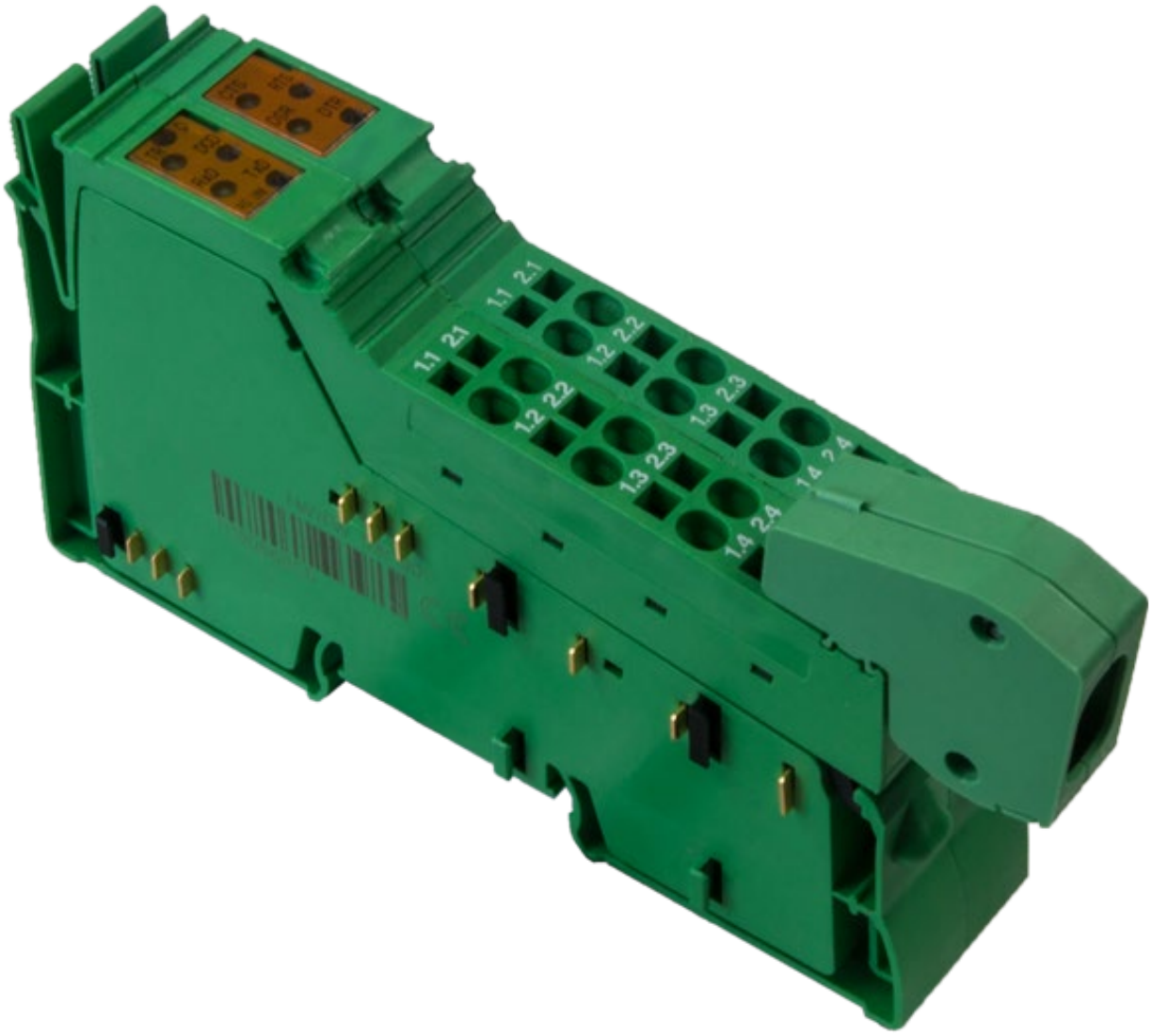
Inline Terminal – Serial Interface

ILT RS UNI /

IB IL RS UNI-PAC

Device Description



This manual is intended to provide support for installation and usage of the device. The information is believed to be accurate and reliable. However, SysMik GmbH Dresden assumes no responsibility for possible mistakes and deviations in the technical specifications. SysMik GmbH Dresden reserves the right to make modifications in the interest of technical progress to improve our modules and software or to correct mistakes.

We are grateful to you for criticism and suggestions. Further information (device description, available software) can be found on our homepage www.sysmik.de. Please ask for latest information.

SysMik disclaims all warranties in case of improper use or disassembly and software modifications not described in this document or when using improper or faulty tools. Commissioning and operation of the device by qualified personnel only. All applicable regulations have to be observed.

SysMik GmbH Dresden	**Tel**	**++ 49 (0) 351 – 4 33 58 – 0**
Bertolt-Brecht-Allee 24	**Fax**	**++ 49 (0) 351 – 4 33 58 – 29**
01309 Dresden	**E-Mail (sales)**	**sales@sysmik.de**
	E-Mail (support)	**service@sysmik.de**
Germany	**Homepage**	**www.sysmik.de**

Content

1 Overview

This terminal is designed for use within an Inline Sedona station. It is used to operate standard I/O devices with serial interfaces.

Features

- A serial input and output channel supports RS-232, RS-422 and RS-485 format
- Transmission speed can be set up to 250.000 baud
- Number of data bits, stop bits and parity can be set
- process data width 15 words
- diagnostic and status indicators

2 Ordering information

Device	Description	Part number
ILT RS UNI	Serial Interface for RS-232, RS-422, RS-485	1225-100537-01-3
ILT terminals may be replaced by device type ‘IB IL’ terminals alternatively: IB IL RS UNI-PAC		2700893

Table 2.1: Ordering information

3 Local status and diagnostic indicators

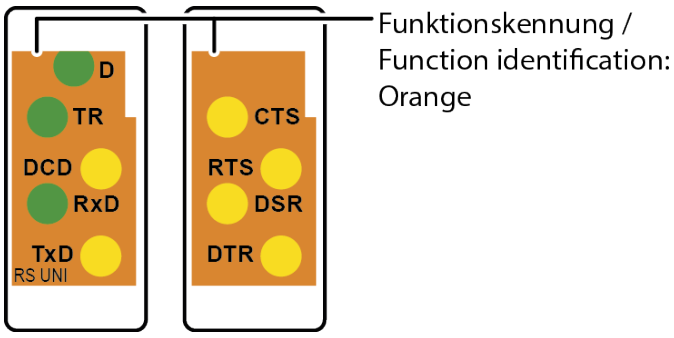


Fig. 3.1: Local status and diagnostic indicators

Indicator	Color	Description
D	green	Diagnostics (bus and logic voltage)
TR	green	PCP communication
DCD	yellow	Data carrier detect
RxD	yellow	Terminal receives data from the connected device
TxD	yellow	Terminal transmits data to the connected device
CTS	yellow	Clear to send
RTS	yellow	Request to send
DSR	yellow	Data set ready
DTR	yellow	Data terminal ready

Table 3.1: Local status and diagnostic indicators

4 Wiring and internal circuit diagram

4.1 Terminal Point Assignment

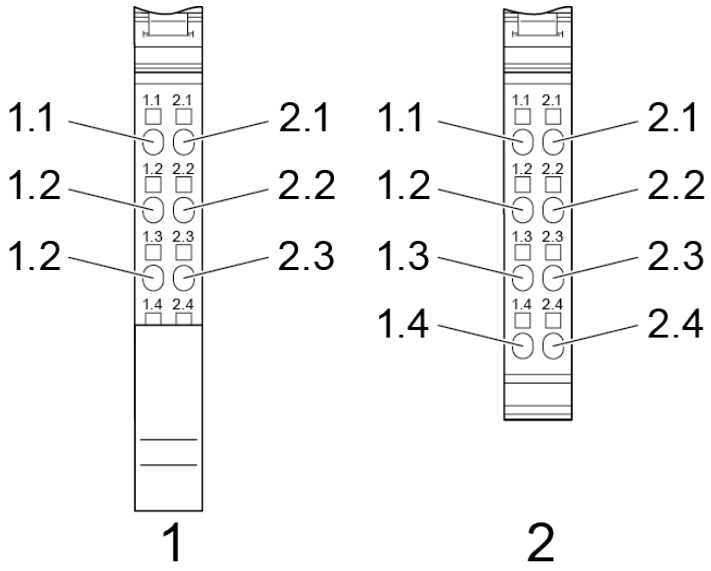


Fig. 4.1: Terminal point assignment

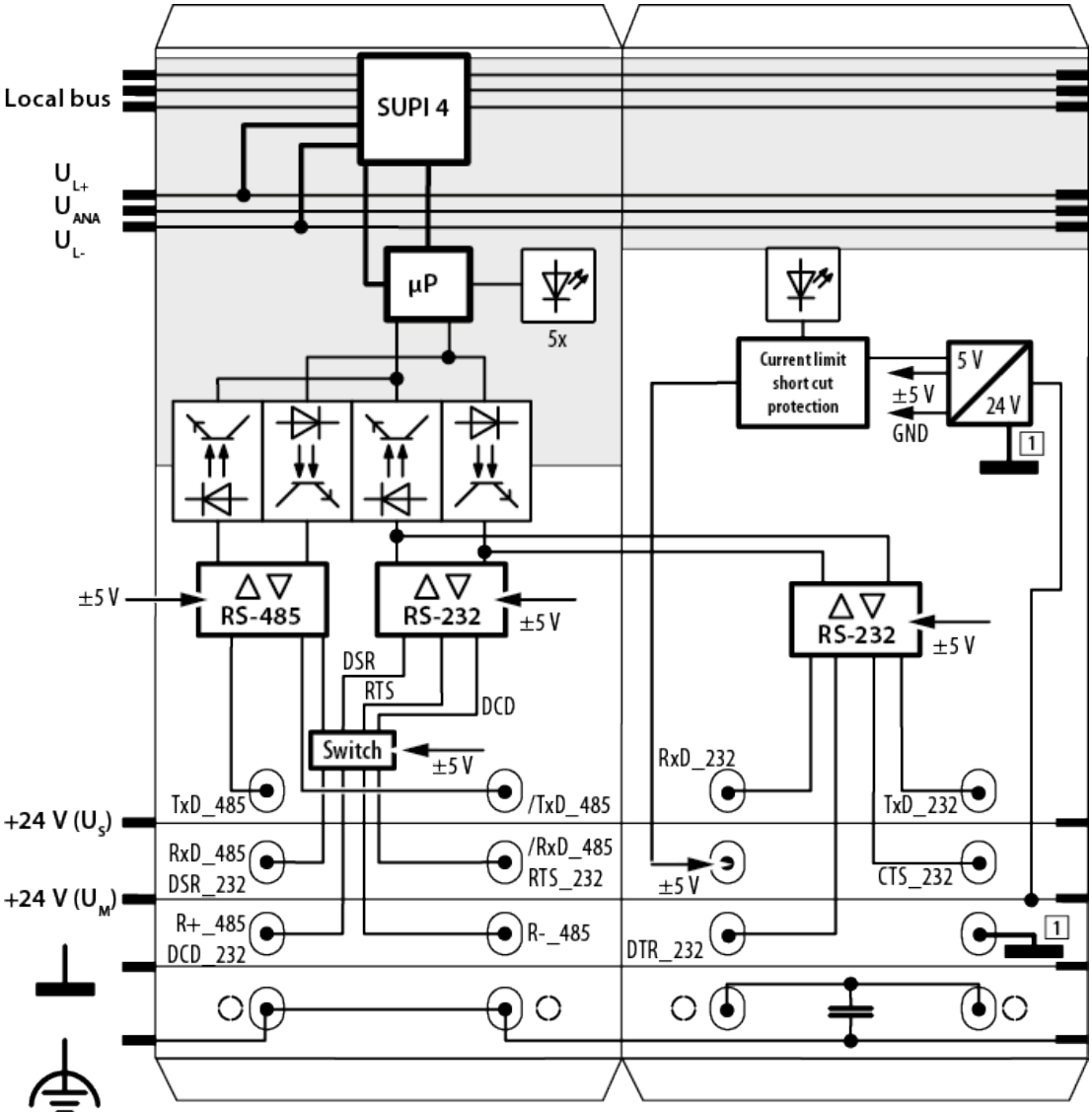
Terminal point	Signal	Assignment RS-485- / RS-422 Communication	
Connector 1			
1.1	TxD+	Transmit data	positive
2.1	TxD-	Transmit data	negative
1.2	RxD+	Receive data	positive
2.2	RxD-	Receive data	negative
1.3	R+	Termination resistor	Positive pole
2.3	R-	Termination resistor	Negative pole
1.4 / 2.4	Shield	Shield connection, same potential as FE	
Connector 2			
The terminal points of this connector are not used.			

Table 4.1: Terminal point assignment – RS-485 / RS-422 communication

Terminal point	Signal	Assignment RS-232 Communication	
Connector 1			
1.1 / 2.1	-		Connected device ready to operate; handshake signal; input
1.2	DSR	Data set ready	Request to send; handshake signal; output
2.2	RTS	Request to send	Connected device ready to operate; handshake signal; input
1.3	DCD	Data carrier detect	Not used
2.3	-		Not used
1.4 / 2.4	-		Connected device ready to operate; handshake signal; input
Connector 2			
1.1	RxD		Serial data input
2.1	TxD		Serial data output
1.2	+5 V DC		Control output; internally wired to +5 V
2.2	CTS	Clear to send	Permission to send; connected device ready to receive; handshake signal; input
1.3	DTR	Data terminal ready	Startup request to the connected device; handshake signal; output
2.3	GND		Ground for the serial interface
1.4 / 2.4	Shield		Shield connection, capacitive to FE
ⓘ	Ensure that on connector 2, terminal point 1.2 (+5 V DC) is exclusively used to provide the 5 V signal for the CTS input (terminal point 2.2), in the event of communication without a handshake. In this case, insert a jumper between the terminal points.		

Table 4.1: Terminal point assignment – RS485 / RS-422 communication

4.2 Internal Circuit Diagram



SUPI 4	Protocol chip		Electrically isolated area
µC	Microprocessor		Capacitor
▽△	RS-485/422/232 interface	1	Ground, electrically isolated from ground of the communications power U_L
	Diagnostic and status indicators		DC/DC converter with electrical isolation
	Optocoupler		

Explanation for other used symbols has been provided in the ICS-500 Manual as in the ICS-Inline User Manual.

There is a combination of resistors between R+_485 and R-_485 which serve as a termination resistor when being used as RS-485 or RS-422 interface.

Fig. 4.2: Internal wiring of terminal points

5 Serial interfaces

5.1 RS-232

The RS-232 interface on the terminal represents some form of DTE (data termination equipment).
This means that connector 2 terminal point 2.1 (TxD) is always used to transmit and connector 2 terminal point 1.1 (RxD) is always used to receive.

According to the standard, some form of DCE (data communication equipment) should be connected to the RS-232 interface as a peer. DTE can also be connected.

Measuring the voltage between the connection points for the TxD and GND signals in idle state will determine whether the device to be connected to the RS-232 interface is a form of DTE or DCE. If the voltage measures approximately -5 V, the device is a form of DTE. If the voltage is approximately 0 V, the device is a form of DCE.

Example: When using a 25-pos. standard connector the voltage between pin 2 (TxD) and pin 7 (GND) must be measured.

RS-232 Module Handshake Signals

Any device with a RS-232 interface can be connected to the RS-232 interface on the terminal. Both the terminal and the device connected to the RS-232 interface can act as a transmitter and a receiver for data exchange. As errors can occur during data exchange if both devices transmit or receive simultaneously, the handshake is used as a procedure for the mutual signaling of clear to receive and clear to transmit.

The terminal itself supports the RTS, CTS, CTR, DSR and DCD handshake signals. Each uses one wire of the connecting cable.

⚠ Although the terminal itself supports the RTS, CTS, CTR, DSR and DCD handshake signals (each uses one wire of the connecting cable), handshake is not supported by the upper software layers in the Sedona controller at present.

5.2 RS-485

In RS-485 operating mode, an RS-485 network with several devices can be created.

Use a twisted-pair, shared and shielded data line to connect the devices. Fit this data line with termination resistors at the two most remote points of the RS-485 network. Use the termination resistor integrated in the device when connecting the Inline terminal.

This operating mode supports half-duplex transmission. Make sure that only one device is transmitting data at a time.

To ensure a defined idle cable state, the terminal contains data line polarization.

5.3 RS-422

In RS-422 operating mode, a point-to-point connection can be established.

Use a twisted-pair, shared and shielded data line to connect the devices. Fit this data line with termination resistors at every device. Use the termination resistor integrated in the device when connecting the Inline terminal.

This operating mode supports full duplex transmission.

6 Connection examples

Operating mode	Special feature	Shield connection	Notes	Required connectors
RS-485	Inline terminal as network end point	Directly	Termination resistor required	Supplied connectors (connector set)
RS-485	Inline terminal as network end point	With a capacitor	Termination resistor required	Supplied connectors (connector set)
RS-485	Terminal in the network center	With a capacitor/directly	-	2 shield connectors
RS-422	Shield connected using a capacitor	With a capacitor	Termination resistor required	Supplied connectors (connector set)
ⓘ	The connector set consists of a shield connector and a standard connector. It is supplied as standard.			

Please observe the following when wiring:

- Always connect the shield between two devices on one side using a capacitor and on the other side directly to FE.
- Fit a termination resistor to the RS-485 network beginning and end.
- For an RS-422 point-to-point connection, the receive signals on every device must be fitted with termination resistors.

6.1 RS-485: Terminal as the network end point

ⓘ Connect the shield directly to!

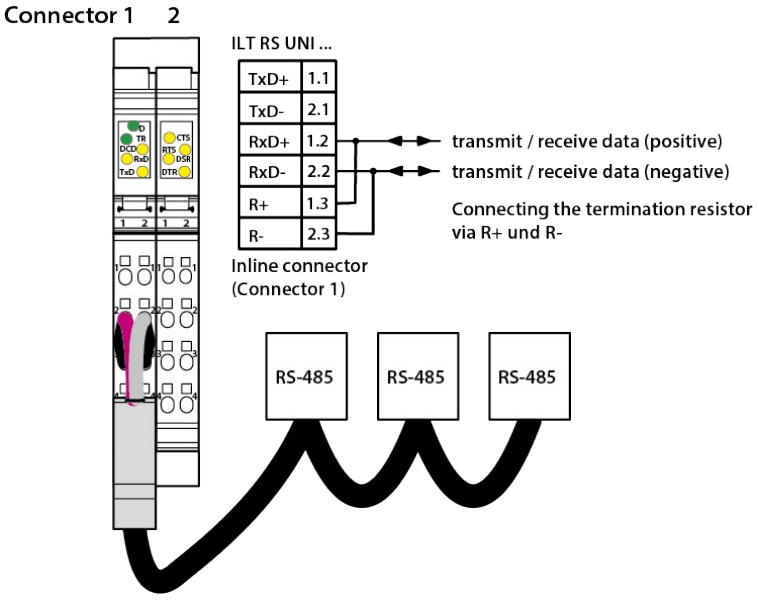


Fig. 6.1: RS-485 interface wiring:
Terminal as end point of a network, shield or data cable directly connected to FE

6.2 RS-485: Terminal as the network end point

Connect the shield to FE using a capacitor!

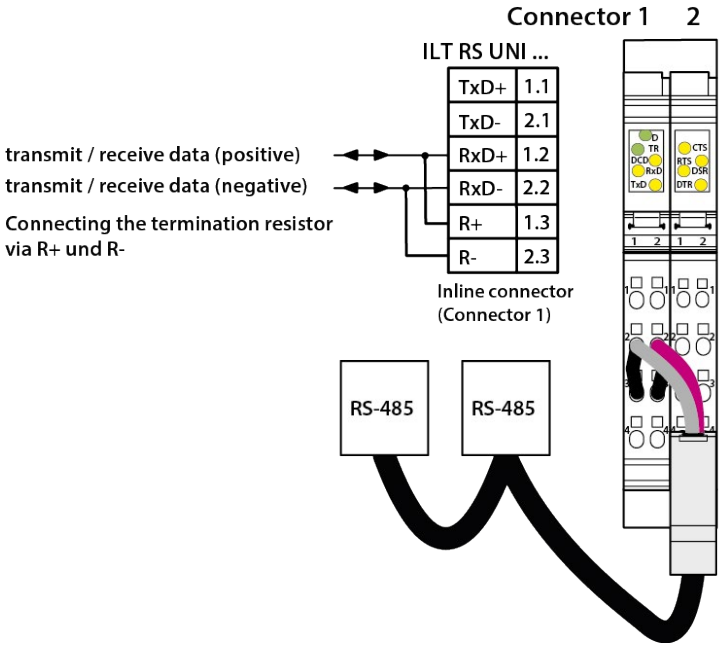


Fig. 6.2: RS-485 interface wiring:
Terminal as end point of a network, shield or data cable connected capacitively to FE

6.3 RS-485: Terminal in the network center

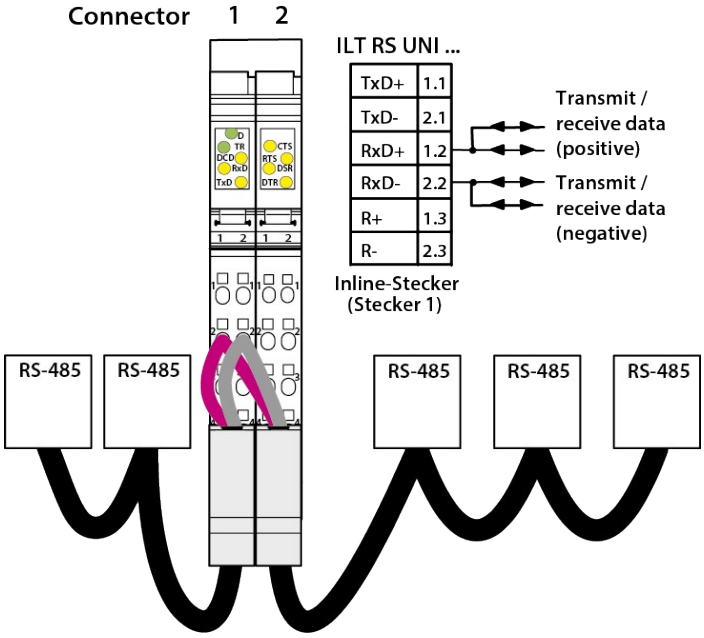


Fig. 6.3: RS-485 interface wiring:
Terminal in the center of a network, data line shield connected capacitively to FE

6.4 RS-422: Shield connected to the terminal using a capacitor

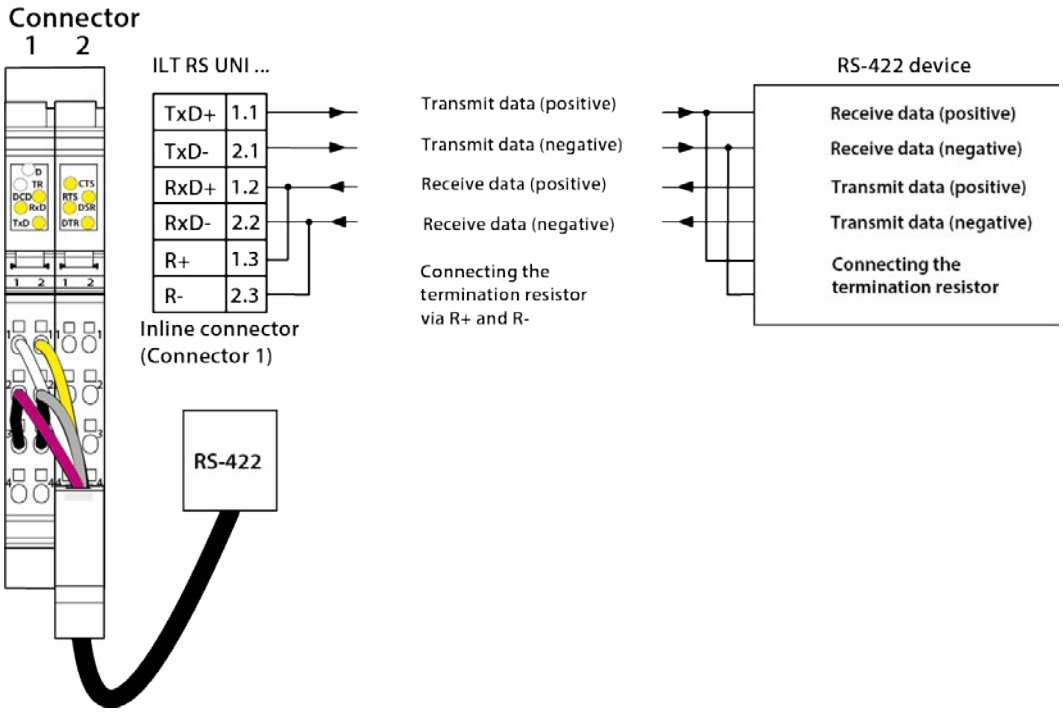


Fig. 6.4: RS-422 interface wiring:
Data line shield connected capacitively to FE

6.5 RS-232: Without handshake

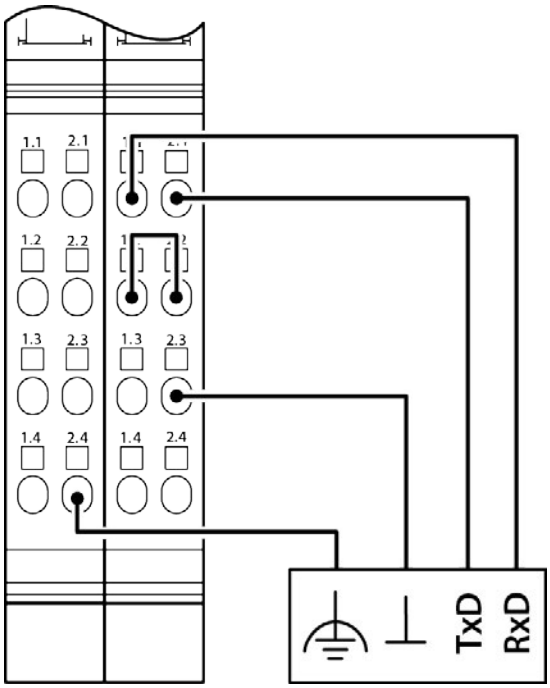


Fig. 6.5: RS-232 interface wiring:
data cable shield connected directly to FE

For wiring without handshake, insert a bridge between terminal points 1.2 (+5 V) and 2.2 (CTS).

6.6 RS-232: With 4-wire handshake

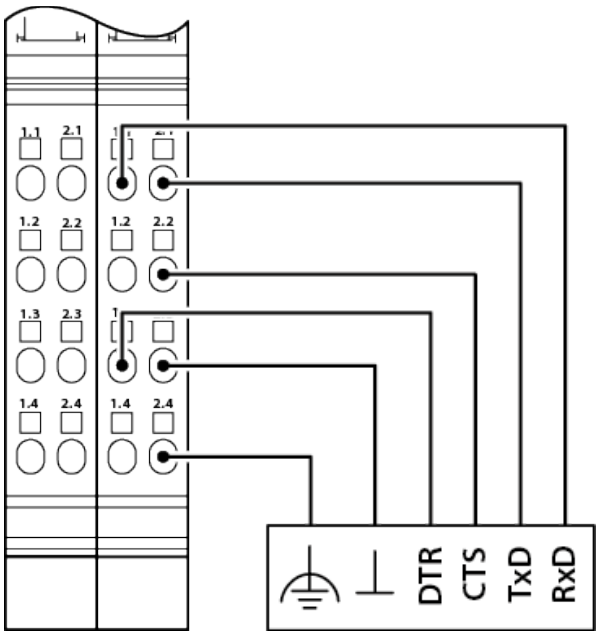
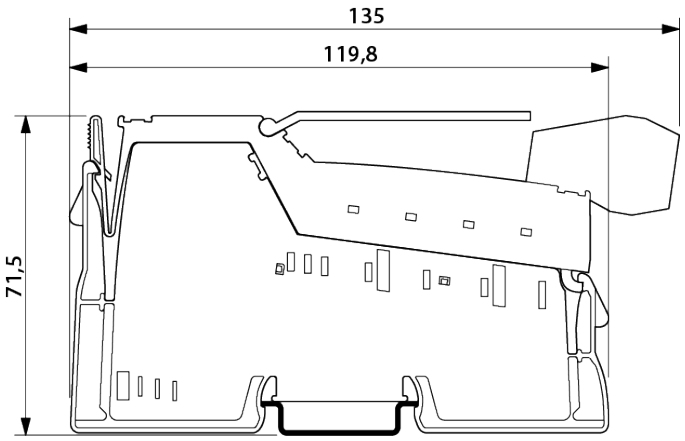


Fig. 6.6: RS-232 interface wiring:
data cable shield connected capacitively to FE

7 Technical Data

Dimensions	
 measures in mm	
Width	24,4 mm
Height	136,8 mm
Depth	71,5 mm

General data		
Colour		green
Weight		125 g
Mounting type		DIN rail
Ambient temperature	operation	-25 °C ... 55 °C
	storage/transport	-25 °C ... 85 °C
Permissible humidity		10 % ... 95 % (DIN EN 61131-2)
Air pressure		70 kPa ... 106 kPa (up to 3000 m above sea level)
Degree of protection		IP20
Protection class		III, IEC 61140, EN 61140, VDE 0140-1

Connection data	
Name	Inline connectors
Connection method	Spring-cage connection
Conductor cross section solid / stranded	0,08 mm² ... 1,5 mm²
Conductor cross section [AWG]	28 ... 16

Interface Inline local bus	
Connection method	Inline data jumper
Transmission speed	500 kBit/s

Power consumption		
Main circuit supply U_M		24 V DC
I/O voltage range		19,2 V DC ... 30 V DC (including all tolerances, including ripple)
Current consumption from U_M	typical	15 mA
	maximum	25 mA
Communications power U_L		7,5 V (via voltage jumper)
Current consumption from U_L	typical	78 mA
	maximum	90 mA
Power loss		max. 1,2 W (within the permissible operating temperature)
ⓘ This terminal takes no current from the U_{ANA} and U_S potential jumpers.		

Electrical isolation / isolation of the voltage areas	
Serial interface/7.5 V supply (bus logic)	500 V AC, 50 Hz, 1 min
Serial interface/24 V supply U_M	500 V AC, 50 Hz, 1 min
Serial interface/functional earth ground	500 V AC, 50 Hz, 1 min
7.5 V supply (bus logics) / functional earth ground	500 V AC, 50 Hz, 1 min
24 V supply (U_M)/functional earth ground	500 V AC, 50 Hz, 1 min
ⓘ Electrical isolation of the logic level from the serial interface is ensured by the DC/DC converter. ⓘ The serial interface control and data lines galvanically have the same potential. FE is a separate potential area.	

Error messages to the higher level control or computer system
none

Table 9.1: Technical data