



# Data Sheet

## Three-Phase RJ12 Current Input Energy Meter RISH ER43XX-X



Measure



Control



Record



Analyze

### Overview :

RISH 43XX measures important electrical parameters in 3 Phase 4 Wire, 3 Phase 3 Wire and 1 Phase 2 Wire Network and is designed for intended use in residential, commercial and light industrial Electrical Energy Metering. It displays many parameters at a glance. It supports Tariff Energy Counters selectable via MODBUS or MBUS communication or Tariff Input. It has Pulse Outputs and Impulse LED for energy monitoring. It has inbuilt industry standard MODBUS RTU or MBUS for remote monitoring. Meter housing is standard Din Rail Mount that allows ease of installation.

### Product Features:

#### Plug and Play Current Transformer :

RJ-12 connector is available for external CT connection, which enables easy, fast and error free installation. 2 meter long cable is provided with CT.

#### Measured Electrical Parameters :

The meter is primarily for bidirectional Active, Reactive and Apparent Energy measurement but it also accurately measures important electrical parameters like Voltage, Current, Frequency, Active, Reactive and Apparent Power, and Power Factor in Three Phase and Single Phase Networks. The measured parameters can be viewed on display and MODBUS or MBUS for remote viewing.

#### Demand :

The Demand parameter for Active Power (Import/Export), Reactive Power (Import/Export), Apparent Power and Current are calculated as per configurable Demand Integration time.

#### Pulse Outputs :

The meter has two opto-isolated SO Outputs that can be configured for any one of the Active (Total/Import/Export), Reactive (Total/Import/Export) Energy parameter. The pulse width of the output is onsite programmable.

#### Impulse LED :

The meter has Impulse LED which flash at rate of 6400 IMP/kWh indicating the Active Energy consumption.

#### LCD :

The LCD has bold seven segment digits with bright white backlit for display of measurement parameters. Special symbols and units are provided for effective display and easy onsite configuration. Indications for active tariff is continuously available on screen. Measurement screen can be set as automatic scrolling or manual scrolling.

#### High Max System Power Limit :

The meter can measure upto 3750 MVA Nominal System Power and upto 9000 MVA Max System Power.

#### Front Keys :

Four keys are provided for easy navigation and accessibility of different parameters and onsite programming of the meter.

#### Remote Communication(Optional) :

The meter has communication based on MODBUS or MBUS protocol for remote data acquisition of measurement data and configuration. MODBUS or MBUS parameters Baud rate, Device address and parity-stop bits are programmable.

#### Tariff Input :

The meter has one Tariff Input for selection of active tariff T1 and T2. The opto-isolated Tariff is rated for a wide range of AC/DC voltage for operation.

#### Dual tariff :

The meter has Tariff Counters for energy accumulation which are selectable via Tariff Input. Energy for tariff are Total/Import/Export Active Energy, Total/Import/Export Reactive Energy.

#### Compliance to Standards :

|                                |                 |
|--------------------------------|-----------------|
| Accuracy Standard :            | EN50470-3 :2022 |
|                                | IEC62053-21     |
| IP for water & dust:           | IEC 60529       |
| Plastic Flammability Standard: | UL 94           |
| Safety Standard                | 62052-31:2015   |

Datasheet subject to change without notice



Measure



Control



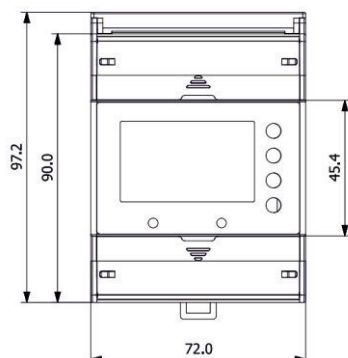
Record



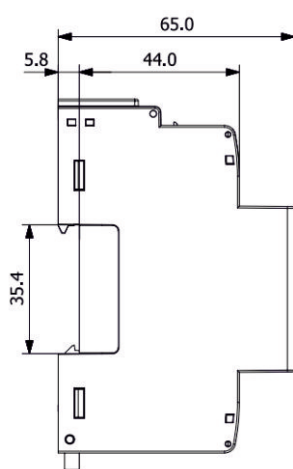
Analyze

### Dimensions Details:

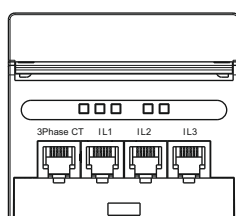
#### Front View



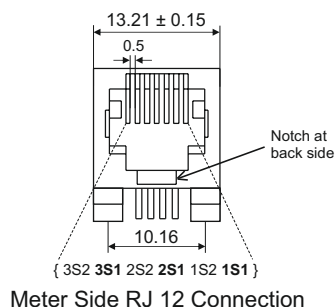
#### Side View



#### Top View



Note: For Single 3 phase CT Connect directly to 3 Phase CT Slot.  
For three individual phasewise CTs connect them to IL1, IL2, IL3 slots respectively.



### Technical Specifications:

#### Input Voltage:

|                              |                                                                        |
|------------------------------|------------------------------------------------------------------------|
| Nominal Input Voltage (Vn)   | 230 VLN (400VLL)                                                       |
| System PT Primary Values     | 100VLL to 1200kVLL programmable on site.                               |
| Measuring Range              | 57.7VLN to 289 VLN (100VLL to 500 VLL)                                 |
| Overload Withstand:          | 2 x rated value for 1 second, repeated 10 times at 10 second intervals |
| Nominal Input Voltage Burden | < 0.3VA approx. per phase(at nominal 240V)                             |

#### Input Current:

| Current Measurement Parameters                    | RJ12 Model                         |
|---------------------------------------------------|------------------------------------|
| Starting Current ( $I_{st} = 0.04 \cdot I_{tr}$ ) | 0.2 mA                             |
| Minimum Current ( $I_{min} = 0.2 \cdot I_{tr}$ )  | 1 mA                               |
| Transitional Current ( $I_{tr}$ )                 | 5 mA                               |
| Nominal Current ( $I_n = 20 \cdot I_{tr}$ )       | 100 mA                             |
| Maximum Current ( $I_{max} = 24 \cdot I_{tr}$ )   | 120 mA                             |
| Operating Current Range                           | 1mA - 100 mA (120 mA)              |
| Short time Over-current                           | $20 \cdot I_{max}$ for 0.5 Seconds |
| Power consumption in Current Circuit              | <1VA per phase                     |
| System CT Primary Values                          | From 1A to 9999A                   |
| Nominal Input Current Burden                      | < 0.05VA approx. per phase         |

#### Auxiliary Supply:

|               |                                     |
|---------------|-------------------------------------|
| Voltage Range | 100-550V AC/DC (230V AC/DC nominal) |
| Frequency     | 50 Hz                               |
| Burden        | < 6VA approx. (at nominal value)    |

#### Reference Conditions for Accuracy:

|                            |                                                            |
|----------------------------|------------------------------------------------------------|
| Reference Temperature      | 23°C +/- 2°C                                               |
| Influence of Temperature   | 0.01% / °C for Voltage, 0.025% / °C for Current            |
| Input Waveform             | Sinusoidal (Distortion factor 0.005)                       |
| Input Frequency            | 50 Hz ± 2%                                                 |
| Auxiliary Supply Frequency | 50 Hz ± 1%                                                 |
| Total Harmonic Distortion  | THDv <= 50% upto 31st at Vn<br>THDi <= 60% upto 31st at In |

#### Accuracy:

|                              |                                                              |
|------------------------------|--------------------------------------------------------------|
| Active Energy                | Class B as per EN 50470 - 3<br>Class 1 as per IEC 62053 - 21 |
| Reactive Energy              | ±2%                                                          |
| Apparent Energy              | ±1%                                                          |
| Active Power                 | ±0.5% of nominal value                                       |
| Reactive Power               | ±1.0% of nominal value                                       |
| Apparent Power               | ±0.5% of nominal value                                       |
| Power Factor                 | ±1%                                                          |
| Voltage                      | ±0.5% of nominal value                                       |
| Current                      | ±0.5% of nominal value                                       |
| Frequency                    | ±0.2% of nominal value                                       |
| THD (V/ I) w.r.t fundamental | ±5% (upto 31st Harmonics)                                    |

Datasheet subject to change without notice



Measure



Control

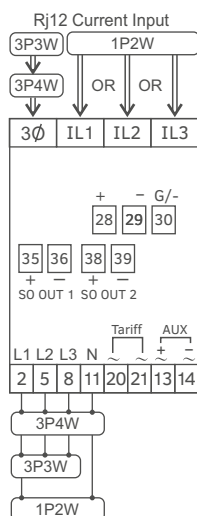


Record



Analyze

### Connector Details:



|               |                                                                    |
|---------------|--------------------------------------------------------------------|
| 2,5,8         | :L1,L2,L3                                                          |
| 11            | :Neutral                                                           |
| 13 & 14       | :Aux Terminal                                                      |
| 35,36 & 38,39 | :Pulse Output Terminal                                             |
| 20,21         | :Tariff input Terminal                                             |
| 28,29,30      | :RS485 Terminal (in Modbus Model)<br>MBus Terminal (in Mbus Model) |

## Wiring Guidelines

|                                                                         |          |      |      |
|-------------------------------------------------------------------------|----------|------|------|
| Solid/Stranded with insulated Pin type lugs (sq. mm)                    | 1 to 2.5 |      |      |
| Torque value (Nm)                                                       | 0.4      |      |      |
| 1. Aux and Voltage terminals<br>3. RS485, Tariff Input and SO terminals | 0.4      |      |      |
| Length available for lug entry in terminal (mm)                         | 9.5      |      |      |
| Use Standard RJ12 Connector                                             |          |      |      |
| PIN NUMBER                                                              | 1, 2     | 3, 4 | 5, 6 |
| CT SIDE                                                                 | S1       | S2   | S3   |

**\*Note:**

1. Pin number 1, 3, 5 are shorted.
2. Pin number 2, 4, 6 are shorted.



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

### Technical Specifications:

### Pulse Outputs :

|                |                             |
|----------------|-----------------------------|
| SO1 and SO2    | Passive Opto-isolated       |
| Contact Ranges | 5-27V DC, 27 mA DC (max)    |
| Pulse Duration | 60, 100 and 200 millisecond |
| Pulse Rate     | 1 pulse per kWh/kVARh       |

### Impulse LED :

|              |                    |
|--------------|--------------------|
| Impulse Rate | 6400 pulse per kWh |
|--------------|--------------------|

### Communication Interface (MODBUS) :

|                   |                                      |
|-------------------|--------------------------------------|
| Protocol          | RS485 MODBUS                         |
| Baudrate          | 4.8 / 9.6 / 19.2 / 38.4 / 57.6 kbps  |
| Data Width        | 8                                    |
| Parity- Stop Bits | None -1 / None -2 / Even -1 / Odd -1 |
| Response Time     | 200 millisecond at 9.6 Kbps Baudrate |

### Communication Interface (MBUS) :

|                    |                                   |
|--------------------|-----------------------------------|
| Protocol           | EN13757-3 MBUS                    |
| Baudrate           | 0.3/ 0.6/ 1.2/ 2.4/ 4.8/ 9.6 kbps |
| Data Width         | 8                                 |
| Parity - Stop Bits | Even -1                           |
| Address            | 1 ... 250                         |

**Display Ranges :**

|                 |                       |
|-----------------|-----------------------|
| Active Energy   | 0.01-9999999.99 kWh   |
| Reactive Energy | 0.01-9999999.99 kVARh |
| Apparent Energy | 0.01-9999999.99 kVAh  |

**Tariff Input :**

0 V Low  
230 V High

### Installation :

|              |                                                                  |
|--------------|------------------------------------------------------------------|
| Installation | Indoor                                                           |
| Enclosure    | IP51(Front side) and IP 20 (Terminal side)<br>(IEC 60529 : 2001) |
| Housing      | (4 Module DIN 43880)                                             |
| Dimensions   | 72 mm X 97.2 mm X 65 mm                                          |
| Weight       | 300 gm                                                           |
| Mounting     | 35 mm DIN Rail                                                   |

### Safety :

|                           |                                                                                              |
|---------------------------|----------------------------------------------------------------------------------------------|
| Safety Standard           | According to 62052-31:2015                                                                   |
| Installation Category     | III                                                                                          |
| Protective Class          | II                                                                                           |
| AC Voltage Test           | 4kV for 1 Minute                                                                             |
| Impulse Voltage Withstand | 6 kV (1.2 microsecond waveform)                                                              |
| Housing flame Resistance  | Flammability Class V-0 acc to UL-94,<br>Self Extinguishing, Non-Dripping, Free of<br>Halogen |

**Environmental Conditions :**

|                               |                           |
|-------------------------------|---------------------------|
| Mechanical Environment        | M1                        |
| Electromagnetic Environment   | E2                        |
| Operating Temperature         | -25°C to +55°C            |
| Storage/Transport Temperature | -40°C to +70°C            |
| Relative Humidity             | 0... 95% (Non Condensing) |
| Altitude                      | < 2000 m                  |

Datasheet subject to change without notice



## Measure



Control



Record



## Analyze

### Measured Parameter System wise:

✓ : Available

✗ : Not Available

| Sr No | Parameters                              | 3 Phase 4Wire | 3Phase 3Wire | 1Phase 2Wire |
|-------|-----------------------------------------|---------------|--------------|--------------|
| 1.    | System Import Active Energy             | ✓             | ✓            | ✓            |
| 2.    | System Export Active Energy             | ✓             | ✓            | ✓            |
| 3.    | System Total Active Energy              | ✓             | ✓            | ✓            |
| 4.    | System Import Reactive Energy           | ✓             | ✓            | ✓            |
| 5.    | System Export Reactive Energy           | ✓             | ✓            | ✓            |
| 6.    | System Total Reactive Energy            | ✓             | ✓            | ✓            |
| 7.    | System Apparent Energy                  | ✓             | ✓            | ✓            |
| 8.    | Tariff 1 & 2 Import Active Energy       | ✓             | ✓            | ✓            |
| 9.    | Tariff 1 & 2 Export Active Energy       | ✓             | ✓            | ✓            |
| 10.   | Tariff 1 & 2 Total Active Energy        | ✓             | ✓            | ✓            |
| 11.   | Tariff 1 & 2 Import Reactive Energy     | ✓             | ✓            | ✓            |
| 12.   | Tariff 1 & 2 Export Reactive Energy     | ✓             | ✓            | ✓            |
| 13.   | Tariff 1 & 2 Total Reactive Energy      | ✓             | ✓            | ✓            |
| 14.   | L1, L2, L3 Import Active Energy         | ✓             | ✗            | ✗            |
| 15.   | L1, L2, L3 Export Active Energy         | ✓             | ✗            | ✗            |
| 16.   | L1, L2, L3 Total Active Energy          | ✓             | ✗            | ✗            |
| 17.   | L1, L2, L3 Import Reactive Energy       | ✓             | ✗            | ✗            |
| 18.   | L1, L2, L3 Export Reactive Energy       | ✓             | ✗            | ✗            |
| 19.   | L1, L2, L3 Total Reactive Energy        | ✓             | ✗            | ✗            |
| 20.   | L1, L2, L3 Apparent Energy              | ✓             | ✗            | ✗            |
| 21.   | Current Demand                          | ✓             | ✓            | ✓            |
| 22.   | kVA Demand                              | ✓             | ✓            | ✓            |
| 23.   | Import kW Demand                        | ✓             | ✓            | ✓            |
| 24.   | Export kW Demand                        | ✓             | ✓            | ✓            |
| 25.   | Import Var Demand                       | ✓             | ✓            | ✓            |
| 26.   | Export Var Demand                       | ✓             | ✓            | ✓            |
| 27.   | Max Current Demand                      | ✓             | ✓            | ✓            |
| 28.   | Max kVA Demand                          | ✓             | ✓            | ✓            |
| 29.   | Max Import kW Demand                    | ✓             | ✓            | ✓            |
| 30.   | Max Export kW Demand                    | ✓             | ✓            | ✓            |
| 31.   | Max Import Var Demand                   | ✓             | ✓            | ✓            |
| 32.   | Max Export Var Demand                   | ✓             | ✓            | ✓            |
| 33.   | System Voltage                          | ✓             | ✓            | ✓            |
| 34.   | L1, L2, L3 Voltage                      | ✓             | ✗            | ✗            |
| 35.   | L12, L23, L31 Voltage                   | ✓             | ✓            | ✗            |
| 36.   | System Current                          | ✓             | ✓            | ✓            |
| 37.   | L1, L2, L3 Current                      | ✓             | ✓            | ✗            |
| 38.   | Neutral Current (Calculated)            | ✓             | ✗            | ✗            |
| 39.   | Frequency                               | ✓             | ✓            | ✓            |
| 40.   | System Active Power (kW)                | ✓             | ✓            | ✓            |
| 41.   | L1, L2, L3 Active Power (kW)            | ✓             | ✗            | ✗            |
| 42.   | System Total Re-active Power (kVAr)     | ✓             | ✓            | ✓            |
| 43.   | L1, L2, L3 Total Re-active Power (kVAr) | ✓             | ✗            | ✗            |
| 44.   | System Apparent Power (kVA)             | ✓             | ✓            | ✓            |
| 45.   | L1, L2, L3 Apparent Power (kVA)         | ✓             | ✗            | ✗            |
| 46.   | System Power Factor                     | ✓             | ✓            | ✓            |
| 47.   | L1, L2, L3 Power Factor                 | ✓             | ✗            | ✗            |
| 48.   | System Phase Angle                      | ✓             | ✓            | ✓            |
| 49.   | L1, L2, L3 Phase Angle                  | ✓             | ✗            | ✗            |

Datasheet subject to change without notice



Measure



Control



Record



Analyze

### Measured Parameter System wise:

✓ : Available

✗ : Not Available

| Sr No | Parameters                    | 3 Phase 4Wire | 3Phase 3Wire | 1Phase 2Wire |
|-------|-------------------------------|---------------|--------------|--------------|
| 50.   | System Voltage THD            | ✓             | ✓            | ✓            |
| 51.   | L1, L2, L3 Voltage THD        | ✓             | ✓            | ✗            |
| 52.   | System Current THD            | ✓             | ✓            | ✓            |
| 53.   | L1, L2, L3 Current THD        | ✓             | ✓            | ✗            |
| 54.   | Run Hour                      | ✓             | ✓            | ✓            |
| 55.   | On Hour                       | ✓             | ✓            | ✓            |
| 56.   | Number of Interruptions       | ✓             | ✓            | ✓            |
| 57.   | Phase Sequence Indication     | ✓             | ✓            | ✗            |
| 58.   | Current Reversal Indication   | ✓             | ✗            | ✓            |
| 59.   | Phase (V-I) Absent Indication | ✓             | ✗            | ✗            |

### Order Code:

Ordering Information:

Product Code :

**ER43-M-0-01-01-A-0-B-0000**

3Ph RJ12 CT Connected Energy Meter

**01** : RJ-12 100mA

A = 1 Tariff Input + 2 SO Output (ER4301 2TS)

B = RS485 with 2 SO Output +1 Tariff Input(ER4311 Mod)

C = MBUS with 2 SO Output +1 Tariff Input(ER4311 MB)

00 = CE Certified

UK = UKCA Certified

### Order Code Example:

**ER43-M00101A0B0000**

ER 4301 2TS- 3Phase input with input voltage 100-500VLL RJ 100mA 2SO Output + 1 Tariff Input with CE Certification.

Datasheet subject to change without notice



Measure



Control



Record



Analyze

## Rishabh Current Transformers with RJ12 Output



3 Phase RJ12 CT



3 Phase Nano CT with RJ12



Single Phase RJ12 CT



Quick Fix Module



Measure



Control



Record



Analyze



RISHABH



Measure



Control



Record



Analyze