

UNIVERSAL MEASURING INSTRUMENTS

TNM96VAF - Z / Multifunction measuring instrument



TNM96VAF-Z measures important electrical parameters in 3 phase 4 wire, 3 phase 3 wire, 1 phase 2 wire and 1 phase 3 wire (split-phase) network. It displays many parameters at a glance. It measures electrical parameters like voltage, current, frequency and power factor. The instrument has one optional built in relay output which can be configured as limit output.

True RMS measurement

The instrument measures distorted waveform up to 15th harmonic

Front panel keys

Two keys are useful for easy setup navigation and changing setup parameters

Storage of parameters

The instrument stores minimum and maximum values of system voltage, system current. Also run hour, ON hour number of AUX interrupts are stored.

Display

- 3 Line, 4 Digit bright Red LED display and indication LEDs
- Display can be configured for automatic scrolling of parameters or manual scrolling through keys as per requirement and application of user

On site programmable

It is possible to program primary, secondary of external potential transformer (PT) & primary, secondary of external current transformer (CT) ,Autoscroll via front panel keys and MODBUS.

MODBUS (RS485) Output

- RS485 output enables the instrument to transmit all the measured parameters over standard MODBUS protocol
- The instrument can be configured baud rate, Device address via Keys and MODBUS communication.

Limit (Alarm) Output

- Potential free 1NO contact
- Fully configurable trip point, hysteresis, on and off delays for Limit Output operation.

Compliance to International Safety standards

Compliance to International Safety standard IEC 61010-1:2017

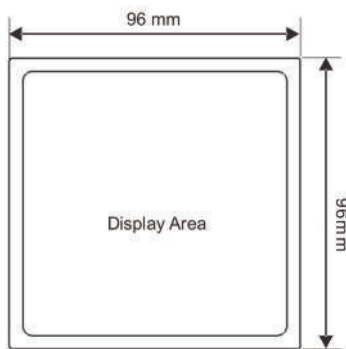
Auxiliary supply

- Higher Auxiliary power supply with voltage range 60V-300V AC/DC.
- Lower Auxiliary power supply with voltage range 20V-60V AC/DC.

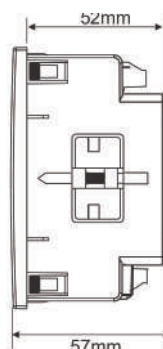
EMC Compatibility

Compliance to International standard IEC 61326

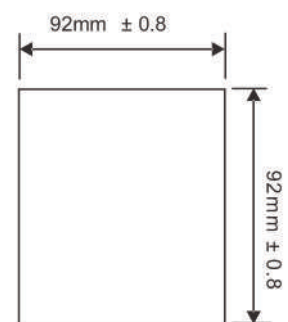
Dimensions



Front View



Side View



Panel Cutout

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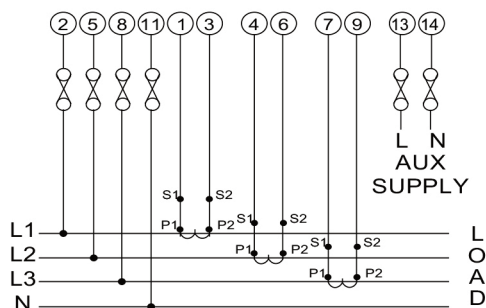
Technical Specifications		
Input voltage	Nominal input voltage (AC RMS) System PT primary values Max continuous input voltage Overload Indication Nominal input voltage burden Overload Withstand	288.68VLN (500VLL) 100VLL to 1200kVLL programmable on site. (1000MVA maximum power per phase) / (1200kVLL when CT primary ≤ 1002A) 120% of nominal value "-ol." >121% of Nominal value < 0.1VA approx. per phase (at nominal 240V) 2 x rated value for 1 second, repeated 10 times at 10 second intervals
Input current	Nominal input current Ranges System CT primary values Max continuous input current Overload Indication Nominal input current burden Overload Withstand	1A / 5A onsite programmable From 1A up to 9999 A (1000 MVA maximum power) / (9999A when PT primary ≤ 120kVLL) 120% of rated value "-ol." >121% of Nominal value < 0.3VA approx. per phase 20 x rated value for 1 second, repeated 5 times at 5 minute intervals
Auxiliary supply	Higher Auxiliary supply range Lower Auxiliary supply range Aux Supply frequency Auxiliary Supply burden	60-300V AC/DC (230V nominal) 20-60 V AC/DC 45 to 65 Hz range < 4VA approx.
Operating measuring ranges	Current Voltage Power Factor Frequency	5 to 120% of nominal value 10 to 120% of nominal value 0.5 Lag ... 1 ... 0.5 Lead 40Hz to 70Hz
Reference conditions of accuracy	Reference temperature Influence of temperature Input Waveform Input frequency Voltage range Current range	23°C +/- 2°C 0.025%/°C for Voltage & 0.05%/°C for Current Sinusoidal (distortion factor 0.005) 50/60 Hz ± 2% 10... 120% of nominal Value 5 ... 120% of nominal Value
Accuracy	Parameter Voltage Current Frequency Power Factor	Accuracy (class 0.5) ± 0.5% of Nominal value ± 0.5% of Nominal value ± 0.1% of mid frequency ±2°
Display update rate	Response time to step input	1 sec approx.
Applicable standards	EMC Immunity Emission Safety IP for water and dust	IEC 61326 - 1 :Table 2 IEC 61000-4-2, 4-3, 4-4, 4-5, 4-6, 4-8, 4-11 CISPR 11 IEC 61010-1-2018 IEC 60529
Isolation	Pollution degree Installation category High voltage test All Circuit Vs Surface Input / AUX Vs Others Relay / Rs485 Vs Others RS85 Vs Relay	2 III 3.5 kV RMS, 50Hz, 1 min 3.5 kV RMS, 50Hz, 1 min 3.3 kV RMS, 50Hz, 1 min 2.2 kV RMS, 50Hz, 1 min
Environmental	Operating temperature Storage temperature Relative humidity Warm up time Shock (As per IEC60068-2-27) Vibration Number of Sweep cycles Enclosure	-10 to +60°C -25 to +70°C 0... 95% RH (non condensing) Minimum 3 minute Half sine wave, Peak acceleration 30gn (300 m/s^2), duration 18ms. 10 ... 150 ...10 Hz, 0.15mm amplitude 10 per axis IP20 (Terminal side) and IP54 (Front side)
Interfaces	Relay MODBUS	250 VAC, 3A AC / 30VDC / 3A DC RS485 Baud rate : 4.8k,9.6k,19.2k, 38.4k, 57.6k bps (Response time < 200ms)

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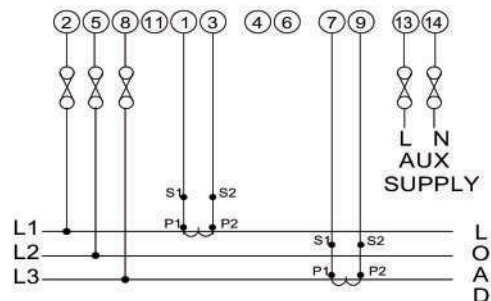
No.	Parameter	3 Phase 4 Wire	3 Phase 3 Wire	1 Phase 2 Wire
1.	System Voltage	●	●	●
2.	System Current	●	●	●
3.	Voltage L1	●	-	●
4.	Voltage L2	●	-	●
5.	Voltage L3	●	-	-
6.	Voltage L1 - L2	●	●	●
7.	Voltage L2 - L3	●	●	-
8.	Voltage L3 - L1	●	●	-
9.	Current L1	●	●	●
10.	Current L2	●	●	●
11.	Current L3	●	●	-
12.	Frequency	●	●	●
13.	System Power Factor	●	●	●
14.	Power Factor L1	●	-	●
15.	Power Factor L2	●	-	●
16.	Power Factor L3	●	-	-
17.	RPM	●	●	●
18.	Max and min - System voltage	●	●	●
19.	Max and min - System current	●	●	●
20.	Run hour	●	●	●
21.	ON Hour	●	●	●
22.	Number of interruptions	●	●	●
23.	Neutral current	●	-	-

Electrical connection:

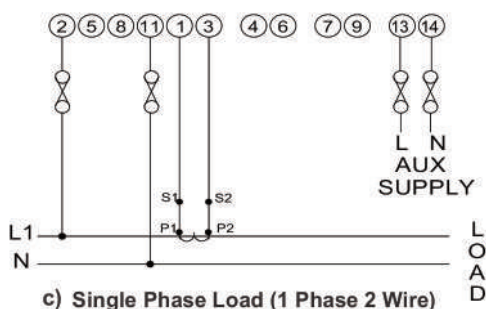
a) 3 Phase 4 wire



b) 3 Phase 3 wire



c) 1 Phase 2 wire - Single phase load



It is recommended that the wires used for connections to the instrument should have lugs crimped at the end. That is, the connections should be made with Lugged wires for secure connections.

Order example:

- TNM96P-Z Power,

to select: None, 1 relay output, RS485 or RS485 + 1 relay output and 60-300V AC