



Technical Data Sheet

AD11-1P45-x

*SINGLE-PHASE AC ENERGY METER -DIRECT CONNECTION,
DIN RAIL MOUNTING*



AD11-1P45-x is a modern Single Phase Direct Connected AC Energy Meter designed for intended 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. It supports maximum 45 A current measurement on direct connection. It supports Tariff Counters selectable via MODBUS or MBUS Communication or Tariff input. It displays parameters on bright LCD and also has Pulse Output 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

- **Direct Connection Meter**
 - The meter can safely measure 45 A maximum current on direct connection, eliminating the use of expensive external CT for high current networks. 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 Output**
 - The meter has one optional opto-isolated potential free pulse output that can be configured for any one of the Active (Import/Export), Reactive (Import/Export) and Apparent 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 impulse per 1 kWh indicating the Active Energy consumption.
- **Front Keys**
 - One key is provided for easy navigation and accessibility of different parameters.
- **Remote Communication (Optional)**
 - The meter provides optional communication based on MODBUS or MBUS protocol for remote data acquisition of measurement data and configuration. MODBUS or MBUS parameters are Baud rate, device address and parity-stop bits are programmable.
- **Tariff Input (Optional)**
 - The meter has one Tariff Input dedicated for selection of active tariff T1 and T2. The opto-isolated Tariff is rated for a wide range of AC 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.
- **LCD**
 - The LCD has bold seven segment digits with bright white backlit for display of measurement parameters. Measurement screen can be set as automatic scrolling or manual scrolling.
- **Compliance to Standards**
 - National / International Standards are complied
 - Accuracy Standard : EN 50470-3:2022
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 (Un)	230 VLN
Operating Voltage Range	193 - 253 VLN
Power consumption in Voltage Circuit	< 2 W (10 VA)
Starting Current ($I_{st} = 0.04 \cdot I$)	20 mA
Minimum Current ($I_{min} = 0.5 \cdot I_{tr}$)	250 mA
Transitional Current (I_{tr})	0.5 A
Nominal Current ($I_{ref} = 10 \cdot I_{tr}$)	5A
Maximum Current ($I_{max} = 90 \cdot I_{tr}$)	45A
Operating Current range	0.25-5 A (45 A)
Short time Over-current	$30 \cdot I_{max}$ for one half-cycle at 50 Hz
Power consumption in Current Circuit	<1 VA per phase
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	$23^{\circ}\text{C} \pm 2^{\circ}\text{C}$
Input Voltage	$U_n \pm 1\%$
Input Waveform	Sinusoidal (distortion factor <2%)
Input Frequency	$50 \text{ Hz} \pm 0.3\%$

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	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 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
Device Address	1 247
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	0-99999 W
Reactive Power	0-99999 VAR
Apparent Power	0-99999 V

Installation

Installation	Indoor
Enclosure	IP51 (Front side) & IP20 (Terminal side) (IEC 60529: 2001)
Housing	1 Module DIN 43880
Dimensions	17.5 mm X 90 mm X 65 mm
Weight	150 gm
Mounting	35 mm DIN Rail

Safety

Safety Standard	According to 62052-31:2015
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

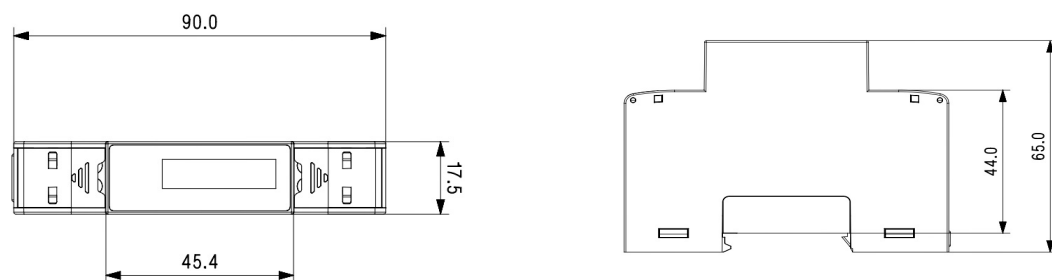
Technical Specifications

Environmental Conditions	
Mechanical Environment	M1
Electromagnetic Environment	E2
Operating Temperature	-25°C to +7°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, $f < 60$ Hz 0.075mm constant amplitude, $f > 60$ Hz $1g_n$ constant acceleration, 10 sweep cycles per axis
Altitude	<2000 m max
Wiring Guidelines	
Current Input Wire Size	2.5 - 10 mm ² (use insulated pin type lug)
Current Voltage Tightening Torque	0.5 Nm
RS485/ MBUS/ SO, Tariff Input Wire Size	1 to 2.5 mm ² (Solid/Stranded with pin type lug)
RS485 / MBUS/ SO, Tariff Tightening Torque	0.4 Nm
Tariff Input	
0 V	Low
230 V	High

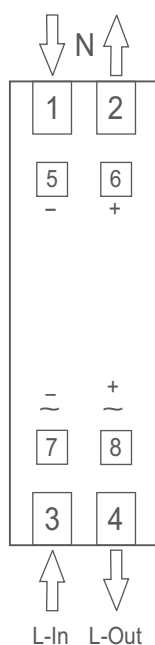
Technical Specifications

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



- 1- Neutral IN
- 2- Neutral Out
- 3- L-In
- 4- L-Out
- 5,6 Pulse Output Terminal
- 7,8 Tariff input Terminal (in Tariff input Model)
- RS485 Terminal (in Modbus Model)
- Mbus Terminal (in MBUS Model)

Ordering information

Ordering Code	Model	Ordering Description
ED11-Z00101A0B00ST	AD11-1P45-TS	AD11-1P45-TS : 193-253VLN 45A 1TI + 1SO
ED11-Z00101B0B00ST	AD11-1P45-RS	AD11-1P45-RS : 193-253VLN 45A RS+1SO
ED11-Z00101C0B00ST	AD11-1P45-MBUS	AD11-1P45-MBUS : 193-253VLN 45A M-BUS+1SO



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