

## Serial interface modules PCD3.F1xx and PCD3.F2xx

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## 0.1 Document versions

0

Version	Date	Updated	Comments
ENG07	2018-02-22	-	Translation from German version

## 0.2 Brand names and trademarks

Saia PCD® and Saia PG5®  
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Technical changes based on the current technical state of the art.

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Published in Switzerland

# 1 General

## 1.1 List of communication logs, manuals and modules

1

Log	Manual	Module / interface
S-Bus	26-739	All CPUs
Ethernet	26-776 26-867	CPUs with Ethernet
BACnet	26-849	BACnet for Saia PCD® (excluding PCD3.F215)
DALI	26-606	PCD3.F261
EIB / KNX	---	CPUs with Ethernet or CPUs with RS-232
M-Bus	27-603	PCD3.F270 to PCD3.F273
Belimo MP-Bus		PCD3.F180 PCD3.F281
Modbus	26-866	CPUs with RS-485
LON	26-883 27-636	LONWORKS® for Saia PCD® PCD3.F240
Profibus	26-860	CPUs with RS-485
SNMP	26-639	CPUs with Ethernet

## 1.2 Structure of an I/O slot module

PCD3 I/O modules consist of two blue, mechanically different half shells. These protect the electronic conductor board.



*Although the PCD3 modules can be plug-connected to all free slots on the CPU, expansion and RIO devices, the communication modules described here are restricted to the slots of the CPU devices.*



*An overview of the currently available modules can be found in the “26-215 System catalogue”. Detailed information on digital and analogous I/O modules is available in the 27-600 manual I/O modules.*

*The above, additional manuals and further documentation can be found on the Saia PCD® Support page: [www.saia-pcd.com](http://www.saia-pcd.com)*



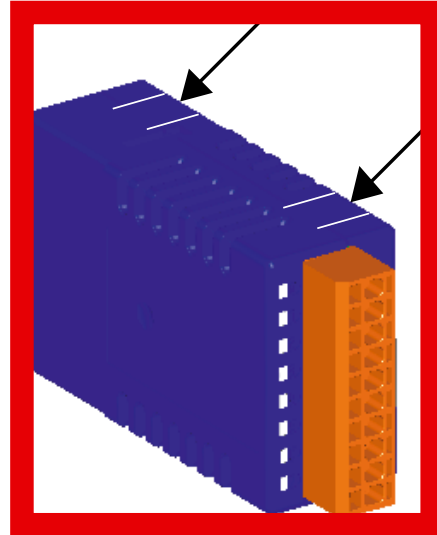
### 1.3 Open/close PCD3 I/O modules

Specific modules must be opened to make manipulations. As such, the possibility exists in some modules to fit the second communication port with communication modules of type PCD7.F1xxS (see next Chapter 1.4.1 or 3.7 Port x.0 of the PCD3.F2xxx module).

1

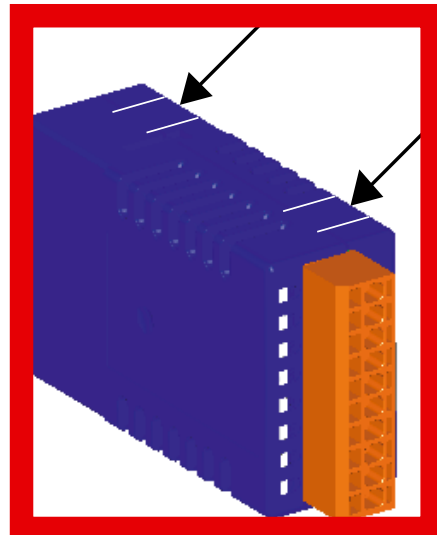
#### Open module

1. There are two snap-in lugs on each housing lid on the two narrow surfaces of the housing.
2. First, lift slightly on one side (approx. 1 mm) with the fingernail of the thumb, and then lift the other side. In so doing, ensure that the lugs you have already loosened do not lock again.
3. Carefully separate the two parts of the housing.  
Beware: The electronic print thereby detaches from the second housing shell. This happens owing to the counter pressure of the integrated mass claws of the shielding sheet below.



#### Close module

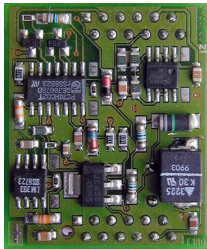
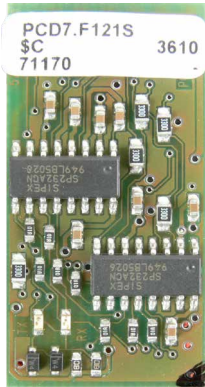
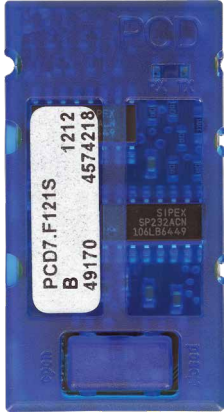
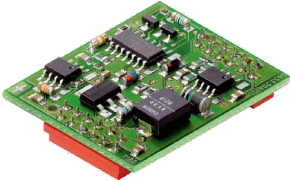

4. To close the housing, place the bottom part (without the snap-in lugs) on an even surface.
5. Ensure that the conductor board is carefully and precisely placed in this housing part. The mass claws should not be bent towards the slot side, as this would cause a short circuit.
6. Press the top part onto the bottom part until the snap-in lugs audibly snap in.
7. Ensure that all four lugs have snapped in correctly.



1.4 Interface modules PCD7.F1xx and PCD7.F1xxS

1.4.1 Design overview of the interface modules PCD7.F1xxx and PCD7.F1xxS

1

<p><b>PCD7.F1xx</b></p> <p>(Production ceased)</p>	<p><b>PCD7.F1xxS</b> new design from 2010 (no longer available in this form)</p>	<p><b>PCD7.F1xxS</b> with housing from 2012</p>
		
	<p>---</p>	

The original interface modules PCD7.F1xx (left column) were replaced with the current generation, designated by an “S” at the end of the item designation, i.e. “PCD7.F1xxS”.

With the interface modules of type PCD7.F1xxS, the function, e. g. RS-485, is defined on a communication port that can be mounted on a compatible device, xx stands as a placeholder.

Communication ports can be mounted on PCD1, PCD2 and PCD3 systems or on carrier cards in the form of I/O modules (PCD2 or PCD3) for slots 0...3 on compatible CPUs.



*The following sections contain further information.*

## 1.5 Two types of PCD3 interface modules

The two designs of the PCD3 interface modules:

- a) PCD3 modules of type PCD3.F1xx with an integrated interface module PCD7.F1xxS, that can be used on slot 0 on the PCD3.Mxxxx CPUs.

For details, see Chapter 2  
“Serial interface modules for CPU slot 0”

- b) PCD3 modules of type PCD3.F2xx with an integrated, non-replaceable interface and additionally with a free selectable interface using interface modules PCD7.F1xxS.

The PCD3.F2xx modules can be used on each slot 0..3 on a PCD3-CPU.

For details, see Chapter 3  
“Serial interface modules for CPU slot 0-3”





## 2 An interface port per module for CPU slot 0

Identification features:

- Plug type A  
order no. 4 405 4954 0
- Designation starts with "PCD3.F1..."



2

### 2.1 System properties of the PCD3.F1xx modules

When using the PCD3.F1xx interface modules, the following must be observed:



- For each Saia PCD® system, **only one** PCD3.F1xx module can be used on **slot 0** of the CPU.
- The PCD3 system has a high-performance processor that processes the application and the serial interfaces. The appropriate CPU capacity is required to process the interface modules. Please note the following when defining the maximum communication capacity for each PCD3 system:
  - The communication volume is determined by the peripheral devices connected. This may be the case if, for example, a PCD3 is used as an S-Bus slave station. If a PCD3 control unit is bombarded with a heavy telegram transfer at high baud rates, there will be little CPU capacity remaining to process the actual application.
  - If the PCD3 is the initiator of the communication, the communication volume and therefore the communication capacity is defined by the user program in the PCD3 (the PCD3 is used as the master station). Theoretically, all interfaces can be operated with a maximum baud rate of 115 kbps. The effective data throughput will however depend on the user program and the number of interfaces, and may be correspondingly low. The essential factor is that the connected peripheral devices can work with the selected configuration and communication capacity.

### 2.1.1 PCD3.F1xx can be used on the following Saia PCD3 control devices

Control device			
Module (excluding Ethernet)*	Module	Power module	RIO
PCD3.M3020*	PCD3.M3120	PCD3.M3160	PCD3.T660**
PCD3.M3230*	PCD3.M3330	PCD3.M3360	PCD3.T665
	PCD3.M5340	PCD3.M5360	PCD3.T666
PCD3.M5440*	PCD3.M5540*	PCD3.M5560	
	PCD3.M6340*	PCD3.M6360	
	PCD3.M6440*		
	PCD3.M6540*	PCD3.M6560	
		PCD3.M6860	
		PCD3.M6880	PCD3.T668

\* phased out, in "repair-phase" till 2021-12-31

\*\* phased out, no longer produced

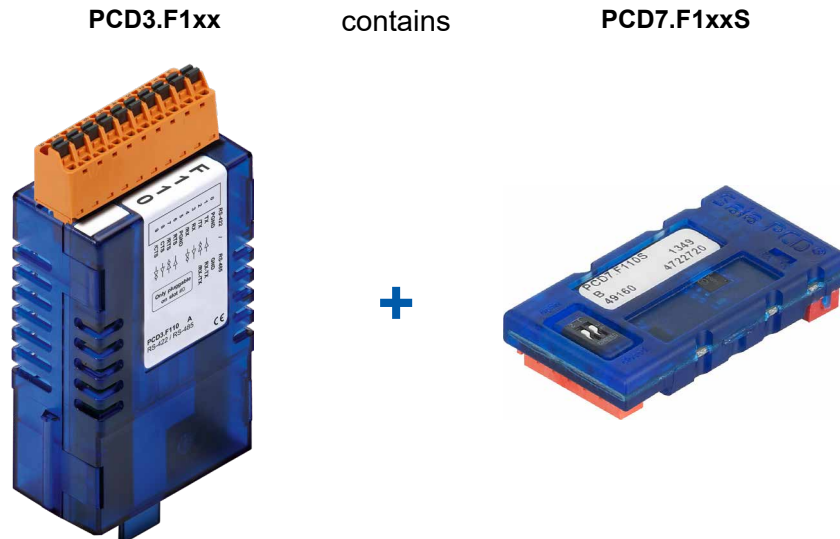
### 2.1.2 Current draw of the PCD3.F1xx interface modules:

Current draw	+5 V-Bus	+V 24V	Function
Module	[I in mA]	[I in mA]	
PCD3.F110	40	---	RS-422 or RS-485
PCD3.F121	15	---	RS-232
PCD3.F130***	5	---	Current loop (20 mA)
PCD3.F150	130	---	RS-485 electrically isolated
PCD3.F160***	50 / peak 250	---	Bluetooth
PCD3.F180	15	---	Belimo MP-Bus

\*\*\* phased out, no longer produced

## 2.2 Structure of the PCD3.F1xx interface modules

PCD3.F1xx modules serve as a carrier for an interface module of the type PCD7.F1xxS.



2

### Overview of the PCD3.F1xx modules

<b>PCD3.F110</b>	PCD3 module with RS-485 interface PCD7.F110S
<b>PCD3.F121</b>	PCD3 module with RS-232 interface PCD7.F121S
<b>PCD3.F130*</b>	PCD3 module with current loop PCD7.F130*
<b>PCD3.F150</b>	PCD3 module with RS-485 interface PCD7.F150S electrically isolated
<b>PCD3.F180</b>	PCD3 module with Belimo MP-Bus PCD7.F180S

\* phased out, no longer produced


The slot pedestal for housing the PCD7.F1xxS interface modules are housed in the PCD3 interface modules. To access this slot on the module conductor board, the housing must be opened as described under Chapter “1.3 Open/close PCD3 I/O modules”.

It is also necessary to open the module for the activation / deactivation of the RS-485 terminating resistors on the PCD7.F110S and PCD7.F150S interface modules.

## 2.3 PCD3 modules with interface modules PCD7.F1xxS

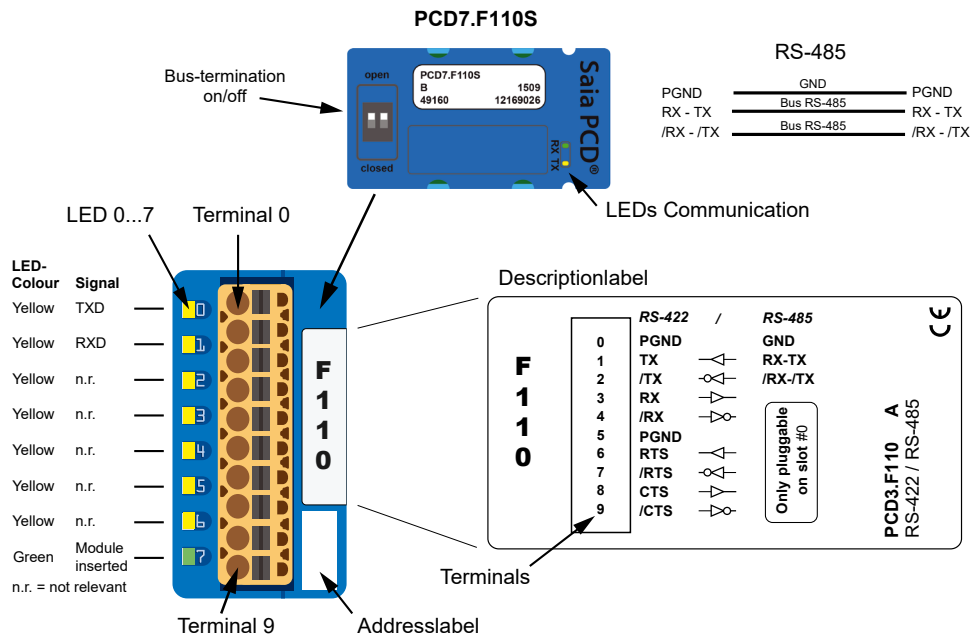
### 2.3.1 PCD3.F110 - RS-422/485 module



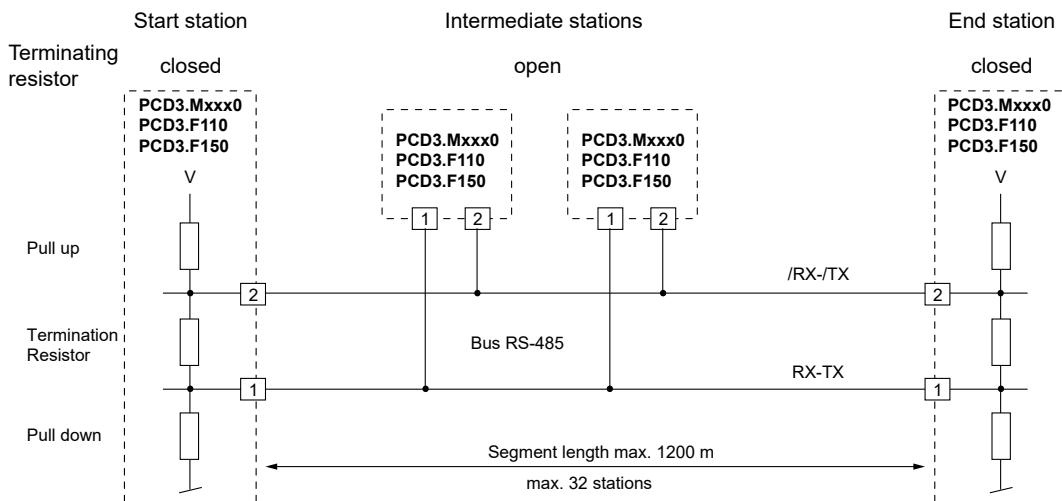
- **ONLY** for CPU I/O module slot **slot 0**.
- PCD3 module with integrated PCD7.F110S. (RS-422 with RTS/CTS or RS-485),
- Electrically connected and with switchable terminating resistors on the PCD7.F110S.
-  To access the switches to deactivate or activate the terminating resistors on the PCD7.F150S plugged into the module, the module housing must be opened as described in Chapter “1.3 Open/close PCD3 I/O modules”.

2

### Connections and LEDs for RS-422/485



### Completion of an RS-485 Bus segment



**Connection plug layout on the PCD3.F110 modules in different operating modes**


**RS-422**

Connections	Important	Terminating resistor
-------------	-----------	----------------------

2

**RS-422**

0	PGND
1	Tx
2	/Tx
3	Rx
4	/Rx
5	PGND
6	RTS
7	/RTS
8	CTS
9	/CTS

 Switch positions OPEN



10-pin spring-loaded terminal block 4 405 4954 0

**RS-485**

Connections	Important	Terminating resistor
-------------	-----------	----------------------

**RS-485**

0	PGND
1	Rx-Tx
2	/Rx-/Tx
3	
4	
5	PGND
6	
7	
8	(SGND)
9	

- Electrically connected RS-485 interface
- Switch position: OPEN (without line terminator)



CLOSED (with line terminator)



10-pin spring-loaded terminal block 4 405 4954 0



Not all manufacturers use the same connection arrangements, therefore in some cases the data lines must be crossed.



With the start and end station, the switches **must** be brought into the “CLOSED” position.  
For all the other stations, the switches **must** remain in the “OPEN” position (delivery status).



For RS-422, each receipt line pair is already completed with a terminating resistor. The switches **must** remain in the “OPEN” position (delivery status).



For details on RS-485 networks, see manual 26-740 “Installation components for RS-485 networks”.

2.3.2 PCD3.F121 - RS-232 module (suitable for modem)

RS-232

Image	Important	Connections
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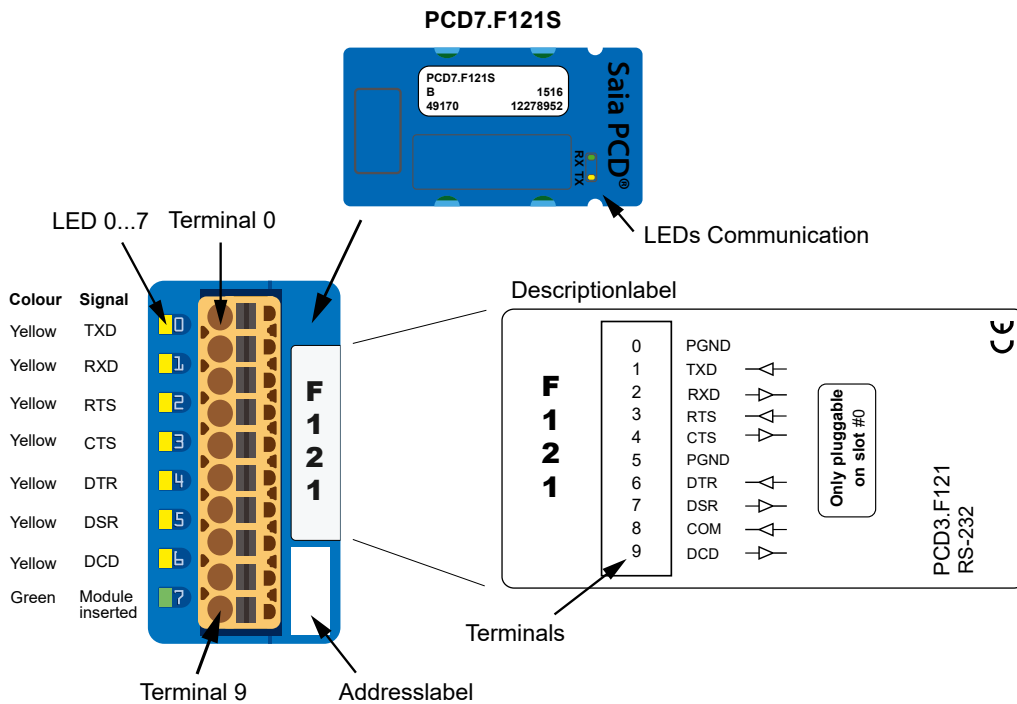


- **ONLY** for CPU I/O module slot **slot 0**.
- PCD3 module with integrated PCD7.F121S (RS-232) supports RTS/CTS, DTR/DSR, DCD
- suitable for modem connection

RS-485	
0	PGND
1	TxD
2	RxD
3	RTS
4	CTS
5	PGND
6	DTR
7	DSR
8	COM
9	DCD

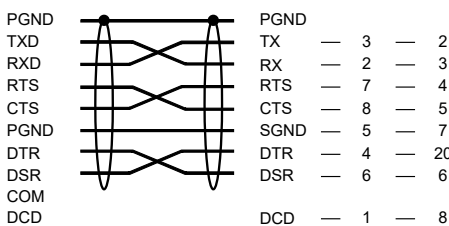
10-pin spring-loaded terminal block 4 405 4954 0

Connections and LEDs



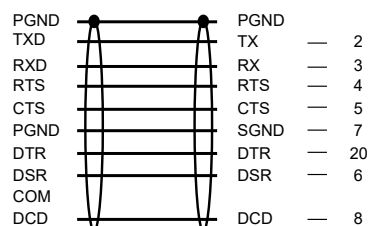
RS 232 interface

PCD	cabel	Peripherie-device (DTE)	D-Sub f 9 pol. (PC)	D-Sub m 25 pol. (PC)
-----	-------	-------------------------	---------------------	----------------------




RS 232 interface for external modem

PCD	cabel	Modem (ETCD) DCE	D-Sub m 25 pol. (z.B. Zyxel)
-----	-------	------------------	------------------------------



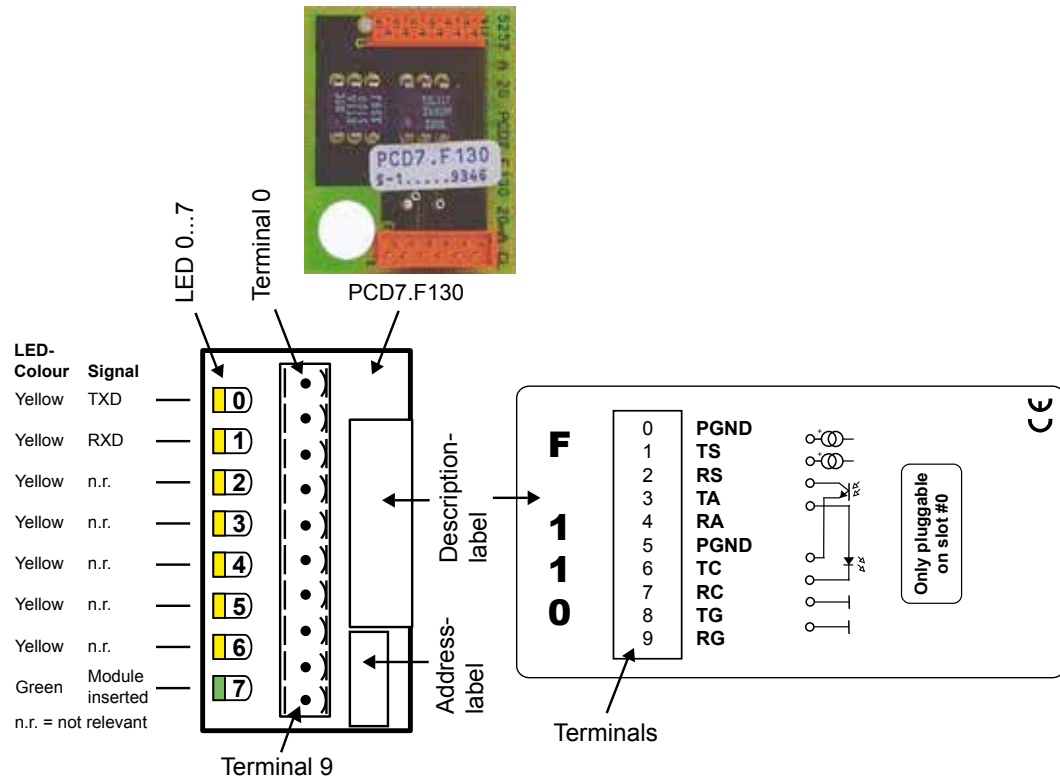
### 2.3.3 PCD3.F130 current loop (phased out!)

Image	Important	Connections																						
	<ul style="list-style-type: none"> <li>- <b>ONLY</b> for CPU I/O module slot <b>slot 0</b>.</li> <li>- TTY/current loop 20 mA (active or passive)</li> </ul>	<table border="1"> <thead> <tr> <th colspan="2">Current loop</th> </tr> </thead> <tbody> <tr><td>0</td><td>PGND</td></tr> <tr><td>1</td><td>TS</td></tr> <tr><td>2</td><td>RS</td></tr> <tr><td>3</td><td>TA</td></tr> <tr><td>4</td><td>RA</td></tr> <tr><td>5</td><td>PGND</td></tr> <tr><td>6</td><td>TC</td></tr> <tr><td>7</td><td>RC</td></tr> <tr><td>8</td><td>TG</td></tr> <tr><td>9</td><td>RG</td></tr> </tbody> </table>	Current loop		0	PGND	1	TS	2	RS	3	TA	4	RA	5	PGND	6	TC	7	RC	8	TG	9	RG
		Current loop																						
0	PGND																							
1	TS																							
2	RS																							
3	TA																							
4	RA																							
5	PGND																							
6	TC																							
7	RC																							
8	TG																							
9	RG																							

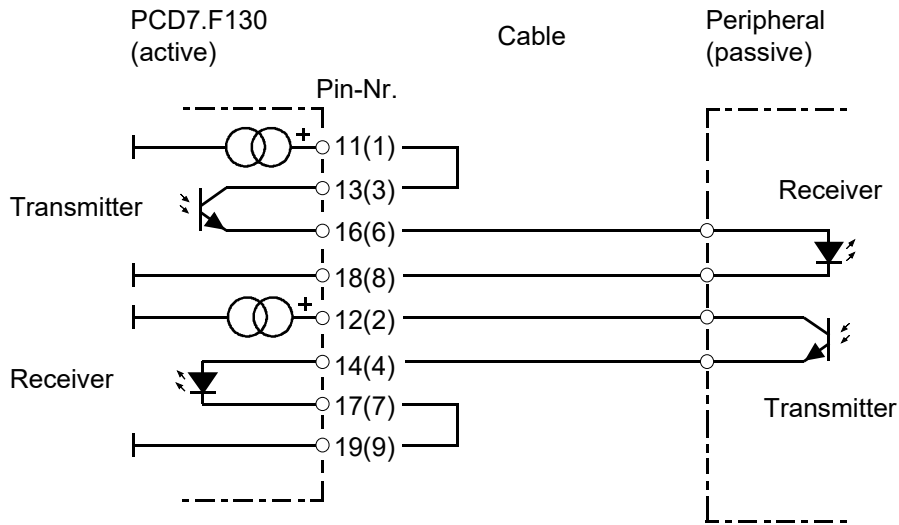
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10-pin spring-loaded terminal block 4 405 4954 0

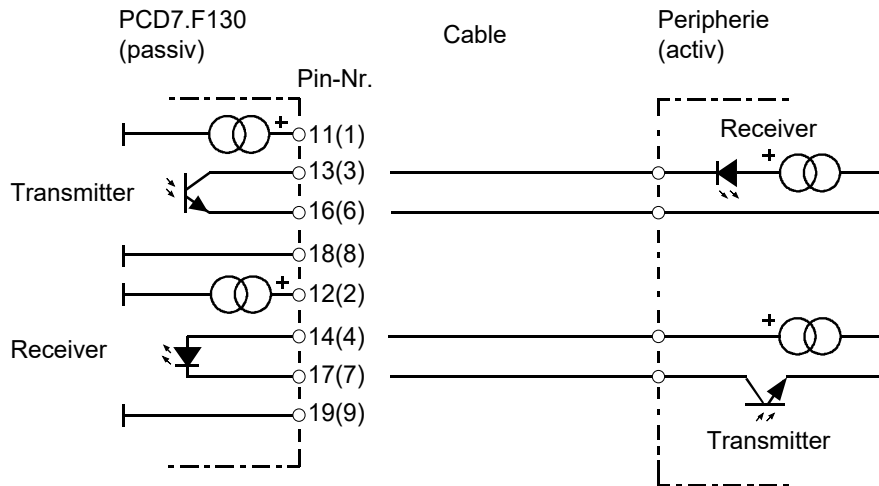
#### Connections and LEDs



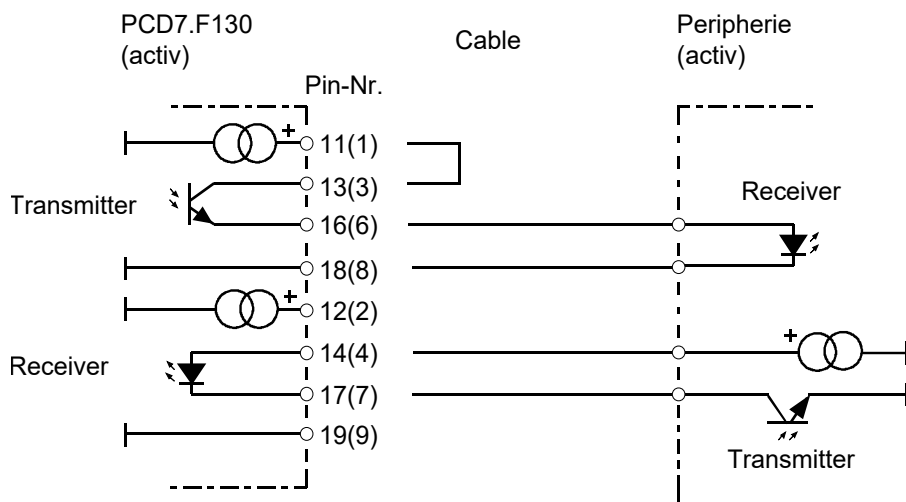
**Saia PCD® active**



**Saia PCD® passive**



**Saia PCD® and periphery active**





2.3.4 PCD3.F150 - RS-485 module

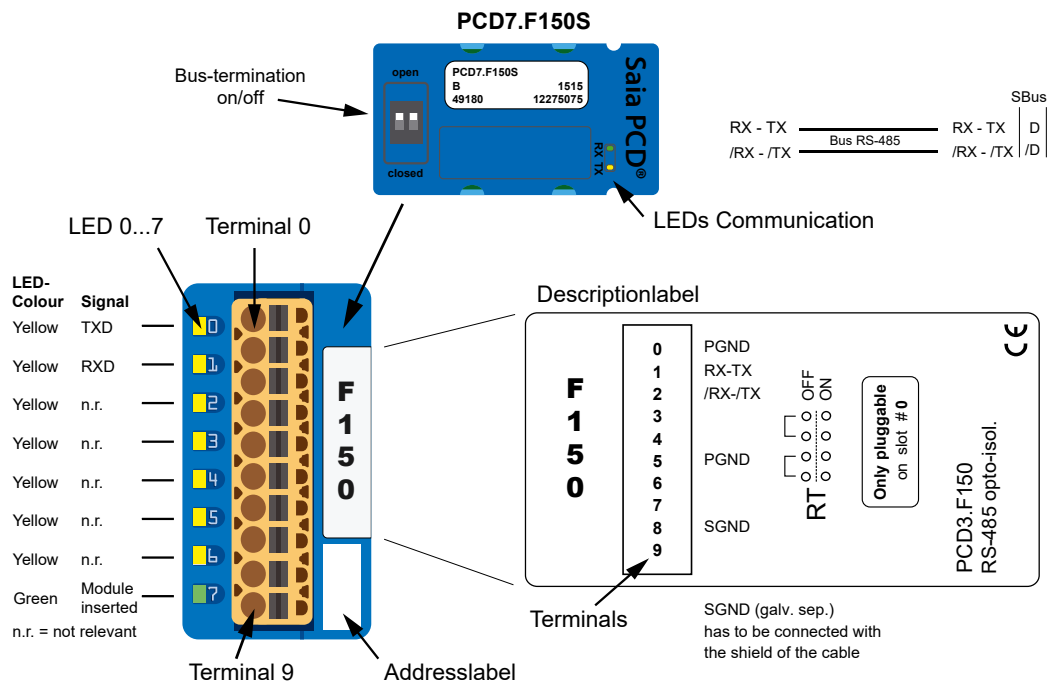


- **ONLY** for CPU I/O module slot **slot 0**.
- PCD3 module with integrated PCD7.F150S (RS-485)
- Electrically separated with switchable terminating resistors on the PCD7.F150S.)
- **i** To access the switches to deactivate or activate the terminating resistors on the PCD7.F150S plugged into the module, the module housing must be opened as described in Chapter “1.3 Open/close PCD3 I/O modules”.



2

The electric isolation on the PCD7.F150S is implemented with optocouplers and a DC/DC converter. The data signals are protected against overvoltage with one suppressor diode (10 V) each. The terminating resistors can be activated and deactivated with the two switches (CLOSE/OPEN) (see figure below).

Connections and LEDs



**RS-485**

Connections		Important	Terminating resistor
<b>RS-485</b>		<ul style="list-style-type: none"> <li>- Electrically connected RS-485 interface.</li> <li>- Switch position: <b>OPEN</b> (without line terminator)</li> </ul>	
0	PGND		
1	Rx-Tx	<ul style="list-style-type: none"> <li>- Switch position: <b>CLOSED</b> (with line terminator)</li> </ul>	
2	/Rx-/Tx		
3			
4			
5	PGND		
6			
7			
8	(SGND)		
9			

2

10-pin spring-loaded terminal block 4 405 4954 0



Not all manufacturers use the same connection arrangements, therefore in some cases the data lines must be crossed.




The voltage difference between PGND and the data lines Rx-Tx, /Rx-/Tx (and SGND) is limited by a fault rectification condenser at 50 V.



Details on the installation, see manual: 26-740 "Installation components for RS-485 networks".

### 2.3.5 PCD3.F180 - MP-Bus

Image	Important	Connections																						
	<ul style="list-style-type: none"> <li>- <b>ONLY</b> for CPU I/O module slot <b>slot 0</b>.</li> <li>- PCD3 module with integrated PCD7.F180S (activation module for MP-Bus)</li> <li>- The module can also connect an MP-Bus strand with a maximum of 8 actuators and sensors.</li> </ul>	<table border="1"> <thead> <tr> <th colspan="2">Current loop</th> </tr> </thead> <tbody> <tr><td>0</td><td>PGND</td></tr> <tr><td>1</td><td>MP</td></tr> <tr><td>2</td><td>'MFT'</td></tr> <tr><td>3</td><td>'IN'</td></tr> <tr><td>4</td><td></td></tr> <tr><td>5</td><td>PGND</td></tr> <tr><td>6</td><td></td></tr> <tr><td>7</td><td></td></tr> <tr><td>8</td><td></td></tr> <tr><td>9</td><td></td></tr> </tbody> </table>	Current loop		0	PGND	1	MP	2	'MFT'	3	'IN'	4		5	PGND	6		7		8		9	
		Current loop																						
0	PGND																							
1	MP																							
2	'MFT'																							
3	'IN'																							
4																								
5	PGND																							
6																								
7																								
8																								
9																								

2

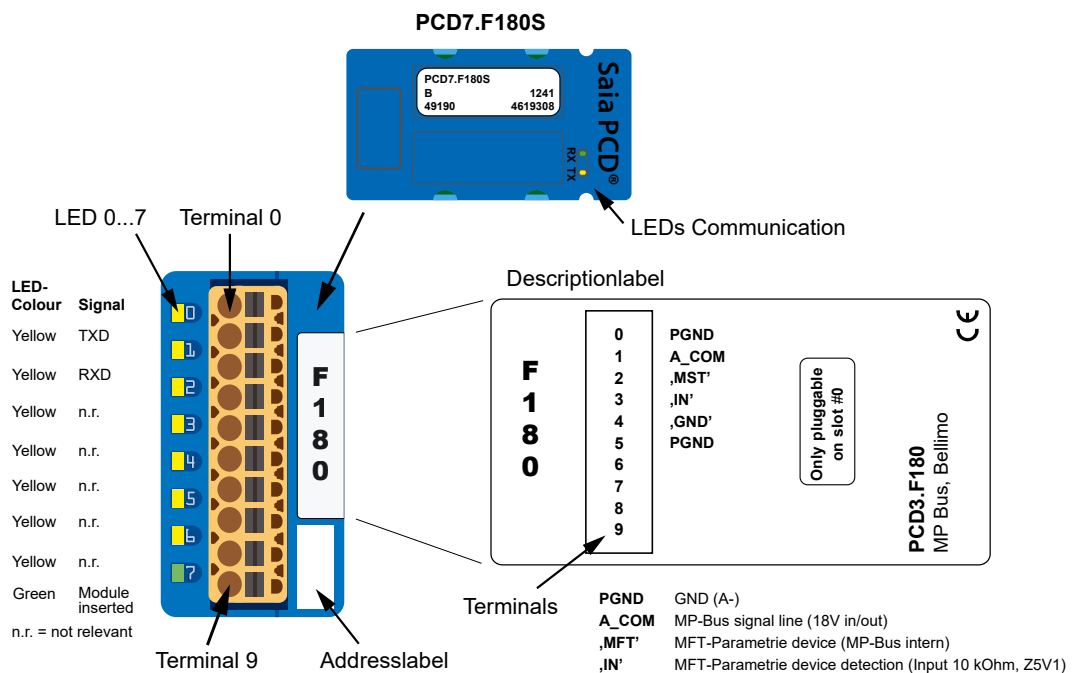
10-pin spring-loaded terminal block 4 405 4954 0

Complete Belimo MP-Bus interface for an MP-Bus with up to 8 actuators and sensors.

MP Bus is a Belimo communication system used to connect Belimo MP field devices including valve and shutter position drives or VVS controllers and room air sensors in building automation systems. Installation is easy. In addition to the 24V AC/DC power supply, the MP Bus needs just one unshielded wire which can be run through the same cable.

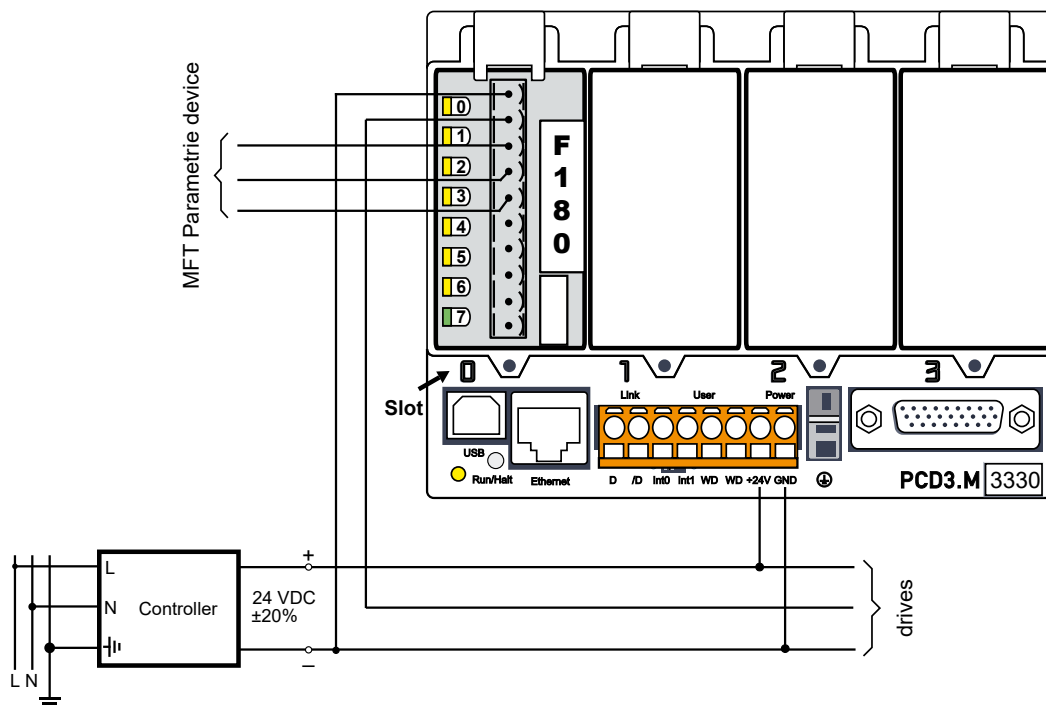
Up to 8 drives can be attached to one communication channel. The total length of the mains cable depends on the diameter of the selected cable and the number and output of the connected drives. A total length of approx. 100 m is generally achieved.

#### Connections and LEDs



**Supply option**

Joint supply for controls and drives



When using the activation module PCD3.F180, the minimum requirement of 24 VDC,  $\pm 5\%$  applies for the feed voltage of the Saia PCD<sup>®</sup> (and not the standard tolerance of  $\pm 20\%$ )



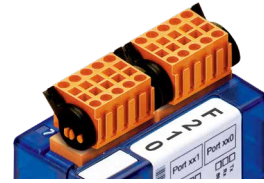
For separate supply to the drives with DC or AC current, please ensure in particular that the mass connection of the Saia PCD<sup>®</sup> CPU is connected to the mass (minus pole) of the drive power supply. The mass serves as a shared basis during communication.



Details see Technical Information  
TI 26-342 MP-Bus interface for BELIMO<sup>®</sup> actuator drives

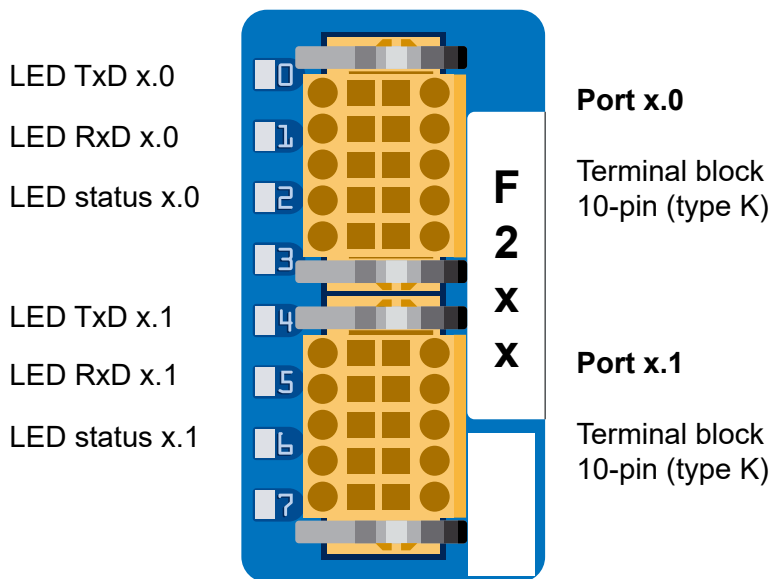
### 3 Modules with two interface ports for CPU slot 0...3

- Identification features:
- 2× plug type K  
order no. 4 405 5048 0
  - Designation starts with "F2.."



3

#### 3.1 LEDs



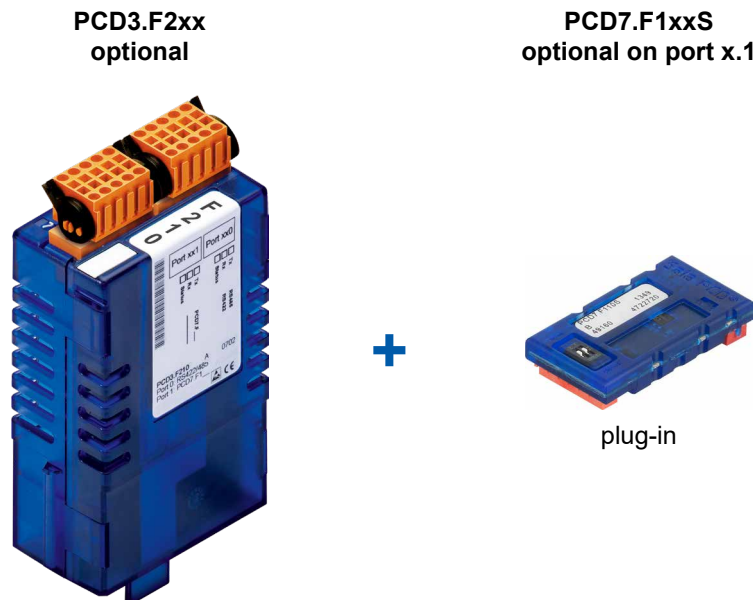
#### Illumination statuses

- LED TxD:    Transmission data identification  
 LED RxD:    Received data identification  
 LED status: The status LED displays the status of the serial port.  
               'green' = the port is working correctly

- Both LEDs permanently red:            F2xx not running
- Both LEDs green 25%/red 75%:        F2xx start procedure
- Both LEDs green 50%/red 50%:        F2xx running, but no communication with PCD3.Mxxxx
  
- Status LED green 75%/red 25%:        F2xx running, channel closed
- Status LED green 90%/red 10%:        F2xx running, channel open with error
- Status LED green 100%:                F2xx running, channel open OK

### 3.2 System properties of the PCD3.F2xx modules

The PCD3.F2xx communication modules are designed for the PCD3.Mxxxx systems. Each module has two serial ports, one integrated interface (port x.0) and a second interface using a PCD7.F1xxS module (port x.1).



### 3.3 Port x.0: Integrated serial interface

Serial interfaces	Port	Module
<b>RS-422 / RS-485</b> + free slot for PCD7.F1xxS module	Port x.0 Port x.1	<b>PCD3.F210</b>
<b>BACnet.</b> + free slot for PCD7.F1xxS module	Port x.0 Port x.1	<b>PCD3.F215</b>
<b>RS-232</b> suitable for modem. + free slot for PCD7.F1xxS module	Port x.0 Port x.1	<b>PCD3.F221</b>
<b>Belimo MP-Bus</b> + free slot for PCD7.F1xxS module	Port x.0 Port x.1	<b>PCD3.F281</b>

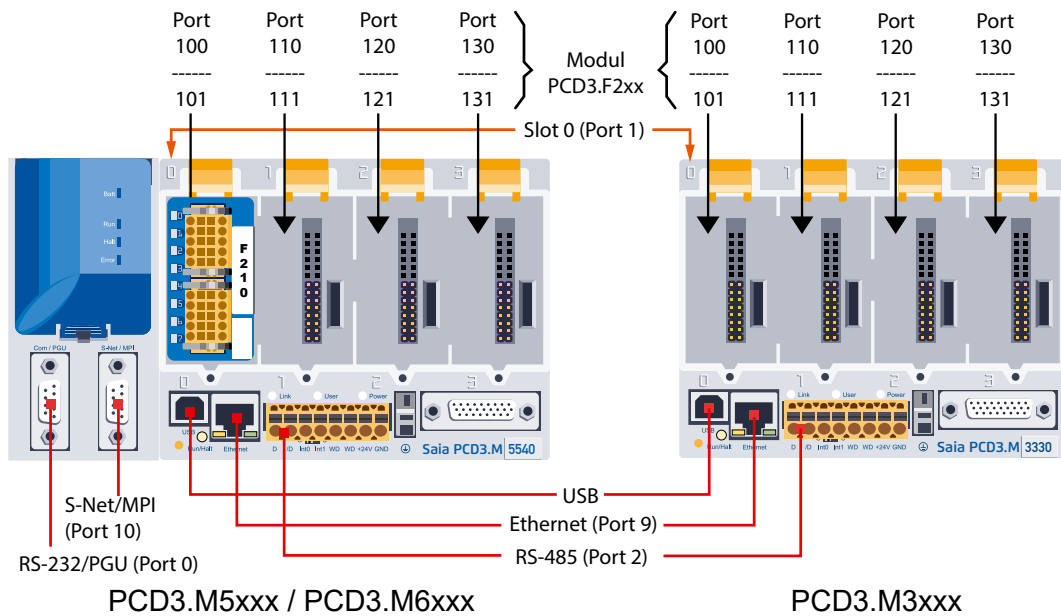
### 3.4 Port x.1: List of the possible interface modules PCD7.FxxxS

Order no.	Function	Image
<b>PCD7.F110S</b>	RS-422 / RS-485	
<b>PCD7.F150S</b>	RS-485, electrically isolated	
<b>PCD7.F121S</b>	RS-232, for modem connection	
<b>PCD7.F180S</b>	Belimo MP-Bus, for max. 8 actuators and sensors	

### 3.5 Port allocations slot 0...3 on the PCD3.Mxxxx CPUs

The PCD3.F2xx modules are intended for inclusion in the I/O slot 0...3 on a PCD3.Mxxxx. As shown in the figure below, the communication ports are allocated as follows:

- I/O slot 0: **port 100** for the x.0 port  
**port 101** for the x.1 port
- I/O slot 1: **port 110** for the x.0 port  
**port 111** for the x.1 port
- I/O slot 2: **port 120** for the x.0 port  
**port 121** for the x.1 port
- I/O slot 3: **port 130** for the x.0 port  
**port 131** for the x.1 port



If a PCD3.F2xx module is connected to I/O slot 0, **port 1 cannot be used**. Instead, the PCD3.F2xx module allocates it and thereby uses the two port addresses 100 and 101.

### 3.5 Properties of the PCD3.F2xx modules

When using the PCD3.F2xx interface modules, the following must be observed:



- Per Saia PCD® system a max. of 4 PCD3.F2xxx modules (max. 8 interfaces) can be used in slots 0...3.
- The PCD3 system has a high-performance processor that processes the application and the serial interfaces. The appropriate CPU capacity is required to process the interface modules. Please note the following when defining the maximum communication capacity per PCD3 system.
  - The communication volume is determined by the peripheral devices connected. This may be the case if, for example, a PCD3 is used as an S-Bus slave station. If a PCD3 control unit is bombarded with a heavy telegram transfer at high baud rates, there will be little CPU capacity remaining to process the actual application. The following rules apply here: the use of 8 interfaces with 9.6 kbps requires approx. 50% of the CPU capacity. Two 57.6 kbps interfaces require approx. 50% of the CPU capacity. Two 115 kbps interfaces require approx. 60% of the CPU capacity.
  - If the PCD3 is the initiator of the communication, the communication volume and therefore the communication capacity is defined by the user program in the PCD3 (the PCD3 is used as the master station). Theoretically, all interfaces can be operated with a maximum baud rate of 115 kbps. The effective data throughput will however depend on the user program and the number of interfaces and can be correspondingly low. The essential factor is that the connected peripheral devices can work with the selected configuration and communication capacity.



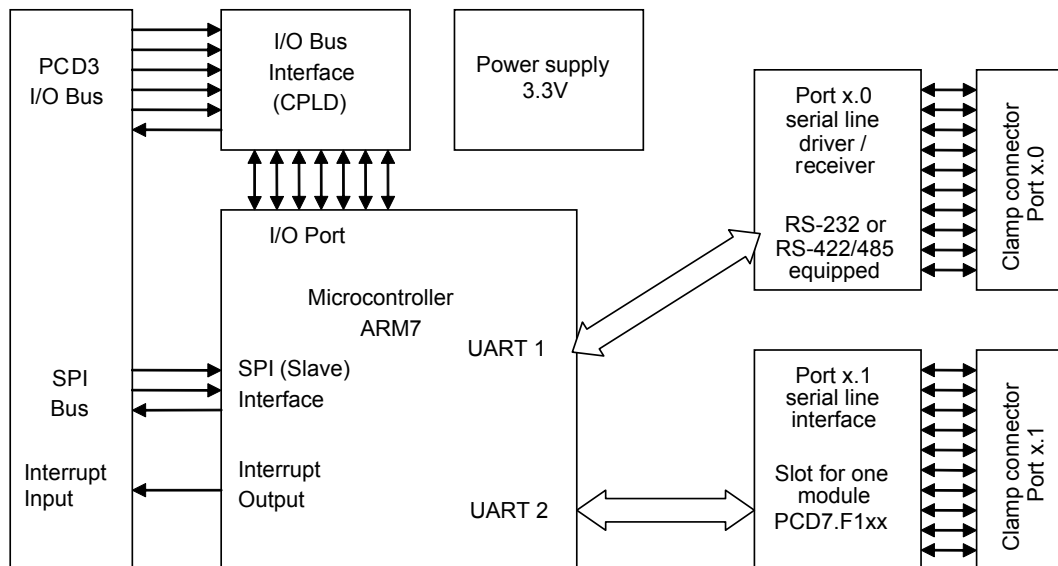
### 3.5.1 Restrictions

The PCD3.F2xxx modules for the PCD3 systems enable users to create up to 8 additional serial interfaces. Note: every additional interface uses PCD3.Mxxxx CPU capacity.

The use of these 8 ports depends on the type of communication, the baud rate required and the volume of the data transfer. Additional important factors are:

- Communication on the PCD3.Mxxxx, including Profi-S-Net, Ether-S-Net, USB
- Use of the web server
- Data transmission from the CPU to the memory
- User program in the PCD3.Mxxxx

#### Block switching diagram of the PCD3.F2xx base modules



## 3.6 Technical data

### 3.6.1 Communication modes supported

MC0	Character mode without automatic handshaking
MC1	Character mode with RTS/CTS handshaking
MC2	Character mode with Xon/Xoff protocol
MC4	Character mode for RS-485 interface
MC5	Similar to MC4 with rapid switching between sending and receiving

SM1	S-Bus master, parity mode
SM2	S-Bus master, data mode

SS1	S-Bus slave, parity mode
SS2	S-Bus slave, data mode

GS1	S-Bus gateway slave, parity mode
GS2	S-Bus gateway slave, data mode

GM	S-Bus gateway master
----	----------------------

→ Gateway always via the PCD3.

### 3.6.2 Supported baud rates (Bit/S)

1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200

### 3.6.3 Current consumption

Current consumption:		+5 V-Bus	V+
Basis module	Port x.1 config.	[I in mA]	[I in mA]
<b>PCD3.F210</b>	none	110	0
	PCD7.F110S	150	0
	PCD7.F121S	125	0
	PCD7.F130	190	22
	PCD7.F150S	240	0
	PCD7.F180S	125	15
<b>PCD3.F221</b>	none	90	0
	PCD7.F110S	130	0
	PCD7.F121S	105	0
	PCD7.F130	120	22
	PCD7.F150S	225	0
	PCD7.F180S	105	15
<b>PCD3.F281</b>	none	90	15
	PCD7.F110S	130	15
	PCD7.F121S	105	15
	PCD7.F130	115	15
	PCD7.F150S	225	15
	PCD7.F180S	105	30

### 3.7 Port x.0 of the PCD3.F2xxx module

#### 3.7.1 RS-422/485 integrated on port x.0 of the PCD3.F210 module

The PCD3.F210 module contains two different interface types on port x.0, RS-422 with RTS/CTS and RS-485 (electrically connected). The line terminator is integrated into the module and can be activated using a switch on the module. For activation (activating the terminating resistors), the module housing must be opened as described in this manual in Chapter “1.3 Open/close PCD3 I/O modules”.

#### PCD3.F210 module

Port x.0 connections	Important	Open module
----------------------	-----------	-------------

##### RS-422

0	PGND	Tx	1
2	/Tx	Rx	3
4	/Rx	PGND	5
6	RTS	/RTS	7
8	CTS	/CTS	9

- Electrically connected RS-422 interface.  
Switch position: always on 'O' for OPEN (without line terminator)
- For the RS-422 interfaces, only the line ends are terminated: Rx/Rx and CTS/CTS are always terminated

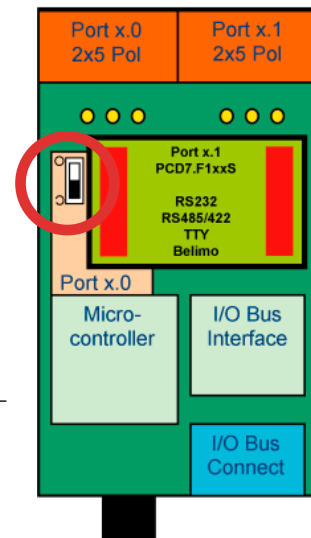
10-pin spring-loaded terminal block 4 405 5048 0

##### RS-485

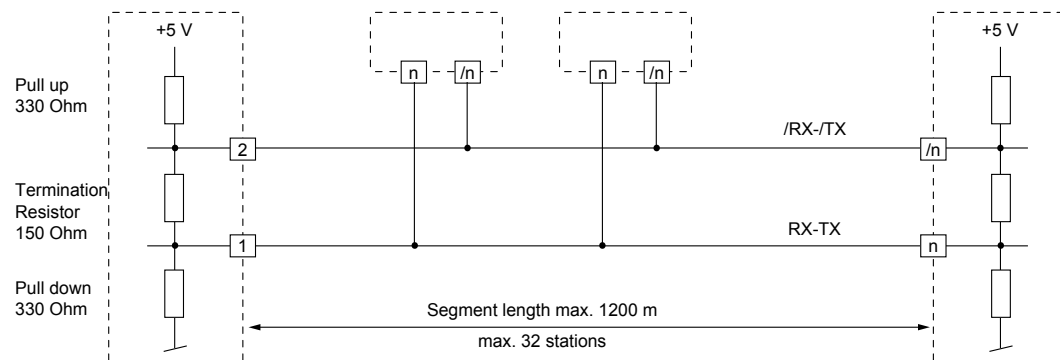
0	PGND	Rx-Tx	1
2	/Rx-/Tx		3
4		PGND	5
6			7
8	(SGND)		9

- Electrically connected RS-485 interface
- Switch position:  
'O' for OPEN (without line terminator)  
'C' for CLOSED (with line terminator)

10-pin spring-loaded terminal block 4 405 5048 0



#### RS-485 Bus segment



The line terminator for port x.0 is integrated into the module and can be activated/deactivated using a switch on the module. Besides the switch the conductor board contains the following designations: 'O' for OPEN and 'C' for CLOSED.

### 3.7.2 RS-232 integrated on port x.0 of the PCD3.F221 module (for modem)

The PCD3.F221 module has a full RS-232 interface on port x.0. This port is designed in particular for all modem connections, including the RTS/CTS, DTR/DSR and DCD.

#### PCD3.F221 module

##### Port x.0 connections

3

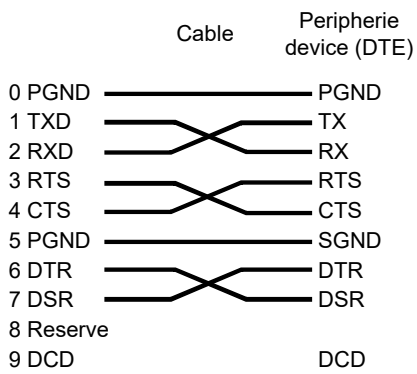
##### RS-232

0	PGND	TxD	1
2	RxD	RTS	3
4	CTS	PGND	5
6	DTR	DSR	7
8	COM	DCD	9

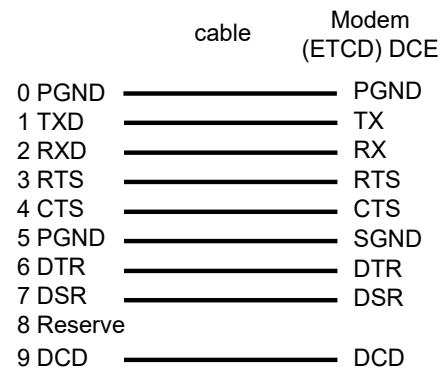
10-pin spring-loaded terminal block 4 405 5048 0

#### RS-232 connection

##### RS-232 connection to DTE



##### RS-232 connection to DCE



### 3.7.3 Belimo MP-Bus integrated on port x.0 of the PCD3.F281 module

The PCD2.F281 module has a full Belimo MP-Bus interface on port x.0.

The M-Bus interface is described in Chapter 2.3.5 “MP-Bus with PCD3.F180”.

#### PCD3.F281 module

##### Port x.0 connections

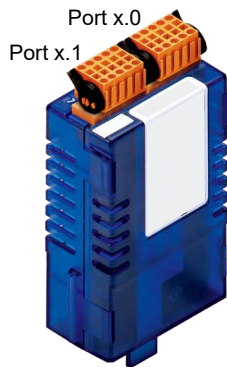
**3**

##### Belimo MP-Bus

0	PGND	MP	1
2	MST	IN	3
4		PGND	5
6			7
8			9

10-pin spring-loaded terminal block 4 405 5048 0

### 3.7.4 Plug allocation of the plug-in PCD7.F1xxS communication modules for port x.1



PCD3.F2xx plug allocation for PCD7.F110S on port x.1

Plug type K  
Port x.0

Plug type K  
Port x.1  
RS-422

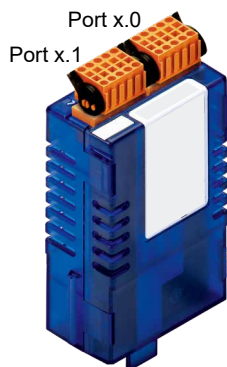
0			1	0	PGND	Tx	1
2			3	2	/Tx	Rx	3
4			5	4	/Rx	PGND	5
6			7	6	RTS	/RTS	7
8			9	8	CTS	/CTS	9

Plug type K  
Port x.0

Plug type K  
Port x.1  
RS-485

0			1	0	PGND	Rx-Tx	1
2			3	2	/Rx-/Tx		3
4			5	4		PGND	5
6			7	6			7
8			9	8	(SGND)		9

3

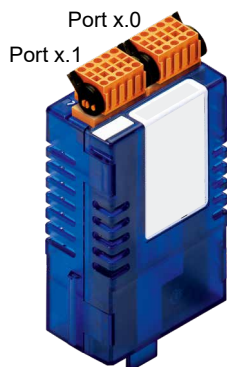


PCD3.F2xx plug allocation for PCD7.F121S on port x.1

Plug type K  
Port x.0

Plug type K  
Port x.1  
RS-232

0			1	0	PGND	TxD	1
2			3	2	RxD	RTS	3
4			5	4	CTS	PGND	5
6			7	6	DTR	DSR	7
8			9	8	COM	DCD	9

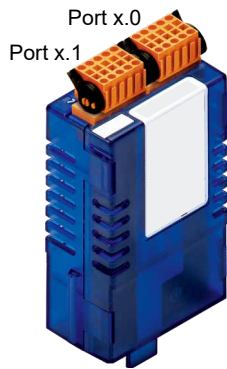


PCD3.F2xx plug allocation for PCD7.F150 on port x.1

Plug type K  
Port x.0

Plug type K  
Port x.1  
RS-485

0			1	0	PGND	Rx-Tx	1
2			3	2	/Rx-/Tx		3
4			5	4		PGND	5
6			7	6			7
8			9	8	(SGND)		9



PCD3.F2xx plug allocation for PCD7.F180 on port x.1

Plug type K Port x.0				Plug type K Port x.1 Belimo MP-Bus			
0			1	0	PGND	MP	1
2			3	2	MST	IN	3
4			5	4		PGND	5
6			7	6			7
8			9	8			9

### 3.8 Overview of the connection port x.0 and port x.1

#### Spring force terminal block type K 4 405 5048 0

- Each serial port has its own individual 10-pin spring-loaded terminal block type K.
- With the PCD3.F2xx modules, a spring force terminal block is mounted (in the scope of delivery) on each port.
- Max. Wire thickness: 1.0 mm<sup>2</sup> AWG 18
- Order no. 4 405 5048 0 spring force terminal block type K



**RS-232**

0	PGND	TxD	1
2	RxD	RTS	3
4	CTS	PGND	5
6	DTR	DSR	7
8	COM	DCD	9

**RS-422**

0	PGND	Tx	1
2	/Tx	Rx	3
4	/Rx	PGND	5
6	RTS	/RTS	7
8	CTS	/CTS	9

**RS-485**

0	PGND	Rx-Tx	1
2	/Rx-/Tx		3
4		PGND	5
6			7
8	(SGND)		9

**TTY (CL)**

0	PGND	TS	1
2	RS	TA	3
4	RA	PGND	5
6	TC	RC	7
8	TG	RG	9

**Belimo MP-Bus**

0	PGND	MP	1
2	MST	IN	3
4		PGND	5
6			7
8			9

## 4 Interface modules for special logs on CPU slot 0-3

### 4.1 Overview of all PCD3 interface modules

Module	Serial interface / log	Slot	Port	Connector type
PCD3.F110	RS-422 / RS-485	I/O 0	Port 0	A
PCD3.F121	RS-232	I/O 0	Port 0	A
PCD3.F130*	Current loop	I/O 0	Port 0	A
PCD3.F150	RS-485 with electrical isolation	I/O 0	Port 0	A
PCD3.F180	Belimo MP-Bus	I/O 0	Port 0	A
PCD3.F210	RS-422 / RS-485 plus PCD7.F1xxS as an option	I/O 0-3	Port x.0 Port x.1	K K
PCD3.F215	BACnetMS/TP or fully programmable	I/O 0-3	Port x.0 Port x.1	K K
PCD3.F221	RS-232 plus PCD7.F1xxS as an option	I/O 0-3	Port x.0 Port x.1	K K
PCD3.F240	LonWorks exclusively for PCD3.M5xx0 and PCD4.M6xx0	I/O 0-3		A9
PCD3.F261	DALI	I/O 0-3		A
PCD3.F270	M-Bus up to 240 nodes	I/O 0-3		A
PCD3.F271	M-Bus up to 20 nodes	I/O 0-3		A
PCD3.F272	M-Bus up to 60 nodes	I/O 0-3		A
PCD3.F273	M-Bus up to 120 nodes	I/O 0-3		A
PCD3.F281	Belimo MP-Bus plus PCD7.F1xxS as an option	Port x.0 Port x.1	Port x.0 Port x.1	Port x.0 Port x.1

\* phased out (no longer produced)

For details, see following subchapters



**4.2 PCD3.F110**

See Chapter 2.3.1 “PCD3.F110 - RS-422/485 module”

**4.3 PCD3.F121**

See Chapter 2.3.2 “PCD3.F121 - RS-232 module (suitable for modem)”

**4.4 PCD3.F130\***

See Chapter 2.3.3 “PCD3.F130 current loop (phased out!)”

\* phased out (no longer produced)

**4.4 PCD3.F150**

See Chapter 2.3.4 “PCD3.F150 - RS-485 module”

**4.5 PCD3.F180**

See Chapter 2.3.5 “PCD3.F150 - RS-485 module”

**4.6 PCD3.F210**

See Chapter 3.7.1 “RS-422/485 integrated on port x.0 of the PCD3.F210 module”

**4.7 PCD3.F215 BACnet MS/TP**

2× connectors type K Order no. 4 405 5048 0

PCD3.F210 serves as the basis of this module but runs with another firmware.

This module is not documented in detail!

connector type K				Port and module
RS-485				- Port x.0 of PCD3.F215
0	PGND	Rx-Tx	1	
2	/Rx-/Tx		3	
4		PGND	5	
6			7	
8			9	

4.8 PCD3.F221

See Chapter 3.7.2 “RS-232 integrated on port x.0 of PCD3.F221 module (for modem)”

4.9 PCD3.F240 Lon module

This module is documented in detail in manual 26-636 “PCD3.F240/PCD2.F2400 LON communication module for TP/FT-10 channel”!

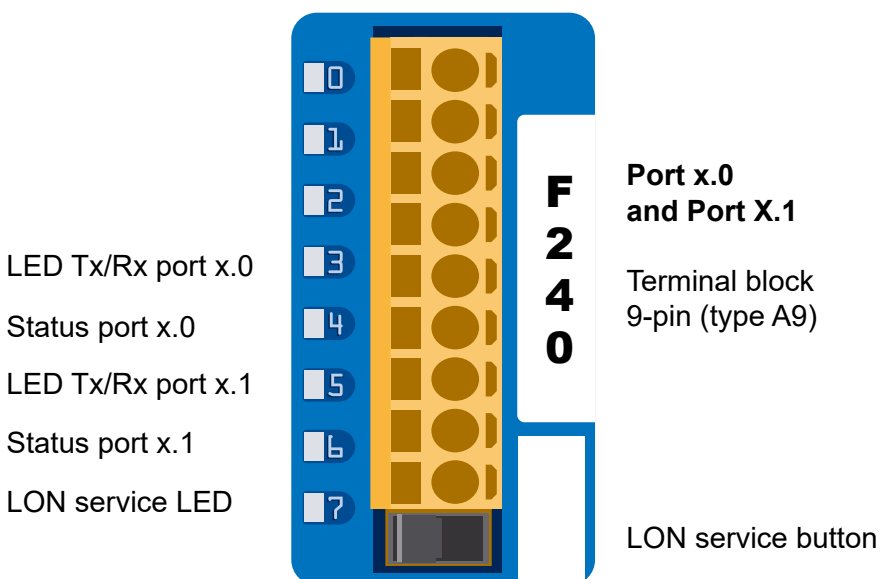
This module contains a Lon interface and has a free slot to connect a communication module PDC7.F1xxS.

Port x.0 LonWorks		PCD7.F110S		Port x.1		PCD7.F150S		PCD7.F180S	
		RS-422	RS-485	RS-232	RS-485	MP-Bus			
0	LON_A	0		0		0		0	
1	LON_B	1		1		1		1	
2	PGND	2		2		2		2	
3	PGND	3		3		3		3	
4		4	PGND	4	PGND	4	PGND	4	PGND
5		5	Tx	5	Rx-Tx	5	TxD	5	Rx-Tx
6		6	/Tx	6	/Rx-/Tx	6	RxD	6	/Rx-/Tx
7		7	Rx	7		7	RTS	7	
8		8	/Rx	8	(SGND)	8	CTS	8	

9-pin spring force clamp block type A9 with order number: 4 405 5113 0

The module has only a 9-pin connector, as the pulse switch LON service button is attached instead of the 10' pin.

LEDs



LonWorks is described in manual 26-883.

## 4.10 PCD3.F261 DALI module

DALI stands for Digital Addressable Lighting Interface.

DALI is a communication system for lighting control, standardised pursuant to IEC 62386-101/102. Installation is easy. The DALI Bus only needs 2 unshielded wires which can be passed through the same cable with the power supply, generally 230 V.

The light parameters are standardised. All upstream devices therefore have the same parameters for dimming, grouping and scenes, irrespective of the type of lighting.

The DALI master module includes the Bus power supply for up to 64 DALI participants. The extensive PG5 FBox library has available function modules for commissioning, operating and servicing with the PLC program. External software tools or other components are not required.

The DALI interface module is described in manual 27-606.

The matching DALI Driver library is described in manual 27-607.

connector type K	Port and module		
<b>RS-485</b>	- Port x.0 of PCD3.F261		
0	+DA	+DA	1
2	-DA	-DA	3
4			5
6			7
8	+24V	GND	9

10-pin spring force clamp block type A with order number: 4 405 4954 0

### 4.11 PCD3.F27x M bus modules with max. 240 nodes

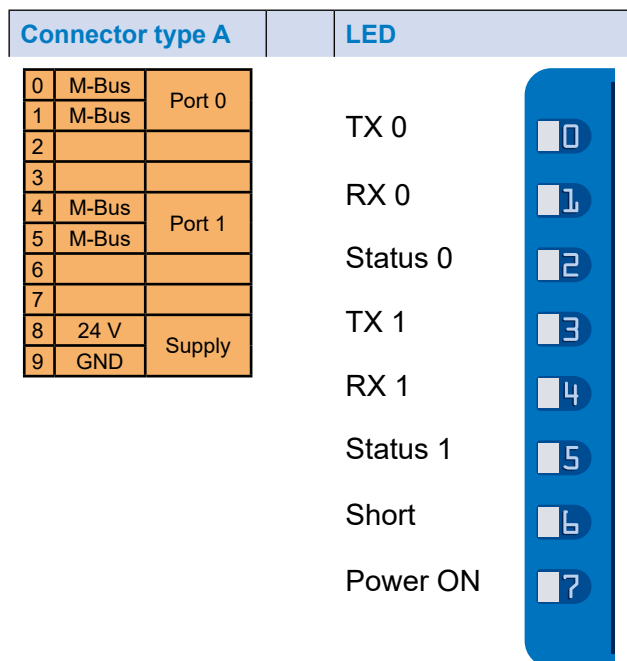
Complete Belimo MP-Bus interface for an MP-Bus with up to 8 actuators and sensors. M-Bus (EN 1434-3) is an international standard for remote meter reading. The M-Bus connection is formed using the PCD3.F27x communication modules in slots 0...3 on the PCD3. This makes it possible to measure all water, heat or energy volumes in an automation station. The measurement data is subsequently processed in an FBox library in the Saia PCD® FUPLA. The interface modules are fitted with a power supply and two separate M-Bus interfaces. Depending on the design, the integrated power supply is sufficient for up to 240 M-Bus standard slave modules whereby it can be distributed as required across the two ports.

The PCD3.F271...F273 master modules require the Engiby M-Bus library.

FBoxes for SBC energy meters with M-Bus are supported by the Engiby library.

**Product variants:**

Type	Maximum number of slaves	Connector
PCD3.F270	240	Type A
PCD3.F271	20	Type A
PCD3.F272	60	Type A
PCD3.F273	120	Type A



10-pin spring-loaded terminal block 4 405 4954 0

The M-Bus interface modules are described in manual 27-603.

## 4.12 PCD3.F281 Belimo MP-Bus

See Chapter 3.7.3 “Belimo MP-Bus integrated on port x.0 of the PCD3.F281 module”.

## **A      Appendix**

**A.1      Symbols for notes etc.**

**A.2      Definitions for the serial interfaces**

**A.3      Contact, support and repair addresses**



## A.1 Symbols for notes etc.

### A.1.1 Note symbols



This symbol refers the reader to further information in this or a different manual or in technical information brochures.  
There is generally no direct link to these documents.



This symbol appears next to instructions that require strict compliance.



This symbol warns the reader of the risk of electric discharge upon contact.  
**Recommendation:** Touch at least the negative terminal (PGU port casing) on the system before coming into contact with the electronic components. It is preferable to be permanently connected to an earthing lug on the wrist with the negative terminal.



The explanations next to this symbol are valid for the Saia PCD® Classic series only.



The explanations next to this symbol are valid for the Saia PCD®xx7 series only.

### A.1.2 Mass designation, symbols and meaning

**A**

Description	Symbol	Meaning
GND	⊥	Ground ( <i>mass</i> )
DGND	⊥D	digital galvanic isolated ground
AGND	⊥A	analog galvanic isolated ground
SGND	⊥S	signal ground

## A.2 Definitions for the serial interfaces

### A.2.1 RS-232

#### Designation of the signal lines

Data lines	TXD	Transmit data	Send data
	RXD	Receive data	Receive data
Signal and message lines	RTS	Request to send	Activate transmitter
	CTS	Clear to send	Ready to send
	DTR	Data terminal ready	Terminal ready
	DSR	Data set ready	Ready
	RI	Ring indicator	Incoming call
	DCD	Data carrier detect	Partner ready

#### Signals to RS-232

Signal type	Logical status	Setpoint value	Nominal value
Data signal	0 (space)	+3 V to +15 V	+7 V
	1 (mark)	-15 V to -3 V	-7 V
Control/ message signal	0 (off)	-15 V to -3 V	-7 V
	1 (on)	+3 V to +15 V	+7 V

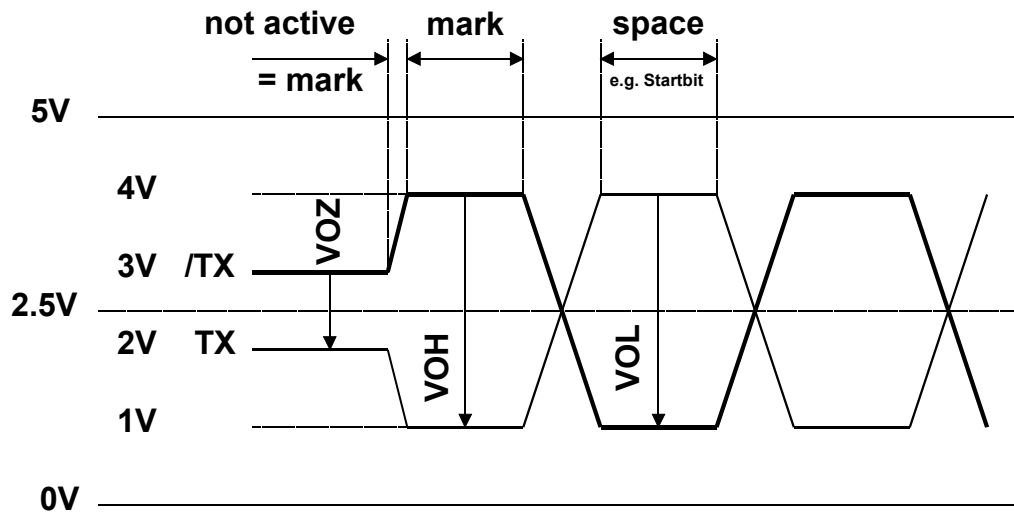
The idle state of the

- data signals = "mark"
- control and reporting signals = "off"



**A.2.2 RS-485/422**

**Signals to RS-485 (RS-422)**



- VOZ = 0.9 V min. ... 1.7 V
- VOH = 2 V min. (with load) ... 5 V max. (without load)
- VOL = -2 V ... -5 V

RS-422 is in active condition in position "mark"



**RS-422**

Signal type	Logical status	Polarity
Data signal	0 (space) 1 (mark)	TX positive for /TX /TX positive for TX
Control/ message signal	0 (off) 1 (on)	/RTS positive for RTS RTS positive for /RTS

**RS-485**

Signal type	Logical status	Polarity
Data signal	0 (space) 1 (mark)	RX-TX positive for /RX-/TX /RX-/TX positive for RX-TX

### RS-485 wiring

Products from other manufacturers that also use RS-485 designate their send and receive lines in reverse compared to our PCD

Third-party manufacturer	Saia PCD®
Rx-Tx	/Rx-/Tx
/Rx-/Tx	Rx-Tx

### Profibus and Profi-S- I/O

Profibus	Colour	PCD7.T160	D-Sub 9-pin on PCD	Port 2 on PCD3.M3 and M6
A=RxD /TxD-N	green	D	pin 8	D
B=RxD /TxD-P	red	D/	pin 3	/D



Not all manufacturers use the same connection allocation, therefore the data lines must be crossed in certain cases



To guarantee an error-free operation of an RS-485 network, the network must be terminated at both ends. Cables and terminating resistors should be selected in accordance with manual section 26-740 "Installation of components for RS-485 networks".



The drivers work with 5 VDC. If a higher voltage is applied, the drivers may be destroyed!

### A.2.3 TTY/current loop

#### Signals to TTY/current loop

Connection 1	TS	Transmitter source	Sender
Connection 3	TA	Transmitter anode	
Connection 6	TC	Transmitter cathode	
Connection 8	TG	Transmitter ground	
Connection 2	RS	Receiver source	Receiver
Connection 4	RA	Receiver anode	
Connection 7	RC	Receiver cathode	
Connection 9	RG	Receiver ground	

Signal type	Setpoint value	Nominal value
Current for logical L (space)	-20 mA to + 2 mA	0 mA
Current for logical H (mark)	+12 mA to +24 mA	+20 mA
No-load voltage on TS, RS	+16 V to +24 V	+24 V
Short circuit current on TS, RS	+18 mA to +29.6 mA	+23.2 mA

The idle status for data signals is “mark”.

The operator uses wire bridges on the screw terminal blocks to select the switching type “active” or “passive”.



The max. transmission rate for TTY/current loops at 20 mA is 9600 bit/s.



## A.3 Contact, support and repair addresses

### Contact

#### Saia-Burgess Controls AG

Bahnhofstrasse 18  
3280 Murten, Switzerland

Head office telephone ..... +41 26 580 30 00  
SBC Support telephone ..... +41 26 580 31 00  
Fax ..... +41 26 580 34 99

### Support

Email support: ..... [support@saia-pcd.com](mailto:support@saia-pcd.com)  
Support website: ..... [www.sbc-support.com](http://www.sbc-support.com)  
SBC website: ..... [www.saia-pcd.com](http://www.saia-pcd.com)

International representations &  
SBC sales companies: [www.saia-pcd.com/contact](http://www.saia-pcd.com/contact)

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### Repair

#### Postal address for customers to return products in Switzerland:

#### Saia-Burgess Controls AG

After sales service  
Bahnhofstrasse 18  
3280 Murten, Switzerland