

TNM 96P - Multimeter



- Fast and Easy Installation on panel with self clicking
- True RMS measurement
- Limit Switch (optional)
- 3 Line 4 Digits ultra bright LED Display (up to 9999)
- On site Programmable CT/PT Ratios
- User selectable CT Secondary 1A/5A
- User selectable PT Secondary from 100 VLL to 500 VLL
- User selectable 3ph3wire / 3ph4wire / single phase Network
- Two auxillary Power Supply available 40V - 300V AC/DC or 12V - 48V DC.
- Storage of MIN / MAX values
- Measurement and Display of RPM, Run hours, On hours, No. of interruption

The TNM96P measures important electrical parameters in 3 phase 4 Wire and 3 phase 3 Wire Network and replaces the multiple analog panel meters. It measures electrical parameters like AC Voltage, AC Current, Frequency, Active, Reactive, Apparent Power and many more.

Product Features

On site programmable PT/CT ratios

It is possible to program primary of external potential Transformer (PT), primary of external Current Transformer (CT) on site via front panel keys by entering into Programming mode.

User selectable CT Secondary 5A/1A

The secondary of external Current Transformer (CT) can be programmed on site to either 5A or 1A using front panel keys.

User selectable PT Secondary

The secondary of external Potential Transformer (PT) can be programmed on site from 100VLL to 500VLL using front panel keys.

Onsite selection of Auto scroll / Fixed Screen

User can set the display in auto scrolling mode or fixed screen mode using front panel keys.

Low back depth

The instrument has very low back depth (behind the panel) of less than 55 mm.

True RMS measurement

The instrument measures distorted waveform up to 15th Harmonic.

RPM Measurement

The instrument display Rotation per minutes for generator applications. Number of poles can be set on site depending upon application requirement.

Optional Limit switch (Relay)

The instrument will trip the relay if the programmed parameter exceeds the programmed Trip Limits.

3 line 4 digits LED display

Simultaneous display of 3 Parameters.

User selectable 3 phase 3Wire or 4Wire or Single phase Network

User can program on site the network connection as either 3 Phase 3 Wire or 4 Wire or single phase network using front panel keys.

In case of self powered TNM 96P only either 3 Phase 4 wire or single phase network are available.

Storage of parameters possible

The instrument stores minimum and maximum values for System Voltage, System Current, Run Hour, ON Hour and number of Interrupts.

Every 60 sec stored values are updated.

Four function keys

Using the four function key, it is possible to go desired parameter screen instantly.

Enclosure Protection for dust and water

Conforms to IP 50 (for front face) and IP 20 (for back) as per IEC60529.

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EMC Compatibility

Compliance to International standard IEC 61326.	
Interference Emission	IEC 61326-1 : 2005, Class A
Interference Immunity	IEC 61326-1 : 2005
Electrostatic discharge (ESD)	IEC 61000-4-2 – 4kV/8kV contact/air.
EM Field	IEC 61000-4-3 – 10 V/m (80 MHz to 1 GHz) – 3 V/m (1.4 GHz to 2 GHz) – 1 V/m (2 GHz to 2.7 GHz)
Burst	IEC 61000-4-4 – 2 kV (5/50 ns, 5 kHz)
Surge	IEC 61000-4-5 – 1 kVLL / 2 kVLN.
Conducted RF	IEC 61000-4-5 – 3 V (150 kHz to 80 MHz)

Rated Power Frequency

magnetic Field	IEC 61000-4-8 – 30 A/m
Voltage dip	IEC 61000-4-11 – 0% during 1 cycle. – 40% during 10/12 cycles. – 70% during 25/30 cycles.
Short interruptions	IEC 61000-4-11 – 0% during 25/30 cycles. 25 cycles for 50 Hz test. 30 cycles for 50Hz test.

Technical Specifications

Input Voltage

Nominal input voltage (AC RMS)	Phase – Neutral 290V L-N , Line-Line 500V L-L
Max continuous input voltage	150% of rated value
Nominal input voltage burden	< 0.3 VA approx. per phase (For external auxiliary meter)
System PT secondary values	100VLL to 500VLL programmable on site.
System PT primary values	100VLL to 692kVLL programmable on site.

Input Current

Nominal input current	5A AC RMS
System CT secondary values	1A and 5A programmable on site.
System CT primary values	From 1A up to 9999A (for 1 or 5 Amp)
Max continuous input current	150% of rated value
Nominal input current burden	< 0.2 VA approx. per phase

Auxiliary supply

External Auxiliary	40 V – 300V AC/DC (± 5 %)
DC Auxiliary supply	12V - 48V DC
Self powered	Input voltage range from 80 to 100% of the rated value (Self powered meter is available only in 3Phase 4 Wire and Single Phase network. Auxiliary input is derived from Phase 1 (R phase)
Frequency range	45 to 65 Hz
VA burden	Approx. 3 VA
DC burden	3V

Overload withstand

Voltage	2 x rated value for 1 second, repeated 10 times at 10 second intervals
Current	20x rated value for 1 second, repeated 5 times at 5 min intervals

Operating Measuring Ranges

Voltage Range With External Aux	10 ... 120% of rated value
Voltage Range With Self Power	80 ... 120% of rated value
Current Range	10 ... 120% of rated value
Frequency	45... 65 Hz
Power Factor	0.5 Lead ... 1 ... 0.5 Lead

Reference conditions for Accuracy

Reference temperature	23°C +/- 2°C
Input waveform	Sinusoidal (distortion factor 0.005)
Input frequency	50 or 60 Hz ±2%
Auxiliary supply voltage	Rated Value ±1%
Auxiliary supply frequency	Rated Value ±1%
Voltage Range	20 ... 100% of nominal value
Current Range	10 ... 100% of nominal value
Power	Cos phi = 1 for active power / Sin phi = 1 for reactive power
Power Factor / Phase Angle	10... 100% of nominal current and 20... 100% of nominal voltage 40... 100% of nominal current and 20... 100% of nominal voltage

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Accuracy

Voltage	± 1.0 % of nominal value
Current	± 1.0 % of nominal value
Frequency	0.5% of mid frequency
Active power	± 1.0 % of nominal value
Re-active power	± 1.0 % of nominal value
Apparent power	± 1.0 % of nominal value
Power factor	2.0% of Unity
Phase angle	2.0% of range

Measurement error is normally much less than error specified above. Variation due to influence quantity is less than twice the error allowed for reference condition.

Limit switch (relay)

Switchin voltage and current for relay	240V DC, 5A	(1NO + 1NC)
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Influence of Variations

Temperature coefficient (for rated value range of use (0...50 °C))	0.025%/°C for Voltage 0.05%/°C for Current
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Display update rate

Response time to step input	1 sec approx.
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Applicable Standards

EMC	IEC 61326-1: 2005
Safety	IEC 61010-1-2001 , Permanently connected use
IP for water and dust	IEC60529
Pollution degree	2
Installation category	III
High Voltage (for 1 minute)	Test 3510V AC r.m.s 2210V AC r.m.s,
	Enclosure Vs Power supply + All measuring input Power supply Vs All measuring input Input Voltage Vs Input Current Input Current Vs Input Current

Environmental

Operating temperature	0 +50°C
Storage temperature	-25 to +70°C
Relative humidity	0... 90% non condensing
Warm up time	Minimum 3 minute
Shock	15g in 3 planes
Vibration	10... 55 Hz, 0.15mm amplitude

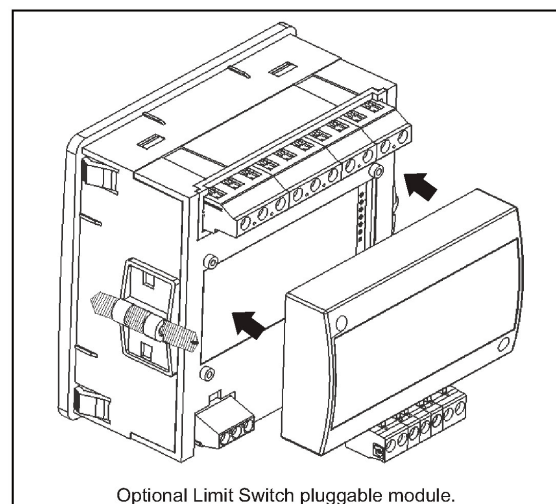
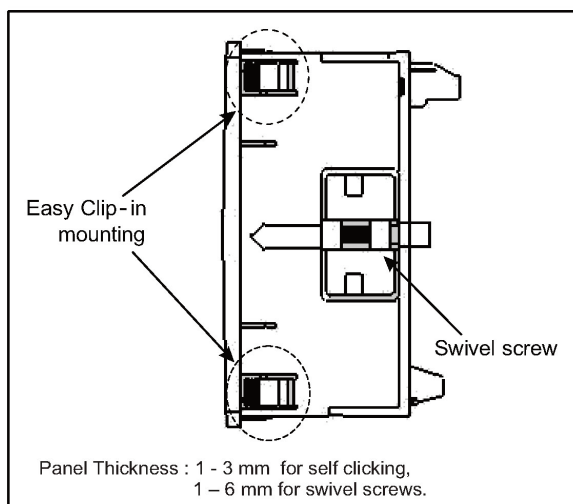
Enclosure:

Front	IP50
Back	IP20

Dimensions and Weights:

Bezel size	96mm x 96mm DIN 43 718
Panel cut-out	92 +0.8mm x 92 +0.8mm
Overall depth	55mm
Panel thickness	1 - 3mm for self clicking, 1 - 6mm for swivel screws
Weight	320gr. approx.

Installation:

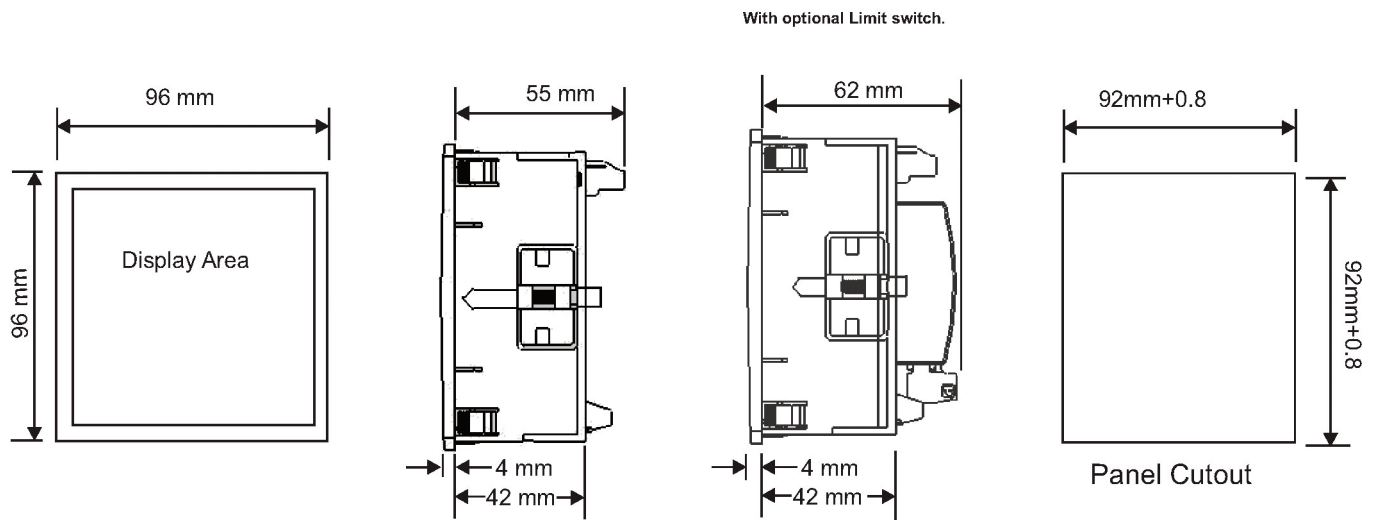


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Electrical connections:

	Self Powered Aux	External Powered Aux
3 Phase 4 Wire Unbalanced Load		
3 Phase 3 Wire Unbalanced Load	Not Applicable	
1 Phase 2 Wire		

Dimensions:



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Parameter measurement and display:

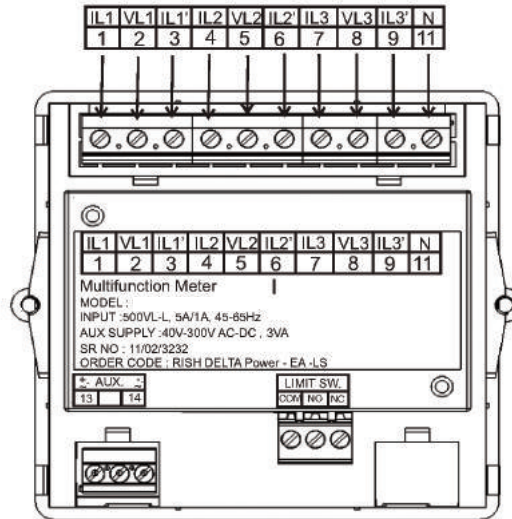
No.	Parameter	3 Phase 4 Wire	3 Phase 3 Wire	1 Phase 2 Wire
1.	System Voltage	●	●	●
2.	System Current	●	●	●
3.	Voltage L1 - N	●	-	●
4.	Voltage L2 - N	●	-	-
5.	Voltage L3 - N	●	-	-
6.	Voltage L1 - L2	●	●	-
7.	Voltage L2 - L3	●	●	-
8.	Voltage L3 - L1	●	●	-
9.	Current L1	●	●	●
10.	Current L2	●	●	-
11.	Current L3	●	●	-
12.	Frequency	●	●	●
13.	System Active Power (kW)	●	●	●
14.	Active Power L1	●	-	●
15.	Active Power L2	●	-	-
16.	Active Power L3	●	-	-
17.	System Re-active Power (kVar)	●	●	●
18.	Re-active Power L1	●	-	●
19.	Re-active Power L2	●	-	-
20.	Re-active Power L3	●	-	-
21.	System Apparent Power (kVA)	●	●	●
22.	Apparent Power L1	●	-	●
23.	Apparent Power L2	●	-	-
24.	Apparent Power L3	●	-	-
25.	System Phase Angle	●	●	●
26.	System Power Factor	●	●	●
27.	Power Factor L1	●	-	●
28.	Power Factor L2	●	-	-
29.	Power Factor L3	●	-	-
30.	Phase Angle L1	●	-	●
31.	Phase Angle L2	●	-	-
32.	Phase Angle L3	●	-	-
33.	RPM	●	●	●
34.	Max (System Voltage/ System Current)	●	●	●
35.	Min (System Voltage/ System Current)	●	●	●
36.	Hour Run	●	●	●
37.	ON Hour	●	●	●
38.	Number of auxiliary interrupt	●	●	●

● : available

- : Not available

UNIVERSAL MEASURING INSTRUMENTS

Rear connection:



Ordering Information	Ordering Code
	TNM96P
Auxiliary Supply Self Aux*	- SA
Auxiliary supply voltage 40 V - 300V AC/DC 12 V - 48V DC	-EA -DC
Optional With Limit switch Without Limit switch	-LS -Z

Order Code Example:

TNM96P- EA - LS

TNM96P, external aux (40V - 300V AC/DC), with limit switch.

*NOTE: Self Auxiliary meter is available only in 3Phase 4 Wire and Single Phase network.

Auxiliary input is derived from Phase 1 (R phase).

In case of external auxiliary meter all three networks are available (3Phase 4Wire / 3Phase 3Wire / Single Phase)