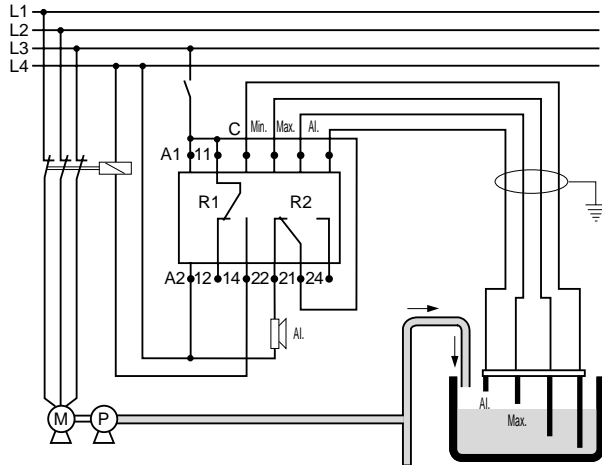# Level control relay with alarm
FN

- **Automatic control and regulation of liquid levels.**
- **2 sensitivity ranges.**
- **Filling or emptying function selected via dip switch.**
- **High or low alarm selected via dip switch.**
- **Memory can be selected.**
- **LEDs indicate state of power supply, output relay and alarm relay.**
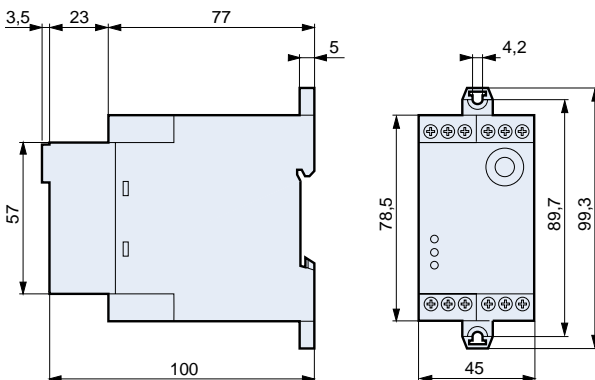
Connection

Filling control with high alarm

Use of terminals

A1 - A2	: Supply voltage
11 - 12 - 14	: Output relay (R1)
21 - 22 - 24	: Alarm output relay (R2)
C - Min - Max - Al.	: Probe inputs

Note : For example, if the tank is conductive (metal), it can be used as a reference electrode (C).

A green LED indicates the power supply.
A yellow LED indicates the state of the output relay.
A red LED indicates the state of the alarm relay.

Dimensions

Type	FN LS	FN	
Part numbers (and voltages)			**1**
24 V ∼		**84 870 501**	
48 V ∼		**84 870 502**	
120 V ∼		**84 870 503**	
230 V ∼	**84 870 803**	**84 870 504**	

Power supply characteristics		
Supply voltage Un		230, 120, 48 and 24 V ∼ 50/60 Hz galvanic isolation via transformer
Supply tolerance		0.85 to 1.15 Un except 120 V ∼ : 0.85 to 1.1 Un
Power	nominal	3 VA at Un
	maximum	4 VA at Un + 15 %
Immunity from micro power cuts		10 ms
Delay on pick-up		T1 = approx. 2 s
Response time on power-up		T4 = 500 ms
Insulation coordination		Category III, degree of pollution 2 conforming to IEC 664.1 / VDE0110 : 4 KV/2

Control circuit technical characteristics		
Sensitivity range	FN	5 kΩ to 100 kΩ
	FN LS	250 Ω to 5 kΩ
Display accuracy		± 30 % with maximum sensitivity
Electrode voltage		15 V ∼ (50 .. 60 Hz)
Electrode current		1 mA
Response time	on immersion	T2 = 400 ms
	on emersion	T3 = 700 ms

Output circuit characteristics		
Output		2 AgCdO changeover
Breaking capacity		2000 VA 80 W
Maximum breaking current		8 A ∼ 8 A ⎓
Minimum breaking current		100 mA ∼ 100 mA ⎓
Maximum breaking voltage		250 V ∼ 250 V ⎓
Mechanical life		2×10^6 operations
Electrical life	AC12	2000 VA - 10^5 operations
	AC15	Cos φ = 0.3 - 6000 operations
	DC13	L/R = 300 ms - 6000 operations

General characteristics		
Casing material		Self-extinguishing
Terminal capacity		2 x 1.5 mm² with ferrule
		2 x 2.5 mm² without ferrule
Temperature limits	Use	- 20 °C to + 60 °C (conforming to IEC 68.1.14)
	Stored	- 30 °C to + 70 °C (conforming to IEC 68.1.1/2)
Relative humidity		93 % (+2 % ; -3 %) without condensation
Weight		280 g approximately

Note :
The probe cable does not have to be screened, but avoid mounting it close to the power supply cables. To conform to the EMC directive (89/336/EEC), a screened cable must be used, with the screening connected to the common and the earth.

3

Operating principle

Control of the level of a conductive liquid at specific points (high and low levels) with an alarm for a level which is abnormally high or low.
The principle is based on measurement of the apparent resistance of the liquid between submerged probes. When this value is lower than the preset threshold on the unit front face, the output relay R1 and/or the alarm relay R2 change state.
To avoid electrolytic phenomena, an AC current runs across the probes.

Adjusting sensitivity

Set the sensitivity so that the relay will change state when the probes are in contact with the liquid. Then check that the relay returns to its initial position as soon as the probes emerge.
In certain applications, fine-tuning the sensitivity prevents inappropriate detection, such as the presence of foam or bubbles on the surface or the occurrence of leakage impedance between probes (extended line capacity, humidity, etc).
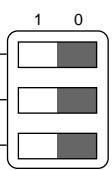
Note :
Latching of the alarm relay R2 in de-energised state if a fault occurs can be programmed via a switch on the underside of the unit (only when the unit is switched off). To reset alarm relay R2, cut the power, as long as the levels are reset.

Programming

The FN level controller can be programmed using 3 switches on the lower panel :

	1	0
Memory	OFF	ON
Alarm	Low	High
Function	Emptying	Filling

Note : Memory, Alarm and Function must only be selected when the unit is switched off.
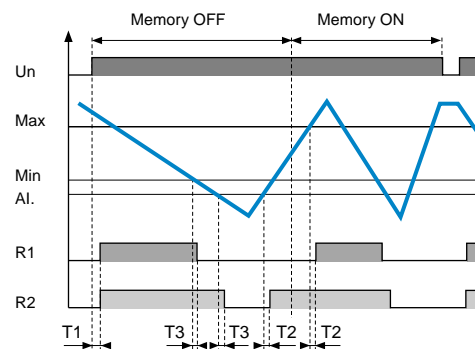
Filling control with low alarm

On power-up, probe AI. is submerged, relays R1 and R2 are energised and the pump is ON : filling starts, the LED for relay R1 is lit. When the level reaches the Max probe, relay R1 de-energises and the pump is OFF : filling stops, the LED for relay R1 goes off. Relay R1 re-energises when the Min probe emerges. In the event of a fault (level continues to fall) probe AI. emerges, relay R2 de-energises and the alarm is triggered : the LED for relay R2 is lit.
This fault can be stored.

Filling control with high alarm

On power-up, the level in the tank is low, relays R1 and R2 are energised and the pump is ON : filling starts, the LED for relay R1 is lit. When the level reaches the Max probe, relay R1 de-energises and the pump is OFF : filling stops, the relay LED goes off. If, in the event of a fault, the level continues to rise and reaches probe AI., relay R2 de-energises and the alarm is triggered : the LED for relay R2 is lit.
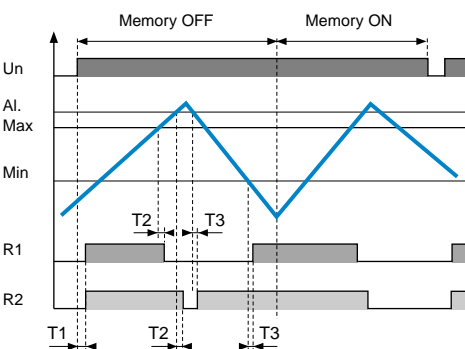This fault can be stored.
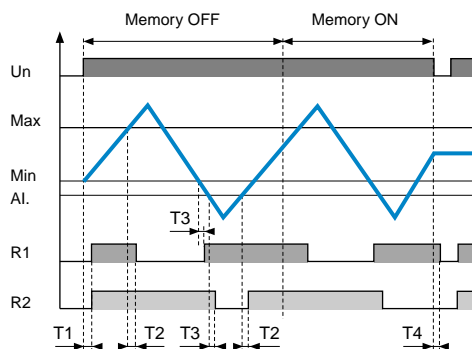
Emptying control with low alarm

On power-up, probes Min, Max and AI. are submerged, relays R1 and R2 are energised and the pump is ON : emptying starts, the LED for relay R1 is lit. When the Min probe emerges, relay R1 de-energises and the pump is OFF : emptying stops, the LED for relay R1 goes off. If, in the event of a fault, the level continues to fall and probe AI. emerges, relay R2 de-energises and the alarm is triggered : the LED for relay R2 is lit.
This fault can be stored.

Emptying control with high alarm

On power-up, probes Min, Max are submerged and probe AI. is above the level of the liquid. Relays R1 and R2 are energised and the pump is ON : emptying starts, the LED for relay R1 is lit. When the Min probe emerges, relay R1 de-energises and the pump is OFF : emptying stops, the LED for relay R1 goes off. If, in the event of a fault, the level continues to rise and reaches probe AI., relay R2 de-energises and the alarm is triggered : the LED for relay R2 is lit.
This fault can be stored.
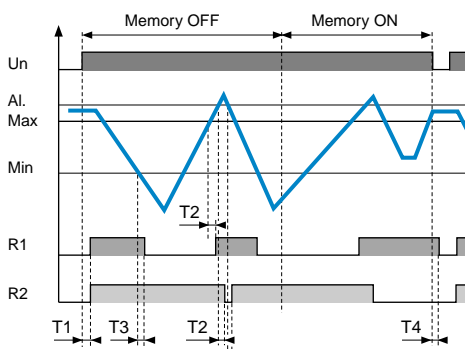
Note :
T1 : Delay on pick-up
T2 : Response time on immersion
T3 : Response time on emersion
T4 : Response time on power-down

Crouzet