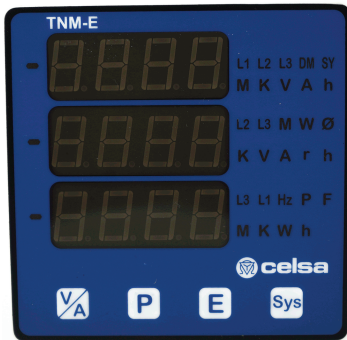


UNIVERSAL MEASURING INSTRUMENTS

TNM 96E - Multimeter



- Fast and Easy Installation on panel with self clicking.
- True RMS measurement.
- 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.
- Programmable Energy format and Energy rollover count
- Wide auxillary Power Supply which can accept any input between 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.
- Optional: MODBUS (RS485) Communication / Pulse output

TNM96E 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, Import and Export Energy and many more.

Products 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. 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. (Without output option).

Four function keys

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

Demand Measurement

Measures and Displays Current Demand, kVA Demand, kW Import Demand, kW Export Demand. Any of the parameters can be assigned to optional Limit switch.

True RMS measurement

The instrument measures distorted waveform up to 15th Harmonic.

Energy Measurement (Import and Export)

Active Energy (kWh), Reactive Energy (kVArh), Apparent Energy (VAh). Any of the parameters can be assigned to optional Pulse output.

Programmable Energy format and Energy rollover count

Customer can assign the format for energy display on MODBUS (RS485) in terms of W, kW or MW. Additional to this, customer can also set a rollover count from 7 to 14 digits depending on the energy format, after which the energy will roll back to zero.

Optional: Pulse Output

The optional pulse output is a potential free, very fast acting relay contact which can be used to drive an external mechanical counter for energy measurement.

-

Optional MODBUS (RS485) Output

The optional Modbus output enables the instrument to transmit all the measured parameters over standard MODBUS (RS485).

Configuration of Instrument via MODBUS

The instrument setting can be configured locally via front panel keys by entering into the programming mode or remotely via MODBUS (RS485).

Note: The MODBUS communication parameters can only be set locally via front panel keys in programming mode.

UNIVERSAL MEASURING INSTRUMENTS

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.

3 line 4 digits LED display

Simultaneous display of 3 Parameters.

RPM Measurement

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

Energy Count Storage

In case of power failure, the instrument memorizes the last energy count. Every 1 min, the instrument updates the energy counter in the non-volatile memory.

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

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

In case of self powered TNM96-E only either 3 Phase 4 wire or single phase network are available.

Onsite selection of Auto scroll / Fixed Screen

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

Enclosure Protection for dust and water

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

EMC Compatibility

Compliance to International standard IEC 61326.

Interference Emission : IEC 61326-1 : 2012

Interference Immunity : IEC 61326-1 : 2012, Table 2

Electrostatic discharge

contact/air.(ESD): IEC 61000-4-2 - 4kV/8kV

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 cycles : IEC 61000-4-11

- 0% during 25/30 cycles.

25 cycles for 50 Hz test.

30 cycles for 60 Hz test.

Technical Specifications

Input Voltage

Nominal input voltage (AC RMS)	Phase -Neutral 290V L-N , Line-Line 500V L-L
Max continuous input voltage	120% 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 / 1A 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	120% of rated value
Nominal input current burden	< 0.2 VA approx. per phase

Auxiliary supply

External Aux	40 V - 300V AC-DC (± 5 %)
DC Auxiliary Supply	12V - 48V DC
Self powered	input voltage range from 80% to 100% of 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	< 4 VA Approx.

Overload withstand

Voltage	2 x rated value for 1 second, repeated 10 times at 10 second intervals
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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 Lag.

UNIVERSAL MEASURING INSTRUMENTS

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 / sin phi = 1 for Active / Reactive Power and Energy. 10... 100% of Nominal Current and 20... 100% of Nominal Voltage. Power Factor / Phase Angle 40... 100% of Nominal Current and 20... 100% of Nominal Voltage.
Accuracy	
Voltage	±1.0% of Nominal Value.
Current	±1.0% of Nominal Value.
Frequency	0.5% of mid frequency
Active Power	±1% of Nominal Value.
Re-Active Power	±1% of Nominal Value.
Apparent Power	±1% of Nominal Value.
Active Energy	± 1 %
Reactive Energy	± 1 %
Apparent Energy	± 1 %
Power Factor	2 % of Unity
Phase angle	2 % 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)	
Switching Voltage and Current for Relay	240 VDC ,5 A (1NO+1NC)
Influence of variations	
Temperature coefficient (for rated value range of use (0...50 °C)	0.025%/°C for Voltage 0.05%/°C for Current
Display update rate	
Response time	to step input 1 sec approx.
Applicable Standards	
EMC Immunity	IEC 61326-1: 2012, Table 2
Safety	IEC 61010-1-2001 , Permanently connected use
IP for water and dust	IEC60529
Safety	
Pollution degree	2
Installation category	III
High Voltage Test	4.7 kV DC, 50Hz for 1 minute between Aux. and measuring inputs
Environmental	
Operating temperature	0 to +50 °C
Storage temperature	-25 °C 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	IP 50.
Back	IP 20.
Dimensions and Weights	
Bezel size	96 mm x 96 mm DIN 43 718.
Panel cut-out	92 +0.8 mm x 92 + 0.8 mm.
Overall depth	55 mm.(without output option)
Panel Thickness	1 - 3 mm for self clicking, 1 - 6 mm for swivel screws.
Weight	320 gm. Approx.(with output option)

UNIVERSAL MEASURING INSTRUMENTS

Pulsed Output Option

Energy (can be programmed for different energy parameters simultaneously):

Relay contact (1NO+1NC)

Switching Voltage and current for Relay 240 VDC, 5 A

Default pulse rate divisor 1 per Wh (up to 3600W), 1 per kWh (up to 3600kWh), 1 per MWh (above 3600kW),

Other Pulse rate divisors (applicable only when Energy on RS485 is in W)

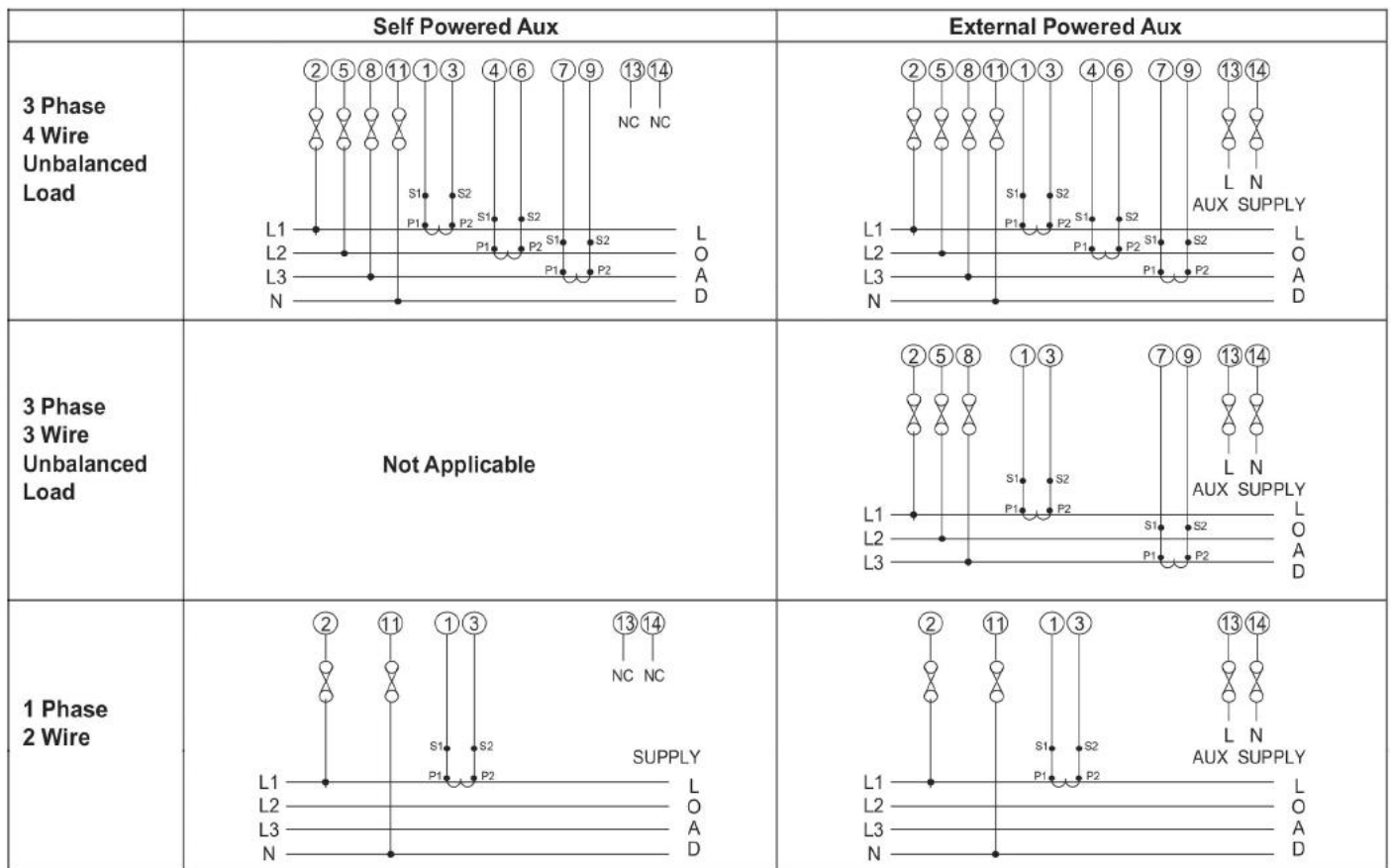
10 1 per 10 Wh (up to 3600W), 1 per 10 kWh (up to 3600kWh), 1 per 10 MWh (above 3600kW),

100 1 per 100 Wh (up to 3600W), 1 per 100 kWh (up to 3600kWh), 1 per 100 MWh (above 3600kW),

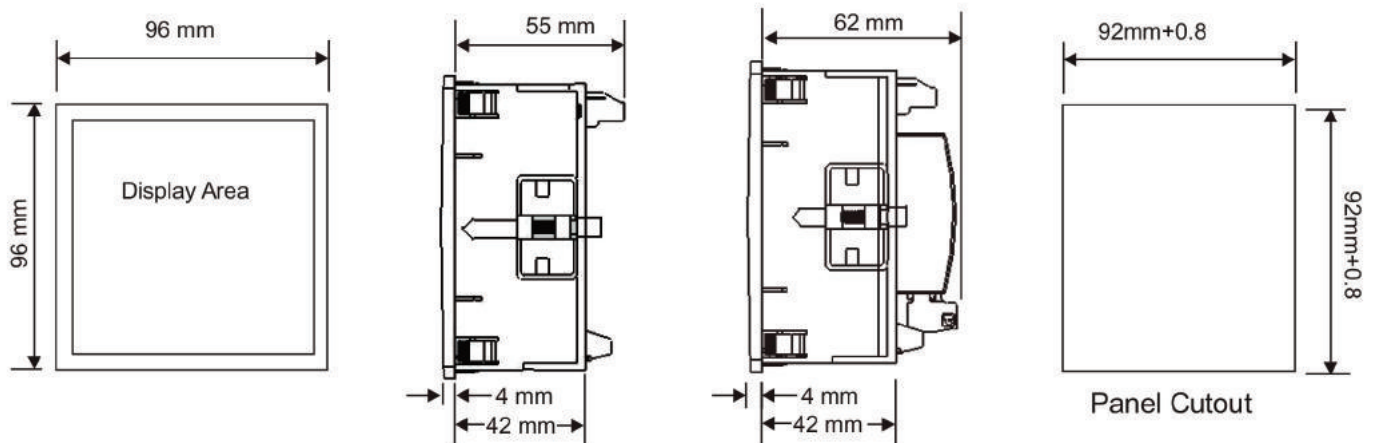
1000 1 per 1000 Wh (up to 3600W), 1 per 1000 kWh (up to 3600kWh), 1 per 1000 MWh (above 3600kW),

Pulse Duration : 60 msec, 100 msec, 200 msec. Above options are also applicable to Apparent and Reactive Energy.

Electrical connections:



Dimensions:

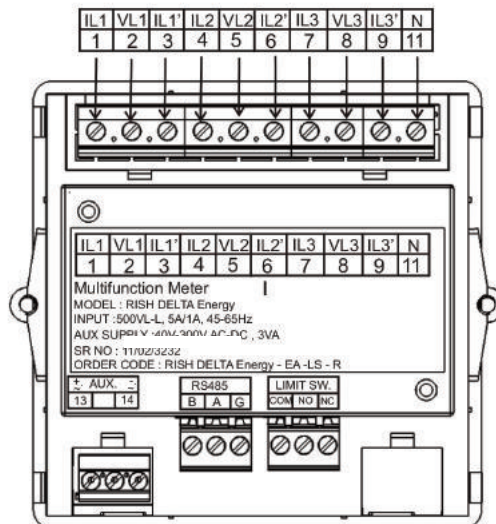


UNIVERSAL MEASURING INSTRUMENTS

No.	Parameter	3 Phase 4 Wire	3 Phase 3 Wire	1 Phase 2 Wire
1.	System Voltage	●	●	●
2.	System Current	●	●	●
3.	Voltage L1 - N (Phase voltage for single phase)	●	-	●
4.	Voltage L2 - N	●	-	-
5.	Voltage L3 - N	●	-	-
6.	Voltage L1 - L2	●	●	-
7.	Voltage L2 - L3	●	●	-
8.	Voltage L3 - L1	●	●	-
9.	Current L1 (Phase voltage for single phase)	●	●	●
10.	Current L2	●	●	-
11.	Current L3	●	●	-
12.	Frequency	●	●	●
13.	System Active Power (kW)	●	●	●
14.	Active Power L1 (phase power for single phase)	●	-	●
15.	Active Power L2	●	-	-
16.	Active Power L3	●	-	-
17.	System Re-active Power (kVar)	●	●	●
18.	Re-active Power L1 (phase power for single phase)	●	-	●
19.	Re-active Power L2	●	-	-
20.	Re-active Power L3	●	-	-
21.	System Apparent Power (kVA)	●	●	●
22.	Apparent Power L1 (phase power for single phase)	●	-	●
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.	Active energy Import (kWh)	●	●	●
34.	Active energy Export (kWh)	●	●	●
35.	Reactive energy Import (kVArh)	●	●	●
36.	Reactive energy Export (kVArh)	●	●	●
37.	Apparent energy (kVAh)	●	●	●
38.	RPM	●	●	●
39.	Max (System Voltage/ System Current)	●	●	●
40.	Min (System Voltage/ System Current)	●	●	●
41.	Hour Run	●	●	●
42.	ON Hour	●	●	●
43.	Number of auxiliary interrupt	●	●	●
44.	Current Demand	●	●	●
45.	kVA Demand	●	●	●
46.	kW Demand Import	●	●	●
47.	kW Demand Export	●	●	●
48.	Max Current Demand	●	●	●
49.	Max kVA Demand	●	●	●
50.	Max kW Demand Import	●	●	●
51.	Max kW Demand Export	●	●	●

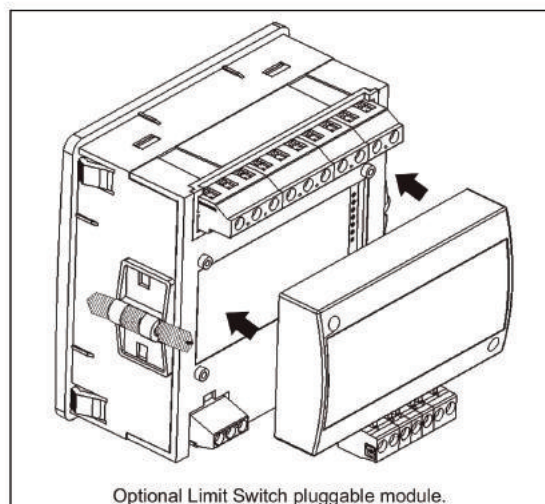
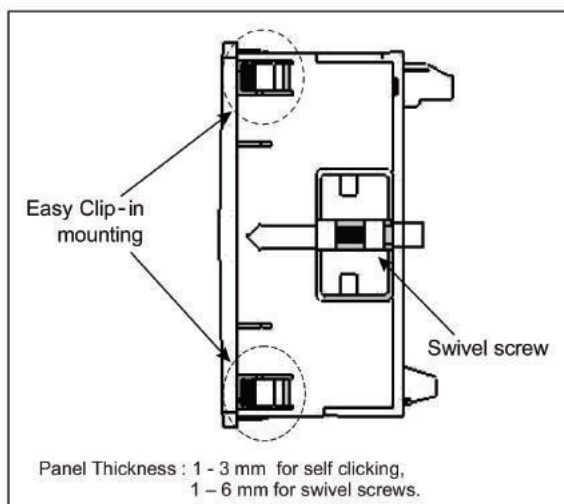
UNIVERSAL MEASURING INSTRUMENTS

Rear connection:



Installation:

Easy Clip in Installation on Panel.



Order information:

Model: TNM96E

Auxiliary Supply

Self Aux*

or 40 V - 300V AC/DC

or 12 V - 48V DC

Optional

With Pulse output (Limit switch)

or /and Output MODBUS (RS485)

Order example:

TNM96E, external aux (40V - 300V AC/DC), with pulse and MODBUS output.

* Note:

Self auxiliary meter is available only in 3Phase 4Wire and Single Phase network. Auxiliary input is derived from 1 Phase (R phase).

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