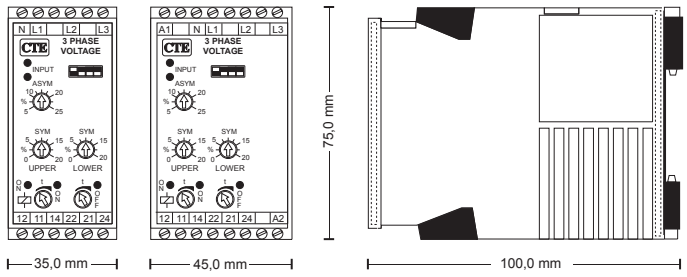


3 PHASE VOLTAGE CONTROL RELAY

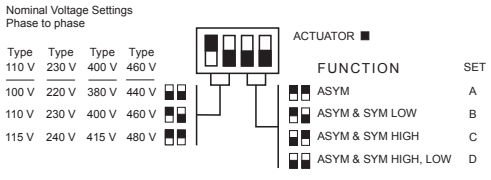
PADA, PADI

PANA, PANI

FEATURES

- **Detect phase-loss and phase-regeneration in three phase systems**
- **High sensitivity for the protection of motors and power transformers**
- **Insensitive to harmonics and spikes as the detection system includes a narrow band pass filter**
- **Adjustable version with individual adjustments for unbalanced and balanced under- and overvoltage settings**
- **Function setting with dipswitch**
- **Time delay - on and off - individually adjustable**
- **One unit for three mains voltages**
- **LED indicates the state of input, relay and timing function**

PROGRAMMABLE FEATURES



Description:
The phase failure relays are designed for applications where a three-phase system needs to be monitored for unbalance or deviation in balanced voltage. The relays includes a standard timing function. In addition the PADI and PANI offers a true time delay on drop out even at total power failure. The relay works in "fail safe" mode and need no external power supply. If an external stable power supply is available the 45mm housing offers seperate terminals for internal power.

A - function monitors the three-phase system for unbalance due to phase angle and phase voltage deviations e.g. a blown fuse or a bad connection.
B - function monitors the three-phase system for both unbalance (as the A - function) and balanced under voltage.
C - function monitors the three-phase system for both unbalance (as the A - function) and balanced over voltage.
D - function Monitors the three-phase system for all possible deviations by monitoring unbalance and balanced under-and over voltage.

Unbalance due to phase angle and phase voltage deviations is very accurately measured by measuring the inverse phase system relatively to the main system. The method is independent of the actual balanced voltage and very insensitive to electrical noise.

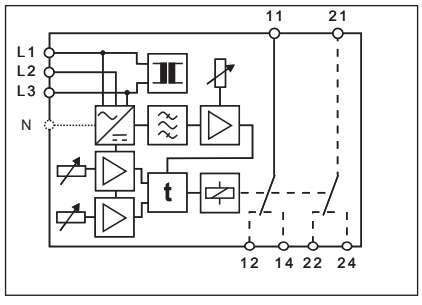
Balanced voltage is measured by rectifying and adding the three-phase voltages.

Operation:
Under normal phase conditions the relay is energized and the green LEDs are switched on. If a phase failure is detected, or the supply voltage for the electronic system is lost, the relay drops out and the LED, related to the type of failure, is switched off.

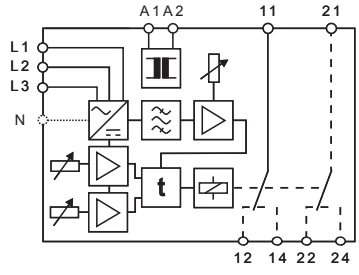
Application:
To switch off motors automatically before damage due to faulty supply, and to switch them on again as soon as the supply is re-established. E.g. pumps, oilburners, ventilators and refrigerators.
To monitor the three-phase main system and control the use of local emergency generators.
To prevent motors from being switched on to a faulty supply e.g. cranes and elevators.

CONNECTION DIAGRAM

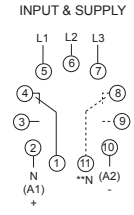
Rail mounting 35mm



Rail mounting 45mm



Socket mounting*



*CE up to 230V phase to phase voltage
**PANA with externaly supply only 1C/O

Thiim A/S
Transformervej 31
2860 Søborg - Denmark
Tel.: +45 4485 8000
Fax: +45 4485 8005
Web: www.thiim.com
Mail: thiim@thiim.com

SPECIFICATIONS

INPUT

Phase to phase voltage	Type B110:	100, 110 and 115
Selectable by dipswitch	Type B230:	220, 230 and 240
	Type B400:	380, 400 and 415
Input resistance	300 kΩ	100 < U_N < 200 V
	500 kΩ	200 < U_N < 500 V
Frequency range	45 to 66 Hz	
Balanced under voltage	Approx. - 40 %	A & C Function
	0 to - 20 %	B & D Function
Balanced over voltage	0 to + 20 %	C & D Function
Differential		
Unbalance	2 % of U_N	
Balanced	2 % of U_N	

PERFORMANCE PARAMETERS

TIMING	
Response time	Approx. 500 msec. with small variation
	Approx. 100 msec. with drop out
Time range during run	Separate On and Off delay
	0 - 10 sec. adjustable
True time delay	PADI & PANI > 6 sec. at total suply loss
ELECTRICAL	
Unbalance sensitivity	5 to 25 %
Temp. dependence	Typ. ± 0.02 % / °C
Supply dependence	Typ. ± 0.01 % / % ΔU_N

* Unbalance is tested by varying one phase against neutral keeping the two other phases on nominal value against neutral.

OUTPUT Relay, 2 C/O

Contact rating	6 A, 250 VAC, 1500 W
Mechanical life	30 Million operations

SUPPLY

AC and DC	18-360 VDC and 20-240 VAC
Isolated switch mode supply	
AC supply range	AC voltage from L1 & L3
with transformer	110 V (From 80 to 138 V)
Standard voltage	230 V (From 176 to 288 V)
	400 V (From 304 to 498 V)
	460 V (From 352 to 576 V)
	AC/DC voltage from A1 & A2
	24 to 480V can be specified
AC frequency range	45 to 440 Hz
Power consumption	4 VA, 3 W

GENERAL

Temperature range	- 25 °C to + 55 °C ambient	
Humidity	Up to 90 % RH non-condensing	
Dielectric test voltage	Coil to relay contacts	4000 VAC
	Pole to pole (45 mm.)	2500 VAC
	11-12-14 to 21-22-24	
Weight	0.22 kg	

CE

	International Standards
EMC directive 89/336:	EN50081 - Emission
	EN50082 - Immunity
Low voltage directive 73/23:	EN60255 - Electrical Relays

ORDERING INFORMATION

EXAMPLE: 35mm Housing PADA B400 A A 3 C

TYPE
- 3 Phase voltage control relay — PADA
- 3 Phase + N voltage control relay — PANA
- As PADA +True time delay — PADI
- As PANA +True time delay — PANI

INPUT with transformer intern conected to L1-L3
- 100, 110 and 115 VAC — B110
- 220, 230 and 240 VAC — B230
- 380, 400 and 415 VAC — B400
- 440, 460 and 480 VAC — B460

ADJUSTMENT
- Trimpot and dipswitch adj. — A

HOUSING
- Rail mounting — A
- socket 11 pin — E

SIZE
- 35 mm. — 3

CODE END — C

EXTERNALY SUPPLY CONECTIONS

EXAMPLE: 45mm Housing PADA 400 2 B230 A A4 C

TYPE
- 3 Phase voltage control relay — PADA
- 3 Phase + N voltage control relay — PANA

NOMINAL INPUT
standart input
- 100, 110 and 115V — 110
- 220, 230 and 240V — 230
- 380, 400 and 415V — 400
- 440, 460 and 480V — 460

(other voltages on request)
- 10.0 to 99.9 V — 1
- 100. to 999. V — 2

SUPPLY VOLTAGE
- 18-360 VDC and 20-240 VAC — E400
- From 19.2 to 28.8 VAC — B024
- From 38.4 to 57.6 VAC — B048
- From 80 to 138 VAC — B110
- From 176 to 288 VAC — B230
- From 304 to 498 VAC — B400
- From 352 to 576 VAC — B460

(other voltages on request)

ADJUSTMENT
- Trimpot and dipswitch adj. — A

HOUSING
- Rail mounting 45 mm. — A4
- Socket 11 pin 35mm. — E3

CODE END — C