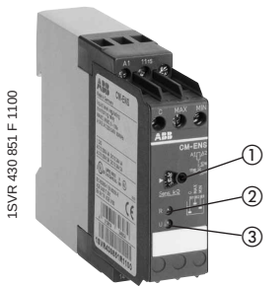
Liquid level relay CM-ENS

Ordering details



CM-ENS

① "Sens." (Sensitivity) Setting potentiometer Response sensitivity

② Yellow- LED operational states

③ Green LED - supply voltage

- Monitors and controls levels of liquids (when emptying or filling tanks)
- Monitors and controls ratios of mixtures (conductivity of liquids)
- Response sensitivity 5-100kΩ
- 4 supply voltage versions from 24-415VAC
- 1c/o
- LEDs to indicate operational states
- VDE approved version with safe isolation acc. to VDE 0160
- Approvals

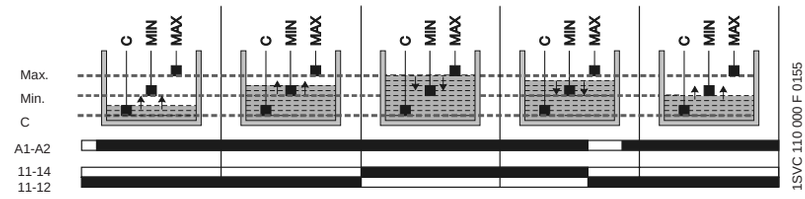
The CM-ENS monitors levels of conductive liquids and fluids, and is used for liquid level control in pump systems.They can be used for fill or drain applications.

It is also suitable for monitoring conductivity of liquids. The measuring prinicple is based on a change in resistance that is sensed by single-pole electrodes. When the supply voltage is applied to the terminals A1, A2 the output relay de-energizes.

The probes must be connected to C, MAX, MIN. The output relay energizes when the liquid exceeds the maximum level (C and MAX wet) and de-energizes when it is below the minimum level (MAX and MIN dry).

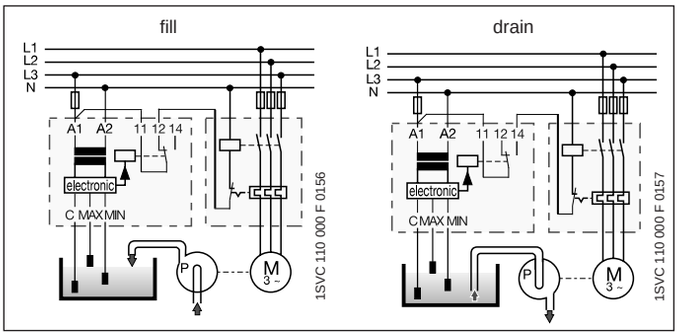
Based on the measuring circuit there will be an operating delay of approx. 250 ms at maximum sensitivity. Different levels in one tank can be controlled by up to 5 CM-ENS without interfering with each other.

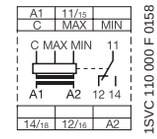
Functional diagram



When using a metal tank the electrode C is not required. The cable can be connected directly to the metallic surface of the tank.

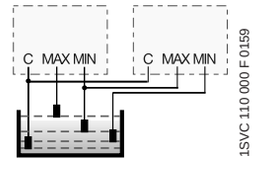
Example application





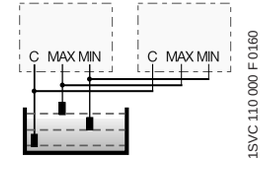
A1-A2	Supply voltage
C	Ground-reference electrode
MAX	Maximum level
MIN	Minimum level
11-12/14	Output contacts Open-circuit principle

Cascading
The electrode inputs can be interconnected as required, which ensures a simple monitoring of different liquid levels.



Redundancy
A redundant liquid level monitoring or control can be realized by connecting the electrodes to two units.

This makes the application much safer.



suitable		not suitable	
Well water	Acids, bases	Chemically pure water	Ethylene glycol
Drinking water	Liquid fertilizers	Fuel	High-percentage alcohol
Sea water	Milk, beer, coffee	Oils	Paraffins
Waste water	Low-percentage alcohol	Explosive liquids	Lacquers
	...		...

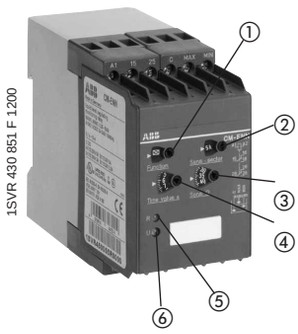
Type	Supply voltage	Order code	Pack. unit piece		
CM-ENS	24VAC	**1SVR 430 851 R 9100**	1		
	110-130VAC	**1SVR 430 851 R 0100**	1		
	220-240VAC	**1SVR 430 851 R 1100**	1		RS 442-9275
	380-415VAC	**1SVR 430 851 R 2100**	1		
	220-240VAC[1)]	**1SVR 430 851 R 1300**	1		

Remark: 1c/o = SPDT; 2c/o = DPDT

[1)] Version with safety isolation acc. to VDE 0160

Liquid level relay CM-ENN

Ordering details



CM-ENN

① "Function" selection switch time function
- ⊠ = ON delay
- ■ = OFF delay

② "Sens. -sector" selector switch measuring range

③ "Sens. " Sensitivity potentiometer - response sensitivity

④ "Time values" fine adjustment of time delay

⑤ Yellow LED - operational states

⑥ Green LED - supply voltage

- Monitors and controls levels of liquids (when draining or filling tanks)
- Monitors and controls ratios of mixtures (conductivity of liquids)
- 3 response sensitivities from 250Ω-500kΩ in one unit
- 5 supply voltage versions from 24VAC/DC-415VAC
- Choice of ON or OFF delay from 0.1-10s
- 2c/o
- 2 LEDs to indicate operational states
- Approvals

c UL us LISTED , GL , PG

The CM-ENN monitors levels of conductive liquids and is used to control pump systems. It can be used to protect submersible tanks from running dry, and to prevent overflowing of tanks.

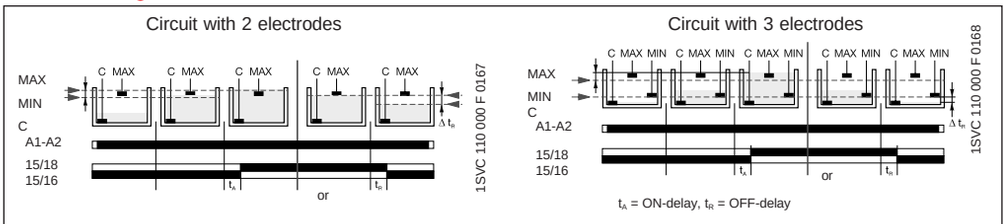
It is also suitable for monitoring conductivity of liquids.The measuring principle is based on change in resistance that is sensed by single pole electrodes (wet or dry).

In place of electrodes, other sensors or transducers can be used if they are capable of sensing changes in resistance. Measuring, output and supply circuits are electrically isolated for potential separation and to prevent electrical interference.

Due to the integrated delay on operate or on release, it is possible to build up time-dependent liquid controls using two electrodes (C, MAX).

Different liquid levels in one tank can be controlled by up to 5 CM-ENN (AC-version) without mutual interference.

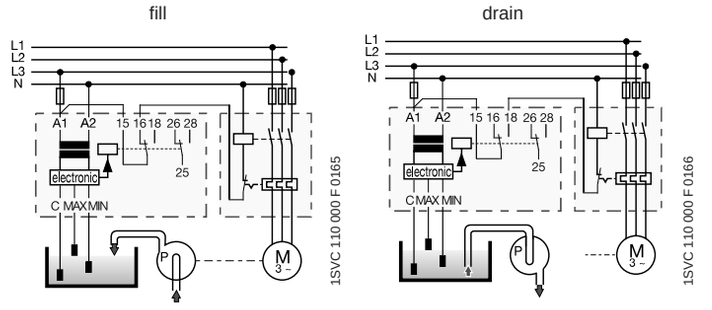
Functional diagrams



t_A = ON-delay, t_R = OFF-delay

When using a metal tank the electrode C is not required. The cable can be connected directly to the metallic surface of the tank.

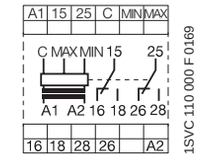
Examples of application



When starting up set both potentiometers (Response sensitivity = R-value and delay on operate = time value) to the minimum value (S) and select suitable resistance range (sector).
After all electrodes have been wetted by the liquid being monitored, turn the sensitivity potentiometer towards maximum value (100) until the relay energizes.

If the relay does not energize, set a higher value (sector) and proceed as before.
Check if the relay de-energizes properly as soon as the electrodes C and MIN are no longer wet.
The maximum electrode level is exceeded by delay on operate (TA = 0.1...10 s).

Taking the level beyond the minimum electrode level MIN is achieved by delay on release (TR = 0.1...10 s), e.g., emptying of tanks.



A1-A2	Supply voltage
C	Ground-reference electrode
MIN	Minimum level electrode
11-12/14	Output contacts Open-circuit principle

Type	Supply voltage	**Order code**	Pack. unit piece		
CM-ENN	24-240VAC/DC	**1SVR 450 055 R 0000**	1		RS 442-9360
	24VAC	**1SVR 450 059 R 0000**	1		
	110-130VAC	**1SVR 450 050 R 0000**	1		
	220-240VAC	**1SVR 450 051 R 0000**	1		
	380-415VAC	**1SVR 450 052 R 0000**	1		

Response sensitivity	**Electrode current max.**	**Cable capacity max.**	**Cable length max.**	
250Ω-5kΩ	8mA	200nF	1000m	
2.5kΩ-50kΩ	2mA	20nF	100m	
25kΩ-500kΩ	0.5mA	4nF	20m	

Remark: 1c/o = SPDT; 2c/o = DPDT

Liquid level relays

Technical data and standards / directives

			CM-ENE
Input circuit			
Supply voltage - power consumption:			
24VAC		**A1-A2**	approx. 1.5VA
110-130VAC		**A1-A2**	approx. 1.2VA
220-240VAC		**A1-A2**	approx. 1.4VA
380-415VAC		**A1-A2**	
24-240VAC/DC		**A1-A2**	
Tolernace of supply voltage			-15%...+15%
Supply voltage frequency			50-60Hz
Duty cycle			100%
Measuring circuits			**MIN-C, MAX-C**
Monitoring function			CM-ENE MIN: dry running protection, CM-ENE MAX: overflow protection
Response sensitivity			0-100kΩ, not adjustable
Electrode voltage max.			30VAC
Electrode current max.			1.5mA
Electrode supply line:	Cable capacity max.		3nF
	Cable length max.		30m
Delay on operate			approx. 200ms
Time circuits			
Time delay			
Display of operating status			
Supply voltage			
Output relay energized			R, yellow LED
CM-ENN UP/DOWN alarm relay AL1			
CM-ENN UP/DOWN alarm relay AL2			
Output circuits			**13-14**
Number of contacts			1n/o
opened-circuit principle [1)]			CM-ENE MIN: open-circuit principle CM-ENE MAX: closed-circuit principle
Contact material			AgCdo
Rated voltage acc. to VDE0110, IEC947-1			250V
Min. switching voltage			
Max. switching voltage			250V
Min. switching current			
Rated operating current acc. to IEC941-x AC12 (resistive)	230V		4A
Rated operating current acc. to IEC941-x AC15 (inductive)	230V		3A
Rated operating current acc. to IEC941-x DC12 (resistive)	24V		4A
Rated operating current acc. to IEC941-x DC13 (inductive)	24V		2A
Maximum mechanical ife			$30x10^6$
Maximum electrical life (acc. to AC12, 230V, 4A)			$0.3x10^6$
Short circuit proof, maximum fuse rating	n/c		
	n/o		10A fast, operating class gL
General data			
Enclosure width			22.5mm
Cable size			2 x 1.5mm² (2 x 16 AWG) stranded with wire end ferrule
Mounting posisiton			any
Degree of protection: housing/ terminals			IP50 / IP20
Operating temperature			-20°C...+60°C
Storage temperature			-40°C...+80°C
Mounting			DIN rail (EN50022)
Mechanical shock resistance IEC68-2-6			10G
Standards / directives			
Product standard			IEC255-6
Electromagnetic compatibility			93/68/EWG
EMC-tests acc. to EN50082-2			
ESD acc. to IEC1000-4-2, EN61000-4-2			Level 3 - 6kV/8 kV
HF-radiation resistance acc. to IEC1000-4-3, EN61000-4-3			Level 3 -10V/m
Burst acc. toIEC1000-4-4, EN61000-4-4			Level 3 - 2kV/5kHz
Surge acc. to IEC1000-4-5, EN61000-4-5			Level 4 - 2kV L-L
HF-line emission acc. to IEC1000-4-6, EN61000-4-6			Level 3 - 10V
Low voltage directive			93/68/EWG
Resistance to vibration			10G, f = 55Hz, a = 0.95mm, t = 2h per level
Approvals			**cULus, GOST**
Isolations data			
Rated isolation voltage to VDE0110, IEC947-between supply, measuring an output circuit			250V
Rated impulse withstand voltage to VDE0110, IEC664 -between all isolated circuits			4 kV/1.2-50µs
Test voltage between all isolated cicuits			2.5kV, 50Hz, 1min.
Pollution category acc.to VDE0110, IEC664 / IEC255-5			III / C
Overvoltage category acc. to VDE0110, IEC664 / IEC255-5			III / C
Environmental tests acc. to IEC68-2-30			24h cycle, 55°C, 93% rel., 96h

Open-circuit principle: Output relay energizes when the resistance exceeds (passes below) the set value
Closed-circuit principle: Output relay de-energizes when the resistance exceeds (passes below) the set value

Liquid level relays

Technical data and standards / directives

CM-ENS, CM ENS UP/DOWN, CM-ENN UP/DOWN	CM-ENN
approx. 1.5VA, CM-ENN UP/DOWN approx. 4VA	
approx. 1.5VA, CM-ENN UP/DOWN approx. 4VA	approx. 2.5VA
approx. 1.5VA, CM-ENN UP/DOWN approx. 4VA	approx. 3VA
approx. 1.5VA, CM-ENN UP/DOWN approx. 4VA	approx. 4VA
	approx. 2VA/W
-15%...+10%	-15%...+10%
50-60Hz	50-60Hz or DC
100%	100%
MAX-MIN-C	**MAX-MIN-C**
liquid-level control	liquid-level control
5-100kΩ, adjustable	250Ω-500kΩ, adjustable
30VAC	20VAC
1mA	
10nF	
100m	
approx. 250ms	
	0.1-10 s, adjustable, ON delay, OFF delay
U, green LED	U, green LED
R MAX/MIN, yellow LED	R, yellow LED
R AL1, yellow LED	
R AL2, yellow LED	
11-12/14, 21-22, 31-32	**15-16/18, 25-26/28**
1c/o, CM-ENN UP/DOWN: 1c/o + 2 n/c	2c/o CM-ENS: open-circuit principle
CM-ENS/ENN UP/DOWN: closed-circuit principle	open-circuit principle
AgCdo	AgCdo
250 V	400 V
250V	400V
4A	5A
3A	3A
4A	5A
2A	2,5A
30 x 10^6	30x10^6
0.3 x 10^6	0.1x10^6
10 A fast, operating class gL	5 A fast, operating class gL
10 A fast, operating class gL	5 A fast, operating class gL
22.5mm, CM-ENN UP/DOWN 45mm	45 mm
2 x 2.5mm^2 (2 x 14 AWG) stranded with wire end ferrule	2 x 2.5mm^2 (2 x 14 AWG) stranded with wire end ferrule
any	any
IP50 / IP20	IP50 / IP20
-20°C...+60°C	-25°C...+65°C
-40°C...+85°C	-40°C...+85°C
DIN rail (EN50022)	DIN rail (EN50022)
6G	10G
IEC255-6	IEC255-6
93/68/EWG	93/68/EWG
Level 3-6 kV/8kV	Level 3 - 6 kV/8 kV
Level 3-10V/m	Level 3 -10V/m
Level 3- 2kV/5kHz	Level 3 - 2 kV/5 kHz
Level 4-2kV L-L	Level 4 - 2kV L-L
Level 3-10V	Level 3 -10 V
93/68/EWG	93/68/EWG
10G, f = 55Hz, a = 0.95mm, t = 2h per level	10G, f = 55Hz, a = 0.95mm, t = 2h per level
cULus, GL (CM-ENS), VDE (CM-ENS version with safe isolation), GOST	**cULus, GL, GOST**
250V	500V
4 kV/1.2 - 50µs	4 kV/1.2-50µs
2.5 kV, 50Hz, 1min.	2.5kV, 50Hz, 1min.
III / C	III / C
III / C	III / C
24h cycle, 55°C, 93% rel., 96h	24h cycle, 55°C, 93% rel., 96h

Remark: 1c/o = SPDT; 2c/o = DPDT