



**Zakład Mechaniki i Elektroniki
ZAMEL sp.j.**
J.W. Dzida, K. Łodzińska

zAMEL

ul. Zielona 27, 43-200 Pszczyna, Poland
Tel. +48 (32) 210 46 65, Fax +48 (32) 210 80 04
www.zamel.pl, e-mail: marketing@zamel.pl

DESCRIPTION

The CAM-01 phase sequence sensor device is used to protect devices powered from a three-phase installation (e.g. a motor) from being damaged in case of phase voltage switch off or phase voltage asymmetry. The threshold value switch on is preset to 185 V and it can't be regulated by the user. The system does not protect from voltage drop asymmetry and it is powered from L1 phase. The switch off delay and voltage hysteresis cause the system is resistant to momentary voltage changes.

FEATURES

- ☞ Phase fading protection,
- ☞ voltage asymmetry protection,
- ☞ phase voltage indicators,
- ☞ (asymmetry) switch on threshold regulation,
- ☞ switch off delay and voltage hysteresis
- ☞ resistant to momentary voltage drops,
- ☞ momentary voltage fading protection max 10 A capacity,
- ☞ monomodular casing,
- ☞ TH-35 DIN rail installation.



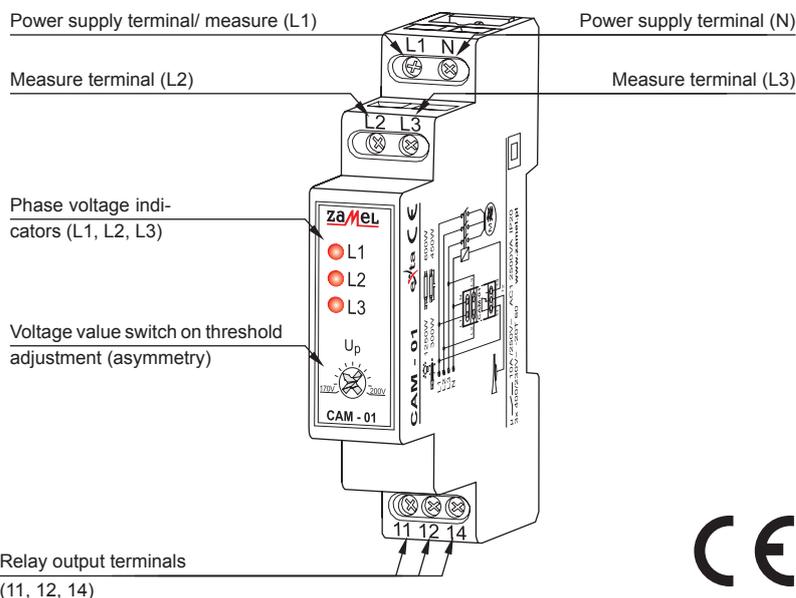
The device is designed for three-phase installation and must be installed in accordance with standards valid in a particular country. The device should be connected according to the details

included in this operating manual. Installation, connection and control should be carried out by a qualified electrician staff, who act in accordance with the service manual and the device functions. Disassembling of the device is equal with a loss of guarantee and can cause electric shock. Before installation make sure the connection cables are not under voltage. The cruciform head screwdriver 3,5 mm should be used to instal the device. Improper transport, storage, and use of the device influence its wrong functioning. It is not advisable to instal the device in the following cases: if any device part is missing or the device is damaged or deformed. In case of improper functioning of the device contact the producer.

TECHNICAL PARAMETERS

CAM - 01	
Supply cables:	L1, N
Input rated voltage / supervised:	230/400 V~
Input voltage tolerance:	from -15 to +10%
Rated frequency:	50 / 60 Hz
Rated current:	34 mA
Phase voltage indicators:	3x LED red
Measure terminals:	L1, L2, L3
Voltage threshold adjustment:	170 ± 200 V
Voltage hysteresis:	approx. 10 V
Switch on delay t_1 :	5 sec - 10 sec
Switch off delay t_2 :	1sec - 5 sec
Output relay parameters:	1NO/NC - 10 A / 250 V AC1 2500 VA
Number of terminal clamps:	7
Section of connecting cables:	0,2 ± 2,50 mm ²
Ambient temperature range:	from -20 to +60 °C
Operating position:	free
Mounting:	TH35 rail (PN-EN 60715)
Protection degree:	IP20 (PN-EN 60529)
Protection class:	II
Overvoltage category:	II
Pollution degree:	2
Rated impulse withstand voltage:	2 kV (PN-EN 61000-4-5)
Dimensions:	monomodular (17,5 mm) 90x17,5x66 mm
Weight:	76 g
Reference standards:	PN-EN 60730-1 PN-EN 60730-2-1 PN-EN 61000-4-2,3,4,5,6,11

APPEARANCE

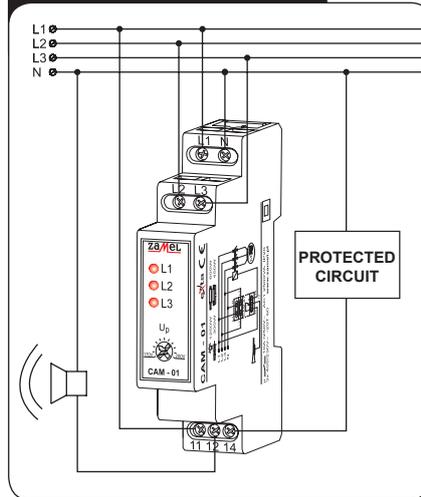


MOUNTING, FUNCTIONING

1. Disconnect the power supply from the mains by the phase fuse, the circuit-breaker or the switch-disconnector that are joined to the proper circuit,
2. **Check if there is no voltage on connection cables by means of a special measuring equipment,**
3. Install CAM-01 device in the switchboard on TH-35 DIN rail,
4. Connect the cables with the terminals according to installing diagram,
5. Switch on the power supply from the mains,
6. Adjust voltage threshold that switches on the asymmetry sensor.

The sensor, after switching on, controls the voltage value of particular phases. The presence of phase voltage is signalled by an appropriate LED diode. In case there is voltage in every phase exceeding the adjusted threshold, the relay is switched on (outputs 11–14 are closed, the motor is switched off, the alarm is switched on). In case there is a lack of any of the phases or there is a voltage drop below the adjusted threshold (voltage asymmetry) the relay is switched off (outputs 11–12 are closed, the motor is switched off, the alarm is switched on). There is a short time delay in switching off the relay (t_2 from 1 to 5 sec). The device is resistant to momentary voltage drops. Another motor switch on follows (outputs 11–14 are closed) when the voltage is 10 V higher from the adjusted voltage threshold (voltage hysteresis), and after t_1 time (from 5 sec to 10 sec) is over. LED diodes are switched on till every phase voltages below 50 V.

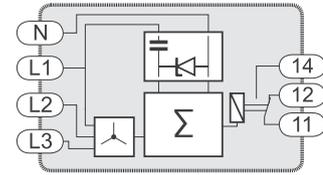
CONNECTING



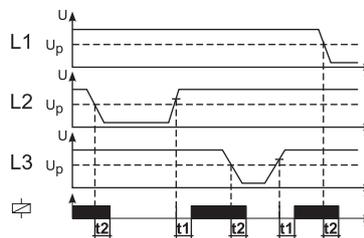
WARNING!

The relay system is powered from L1 phase. The relay switch off time delay depends on output power connected to a three-phase installation. The lack of two phases causes the sensor to switch on.

INNER DIAGRAM



TIME COURSE



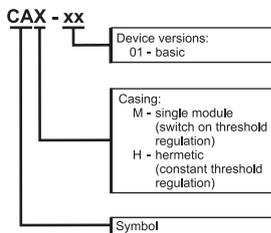
SIGNALLING

SIGNALLING

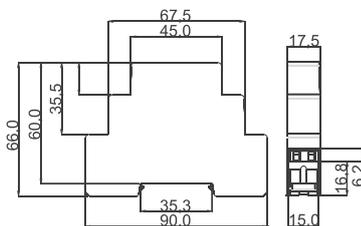
<ul style="list-style-type: none"> ★ Phases voltage has the appropriate value. The relay is switched on (11-14 contacts are closed) and the device operates properly.
<ul style="list-style-type: none"> ★ Total voltage lack on L2 phase. The relay is switched off (11-12 contacts are closed).

PRODUCT FAMILY

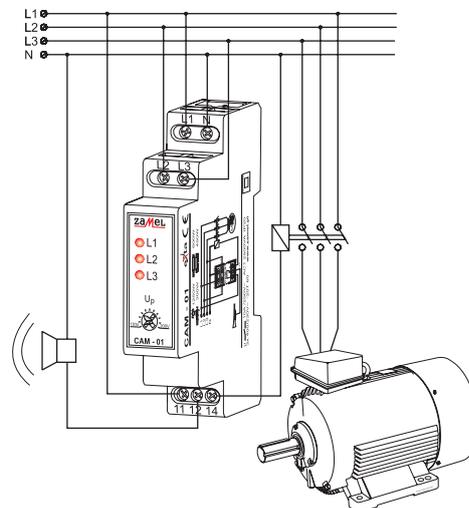
Voltage asymmetry sensor CAM-01 belongs to voltage asymmetry sensor family CAX.



DIMENSIONS



EXAMPLE OF INSTALLATION



Voltage asymmetry sensor CAM-01 protects the engine from voltage asymmetry or lack of supply phase.

GUARANTEE CARD

There is 24 months guarantee on the product

Salesman stamp and signature, date of sale

1. ZAMEL provides a two-year warranty for its products.
2. The ZAMEL warranty does not cover:
 - a) mechanical defects resulting from transport, loading / unloading or other circumstances,
 - b) defects resulting from incorrect installation or operation of ZAMEL products,
 - c) defects resulting from any changes made by CUSTOMERS or third parties, to products sold or equipment necessary for the correct operation of products sold,
 - d) defects resulting from force majeure or other aleatory events for which ZAMEL is not liable.
3. All complaints in relation to the warranty must be provided by the CUSTOMER in writing to the retailer after discovering a defect.
4. ZAMEL will review complaints in accordance with existing regulations.
5. The way a complaint is settled, e.g. replacement of the product, repair or refund, is left to the discretion of ZAMEL.