

# Current and Voltage Controls

## 3-Phase True RMS, Multi-Function

### Type EUY

CARLO GAVAZZI



- True RMS measuring on own power supply
- Frequency range 45-440 Hz
- Monitoring relay and 3-phased measuring relay for over/under voltage control (closed circuit)
- Monitors phase asymmetry
- Monitors phase loss/phase sequence
- Measures if all 3 phase-phase voltages are within set limits
- Upper and lower limits separately adjustable
- Adjustable asymmetry
- 2 separately adjustable time functions (0.1-30 s)
- Output: 2 x 5 A SPDT relays (one relay for each level)
- For mounting on DIN-rail in accordance with DIN/EN 50 022
- 45 mm Euronorm housing
- LED-indication for power supply ON
- Two LED's indicating fault and/or status of the 2 relay outputs (flashing when timing)

## Product Description

True rms 3-phase monitoring relay for separate over and under voltage, asymmetry and phase failure control. The advantage of true rms measuring is that correct values are always obtained irrespective of the waveform of the measured voltage, i.e. the EUY measures the correct rms value of a normal sinusoidal

power supply as well as of a distorted power supply. Frequency range 45 to 440 Hz. With relays measuring average value (EUB, EUC) correct values are only obtained for true sinusoidal power supplies. Often used in motor applications where it is important to detect the reliability of the electrical power.

## Ordering Key

**EUY C 400**

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

## Type Selection

Mounting	Output	Supply: 115 VAC	Supply: 220 VAC	Supply: 240 VAC	Supply: 400 VAC	Supply: 480 VAC	Supply: 600 VAC	Supply: 690 VAC
For DIN-rail	2 x SPDT	EUY C 115	EUY C 220	EUY C 240	EUY C 400	EUY C 480	EUY C 600	EUY C 690

## Input Specifications

Input U, V, W		L1 - L2 - L3 measures on own supply phase sequence not arbitrary 45-440 Hz
Frequency range		
Measuring ranges (True rms)	115	92-132 VAC
	220	176-253 VAC
	240	192-276 VAC
	400	320-460 VAC
	480	384-552 VAC
	600	480-690 VAC
	690	552-794 VAC
Range		
Upper level (sep. adjustable)		80 - 115%
Lower level (sep. adjustable)		80 - 115%
Asymmetry (sep. adjustable)		5-25% of nominal range
Phase loss (phase-phase)		70% of nominal range

## Output Specifications

Output	2 x SPDT relay
Rated insulation voltage	
Upper limit	250 VAC (contact/elect.)
Lower limit	Terminals 25/26/28 Terminals 15/16/18
Contact ratings (AgCdO)	
Resistive loads	μ (micro gap) 5 A, 250 VAC
	DC 1 5 A, 24 VDC
Small inductive loads	AC 15 2 A, 250 VAC
	DC 13 3 A, 24 VDC
Mechanical life	≥ 40 x 10 <sup>6</sup> operations
Electrical life	≥ 10 <sup>5</sup> operations (at max. load)
Operating frequency	≤ 7200 operations/h
Dielectric strength	
Dielectric voltage	2 kVAC (rms)
Rated impulse withstand volt.	4 kV (1.2/50 μs)

## Supply Specifications

<b>Power supply</b>	Overvoltage cat. III (IEC 60664)
Rated operational voltage	(IEC 60038)
Through term. U, V, W 115	115 VAC, -20/+15%
220	45-440 Hz
240	220 VAC, -20/+15%
400	45-440 Hz
480	240 VAC, -20/+15%
600	45-440 Hz
690	400 VAC, -20/+15%
	45-440 Hz
Voltage interruption	480 VAC, -20/+15%
Dielectric voltage	45-440 Hz
Rated impulse withstand voltage	≤ 40 ms
up to 480 VAC	None
up to 690 VAC	4 kV (1.2/50 μs)
	6 kV (1.2/50 μs)
<b>Rated operational power</b>	5 VA
Supplied from	L1, L3

## General Specifications

<b>Power ON delay</b>	≤ 3 s
<b>Reaction time</b>	
Switching out	
1. priority error	≤ 1.5 s
2. priority error	≤ 3.0 s
Switching in	≤ 4.0 s
<b>Accuracy</b>	
Range	≤ 5%
Temperature drift	≤ 0.1%/°C
Delay (upper/lower level)	30 s, ±5% on max. < 0.1 s on min.
Temperature drift	≤ 0.05%/°C (≤ 0.06%/°F)
<b>Hysteresis</b>	
Level	< 2.0%
Asymmetry	< 3.0%
<b>Indication for</b>	
Power supply ON	LED, green
Output/error condition	2 x LED's, yellow (see LED table)
<b>Environment</b>	
Degree of protection	IP 20
Pollution degree	3
Operating temperature	-10° to +50°C (-4° to +122°F)
Storage temperature	-50° to +85°C (-58° to +185°F)
<b>Weight</b>	280 g
<b>Screw terminals</b>	
Tightening torque	Max. 0.5 Nm acc. to IEC 60947
<b>Approvals</b>	UL, CSA

## Mode of Operation

Connected to the 3 phases, the EUY operates and the two output relays are energized when all three phases are present at the same time, the phase sequence is correct, the measured asymmetry is below set value and the 3 phase-phase voltages are within set limits. This is indicated by the two LED's. If one or more of the phase-phase voltages rises above, or if the measured asymmetry exceeds the set level, then the centre (yellow) LED starts to flash, and the

output relay (terminals 25/26/28) releases after the set time period. If one or more of the phase-phase voltages drops below the set level, then the left (yellow) LED starts to flash, and the output relay (terminals 15/16/18) releases after the set time period. If the phase sequence is wrong or one phase is lost, then the two built-in output relays will release immediately. No time function will occur. The failure will be indicated by the two yellow LED's. At phase loss

both LED's will flash. At wrong phase sequence the LED's will flash alternately (see LED table).

### Example 1

#### Mains network monitoring

The relay monitors over and under voltage, phase loss, correct phase sequence and that the phase asymmetry is within the adjusted level.

### Example 2

#### Starting and operating load monitoring

The EUY ensures correct starting and operating conditions. The relay controls the voltage level, phase sequence, asymmetry and the correct direction of motor rotation.

Frequent failures are fuse blowing, asymmetry, and incorrect voltage level. In case of fuse blowing the motor will regenerate a voltage in the interrupted phase. The EUY will detect the failure and react immediately due to excessive imbalance between the phases.

## Asymmetry/Level/Time Setting

### Level setting

Upper left knob:  
Setting of upper limit on absolute scale.

Lower left knob:  
Setting of lower limit on absolute scale.

### Time 1 setting (lower level)

Centre right knob:  
Setting of time delay on absolute scale (0.1-30 s).

### Time 2 setting (upper level)

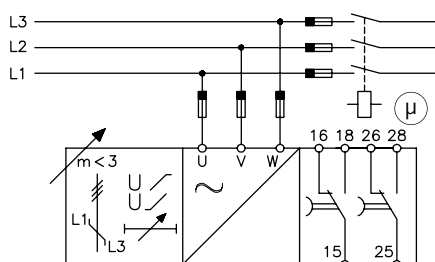
Upper right knob:  
Setting of time delay on absolute scale (0.1-30 s).

### Asymmetry setting

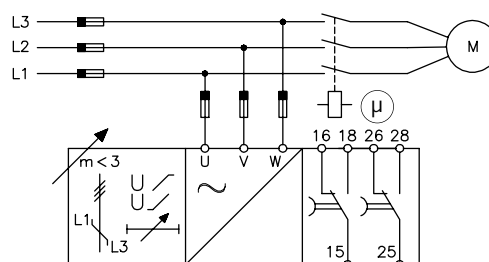
Lower right knob:  
Setting of asymmetry level on absolute scale.

## Wiring Diagrams

Example 1



Example 2

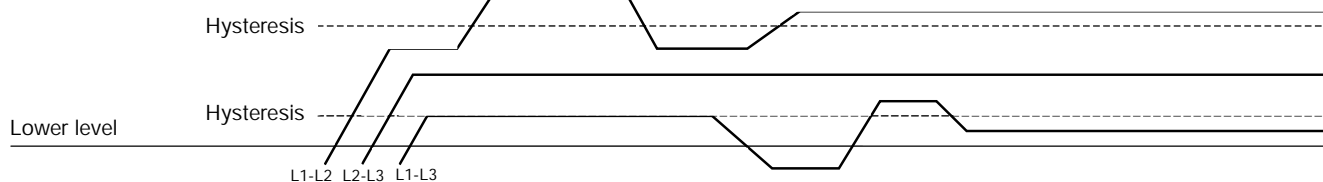


## Table for Relay Position and LED-indication

Failure	Relay for lower level term. 15/16/18	Relay for upper level term. 25/26/28	Time delay	Left yellow LED (1) for lower level indication	Centre yellow LED (2) for upper level indication	Right green LED for power ON indication
<b>The voltage rises above</b> the UL set value	Remains ON	Switches OFF	Time 2 UL Time delay Adj. 0.1-30 s	Remains ON	LED starts flashing (during the time period) when the measured voltage exceeds the set value. Frequency 1 Hz. Switches off after delay.	Remains ON
<b>The voltage drops below</b> the LL set value	Switches OFF	Remains ON	Time 1 LL Time delay Adj. 0.1-30 s	LED starts flashing (during the time period) when the measured voltage drops below the set value. Frequency 1 Hz. Switches off after delay.	Remains ON	Remains ON
<b>Asymmetry</b> exceeds set level	Remains ON	Switches OFF	Time 2 UL Time delay Adj. 0.1-30 s	Switches OFF	LED starts flashing (during the time period) when the measured asymmetry exceeds the set value. Frequency 8 Hz. Switches off after delay.	Remains ON
<b>Phase loss</b> voltage drops below 70% of nom. range	Switches OFF	Switches OFF	No time delay	Both LED's flash in phase. Frequency 3 Hz. If L2 or L3 are lost no LED indication will occur. (L2 and L3 are supplying the system).	Both LED's flash in phase. Frequency 3 Hz. If L2 or L3 are lost no LED indication will occur. (L2 and L3 are supplying the system).	Remains ON
<b>Phase sequence</b> If phase sequence is wrong	Switches OFF	Switches OFF	No time delay	Both LED's flash alternately. Frequency 3 Hz.	Both LED's flash alternately. Frequency 3 Hz.	Remains ON
<b>Overlapping of LL and UL set level</b>	Switches OFF	Switches OFF	No time delay	Indicating actual fault.	Indicating actual fault.	Green LED starts flashing. Frequency 3 Hz.

## Operation Diagram

Upper level



Asymmetry

