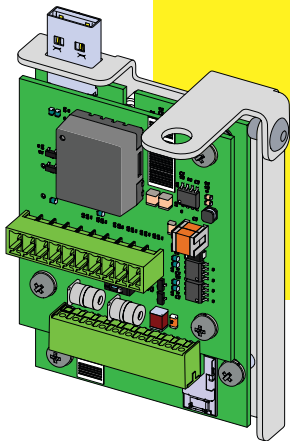# FIMER

Solar Inverter
PVS-20/30/33-CCB
Quick Installation Guide

1. Funcionalities

The PVS-20/30/33-CCB (communication and control board) is an an expansion accessory board for PVS-20/30/33 inverter family that adds the following capabilities to the inverter:
- RS 485-1 main communication line (master or slave)
- Active output power limitation via digital inputs (PMU mode)
- Auxiliary power supply (24Vdc/80mA) to supply external devices (ex: VSN800 Weather Station).

2. Main components
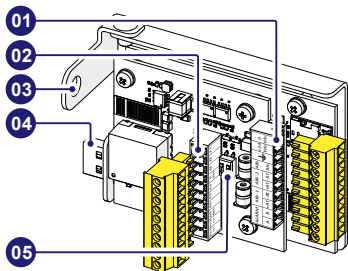
| Main components	
01	Signal connector J1 (Alarm relay, RS-485 and 24V power supply)
02	Signal connector J3 (Digital and Analog inputs)
03	Mounting bracket
04	USB connector
05	RS-485 line termination switches

3. Supplied component list

Components available in the kit		Q.ty
	Communication and Control Board (PVS-20/30/33-CCB)	1
	Counterpart J1 connector (L-shaped)	1
	Counterpart J3 connector (straight)	1
	M6 screw with washer for mechanical securing	1
	Technical documentation	1

4. Assembly instructions

The PVS-20/30/33-CCB must be installed inside the Signals connection box **(08)** on the lower part of the PVS-20/30/33-TL inverter.
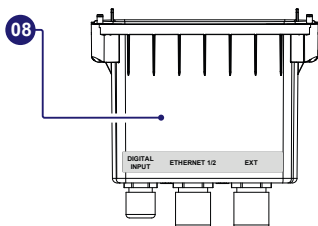
PVS-20/30/33-CCB must be connected to inverter USB connector **(10)** located under the Signals connection box **(08)**.
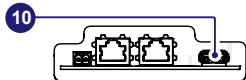
The connection cables of the PVS-20/30/33-CCB must be passed through the EXT cable gland **(22)** of the signals connection box **(08)**. The cable gland is equipped with a three-holes gasket that can be removed in case of using a single multicore cable. Signal cables caracteristics:
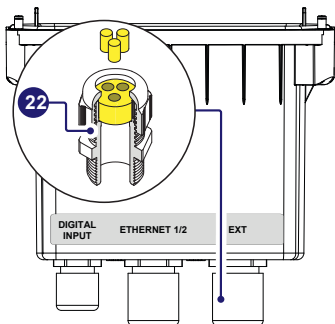
EXT cable gland (22)- M25	
Multi cables installation (with three-hole gasket)	4...6 mm (each hole)
Single cable installation (without three-hole gasket)	10...17mm

J1 and J3 screw terminal blocks	
Signal connectors wires	0.14...1.5mm^2

| Tightening torques	
EXT cable gland **(22)**- M25	7.5 Nm
Screw terminal blocks (**J1 and J3**)	0.22...0.25Nm

4.1 PVS-20/30/33-CCB installation procedure

⚠ **WARNING –** The installation of the PVS-20/30/33-CCB must be carried out with the inverter disconnected from the grid and from the photovoltaic generator.
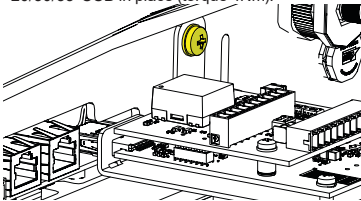
• Remove the Signals connection box **(08)** by unscrewing the 4 retain screws.

⚠ **ATTENTION –** If any cable is installed on the other two cable glands remember to unscrew it in order to slide the cables freely.

• Connect the PVS-20/30/33-CCB to the USB connector **(10)**.
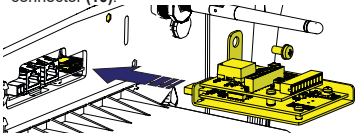
• Tighten the screw supplied to lock the PVS-20/30/33-CCB in place (torque 4Nm).

⚠ **ATTENTION –** The PVS-20/30/33-CCB, once installed, will be detected at the next restart of the inverter.

4.2 Communication and control signals connection

- Take the Signals connection box **(08)**, unscrew and remove the EXT cable gland **(22)** ring.
- Remove the three-holes gasket from the EXT cable gland **(22)**.
- Remove the plug/s (plastic cylinder/s) from the gasket.

⚠ **ATTENTION –** Skip this step in case of use of a single multicore cable.

- Insert the cable/s through the EXT cable gland **(22)** ring.
- Install the three-holes gasket on the cable/s and reinstall it inside the cable gland.

⚠ **ATTENTION –** Skip this step in case of use of a single multicore cable.

- Insert the cable/s inside the Signals connection box **(08)** through the EXT cable gland **(22)**.
- Reinstall the cable gland ring without firmly tighten it.
- Connect the wires on the supplied mating connectors following the pin out indicated on the labels appiled on the board:
  - Counterpart J1 connector L-shaped connector.
  - Counterpart J3 connector straight connector.

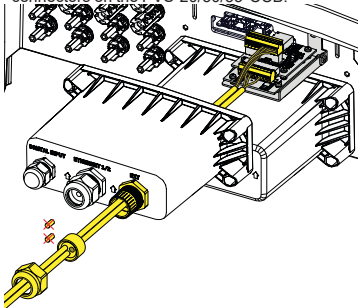| An1 In	An2 In	AN RN	K6	K5	K4	K RN	K3	K2	K1
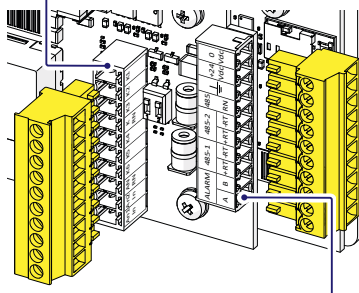
ALARM		485-1		485-2		485		+24	0
A	B	+RT	-RT	+RT	-RT	RN		Vdc	Vdc

🄟 **NOTE –** Available signals are higlighted in yellow. See the dedicated paragraphs on this guide.

- Install the mating connectors on the respective connectors on the PVS-20/30/33-CCB.

- Install the signals connection box **(08)** by screwing the 4 locking screws present on it).
- Firmly tighten the EXT cable gland **(22)** ring (torques 7.5Nm).

⚠ **ATTENTION –** If any cable is installed on the other two cable glands remember to screw it.
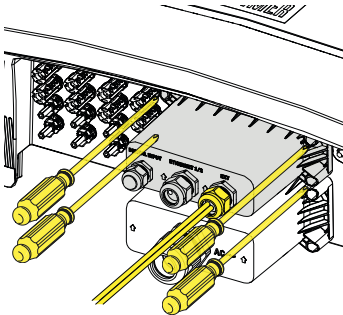
5. RS 485-1 line (Main)

The PVS-20/30/33-CCB 485-1 line can be used in one of the following adjustable modalities:

• Connection of the inverter to a third party system (slave mode).

• Connection of supported external devices (like VSN800 Weather Station, meter, etc). In this case data from accessories will be logged and transferred to the cloud by inverter itself (master mode).

The 485-1 serial communication line is available on the PVS-20/30/33-CCB terminal blocks +RT, -RT, 485 RN and ⏚.
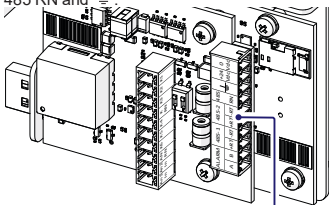
ALARM		485-1		485-2		485	⏚	+24	0
A	B	+RT	-RT	+RT	-RT	RN		Vdc	Vdc

To activate the 120Ohm termination resistance of the communication line set the switch 1, of S1 **(05)** component, in ON position.
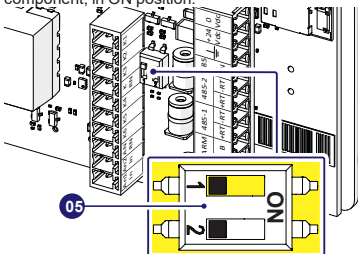
> 📖 **NOTE –** Automatic settings of network parameters at power on, embedded logging capability, automatic logger-free transferring of data to Aurora Vision cloud and remote firmware update are provided over TCP/IP connectivity (Ethernet and/or Wi-fi) bus only.

5.1 RS 485-1 third party system

The use of the inverters over the 485-1 line is recommended in case of using third party RS-485 control systems.

> 📖 **NOTE –** RS-485 line supports Modbus/RTU SUNSPEC compliant Modbus protocol.

• Connect one or more units (daisy-chain) observing the correspondence between the signals as for the table below:

	Signal	Symbol
	Positive data	+RT
	Negative data	- RT
	Reference	485 RN
	Shield	⏚

> ⚠ **ATTENTION –** Shield continuity must be provided along the communication line and must be grounded in a single point.

> ⚠ **ATTENTION –** Use a shielded twisted pair cable with characteristic impedance of Z0=120 Ohm in case of long distance connection.

• Activate the termination resistance of the communication line of the final unit of the chain.

> 📖 **NOTE –** Activate the switch also in case of a single unit installed
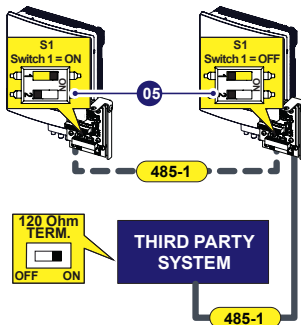
- Set the communication protocol parameters on the "Connettivity → Communication protocols" menu of the APP "Installer for solar inverters" or Web User Interface.
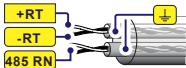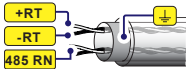
5.2 RS 485-1 external devices

The 485-1 port can be used for connecting supported devices (like VSN800 Weather Station, meter, etc) and have the inverter acting as datalogger for the connected devices.

In this case data from accessories will be logged and transferred to FIMER Aurora Vision cloud by inverter itself (master mode).

- Connect the external device observing the correspondence between the signals as for the table below:

|	Signal	Symbol
	Positive data	+RT
	Negative data	- RT
	Reference	485 RN
	Shield	⏚

- Activate the termination resistance of the 485-1 communication line.

When an accessory is connected to the 485-1 port, it must be added and configured into the "Connettivity → Additional devices" list on the APP "Installer for solar inverters" or Web User Interface.

6. Auxliary power supply

The PVS-20/30/33-CCB is equipped with a 24Vdc power supply for external devices direcly connected to the 485-1 communication line.
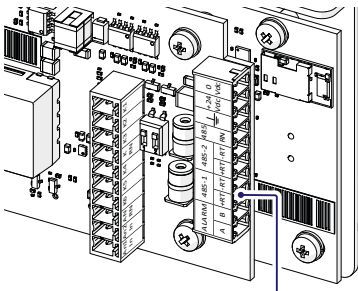
ALARM		485-1		485-2		485		+24 Vdc	0 Vdc
A	B	+RT	-RT	+RT	-RT	RN			

> 📝 **NOTE –** The maximum output current is 80mA

7. PMU Mode

PVS-20/30/33-CCB adds to the inverter digital inputs that can be used by a ripple control system to reduce the active output power of the plant.

The active power control via digital inputs allow to set the maximum active output power as % of the inverter nominal power.

The digital inputs used for the active power limitation function are "K1, K2, K3, K4 and K RN".

An1 In	An2 In	AN RN	K6	K5	K4	K RN	K3	K2	K1
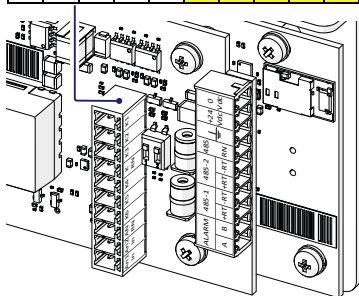
• Connect the wires based on the following table. The input that is "Closed" must be short circuited with the "K RN" terminal.

K1	K2	K3	K4	Maximum active power as % of the inverter nominal power
Closed	Open	Open	Open	100
Open	Closed	Open	Open	60
Open	Open	Closed	Open	30
Open	Open	Open	Closed	0

> 📝 **NOTE –** Inverter receiving the specific ripple control signal (according to above table) provides to send to all the inverter, connected to the same Ethernet line, the corrisponding active power limitation command.

• Enable the PMU Mode on the "Connettivity → Power management via PVS-20/30/33-CCB"

menu of the APP "Installer for solar inverters" or Web User Interface.

> 🔲 **NOTE –** If the PMU mode is enabled, isn't possible to set export limitation functionality to the inverter's plant.

> 🔲 **NOTE –** In case of multiple inverter, connected via Ethernet one to each other, only one PVS-20/30/33-CCB is needed to activate PMU mode in all inverters.

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