Energy Meter Selection Guide

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Victron VM-3P75CT



Victron VM-3P5A



ET112



ET340



EM540



ABB B21



ABB B23/B24

Venus OS supports several types of energy meters, some of which are manufactured and/or stocked by Victron and others that need to be purchased from the manufacturers directly, such as Carlo Gavazzi or ABB.

The Energy Meters are used in systems with a GX device to measure the output of a PV Inverter, a AC Genset or as a Grid Meter in an ESS installation. It also can be used to measure AC loads.

The VM-3P75CT and VM-3P5A energy meter connect to the GX device via VE.Can or Ethernet and are ready to use out of the box with no configuration required. Alternatively, the EM24 Ethernet meter can be used, provided the meter connects to a local network in such a way that the GX device can reach it. All other Energy Meters listed here connect to a GX device via RS485 either through a wired connection via a RS485 to USB interface or wirelessly via a Zigbee to USB and Zigbee to RS485 converters. Its data is then displayed on a GX device and the VRM portal.

To make a selection, first decide if you need a single-, split- or three-phase meter:

Which Energy Meter should be selected depends on the installation, the number of phases you want to measure and the maximum current per phase.

Examples: For a three-phase utility connection, use a three-phase meter, and for a three-phase PV inverter, also use a three-phase meter. For a single-phase utility connection, either a single-phase meter or a three-phase meter can be used, as most three-phase meters support single-phase operation. In installations with a single-phase utility connection that also require measurement of a PV inverter, use the ET340. If the application exceeds the maximum current rating, select an energy meter with current transformers (CTs). Note that most PV inverters support direct readout by the Victron system, so in many cases an additional energy meter is not required to measure their output.

Now, based on current, select the model:

Requirement	Measurement type	Solution
Single-phase up to 100A	Direct/Shunt	ET1XX / EM1XX / ABB B21
Three-phase up to 65A/phase	Direct/Shunt	ET340 / EM24 / EM340 / EM540 / ABB B23
Single-phase more than 100A/phase	Current Transformers	Not available, use a 3-phase CT solution
Split-phase more than 65A/phase	Current Transformers	VM-3P75CT / VM-3P5A
Three-phase more than 65A/phase	Current Transformers	VM-3P75CT / VM-3P5A / EM24* / EM330 / EM530 / ABB B24

* EM24DINAV53DISX only, not stocked by Victron

Connection Options: RS485, VE.Can and/or Ethernet:

The VM-3P75CT, VM-3P5A and EM24 Ethernet support Ethernet connectivity, which can be advantageous in installations where an Ethernet network is already available. Instead of installing an RS485 connection between the main AC distribution board and the storage system, the existing Ethernet infrastructure can be used. However, Ethernet communication depends on the availability and reliability of the network. In the event of a network failure, the storage system will switch to idle (passthrough) mode. For a simpler and more robust setup, VE.Can offers a direct connection between the VM-3P75CT / VM-3P5A and the GX device. This connection operates independently of any external network, ensuring higher reliability.

Energy Registration Methods:

The VM-3P75CT and VM-3P5A provide configurable energy registration, allowing selection between Vector, Arithmetic and Absolute. This flexibility ensures compatibility with regional requirements. Vector registration is the preferred method in countries such as Germany and Austria, as well as most other regions. In contrast, EM24, EM5XX and ABB meters support vector registration only. Most other energy meters use arithmetic registration.
See FAQ Q8 in the Victron Energy Meter manuals for further details regarding energy counting differences.

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Energy Meter	VM-3P75CT	VM-3P5A	ET340	EM540	EM24 Ethernet	EM24 Ethernet CT [1]	ET112
Manual	VM-3P75CT	tbd	ET340	EM540	EM24 Ethernet	EM24 Ethernet CT	ET112
Part number	REL200300100	REL200320100	REL300300000	REL200100100	REL200200100	NA	REL300100000
Display	No			LCD			No
Phases	3						1
Max Current Rating	80 A	5 A per phase	65 A per phase	65 A per phase	65 A per phase	5 A per phase	100 A
Measurement type	CTs	CTs	Direct/Shunt	Direct/Shunt	Direct/Shunt	CTs	Direct/Shunt
Comms	VE.Can / Ethernet	VE.Can / Ethernet	RS485	RS485	Ethernet	Ethernet	RS485
Refresh rate [2]	100 ms	100 ms	2000 ms	100 ms	600 ms	600 ms	750 ms
Power Factor reporting	Yes	Yes	No	Yes	No	No	No
Phase sequence reporting	Yes						No
Remarks	Also for split-phase		ET340DINAV23XS1X	EM540DINAV23XS1X	EM24DINAV23XE1X	EM24DINAV53XE1X	ET112DINAV01XS1X

[1] Not stocked by Victron
[2] Refresh rate = how often the energy meter provides a new value in its registers. Note that the GX device's latency (the time it takes to read at 9600 baud) is between 180 and 250ms.

Other Energy Meters with GX firmware support									
Energy Meter	EM111	EM112	EM330 [1]	EM340 [1]	EM530 [1]	EM24 RS485 [1]	ABB B21 [1,2]	ABB B23 [1,2]	ABB B24 [1,2]
Manual	EM111	EM112	EM330	EM340	EM530	EM24 RS485	B21	B23	B24
Part number	Not stocked								
Display	LCD								
Phases	1	1	3	3	3	3	1	3	3
Max Current Rating	45 A	100 A	5 A per phase	65 A per phase	5 A per phase	65 A per phase	65 A	65 A per phase	65 A per phase
Measurement type	Direct/Shunt	Direct/Shunt	CTs	Direct/Shunt	CTs	Direct/Shunt	Direct/Shunt	Direct/Shunt	CTs
Comms	RS485								
Refresh rate [3]	750 ms	750 ms	1200 ms	-	100 ms	600 ms	480 ms	480 ms	480 ms
Power Factor reporting	No						Yes		
Phase sequence reporting	No		Yes				No		
Remarks			EM330DINAV53HS1X27 EM330DINAV53HS1PFB27	EM340DINAV23XS1X27 EM340DINAV23XS1PFB27	EM530DINAV53XS1X	EM24DINAV93XISX	2CMA100155 R1000 Silver	2CMA100169 R1000 Silver	2CMA100183 R1000 Silver

[1] Selected models are supported
[2] Zigbee connection is not supported
[3] Refresh rate = how often the energy meter provides a new value in its registers. Note that the GX device's latency (the time it takes to read at 9600 baud) is between 180 and 250ms.