$\rightarrow$ 3-phase voltage control relay - $17.5 \mathrm{~mm} / 35 \mathrm{~mm}$

- 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



## 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) | $3 \times 208 \rightarrow 3 \times 480 \mathrm{~V}$ ~ | $3 \times 220 \rightarrow 3 \times 480 \mathrm{~V}$ ~ | $3 \times 120 \rightarrow 3 \times 277$ 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 | $3 \times 208 \rightarrow 3 \times 480$ V * | $3 \times 220 \rightarrow 3 \times 480$ V * | $3 \times 120 \rightarrow 3 \times 277 \mathrm{~V}$ ~ * |
| Voltage supply tolerance | -12\%/+10\% | -12\% / +10\% | -20\% / +20\% |
| Operating range | $183 \rightarrow 528 \mathrm{~V}$ ~ | $194 \rightarrow 528$ V | $96 \rightarrow 332 \mathrm{~V}$ ~ |
| Power consumption at Un | 1.8 VA in $\sim$ | 2.9 VA in $\sim$ | 3.9 VA in $\sim$ |
| Inputs and measuring cicuit |  |  |  |
| Selection of phase-phase nominal voltage Un | $\begin{aligned} & 208-220-380-400-415- \\ & 440-480 \mathrm{~V} \sim \end{aligned}$ | $\begin{aligned} & 220-380-400-415-440- \\ & 480 \mathrm{~V} \sim \end{aligned}$ | - |
| Selection of phase-neutral voltage | - | - | 120-127-220-230-240-260-277 |
| Output |  |  |  |
| Electrical life (number of operations) | $1 \times 10^{5}$ | $1 \times 10^{4}$ | $1 \times 10^{4}$ |
| 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 |


|  | www.crouzet.com |
| :---: | :---: |
| General characteristics |  |
| Supply |  |
| ~ supply voltage frequency | $50 / 60 \mathrm{~Hz} \pm 10 \%$ |
| Galvanic isolation of power supply/measurement | No |
| Inputs and measuring cicuit |  |
| Frequency of measured signal | $50 \rightarrow 60 \mathrm{~Hz} \pm 10 \%$ |
| Max. measuring cycle time | $150 \mathrm{~ms} /$ True RMS measurement |
| Voltage threshold adjustment | ■ Undervoltage -2 to $-20 \%$ of selected Un for M3US: <br> (-2 to $-12 \%$ across the $3 \times 208 \mathrm{~V}$ range) <br> (-2 to -17\% across the $3 \times 220 \mathrm{~V}$ range) for H3US: <br> (-2 to -12\% across the $3 \times 220 \mathrm{~V}$ range) Overvoltage $2 \rightarrow 20 \%$ of selected Un For M3US and H3US: <br> ( $+2 \rightarrow+10 \%$ across the $3 \times 480 \mathrm{~V} \sim$ range) |
| Fixed hysteresis | 2\% of Un (M3US, H3US) |
| 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\% / ${ }^{\circ} \mathrm{C}$ |
| Timing |  |
| Delay on threshold crossing | $0.3 \rightarrow 30 \mathrm{~s}$ ( $0,+10 \%$ ) |
| 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 contacts | No cadmium |
| Maximum breaking voltage | $250 \mathrm{~V} \sim$ |
| Max. breaking current | $5 \mathrm{~A} \sim$ |
| Min. breaking current | $10 \mathrm{~mA} / 5 \mathrm{~V}=-$ |
| 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) | $30 \times 10^{6}$ |
| 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 | $4 \mathrm{KV}(1.2 / 50 \mu \mathrm{~s})$ |
| Dielectric strength IEC 60664-1/60255-5 | 2 kV AC 50 Hz 1 min |
| Insulation resistance IEC 60664-1/ 60255-5 | $>500 \mathrm{M} \Omega / 500 \mathrm{~V}=-$ |
| 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) | $\begin{aligned} & \text { Terminal block: IP } 20 \\ & \text { Casing: IP30 } \end{aligned}$ |
| Connecting capacity IEC 60947-1 | Rigid: $1 \times 4^{2}-2 \times 2.5^{2} \mathrm{~mm}^{2}$ <br> $1 \times 11$ AWG $-2 \times 14$ AWG <br> Flexible with ferrules: $1 \times 2.5^{2}-2 \times 1.5^{2} \mathrm{~mm}^{2}$ <br> $1 \times 14$ AWG $-2 \times 16$ AWG |
| Max. tightening torques IEC 60947-1 | $0.6 \rightarrow 1 \mathrm{Nm} / 5.3 \rightarrow 8.8 \mathrm{Lbf}$.Ft |
| Operating temperature IEC 60068-2 | $-20 \rightarrow+50^{\circ} \mathrm{C}$ |
| Storage temperature IEC 60068-2 | $-40 \rightarrow+70^{\circ} \mathrm{C}$ |
| Humidity IEC 60068-2-30 | $2 \times 24 \mathrm{hr}$ cycle 95\% RH max. without condensation $55^{\circ} \mathrm{C}$ |
| Vibrations according to IEC/EN60068-2-6 | $10 \rightarrow 150 \mathrm{~Hz}, \mathrm{~A}=0.035 \mathrm{~mm}$ |
| 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 <br> Emission EN 61000-6-4/EN 61000-6-3 <br> IEC 61000-6-4/IEC 61000-6-3 <br> 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 Un
- Overvoltage, adjustable from 2 to $20 \%$ of Un
- 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 Un.
The position of this selector switch is only taken into account when the unit is powered up.
If the switch position changes while the unit is operating, all the LEDs flash but the product continues to work normally with the voltage selected on energisation prior to the change of position.
The LEDs return to their normal state if the switch is reset to its initial position defined before the last energisation.

## M3US - Under/OvervoItage


(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 Un (-12 to $-2 \%$ over the $3 \times 208 \mathrm{~V} \sim$ range and $17 \%$ to $-2 \%$ for the $3 \times 220 \vee \sim$ range due to the minimum voltage $183 \mathrm{~V} \sim$ )
- Overvoltage, adjustable from $+2 \rightarrow+20 \% \quad(+2 \rightarrow+10 \%$ over the $3 \times 480 \vee \sim$ range due to the maximum voltage $528 \mathrm{~V} \sim$ ).
An adjustable time delay from 0.3 to 30 s 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



## Operating principle

H3US
The relay monitors its own supply voltage.
It controls:

- Undervoltage, adjustable from - 2 to $-20 \%$ of Un (-2 to $-12 \%$ over the $3 \times 220 \mathrm{~V} \sim$ range due to the minimum voltage $194 \mathrm{~V} \sim$ )
- Overvoltage, adjustable from +2 to $+20 \%$ ( +2 to $+10 \%$ over the $3 \times 480 \vee \sim$ range due to the maximum voltage $528 \mathrm{~V} \sim$ ).
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 Un,
- 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)
mзus



H3US - H3USN


## Connections

M3US

(1) 100 mA fast-blow fuse or cut-out
h3us

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

