

Assembly Instructions
IF2008A / IF2008E

Interface board

MICRO-EPSILON
MESSTECHNIK
GmbH & Co. KG
Königbacher Strasse 15

D-94496 Ortenburg

Tel. 0049/ 08542/168-0
Fax 0049/ 08542/168-90
e-mail: info@micro-epsilon.de
www.micro-epsilon.com

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1. Safety

Knowledge of the assembly instructions is a prerequisite for board operation.

1.1 Symbols Used

The following symbols are used in these assembly instructions:

NOTICE

Indicates a situation which, if not avoided, may lead to property damage.



Indicates a user action.



Indicates a user tip.

1.2 Warnings

Electronic devices can be damaged due to electrostatic discharge. Prior to installation of the interface card(s), we recommend to touch a grounded surface in order to avoid electrostatic discharge. For that purpose please touch a grounded surface, for example the metal housing of your computer.

> Damage to or destruction of the board.

NOTICE

1.3 Proper Environment

- Operating temperature: 5 ... +50 °C (41 ... +122 °F)
- Storage temperature: -10 ... +50 °C (+50 ... +122 °F)
- Humidity: 5 - 95 % (no condensation)
- Pressure: Atmospheric pressure

2. Delivery



Check for completeness and shipping damage immediately after unpacking. In case of damage or missing parts, please contact the manufacturer or supplier.

The delivery includes:

1 IF2008A and/or IF2008E interface board

1 Assembly instructions

1 Software package, driver for windows ® 2000 Windows ® XP, Windows ® Vista

3. System Requirements

- Pentium PC with 500 MHz or faster
- 1 GB RAM
- Windows ® 2000 (Service Pack 4), Windows ® XP, Windows ® Vista, Windows ® 7 (32/64 bit)
- Free PCI slot
- Minimum 10 MB free disk space on the hard disk

4. Technical Data

4.1 IF2008A

Mechanics and Environment

- Dimensions circuit board: approximately 140 x 102 mm, 1 slot wide
- Ambient temperature maximum +50 °C (+122 °F)
- 2 D-Sub female connectors HD 15-pin for sensor connections
- 1 D-Sub male connector HD 15-pin for encoder signals
- 1 Tyco/AMP Commercial MATE-N-LOK connector (IDE hard drive connector) for supply DC-/DC-converter, see Chap. 5
- 3 Female connectors Tyco/AMP MicroMatch for connection to IF2008E

PCI-Bus

- PCI connector, 3.3 or 5 Volt, 32 bit, 2x60 pin
- Target Interface (slave) according to specifications Rev. 2.1 and 2.2
- Bus clock frequency 40 MHz maximum
- current consumption +5 Volt approximately 0.5 A, sensors and encoder excluded

Sensor-Interface (X1 / X2)

- 2 RS422 driver and two RS422 receiver including galvanic isolation per connector (in-/ output frequency 5 MHz maximum)
- 2 LVDS or 3.3 Volt CMOS outputs including galvanic isolation per connector (output frequency 5 MHz maximum)
- Power supply of the sensors 24 V

Encoder-Interface (X3)

- Interface for two encoders with 1 V_{ss} -, RS422- (differential-) or TTL- (single-ended) signals
- Power supply of the encoders with +5 V, PCI supply without galvanic isolation (current consumption depends on encoders connected)
- Interpolation programmable from 1- to bis 64 times in case of encoders with 1 V_{ss} signals (input frequency maximum = [3.2 MHz / interpolation] ≤ 800 kHz)
- Evaluation programmable from 1- to 4 times in case of encoders with:
 - RS422- / differential signals (input frequency maximum = 800 kHz)
 - TTL- / single-ended-signals (input frequency maximum = 400 kHz)

DC-/DC-converter

- Input voltage range 12 V ±1.0 V
- Output voltage 24 V ±0.5 V
- Output current 1.25 A max. for all sensors
- Efficiency typical 90 %

4.2 IF2008E

Mechanics and Invironment

- Dimensions (conductor board) approximately 71 x 102 mm, 1 slot wide
- Ambient temperature +50 °C maximum
- 1x D-SUB female connector HD 15-pin for sensor connections
- 1x D-SUB female connector 9-pin for I/O-Interface
- 1x D-SUB male connector 9-pin for analog inputs
- 3x female connectors MicroMatch for connection to IF2008A

Sensor-Interface (X1)

- Similar to IF2008A (X1)

I/O-Interface (X2)

- 4 optocoupler inputs, current input 5 mA maximum, input frequency 1 Mhz maximum
- 4 optocoupler outputs, current output 20 mA maximum, output frequency 1 Mhz maximum

Analog Interface (X3)

- 2x ADC channels
- Input voltage range 0-5 V, 0-10 V, ± 5 V, ± 10 V adjustable separately for each channel by means of DIP switch
- Resolution 16 bit
- Offset error ± 3 mV maximum
- Amplification error ± 5 mV maximum
- Conversion rate 150 kHz maximum per channel

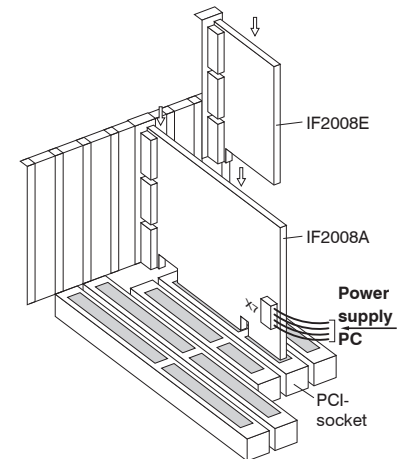
5. Installation of IF2008

For installing the IF2008 please proceed as follows:

- ➡ Switch off your computer as well as all peripheral devices. Unplug the power cords.
- ➡ Open the housing of your computer. For further details please find the instruction in your computer manual.
- ➡ Find a PCI extension slot for the IF2008A card which is not assigned. Remove the cover of the slot, keep hold of the card on the top edge while carefully pushing it into the slot. The card must be fastened to the mounting using bolts.

i IF2008A requires on X7 an external supply voltage through PC!

- ➡ Connect X7 of the IF2008A with the power supply of the PC. Therewith you support the necessary power supply of the DC-/DC converter.
- ➡ The IF2008E has to be fastened to a mounting which is not assigned using bolts. Interconnect the interface cards IF2008A and IF2008E. Connect the plug connectors of the same numbering using the cables which are included in delivery, that means X4 with X4, X5 with X5, X6 with X6.
- ➡ Close the housing of your computer and switch on the computer as well as the peripheral devices.

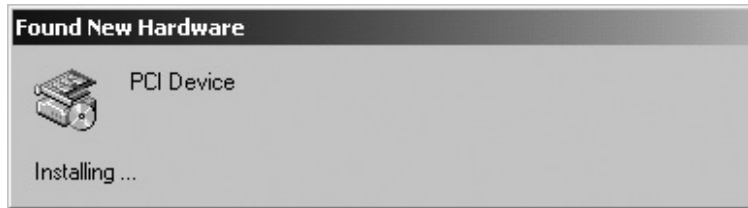


6. Installation of Devices Driver

6.1 Windows 2000

i Administration rights are required in order to install the driver unit on your PC. Otherwise, the installation cannot be carried out.

By the time the hardware installation has finished, the operating system shows that a new hardware has been found.



- Confirm the following dialog box using *Continue* in order to continue the installation.
- Let find the operating system an appropriate driver. The following dialog appears: [Find an appropriate driver for the device (recommended)]. If this procedure has finished please click on *Continue*.
- Please insert the CD. The driver is located in the root register of the CD.

The operating system shows, that the driver has been found.

- Click on *Continue* in order to install the driver.

The driver is now being installed.

- Click on *Finish* in order to complete this procedure.

After the driver has been installed the hardware is listed in the device manager.

6.2 Windows XP

I Administration rights are required in order to install the driver unit on your PC. Otherwise, the installation cannot be carried out.

By the time the hardware installation has finished, the operating system shows that a new hardware has been found.

➡ Choose **No**, not this time and confirm the adjacent dialog box with **Next**, in order to continue the installation.



➡ Instruct the operating system to find a specified driver [Install from a list or specific location...] and click on **Next**.



- ➡ Indicate the path for the driver. Choose [Search for the best driver in these location...] and click on Next. The MEDAQLib is located in the root register of the CD.



The driver is now being installed.

- ➡ Click on **Finish** in order to complete this procedure.

By the time the driver has been installed the hardware is listed in the device manager.



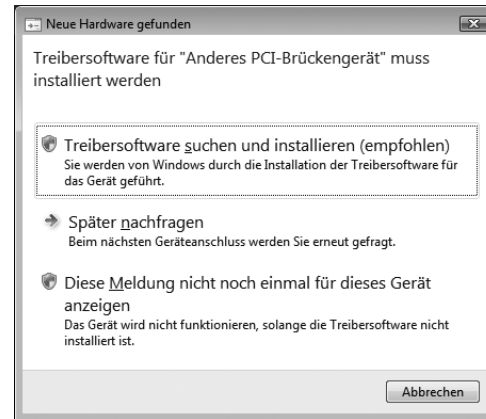
6.3 Windows Vista

I Administration rights are required in order to install the driver unit on your PC. Otherwise, the installation cannot be carried out.

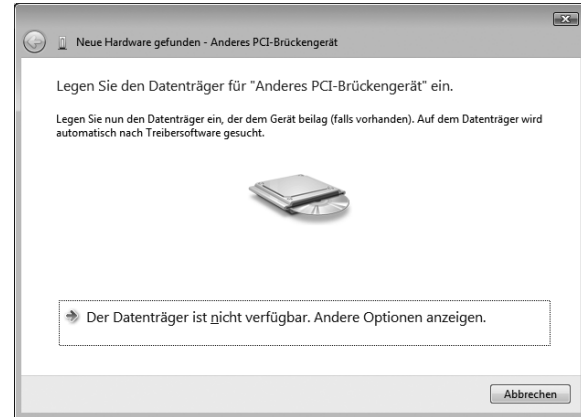
By the time the hardware installation has finished, the operating system shows that a new hardware has been found.

➡ Choose **F**ind and install driver software...

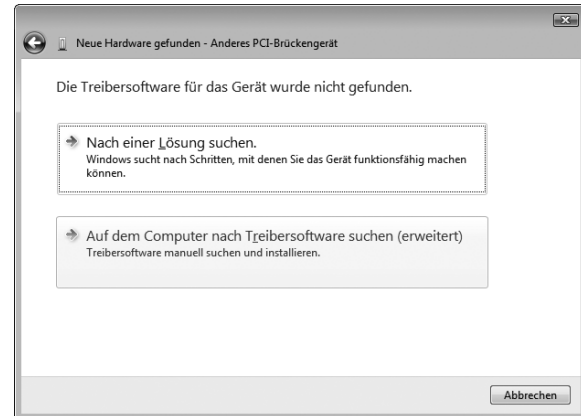
➡ Confirm the following dialog box using **C**ontinue in order to continue the installation.



➔ Click on The data carrier is not available. Give another option.



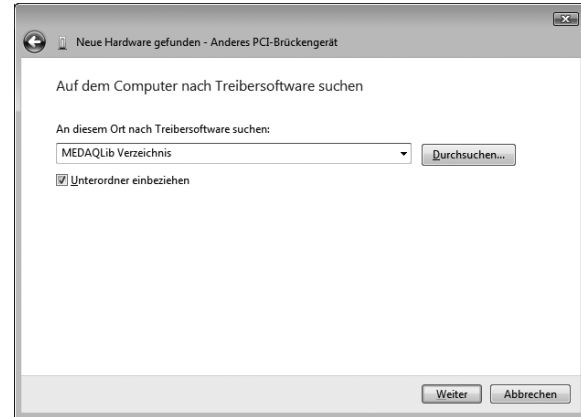
➔ Indicate the path for the driver. Choose Find driver software on the computer...



➡ Indicate the register for the driver. Click on **Browse**. Finally, click on **Continue**.

The **MEDAQLib** is located in the root register of the **CD**.

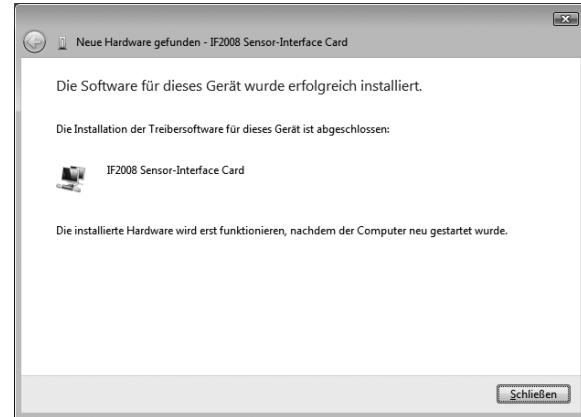
➡ Do not consider the adjacent error message and choose **Install this driver software**.



The driver is now being installed.

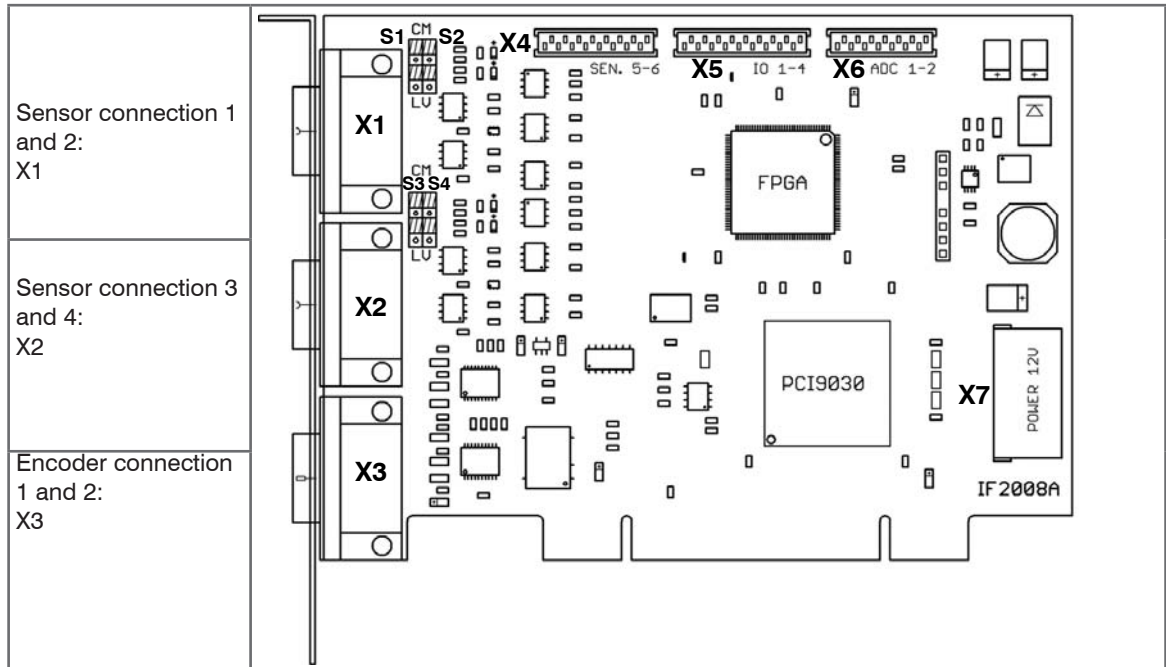
➡ Click on **C**lose in order to finish this procedure.

By the time the driver has been installed the hardware is listed in the device manager.



7. Hardware

7.1 View IF2008A



X4 ... X6 = Connection to IF2008E

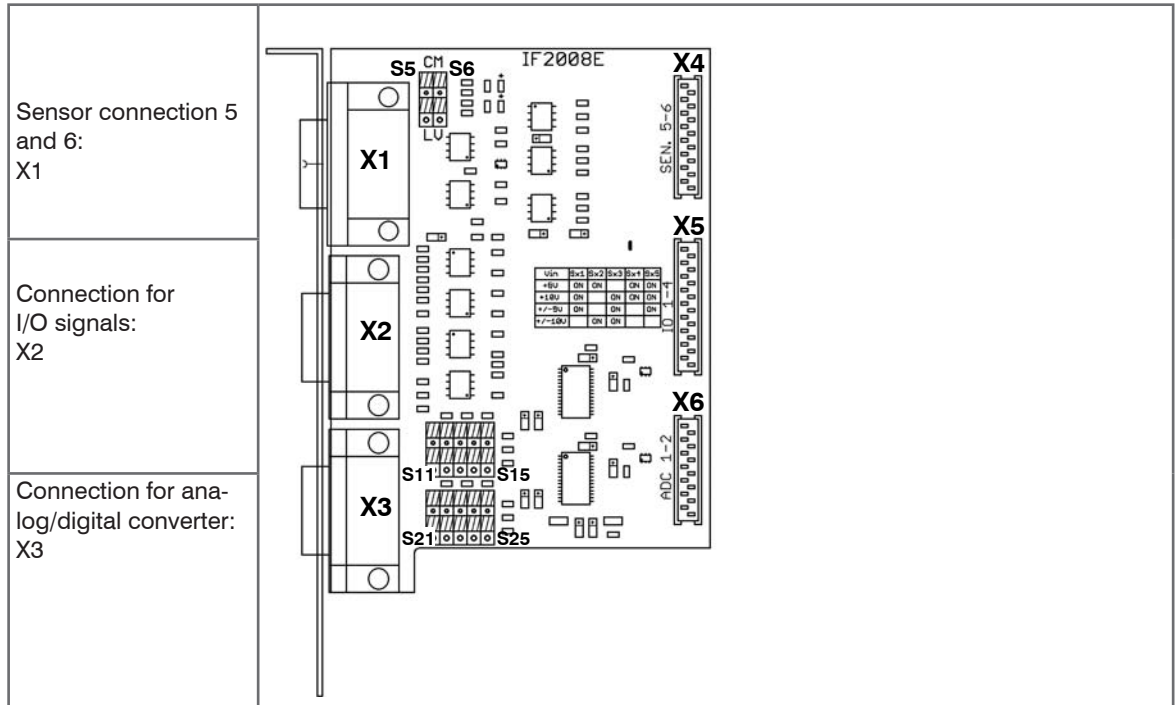
X7 = Connection 12 V power, see Chap. 5

S1 .. S4 = Switch for positive trigger level



IF2008A requires on X7 an external supply voltage through PC, see Chap. 5!

7.2 View IF2008E



X4 ... X6 = Connection to IF2008A

S5 and S6 = Switch for positive trigger level

S11 ... S15 = Switch for ADC level 1

S21 ... S25 = Switch for ADC level 2

7.3 Pin Assignments and Jumper Setting

7.3.1 Sensor Interface (IF2008A X1 and X2, IF2008E X1)

Pin	Signal
1	Sensor 1 TxD-
2	Sensor 1 TxD+
3	Sensor 1 RxD-
4	Sensor 1 RxD+
5	Power supply 0 V
6	Sensor 1 TRG+
7	Sensor 1 TRG-
8	Sensor 2 TRG+
9	Sensor 2 TRG-
10	Power supply +24 V
11	Sensor 2 TxD-
12	Sensor 2 TxD+
13	Sensor 2 RxD-
14	Sensor 2 RxD+
15	GND (galvanic isolation to PC-GND)

7.3.2 Encoder Interface (IF2008A X3)

Pin	Function	1 V _{ss} or RS422		TTL (single-ended)	
		Signal Encoder 1	Signal Encoder 2	Signal Encoder 1	Signal Encoder 2
1	Encoder 1 track A+	A+		A	
2	Encoder 1 track A-	A-		open	
3	Encoder 2 track A+		A+		A
4	Encoder 2 track A-		A-		open
5	VCC (+5 V)	+UB	+UB	+UB	+UB
6	Encoder 1 track B+	B+		B	
7	Encoder 1 track B-	B-		open	
8	Encoder 2 track B+		B+		B
9	Encoder 2 track B-		B-		open
10	GND	GND	GND	GND	GND
11	Encoder 1 track R+	R+		R	
12	Encoder 1 track R-	R-		open	
13	Encoder 2 track R+		R+		R
14	Encoder 2 track R-		R-		open
15	GND	GND	GND	GND	GND

- **i** Non-inverting inputs (A+, B+, R+) may not keep open. For example, if only the clock is used regarding the counter, the plus inputs have to be set on GND or VCC.
Not assigned negative inputs (A-, B-, R-) may not be connected with GND.
The pin assignment is not compatible with IF2004B!

7.3.3 Sensor Power (IF2008A X7)

Pin	Function
1	+ 12 V
2	GND
3	GND
4	NC

7.3.4 I/O Interface (IF2008E X2)

Pin	Function
1	OUT 1
2	OUT 2
3	OUT 3
4	OUT 4
5	GND (galvanic isolation to PC-GND)
6	IN 1
7	IN 2
8	IN 3
9	IN 4

7.3.5 Analog Interface (IF2008E X3)

Pin	Function
1	Input signal 1
2	Analog GND
3	Input signal 2
4	Analog GND
5	NC
6	NC
7	NC
8	NC
9	NC

7.3.6 Jumper-/Switch Setting for Trigger Level

By means of the switches S1 to S4 (IF2008A) and the switches S5 and S6 (IF2008E) the positive trigger level for the sensor channels 1 to 4 (IF2008A) or 5 and 6 (IF2008E) can be selected. The negative output always has LVDS level.

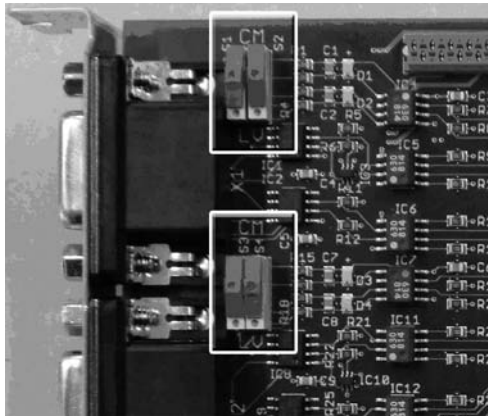


Fig. 1: Switch settings trigger level IF2008A

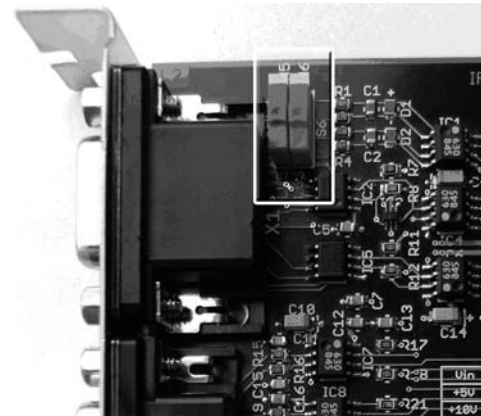


Fig. 2: Switch settings trigger level IF2008E



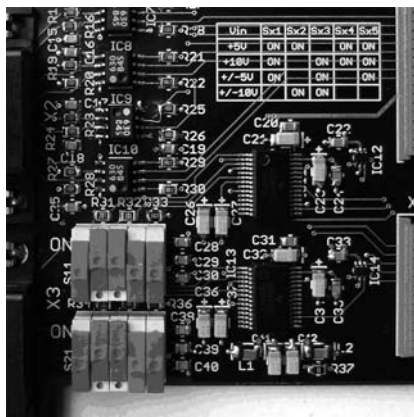
Switch	Setting	Trigger output +
S1 to S6	CMn 	3.3 V CMOS level for sensor n TRG+
	LVn 	LVDS level for sensor n TRG+

Fig. 3: Switch settings trigger level

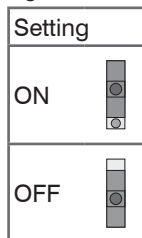
7.3.7 Switch Setting for ADC Level

By means of the switches S11 to S15 and S21 to S25 the input voltage range of the analogue-digital converter for the sensor channel 5 and 6 on the IF2008E can be selected.



V_{IN}	Sx1	Sx2	Sx3	Sx4	Sx5
0-5 V	ON	ON	OFF	ON	ON
0-10 V	ON	OFF	ON	ON	ON
± 5 V	ON	OFF	ON	OFF	ON
± 10 V	OFF	ON	ON	OFF	OFF

Fig. 4: Switch settings ADC level for ± 10 V



8. Recommendation Regarding Cabling

8.1 Sensor ILD1302 and ILD1402

Pin X1/X2 IF2008A X1 IF2008E	Signal	ILD1302, ILD1402		Signal sensor
		Pin sensor 1	Pin sensor 2	
1	Sensor 1 TxD-	4		RxD-
2	Sensor 1 TxD+	3		RxD+
3	Sensor 1 RxD-	6		TxD-
4	Sensor 1 RxD+	5		TxD+
5	Power supply 0 V	12	12	GND
6	Sensor 1 TRG+	9		TeachIn
7	Sensor 1 TRG-	NC	NC	
8	Sensor 2 TRG+		9	TeachIn
9	Sensor 2 TRG-	NC	NC	
10	Power supply +24 V	7	7	+UB
11	Sensor 2 TxD-		4	RxD-
12	Sensor 2 TxD+		3	RxD+
13	Sensor 2 RxD-		6	TxD-
14	Sensor 2 RxD+		5	TxD+
15	GND (galvanic isolation to PC-GND)	12	12	GND

8.2 Sensor ILD1700

Pin X1/X2 IF2008A X1 IF2008E	Signal	ILD1700		Signal sensor
		Pin sensor 1	Pin sensor 2	
1	Sensor 1 TxD-	11		RxD-
2	Sensor 1 TxD+	12		RxD+
3	Sensor 1 RxD-	2		TxD-
4	Sensor 1 RxD+	1		TxD+
5	Power supply 0 V	6	6	GND
6	Sensor 1 TRG+	3		TRG+
7	Sensor 1 TRG-	4		TRG-
8	Sensor 2 TRG+		3	TRG+
9	Sensor 2 TRG-		4	TRG-
10	Power supply +24 V	5	5	+UB
11	Sensor 2 TxD-		11	RxD-
12	Sensor 2 TxD+		12	RxD+
13	Sensor 2 RxD-		2	TxD-
14	Sensor 2 RxD+		1	TxD+
15	GND (galvanic isolation to PC-GND)	6	6	GND

8.3 Sensor ILD2200

Pin X1/X2 IF2008A X1 IF2008E	Signal	ILD2200		Signal sensor
		Pin sensor 1	Pin sensor 2	
1	Sensor 1 TxD-	24		RxD-
2	Sensor 1 TxD+	11		RxD+
3	Sensor 1 RxD-	10		TxD-
4	Sensor 1 RxD+	23		TxD+
5	Power supply 0 V	14	14	Supply ground
6	Sensor 1 TRG+	20		SyncIn+
7	Sensor 1 TRG-	NC		
8	Sensor 2 TRG+		20	SyncIn+
9	Sensor 2 TRG-		NC	
10	Power supply +24 V	1	1	+UB
11	Sensor 2 TxD-		24	RxD-
12	Sensor 2 TxD+		11	RxD+
13	Sensor 2 RxD-		10	TxD-
14	Sensor 2 RxD+		23	TxD+
15	GND (galvanic isolation to PC-GND)	7	7	SyncIn-

8.4 Sensor ILD2300

Pin X1/X2 IF2008A X1 IF2008E	Signal	ILD2300		Signal sensor
		Pin sensor 1	Pin sensor 2	
1	Sensor 1 TxD-	8		RxD-
2	Sensor 1 TxD+	7		RxD+
3	Sensor 1 RxD-	10		TxD-
4	Sensor 1 RxD+	9		TxD+
5	Power supply 0 V	2	2	Supply ground
6	Sensor 1 TRG+	5		SyncIn+
7	Sensor 1 TRG-	6		SyncIn-
8	Sensor 2 TRG+		5	SyncIn+
9	Sensor 2 TRG-		6	SyncIn-
10	Power supply +24 V	1	1	+UB
11	Sensor 2 TxD-		8	RxD-
12	Sensor 2 TxD+		7	RxD+
13	Sensor 2 RxD-		10	TxD-
14	Sensor 2 RxD+		9	TxD+
15	GND (galvanically isolated to GND PC)	2	2	

8.5 Encoder Interface

Pin X3 IF2008A	Signal	1 V _{ss} or RS422		TTL (single-ended)	
		Signal encoder 1	Signal encoder 2	Signal encoder 1	Signal encoder 2
1	Encoder 1 track A+	A+		A	
2	Encoder 1 track A-	A-		open	
3	Encoder 2 track A+		A+		A
4	Encoder 2 track A-		A-		open
5	VCC (+5 V)	+UB	+UB	+UB	+UB
6	Encoder 1 track B+	B+		B	
7	Encoder 1 track B-	B-		open	
8	Encoder 2 track B+		B+		B
9	Encoder 2 track B-		B-		open
10	GND	GND	GND	GND	GND
11	Encoder 1 track R+	R+		R	
12	Encoder 1 track R-	R-		open	
13	Encoder 2 track R+		R+		R
14	Encoder 2 track R-		R-		open
15	GND	GND	GND	GND	GND

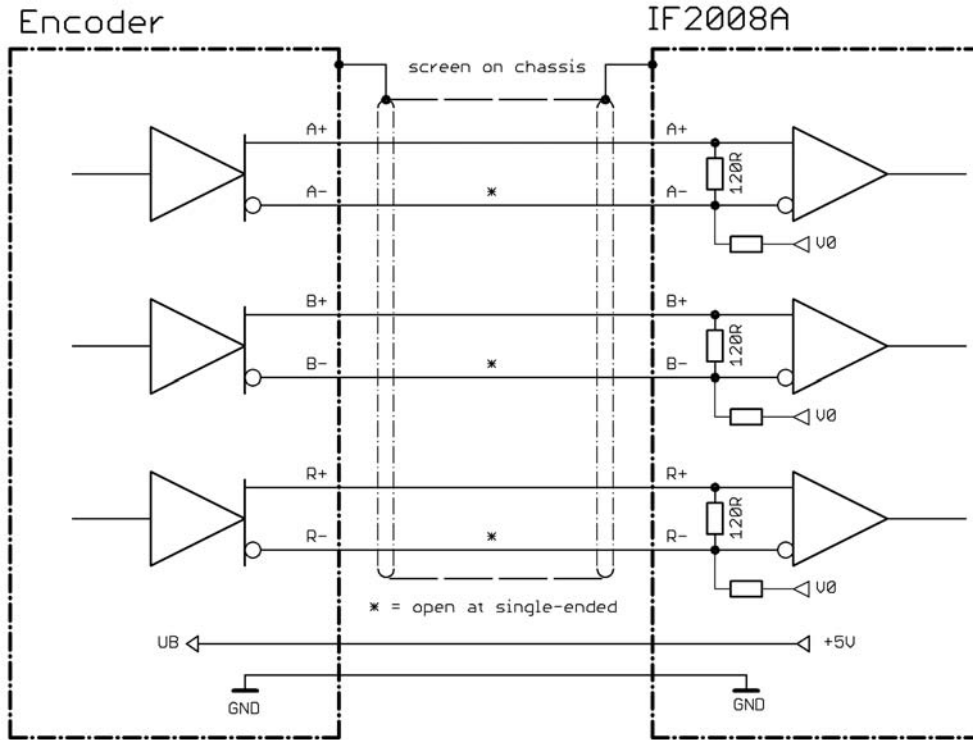


Fig. 5: Block diagramm encoder interface

i Non-inverting inputs (A+, B+, R+) may not keep open. For example, if only the clock is used regarding the counter, the plus inputs have to be set on GND or VCC.

8.6 Optocoupler I/O

Pin X2 IF2008E	Signal
1	OUT 1
2	OUT 2
3	OUT 3
4	OUT 4
5	GND (galvanic isolation to PC-GND)
6	IN 1
7	IN 2
8	IN 3
9	IN 4

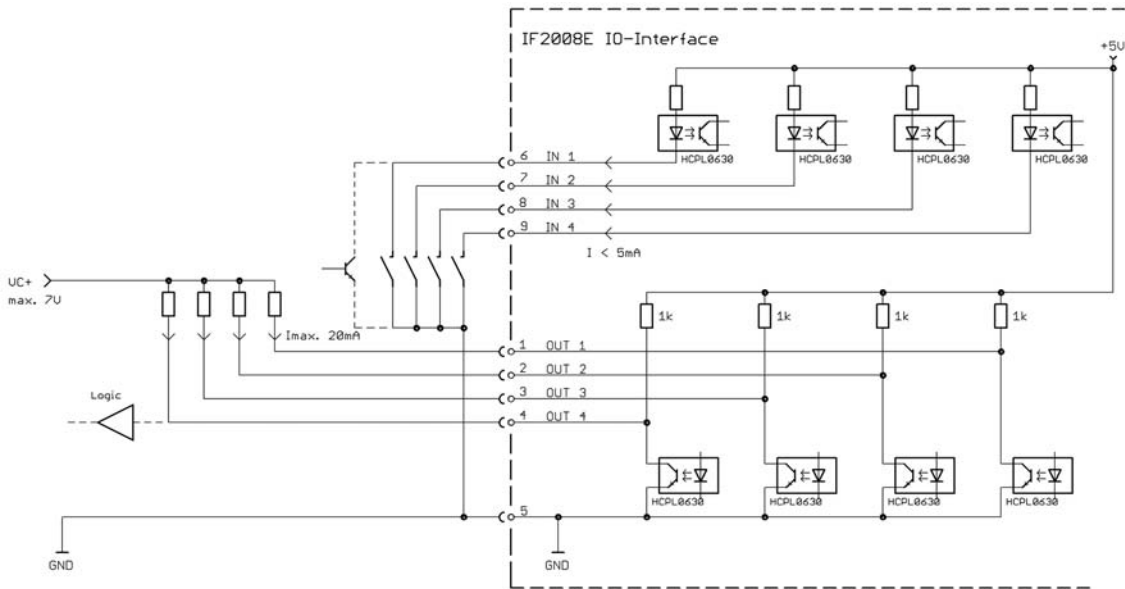


Fig. 6: Block diagram optocoupler I/O

9. Warranty

All components of the device have been checked and tested for perfect function in the factory. In the unlikely event that errors should occur despite our thorough quality control, this should be reported immediately to MICRO-EPSILON.

The warranty period lasts 12 months following the day of shipment. Defective parts, except wear parts, will be repaired or replaced free of charge within this period if you return the device free of cost to MICRO-EPSILON. This warranty does not apply to damage resulting from abuse of the equipment and devices, from forceful handling or installation of the devices or from repair or modifications performed by third parties.

No other claims, except as warranted, are accepted. The terms of the purchasing contract apply in full. MICRO-EPSILON will specifically not be responsible for eventual consequential damages. MICRO-EPSILON always strives to supply the customers with the finest and most advanced equipment. Development and refinement is therefore performed continuously and the right to design changes without prior notice is accordingly reserved. For translations in other languages, the data and statements in the German language operation manual are to be taken as authoritative.

10. Decommissioning, Disposal

➡ Disconnect the cable at the IF2008.

➡ Disconnect the IF2008 from the PC.

The IF2008 is produced according to the directive 2002/95/EC, „RoHS“. The disposal is done according to the legal regulations (see directive 2002/96/EC).



MICRO-EPSILON MESSTECHNIK GmbH & Co. KG
Königbacher Str. 15 · 94496 Ortenburg / Deutschland
Tel. +49 (0) 8542 / 168-0 · Fax +49 (0) 8542 / 168-90
info@micro-epsilon.de · www.micro-epsilon.de

X9771216-A051043MSC

