

# 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
<b>Supply</b>		
Power consumption at Un	5 VA in $\sim$ / 1.5 W in $\equiv$	5 VA in $\sim$ / 2.7 W in $\equiv$
Immunity from micro power cuts (ms)	90 max. in $\sim$ et 100 max. en $\equiv$	50
<b>Output</b>		
Type of output	1 double changeover relay	1 single pole changeover relay
<b>Timing</b>		
Maximum reset time	4 s	1.7 s
<b>Inputs and measuring circuit</b>		
Measurement range	250 $\Omega$ → 1 M $\Omega$	-
Low sensitivity adjustment gamme LS	250 $\Omega$ → 5 k $\Omega$	-
Standard sensitivity adjustment gamme St	5 k $\Omega$ → 100 k $\Omega$	-
High sensitivity adjustment gamme HS	50 k $\Omega$ → 1 M $\Omega$	-
Adjustment of sensitivity	5 → 100% of the selected range	-
Display precision	± 10% of full scale for LS and St ranges -40% / +10% of full scale for HS range	±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 ± 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	✓
<b>General characteristics</b>		
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 $\text{---}$
Electrical life (number of operations)	1 x 10 <sup>5</sup>
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 <sup>6</sup>

### 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 $\mu$ s)
Dielectric strength IEC 60664-1/60255-5	2 kV AC 50 Hz 1 min.
Insulation resistance IEC 60664-1 / 60255-5	> 500 M $\Omega$ / 500 V $\text{---}$

### 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 <sup>2</sup> - 2 x 2.5 <sup>2</sup> mm <sup>2</sup> 1 x 11 AWG - 2 x 14 AWG Flexible with ferrules: 1 x 2.5 <sup>2</sup> - 2 x 1.5 <sup>2</sup> mm <sup>2</sup> 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.

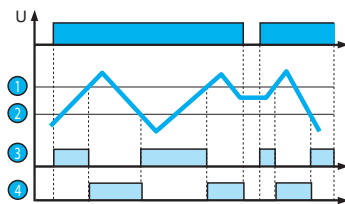
The configuration of these switches is taken into account on energisation.

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.

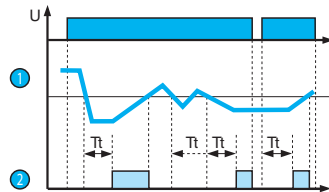
#### Control of two levels, filling function

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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

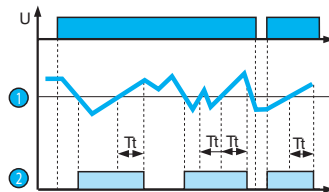
#### One-level control (min. probe), filling function, on-delay

(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.

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

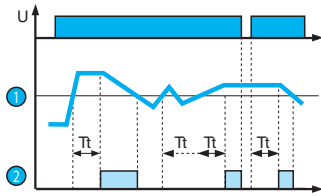
(Level: 1 - off-delay, LS filling function (Low sensitivity: 250Ω to 5 kΩ) or St filling (Standard sensitivity: 5 kΩ to 100 kΩ) or HS filling (High sensitivity: 50 kΩ to 1 MΩ).

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

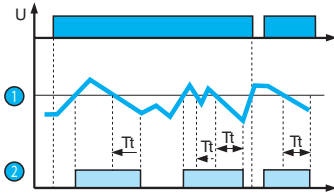
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When the liquid level rises above the probe for a duration longer than the value of time delay Tt set on the front face, the relay closes and stays closed until the liquid level drops back below the probe.

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

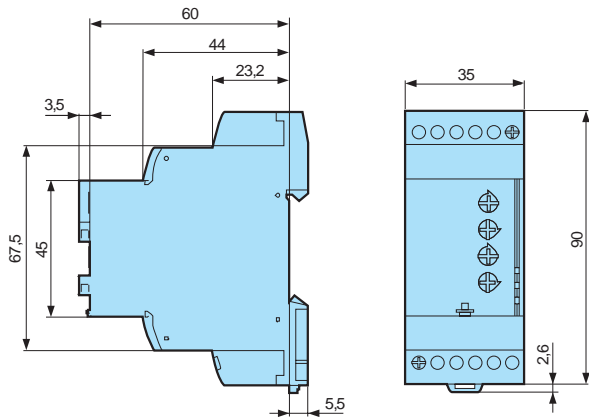
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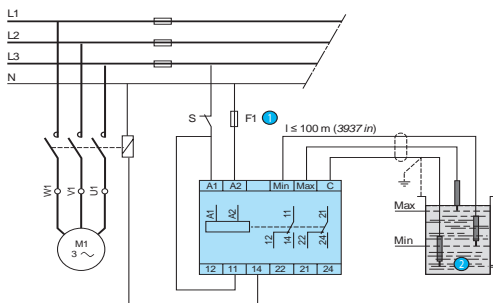
## Dimensions (mm)

### HNM-HNE



## Connections

### HNM



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

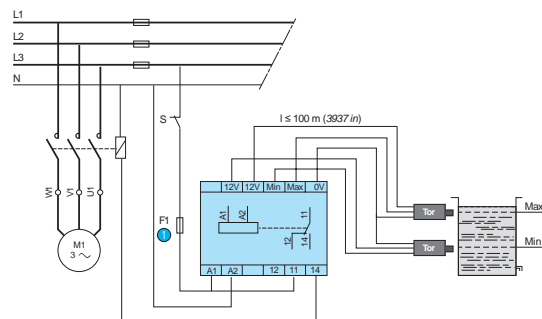
#### NB:

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

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