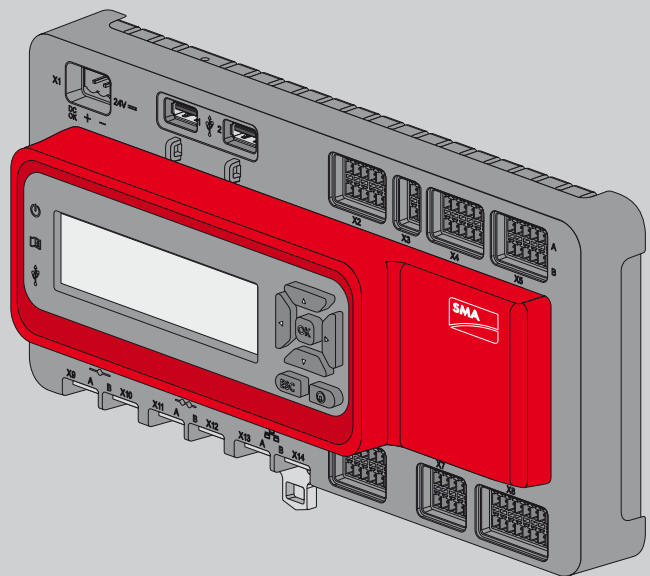


## Quick Reference Guide for Commissioning SMA CLUSTER CONTROLLER

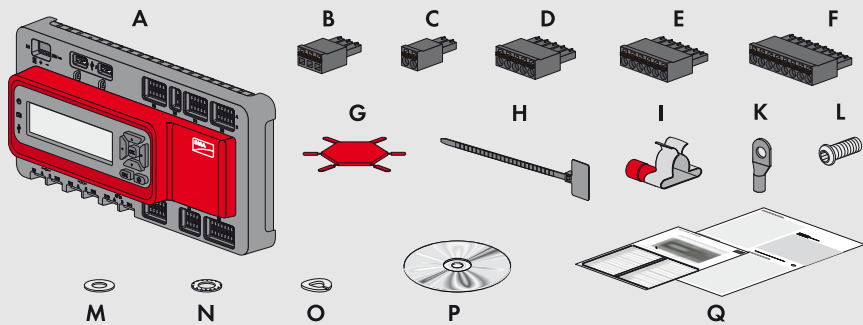


ClusterController-IAS-en-1.1 | Version 1.1

ENGLISH

### 3 SCOPE OF DELIVERY

Check the scope of delivery for completeness and any externally visible damage. Contact your specialist dealer if the delivery is incomplete or damaged.



**A)** 1 x Cluster Controller, **B)** 1 x three-pole plug, **C)** 1 x two-pole plug, **D)** 2 x five-pole plug, **E)** 8 x six-pole plug, **F)** 2 x eight-pole plug, **G)** 2 x coding element, **H)** 20 x cable ties with writing field, **I)** 8 x shield clamp with ring terminal lug, **K)** 1 x ring terminal lug, **L)** 1 x fastening screw, **M)** 2 x washer, **N)** 1 x tooth lock washer, **O)** 1 x split lock washer, **P)** 1 x CD with product documentation, **Q)** 1 x quick reference guide for commissioning and supplementary sheet for writing down the connected devices

### 4 MOUNTING

#### NOTICE

#### Radio interference in living areas possible due to the Cluster Controller

The Cluster Controller is a device of ITE class A (EN 55022) and can cause radio interference in the living area.

- Take suitable measures for shielding radio waves when the Cluster Controller is used in the vicinity of living areas.

#### Selecting the Mounting Location

Select the mounting location. Observe the mounting location requirements, the minimum clearances and the permissible mounting position (see installation manual on the CD provided).

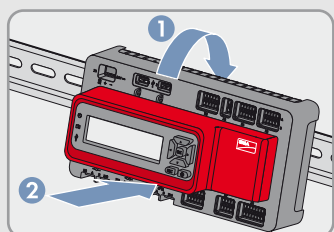
#### Mounting the Cluster Controller

##### Requirements:

- A 35 mm wide top-hat rail must be available which is mounted securely on the wall or in the switch cabinet.
- In order to mount the Cluster Controller, the top-hat rail must be at least 26 cm in length. To mount the top-hat rail power supply unit, the top-hat rail must be correspondingly longer.

##### Procedure:

- Use the rear-side upper retainers to hook the Cluster Controller into the upper edge of the top-hat rail and press down in the direction of the top-hat rail. This will hook the spring-mounted top-hat rail locking mechanism of the Cluster Controller onto the lower edge of the top-hat rail.



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## 1 INFORMATION ON THIS DOCUMENT

#### Validity

This document is applicable for the device type "CLCON-10.GR1" (SMA Cluster Controller) from hardware version A1 and from firmware version 1.0.

#### Target Group

This document is for skilled persons. Only persons with the appropriate skills are allowed to perform the tasks described in this document. Skilled persons must have the following qualifications:

- Training in the installation and commissioning of electrical devices
- Training in how to deal with the dangers and risks involved in installing and operating electrical devices and plants
- Training in the installation and configuration of IT systems
- Knowledge of how an inverter works and is operated
- Knowledge of all applicable standards and directives
- Knowledge of and adherence to this document and all safety precautions

## 2 SAFETY

#### Appropriate Usage

The Cluster Controller\* is a device for monitoring and controlling up to 75 SMA inverters with Speedwire/Webconnect interface in decentralised large-scale PV plants. The Cluster Controller is an ITE Class A device according to EN 55022 and is designed for industrial use.

The Cluster Controller must only be used in an indoor environment and must only be used with supported products (for a list of the supported products, see the installation manual on the CD included in the scope of delivery).

For safety reasons, it is not permitted to modify the product or install components that are not explicitly recommended or distributed by SMA Solar Technology AG for this product.

Only use the Cluster Controller in accordance with the information provided in the enclosed documentation.

Any other use may result in personal injury or property damage.

The enclosed documentation is an integral part of this product:

- Read and observe the documentation.
- Keep the documentation in a convenient place for future reference.

#### Safety Precautions

##### DANGER

#### Danger to life due to electric shock

If overvoltage occurs (e. g. through a flash of lightning) or if the enclosure of the Cluster Controller is not earthed, there is a danger of electric shock.

- Ensure that the Cluster Controller is integrated in the existing lightning protection.
- Earth the enclosure of the Cluster Controller (see Section **Connecting the Protective Conductor to the Cluster Controller**).

##### NOTICE

#### Damage to the devices and cables

The Cluster Controller is not splash water-protected (degree of protection: IP20). Consequently, it is possible that moisture may penetrate the device.

- Only use the Cluster Controller in a dry, indoor environment.

\* In this document, the SMA Cluster Controller is referred to as the Cluster Controller.

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## 5 CONNECTION AND COMMISSIONING

##### DANGER

#### Danger to life due to electric shock from faulty connection of the connection cable to the ripple control receiver

In the event of faulty connection of the connection cable to the ripple control receiver, mains voltage may be present in the Cluster Controller enclosure.

- Do not connect insulated wires of the connection cable to phase conductors of the ripple control receiver.
- When connecting, ensure that no bridge is being used in the ripple control receiver.



#### For a detailed connection description, see installation manual

This quick reference guide enables the elementary commissioning of the Cluster Controller. A detailed description of all connection possibilities is contained in the installation manual on the CD included in the scope of delivery.



#### Noting down the connections on the supplementary sheet

Note down the terminal assignment on the supplementary sheet supplied.

#### Cable Requirements and Information on Routing

Connection	Cable Requirements
Earthing	<input type="checkbox"/> Conductor cross-section: 2.5 mm <sup>2</sup>
	<input type="checkbox"/> Maximum cable length: 30 cm
Voltage supply	<input type="checkbox"/> Number of insulated wires: at least two
	<input type="checkbox"/> Conductor cross-section: 0.2 mm <sup>2</sup> to 2.5 mm <sup>2</sup>
	<input type="checkbox"/> Maximum cable length: 3 m
Inverter (Speedwire) and local area network (LAN)	<input type="checkbox"/> Number of insulated wire pairs and insulated wire cross-section: at least 2 x 2 x 0.22 mm <sup>2</sup> or at least 2 x 2 AWG 24
	<input type="checkbox"/> External diameter: the maximum external diameter depends on the size of the cable gland
	<input type="checkbox"/> Cable category: Cat5, Cat5e, Cat6, Cat6a, Cat7
	<input type="checkbox"/> Cable shield: SF/UTP, S/UTP, SF/FTP, S/FTP
	<input type="checkbox"/> Plug type: RJ45 for Cat5, Cat5e, Cat6, Cat6a
	<input type="checkbox"/> Cable length between two nodes: max 50 m with patch cable, max 100 m with installation cable



#### Disturbance of data transmission due to unshielded power cables

If unshielded power cables are used, they generate an electromagnetic field which may induce interference in network cables during data transmission.

- When laying network cables, observe the following minimum clearances to unshielded power cables:
  - For installation without separating strip: at least 200 mm
  - For installation with aluminium separating strip: at least 100 mm
  - For installation with steel separating strip: at least 50 mm

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## Connecting the Cluster Controller to the Voltage Supply

### NOTICE

#### Damage to the Cluster Controller due to condensation water

If the Cluster Controller is moved from a cold environment to a warm environment, condensation water may form in the Cluster Controller.

- In the event of large temperature differences, only supply voltage to the Cluster Controller once the Cluster Controller has reached room temperature.

## Connecting the Protective Conductor to the Cluster Controller

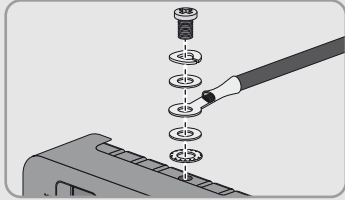
### Additionally required material (not included in scope of delivery):

- 1 protective conductor (see Section **Cable Requirements**)

### Procedure:

- Remove 1 cm of the cable sheath from the protective conductor.
- Insert the insulated wires into the ring terminal lug and crimp with a crimping tool.
- Attach the protective conductor at the terminal for earthing (for the position of the terminal, see installation manual on the CD included in the delivery). Observe the following sequence and hand-tighten the fastening screws (torque: 0.8 Nm):

- Fastening screw, split lock washer, washer, ring terminal lug with protective conductor, washer, tooth lock washer



## Connecting the Top-Hat Rail Power Supply Unit

### Additionally required material (not included in scope of delivery):

- 1 top-hat rail power supply unit (available as an accessory). If the top-hat rail power supply unit available as an accessory is not used, observe the requirements for the top-hat rail power supply unit (see installation manual on the CD included in the delivery).
- 1 AC connection cable
- 1 connection cable for the connection of the top-hat rail power supply unit to the Cluster Controller (see Section **Cable Requirements**)

### Procedure:

- Mount the top-hat rail power supply unit on the top-hat rail (see the manufacturer manual).
- Connect the connection cable to the top-hat rail power supply unit (see the manufacturer manual). For this purpose, trim the unused insulated wires up to the cable sheath and note down the wire colours.
- Connect the connection cable to the three-pole plug. For this purpose, release conductor entries 2 and 3 with a screwdriver and insert the insulated wires into the conductor entries. Observe the pin assignment.
- Connect the three-pole plug to terminal **X1** of the Cluster Controller.
- Connect the AC connection cable to the top-hat rail power supply unit (see the manufacturer manual).

### ⚠ DANGER



#### Danger to life due to electric shock



Lethal voltages are present at the connection point of the electricity grid.

- Disconnect the connection point from voltage sources and ensure that the connection point is voltage-free.
- Connect the other end of the AC connection cable to the electricity supply.

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- Connect the connection point to the electricity grid.

The power LED (  ) of the Cluster Controller glows red for two seconds, then it permanently glows green. The status LED (  ) glows corresponding to the current device status (see Cluster Controller installation manual on the CD included in the delivery). The Cluster Controller is ready for operation after a maximum of one minute.

Is the power LED (  ) glowing permanently red, the status LED (  ) glowing yellow or red and the Cluster Controller not starting?

Possible fault cause: the voltage supply is too low.

- Ensure that the connected voltage supply is sufficient (for requirements for the voltage supply see the installation manual on the CD provided). If the problem persists, contact the SMA Service Line (see Section 7).

## Checking and Setting the Plant Time of the Cluster Controller

Before connecting the Cluster Controller to the Speedwire network and before commissioning the inverters, you must use the display of the Cluster Controller to check whether the correct plant time is displayed on the Cluster Controller. If the correct plant time is not displayed, you must set the correct plant time using the user interface of the Cluster Controller. This way, you can avoid inconsistencies in the time settings of the inverters.

### Requirements:

- The Cluster Controller must be connected to the voltage supply and be in operation (see Section **Connecting the Cluster Controller to the Voltage Supply**).

### Procedure:

- Use one network cable to connect the computer to terminal **X13** or **X14** of the Cluster Controller.
- Log in to the Cluster Controller:
  - On the Cluster Controller, select the **External communication** display view and read out the IP address.
  - Enter the IP address in the address bar of the Internet browser.
  - Log in with the default plant password (User = "0000", installer = "1111").
- Select the Cluster Controller in the plant tree and select the **Settings** menu in the device menu.
- Select the **Device > Time settings** parameter group.
- Select **[Edit]**.
- If required, use the **Standard/Daylight Saving Time conversion on** drop-down list to set automatic conversion between standard and daylight saving time.
- In the **Set plant time** field, set the current date and time of the plant.
- In the **Time zone** drop-down list, select the time zone in which the plant is located.
- Select **[Save]**.
  - The plant time is updated.
- Select **[Logout]** in the icon bar.
- Connect the Cluster Controller to the Speedwire network (see Section **Connecting the Cluster Controller to a Speedwire Network**) and make any additional required connections.

## Connecting the Cluster Controller to a Speedwire Network

### Do not connect the Speedwire network and the local network (LAN)

The Speedwire network is a separate network managed by the Cluster Controller. In case the Speedwire network and the local network (LAN) are connected, a disturbance of both networks is likely to occur.

- In order to ensure correct communication, do not connect the Speedwire network and the local network (LAN) (the Speedwire bus and the Ethernet bus must not be connected to the same switch, for example).

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### Observe the configuration of the router and the network switch

For the Speedwire connection, the Cluster Controller uses IP addresses from the Unicast area and also IP addresses from the Multicast area 239/8 (239.0.0.0 to 239.255.255.255).

- When using a router or network switch, ensure that the router and network switch forward the Multicast telegrams required for the Speedwire connection to all nodes of the Speedwire network (for information on configuration of the router or network switch, see the manufacturer's manual).

### Requirements:

- The nodes in the Speedwire network (e. g. inverters) must be cabled according to one of the possible network topologies (see the node installation manual).
- In the router and in the switch, network port 9522 must be approved.

### Additionally required material (not included in scope of delivery):

- Depending on the network topology: network cable (see Section **Cable Requirements**)

### Procedure:

- Connect the network cable to terminal **X9** or **X10** of the Cluster Controller.

## Connecting the Cluster Controller to a Local Area Network (LAN)

### NOTICE

#### High costs possible due to inappropriate Internet rates

According to use, the data volume of the Cluster Controller transferred via the Internet can be more than 1 GB per month. The data volume depends, among other things, on the number of inverters, the frequency of device updates, the frequency of data transfer to the Sunny Portal and the use of FTP push.

- SMA Solar Technology AG recommends using an Internet flat rate.

### Different IP address ranges required for Speedwire network and local network (LAN)

The IP address ranges of the Speedwire network and the local network (LAN) must be different enabling the Cluster Controller to clearly identify the IP addresses in the two networks. At the factory, the Cluster Controller uses address range 172/16 for the Speedwire network.

- Ensure that different IP address ranges are used for the Speedwire network and the local network (LAN).

### Requirements:

- In the router and in the network switch, network port 9522 must be approved.

### Additionally required material (not included in scope of delivery):

- 1 network cable (see Section **Cable Requirements**)

### Procedure:

- Connect the network cable to terminal **X13** or **X14** of the Cluster Controller.
- Connect the other end of the patch cable to the desired device in the local area network (LAN).

## Connecting USB Data Carriers to the Cluster Controller

### Not possible to use USB Ethernet hubs


The Cluster Controller does not support any USB Ethernet hubs. You must connect the USB data carrier directly to the desired USB terminal on the Cluster Controller.

### Additionally required material (not included in scope of delivery):

- Up to two USB data carriers, e.g. two USB sticks (available as an accessory). If the USB data carrier available as an accessory is not used, observe the requirements for USB data carriers (see installation manual on the CD included in the delivery).

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### Procedure:

- Connect the USB data carrier to the desired USB terminal of the Cluster Controller.
  - To export plant data, connect the USB data carrier to USB terminal **1**.
  - To transmit update files to the Cluster Controller, connect the USB data carrier to USB terminal **2**.
- If the USB data carrier is to be removed from the Cluster Controller, wait until the data carrier status LED (  ) is not flashing anymore.

## Checking the Connections via the Display

- You can use the display of the Cluster Controller to check whether the connections have been made correctly and whether all inverters, sensors and remote terminals have been recorded by the Cluster Controller (see installation manual on the CD included in the delivery).

## 6 CONFIGURING THE CLUSTER CONTROLLER

### Requirements:

- The Cluster Controller and the computer must be located in the same local area network.

### Procedure:

- Log in to the Cluster Controller:
  - Select the **External communication** display view and read out the IP address of the Cluster Controller.
  - Enter the IP address in the address bar of the Internet browser.
  - Log in with the default plant password (User = "0000", installer = "1111").
- Deactivate the Webconnect function of the inverters (see user manual of the Cluster Controller on the CD included in the delivery).
- Make further desired configurations via the user interface (see user manual on the CD included in the delivery).

## 7 CONTACT

If you have technical problems concerning our products, please contact the SMA Service Line.

We require the following information in order to provide you with the necessary assistance:

- Serial number and firmware version of the Cluster Controller
- Type, serial number and firmware version of the inverter
- When using a retrofitted Speedwire/Webconnect interface: serial number and firmware version of the Speedwire/Webconnect interface

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