



Tigo Energy Intelligence



Tigo Energy Intelligence Energy Meter Installation and Operation Manual

002-00091-00 | 12/1/2021



IMPORTANT SAFETY INSTRUCTIONS

SAVE THESE INSTRUCTIONS

This manual contains important instructions for Model SM-US-200 that shall be followed during installation and maintenance of the inverter.

Safety Information

The following safety symbols are used in this document. Familiarize yourself with the symbols and their meaning before installing or operating the system.



CAUTION: Risk of Electric Shock, Do Not Remove Cover. No User Serviceable Parts Inside. Refer Servicing To Qualified Service Personnel.



WARNING: Hazardous voltage is still present 5 minutes after all power sources have been disconnected.



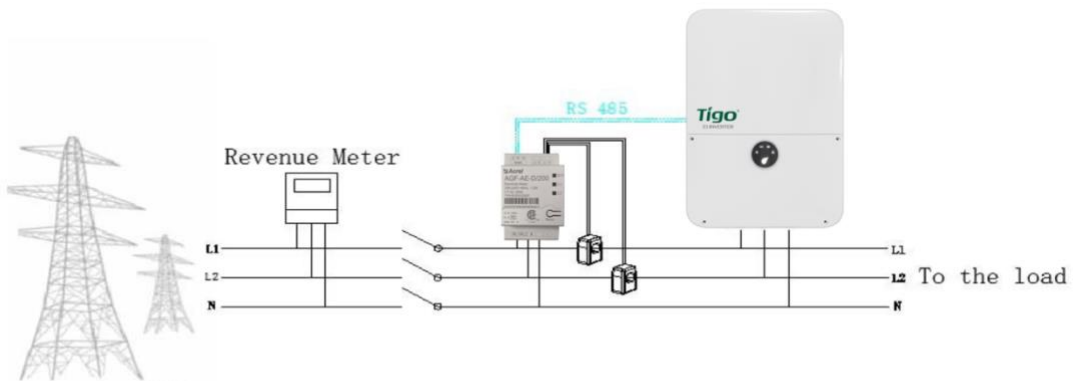
INFORMATION: Information notes, provided that will ensure the optimal operation of the system.

Warning: These instructions are for use by qualified personnel only. To reduce the risk of electric shock, do not perform any servicing other than that specified in the operating instructions

Introduction


This meter is supplied with 2 current transformers for use in monitoring the energy from the inverter output and/or from the utility grid. This meter is recommended for use with the Tigo TSI inverters and required for use when installing a Tigo TSB storage system.

The application of this meter will provide accurate data to the Tigo Energy Intelligence monitoring platform showing the energy usage throughout the PV system.



Required For Installation

- AC Wire for connection to AC load center: 22-18AWG stranded, 600V
- RS-485 for data connection to inverter: minimum 3-wire shielded, twisted pair, 24-18AWG
- Conduit/conduit fittings, and associated tools to install, if necessary
- Over current protection device, 20A or less
- Enclosure, if not installed in the AC load center
- Cable ties
- Screwdriver

	Note
	If using a cable longer than 10m/33ft in areas where there is a risk of induced voltage surges by lightening, it is recommended to use external surge protection devices. If grounded metal conduit is used for routing the communication wires, there is no need for a lightening protection device.

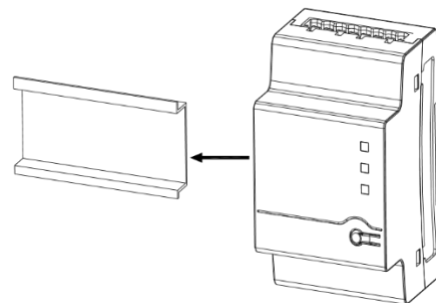
Installation Guidelines

- All prevailing electrical codes and requirements, national and local, must be followed in the installation of this product.
- The meter is considered "permanently connected equipment" and requires a disconnect means (circuit breaker or disconnect switch) and over current protection (fuse or circuit breaker).
 - The meter draws 10-30mA, therefore the rating of any disconnect switches, fuses, and/or circuit breakers is determined by the wire gauge, the service voltage, and the required current interrupting rating.
 - Use circuit breakers or fuses rated for 20A or less.
 - The circuit breaker or fuses must protect the meter's input terminals labeled L1 and L2. If a neutral conductor is used and it has over current protection, the over current protection device must interrupt both neutral and ungrounded conductors simultaneously.
 - The disconnect switch or circuit breaker must be located near the meter and easily operated.

Mounting the Meter

This meter is intended to be mounted in an AC load center or other outdoor enclosure. The meter clamps to a 35mm DIN rail. Dimensions of the meter and Current Transformers (CTs) can be found at the end of this document.

Mount in an appropriate enclosure prior to wiring the meter or CTs.



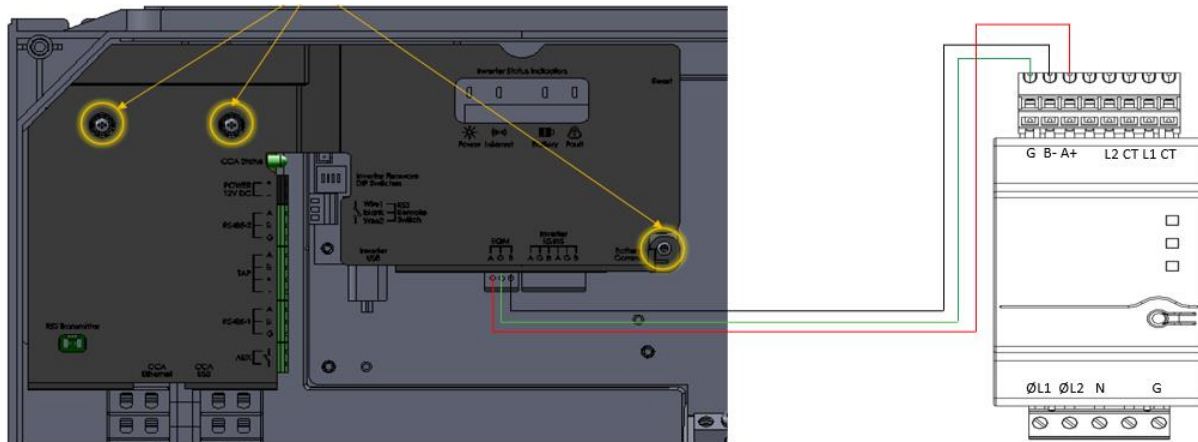


CAUTION

This meter is to be wired only by qualified personnel. Hazardous voltage and the risk of electric shock is present.

Wiring the Meter to the Tigo Inverter

The meter is connected to the inverter which communicates this data to the cloud to be monitored in the Energy Intelligence app or web portal. The meter connects to the TSI inverter using an RS-485 cable through a 3-pin connector labeled “RGM” above the PV input terminals, as shown below.

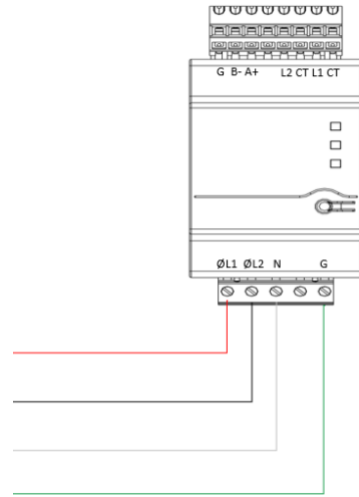


1. Verify power is OFF before making connections.
2. Open any knockouts in the meter enclosure and run conduit from the meter enclosure to the inverter's "comm" knockouts. Use appropriate conduit fittings for the environment in which the equipment is installed.
3. Feed the RS-485 cable through the conduit to the inverter.
4. Connect the RS-485 cable to the 4-pin terminal (pin 4 is empty: G, B-, A+) and insert into the meter terminal block ensuring a fully seated connection.

Wiring the Meter to the AC

The meter senses voltage over a wired connection to the AC panel using the lower terminals labeled ØL1, ØL2, N and G.

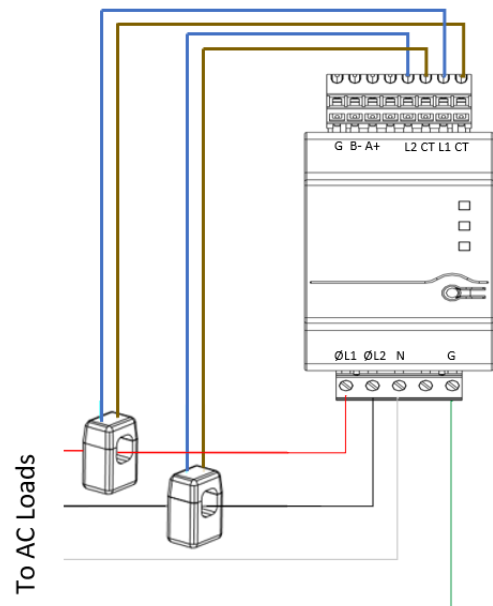
1. Verify power is OFF before making connections.
2. Open any knockouts in the meter enclosure and run conduit from the meter enclosure to the AC load panel. Use appropriate conduit fittings for the environment in which the equipment is installed.
3. Feed the conductors through the conduit to the AC load panel.
4. Loosen the 4 labeled screw terminals on the lower section of the meter.
5. Insert AC conductors into the proper screw terminal and tighten the set screw to 0.4Nm:
 - ØL1 to pin 1
 - ØL2 to pin 2
 - Neutral to pin 3
 - Ground to pin 5
6. Wire conductors to the AC load panel through a double-pole circuit breaker (20A or less).



	<p>Note</p> <p>If the meter is used in a single-phase two-wire system (no neutral), connect L2 and N at the meter's terminals.</p>
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Installing the Current Transformers

1. Turn off the AC power before clamping the CTs.
2. Install the CTs around the ØL1 and ØL2 conductors installed in the previous step. The split-core CTs can be opened for easy installation around a conductor. A nylon cable tie may be used around the CT to prevent accidental opening.
3. Install the CT with the arrow pointing to the grid for consumption or export measurement.
4. Connect the CT conductors to the 4-pin terminal block to the right of the inverter connection (L2, CT, L1, CT).
 - Core 1: L1 (blue) to pin 1
 - Core 1: CT (brown) to pin 2
 - Core 2: L2 (blue) to pin 3
 - Core 2: CT (brown) to pin 4





LED Indicators

Three status LEDs on the front face of the meter indicate operation and correct measurement. At normal startup, when power is first applied, all LEDs will light up sequentially for one second.

Power Status LED

LED	LED Color	Function	Indication	Troubleshooting
RUN	GREEN	Flashing ON/OFF (for 1 sec)	Normal	N/A
	RED	ON for > 3 sec	Internal Error	Contact Support
	YELLOW	Flashing ON/OFF (for 1 sec)	No communication	Check that the communications cable is properly connected

Phase Status LED

LED	LED Color	Function	Indication	Troubleshooting
L1/L2	GREEN	ON for >3 sec	No Current	
		Flashing ON/OFF (for 1 sec)	Positive Power	
	RED	Flashing ON/OFF (for 1 sec)	Negative Power	Check for reversed CTs, swapped CT wires, or CTs not matched with lines.
		Flashing with GREEN LED	High Voltage > 130V	Check the line voltages and the meter rating.
		Flashing with YELLOW LED	Low voltage < 70V	
	YELLOW	Flashing ON/OFF (for 1 sec)	Break fault < 30V	
		ON for > 3 sec	Frequency is below 45Hz or above 70Hz	Check for the presence of high noise.

Reset button

If the software version of the meter needs to be updated a connection to a computer is necessary.

1. Connect to the meter via RS-485
2. Open the programming software provided by Tigo and load the new version
3. Press the "reset" button on the front face of the meter; the meter will restart
4. Wait for the upload to complete

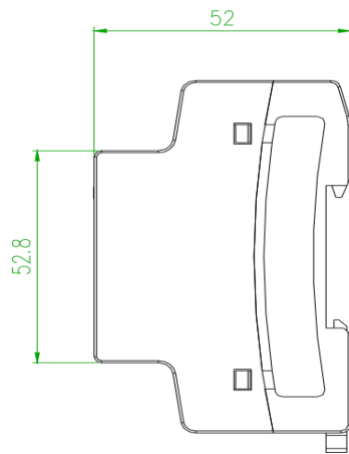


Technical Specifications

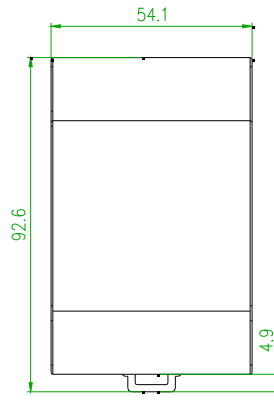
Electrical Meter			Units
Model	SM-US-200		
Rated Voltage-Line to N	120		V
Rated Voltage-Line to Line	208/240		V
Extended Voltage Range	88%~110%		
AC Frequency	60		Hz
Grids Supported	L1/L2/N/PE		
Power Consumption	1.2		W
Communication			
Meter Communication Interfaces	RS-485		
Response Time	≤1		S
Meter Accuracy			
Rated RMS current	100	200	A
1%-100% of CT Current	±0.5	±1	%
Current Transformers			
Number of Supplied Current Transformers	2		
Dimensions	I.D:15 O.D:35	70.5×54.5×39 (H×W×D)	mm
Standard Compliance			
Safety	UL1741		
Installation Specifications			
Dimensions(H×W×D)	54.1×87.8×52		mm
Weight	0.2		kg
Operating Temperature Range	-30~55		°C
Relative Humidity (noncondensing)	5 - 90		%
Mounting Type	DIN-Rail, 35mm		

This meter is intended to be installed in an appropriately rated enclosure.

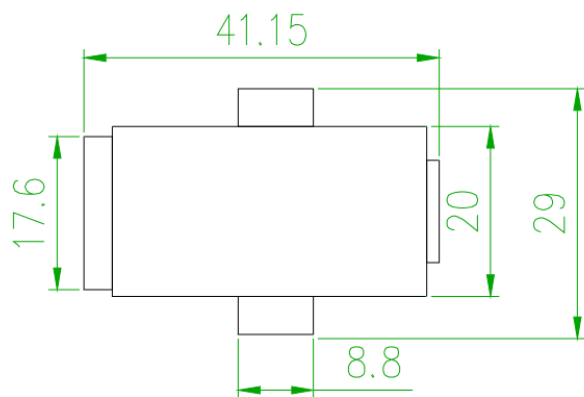
Dimensions



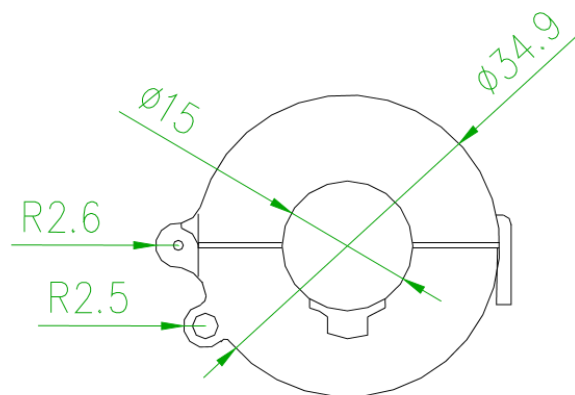
Meter Side View



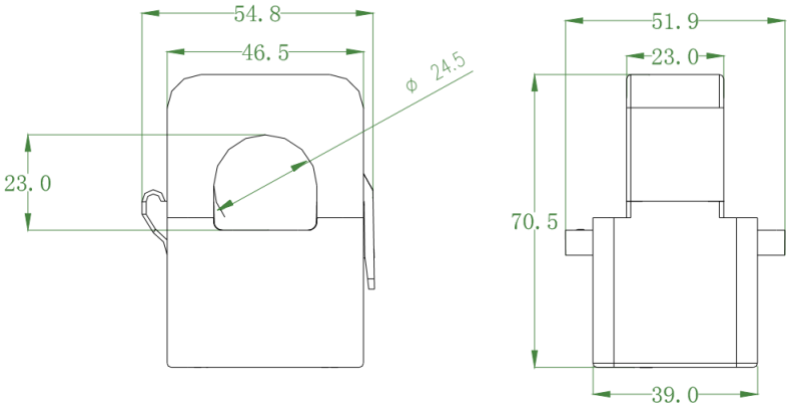
Meter Front View



100A Current Transformer Side View



100A Current Transformer Front



200A Current Transformer Side/Front View