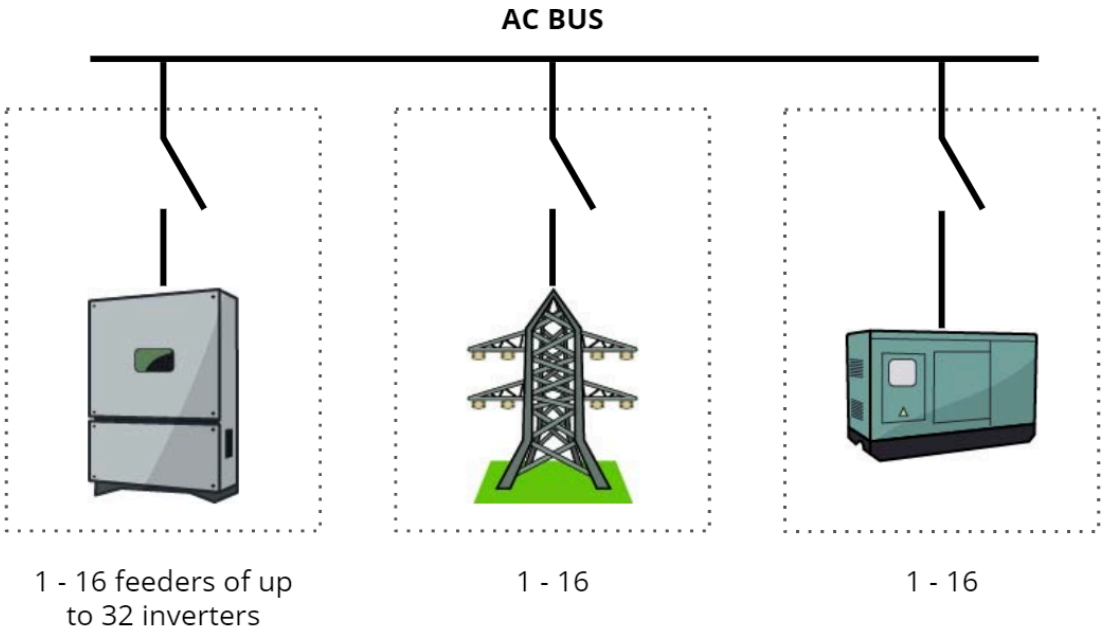
PV/Genset

Application Note

1 PV/Genset applications



1.1 Application description

ECpv2 covers applications with any combination of 1-16 PV feeders, 1-16 grid connections and 1-16 gensets.

A PV feeder is defined as a point where solar power is fed into the AC system from a number of solar inverters. A grid connection is defined as a point where power can access the AC system from the utility

ECpv2 controls the power and reactive power of the PV plant via the inverters stepless via communication. In addition to controlling, it also monitors a wide range of essential values that is visualised on ECweb

ECpv2 controls the power output of the PV plant and balances this towards the grid. By doing so, it can obtain:

- A fixed power and reactive power from the PV fed into the grid while having control of the power factor
- Self consumption only covering internal load while making sure no power is fed to the grid

ECpv2 controls the power output of the PV plant safely with genset protection features:

- Ensuring minimum load on gensets
- Reverse power protection on DG

All can be set up, adjusted and monitored through ECweb. The ECweb runs on PC´s or mobile devices.

1.2 ECpv2 type

As standard, the unit covers up to 16 PV feeders and 16 mains connections in all variants and up to 16 gensets in all PV/Genset variants

All variants are capable of controlling power exported to the grid.

1.2.1 Variants

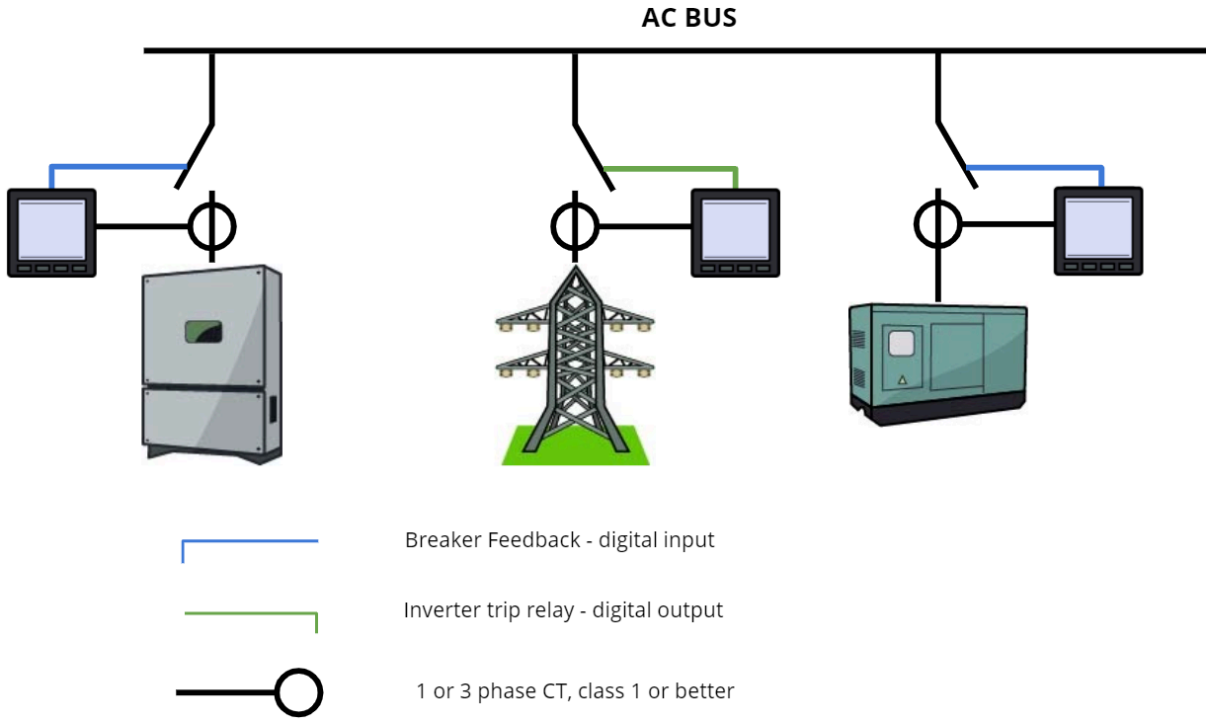
ECpv2 Logger: Logging
ECpv2 Solar: Only PV control and logging. Inverter power unlimited
ECpv2 S: PV/Genset/grid and logging. Inverter power up to 100KW
ECpv2 M: PV/Genset/grid and logging. Inverter power up to 500KW
ECpv2 L: PV/Genset/grid and logging. Inverter power unlimited

1.3 Features

- Genset reverse power protection
- Minimum load protection on gensets
- Fixed power and reactive control to grid
- Self consumption
- Grid feed in protection relay
- Stepless inverter power and reactive power control and monitoring via communication
- Universal interface to all inverter, power meters and generator controllers
- Consumption, production and PV performance monitoring and reporting

- Available as DIN rail mounted or as a ready to use solution

2 Power Measurements



ECpv2 works on single or three phase AC systems.

At each connection of a power source, either a grid connection, a genset or a string of inverters, a power measurement is recommended.

However, you can opt to rely directly on the measured power from inverters which the ECpv2 read back via communication, please note that the update speeds from the various inverters can vary highly.

Each power measurement, when not measuring via inverters, is done through current transformers and the ECpv2 will read the measurements via communication* from one of the supported genset controllers or power meters.

In case PV is backfeeding to utility, ECpv2 can be setup to activate relay outputs on the PV power meter(s) installed. The relay(s) can be used to trip breaker/contactor installed in front of the PV plant thereby disconnecting the PV plant.

In case PV is creating reverse power on the generators, ECpv2 can be setup to activate relay outputs on the PV power meter(s) installed. The relay(s) can be used to trip breaker/contactor installed in front of the PV plant thereby disconnecting the PV plant.

3 Communication

The ECpv2 has in total 3 communication ports:

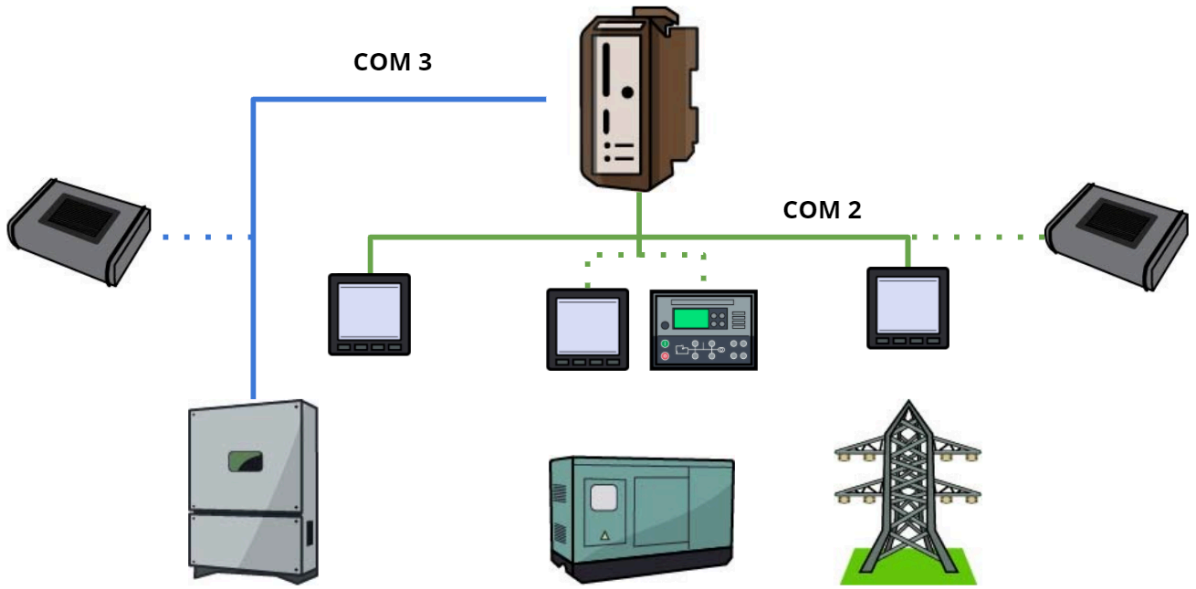
1. Ethernet: Modbus TCP
2. COM 2: RS-485
3. COM 3: RS-485

Using these ports a wide range of possible connections can be made to inverters, genset controllers, meter and sensors.

Even by controlling the inverters via Modbus TCP, you can have have RS-485 meters for reading power and reactive power from other power sources.

As a general rule, meter/controller types on each power source/grid should be the same type. E.g. if using Pilot SPM-33 for the gensets, all gensets have to have this same type of meter.

3.1 RS-485



*for meter positioning and information, please refer to part 2 of this document.

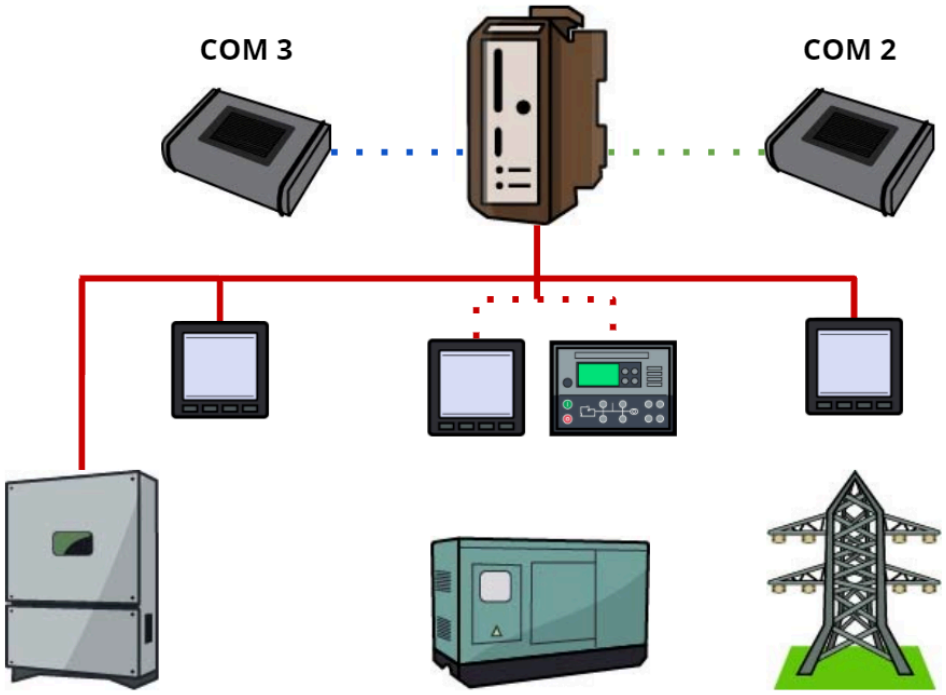
COM 3 is the RS-485 which the inverters and sensors (can be on COM2 as well) are daisy chained on.
32 modbus devices in total can be connected on this line without the use of modbus extenders.

COM 2 is the RS-485 which meters or genset controllers are daisy chained on and optionally sensors.
A total of:

- 16 grid meters/controllers
- 16 PV feeders
- 16 genset controllers/meters

All supported devices can be found on www.encombi.com or in the ECpv2 Data Sheet

3.2 Modbus TCP



*for meter positioning and information, please refer to part 2 of this document.

Ethernet can be used for connecting all devices in the application that communicates in Modbus TCP except from sensors - these are still to be connected on the COM 3 port using RS-485.

Across the plant you can connect up to:

- 16 grid meters/controllers
- 16 PV feeders
- 16 genset controllers/meters
- 32 inverters

4 Interfaces

Below will follow a list of any devices the ECpv2 can interface with. This list is being updated regularly.

4.1 PV inverters

Below listed inverters are all **SunSpec** based control and monitoring

Fronius, **KACO**, **SMA** (STP/Core) , **Huawei** (Sun2000), **Delta** (RPIh7/10) and **Solvia**, **ABB** (Trio 50/60, PVS100/120, Uno), **REFUsol** (8k to 100K)

Non SunSpec
Delta Solvia, **SolarEdge**, **Huawei** Smartlogger, SUN2000-8-28ktl, 33-42ktl, 50-75ktl, **ABB** Trio 8,5 - 27,6, **Sungrow** SG series and COM100E. **Schneider** Conext CL36 - CL125, **Growatt** & Growatt MAX, **Sofar Solar** 1-40 / 50-50, **KSTAR**, **Ginlong Solis**, **Polycab**, **Kehua** SPI-B, **GoodWe**, **AISWEI Solplanet**, **INVT**, **Chint** CPS 14-36kw & CPS SCA 18-36 kw, **WEG** 750SIW, **DEYE**, **SMA** Datamanager, **SOLAX** X3 MEGA, SOLAX X3 FORTH

4.2 Genset Controllers

Cummins PC2.X, PC3.x, MCM3320 **Caterpillar** EMCP4, **DeepSea** GenComm, **DEIF** ML-2, CGC 400, **ComAp** InteliSys, InteliGen, InteliCompact, AMF20, AMF25, InteliLite9, Intelligen4 200, IntelliMains 210, **Woodward** EasyGen 2000, EasyGen 3000, EasyGen 3000XT, LS5, **Smartgen:** HGM400-series, HGM7X00, HGM9X00, **Lovato** RGK60, **Sices** GC310, GC350, GC500, MC100, MC200, MC400, **Kohler/SDMO** APM802, **Datakom** D300, D500, D700

4.3 Power Meters

Pilot SPM 32, SPM 33, PMAC770, **Accuvim** L, EV300, **Schneider** EM64XX,

PM1200, PM2XXX, PM5100, 5300, 5500, **Entes** EMP-07S. **Janitza** UMG96RM. **DEIF** MIC-2, **Phoenix** EEM-EM3XX, EMpro, **Eastron** SDM630, X96-series **Klemsan** Ercas, Krea & Powys. **Socomec** Diris A40, **Chint** DTSU666, **ABB** M4M 20, M4M 30, **Secure Meters** 440, 300, **Algodue** UPM209, **Circutor** CVM C4, **Carlo Gavazzi** EM330, **DFUN** DFPM93, **Lettel** MCX-34V, **Acrel** ADL3000-E, **Selec** MFM384, **SMA** Datamanager, **Huawei** Smartlogger

4.4 Sensors

IMT Si-RS485TC-2T-MB, **MeteoControl** Si-RS485TC-2T-MB, **SevenSolar** (RS-485 based), **Sungrow** PC-4, **Rainwise** PV-MET-100-2, **Soluzione Solar** LiteMeter Pro, SunMeter Pro. Envmeter Pro, SunMeter Pro Wind, Windmeter, **Hukseflux** SR05, **Kipp Zonen** SMP-series, **BDsensor** DCL531 (fuel sensor), **Rika** RK200, RK220, **Acrel** ADL3000-E

If you do not find the interface you need for your project, please contact us at support@encombi.com