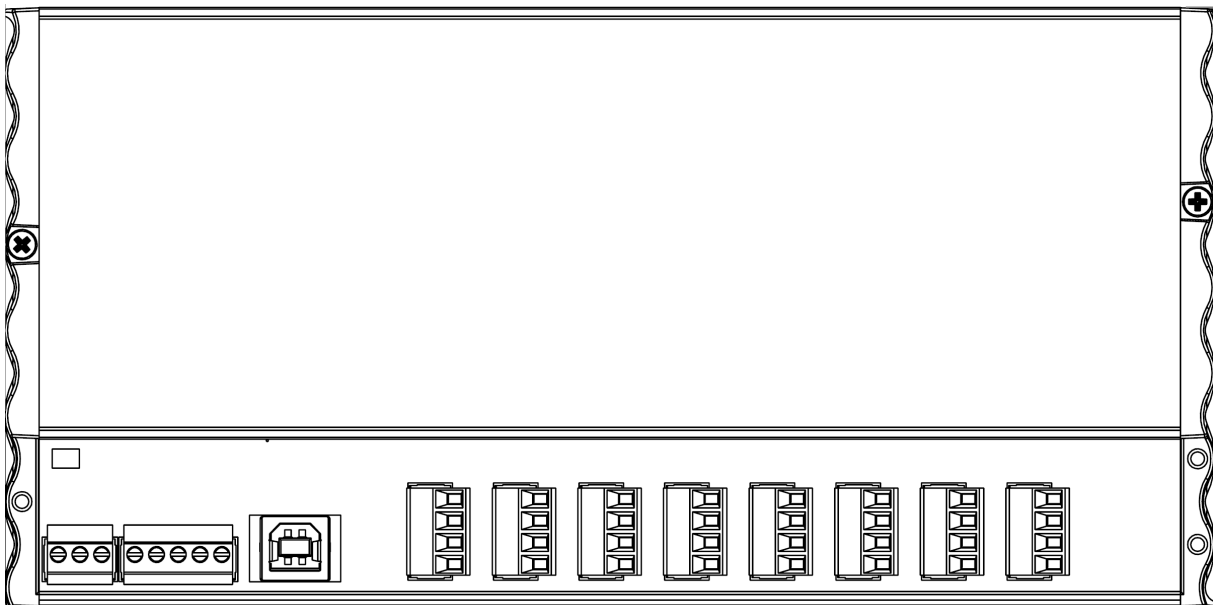


Interface definition

PLC.D Multiplexer

V1.0



Change history



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Version	Processor	Date	Amendment
1.0	Wagner	13.12.2023	Creation

INTERFACE DEFINITION

1 Technical data

General data	
Ambient temperature	+10 to 50 °C
Storage temperature	-10 to +60 °C
Maximum housing temperature	< 60 °C
Mounting type	Top hat rail
Dimensions	21.2 x 10.5 x 7.3 cm
Weight	approx. 600 g
Operating voltage	24 V
Input current	< 500 mA
PLC connection	RS485
Connection sensors	24 V + RS232
Sensor connections	8 pieces
Sensor connection, PINs	PINs 4-pin (24 V + RS232)
USB connection	for firmware updates
Cooling	none
Noise emission	none
Serial port	Baud: 115200 Databits: 8 Parity: None Stop bits: 1

Minimum distances	
Minimum distances, top	0.5 cm
Minimum clearances, lateral	0.5 cm

2 Programming interface

Communication with the PLC.D multiplexer takes place via RS485 communication. This switches the communication channel between the connected PLC.Ds using commands. Communication with the connected PLC.D sensors takes place via RS232 communication.

Communication takes place as ASCII communication, which is shown below using the example "Query measured value":

- **Controller sends:** CH1_DS_MeasResult? {CR}{LF}
- **PLC.D Sensor responds:** CH1_DS_FbMeasResult : 1.2345E+01 (CRC) {CR}{LF}

The PLC.D only transmits after a software or hardware request from the control unit. The "Continuous measurement mode" is an exception to this.

Only one command/query is processed at a time.



Communication is available after the sensor has been initialized. Depending on the version, initialization may take a few seconds.

Definitions:

- Baud rate: 115200 baud
- Parity: None
- Data bits: 8
- Stop bit: 1

Type definition:

- **BOOL:** ASCII representation of the value: "1" = TRUE; "0" = FALSE
- **INT:** ASCII representation of the value: 12345
- **FLOAT:** ASCII representation of the value: 1.2345E+01
- **STRING:** ASCII representation of an alphanumeric character string
- **DATE:** ASCII representation in DD.MM.YYYY format
- **ARRAY[1..8]** of Separated by {Tab}

Unused digits in INT or FLOAT specifications must be written with "0".

For example, setting the power to 50.1% corresponds to 050.0 as the transfer value.

Command structure specifications:

- Answers and values are separated by {Tab}

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- Command start with CH and a channel number (1..8).
Example: "CH5_DS_SerialNr?"
- Command end by {CR}{LF}
- Command and data separation by ":" (no {Tab} before and after :)
- Commands are executed with "!" Request for data is executed with "?" at the end (no {Tab})
- Commands including data request are executed with "!" at the end (no {Tab})
- For data that can be set (!?), the command (without data) is sent with ? to query the data. Example "CH1_DS_MeasAVG":
 - Set: CH1_DS_MeasAVG: 01!
 - Queries: CH1_DS_MeasAVG?
- Command length limited to 200 characters
- Unintelligible commands are confirmed by :
 - NACK:No such command!{CR}{LF}

Error handling / timeout:

- Timeout for command processing; default value: 200 ms
- Time interval for retransmission; default value: 200 ms

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3 Command overview

Use	Command	Answer	Value range
Query serial number	CHx_DS_SerialNr?	CHx_DS_FbSerialNr : 123456 (CRC)	STRING
Query type number	CHx_DS_Type?	CHx_DS_FbType : 800 Axx (CRC)	STRING
Query spectral range	CHx_DS_Spectral?	CHx_DS_FbSpectral:UVA+ (CR)	STRING
Firmware query	CHx_DS_Firmware?	CHx_DS_FbFirmware : 01.03.25 (CRC)	V00.00.00 - 99.99.99
Command to reset the PLC.D	CHx_DS_Reset	CHx_DS_FbReset (CRC)	-
Calibration date request	CHx_DS_CalibDate?	CHx_DS_FbCalibDate : 01.01.2020 (CRC)	DATE
Start the measurement	CHx_DS_StartMeas	CHx_DS_FbStartMeas (CRC)	-
Request for the measurement result	CHx_DS_MeasResult	CHx_DS_FbMeasResult: 1.2345E+01 (CRC)	FLOAT
Requesting the measurement mode	CHx_DS_DataMode	CHx_DS_FbDataMode:1 (CRC)	1: Software polling 2: Hardware trigger Transfer 3: Hardware trigger Without transfer 4: continuous
Unit request	CHx_DS_Unit	CHx_DS_FbUnit: mW/cm ² (CRC)	STRING
Inquiry of the measuring range	CHx_DS_Range	CHx_DS_FbRange: 10000 (CRC)	INTEGER
Request for the transmission interval	CHx_DS_ContTime	CHx_DS_FbContTime: 05m (CRC)	INTEGER + Time abbreviation s: Seconds (1-59) m: minutes (1-59) h: Hours (1-24)
Request for averages	CHx_DS_MeasAVG	CHx_DS_FbMeasAVG: 04 (CRC)	INTEGER 1..99

CHx: x corresponds to the channel number

Checksum:

All responses that are sent with data content must be provided with a checksum (CRC-16). This is evaluated accordingly for correctness. The checksum is always at the end of the message, separated by TAB, which is part of the data to be checked.



The prefix "CHx_" is only used by the multiplexer for channel switching and is not taken into account in the CRC calculation, as the checksum is calculated directly by the PLC.D sensor.

The checksum is defined as follows:

Type: CRC-16
CRC Polynomial: 0x8005
Init CRC value: 0x0000
Final XOR value: 0x0000
Reflect data (byte): No
Reflect CRC (word): No
Example (ASCII): 123456789
Result: 0xFEE8

The checksum is omitted for the commands to the PLC.D Multiplexer.

The checksum is always at the end of the answers. Example:

command to set the averaging to 5:

```
CH1_DS_MeasAVG:05!?
```

Answer (spaces are tabs):

```
CH1_DS_FbMeasAVG:05{Tab}0xE4ED
```

Further examples are given below. The checksum is only given here as an example.

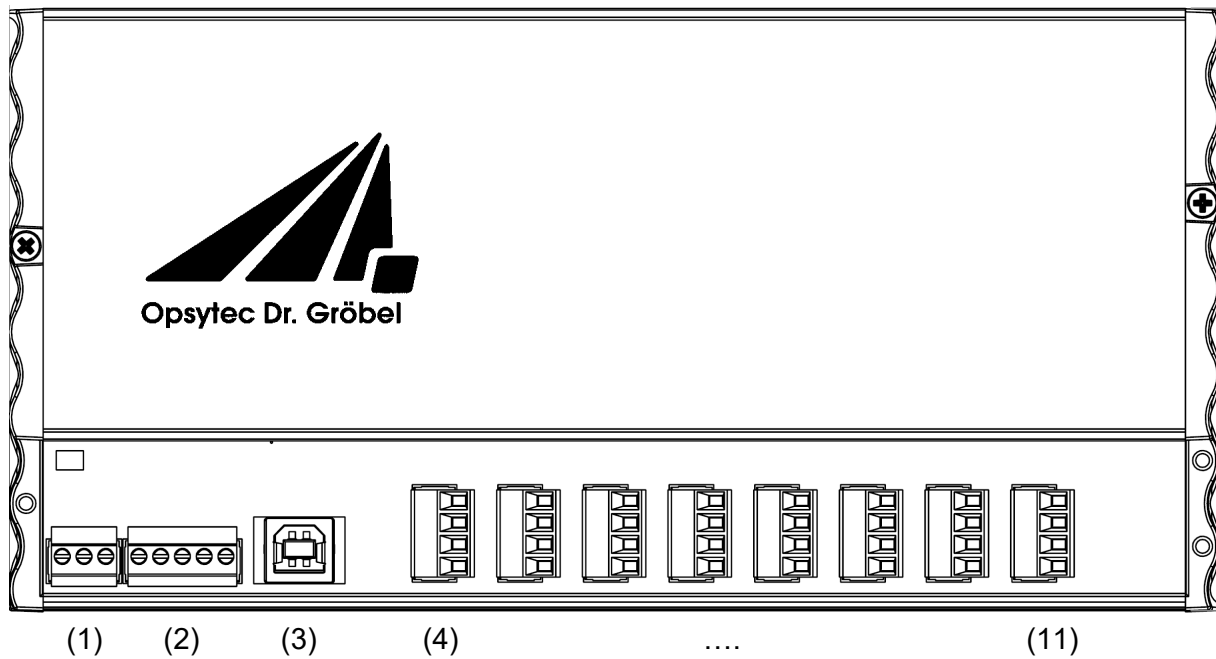
```
CH1_DS_SerialNr?  
CH1_DS_FbSerialNr:000115{Tab}0x207E
```

```
CH1_DS_Spectral?  
CH1_DS_FbSpectral:UVBB{Tab}0xF021
```



Individual functions are not available for every firmware. Therefore, always ask for the firmware version.

4 Hardware interface



- (1) DC input voltage
- (2) RS485
- (3) USB (for firmware updates)
- (4) PLC.d sensor connection 1
- ...
- (11) PLC.d sensor connection 8

INTERFACE DEFINITION

4.1 Connector DC input voltage

Type: Würth WR-TBL Series 3611
Item no.: 691361100003

PIN	Signal
1	+24V
2	GND
3	PE

4.2 RS485 plug connector

Type: Würth WR-TBL Series 3611
Item no.: 691361100005

PIN	Signal
1	A/Rxd
2	B
3	Y/TxD
4	Z
5	GND

4.3 Plug connector PLC.d Sensor connection

Type: Würth WR-TBL Series 3611
Item no.: 691361100004

PIN	Color	Color	Signal
1	BN	Brown	+24V
2	BU	Blue	GND
3	PK	Pink	TX RS232
4	GN	Green	RX RS232