



Technical Data Sheet

AD21-1PRJ-x

SINGLE-PHASE AC ENERGY METER - RJ12 CURRENT INPUT, DIN RAIL MOUNTING



AD21-1PRJ-x is a modern Single Phase RJ12 CT Connected Energy Meter designed for intended to use in residential, commercial and light industrial Electrical Energy Metering. The meter is engineered using advanced microcontroller technology and is suitable for electrical parameter measurement and monitoring in 1 Phase 2 Wire Networks. The meter is available in 100 mA maximum current measurement range through external CT connection. It supports Tariff Counters selectable via MODBUS or MBUS Communication or Tariff Input. It displays parameters on bright intuitive LCD and also 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.

Application

- Residential & Commercial
- Light Industrial
- Energy Management & Monitoring
- Renewable Energy Systems
- Billing & Revenue Metering
- Data Centers

Product Features

- **Plug and Play Current Transformer**
 - RJ-12 connector is available for external CT connection, which enables easy, fast and error free installation. Meter is also self-powered thus offer simplified connections.
- **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 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 Pulse Outputs (SO) that can be configured for any one of the Active (Import/Export), Reactive (Import/Export/Inductive/Capacitive) Energy parameter. The pulse width and rate of pulse out is onsite programmable.
- **Impulse LED**
 - The meter has Impulse LED which flash at rate of 1000 IMP/kWh indicating the Active Energy consumption.
- **Front Keys**
 - Two keys are provided for easy navigation and accessibility of different parameters and onsite programming of the meter.
- **LCD**
 - 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 communication status, active tariff, pulse outputs are available on screen. Measurement screen can be set as automatic scrolling or manual scrolling.
- **Remote Communication (Optional)**
 - The Meter provides communication based on MODBUS or MBUS protocol for remote data acquisition of measurement data & configuration. MODBUS or MBUS parameters baud rate, device address and parity-stop bits are programmable.
- **Tariff Input**
 - The meter has one Tariff Input dedicated for selection of active tariff T1 and T2. The opto-isolated Tariff Input 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 or via MODBUS or MBUS Communication. Energy for tariff are Active Energy (Import/Export/Total), Reactive Energy (Import/Export/Total) and Apparent Energy.
- **On-Site Programable CT Ratios**
 - It is possible to program Primary value of current transformer (CT) via front panel keys. The settable range for CT primary is 5A-9999A . This parameters are configured and programmed at the site only in first 15 minutes after entering into CT Primary or CT secondary edit mode and get locked as per MID standards.
- **Compliance to Standards**
 - National / International Standards are complied
 - Accuracy Standard : EN50470-3:2022
IEC62053-21, 23
 - IP for water & dust: IEC 60529
 - Plastic Flammability Standard: UL 94
 - Safety Standard 62052-31:2015

Technical Specifications

Input Voltage

Nominal Voltage (U_n)	230 VLN
Operating Voltage Range	184 - 253 VLN
Power consumption in Voltage Circuit	< 2 W (7 VA)
Current Measurement Parameter	RJ12 MODEL
Starting Current ($I_s = 0.04 \cdot I_{tr}$)	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-100mA (120mA)
Short time Over-current	20 \cdot I_{max} for 0.5 seconds
Power consumption in Current Circuit	<0.03 VA
Nominal Frequency	50 / 60 Hz
Operating Frequency Range	45 to 66 Hz

Auxiliary Supply

Type	Self Powered
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Reference Conditions for Accuracy

Reference Temperature	23°C \pm 2°C
Input Voltage	$U_n \pm 1\%$
Input Waveform	Sinusoidal (distortion factor <2%)
Input Frequency	50 Hz \pm 0.3%

Accuracy

Active Energy (Import/Export)	Class B as per EN50470-3 : 2022 Class 1 as per IEC 62053-21
Reactive Energy (Import/Export)	Class 2 as per IEC62053-23
Apparent Energy	$\pm 1.0 \%$
Voltage	$\pm 0.5\%$ of range max
Current	$\pm 0.5\%$ of Nominal value
Frequency	$\pm 0.2\%$ of Mid frequency
Active Power	$\pm 1\%$ of range max
Reactive Power	$\pm 1\%$ of range max
Apparent Power	$\pm 1\%$ of range max
Power Factor	$\pm 1.0 \%$

Pulse Output

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, 10, 100, 1000 pulse per kWh/kVARh/kVAh

Impulse LED

Impulse Rate	1000 pulse per kWh
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Technical Specifications

Communication Interface (MODBUS)

Protocol	RS 485 MODBUS
Baudrate	2.4/ 4.8/ 9.6/ 19.2/ 38.4 kbit
Data Width	8
Parity - Stop Bits	None -1 / None -2/ Even -1 / Odd -1
Response Time	< 200 millisecond (1000 millisecond for 2.4/ 4.8 Kbit 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	0.01-99999.99 kWh & Autoranging further
Reactive Energy	0.01-99999.99 kVARh & Autoranging further
Apparent Energy	0.01-99999.99 kVAh & Autoranging further
Active Power	0-3000 KW
Reactive Power	0-3000 KVAR
Apparent Power	0-300 0KVA

Installation

Installation	Indoor
Enclosure	IP51 (Front side) & IP20 (Terminal side) (IEC 60529: 2001)
Housing	2 Module DIN 43880
Dimensions	35 mm X 95.5 mm X 65 mm
Weight	250 gm
Mounting	35 mm DIN Rail

Safety

Safety Standard	According to 62052-31:2015
EMC Standard	IEC61326 (IEC)
Installation Category	III
Protective Class	II (EN 50470-3) / IEC61010 (IEC)
Pollution Degree	2
High Voltage Test	4 kV AC, 50Hz for 1 minute between all electrical circuits
Impulse Voltage Withstand	6.0 kV (1.2 microsecond waveform)
Housing Flame Resistance	Flammability Class V-0 acc. to UL 94, Self Extinguishing, Non Dripping, free of Halogen

Technical Specifications

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)
Shock	Half sine wave, peak acceleration $30g_n$ (300 m/s^2), pulse duration 18msec
Viabration	10...150Hz, $f < 60 \text{ Hz}$ 0.075mm constant amplitude, $f > 60 \text{ Hz}$ $1g_n$ constant acceleration, 10 sweep cycles per axis
Altitude	<2000 m max

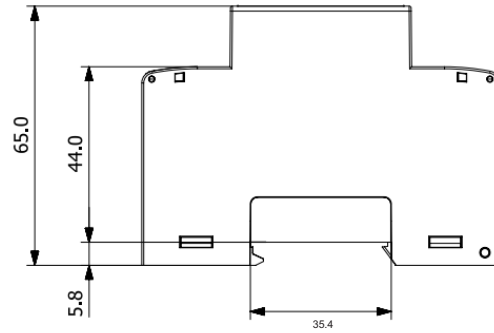
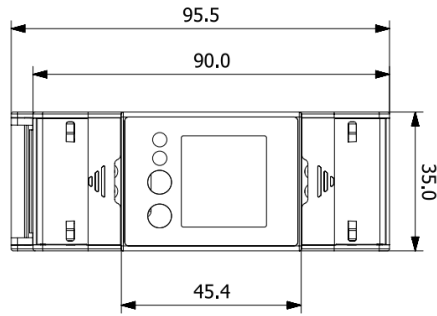
Tariff Input

0 V	Low
230 V	High

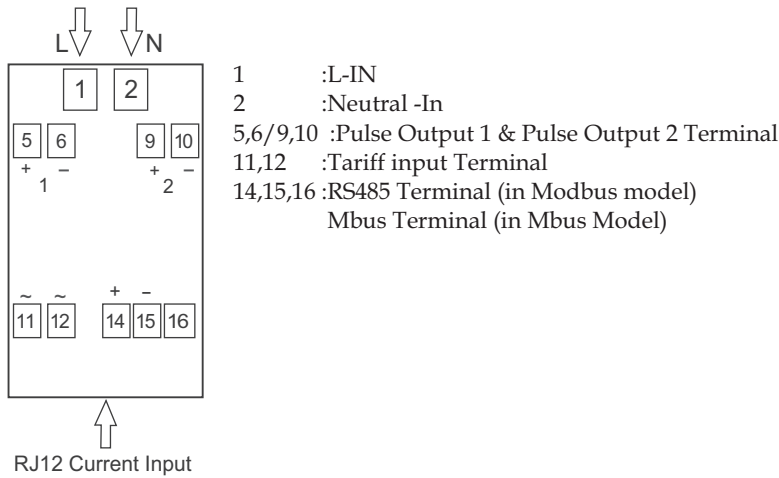
Technical Specifications

Sr No	Displayed Parameters	Sr No	Displayed Parameters
1	Import Active Energy	23	Partial Export Active Energy
2	Export Active Energy	24	Partial Total Active Energy
3	Total Active Energy	25	Partial Import Reactive Energy
4	Import Reactive Energy	26	Partial Export Reactive Energy
5	Export Reactive Energy	27	Partial Total Reactive Energy
6	Total Reactive Energy	28	Partial Total Apparent Energy
7	Total Apparent Energy	29	Max Import kVA Demand
8	Tariff 1 Import Active Energy	30	Max Current Demand
9	Tariff 1 Export Active Energy	31	Max Export kVA Demand
10	Tariff 1 Total Active Energy	32	Max Import kW Demand
11	Tariff 1 Import Reactive Energy	33	Max Export kW Demand
12	Tariff 1 Export Reactive Energy	34	Max Import kVAR Demand
13	Tariff 1 Total Reactive Energy	35	Max Export kVAR Demand
14	Tariff 1 Total Apparent Energy	36	Voltage
15	Tariff 2 Import Active Energy	37	Current
16	Tariff 2 Export Active Energy	38	Frequency
17	Tariff 2 Total Active Energy	39	Active Power
18	Tariff 2 Import Reactive Energy	40	Reactive Power
19	Tariff 2 Export Reactive Energy	41	Apparent Power
20	Tariff 2 Total Reactive Energy	42	Power Factor
21	Tariff 2 Total Apparent Energy	43	Number of Interruptions
22	Partial Import Active Energy		

Dimensions

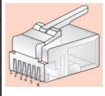


Electrical Connections



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 2.RS485,MBUS,Tariff Input,SO terminals	0.4 Nm
Length available for lug entry in terminal (mm)	6.5
Use Standard RJ12 Connector	
PIN NUMBER	1, 3, 5 2, 4, 6
CT SIDE	S1 S2
*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.

Ordering information

Ordering Code	Model	Ordering Description
ER21-Z00101A0B00ST	AD21-1PRJ-TS	AD21-1PRJ-TS : 184-276VLN 100mA 1TI + 2SO
ER21-Z00101B0B00ST	AD21-1PRJ-RS	AD21-1PRJ-RS : 184-276VLN 100mA RS+1TI+2SO
ER21-Z00101C0B00ST	AD21-1PRJ-MBUS	AD21-1PRJ-MBUS : 184-276VLN 100mA MBUS+1TI+2SO



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