Rayleigh Instruments

# RI-D35-100-C

OP663-V01

## PRODUCT PROFILE

## SPECIFICATIONS

**DISPLAY** - 1 Row of 7 Digits
- LCD Display with backlight

**LCD INDICATIONS**
- ⇄ - Communication in progress
- **MD** - Maximum Demand of Power
- **IP** - Import Energy
- **EP** - Export Energy

**LED INDICATIONS**
- **INT** - Integration of energy

**WIRING INPUT** -1Ø - 2wire

**RATED INPUT VOLTAGE**
-230V AC (±20%)

**FREQUENCY RANGE**
-50 Hz & 60 Hz

**RATED INPUT CURRENT**
-Ib : 10A, Imin : 0.5A, Imax : 100A

**DISPLAY UPDATE TIME**
-1 sec for all parameters

**DISPLAY SCROLLING**
-Auto / Manual (Programmable)

**POWER CONSUMPTION**
-Less than 8VA

**ENVIRONMENTAL CONDITIONS**
- Indoor use
- Altitude up to 2000 meters
- Pollution degree II

Temperature -Operating : -10°C to 55°C
- Storage : -20°C to 75°C

Humidity - Upto 85% (non - condensing)

**MOUNTING** - Din Rail mounting

**WEIGHT** - 150gms

**PROTECTION** Ip51 (Front of housing only - this device must be installed within a suitable IP rated enclosure)

**OUTPUT** - Pulse Output : Voltage Range : External 24V DC Max
- Current Capacity : 100mA Max

The meter is intended to be installed in Mechanical Environment `M1`,with Shock and Vibrations of low significance, as per 2014/32/EU Directive.
The meter is intended to be installed in Electromagnetic Environment `E2`, as per 2014/32/EU Directive.

**COMMUNICATION**
-RS485 MODBUS RTU

## ORDER CODE INFORMATION

| Product | Outputs | Certification | |
|---|---|---|---|
| RI-D35-100-C | RS485 (Modbus RTU) & Pulse | CE | MID |

## SERIAL COMMUNICATION

| | |
|---|---|
| Interface standard and protocol | RS485 AND MODBUS RTU |
| Communication address | 1 to 255 |
| Transmission Mode | Half duplex |
| Data types | Float and Integer |
| Transmission distance | 500 Meter maximum |
| Transmission speed | 9600 &19200 (in bps) |
| Parity P rating : | None, Odd, Even |
| Stop bits | 1 or 2 |

## RESOLUTION

| | |
|---|---|
| Energy | 0.01k |

## ACCURACY

| Measurement | |
|---|---|
| Voltage $V_{L-N}$ | ±0.5% of Full scale |
| Current | ±0.5% of Nominal |
| Power Factor | ±0.01 of Full scale |
| Frequency | ±0.1% of Full range |
| Active Power | 1.00 % of Full range |
| Reactive Power | 1.00 % of Full range |
| Apparent Power | 1.00 % of Full range |
| Active Energy | EN50470(Class B) |
| Reactive Energy | EN62053-23(Class 2) |
| Apparent Energy | Class1 |
| Demand Active Power | 1.00 % of Full range |
| Demand Reactive Power | 1.00 % of Full range |
| Demand Apparent Power | 1.00 % of Full range |

## 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.

⚠ CAUTION :

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.

## WIRING GUIDELINES

⚠ WARNING :

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 acrosssection of 35mm$^2$(13 to11AWG;75C$^0$(min)).Thesewires shall have current carrying capacity of100A.
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.

## INSTALLATION GUIDELINES

⚠ CAUTION :

1. This equipment, being buit-in type, 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.

## CONFIGURATION

There are 2 dedicated keys(Scroll & Enter) to enter into configuration Menu/ change settings.

- The settings should be done by a professional, after going through this user manual and after having understood the application situation.

**For the configuration setting mode :**
- Press the (Scroll & Enter) keys for 3 sec to enter or exit from the Configuration menu.
- In online mode, press Scroll key to move on to next page.
- In config mode, press Enter key to change the parameters value/page and Scroll key to enable the editing and save the changes in configuration.
- Press the Enter key to check Serial no. and CRC no.
- Press the Enter key for 3sec for communication Lock.

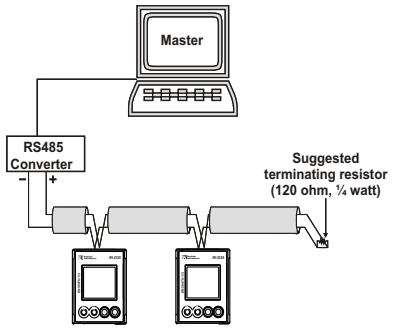
**NOTE :**
- Above 70A current pulse duration should be set to 0.05sec.

| Config. page | Function | Range or Selection | Factory Setting |
|---|---|---|---|
| 1 | Password | 0000 to 9998 | 1000 |
| 2 | Change Password | No / Yes | No |
| 2.1 | New Password | 0000 to 9998 | 0001 |
| 3 | Demand interval method | Sliding / Fixed | Sliding |
| 4 | Demand interval duration | 1 to 30 | 15 |
| 5 | Demand interval length | 1 to 30 min | 1 |
| 6 | POP | Kwh - Total/IP/EP<br>Kvarh -Total/IP/EP | Total varh |
| 7 | Pulse Weight | 1/10/100/1000 | 1000 |
| 8 | Pulse Duration | 0.05 to 2 sec | 0.1 |
| 9 | Slave Id | 1 to 255 | 1 |
| 10 | Baud rate | 9600, 19200 bps | 9600 bps |
| 11 | Parity | None, Odd, Even | None |
| 12 | Stop Bit | 1 or 2 | 1 |
| 13 | Backlight | 0 to 7200 | 0 |
| 14 | Factory default | No / Yes | No |
| 15 | Reset | No / Yes | No |
| 15.1 | Password | 0001 to 9999 | 1001 |
| 15.2 | Reset kwh | No / Yes | No |
| 15.3 | Reset kvarh | No / Yes | No |
| 15.4 | Reset kvah | No / Yes | No |
| 15.5 | Reset Max Demand | No / Yes | No |

## PULSE OUTPUT DESCRIPTION

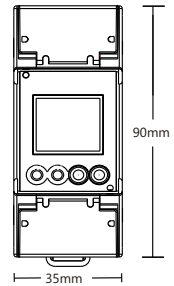
| Pulse Output | Type | Description | Pulse width |
|---|---|---|---|
| POP1 | Fixed 1000 Kwh Pulses | Kwh | 0.05 to 2 sec |
| POP2 | Configurable 1/10/100/1000 Pulses | Kwh - Total/IP/EP<br>kvarh - Total/IP/EP | 0.05 to 2 sec |

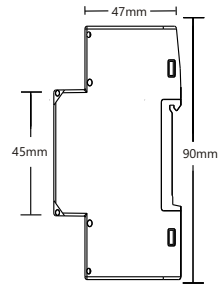
## CONNECTION DIAGRAM FOR COMMUNICATION



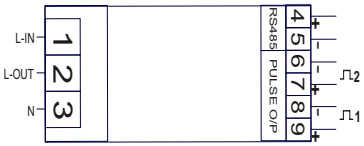

Contact sales for PC based monitoring software to communicate with the meters.

## MECHANICAL DIMENSIONS



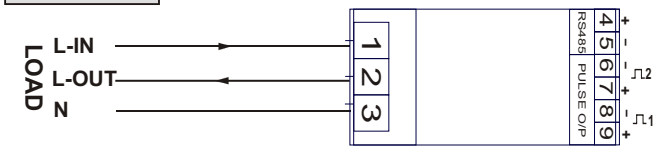




## TERMINAL CONNECTIONS




## TYPICAL WIRING DIAGRAM

1 PHASE 2 WIRE




## FRONT PANEL DESCRIPTION

FOR RI-D35-100-C

| KEY PRESS | ONLINE PAGE DESCRIPTION | |
|---|---|---|
| Press | 1st screen | Displays Total Active Energy |
| | 2nd screen | Displays Import Active Energy |
| | 3rd screen | Displays Export Active Energy |
| | 4th screen | Displays Total Reactive Energy |
| | 5th screen | Displays Import Reactive Energy |
| | 6th screen | Displays Export Reactive Energy |
| | 7th screen | Displays Apparent Energy |
| | 8th screen | Displays Active Power |
| | 9th screen | Displays Reactive Power |
| | 10th screen | Displays Apparent Power |
| | 11th screen | Displays Voltage L-N |
| | 12th screen | Displays Current |
| | 13th screen | Displays Power Factor |
| | 14th screen | Displays Frequency |
| | 15th screen | Displays Max Demand Active Power |
| | 16th screen | Displays Max Demand Reactive Power |
| | 17th screen | Displays Max Demand Apparent Power |

## AUTOMATIC/MANUAL

Long press scroll key to toggle between Automatic/Manual mode.

## MODBUS REGISTER ADDRESSES LIST

Readable parameters for Communication
[Length (Register) : 2; Data Structure : Float]

| Address | Hex Address | Parameter |
|---|---|---|
| 30001 | 0x01 | Total Active Energy |
| 30003 | 0x03 | Import Active Energy |
| 30005 | 0x05 | Export Active Energy |
| 30007 | 0x07 | Total Reactive Energy |
| 30009 | 0x09 | Import Reactive Energy |
| 30011 | 0x0B | Export Reactive Energy |
| 30013 | 0x0D | Apparent Energy |
| 30015 | 0x0F | Active Power |
| 30017 | 0x11 | Reactive Power |
| 30019 | 0x13 | Apparent Power |
| 30021 | 0x15 | Voltage L-N |
| 30023 | 0x17 | Current |
| 30025 | 0x19 | Power Factor |
| 30027 | 0x1B | Frequency |
| 30029 | 0x1D | Max Demand Active Power |
| 30031 | 0x1F | Max Demand Reactive Power |
| 30033 | 0x21 | Max Demand Apparent Power |

Energy rollover counter addresses : Energy rollover counter will increment when energy is roll over from 99999.99 to 0.
[ Data Structure: Integer]

| | | |
|---|---|---|
| 30150 | 0x96 | Total Kwh |
| 30151 | 0x97 | Import Kwh |
| 30152 | 0x98 | Export Kwh |
| 30153 | 0x99 | Total Kvarh |
| 30154 | 0x9A | Import Kvarh |
| 30155 | 0x9B | Export Kvarh |
| 30156 | 0x9C | Kvah |

(Specifications subject to change as development is a continuous process.)

**Rayleigh Instruments**
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