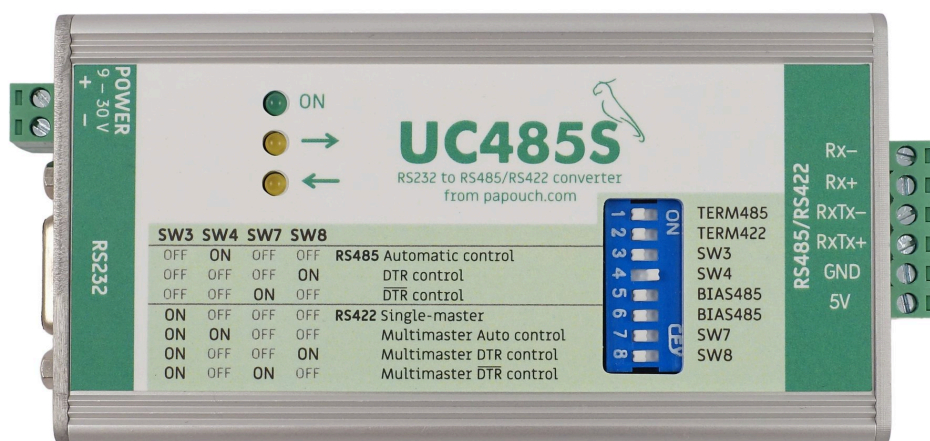


UC485

RS232 to RS485 or RS422 line converter with galvanic isolation

Complete user documentation



Version 2.0

September 21, 2026

Table of Contents

1 Document revision history	2
2 Basic information	3
2.1 Applications	3
2.2 Features	3
2.3 Available versions	3
3 Block diagram	5
4 RS485 and RS422 lines	6
5 Connections	7
5.1 RS232	7
5.2 RS485/422 – UC485C	7
5.3 RS485/422 – UC485S	7
5.4 Power supply	8
6 Settings	9
6.1 Modes	9
6.2 Line termination and idle state	10
6.3 Automatic control settings	10
7 Typical UC485 connections	12
7.1 RS232 to RS485 converter	12
7.2 RS232 to RS422 converter	13
7.3 RS232 line extension	14
8 Indicators	15
9 Possible problems during installation	16
9.1 Identifying RxTx+ and RxTx– wires	16
9.2 RxD indicator remains on when no data is transmitted	16
9.3 Received data is corrupted	16
10 Technical parameters	17

1 Document revision history

Version	Description
2.0	Complete update of the documentation and images. Clarification of supply ranges and order codes, dimensions, isolation withstand voltage and operating humidity.

Table 1: Document revision history

2 Basic information

UC485 is an industrial converter from an RS232 serial line to an RS485 or RS422 bus. The communication interfaces are galvanically isolated. A version with additional galvanic isolation between the power supply and the RS232 interface is available on request. The converter includes overvoltage protection on the RS485/422 bus and supports communication speeds up to 480 kBd.

2.1 Applications

- Conversion of an RS232 serial port to an RS485 bus
- Conversion of an RS232 serial port to an RS422 bus
- Conversion of an RS232 serial port to an RS422 bus in multimaster mode
- Control of industrial equipment from a PC
- Galvanic isolation of controlled equipment from a PC
- RS232 transmission over longer distances and branching (two or more UC485 modules connected to each other)

2.2 Features

- Selectable interfaces: RS485, RS422 and RS422 multimaster
- Transmission speed up to 480 kBd
- Automatic RS485 direction control or control by the DTR signal with selectable polarity
- Complete galvanic isolation (including ground) of RS485/422 from RS232 and the power supply, provided as standard for all versions
- Optional additional isolation between power supply ground and RS232 ground
- Overvoltage protection on RS485/RS422
- Power and data flow indicators for easy commissioning
- Selectable built-in termination and resistors defining the idle state
- Power supply according to the selected version: standard 9 to 30 V; other versions include 5 V and 36 to 75 V
- D-SUB 9 connectors or a removable terminal block
- Dimensions excluding connectors: 104 × 55 × 24 mm; DIN rail mounting option

2.3 Available versions

RS485/422 connection

- D-SUB 9 male connector (UC485C version)
- Removable screw terminal block (UC485S version)



Fig. 1: Version comparison: UC485S with screw terminal block on the left; UC485C with a D-SUB 9 male connector for RS485/422 on the right

Mounting

- No holder (standard version)
- Holder for a 35 mm DIN rail



Fig. 2: Version with DIN rail holder

- Wall holder

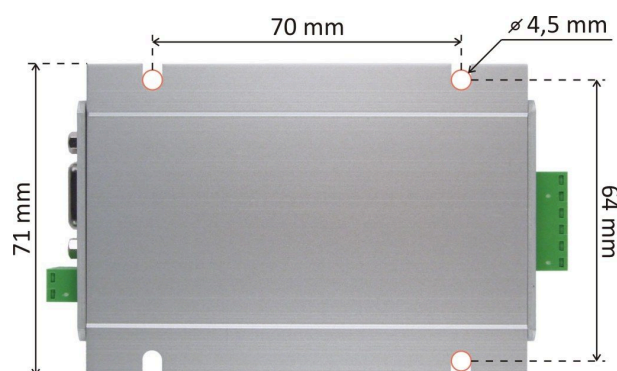


Fig. 3: Version with wall holder, underside view

Power supply

Supply range	UC485C order code	UC485S order code
9 to 30 V ¹ (standard version)	UC485C	UC485S
5 V $\pm$ 10 % ¹²	UC485C_5V	UC485S_5V
4.5 to 9.0 V ²³	UC485C_ISOL_5V	UC485S_ISOL_5V
9 to 18 V ^{2 3}	UC485C_ISOL_12V	UC485S_ISOL_12V
18 to 36 V ^{2 3}	UC485C_ISOL_24V	UC485S_ISOL_24V
36 to 75 V ^{2 3}	UC485C_ISOL_48V	UC485S_ISOL_48V

Table 2: Supply versions and order codes

Please contact us if you have other requirements for the converter's configuration or functionality.

¹ Complete galvanic isolation (including ground) of RS485/422 from RS232 and the power supply, shown as G1 in the [block diagram](#). RS232 ground is galvanically connected to power supply ground.

² The delivery time for this version may be up to three weeks.

³ As for G1, with additional galvanic isolation between RS232 ground and power supply ground, shown as G2 in the [block diagram](#).

3 Block diagram

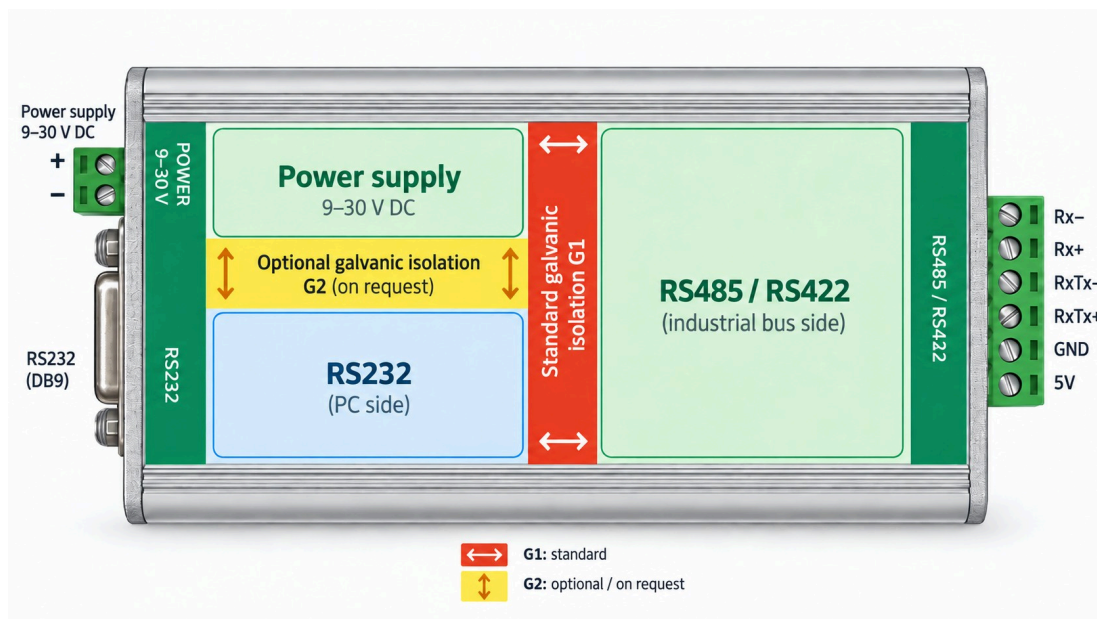


Fig. 4: Galvanic isolation block diagram; the standard 9 to 30 V supply version is shown

Isolation G1 separates RS485/422 from RS232 and the power supply and is included in all versions. Isolation G2 additionally separates power supply ground from RS232 ground; its availability depends on the [power supply version](#).

4 RS485 and RS422 lines

An RS485 line consists of a balanced pair of wires labelled RxTx+ and RxTx−,⁴ preferably a twisted pair. In the idle state, RxTx+ is more positive than RxTx−. The line should use a linear topology with short branches. Termination should be connected at both endpoints. RS485 is half-duplex: the same pair carries transmitted and received data, so the communication direction must switch between transmission and reception.

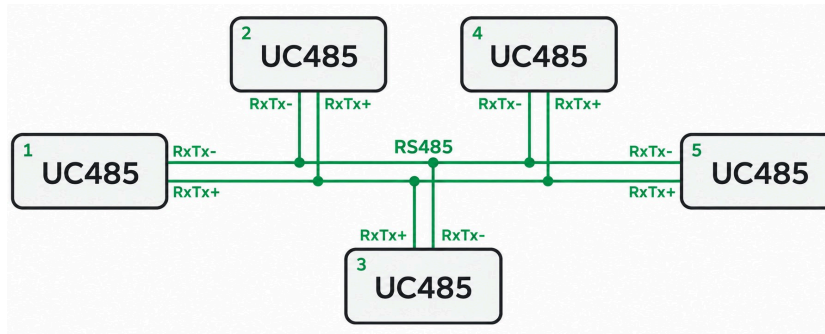


Fig. 5: RS485 network example; modules 1 and 5 have termination connected

Direction control can use the RS232 DTR signal or automatic (timed) switching.



Fig. 6: RS422 connection example; both modules have termination connected

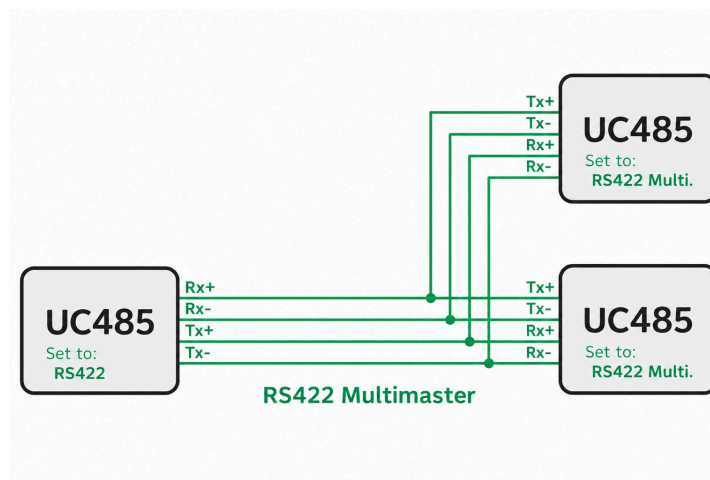


Fig. 7: RS422 multimaster connection example

An RS422 line consists of two balanced pairs. It is full-duplex and directly replaces the RS232 Rx/D and Tx/D signals: one pair receives data and the other transmits it. Tx+ and Tx− are the transmit wires; Rx+ and Rx− are the receive wires. In the idle state, the wire labelled + is more positive than the wire labelled −. The line endpoints are terminated. RS422 may also have branches, but the transmitters must then be disabled when not transmitting. This is supported by the modes labelled Multimaster in the [communication mode settings](#).

⁴ RxTx+ and RxTx− are sometimes also labelled A and B.

5 Connections

1. Set the interface parameters using the switches as described in [Settings](#).
2. Connect the [RS485/422 line on the UC485C or UC485S](#), and connect the [RS232 line](#).
3. Connect the [power supply](#). The input has reverse polarity protection.
4. The device is ready for operation.

5.1 RS232

The RS232 serial line connects through a D-SUB 9 female connector.

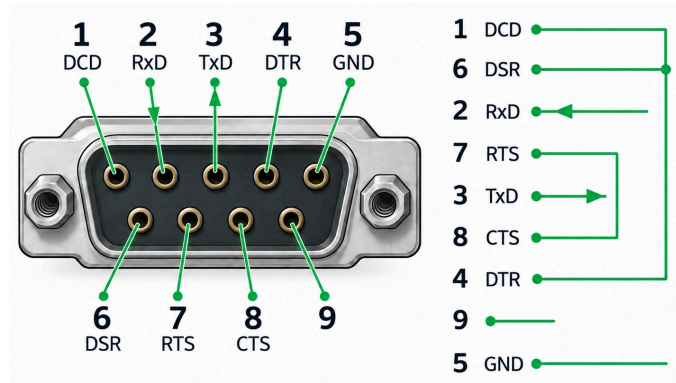


Fig. 8: RS232 connector internal wiring



Fig. 9: Power supply and RS232 connectors

5.2 RS485/422 – UC485C

UC485C has a D-SUB 9 male connector for the RS485 or RS422 bus.

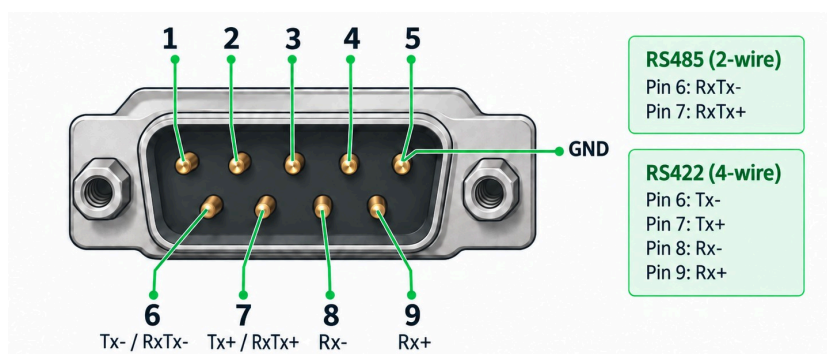


Fig. 10: RS485/422 connector wiring

The connector is shown in the [UC485S and UC485C comparison photograph](#).

5.3 RS485/422 – UC485S

UC485S has a removable screw terminal block for the RS485 or RS422 bus.

Pin	Signal	RS485	RS422
1	U _{OUT} (5 V / 15 mA)	auxiliary output	auxiliary output
2	GND	signal ground	signal ground
3	Tx+ / RxTx+	RxTx+	Tx+
4	Tx- / RxTx-	RxTx-	Tx-
5	Rx+	—	Rx+
6	Rx-	—	Rx-

Table 3: UC485S terminal block pinout

The U_{OUT} terminal provides an auxiliary 5 V output with a maximum load of 15 mA.

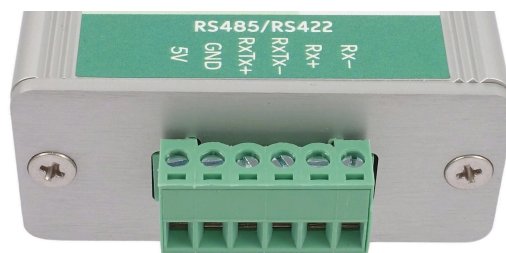


Fig. 11: UC485S removable screw terminal block for the RS485/422 line

5.4 Power supply

Power connects through a removable screw terminal block. Polarity is marked on the top label. The supply input includes reverse polarity protection.

Versions other than the standard 9 to 30 V version have an additional label above the connector showing the supply range.

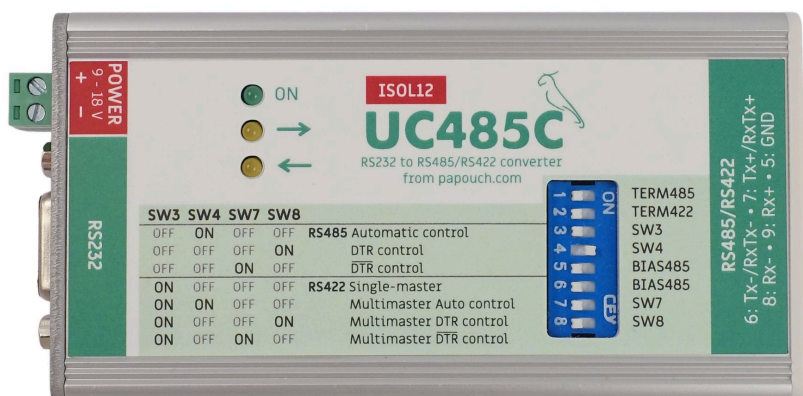


Fig. 12: UC485C with an additional label identifying the non-standard 9 to 18 V supply range

6 Settings

6.1 Modes

Communication modes are selected using the switches on the front panel.

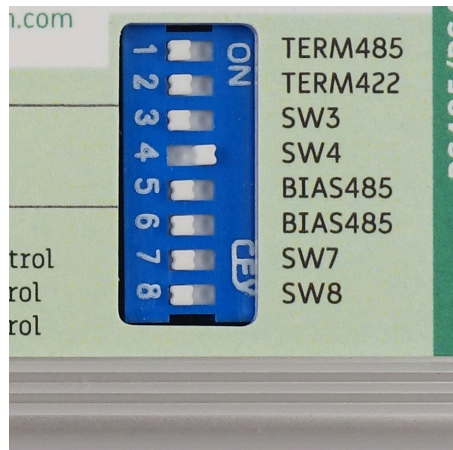


Fig. 13: UC485 front panel switches, SW4 in the ON position

Interface	SW3	SW4	SW7	SW8	Mode and function
RS485	OFF	ON	OFF	OFF	Automatic control. When data is transmitted from RS232 to RS485, the converter automatically switches to transmission. After transmission ends, it switches to reception following a short delay. Set the delay using the delay settings .
RS485	OFF	OFF	OFF	ON	DTR control. Transmission to RS485 is enabled by positive polarity of the RS232 DTR signal.
RS485	OFF	OFF	ON	OFF	DTR control. Transmission to RS485 is enabled by negative polarity of the RS232 DTR signal.
RS422	ON	OFF	OFF	OFF	Standard RS422. Communication is bidirectional (full-duplex); the output line drivers remain enabled.
RS422 multimaster	ON	ON	OFF	OFF	Multimaster – automatic control. When data is transmitted from RS232 to RS422, the line driver is enabled automatically. After transmission ends, it is disabled following a short delay. Set the delay using the delay settings .
RS422 multimaster	ON	OFF	OFF	ON	Multimaster – DTR control. Transmission to RS422 is enabled by positive polarity of the RS232 DTR signal.
RS422 multimaster	ON	OFF	ON	OFF	Multimaster – DTR control. Transmission to RS422 is enabled by negative polarity of the RS232 DTR signal.

Table 4: Communication mode settings

6.2 Line termination and idle state

TERM485

Connects termination on the transmitter side of RS485 or RS422. It prevents signal reflections at line endpoints. These resistors should be connected at both endpoints of the communication line.

TERM422

Connects termination on the receiver side of RS422. It prevents signal reflections at line endpoints. These resistors should be connected at both endpoints of the communication line.

BIAS485

Connects resistors defining the idle state on the transmitter side of RS485 or RS422. They define the idle levels of the communication line. See [Defining the idle state](#) for details.

6.3 Automatic control settings

For automatic control of RS485 or RS422 multimaster, delay T determines how long the driver remains in transmission mode after data transmission ends.

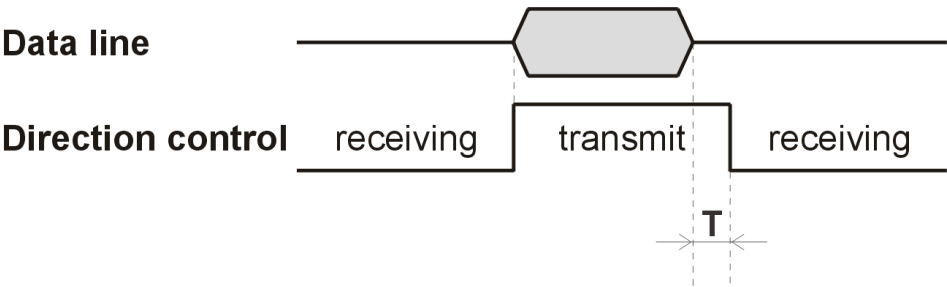


Fig. 14: Time for which the driver remains in transmission mode

The default delay is 460 μ s. It can be changed using jumpers inside the module.

First open the enclosure. Remove the two opposing screws on the lower side of the module, loosen the screws on the upper side and lift off the top cover.

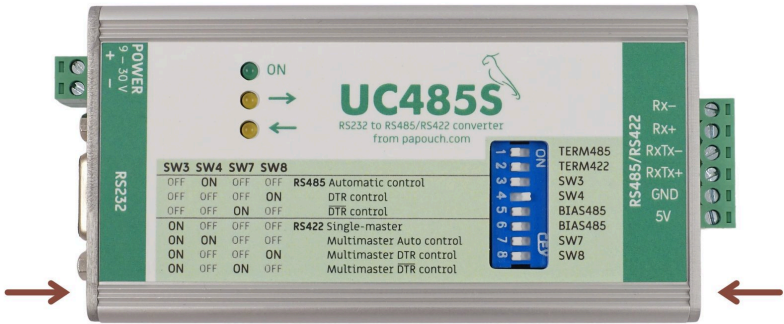


Fig. 15: Screws securing the enclosure cover

Inside the enclosure are four pairs of jumper pins labelled S1 to S4.

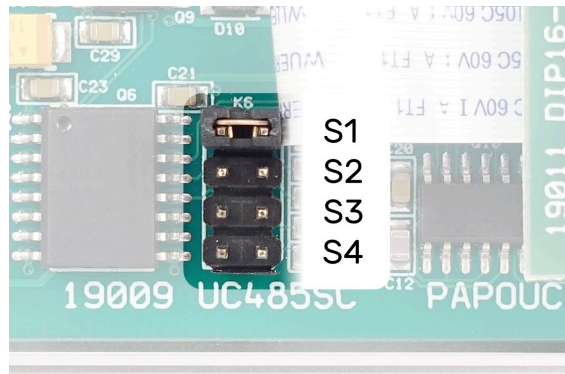


Fig. 16: Jumper pins for setting the delay

Set delay T by fitting jumpers according to the following table. ON means a jumper is fitted; OFF means the pins are open.

S1	S2	S3	S4	Delay	Recommended speeds
OFF	OFF	OFF	OFF	1.9 ms	< 19 200 Bd
ON	OFF	OFF	OFF	460 μ s	19 200 or 38 400 Bd (factory setting)
OFF	ON	OFF	OFF	140 μ s	57 600 or 115 200 Bd
OFF	OFF	ON	OFF	33 μ s	
OFF	OFF	OFF	ON	9 μ s	
OFF	OFF	ON	ON	7 μ s	

Table 5: Delay settings

7 Typical UC485 connections

7.1 RS232 to RS485 converter

Installation procedure for UC485 communication over RS485:

1. Set switches SW3 to SW8 according to the [communication mode settings](#).
2. Connect the RS485 wires to the D-SUB 9 male connector or removable terminal block using the following table. See [RS485/422 – UC485C](#) for the connector drawing.

Wire	D-SUB 9 male connector pin	Removable terminal block	Note
RxTx+ (A)	7	3	
RxTx– (B)	6	4	
SGND	5	2	signal ground

Table 6: RS485 connection

3. Connect RS232 to the D-SUB 9 female connector using a straight-through cable as shown below.

Signal	UC485 D-SUB 9 female	PC D-SUB 9	PC D-SUB 25	Note
TxD	3	3	2	data transmitted from the PC
RxD	2	2	3	data received by the PC
GND	5	5	7	signal ground
DTR ⁵	4	4	20	communication direction control
RTS	4	7	4	communication direction control

Table 7: RS232 connection for conversion to RS485

4. If the converter is at a line endpoint, connect the termination resistors using TERM485. Consider connecting idle-state bias resistors.
5. Connect the power supply.

Defining the idle state

During RS485 or RS422 multimaster communication, there are periods when no device transmits data and all devices are receiving. The line state is then undefined and the line is extremely sensitive to induced voltages (interference), which appear as incoming data. Define the idle state by connecting suitable resistors at one point on the line. On longer lines, preferably connect them at the end-of-line UC485 modules or equipment.

⁵ DTR or RTS is used only in DTR-controlled mode. See [Modes](#) for settings.

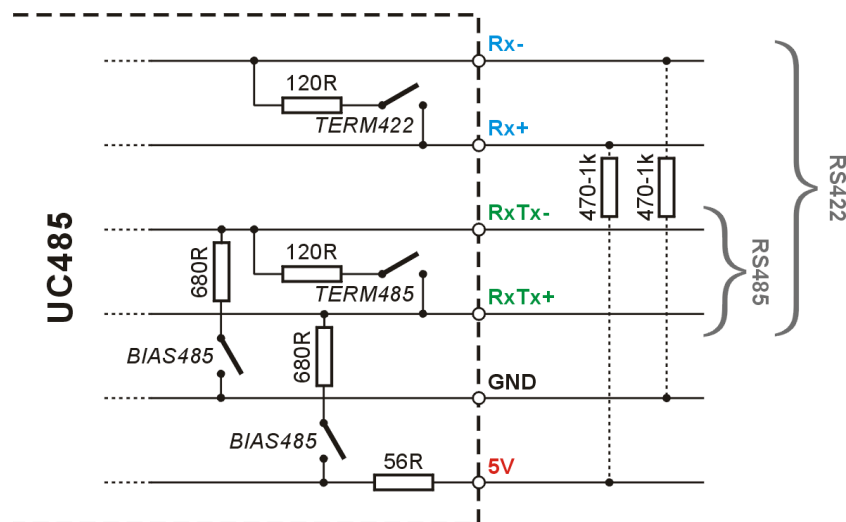


Fig. 17: Idle-state bias resistor circuit

UC485 includes built-in resistors that can be connected using the two BIAS485 switches. Alternatively, connect resistors directly to the RS485 connector as shown in the [idle-state circuit diagram](#). On long lines, higher resistor values and termination are advisable. SGND can also be used to connect the cable shield.

7.2 RS232 to RS422 converter

Installation procedure for communication between two devices over RS422:

1. Set switches SW3 to SW8 according to the [communication mode settings](#).
2. Connect the RS422 wires to the D-SUB 9 male connector or removable terminal block using the following table. See [RS485/422 – UC485C](#) for the connector drawing.

Wire	D-SUB 9 male connector pin	Removable terminal block	Note
Tx+ (A)	7	3	
Tx- (B)	6	4	
Rx+ (A')	9	5	
Rx- (B')	8	6	
SGND	5	2	signal ground

Table 8: RS422 connection

3. Connect RS232 to the D-SUB 9 female connector using a straight-through cable as shown below.

Signal	UC485 D-SUB 9 female	PC D-SUB 9	PC D-SUB 25	Note
TxD	3	3	2	data transmitted from the PC
RxD	2	2	3	data received by the PC
GND	5	5	7	signal ground
DTR ⁵	4	4	20	line driver enable/disable control
RTS	4	7	4	line driver enable/disable control

Table 9: RS232 connection for conversion to RS422

4. If the converter is at a line endpoint, connect the termination resistors using TERM422. In multimaster mode, consider connecting idle-state bias resistors.
5. Connect the power supply.

7.3 RS232 line extension

Two UC485 converters can extend an RS232 line to a distance of up to 1200 m.⁶

1. Connect RS232 and the power supply to the UC485 converters at both ends.
2. Set both converters to RS422 mode as described above.
3. Connect the cable between the converters as shown below. See [RS485/422 – UC485C](#) for the connector drawing.

UC485 (UC485S)	UC485 at the other end (UC485S)
7 (3)	9 (5)
6 (4)	8 (6)
9 (5)	7 (3)
8 (6)	6 (4)

Table 10: Cable wiring for RS232 extension

⁶ An RS232 line can also be extended using the dedicated [LD232](#) kit.

8 Indicators

UC485 has three indicators.

The **green** ON indicator lights when the supply voltage is connected.

The two **yellow indicators** light during data transmission. Each indicates one communication direction, shown by an arrow on the label.

9 Possible problems during installation

9.1 Identifying RxTx+ and RxTx– wires

In the idle state of RS485 (RS422), RxTx+ is more positive than RxTx–. Before measuring, ensure that the device at the other end acts as a transmitter in the idle state or transmits data infrequently. With correct RxTx+ and RxTx– polarity, the yellow RxD indicator lights during data transmission. Test with the control signal disconnected and the mode set to “DTR control”.

9.2 RxD indicator remains on when no data is transmitted

Possible causes:

- The RxTx+ and RxTx– wires of RS485 are swapped.
- Termination is connected at the receiver, but idle-state bias resistors are not connected.
- Termination is connected at the module and bias resistors are connected at the opposite end, but the line or one wire is broken.

9.3 Received data is corrupted

Possible causes:

- Excessive delay for automatic direction switching; see [Automatic control settings](#).
- One wire is broken.

10 Technical parameters

General parameters

Parameter	Value
Supply voltage	Standard version: 9 to 30 V. Selecting different versions covers an overall range of 4.5 to 75 V; each individual version has its own range listed under Available versions . Reverse polarity protection.
Current at 12 V	typically 30 mA
Current at 24 V	typically 18 mA
Power supply connector	removable screw terminal block
Galvanic isolation withstand voltage	1 000 V DC (for breaking ground loops)
Maximum transmission speed	480 kBd
Operating temperature	–20 °C to +70 °C
Electronics operating humidity	max. 90 %, non-condensing
Weight	140 g
Dimensions excluding connectors	104 × 55 × 24 mm
Dimensions including connectors – UC485S	121 × 55 × 24 mm
Dimensions including connectors – UC485C	117 × 55 × 24 mm

RS485/422

Parameter	Value
Termination resistors	120 Ω
Idle-state bias resistors	680 Ω
Maximum number of connected devices	31
Overvoltage protection	yes, 12 V transils
UC485C connection	D-SUB 9 male
UC485S connection	removable terminal block

RS232

Parameter	Value
Overvoltage protection (ESD)	15 kV
Connection	D-SUB 9 female

Notes:

Notes:



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