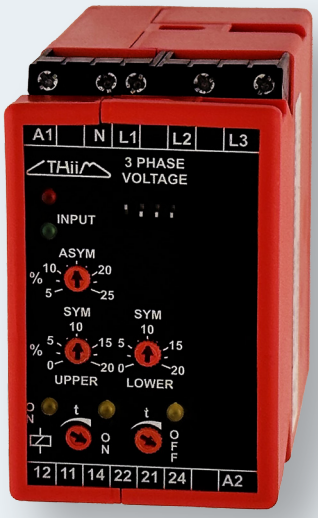
3 PHASE ASYMMETRY AND VOLTAGE RELAY

PADA, PADI, PANA, PANI



PANA (WITH SEPARATE POWER SUPPLY)

PADI

Features

- Detect phase loss and phase re-generation in 3 phase or 3 phase+neutral systems
- High sensitivity for the protection of motors
- Built-in narrow band pass filter limiting electrical noise
- Individual adjustments for unbalanced and balanced under- and overvoltage settings
- Outputs activate with undervoltage, overvoltage or phase voltage asymmetry

Benefits

- Provides monitoring of 3 phase power supply systems ensuring correct performance of connected machinery and appliances
- Prevents damage to AC motors from being switched on to faulty power supply
- Switches off motors automatically before damage due to faulty supply, and on again when supply is re-established
- Insensitive to electrical noise
- Helps improve reliability and performance of connected electrical equipment

Applications

- Mains power connection
- Supply to heavy duty machinery with moving parts
- AC motors
- Generators

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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 45 mm 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 undervoltage.

C Function monitors the three-phase system for both unbalance (as the A-function) and balanced overvoltage.

D Function monitors the three-phase system for all possible deviations by monitoring unbalance and balanced under- and overvoltage.

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 inde-pendent of the actual balanced voltage and very insensitive to electrical noise.

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

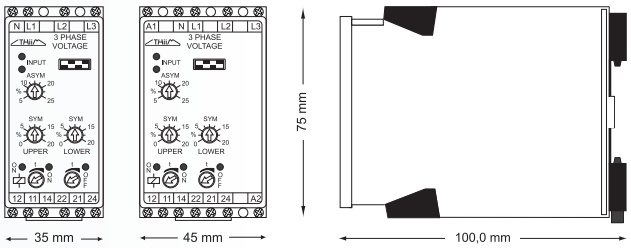
APPLICATION

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.

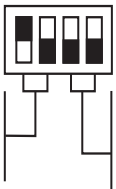
DIMENSIONS



CONFIGURATION

Nominal Voltage Settings
Phase to phase

Type 110 V	Type 230 V	Type 400 V	Type 460 V
100 V	220 V	380 V	440 V
110 V	230 V	400 V	460 V
115 V	240 V	415 V	480 V



ACTUATOR ■

FUNCTION	SET
ASYM	A
ASYM & SYM LOW	B
ASYM & SYM HIGH	C
ASYM & SYM HIGH, LOW	D

3 PHASE ASYMMETRY AND VOLTAGE RELAY

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INSTALLATION AND SETUP

The relay is designed for DIN rail mounting with built-in screw terminal conections for corresponding wires of the installation, as indicated on the front panel and connection diagram

Setup is done from the front of the relay using the dip-switches for setting the desired functionality and nominal system voltage, and the screw potentiometers for setting desired trip levels, sensitivity and time delay.

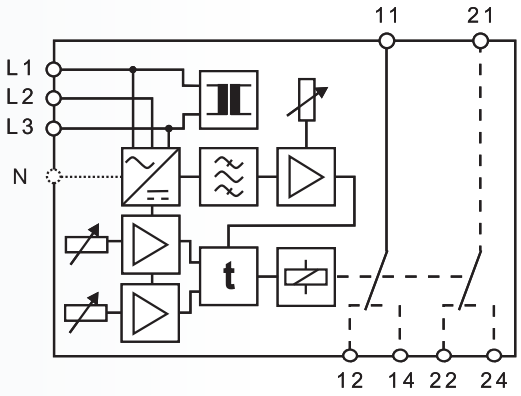
OPERATIONS

Under normal phase conditions the relay is energized and the green LEDs are switched on.

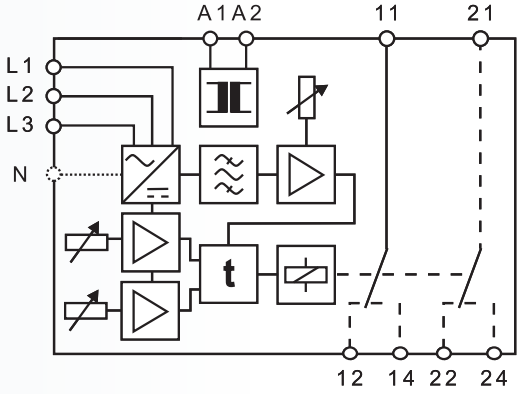
If a phase failure is detected, or the supply voltage for the electronic system is lost, the relay drops out and the LED, related to the type of failure, is switched off.

CONNECTIONS

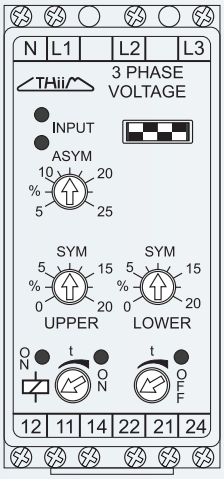
Rail mounting 35 mm

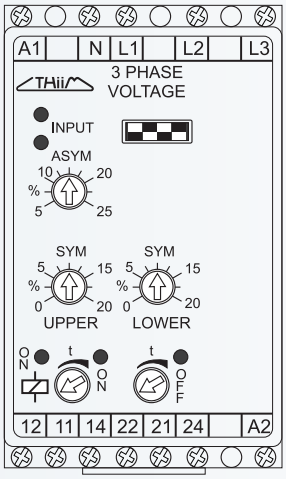


Rail mounting 45 mm



FRONT





Company info

3 PHASE ASYMMETRY AND VOLTAGE RELAY

PADA, PADI, PANA, PANI

SPECIFICATIONS

INPUT

Phase to phase voltage	Type B110:	100, 110 and 115 VAC
Selectable by dipswitch	Type B230:	220, 230 and 240 VAC
	Type B400:	380, 400 and 415 VAC
	Type B460	440, 460 and 480 VAC
Input resistance	300 kΩ	100 < U_N < 200 V
	500 kΩ	200 < U_N < 500 V
Frequency range	45 to 66 Hz	
Balanced undervoltage	Approx. -40 %	A & C function
	0 to -20 %	B & D function
Balanced overvoltage	0 to +20 %	C & D function
Differential		
Unbalance	2 % of U_N	
Balanced	2 % of U_N	

PERFORMANCE PARAMETERS

TIMING

Response time	Approx. 500 ms with small variation
	Approx. 100 ms with drop out
Time range during run	Separate On and Off delay
	0-10 s adjustable
True time delay	PADI & PANI > 6 s at total supply 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 supply range	AC voltage from L1 & L3
with built-in transformer	
Standard voltage	110 V (from 80 to 138 V)
	230 V (from 176 to 288 V)
	400 V (from 304 to 498 V)
	460 V (from 352 to 576 V)
Separate external supply	AC/DC voltage from A1 & A2
AC supply range	From 400 to 480 VAC
AC and DC	18-360 VDC and 20-240 VAC
isolated switch mode supply	
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

TERMINALS

Tightening torque	0.32 Nm to 0.39 Nm
Screw type	PH1
Cable size	Accepts up to 3.3 mm² or 12 AWG
Weight	0.22 kg

CE

International standards

EMC directives 89/336:

EN 50081	Emission
EN 50082	Immunity

EU directive: Low voltage directive 73/23:

EN 60255	Electrical Relays

ORDERING INFORMATION

EX: Power supply from installation (35 mm 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 internally connected 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 35 mm — A

SIZE
- 35 mm — 3

CODE END — C

EX: Separate external power supply (45 mm housing) PADA 400 2 E400 A A4 C

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

NOMINAL INPUT
Standard input
- 100, 110 and 115 VAC — 110
- 220, 230 and 240 VAC — 230
- 380, 400 and 415 VAC — 400
- 440, 460 and 480 VAC — 460
- 100. to 999. V — 2

SUPPLY VOLTAGE
- From 18 to 360 VDC or 20 to 240 VAC — E400
- 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

CODE END — C

Datasheet_PADA-PADI-PANA-PANI_S24_v1

www.thiim.com thiim@thiim.com +45 4485 8000