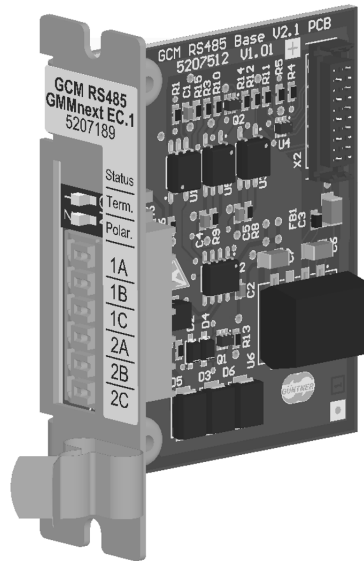


# Data sheet GCM RS485 GMMnext EC.1

## RS485 communication module for GMMnext EC



ERP No.:

5207189

GCM RS485 GMMnext EC.1

[www.guentner.de](http://www.guentner.de)

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# 1 GCM RS485 GMMnext EC.1

## 1.1 Functional description

The **GCM RS485 GMMnext EC.1** is a communication module which complements a GMMnext EC/xx system with a universal RS485 interface.

The module can be used for the following interface functions based on the physical RS-485 interface:

### **Modbus RTU device (server) <sup>\*1)</sup>**

The module allows the GMMnext EC control device to be connected to a Modbus network. As a server, it allows data to be read out as well as external control via a Modbus RTU master.

The protocol used is Modbus RTU.

Both the information transmitted via the bus interface and details of the protocol are described in detail in the current Modbus interface specification.

### **Modbus RTU master (client) <sup>\*2)</sup>**

Together with the module, the GMMnext EC control device can establish a Modbus network in order to read out data from the units connected in the network or to control these units. As a client, it acts as a Modbus RTU master on the bus.

The protocol used is Modbus RTU.

### **BACnet MS/TP (master / slave) <sup>\*3)</sup>**

Together with the module, the GMMnext EC control device can be integrated into a BACnet network. It can act either as a passive slave or as an active master in order to provide data or to be controlled externally.

The protocol used is BACnet MS/TP.

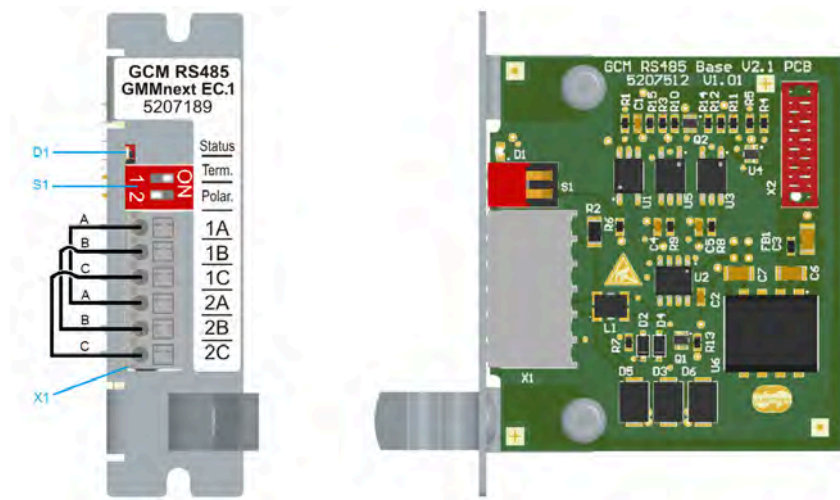
The RS-485 interface of the communication module has galvanic separation.

The GCM RS485 GMMnext EC.1 module can be used for all GMMnext EC types.

<sup>\*1)</sup> This function is available as standard in the basic software of the GMMnext. The function can be configured in the fieldbus settings in the service menu.

<sup>\*2), \*3)</sup> This function is **not** available in the basic software of the GMMnext and may be implemented later. If this function is possible, it can be configured in the fieldbus settings in the service menu.

## 1.2 Connections



Connections and components GCM GMMnext GMM EC.1

| Label                                                                                                                  | Description                                                                                                        |
|------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|
| <b>X1</b>                                                                                                              | <b>Terminal for connecting to the RS-485 network (two-wire interface). This interface has galvanic separation.</b> |
| <b>Connection 1 of the RS-485 interface</b>                                                                            |                                                                                                                    |
| The signals of connection 1 are connected internally to the corresponding signals of connection 2: 1A=2A, 1B=2B, 1C=2C |                                                                                                                    |
| 1A                                                                                                                     | Signal A / Data +                                                                                                  |
| 1B                                                                                                                     | Signal B / Data -                                                                                                  |
| 1C                                                                                                                     | Common / GND reference potential of the RS-485 interface                                                           |
| <b>Connection 2 of the RS-485 interface</b>                                                                            |                                                                                                                    |
| The signals of connection 2 are connected internally to the corresponding signals of connection 1: 2A=1A, 2B=1B, 2C=1C |                                                                                                                    |
| 2A                                                                                                                     | Signal A / Data +                                                                                                  |
| 2B                                                                                                                     | Signal B / Data -                                                                                                  |
| 2C                                                                                                                     | Common / GND reference potential of the RS-485 interface                                                           |
| <b>X2</b>                                                                                                              | <b>Plug-in connector for connecting the interface board to the base board of the GMMnext EC/xx</b>                 |

Connections GCM GMMnext GMM EC.1

## 1.3 Status LED

| LED Name | LED state | Description                                                |
|----------|-----------|------------------------------------------------------------|
| D1       | on        | Module ready, no communication on the RS-485 interface     |
|          | Flashing  | Module ready, active communication on the RS-485 interface |
|          | Off       | Module not ready <sup>(1)</sup>                            |

Status of LED D1

(1) [see Fault/troubleshooting, page 12](#)

## 1.4 Slide switch

| Number                                                                                   | State                      | Description                                    |
|------------------------------------------------------------------------------------------|----------------------------|------------------------------------------------|
| S1                                                                                       | Termination / polarization |                                                |
| Termination: activation of the 120 ohm terminal resistor                                 |                            |                                                |
| 1 - termination                                                                          | OFF                        | RS-485 bus termination inactive <sup>(1)</sup> |
|                                                                                          | ON                         | RS-485 bus termination active <sup>(1)</sup>   |
| Polarization: activation of the bias network for a stable state when the bus is inactive |                            |                                                |
| 2 - polarization                                                                         | OFF                        | Polarization inactive <sup>(2)</sup>           |
|                                                                                          | ON                         | Polarization active <sup>(2)</sup>             |

[Settings DIP switch](#)

(1) Termination must be activated only for the first and last unit in the Modbus network. Termination have to be deactivated for all other units.

(2) If a unit on the RS-485 bus requires polarization, i.e. a pre-defined signal cable state when the bus is inactive via pull-up and pull-down resistors, polarization must be activated in the RS-485 network. However, polarization may only be active at one location in the bus. This is typically achieved on the master or management point of the bus. If it is not possible to activate polarization there, it can also be activated on another bus subscriber.

## 1.5 Electrical properties

|                                  | Min  | Type | Max    | Unit  |
|----------------------------------|------|------|--------|-------|
| Power supply                     | 4.75 | 5.0  | 5.25   | V     |
| Current consumption              |      | 80   | 120    | mA    |
| Power consumption                |      | 0.4  | 0.65   | W     |
| <b>Modbus</b>                    |      |      |        |       |
| Termination (can be switched in) |      | 120  |        | Ω     |
| Transmission rate                | 1200 | 9600 | 115200 | bit/s |

[Electrical properties](#)

|                         | Min | Type | Max   | Unit    |
|-------------------------|-----|------|-------|---------|
| Galvanic separation     |     |      | 1,000 | V (rms) |
| Dielectric strength A/B | -8  |      | +15   | V       |

Electrical properties

## 1.6 Installation / Operating conditions

### GCM RS485 GMMnext EC.1

- The Modbus module is intended for installation in a GMMnext EC casing. Installation should only be performed by personnel with appropriate professional training.
- The shielding of bus lines must be earthed at one end only.
- Suitable shielding and routing measures must be taken to ensure that mains cables and motor cables do not cause any interference in signal and control lines.
- Bus cables must be connected via shielded cables.
- Recommended cables: Belden9841, Lapp Unitronic LD 2170203 / 2170204 / 2170803, Heluka-bel 81910
- Temperature in operation: -20°C ... +75°C
- Temperature for storage and transport: -20°C ... +70°C
- The GMMnext EC with Modbus adapter GCM RS485 GMMnext EC.1 complies with the following EMC standards:

EN 61000-6-2 (Immunity Standard for Industrial Environments)  
 EN 61000-6-3 (Emission Standard for Residential Environments)  
 IEC 61000-4-4/-5/-6/-11

## 1.7 Scope of delivery

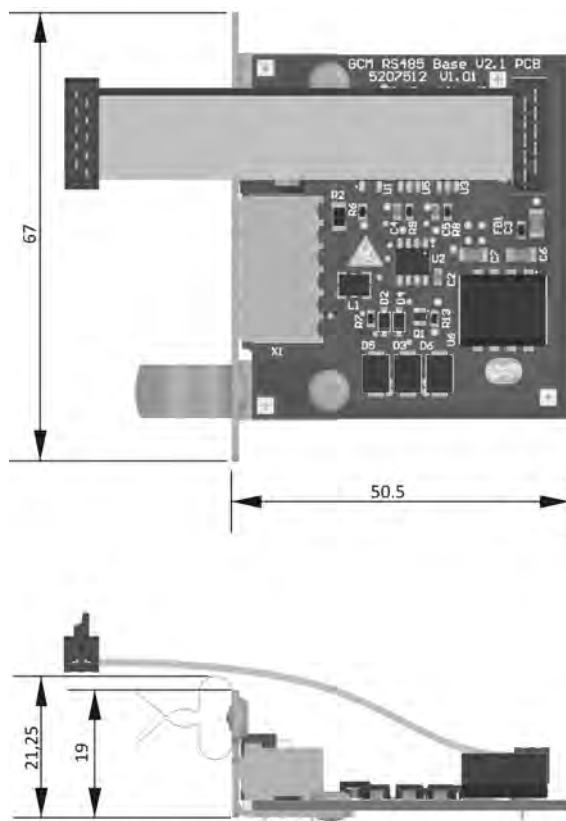
- GCM RS485 GMMnext EC.1 module pre-installed including shield plate with terminal for shielding contact
- Customised ribbon cable 70mm
- Data sheet with installation instructions

## 1.8 Dimensions / weight

You will find the casing dimensions below.

All dimensions are given in millimetres.

Dimension drawing of GCM MOD GMMnext EC.1



Dimensions of GCM GMMnext GMM EC.1

Weight:  
approx. 29g

---

## 2 Installation

---

### 2.1 Requirements

#### 2.1.1 Handling

---

The GCM RS485 GMMnext EC.1 reacts sensitively to electrostatic discharge.

 **CAUTION**

Take appropriate precautionary measures when handling the module.

An example of a precautionary measure is the wearing of an ESD wristband which is connected to an earthing point. Switch off the power supply of the GMMnext EC before beginning installation.

#### 2.1.2 Hardware

---

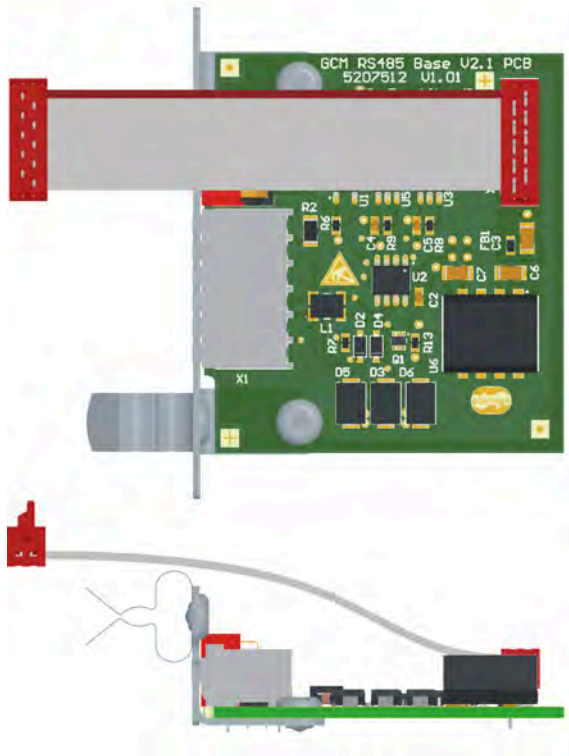
The GCM RS485 GMMnext EC.1 can be installed in all GMMnext EC systems.

A GMMnext EC can be equipped either with a GCM RS485 GMMnext EC.1 or another expansion module on the Communication Expansion Port (CXP). It is not possible to install a number of GCM RS485 GMMnext EC.1 units.

## 2.2 Installation

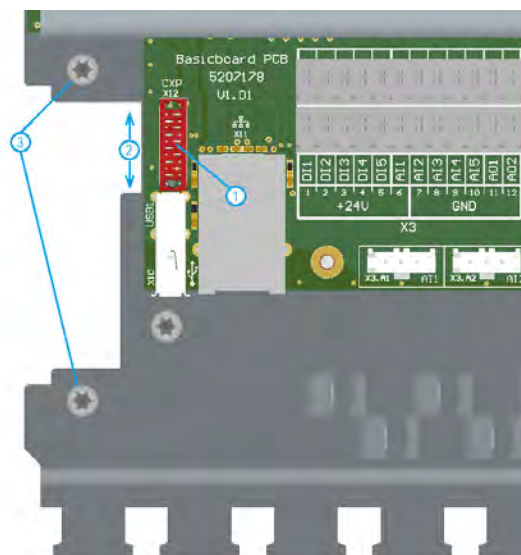
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- 1) Disconnect the power supply to the GMMnext EC.
- 2) If you have not already done so, plug the ribbon cable into the pin connector socket of the GCM RS485 GMMnext EC.1. Make sure the cable outlet exits to the left, as shown in [img. 3: GCM RS485 GMMnext EC.1 with ribbon cable](#).

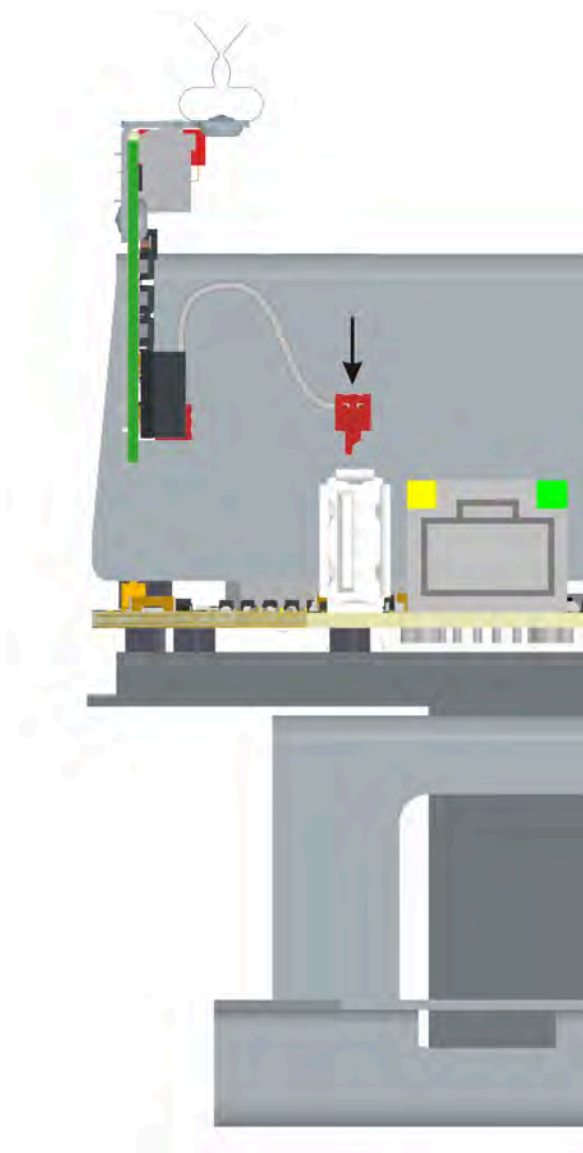


GCM RS485 GMMnext EC.1 with ribbon cable

3) Remove the pre-assembled M3 screws from the supporting plate ([img. 4](#) : fixing screws (3)). You will need these later for mounting the module. Now hold the interface module above the module compartment in order to plug the free pin header of the ribbon cable into the base X12 of the expansion interface CXP (Communication Expansion Port) (1) of the GMMnext EC base board.



Module compartment and CXP plug-in connector



Inserting the pin header into the socket strip on the base board

Place the pin header lightly on the socket strip and then push it in in the centre until it locks. Ensure that the plug-in connector's index pin is inside the hole in the circuit board.

4) After inserting the plug-in connector, insert the interface module into the module compartment. Ensure that the ribbon cable passes through the cut-out ([img. 4](#) : ribbon cable cut-out (2)) in the supporting plate and is not damaged at the edges. Fix the module to the insert nuts using the M3 screws that you removed before ([img. 4](#): insert nuts (3))

5) Check that the DIP switches for the GCM RS485 GMMnext EC.1 are set correctly  
→ [see img. 1: Connections and components GCM GMMnext GMM EC.1, page 4](#) and [see tab. 3: Settings DIP switch , page 5](#)

Activate or deactivate the termination for the RS-485 bus according to the module application and the position of the GMMnext EC in the network.

**Termination may be activated only on the first and last unit in the RS-485 network. All other units must have termination deactivated.**

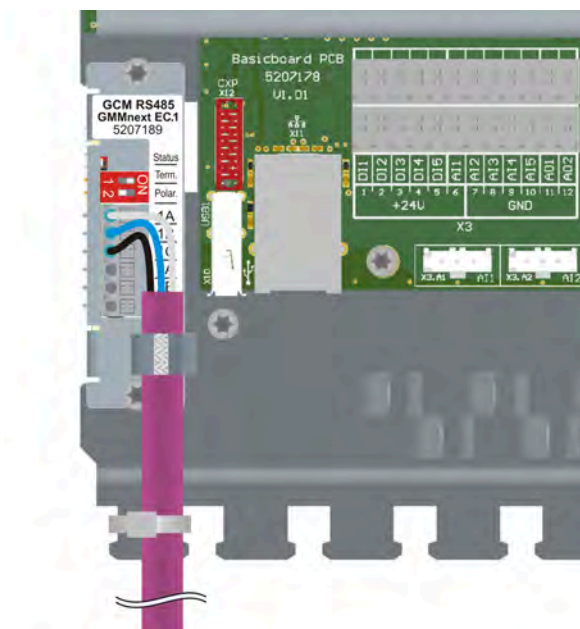
6) Strip 8 mm of the shielding on the RS-485 bus cable.

Connect the signal lines of the cable to the terminals of terminal strip X1.

→ [see img. 1: Connections and components GCM GMMnext GMM EC.1, page 4](#)

→ [see Cable connection specification, page 14](#)

Now clamp the exposed shielding in the spring terminal on the module front plate. Fix the cable to the left-hand tab on the supporting plate using a cable tie (strain relief).



Cable connection GCM RS485 GMMnext EC.1

Recommended cable types are listed under [Installation / Operating conditions, page 6](#).

→ [see RS-485 network, page 13](#)

7) The unit is now ready for operation.

After switching on the GMMnext EC supply voltage, wait until the system has started up. The operating state of the GCM RS485 GMMnext EC.1 can be verified with the help of the LED D1.

→ [see tab. 2: Status of LED D1, page 5](#)

## 2.3 Fault/troubleshooting

| Fault status                                                | Cause/troubleshooting                                                                                                                                                                                                                                                                                                                                                                                                           |
|-------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| LED does not illuminate                                     | Fault with supply voltage<br>→ Check mains voltage of GMM EC, check fuses, check that ribbon cable connector is correctly seated                                                                                                                                                                                                                                                                                                |
|                                                             | System is not ready<br>→ After power on, wait until the boot process is completed. Check software status and restore or update the GMMnext system if necessary                                                                                                                                                                                                                                                                  |
| <b>Operating Mode: "Modbus RTU Device" <sup>*1)</sup></b>   |                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| LED does not flash, even though the Modbus master is active | Fault with signal connection<br>→ Check connection of signals A and B                                                                                                                                                                                                                                                                                                                                                           |
|                                                             | Fault Fieldbus configuration<br>→ Check configuration parameters in service menu:<br>Is Modbus RTU switched on?<br>Are all parameters for address, baudrate, framing set correctly?<br>Is the correct mapping used?<br>Standard = new interface with new Modbus Register addresses (see new interface specification)<br>Compatibility Mode = backward compatibility of the Modbus Register addresses to existing GMM/GHM-series |

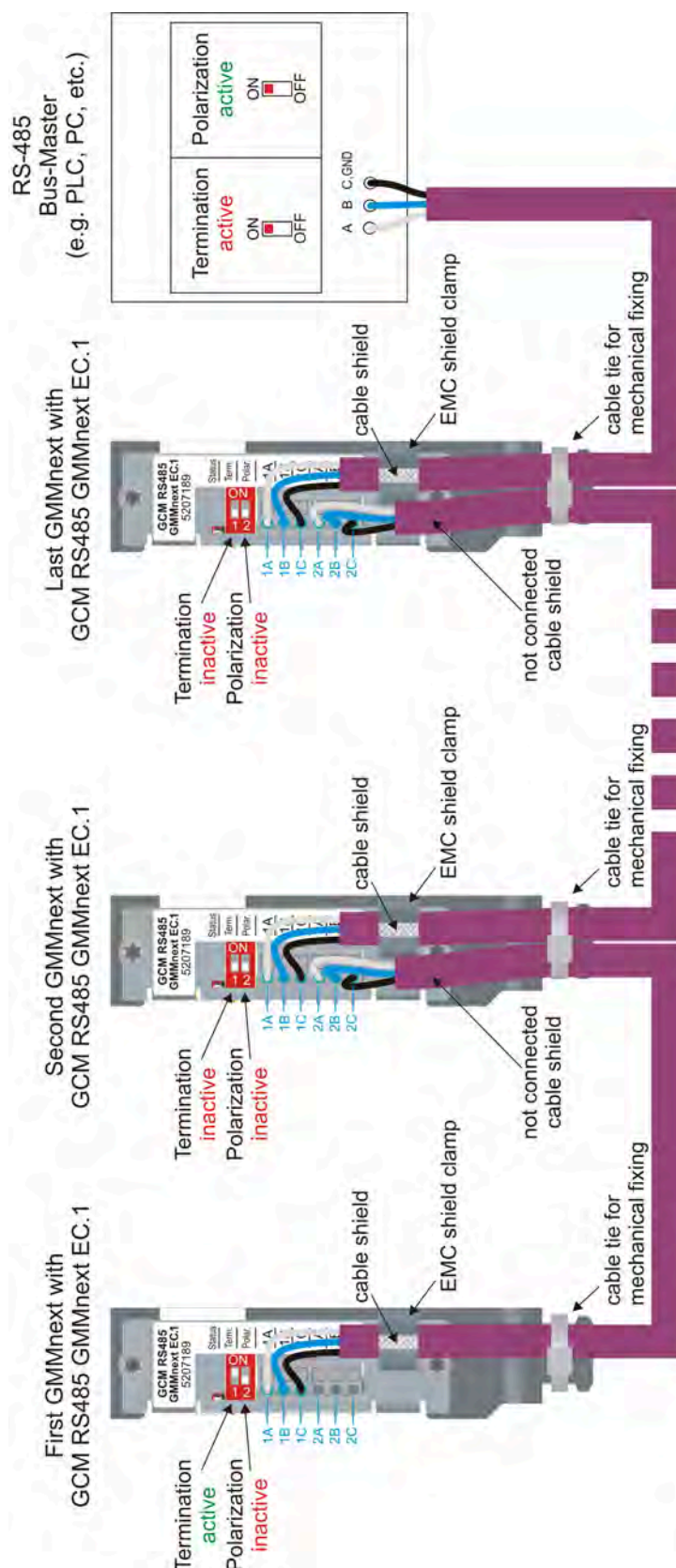
### Fault/troubleshooting

<sup>\*1)</sup> The operating mode is "Modbus RTU Device" by default.

If this operating mode can be changed, this will be offered in the service menu / fieldbus settings.

## 2.4 RS-485 network

### Signal connections, termination, shielding



#### Shielding:

Only one cable end at a bus segment should be electrical connected to P. At GCM RS485 GMMnext EC.1 this connection is established, when inserting the uncovered cable shield into the EMC shield clamp. If the shield is connected to PE at the last bus device, the cable shield should not be connected additionally to the PE-terminal of the RS-485 Bus Master.

#### Polarization:

If there are devices connected to RS-485 bus, which require a polarization, the master should activate the polarization. The GCM RS485 GMMnext do not require a polarized RS-485 bus. If there are communication problems caused by noisy environment, a polarization can reduce the noise effects. If the master has no capability to enable a polarization, only one bus device should activate the polarization. This should be the first device where the termination is activated too.

## 2.5 Cable connection specification

### 2.5.1 Connection data without wire end sleeve

|                                   | Min | Type | Max | Unit            |
|-----------------------------------|-----|------|-----|-----------------|
| Stripped length                   | 8.0 | 8.5  | 9.0 | mm              |
| Conductor cross section, rigid    | 0.2 |      | 1.5 | mm <sup>2</sup> |
| Conductor cross section, flexible | 0.2 |      | 1.5 | mm <sup>2</sup> |
| Conductor cross section, AWG      | 24  |      | 16  | AWG No.         |

Connection data without wire end sleeve

### 2.5.2 Connection data without wire end sleeve

|                              | Min  | Type | Max  | Unit            |
|------------------------------|------|------|------|-----------------|
| Conductor cross section      | 0.14 |      | 0.75 | mm <sup>2</sup> |
| Conductor cross section, AWG | 26   |      | 18   | AWG No.         |

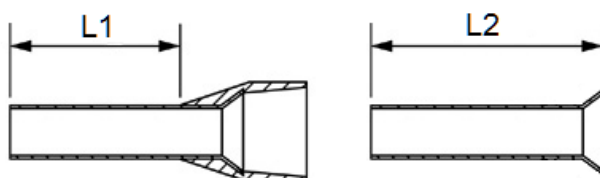
Connection data with wire end sleeve

### 2.5.3 Specification of wire end sleeve

| Conductor cross section [mm <sup>2</sup> ] | Wire end sleeve with insulating collar, DE colour code <sup>(1)</sup> | Wire end sleeve with insulating collar, DIN colour code | Min. length L1 with insulating collar [mm] | Min. length L2 without insulating collar [mm] |
|--------------------------------------------|-----------------------------------------------------------------------|---------------------------------------------------------|--------------------------------------------|-----------------------------------------------|
| 0.14                                       | grey                                                                  | grey                                                    | 8 (long)                                   | 7                                             |
| 0.25                                       | light blue                                                            | yellow                                                  | 8 (long)                                   | 7                                             |
| 0.34                                       | turquoise                                                             | turquoise                                               | 8 (long)                                   | 8                                             |
| 0.5                                        | orange                                                                | white                                                   | 8 (normal)                                 | 8                                             |
| 0.75                                       | white                                                                 | grey                                                    | 10 (half-length)                           | 8                                             |

Specification of wire end sleeve

(1) DE = German colour code, type W (Weidmüller)



Definition of wire end sleeve length with/without insulating collar

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