

M2510 Analog Input

Technical Description

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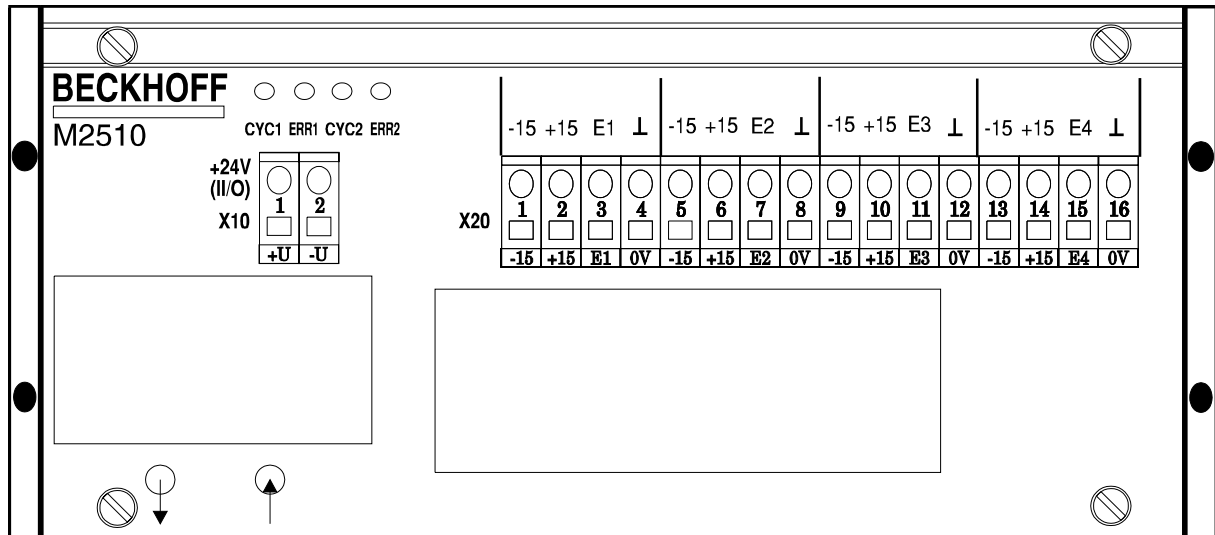
INDUSTRIE ELEKTRONIK

Eiserstraße 5 Phone: +495246/963-0
33415 Verl Fax: +495246/963-149

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1. Function Description - Hardware



M2510

General

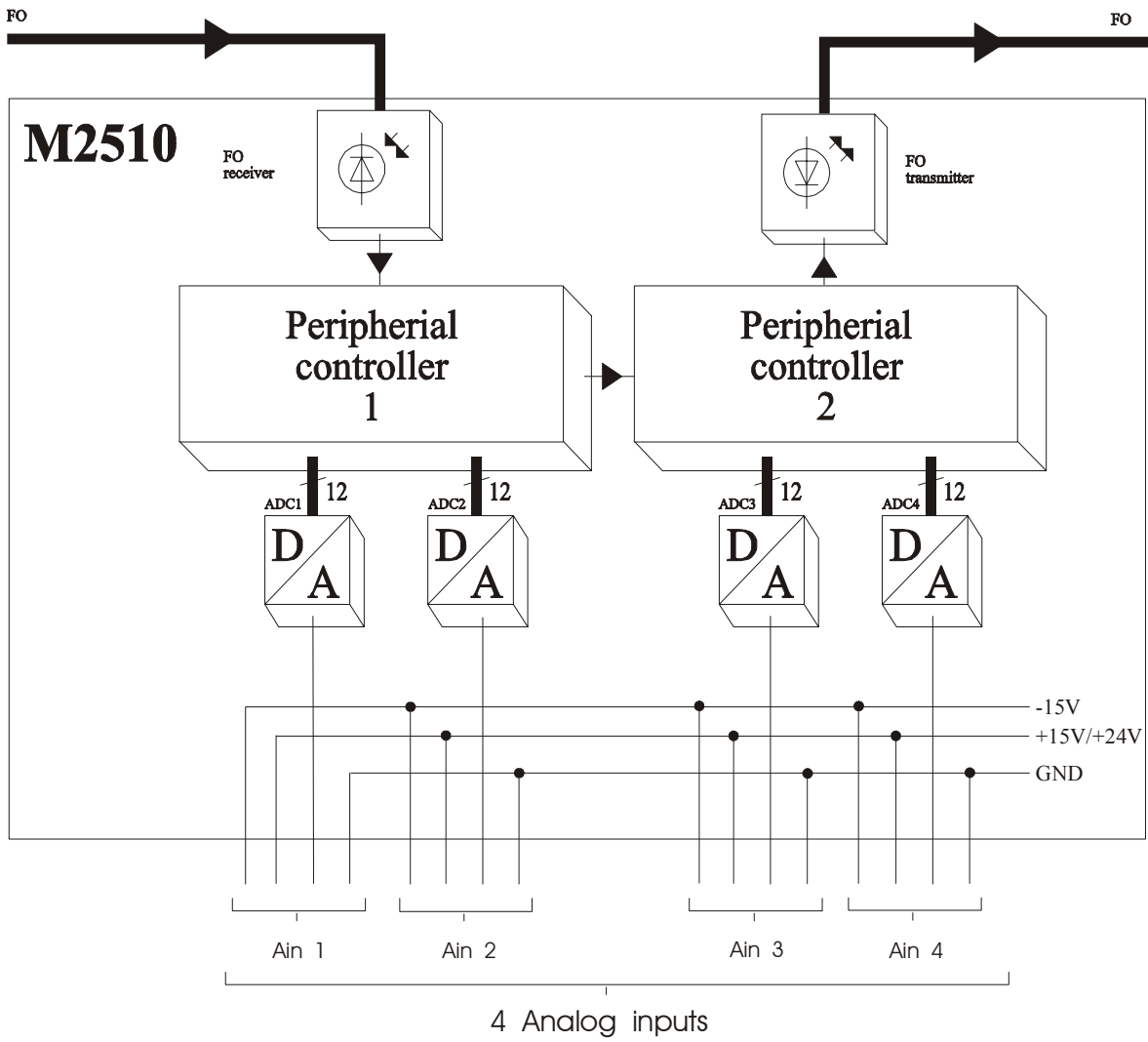
The module M2510 is an input module used in the II/O system. By ADU four analog input values in the form

- a) 0 to +10V
- b) 0 to 1V
- c) 0 to 20mA
- d) -10 V to +10V
- e) -1 V to +1V

can be used. The resolution is 12 bit, so that, in a single telegram of the II/O system parallel transmission of 2 ADU's is possible.

The whole module uses 2 addresses in the II/O system.

There are four LEDs for system diagnosis. Working normally, only the green LEDs "CYCLE (XILINX1)" and "CYCLE (XILINX2)" are switched on. In case an error is detected the red "ERROR (XILINX1)" "ERROR (XILINX2)" LEDs are switched on (according to the type of failure, one or two of the LEDs).



Basic circuit diagram

2. Function Description - Software

The 4 ADCs work in stand alone mode. They are triggered by the 'CYCLE' signal, when the telegram is received.

When the twelve bit of data are read, the transformation result of the previous cycle is used. There is no need for selection or other communications, since all control signals needed are created by the hardware.

As there are always 2 ADCs read in a 32 bit telegram, two addresses in the II/O system have to be reserved for the whole module.

II/O Lightbus Address 1	ADC 2		ADC 1	
	Port D3	Port D2	Port D1	Port D0
<i>LSB</i>	DDDD	DDDD	DDDD	DDDD
<i>MSB</i>	xxxx	DDDD	xxxx	DDDD

II/O Lightbus Address 2	ADC 4		ADC 3	
	Port D3	Port D2	Port D1	Port D0
<i>LSB</i>	DDDD	DDDD	DDDD	DDDD
<i>MSB</i>	xxxx	DDDD	xxxx	DDDD

3. Technical Data

Analog Inputs	max. 4
Analog Specifications	$U_{in} = -10 \text{ V to } 10 \text{ V}$, (voltage input) $I_{in} = 0 \text{ to } 20 \text{ mA}$ (current input) burden 50 Ohm / 500 Ohm switchable resolution: 12 Bit
Transformation Time	10 μs
Connections	plug-in unit; +,-,signal
Data Connections	fibre optic, II/O Lightbus System
Transmission Rate	2,5 MBaud, 25 μs for 32 bit
Support Voltage Connection	$\pm 15 \text{ V}$, 80 mA total load, short circuit proof Option: +24 V/-15 V
Supply Voltage	24 V DC ($\pm 10 \%$)
Input Current	0,17 A (at 24 V DC without support voltage load)
Input Impedance	1 MOhm using unipolar voltage measuring, 2 MOhm using bipolar voltage measuring, 50 Ohm / 500 Ohm measuring the current
Cartridge	closed cartridge, can be installed to cartridge carrier according to DIN EN 50022, 50035
Size (w*h*d)	166 * 76 * 68 mm
Weight	about 700 g
Working Temperature	0 .. +55 °C
Storage Temperature	-20 .. +70 °C

4. Installation Notes

Mounting

The M2510 is connected to the fibre optic ring using fibre optic connections (Beckhoff Z1000). The maximum length of the FO cable, leading to the neighbouring boxes, should not be more than 600m for glass fibre or 45 meters for other fibres. These values are only valid if for bending the cable a radius of at least 30 mm is used. If plastic fibres are used, no special tools are needed for installation of the plugs.

The M2510 is installed at the machine or simply by installing it to a cartridge carrier according to DIN EN 50022 or DIN EN 50035.

Configuration

Before setting the system to work the desired modes of the Analog transformers have to be adjusted by setting certain jumpers according to the following configuration table:

Input	Jx.1	Jx.2	Jx.3	Jx.4	Jx.5	Jx.6
0 to 10V	o	cl	cl	cl	o	o
burden 50 Ohm 0 to 20 mA	cl	o	cl	cl	o	o
burden 500 Ohm 0 to 20 mA	o	cl	cl	cl	o	cl
-10 V to +10 V	o	cl	o	o	cl	o
0 to 1 V	o	o	cl	cl	o	o
-1 V to +1 V	o	o	o	o	cl	o

where : cl = closed
 o = open
 and x = 1,2,3,4

Adjusting and Testing of Analog Inputs

The module M2510 is configured to the measuring range 0 to 10V per default. It can be delivered with customized configuratin and adjustment.

Every analog input of the M2510 can be adjusted indepenedently of the other inputs if necessary (e.g. change of the measuring range).

First the appropriate jumpers have to be set. Then an adjustment of the mode concerned can be done:

a) unipolar 0-10 V

- connect input with ground
- read channel by II/O Lightbus test program or other II/O-Lightbus software (continuously to provide constant transformation)
- use potentiometer "Offset unipolar" to adjust the value read to "0"

b) unipolar 0-1 V

- connect input with ground
- read channel by II/O Lightbus test program or other II/O-Lightbus software (continuously to provide constant transformation)
- use potentiometer "Offset unipolar" to adjust the value read to "0"
- connect and adjust precisely 1V to the input
and then adjust by using potentiometer"GAIN" to the value "FFF_h"

c) unipolar 0-20 mA

- connect input with ground
- read channel by II/O Lightbus test program or other II/O-Lightbus software (continuously to provide constant transformation)
- use potentiometer "Offset unipolar" to adjust the value read to "0"
- connect and adjust precisely 20mA to the input
(alternatively 1V with 50 Ohm burden, or 10V with 500 Ohm burden)
and then adjust by using potentiometer"GAIN" to the value "FFF_h"

d) bipolar +/-10 Volt

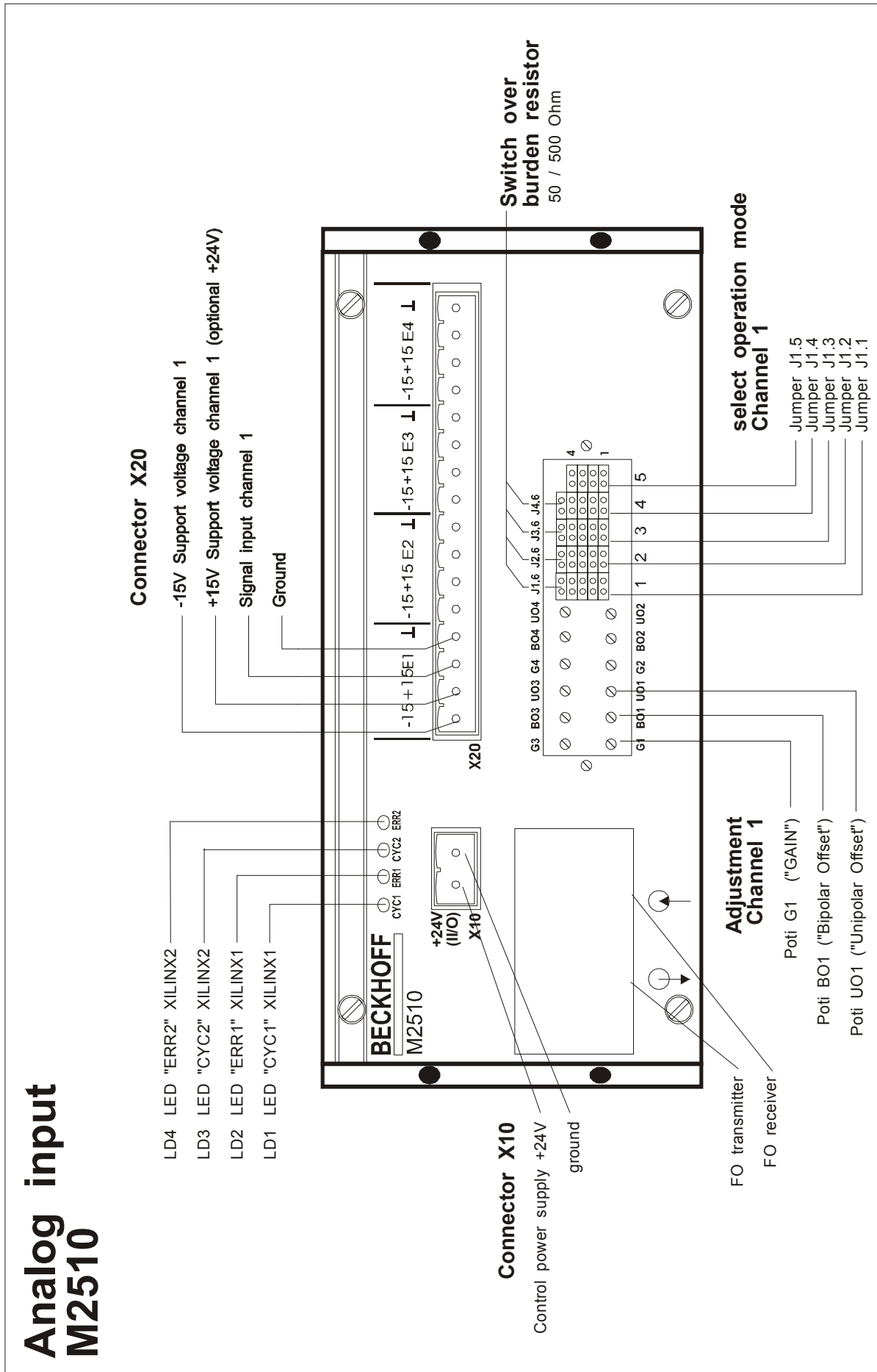
- connect input with ground
- read channel by II/O Lightbus test program or other II/O-Lightbus software (continuously to provide constant transformation)
- adjust by using potentiometer "Offset bipolar" the read in value to "800_h"

e) bipolar +/-1 Volt

- connect input with ground
- read channel by II/O Lightbus test program or other II/O-Lightbus software (continuously to provide constant transformation)
- adjust by using potentiometer "Offset bipolar" the read in value to "800_h"
- connect and adjust precisely -1V to the input and then adjust by using potentiometer "GAIN" to the value "000_h"

Spannungsversorgung

There is a two-pin terminal (X10 Pin1+2) for the supply voltage with connections for control logic (+).



5. Connections Table

Pin assignment with signal description

Conector X10

Connector	Pin	Signal	Description
X10	1	+	Control power supply +24 V
X10	2	-	ground

Connector X20

Connector	Pin	Signal	Description
X20	1	-15 V	Support voltage -15 V DC
X20	2	+15 V	Support voltage +15 V DC, Option:+24 V DC
X20	3	E1	Analog input channel 1
X20	4	GND	ground
X20	5	-15 V	Support voltage -15 V DC
X20	6	+15 V	Support voltage +15 V DC, Option:+24 V DC
X20	7	E2	Analog input channel 2
X20	8	GND	ground
X20	9	-15 V	Support voltage -15 V DC
X20	10	+15 V	Support voltage +15 V DC, Option:+24 V DC
X20	11	E3	Analog input channel 3
X20	12	GND	ground
X20	13	-15 V	Support voltage -15 V DC
X20	14	+15 V	Support voltage +15 V DC, Option:+24 V DC
X20	15	E4	Analog input channel 4
X20	16	GND	ground