

## ANNEX 1 of the CI 2005-11

Line parameters of the Profi-S-Bus is the same as Line parameters of the Profibus DP.

The line type A specified in EN 50170 is recommended for Profibus DP bus line.

In the case of **SAIA® Profi-S-Bus up to 187,5 Kbit/s**, the line Type B, according to the same EN 50170 specification, can be recommended in most cases particularly to save money.

Parameter	Line A	Line B
Characteristic impedance (Ω)	135...165	100 ... 130
Capacitance per unit length (pF/m)	< 30	< 60
Resistance (Ω/km)	110	---
Wire diameter (mm)	0.64	> 0.53
Wire cross section (mm <sup>2</sup> )	>0.34	> 0.22

### 1 - Overall length of cable

The overall length of cable depends on the baud rate and type of cable.

Baud rate in Kbit/s	9.6	19.2	93.75	<b>187.5</b>	500	1500	12000
Line type A	1200	1200	1200	<b>1000</b>	400	200	100
<b>Line type B</b>	1200	1200	1200	<b>600</b>	200	-	-

Experience shows that the distances may be doubled if conductors with an area  $\geq 0,5 \text{ mm}^2$  (20 AWG) are used.

A mixture of both cable types and cable termination resistors as described above is allowed for Profi-S-Bus. However, the maximum line length has to be reduced up to the half of the above fixed values if line termination and line impedance do not match.

### 2 - Save money using Line type B

The combination PCD7.D7xx / PCD2.M480 & PCD3.Mxxxx is only available with **Profi-S-Bus baud rate 187.5 Kbit/s**.

Use therefore preferentially the lines **type B, 600 meters per segment** being sufficient in most cases.

☞ Attention: maximum 600 meter is a physical length of the line and not between 2 stations.

See also the 2 examples of configuration page 4

### 3 - Bus Cable specification

Shielded twisted pair cable. The shield helps to improve the electromagnetic compatibility (EMC). Unshielded twisted pair may be used, if there is no severe electromagnetic interference (EMI).

### 4 - Grounding, Shielding

If a shielded twisted pair cable is used it is recommended to connect the shield to the Protective Ground at both ends of the cable via low impedance (i.e. low inductance) connections. This is necessary to achieve a reasonable electromagnetic compatibility.

### 5 - Bus termination using line type B or A

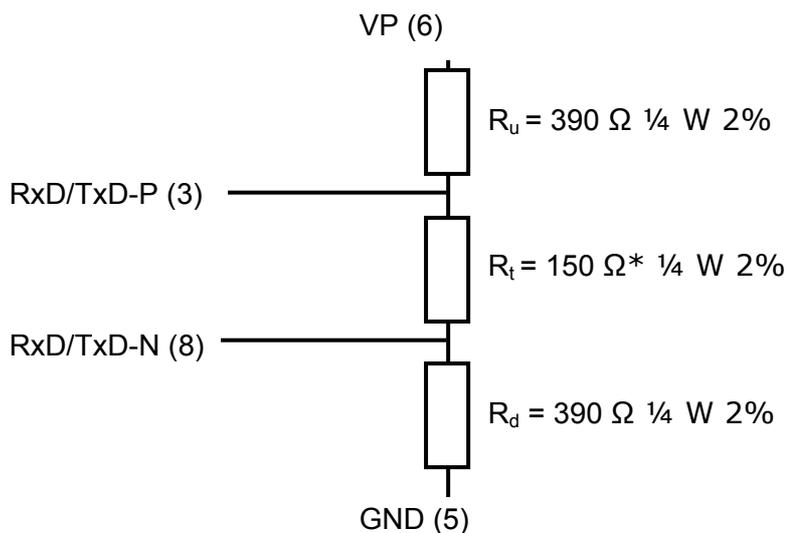
The bus cable shall be terminated at both ends with  $R_t$ . The termination resistor  $R_t$  specified in EIA-RS-485 shall be complemented by a pull down resistor  $R_d$  (connected to Data Ground DGND) and by a pull up resistor  $R_u$  (connected to Voltage-Plus VP). This supplement forces the differential mode voltage (i.e. the voltage between the conductors) to a well defined value when no station is transmitting (during the idle periods).

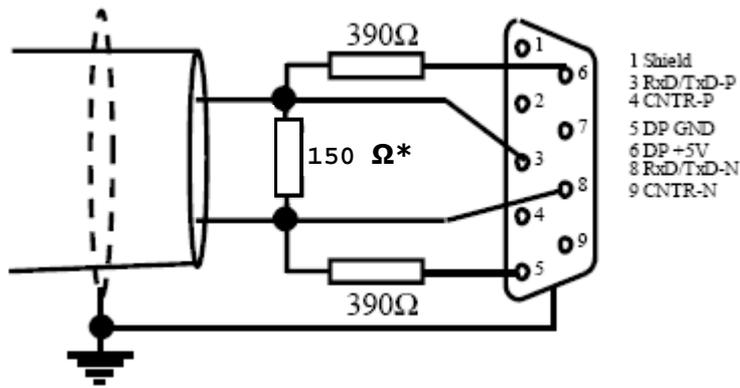
Each station which is destined to terminate the line (in common with a Bus Terminator) shall make Voltage-Plus (+ 5 V  $\pm$  5%).

#### 5 – 1 PCDs on end.

D-Sub 9 female connector:

Pin	Signal
5	Signal GND
6	VP (+5V)
3	RxD/TxD-P
8	RxD/TxD-N



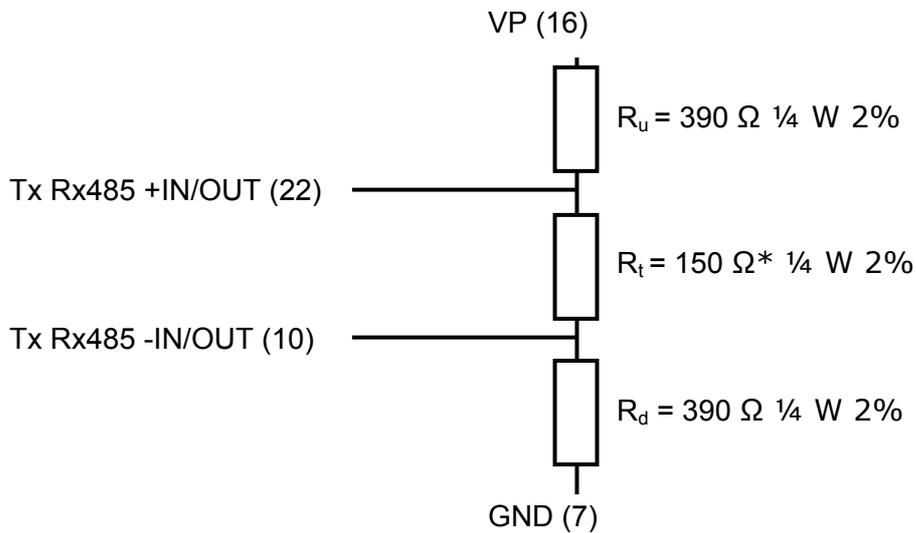


NOTE: Inversion of the two wires is not allowed!  
 \* 150 Ω is the available value for line Type and B

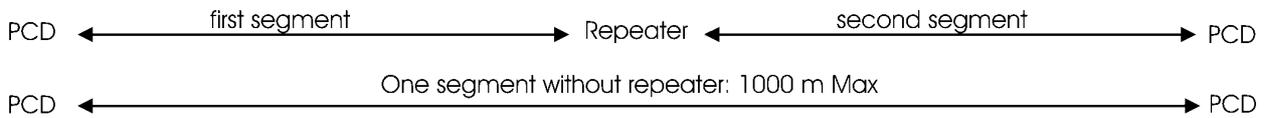
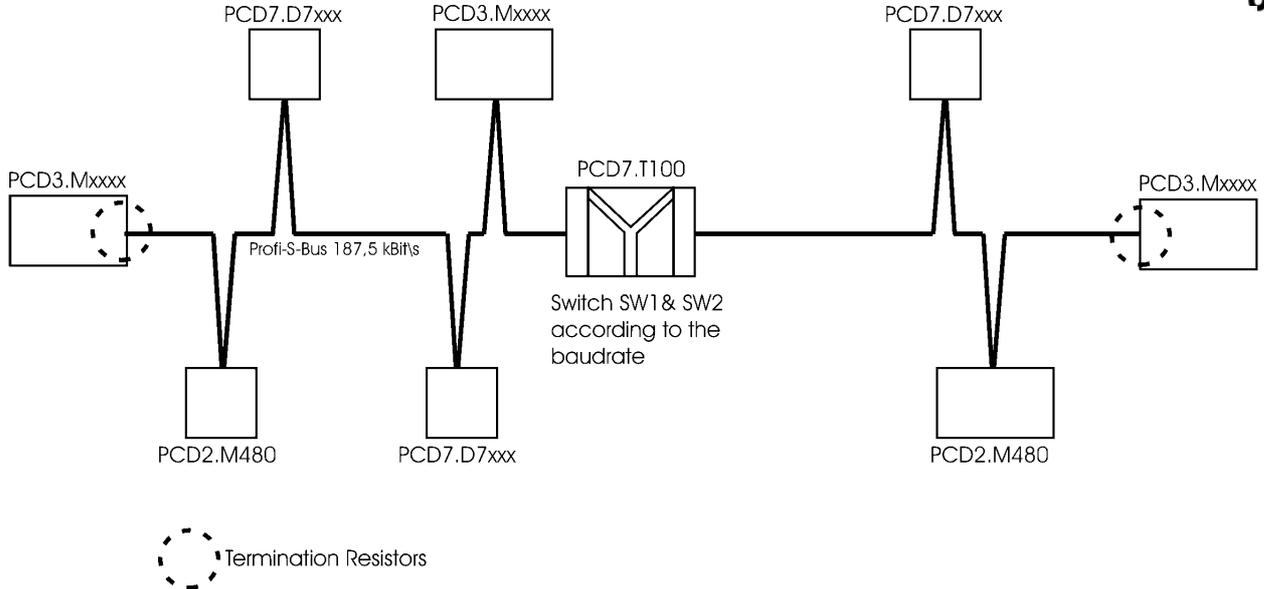
### 5 – 2 PCD7.D7xx panels on end

D-Sub 25 female connector (RS 485 signal on MSP)

Pin	Signal
7	Signal GND
16	VP (+5V)
10	Tx Rx485 -IN/OUT
22	Tx Rx485 +IN/OUT



**Example of configuration 1: PCD3.M3xxx (available also with PCD2.M480) at both end + one repeater PCD7.T100**



**Example of configuration 2: PCD7.T160 2 x termination blocs at both end + one repeater PCD7.T100**

