GivEnergy®

Metering Guide

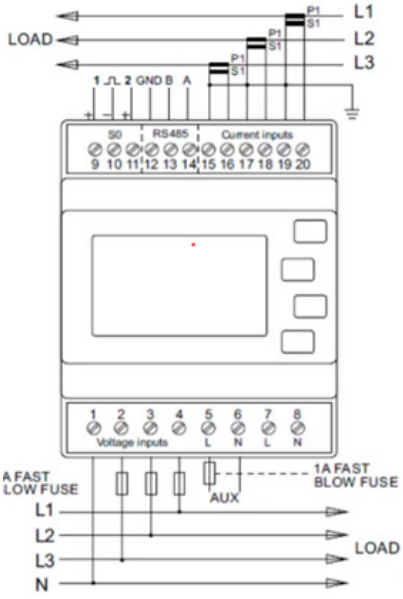
METERS | GEM 630, GEM 120, LoRa

THE 3 PHASE METER

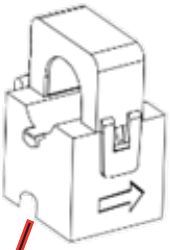
GEM630MCT

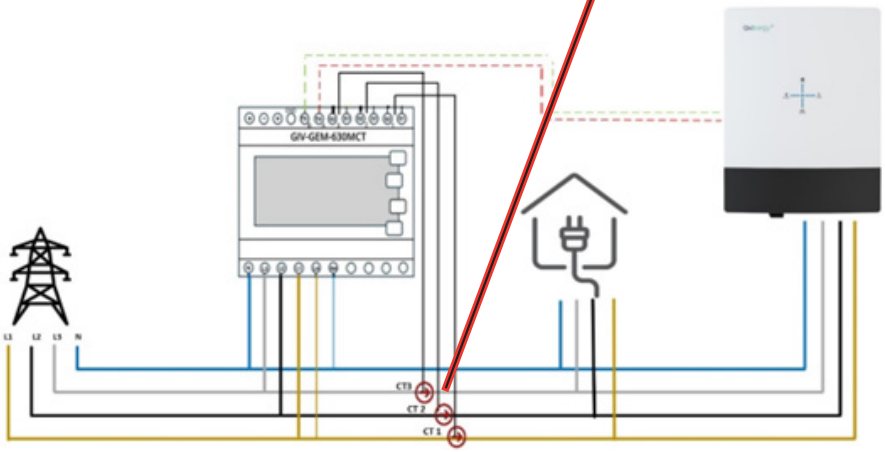
The main function of the **Eastron GEM630CT** is to provide accurate and reliable measurement of electrical parameters, particularly energy consumption, in a single-phase electrical system, with the capability to handle higher currents using external CTs. It is vital that each **GivEnergy 6kW, 8kW, 10kW, 15kW and 20kW** Three phase High Voltage inverter and battery system consists of at least one **GEM630CT meter** with CTs

CT Input	Meter Lable	Voltage Inputs	Meter Lable	RS485 Input	Meter Lable	Power Supply Input	Meter Lable
White	20	L1	4	NA	6	Negative	TXB-
Black	19	L2	3	LA	5	Positive	TXA+
White	18	L3	2				
Black	17	N	1				
White	16						
Black	15						



CT clamps arrows must face towards the property load and only clamp around each phase Live wire and not the neutral.





SDM 630 Grid Feed

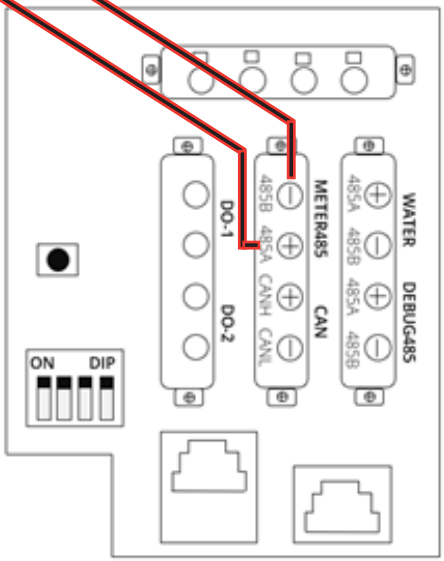
Neutral	Connection Marked N at The bottom of the meter
Phase 1	Connection Marked L1 at The bottom of the meter
Phase 2	Connection Marked L2 at The bottom of the meter
Phase 3	Connection Marked L3 at The bottom of the meter
Power Source Live	Bridge L1 and LA at the bottom of the meter
Power Source Neutral	Bridge L1 and LA at the bottom of the meter

When installing the **GEM630MCT meter**, it is crucial to follow the exact same phase rotation as that of the property, as i**ncorrect phase rotation** will result in inaccurate readings. For the power source, it is recommended to supply the **GEM630MCT** from a **6A MCB**. To power on the meter, connect the Live cable to terminal **LA** and the Neutral cable to terminal **NA**, both located at the bottom of the meter. To measure the correct load, connect the voltage reference to the same supply point you intend to measure. For phase connections, the terminals at the bottom of the meter are marked as follows: **Phase 1** is **L1**, **Phase 2** is **L2**, and **Phase 3** is **L3**.

RS485 Communication

To ensure the **GivEnergy Three HV Inverter** accurately calculates and supplies the load, a communication cable must be installed between the meter and the inverter. Using an **RS485 cable**, you can choose any color for the negative (–) and positive (+) connections. Connect the negative (–) wire from the meter's port marked "**TXB-**" to the **485B-** port on the inverter, and the positive (+) wire from the meter's port marked "**TXA+**" to the **485A+** port on the inverter.

GEM630 Meter	Inverter Connection
Meter TX B-	Meter Port - 485B
Meter TX A+	Meter Port - 485A

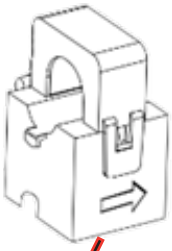


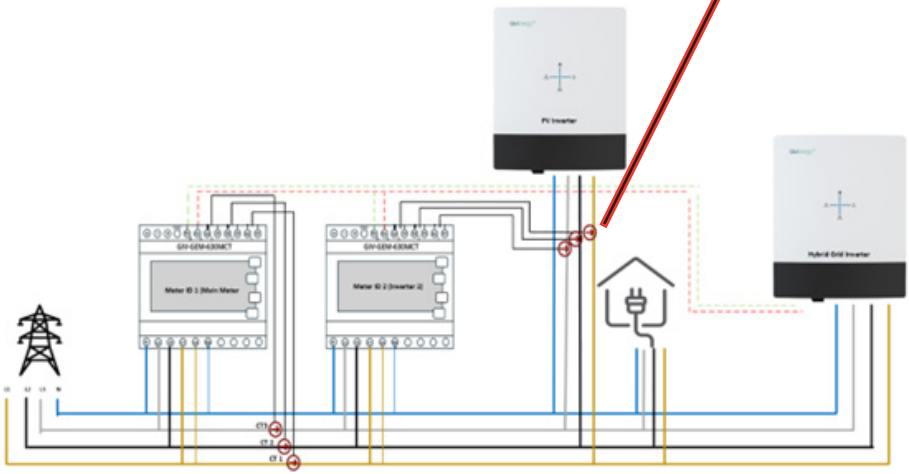
	CT Wire	Ports
Phase 1, Port S1[1]	White Cable	Port 20
Phase 1, Port S2[1]	Black Cable	Port 19
Phase 2, Port S1[2]	White Cable	Port 18
Phase 2, Port S2[2]	Black Cable	Port 17
Phase 3, Port S1[3]	White Cable	Port 16
Phase 3, Port S2[3]	Black Cable	Port 15

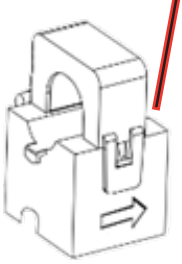
When installing the GEM630MCT, it's essential to use the current transformer (CT) clamps. The CT clamp wires must not be extended or shortened, as this can lead to inaccurate readings. Since the GEM630MCT is a three-phase meter, the CT clamps must match the same phase rotation. For **Phase 1**, connect the CT clamp's white wire to port **20** and the black wire to port **19**. For **Phase 2**, connect the white wire to port **18** and the black wire to port **17**. For **Phase 3**, connect the white wire to port **16** and the black wire to port **15**. These ports are marked at the top of the meter. The CT clamps should be installed on the main grid feed supply, before any load, clamping only around the live voltage reference wire for each phase, with the arrow pointing towards the property's load. Ensure the CT clamps is closed securely.

GEM630MCT ID 1 & ID 2 Connection Guide

CT clamps arrows must clamp around each and every Live cable of the PV string inverter facing towards the property load and only clamp around 1 Live wire and not the neutral.







CT clamps arrows must clamp around each and every Live cable of the PV string inverter facing towards the property load and only clamp around 1 Live wire and not the neutral.

GEM630MCT Voltage Feed Reference Between ID1 & ID2

When installing the **GEM630MCT meter**, it is crucial to follow the exact same phase rotation as that of the property for the **ID1 meter** and the **ID2 meter**, as incorrect phase rotation will result in inaccurate readings. For the power source, it is recommended to supply the **GEM630MCT** from a **6A MCB**. To power on the meter, connect the **Live cable** to terminal **LA** and the **Neutral cable** to terminal **NA**, both located at the bottom of the meter. To measure the **correct load**, connect the **voltage reference** to the **same supply point you intend to measure**. For example, if you measuring an external device such as a PV string inverter, the voltage reference will need to come that. For phase connections, the terminals at the bottom of the meter are marked as follows: **Phase 1 is L1, Phase 2 is L2**, and **Phase 3 is L3.**

CT Connections

When installing the **GEM630MCT**, it's essential to use the current transformer (CT) clamps. The CT clamp wires must not be extended or shortened, as this can lead to inaccurate readings. Since the GEM630MCT is a three-phase meter, the CT clamps must match the same phase rotation. For Phase 1, connect the CT clamp's **white wire** to **port 20** and the **black wire** to **port 19**. For **Phase 2**, connect the **white wire** to **port 18** and the **black wire** to **port 17**. For **Phase 3**, connect the **white wire** to **port 16** and the **black wire** to **port 15**. These ports are marked at the top of the meter. The **CT clamps** should be installed on the **main grid feed supply**, **before any load**, clamping only around the **live voltage reference wire** for each phase, with the arrow pointing towards the property's load. Ensure the **CT clamps** is closed securely. The same **CT** connections applies to the **ID2 meter.** The **ID2 meter CT** location must be clamped on string inverter grid feed and facing towards the load.

RS485 Communication

To ensure the **GivEnergy Three phase high voltage Phase Inverter** accurately calculates and supplies the load between the **ID1** and the **ID2 meter**, a communication cable must be installed between the two meters and the inverter. Using an **RS485 cable**, you can choose any color for the **negative (–)** and **positive (+)** connections. You can bridge the communication cable between both Meters. Connect the **negative (–)** wire from the meter's port 9 to the **Meter B- port** on the inverter, and the **positive (+)** wire from the meter's **port 10** to the **Meter A+ port** on the inverter. Only the **ID1 meter** will communicate with the inverter.

3 Phase CT placement check

First all solar panels needs to be switched off. Go into the **inverter remote settings** on the web portal dashboard (not using the phone app) you need to go control and go to **On/Off state** and change the setting to **"Off/Auto Off"** once that is done go back to the inverter data tab. If the data on the **L1, L2** and **L3** Meter active power is showing a **Positive (+)** value and the if the **L1, L2** and **L3** Load Power adds up the same value as total Load Power. If all figures match then the Grid Import Active Power needs to be a **Negative (-)** value. Below is an example of a meters that are reading correctly.

Grid Import Active Power	Grid Export Active Power	L1 Meter Active Power	**L2 Meter Active Power** ↑	L3 Meter Active Power	L1 Load Power	L2 Load Power	L3 Load Power	Total Load Power
-9502	0	1854	3814	3834	1854	3814	3834	9502
-10352	0	2712	3822	3818	2712	3822	3818	10352
-13171	0	5529	3822	3820	5529	3822	3820	13171
-11592	0	3986	3802	3804	3986	3802	3804	11592
-11994	0	4397	3827	3835	4333	3829	3832	11994

How to program the GEM630MCT from ID1 to ID2

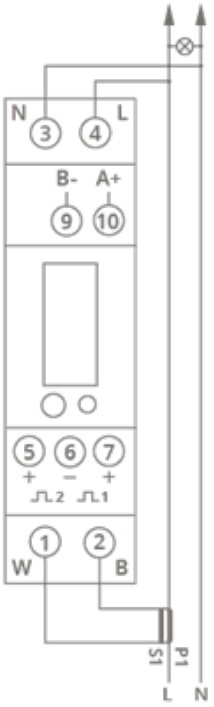
Step 1	Description
	Hold this button in until the password page appears
Step 2	
	Set password to 1000 using these buttons
Step 3	
	Hold this button in to confirm the password
Step 4	
	Scroll using the these buttons until the ID page
Step 5	
	Hold this button in to confirm that you want to change this setting
Step 6	
	Press this button to choose whic value you want to change
Step 7	
	Set Meter to 002 using these buttons
Step 8	
	Confirm the setting by holding on this button
Step 9	
	Exit this setting by pressing this button

THE 1 PHASE METER

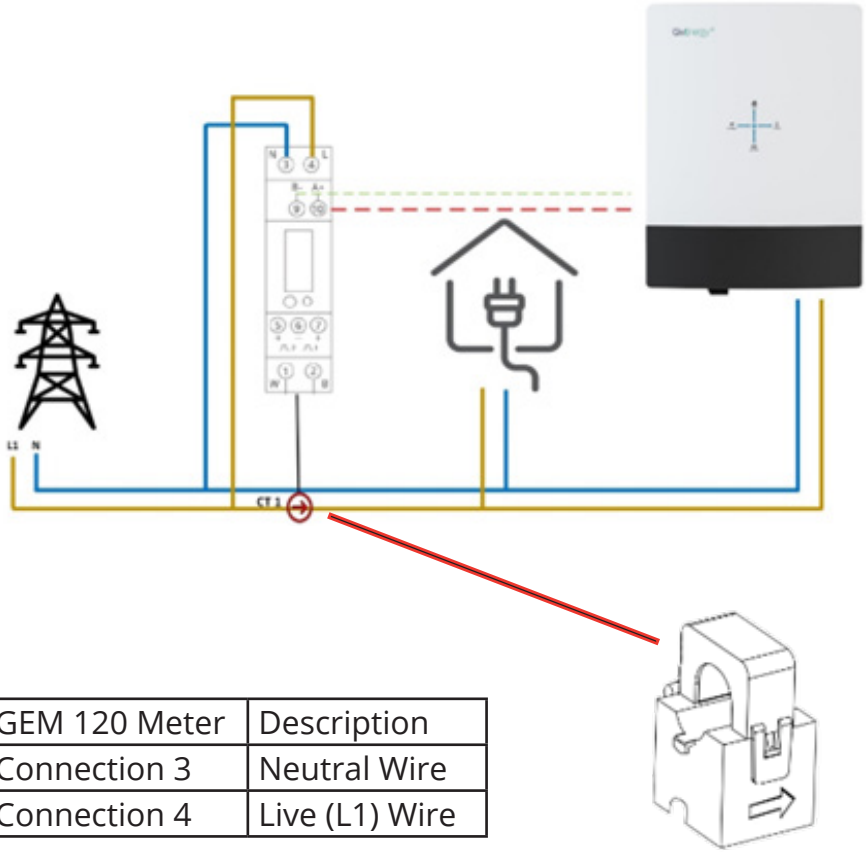
GEM120CT

The main function of the GEM120CT is to provide accurate and reliable measurement of electrical parameters, particularly energy consumption, in a single-phase electrical system, with the capability to handle higher currents using external CTs. It is vital that each GivEnergy AC couple 3.0, GEN 3, 3.6kW, 5kW and the All-In-One single phase inverter and battery system consists of at least one GEM120CT meter with CTs

Meter Marking	Description
W (1)	CT Cable White Connection
B (2)	CT Cable Black Connection
N (3)	Grid Neutral Feed Connection
L (4)	Grid Live Feed Connection
B- (9)	RS485 Negative (-) Connection
A+ (10)	RS485 Positive (+) Connection



GEM120CT Meter Connection Guide



GEM 120 Meter	Description
Connection 3	Neutral Wire
Connection 4	Live (L1) Wire

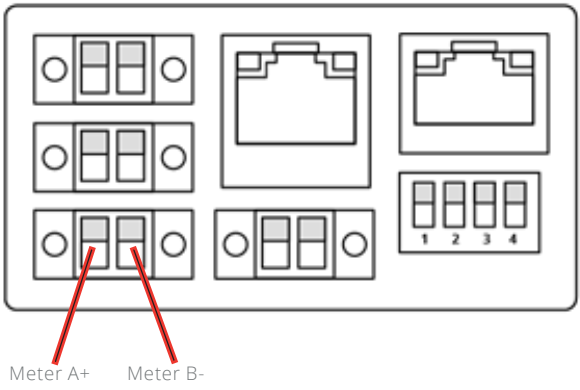
When installing the **GEM120CT meter**, connect the voltage reference to the same supply point you intend to measure. The Neutral voltage reference should be connected to **terminal 3**, labeled **"N"** on the meter, and the Live voltage reference should be connected to **terminal 4**, labeled **"L"** on the meter.

CT clamp arrow must face towards the property load and only clamp around **1 Live wire** and not the neutral.

RS485 Communication

GEM120 Meter	Inverter Communication
Meter B- (9) Green White	Meter Port - Right Pin
Meter A+ (10) Orange White	Meter Port - Left Pin

To ensure the **GivEnergy GEN3 Single Phase Inverter** accurately calculates and supplies the load, a communication cable must be installed between the meter and the inverter. Using an **RS485 cable**, you can choose any color for the negative (**–**) and positive (**+**) connections. Connect the negative (**–**) wire from the meter's **Port 9** to the **Meter B- port** on the inverter, and the positive (**+**) wire from the meter's **Port 10** to the **Meter A+ port** on the inverter.

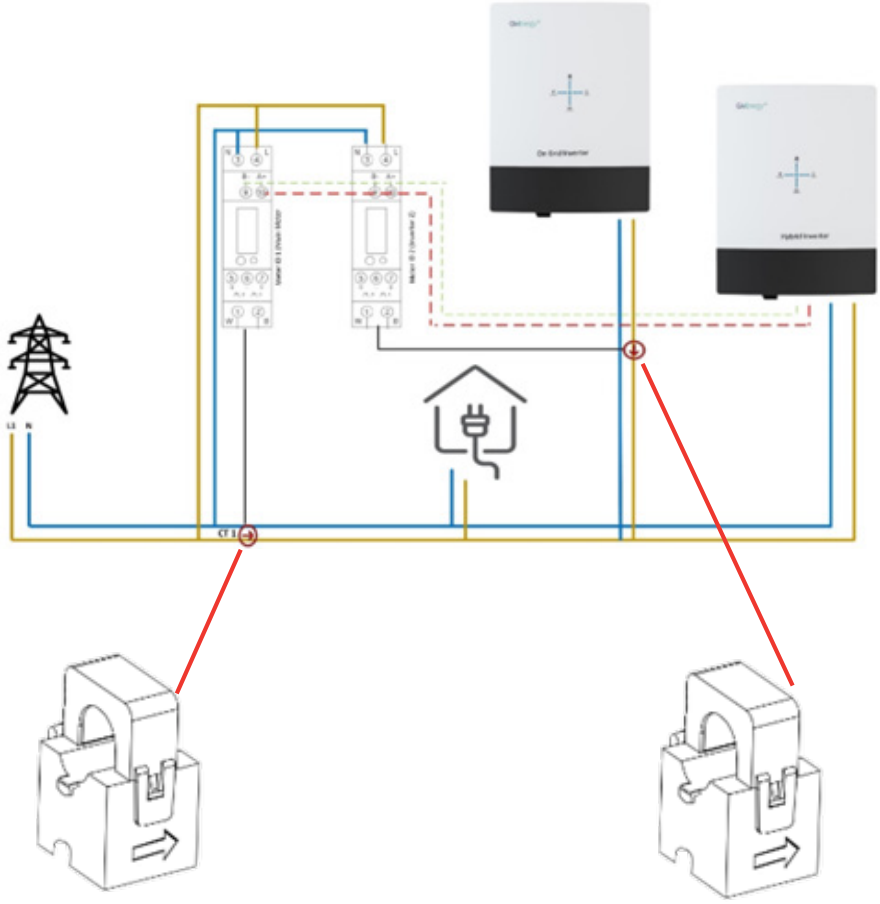


CT Connection Meter

GEM120 Meter	Description
Port 1	White Cable
Port 2	Black Cable

When installing the **GEM120CT**, ensure that you use the **Current Transformer (CT) clamp**. The **CT clamp** wires must not be extended or shortened, as this can result in inaccurate readings. Connect the white cable of the **CT clamp** to **Port 1** at the bottom of the meter, and the black cable to **Port 2**. The **CT clamp** should be installed on the main grid feed supply, before any load clamping only around the live voltage reference wire, with the arrow pointing towards the property's load. Ensure the **CT clamp** is closed securely.

GEM120CT ID1 & ID2 Connection Guide



CT clamp arrow must face towards the property load and only clamp around 1 **Live wire** and not the neutral.

CT clamp arrow must clamp around the Live cable of the PV string inverter facing towards the property load and only clamp around **1 Live wire** and not the neutral.

GEM120CT Voltage Feed Reference Between ID1 & ID2

When installing the **GEM120CT meter**, **ID1** and **ID2**, connect the **voltage reference** to the same supply point you intend to measure. You can create a **bridge** between both meters if needed. The Neutral voltage reference should be connected to **terminal 3**, labeled **"N"** on the meter, and the Live voltage reference should be connected to **terminal 4**, labeled **"L"** on the meter.

RS485 Communication

To ensure the **GivEnergy GEN3 Single Phase Inverter** accurately calculates and supplies the load between the **ID1** and the **ID meter**, a communication cable must be installed between the two meters and the inverter. Using an **RS485 cable**, you can choose any color for the **negative (–)** and **positive (+)** connections. You can **bridge** the communication cable between both Meters. Connect the **negative (–)** wire from the meter's **port 9** to the **Meter B- port** on the inverter, and the **positive (+)** wire from the meter's port 10 to the **Meter A+ port** on the inverter. Only the **ID1 meter** will communicate with the inverter.

CT Connections

When installing the **GEM120CT**, ensure that you use the **current transformer (CT) clamp** for both the **ID1** and **ID2 meter**. The **CT clamp wires** must not be extended or shortened, as this can result in inaccurate readings. Connect the **white cable** of the **CT clamp** to **Port 1** at the bottom of the meter, and the **black cable** to **Port 2**. The **CT clamp** for **ID1** should be installed on the **main grid feed supply**, **before any load** clamping only around the **live voltage reference wire**, with the arrow pointing towards the property's load. The **CT clamp** of the **ID2 meter** must clamped around the string inverter Live cable feed, with the arrow pointing towards the property's load. Ensure the **CT clamp** is closed securely.

1 Phase CT Placement check

First of all solar panels needs to be switched **OFF**. Go into the inverter remote settings on the web portal dashboard (not using the phone app) you need to go control and go to **On/Off state** and change the setting to **"Off/Auto Off"** once that is done go back to the inverter data tab. If the data on **PAC** is showing a **Negative (-)** value and Load is a **Positive (+)**, both having the same value then the meter is reading correctly. Below is an example of a meters that are reading correctly.

PAC	VAC	IAC	FAC	Load	PInv
-376	233.3	0.1	50	376	0
-550	231.9	0.1	49.95	550	0
-540	231.8	0.1	49.95	540	0

Difference between ID1 and ID2 Meter

The **GEM120** and **GEM630CT meters** can be programmed to either **ID1** to **ID8** on the meter settings.

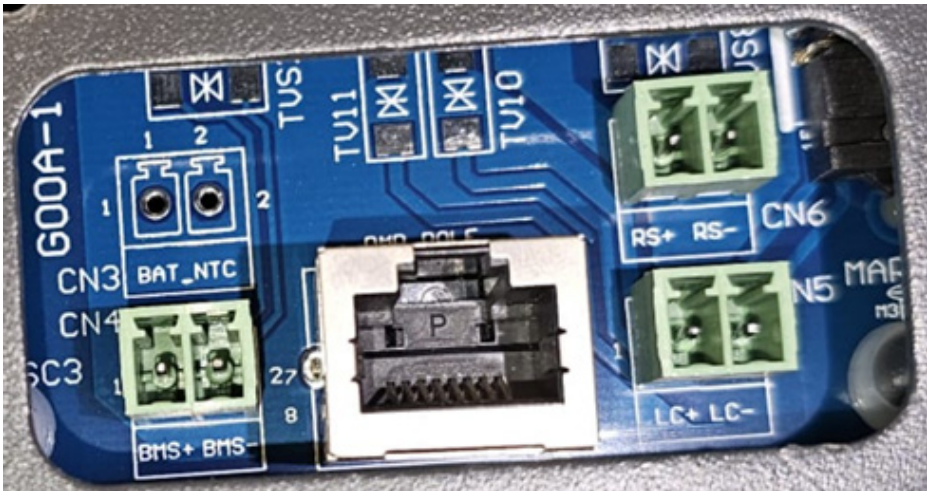
ID1 Setting: When the meter is programmed to **ID1**, it monitors data from the main energy supply. This setup is essential when installing a meter on the primary energy source to track feed-in and feedback power.

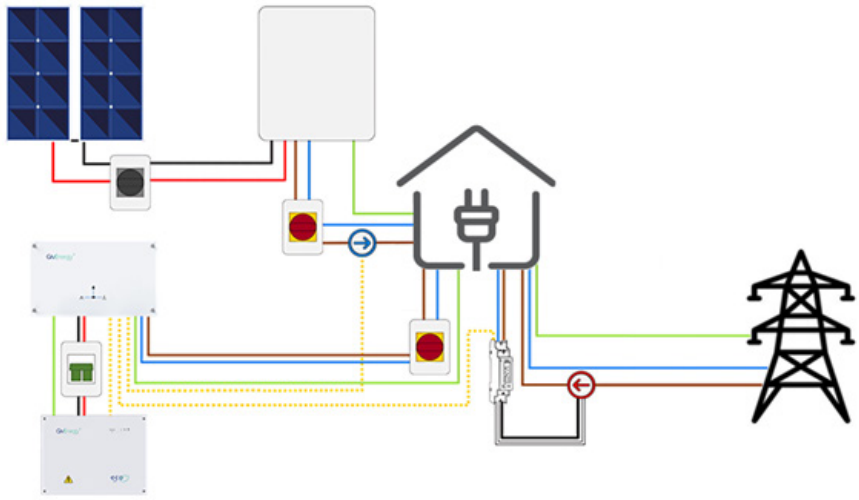
ID2 Setting: If the meter is set to **ID2 – ID8**, it allows the **GivEnergy** inverter and battery systems to monitor external devices, such as various types of string inverter systems. This configuration is necessary when a homeowner has an external **PV system** connected to their grid input. The **ID2** meter enables the **GivEnergy** system to manage the energy produced, whether it's supplying the loads, charging the batteries, or feeding back to the grid.

AC Couple 3.0 & ID1 Connection Guide

The installation of the **AC couple** needs to be followed as laid out in the AC Couple 3.0 installation manual.
For the **GEM120CT** connection guide can be followed as per the connection guide about labeled **GEM120CT** Connection guide in this manual.

For the **Blue CT clamp** that comes with the **AC Couple 3.0** this needs to be installed on the **String inverter system** that you are monitoring. The clamp location needs to on the **Live cable** of the string inverter, with the arrow facing towards the property's **load**.





AC Couple	Description
BMS+	Battery - Comms Cable
BMS-	Battery + Comms Cable
LC+	CT Positive (+) Cable
LC-	CT Negative (-) Cable
RS+	GEM120CT Positive (+) Comms Cable
RS-	GEM120CT Positive (-) Comms Cable

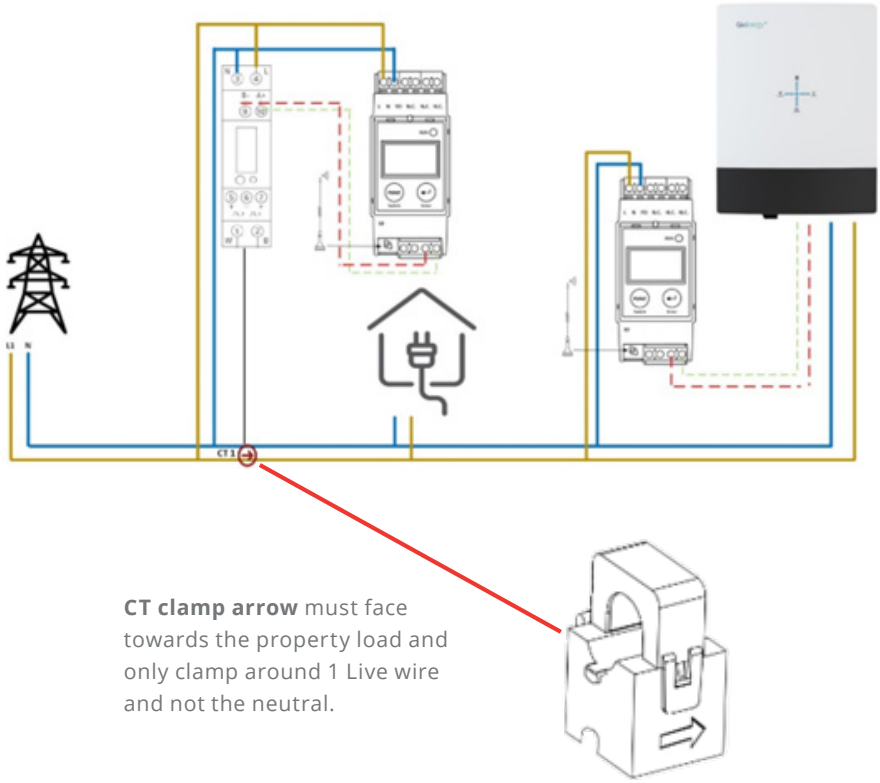
GIV-LORA-LCD

LoRa

The purpose of installing the **GIV-LORA-LCD** meter is for installations where the meter communication for the inverter is to far. By installing the **LoRa sender and receiver** you are able to improve the communication by up to 6km without any interference.

Meter Marking	Description
L	Live Power Supply
N	Neutral Power Supply
RS485+	RS485 Positive (+) Connection
RS485-	RS485 Negative (-) Connection
RF	Where the Antenna needs to be plugged in

Difference between ID1 and ID2 Meter



CT clamp arrow must face towards the property load and only clamp around 1 Live wire and not the neutral.

SDM 120 and LoRa Grid Feed

	SDM 120 Meter Connection	LoRa Device
Live	Connection 3 of the Meter	Connection Marked L on top of the device
Neutral	Connection 4 of the Meter	Connection Marked N on top of the device

When installing the **GEM120CT** or **GEM630MCT** meter with a **LoRa device**, connect the voltage reference to the same supply point you intend to measure. For example on the **GEM120CT**:
The Neutral voltage reference should be connected to **terminal 3**, labeled **"N"** on the **SDM120 meter**, and the Live voltage reference should be connected to **terminal 4**, labeled **"L"** on the meter. On the **LoRa device** the same **voltage reference** can be used and installed on connections marked **"L"** for the **Live cable** and **"N"** for the **Neutral cable**.

RS485 Communication

	GEM120 Meter	LoRa Device	Inverter
B-	Meter B- (9)	LoRa Marked B- Green White	Meter Port - Left Pin
A+	Meter A+ (10)	LoRa Marked A- Orange White	Meter Port - Right Pin
Aeriel		Marked RF	

To ensure the **GivEnergy GEN3 Single Phase Inverter** accurately calculates and supplies the load, you must install a communication cable between the meter, the LoRa device sender, the LoRa device receiver, and the inverter. The LoRa device "sender" communicates with the **SDM120CT meter**. Using an **RS485 cable**, you can choose **any color** for the **negative (–)** and **positive (+)** connections. Connect the **negative (–) wire** from the meter's **port 9** to the LoRa device **RS485-**, and the **positive (+) wire** from the meter's **port 10** to the **RS485+** at the bottom of the LoRa device.

The LoRa device "receiver" communicates with the inverter. Again, using an RS485 cable, connect the negative (**–**) wire from the LoRa device **RS485- to the B- port** on the inverter, and the positive (**+**) wire from the LoRa device **RS485+ to the A+ port** on the inverter. For the LoRa device sender and receiver they both need to be installed with the packaged Aerial. Install 1 Aerial per device on connection point RF of the LoRa devices.

For further details on setting up connectivity between the LoRa sender and receiver, please refer to the LoRa device installation manual. For the installation of the **GEM120CT CT** clamps, follow the instructions provided in the previous section for standard **GEM120CT** wiring.

FAQ

Does Phase rotation matter when installing a GEM630 3 Phase energy meter?

- Yes phase rotation is very crucial, if the phase rotation is not correct then readings will be incorrect. You can use a Phase rotation

Is it advisable to put the meter on its own power supply?

- Yes it is, you can use a 6A MCB.

Can I shorten or extend the CT meter cable?

- No you cannot. By doing this you will get strange readings and the system will not work correctly.

Can I use any color of the RS485 communication cable to obtain communication between the inverter and the meter?

- Yes you can. It does not what matter colors you use for the Positive (+) and the Negative (-) communication cable.

How do I know if the meter is communicating with the inverter?

- In the Top right hand corner of the GEM630MCT you will see a small (Telephone) symbol. On the GEM120CT there will be a red light flashing on the meter.

GivEnergy®

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