

# M1110

## Parallel Input / Output Box

### Technical Description

# **BECKHOFF**

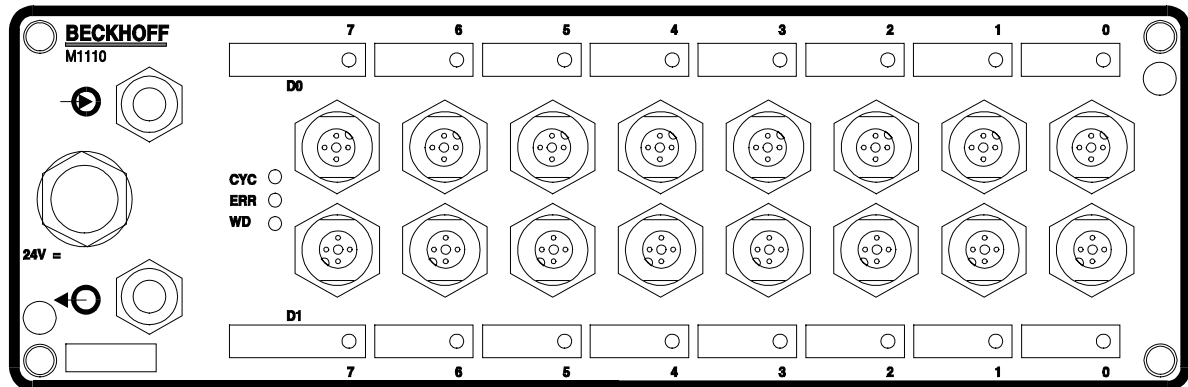
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## 1. Function Description Hardware



*M1110*

### About the Hardware

The parallel module M1110 is an input / output module used in the II/O system. There are 16 Standard 24 V inputs / outputs, which achieve 2 ports of 8 bit each.

These 2 ports ( D0,D1 ) correspond to the Data bytes in the FO transmissions protocol and according to the way they are used, they can be configured as input or output.

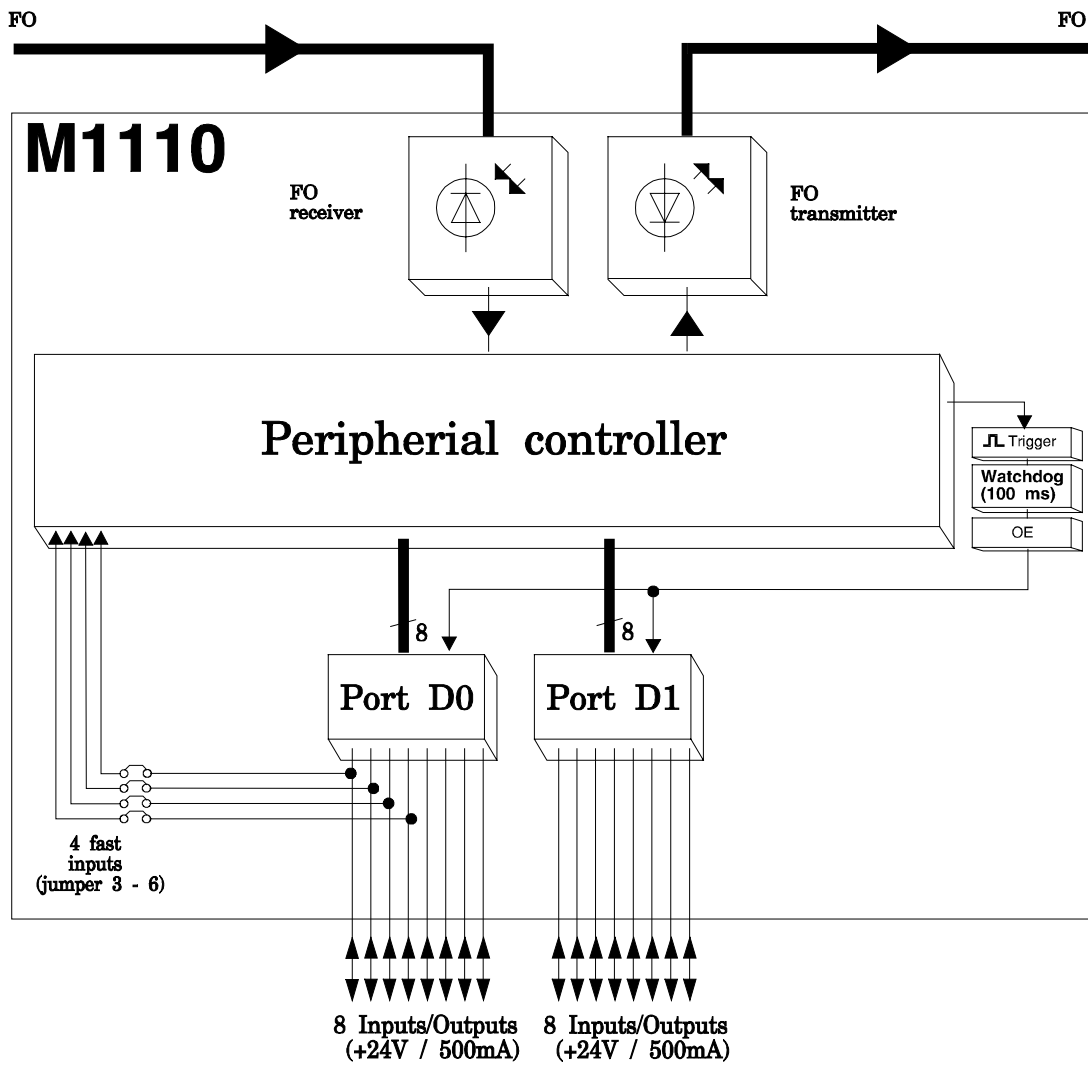
Each input / output has a LED, that indicates the current state. In addition there are three diagnosis LEDs for the II/O fibre optic ring:

**LD1** The green 'CYCLE' LED is switched on by each start bit of a telegram and is switched off again by the stop bit.

**LD2** The red 'ERROR' LED is switched on after recognising a bad telegram (checksum, frame). After a sequence of three correct telegrams (checksum, frame) were processed it is switched off again.

**LD3** The green LED 'WATCHDOG' is switched on by a valid writing telegram with matching address. If in a 100 ms afterwards no further telegram, which has the properties defined above, is recognised a special unit of the module switches off all outputs.

The cartridge is according to IP65 protection norm designed as a compact, splash-proof and dust proof box.



*Basic Circuit Diagram*

## **2. Function Description Software**

### 3. Technical Data

<b>Inputs / Outputs</b>	16, can be configured for each port; LED shows state of all inputs / outputs
<b>Input Specifications</b>	24 V DC, 8 mA, digital filter
<b>input switching voltages</b>	0 - 8V = LOW 15 - 24V = HIGH
<b>input delay</b>	0,7 ms RC network 6,8 ms input latch
<b>Output Specifications</b>	24 V DC, max. 500 mA, short circuit proof
<b>Output Check</b>	Watchdog System (100 ms)
<b>I / O Connections</b>	round plug connectors according to protection mode IP65 and to initiator norm V1; +,-,Signal
<b>Voltage Connection</b>	Lumberg IP65 connector
<b>Data Connection</b>	Harting IP65 FO connector
<b>Transmission Rate</b>	2,5 MBaud, 25 µs for 32 Bit
<b>Supply Voltage</b>	24 V DC (± 10%)
<b>Input Current</b>	0,1 A (without load and input currents)
<b>Cartridge</b>	Aluminium cartridge
<b>Protection mode</b>	IP65
<b>Size (W * H * D)</b>	80 * 250 * 52 mm
<b>Working Temperature</b>	±0..+55 °C
<b>Storage Temperature</b>	-20..+70 °C

## 4. Installation

The M1110 is connected externally to the fibre optic ring using fibre optic connections (Harting , type F-TNC), or internally by Toshiba TOC P155. The maximum length of the FO cable, leading to the neighbouring boxes, should not be more then 45 meters. These values are only valid if for bending the cable a radius of at least 30 mm is used.

Common actors and sensors are connected directly to the inputs / outputs (using "+,-,signal" ) by round plug connectors according to initiator norm V1.

The installation of the M1110 is done at the machine. Sensors and actors can be connected to the box directly.

### Configuration

Each port of the M1110 can be, configured as input or as output. This does not dependent on the configuration of the other ports. There are DIP switches used for configuration. The switches are assigned as follows :

Switch 1	=>	Port D0
Switch 2	=>	Port D1
Switch 3	=>	*
Switch 4	=>	*

Depending on the state of the switches, the port is input or output :

'ON'	=>	port is output
'OFF'	=>	port is input

**ATTENTION:**

**Configuring a port as input ( switch "OFF") all of the eight output controller ICs of the port concerned have to be removed.**

If the driver ICs are not removed the port is not functional as input, but the module remains undamaged.

The following module configurations are possible by jumpers adjustments :

<b>Jumper Field on board M1210_4</b>	
Jumper 1	<b>Watchdog on / off</b>
	If this jumper is set the 'Watchdog' function is switched off. This means if an error is detected the outputs set are not switched off.
Jumper 2	<b>Latch on / off</b>
	The jumper is set according to the standard configuration. The input signals are read each 6.8 msecs.

<b>Jumper Field on Board M1110_4</b>	
	<b><i>Fast Inputs M1110_4 (Interrupt Inputs)</i></b>
Jumper 3	Fast input I13 : If jumper connection between port D0.3 and XILINX I13 is established.
Jumper 4	Fast input I12: If jumper connection between port D0.2 and XILINX I12 is established.
Jumper 5	Fast input I11 : If jumper connection between port D0.1 and XILINX I11 is established.
Jumper 6	Fast input I10 : If jumper connection between port D0.0 and XILINX I10 is established.



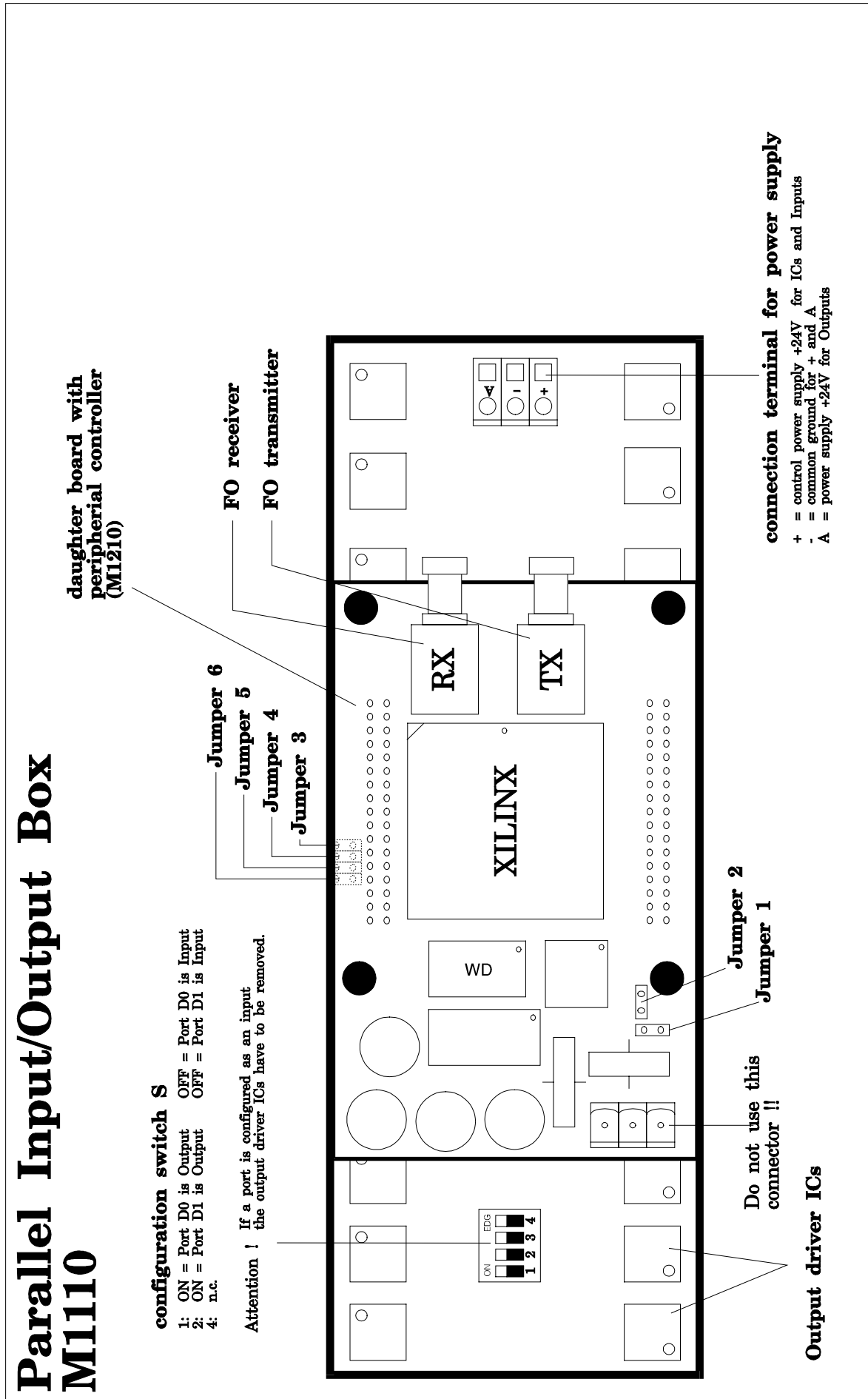
## Power Supply

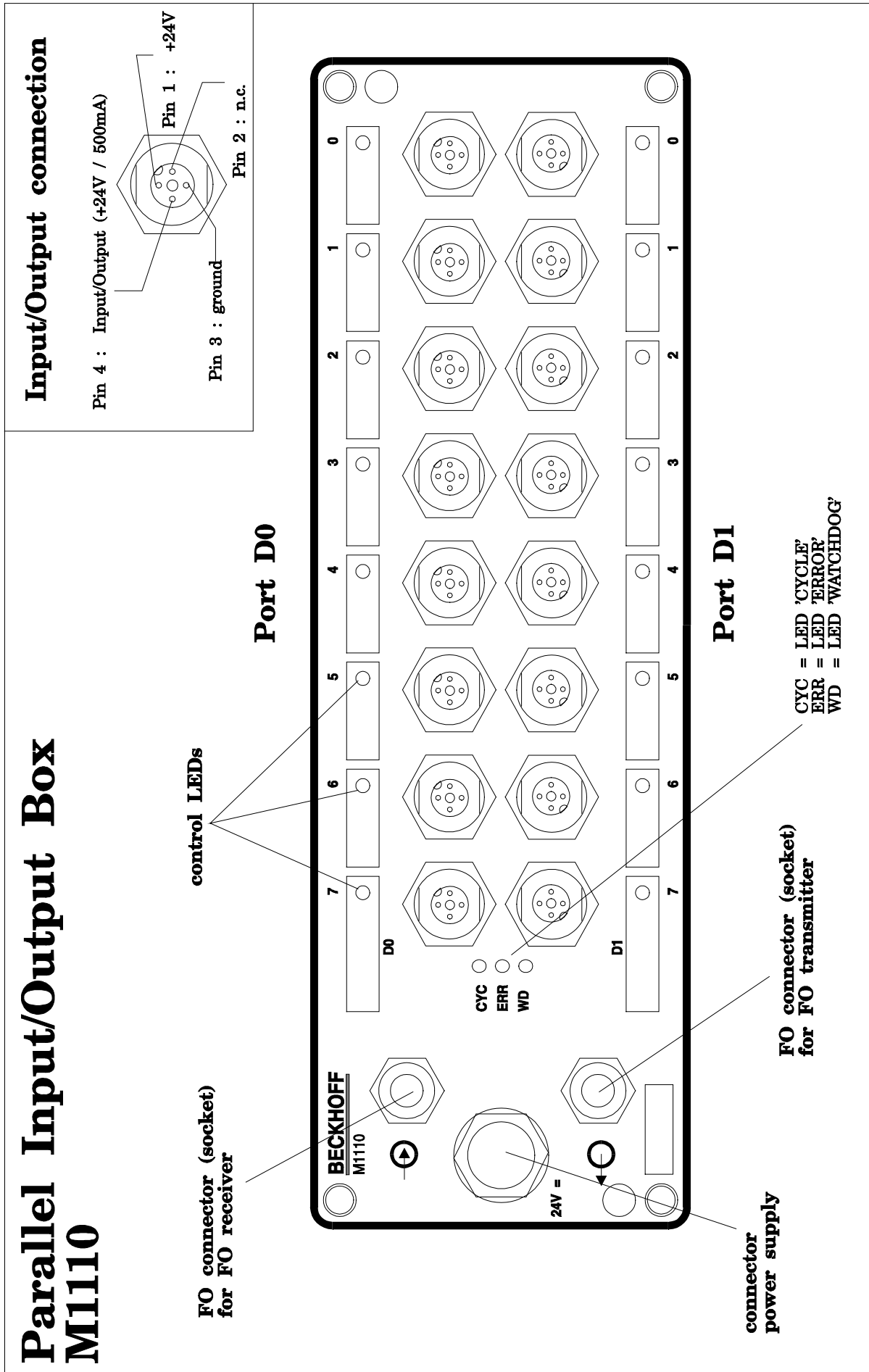
### *external*

There is a three pole plug connection (Lumberg) for supply voltage with separate connections for control logic / inputs (pin 1) and for outputs (pin 3) at same ground (pin 2).

### *internal*

There is a three pole plug connection for supply voltage with separate connections for control logic / inputs (+) and for outputs (A) at same ground (-).The plug-in card 1210 is automatically connected to the supply voltage of the lower board if plugged in.





## 5. Connection Table

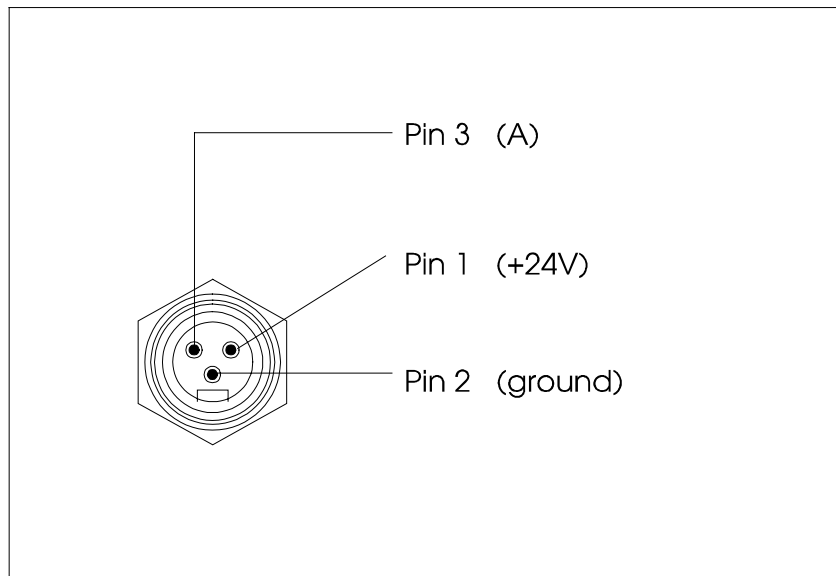
### Pin assignment (Cartridge)

Port D0		
Plug	Pin	Signal
<b>D00</b>	1	+24V
	2	n.c.
	3	GND
	4	D0.0.
<b>D01</b>	1	+24V
	2	n.c.
	3	GND
	4	D0.1
<b>D02</b>	1	+24V
	2	n.c.
	3	GND
	4	D0.2
<b>D03</b>	1	+24V
	2	n.c.
	3	GND
	4	D0.3
<b>D04</b>	1	+24V
	2	n.c.
	3	GND
	4	D0.4
<b>D05</b>	1	+24V
	2	n.c.
	3	GND
	4	D0.5
<b>D06</b>	1	+24V
	2	n.c.
	3	GND
	4	D0.6
<b>D07</b>	1	+24V
	2	n.c.
	3	GND
	4	D0.7

Port D1		
Plug	Pin	Signal
<b>D10</b>	1	+24V
	2	n.c.
	3	GND
	4	D1.0
<b>D11</b>	1	+24V
	2	n.c.
	3	GND
	4	D1.1
<b>D12</b>	1	+24V
	2	n.c.
	3	GND
	4	D1.2
<b>D13</b>	1	+24V
	2	n.c.
	3	GND
	4	D1.3
<b>D14</b>	1	+24V
	2	n.c.
	3	GND
	4	D1.4
<b>D15</b>	1	+24V
	2	n.c.
	3	GND
	4	D1.5
<b>D16</b>	1	+24V
	2	n.c.
	3	GND
	4	D1.6
<b>D17</b>	1	+24V
	2	n.c.
	3	GND
	4	D1.1

**Pin assignment (Board)***Internal Power Supply (Board)*

<b>Power Supply Connection</b>		
<b>Pin</b>	<b>Signal</b>	<b>Description</b>
+	+24V	+ 24 V Control power supply for IC's and Inputs
-	GND	Ground for + and A
A	+24V	+ 24 V power supply for outputs

*External Power Supply ( plug-in connector Lumberg)*

## Signal Description

Pin	Signal	I/O	Description
D07-1	+24V	-	+24VDC support voltage
D07-2	n.c.	-	not connected
D07-3	GND	-	GND support voltage
D07-4	D0.7	I/O	Bit 7 of data byte 0 D0.7 is output, if DIL_switch S1 = ON D0.7 is input, if DIL_switch S1 = OFF
D06-1	+24V	-	+24VDC support voltage
D06-2	n.c.	-	not connected
D06-3	GND	-	GND support voltage
D06-4	D0.6	I/O	Bit 6 of data byte 0 D0.6 is output, if DIL_switch S1 = ON D0.6 is input, if DIL_switch S1 = OFF
D05-1	+24V	-	+24VDC support voltage
D05-2	n.c.	-	not connected
D05-3	GND	-	GND support voltage
D05-4	D0.5	I/O	Bit 5 of data byte 0 D0.5 is output, if DIL_switch S1 = ON D0.5 is input, if DIL_switch S1 = OFF
D04-1	+24V	-	+24VDC support voltage
D04-2	n.c.	-	not connected
D04-3	GND	-	GND support voltage
D04-4	D0.4	I/O	Bit 4 of data byte 0 D0.4 is output, if DIL_switch S1 = ON D0.4 is input, if DIL_switch S1 = OFF
D03-1	+24V	-	+24VDC support voltage
D03-2	n.c.	-	not connected
D03-3	GND	-	GND support voltage
D03-4	D0.3	I/O	Bit 3 of data byte 0 D0.3 is output, if DIL_switch S1 = ON D0.3 is input, if DIL_switch S1 = OFF
D02-1	+24V	-	+24VDC support voltage
D02-2	n.c.	-	not connected
D02-3	GND	-	GND support voltage

Pin	Signal	I/O	Description
D02-4	D0.2	I/O	Bit 2 of data byte 0 D0.2 is output, if DIL_switch S1 = ON D0.2 is input, if DIL_switch S1 = OFF
D01-1	+24V	-	+24VDC support voltage
D01-2	n.c.	-	not connected
D01-3	GND	-	GND support voltage
D01-4	D0.1	I/O	Bit 1 of data byte 0 D0.1 is output, if DIL_switch S1 = ON D0.1 is input, if DIL_switch S1 = OFF
D00-1	+24V	-	+24VDC support voltage
D00-2	n.c.	-	not connected
D00-3	GND	-	GND support voltage
D00-4	D0.0	I/O	Bit 0 of data byte 0 D0.0 is output, if DIL_switch S1 = ON D0.0 is input, if DIL_switch S1 = OFF

Pin	Signal	I/O	Description
D17-1	+24V	-	+24VDC support voltage
D17-2	n.c.	-	not connected
D17-3	GND	-	GND support voltage
D17-4	D1.7	I/O	Bit 7 of data byte 0 D1.7 is output, if DIL_switch S2 = ON D1.7 is input, if DIL_switch S2 = OFF
D16-1	+24V	-	+24VDC support voltage
D16-2	n.c.	-	not connected
D16-3	GND	-	GND support voltage
D16-4	D1.6	I/O	Bit 6 of data byte 0 D1.6 is output, if DIL_switch S2 = ON D1.6 is input, if DIL_switch S2 = OFF
D15-1	+24V	-	+24VDC support voltage
D15-2	n.c.	-	not connected
D15-3	GND	-	GND support voltage
D15-4	D1.5	I/O	Bit 5 of data byte 0 D1.5 is output, if DIL_switch S2 = ON D1.5 is input, if DIL_switch S2 = OFF
D14-1	+24V	-	+24VDC support voltage
D14-2	n.c.	-	not connected
D14-3	GND	-	GND support voltage
D14-4	D1.4	I/O	Bit 4 of data byte 0 D1.4 is output, if DIL_switch S2 = ON D1.4 is input, if DIL_switch S2 = OFF
D13-1	+24V	-	+24VDC support voltage
D13-2	n.c.	-	not connected
D13-3	GND	-	GND support voltage
D13-4	D1.3	I/O	Bit 3 of data byte 0 D1.3 is output, if DIL_switch S2 = ON D1.3 is input, if DIL_switch S2 = OFF
D12-1	+24V	-	+24VDC support voltage
D12-2	n.c.	-	not connected
D12-3	GND	-	GND support voltage



Pin	Signal	I/O	Description
D12-4	D1.2	I/O	Bit 2 of data byte 0 D1.2 is output, if DIL_switch S2 = ON D1.2 is input, if DIL_switch S2 = OFF
D11-1	+24V	-	+24VDC support voltage
D11-2	n.c.	-	not connected
D11-3	GND	-	GND support voltage
D11-4	D1.1	I/O	Bit 1 of data byte 0 D1.1 is output, if DIL_switch S2 = ON D1.1 is input, if DIL_switch S2 = OFF
D10-1	+24V	-	+24VDC support voltage
D10-2	n.c.	-	not connected
D10-3	GND	-	GND support voltage
D10-4	D1.0	I/O	Bit 0 of data byte 0 D1.0 is output, if DIL_switch S2 = ON D1.0 is input, if DIL_switch S2 = OFF