



## Digital Panel Meters



Larsen & Toubro (L&T) is a technology-driven company that infuses engineering with imagination. The Company offers a wide range of advanced solutions, in the fields of Engineering, Construction, Electrical & Automation, Machinery and Information Technology.

L&T Switchgear, which forms part of the Electrical & Automation business, is India's largest manufacturer of low voltage switchgear, with the scale, sophistication and range to meet global benchmarks. With over five decades of experience in this field, the Company today enjoys a leadership position in the Indian market with growing presence in International markets.

It offers a complete range of products including: controlgear, powergear, motor starters, energy meters, wires and host of other accessories. Most of our products conform to International standards, carry  $\text{C}\epsilon$  markings and are *KEMA* certified.

L&T manufactures and markets a comprehensive range of high quality electronic energy meters and metering solutions for utilities, industries and commercial establishments.

L&T products are designed and developed in-house and conform to relevant Indian and International standards. The products are manufactured at L&T's Mysore Campus, which is equipped with latest test facilities.

L&T through its emphasis on innovation, technology and quality is committed to support its customers with accurate, reliable and easy to use electronic metering solutions.

# CONTENT

VEGA

1



QUASAR

8



NOVA

12



ACRUX

14



GEMiNi

15



mi - ENERGY

17



## Single Function Digital Panel Meter | VEGA

- Wide operating range of auxiliary supply
- Field programmable CT/PT ratio with password protection
- Auto scaling of Kilo and Mega
- Displays average and phase quantities\*
- Ergonomic design
- Ease of installation and usage
- Standard size of 96 x 96 mm
- Auto and manual scrolling\*
- Phase indication of displayed parameter through LED\*
- Ammeter with secondary currents of 1 A and 5 A

\* Applicable to 3 Phase Meters



## VAF Digital Panel Meters | VEGA

- 3 line LED display
- Measures V, A, f and RPM
- Models with secondary current of 5 A and 1 A
- Password protected programming mode through keypad includes
  - RPM : Number of poles programmable from 2 to 16
  - CT/PT ratio
- Suitable for 50/60 Hz electrical systems
- Auto scaling of Kilo & Mega LEDs
- Rugged design for industrial use
- Compact size of 96 x 96 mm



## Multifunction Digital Panel Meters | VEGA

- 3 Line LED display
- Parameters measured - V, A, f, pf, neutral Current, phase angle, power, energy, MD kVA, MD kW, average load
- Models with secondary currents of 5 A and 1 A
- Unidirectional / bidirectional recording
- Cumulative import & export and recording of reset parameters
- Current reversal indications
- Total Harmonic Distortion (THD) display
- Programmability and communication through RS485 port
- Easy programmability through key pad
- Field programmable CT & PT ratios with password protection
- Two relays provided for tripping fault circuits on preprogrammed abnormal system conditions (Optional)
- Available in three ranges - Model A, B, C
- Auto scaling of Kilo, Mega & Giga LEDs
- Standard size of 96 x 96 mm
- Rugged design for industrial use



## Technical Specifications:

(Common for Single Function, VAF & Multi-Function Panel Meters)

| Model                                                                | VEGA                                                           |                                                                                                                          |
|----------------------------------------------------------------------|----------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|
| Auxiliary Supply                                                     | Auxiliary voltage                                              | Single function : 90 to 300 V AC                                                                                         |
|                                                                      |                                                                | VAF : 90 to 300 V AC                                                                                                     |
|                                                                      |                                                                | Multifunction : 80 to 300 V AC                                                                                           |
|                                                                      | Auxiliary burden                                               | < 4 VA                                                                                                                   |
|                                                                      | Frequency range                                                | 50 Hz $\pm$ 5%                                                                                                           |
| Measuring Circuit<br>(Parameters as applicable to individual meters) | Class of accuracy                                              | For voltage, current and energy : Class 1.0                                                                              |
|                                                                      |                                                                | For frequency : 0.2% of mid frequency                                                                                    |
|                                                                      |                                                                | (Parameters as applicable to individual meters)                                                                          |
|                                                                      | Measurement circuit burden                                     | < 0.2 VA per phase                                                                                                       |
|                                                                      | Input voltage measurement range                                | 10 V to 300 V (P-N)                                                                                                      |
|                                                                      |                                                                | 17.32 V (P-P) to 520 V (P-P)                                                                                             |
|                                                                      | Basic current                                                  | -5 A, -1 A                                                                                                               |
|                                                                      | Input current measurement range                                | 2% to 120% of basic current                                                                                              |
|                                                                      | Voltage range for class of accuracy                            | 57.7 V (P-N) to 277 V (P-N)<br>100 V (P-P) to 480 V (P-P)                                                                |
| Insulation Properties                                                | Current range for class of accuracy                            | 5% to 120% of basic current                                                                                              |
|                                                                      | Input frequency range                                          | 45 Hz to 65 Hz                                                                                                           |
|                                                                      | Impulse voltage test                                           | $\pm$ 4 kV as per IEC 62053-21                                                                                           |
| Electrical Requirements                                              | AC voltage test                                                | 4 kV double insulation as per IEC62053-21                                                                                |
|                                                                      | Insulation resistance                                          | 500 V DC as per IS 13779                                                                                                 |
|                                                                      | Test of power consumption                                      | as per IEC 62053-21                                                                                                      |
|                                                                      | Voltage dips and interrupts                                    | as per IEC 61326-1                                                                                                       |
| Electro-Magnetic Compatibility (EMC)                                 | Short time over current protection                             | For Multifunction, VAF and Ammeter :                                                                                     |
|                                                                      |                                                                | 20 times of $I_{max}$ for half a second as per 7.2 of IEC 62053-21<br>(Not applicable for Voltmeter and Frequency meter) |
|                                                                      | Fast transients burst test                                     | $\pm$ 4 kV as per IEC 61000-4-4                                                                                          |
|                                                                      | Immunity to electrostatic discharge                            | $\pm$ 8 kV air discharge, $\pm$ 6kV contact discharge as per IEC 61000-4-2                                               |
|                                                                      | Radiated, radio-frequency, electromagnetic field immunity test | 10 V/m as per 61000-4-3                                                                                                  |
|                                                                      | Immunity to electromagnetic HF fields through conducted lines  | 3 V as per IEC 61000-4-6                                                                                                 |
|                                                                      | Surge immunity test                                            | $\pm$ 4 kV as per IEC 61000-4-5                                                                                          |
| Operating Conditions                                                 | Rated power frequency magnetic fields                          | 1 A/m as per IEC 61000-4-8                                                                                               |
|                                                                      | Emission                                                       | Class B as per CISPR 22                                                                                                  |
|                                                                      | Operating temperature                                          | 0°C to +55°C                                                                                                             |
| Mechanical Tests                                                     | Storage temperature                                            | -20°C to +70°C                                                                                                           |
|                                                                      | Humidity                                                       | 0 to 95% relative humidity non-condensing                                                                                |
|                                                                      | Shock                                                          | 40 g in 3 planes                                                                                                         |
|                                                                      | Vibration                                                      | 10 to 55 Hz, 0.15 mm amplitude                                                                                           |
| Dimensions                                                           | Casing                                                         | Plastic mould protected to IP51 from front side                                                                          |
|                                                                      |                                                                |                                                                                                                          |
|                                                                      |                                                                |                                                                                                                          |
| Dimensions                                                           | Weight                                                         | Single function : 255 g (approx.)                                                                                        |
|                                                                      |                                                                | VAF : 350 g (approx.)                                                                                                    |
|                                                                      |                                                                | Multifunction : 400 g (approx.)                                                                                          |
| Dimensions                                                           | Dimensions                                                     | Single Function : 96* 96* 45 mm (approx.)                                                                                |
|                                                                      |                                                                | VAF : 96* 96* 45 mm (approx.)                                                                                            |
|                                                                      |                                                                | Multifunction : 96* 96* 65 mm (approx.)                                                                                  |

## Display Parameters

### Single Function Digital Panel Meter

| Display parameter list |              | 1Phase Voltmeter | 3 phase Voltmeter | 1Phase Ammeter | 3Phase Ammeter | Frequency Meter |
|------------------------|--------------|------------------|-------------------|----------------|----------------|-----------------|
| Voltage                | R Phase      | ✓                | ✓                 |                |                |                 |
|                        | Y Phase      |                  | ✓                 |                |                |                 |
|                        | B Phase      |                  | ✓                 |                |                |                 |
|                        | Line voltage |                  | ✓                 |                |                |                 |
|                        | Average      |                  | ✓                 |                |                |                 |
| Current                | R Phase      |                  |                   | ✓              | ✓              |                 |
|                        | Y Phase      |                  |                   |                | ✓              |                 |
|                        | B Phase      |                  |                   |                | ✓              |                 |
|                        | Average      |                  |                   |                | ✓              |                 |
| Frequency              |              |                  |                   |                |                | ✓               |

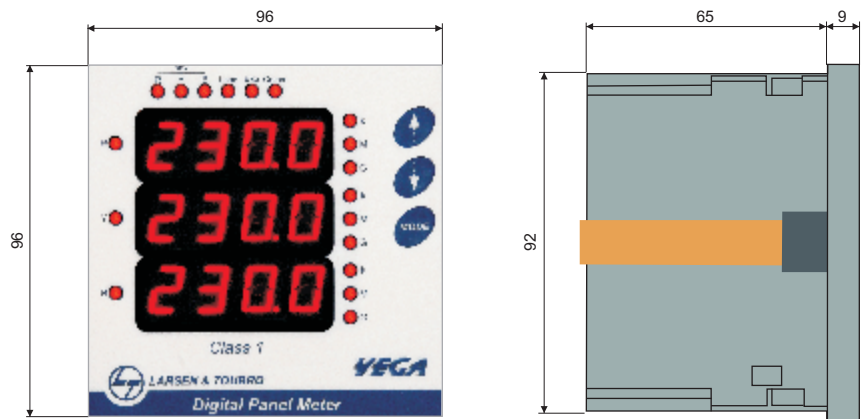
### VAF Digital Panel Meter

| Display Parameter List     |              | VAF Meter |
|----------------------------|--------------|-----------|
| Voltage                    | R Phase      | ✓         |
|                            | Y Phase      | ✓         |
|                            | B Phase      | ✓         |
|                            | Line voltage | ✓         |
|                            | Average      | ✓         |
| Current                    | R Phase      | ✓         |
|                            | Y Phase      | ✓         |
|                            | B Phase      | ✓         |
|                            | Average      | ✓         |
| Frequency                  |              | ✓         |
| RPM (Rotations per minute) |              | ✓         |

## Multifunction Digital Panel Meter

|                             | Parameters                                         | Model A | Model B | Model C |
|-----------------------------|----------------------------------------------------|---------|---------|---------|
| Instantaneous Parameters    | V1 V2 V3 $V_{avg}$ V12 V23 V31                     | ✓       | ✓       | ✓       |
|                             | A1 A2 A3 $A_{avg}$                                 | ✓       | ✓       | ✓       |
|                             | $A_n$                                              |         | ✓       | ✓       |
|                             | F                                                  | ✓       | ✓       | ✓       |
|                             | % Load                                             |         | ✓       | ✓       |
|                             | % A Unbal, % V Unbal                               | ✓       | ✓       | ✓       |
|                             | PF-1 PF-2 PF-3                                     | ✓       | ✓       | ✓       |
|                             | RPM (Rotations per minute)                         | ✓       | ✓       | ✓       |
|                             | Phase Angle $A^\circ 1 A^\circ 2 A^\circ 3$        | ✓       | ✓       | ✓       |
|                             | W1 W2 W3 $W_{sum}$                                 | ✓       | ✓       | ✓       |
|                             | VA1 VA2 VA3 $VA_{sum}$                             | ✓       | ✓       | ✓       |
|                             | VAR1 VAR2 VAR3 $VAR_{sum}$                         | ✓       | ✓       | ✓       |
| Demand/<br>Load Parameters  | Maximum demand MD VA, MD W, Max Avg A              |         | ✓       | ✓       |
|                             | Rising demand RD VA (Import & Export), RD W, Avg A |         | ✓       | ✓       |
|                             | Time remaining (Import & Export) for VA            |         | ✓       | ✓       |
|                             | Hr MD/Max occurred (VA, W, A)                      |         | ✓       | ✓       |
| Cumulative Parameters       | Import Wh                                          | ✓       | ✓       | ✓       |
|                             | Import Vah                                         | ✓       | ✓       | ✓       |
|                             | Import VARh (Lead & Lag)                           | ✓       | ✓       | ✓       |
|                             | Import run hours                                   | ✓       | ✓       | ✓       |
|                             | Export Wh                                          |         |         | ✓       |
|                             | Export Vah                                         |         |         | ✓       |
|                             | Export Varh (Lead & Lag)                           |         |         | ✓       |
|                             | Export run hours                                   |         |         | ✓       |
|                             | ON hours                                           | ✓       | ✓       | ✓       |
|                             | INTR                                               | ✓       | ✓       | ✓       |
|                             | No. of Resets                                      | ✓       | ✓       | ✓       |
| Reset MD                    | Reset MD VA                                        |         | ✓       | ✓       |
|                             | Reset MD W                                         |         | ✓       | ✓       |
|                             | Reset Max Avg A                                    |         | ✓       | ✓       |
| Reset Cumulative Parameters | Import Wh                                          | ✓       | ✓       | ✓       |
|                             | Import Vah                                         | ✓       | ✓       | ✓       |
|                             | Import Varh (Lead & Lag)                           | ✓       | ✓       | ✓       |
|                             | Import run hours                                   | ✓       | ✓       | ✓       |
|                             | Export Wh                                          |         |         | ✓       |
|                             | Export Vah                                         |         |         | ✓       |
|                             | Export Varh (Lead & Lag)                           |         |         | ✓       |
|                             | Export run hours                                   |         |         | ✓       |
| Harmonic                    | V V1 V2 V3 - harmonic                              |         |         | ✓       |
|                             | AA1 A2 A3 - harmonic                               |         |         | ✓       |
| Modbus                      | Modbus slave ID                                    | ✓       | ✓       | ✓       |
|                             | Baud rate value                                    | ✓       | ✓       | ✓       |
| Relays (Optional)           | 2 Relays for fault tripping                        | ✓       | ✓       | ✓       |

Overall Dimensions (mm)  
(Common for Single Function, VAF & Multi-Function Panel Meters)

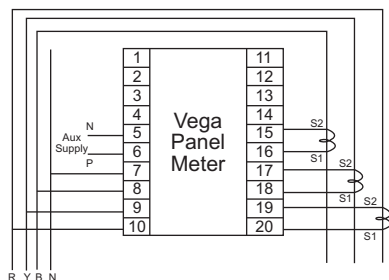


Panel Cutout Dimensions 92 mm x 92 mm  
All Dimensions are in mm

Connection Details  
Single Function Meters

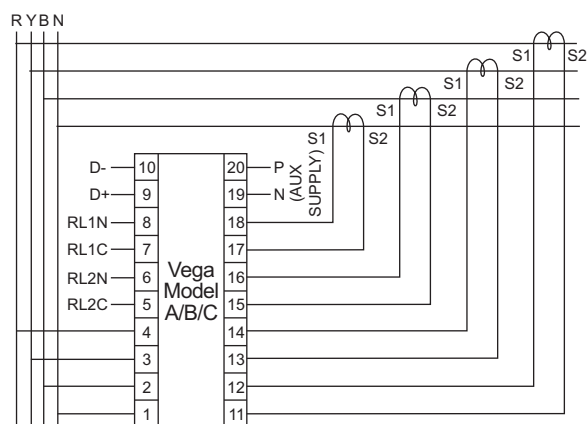
| Single Phase Voltmeter                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Three Phase Voltmeter                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Wiring diagram for a Single Phase Voltmeter. The meter has 20 terminals. Terminals 1, 2, 3, 4, 5, 6, 7, 8, 9, and 10 are on the left. Terminals 11, 12, 13, 14, 15, 16, 17, 18, 19, and 20 are on the right. Terminals 17, 18, and 19 are labeled N, P, and (AUX. SUPPLY) respectively. The diagram shows connections for Line (L) and Neutral (N) to terminals 12 and 13, and for the auxiliary supply to terminals 18 and 19.</p>                                                                               | <p>Wiring diagram for a Three Phase Voltmeter. The meter has 20 terminals. Terminals 1, 2, 3, 4, 5, 6, 7, 8, 9, and 10 are on the left. Terminals 11, 12, 13, 14, 15, 16, 17, 18, 19, and 20 are on the right. Terminals 17, 18, and 19 are labeled N, P, and (AUX. SUPPLY) respectively. The diagram shows connections for three phases (R, Y, B) and Neutral (N) to terminals 12, 13, 14, and 15, and for the auxiliary supply to terminals 18 and 19.</p>                                                                                                         |
| Single Phase Ammeter                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Three Phase Ammeter                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <p>Wiring diagram for a Single Phase Ammeter. The meter has 20 terminals. Terminals 1, 2, 3, 4, 5, 6, 7, 8, 9, and 10 are on the left. Terminals 11, 12, 13, 14, 15, 16, 17, 18, 19, and 20 are on the right. Terminals 17, 18, and 19 are labeled N, P, and (AUX. SUPPLY) respectively. The diagram shows connections for Line (L) and Neutral (N) to terminals 12 and 13, and for the auxiliary supply to terminals 18 and 19. It also shows current sensing connections S1 and S2 across terminals 12 and 13.</p> | <p>Wiring diagram for a Three Phase Ammeter. The meter has 20 terminals. Terminals 1, 2, 3, 4, 5, 6, 7, 8, 9, and 10 are on the left. Terminals 11, 12, 13, 14, 15, 16, 17, 18, 19, and 20 are on the right. Terminals 17, 18, and 19 are labeled N, P, and (AUX. SUPPLY) respectively. The diagram shows connections for three phases (R, Y, B) and Neutral (N) to terminals 12, 13, 14, and 15, and for the auxiliary supply to terminals 18 and 19. It also shows current sensing connections S1 and S2 across terminals 12 and 13, 14 and 15, and 16 and 17.</p> |
| Frequency Meter                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <p>Wiring diagram for a Frequency Meter. The meter has 20 terminals. Terminals 1, 2, 3, 4, 5, 6, 7, 8, 9, and 10 are on the left. Terminals 11, 12, 13, 14, 15, 16, 17, 18, 19, and 20 are on the right. Terminals 17, 18, and 19 are labeled N, P, and (AUX. SUPPLY) respectively. The diagram shows connections for Line (L) and Neutral (N) to terminals 12 and 13, and for the auxiliary supply to terminals 18 and 19.</p>                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |

## VAF Meters

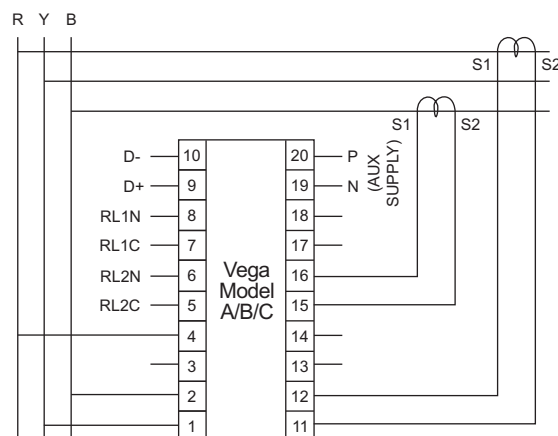


## Multifunction Meters

### 3 Phase 4 Wire



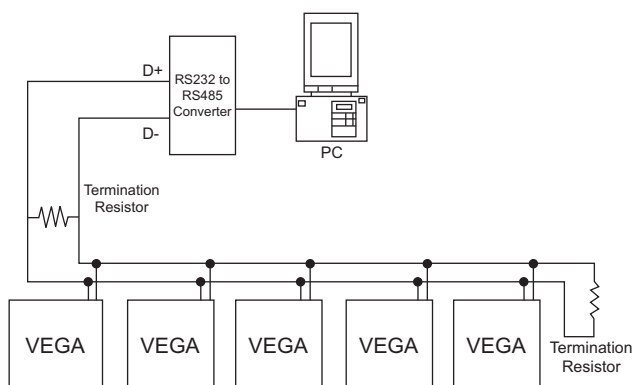
### 3 Phase 3 Wire



### Note:

- Connection of point 17 and 18 is not applicable for Model A
- D- and D+ are for communication using RS485
- RL1 and RL2 are relay connections

## RS485 Connection Diagram



## Ordering Information

### Single Function Meters

| Type of Meter                      | 1 Phase / 3 Phase | Cat. No.    |
|------------------------------------|-------------------|-------------|
| <b>Voltmeter</b>                   | 1 Phase Meters    | WDS101FEV00 |
|                                    | 3 Phase Meters    | WDS301FEV00 |
| <b>Ammeter<br/>(5 A secondary)</b> | 1 Phase Meters    | WDS101FCA00 |
|                                    | 3 Phase Meters    | WDS301FCA00 |
| <b>Ammeter<br/>(1 A secondary)</b> | 1 Phase Meters    | WDS101OCA00 |
|                                    | 3 Phase Meters    | WDS301OCA00 |
| <b>Frequency Meter</b>             |                   | WDS121FCF00 |

### VAF Meters

| Type                                       | Current Rating | Cat. No.    |
|--------------------------------------------|----------------|-------------|
| <b>VAF Meters<br/>90-300 V Aux. Supply</b> | 5 A            | WDV303FC000 |
|                                            | 1 A            | WDV303OC000 |

### Multifunction Meters

| Type of Meter  | Current Rating | Relay         | Cat. No.    |
|----------------|----------------|---------------|-------------|
| <b>Model A</b> | <b>5 A</b>     | With Relay    | WDM303FDWA0 |
|                |                | Without Relay | WDM303FDWA1 |
|                | <b>1 A</b>     | With Relay    | WDM303ODWA0 |
|                |                | Without Relay | WDM303ODWA1 |
| <b>Model B</b> | <b>5 A</b>     | With Relay    | WDM303FDNB0 |
|                |                | Without Relay | WDM303FDNB1 |
|                | <b>1 A</b>     | With Relay    | WDM303ODNB0 |
|                |                | Without Relay | WDM303ODNB1 |
| <b>Model C</b> | <b>5 A</b>     | With Relay    | WDM303FDNC0 |
|                |                | Without Relay | WDM303FDNC1 |
|                | <b>1 A</b>     | With Relay    | WDM303ODNC0 |
|                |                | Without Relay | WDM303ODNC1 |

## Intelligent Panel Meter | QUASAR

The meter is designed with DSP technology to combine measurement of both instantaneous and cumulative values in an electrical feeder. The parameters are displayed over 22 screens that can be scrolled up & down by front panel push buttons.

- Class 0.5 & 1.0 as per IS & IEC standards
- kWh, kVarh & kVAh
- LCD with back light
- CT/PT ratio programming
- RS485 communication
- Phase sequence
- Harmonic measurement



## Technical Specifications:

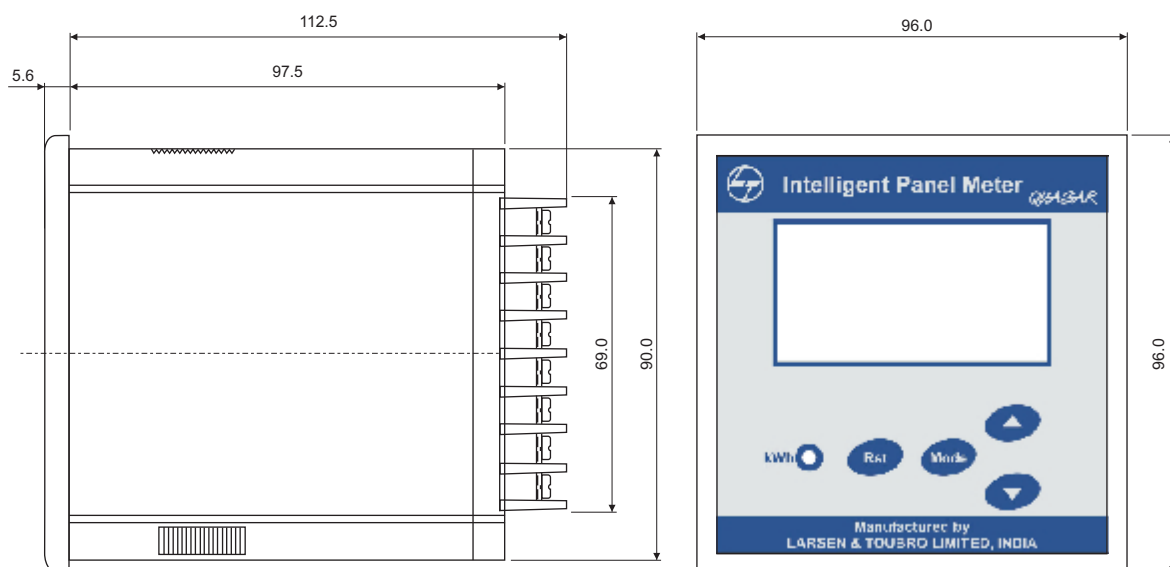
| Model                                 | QUASAR                                                                                      |                                  |
|---------------------------------------|---------------------------------------------------------------------------------------------|----------------------------------|
| Accuracy                              | For power                                                                                   | Class 1.0                        |
|                                       | IEC 62052-11, 62053-21/ IS 13779                                                            |                                  |
|                                       | For voltage                                                                                 | ±10%                             |
|                                       | For current                                                                                 | 0.5% of readout ± 2 digits       |
| Voltage (Vn)                          | 3 Ph 4 W- 415 V AC (-40% to +20%)                                                           |                                  |
|                                       | 3 Ph 4 W- 110 V AC (-40% to +20%)                                                           |                                  |
|                                       | 3 Ph 3 W- 110 V AC (-40% to +20%)                                                           |                                  |
| Current (In)                          | 5 A or 1 A ( $I_{\max} = 2I_n$ )                                                            |                                  |
| Starting Current                      | 0.2% in (Class 1.0)                                                                         |                                  |
| Frequency                             | 50 Hz ±5%                                                                                   |                                  |
| Load Characteristics                  | < 8 VA in potential circuit                                                                 |                                  |
|                                       | < 0.5 VA in current circuit                                                                 |                                  |
| Electromagnetic Compatibility:        |                                                                                             |                                  |
| Electrical Fast Transient             | As Per IEC 62052-11, 62053-21, Test Level: 4 kV, 5k Hz                                      |                                  |
| Surge Immunity                        | As Per IEC 62052-11, 62053-21, Test Level: 4 kV                                             |                                  |
| Influence of Short Time Over Currents | 20 times $I_{\max}$ for 0.5 sec at rated frequency. As per IEC 62053-21                     |                                  |
| Case Material                         | Plastic moulded protected to IP51- IEC 62052-11, 62053-21/IS 13779 (Class 1.0) (with panel) |                                  |
| Insulation Properties:                |                                                                                             |                                  |
| Insulation Resistance                 | As per IEC 62052-11, 62053-21 / IS 13779 (Class 1.0)                                        |                                  |
| AC voltage Test                       | 2 kV AC RMS, 50 Hz for 1 minute as per IEC 62052-11                                         |                                  |
| Impulse Voltage                       | 6 kV, 1.2/50μ sec, as per IEC 62052-11                                                      |                                  |
| Voltage Dips and Interrupts           | As per IEC 61000-4-11                                                                       |                                  |
| Display                               | Backlit LCD, 10 mm height digits                                                            |                                  |
| Pulse Output                          | Pulses/kWh                                                                                  | Voltage/Current                  |
|                                       | 2,500 / (external CT* PT)                                                                   | 3 Ph 4 W 415 V (L-L) / 5 A       |
|                                       | 12,500 / (external CT* PT)                                                                  | 3 Ph 4 W 415 V (L-L) / 1 A       |
|                                       | 10,000 / (external CT* PT)                                                                  | 3 Ph 4 W / 3 W 110 V (L-L) / 5 A |
|                                       | 50,000 / (external CT* PT)                                                                  | 3 Ph 4 W / 3 W 110 V (L-L) / 1 A |
| Temperature                           | -10°C to 60°C for operation                                                                 |                                  |
|                                       | -20°C to 70°C for storage                                                                   |                                  |
| Humidity                              | 95% RH non condensing                                                                       |                                  |
| Dimension                             | 96 x 96 mm - depth 105 mm                                                                   |                                  |
| Weight                                | < 600 gms                                                                                   |                                  |

## Display Parameters:

|           |       |                           |
|-----------|-------|---------------------------|
| Screen 1  | ----- | V, A, kW                  |
| Screen 2  | ----- | R-Y-B Voltages            |
| Screen 3  | ----- | R-Y-B Currents            |
| Screen 4  | ----- | R-Y-B kW                  |
| Screen 5  | ----- | R-Y-B kVAr                |
| Screen 6  | ----- | R-Y-B kVA                 |
| Screen 7  | ----- | R-Y-B pF                  |
| Screen 8  | ----- | R-Y-B Volt angles         |
| Screen 9  | ----- | R-Y-B Phase angles        |
| Screen 10 | ----- | kW+kVAr+kVA               |
| Screen 11 | ----- | Pd+pF+F                   |
| Screen 12 | ----- | kWh                       |
| Screen 13 | ----- | kVArh (L)                 |
| Screen 14 | ----- | kVArh (C)                 |
| Screen 15 | ----- | kVAh                      |
| Screen 16 | ----- | R ph. Voltage - Harmonics |
| Screen 17 | ----- | Y ph. Voltage - Harmonics |
| Screen 18 | ----- | B ph. Voltage - Harmonics |
| Screen 19 | ----- | R ph. Current - Harmonics |
| Screen 20 | ----- | Y ph. Current - Harmonics |
| Screen 21 | ----- | B ph. Current - Harmonics |

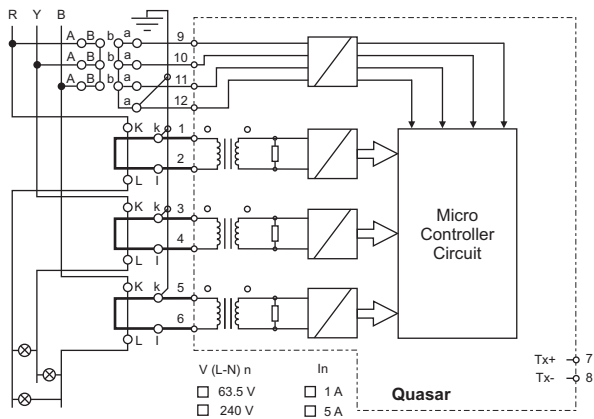
## Overall Dimensions (mm)

### Panel Cutout 92 x 92 mm

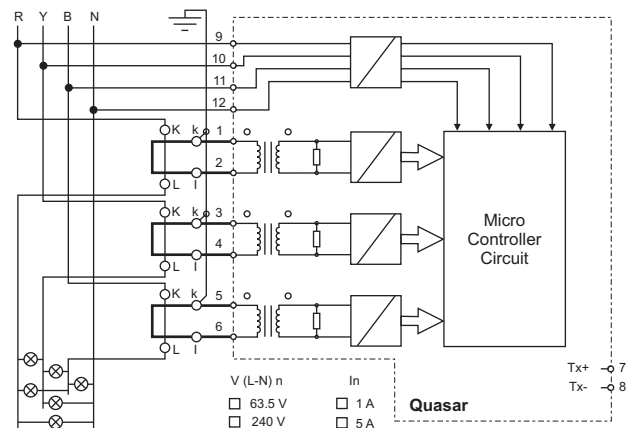


## Connection Details (Wiring Diagram)

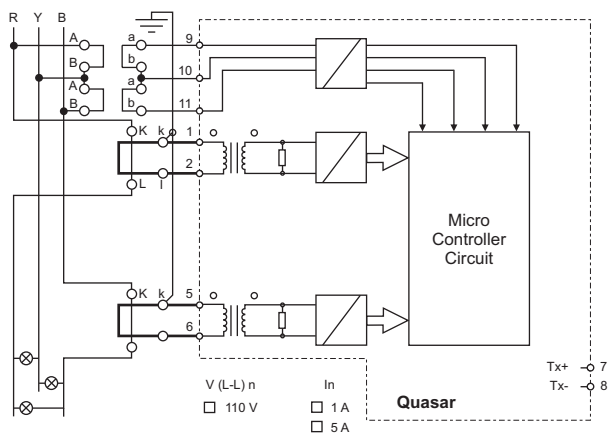
### 3 Ph. 4 Wire with CT & PT



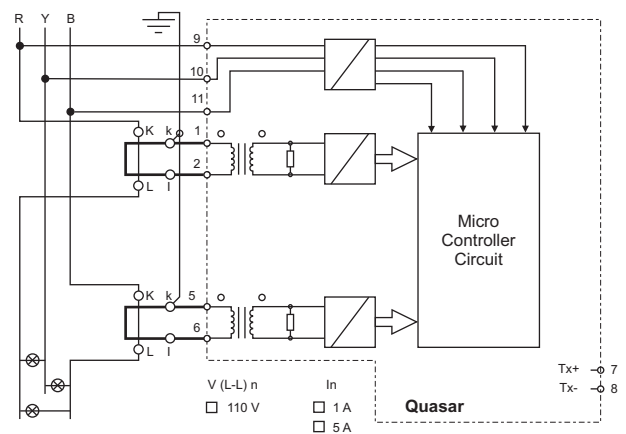
### 3 Ph. 4 Wire with CT & without PT



### 3 Ph. 3 Wire with CT & PT



### 3 Ph.3 Wire with CT & without PT



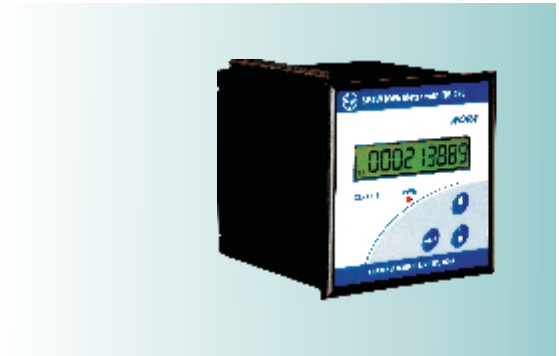
## Ordering Information

| Accuracy  | Type      | Voltage      | Secondary Current | RS485 | Cat. No.    |
|-----------|-----------|--------------|-------------------|-------|-------------|
| Class 1   | 3 Ph, 4 W | 240 V ( L-N) | 1 A               |       | WI300FC1300 |
|           |           |              |                   | ✓     | WI300FC13RS |
|           |           |              | 5 A               |       | WI300FC5300 |
|           |           |              |                   | ✓     | WI300FC53RS |
|           | 3 Ph, 3 W | 110 V ( L-L) | 1 A               |       | WI301FC1300 |
|           |           |              |                   | ✓     | WI301FC13RS |
|           |           |              | 5 A               |       | WI301FC5300 |
|           |           |              |                   | ✓     | WI301FC53RS |
|           | 3 Ph, 4 W |              | 1 A               |       | WI300FB1300 |
|           |           |              |                   | ✓     | WI300FB13RS |
|           |           |              | 5 A               |       | WI300FB5300 |
|           |           |              |                   | ✓     | WI300FB53RS |
| Class 0.5 | 3 Ph, 4 W | 240 V ( L-N) | 1 A               |       | WI300FC1200 |
|           |           |              |                   | ✓     | WI300FC12RS |
|           |           |              | 5 A               |       | WI300FC5200 |
|           |           |              |                   | ✓     | WI300FC52RS |
|           | 3 Ph, 3 W | 110 V ( L-L) | 1 A               |       | WI301FC1200 |
|           |           |              |                   | ✓     | WI301FC12RS |
|           |           |              | 5 A               |       | WI301FC5200 |
|           |           |              |                   | ✓     | WI301FC52RS |
|           | 3 Ph, 4 W |              | 1 A               |       | WI300FB1200 |
|           |           |              |                   | ✓     | WI300FB12RS |
|           |           |              | 5 A               |       | WI300FB5200 |
|           |           |              |                   | ✓     | WI300FB52RS |

## Three phase MFM | NOVA

Nova is a compact, digital, panel mount meter for kWh measurement. Nova is flush mount 3 Phase 4 Wire CT operated kWh meter with RS485 MODBUS communication.

- Accuracy class - 1.0
- Measures kWh & kW
- Forwarded energy registration in case of current reversal
- Phase wise Voltage, Current & Power on display
- Average Voltage & Current on display
- Phase sequence on display
- RS485 MODBUS communication
- Auto & manual display mode
- User friendly menu driven LCD display
- Field programmable CT/PT ratio
- Customised LCD display & Push Button navigation
- Scroll lock feature for locking of a desired parameter on display
- Low CT/PT burden
- High resolution energy
- Auxiliary supply 88 V to 300 V AC/DC



## Technical Specifications:

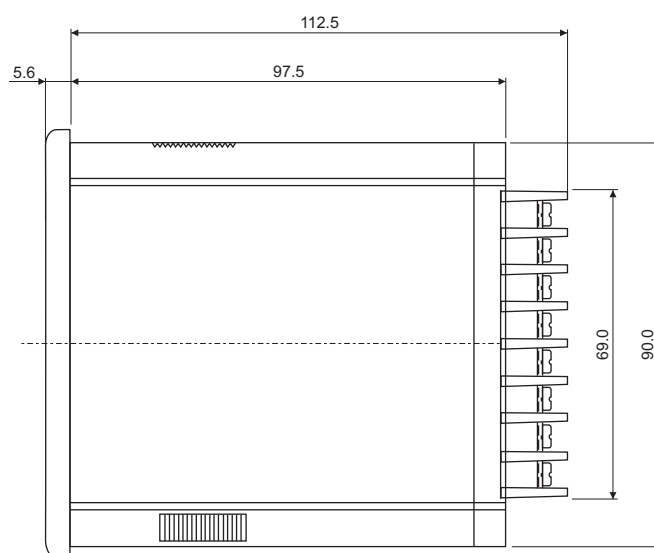
| Model                 | NOVA                                                    |
|-----------------------|---------------------------------------------------------|
| Enclosure             | Engineering plastic complying to IP51                   |
| Dimension             | 96 x 96 mm x 105 mm (HxWxD)<br>Panel cutout: 92 x 92 mm |
| Connection            | 3P 4W                                                   |
| Display               | Backlit LCD                                             |
| Type                  | kWh Meter                                               |
| Measurements          | kWh / kW / Frequency / Voltage / Current                |
| Starting Current      | 0.2% of rated current (5 A)                             |
| Class of Accuracy     | Class 1.0                                               |
| Current               | 5 A (rated), 10 A (max)                                 |
| Voltage (P-N)         | 3 x 240 V (-30 % to +20 % of V Ref)                     |
| Frequency             | 50 Hz $\pm$ 5%                                          |
| Auxiliary Supply      | 88 V to 300 V AC/DC                                     |
| Weight                | 450 gm $\pm$ 5%                                         |
| Weight with Packaging | 610 gm $\pm$ 5%                                         |

## Display Parameters:

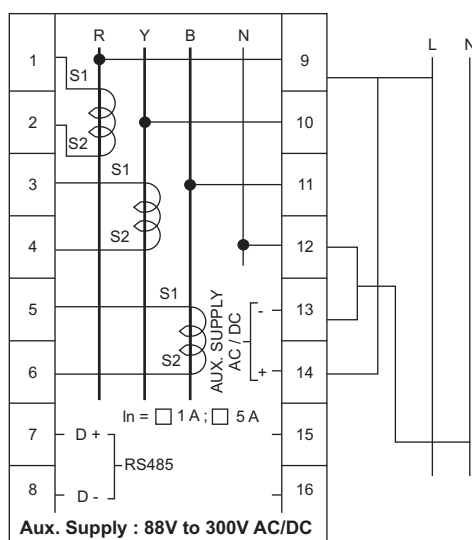
- Cumulative EB energy kWh
- Average voltage
- Average current
- Total active power
- Frequency
- Power factor
- R Phase voltage
- Y Phase voltage
- B Phase voltage
- R Phase current
- Y Phase current
- B Phase current
- R Phase active power
- Y Phase active power
- B Phase active power
- Phase sequence

## Overall Dimensions (mm)

Panel Cutout 92 x 92 mm



## Connection Details



- Meter connection should be done exactly as shown in above diagrams
- Make the CT connections on terminals 1-2 (R-Ph), 3-4 (Y-Ph) and 5-6 (B-Ph)
- Make the PT connections on the terminals 9 (R), 10 (Y), 11 (B) and 12 (N)
- Connect the Auxiliary Supply (88 V to 300 V AC/DC) to the terminals 13 (-ve) and 14 (+ve) to power ON the meter; it can be done by shorting one phase with auxiliary as shown in the above picture

## Ordering Information

| Cat. No.    | Description                                                        |
|-------------|--------------------------------------------------------------------|
| WM30KFC3CRS | 3 Ph 4 W 240 V 5 A with RS485 ( kWh meter with RS485 port ) - Nova |

## Counter Type kWh Meter | ACRUX

This is an ideal product for control panels to measure kWh energy. Compactness of the meter ensures that it will fit in smartly into any panel. L&T offers this product in 3 phase 4 wire.

- Class 1.0 accuracy
- Active energy measurement
- Stepper motor counter display
- Pulse output LED
- Terminal covers with sealing provision



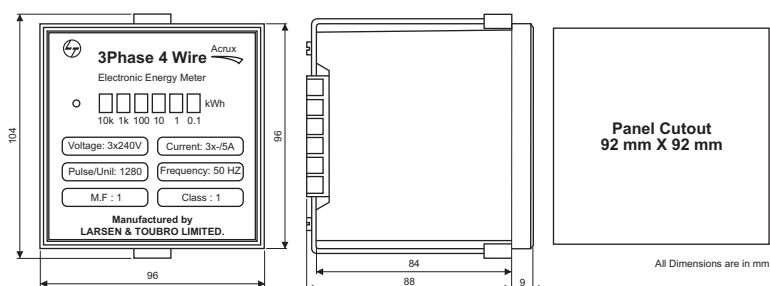
## Technical Specifications:

| Model                 | ACRUX                         |
|-----------------------|-------------------------------|
| Accuracy              | Class 1.0 as per IS 13779     |
| Voltage Rating        | 240 V (3 Phase 4 Wire)        |
| Current Rating (Ib)   | 5 A & 1 A                     |
| Frequency             | 50 Hz $\pm$ 5%                |
| Maximum Current       | 200% of Ib                    |
| Starting Current      | 0.4% of Ib                    |
| Operating Temperature | 0 to 55°C                     |
| Display               | 6 Digit stepper motor counter |
| Enclosure             | Polycarbonate                 |
| Weight                | 500 g (approximate)           |
| Mounting              | Flush mounting                |

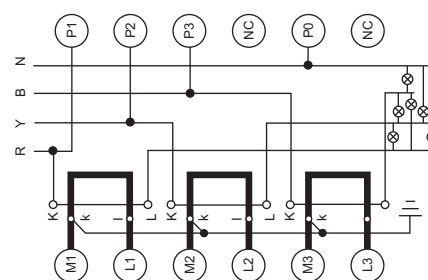
## Display Parameters:

Cumulative Energy kWh

## Overall Dimensions (mm)



## Connection Details



3 P 4 W with CT 240 V-1 A & 5 A

## Ordering Information

| Cat. No.    | Description                                         |
|-------------|-----------------------------------------------------|
| WM301FC1C10 | 3 Ph 4 W 240 V 1 A (kWh meter counter type) - Acrux |
| WM301FC3C10 | 3 Ph 4 W 240 V 5 A (kWh meter counter type) - Acrux |

## Dual Source Meter | GEMiNi

An innovative panel meter designed for dual source energy measurement. It serves as a replacement for two separate energy meters necessary for metering same application with dual energy sources.

- Class 1.0 accuracy as per IS & IEC standards
- Dual energy register for dual energy source
- RS485 MODBUS communication
- Field programmable CT, PT Values & Meter ID



## Technical Specifications:

| Model                 | GEMiNi                                                  |
|-----------------------|---------------------------------------------------------|
| Enclosure             | Engineering plastic complying to IP51                   |
| Dimension             | 96 x 96 mm x 105 mm (HxWxD)<br>Panel cutout: 92 x 92 mm |
| Connection            | 3 P 4 W                                                 |
| Display               | Backlit LCD                                             |
| Type                  | kWh Meter                                               |
| Measurements          | kWh / kW / Frequency / Voltage / Current                |
| Starting Current      | 0.2% of rated current (5 A)                             |
| Class of Accuracy     | Class 1.0                                               |
| Current               | 5 A (rated), 10 A (max)                                 |
| Voltage (P-N)         | 3 x 240 V (-30 % to +20 % of V Ref)                     |
| Frequency             | 50 Hz $\pm$ 5%                                          |
| Auxiliary Supply      | 88 V to 300 V AC/DC                                     |
| DG Sensing Input      | 18 V-60 V DC/80 V-300 V AC                              |
| Weight                | 470 gm $\pm$ 5%                                         |
| Weight with Packaging | 630 gm $\pm$ 5%                                         |

## Dual Energy Registers:

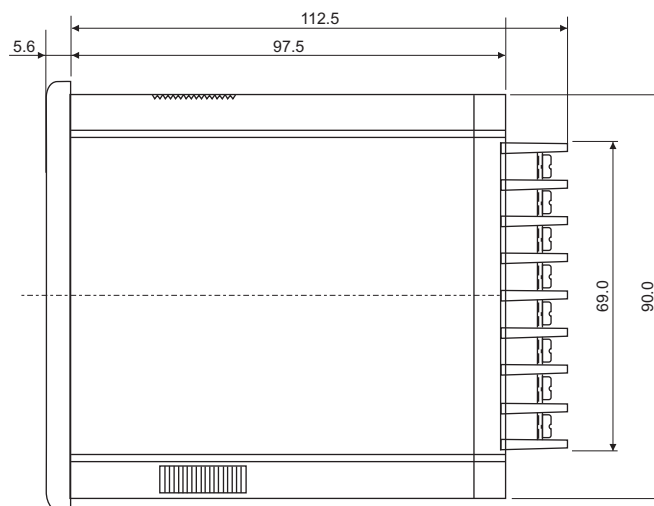
Two separate energy registers are provided, one for EB (Electricity Board supply) and another for G (Generator Supply). Normally meter accumulates energy in EB register. Whenever the DG sensing signal (18 to 60 V DC / 80 to 300 V AC) is present, meter accumulates energy in G register. Separate LED indication is provided on the meter front Panel, which glows when DG sensing signal is present.

## Display Parameters:

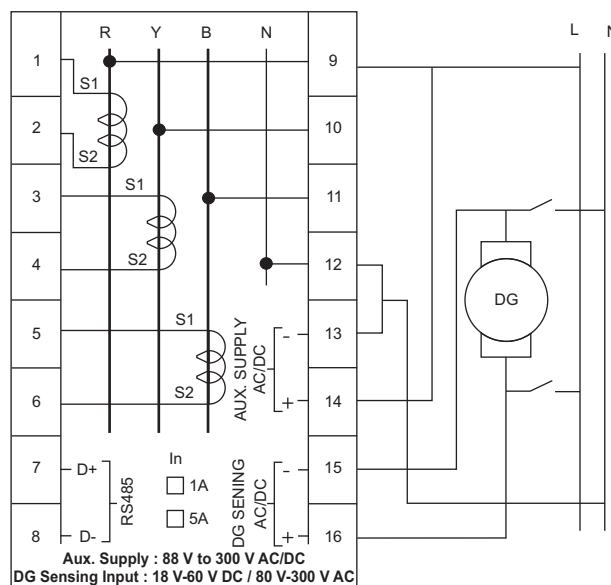
- Cumulative EB energy kWh
- Cumulative gen. energy kWh
- Average voltage
- Average current
- Total active power
- Frequency
- R Phase voltage
- Y Phase voltage
- B Phase voltage
- R Phase current
- Y Phase current
- B Phase current
- R Phase active power
- Y Phase active power
- B Phase active power
- Phase sequence

## Overall Dimensions (mm)

Panel Cutout 92 x 92 mm



## Connection Details



- Meter connection should be done exactly as shown in above diagram
- Make the CT connections on terminals 1-2 (R-Ph), 3-4 (Y-Ph) and 5-6 (B-Ph)
- Make the PT connections on the terminals 9 (R), 10 (Y), 11 (B) and 12 (N)
- Connect the Auxiliary Supply (88 V to 300 V AC/DC) to the terminals 13 (-ve) and 14 (+ve) to power ON the meter; it can be done by shorting one phase with auxiliary as shown in the above picture
- Connect the DG sensing input (18 V-60 V DC/80 V-300 V AC) on terminal 15 (-ve) & 16 (+ve)

## Ordering Information

| Cat. No.    | Description                                                    |
|-------------|----------------------------------------------------------------|
| WM30DFC3CRS | 3 Ph 4 W 240 V 5 A with RS485 (Dual source kWh meter) - GEMiNi |

## mi-ENERGY

mi-ENERGY is L&T's DIN rail mounted meter. Available in 3 phase and 1 phase models, these meters can be mounted inside distribution boxes to monitor electric consumption of identified loads, circuits and areas.

- LCD display
  - Class 2 accuracy
  - Displays day, week, month and push-to-push kWh consumption
  - Push Button for parameter scrolling
  - Low starting current
  - Reverse current indication\*
  - Compact size and easy mounting
- \* For 3 Phase Meter



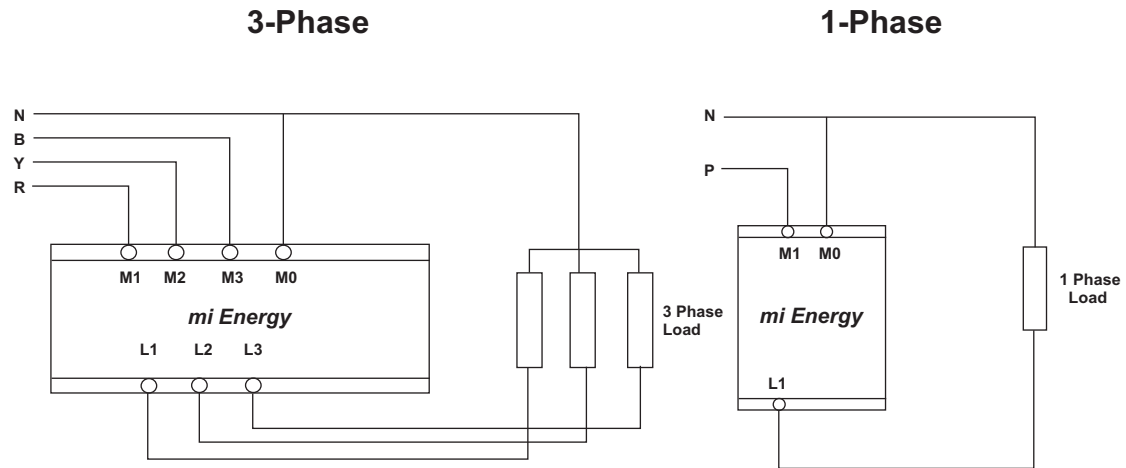
## Display Parameters

| Parameters               |                | 3-Phase Meter | 1-Phase Meter |
|--------------------------|----------------|---------------|---------------|
| Instantaneous Parameters | Phase voltage  | ✓             | ✓             |
|                          | Phase current  | ✓             | ✓             |
|                          | Power factor   | ✓             |               |
|                          | Active power   | ✓             | ✓             |
|                          | Reactive power | ✓             |               |
|                          | Apparent power | ✓             |               |
|                          | Frequency      | ✓             |               |
| Maximum Demand           | Present month  | ✓             |               |
|                          | Previous month | ✓             |               |
| kWh Consumption          | Total          | ✓             | ✓             |
|                          | Present day    | ✓             | ✓             |
|                          | Present week   | ✓             | ✓             |
|                          | Present month  | ✓             | ✓             |
|                          | Push-to-push   | ✓             | ✓             |
|                          | Previous day   | ✓             | ✓             |
|                          | Previous week  | ✓             | ✓             |
|                          | Previous month | ✓             | ✓             |

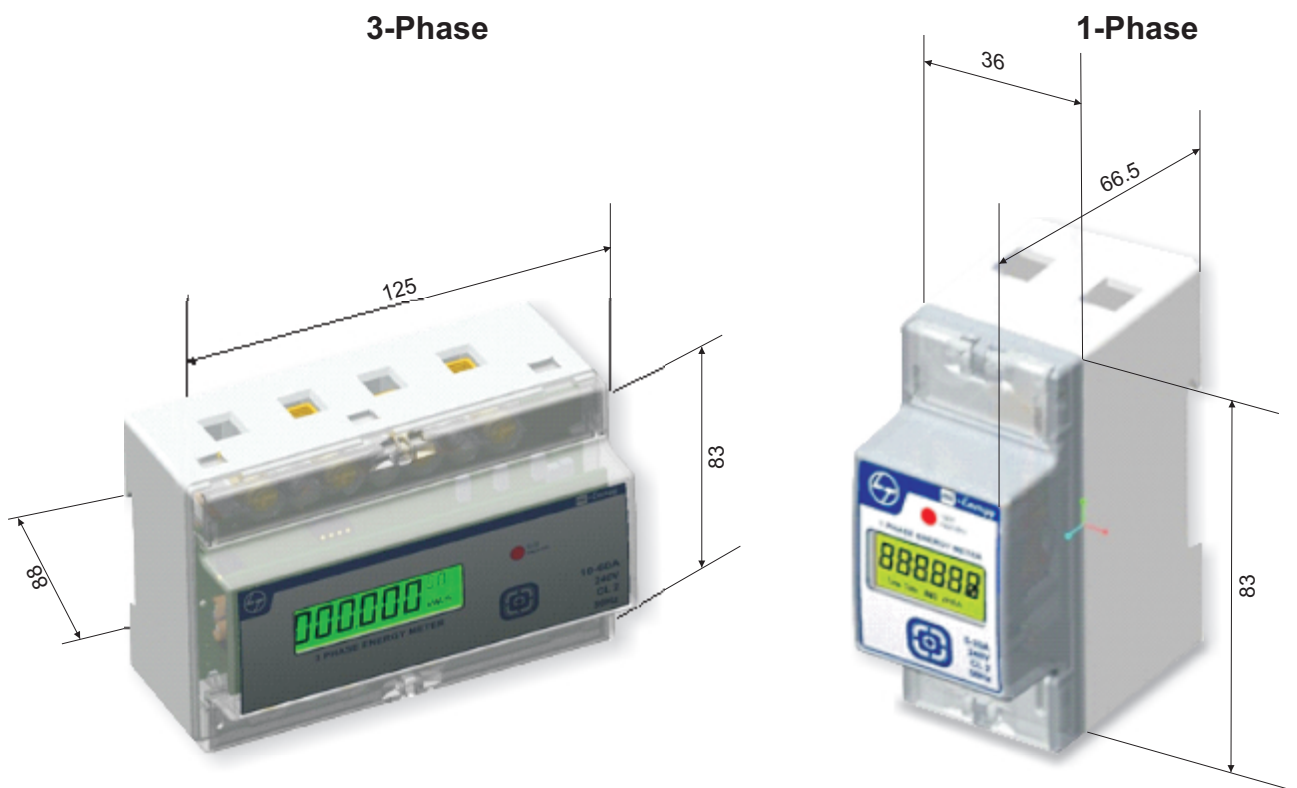
## Technical Specifications:

|                                      |                                                |                                                                                            |
|--------------------------------------|------------------------------------------------|--------------------------------------------------------------------------------------------|
| Display                              | Type                                           | 6 digit LCD                                                                                |
|                                      | Height                                         | 6 mm (10 mm in case of 3 Phase meter)                                                      |
| Measuring Circuit                    | Class of accuracy                              | Class 2 as per IEC 62053-21                                                                |
|                                      | Measurement circuit burden                     | <1 W, <8 VA                                                                                |
|                                      | Rated Voltage                                  | 240 V                                                                                      |
|                                      | Current                                        | 3 phase: 10-60 A<br>1 phase: 5-30 A                                                        |
|                                      | Starting current                               | 3 phase: 40 mA<br>1 phase: 20 mA                                                           |
|                                      | Voltage range for class of accuracy            | -30% to +20% of rated voltage                                                              |
|                                      | Current range for class of accuracy            | 5% $I_b$ to $I_{max}$                                                                      |
|                                      | Input frequency range                          | 50 Hz $\pm$ 5%                                                                             |
| Insulation Properties                | Impulse voltage test                           | $\pm$ 6 kV as per IEC 62052-11                                                             |
|                                      | AC voltage test                                | 4 kV double insulation as per IEC 62053-21                                                 |
|                                      | Insulation resistance                          | 500 V DC as per IS 13779                                                                   |
| Electrical Requirements              | Test of power consumption                      | IEC 62053-21                                                                               |
|                                      | Voltage dips and interrupts                    | IEC 62052-11                                                                               |
|                                      | Short timeover current protection              | 20 times of $I_{max}$ for half a second as per IEC 62053-21                                |
| Electro-Magnetic Compatibility (EMC) | Fast transients burst test                     | IEC 61000-4-4                                                                              |
|                                      | Immunity to electrostatic discharge            | IEC61000-4-2                                                                               |
|                                      | Immunity to electromagnetic HF fields          | IEC61000-4-3                                                                               |
|                                      | Immunity to conducted disturbances by RF field | IEC61000-4-6                                                                               |
|                                      | Surge immunity test                            | $\pm$ 4 kV as per IEC 61000-4-5                                                            |
| Climatic Test                        | Dry heat test                                  | IS 9000 (part 3)                                                                           |
|                                      | Cold test                                      | IS 9000 (part 2)                                                                           |
|                                      | Damp heat cyclic test                          | IS 9000 (part 5)                                                                           |
| Operating Conditions                 | Operating temperature                          | -10°C to +55°C                                                                             |
|                                      | Storage temperature                            | -20°C to +70°C                                                                             |
| Mechanical Tests                     | Shock                                          | IS 9000 (part 7)                                                                           |
|                                      | Vibration                                      | IS 9000 (part 8)                                                                           |
|                                      | Resistance to dust and water                   | IP20                                                                                       |
| Dimensions                           | Weight                                         | 3 phase: 460 g (approx.)<br>1 phase: 150 g (approx.)                                       |
|                                      | Dimensions                                     | 3 phase: 125 mm x 83 mm x 63.5 mm (approx.)<br>1 Phase: 36 mm x 83 mm x 66.73 mm (approx.) |

## Wiring Diagram



## Dimensional Details



All Dimensions in mm

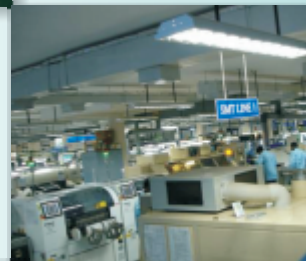
## Ordering Information

|                              |                    |
|------------------------------|--------------------|
| 3 phase 4 wire 240 V 10-60 A | <b>W4DLD100600</b> |
| 1 phase 2 wire 240 V 5-30 A  | <b>W2DLD050600</b> |

L&T's manufacturing facility at Mysore is equipped with the latest test equipment including environmental test chambers, comprehensive EMI/EMC setups and high energy lightning surge test facilities. Here our products are constantly tested for function, accuracy, insulation, response to climatic conditions, EMI/EMC and mechanical requirements. Incoming inspection of electrical and mechanical components, field failure analysis, calibration of in-house equipment, outgoing inspection and validation of meter software & base computer software is done at the lab.

## TEST SETUPS

- Dry Heat Chamber
- Rain Chamber
- Climatic Chamber
- Dust Chamber
- Electrostatic Discharge Simulator
- Electrical Fast Transient Simulator
- Lighting Surge Simulator
- Damped Oscillator Simulator
- Conducted Wave Simulator
- Vibration Shaker System
- AC Voltage Tester
- Glow Wire Test
- Insulation Resistance Tester
- Mechanical Shock Simulator
- Impulse Voltage Test
- Radio Interference Test
- Radiated Susceptibility Test
- Damp Heat Cyclic Test
- CT/PT Tester
- MMD Calibrator
- Magnetic Test



## Electrical Standard Products (ESP) Branch Offices:

### REGISTERED OFFICE AND HEAD OFFICE

L&T House, Ballard Estate  
P. O. Box 278  
**Mumbai 400 001**  
Tel: 022-67525656  
Fax: 022-67525858  
Website: www.Larsentoubro.com

### ELECTRICAL STANDARD PRODUCTS (ESP)

501, Sakar Complex I  
Opp. Gandhigram Rly. Station  
Ashram Road  
**Ahmedabad 380 009**  
Tel: 079-66304006-11  
Fax: 079-66304025  
e-mail: esp-ahm@LNTEBG.com

38, Cubbon Road, P. O. Box 5098  
**Bangalore 560 001**  
Tel: 080-25020100 / 25020324  
Fax: 080-25580525  
e-mail: esp-blr@LNTEBG.com

131/1, Zone II  
Maharana Pratap Nagar  
**Bhopal 462 011**  
Tel: 0755-3080511 / 05 / 08 / 13 / 17 / 19  
Fax: 0755-3080502  
e-mail: esp-bho@LNTEBG.com

Plot No. 559, Annapurna Complex  
Lewis Road  
**Bhubaneswar 751 014**  
Tel: 0674-6451342, 2436696  
Fax: 0674-2537309  
e-mail: esp-bbi@LNTEBG.com

SCO 32, Sector 26-D  
Madhya Marg, P. O. Box 14  
**Chandigarh 160 019**  
Tel: 0172-4646840, 4646853  
Fax: 0172-4646802  
e-mail: esp-chd@LNTEBG.com

L&T Construction Campus  
TC-1 Building, II Floor  
Mount-Poonamallee Road  
Manapakkam  
**Chennai 600 089**  
Tel: 044-2270 6800  
Fax: 044-22706940  
e-mail: esp-maa1@LNTEBG.com

67, Appuswamy Road  
Post Bag 7156  
Opp. Nirmala College  
**Coimbatore 641 045**  
Tel: 0422-2588120 / 1 / 5  
Fax: 0422-2588148  
e-mail: esp-cbe@LNTEBG.com

Khairasol, Degaul Avenue  
**Durgapur 713 212**  
Tel: 2559848, 2559849, 2559844  
Fax: 0343-2553614  
e-mail: esp-dgp@LNTEBG.com

Milanpur Road, Bamuni Maidan  
**Guwahati 781 021**  
Tel: 0361-2550562 / 65  
Fax: 0361-2551308  
e-mail: hazrasudipto@LNTEBG.com

II Floor, Vasantha Chambers  
5-10-173, Fateh Maidan Road  
**Hyderabad 500 004**  
Tel: 040-67015052  
Fax: 040-23296468  
e-mail: esp-hyd@LNTEBG.com

Monarch Building, 1st Floor  
D-236 & 237, Amrapali Marg  
Vaishali Nagar  
**Jaipur 302 021**  
Tel: 0141-4385914 to 18  
Fax: 0141-4385925  
e-mail: esp-jai@LNTEBG.com

Akashdeep Plaza, 2nd Floor  
P. O. Golmuri  
**Jamshedpur 831 003**  
Jharkhand  
Tel: 0657-2312205 / 38  
Fax: 0657-2341250  
e-mail: esp-jam@LNTEBG.com

Skybright Bldg; M. G. Road  
Ravipuram Junction, Ernakulam  
**Kochi 682 016**  
Tel: 0484-4409420 / 4 / 5 / 7  
Fax: 0484-4409426  
e-mail: esp-cok@LNTEBG.com

3-B, Shakespeare Sarani  
**Kolkata 700 071**  
Tel: 033-44002572 / 3 / 4  
Fax: 033-22821025 / 7587  
e-mail: esp-ccu@LNTEBG.com

A28, Indira Nagar, Faizabad Road  
**Lucknow 226 016**  
Tel: 0522-4929905/04  
Fax: 0522-2311671  
e-mail: esp-Lko@LNTEBG.com

No: 73, Karpaga Nagar, 8th Street  
K. Pudur  
**Madurai 625 007**  
Tel: 0452-2537404, 2521068  
Fax: 0452-2537552  
e-mail: esp-mdu@LNTEBG.com

EBG North Wing Office-Level 2  
Gate 7, Powai Campus  
**Mumbai 400 072**  
Tel: 022-67052874 / 2737 / 1156  
Fax: 022-67051112  
e-mail: esp-bom@LNTEBG.com

12, Shivaji Nagar  
North Ambazari Road  
**Nagpur 440 010**  
Tel: 0712-2260012 / 3  
Fax: 0712-2260020 / 30  
e-mail: esp-nag@LNTEBG.com

32, Shivaji Marg  
P. O. Box 6223  
**New Delhi 110 015**  
Tel: 011-41419514 / 5 / 6  
Fax: 011-41419600  
e-mail: esp-del@LNTEBG.com

L&T House  
P. O. Box 119  
191/1, Dhole Patil Road  
**Pune 411 001**  
Tel: 020-26164048  
Fax: 020-26164048/26164910  
e-mail: esp-pnq@LNTEBG.com

Crystal Tower, Plot No. 606/1  
4th Floor, G. E. Road  
Telibandha  
**Raipur - 492 006**  
Tel: 0771-4283214  
e-mail: esp-raipur@LNTEBG.com

3rd Floor  
Vishwakarma Chambers  
Majura Gate, Ring Road  
**Surat 395 002**  
Tel: 0261-2473726  
Fax: 0261-2477078  
e-mail: esp-sur@LNTEBG.com

Radhadaya Complex  
Old Padra Road  
Near Charotar Society  
**Vadodara 390 007**  
Tel: 0265-6613610 / 1 / 2  
Fax: 0265-2336184  
e-mail: esp-bar@LNTEBG.com

48-8-16, Dwarakanagar  
**Visakhapatnam 530 016**  
Tel: 0891 670 1125 to 30  
Fax: 0891 670 1139  
e-mail: esp-viz@LNTEBG.com

Product improvement is a continuous process. For the latest information and special applications, please contact any of our offices listed here.



Larsen & Toubro Limited  
Electrical Standard Products  
Powai Campus, Mumbai 400 072  
**Customer Interaction Center (CIC)**  
BSNL / MTNL (toll free) : 1800 233 5858  
Reliance (toll free) : 1800 200 5858  
Tel : 022 6774 5858, Fax : 022 6774 5859  
E-mail : cic@LNTEBG.com  
Website : www.LNTEBG.com