# Energy Meters start page

At Victron Energy, we stock several types of Energy Meters.

The Energy Meters are used in systems with a GX device. To measure the output of a PV inverter (more info in the Venus-OS manual here. Or as a Grid Meter in an ESS installation, more information in the ESS manual.

## 1. Selection guide

| Energy Meter | ET112 | ET340 | EM24 RS485 | EM24 Ethernet |
|---|---|---|---|---|
| Appearance |  |  | | |
| Display | no display | no display | LCD Display | |
| Manual and Wiring Diagrams | ET112 Manual | ET340 Manual | EM24 RS485 Manual | EM24 Ethernet Manual |
| Part Number | REL300100000 | REL300300000 | REL200100000 | REL200200100 |
| Supported Phases | 1 phase | 3 phase | | |
| Maximum Current Rating | 100A | 65A per phase | | |
| Measurement Type | Shunt | | | |
| Data connection | RS485 | | | Ethernet |

**First decide if you need single- or three phase meters**

For a three phase utility connection, use a three phase meter. For a three phase PV Inverter, use a three phase meter as well. For a single phase utility connection, use a single phase meter. And in an installation with a single phase utility connection, that also has a PV Inverter that needs measuring with a Victron meter, then you can use 2 pieces of ET112; or use the ET340.

**Now, based on current, select the model:**

| Requirement | Type | Model / Solution |
|---|---|---|
| Single phase up to 100A | Shunt | ET112 |
| Three phase up to 65A/phase | Shunt | EM24/ET340* |
| Single phase more than 100A/phase | CT | Not available, use the three phase CT solution |
| Three phase more than 65A/phase | CTs | Carlo Gavazzi EM24DINAV53DISX (see FAQ Q8) |

The EM24 meter counts energy in a different way than the ET340. For Germany and most other countries; the EM24 is the advised model. See FAQ Q5 and Q9 for further details regarding energy counting differences.

**In case of EM24, select between RS485 and Ethernet connection:**

The Ethernet model will have an advantage in installations where an Ethernet network is available. Rather than having to pull an RS485 wire between the main AC distribution board and the storage system, the existing Ethernet can be used.

The disadvantage is that this relies on that network functioning properly - in case of issues the Storage system will switch to idle mode: passthrough.

# 2. Support for other Carlo Gavazzi meters

Besides above listed meters, there are many more meters available from Carlo Gavazzi. Use this list to see which ones are compatible.

| Type | Support | Remarks |
|---|---|---|
| **EM111** | Supported | Compatible with ET112. |
| **ET111** | Supported | Compatible with ET112. |
| **EM112** | Supported | Compatible with ET112. |
| **ET340** | Supported | None. |
| **EM340** | Not supported | does not report exported energy per phase (unlike the ET340) |
| **EM21 72D** | Not supported | does not report exported energy, |
| | | com protocol not compatible with supported grid meters |
| **EM271** | Not supported | does not report exported energy, |
| | | com protocol not compatible with supported grid meters |

# 3. FAQ

**Q1: Can I combine three ET112s for a three phase system?**

No. Use a real three-phase meter.

**Q2: Can I use other meters, for example from other brands?**

No.

**Q3: I already have a Fronius SmartGrid meter, can I use that?**

No.

**Q5: What are the differences between the various three phase meters?**

- EM24 - REL200100000 - Carlo Gavazzi EM24DINAV93XISX

- ET112 - REL300100000 - Carlo Gavazzi ET112-DIN.AV01.X.S1.X
- ET340 - REL300300000 - Carlo Gavazzi ET340-DIN.AV23.X.S1.X

Differences:

- The ET meters don't have a front selector that the installer needs to put in a different setting than it comes out of the box: easier, less mistakes to be made.
- The ET meters have no display. The only thing they have is an LED, which blinks in case of active communication.
- The new meters have 2 RJ45 sockets for the Modbus RS485 connection. But they are not used. Note the possible confusion because of yet another RJ-45 socket in the Victron world though. Don't mix that with VE.Bus, VE.Can or VE.net. Besides the RJ-45 sockets, the meters still also have screw terminals access below the sockets for the RS485 wiring, which is how we advise to connect a meter to the RS485 to USB interface and then CCGX.
- Since there is no display, the Modbus address can no longer be changed on the meter. Combining multiple of those meters on one RS485 network is therefore not supported by Victron. You are advised to use multiple RS485 to USB interfaces.

Three-phase new meter only (ET340):

- Measuring Energy from single phase PV Inverter on the second phase of the new meter, ET340, actually works. Where-as with the old meter, the EM24, only the Power Metering (Watts) works. The Energy Metering (kWh) for a single phase PV Inverter on the second phase of the EM24 does not work. See Q9 for the details.

#### Q6: Will you keep shipping both 3 phase meters? (ET340 & EM24)

Yes. There are still situations suitable for each. See Q9.

#### Q7: Can I buy those meters directly from Carlo Gavazzi instead of from you?

Yes. That is also why we make no secret of the CG part numbers.

#### Q8: I want to use Current Transformers (CTs), is that possible?

Yes. You can buy the CG EM24DINAV53DISX directly from Carlo Gavazzi or one of their distributors. Even though Victron does not stock that type of meter, we do support it in our software.

The EM24DINAV53DISX is the solution for three-phase systems that go over 65A per phase.

#### Q9: What’s the difference between ET340 and EM24 in 3 phase systems?

These meters have a different way of calculating the total of energy imported and exported.

In the ET340 - the energy imported and exported is counted at each individual phase and then the Total is provided from the sum of those values.

In the EM24 - the energy imported and exported is counted as a total power, with net differential readings from each phase cancelling each other out.

Which meter is best to use with depend on your countries own metering configuration. It is most common in Australia and Germany for example to only be billed for the total in a 3 phase system. So it is more accurate to use an EM24 to match the billing.

So if you are exporting from one phase, and importing from another phase after the energy meter, but before the billing meter then you will not be charged for this, and the meter should not count it as an import and an export.

This is also how Victron's phase compensation feature works, to make the most of the cost savings for an ESS system when there is a differential in generation and load across different phases.

#### Q10: Can I use an isolated USB-RS485 interface?

Yes. The interfaces we sell are non isolated; suitable for most use cases.

In case an isolated one is needed; purchase it directly from Hjelmslund Electronics.

- USB485-STIXL : Isolated USB to RS485 converter

#### Q11: Can I use Victron energy meters instead of a Victron Inverter/Charger to make use of a GX device (e.g. Cerbo GX), VRM and other features?

Energy meters are intended only to supplement a Victron inverter charger in the system. Energy Meters are currently limited in their potential applications. Each energy meter is only intended to provide a specific piece of additional information - total loads on AC input and grid import/export, or AC PV inverter or generator production without network communications.




In GX device firmware version 2.80 and later - They can also be used for other purposes e.g. to measure specific, arbitrary AC loads or circuits for example. However it should not be considered a replacement to having a Victron inverter / charger. Attempting to use other brand battery inverters and trying to substitute their lack of data connectivity to the GX device by using energy meters will not work as expected.

# DISQUS

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