Current and Voltage Controls
3-Phase Voltage Sequence Control
Type SM 170

- **3-phase monitoring relay for phase sequence/phase loss**
- **Measures when all 3 phases are present and have the correct phase sequence**
- **Output: 10 A SPDT relay**
- **Plug-in type module**
- **S-housing**
- **LED-indication for power supply and output ON**
- **Power supply is the 3-phased measuring voltage**

Product Description

3-phase plug-in monitoring and phase sequence/phase-loss relay. Frequently used to prevent a 3-phase motor from running on only 2 phases or to secure the right phase sequence when connecting a load to the mains.

Ordering Key

SM 170 400

Housing
Function
Output
Type
Power supply

Type Selection

Plug	Output	Supply: 220 VAC	Supply: 380 VAC	Supply: 400 VAC	Supply: 415 VAC
Circular	SPDT	**SM 170 220**	**SM 170 380**	**SM 170 400**	**SM 170 415**

Input Specifications

Input	
Pin 5	Phase L1
Pin 6	Phase L2
Pin 7	Phase L3
Pin 11	Neutral (optional connection) measures on own supply

Supply Specifications

Power supply AC types		Overvoltage cat. III (IEC 60664)
Rated operational voltage		(IEC 60038)
Through pins 5, 6, 7 & 11		
	220	3 x 220 VAC ± 15%, 45 to 65 Hz
	380	3 x 380 VAC ± 15%, 45 to 65 Hz
	400	3 x 400 VAC ± 15%, 45 to 65 Hz
	415	3 x 415 VAC ± 15%, 45 to 65 Hz
Internal measuring circuit is connected to pins 5 & 7		
Voltage interruption		≤ 40 ms
Dielectric voltage		None (supply/elect.)
Rated impulse withstand volt.		4 kV (1.2/50 µs) (line/neutral, line/line), direct connection to electronics
Rated operational power		2.5 VA

Output Specifications

Output		SPDT relay
Rated insulation voltage		250 VAC (rms) (cont./elect.)
Contact ratings (AgCdO)		µ (micro gap)
Resistive loads	AC 1	10 A/250 VAC (2500 VA)
	DC 1	1 A/250 VDC (250 W)
	or	10 A/25 VDC (250 W)
Small inductive loads	AC 15	2.5 A/230 VAC
	DC 13	5 A/24 VDC
Mechanical life		≥ 30 x 10^6 operations
Electrical life	AC 1	≥ 2.5 x 10^5 operations (at max. load)
Operating frequency		≤ 7200 operations/h
Dielectric strength		
Dielectric voltage		≥ 2 kVAC (rms) (cont./elect.)
Rated impulse withstand volt.		4 kV (1.2/50 µs) (cont./elect.) (IEC 60664)

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General Specifications

Reaction time	τ = 0.5 s, worst case reaction time may be up to 5 x τ
Indication for	
Power supply ON	LED, green
Output ON	LED, red
Environment	(IEC 60947-1)
Degree of protection	IP 20 B (IEC 60529)
Pollution degree	(IEC 60664) 1: SM 170 380/400/415 2: SM 170 220
Operating temperature	-20° to +50°C (-4° to +122°F)
Storage temperature	-50° to +85°C (-58° to +185°F)
Weight	200 g
Approvals	UL, CSA, SEV (SEV only 3 x 220 VAC)

Mode of Operation

The relay measures on its own 3-phased power supply and operates when all phases are present and the phase sequence is correct.

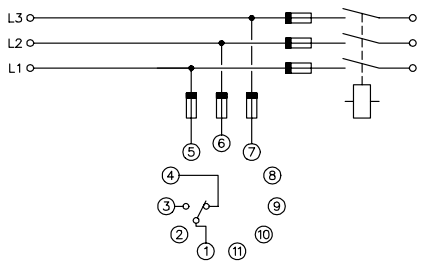
Example 1
The relay is for monitoring that the power supply has a correct phase sequence and that all phase voltages are present. The relay is a 3-phase power supply monitoring relay.

Example 2
The relay releases in case of interruption of one of the phases, provided that the voltage regenerated by electric motors on the interupted phase does not exceed 70% of the nominal voltage. If it exceeds this value the connection cannot be recommended (see description ex. 3). The regenerated voltage will be a lower phase voltage combined with a phase angle failure.

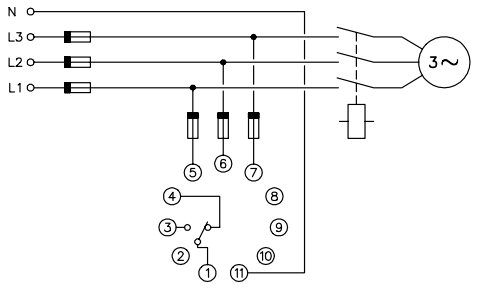
Example 3
If the value of the regenerated voltage is slightly higher than 70% of the nominal voltage, the relay releases when neutral is connected to pin 11 as sensitivity is improved.

Wiring Diagrams

Example 1



Example 2 and 3



Accessories

Sockets◊	S 411
Hold down spring◊	HF
Mounting rack	SM 13
Socket covers	BB 4
Front mounting bezel	FRS 2

For further information refer to "Accessories".

Operation Diagram