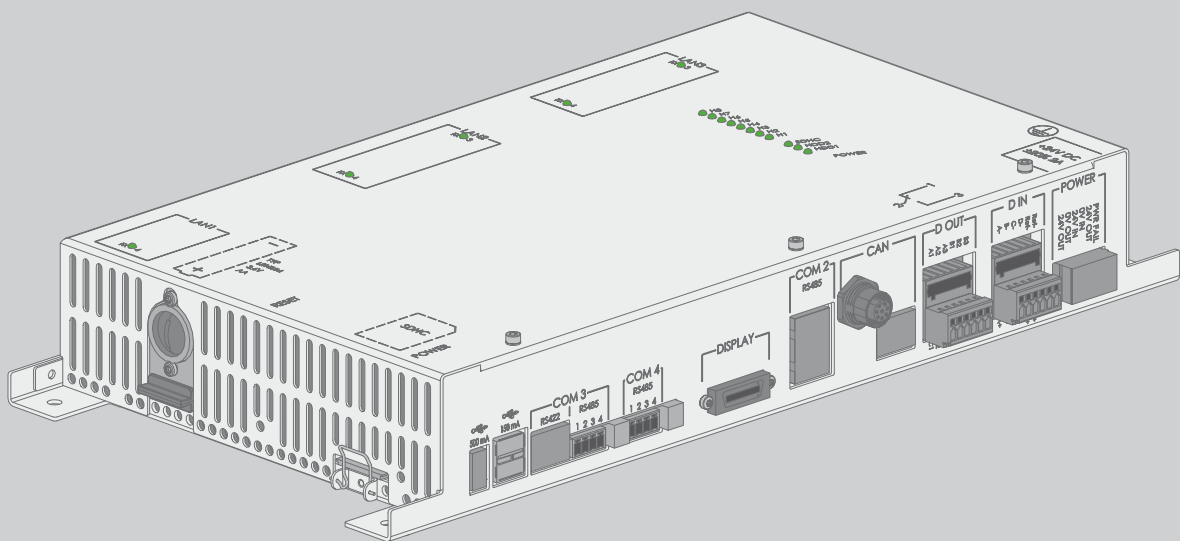


Technical Information

SUNNY CENTRAL COMMUNICATION CONTROLLER



Content

The Sunny Central Communication Controller is an integral part of the central inverter which is responsible for establishing the connection between the inverter and the PV system operator. The Sunny Central Communication Controller has been specifically developed for use in central inverters of the CP XT production series. With its various interfaces, the Sunny Central Communication Controller enables customized integration of the central inverter into the PV farm network.

The Sunny Central Communication Controller meets the stricter requirements for regulation of large-scale PV farms and therefore provides a professional solution for monitoring PV power plants.

This document specifies the key functions, interfaces and technical data of the Sunny Central Communication Controller. In this document, the Sunny Central Communication Controller is referred to as SC-COM.

1 Summary of Functions

The SC-COM is the central communication interface of the central inverter which manages the data of all connected devices. The SC-COM is integrated in the central inverter and is wired at the factory.

The main functions of the SC-COM can be summarized as follows:

PV System Configuration

You can use the SC-COM to set the parameters of the central inverter. Thus, you can adapt the central inverter specifically to your PV array.

You can configure the parameters via an integrated web server and the user interface on your computer.

PV System Monitoring

As the principle communication interface of the central inverter, the SC-COM supplies the PV system operator with data on the instantaneous values of the central inverter and PV string currents, as well as error messages. You can access this data on the user interface and optionally from Sunny Portal. In addition, it is possible to read out the data via Modbus[®] protocols.

Grid Management Service

The SC-COM enables the grid operator to limit the power output of the PV system by remote control. If the devices regulating active and reactive power are connected, the SC-COM can be used to adjust the nominal PV system power in rapid response to the specifications of the grid operator. The SC-COM will record these specifications and transmit them to the central inverter.

2 Features

2.1 Network Concept

In order to transmit the data faster and more efficiently, the SC-COM is equipped with two additional LAN interfaces. This enables two separate networks to be set up as required:

- Control network in which the specifications of the grid operator for grid management service, such as setpoints for active power and reactive power, are transmitted.
- Monitoring network in which the data for monitoring and parameterization are transmitted.

Due to the two separate networks, a faster rate of data communication with extremely short response times is achieved. If your network has sufficient data transmission speed, one network may be sufficient for both types of data.

2.2 Interfaces

The SC-COM is completely integrated in the central inverter at the factory. The entire internal cabling is installed at the factory. External data cables are connected as always via terminals in the customer connection area of the central inverter.

The SC-COM uses the following interfaces:

LAN1	<ul style="list-style-type: none"> • Service interface • Extension I/O to link in optional analog and digital inputs
LAN2	Control network
LAN3	Monitoring network
RS485	Communication with devices for string-current monitoring

2.3 Optical-Fiber Converter

Optical-fiber converters with two optical-fiber ports for subscriber connectors can be optionally integrated in the SC-COM. The optical-fiber converters are available for multi-mode optical fibers. The connection between SC-COM and splice box is established at the factory. The connection of the optical fibers takes place at the splice box with subscriber connectors in the central inverter.

2.4 Protocols

To enable the SC-COM to meet the current grid management requirements, the communication interface operates with the various communication protocols listed below:

- Modbus* /TCP
- Modbus/UDP
- RPC
- FTP

2.5 Response Times

By using the fast Modbus/UDP protocol for the transmission of setpoints from the grid operator, fast response times can be achieved.

This makes for response times between the setpoint being received at the SC-COM and the first reaction of the central inverter in the range of 100 ms to 200 ms.

An exception are the power boosts of the central inverter which start from a power output of 0%. These boosts require slower response times.

A further exception is the disconnection of the central inverter by external fast-stop function via Modbus. In this case, the average response time is less than 100 ms.

Remember that the inquired measured values are not real-time values, but may have a time shift of 500 ms to 1 s.

From one single superordinate control gear for PV farms, all central inverters can be set simultaneously to a new setpoint by means of one Modbus/UDP command.

* Modbus[®] is a registered trademark of Schneider Electric and is licensed by the Modbus Organization, Inc.

3 Various Solutions for Grid Management Services

When using a Power Reducer Box, it is possible for the grid operator to regulate active power and reactive power of the central inverter. The specifications are analyzed by the Power Reducer Box and transmitted via the Ethernet network to the SC-COM.

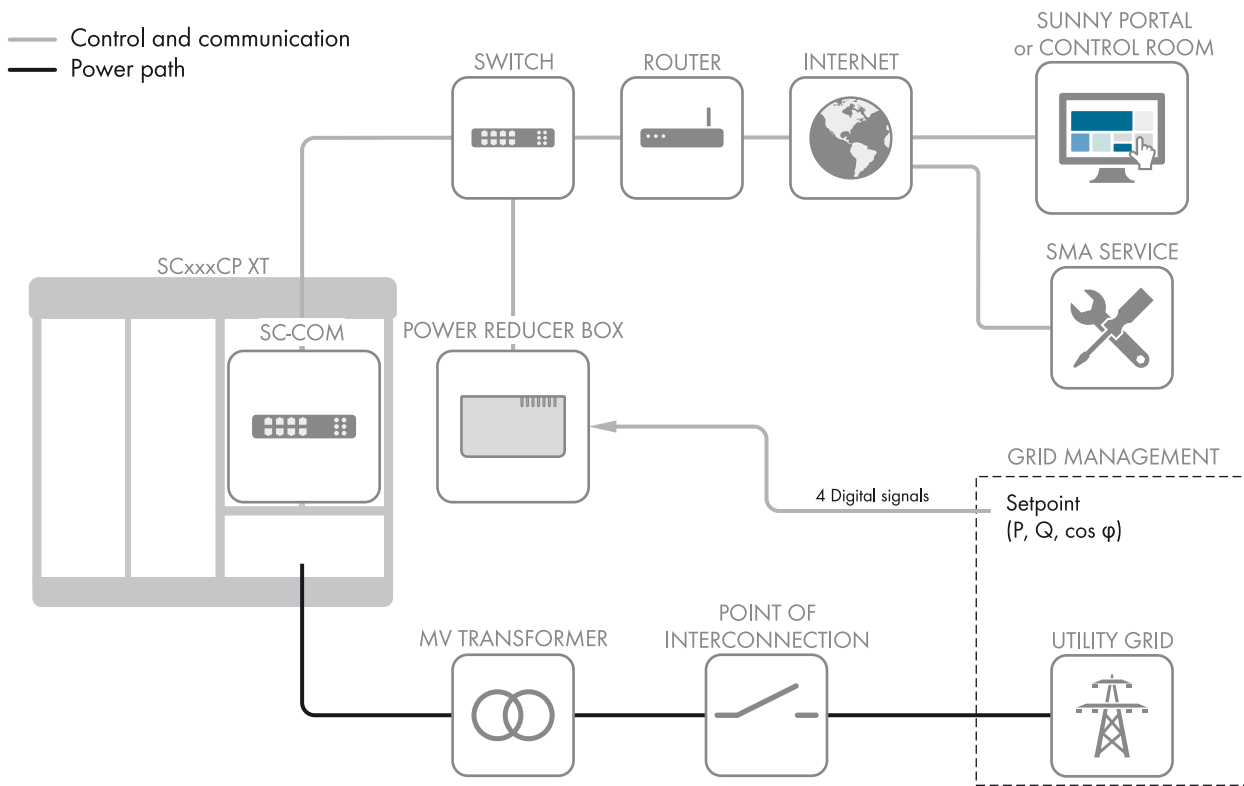


Figure 1: Regulation of active power and reactive power of the central inverter

In the solution with PV farm control, it is possible to regulate voltage, active and reactive power at the feed-in point. The setpoints are analyzed by a control gear for PV farms such as the SMA Power Plant Controller and forwarded to the SC-COM via the control network set up for this specific purpose. The feedback to the grid operator takes place via the changed measured values.

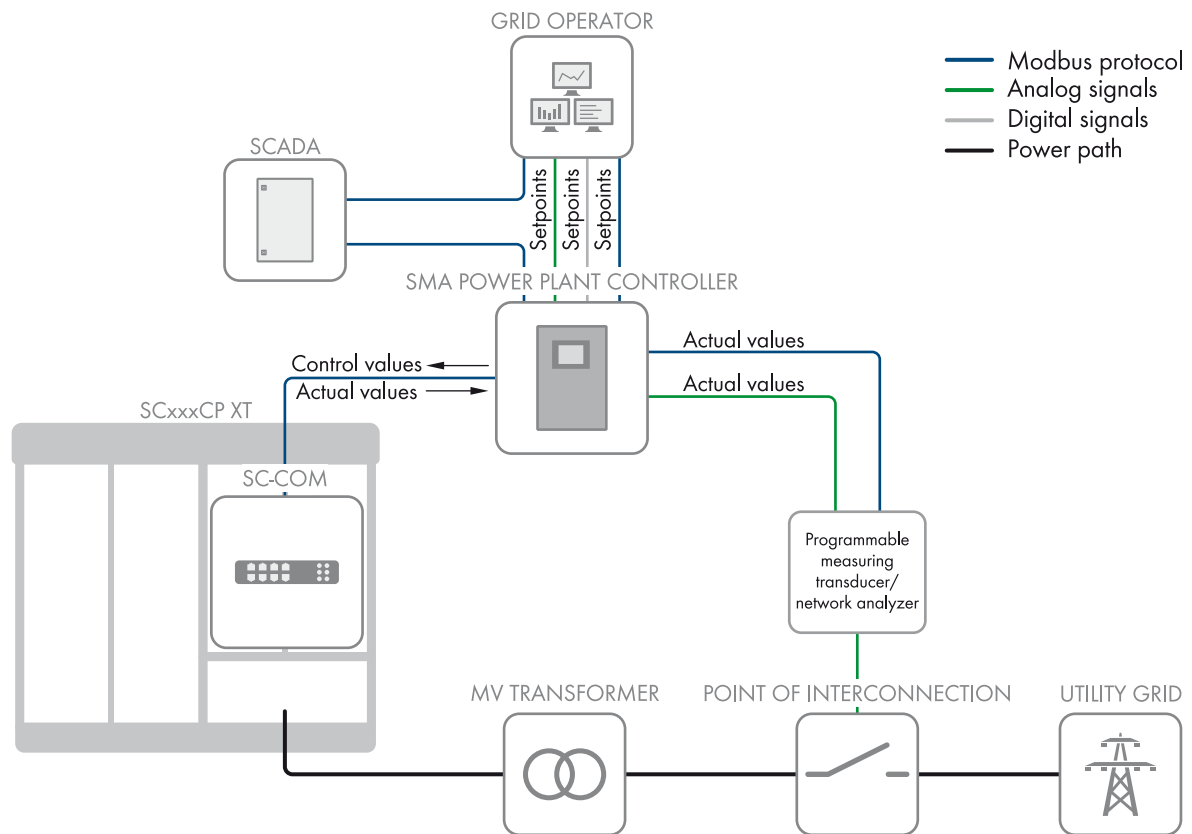


Figure 2: Control of voltage, active power and reactive power of the central inverter

With the SMA Power Plant Controller, it is possible for the grid operator to remotely control the power output of the PV power plant.

Main functions of the SMA Power Plant Controller:

- Measurement of the active power and reactive power as well as the voltage at the feed-in point
- Calculation of the setpoints based on the target value specifications by grid management using the PI/PID algorithm
- Simultaneous transmission of setpoints to all connected central inverters

All status changes, events and measuring values relating to the point of interconnection are recorded by the SMA Power Plant Controller and can be recalled by a higher-level control room.