ChargePoint CPKM3000

Integrated Meter Guide

Important Safety Instructions

DANGER: RISK OF SHOCK. Before working with this equipment, disconnect the power to the CPKM3000 Integrated Meter. Follow standard practice and local code to de-energize the applicable circuit and lock out/tag out the disconnect before proceeding. Use a multimeter to test that power is off. Keep power off for this circuit until the work scope is completed. FAILURE TO FOLLOW THESE INSTRUCTIONS CAN RESULT IN SERIOUS INJURY OR LOSS OF LIFE.

IMPORTANT: You must be a licensed electrician and complete online training to become a ChargePoint approved installer, and to get a login for ChargePoint. If you do not complete this training, you will be unable to complete the installation process.
To complete online training and become a certified installer, refer to ChargePoint University at: chargepoint.com/installers.

CAUTION: Do not use power tools during installation or servicing. Over-torquing can damage the equipment.

WARNING: Do not install or service the charging station in inclement weather. If you work in snow, rain, or wind, you must use a weather-proof shelter that covers all boxes and components.

IMPORTANT: The CPKM3000 is not repairable in the field and does not contain any user-serviceable parts. In case of any error, the CPKM3000 opens internal relays and interrupts the flow of energy.

Contents

1 Introduction

The CPKM3000Meter is an active energy measurement device which can measures active energy being delivered from the grid. It has been designed to fit and be installed within a custom made AC EV charger which shall provide a sealed and controlled environment (at least IP54).

Voltage Configurations

- 230/400 V, 50Hz, 3p+N meter, which can work as a 3ph or 1ph meter.
- 230 V, 50Hz, 1ph + N meter, which works as a 1ph meter.

The meter can be powered up from any L1, L2 and L3 phase. However, for the practical application of our product, the meter shall always be connected to L1. Without L1, the entire device (meter + EVSE) won't work. A configuration where L1 is not connected, but L2 and L3 is, is not valid.

Wiring Systems

Supports TT, TNS, TNC-S, and IT systems. Neutral is mandatory. In IT systems without a neutral, L2 may serve as neutral (max 230 VAC).

LCD Display

The backlit LCD shows cumulative active energy.

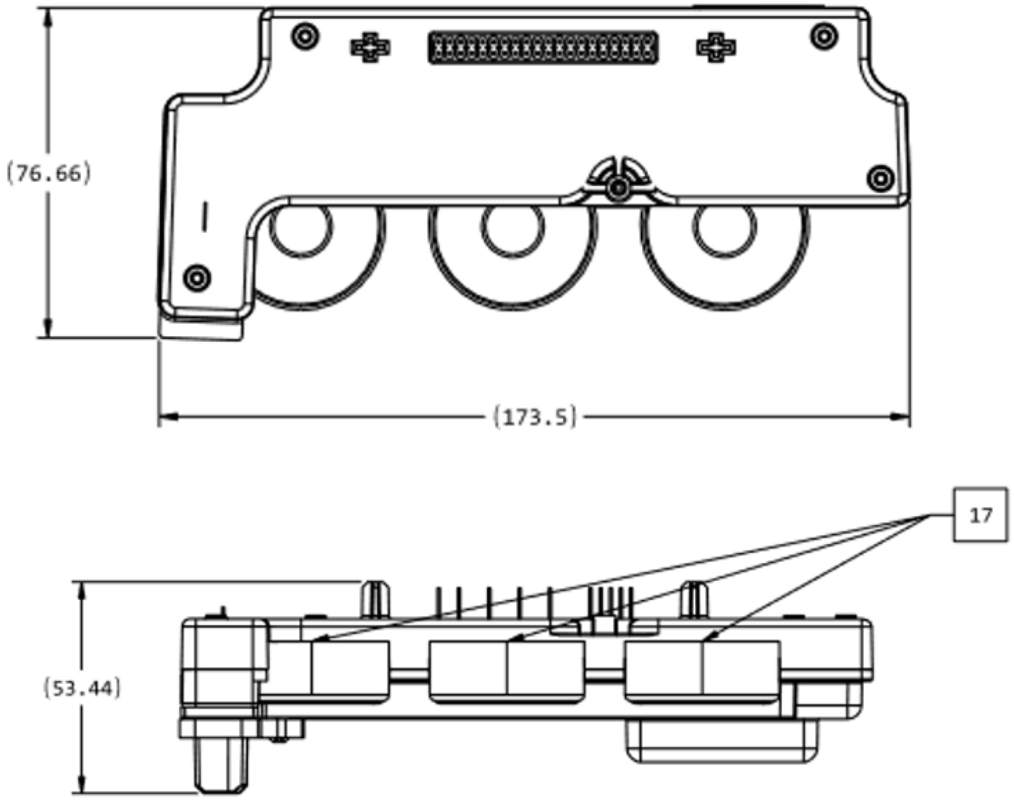
Meter Dimensions and MID Labels 2

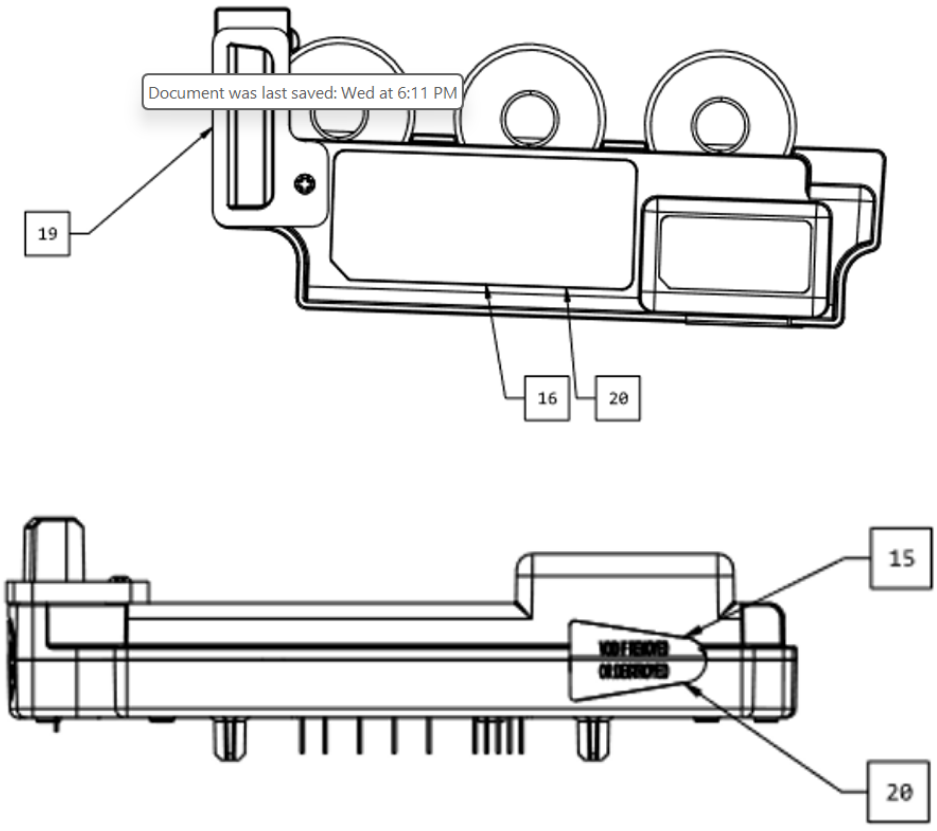
This section provides a visual and descriptive overview of the physical dimensions of the CPKM3000 meter and the associated MID (Measuring Instruments Directive) labeling used for compliance and identification.

Physical Dimensions

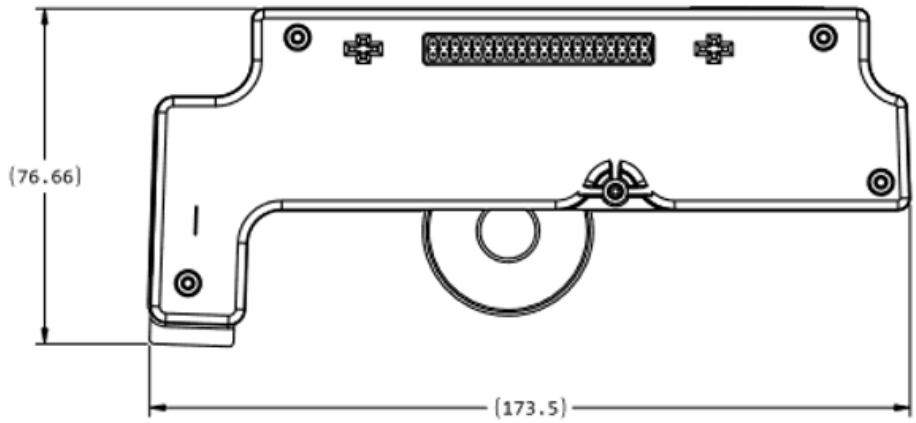
Note: Images are not to scale. Measurements appear in metric units (mm) followed by imperial equivalents (inches).

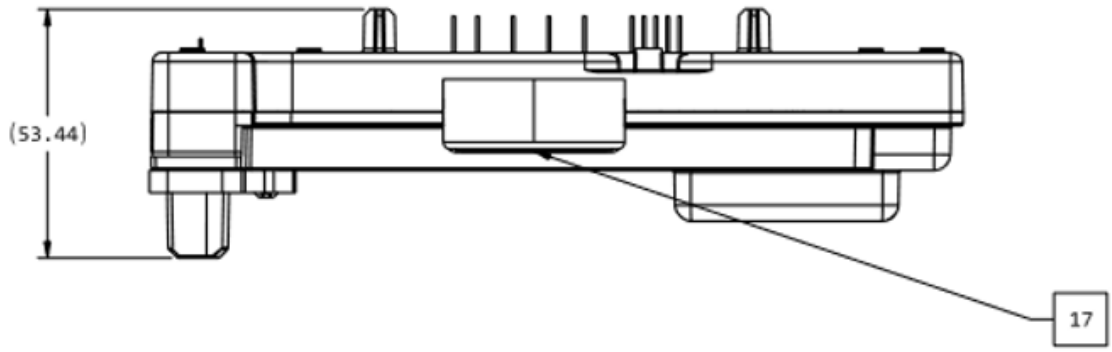
Three Phase Module





Single Phase Module


(76.66)
(173.5)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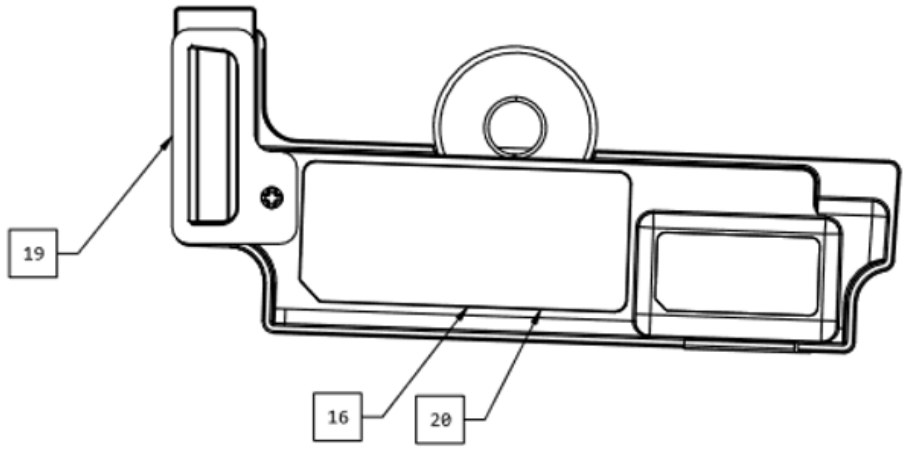
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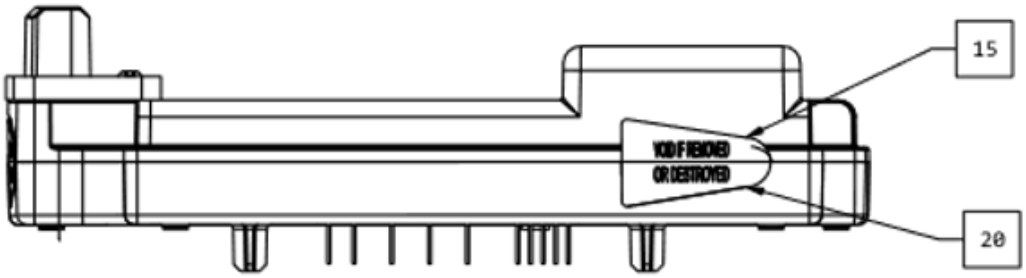
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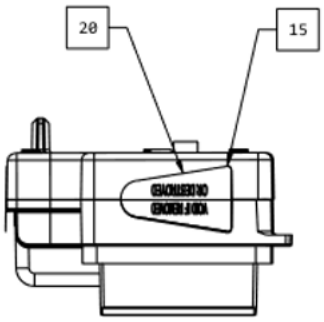
VOID IF REMOVED
OR DESTROYED
20



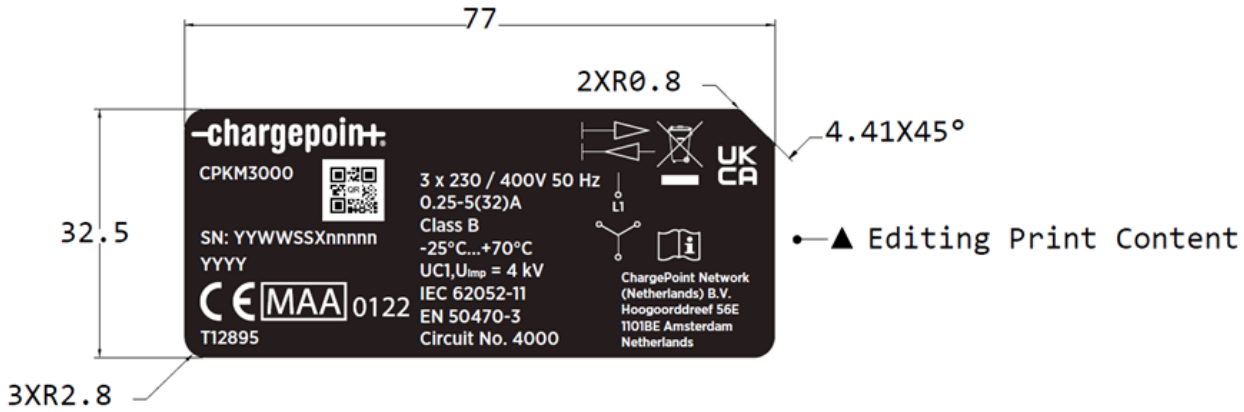
MID Labels

The following MID (Measuring Instruments Directive) labels ensure compliance with regulatory standards and vary based on meter configuration.

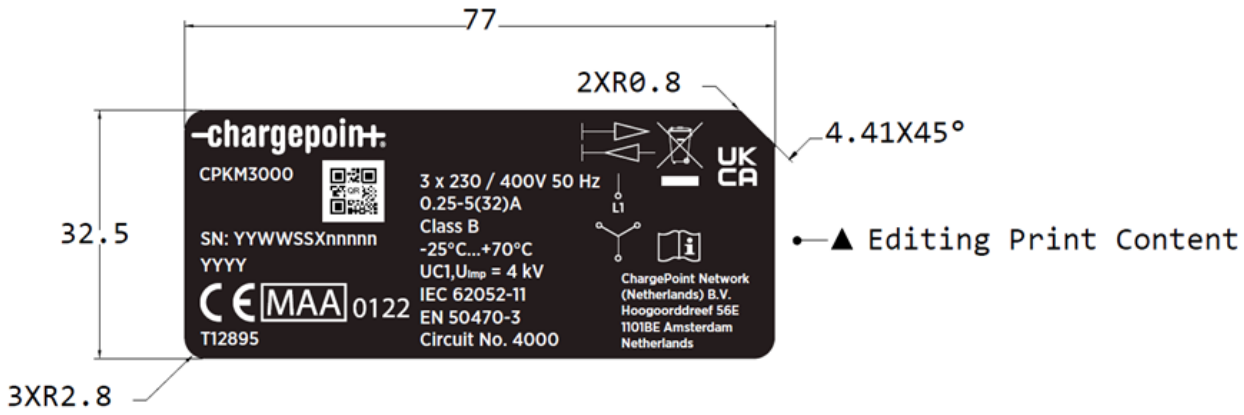
Detailed MID labels are available for:

- 1-phase meters
- 3-phase meters
- Tamper protection

1-phase meters

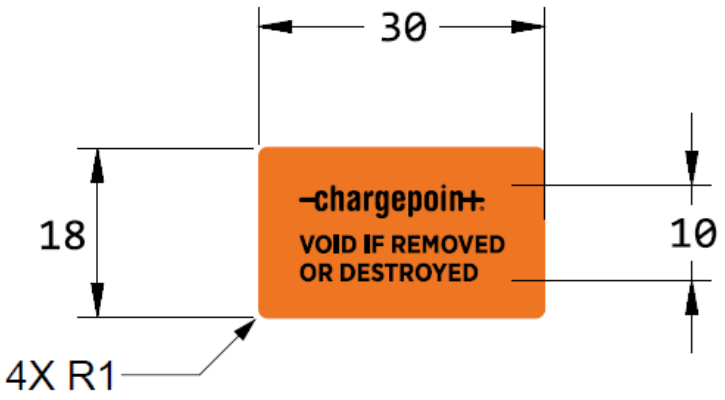


3-phase meters



1:1

Tamper label



1:1

3 Data Protection and Firmware Security

Data integrity and firmware security are central to the reliable operation of the CPKM3000 meter. The following subsections describe how energy data is securely stored, how firmware is managed, and how physical tampering is prevented

Energy Data Storage

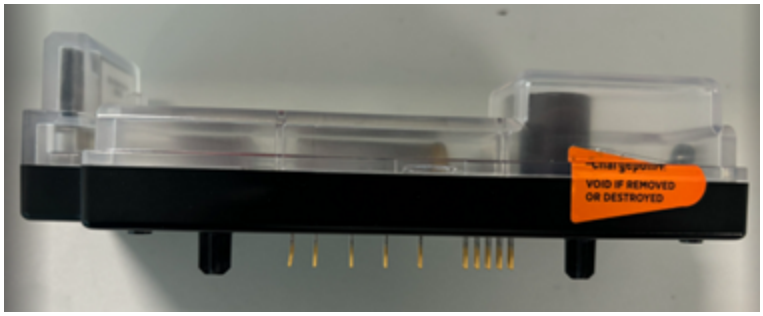
Energy consumption data is securely stored in the embedded STM32G4xx microcontroller. The microcontroller does not expose any direct access points for retrieving or modifying this data externally.

Firmware Security

Firmware updates are performed through the CAN bus interface. The meter uses a secure boot mechanism to authenticate updates, ensuring that only signed and authorized firmware can be installed.

Tamper Protection

To safeguard against unauthorized access or tampering, the meter is equipped with tamper-proof labels located in two specific areas. These labels provide a visual indication if the device has been opened or altered.



Interface Description 4

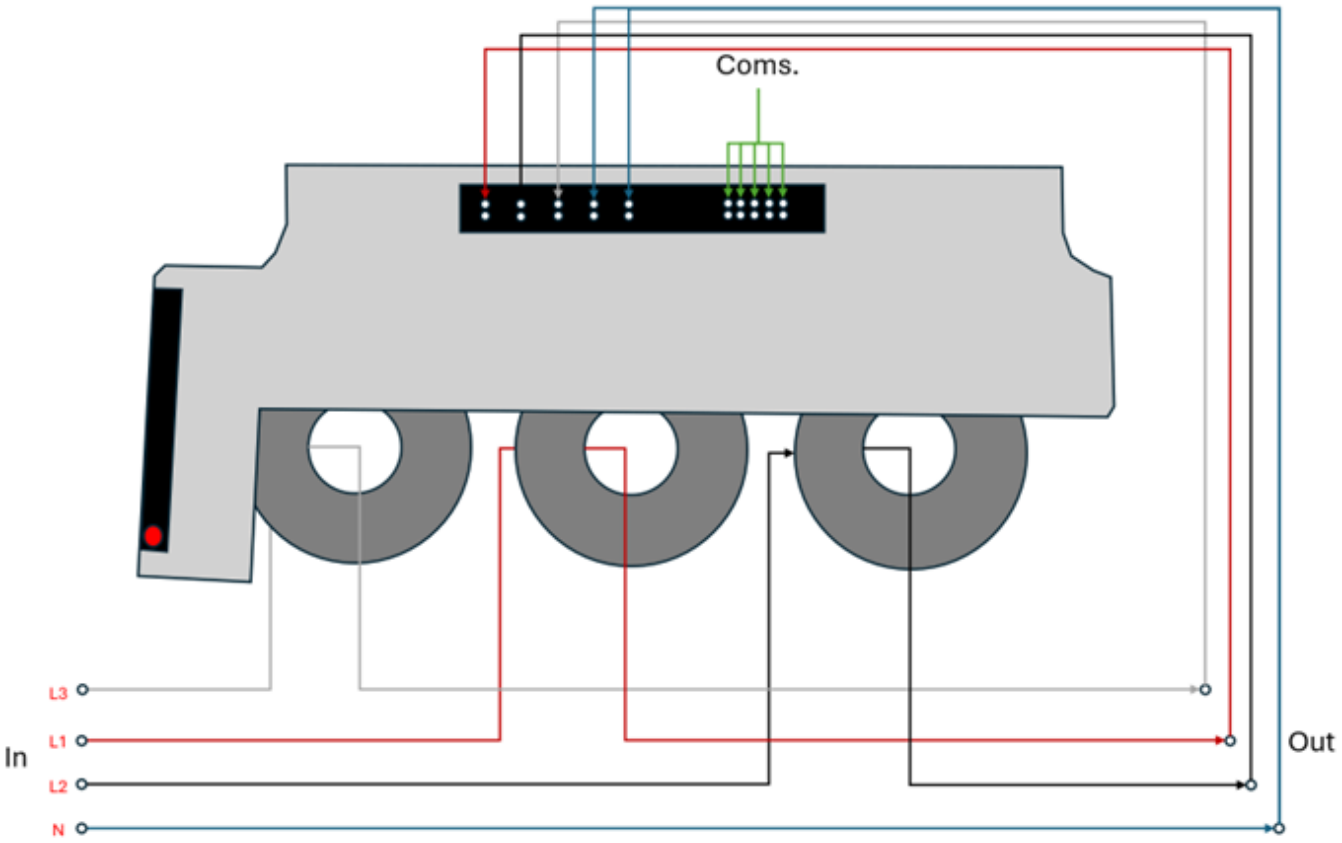
The CPKM3000 meter features a range of physical and electrical interfaces that support integration with EVSE (Electric Vehicle Supply Equipment). These include power supply inputs, voltage measurement points, LED indicators, a display interface, and a CAN bus for communication.

Power Input and CAN Bus

The meter includes:

- AC power input
- Voltage measurement circuit
- LED indicators
- LCD display
- CAN bus interface

Integrated Meter Wiring Diagram – Voltage and current circuit

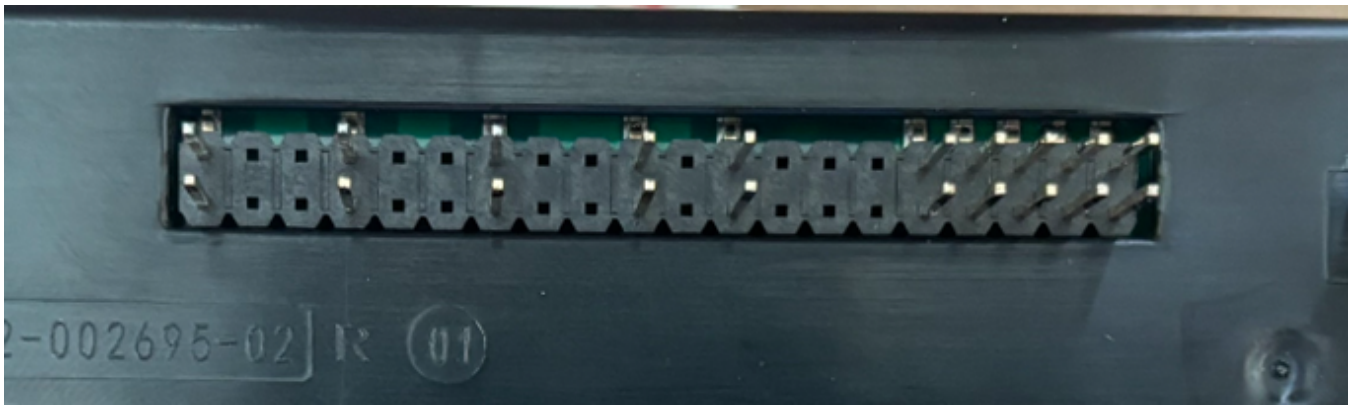


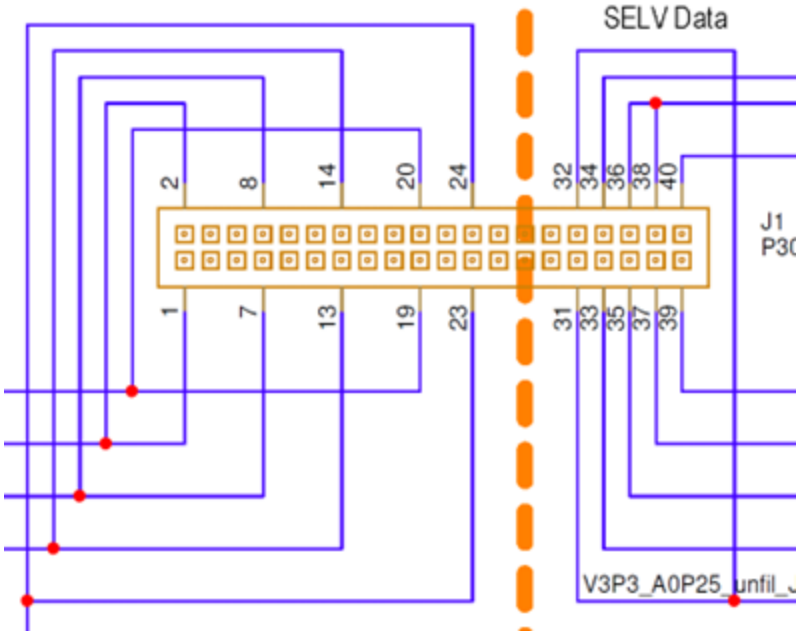
Note: 3-phase meter can also be used as 1-phase meter. For 1-phase meter, only L1 and N are necessary.

Main Connectors

The CPKM3000 meter includes a 40-pin main connector used for interfacing with power lines, neutral lines, CAN communication, and control signals. Each pin is designated for a specific signal or voltage rail, supporting the operation and monitoring functions of the meter.

Main Connectors





Connector Pinout Table

The following table lists the connector pin assignments for the CPKM3000 meter, including the pin ranges, signal names, and their corresponding electrical or communication functions.

Pin Range	Signal Name	Description
1–2	AC_L1_IN_hv	L1 power supply of meter
3–4	blank	—
5–6	blank	—
7–8	AC_L2_IN_hv	L2 power supply of meter
9–10	blank	—
11–12	blank	—
13–14	AC_L3_IN_hv	L3 power supply of meter
15–16	blank	—
17–18	blank	—
19–20	AC_SYS_N_ RTN	Neutral for the system
21–22	blank	—
23–24	N	N power supply of meter
25–26	blank	—
26–27	blank	—
28–29	blank	—
30	blank	—

Pin Range	Signal Name	Description
31–32	V3P3_A0P25_FI_lv	Filtered 3.3V supply from the EVSE AC Board powering the SELV side of the meter data interface
33	CAN_TX_lv	Transmit data line from meter to CAN bus (SELV side)
34	DBG_Rx_FLT_lv	FAULT indicator line from EVSE AC Board to meter; also used for UART debug Rx (SELV side)
35	CAN_RX_lv	Receive data line from CAN bus to meter (SELV side)
36–38	0V_J1_lv	0V (ground) supply on SELV side of the meter
37	ACS_DATA_Tx_lv	UART transmit line for data sent to ACB controller (e.g., zero crossing and voltage samples)
39	ADC_SYNC_lv	Synchronization pulse to align external meter readings to voltage samples (SELV side)
40	V_TX_UART_lv	UART data transmit line to external devices for metrology data (SELV side)

Pin P1R (Right)

Pin Range	Signal Name	Description
1–2	AC_L1_IN_hv	L1 power supply
7–8	AC_L2_IN_hv	L2 power supply
13–14	AC_L3_IN_hv	L3 power supply
19–20	AC_SYS_N_RTN	Neutral return
23–24	N	Neutral power supply
31–32	V3P3_A0P25_FI_lv	3.3V supply for SELV side
33	CAN_TX_lv	CAN bus transmit
34	DBG_Rx_FLT_lv	Fault indicator/debug
35	CAN_RX_lv	CAN bus receive
36–38	0V_J1_lv	Ground (SELV side)
37	ACS_DATA_Tx_lv	UART Tx to ACB controller
39	ADC_SYNC_lv	Sync pulse for external meters
40	V_TX_UART_lv	UART Tx for metrology data

Display Information

The display of the CPKM3000 meter provides real-time visual feedback of energy usage and software status. When powered by any phase (L1, L2, or L3 to N), the display automatically cycles through the following values every 3 to 6 seconds:

Display Values

State	Description	Caption Preview
POS	Positive (grid to EV) energy register	POS display 
XXXXX.XX kWh	Accumulated positive energy	kWh display 
NEG	Negative (EV to grid) energy register	NEG display 
XXXXX.XX kWh	Accumulated negative energy	kWh display 
Lrs	Legally relevant software	Lrs code 
YYYYYY SW	Software version	SW display 

POS – Grid to EV energy

kWh – Accumulated positive energy in kWh

NEG – EV to grid energy

kWh – Accumulated negative energy in kWh

Lrs – Legally relevant software

SW – Software version

LED Indicators

The CPKM3000 meter includes two LEDs integrated into the display panel:

1. **Impulse LED (red):**

- Pulses at a rate of 20000 impulses per kWh.
- Used to calculate metered energy with high resolution.

2. **Warning LED:**

- Indicates a safety fault within the EVSE system.
- Not related to metering performance or energy accuracy.

Technical Specification 5

CPKM3000 Integrated Meter complies with the following standards:

Standards under scope
EN 50470-3:2022
IEC 62052-11:2020
IEC 62052-21:2020
IEC 62052-31:2020

Environmental Specifications

The electrical specifications define the operating voltage, current ranges, power consumption, and accuracy class required for the reliable performance of the CPKM3000 meter.

Power	Self-powered (via measured voltage)
Consumption	<2 W, <10 VA (per port)
Ist	0.025 A
Imin	0.25 A
Itr	0.5 A
Iref	5 A
Imax	32 A
230V/400VAC	400V AC phase-to-phase 230V AC phase-neutral, neutral connection mandatory
Frequency	45-65 Hz
Accuracy class	Active energy: Class B (EN 50470-3)
Working temperature	-25o C to 70o C Note: LCD performance degraded at <-20o C
Storage temperature	-40o C to 80o C
Mechanical environment	Class M1 - 2014/32/EU - Measuring Instrument Directive
Electromagnetic environment	Class E2 - 2014/32/EU - Measuring Instrument Directive
Energy direction measurement	Bi-directional

LED Specifications

Pulse weight	20000 imp / kWh
Color	Red

General Features

Connectors	
Protection grade	IP41 – Meter shall be installed in an enclosure with minimum IP54 degree protection

Output Specifications

Pulse output	Proportionate to measured active energy (EN 62052-31)

Protection Against Electrical Shock

The Koala CPKM3000 is designed to be installed inside an AC EV charger. To ensure protection against electrical shock, the upstream circuit must be equipped with a Residual Current Device (RCD) that meets the following requirements:

- Tripping current: 30 mA
- Type: At least Type A
- Nominal current rating: 40 A

Overcurrent and Short-Circuit Protection

To prevent overcurrent or short-circuit hazards, an upstream modular circuit breaker must be installed with the following characteristics:

- Nominal current rating: 40 A
- Configuration: 3p+N or 4-pole protection
- Minimum short-circuit rating: 6 kA
- Curve type: Minimum Curve B or Curve C

A combined protection device such as an RCBO (Residual Current Breaker with Overcurrent Protection) may also be used, provided it satisfies the criteria outlined above.

MID Assembly Instructions

CPKM3000 Integrated Meter has been designed to be assembled within a ChargePoint Koala EV charger. The following pictures shows the assembly:

1. First, slide the MID METER (B) over the blades from AC board (A)

2. Rotate and lock down into the ACB.

3. Take the entire sub-assembly (E) and install over Koala rear housing (B).

The housing includes a window from which the CPKM3000 display can be observed.