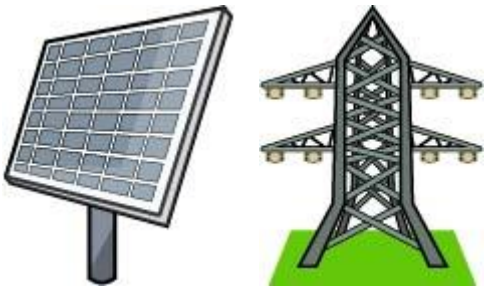
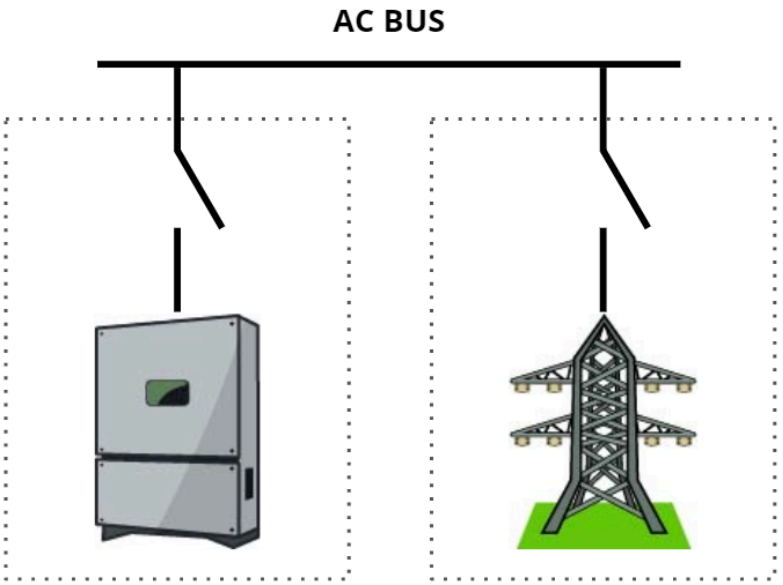


Power Export Control

Application Note

1 Power Export Control applications



1.1 Application description

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

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 maintain:

- 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

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

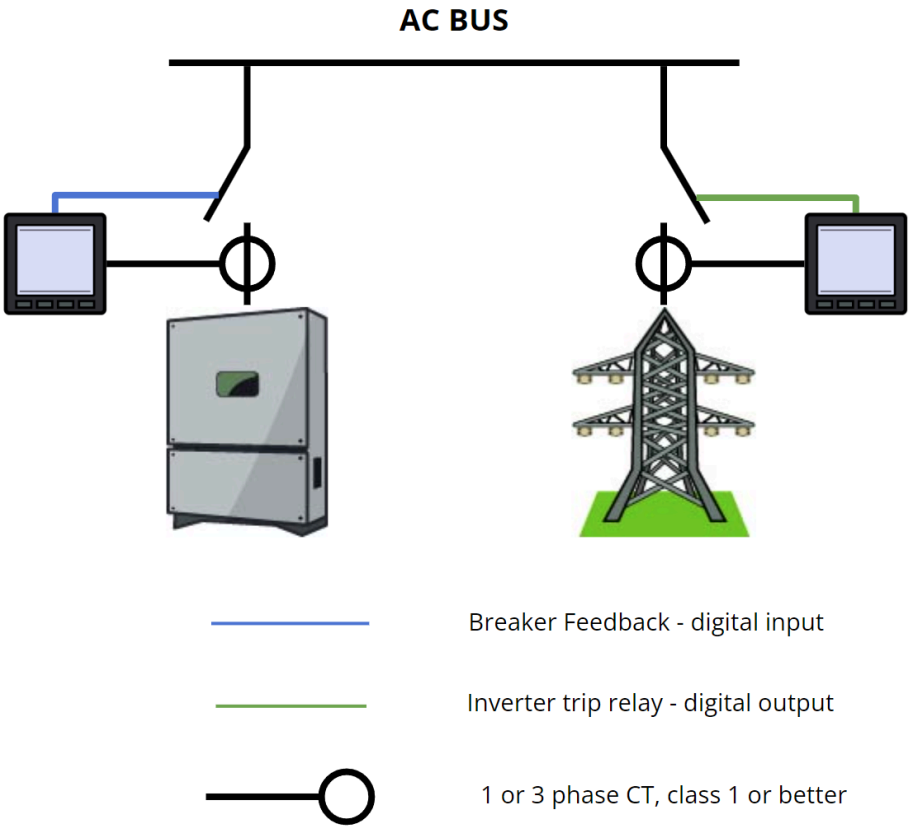
1.2 Extras

As standard, ECpv2 Solar will cover any type of the above listed applications with no limitation in regards to inverter capacity

1.3 Features

- Fixed power / reactive control to grid
- Self consumption
- Grid feed in protection relay
- Stepless inverter power and reactive power control and monitoring via communication
- RRCR function
- 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 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 reads 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 power meters*.

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

3 Communication

The ECpv2 has in total 3 communication ports:

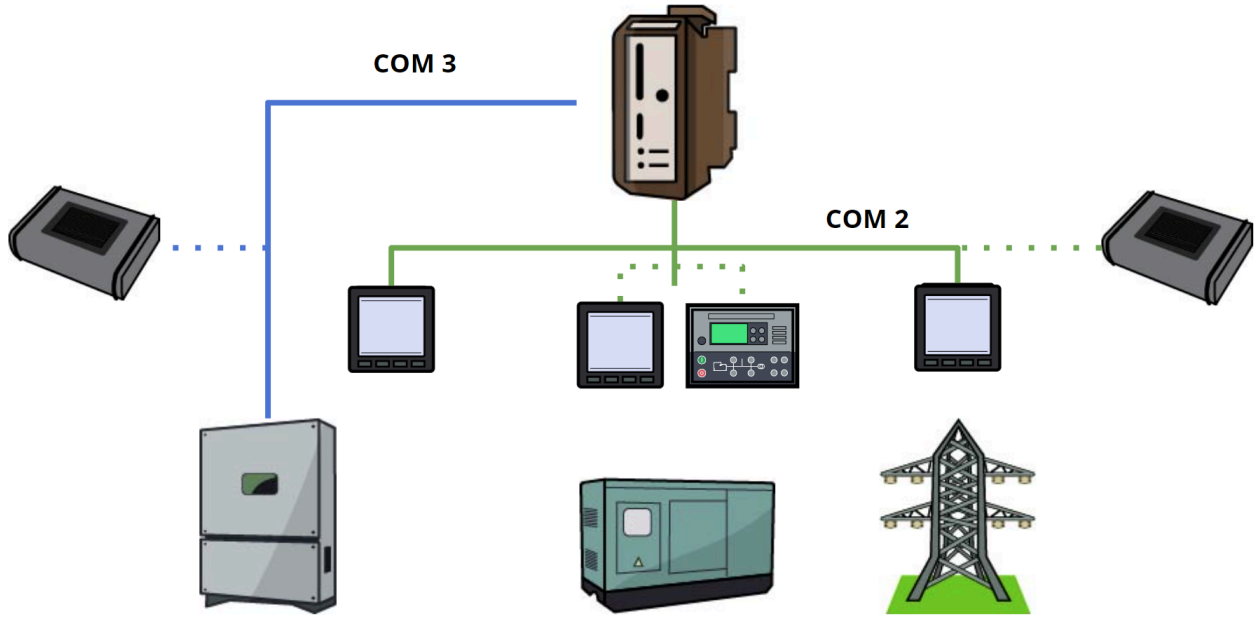
1. Ethernet: Modbus TCP
2. COM 2: RS-485
3. COM 3: RS-485

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

Even when controlling the inverters via Modbus TCP, you can 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 grid connections, all grid connections 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 optionally weather sensors) are daisy chained on.

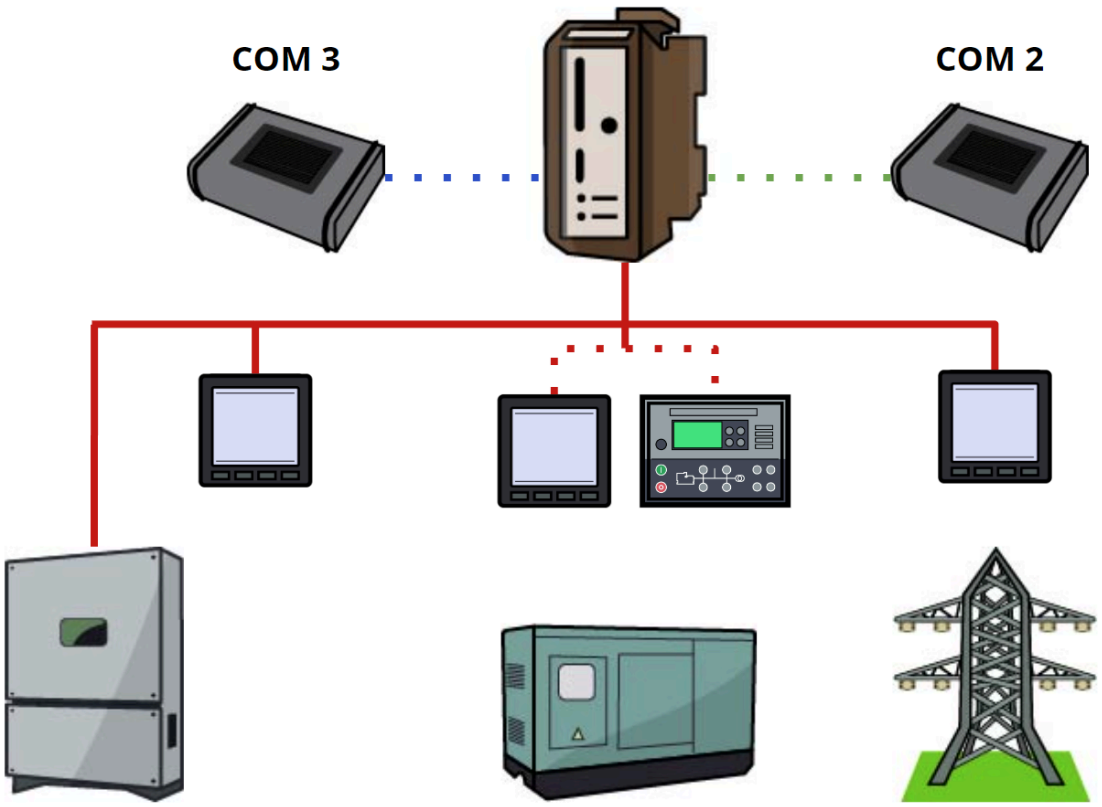
COM 2 is the RS-485 which meters of genset controllers are daisy chained on. A total of:

- 16 grid meters/controllers
- 16 PV feeders
- 16 genset controllers/meters
- Optionally also Weather sensors

32 modbus RTU devices in total can be connected on each of these lines without the use of modbus extenders.

All supported devices can be found further down in this document and on www.encombi.com

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 a COM 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 (check www.encombi.com for all news).

4.1 PV inverters

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

- **Non SunSpec: Delta** Solvia, **SolarEdge**, **Huawei** Smartlogger, **Huawei** 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, I**NVT**, **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.C, MCM3320
- **Caterpillar** EMCP4
- **DeepSea** GenComm
- **DEIF** ML-2 AGC series, CGC 400
- **ComAp** InteliSys, InteliGen, InteliCompact, AMF20, AMF25, InteliLite9, Intelligen4 200, IntelliMains 210
- **Woodward** EasyGen 2000, EasyGen 3000, Easygen 3000XT, LS5
- **Lovato** RGK60
- **Smartgen** HGM400-series, HGM7X00, HGM9X00
- **Sices** GC310, GC350, GC500, MC100, MC200, MC400
- **Kohler/SDMO** APM802
- **Datakom** D300, D500, D700

4.3 Power Meters

- **Pilot** SPM 33, SPM 32, PMAC770
- **Accuvim** L, EV300
- **Schneider** EM64XX, PM1200, PM2XXX, PM5100, 5300, 5500
- **Entes** EMP-07S

- **Janitza** UMG
- **DEIF** MIC-2
- **Entes** EMP-07S
- **Phoenix** EEM-EM3XX, EMpro
- **Eastron** SDM630, X96-series
- **Klemsan** Ercas, Krea & Powys
- **Socomec** DIris A40
- **Chint** DTSU666
- **ABB** M4M 30, 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 Weather Sensors

- **IMT** Si-RS485TC-2T-MB
- **Meteocontrol** Si-RS485TC-2T-MB
- **Sevensolar**
- **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