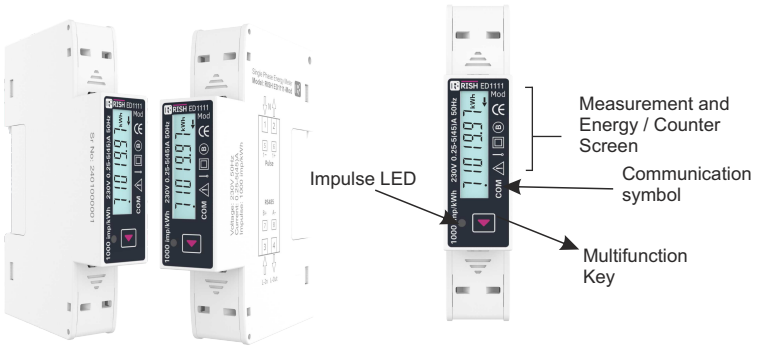
RISH ED 1111
Single Phase Direct connected Energy Meter Din Mount 1U Installation Guide



The Direct Connected Energy Meter is a DIN Rail mounted Digital Meter, primarily for bidirectional Active, Reactive and Apparent Energy measurement intended for use in industrial, commercial and residential electrical energy metering. It also accurately measures important electrical parameters like TRMS Voltage, TRMS Current, Frequency, Active / Reactive and Apparent Power, and Power Factor in Single Phase Networks. The meter is engineered using advanced microcontroller technology and is suitable for electrical parameter measurement and monitoring in 1 Phase 2 Wire Networks. It supports maximum 45 A current measurement on direct connection. It displays parameters on bright intuitive LCD and also has Pulse Outputs and Impulse LED for energy monitoring. It supports Tariff Counters selectable via MODBUS Communication as per model. It has inbuilt industry standard MODBUS RTU for remote monitoring.

Safety Precautions:

All safety related codifications, symbols and instructions that appear in this operating manual or on the equipment must be strictly followed to ensure the safety of the operating person as well as the instrument.

If the equipment is not used in a manner specified by the manufacturer it might impair the protection provided by the equipment.

Do not use the equipment if there is any mechanical damage.

Ensure that the equipment is supplied with correct voltage.

1. Read complete instructions prior to installation and operation of the unit.
2. Risk of electric shock.
3. The equipment in its installed state must not come in close proximity to any heating sources, oils, steam, caustic vapors or other unwanted process by products.
4. Circuit breaker should be installed and preferably near equipment so that in case of hazards can be accessed easily for switching off the mains.

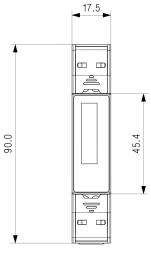
Wiring Guidelines:

1. To prevent the risk of electric shock, power supply to the equipment must be Kept OFF while doing the wiring arrangement.
2. Wiring shall be done strictly according to the terminal layout. Confirm that all connections are correct.
3. Use lugged terminals.
4. To reduce electromagnetic interference use of wires with adequate ratings and twists of the same in equal size shall be made with shortest connections.
5. Layout of connecting cables shall be away from any internal EMI source.
6. Cable used for connection to power source, must have across section of 10 mm^2
   These wires shall have current carrying capacity of 45A.
7. Copper cable should be used (Stranded or Single core cable).
8. Before attempting work on device, ensure absence of voltages using appropriate voltage detection device.
9. Use the wire sizes and tightening torque as listed below
   Current input wire size 10mm^2
   Tightening torque 0.5Nm
   RS485/SO wire size 0.1 to 2.5 mm^2 (Solid/Stranded with pin type lug)
   Tightening torque 0.3 to 0.4 Nm.

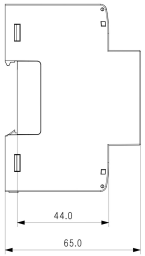
Installation Guidelines

1. This equipment, being normally becomes a part of main control panel and in such case the terminals do not remain accessible to the user end after installation and internal wiring.
2. Conductors must not come in contact with the internal circuitry of the equipment or else it may lead to a safety hazard that may in turn endanger life or cause electrical shock to the operator.
3. The equipment shall not be installed in environmental condition other than those mentioned in this manual.
4. Connector screw must be tightened after installation.
5. Enclosure is IP51 front and IP20 at terminals and to be used in indoor installations only

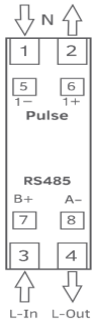
Dimension: 17.5 x 90 x 65 mm



FRONT



SIDE



Connection Terminals Detail:

1,2 - Neutral
3 - Line In
4 - Line out
5,6 - Pulse Output
7,8 - RS485 (MODBUS)

Specifications:

Input :

Connections:	1 Phase 2 Wire
Reference Voltage (Un)	230 VLN
Operating Voltage Range	193 - 253 VLN
Power consumption in Voltage Circuit:	< 2 W (10 VA)
Starting Current (Ist = 0.04*Itr)	20 mA
Minimum Current (Imin = 0.5*Itr)	250 mA
Transitional Current (Itr)	0.5 A
Reference Current (Irf = 10*Itr)	5 A
Maximum Current (Imax > 50*Itr)	45 A
Operating Current Range	0.25-5 A
Short time Over-current	30*Imax for half-cycle at 50 Hz
Power consumption in Current Circuit	< 1 VA per phase
Frequency	45-65 Hz

Accuracy :

Active Energy (Import/Export)	Class B as per EN50470-3, Class 1 as per IEC62053-21
Reactive Energy (Import/Export)	Class 2 as per IEC62053-23
Apparent Energy	± 1.0 %
Voltage	± 0.5% of of range max
Current	± 0.5% of Nominal value
Frequency	± 0.2% of Mid frequency
Active Power	± 1% of range max
Reactive Power	± 1% of range max
Apparent Power	± 1% of range max
Power Factor	± 1% of unity

Pulse Outputs :

SO1	Passive Opto-isolated
Contact Ranges	5 - 27V DC, 27 mA DC (max)
Pulse Duration	60 / 100 / 200 millisecond
Pulse Rate	1 / 10 / 100 / 1000 pulse per kWh
Impulse Rate	1000 pulse per kWh

Communication Interface:

Protocol	RS485 MODBUS RTU
Baudrate	2.4 / 4.8 / 9.6 /19.2 / 38.4 kbps
Data Width	8
Parity Stop Bits	None -1 / None -2/ Even -1 / Odd -1
Device Address	1- 247
Response Time	200 millisecond (1000 millisecond for 2.4/4.8 Kbit Baudrate)

TABLE 1 : Measurement Parameters:
1. Screen1

Parameter No.	Parameters	On Display	On Modbus
1	Import Active Energy	✓	✓
2	Export Active Energy	✓	✓
3	Total Active Energy	✓	✓
4	Import Reactive Energy	✓	✓
5	Export Reactive Energy	✓	✓
6	Total Reactive Energy	✓	✓
7	Total Apparent Energy	✓	✓
8	Partial Import Active Energy	✓	✓
9	Partial Export Active Energy	✓	✓
10	Partial Total Active Energy	✓	✓
11	Partial Import Reactive Energy	✓	✓
12	Partial Export Reactive Energy	✓	✓
13	Partial Total Reactive Energy	✓	✓
14	Partial Total Apparent Energy	✓	✓
15	Voltage	✓	✓
16	Current	✓	✓
17	Active Power	✓	✓
18	Reactive Power	✓	✓
19	Apparent Power	✓	✓
20	Power Factor	✓	✓
21	Frequency	✓	✓
22	Cst - xxxx	✓	✓
23	Add - xxx	✓	✓
24	bd - xxxx	✓	✓
25	Pd - Pd count of meter	✓	✓
26	Active tariff status	✓	✓
27	Serial Number	✓	✓
28	Display Test	✓	--

TABLE 1 : Measurement Parameters (contd.):
2. Screen 2

Parameter No.	Parameters	On Display	On Modbus
29	T1 Import Active Energy	✓	✓
30	T1 Export Active Energy	✓	✓
31	T1 Total Active Energy	✓	✓
32	T1 Import Reactive Energy	✓	✓
33	T1 Export Reactive Energy	✓	✓
34	T1 Total Reactive Energy	✓	✓
35	T1 Total Apparent Energy	✓	✓
36	T2 Import Active Energy	✓	✓
37	T2 Export Active Energy	✓	✓
38	T2 Total Active Energy	✓	✓
39	T2 Import Reactive Energy	✓	✓
40	T2 Export Reactive Energy	✓	✓
41	T2 Total Reactive Energy	✓	✓
42	T2 Total Apparent Energy	✓	✓
43	Import W Max Demand	✓	✓
44	Export W Max Demand	✓	✓
45	Import VAr Max Demand	✓	✓
46	Export VAr Max Demand	✓	✓
47	Import VA Max Demand	✓	✓
48	Export VA Max Demand	✓	✓
49	Current Max Demand	✓	✓

Measurement Parameters Screens


Import Active Energy


Export Active Energy

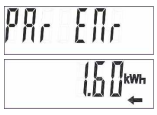

Total Active Energy

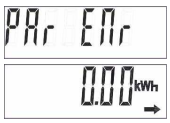

Import Reactive Energy

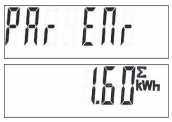

Export Reactive Energy

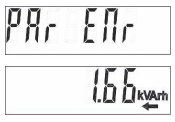

Total Reactive Energy

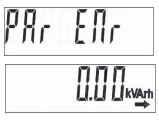

Total Apparent Energy

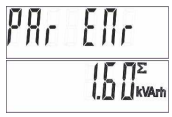

Partial Import Active Energy

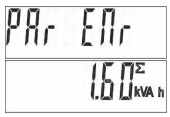

Partial Export Active Energy


Partial Total Active Energy


Partial Import Reactive Energy


Partial Export Reactive Energy


Partial Total Reactive Energy


Partial Total Apparent Energy


Voltage


Current


Active Power


Reactive Power


Apparent Power

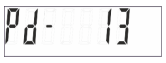

Power Factor


Frequency

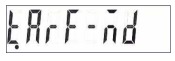

Pulse Constant

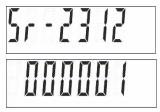

Modbus Device Address


Buad Rate

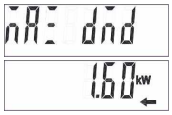

Power Drop

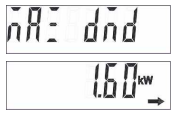

Tarrif Status- Input Based


Tarrif Status- Modbus Based

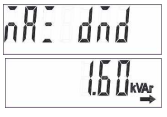

Serial Number

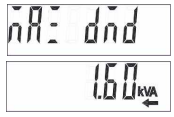

Display Check

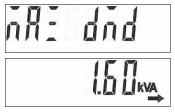

Import Active Power Max Demand

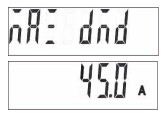

Export Active Power Max Demand


Import Reactive Power Max Demand


Export Reactive Power Max Demand

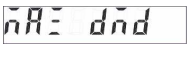

Import Apparent Power Max Demand


Export Apparent Power Max Demand


Current Max Demand


Display Check Screen


This Screen is used to show the partial energy for displayed parameter on next sequential screen


This Screen is used to show the Max Demand for displayed parameter on next sequential screen

LCD Display

Introduction

The meter displays more than 40 measurement parameters including Total Energies, Tariff, Partial and also other important electrical parameters like Max Demand, Voltage, Current, Frequency, Active Power, Reactive Power, Apparent Power and Power Factor on individual screens. The user can easily scroll the Parameter By Pressing key and By Pressing and Holding key for 5 Seconds on screen 2 option the user can see Tarrif & Demand Parameters. again Pressing and Holding key for 5 Seconds on screen 1 option it back to the Main Parameter . For Setup menu the user need to Press & Hold the Key on measurement parameters screen.

LCD Display Symbols and Indications

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 current reversal, communication status, active tariff available on screen. Measurement screen can be set as automatic scrolling or manual scrolling.

Communication Indication

The meter provides communication based on MODBUS protocol for remote data acquisition of measurement data and configuration. If meter is properly communicating with host than it is indicated by symbol as shown:

COM This symbol indicates that the meter is communicating.

Tariff Energies Indication

This Instrument comes with 2 tariff based on MODBUS. In the image given here, it indicates that the instrument is currently displaying the selected energy parameter (Import Active Energy) of Tariff 1. These Tariff energies and Demand parameters are available on display screen 2, For opening the Screen 2 Press and hold the Key for 5 Seconds on screen 2 Option

Tariff Indication: Meter has tariff function and indicated by symbol **T**, The digit after this symbol indicates tariff number either 1 or 2.

Other Labels: **Σ**- Indicates Total parameter ,
⬅ - indicates Import parameter ,
➡ - indicates export parameter.

Tariff Selection :

The meter is provided Tariff Selection Via MODBUS for selection of active tariff tariff respectively for energy metering.

Tariff Selection:

4X Add 46023	Tariff number
2	Tariff 1
3	Tariff 2

Pulse Output :

The Meter is provided with Opto-isolated pulse outputs that can be configured for any one of the Active, Reactive and Apparent Energy parameters. Refer below TABLE for parameters for pulse output.

Pulse Output is Opto-coupler based SO which can be used to drive an external mechanical counter for energy measurement. The Pulse Output can be configured to the parameters mentioned in below TABLE through setup parameter screen.

TABLE : Parameters for Pulse Output

Parameter Number	Parameter	1P 2W
1	Import Active Energy	✓
2	Export Active Energy	✓
3	Import Reactive Energy	✓
4	Export Reactive Energy	✓
5	Inductive Reactive Energy	✓
6	Capacitive Reactive Energy	✓
7	Total active energy	✓
8	Total Reactive energy	✓

Programming mode Screen :

Screen No.	Screen Label	Description of programming function	Parameter range / values	Default Values
1	CodE	Enter password to allow programming	0000 - 9999	0000
2	Add	Device Address for communication	001 - 247	001
3	bd	Baud rate of communication	2.4 / 4.8 / 9.6 / 19.2 / 38.4 kbps	9.6
4	Prty	Parity and stop bit of communication	None-1 / None-2/Even-1/Odd-1	None-1
5	PLS1OUT	Pulse1(SO1) parameter	kwh - imp / exp kvarh - imp / exp / ind / cap	kwh-imp
6	cST	Pulse (SO1) constant	1 / 10 / 100 / 1000	1000
7	PLST	Pulse (So1) on time	60 / 100 / 200 milisecond	200
8	dit	Demand integration time	5 - 30 Minutes	15
9	rST	Reset of Parameter	None/Partial energy/PD/Dmd/all	None
10	SCrl	Auto scrolling of parameter	No/10/20/30 sec	No
11	blt	Backlit configuration	On/off/alt	On
12	SetPASS	Set programming password	0000-9999	----
13	quit	Quit program mode	Yes / No	No

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