

# Level control

## → ENRM

- Adjusting one or two levels (min./max.)
- Monitoring filling (UP) or emptying (DOWN) selected by a switch on the front panel.
- Probes supplied with AC current.
- Sensitivity adjustable on front panel from 250  $\Omega$  to 1 M  $\Omega$ .
- Time delay preventing wave effect adjustable from 0.1 to 5s.



## Specifications

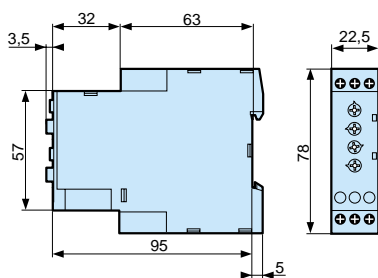
Type	Characteristics	Voltages	Code
ENRM	Monitoring filling UP Monitoring emptying DOWN	24 V AC	84 870 211
		48 V AC	84 870 212
		120 V AC	84 870 213
		230 V AC	84 870 214

## General characteristics

Operating range	0.85 → 1.10 x Un
Maximum power consumption	3 VA
Adjustable sensitivity	250 $\Omega$ → 1 M $\Omega$
Measurement accuracy (at maximum sensitivity)	± 30 %
Electrode voltage (max)	24 V AC (50/60 Hz)
Electrode current (maximum)	1 mA (50/60 Hz)
Maximum cable capacity	10 nF
Response time high level	300 ms
Response time low level	500 ms
Output relay (according to AC1 resistive load)	1 AgNi changeover relay 8 A AC max.
Galvanic isolation via transformer (4 kV, 8 mm creepage distance)	Class II VDE 0551
Isolation of contacts and electrodes from power supply	2.5 kV AC
Operating temperature range (°C)	-20 → +50°C
Storage temperature range (°C)	-40 → +70°C
Weight (g)	150

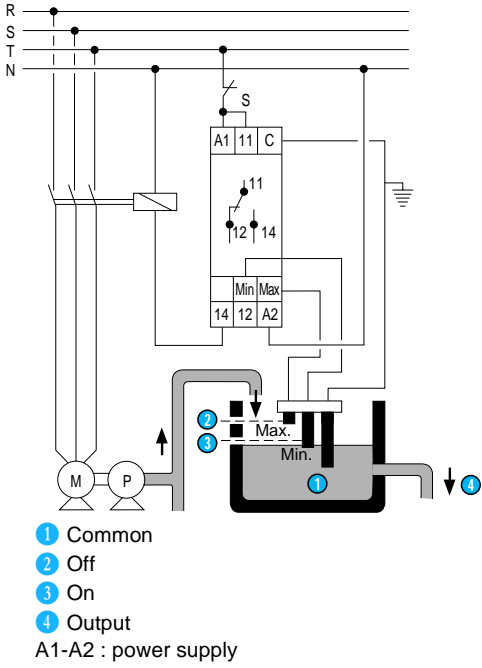
## Dimensions

### ENRM

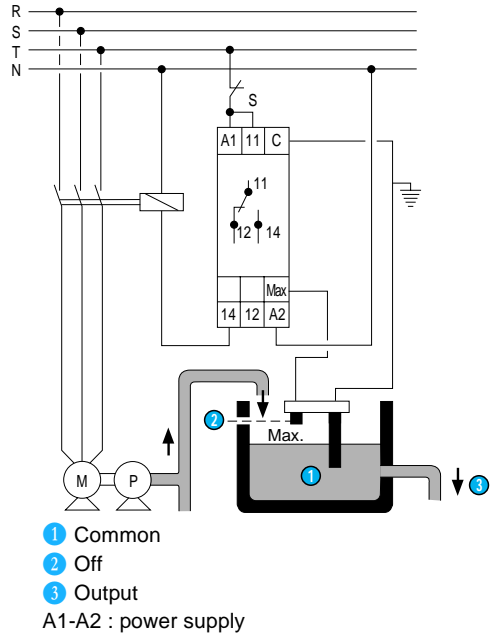


## Connections

### Adjusting two levels Monitoring filling "Up"



### Monitoring emptying "Down"





**Operating principle**

**General principle :**

The ENRM monitors the levels of conductive liquids. The principle is based on measuring the apparent resistance of the liquid between two submerged probes. When this value is lower than the preset threshold displayed on the unit's front panel, the relay changes state. To prevent any occurrences of electrolysis, an AC current is passed through the probes. A rotary switch on the front panel can be used to select the desired function and sensitivity range. A level can be monitored using the 2<sup>nd</sup> rotary switch.

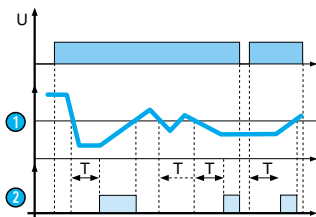
In this instance, the max. probe remains above the liquid and an adjustable time delay prevents the wave effect.

A green LED indicates that the supply voltage is present.

A yellow LED indicates the output relay's state.

When the green and yellow LEDs are flashing, this indicates an incompatible adjustment position.

**Rotary switch in mode 2 - Activation time - Filling function**



- 1 Level
- 2 Relay

**Monitoring a level, filling function, activation time**

(level : 1 - on delay, function Up LS (Low Sensitivity : 250 W to 5 kW) , Up St (Standard Sensitivity : 5 kW to 100 kW) , Up HS (High Sensitivity : 50 kW to 1 MW).

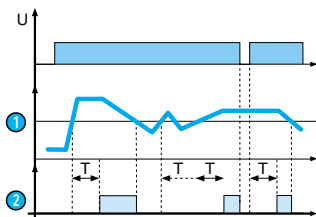
When the level of liquid drops below the probe for a period exceeding the value of time delay T set on the front panel, the relay energises and remains on until the level of liquid reaches the probe again.

If the level of liquid returns above the level set before the time delay elapses, the relay does not come on.

**Note**

When the power returns after a power break, the output relay only energises after time delay T if the level of liquid is below the threshold.

**Rotary switch in mode 2 - Activation time - Emptying function**



- 1 Level
- 2 Relay

**Monitoring a level, emptying function, activation time**

(level : 1 - on delay, function Dwn LS (Low Sensitivity : 250 W to 5 kW) , Dwn St (Standard Sensitivity : 5 kW to 100 kW) , Dwn HS (High Sensitivity : 50 kW to 1 MW).

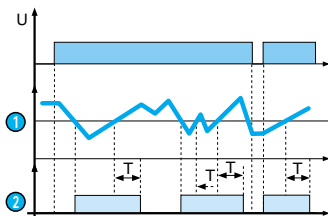
When the level of liquid rises above the probe for a period exceeding the value of time delay T set on the front panel, the relay energises and remains on until the level of liquid drops back below the probe.

If the level of liquid drops back below the level set before the time delay elapses the relay does not come on.

**Note**

When the power returns after a power break, the output relay only energises after delay time T if the level of liquid is above the threshold.

**Rotary switch in mode 3 - Deactivation time - Filling function**



- 1 Level
- 2 Relay

**Monitoring a level, filling function, deactivation time**

(level : 1 - off delay, function Up LS (Low Sensitivity : 250 W to 5 kW) or Up St (Standard Sensitivity : 5 kW to 100 kW) or Up HS (High Sensitivity : 50 kW to 1 MW).

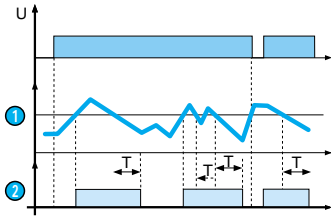
When the liquid level drops below the probe the relay energises immediately and remains on until the level of liquid reaches the probe again and remains above it for a period exceeding time delay T set on the front panel.

If the level of liquid drops back below the level set before the time delay elapses, the relay remains on.

**Note**

When the power returns after a power break, the output relay energises immediately if the liquid level is below the threshold.

**Rotary switch in mode 3 - Deactivation time - Emptying function**



- 1 Level
- 2 Relay

#### Monitoring a level, emptying function, deactivation time

(level : 1 - off delay, function Dwn LS (Low Sensitivity : 250 W to 5 kW) or Dwn St (Standard Sensitivity : 5 kW to 100 kW) or Dwn HS (High Sensitivity : 50 kW to 1 MW).

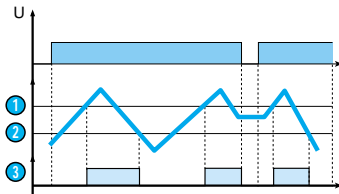
When the level of liquid rises above the probe the relay energises immediately and remains on until the level of liquid drops back below the probe for a period exceeding the value of time delay T set on the front panel.

If the level of liquid returns above the level set before the time delay elapses the relay remains on.

#### Note

When the power returns after a power break, the output relay energises immediately if the level of liquid is above the threshold.

#### Monitoring two levels, emptying function



- 1 Maximum level
- 2 Minimum level
- 3 Output relay : Down

#### Monitoring two levels, emptying function

(level : 2, function Dwn LS (Low Sensitivity : 250 W to 5 kW) , Dwn St (Standard Sensitivity : 5 kW to 100 kW) , Dwn HS (High Sensitivity : 50 kW to 1 MW).

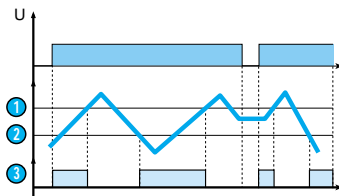
The output relay remains open as long as the level of liquid has not reached the maximum probe. Once the maximum level is reached the contact closes and the tank can then be emptied (valve opened, pump started, etc). When the level drops below the minimum level the contact opens and interrupts the emptying process.

Note : when monitoring two levels the time delay preventing the wave effect is not in operation.

#### Note

When the power returns after a power break, the output relay energises immediately if the level of liquid is above the threshold.

#### Monitoring two levels, filling function



- 1 Maximum level
- 2 Minimum level
- 3 Output relay : Up

#### Monitoring two levels, filling function

(level : 2, function Up LS (Low Sensitivity : 250 W to 5 kW) or Up St (Standard Sensitivity : 5 kW to 100 kW) or Up HS (High Sensitivity : 50 kW to 1 MW).

The output relay remains on as long as the level of liquid has not reached the maximum probe. As soon as the maximum level is reached the contact opens and pumping stops. When the level drops below the minimum level the contact closes again and pumping restarts to bring the level of liquid back up.

Note : When monitoring the two levels the time delay preventing the wave effect is not in operation.

#### Note

When the power returns after a power break, the output relay energises immediately if the level of liquid is below the threshold.

### Other informations

The probe cable (maximum length 100 metres) does not have to be screened, but avoid mounting it in parallel with the power supply cables. A screened cable can be used with the screening connected to the common terminal.