

Description

The RIO module was developed as a S-Bus data node for local switching tasks. Via a DDC of the type PCDx / PCS1 outputs can be write. Two address switches (x1 / x10) on the front panel allow module addressing and identification. Addresses can be set between 00 and 99. Up to 100 RIO modules and a maximum of 3 PCD stations can be connected to one bus branch simultaneously. If the bus cycle time is critical, fewer than 30 slaves should be operated in one segment. Over the 4 front potentiometer it is possible to switch all outputs between automatic and manual operation. The intensity of the yellow LED above the potentiometer visualize the set output value.

Technical data

Bus system	S-Bus
Transmission rate	1200...38400
Transmission mode	Parity / Data
Bus length max.	1200 m (without repeater)
Nominal voltage UN	18 V DC...32 V DC / 20 VAC...28 V AC
Current consumption	<50 mA DC / <110 mA AC
Power consumption	1.2 W / 2.7 VA
Relative duty cycle	100 %
Reaction time	15 ms (from receive data to send data reaction)
Recovery time	< 550 ms
Operating temperature range	-5°C...+55°C
Storage temperature range	-20°C...+70°C
Protective wiring	Reverse battery protection of service voltage Reverse battery protection of supply and bus EMC according to DIN EN 61000-6-2
Outputstate indicator	Yellow LED
Function indicator	Green LED for bus activity
Status indicator	Red LED for bus error message
Special features	Manual control level with revertive communication via bus;

Signal outputs

Signale type	4 x 0...10 V DC
Output current	5 mA by 10 V DC (2 kOhm)
Accuracy	0.625 mV /Digit
Fault	100 mV
Data range	0...1000 (2 comma stages)

Housing

Protection class	Housing IP50 / Terminals IP20
Humidity class	F (DIN 40040)
Connection cross-section	2.5 mm² (terminals)
Plug-in terminal	1.0 mm² (screw-type)
Mounting position	any
Weight	72 g
Housing dimensions	W x H x D: 35 x 70 x 69 mm
Joined without spacing	After 15 modules have been joined in sequence or a maximum supply current of 2 A (AC or DC) per port on the powersupply, the external supply voltage must be reapplied.

Data transmission

All S-Bus instructions (level 1) are recognized. Instructions that have no function in the device are answered with <NAK>. The module has integral, automatic baud rate and transmission mode recognition.

Display/Write Register"

Register 1 to 4 can be called together

Adresse	Information
1	Output 1 (divided with 100 => Voltage value)
2	Output 2 (divided with 100 => Voltage value)
3	Output 3 (divided with 100 => Voltage value)
4	Output 4 (divided with 100 => Voltage value)

Remark: The voltage value will be set with a number as (100 => 1 VDC) linear.

„Display Register"

Address	Information
5	Baud rate (plain text => kBit/s)
6	Module address
7	Status register
8	Bus timer
9	Current transmission mode (data / parity)
10	Bus error counter (divided into 4 bytes)
11	Bustimeout

The following registers can be called together
(Display Register "x" to "y") 1 to 4 / 5 to 7 / 8 to 10

"Write Register"

Address	Value	Baud rate setting (Baud kbit/s)
5	4	1 200
	5	2 400
	6	4 800
	7	9 600
	8	19 200
	9	38 400

Address	Value range	Meaning
8	2 <-> 20	20 <-> 200 ms

Bus timer (register 8)

The value displayed indicates how long the module waits until a telegram is complete. The time is shown in 10 ms steps (e.g.: value 20 => a time of 200 ms). The recommended time is 100 ms, i.e. a register value of 10. If the time is reduced, modules will react faster to telegrams from the master. If there is a heavy load on the master station, a bus timer setting that is too low may lead to lost telegrams. Times of less than 20 ms (value 2) are not permitted.

Times that reach the master station within 20 ms of the timeout will lead to lost connections. The value is stored in EEPROM and protected against voltage loss. (Factory setting : 2)

"Write Register"

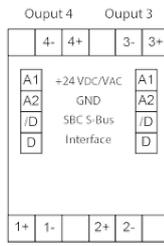
Address	Value	Meaning
9	1	Parity mode
	2	Data mode (factory setting)

Address	Value	Meaning
10	0	Reset of error count register

Address	Value	Meaning
11	0	Bustimout deactivated
	1 - 255	Time in 1 second steps -> switch of outputs by no buscommunication

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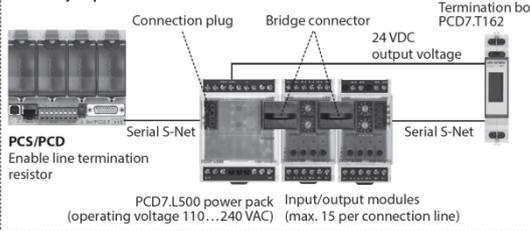
PCD7.L410 RAIL



Screw terminals,
2.5 mm², 1.0 mm² for
supply voltage and bus

Supply and Bus concept

Example with power supply PCD7.L500 with Serial S-Net connection over the terminal block and RAIL-modules with connecting of bus and supply voltage over the jumper and bus termination with PCD7.T162.



Mounting and commissioning to be conform with current regulations:

1. Power-off the installation
2. Place module onto 35 mm tophat rail and press down to engage.
3. Strip insulation from 7 mm of cable (max. single wire 4 mm², fine strand 2.5 mm², diameter 0.3 mm to 2.7 mm), insert into binding and tighten with a screwdriver.

Connect supply voltage and field bus to plug-in screw terminal.

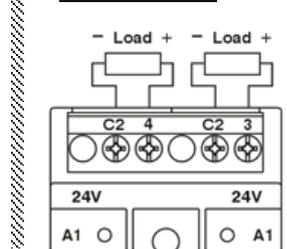
Caution!!
Plug-in terminal has max. 1.0 mm² connection cross-section. Check correct connection of bus lines and supply.

Operational safety:

Please take care to following points for a safety operation:

- Maximal cable length
- S-Bus member and segment division
- Potential compensation by one single grounding of power supply
- Termination of both network sides
- Cable shield grounding on one side only.

Connection example



Status register:

- Bit 0: 1= Device recognized last transmission
0= Device did not recognize last transmission
 - Bit 1: 1= Last transmission was a broadcast
0= Last transmission was not a broadcast
 - Bit 2: 1= Last transmission came from master
0= Last transmission came from a slave
 - Bit 3: 1= CRC of last message was correct
0= CRC of last message was incorrect
 - Bit 5: 1= Device has executed an internal reset
0= Device function is OK
 - Bit 8: 1= Internal bus to EEPROM is OK
0= Internal bus not working perfectly
 - Bit 9: 1= EEPROM data memory is OK
0= EEPROM data memory is faulty
 - Bit 10: 1= Baud rate uploaded from EEPROM
0= Baud rate is at default value (9600 Bd.)
 - Bit 12: 1= Input/channel 1 manuel overdriven
0= Input/channel 1 in automatic
 - Bit 13: 1= Input/channel 2 manuel overdriven
0= Input/channel 2 in automatic
 - Bit 14: 1= Input/channel 3 manuel overdriven
0= Input/channel 3 in automatic
 - Bit 15: 1= Input/channel 4 manuel overdriven
0= Input/channel 4 in automatic
- All other bits are reserved for factory tests.

"Write Output"

The write output instruction at address 255 is recognized as broadcast message.
Autobaud function: "Write or Display output 255" (1 = autobaud active / 0 = autobaud inactive)

N.B:

After a power failure, the last baud rate set will be reinstalled.
The autobaud function must not be turned on permanently, but only on the commissioning. At the condition as supplied to the customer, the autobaud is turned on, to adjust the device automatically to the system. But after the commissioning it has to be switched-off via bus command.

For further information on the use of modules linked to S-Bus, including all restrictions, see documentation PP26-339_ENG