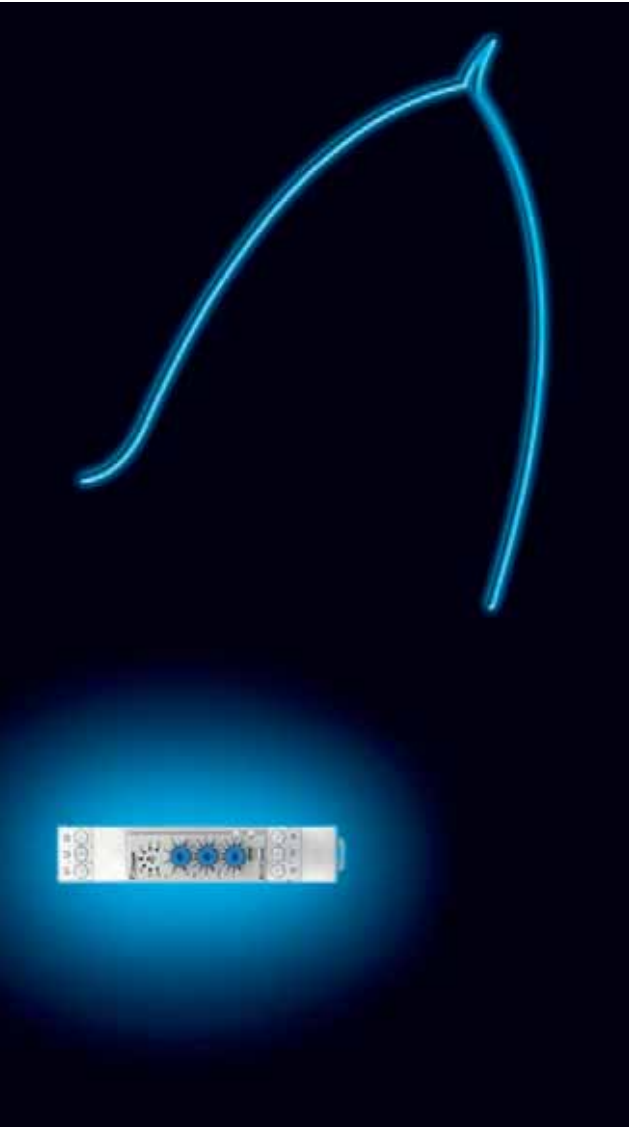
1 The strong points of C-Lynx

- The combination of **several functions** in the same housing optimises your wiring time and simplifies installation.
- **The new 17.5 mm modular format** considerably reduces the dimensions of your equipment.
- **The Easy to use function:** the visual LED interface informs you of operating faults in your installation and any errors made when setting the parameters.
- **The new-generation built-in multi-voltage power supplies** optimise the number of parts and simplify product selection.
- **Eco-design:** **C-Lynx** control relays have been developed in accordance with the principles of eco-design (choice of materials, manufacturing process, energy consumption and component recycling). The recycling rate for these control relays is higher than that imposed by the WEEE (Waste Electrical and Electronic Equipment) European directive.
- **C-Lynx** control relays comply with **all the required electrical standards** and are easily integrated in your electrical equipment.





to adapt to your equipment



Custom'able label



Crouzet can satisfy all your automation requirements, from custom components to the most dedicated product. Throughout the world Crouzet provides technical and industrial expertise to ensure that its products are perfectly customised and adapted for integration in any of your equipment.

This is why Crouzet guarantees customisation or adaptation of the whole range of **C-Lynx** control relays.

2 Adaptability: C-Lynx's trump card

The Crouzet design office can create control relays tailored to suit your needs, based on your specification.

Crouzet offers you the following adaptations:

- Adaptation of the level of regeneration for phase failure checks,
- Conversion of adjustable products into products with a fixed threshold,
- Adaptation of input voltage ranges and measurement ranges,
- Modification of timing ranges and addition of fixed values, etc,
- Possibility of customising colours and labelling, etc.



■ Ease of reading

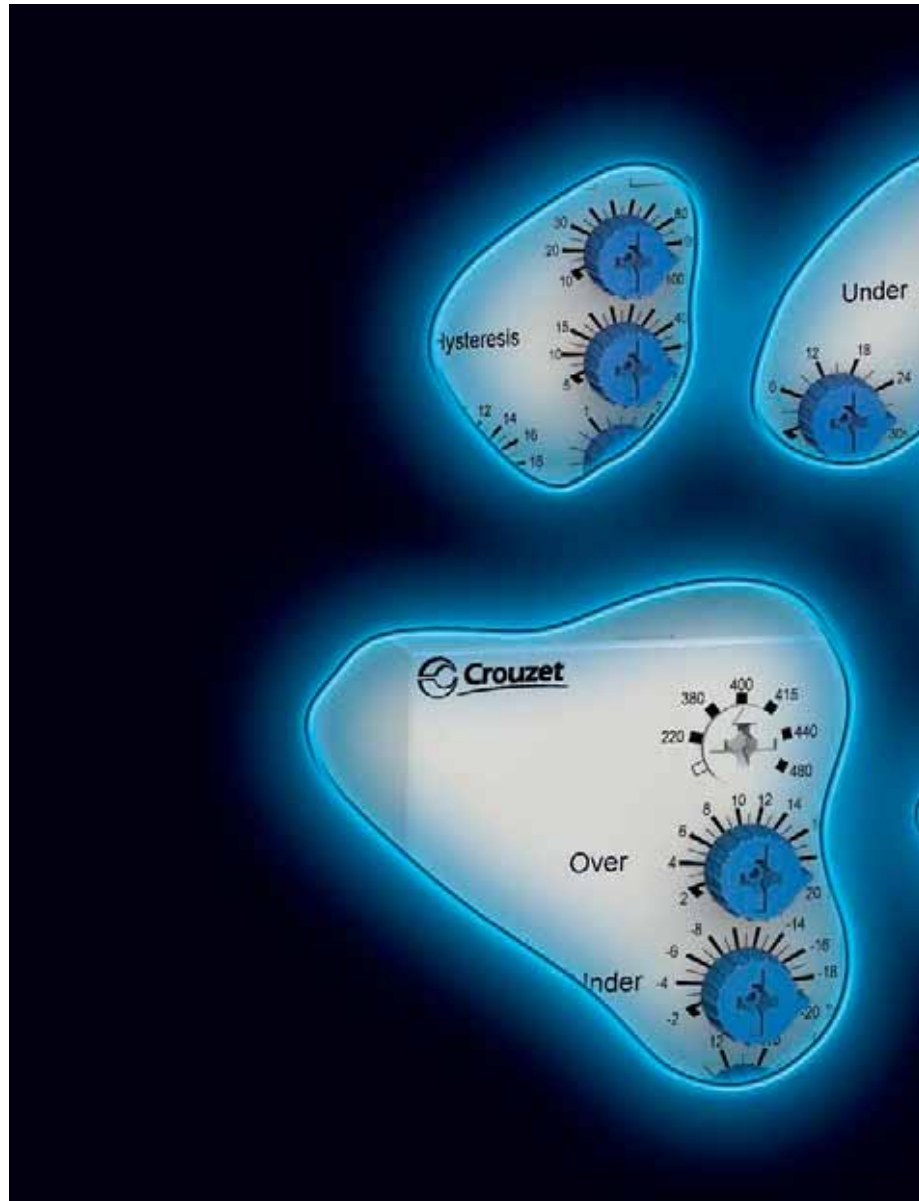


■ Simplified connections

C-Lynx by Crouzet: a complete collection of

1 New features of the C-Lynx range

- **Positive logic output** also indicating loss of power supply,
- **True RMS measurement:** even if the sine waves are distorted, the measurement is correct,
- **Reduction in the number of housing sizes:** with a 17.5 mm and 35 mm **modular** compact format, **C-Lynx** control relays can be integrated more easily in industrial and commercial cabinets,
- **Built-in universal power supplies:** a version with power supply for single-phase products and a self-powered version for 3-phase products,
- **Adjustable time delay** on crossing thresholds, thus avoiding transient faults,
- **Settings can be protected** by fitting a sealable cover,
- **Very clear display** of control status via LEDs.



H3US



MUSF



HIH



HHZ

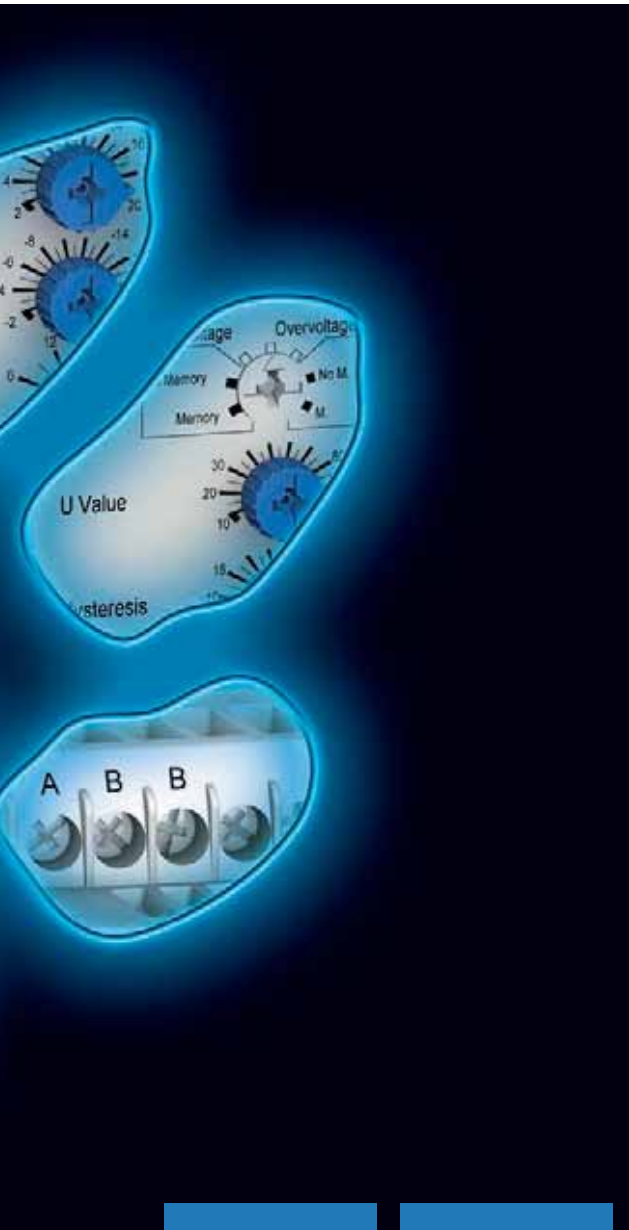


HPC



MNS

control relays



2 A complete range of standard control relays

To satisfy all your automation requirements, Crouzet offers you an extensive range of standard control relays.

- **Phase control relays** (MWS, MWS2, MWG, MWU, MWA, MWUA, HWUA, H3US, H3USN, M3US) :
 - presence and regeneration, phase sequence, phase, balance and level of asymmetry (or balance),
 - adjustment of voltage thresholds.
- **Voltage control relays** (MUS, MUSF, HUL, HUH) :
 - overvoltage, undervoltage control,
 - self-powered versions.
- **Current control relays** (MIC, HIL, HIH) :
 - overcurrent and undercurrent control,
 - version with built-in current transformer.
- **Frequency control relays** (HHZ) :
 - Overfrequency and underfrequency control of the 50 or 60 Hz AC signal.
- **Pump control relays** (HPC) :
 - control of single-phase or 3-phase pumps,
 - dry run and overload protection,
 - 3-phase control.
- **Level control relays** (HNM, MNS, HNE) :
 - automation of filling and emptying cycles,
 - high or low level information,
 - check for presence of a conductive or non-conductive liquid by temperature probe or discrete sensor.
- **Speed control relays** (HSV) :
 - monitoring of pulse rates,
 - overspeed and underspeed control, rotation or movement control.
- **Lift temperature control relays** (HT81, HT81-2, HWT81) :
 - temperature monitoring in machine rooms and lift pulley rooms in accordance with **standard EN 81**,
 - version with built-in phase control,
 - phase failure with regeneration up to 70%.
- **Phase and temperature control relays** (HWTM, HWTM2) :
 - 3-phase network control,
 - motor temperature control with PTC probe test and memory function on temperature control.

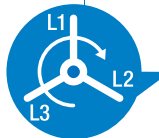


HSV



HT 81

Selection guide



Designation	Part number	Description	Operating conditions
Phase control			
MWS	84873020	Phase failure and phase sequence	–
MWS2	84873021	Phase failure and phase sequence	–
MWG	84873022	Phase failure and phase sequence	Regeneration 70% of Un
MWU	84873023	Phase failure and phase sequence	Regeneration 70% of Un
		Undervoltage	Phase/phase Un: 208/220/380/400/415/440/480 V AC
MWA	84873024	Phase failure and phase sequence	Regeneration 70% of Un
		Asymmetry	–
MWUA	84873025	Overtoltage/undervoltage (window)	Phase/phase Un: 208/220/380/400/415/440/480 V AC
		Asymmetry	–
		Phase failure and phase sequence	–
HWUA	84873026	Overtoltage	Phase/phase Un: 220/380/400/415/440/480 V AC
		Asymmetry	–
		Undervoltage	Phase/phase Un: 220/380/400/415/440/480 V AC
		Phase failure and phase sequence	–
H3US	84873220	Phase failure	–
		Undervoltage	Phase/phase Un: 220/380/400/415/440/480 V AC
		Overtoltage	Phase/phase Un: 220/380/400/415/440/480 V AC
H3USN	84873221	Loss of phase and neutral	–
		Undervoltage	Phase/neutral Un: 120/127/220/230/240/260/277 V AC
		Overtoltage	Phase/neutral Un: 120/127/220/230/240/260/277 V AC
M3US	84873222	Phase failure	–
		Undervoltage	Phase/phase Un: 208/220/380/400/415/440/480 V AC
		Overtoltage	Phase/phase Un: 208/220/380/400/415/440/480 V AC



Voltage control			
MUS12DC	84872140	Undervoltage or overvoltage	–
MUS80ACDC	84872141	Undervoltage or overvoltage	–
MUS260ACDC	84872142	Undervoltage or overvoltage	–
MUSF80ACDC	84872151	Overtoltage/undervoltage (window)	–
MUSF260ACDC	84872152	Overtoltage/undervoltage (window)	–
HUL	84872120	Undervoltage or overvoltage	–
HUH	84872130	Undervoltage or overvoltage	–



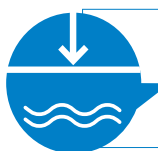
Current control			
MIC	84871122	Overcurrent (or undercurrent)	Via built-in current transformer
HIL	84871120	Undercurrent or overcurrent	–
HIH	84871130	Undercurrent or overcurrent	–

Control values	Supply voltage	Time delay	Output relay
208-480 V AC 50/60 Hz	Self-powered 208-480 V AC	–	1 single changeover relay (1 SPDT) 5 A
208-440 V AC 50/60 Hz	Self-powered 208-440 V AC	–	2 single changeover relay (2 SPDT) 5 A
208-480 V AC 50/60 Hz	Self-powered 208-480 V AC	–	1 single changeover relay (1 SPDT) 5 A
208-480 V AC 50/60 Hz -20% to -2%	Self-powered 208-480 V AC	0.1 s to 10 s	1 single changeover relay (1 SPDT) 5 A
208-480 V AC 50/60 Hz 5% to 15%	Self-powered 208-480 V AC	0.1 s to 10 s	1 single changeover relay (1 SPDT) 5 A
208-480 V AC 50/60 Hz -20% to -2% +2% to +20% 5% to 15%	Self-powered 208-480 V AC	0.1 s to 10 s	1 single changeover relay (1 SPDT) 5 A
208-480 V AC 50/60 Hz +2% to +20% 5% to 15% -20% to -2%	Self-powered 220-480 V AC	0.1 s to 10 s	1 double changeover relay (1 DPDT) 2 x 5 A
220-480 V AC 50/60 Hz 220-480 V AC 50/60 Hz -20% to -2% +2% to +20%	Self-powered 220-480 V AC	0.3 s to 30 s	2 single changeover relay (2 SPDT) 5 A
120-277 V AC 50/60 Hz -20% to -2% +2% to +20%	Self-powered 120-277 V AC	0.3 s to 30 s	2 single changeover relay (2 SPDT) 5 A
208-480 V AC 50/60 Hz -20% to -2% +2% to +20%	Self-powered 208-480 V AC	0.3 s to 30 s	1 single changeover relay (1 SPDT) 5 A
9-15 V DC	Self-powered 12 V DC	0.1 s to 10 s	1 single changeover relay (1 SPDT) 5 A
20-80 V AC/DC	Self-powered 24-48 V AC/DC	0.1 s to 10 s	1 single changeover relay (1 SPDT) 5 A
65-260 V AC/DC	Self-powered 110-240 V AC/DC	0.1 s to 10 s	1 single changeover relay (1 SPDT) 5 A
20-80 V AC/DC	Self-powered 24-48 V AC/DC	0.1 s to 10 s	1 single changeover relay (1 SPDT) 5 A
65-260 V AC/DC	Self-powered 110-240 V AC/DC	0.1 s to 10 s	1 single changeover relay (1 SPDT) 5 A
0.2 V to 2 V 1 V to 10 V 6 V to 60 V	24-240 V AC/DC 50/60 Hz	0.1 s to 3 s	1 double changeover relay (1 DPDT) 2 x 5 A
15 V to 150 V 30 V to 300 V 60 V to 600 V	24-240 V AC/DC 50/60 Hz	0.1 s to 3 s	1 double changeover relay (1 DPDT) 2 x 5 A
2 A to 20 A	24-240 V AC/DC 50/60 Hz	–	1 single changeover relay (1 SPDT) 5 A
2 mA to 20 mA 10 mA to 100 mA 50 mA to 500 mA	24-240 V AC/DC 50/60 Hz	0.1 s to 3 s	1 double changeover relay (1 DPDT) 2 x 5 A
0.1 A to 1 A 0.5 A to 5 A 1 A to 10 A	24-240 V AC/DC 50/60 Hz	0.1 s to 3 s	1 double changeover relay (1 DPDT) 2 x 5 A

Selection guide



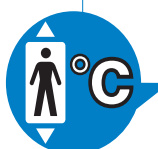
Designation	Part number	Description	Operating conditions
Frequency control			
HHZ	84872501	Underfrequency and overfrequency (window)	50 Hz or 60 Hz



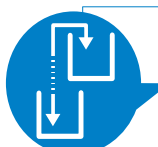
Level control			
HNM	84870700	Filling or emptying with conductive liquids	1 or 2 levels
MNS	84870720	Filling	–
HNE	84870710	Filling or emptying	1 or 2 levels



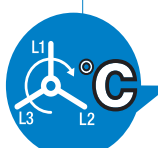
Speed control			
HSV	84874320	Underspeed or overspeed	–



Temperature control in lifts according to EN 81			
HT81	84874110	Undertemperature and overtemperature (window)	–
HT81-2	84874120	Undertemperature and overtemperature (window)	–
HWT81	84874130	Undertemperature and overtemperature (window)	–
		Phase failure and phase sequence	Regeneration 70% of Un



Pump and level control			
HPC	84874200	Network monitoring	1 phase
			3-phase: Phase failure and phase sequence
		Undercurrent and overcurrent (window)	–



Temperature and phase control			
HWTM	84873027	Phase failure and phase sequence	–
		Thermal protection	–
HWTM2	84873028	Phase failure and phase sequence	–
		Thermal protection	–
		Test	Reset on front panel via pushbutton and remotely
		Memory	Reset on front panel via pushbutton and remotely



Control values	Supply voltage	Time delay	Output relay
40 HZ to 60 HZ 50 HZ to 70 HZ	120-277 V AC 50/60 Hz	0.1 s to 10 s	2 single changeover relay (2 SPDT) 5 A
250 Ω to 5 KΩ 5 KΩ to 100 KΩ 50 KΩ to 1 MΩ	24-240 V AC/DC 50/60 Hz	0.1 s to 5 s	1 double changeover relay (1 DPDT) 2 x 5 A
Contact input for discrete sensor	24-240 V AC/DC 50/60 Hz	0.1 s to 5 s	1 single changeover relay (1 SPDT) 5 A
Input for discrete sensor: Contact/PNP/NPN	24-240 V AC/DC 50/60 Hz	0.1 s to 5 s	1 single changeover relay (1 SPDT) 5 A
Time between controlled pulses: 0.05 s to 0.5 s 0.1 s to 1 s 0.5 s to 5 s 1 s to 10 s 0.1 mn to 1 mn 0.5 mn to 5 mn 1 mn to 10 mn	24-240 V AC/DC 50/60 Hz	0.6 s to 60 s	1 single changeover relay (1 SPDT) 5 A
3-wire PT100 input Low threshold: -1°C to +11°C High threshold: +34°C to +46°C	24-240 V AC/DC 50/60 Hz	1 s to 10 s	1 single changeover relay (1 SPDT) 5 A
3-wire PT100 input Low threshold: -1°C to +11°C High threshold: +34°C to +46°C	24-240 V AC/DC 50/60 Hz	1 s to 10 s	2 single contact relays (NO) (2 SPST) 5 A
3-wire PT100 input Low threshold: -1°C to +11°C High threshold: +34°C to +46°C	24-240 V AC/DC 50/60 Hz	1 s to 10 s	2 single contact relays (NO) (2 SPST) 5 A
208-480 V AC 50/60 Hz			
230 V AC 50/60 Hz	Self-powered (1 or 3 phases)	1 s to 60 s on power-up 0.1 s to 10 s on threshold crossing	1 single changeover relay (1 SPDT) 5 A
208-480 V AC 50/60 Hz			
1 A to 10 A AC			
208-480 V AC 50/60 Hz Thermistor with automatic reset	24-240 V AC/DC	–	2 single contact relays (NO) (2 SPST) 5 A
208-480 V AC 50/60 Hz Thermistor with automatic reset	24-240 V AC/DC	–	2 single contact relays (NO) (2 SPST) 5 A
–			
–			

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Phase control

→ Single function phase control relay - 17.5 mm

- Control of 3-phase networks: phase sequence, total phase failure
- Multi-voltage from 3 x 208 to 3 x 480 V ~
- Controls its own supply voltage
- True RMS measurement
- LED status indication



MWS



MWS2

Part numbers

	MWS	MWS2
Function	Phase sequence and failure	Phase sequence and failure
Nominal voltage (V)	3 x 208 → 3 x 480 V ~	3 x 208 → 3 x 440 V ~
Output	1 single pole changeover relay	2 single pole changeover relay
Part numbers	84873020	84873021

Product adaptations



- Customisable colours and labels

Accessories

Description	Code
Removable sealable cover for 17.5 mm casing	84800000

General characteristics

	MWS	MWS2
Supply		
Supply voltage Un	3 x 208 → 3 x 480 V ~ *	3 x 208 → 3 x 440 V ~ *
Operating range	183 → 528 V ~	183 → 484 V ~
Inputs and measuring circuit		
Measurement ranges	183 → 528 V ~	183 → 484 V ~
General characteristics		
Weight	80 g	85 g
Comments	* 3-phase mains with earth	* 3-phase mains with earth

Phase control

MWS / MWS2

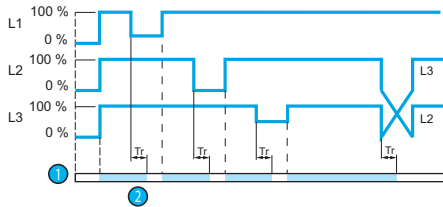
Supply	
Voltage supply tolerance	-12% / +10%
~ supply voltage frequency	50 / 60 Hz ± 10%
Galvanic isolation of power supply/measurement	No
Power consumption at Un	1.8 VA in ~
Immunity from micro power cuts	60 ms
Inputs and measuring circuit	
Guaranteed phase failure detection threshold	< 100 V ~
Frequency of measured signal	50 → 60 Hz ± 10%
Timing	
Delay on pick-up	500 ms
Alarm on delay time max.	100 ms
Output	
Type of contacts	No cadmium
Maximum breaking voltage	250 V ~ / ---
Max. breaking current	5 A ~
Min. breaking current	10 mA / 5 V ---
Electrical life (number of operations)	1 x 10 ⁵ MWS 1 x 10 ⁴ MWS2
Breaking capacity (resistive)	1250 VA ~
Maximum rate	360 operations/hour at full load
Operating categories acc. to IEC 60947-5-1	AC12, AC13, AC14, AC15, DC12, DC13
Mechanical life (operations)	30 x 10 ⁶
Insulation	
Nominal insulation voltage IEC 60664-1	400 V
Insulation coordination (IEC 60664-1 / 60255-5)	Overvoltage category III: degree of pollution 3
Rated impulse withstand voltage IEC 60664-1/60255-5	4 kV (1.2 / 50 µs)
Dielectric strength IEC 60664-1/60255-5	2 kV AC 50 Hz 1 min.
Insulation resistance IEC 60664-1 / 60255-5	> 500 MΩ / 500 V ---
General characteristics	
Output relay status indication	Yellow LED
Casing	17.5 mm
Mounting	On 35 mm symmetrical DIN rail, IEC/EN 60715
Mounting position	All positions
Material: enclosure plastic type VO to UL94 standard	Incandescent wire test according to IEC 60695-2-11 & NF EN 60695-2-11
Protection (IEC 60529)	Terminal block: IP20 Casing: IP30
Connecting capacity IEC 60947-1	Rigid: 1 x 4 ² - 2 x 2.5 ² mm ² 1 x 11 AWG - 2 x 14 AWG Flexible with ferrules: 1 x 2.5 ² - 2 x 1.5 ² mm ² 1 x 14 AWG - 2 x 16 AWG
Max. tightening torques IEC 60947-1	0.6 → 1 Nm / 5.3 → 8.8 Lbf.In
Operating temperature IEC 60068-2	-20 → +50°C
Storage temperature IEC 60068-2	-40 → +70°C
Humidity IEC 60068-2-30	2 x 24 hr cycle 95% RH max. without condensation 55°C
Vibrations according to IEC/EN60068-2-6	10 → 150 Hz, A = 0.035 mm
Shocks IEC 60068-2-6	5 g
Standards	
Marking	CE (LVD) 73/23/EEC - EMC 89/336/EEC
Product standard	NF EN 60255-6 / IEC 60255-6 / UL 508 / CSA C22.2 N°14
Electromagnetic compatibility	Immunity EN 61000-6-2/IEC 61000-6-2 Emission EN 61000-6-4/EN 61000-6-3 IEC 61000-6-4/IEC 61000-6-3 Emission EN 55022 class B
Certifications	UL, CSA, GL pending
Conformity with environmental directives	RoHS, WEEE

Principles

Overview

3-phase network control relays monitor the sequence of phases L1, L2, L3 and failure of one or more phases. LEDs are used for signalling.

MWS-MWS2 - Phase failure and sequence



- 1 MWS: Relay R
MWS2: Relays R1/R2
- 2 Response time on appearance of a fault (T_r)

Operating principle

MWS-MWS2: Phase controller

The relay monitors its own supply voltage.

The relay controls:

- correct sequencing of the three phases,
- total failure of one of the three phases.

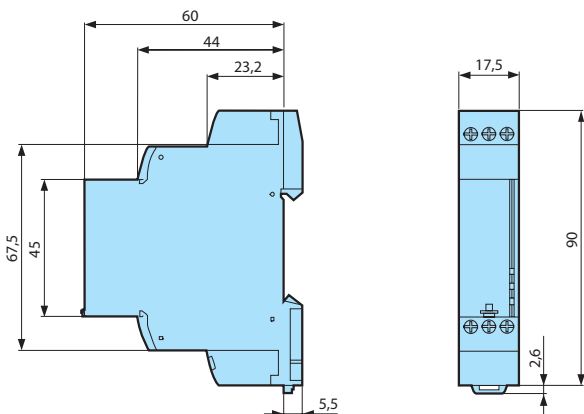
When the phase sequence and voltages are correct ($> 183 V \sim$), the output relay (s) are closed and the yellow LED is lit.

In the event of a phase sequence or total phase failure fault (detected when one of the voltages drops below 100 V), the relay opens instantly and its LED is extinguished.

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

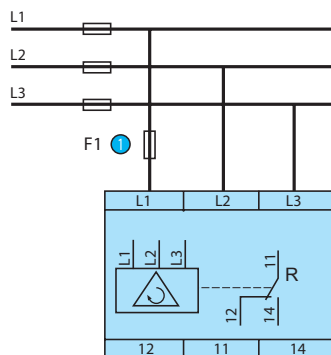
Dimensions (mm)

MWS-MWS2



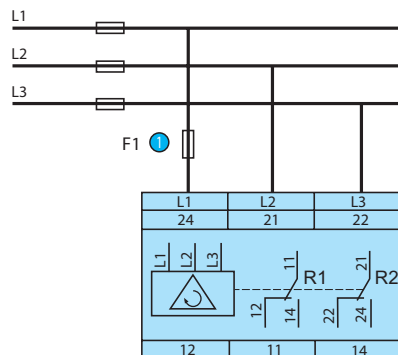
Connections

MWS



- 1 100 mA fast-blow fuse

MWS2



- 1 100 mA fast-blow fuse

Phase control

→ Multi-function phase control relay - 17.5 mm

- Control of 3-phase networks: phase sequence, phase failure, imbalance (asymmetry), over and undervoltage
- Range includes mono-function product and multi-function product
- Multi-voltage from 3 x 208 to 3 x 480 V ~
- Controls its own supply voltage
- True RMS measurement
- LED status indication



MWG



MWU



MWA



MWUA

Part numbers

Type	Functions	Nominal voltage (V)	Code
MWG	Phase sequence and failure	3 x 208 → 3 x 480 V ~	84873022
MWU	Phase sequence, failure, undervoltage	3 x 208 → 3 x 480 V ~	84873023
MWA	Phase sequence, failure and imbalance	3 x 208 → 3 x 480 V ~	84873024
MWUA	Phase sequence, failure, imbalance, under and overvoltage in window mode	3 x 208 → 3 x 480 V ~	84873025

Product adaptations



- Customisable colours and labels
 - Single voltage in the generic range
 - Adjustable fixed hysteresis
 - Fixed or adjustable time delay except for MWG
- Dedicated adaptation on MWG:**
- Adjustable regeneration rate
- Dedicated adaptation on MWU:**
- Fixed undervoltage threshold in the generic range
- Dedicated adaptation on MWA:**
- Fixed asymmetry threshold in the generic range
- Dedicated adaptations to MWUA:**
- Fixed undervoltage threshold in the generic range
 - Fixed overvoltage threshold in the generic range
 - Fixed asymmetry threshold in the generic range or adjustable 5→ 25 %

Accessories

Description	Code
Removable sealable cover for 17.5 mm casing	84800000

General characteristics

MWG / MWU / MWA / MWUA

Supply	
Supply voltage Un	3 x 208 → 3 x 480 V ~ *
Voltage supply tolerance	-12% / +10%
Operating range	183 → 528 V ~
~ supply voltage frequency	50 / 60 Hz ±10%
Galvanic isolation of power supply/measurement	No
Power consumption at Un	1.8 VA in ~
Immunity from micro power cuts	10 ms

General characteristics

Inputs and measuring circuit

Measurement ranges	183 → 528 V \sim
Selection of phase-phase nominal voltage Un	208 - 220 - 380 - 400 - 415 - 440 - 480 V
Frequency of measured signal	50 → 60 Hz \pm 10%
Max. measuring cycle time	150 ms/True RMS measurement
Voltage threshold adjustment	2 → 20% of selected Un (-2 to -12% across the 3 x 208 V \sim range / -2 to -17% across the 3 x 220 V \sim range / 2 to 10% across the 3 x 480 V \sim range)
Voltage threshold hysteresis	2% of fixed Un
Asymmetry threshold hysteresis	2% of fixed Un
Asymmetry threshold adjustment	5 to 15% of fixed Un
Display precision	\pm 3% of the displayed value
Repetition accuracy with constant parameters	\pm 0.5%
Measuring error with voltage drift	< 1% across the whole range
Measuring error with temperature drift	< 0.05%/°C
Maximum regeneration (phase failure)	70%

Timing

Delay on threshold crossing	0.1 to 10 s (0, +10%)
Repetition accuracy with constant parameters	\pm 3%
Reset time	1500 ms
Delay on pick-up	500 ms
Alarm on delay time max.	< 200 ms

Output

Type of output	1 single pole changeover relay
Type of contacts	No cadmium
Maximum breaking voltage	250 V \sim
Max. breaking current	5 A \sim
Min. breaking current	10 mA / 5 V ---
Electrical life (number of operations)	1 x 10 ⁵
Breaking capacity (resistive)	1250 VA \sim
Maximum rate	360 operations/hour at full load
Operating categories acc. to IEC 60947-5-1	AC 12, AC 13, AC 14, AC 15, DC 12, DC 13, DC 14
Mechanical life (operations)	30 x 10 ⁶

Insulation

Nominal insulation voltage IEC 60664-1	400 V
Insulation coordination (IEC 60664-1 / 60255-5)	Overvoltage category III: degree of pollution 3
Rated impulse withstand voltage IEC 60664-1/60255-5	4 kV (1.2 / 50 μ s)
Dielectric strength IEC 60664-1/60255-5	2 kV AC 50 Hz 1 min
Insulation resistance IEC 60664-1 / 60255-5	> 500 M Ω / 500 V ---

General characteristics

Display power supply	Green LED
Display relay	Yellow LED - This LED flashes during the threshold delay
Casing	17.5 mm
Mounting	On 35 mm symmetrical DIN rail, IEC/EN 60715
Mounting position	All positions
Material: enclosure plastic type VO to UL94 standard	Incandescent wire test according to IEC 60695-2-11 & NF EN 60695-2-11
Protection (IEC 60529)	Terminal block: IP20 Casing: IP30
Weight	80 g
Connecting capacity IEC 60947-1	Rigid: 1 x 4 ² - 2 x 2.5 ² mm ² 1 x 11 AWG - 2 x 14 AWG Flexible with ferrules: 1 x 2.5 ² - 2 x 1.5 ² mm ² 1 x 14 AWG - 2 x 16 AWG
Max. tightening torques IEC 60947-1	0.6 Nm → 1 / 5.3 → 8.8 Lbf.in
Operating temperature IEC 60068-2	-20 → +50°C
Storage temperature IEC 60068-2	-40 → +70°C
Humidity IEC 60068-2-30	2 x 24 hr cycle 95% RH max. without condensation 55°C
Vibrations according to IEC/EN60068-2-6	10 → 150 Hz, A = 0.035 mm
Shocks IEC 60068-2-6	5 g

Standards

Marking	CE (LVD) 73/23/EEC - EMC 89/336/EEC
Product standard	NF EN 60255-6 / CEI 60255-6 / UL 508 / CSA C22.2 N°14
Electromagnetic compatibility	Immunity EN 61000-6-2/IEC 61000-6-2 Emission EN 61000-6-4/EN 61000-6-3 IEC 61000-6-4/IEC 61000-6-3 Emission EN 55022 class B
Certifications	UL, CSA, GL pending
Conformity with environmental directives	RoHS, WEEE

Comments

* 3-phase mains with earth

Phase control

Principles

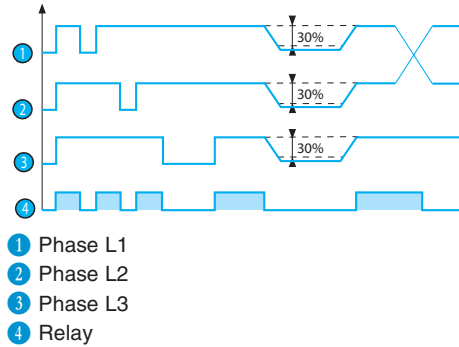
Overview

3-phase network control relays monitor:

- The correct sequence of phases L1, L2, L3
- Total phase failure
- Undervoltage and overvoltage from 2 to 20 % of U_n
- Asymmetry rate from 5 to 15% of U_n
- 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.

MWG - Phase failure and sequence (with regeneration)



Operating principle

MWG: Phase controller with voltage regeneration

Voltage selector switch:

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

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.

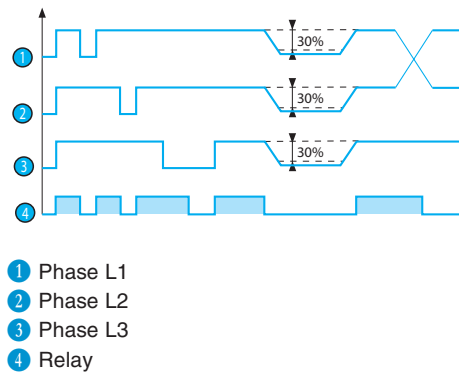
The LEDs return to their normal state if the switch is reset to its initial position defined before the last energisation.

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 $< 0.7 \times U_n$).
- 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.

MWU - Phase failure and sequence (with regeneration)



Operating principle

MWU: Phase controller with voltage and undervoltage regeneration

Voltage selector switch:

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

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.

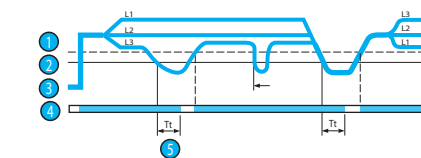
The LEDs return to their normal state if the switch is reset to its initial position defined before the last energisation.

The relay monitors its own supply voltage.

The relay controls:

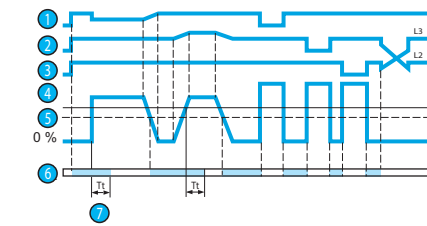
- correct sequencing of the three phases
 - failure of one of the three phases (U measured $< 0.7 \times U_n$).
 - undervoltage, adjustable from -2 to -20% of U_n (-2 to -12% across the 3 x 208 V range and -2 to 17% for the 3 x 220 V range due to the minimum voltage 183 V \sim).
- In the event of a phase 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.

MWU - Undervoltage



Principles

MWA - Failure, phase sequence and asymmetry



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

Operating principle

MWA: Phase controller with voltage and asymmetry regeneration

Voltage selector switch:

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

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 (U_n) x asymmetry rate (%) displayed on front face.

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 $< 0.7 \times U_n$).
- asymmetry, adjustable from 5 to 15% of U_n .

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

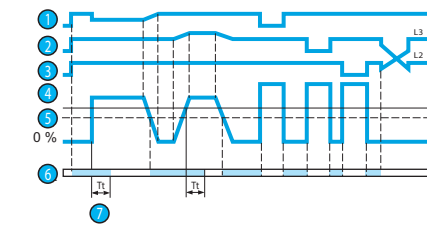
In the event of an asymmetry fault, the relay opens at the end of the time delay set by the user.

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

Asymmetry is defined as follows: $(V_{rms \text{ max.}} - V_{rms \text{ min.}}) / V_{rms \text{ mains}}$.

$V_{rms \text{ mains}}$ corresponds to the voltage selected by the switch on the front face.

MWUA - Failure, phase sequence and asymmetry



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

Operating principle

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

Voltage selector switch:

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

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.

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 $< 0.7 \times U_n$).
- asymmetry, adjustable from 5 to 15% of U_n ,
- and the under and overvoltage drift adjustable from 2 to 20% of U_n (-2 to -12% across the 3 x 208 V \sim range, -2 to -17% across the 3 x 220 V \sim range due to the minimum voltage 183 V \sim ; +2 to +10% across the 3 x 480 V \sim range due to the maximum voltage 528 V \sim).

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

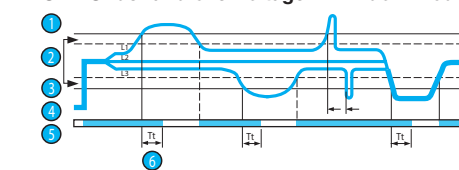
In the event of an asymmetry or voltage fault, the relay opens at the end of the time delay set by the user.

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

Asymmetry is defined as follows: $(V_{rms \text{ max.}} - V_{rms \text{ min.}}) / V_{rms \text{ mains}}$.

$V_{rms \text{ mains}}$ corresponds to the voltage selected by the switch on the front face.

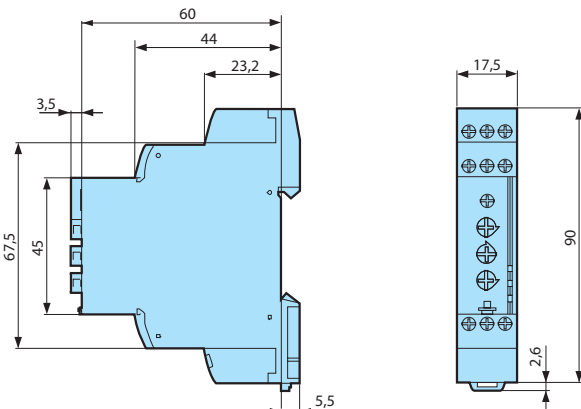
MWUA - Under and overvoltage in window mode



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

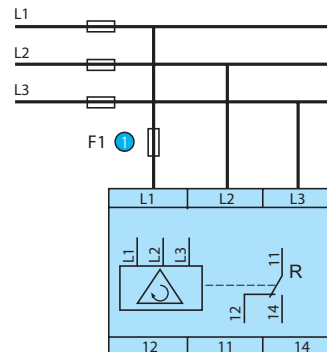
Dimensions (mm)

MWG - MWA - MWU - MWUA



Connections

MWG - MWA - MWU - MWUA



- 1 100 mA fast-blow fuse

Phase control

→ Multi-function phase control relay - 35 mm

- Control of 3-phase networks: phase sequence, phase failure, asymmetry, under and overvoltage with independent settings
- Multi-function/Multi-voltage product
- Controls its own supply voltage
- True RMS measurement
- LED status indication



HWUA

Part numbers

Type	Functions	Nominal voltage (V)	Code
HWUA	Phase sequence, failure, asymmetry, under/overvoltage	3 x 220 → 3 x 480 V ~	84873026

Product adaptations



- Customisable colours and labels
- Single voltage in the generic range
- Fixed undervoltage threshold in the generic range
- Fixed overvoltage threshold in the generic range
- Fixed asymmetry threshold in the generic range or adjustable 5 → 25 %
- Fixed or adjustable time delay

Accessories

Description Code	Description Code
Removable sealable cover for 35 mm casing	84800001

General characteristics

Supply

Supply voltage Un	3 x 220 → 3 x 480 V ~ *
Voltage supply tolerance	-12% / +10%
Operating range	194 → 528 V
~ supply voltage frequency	50 / 60 Hz ± 10%
Galvanic isolation of power supply/measurement	No
Power consumption at Un	2.9 VA in ~
Immunity from micro power cuts	10 ms

Inputs and measuring circuit

Measurement ranges	194 → 528 V
Selection of phase-phase nominal voltage Un	220 - 380 - 400 - 415 - 440 - 480 V
Frequency of measured signal	50 → 60 Hz ± 10%
Max. measuring cycle time	140 ms/True RMS measurement
Voltage threshold adjustment	2 → 20% of selected Un (+2 → +10% across the 3 x 480 V ~ range -12 to -2% across the 3 x 220 V ~ range)
Asymmetry threshold adjustment	5 → 15% of fixed Un
Fixed hysteresis	Under or overvoltage, asymmetry: 2% of the Un value of the selected network Asymmetry: 2% of the Un value of the selected network
Display precision	± 3% of the displayed value
Repetition accuracy with constant parameters	± 0.5%
Measuring error with voltage drift	< 1%
Measuring error with temperature drift	0.05%/°C

General characteristics

Timing

Delay on threshold crossing	0.1 → 10s (0, +10%)
Repetition accuracy with constant parameters	± 0.3%
Reset time	1.5 s
Delay on pick-up	500 ms
Alarm on delay time max.	< 200 ms

Output

Type of output	1 double changeover relay
Type of contacts	No cadmium
Maximum breaking voltage	250 V \sim
Max. breaking current	5 A \sim
Min. breaking current	10 mA / 5 V ---
Electrical life (number of operations)	1 x 10 ⁵
Breaking capacity (resistive)	1250 VA \sim
Maximum rate	360 operations/hour at full load
Operating categories acc. to IEC 60947-5-1	AC 12, AC 13, AC 14, AC 15, DC 12, DC 13, DC 14
Mechanical life (operations)	30 x 10 ⁶

Insulation

Nominal insulation voltage IEC 60664-1	400 V
Insulation coordination (IEC 60664-1 / 60255-5)	Overvoltage category III: degree of pollution 3
Rated impulse withstand voltage IEC 60664-1/60255-5	4 kV (1.2 / 50 μ s)
Dielectric strength IEC 60664-1/60255-5	2 kV AC 50 Hz 1 min
Insulation resistance IEC 60664-1 / 60255-5	> 500 M Ω / 500 V ---

General characteristics

Display power supply	Green LED Extinguished in the event of phase failure
Display relay	Yellow LED Flashes during the threshold crossing delay
"Fault" indication	Yellow LED Lights up in the event of asymmetry Flashes in the event of under or overvoltage
Casing	35 mm
Mounting	On 35 mm symmetrical DIN rail, IEC/EN 60715
Mounting position	All positions
Material: enclosure plastic type VO to UL94 standard	Incandescent wire test according to IEC 60695-2-11 & NF EN 60695-2-11
Protection (IEC 60529)	Terminal block: IP 20 Casing: IP 30
Weight	130 g
Connecting capacity IEC 60947-1	Rigid: 1 x 4 ² - 2 x 2.5 ² mm ² 1 x 11 AWG - 2 x 14 AWG Flexible with ferrules: 1 x 2.5 ² - 2 x 1.5 ² mm ² 1 x 14 AWG - 2 x 16 AWG
Max. tightening torques IEC 60947-1	0.6 → 1 Nm / 5.3 → 8.8 Lbf.In
Operating temperature IEC 60068-2	-20 → +50°C
Storage temperature IEC 60068-2	-40 → +70°C
Humidity IEC 60068-2-30	2 x 24 hr cycle 95% RH max. without condensation 55°C
Vibrations according to IEC/EN60068-2-6	10 → 150 Hz, A = 0.035 mm
Shocks IEC 60068-2-6	5 g

Standards

Marking	CE (LVD) 73/23/EEC - EMC 89/336/EEC
Product standard	NF EN 60255-6 / IEC 60255-6 / UL 508 / CSA C22.2 N°14
Electromagnetic compatibility	Immunity EN 61000-6-2/IEC 61000-6-2 Emission EN 61000-6-4/EN 61000-6-3 IEC 61000-6-4/IEC 61000-6-3 Emission EN 55022 class B
Certifications	UL, CSA, GL pending
Conformity with environmental directives	RoHS, WEEE

Comments

* 3-phase mains with earth

Phase control

Principles

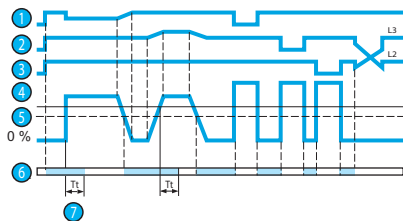
Overview

The HWUA 3-phase network control relay monitors:

- The correct sequence of phases L1, L2, L3
- Total phase failure
- Undervoltage and overvoltage from 2 to 20 % of U_n
- Asymmetry rate from 5 to 15% of U_n
- Faults are signalled via LEDs, distinguishing the origin of the fault.

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

HWUA - Failure, phase sequence and asymmetry



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

Operating principle

HWUA: Phase + Asymmetry + Under/Overvoltage controller

Voltage selector switch:

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

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.

The relay monitors its own supply voltage.

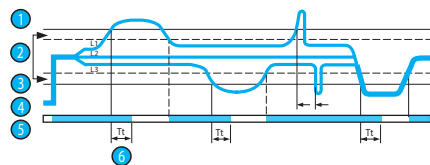
The relay controls:

- correct sequencing of the three phases,
- failure of one of the three phases (U measured $< 0.7 \times U_n$),
- asymmetry, adjustable from 5 to 15% of U_n ,
- undervoltage adjustable from - 2 to - 20% of U_n , (-2 to -12% for the 220 V range) and overvoltage adjustable from +2 to +20% (+2 to +10% over the 3 x 480 V range due to the maximum voltage 528 V \sim).

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

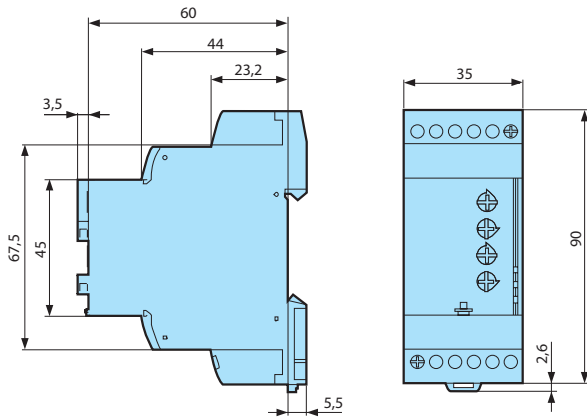
HWUA - Under/Overvoltage



- 1 Overvoltage
- 2 Hysteresis
- 3 Undervoltage
- 4 Phases L1, L2, L3
- 5 Relay
- 6 Delay on threshold crossing (T_t)

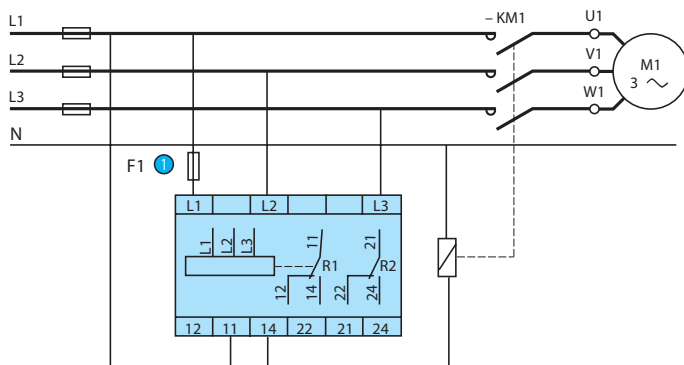
Dimensions (mm)

HWUA



Connections

HWUA



① 100 mA fast-blow fuse

Phase control

→ 3-phase voltage control relay - 17.5 mm / 35 mm

- H3US and M3US relays control, on 3-phase networks:
 - overvoltage between phases,
 - undervoltage between phases
- The H3USN relay controls, on 3-phase networks:
 - overvoltage between phases and neutral,
 - undervoltage between phases and neutral,
 - loss of neutral
- Multi-voltage Products
- Controls its own supply voltage
- True RMS measurement
- LED status indication



M3US



H3US



H3USN

Part numbers

	M3US	H3US	H3USN
Function	Under/overvoltage between phases	Under/overvoltage between phases	Over and undervoltage between phases and neutral / loss of neutral
Nominal voltage (V)	3 x 208 → 3 x 480 V ~	3 x 220 → 3 x 480 V ~	3 x 120 → 3 x 277 V ~
Output	1 single pole changeover relay	2 single changeover relays / one per threshold	2 single changeover relays / one per threshold
Part numbers	84873222	84873220	84873221

Product adaptations



- Customisable colours and labels
- Single voltage in the generic range
- Fixed or adjustable time delay
- Adjustable fixed hysteresis
- Adaptations dedicated to M3US:
 - Fixed threshold in the generic range
- Adaptations dedicated to H3US:
 - Fixed threshold in the generic range
- Adaptations dedicated to H3USN:
 - Fixed overvoltage threshold in the generic range
 - Fixed undervoltage threshold in the generic range

Accessories

Description	Code
Removable sealable cover for 17.5 mm casing	84800000
Removable sealable cover for 35 mm casing	84800001

General characteristics

	M3US	H3US	H3USN
Supply			
Supply voltage Un	3 x 208 → 3 x 480 V ~ *	3 x 220 → 3 x 480 V ~ *	3 x 120 → 3 x 277 V ~ *
Voltage supply tolerance	-12% / +10%	-12% / +10%	-20% / +20%
Operating range	183 → 528 V ~	194 → 528 V ~	96 → 332 V ~
Power consumption at Un	1.8 VA in ~	2.9 VA in ~	3.9 VA in ~
Inputs and measuring circuit			
Selection of phase-phase nominal voltage Un	208-220-380-400-415-440-480 V ~	220-380-400-415-440-480 V ~	-
Selection of phase-neutral voltage	-	-	120-127-220-230-240-260-277
Output			
Electrical life (number of operations)	1 x 10 ⁵	1 x 10 ⁴	1 x 10 ⁴
General characteristics			
Casing	17.5 mm	35 mm	35 mm
Weight	80 g	130 g	130 g
Comments			
	* 3-phase mains with earth	* 3-phase mains with earth	* 3-phase mains with earth

General characteristics

Supply

~ supply voltage frequency	50 / 60 Hz ±10%
Galvanic isolation of power supply/measurement	No

Inputs and measuring circuit

Frequency of measured signal	50 → 60 Hz ± 10%
Max. measuring cycle time	150 ms/True RMS measurement
Voltage threshold adjustment	<ul style="list-style-type: none"> ■ Undervoltage -2 to -20% of selected Un for M3US: (-2 to -12% across the 3 x 208 V range) (-2 to -17% across the 3 x 220 V range) for H3US: (-2 to -12% across the 3 x 220 V range) ■ Overvoltage 2 → 20% of selected Un For M3US and H3US: (+2 → +10% across the 3 x 480 V ~ range)
Fixed hysteresis	2% of Un (M3US, H3US)
Display precision	± 3% of the displayed value
Repetition accuracy with constant parameters	± 0.5%
Measuring error with voltage drift	< 1% across the whole range
Measuring error with temperature drift	0.05% / °C

Timing

Delay on threshold crossing	0.3 → 30 s (0, +10%)
Repetition accuracy with constant parameters	± 3%
Reset time	1500 ms
Delay on pick-up	500 ms
Alarm on delay time max.	200 ms

Output

Type of contacts	No cadmium
Maximum breaking voltage	250 V ~
Max. breaking current	5 A ~
Min. breaking current	10 mA / 5 V ---
Breaking capacity (resistive)	1250 VA ~
Maximum rate	360 operations/hour at full load
Operating categories acc. to IEC 60947-5-1	AC 12, AC 13, AC 14, AC 15, DC 12, DC 13, DC 14
Mechanical life (operations)	30 x 10 ⁶

Insulation

Nominal insulation voltage IEC 60664-1	400 V
Insulation coordination (IEC 60664-1 / 60255-5)	Overvoltage category III: degree of pollution 3
Rated impulse withstand voltage IEC 60664-1/60255-5	4 kV (1.2 / 50 µs)
Dielectric strength IEC 60664-1/60255-5	2 kV AC 50 Hz 1 min
Insulation resistance IEC 60664-1 / 60255-5	> 500 MΩ / 500 V---

General characteristics

Display power supply	Green LED
Display relay	Yellow LED (1 for M3US, 2 for H3US and H3USN)
Mounting	On 35 mm symmetrical DIN rail, IEC/EN 60715
Mounting position	All positions
Material: enclosure plastic type VO to UL94 standard	Incandescent wire test according to IEC 60695-2-11 & NF EN 60695-2-11
Protection (IEC 60529)	Terminal block: IP 20 Casing: IP30
Connecting capacity IEC 60947-1	Rigid: 1 x 4 ² - 2 x 2.5 ² mm ² 1 x 11 AWG - 2 x 14 AWG Flexible with ferrules: 1 x 2.5 ² - 2 x 1.5 ² mm ² 1 x 14 AWG - 2 x 16 AWG
Max. tightening torques IEC 60947-1	0.6 → 1 Nm / 5.3 → 8.8 Lbf.Ft
Operating temperature IEC 60068-2	-20 → +50°C
Storage temperature IEC 60068-2	-40 → +70°C
Humidity IEC 60068-2-30	2 x 24 hr cycle 95% RH max. without condensation 55°C
Vibrations according to IEC/EN60068-2-6	10 → 150 Hz, A = 0.035 mm
Shocks IEC 60068-2-6	5 g

Standards

Marking	CE (LVD) 73/23/EEC - EMC 89/336/EEC
Product standard	NF EN 60255-6 / CEI 60255-6 / UL 508 / CSA C22.2 N°14
Electromagnetic compatibility	Immunity EN 61000-6-2/IEC 61000-6-2 Emission EN 61000-6-4/EN 61000-6-3 IEC 61000-6-4/IEC 61000-6-3 Emission EN 55022 class B
Certifications	UL, CSA, GL pending
Conformity with environmental directives	RoHS, WEEE

Phase control

Principles

Overview

- 3-phase voltage controllers which monitor:
- Undervoltage, adjustable from -20 to -2% of U_n
 - Overvoltage, adjustable from 2 to 20% of U_n
 - Presence of the neutral (H3USN only)

Measurements are taken between Phases for the H3US - M3US and between Phases and Neutral for the H3USN
 Faults are signalled via LEDs, distinguishing the origin of the fault (one LED for the upper threshold, one LED for the lower threshold).

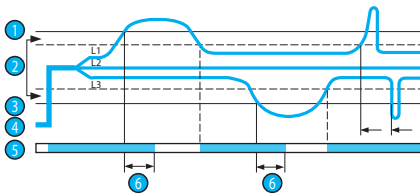
Voltage selector switch: Set the selector switch to the 3-phase network voltage U_n .

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.

M3US - Under/Overvoltage



- 1 Overvoltage
- 2 Hysteresis
- 3 Undervoltage
- 4 Phases L1, L2, L3
- 5 Relay
- 6 Over and undervoltage threshold delay

Operating principle

M3US

The relay monitors its own supply voltage. It controls:

- Undervoltage, adjustable from -20 to -2% of U_n (-12 to -2% over the 3 x 208 V \sim range and -17% to -2% for the 3 x 220 V \sim range due to the minimum voltage 183 V \sim)
- Overvoltage, adjustable from +2 to +20% (+2 to +10% over the 3 x 480 V \sim range due to the maximum voltage 528 V \sim).

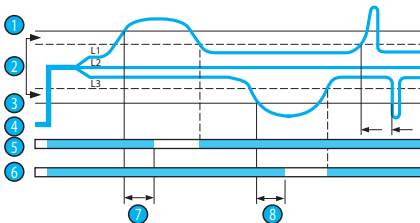
An adjustable time delay from 0.3 to 30s can be used to disable the output relay during a transient fault.

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

In the event of phase failure, the relay opens instantaneously, without waiting for the end of the time delay.

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

H3US - H3USN - Under/Overvoltage



- 1 Overvoltage
- 2 Hysteresis
- 3 Undervoltage
- 4 Phases L1, L2, L3
- 5 Relay R1
- 6 Relay R2
- 7 Overvoltage threshold delay
- 8 Undervoltage threshold delay

Operating principle

H3US

The relay monitors its own supply voltage.

It controls:

- Undervoltage, adjustable from -2 to -20% of U_n (-2 to -12% over the 3 x 220 V \sim range due to the minimum voltage 194 V \sim)
- Overvoltage, adjustable from +2 to +20% (+2 to +10% over the 3 x 480 V \sim range due to the maximum voltage 528 V \sim).

Each threshold has its own time delay with independent setting between 0.3 and 30 s.

In the event of a voltage fault, the corresponding relay (one undervoltage output/one overvoltage output) opens at the end of the time delay set by the user.

In the event of phase failure, both relays open instantaneously, without waiting for the end of the time delay. The two relay LEDs go out.

H3USN

The relay monitors its own supply voltage.

It controls:

- Presence of the neutral,
- Undervoltage, adjustable from -2 to -20% of U_n ,
- Overvoltage, adjustable from +2 to +20%.

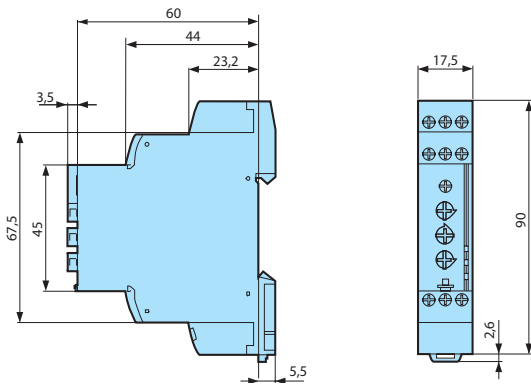
Each threshold has its own time delay with independent setting between 0.3 and 30 s.

In the event of a voltage fault, the corresponding relay (one undervoltage output/one overvoltage output) opens at the end of the time delay set by the user.

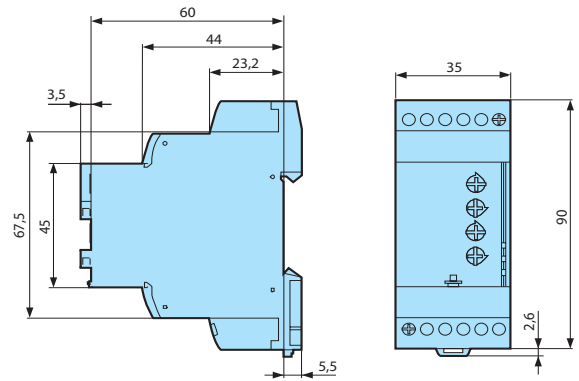
If neutral is lost, both relays open instantaneously and the corresponding LED is extinguished, without waiting for the end of the time delay. The two relay LEDs are extinguished.

Dimensions (mm)

M3US

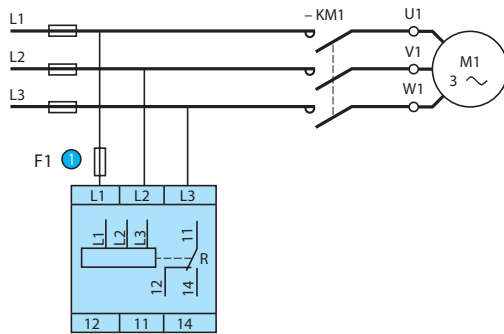


H3US - H3USN



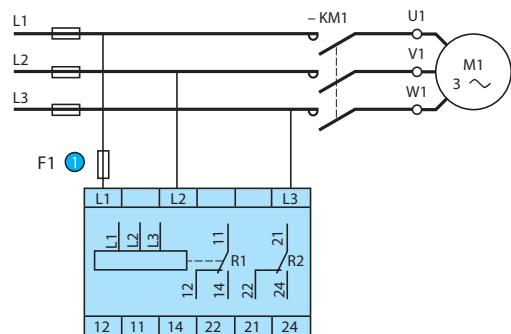
Connections

M3US



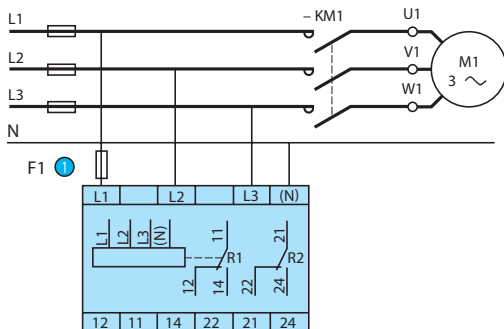
① 100 mA fast-blow fuse or cut-out

H3US - H3USN



① 100 mA fast-blow fuse or cut-out

H3US



① 100 mA fast-blow fuse or cut-out

Voltage control

→ Voltage control relay - 17.5 mm

- Control relays monitoring their own power supply
 - MUS: Over/undervoltage control Selectable latching (memory) function
 - MUSF: Over/undervoltage control
- Adjustable time delays
- Control in 50 Hz, 60 Hz or ---
- True RMS measurement
- LED status indication



MUS



MUSF

Part numbers

	MUS 12 ---	MUS/MUSF 80 \sim	MUS/MUSF 260 \sim
Controlled ranges	9 → 15 V ---	20 → 80 V \sim	65 → 260 V \sim
Functions			
Under/Overvoltage control	84872140	84872141	84872142
Under/Overvoltage control in window mode	-	84872151	84872152

Product adaptations



- Customisable colours and labels
 - Fixed threshold in the generic measurement range
 - Fixed or adjustable time delay
 - Adjustable hysteresis
- Adaptations dedicated to MUS 12 --- , MUS 80 \sim , MUS 260 \sim :**
- Possible to delete settings
 - Adjustable fixed hysteresis

Accessories

Description	Code
Removable sealable cover for 17.5 mm casing	84800000

General characteristics

	MUS 12 ---	MUS/MUSF 80 \sim	MUS/MUSF 260 \sim
Supply			
Nominal voltage (V)	12 V ---	24 → 48 V \sim	110 → 240 V \sim
Power consumption at U_n	1 W in ---	3.9 VA in \sim / 1.6 W in ---	3 VA in \sim / 1 W in ---
Operating range	7 → 20 V ---	15 → 100 V \sim	50 → 270 V \sim
Range of adjustment	9 → 15 V ---	20 → 80 V \sim	65 → 260 V \sim
Inputs and measuring circuit			
Hysteresis	5 → 20% of threshold	5 → 20% of threshold (MUS) 3% (fixed) of threshold (MUSF)	5 → 20% of threshold (MUS) 3% (fixed) of threshold (MUSF)
General characteristics			
Weight	75 g	80 g	80 g

General characteristics

MUS 12 --- / MUS/MUSF 80 ~ / MUS/MUSF 260 ~

Supply

Polarity with DC voltage	✓
~ supply voltage frequency	50 / 60 Hz \pm 10%
Galvanic isolation of power supply/measurement	No
Immunity from micro power cuts	10 ms

Inputs and measuring circuit

Max. measuring cycle time	250 ms/True RMS measurement
Display precision	\pm 10% of full scale
Repetition accuracy with constant parameters	\pm 0.5%
Measuring error with voltage drift	< 1% across the whole range
Measuring error with temperature drift	\pm 0.05% / °C

Timing

Delay on threshold crossing	0.1 \rightarrow 10 sec (0, +10%)
Repetition accuracy with constant parameters	\pm 0.5%
Reset time	1.5 s
Delay on pick-up	500 ms en ~ / 1 s in ---

Output

Type of output	1 single pole changeover relay
Type of contacts	No cadmium
Maximum breaking voltage	250 V ~
Max. breaking current	5 A ~
Min. breaking current	10 mA / 5 V ---
Electrical life (number of operations)	1 x 10 ⁵
Breaking capacity (resistive)	1250 VA ~
Maximum rate	360 operations/hour at full load
Operating categories acc. to IEC 60947-5-1	AC 12, AC 13, AC 14, AC 15, DC 12, DC 13, DC 14
Mechanical life (operations)	30 x 10 ⁶

Insulation

Nominal insulation voltage IEC 60664-1	250 V
Insulation coordination (IEC 60664-1 / 60255-5)	Overvoltage category III: degree of pollution 3
Rated impulse withstand voltage IEC 60664-1/60255-5	4 KV (1.2 / 50 μ s)
Dielectric strength IEC 60664-1/60255-5	2 KV ~ 50 Hz 1 min
Insulation resistance IEC 60664-1 / 60255-5	> 500 M Ω / 500 V ---

General characteristics

Display power supply	Green LED
Display relay	Yellow LED
Casing	17.5 mm
Mounting	On 35 mm symmetrical DIN rail, IEC/EN 60715
Mounting position	All positions
Material: enclosure plastic type VO to UL94 standard	Incandescent wire test according to IEC 60695-2-11 & NF EN 60695-2-11
Protection (IEC 60529)	Terminal block: IP 20 Casing: IP 30
Connecting capacity IEC 60947-1	Rigid: 1 x 4 ² - 2 x 2.5 ² mm ² 1 x 11 AWG - 2 x 14 AWG Flexible with ferrules: 1 x 2.5 ² - 2 x 1.5 ² mm ² 1 x 14 AWG - 2 x 16 AWG
Max. tightening torques IEC 60947-1	0.6 \rightarrow 1 Nm / 5.3 \rightarrow 8.8 Lbf.In
Operating temperature IEC 60068-2	-20 \rightarrow +50°C
Storage temperature IEC 60068-2	-40 \rightarrow 70°C
Humidity IEC 60068-2-30	2 x 24 hr cycle 95% RH max. without condensation 55°C
Vibrations according to IEC/EN60068-2-6	10 \rightarrow 150 Hz, A = 0.035 mm
Shocks IEC 60068-2-6	5 g

Standards

Marking	CE (LVD) 73/23/EEC - EMC 89/336/EEC
Product standard	NF EN 60255-6 / IEC 60255-6 / UL 508 / CSA C22.2 N°14
Electromagnetic compatibility	Immunity EN 61000-6-2/IEC 61000-6-2 Emission EN 61000-6-4/EN 61000-6-3 IEC 61000-6-4/IEC 61000-6-3 Emission EN 55022 class B
Certifications	UL, CSA, GL pending
Conformity with environmental directives	RoHS, WEEE

Voltage control

Principles

Overview

MUS and MUSF 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 principle

MUS - 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.

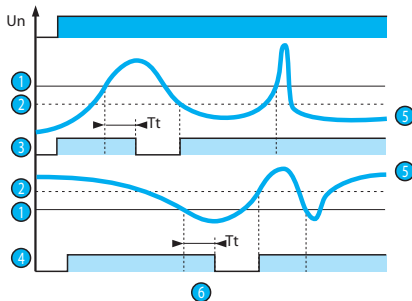
The switch position, and hence the operating mode, is read by the product on energisation.

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.

MUS - Under/overvoltage - without latching



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

The under or overvoltage threshold value is set by a graduated potentiometer by reading the U_n 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.

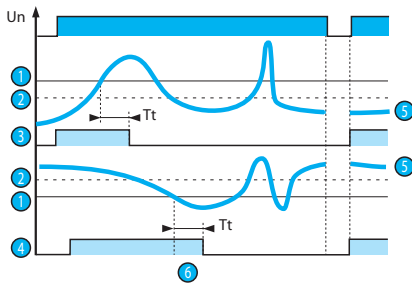
In overvoltage mode, if the controlled voltage exceeds the preset threshold for longer than the time set on the front face (0.1 to 10 s), the output relay opens and LED R is extinguished. During the time delay, this LED flashes.

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 - Under/overvoltage - with latching

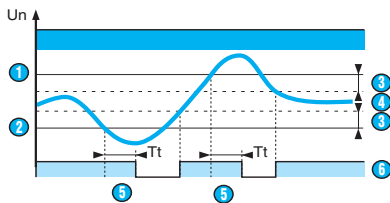


- ① Threshold
- ② Hysteresis
- ③ Overvoltage function relay
- ④ Undervoltage function relay
- ⑤ Controlled signal
- ⑥ Delay on threshold crossing (Tt)

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.

Principles

MUSF - Under and overvoltage controller in window mode

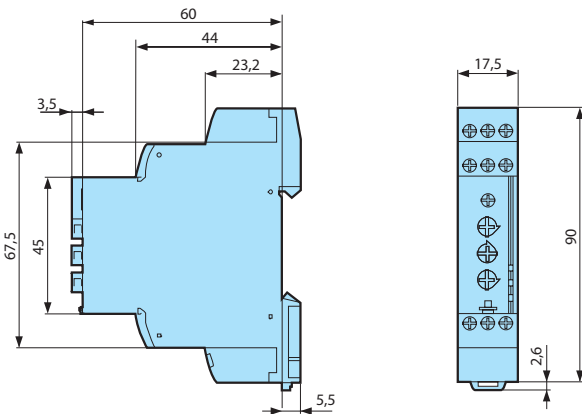


- ① High threshold
- ② Low threshold
- ③ Hysteresis
- ④ Controlled signal
- ⑤ Delay on threshold crossing (Tt)
- ⑥ Relais

MUSF relays operate in window mode: they check that the controlled voltage stays between a minimum and maximum threshold.
 The under and overvoltage threshold values are set by two graduated potentiometers by reading the Un scale to be monitored directly.
 The hysteresis is fixed, value: 3 % of the preset thresholds.
 If the controlled voltage exceeds the preset upper threshold, or falls below the preset lower 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 returns to below the upper threshold value minus the hysteresis, or above the lower threshold value plus the hysteresis, the relay closes instantaneously.
 When the unit is powered up with a measured fault, the relay stays open.

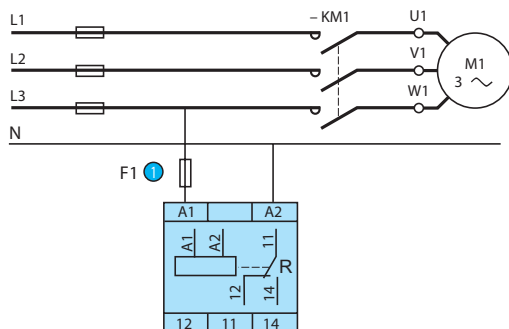
Dimensions (mm)

MUS - MUSF



Connections

MUS - MUSF



- ① 1 A fast-blow fuse or cut-out

Voltage control

→ Multi-function voltage control relay - 35 mm

- Control of AC and DC voltages
- Automatic recognition of AC/DC
- Measurement ranges from 0.2 V to 600 V
- Choice between under and overvoltage
- True RMS measurement
- Selectable latching (memory) function



HUL



HUH

Part numbers

	HUL	HUH
Functions	Under/Overvoltage	Under/Overvoltage
Measurement range	0.2 V → 60 V	15 V → 600 V
Nominal voltage (V)	24 → 240 V \sphericalangle	24 → 240 V \sphericalangle
Part numbers	84872120	84872130

Product adaptations



- Customisable colours and labels
- Measuring ranges within the generic limits
- Fixed threshold in the generic measurement range
- Fixed or adjustable time delay
- Adjustable hysteresis

Accessories

Description	Code
Removable sealable cover for 35 mm casing	84800001

General characteristics

	HUL	HUH
Inputs and measuring circuit		
Measurement range	0.2 V → 60 V E1 - M: 0.2 → 2 V E2 - M: 1 → 10 V E3 - M: 6 → 60 V	15 V → 600 V E1 - M: 15 → 150 V E2 - M: 30 → 300 V E3 - M: 60 → 600 V
Input resistance	E1 - M: 6 Ω E2 - M: 30 Ω E3 - M: 180 Ω	E1 - M: 150 Ω E2 - M: 300 Ω E3 - M: 600 Ω
Permanent overload at 25°C	E1 - M: 10 V E2 - M: 30 V E3 - M: 150 V	E1 - M: 250 V E2 - M: 500 V E3 - M: 700 V

General characteristics

HUL / HUH

Supply	
Supply voltage Un	24 V → 240 V \sim
Voltage supply tolerance	-15% / +10%
Operating range	20.4 V → 264 V \sim
Polarity with DC voltage	No
\sim supply voltage frequency	50 / 60 Hz \pm 10%
Galvanic isolation of power supply/measurement	✓
Power consumption at Un	3.5 VA in AC/0.6 W in DC
Immunity from micro power cuts	10 ms
Inputs and measuring circuit	
Frequency of measured signal	0 Hz, 40 → 70 Hz
Max. measuring cycle time	30 ms/True RMS measurement
Threshold adjustment	10 → 100% of the range
Adjustable hysteresis	5 → 50% of displayed threshold
Display precision	\pm 10% of full scale
Repetition accuracy with constant parameters	\pm 0.5%
Measuring error with voltage drift	< 1% across the whole range
Measuring error with temperature drift	\pm 0.05% / °C
Timing	
Delay on threshold crossing	0.1 → 3 s (0, + 10%)
Repetition accuracy with constant parameters	\pm 2%
Reset time	1500 ms
Delay on pick-up	< 600 ms
Output	
Type of output	1 double changeover relay
Type of contacts	No cadmium
Maximum breaking voltage	250 V \sim / ---
Max. breaking current	5 A \sim
Min. breaking current	10 mA / 5 V---
Electrical life (number of operations)	1 x 10 ⁶
Breaking capacity (resistive)	1250 VA \sim
Maximum rate	360 operations/hour at full load
Operating categories acc. to IEC 60947-5-1	AC12, AC13, AC14, AC15, DC12, DC13, DC14
Mechanical life (operations)	30 x 10 ⁶
Insulation	
Nominal insulation voltage IEC 60664-1	250 V
Insulation coordination (IEC 60664-1 / 60255-5)	Overvoltage category III: degree of pollution 3
Rated impulse withstand voltage IEC 60664-1/60255-5	4 kV (1.2 / 50 μ s)
Dielectric strength IEC 60664-1/60255-5	2 kV AC 50 Hz 1 min.
Insulation resistance IEC 60664-1 / 60255-5	> 500 M Ω / 500 V ---
General characteristics	
Display power supply	Green LED
Display relay	Yellow LED
Casing	35 mm
Mounting	On 35 mm symmetrical DIN rail, IEC/EN 60715
Mounting position	All positions
Material: enclosure plastic type VO to UL94 standard	Incandescent wire test according to IEC 60695-2-11 & NF EN 60695-2-11
Protection (IEC 60529)	Terminal block: IP 20 Casing: IP 30
Weight	130 g
Connecting capacity IEC 60947-1	Rigid: 1 x 4 ² - 2 x 2.5 ² mm ² 1 x 11 AWG - 2 x 14 AWG Flexible with ferrules: 1 x 2.5 ² - 2 x 1.5 ² mm ² 1 x 14 AWG - 2 x 16 AWG
Max. tightening torques IEC 60947-1	0.6 → 1 Nm / 5.3 → 8.8 Lbf.In
Operating temperature IEC 60068-2	-20 → +50°C
Storage temperature IEC 60068-2	-40 → +70°C
Humidity IEC 60068-2-30	2 x 24 hr cycle 95% RH max. without condensation 55°C
Vibrations according to IEC/EN60068-2-6	10 → 150 Hz, A = 0.035 mm
Shocks IEC 60068-2-6	5 g
Standards	
Marking	CE (LVD) 73/23/EEC - EMC 89/336/EEC
Product standard	NF EN 60255-6 / IEC 60255-6 / UL 508 / CSA C22.2 N°14
Electromagnetic compatibility	Immunity EN 61000-6-2/IEC 61000-6-2 Emission EN 61000-6-4/EN 61000-6-3 IEC 61000-6-4/IEC 61000-6-3 Emission EN 55022 class B
Certifications	UL, CSA, GL pending
Conformity with environmental directives	RoHS, WEEE

Voltage control

Principles

HUL-HUH

Overview

HUL and HUH control relays are designed to control AC or DC voltages. They automatically recognise the shape of the DC or AC signal (50 or 60 Hz).

General principle:

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.

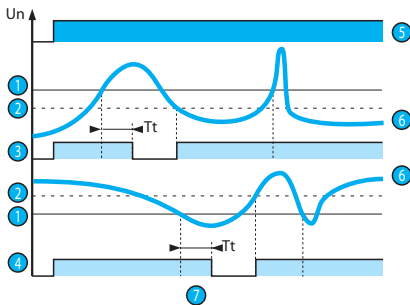
If the switch position changes while the unit is operating, all the LEDs flash but the product continues to work normally with the function selected on energisation prior to the change of position.

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 as a percentage of the U scale to be monitored.

The hysteresis is set by a graduated potentiometer from 5 to 50% of the preset threshold. The hysteresis value cannot be higher than the extremes of the measurement range.

HUL-HUH - Under/overvoltage - without latching



- 1 Threshold
- 2 Hysteresis
- 3 Overvoltage function relay
- 4 Undervoltage function relay
- 5 Unit power-up
- 6 Controlled voltage
- 7 Delay on threshold crossing (Tt)

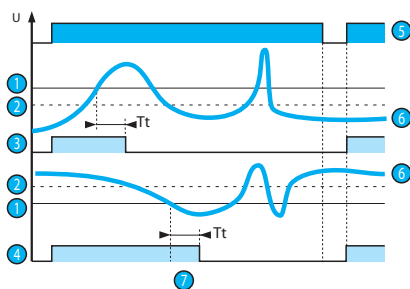
In overvoltage mode, if the controlled voltage exceeds the preset threshold for longer than the time set on the front face (0.1 to 3 s), the output relay opens and LED R is extinguished. During the time delay, this LED flashes.

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 3 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.

HUL-HUH - Under/overvoltage - with latching



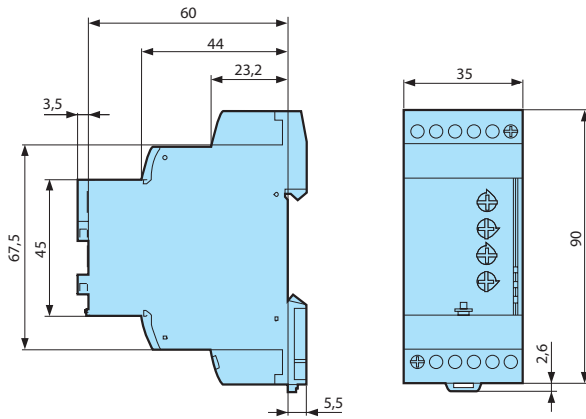
- 1 Threshold
- 2 Hysteresis
- 3 Overvoltage function relay
- 4 Undervoltage function relay
- 5 Unit power-up
- 6 Controlled voltage
- 7 Delay on threshold crossing (Tt)

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.

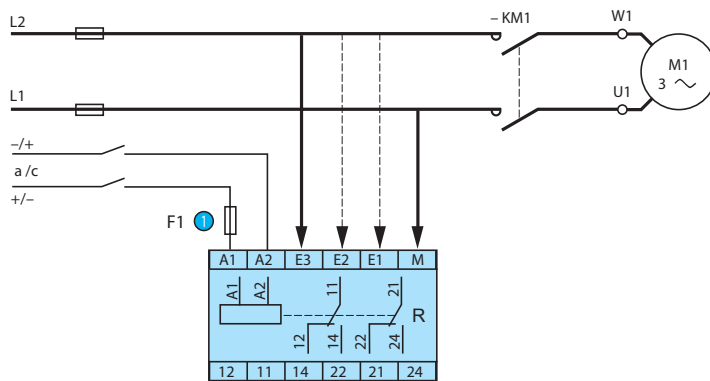
Dimensions (mm)

HUL-HUH



Connections

HUL-HUH



① 1 A fast-blow fuse or cut-out

NB:

When controlling DC voltage from the same source supplying terminals A1 and A2, terminal M must be connected directly to the "minus" pole of this power supply.

Current control

→ Single function current control relay with current transformer - 17.5 mm

- Control of AC currents
- Built-in current transformer
- Measurement ranges from 2 A to 20 A
- Choice of output relay action
- True RMS measurement



MIC

Part numbers

Type	Functions	Measurement range	Nominal voltage (V)	Code
MIC	Overcurrent (or undercurrent)	2 → 20 A	24 → 240 V \sim	84871122

Product adaptations



- Customisable colours and labels
- Current range adjustable up to 50 A
- Adjustable fixed hysteresis

General characteristics

Supply	
Supply voltage Un	24 V → 240 V \sim
Voltage supply tolerance	-15% / +10%
Operating range	20.4 V → 264 V \sim
Polarity with DC voltage	✓
\sim supply voltage frequency	50 / 60 Hz \pm 10%
Galvanic isolation of power supply/measurement	✓
Power consumption at Un	3 VA in \sim et 1 W in ---
Immunity from micro power cuts	10 ms
Inputs and measuring circuit	
Measurement range	2 → 20 A
Permanent overload at 25°C	100 A
Pulse overload < 3 s → 25°C	300 A
Frequency of measured signal	40 → 70 Hz sinusoidal
Max. measuring cycle time	30 ms/True RMS measurement
Threshold adjustment	10 → 100% of the range
Fixed hysteresis	15% (fixed) of displayed threshold
Display precision	\pm 10% of full scale
Repetition accuracy with constant parameters	\pm 0.5%
Measuring error with voltage drift	< 1%
Measuring error with temperature drift	\pm 0.05% / °C
Timing	
Response time	200 ms
Delay on pick-up	500 ms
Output	
Type of output	1 single pole changeover relay
Type of contacts	No cadmium
Maximum breaking voltage	250 V \sim
Max. breaking current	5 A \sim
Min. breaking current	10 mA / 5 V ---
Electrical life (number of operations)	1 x 10 ⁵ manoeuvres
Breaking capacity (resistive)	1250 VA \sim
Maximum rate	360 operations/hour at full load
Operating categories acc. to IEC 60947-5-1	AC12, AC13, AC14, AC15, DC12, DC13, DC14
Mechanical life (operations)	30 x 10 ⁶ manoeuvres
Insulation	
Nominal insulation voltage IEC 60664-1	400 V
Insulation coordination (IEC 60664-1 / 60255-5)	Overvoltage category III: degree of pollution 3
Rated impulse withstand voltage IEC 60664-1/60255-5	4 KV (1.2 / 50 μ s)
Dielectric strength IEC 60664-1/60255-5	2 KV AC 50 Hz 1 min.
Insulation resistance IEC 60664-1 / 60255-5	> 500 M Ω @ 500 V ---

General characteristics

General characteristics	
Display power supply	Green LED
Display relay	Yellow LED
Casing	17.5 mm
Mounting	On 35 mm symmetrical DIN rail, IEC/EN 60715
Mounting position	All positions
Material: enclosure plastic type VO to UL94 standard	Incandescent wire test according to IEC 60695-2-11 & NF EN 60695-2-11
Protection (IEC 60529)	Terminal block: IP20 Casing: IP30
Weight	110 g
Connecting capacity IEC 60947-1	Rigid: 1 x 4 ² - 2 x 2.5 ² mm ² 1 x 11 AWG - 2 x 14 AWG Flexible with ferrules: 1 x 2.5 ² - 2 x 1.5 ² mm ² 1 x 14 AWG - 2 x 16 AWG
Max. tightening torques IEC 60947-1	0.6 → 1Nm / 5.3 → 8.8 Lbf.In
Operating temperature IEC 60068-2	-20 → +50°C
Storage temperature IEC 60068-2	-40 → +70°C
Humidity IEC 60068-2-30	2 x 24 hr cycle 95% RH max. without condensation 55°C
Vibrations according to IEC/EN60068-2-6	10 → 150 Hz, A = 0.035 mm
Shocks IEC 60068-2-6	5 g
Standards	
Marking	CE (LVD) 73/23/EEC - EMC 89/336/EEC
Product standard	NF EN 60255-6 / IEC 60255-6 / UL 508 / CSA C22.2 N°14
Electromagnetic compatibility	Immunity EN 61000-6-2/IEC 61000-6-2 Emission EN 61000-6-4/EN 61000-6-3 IEC 61000-6-4/IEC 61000-6-3 Emission EN 55022 class B
Certifications	UL, CSA, GL pending
Conformity with environmental directives	RoHS, WEEE

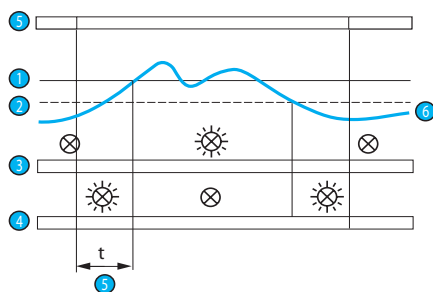
Principles

MIC

Overview

The MIC control relay is designed to control overcurrents (or undercurrents). It has a built-in current transformer.

MIC - Overcurrent



Operating principle

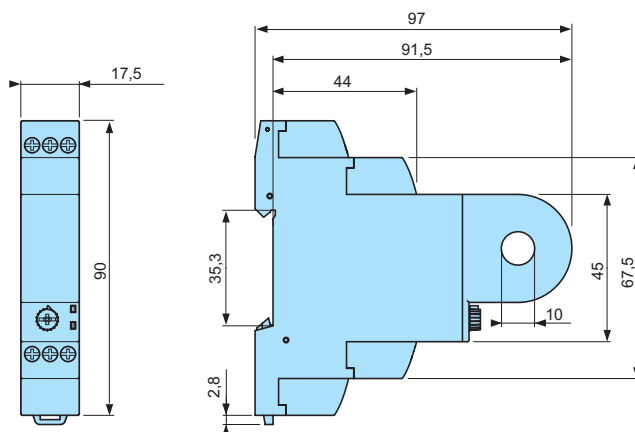
The MIC relay controls the overcurrent. The relay closes when the current exceeds the threshold displayed on the front face and opens when it falls below the threshold minus the hysteresis. When terminal Y1 is connected to A1 (+), the output is inverted. The relay opens when the current exceeds the threshold displayed on the front face and closes again when it falls back below the hysteresis (undercurrent).

Can be used for undercurrent control: ask your sales adviser.

- 1 Threshold
- 2 Hysteresis
- 3 Closing on threshold crossing mode (Y1 and A1 not connected)
- 4 Opening on threshold crossing mode (Y1 and A1 connected)
- 5 Unit power-up
- 6 Current control

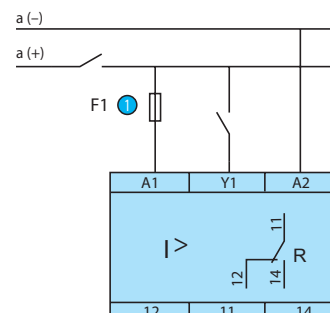
Dimensions (mm)

MIC



Connections

MIC



- 1 100 mA fast-blow fuse or cut-out

Current control

→ Multi-function current control relay - 35 mm

- Control of AC and DC currents
- Automatic recognition of AC/DC
- Measurement ranges from 2 mA to 10 A
- Choice between over and undercurrent
- True RMS measurement
- Selectable latching (memory) function



HIL



HIH

Part numbers

	HIL	HIH
Functions	Over or undercurrent	Over or undercurrent
Measurement range	2 mA → 500 mA	0.1 A → 10 A
Nominal voltage (V)	24 → 240 V \sphericalangle	24 → 240 V \sphericalangle
Part numbers	84871120	84871130

Product adaptations



- Customisable colours and labels
- Measuring ranges within the generic limits
- Fixed threshold in the generic measurement range
- Fixed or adjustable time delay
- Adjustable hysteresis

Accessories

Description	Code
Removable sealable cover for 35 mm casing	84800001

General characteristics

	HIL	HIH
Inputs and measuring circuit		
Measurement range	2 → 500 mA E1 - M: 2 → 20 mA E2 - M: 10 → 100 mA E3 - M: 50 → 500 mA	0.1 → 10 A E1 - M: 0.1 → 1 A E2 - M: 0.5 → 5 A E3 - M: 1 → 10 A
Input resistance	E1 - M: 5 Ω E2 - M: 1 Ω E3 - M: 0.2 Ω	E1 - M: 0.1 Ω E2 - M: 0.02 Ω E3 - M: 0.01 Ω
Permanent overload at 25°C	E1 - M: 0.4 A E2 - M: 1 A E3 - M: 2 A	E1 - M: 2 A E2 - M: 11 A E3 - M: 11 A
Pulse overload < 1 sec at 25°C	E1 - M: 1 A E2 - M: 5 A E3 - M: 8 A	E1 - M: 17 A E2 - M: 20 A E3 - M: 50 A

General characteristics

Supply

Supply voltage Un	24 V → 240 V \sim
Voltage supply tolerance	-15% / +10%
Operating range	20.4 V → 264 V \sim
Polarity with DC voltage	No
\sim supply voltage frequency	50 / 60 Hz \pm 10%
Galvanic isolation of power supply/measurement	\checkmark
Power consumption at Un	3.5 VA in AC/0.6 W in DC
Immunity from micro power cuts	50 ms

Inputs and measuring circuit

Frequency of measured signal	0 Hz, 40 → 70 Hz
Max. measuring cycle time	30 ms/True RMS measurement
Threshold adjustment	10 → 100% of the range
Maximum 3-phase voltage	277 / 480 V (3-phase mains with earth)
Adjustable hysteresis	5 → 50% of displayed threshold
Display precision	\pm 10% of full scale
Repetition accuracy with constant parameters	\pm 0.5%
Measuring error with voltage drift	\pm 1% across the whole range
Measuring error with temperature drift	\pm 0.05% / °C

Timing

Delays on power up	1 → 20 s 0, +10%
Delay on threshold crossing	0.1 → 3 s 0, +10%
Repetition accuracy with constant parameters	\pm 2%
Reset time	1500 ms
Delay on pick-up	< 300 ms

Output

Type of output	1 double changeover relay
Type of contacts	No cadmium
Maximum breaking voltage	250 V \sim
Max. breaking current	5 A \sim
Min. breaking current	10 mA / 5 V ---
Electrical life (number of operations)	1 x 10 ⁶
Breaking capacity (resistive)	1250 VA \sim
Maximum rate	360 operations/hour at full load
Operating categories acc. to IEC 60947-5-1	AC12, AC13, AC14, AC15, DC12, DC13, DC14
Mechanical life (operations)	30 x 10 ⁶

Insulation

Nominal insulation voltage IEC 60664-1	250 V
Insulation coordination (IEC 60664-1 / 60255-5)	Overvoltage category III: degree of pollution 3
Rated impulse withstand voltage IEC 60664-1/60255-5	4 kV (1.2 / 50 μ s)
Dielectric strength IEC 60664-1/60255-5	2 kV \sim 50 Hz 1 min.
Insulation resistance IEC 60664-1 / 60255-5	> 500 M Ω / 500 V ---

General characteristics

Display power supply	Green LED
Display relay	Yellow LED
Casing	35 mm
Mounting	On 35 mm symmetrical DIN rail, IEC/EN 60715
Mounting position	All positions
Material: enclosure plastic type VO to UL94 standard	Incandescent wire test according to IEC 60695-2-11 & NF EN 60695-2-11
Protection (IEC 60529)	Terminal block: IP 20 Casing: IP 30
Weight	130 g
Connecting capacity IEC 60947-1	Rigid: 1 x 4 ² - 2 x 2.5 ² mm ² 1 x 11 AWG - 2 x 14 AWG Flexible with ferrules: 1 x 2.5 ² - 2 x 1.5 ² mm ² 1 x 14 AWG - 2 x 16 AWG
Max. tightening torques IEC 60947-1	0.6 → 1 Nm / 5.3 → 8.8 Lbf.in
Operating temperature IEC 60068-2	-20 → +50°C
Storage temperature IEC 60068-2	-40 → +70°C
Humidity IEC 60068-2-30	2 x 24 hr cycle 95% RH max. without condensation 55°C
Vibrations according to IEC/EN60068-2-6	10 → 150 Hz, A = 0.035 mm
Shocks IEC 60068-2-6	5 g

Standards

Marking	CE (LVD) 73/23/EEC - EMC 89/336/EEC
Product standard	NF EN 60255-6 / IEC 60255-6 / UL 508 / CSA C22.2 N°14
Electromagnetic compatibility	Immunity EN 61000-6-2/IEC 61000-6-2 Emission EN 61000-6-4/EN 61000-6-3 IEC 61000-6-4/IEC 61000-6-3 Emission EN 55022 class B
Certifications	UL, CSA, GL pending
Conformity with environmental directives	RoHS, WEEE

Current control

Principles

HIL-HIH

Overview

HIL and HIH control relays are designed to control AC or DC currents.

They automatically recognise the shape of the DC or AC signal (50 or 60 Hz) and can control up to 10 A in DC. Above this level, a current transformer can be connected.

General principle:

The operating mode is set by the user.

A switch is used to select over or undercurrent 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 function selected on energisation prior to the change of position.

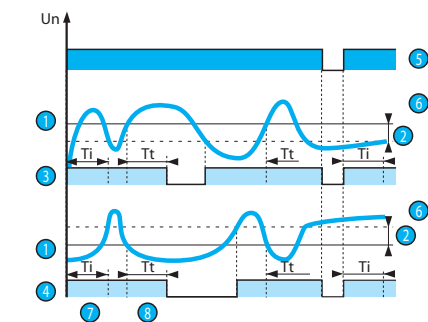
The LEDs return to their normal state if the switch is reset to its initial position defined before the last energisation.

The over or undercurrent threshold value is set by a graduated potentiometer as a percentage of the I scale to be monitored.

The hysteresis is set by a graduated potentiometer from 5 to 50% of the preset threshold. The hysteresis value cannot be higher than the extremes of the measurement range.

An adjustable time delay from 1 to 20 s on energisation is used to prevent current peaks or troughs on starting.

HIL-HIH - Under/overcurrent - without latching



- ① Threshold
- ② Hysteresis
- ③ Overcurrent function relay
- ④ Undercurrent function relay
- ⑤ Unit power-up
- ⑥ Controlled current
- ⑦ Inhibit delay on starting (T_i)
- ⑧ Delay on upward threshold crossing (T_t)

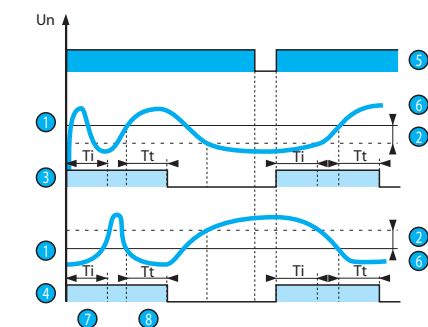
In overcurrent mode, if the controlled current exceeds the preset threshold for longer than the time set on the front face (0.1 to 3 s), the output relay opens and LED R is extinguished. During the time delay, this LED flashes.

Once the current falls below the threshold value minus the hysteresis, the relay closes instantaneously.

In undercurrent mode, if the controlled current falls below the preset threshold for longer than the time set on the front face (0.1 to 3 s), the output relay opens and LED R is extinguished. During the time delay, this LED flashes.

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

HIL-HIH - Under/overcurrent - with latching



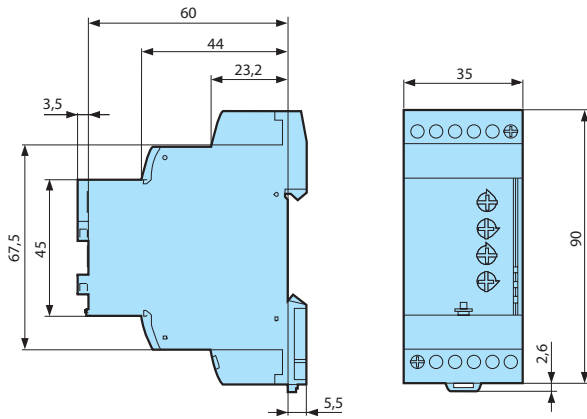
- ① Threshold
- ② Hysteresis
- ③ Overcurrent function relay
- ④ Undercurrent function relay
- ⑤ Unit power-up
- ⑥ Controlled current
- ⑦ Inhibit delay on starting (T_i)
- ⑧ Delay on upward threshold crossing (T_t)

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.

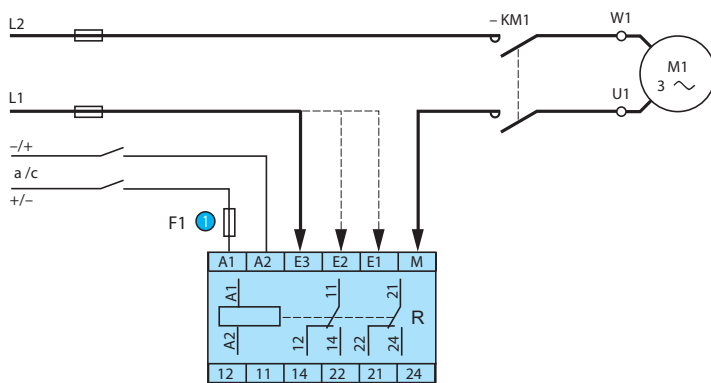
Dimensions (mm)

HIL-HIH



Connections

HIL-HIH



① 1 A fast-blow fuse or cut-out

NB:

When controlling DC current from the same source supplying terminals A1 and A2, terminal M must be connected directly to the "minus" pole of this power supply.

Frequency control

→ Frequency control relay - 35 mm

- Controls frequency variations on 50 or 60 Hz AC networks
- Controls its own supply voltage, connected between phase and neutral
- Over and underfrequency with two independent relay outputs
- Selectable latching (memory) function
- LED status indication



HHZ

Part numbers

Type	Function	Nominal voltage (V)	Code
HHZ	50 or 60 Hz over and underfrequency	120 → 277 V ~	84872501

Product adaptations



- Customisable colours and labels
- Fixed threshold in the generic measurement range
- Fixed or adjustable time delay
- Adjustable fixed hysteresis

Accessories

Description	Code
Removable sealable cover for 35 mm casing	84800001

General characteristics

Supply

Supply voltage Un	120 → 277 V ~
Voltage supply tolerance	-15% / +10%
Operating range	102 → 308 V ~
~ supply voltage frequency	50/60 Hz ± 15%
Galvanic isolation of power supply/measurement	No
Power consumption at Un	6 VA in ~
Immunity from micro power cuts	10 ms

Inputs and measuring circuit

Measurement ranges	40 → 70 Hz
Max. measuring cycle time	200 ms/True RMS measurement
Adjustment of upper threshold	-2, +0, +2, +4, +6, +8, +10 Hz
Adjustment of lower threshold	+2, -0, -2, -4, -6, -8, -10 Hz
Fixed hysteresis	0.3 Hz
Display precision	±10% of full scale
Repetition accuracy with constant parameters	± 0.5%
Measuring error with voltage drift	< ± 1% across the whole range
Measuring error with temperature drift	± 0.05% / °C

Timing

Delay on threshold crossing	0.1 → 10 s (0, +10%)
Display precision	±10% of full scale
Repetition accuracy with constant parameters	± 0.5%
Reset time	2 s
Delay on pick-up	500 ms

Output

Type of output	2 single pole changeover relay
Type of contacts	No cadmium
Maximum breaking voltage	250 V ~
Max. breaking current	5 A ~
Min. breaking current	10 mA / 5 V ---
Electrical life (number of operations)	1 x 10 ⁴
Breaking capacity (resistive)	1250 VA ~
Maximum rate	360 operations/hour at full load
Operating categories acc. to IEC 60947-5-1	AC 12, AC 13, AC 14, AC 15, DC 12, DC 13, DC 14
Mechanical life (operations)	30 x 10 ⁶

Insulation

Nominal insulation voltage IEC 60664-1	400 V
Insulation coordination (IEC 60664-1 / 60255-5)	Overvoltage category III: degree of pollution 3
Rated impulse withstand voltage IEC 60664-1/60255-5	4 kV (1.2 / 50 μs)
Dielectric strength IEC 60664-1/60255-5	2 kV ~ 50 Hz 1 min.
Insulation resistance IEC 60664-1 / 60255-5	> 500 MΩ / 500 V ---

General characteristics

Display power supply	Green LED
Display relay	2 x yellow LEDs - These LEDs flash during the threshold time delay
Casing	35 mm
Mounting	On 35 mm symmetrical DIN rail, IEC/EN 60715
Mounting position	All positions
Material: enclosure plastic type VO to UL94 standard	Incandescent wire test according to IEC 60695-2-11 & NF EN 60695-2-11
Protection (IEC 60529)	Terminal block: IP20 Casing: IP30
Weight	100 g
Connecting capacity IEC 60947-1	Rigid: 1 x 4 ² - 2 x 2.5 ² mm ² 1 x 11 AWG - 2 x 14 AWG Flexible with ferrules: 1 x 2.5 ² - 2 x 1.5 ² mm ² 1 x 14 AWG - 2 x 16 AWG
Max. tightening torques IEC 60947-1	0.6 → 1Nm / 5.3 → 8.8 Lbf.In
Operating temperature IEC 60068-2	-20 → +50°C
Storage temperature IEC 60068-2	-40 → +70°C
Humidity IEC 60068-2-30	2 x 24 hr cycle 95% RH max. without condensation 55°C
Vibrations according to IEC/EN60068-2-6	10 → 150 Hz, A = 0.035 mm
Shocks IEC 60068-2-6	5 g

Standards

Marking	CE (LVD) 73/23/EEC - EMC 89/336/EEC
Product standard	NF EN 60255-6 / IEC 60255-6 / UL 508 / CSA C22.2 N°14
Electromagnetic compatibility	Immunity EN 61000-6-2/IEC 61000-6-2 Emission EN 61000-6-4/EN 61000-6-3 IEC 61000-6-4/IEC 61000-6-3 Emission EN 55022 class B
Certifications	UL, CSA, GL pending
Conformity with environmental directives	RoHS, WEEE

Frequency control

Principles

Overview

The HHZ control relay controls frequency variations on 50 or 60 Hz networks.

It can be used to monitor under and overfrequency, by setting two independent thresholds. It has two relay outputs: one per threshold.

Operating principle

HHZ - Over and underfrequency controller

Function selector switch:

Set the selector switch to the 50 or 60 Hz frequency of the network being monitored, select with or without memory mode. 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 on energisation, 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 function 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.

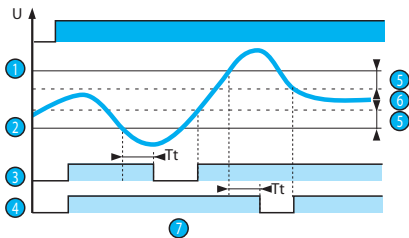
The relay monitors its own supply voltage.

The over and underfrequency threshold values are set using two potentiometers, graduated with the drift value of the frequency to be monitored.

A x1/x2 switch can be used to double the control scale. The hysteresis is set at 0.3 Hz.

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

HHZ - Under and overfrequency - without latching



- ① High threshold
- ② Low threshold
- ③ Relay R1
- ④ Relay R2
- ⑤ Hysteresis
- ⑥ Frequency
- ⑦ Delay on upward threshold crossing (Tt)

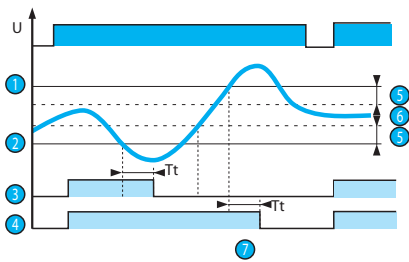
If the frequency of the controlled voltage exceeds the preset overfrequency threshold for longer than the time set on the front face (0.1 to 10 s), the corresponding output relay opens and its LED is extinguished. During the time delay, this LED flashes.

Once the frequency falls below the value of the threshold minus the hysteresis, the relay closes instantly.

If the frequency of the controlled voltage falls below the underfrequency threshold for longer than the time set on the front face (0.1 to 10 s), the corresponding output relay opens and its LED is extinguished. During the time delay, this LED flashes.

Once the frequency rises above the threshold value plus the hysteresis, the relay closes instantly.

HHZ - Under and overfrequency - with latching



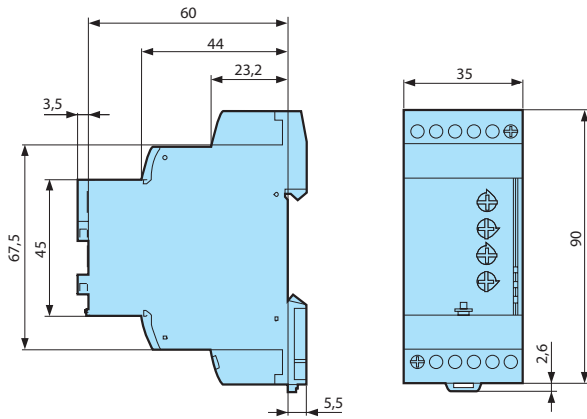
- ① High threshold
- ② Low threshold
- ③ Relay R2
- ④ Relay R1
- ⑤ Hysteresis
- ⑥ Frequency
- ⑦ Delay on upward threshold crossing (Tt)

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.

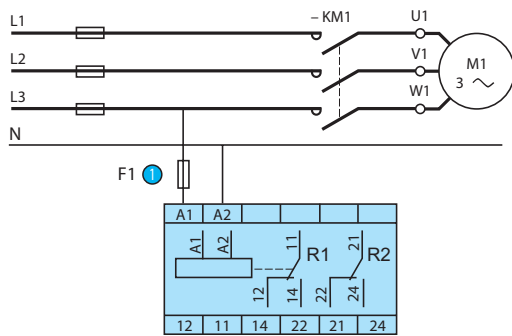
Dimensions (mm)

HHZ



Connections

HHZ



① 1 A fast-blow fuse or cut-out

Level control

→ Level control relay - 17.5 mm

- Level control by means of a discrete sensor



MNS

Part numbers

Type	Sensing	Nominal voltage (V)	Code
MNS	By discrete sensor	24 → 240 V \sim	84870720

Product adaptations



- Customisable colours and labels
- Fixed time delay or adjustable range

Accessories

Description	Code
Removable sealable cover for 17.5 mm casing	84800000

General characteristics

Supply	
Supply voltage U_n	24 V → 240 V \sim
Voltage supply tolerance	-15% / +10%
Operating range	20.4 V → 264 V \sim
Polarity with DC voltage	No
\sim supply voltage frequency	50/60 Hz \pm 10%
Power consumption at U_n	5.5 VA in \sim / 2 W in ---
Immunity from micro power cuts	< 5 ms
Inputs and measuring circuit	
Display precision	\pm 10% of full scale
Digital probe input circuit	Volt-free contact
Max. voltage at probe terminals	Supply voltage U_n
Minimum pushbutton activation duration	50 ms
Max input current	1 mA
Max. length of probe cables	100 m
Timing	
Delay on threshold crossing	1 → 10 s, (1/+10%)
Repetition accuracy with constant parameters	\pm 0.5%
Reset time	< 100 ms
Output	
Type of output	1 single pole changeover relay
Type of contacts	No cadmium
Maximum breaking voltage	250 V \sim
Max. breaking current	5 A \sim
Min. breaking current	10 mA / 5 V ---
Electrical life (number of operations)	1 x 10 ⁶
Breaking capacity (resistive)	1250 VA \sim
Maximum rate	360 operations/hour at full load
Operating categories acc. to IEC 60947-5-1	AC 12, AC 13, AC 14, AC 15, DC 12, DC 13, DC 14
Mechanical life (operations)	30 x 10 ⁶
Insulation	
Nominal insulation voltage IEC 60664-1	250 V
Insulation coordination (IEC 60664-1 / 60255-5)	Overvoltage category III: degree of pollution 3
Rated impulse withstand voltage IEC 60664-1/60255-5	4 kV (1.2 / 50 μ s)
Dielectric strength IEC 60664-1/60255-5	2 kV AC 50 Hz 1 min
Insulation resistance IEC 60664-1 / 60255-5	> 500 Ω / 500 V ---

General characteristics

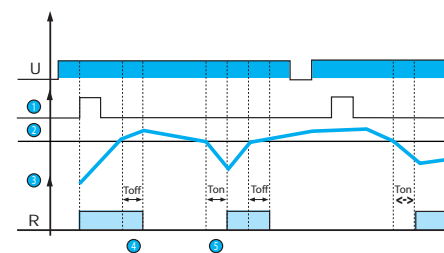
General characteristics

Display power supply	Green LED
Display relay	Yellow LED
Casing	17.5 mm
Mounting	On 35 mm symmetrical DIN rail, IEC/EN 60715
Mounting position	All positions
Material: enclosure plastic type VO to UL94 standard	Incandescent wire test according to IEC 60695-2-11 & NF EN 60695-2-11
Protection (IEC 60529)	Terminal block: IP 20 Casing: IP 30
Weight	80 g
Connecting capacity IEC 60947-1	Rigid: 1 x 4 ² - 2 x 2.5 ² mm ² , 1 x 11 AWG - 2 x 14 AWG Flexible with ferrules: 1 x 2.5 ² - 2 x 1.5 ² mm ² , 1 x 14 AWG - 2 x 16 AWG
Max. tightening torques IEC 60947-1	0.6 → 1 Nm / 5.3 → 8.8 Lbf.in
Operating temperature IEC 60068-2	-20 → +50°C
Storage temperature IEC 60068-2	-40 → +70°C
Humidity IEC 60068-2-30	2 x 24 hr cycle 95% RH max. without condensation 55°C
Vibrations according to IEC/EN60068-2-6	10 → 150 Hz, A = 0.035 mm
Shocks IEC 60068-2-6	5 g

Standards

Marking	CE (LVD) 73/23/EEC - EMC 89/336/EEC
Product standard	NF EN 60255-6 / CEI 60255-6 / UL 508 / CSA C22.2 N°14
Electromagnetic compatibility	Immunity EN 61000-6-2/IEC 61000-6-2 Emission EN 61000-6-4/EN 61000-6-3 IEC 61000-6-4/IEC 61000-6-3 Emission EN 55022 class B
Certifications	UL, CSA, GL pending
Conformity with environmental directives	RoHS, WEEE

Principles



- 1 Cycle start PB
- 2 High threshold level
- 3 Monitored level
- 4 Ton time delay
- 5 Toff time delay

Operating principle

MNS - Level controller using a discrete sensor

This product is designed to control a level by means of a discrete probe (float switch).

On power-up, the relay remains in the rest position. The level control function only begins after the pushbutton (PB) is pressed. This pushbutton is located on the front of the product, but can also be remotely located between Y1 and A1.

The output relay only closes if the float switch is open. If the level rises enough to make the float switch close, the relay will be deactivated after the time delay Toff.

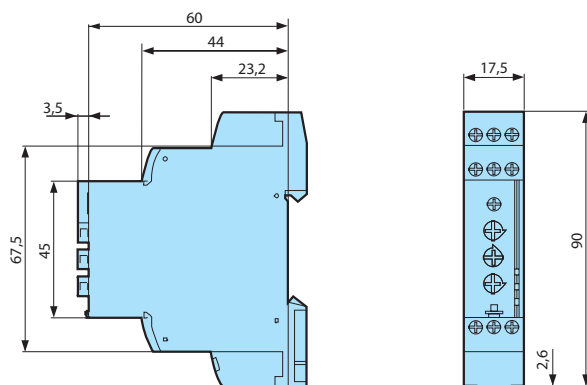
When the level drops and the probe opens, the relay is re-energised after the time delay Ton.

The LEDs flash when the product is energised but the cycle has not started (PB has not yet been pressed).

The time delays Ton and Toff are set at between 0.1 and 10 sec by means of two potentiometers on the front face.

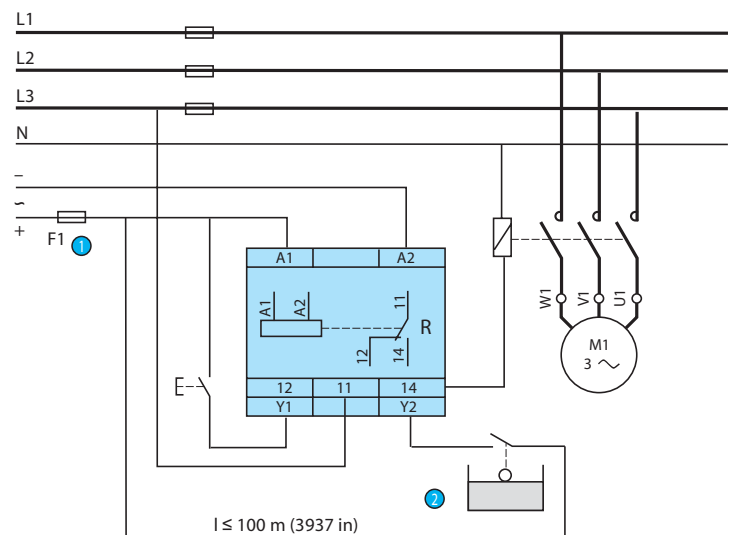
Dimensions (mm)

MNS



Connections

MNS



- 1 1 A fast-blow fuse or cut-out
- 2 "Float" switch

Level control

→ Level control relay - 35 mm

- Control of one or two levels
- Filling or emptying function
- HNM: Control by a resistive level probe
- HNE: Control by a discrete sensor



HNM



HNE

Part numbers

	HNM	HNE
Sensing	By resistive probes	By discrete sensors
Nominal voltage (V)	24 → 240 V \sim	24 → 240 V \sim
Part numbers	84870700	84870710

Product adaptations



- Customisable colours and labels
- Fixed or adjustable time delay
- Adaptation dedicated to HNM:
- Fixed threshold in the generic measurement range

Accessories

Description	Code
Removable sealable cover for 35 mm casing	84800001

General characteristics

	HNM	HNE
Supply		
Power consumption at Un	5 VA in \sim / 1.5 W in ---	5 VA in \sim / 2.7 W in ---
Immunity from micro power cuts (ms)	90 max. in \sim et 100 max. en ---	50
Output		
Type of output	1 double changeover relay	1 single pole changeover relay
Timing		
Maximum reset time	4 s	1.7 s
Inputs and measuring circuit		
Measurement range	250 Ω → 1 M Ω	-
Low sensitivity adjustment gamme LS	250 Ω → 5 k Ω	-
Standard sensitivity adjustment gamme St	5 k Ω → 100 k Ω	-
High sensitivity adjustment gamme HS	50 k Ω → 1 M Ω	-
Adjustment of sensitivity	5 → 100% of the selected range	-
Display precision	\pm 10% of full scale for LS and St ranges -40% / +10% of full scale for HS range	\pm 10% of full scale
Measuring error with temperature drift	0.5% / °C in standard sensitivity	0.5% / °C in standard sensitivity
Measuring error with voltage drift	0%/V across the whole range	0%/V across the whole range
Max. voltage at probe terminals	5 V / 500 Hz \pm 10%	12 V
Max. current via probes	< 1 mA	40 mA
Max. length of probe cables	100 m	-
Max. capacity of probe cable (nF)	1 nF for HS range 2.2 nF for St range 4.7 nF for LS range	-
Input circuit 3-wire sensors	No	✓
General characteristics		
Weight	115 g	110 g

General characteristics

HNM / HNE

Supply	
Supply voltage Un	24 V → 240 V \sim
Voltage supply tolerance	-15% / +10%
Operating range	20.4 → 264 V \sim
Polarity with DC voltage	No
\sim supply voltage frequency	50/60 Hz \pm 10%
Galvanic isolation of power supply/measurement	✓
Timing	
Delay on threshold crossing	0.1 → 5 s (0, + 10%)
Repetition accuracy with constant parameters	\pm 2%
Delay on pick-up	600 ms
Output	
Type of contacts	No cadmium
Maximum breaking voltage	250 V \sim
Max. breaking current	5 A \sim
Min. breaking current	10 mA / 5 V \sim
Electrical life (number of operations)	1 x 10 ⁵
Breaking capacity (resistive)	1 250 VA \sim
Maximum rate	360 operations/hour at full load
Operating categories acc. to IEC 60947-5-1	AC12, AC 13, AC 14, AC 15, DC 12, DC 13
Mechanical life (operations)	30 x 10 ⁶
Insulation	
Nominal insulation voltage IEC 60664-1	250 V
Insulation coordination (IEC 60664-1 / 60255-5)	Overvoltage category III: degree of pollution 3
Rated impulse withstand voltage IEC 60664-1/60255-5	4 kV (1.2 / 50 μ s)
Dielectric strength IEC 60664-1/60255-5	2 kV AC 50 Hz 1 min.
Insulation resistance IEC 60664-1 / 60255-5	> 500 M Ω / 500 V \sim
General characteristics	
Display power supply	Green LED
Display relay	Yellow LED
Delay	Yellow LED
Casing	35 mm
Mounting	On 35 mm symmetrical DIN rail, IEC/EN 60715
Mounting position	All positions
Material: enclosure plastic type VO to UL94 standard	Incandescent wire test according to IEC 60695-2-11 & NF EN 60695-2-11
Protection (IEC 60529)	Terminal block: IP20 Casing: IP30
Connecting capacity IEC 60947-1	Rigid: 1 x 4 ² - 2 x 2.5 ² mm ² 1 x 11 AWG - 2 x 14 AWG Flexible with ferrules: 1 x 2.5 ² - 2 x 1.5 ² mm ² 1 x 14 AWG - 2 x 16 AWG
Max. tightening torques IEC 60947-1	0.6 → 1 Nm / 5.3 → 8.8 Lbf.In
Operating temperature IEC 60068-2	-20 → +50°C
Storage temperature IEC 60068-2	-40 → +70°C
Humidity IEC 60068-2-30	2 x 24 hr cycle 95% RH max. without condensation 55°C
Vibrations according to IEC/EN60068-2-6	10 → 150 Hz, A = 0.035 mm
Shocks IEC 60068-2-6	5 g
Standards	
Marking	CE (LVD) 73/23/EEC - EMC 89/336/EEC
Product standard	NF EN 60255-6 / IEC 60255-6 / UL 508 / CSA C22.2 N°14
Electromagnetic compatibility	Immunity EN 61000-6-2/IEC 61000-6-2 Emission EN 61000-6-4 2002/EN 61000-6-3 IEC 61000-6-4/IEC 61000-6-3 Emission EN 55022 class A
Certifications	UL, CSA, GL pending
Conformity with environmental directives	RoHS, WEEE

Level control

Principles

HNM-HNE

Overview

HNM and HNE control relays are designed to monitor the levels of:

- Conductive liquid (HNM)
- Any other product (HNE)

The HNM relay takes its measurements by means of resistive probes.

The HNE relay takes its measurements by means of discrete sensors.

Both these products actuate their output relay during emptying or filling of a tank.

General principle:

HNM relays control levels of conductive liquids. The principle is based on measuring the apparent resistance of the liquid between two submerged probes. When this value is below the preset threshold displayed on the front face of the unit, the relay changes state. To avoid electrolytic phenomena, an AC current runs across the probes. A rotary switch on the front face can be used to select the desired function and sensitivity range.

HNE relays control levels of products which may or may not be conductive. High and low-level data is produced by 3-wire output discrete sensors.

A green LED indicates the presence of the supply voltage.

A yellow LED indicates the status of the output relay.

A yellow LED flashes during the time delay.

Parameter setting:

A rotary switch on the front face can be used to select the sensitivity range, and the emptying or filling function.

A second switch can be used to select the number of levels (1 or 2), as well as the type of time delay in the case of 1-level mode.

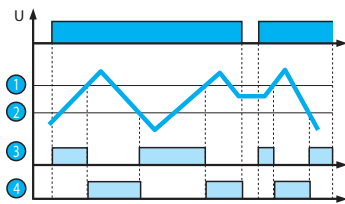
The configuration of these switches is taken into account on energisation.

If the switch is set to a non-conforming position on energisation, 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 function 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.

HNM-HNE - Emptying/filling function - two levels



- ① Maximum level
- ② Minimum level
- ③ Output relay R filling function "Up"
- ④ Output relay R emptying function "Down"

Control of two levels, emptying function

(Level: 2, LS emptying function (Low sensitivity: 250Ω to 5 kΩ), St emptying (Standard sensitivity: 5 kΩ to 100 kΩ), HS emptying (High sensitivity: 50 kΩ to 1 MΩ).

As long as the liquid level has not reached the probe maximum, the output relay stays open.

Once the max. level is reached, the contact closes, thus allowing the tank to empty (valve opens, pump starts, etc). When the level drops below the min. level, the contact opens to interrupt the emptying process.

NB: In two-level control mode the time delay for preventing wave effect is not active.

Control of two levels, filling function

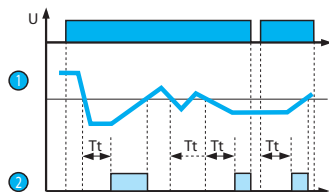
(Level: 2, LS filling function (Low sensitivity: 250Ω to 5 kΩ), St filling (Standard sensitivity: 5 kΩ to 100 kΩ), HS filling (High sensitivity: 50 kΩ to 1 MΩ).

As long as the liquid level has not reached the probe maximum, the output relay stays closed.

Once the max. level is reached, the contact opens and pumping stops. When the level drops below the min. level, the contact closes again and pumping restarts so as to make the liquid level rise again.

NB: In two-level control mode the time delay for preventing wave effect is not active.

HNM-HNE - One-level filling function/on-delay



- ① Min. probe level
- ② R output relay

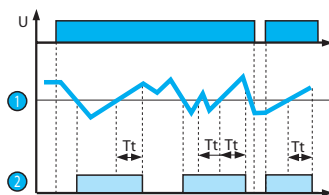
One-level control (min. probe), filling function, on-delay

(Level: 1 - on-delay, LS filling function (Low sensitivity: 250Ω to 5 kΩ), St filling (Standard sensitivity: 5 kΩ to 100 kΩ), HS filling (High sensitivity: 50 kΩ to 1 MΩ).

When the liquid level drops below the probe for a duration longer than the value of time delay T_t set on the front face, the relay closes and stays closed until the liquid level reaches the probe again.

If the liquid level rises back above the level set before the end of the time delay, the relay does not close.

HNM-HNE - One-level filling function/off-delay



- ① Min. probe level sonde Min
- ② R output relay

One-level control (min. probe), filling function, off-delay

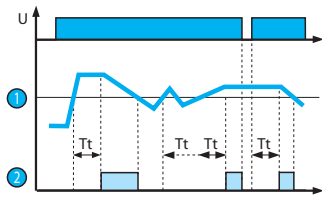
(Level: 1 - off-delay, LS filling function (Low sensitivity: 250Ω to 5 kΩ) or St filling (Standard sensitivity: 5 kΩ to 100 kΩ) or HS filling (High sensitivity: 50 kΩ to 1 MΩ).

When the liquid level drops below the probe for a duration longer than the value of time delay T_t set on the front face, the relay closes instantly and stays closed until the liquid level reaches the probe again and stays above it for a duration longer than time delay T_t set on the front face.

If the liquid level drops back below the level set before the end of the time delay, the relay stays closed.

Principles

HNM-HNE - One-level emptying function/on-delay



- ① Min. probe level
- ② R output relay

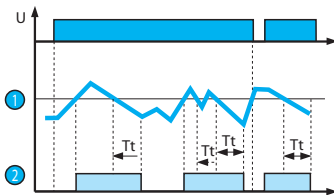
One-level control (min. probe), emptying function, on-delay

(Level: 1 - on-delay, LS emptying function (Low sensitivity: 250Ω to 5 kWΩ), St emptying (Standard sensitivity: 5 kΩ to 100 kΩ), HS emptying (High sensitivity: 50 kΩ to 1 MΩ).

When the liquid level rises above the probe for a duration longer than the value of time delay T_t set on the front face, the relay closes and stays closed until the liquid level drops back below the probe.

If the liquid level drops back below the level set before the end of the time delay, the relay does not close.

HNM-HNE - One-level emptying function/off-delay



- ① Min. probe level
- ② R output relay

One-level control (min. probe), emptying function, off-delay

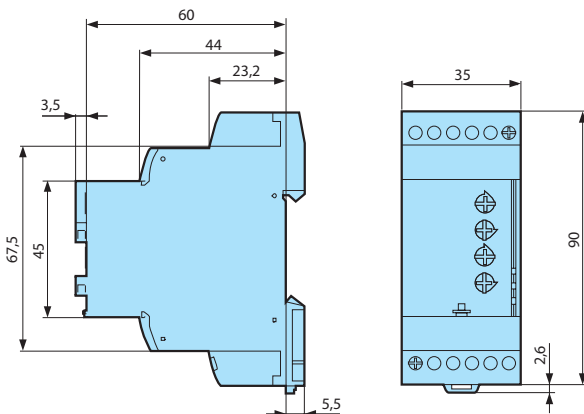
(Level: 1 - off-delay, LS emptying function (Low sensitivity: 250Ω to 5 kΩ), St emptying (Standard sensitivity: 5 kΩ to 100 kΩ), HS emptying (High sensitivity: 50 kΩ to 1 MΩ).

When the liquid level rises above the probe, the relay closes instantly and stays closed until the liquid level drops back below the probe for a duration longer than the value of time delay T_t set on the front face.

If the liquid level rises back above the level set before the end of the time delay, the relay stays closed.

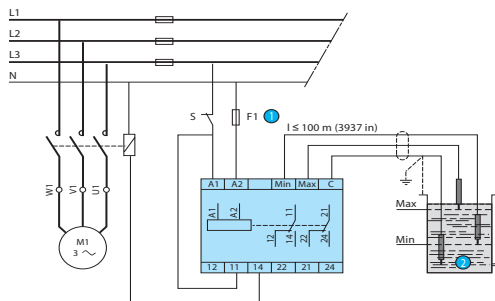
Dimensions (mm)

HNM-HNE



Connections

HNM



- ① 1 A fast-blow fuse or cut-out
- ② Common

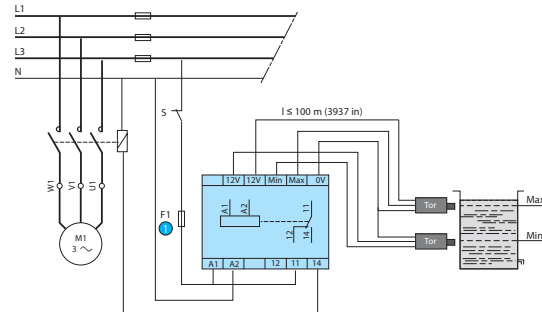
NB:

Probe cable: screened cable recommended, screening and "common" connected to earth.

The probe cable does not have to be screened, but it is inadvisable to mount it close to the power cables.

For mono level, use the "com" and "min." electrodes.

HNE



- ① 1 A fast-blow fuse or cut-out

NB:

Probe cable: screened cable recommended, screening and "common" connected to earth.

The probe cable does not have to be screened, but it is inadvisable to mount it close to the power cables.

For mono level, use the "com" and "min." electrodes.

Level control

→ Electrode and probe holders

■ Level control accessories



3 probe
electrode holder



Single probe
electrode holder



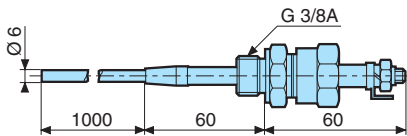
Protected
holder

Part numbers

Type	Accessories	Operating temperature (°C)	Pressure	Code
S8	Light and compact 3-probe electrode holder (stainless steel) Electrode holder and 1000 mm probe Especially recommended for drinks dispensers and for applications where space is limited	80	2 kg/cm ²	79 696 044
S3	Electrode holder with a single probe supplied in a standard length of 1000 mm. (304 stainless steel) Mounting with external 3/8" BSP thread and hexagonal head. Use 24 mm. spanner for hexagon. Suitable for use on boilers, autoclaves	≤ 200	Max.: 25 Kg/cm ²	79 696 014
S7	Protected electrode for mounting by suspension. Protective shell: PUC (S7) Electrode: stainless steel Length of cable as requested (ref. C1) : 79 696 001			79 696 043
S5	Suitable for high pressures and high temperatures. Metal parts of stainless steel, isolated by ceramic. 3/8" BSP mounting thread.	≤ 350	Max.: 15 Kg/cm ²	79 696 006

Dimensions (mm)

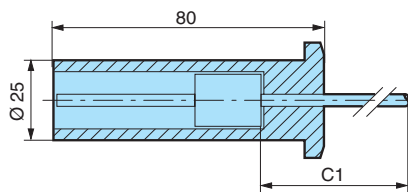
79 696 014 - S3



Electrode holder with a single probe supplied in a standard length of 1000mm. (304 stainless steel).

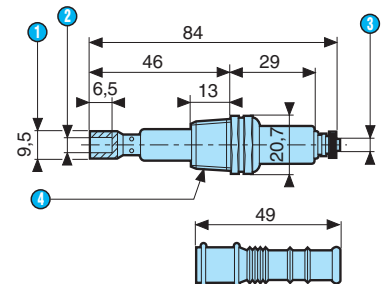
Mounting with external 3/8" BSP thread and hexagonal head.
Use 24 mm. spanner for hexagon. Suitable for use on boilers, autoclaves and under high temperature conditions up to 200°C and high pressure conditions up to 25 kg/cm²

79 696 043 - S7



Protected electrode for mounting by suspension.
Protective shell: PUC (S7)
Electrode: stainless steel.
Length of cable as requested (C1) : 79 696 001

S5

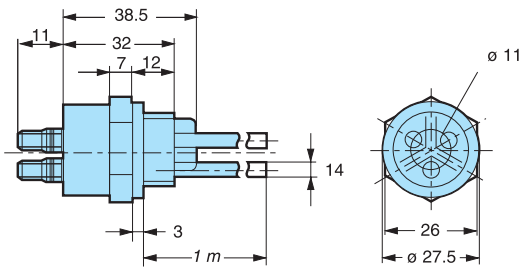


- ① 9.5 Across flats
- ② 1/4 width
- ③ 5/32 width
- ④ 3/8 tapered NPT

Suitable for high pressures and high temperatures. For use up to 350 °C and 15 kg/cm²
Metal parts of stainless steel, isolated by ceramic.
3/8" BSP mounting thread.

Dimensions (mm)

79 696 044 - S8



Light and compact 3-probe electrode holder (stainless steel).
 Electrode holder and 1000 mm probe.
 Especially recommended for drinks dispensers
 and for applications where space
 is limited.

Operating temperature: 80 °C
 Max. pressure: 2 kg/cm²

Speed control

→ Speed control relay - 35 mm

- Control of overspeed, underspeed, operating rate, stopping
- Measurement via discrete sensors - 3-wire PNP or NPN, Namur, voltage 0-30V or volt-free contact type
- Works with either NO or NC sensors
- Time between pulses adjustable from 0.05 s to 10 min.
- Power-on inhibit time, adjustable from 0.6 to 60 s
- Inhibit time can be managed via an external contact



HSV

Part numbers

Type	Nominal voltage (V)	Code
HSV	24 → 240 V \sphericalangle	84874320

Product adaptations



- Customisable colours and labels
- Possible to delete settings
- Fixed threshold in the generic measurement range
- Fixed or adjustable time delay

Accessories

Description	Code
Removable sealable cover for 35 mm casing	84800001

General characteristics

Supply	
Supply voltage Un	24 V → 240 V \sphericalangle
Voltage supply tolerance	-15% / +10%
Operating range	20.4 V → 264 V \sphericalangle
Polarity with DC voltage	No
\sphericalangle supply voltage frequency	50 / 60 Hz \pm 10%
Galvanic isolation of power supply/measurement	Yes
Power consumption at Un	5 VA in \sphericalangle / 3 W in \sphericalangle
Immunity from micro power cuts	50 ms
Inputs and measuring circuit	
Input circuit 3-wire sensors	PNP or NPN, 12V, 50 mA max.
Input circuit NAMUR sensor	12 V / 1.5 K Ω *
Input circuit Contact	12 V / 9.5 K Ω
Input circuit Voltage input	0 V min. / 30 V max. / 9.5 K Ω High state 4.5 V min. Low state 1 V max.
Minimum pulse time	5 ms in high and low state
Frequency of measured signal	1.5 m Hz minimum, 22 Hz maximum
Measurement ranges	0.5 s - 1 s - 5 s - 10 s - 1 mn - 5 mn - 10 mn
Threshold adjustment	10 → 100% of the range
Fixed hysteresis	5% of displayed threshold
Display precision	\pm 10% of full scale
Repetition accuracy with constant parameters	\pm 0.5%
Measuring error with voltage drift	< 1% across the whole range
Measuring error with temperature drift	\pm 0.1% / °C max.
Timing	
Maximum threshold crossing response time	15 ms
Reset time S2	50 ms minimum (in memory mode)
Reset time	In memory mode (power break) : 1500 ms minimum
Inhibit time delay	On energisation: 0.6 → 60 s (0, +10% of full scale)
Repetition accuracy with constant parameters	\pm 0.5%
Delay on pick-up	50 ms
Display precision	\pm 10% of full scale

General characteristics

Output

Type of output	1 single pole changeover relay
Type of contacts	No cadmium
Maximum breaking voltage	250 V ~ / ---
Max. breaking current	5A ~
Min. breaking current	10 mA / 5 V ---
Electrical life (number of operations)	1 x 10 ⁵
Breaking capacity (resistive)	1250 VA ~
Maximum rate	360 operations/hour at full load
Operating categories acc. to IEC 60947-5-1	AC 12, AC 13, AC 14, AC 15, DC 12, DC 13, DC 14
Mechanical life (operations)	30 x 10 ⁶

Insulation

Nominal insulation voltage IEC 60664-1	250 V
Insulation coordination (IEC 60664-1 / 60255-5)	Overvoltage category III: degree of pollution 3
Rated impulse withstand voltage IEC 60664-1/60255-5	4 kV (1.2 / 50 µs)
Dielectric strength IEC 60664-1/60255-5	2 kV AC 50 Hz 1 min
Insulation resistance IEC 60664-1 / 60255-5	> 500 MΩ / 500 V ---

General characteristics

Display power supply	Green LED
Display relay	Yellow LED
Inhibit display	Yellow LED
Casing	35 mm
Mounting	On 35 mm symmetrical DIN rail, IEC/EN 60715
Mounting position	All positions
Material: enclosure plastic type VO to UL94 standard	Incandescent wire test according to IEC 60695-2-11 & NF EN 60695-2-11
Protection (IEC 60529)	Terminal block: IP20 Casing: IP30
Weight	120 g
Connecting capacity IEC 60947-1	Rigid: 1 x 4 ² - 2 x 2.5 ² mm ² 1 x 11 AWG - 2 x 14 AWG Flexible with ferrules: 1 x 2.5 ² - 2 x 1.5 ² mm ² 1 x 14 AWG - 2 x 16 AWG
Max. tightening torques IEC 60947-1	0.6 → 1 Nm / 5.3 → 8.8 Lbf.In
Operating temperature IEC 60068-2	-20 → +50°C
Storage temperature IEC 60068-2	-40 → +70°C
Humidity IEC 60068-2-30	2 x 24 hr cycle 95% RH max. without condensation 55°C
Vibrations according to IEC/EN60068-2-6	10 → 150 Hz, A = 0.035 mm
Shocks IEC 60068-2-6	5 g

Standards

Marking	CE (LVD) 73/23/EEC - EMC 89/336/EEC
Product standard	NF EN 60255-6 / IEC 60255-6 / UL 508 / CSA C22.2 N°14
Electromagnetic compatibility	Immunity EN 61000-6-2/IEC 61000-6-2 Emission EN 61000-6-4/EN 61000-6-3 IEC 61000-6-4/IEC 61000-6-3 Emission EN 55022 class B
Certifications	UL, CSA, GL pending
Conformity with environmental directives	RoHS, WEEE

Comments

The IEC 60947-5-6/1999-12 NAMUR standard does not impose the operating voltage (open circuit voltage) or the load resistance (source resistance of the control amplifier), but it defines the test conditions for which, using the sensor voltage/current characteristics with high and low impedance, the normal operating zones are specified. The great majority of NAMUR sensors use a 12 V supply voltage. Matching the load resistance to the operating voltage allows the nominal switching distance to be maintained.

Speed control

Principles

HSV

Overview

The HSV relay controls the speed (or, more strictly speaking, the operating rate, or frequency) of a process (moving walkway, conveyor, etc.) using discrete sensors:

- 3-wire PNP or NPN output proximity sensor
- voltage input 0 - 30 V
- NAMUR proximity sensor
- volt-free contact

It can be used to monitor under OR overspeed

Operating principle

Measurement

The monitored process cycle is the succession of pulses characterised by a signal with two states: high and low. The speed measurement is obtained by measuring the duration of this signal, from the first detected change of state (either a rising or falling edge).

Digital signal processing avoids the problem of disparity of signals.

From energisation, or after the appearance (or reappearance) of the sensor signal, detection (characterisation) of the signal requires processing of one or more periods (two maximum).

During this time, control is inoperative.

Operating mode

Using the selector switch, select one of four modes:

- Underspeed without latching
- Underspeed with latching
- Overspeed without latching
- Overspeed with latching

If, on energisation, the switch is placed in one of the three intermediate positions (between "underspeed with latching" and "overspeed with latching"), the relay stays in the rest state ("alarm") and the error is signalled by all three LEDs flashing simultaneously.

The mode selector switch position is taken into account on energisation.

Modifications made during operation will have no effect: the active configuration may therefore be different from that indicated by the switch, the relay operates normally but the change in configuration is signalled by all three LEDs flashing simultaneously.

Latching

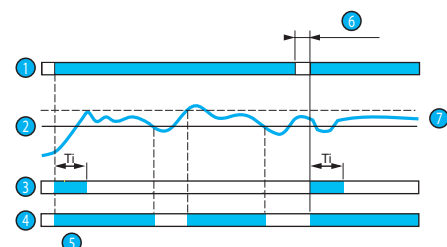
In "memory" mode, when a fault has been recorded, the HSV relay latches in the rest position ("alarm" operational state). Once the speed is correct again, the relay can be unlatched (reset) by closing contact S2 (for 50 ms minimum).

Irrespective of the speed of the controlled process, when S2 is closed the HSV relay is inhibited, the output is at the operating point ("normal" operational state); if the speed is still not correct when contact S2 is reopened, the relay latches again in the rest position ("alarm" operational state).

The HSV can also be reset, by switching off and on again several times in succession (the power break must last at least 1500 ms).

If the process speed is incorrect, this method is limited by the same restriction as resetting using S2.

HSV - Control of underspeed without latching



- 1 Voltage (S1)
- 2 Threshold
- 3 Inhibit LED
- 4 Relay
- 5 Inhibit delay on starting (T_i)
- 6 1500 ms min.
- 7 Speed

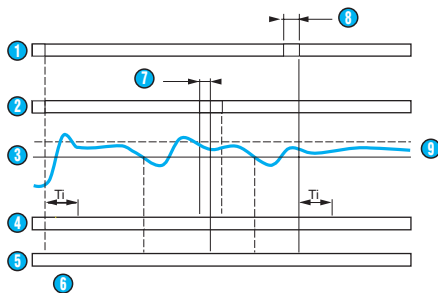
After the end of the inhibit delay on starting, " T_i ", as soon as the measured speed drops below the threshold value, the output relay changes state, from operating point to rest position ("alarm" operational state, 11-14 open and 11-12 closed).

It returns to the initial state when the speed rises above the threshold plus the hysteresis (fixed at 5% of the displayed threshold).

After the power supply returns, following a break that has lasted at least 1500 ms, the relay is in the ("normal") operating state during the time delay and stays there until the speed is above the threshold.

Principles

HSV - Control of underspeed with latching

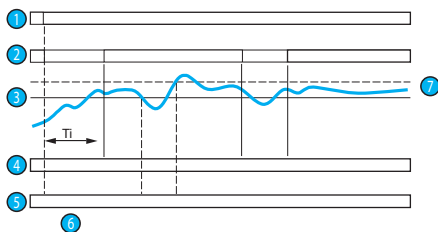


- 1 Voltage (S1)
- 2 Contact S2
- 3 Threshold
- 4 Inhibit LED
- 5 Relay
- 6 Inhibit delay on starting (T_i)
- 7 50 ms min.
- 8 1500 ms min.
- 9 Speed

When the HSV has been configured in "memory" mode, if underspeed is detected, the output relay stays in the rest state ("alarm") irrespective of any subsequent change in the speed of the process.

It will not be able to revert to ("normal") operating state until contact S2 closes (50 ms minimum). If, when S2 reopens, the speed is inadequate, the relay reverts to the rest latched state ("alarm"). The HSV can also be reset by a power break (1500 ms minimum); the relay then returns to the ("normal") operating state for at least the duration of the time delay, irrespective of the speed of the process.

HSV - Underspeed with inhibition by S2



- 1 Voltage (S1)
- 2 Contact S2
- 3 Threshold
- 4 Inhibit LED
- 5 Relay
- 6 Inhibit delay on starting (T_i)
- 7 Speed

On energisation, to allow the controlled process to reach its nominal operating speed, the HSV relay is inhibited for a period that is adjustable from 0.6 to 60 seconds.

This time delay can be modified during inhibition to be shorter or longer.

The HSV relay can also be inhibited by the closing of contact S2: on starting, for example, if the process acceleration time is more than 60 s, or at any time during operation.

Irrespective of the origin (delay on starting or S2 closing), inhibition maintains the output relay in the "closed" position ("normal" operational state, contacts 11-14 closed and 11-12 open) and is signalled by the Inhibit LED lighting up.

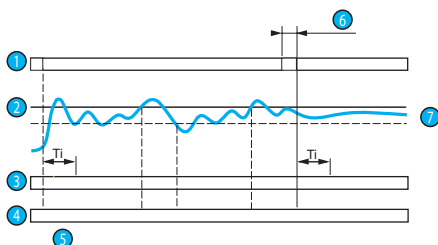
If, after removal of the inhibition (end of delay on starting or opening of contact S2), the signal detection phase has not ended, the relay drops out after the expected time between two pulses (measured from the end of inhibition).

Inhibition must last for as long as required for the product to detect at least 2 periods.

If the signal type has not been determined at the end of the inhibit period, the "inhibit" LED flashes for as long as it is impossible to measure the speed.

Similarly, during operation, it is possible to inhibit the HSV relay at any time by closing S2.

HSV - Control of overspeed without latching



- 1 Voltage (S1)
- 2 Threshold
- 3 Inhibit LED
- 4 Relay
- 5 Inhibit delay on starting (T_i)
- 6 1500 ms min.
- 7 Speed

After the end of the inhibit delay on starting, " T_i ", as soon as the measured speed rises above the threshold value, the output relay changes state, from operating point to rest position ("alarm" operational state, 11-14 open and 11-12 closed).

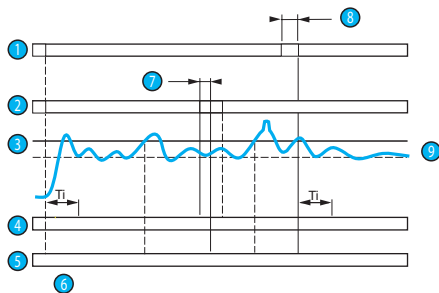
It returns to the initial state when the speed falls back below the threshold minus the hysteresis (fixed at 5% of the displayed threshold).

After a power break that has lasted at least 1500 ms, the relay is in the ("normal") operating state during the time delay and stays there until the speed is below the threshold.

Speed control

Principles

HSV - Control of overspeed with latching

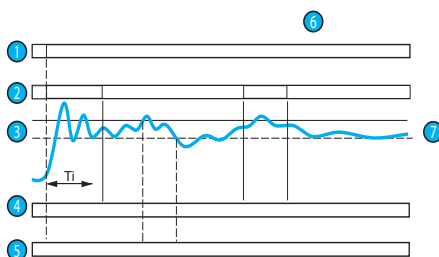


- 1 Voltage (S1)
- 2 Contact S2
- 3 Threshold
- 4 Inhibit LED
- 5 Relay
- 6 Inhibit delay on starting (T_i)
- 7 50 ms min.
- 8 1500 ms min.
- 9 Speed

When the HSV has been configured in "memory" mode, if overspeed is detected, the output relay stays in the rest state ("alarm") irrespective of any subsequent change in the speed of the process. It will not be able to revert to ("normal") operating state until contact S2 closes (50 ms minimum). If, when S2 reopens, the speed is too high, the relay reverts to the rest latched state ("alarm").

The HSV can also be reset by a power break (1500 ms minimum) ; the relay then returns to the ("normal") operating state for at least the duration of the time delay, irrespective of the speed of the process.

HSV - Overspeed with inhibition by S2

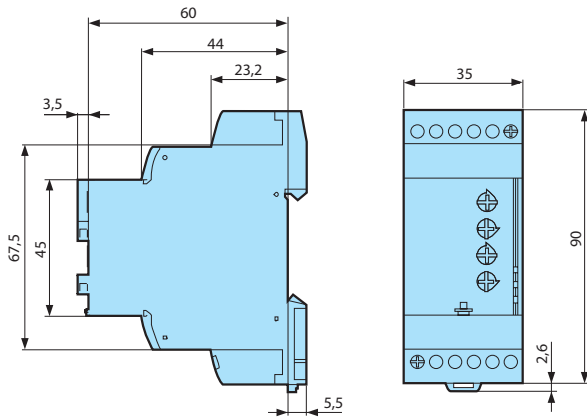


- 1 Voltage (S1)
- 2 Contact S2
- 3 Threshold
- 4 Inhibit LED
- 5 Relay
- 6 Inhibit delay on starting (T_i)
- 7 Speed

It is possible to inhibit the HSV relay by closing external contact S2 until the process has reached its nominal speed.

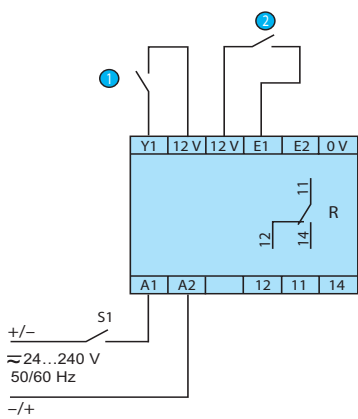
Dimensions (mm)

HSV

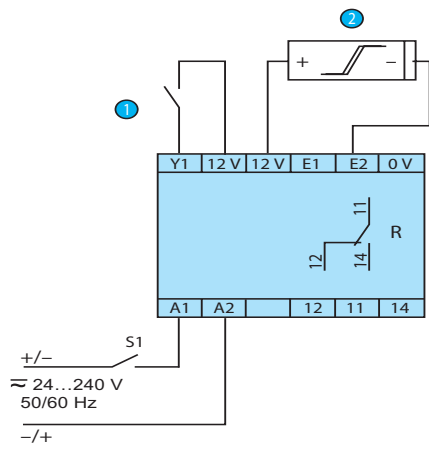


Connections

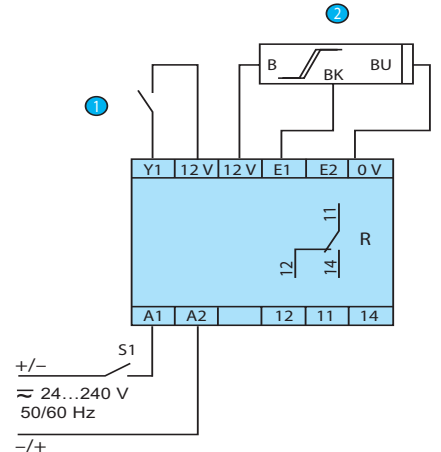
HSV - Input circuits



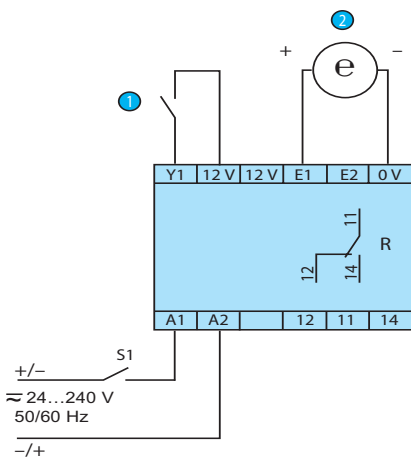
- ① S2 Inhibit - Reset
- ② Volt-free contact input 12 V, 9.5 kΩ



- ① S2 Inhibit - Reset
- ② NAMUR proximity sensor input 12 V, 1.5 kΩ



- ① S2 Inhibit - Reset
- ② 3-wire PNP/NPN proximity switch 12 V, 50 mA max.



- ① S2 Inhibit - Reset
- ② Voltage input 0 V - 30 V

Temperature control in lifts according to EN81

→ Temperature control relay for lift service rooms - according to EN81 - 35 mm

- Control relay designed to monitor the temperature in lift machine rooms in accordance with standard EN81
- PT100 input
- Adjustable control between 5 °C and 40 °C
- Independent setting of high and low thresholds
- Built-in phase control option



HT81



HT81-2



HWT81

Part numbers

	HT81	HT81-2	HWT81
Function	Under/Overtemperature window mode	Under/Overtemperature window mode	Under/Overtemperature window mode + phase sequence and failure
Nominal voltage (V)	24 → 240 V ~	24 → 240 V ~	24 → 240 V ~
3-phase control	-	-	3 x 208 → 480 V ~
Part numbers	84874110	84874120	84874130

Product adaptations



- Customisable colours and labels
- Fixed threshold in the generic measurement range
- Fixed or adjustable time delay
- Adjustable fixed hysteresis

Accessories

Description	Code
Removable sealable cover for 35 mm casing	84800001

General characteristics

	HT81	HT81-2	HWT81
Inputs and measuring circuit			
Phase control voltage range	-	-	208 V → 480 V (-15% / +10%) *
Phase failure detection with regeneration	-	-	> 30% of the average of the 3 phases
Frequency of measured signal	-	-	50 → 60 Hz ± 1 Hz
Relay drop-out voltage (phase failure)	-	-	70%
3-phase input resistors	-	-	600 KΩ
Timing			
Maximum response time in the event of a 3-phase fault (ms)	-	-	500 ms
Output			
Type of output	1 single pole changeover relay	2 single pole NO relay	2 single pole NO relay
Insulation			
Galvanic isolation of power supply/measurement	Yes, between power supply and PT100 (transformer) Yes, between power supply and output (transformer and relay) Yes, between PT 100 and output (relay)	Yes, between power supply and PT100 (transformer) Yes, between power supply and output (transformer and relay) Yes, between PT100 and output (relay)	Yes, between power supply and PT100 (transformer) Yes, between power supply and output (transformer and relay) Yes, between power supply and 3-phase network (transformer) Yes, between 3-phase network and output (relay) No, between 3-phase network and PT100 (leakage current limited by several high-value resistors) Yes, between PT 100 and output (relay)
Nominal insulation voltage IEC 60664-1	250 V	250 V	400 V

General characteristics

HT81 / HT81-2 / HWT81

Supply	
Supply voltage Un	24 V → 240 V ~
Voltage supply tolerance	-15%, + 10% in ~ -10%, +10% in ---
Operating range	20.4 V → 264 V ~ 21.6 V → 264 V ---
Polarity with DC voltage	No
~ supply voltage frequency	50 / 60 Hz ±10%
Power consumption at Un	3.5 VA in ~ / 0.6 W in ---
Immunity from micro power cuts	10 ms
Inputs and measuring circuit	
Low temperature measurement selection	-1°C, 1°C, 3°C, 5°C, 7°C, 9°C, 11°C
High temperature measurement selection	34°C, 36°C, 38°C, 40°C, 42°C, 44°C, 46°C
Temperature measurement input resistance	1330 Ω
Fixed hysteresis	2 °C
Display precision	± 2%
Max. length of PT100 probe cables	10 m
Timing	
Delay on threshold crossing	1 → 10 s
Display precision	0, + 10%
Reset time	8 s
Delay on pick-up	200 ms
Maximum response time on disappearance of fault	3.5 s for a temperature fault, 500 ms for a phase fault
Output	
Type of contacts	No cadmium
Maximum breaking voltage	250 V ~
Max. breaking current	5 A ~
Min. breaking current	10 mA / 5 V ---
Electrical life (number of operations)	1 x 10 ⁴
Breaking capacity (resistive)	1250 VA ~
Maximum rate	360 operations/hour at full load
Operating categories acc. to IEC 60947-5-1	AC 12, AC 13, AC 14, AC 15, DC 12, DC 13, DC 14
Mechanical life (operations)	30 x 10 ⁶
Insulation	
Insulation coordination (IEC 60664-1 / 60255-5)	Overvoltage category III: degree of pollution 3
Rated impulse withstand voltage IEC 60664-1/60255-5	4 kV (1.2 / 50 μs)
Dielectric strength IEC 60664-1/60255-5	2 kV ~ 50 Hz 1 min.
Insulation resistance IEC 60664-1 / 60255-5	> 100 MΩ - 500 V ---
General characteristics	
Display power supply	Green LED
Display temperature	Yellow LED (HWT81)
Display phases	Yellow LED (HWT81)
High threshold relay	Yellow LED (HT81, HT81-2)
Low threshold relay	Yellow LED (HT81, HT81-2)
Casing	35 mm
Mounting	On 35 mm symmetrical DIN rail, IEC/EN 60715
Mounting position	All positions
Material: enclosure plastic type VO to UL94 standard	Incandescent wire test according to IEC 60695-2-11 & NF EN 60695-2-11
Protection (IEC 60529)	Terminal block: IP 20 IP 30 casing
Weight	121 g
Connecting capacity IEC 60947-1	Rigid: 1 x 4 ² - 2 x 2.5 ² mm ² 1 x 11 AWG - 2 x 14 AWG Flexible with ferrules: 1 x 2.5 ² - 2 x 1.5 ² mm ² 1 x 14 AWG - 2 x 16 AWG
Max. tightening torques IEC 60947-1	0.6 → 1 Nm / 5.3 → 8.8 Lbf.In
Operating temperature IEC 60068-2	-20 → +50°C
Storage temperature IEC 60068-2	-40 → +70°C
Humidity IEC 60068-2-30	2 x 24 hr cycle 95% RH max. without condensation 55°C
Vibrations according to IEC/EN60068-2-6	10 → 150 Hz, A = 0.035 mm
Shocks IEC 60068-2-6	5 g
Standards	
Marking	CE (LVD) 73/23/EEC - EMC 89/336/EEC
Product standard	NF EN 60255-6 / IEC 60255-6 / UL 508 / CSA C22.2 N°14 / EN 81-1
Electromagnetic compatibility	Immunity EN 61000-6-2/IEC 61000-6-2 Emission EN 61000-6-4/EN 61000-6-3 IEC 61000-6-4/IEC 61000-6-3 Emission EN 55022 class B
Certifications	UL, CSA, GL pending
Conformity with environmental directives	RoHS, WEEE
Comments	
* 3-phase mains with earth	

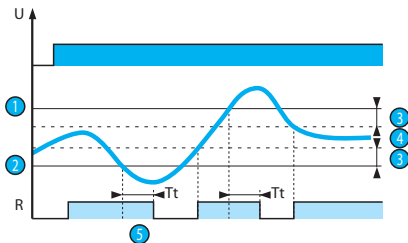
Temperature control in lifts according to EN81

Principles

Overview

Temperature control relays for lift machine rooms are designed for monitoring the temperature between 5 °C and 40 °C according to standard EN81.

HT81 - Under/Overtemperature

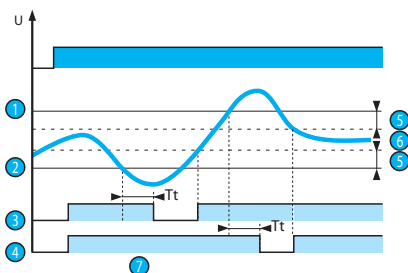


- ① High threshold
- ② Low threshold
- ③ Hysteresis
- ④ Monitored temperature
- ⑤ Threshold crossing delay adjustable on front face (Tt)

HT81 operating principle:

As long as the temperature controlled by the PT100 stays between the two preset thresholds on the front face, the output relay is closed and the yellow LEDs are lit. When the temperature exceeds one of the preset thresholds on the front face (upper or lower threshold), the preset time delay on the front face (Tt) is activated. The yellow LED corresponding to the threshold exceeded (upper or lower) flashes. At the end of the time delay, if the temperature still exceeds one of the preset thresholds, the output relay opens and the yellow LED corresponding to the threshold is extinguished. The output relay closes instantaneously (at about the response time for disappearance of a fault) when the temperature returns within the window of the two preset thresholds on the front face plus (or minus) the fixed hysteresis. If the PT100 probe is wired incorrectly (missing or short-circuited) the output relays opens and all 3 LEDs flash.

HT81-2 - Under/Overtemperature

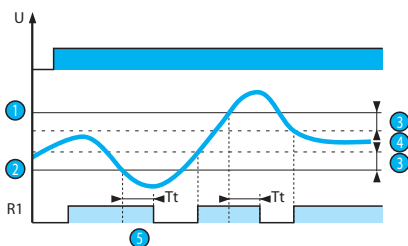


- ① High threshold
- ② Low threshold
- ③ Low threshold relay R1
- ④ High threshold relay R2
- ⑤ Hysteresis
- ⑥ Monitored temperature
- ⑦ Threshold crossing delay adjustable on front face (Tt)

HT81-2 operating principle:

As long as the temperature controlled by the PT100 stays between the two preset thresholds on the front face, the output relays are closed and their yellow LEDs are lit. When the temperature exceeds one of the preset thresholds on the front face (upper or lower threshold), the preset time delay on the front face (Tt) is activated. The yellow LED corresponding to the threshold exceeded (upper or lower) flashes. At the end of the time delay, if the temperature is still beyond one of the preset thresholds, the corresponding output relay opens and the yellow LED corresponding to the threshold exceeded is extinguished. The output relay closes instantaneously (at about the response time for disappearance of a fault) when the temperature returns within the window of the two preset thresholds on the front face plus (or minus) the fixed hysteresis. If the PT100 probe is wired incorrectly (missing or short-circuited) the output relays open and all 3 LEDs flash.

HWT81 - Under/Overtemperature

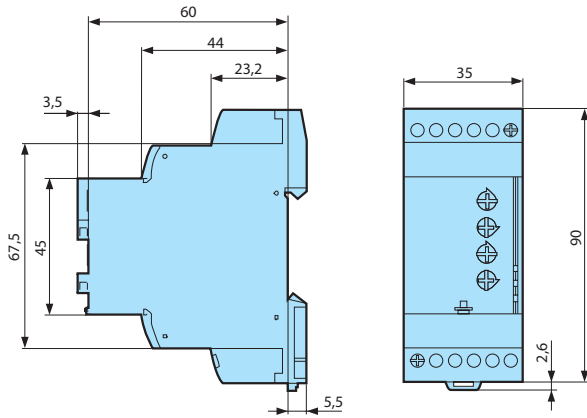


- ① High threshold
- ② Low threshold
- ③ Hysteresis
- ④ Monitored temperature
- ⑤ Threshold crossing delay adjustable on front face (Tt)

HWT81 operating principle:

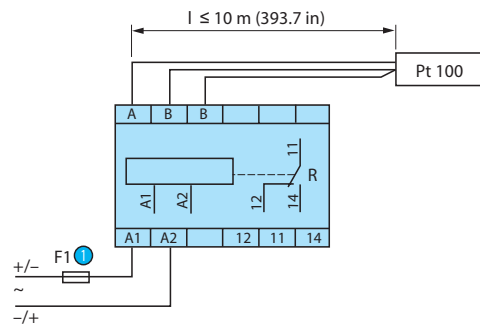
As long as the temperature controlled by the PT100 stays between the two preset thresholds on the front face, the temperature relay is closed. When the temperature exceeds one of the preset thresholds on the front face (upper or lower threshold), the preset time delay on the front face (Tt) is activated. The yellow temperature LED (R1) flashes. At the end of the time delay, if the temperature still exceeds the preset threshold, the output relay opens and the yellow LED is extinguished. The output relay R1 closes instantaneously when the temperature returns within the window of the two preset thresholds on the front face plus or minus the fixed hysteresis. The unit also monitors correct sequencing of phases L1, L2 and L3 of the 3-phase network and the total phase failure in the event of phase regeneration (<70%). After a time delay on pick-up (t) and as long as the presence and sequence of the phases are correct, relay R2 and the R2 "phase" LED are active. When a fault appears, the "phase" relay opens and the R2 "phase" LED is extinguished instantly (response time from the appearance of a fault). On disappearance of the fault, both relay R2 and the phase control LED are activated (response time from the disappearance of a fault). See "Phase failure and phase sequence" curve on page 67. If the PT100 probe is wired incorrectly (missing or short-circuited), output relay R1 opens and the yellow R1 LED flashes.

Dimensions (mm)



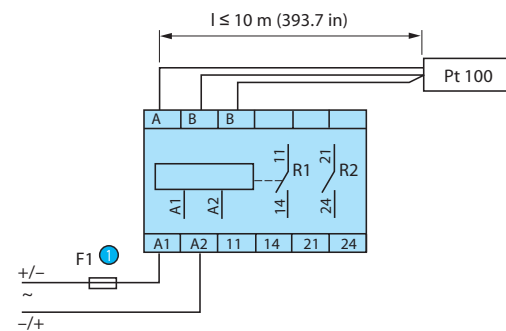
Connections

HT81



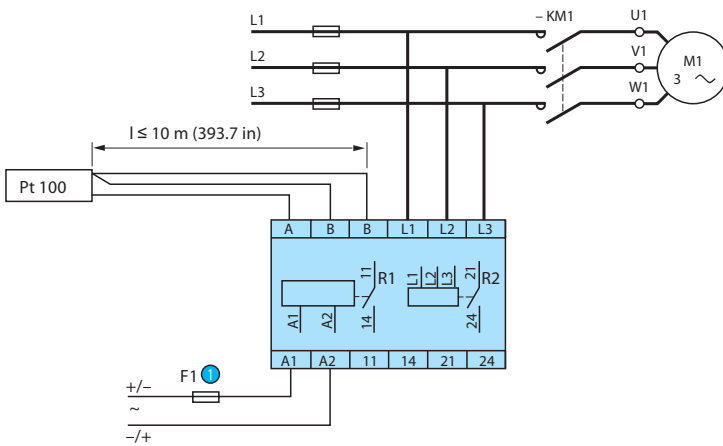
① 1 A fast-blow fuse or cut-out

HT81-2



① 1 A fast-blow fuse or cut-out

HWT81



① 1 A fast-blow fuse or cut-out

Pump control

→ 3-phase and single phase pump control relay - 35 mm

- Allows control and monitoring of single phase and 3-phase pumps
- Monitors phase sequence and phase failure
- Checks for undercurrent to protect against running dry
- Checks for overcurrent to protect against overload
- Digital inputs for operation control logic
- True RMS current measurement



HPC

Part numbers

Type	Measurement ranges	Nominal voltage (V)	Code
HPC	1 A → 10 A in DC	208 → 480 V ~ 3-phase 230 V ~ monophasé	84874200

Product adaptations



- Customisable colours and labels
- Fixed or adjustable time delay
- Fixed threshold in the generic range

Accessories

Description	Code
Removable sealable cover for 35 mm casing	84800001

General characteristics

Supply

Supply voltage Un	208 V → 480 V ~ 3-phase * 230 V ~ monophasé
Voltage supply tolerance	-12% / +10%
Operating range	183 → 528 V ~
~ supply voltage frequency	50/60 Hz ± 10%
Galvanic isolation of power supply/measurement	No
Power consumption at Un	5 VA in ~
Immunity from micro power cuts	500 ms

Inputs and measuring circuit

Measurement ranges	1 → 10 A ~ E1-L2: 1 → 10 A
Input resistance	E1-L2: 0.01 Ω
Permanent overload at 25°C	E1-L2: 11 A
Pulse overload < 1 sec at 25°C	E1-L2: 50 A
Frequency of measured signal	50 / 60 Hz: ± 10%
Max. measuring cycle time	150 ms/True RMS measurement
Adjustment of upper threshold	0.1 → 10 A
Adjustment of lower threshold	0.1 → 10 A
Fixed hysteresis	5% of displayed threshold
Display precision	±10% of full scale
Repetition accuracy with constant parameters	± 0.5%
Measuring error with voltage drift	< ± 1% across the whole range
Measuring error with temperature drift	± 0.05% / °C

Timing

Delays on power up (Ti)	1 → 60 s (0, + 10%)
Delay on threshold crossing	0.1 → 10 s (0, + 10%)
Repetition accuracy with constant parameters	± 1%
Reset time	2 s
Y2 minimum reset time	300 ms
Delay on pick-up	500 ms
Alarm on delay time max.	300 ms

Output

Type of output	1 single pole changeover relay
Type of contacts	No cadmium
Maximum breaking voltage	250 V ~
Max. breaking current	5 A ~
Min. breaking current	10 mA / 5 V ---
Electrical life (number of operations)	1 x 10 ⁶
Breaking capacity (resistive)	1250 VA ~
Maximum rate	360 operations/hour at full load
Operating categories acc. to IEC 60947-5-1	AC 12, AC 13, AC 14, AC 15, DC 12, DC 13
Mechanical life (operations)	DC 14, 30 x 10 ⁶

Insulation

Nominal insulation voltage IEC 60664-1	400 V
Insulation coordination (IEC 60664-1 / 60255-5)	Overvoltage category III: degree of pollution 3
Rated impulse withstand voltage IEC 60664-1/60255-5	4 kV (1.2 / 50 μs)
Dielectric strength IEC 60664-1/60255-5	2 kV ~ 50 Hz 1 min
Insulation resistance IEC 60664-1 / 60255-5	> 500 MΩ 500 V ---

Pump control

General characteristics

General characteristics	
Display power supply	Green LED
Display relay	Yellow LED
"Fault" indication	Yellow LED
Casing	35 mm
Mounting	On 35 mm symmetrical DIN rail, IEC/EN 60715
Mounting position	All positions
Material: enclosure plastic type VO to UL94 standard	Incandescent wire test according to IEC 60695-2-11 & NF EN 60695-2-11
Protection (IEC 60529)	Terminal block: IP 20 Casing: IP 30
Weight	100 g
Connecting capacity IEC 60947-1	Rigid: 1 x 4 ² - 2 x 2.5 ² mm ² 1 x 11 AWG - 2 x 14 AWG Flexible with ferrules: 1 x 2.5 ² - 2 x 1.5 ² mm ² 1 x 14 AWG - 2 x 16 AWG
Max. tightening torques IEC 60947-1	0.6 → 1 Nm / 5.3 → 8.8 Lbf.In
Operating temperature IEC 60068-2	-20 → +50°C
Storage temperature IEC 60068-2	-40 → +70°C
Humidity IEC 60068-2-30	2 x 24 hr cycle 95% RH max. without condensation 55°C
Vibrations according to IEC/EN60068-2-6	10 → 150 Hz, A = 0.035 mm
Shocks IEC 60068-2-6	5 g
Standards	
Marking	CE (LVD) 73/23/EEC - EMC 89/336/EEC
Product standard	NF EN 60255-6 / IEC 60255-6 / UL 508 / CSA C22.2 N°14
Electromagnetic compatibility	Immunity EN 61000-6-2/IEC 61000-6-2 Emission EN 61000-6-4/EN 61000-6-3 IEC 61000-6-4/IEC 61000-6-3 Emission EN 55022 class B
Certifications	UL, CSA, GL pending
Conformity with environmental directives	RoHS, WEEE
Comments	
	* 3-phase mains with earth

Principles

HPC

Overview

The pump controller can operate on a single phase or 3-phase network. It provides 3 functions in one unit:

- Checking current,
- Checking phase presence (in 3-phase mode),
- Checking phase sequence (in 3-phase mode).

It has two operating modes whose purposes is to control a pump based on two external signal inputs (Y1 Y2).

These two signals are controlled by volt-free contacts.

Faults are signalled via LEDs, distinguishing the origin of the fault.

Operating principle

Selecting the operating mode

A rotary switch on the front is used to select:

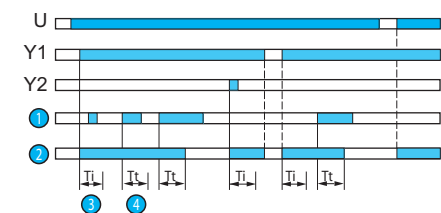
- single control mode,
- dual control mode,
- single-phase or 3-phase network.

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 mode 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.

HPC - Single control mode



- 1 Current fault
- 2 Relay
- 3 Fault monitoring inhibit time on pump start-up (Ti)
- 4 Delay timing in case of fault (Tt)

This mode is for controlling a pump based on one external signal (Y1).

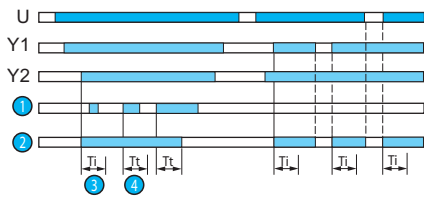
The relay output is closed when the signal is present at Y1 (contact closed).

After a fault the relay remains open (even if the current returns to normal) and the module can be reclosed in two different ways:

- By a reset: cutting of power supply,
- Or by a reset through pressing an external contact (pushbutton for example) entering the second control input (Y2).

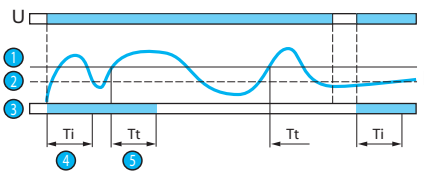
Principles

HPC - Dual control mode



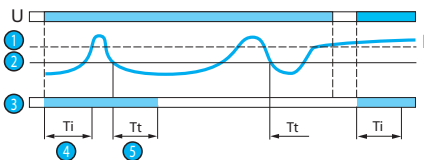
- 1 Current fault
- 2 Relay
- 3 Fault monitoring inhibit time on pump start-up (T_i)
- 4 Delay timing in case of fault (T_t)

HPC - Overcurrent control



- 1 Overcurrent
- 2 Hysteresis
- 3 Relay
- 4 Fault monitoring inhibit time on pump start-up (T_i)
- 5 Delay timing in case of fault (T_t)

HPC - Undercurrent control



- 1 Undercurrent
- 2 Hysteresis
- 3 Relay
- 4 Fault monitoring inhibit time on pump start-up (T_i)
- 5 Delay timing in case of fault (T_t)

This mode is for controlling a pump based on two external signals (Y1 and Y2). The output relay closes when both input signals are present (Y1 and Y2 closed). It will open as soon as either of these two signals is absent.

If the controller is configured in single phase, it monitors the current drawn by the pump. If the controller is configured in 3-phase, it monitors current, phase sequence and phase failure. If a phase fault is detected, the output relay opens immediately. On energisation, the output relay cannot be closed if there is a phase fault or phase failure.

Current control

The under and overcurrent values are set by two independent potentiometers graduated from 1 to 10 A.

In case of a control error (low threshold higher than high threshold), the output relay opens and all the LEDs flash to signal the error.

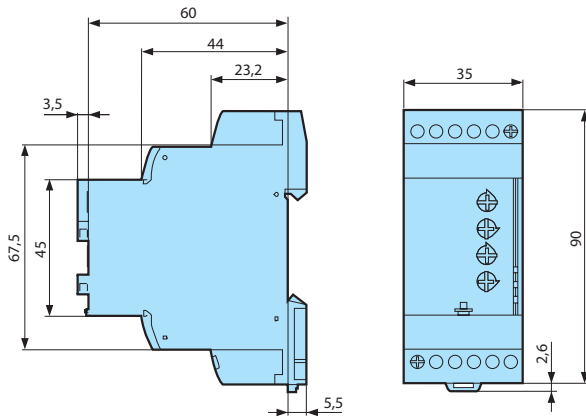
If a current fault occurs (under or overcurrent) the relay opens if the fault persists beyond the preset threshold delay. When the current returns to a correct value, the output relay remains open. It can only be closed by a reset: either by de-energisation or by closing on external contact Y2 (in single control mode)

An inhibit delay (T_i) on energisation allows current peaks due to start-up of the motor to be disregarded.

Pump control

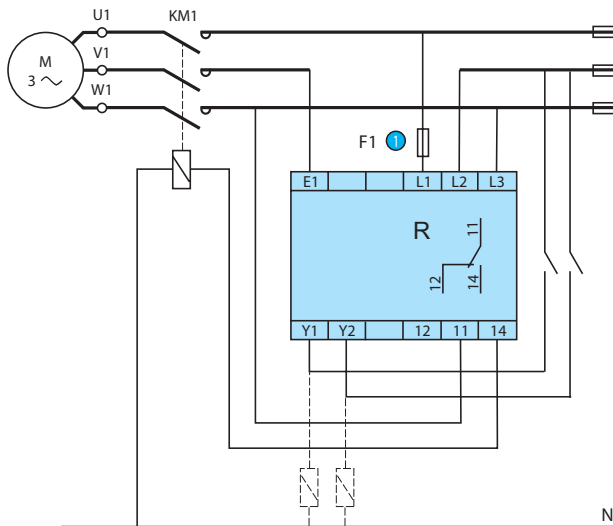
Dimensions (mm)

HPC



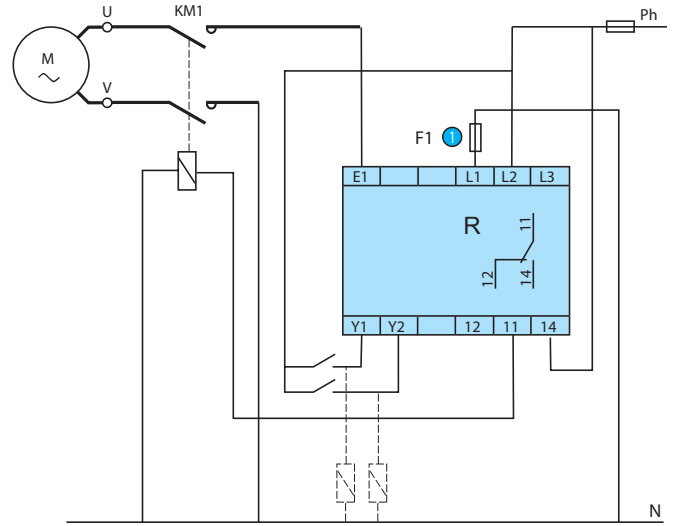
Connections

3 ph < 10 A



① 100 mA fast-blow fuse or cut-out

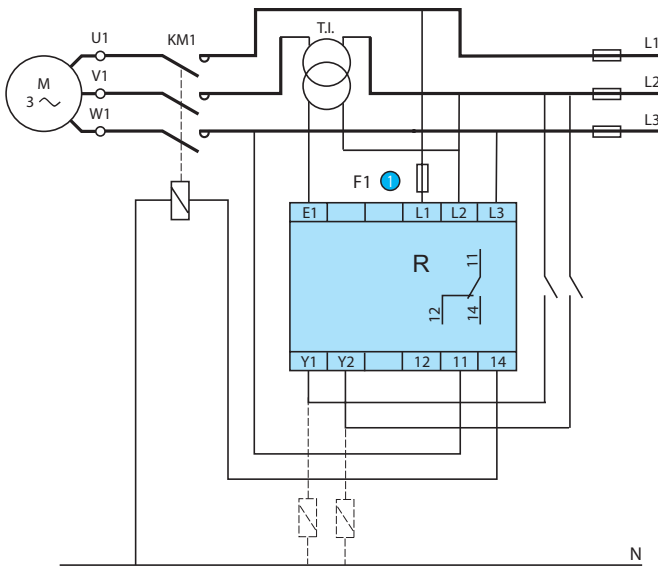
1 ph ~ 230 V < 10 A



① 100 mA fast-blow fuse or cut-out

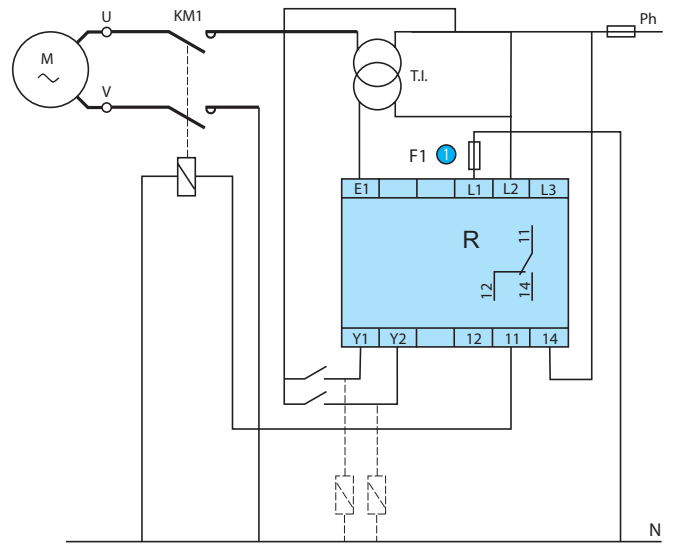
Connections

3 ph > 10 A



① 100 mA fast-blow fuse or cut-out

1 ph ~ 230 V > 10 A



① 100 mA fast-blow fuse or cut-out

Phase and temperature control

→ Motor phase and temperature control relay - 35 mm

- Control of 3-phase networks: phase sequence, phase failure
- Multi-voltage
- True RMS measurement
- Motor temperature control via PTC probes
- With line break or probe short-circuit detection
- Version with fault latching function and reset / test
- LED status indication



HWTM



HWTM2

Part numbers

Type	Functions	Nominal voltage (V)	Phase control voltage range	Code
HWTM	Phase sequence, phase failure, motor temperature via PTC probe, test, memory	24 → 240 V \sim	3 x 208 → 3 x 480 V \sim	84873027
HWTM2	Phase sequence, phase failure, motor temperature via PTC probe, test, memory	24 → 240 V \sim	3 x 208 → 3 x 480 V \sim	84873028

Product adaptations



- Customisable colours and labels

Accessories

Description	Code
Removable sealable cover for 35 mm casing	84800001

General characteristics

HWTM / HWTM2

Supply	
Supply voltage Un	24 V → 240 V \sim
Voltage supply tolerance	-15% / +10%
Operating range	20.4 V → 264 V \sim
Polarity with DC voltage	No
\sim supply voltage frequency	50 / 60 Hz \pm 10%
Galvanic isolation of power supply/measurement	No (current limiting)
Power consumption at Un	4 VA in \sim / 0.5 W in ---
Immunity from micro power cuts	20 ms at 20.4 V

General characteristics

Inputs and measuring circuit

3-phase control

Measurement ranges	3 x 208 → 3 x 480 V \sim *
Operating range	176 → 528 V \sim
Frequency of measured signal	50 / 60 Hz \pm 10%
Input resistance	602 K Ω / line

Temperature control

Maximum voltage of heat detection circuit	3.6 V (T1-T2 open)
Short-circuit current	7 mA (T1, T2 close circuit)
Maximum heat detector resistance at 20°C	1500 Ω
Trip threshold	3100 Ω \pm 10%
Reset threshold	1650 Ω \pm 10%
Short-circuit detection range	0 → 15 Ω \pm 5 Ω
Resistance measurement temperature drift	\pm 0.1% / °C max.
Repetition accuracy with constant parameters	\pm 0.5%

Timing

Delay on threshold crossing	300 ms max. (phase) 300 ms typical (temperature)
Response time for input Y1 and PB	50 ms typical
Reset time	10 s max. à 264 V \sim
Delay on pick-up	500 ms

Output

Type of output	2 NO relays
Type of contacts	No cadmium
Maximum breaking voltage	250 V \sim
Max. breaking current	5 A \sim
Min. breaking current	10 mA / 5 V \sim
Electrical life (number of operations)	1 x 10 ⁴
Breaking capacity (resistive)	1250 VA \sim
Maximum rate	360 operations/hour at full load
Operating categories acc. to IEC 60947-5-1	AC12, AC13, AC14, AC15, DC12, DC13, DC14
Mechanical life (operations)	30 x 10 ⁶

Insulation

Nominal insulation voltage IEC 60664-1	400 V
Insulation coordination (IEC 60664-1 / 60255-5)	Overvoltage category III: degree of pollution 3
Rated impulse withstand voltage IEC 60664-1/60255-5	4 kV (1.2 / 50 μ s)
Dielectric strength IEC 60664-1/60255-5	2 kV AC 50 Hz 1 min.
Insulation resistance IEC 60664-1 / 60255-5	> 500 M Ω / 500 V $\overline{\text{---}}$

General characteristics

"Phase" relay status indication	Yellow LED
"Temperature" relay status indication	Yellow LED
Display power supply	Green LED
Casing	35 mm
Mounting	On 35 mm symmetrical DIN rail, IEC/EN 60715
Mounting position	All positions
Material: enclosure plastic type VO to UL94 standard	Incandescent wire test according to IEC 60695-2-11 & NF EN 60695-2-11
Protection (IEC 60529)	Terminal block: IP20 Casing: IP30
Weight	107.1 g
Connecting capacity IEC 60947-1	Rigid: 1 x 4 ² - 2 x 2.5 ² mm ² 1 x 11 AWG - 2 x 14 AWG Flexible with ferrules: 1 x 2.5 ² - 2 x 1.5 ² mm ² 1 x 14 AWG - 2 x 16 AWG
Max. tightening torques IEC 60947-1	0.6 → 1 Nm / 5.3 → 8.8 Lbf.In
Operating temperature IEC 60068-2	-20 → +50°C
Storage temperature IEC 60068-2	-40 → +70°C
Humidity IEC 60068-2-30	2 x 24 hr cycle 95% RH max. without condensation 55°C
Vibrations according to IEC/EN60068-2-6	10 → 150 Hz, A = 0.035 mm
Shocks IEC 60068-2-6	5 g

Standards

Marking	CE (LVD) 73/23/EEC - EMC 89/336/EEC
Product standard	NF EN 60255-6 / IEC 60255-6 / CEI 60034-11-2 / UL 508 / CSA C22.2 N°14
Electromagnetic compatibility	Immunity EN 61000-6-2/IEC 61000-6-2 Emission EN 61000-6-4/EN 61000-6-3 IEC 61000-6-4/IEC 61000-6-3 Emission EN 55022 class B
Certifications	UL, CSA, GL pending
Conformity with environmental directives	RoHS, WEEE

Comments

* 3-phase mains with earth

Phase and temperature control

Principles

Overview

Relays HWTM and HWTM2 check the availability of the 3-phase network and the temperature of the motors using integrated PTC probes.

The "phase" and "temperature" control functions are independent of one another.

The 3-phase (208 to 480 V) network control verifies the sequence of phases L1, L2, L3 and their presence:

- the complete failure of a phase is detected, also in the event of regeneration (U measured < 0.7 x Un).

The result of the check is indicated by the status of the "phase" output relay. NO contact 21-24 will be open in case of fault.

The temperature control accepts up to 6 PTC probes (positive temperature coefficient resistor) wired in series between terminals T1 and T2.

A fault is reported if the resistance of the thermal detector circuit exceeds 3100 Ω.

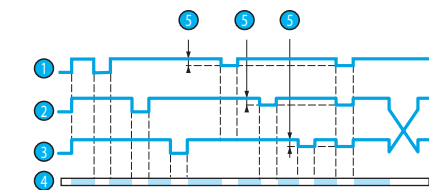
Return to normal is verified when the resistance falls below 1650 Ω.

The result of the check is indicated by the status of the "temperature" output relay. NO contact 11-14 will be open in case of fault.

Opening of the thermal detector circuit has the same effect as high temperature (resistance exceeding 3100 Ω) and is therefore interpreted as a fault.

Total short-circuit of the thermal probe (s), detected when resistance is less than 15 Ω ± 5 Ω is treated as a fault.

HWTM - Phase failure and phase sequence

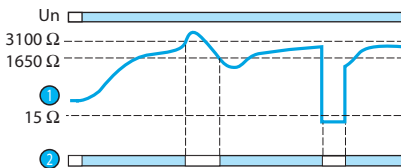


- ① Phase L1
- ② Phase L2
- ③ Phase L3
- ④ Relay R2
- ⑤ 30% of Un

Control of 3-phase network

As soon as the phase sequence (L1 L2 L3) and phase amplitude symmetry ($D < 30\%$) are considered correct, the contact of the output relay closes and, subject to the result of the temperature check, LED "R2" lights up.

In case of total failure or a drop in the amplitude of a phase (absence of phase with regeneration) or inversion of the phase sequence, the contact of the output relay opens and LED "R2" is extinguished.



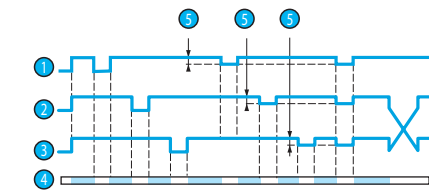
- ① Resistance between terminals T1 and T2
- ② Relay R1

Temperature control without latching

As soon as it is verified that the resistance of the thermal detector is between 15 and 3100Ω, the contact of the output relay closes and, subject to the result of the phase control check, LED "R1" lights up.

If the resistance of the thermal detector circuit exceeds 3100 Ω, the output relay opens and LED "R1" is extinguished. After an overheating fault, the resistance must fall below 1650 Ω for the output relay contact to reclose and, subject to the result of the phase check, LED "R1" to light up. If the resistance falls below 15 Ω (short-circuit), the output relay opens and LED "R1" is extinguished. As soon as it returns to between 15 and 3100Ω, the contact of the output relay closes again and, subject to the result of the phase control check, LED "R1" lights up.

HWTM2 - Phase failure and phase sequence



- ① Phase L1
- ② Phase L2
- ③ Phase L3
- ④ Relay R2
- ⑤ 30% of Un

The configuration is taken into account on energisation of the relay HWTM2.

Selecting the operating mode:

Using the selector switch, select one of two modes:

- Thermal control without latching,
- Thermal control with latching.

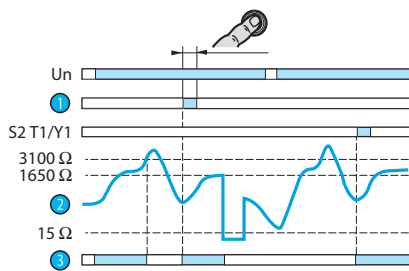
NB: On energisation, the switch placed in one of the five intermediate positions keeps the relays in the open contact state and the error is signalled by the LEDs flashing simultaneously.

The mode selector switch position is taken into account on energisation.

Changes made during operation have no effect: the active configuration may therefore be different from that indicated by the switch; relay HWTM2 operates normally but the change in configuration is signalled by both LEDs flashing simultaneously.

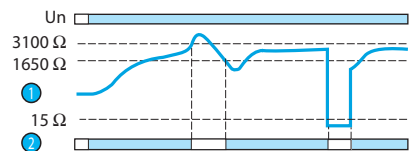
Principles

HWTM2 with latching



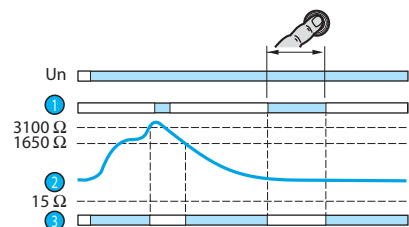
- ① Test / Reset
- ② Resistance between terminals T1 and T2
- ③ Relay R1

HWTM2 without latching



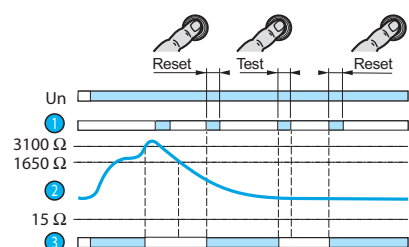
- ① Resistance between terminals T1 and T2
- ② Relay R1

HWTM2 Test/Reset without latching



- ① Test / Reset
- ② Resistance between terminals T1 and T2
- ③ Relay R1

HWTM2 Test/Reset with latching



- ① Test / Reset
- ② Resistance between terminals T1 and T2
- ③ Relay R1

Latching (HWTM2)

The HWTM2 version has a rotary switch which can be used to configure the temperature control operating mode with or without latching.

In "memory" mode, when a fault has been recorded, the "temperature" relay latches in the open position.

Once the temperature has returned to a correct value, the relay can be unlatched (reset), either by pressing the "Test/Reset" pushbutton (50 ms minimum), or by closing (50 ms minimum) a volt-free contact between terminals Y1 and T1 (without parallel load).

The HWTM2 can also be reset, more abruptly, by switching it off and on again several times in succession (see reset time).

HWTM2 version has a "test/reset" button for checking the operating state of the temperature control: When the temperature is normal, pressing the "test/reset" button simulates overheating, the yellow LED is extinguished and the contact of the "temperature" output relay opens; if "memory" mode is active, the fault indication is latched (the button must be released for at least 50 ms, then pressed again to reset the function).

Using the "test/reset" button

HWTM2 version has a "test/reset" button for checking the operating state of the temperature control and resetting it after latching in "memory" mode.

For both functions, the button must be pressed and released for 50 ms.

When the temperature is normal, pressing the "test/reset" button simulates overheating, the contact of the "temperature" output relay opens and the "no fault" LED is extinguished.

If "memory" mode is inactive, the "fault" indication is maintained as long as the button is pressed.

If "memory" mode is active, the "fault" indication is latched. The button must be released, then pressed again to reset the function.

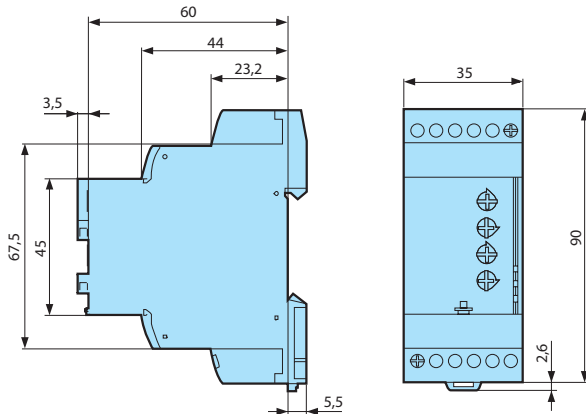
In "memory" mode, if a fault has been detected and the temperature is now correct again, the "temperature" relay can be unlatched (reset) with the "test/reset" button.

As long as the temperature is abnormal, i.e. as long as the resistance of the thermal detector circuit is greater than 3.100 Ω or, having exceeded 3.100 Ω it has not fallen back to below 1.650 Ω, pressing the "test/reset" button has no effect.

Phase and temperature control

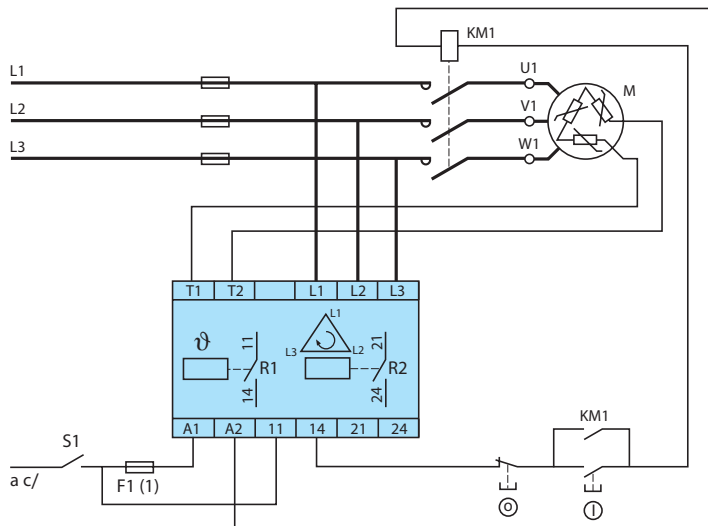
Dimensions (mm)

HWTM



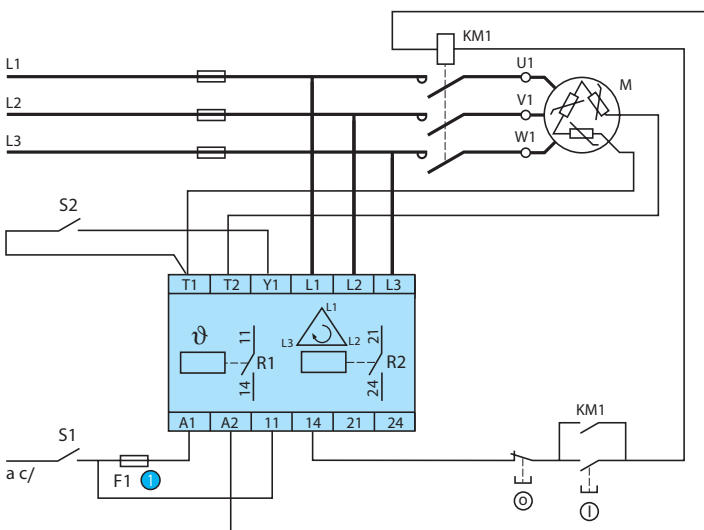
Connections

HWTM



① 1 A fast-blow fuse or cut-out

HWTM2



① 1 A fast-blow fuse or cut-out



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■ Application : temperature control in lifts



■ Applications : Pump and level control



■ Selection guide

Crouzet Across the Globe



AUSTRIA

Crouzet GmbH
Zweigniederlassung Österreich
Spengergasse 1/3
1050 Wien
ÖSTERREICH
Tel. : +43 (0) 1 36 85 471
Fax : +43 (0) 1 36 85 472
E-mail : info-direkt@crouzet.com
www.crouzet.at

BELGIUM

Crouzet NV/SA
Koning Albert I Laan 40
40 Avenue Roi Albert I
1780 Wemmel
BELGIUM
Tel. : +32 (0) 2 462 07 30
Fax : +32 (0) 2 461 00 23
E-mail : com-be@crouzet.com
www.crouzet.be

BRAZIL

Crouzet do Brazil Ltda
Rua Gal.Furtado Nascimento,
740 - sala 77
Alto de Pinheiros / 05465-070
São Paulo - SP
BRAZIL
Tel. : +55 (11) 3026 9008
Fax : +55 (11) 3026 9009
E-mail : crz-infobrazil@crouzet.com
www.crouzet.com.br

CHINA

**Crouzet Asia
(Shanghai) Limited**
603-6F, Dynasty Business Ctr
457 Wu Lu Mu Qi (N) Road
Shanghai, 200040
CHINA
Tel. : +86 (21) 6249 0910
Fax : +86 (21) 6249 0701
E-mail : com-cn@crouzet.com
www.crouzet.com

FRANCE

Crouzet Automatismes SAS
2 rue du Docteur Abel - BP 59
26902 Valence CEDEX 9
FRANCE
Tel. : +33 (0) 4 75 44 88 44
Fax : +33 (0) 4 75 55 98 03
E-mail : com-fr@crouzet.com
www.crouzet.fr

Customer service

 N° Indigo 0 825 333 350

 N° Azur FAX 0 810 610 102

GERMANY

Crouzet GmbH
Otto-Hahn-Str. 3, 40721 Hilden
Postfach 203, 40702 Hilden
DEUTSCHLAND
Tel. : +49 (0) 21 03 9 80-0
Fax : +49 (0) 21 03 9 80-200
E-mail : info-direkt@crouzet.com
www.crouzet.de

Customer service

Tel. : +49 (0) 21 03 9 80-108/176
Fax : +49 (0) 21 03 9 80-250
E-mail : info-direkt@crouzet.com

INDIA

Crouzet India
India Liaison Office
Unit No. 3-D,
"SPL Enderley" III Floor,
26, Off Cubbon road
Bangalore 560 001
INDIA
Tel. : +91 (80) 329 02 245
Fax : +91 (80) 412 38 066
E-mail : crz_bangalore@crouzet.com
www.crouzet.co.in

ITALY

Crouzet Componenti s.r.l.
Via Viganò De Vizzi, 93/95
20092 Cinisello Balsamo (Mi)
ITALIA
Tel. : +39 (02) 66 599 220
Fax : +39 (02) 66 599 228
E-mail : crz-ii-microcontrol@crouzet.com
www.crouzet.it

MEXICO

Automatismo Crouzet S.A. de C.V.
Calzada Zavaleta 2505 - C
Col Sta Cruz Buenavista
C.P. 72150 - Puebla
MEXICO
Tel. : +52 (222) 409 7000
Fax : +52 (222) 409 7810
01 800 087 6333
www.crouzet.com

SPAIN/PORTUGAL

Crouzet Ibérica
C/ Aragón 224, 2º 2ª
08011 Barcelona
ESPAÑA
Tel. : +34 (93) 484 39 70
Fax : +34 (93) 484 39 73
E-mail : es-consultas@crouzet.es
www.crouzet.es

SWEDEN

Crouzet AB
Malmgårdsråvägen 63
Box 11183
100 61 Stockholm
SVERIGE
Tel. : +46 (0) 8 556 022 00
Fax : +46 (0) 8 556 022 29
E-mail : info-direkt@crouzet.com
www.crouzet.se

SWITZERLAND

Crouzet AG
Gewerbepark - Postfach 56
5506 Mägenwil
SCHWEIZ
Tel. : +41(0) 62 887 30 30
Fax : +41(0) 62 887 30 40
E-mail : info-direkt@crouzet.com
www.crouzet.ch

THE NETHERLANDS

Crouzet BV
Industrieweg 17
2382 NR Zoeterwoude
NEDERLAND
Tel. : +31 (0) 71-581 20 30
Fax : +31 (0) 71-541 35 74
E-mail : com-nl@crouzet.com
www.crouzet.nl

UNITED KINGDOM

Crouzet Ltd
Intec 3 Wade Road
Basingstoke Hampshire
RG24 8NE
UNITED KINGDOM
Tel. : +44 (0)1256 318 900
Fax : +44 (0)1256 318 901
E-mail : info@crouzet.co.uk
www.crouzet.co.uk

USA/CANADA

Crouzet North America
204 Airline Drive, suite 300
75019 Coppell Texas
USA
Tel. : +1 (972) 471 2565
Fax : +1 (972) 471 2560
E-mail : customerservice@us.crouzet.com
www.crouzet-usa.com

OTHER COUNTRIES

Crouzet Automatismes SAS
2 rue du Docteur Abel - BP 59
26902 Valence CEDEX 9
FRANCE
Tel. : +33 (0) 475 802 102
Fax : +33 (0) 475 448 126
E-mail : com-ex@crouzet.com
www.crouzet.com

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Crouzet Automatismes SAS

2 rue du Docteur Abel - BP 59
26902 Valence CEDEX 9
FRANCE

www.crouzet.com

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