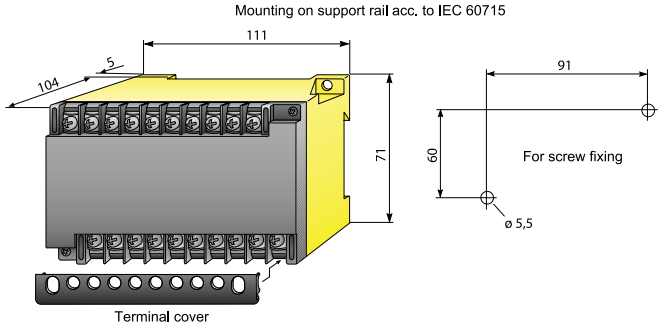
BENDER Voltage Monitoring Device

SUR357
SUR358
SUR357Z
SUR358Z

- combination of over- and undevoltage monitoring function in 3 AC up to 690 V systems
- for three- and four-conductor systems
- no need for auxiliary power supply
- built-in LED indication
- stepless adjustment for response values for under- and overvoltage monitoring
- with or without time delay selectable

Dimension diagram



Description of the instrument

The voltage monitoring device SUR357 and SUR 358 monitor three-phase a.c. mains for under- and over voltage with three- and four- conductor mains.

The response values for undervoltage, overvoltage and time delay are continously adjustable.

The input voltage (auxiliary voltage) for the supply of the instrument is taken from the mains to be monitored.

The auxiliary- and measuring voltage inputs are isolated from the mains. Special input transformers suppress the transfer of the interference components from the mains. When used with mains which have voltage spikes (thyristor control, etc.) it is possible to add an additional protective circuit.

Type SUR357 is a combined under- and overvoltage contacts. It can be supplied with or without a time delay, as required.

A built-in LED lights up when the mains voltage is within the set nominal values. The output contact is excited during normal operation (closed current circuit). It drops out if the mains voltage is below, or exceeds the set response values. In this case, the LED also extinguishes.

Type SUR358 performs the same functions as the previously described type SUR357, but with following difference:

The instrument has two separate working output contact sets available. The output contacts for undervoltage operates with closed current circuit, and the output contacts for overvoltage operates with the contact excited.

Three LEDs are fitted to type SUR358. A green LED indicates "Mains voltage on", and one red LED each indicates "Undervoltage" ($<U_N$) or "Overvoltage" ($>U_N$).

Type SUR358 can also be supplied with ot without time delay, as required.

Design description

The instruments are contained in a case of plastic. They are suitable for rapid mounting on support rail 35 x 27 x 7.3 to IEC 60715, and for screwed mounting.
Adjustment potentiometers are fitted to the front panel for the continous adjustment of the response values and of the delay time if applicable. The adjustment knobs have screwdriver slots and recesses mounting. The adjustment can only take place with a suitable tool. In the case of type SUR357, one LED is fitted, and in the case of type SUR358, there are three.

Mode of operation

The actual values of the three phase conductor voltages are picked up by measurement transformers and separated from direct connection to the mains. Secondary signal noise is suppressed and the secondary signals are taken to a measurement value (actual value) with a variable nominal value for undervoltage and overvoltage.
If a preset nominal value is not achieved, or is exceeded in the case of one or more measurement values, when using type SUR357, then a common signal is produced. This causes the output contacts (two change-overs) return to their rest position. The green LED extinguishes.
If a preset nominal value is not achieved, or is exceeded in the case of one or more measurement values, when using type SUR358, then signals independent of each other, and each is taken to an output contact to indicate under- and overvoltage. In the case of undervoltage, the appropriate contact 11/12/14 drops out and the contacts (two change-overs) return to their rest postition. A red LED indicates $<U_N$. In the case of overvoltage, the appropriate contact 21/22/24 is excited and its contacts (two change-overs) switch over their conducting position. A red LED indicates $>U_N$.
The output contacts are reset automatically and without delay, as soon as all measured values (actual values) are again within the nominal value range, which was preset. The permanently set switching hysterises (about 2 % of the response value) should be taken into consideration.
Both instrument types can operate without a delay, or be fitted with an adjustable time delay.

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Technical Data

Insulation coordination acc. to IEC 664-1	
Rated insulation voltage	AC 630 V
Rated impulse withstand voltage / contamination level	6 kV / 3
Dielectric test acc. to IEC 255	3 kV
System being monitored	
Nominal system voltage	see ordering details
Working range	0.5...1.3 U_S
Max. power consumption	6 VA
Response values	
Response value (steplessly adjustable)	
for undervoltage	0.95 ... 0.7 U_N
for overvoltage	1.05 ... 1.3 U_N
Delay on response (adjustable), only SUR357Z/358Z	0.5 ... 5 sec
	(others on request)
Switching hysteresis approx.	2 % of response value
Recovery time	approx. 100 ... 200 ms
Contact circuit	
Switching components (VDE 0435)	
at SUR357(Z)	1 x 2 change over contacts
at SUR358(Z) K1 / K2	2 x 2 change over contacts
Contact class acc. to DIN IEC 255 Teil 0-20	IIB
Rated contact voltage	AC 250 V / DC 300 V
Admissible number of operations	12000 cycles
Limited making capacity	UC 5 A
Limited breaking capacity	
AC 230 V, cos phi = 0.4	AC 2 A
DC 220 V, L/R = 0	DC 0.2 A
Operating principle	
SUR357(Z)	N/C operation
SUR358(Z) undervoltage	N/C operation
overvoltage	N/O operation
Type tests	
Test of the Electromagnetic Compatibility (EMC):	
Interferences acc. prEN 50082-2:	
ESD acc. to IEC 1000-4-2	class III
EM-Field acc. to IEC 1000-4-3	class III
Burst acc. to IEC 1000-4-4	class III
Surge acc. to IEC 1000-4-5	class III
Impulse voltage and electrical disturbance test acc. to IEC 255:	
Impulse voltage test acc. to IEC 60255-5	class III
Electrical disturbance test acc. to IEC 60255-5	class III
Emissions acc. to EN 50081-1	
Emissions acc. to EN 55011 / CISPR11	class B [1]
Mechanical tests	
Shock resistance acc. to IEC 6068-2-27	15 g / 11 ms
Bumping acc. to IEC 6068-2-29	40 g / 6 ms
Vibration strenght acc. to IEC 6068-2-6	10...150 Hz / 0.15 mm - 2 g
Environmental conditions	
Ambient temperature, during operation	-10°C...+50°C
Storage temperature range	-20°C...+70°C
Climatic class acc. to IEC 60721	3K5, except condensation and formation of ice
General data	
Operation class	continous operation
Mounting position	any position
Type of connection	terminals with self lifting clamp washers
Wire cross section	
single wire	2 x (1...1.15 mm^2)
fine braid	2 x (0.75...1.5 mm^2)
DIN rail	according to IEC 60715
Protection class acc. to EN 60529	
Internal components	IP 50
Terminals / with terminal covers	IP 10 / IP 20
Type of casing	X200
Flammability class	UL94V-0
Weight approx.	700 g

[1] Class B devices are suitable for household and industrial use

Ordering details

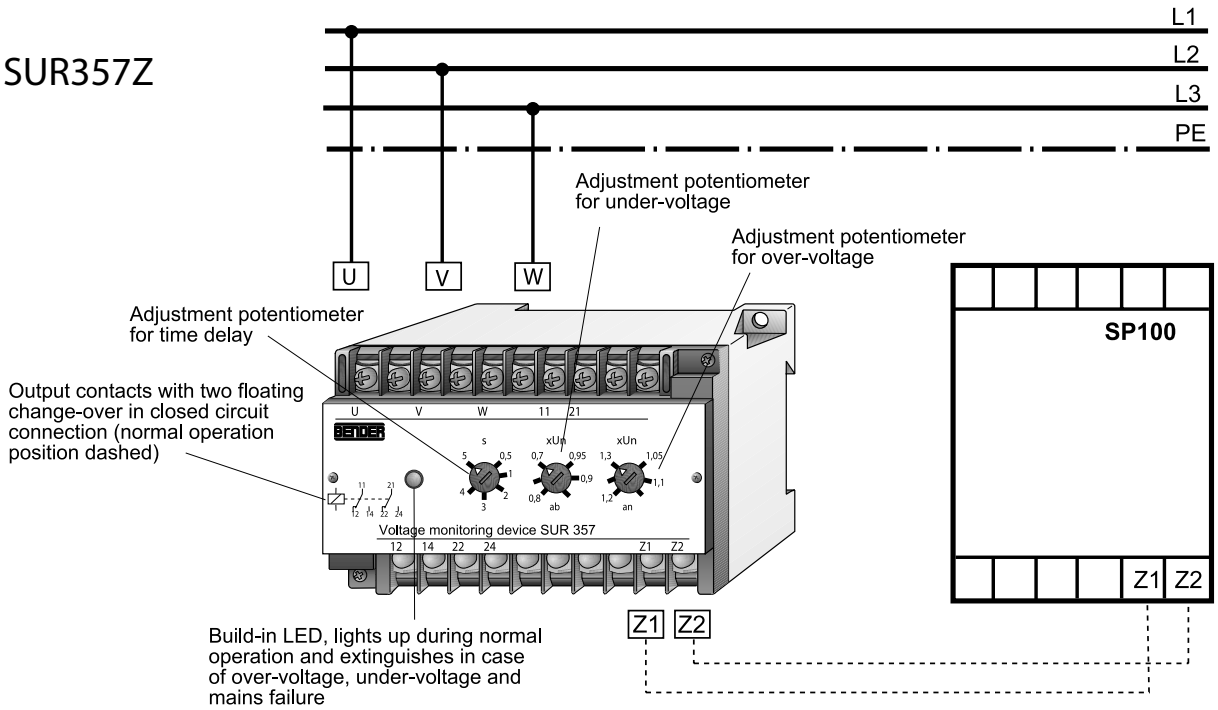
Type	Response value (sec)	Rated voltage U_N	Art.-No.
SUR357Z	0,5-5	3 AC 690 V 3 AC 400 V	B933014CN B933697CN
SP100			B935700CN

Note

The time delay remains fully effective even if one phase fails. In the case of a total mains failure, the delay becomes ineffective apart from the natural delay of the instrument.
If it is necessary to maintain the delay function even with total mains failure, then this can be achieved using a combination of SUR357 or SUR358 with an energy buffer of type SP100.

Wiring diagram

SUR357Z



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