Operating Manual

DIN Rail Single Channel DC Energy Meter
RISH DC 2111 - Mod

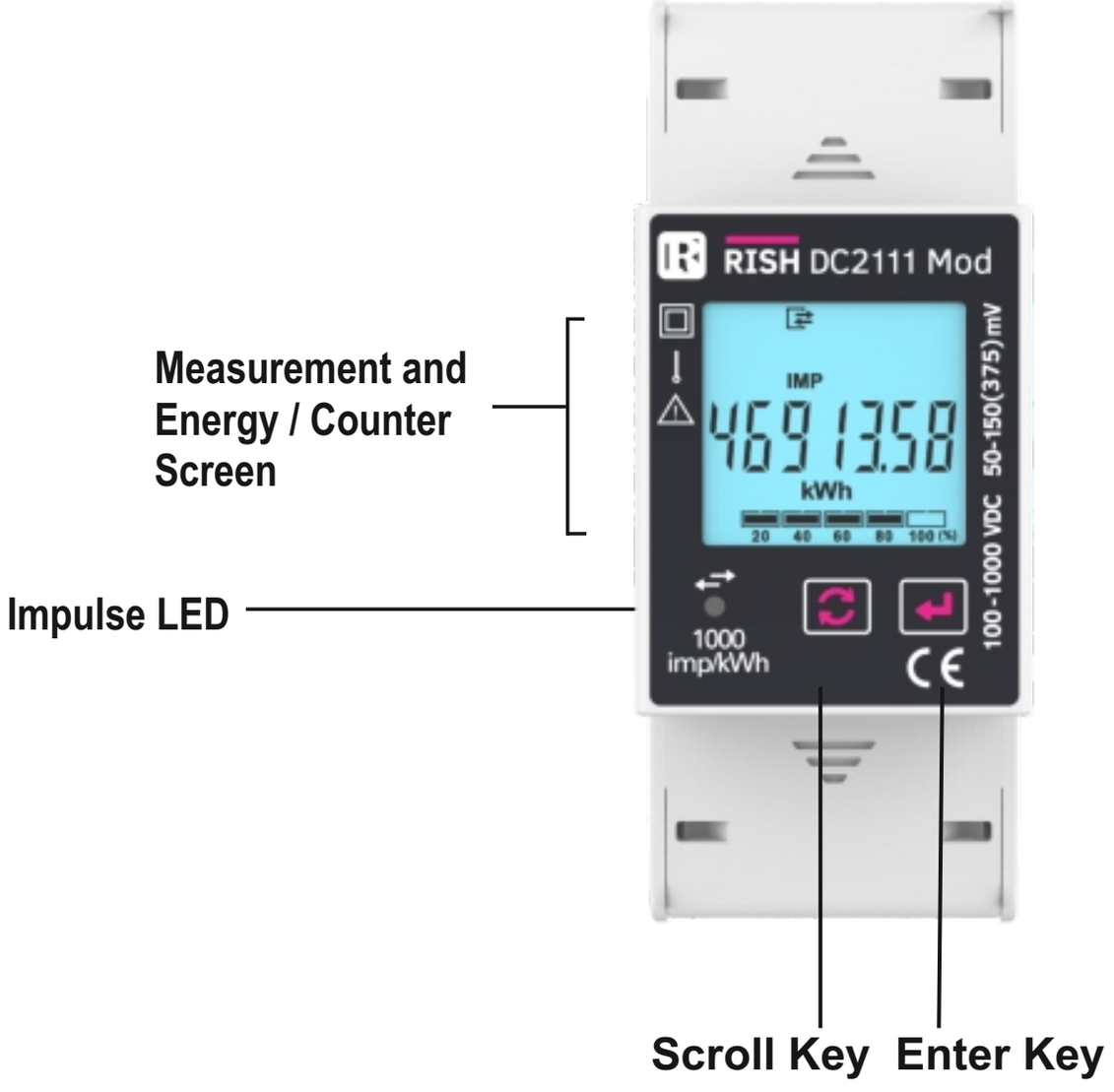
DMAN-00IM-1668 Rev. C - 07/25

Manual subject change without notice

Index

1. INTRODUCTION

RISH DC2111 is a DIN Rail mounted modern Single channel DC Energy Meter with bidirectional energy measurement, designed for EV charging station, telecommunications base stations, solar photovoltaic, and other applications of DC Energy measurement. It also accurately measures important electrical parameters like Voltage, Current, Power, Energy, Ampere hours.The meter is engineered using advanced micro controller technology and it is suitable for electrical parameter measurement and monitoring. It supports the input voltage range of 5-1000V and measures upto 2000A maximum current through external shunt register of output 50-150mV. It displays parameters on bright intuitive LCD and also has Pulse Outputs and Impulse LED for energy monitoring. It has an inbuilt industry standard MODBUS RTU for remote monitoring.



2. LCD Display

2.1. Introduction

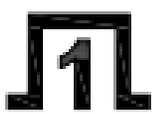
The meter displays more than 30 measurement parameters including Total Energies, Ampere Hour, Partial and also other important electrical parameters like Max Demand, Voltage, Current, Power on individual screens. The user can easily scroll and See System Parameter By Pressing Scroll key. Pressing and Holding Scroll key for 5 Seconds it will enter into setup Parameter. Refer Table 1 for list all the Measurement Parameters available on Display and MODBUS

2.2. LCD Display Symbols and Indications

The LCD has bold seven segment digits with bright white backlit for display of measurement parameters. Special symbols, units and bar graph are provided for effective display and easy onsite configuration. Indications for current reversal, communication status, and pulse outputs status are continuously available on screen. Measurement screen can be set as automatic scrolling or manual scrolling.

2.2.1 SO Output Indication

The meter has one opto-isolated pulse outputs that can be configured for any one of the Energy parameter.



This symbol indicates that SO is energized.

2.2.2 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 then it is indicated by symbol as shown:

This symbol indicates that the meter is communicating.

2.2.4 Bargraph Indication

Measured meter current in percentage of meter maximum current rating is displayed by bargraph symbols.

Start-up screens Example

Display Check Screen

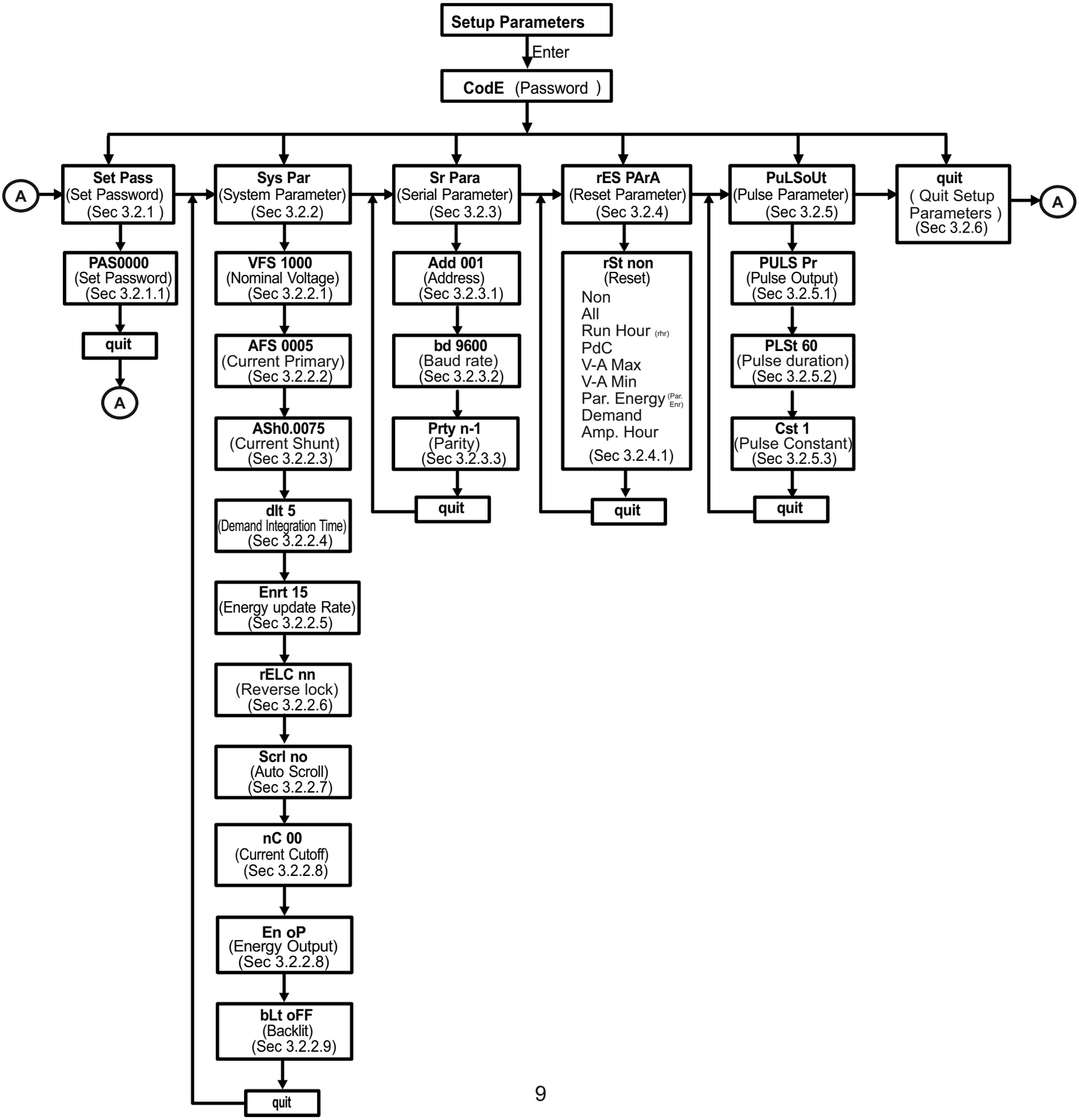
Software version screen

TABLE 1 : Measurement Parameters:

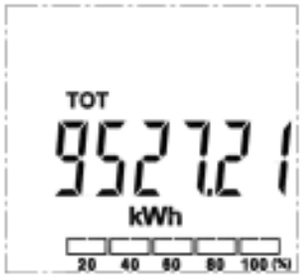
Parameter No.	Parameters	On Display	On Modbus
1	Total Energy	✓	✓
2	Import Energy	✓	✓
3	Export Energy	✓	✓
4	Partial Total Energy	✓	✓
5	Partial Import Energy	✓	✓
6	Partial Export Energy	✓	✓
7	Voltage	✓	✓
8	Current	✓	✓
9	Power	✓	✓
10	Total Ampere Hour	✓	✓
11	Import Ampere Hour	✓	✓
12	Export Ampere Hour	✓	✓
13	Partial Total Ampere Hour	✓	✓
14	Partial Import Ampere Hour	✓	✓
15	Partial Export Ampere Hour	✓	✓
16	Import W Demand	✓	✓
17	Export W Demand	✓	✓
18	Import W Max Demand	✓	✓
19	Export W Max Demand	✓	✓
20	Import A Max Demand	✓	✓
21	Export A Max Demand	✓	✓
22	Import A Demand	✓	✓
23	Export A Demand	✓	✓
24	Current Max	✓	✓
25	Current Min	✓	✓

TABLE 1 : Measurement Parameters (contd.):

Parameter No.	Parameters	On Display	On Modbus
26	Voltage Max	✓	✓
27	Voltage Min	✓	✓
28	Power Max	✓	✓
29	Power Min	✓	✓
30	On Hour	✓	✓
31	Run Hour	✓	✓
32	Cst - xxxx	✓	✓
33	Add - xxx	✓	✓
34	bd - xxxx	✓	✓
35	Pd - Pd count of meter	✓	✓


Setup Parameters
Enter
CodE (Password)
A
Set Pass
(Set Password)
(Sec 3.2.1)
PAS0000
(Set Password)
(Sec 3.2.1.1)
quit
A
Sys Par
(System Parameter)
(Sec 3.2.2)
VFS 1000
(Nominal Voltage)
(Sec 3.2.2.1)
AFS 0005
(Current Primary)
(Sec 3.2.2.2)
ASh0.0075
(Current Shunt)
(Sec 3.2.2.3)
dlt 5
(Demand Integration Time)
(Sec 3.2.2.4)
Enrt 15
(Energy update Rate)
(Sec 3.2.2.5)
rELC nn
(Reverse lock)
(Sec 3.2.2.6)
Scrl no
(Auto Scroll)
(Sec 3.2.2.7)
nC 00
(Current Cutoff)
(Sec 3.2.2.8)
En oP
(Energy Output)
(Sec 3.2.2.8)
bLt oFF
(Backlit)
(Sec 3.2.2.9)
quit
Sr Para
(Serial Parameter)
(Sec 3.2.3)
Add 001
(Address)
(Sec 3.2.3.1)
bd 9600
(Baud rate)
(Sec 3.2.3.2)
Prty n-1
(Parity)
(Sec 3.2.3.3)
quit
rES PArA
(Reset Parameter)
(Sec 3.2.4)
rSt non
(Reset)
Non
All
Run Hour (rhr)
PdC
V-A Max
V-A Min
Par. Energy (Par. Enr)
Demand
Amp. Hour
(Sec 3.2.4.1)
quit
PuLSoUt
(Pulse Parameter)
(Sec 3.2.5)
PULS Pr
(Pulse Output)
(Sec 3.2.5.1)
PLSt 60
(Pulse duration)
(Sec 3.2.5.2)
Cst 1
(Pulse Constant)
(Sec 3.2.5.3)
quit
quit
(Quit Setup
Parameters)
(Sec 3.2.6)
A

2.4 Measurement Parameters Screens



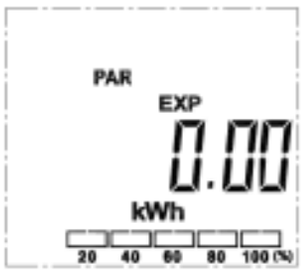
Total Energy

Import Energy

Export Energy

Partial Total Energy

Partial Import Energy



Partial Export Energy

Voltage

Current

Power

Total Ampere Hour

Import Ampere Hour

Export Ampere Hour

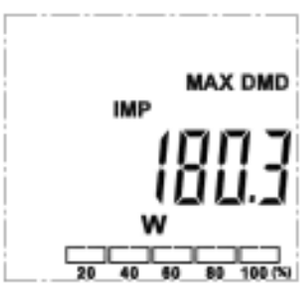
Partial Total Ampere Hour

Partial Import Ampere Hour

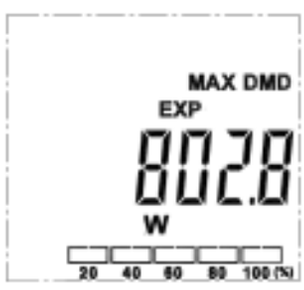
Partial Export Ampere Hour

Import Power Demand

Export Power Demand



Import Power Max Demand



Export Power Max Demand

Import Current Max Demand

Export Current Max Demand

Import Current Demand

Export Current Demand

Max Current

Min Current

Max Voltage

Min Voltage

Max Power

Min Power

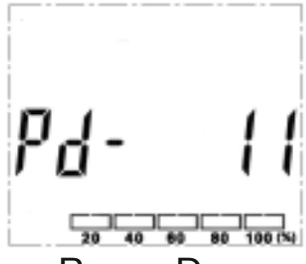
On Hour

Run Hour

Pulse Constant

Modbus Device Address

Baud Rate



Power Drop

3. PROGRAMMING

The following sections comprise step by step procedures for configuring the Energy Meter according to individual user requirements. To access the set-up screens press and hold "↵" enter key for 5 seconds. This will take the User into the Password Protection Entry Stage (Section 3.1).

3.1 Password Protection

Password protection can be enabled to prevent unauthorized access to set-up screens, when default password protection is not enabled. Password protection is enabled by selecting a four digit number other than 0000, setting a password of 0000 disables the password protection.

Enter Password, prompt for first digit. Press the "↻" scroll key to scroll the value of first digit from 0 through to 9, Press the "↵" enter key to advance to next digit.

Enter Password, first digit entered, prompt for second digit..
Press the "↻" scroll key to scroll the value of first digit from 0 through to 9
Press the "↵" enter key to advance to next digit.

Enter Password, second digit entered, prompt for third digit.
Press the "↻" key to scroll the value of first digit from 0 through to 9.
Press the "↵" enter key to advance to next digit.

Enter Password, third digit entered, prompt for fourth digit. .
Press the "↻" scroll key to scroll the value of first digit from 0 through to 9.
Press the "↵" key to advance to verification of the password.

Password confirmed and Pressing "↵" enter key advances to the "Setup Menu" entry stage. (See Section 3.2).

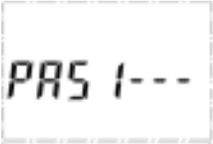
Password Incorrect.

When this Screen appears and first digit is blinking means the unit has not accepted the Password entered. it gives one more chance to enter the password and after this meter will quit setup menu.

3.2 Setup Menu selection

3.2.1. New / Change Password

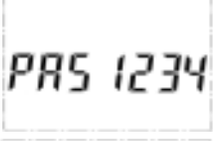
This screen allows user to set password.
Pressing " ↻ " scroll key accepts the present status and advance to the "Backlit" screen (see Section 3.2.2.8).



Pressing the " ↵ "enter key advances to "Set Password Edit" mode and
Pressing the " ↻ "scroll keys scroll the value of first digit from 0 through to 9.

Pressing the " ↵ " enter key selects the value and advances to set second digit.
Pressing the " ↻ "scroll keys scroll the value of second digit from 0 through to 9.

Pressing the " ↵ " enter key selects the value and advances to set third digit.
Pressing the " ↻ "scroll keys scroll the value of third digit from 0 through to 9.



Pressing the " ↵ " enter key selects the value and advances to set fourth digit.
Pressing the " ↻ "scroll keys scroll the value of fourth digit from 0 through to 9.

Pressing the " ↵ " enter key selects the value and advances to Password conformation.

3.2.2 System Parameters

3.2.2.1 Nominal Voltage

This address is allowed to set the nominal voltage of the meter. The range of the nominal voltage are 100 to 1000 V.
Press " ↵ " enter key to set the Nominal Voltage value.
Pressing the " ↻ " key to scrolls the value .
The default value is 1000.

3.2.2.2 Current Primary

This screen allows the user to set CT Primary value for the meter. The valid range of value is 5 to 1000 A.
Press " ↵ " enter key to set the CT Primary value.
Pressing the " ↻ " scroll key advances to the "Current Shunt" setup screen.
Press enter key to enter into edit mode, prompt for first digit. Press the scroll keys to scroll the value of the first digit. Press the enter key to advance to next digit.
Similarly, enter second third and fourth digits CT Primary value. After entering third digit, Pressing enter key confirms the selection.
The default setting is ' 5 'A.

3.2.2.3 Current Shunt

This screen allows the user to set Current Shunt value for the meter. The range of Current Shunt is 50 to 150 mV.
Press " ↵ " enter key to set the Current Shunt value.
Pressing the " ↻ " key to set current Shunt value.
Press enter key to enter into "Current Shunt "edit mode.
Pressing enter key sets the value and advances to "Demand Integration Time" screen (see section 3.2.2.4)
The default setting is '75'mV.

3.2.2.4 Demand Integration Time

This screen is used to set the period over which current and power readings are to be integrated. The Unit of displayed value is minutes.
Pressing " ↻ " scroll key accepts the present value and advance to "Energy Update Rate " screen.
Pressing the" ↵ " enter key advances to "Demand Integration Time Edit" mode and pressing the scroll keys scroll the value through *5,10,15,30 and 60 minutes*.
Pressing the enter key selects the value and advances to "Energy Update Rate " menu (see Section 3.2.2.5).
Default value is set to '*5'minute.*

3.2.2.5 Energy Update Rate

This screen is used to set Energy Update Rate values in minutes and can range from 1-60 mins.
Pressing "↻" scroll key accepts the present value and advance to "Reverse lock " screen.
Pressing the"↵ " enter key advances to "Energy Update Rate Edit" mode.
Default value is set to '*15'minute".*

3.2.2.6 Reverse lock

This screen is used to set Reverse lock values. Reverse locking is when the current and the power is in the opposite direction of the desire direction, the energy and amp-hour accumulation is stopped. The energy locking is depend on power direction and amp-hour locking will depend on current direction
Pressing "↻" scroll key accepts the present value and advance to "Auto Scroll " screen.
Pressing the" ↵ " enter key advances to "Reverse lock Edit" mode and pressing the scroll key scrolls the value through: nn - Non, PS - Positive/Import, nE - Negative/Export.
The default value is "nn"(Non).

3.2.2.7 Auto Scrolling

This screen allows user to enable auto screen scrolling.
Pressing "↻" scroll key accepts the present status and advance to the "Current Cutoff "screen (see Section 3.2.2.8).
Pressing the "↵" enter key advances to "Auto Scroll Edit" mode and pressing the scroll keys scroll through no,10,20,30 sec.
No - Auto scroll is disabled
10,20,30 - Autoscroll activated and number here displays Time in seconds between two screens in autoscroll.
Pressing the enter key selects the value and advances to "Cutoff Current " menu.
Default value is 'no'.

3.2.2.8 Current Cutoff

This screen is used to set Current Cutoff values.
Pressing " ↻" scroll key accepts the present value and advance to "Auto Scroll " screen.
Pressing the" ↵" enter key advances to "Current Cutoff Edit" mode and pressing the scroll key scrolls the value through: 0 - 30% of the nominal value.
By default it is set to 0 %.

3.2.2.9 Energy.Output

This screen is used to set Energy Output values. The user can set the unit to Wh, kWh, MWh.
Pressing " " scroll key accepts the present value and advance to "Auto Scroll " screen.
Pressing the" " enter key advances to "Energy Output Edit" mode and pressing the scroll key scrolls the value through: Wh, kWh or MWh

3.2.2.10 Backlit

This screen allows user to set backlit configuration.
Pressing the " "enter key advances to "Backlit Configuration" edit mode .
Pressing the " " scroll key advances through on, off, *act.*
Pressing the " " enter key will confirms the selection.

1)on - backlit set to continues on mode.
2)off-backlit set to continues off mode.
3)act - backlit on when key is pressed.
Default value is 'ON'.

3.2.3 Serial Parameter Selection

3.2.3.1 Address Setting

This screen applies to the RS 485 output. This screen allows the user to set address for the meter. The allowable range of addresses is 1 to 247.
Press " " enter key to set the address of meter.
Pressing the " " scroll key to advance to the "Baud Rate" setup screen.
Press enter key to enter into edit mode, prompt for first digit.

Press the scroll keys to scroll the value of the first digit. Press the enter key to advance to next digit.
Similarly, enter second and third digits of address. After entering third digit, pressing enter key confirms the selection.
The default setting is '*001*'.

3.2.3.2 Baud Rate

This screen allows the user to set Baud Rate of RS 485 - MODBUS port. The values displayed on screen are in bits per second.
Pressing " " scroll key accepts the present value and advances to the "Parity and Stop Bit Selection" screen (see Section3.2.3.3).
Pressing the " " enter key advances to the "Baud Rate Edit" mode and pressing the scroll key scrolls the value through *2400, 4800, 9600, 19200 ,38400 &* 57600.
Pressing the enter key sets the value and shows the " Baud Rate" screen.
The Default value is set as '*9600*'.

3.2.3.3 Parity and Stop Bit

This screen allows the user to set Parity & number of stop bits of RS 485 port.
Pressing " ↻ " scroll key accepts the present value and advances to "Quit" Serial parameter screen.
Pressing the " ↵ " enter key advances to the "Parity & Stop bit Edit" mode & pressing the " ↻ "scroll keys scrolls the value through: *nonE1*: no parity with one stop bit, *nonE2*: no parity with two stop bit, *EVEn*: even parity with one stop bit, *odd*: odd parity with one stop bit.
Pressing enter key sets the value and advances to "Quit" screen and after quiting serial setup parameter screen advances to "Reset Parameter " screen.
Default value is set as '*nonE1*'.

3.2.4 Reset Parameter Selection

This screen is used to reset different parameters.
Pressing "↻ " scroll key accepts the present value and advances to "Auto Scroll" screen.
Pressing the " ↵ " enter key advances to "Reset Parameter Edit" mode and pressing the scroll keys scroll through *none,* all, Run Hour, PdC, V&A Max, V&A Min, Partial Energy, Demand, Ampere Hour **.**
Pressing the enter key selects the value and advances to "Quit" Reset parameters screen.

3.2.5 Pulse Output Parameter Selection

3.2.5.1. Pulse Output

This screen is used to set the pulse output, i.e SO output parameter.
Pressing " ↻ "scroll key accept the current values and advances to "Pulse Duration" menu.
Pressing the " ↵ " enter key advances to the " Pulse Output Parameter edit " mode & pressing the scroll key scrolls the value through: *IMP KWH, EXP KWH, TOT KWH.*
Pressing enter key sets the value and advances to "Pulse Duration" screen.
Default value is IMP KWH - *import kwh*

3.2.5.2 Pulse Duration

This screen applies only to the Pulse Output. This screen allows the user to set pulse Output energization time in milliseconds.
Pressing "↻" scroll key accepts the present value and advances to "Pulse Rate " screen(see section 3.2.5.3).
Pressing the "↵ " enter key advances to "Pulse Duration Edit" mode and pressing the scroll keys scroll the value through 60, 100 and 200 miliseconds.
Pressing the enter key selects the vaiue and advances to "Pulse Rate" menu.
Default value is set to '200'.

3.2.5.3 Pulse Rate

This screen applies to the Pulse Output option only. The screen allows user to set the following pulse rates: 1 pulse per 1 (1kWh) / 10 (1kWh) / 100 (1kWh) / 1000 (1kWh).
Pressing "↻" scroll key accepts the present selection and takes to the "Pulse Rate Selection" menu (See section 3.2.5.3).
Pressing the "↵" enter key advances to "Pulse Rate Edit" mode & pressing Scroll key will scrolls the value through the values 1, 10, 100 and 1000.
Pressing the enter key set the value and advances to "Quit Setup Menu" screen (see Section3.2.6).

Setting the value to 1 means 1 pulse per 1kWh/kVArh.
Setting the value to 10 means 1 pulse per 10kWh/kVArh.
Setting the value to 100 means 1 pulse per 100kWh/kVArh.
Setting the value to 1000 means 1 pulse per 1000kWh/kVArh.
NOTE: The Pulse rate is auto set or restricted
If power is less than or equal to 3333.33 then the settable values are 1,10,100,1000.
If power is less than or equal to 33333.33 then the settable values are 10,100,1000.
If power is less than or equal to 333333.33 then the settable values are 100,1000.
If power is greater than 333333.33 then value will auto set to 1000.

3.2.6 Quit Setup Menu

This screen allows user to Exit from Setup Menu.
Pressing the "↵" enter key advances to "quit setup" edit mode
pressing the "↻" scroll key scroll the options yes or no.
Pressing the "↵" enter key will conforms the selection.
if YES selected then meter will quit from setup, selecting the NO option it will advanced to st password setup screen.

6. SO Output :

The Meter is provided with one opto-isolated pulse outputs that can be configured for the Energy parameters. Refer TABLE 2 for parameters for pulse output. The pulse duration and rate of pulse out is onsite programmable .

6.1 Pulse Output :

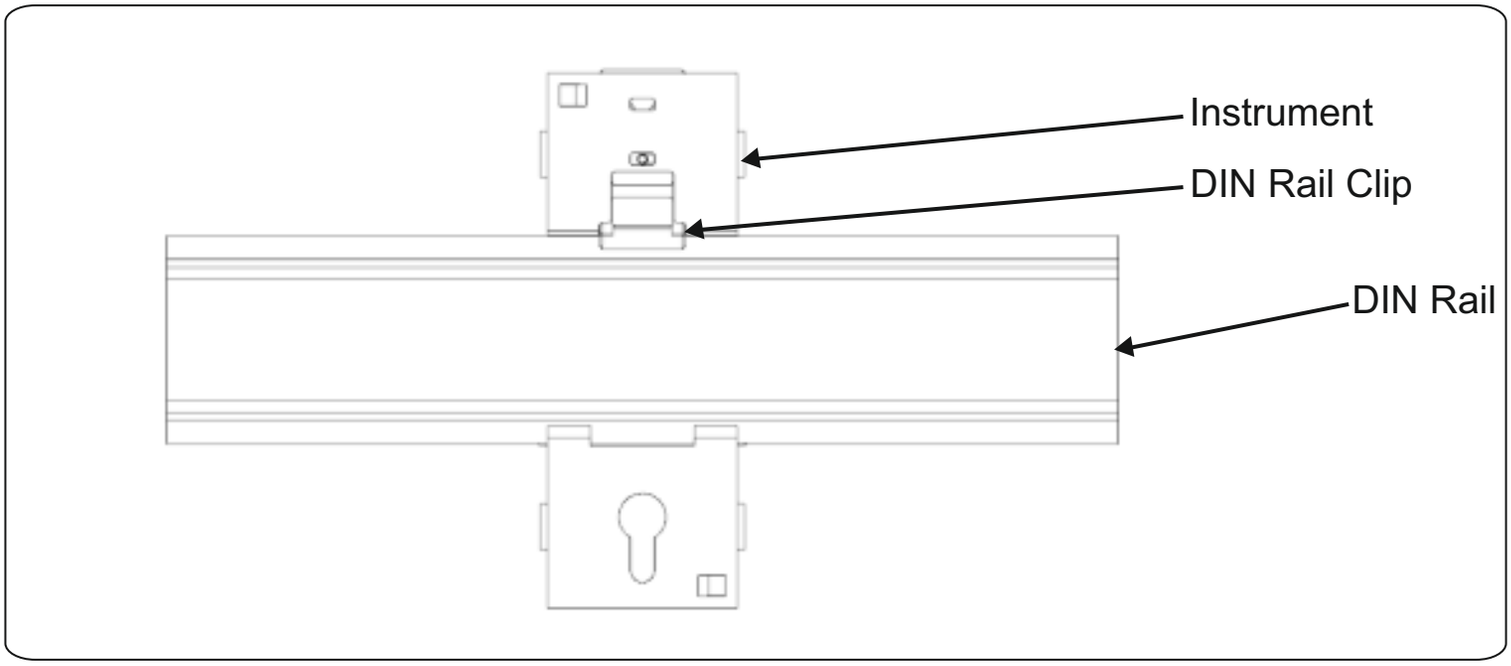
Pulse Output is opto-coupler based SO which can be used to drive an external mechanical counter for energy measurement. The Pulse Output can be configured to the parameters mentioned in TABLE 2 through setup parameter screen.

TABLE 2 : Parameters for Pulse Output

Parameter Number	Parameter
1	Import Energy
2	Export Energy
3	Total Energy

7. Installation

The Instrument should be mounted in a reasonably stable ambient temperature and where the operating temperature is within the range defined by the technical specification. Vibration should be kept to a minimum and the product should not be mounted where it will be subjected to excessive direct sunlight.



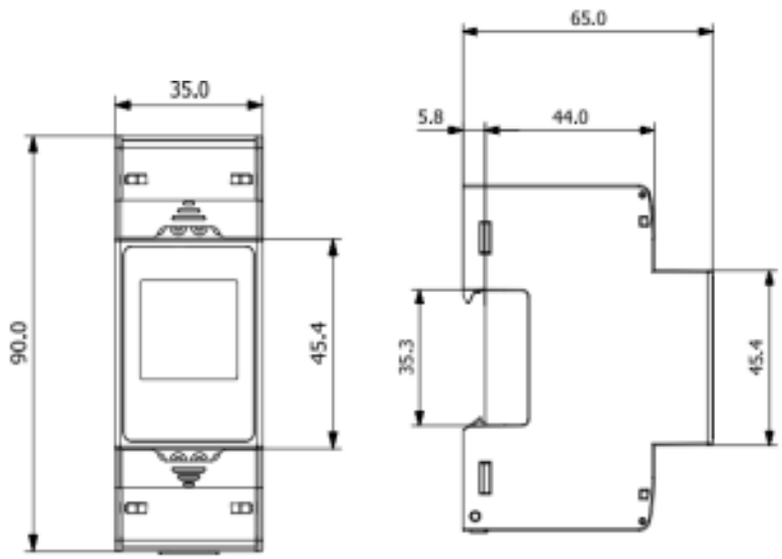
⚠ Caution
1. In the interest of safety and functionality this product must be installed by a qualified engineer, abiding by any local regulations. 2. Voltages dangerous to human life are present at some of the terminal connections of this unit. Ensure that all supplies are de-energised before attempting any connection or disconnection. 3. These products do not have internal fuses therefore external fuses must be used to ensure safety under fault conditions. 4. The intaller must select the approprite supply side protection overcurent device ensuring the rating and characteristics of that device.
⚠ Warning
1. Qualified personnel familiar with applicable codes and regulations must perform the installation. 2. Utilize insulated tools for device installation. 3. Install a fuse, thermal cut-off, or single-pole circuit breaker on the supply line, not on the neutral line.

9.1 EMC Installation Requirements

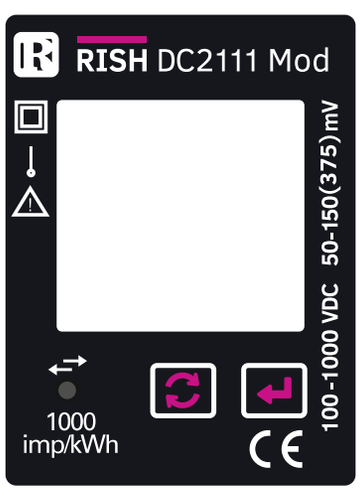
This product has been designed to meet the certification of the EU directives when installed to a good code of practice for EMC in industrial environments, e.g.

1. Screened output and low signal input leads or have provision for fitting RF suppression components, such as ferrite absorbers, line filters etc., in the event that RF fields cause problems.
Note : It is good practice to install sensitive electronic instruments that are performing critical functions, in EMC enclosures that protect against electrical interference which could cause a disturbance in function.
2. Avoid routing leads alongside cables and products that are, or could be, a source of interference.
3. To protect the product against permanent damage, surge transients must be limited to 2kV pk. It is good EMC practice to suppress differential surges to 2kV at the source. The unit has been designed to automatically recover in the event of a high level of transients. In extreme circumstances it may be necessary to temporarily disconnect the auxiliary supply for a period of greater than 5 seconds to restore correct operation.
4. ESD precautions must be taken at all times when handling this product.

7.2 Case Dimensions



7.3 Name Plate



7.4 Wiring

Input connections are made directly to screw-type terminals with indirect wire pressure. Numbering is clearly marked at the connector location. Choice of cable should meet local regulations.

Note : It is recommended to use **wire with** insulated pin type lug for **connection with meter.**

Wire: It is suggested to use wire with a temperature rating of at least 83 Deg. C

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. The terminal for both current and voltage inputs will accept upto 4mm^2 (12AWG) solid or 2.5 mm^2 stranded cable .
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.

	ISO 7000-0434B(2004-01)	CAUTION
	ISO 7000-1641	Operating Instructions

Wiring Guideline :

Connections	Cable Size (mm^2)	Torque (Nm)
L/+V, N/-V, +VDC, -VDC	1 - 2.5 mm^2 use insulated pin types lugs	0.4 Nm
B, A, G, SO+, SO-, I+, I-	0.5 - 2.5 mm^2 Stranded with pin types lugs	0.4 Nm

6.5 Auxiliary Supply

Meter should ideally be powered from a dedicated supply, however powered from the signal source, provided the source remains within it may be the limits of the Chosen auxiliary voltage range.

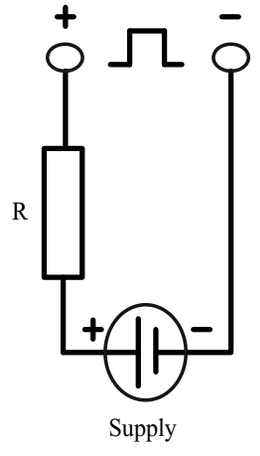
6.6 Fusing

It is recommended to choose fuse of a type and with breaking capacity appropriate to the supply and in accordance with local regulations.

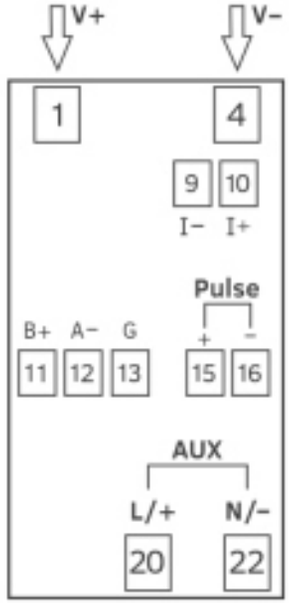
7. Connection Diagram

Connection Terminals Detail:

1	:Voltage +ve
4	:Voltage -ve
9,10	:Current Out, Current In
11,12,13	:RS485 Terminal
15,16	:Pulse Output
20	:Line/+ve
22	:Neutral/-ve



SO Connections



11. Saftey Instructions :

Warning :

This indicates potential danger that can lead to death, serious injury, or significant material damage if not followed. Ignoring these instructions can cause death, serious injury, or major material damage.

Caution :

This indicates electric shock risk, which can also result in death, serious injury, or significant material damage.Risk of electric shock. Not taking precautions can result in death, serious injury, or major material damage.

Qualified Personnel:

- Only qualified individuals should install and operate this device.
- Qualified personnel are those with authorization and knowledge of labeling and grounding electrical equipment according to local safety regulations.

Intended Use:

- Use the device only as specified in the catalog and user manual.
- Use only with devices and components.

Proper Handling:

- Ensure proper transport, storage, installation, connection, operation, and maintenance for reliable operation.
- Be aware that parts of the meter may carry dangerous voltages during use.

Safety Precautions:

1. Use insulated tools suitable for the meter's voltages.
2. Do not connect the meter while the circuit is powered.
3. Install the meter in a dry environment within a suitable IP-rated enclosure.
4. Follow local installation codes and regulations.
5. Avoid installing in explosive areas or places with dust, mildew, or insects.
6. Use wires suitable for the meter's maximum current and ensure correct AC wire connections before powering the meter.
7. Do not touch the meter's connection clamps with bare hands or conductive materials to avoid electric shock.
8. Replace protection covers after installation.
9. Maintenance and repairs should only be performed by qualified personnel.
10. Do not break any seals on the meter as it may affect functionality, accuracy, and void the warranty.
11. Handle the meter carefully to avoid damaging internal components.
12. Ensure all clamps are properly tightened and wires fit securely to avoid bad contact and potential sparks.
13. If required clean the device with a microfiber cloth, keeping liquids away from all components.

9. Specification

Input :

Operating Voltage Range	± 5 - 1000 VDC
Nominal input Voltage Range	100 - 1000 V
Power consumption in Voltage Circuit	< 2 W
Current Sensor	External Shunt
Shunt setting Range	50 - 150(375) mV (Note 1)
Nominal Input Current Range	5 A to 1000 A(via external shunt)
Operating Current Range	± 5 - 2000 A

Auxiliary supply:

Aux	20-60V AC/DC (24V AC/DC nominal)
Burden	< 6VA approx. (at nominal value)
Aux supply frequency	45 to 65 Hz range

Accuracy :

Voltage	± 0.5% of Nominal value
Current	± 0.5% of Nominal value
Power	± 1.0% of range max
Energy	± 1.0 %
Energy (Import / Export)	Class 1 as per IEC 62053-41:21

Pulse Outputs :

SO	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 :

MODBUS :

Protocol	RS485 MODBUS RTU
Baudrate	2.4 / 4.8 / 9.6 /19.2 / 38.4 / 57.6 kbit
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 Baudrate)

Display Ranges :

Energy	0-99999.99 kWh & Autoranging further
Ampere Hour	0-99999.99 kWh & Autoranging further
Voltage	± 0-9999 V
Current	± 0-9999 A
Power	± 0-9999 VA

Installation :

Installation	Indoor
Enclosure	IP51(front side) & IP20(terminal side) (IEC 60529: 2001)
Housing	2 Module DIN 43880
Dimensions	35 mm X 90 mm X 65 mm
Weight	250 gm
Mounting	35 mm DIN Rail

Safety :

Safety Standard	According to 62052-31:2015
Installation Category	II
Protective Class	II (EN 50470-4) / (IEC61010) (IEC)
High Voltage Test	4.4 kV AC, 50Hz for 1 minute between all electrical circuits
Impulse Voltage Withstand	8.0 kV (1.2 microsecond waveform)
Pollution Degree	2
Housing Flame Resistance	Flammability Class V-0 acc. to UL 94, Self Extinguishing, Non Dripping, free of Halogen

Environmental Conditions :

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

Electromagnetic Compatibility	IEC 61326 - 1, Table 2

Note 1 :

IEC62053-41:2021 standard applicable to nominal input current range setting of 5A to 2000A and the shunt settings 50mV to 150mV

Current measurement parameters	5 to1000A	1001 to 2000A
Nominal Current (I_n)	5 to1000A	1001 to 2000A
Maximum Current Imax	<=2*In	2000A

As per EN50470-4:2023 standard applicable for nominal input current settings 5A to 400A and the shunt settings 50mV to 75mV.

Current measurement parameters	5A	400A
Starting Current ($0.04*I_{tr}$)	0.02A	1.6A
Minimum Current ($0.5*I_{tr}$)	0.25A	20A
Transitional Current (I_{tr})	0.5A	40A
Nominal Current (I_n)	5A	400A
Maximum Current Imax ($50*I_{tr}$)	25A	2000A

NOTE