

# Current and Voltage Controls

## 3 Phase-phase Max. and Min. Voltage Control

### Types S 172, SYY 165

CARLO GAVAZZI



- Monitoring relay and 3-phased measuring relay for upper/lower phase-phase voltages control
- Measures if all 3 phase-phase voltages are within set limits
- Measures on own power supply
- Operates irrespective of phase sequence
- Upper and lower limits separately adjustable
- Built-in adjustable timer function
- 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 monitoring plug-in relay for separate upper and lower voltage control. Often used where the generated electrical power is unstable

(or incorrect) in order to secure the equipment. The S 172 features built-in time delay.

## Ordering Key

**S 172 156 220**

Housing \_\_\_\_\_  
 Type \_\_\_\_\_  
 Output \_\_\_\_\_  
 Power supply \_\_\_\_\_

## Type Selection

Plug	Output	Timer	Supply: 220 VAC	Supply: 380 VAC	Supply: 400 VAC	Supply: 415 VAC
Circular	SPDT	Yes	<b>S 172 156 220</b>	<b>S 172 156 380</b>	<b>S 172 156 400</b>	<b>S 172 156 415</b>
Circular	SPDT	No	<b>SYY 165 220</b>	<b>SYY 165 380</b>		<b>SYY 165 415</b>

## Input Specifications

<b>Input</b> Pins 5, 6 & 7	Arbitrary phase sequence
<b>Measuring ranges (VAC)</b>	
Power supply (phase-phase)	<b>3 x 220</b> <b>3 x 380</b> <b>3 x 400</b> ± 15%   ± 15%   ± 15%
Range	187-253   323-437   340-460
Upper level	231-253   399-437   420-460
Scale	105-115%   105-115%   105-115%
Lower level	187-209   323-361   340-480
Scale	85-95%   85-95%   85-95%
Power supply (phase-phase)	<b>3 x 415</b> ± 15%
Range	353-477
Upper level	436-477
Scale	105-115%
Lower level	353-394
Scale	85-95%
	measures average value of own supply, whereas scale ranges are calibrated to rms-value
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

## Output Specifications

<b>Output</b> Rated insulation voltage	SPDT relay 250 VAC (rms) (cont./elect.)
<b>Contact ratings (AgCdO)</b>	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
<b>Mechanical life</b>	≥ 30 x 10 <sup>6</sup> operations
<b>Electrical life</b>	AC 1   ≥ 2.5 x 10 <sup>5</sup> operations (at max. load)
<b>Operating frequency</b>	≤ 7200 operations/h
<b>Dielectric strength</b>	
Dielectric voltage	≥ 2 kVAC (rms) (cont./elect.)
Rated impulse withstand volt.	4 kV (1.2/50 μs) (cont./elect.) (IEC 60664)

## Supply Specifications

<b>Power supply AC types</b>	Overvoltage cat. III (IEC 60664) (IEC 60038)
Rated operational voltage through pins 5, 6 & 7	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
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.
Internal measuring circuit is connected to pins 5 & 7	
<b>Rated operational power</b>	5 VA

## General Specifications

<b>Reaction time</b>	$\tau = 1$ s, worst case reaction time may be up to $5 \times \tau$ Adjustable delay on release built-in (0.2 - 10 s) <b>Note:</b> Reaction time + set time = real delay on release time
<b>Accuracy</b> OFF delay	10s, -1/+3 on max. < 0,1s on min.
<b>Time function</b> (only S 172)	Delay on release 0.2-10 s. adj.
<b>Indication for</b> Power supply ON Output ON	LED, green LED, red
<b>Environment</b> Degree of protection Pollution degree	(IEC 60947-1) IP 20 B (IEC 60529) (IEC 60664) 1: S 172 380/400/415 SY Y 165 380/415 2: S 172 220, SY Y 165 220, -20° to +50°C (-4° to +122°F) -50° to +85°C (-58° to +185°F)
Operating temperature Storage temperature	
<b>Weight</b>	200 g
<b>Approvals</b>	UL, CSA

## Mode of Operation

Connected to 3 phases, the S 172 and SY Y 165 measure sinusoidal voltages. The phase sequence is arbitrary.

lower limit, the relay releases after the set time period whereas SY Y 165 releases immediately.

The relay operates as long as all 3 phase-phase voltages are within the set upper and lower limits. The two limits can be adjusted separately. For S 172 applies that if one or more of the phase-phase voltages rises above the upper limit or drops below the

The relay operates again when all 3 phase-phase voltage are within set limits. Hysteresis on operate is 2%.

### Example 1 Mains monitoring

The relay measures if the 3 phase-phase voltage are

within the upper and lower limits. The limits are adjusted by the two built-in potentiometers.

### Example 2 Monitoring load supply

The relay can protect loads, such as heating elements, against overvoltage and thereby against increase in current, which could otherwise destroy the heating elements.

Undervoltage to ohmic loads causes insufficient heating capacity, and this can also be monitored.

The relay cannot be used for load monitoring if the load is a motor, as the regenerated phase voltage, at e.g. fuse breakdown, is indefinable and dependent on the mechanical performance when the failure occurs (see S 171).

## Time/Range Setting

<b>Range setting</b> Upper potentiometer: Adjustment of upper limit in %.	<b>Time setting</b> Bottom potentiometer: Time setting on relative scale (not SY Y 165).
Middle potentiometer: Adjustment of lower limit in %.	<b>Time</b> Adjustable delay on release: 0.2 to 10 s
<b>Hysteresis</b> ≤2% of rms-value	

## Accessories

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

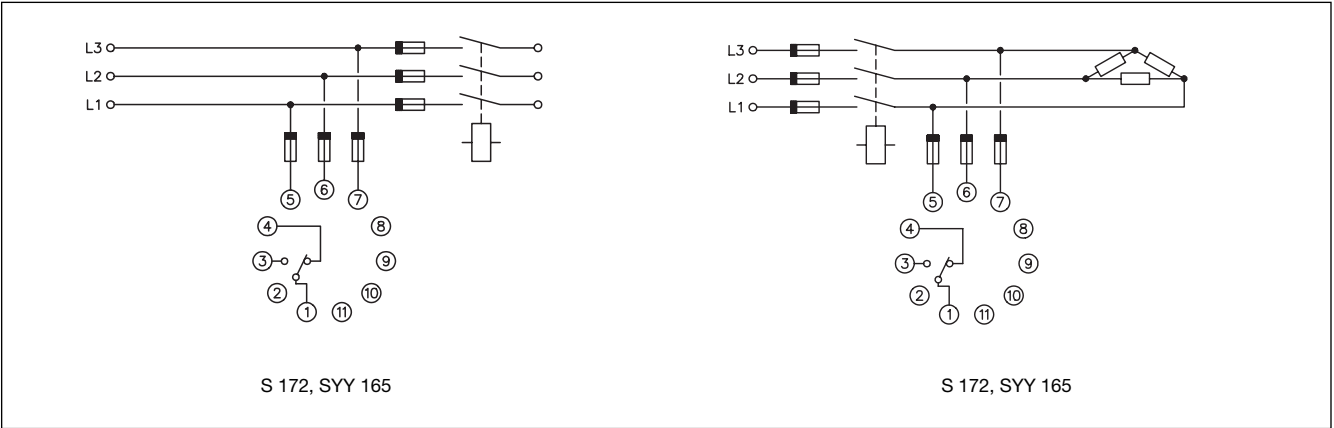
For further information refer to "Accessories".



Wiring Diagrams

Example 1

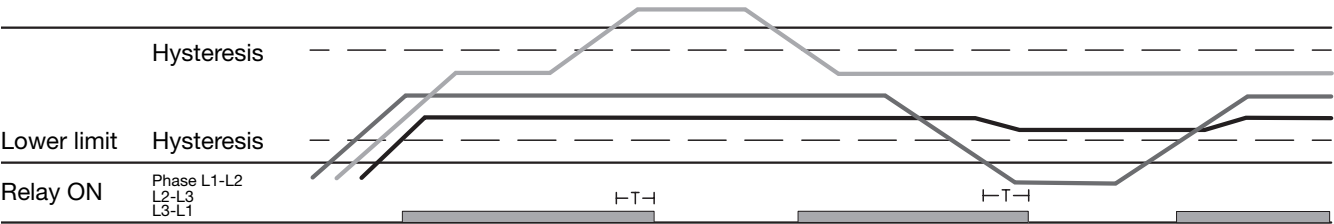
Example 2



Operation Diagrams

S 172

Upper limit



SY Y 165

Upper limit

