

Industriefunkuhren



Technical Manual

Universal 4-Channel I/O Board

Model 7170

ENGLISH

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Safety regulations

The safety regulations and technical data serve to ensure trouble-free operation of the devices and protection of persons and equipment. It is therefore of utmost importance to observe and comply with these regulations. If these are not complied with, then no claims may be made under the terms of the warranty and no liability will be assumed for any ensuing damage.

Safety of the device

This device has been manufactured in accordance with the latest technological standards and approved safety regulations

The device should only be put into operation by trained and qualified staff. Care must be taken that all cable connections are laid and fixed in position correctly. The device should only be operated with the voltage supply indicated on the identification label.

The device should only be operated by qualified staff or employees who have received specific instruction.

If a device must be opened for repair, this should only be carried out by employees with appropriate qualifications or by **hopf** Elektronik GmbH.

Before a device is opened or a fuse is changed all power supplies must be disconnected.

If there are reasons to believe that the operational safety can no longer be guaranteed the device must be taken out of service and labelled accordingly. The safety may be impaired when the device does not operate properly or if it is obviously damaged. Contact your local **hopf** Elektronik GmbH representative for required action.

CE-Conformity



This device fulfils the requirements of the EU directive 89/336/EEG "Electromagnetic compatibility" and 73/23/EEG "Low voltage equipment".

Therefore the device bears the CE identification marking (CE=Communauté Européenne)

CE = Communautés Européennes = European communities

The CE indicates to the controlling bodies that the product complies with the requirements of the EU directive - especially with regard to protection of health and safety for the operator and the user - and may be released for sale within the common markets.

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1 General

The board 7170 is a universal 4-channel I/O board in euro format with a 3U/4HP front panel. According to the type of board it is suitable for the potential free output of pulses/signals or rather for reading digital pulses. It was created for systems 6000 and 7001.

Connection

The connection is made via four 2-pole, pluggable screw terminals (cable core max. 1.5 mm²)

1.1 Status Display

Each output and input has a status LED showing the current operation status of the appropriate output/input.

1.2 Board with signal output via optical couplers or relays

For the output of four (4) potential free pulses/signals the board can be ordered with optical couplers or relays. The according configuration can be read off the board.

Output signals

Up to four (4) pulses/signals can be connected to the internal system VG ledge which can be distributed to the available outputs via an existing logic on the board by means of jumpers.

PPS pulse and DCF77 pulse

On operating the board at the system bus of systems 6000 and 7001 the board can put out the DCF77 pulse or a PPS pulse, configurable in length, without taking any additional actions at the systems.

Signal reversion

Each of the output pulses/signals can be reversed on the board via jumper.

Option – Output of active pulses

Optionally there is also the output of active pulses/signals possible (5,12 or 24V DC). Please pay attention to the fact that the active pulses are not potential free to each other.

1.3 Board with digital inputs

For the potential free reading of digital pulses.

Reading of different digital signals

The inputs can be configured for two different signal levels:

- Active pulses/signals from 5-60V DC
- TTL-pulses/signals and voltage-free signal output (dry contact)

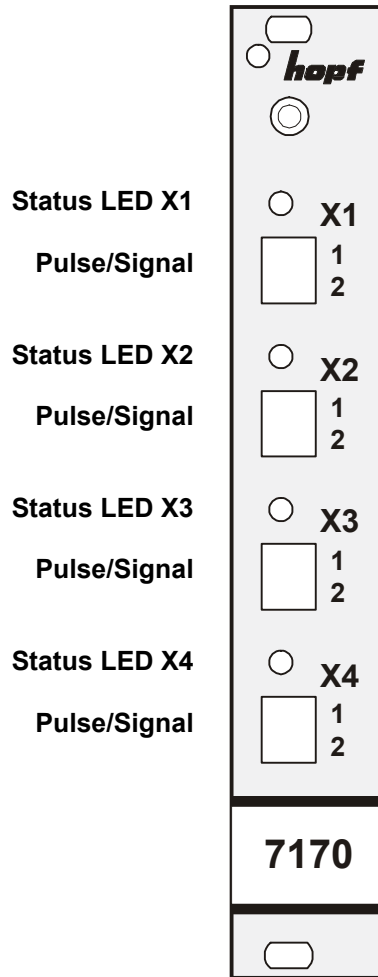
Signal tapping

On operating the board with digital inputs the read signals can be tapped on the internal VG ledge in TTL level.

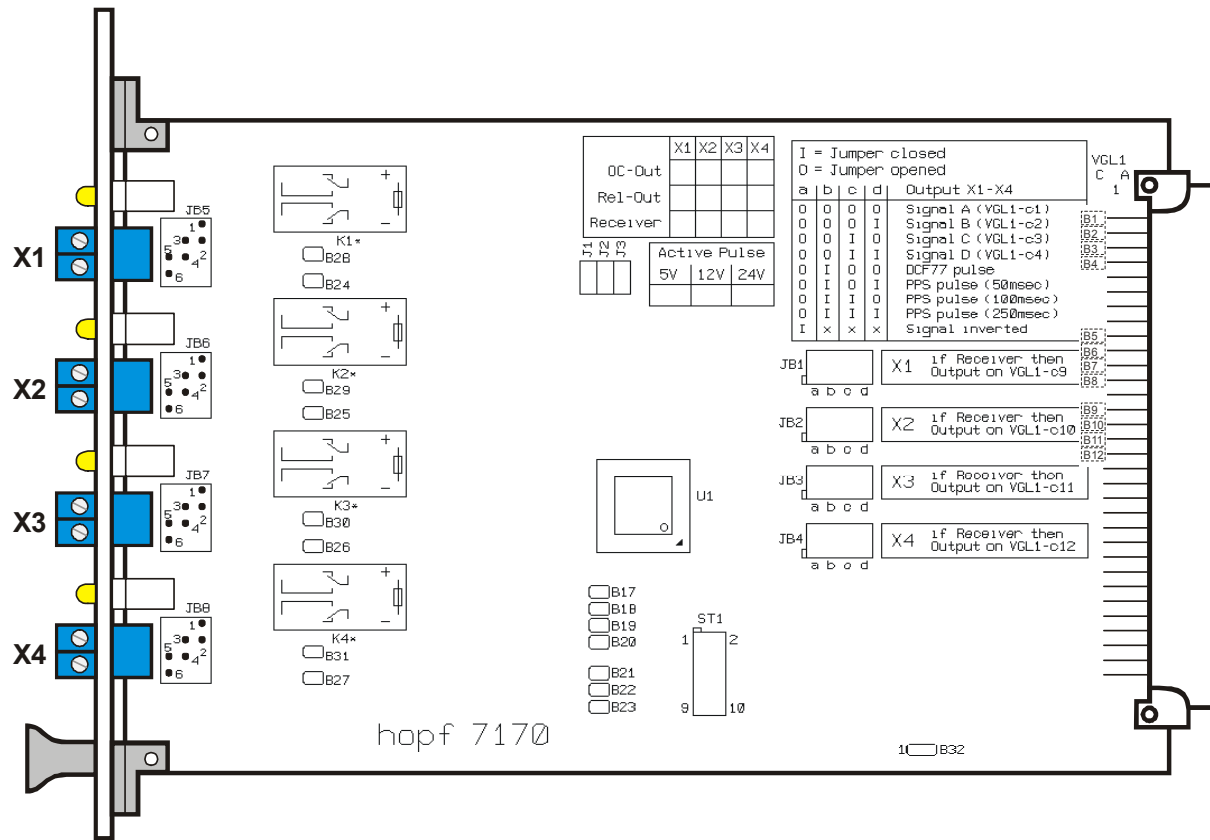
Signal reversion

Each of the read signals can be reversed on the board via jumper.

2 Front panel 3U/4HP



3 Board Configuration



Hardware Configuration of X1-X4	X1	X2	X3	X4
OC-Out - Output via Optical Coupler (Optokopplerausgabe)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Rel-Out - Output via Relais (Relaisausgabe)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Receiver - Active Pulse / TTL / Dry Contact (aktiver Impuls / TTL / potentialfrei)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Option: Output of Active Pulses (Ausgabe aktiver Impuls)	
no active pulses (keine aktiven Impulse)	<input type="checkbox"/>
5V DC active pulses	<input type="checkbox"/>
12V DC active pulses	<input type="checkbox"/>
24V DC active pulses	<input type="checkbox"/>

Hardware adjustment for different pulse types (Einstellungen für verschiedene Impulstypen)

Jumper Block JB5 - JB8	Jumper configuration		
		Active Pulse TTL / Dry Contact	Passive Pulse Active Pulse
JB5	(for X1)	<input type="checkbox"/> Jumper 1-2 / 3-4 / 5-6	<input type="checkbox"/> Jumper 2-3 / 4-5
JB6	(for X2)	<input type="checkbox"/> Jumper 1-2 / 3-4 / 5-6	<input type="checkbox"/> Jumper 2-3 / 4-5
JB7	(for X3)	<input type="checkbox"/> Jumper 1-2 / 3-4 / 5-6	<input type="checkbox"/> Jumper 2-3 / 4-5
JB8	(for X4)	<input type="checkbox"/> Jumper 1-2 / 3-4 / 5-6	<input type="checkbox"/> Jumper 2-3 / 4-5

Output				X1	X2	X3	X4	
Jumper Bank JB1 - JB4				Signal-Output on X1-X4				
a	b	c	d	JB1	JB2	JB3	JB4	
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Signal A (VGL1-c1)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Signal B (VGL1-c2)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Signal C (VGL1-c3)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Signal D (VGL1-c4)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	DCF77 pulse	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	PPS pulse (50 msec)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	PPS pulse (100 msec)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	PPS pulse (250 msec)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Signal inverted	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Receiver				X1	X2	X3	X4
Jumper Bank JB1 - JB4				Signal-Input on X1-X4			
a				JB1	JB2	JB3	JB4
<input type="radio"/>	Signal not inverted			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="radio"/>	Signal inverted			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

I = Jumper closed / o = Jumper opened

				def.	user
Jumper J1	closed (zu)	only for factory use (nur für werksinterne Einstellungen)		<input type="checkbox"/>	<input type="checkbox"/>
	opened (offen)	only for factory use (nur für werksinterne Einstellungen)		<input checked="" type="checkbox"/>	<input type="checkbox"/>
Jumper J2	closed (zu)	only for factory use (nur für werksinterne Einstellungen)		<input type="checkbox"/>	<input type="checkbox"/>
	opened (offen)	only for factory use (nur für werksinterne Einstellungen)		<input checked="" type="checkbox"/>	<input type="checkbox"/>
Jumper J3	closed (zu)	only for factory use (nur für werksinterne Einstellungen)		<input type="checkbox"/>	<input type="checkbox"/>
	opened (offen)	only for factory use (nur für werksinterne Einstellungen)		<input checked="" type="checkbox"/>	<input type="checkbox"/>

B1-B8 on the bottom layer (B1-B8 auf der Bestückungsseite)

				def.	user
B1	closed (zu)	only for factory use (nur für werksinterne Einstellungen)		<input checked="" type="checkbox"/>	<input type="checkbox"/>
	opened (offen)	only for factory use (nur für werksinterne Einstellungen)		<input type="checkbox"/>	<input type="checkbox"/>
B2	closed (zu)	only for factory use (nur für werksinterne Einstellungen)		<input checked="" type="checkbox"/>	<input type="checkbox"/>
	opened (offen)	only for factory use (nur für werksinterne Einstellungen)		<input type="checkbox"/>	<input type="checkbox"/>
B3	closed (zu)	only for factory use (nur für werksinterne Einstellungen)		<input checked="" type="checkbox"/>	<input type="checkbox"/>
	opened (offen)	only for factory use (nur für werksinterne Einstellungen)		<input type="checkbox"/>	<input type="checkbox"/>
B4	closed (zu)	only for factory use (nur für werksinterne Einstellungen)		<input checked="" type="checkbox"/>	<input type="checkbox"/>
	opened (offen)	only for factory use (nur für werksinterne Einstellungen)		<input type="checkbox"/>	<input type="checkbox"/>
B5	closed (zu)	only for factory use (nur für werksinterne Einstellungen)		<input checked="" type="checkbox"/>	<input type="checkbox"/>
	opened (offen)	only for factory use (nur für werksinterne Einstellungen)		<input type="checkbox"/>	<input type="checkbox"/>
B6	closed (zu)	only for factory use (nur für werksinterne Einstellungen)		<input checked="" type="checkbox"/>	<input type="checkbox"/>
	opened (offen)	only for factory use (nur für werksinterne Einstellungen)		<input type="checkbox"/>	<input type="checkbox"/>
B7	closed (zu)	only for factory use (nur für werksinterne Einstellungen)		<input checked="" type="checkbox"/>	<input type="checkbox"/>
	opened (offen)	only for factory use (nur für werksinterne Einstellungen)		<input type="checkbox"/>	<input type="checkbox"/>
B8	closed (zu)	only for factory use (nur für werksinterne Einstellungen)		<input checked="" type="checkbox"/>	<input type="checkbox"/>
	opened (offen)	only for factory use (nur für werksinterne Einstellungen)		<input type="checkbox"/>	<input type="checkbox"/>

B9-B12 on the bottom layer (B9-B12 auf der Bestückungsseite)

			def.	user
B9	closed (zu)	only for factory use (nur für werksinterne Einstellungen)	<input type="checkbox"/>	<input type="checkbox"/>
	opened (offen)	only for factory use (nur für werksinterne Einstellungen)	<input checked="" type="checkbox"/>	<input type="checkbox"/>
B10	closed (zu)	only for factory use (nur für werksinterne Einstellungen)	<input type="checkbox"/>	<input type="checkbox"/>
	opened (offen)	only for factory use (nur für werksinterne Einstellungen)	<input checked="" type="checkbox"/>	<input type="checkbox"/>
B11	closed (zu)	only for factory use (nur für werksinterne Einstellungen)	<input type="checkbox"/>	<input type="checkbox"/>
	opened (offen)	only for factory use (nur für werksinterne Einstellungen)	<input checked="" type="checkbox"/>	<input type="checkbox"/>
B12	closed (zu)	only for factory use (nur für werksinterne Einstellungen)	<input type="checkbox"/>	<input type="checkbox"/>
	opened (offen)	only for factory use (nur für werksinterne Einstellungen)	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Settings for B17-B32 adjusted by hopf (Einstellungen für B17-B32 von hopf voreingestellt)

			def.	user
B17	closed (zu)	only for factory use (nur für werksinterne Einstellungen)	<input type="checkbox"/>	<input type="checkbox"/>
	opened (offen)	only for factory use (nur für werksinterne Einstellungen)	<input checked="" type="checkbox"/>	<input type="checkbox"/>
B18	closed (zu)	only for factory use (nur für werksinterne Einstellungen)	<input type="checkbox"/>	<input type="checkbox"/>
	opened (offen)	only for factory use (nur für werksinterne Einstellungen)	<input checked="" type="checkbox"/>	<input type="checkbox"/>
B19	closed (zu)	only for factory use (nur für werksinterne Einstellungen)	<input type="checkbox"/>	<input type="checkbox"/>
	opened (offen)	only for factory use (nur für werksinterne Einstellungen)	<input checked="" type="checkbox"/>	<input type="checkbox"/>
B20	closed (zu)	only for factory use (nur für werksinterne Einstellungen)	<input type="checkbox"/>	<input type="checkbox"/>
	opened (offen)	only for factory use (nur für werksinterne Einstellungen)	<input checked="" type="checkbox"/>	<input type="checkbox"/>

			def.	user
B21	closed (zu)	only for factory use (nur für werksinterne Einstellungen)	<input type="checkbox"/>	<input type="checkbox"/>
	opened (offen)	only for factory use (nur für werksinterne Einstellungen)	<input checked="" type="checkbox"/>	<input type="checkbox"/>
B22	closed (zu)	only for factory use (nur für werksinterne Einstellungen)	<input type="checkbox"/>	<input type="checkbox"/>
	opened (offen)	only for factory use (nur für werksinterne Einstellungen)	<input checked="" type="checkbox"/>	<input type="checkbox"/>
B23	closed (zu)	only for factory use (nur für werksinterne Einstellungen)	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	opened (offen)	only for factory use (nur für werksinterne Einstellungen)	<input type="checkbox"/>	<input type="checkbox"/>

			def.	user
B24	closed (zu)	only for factory use (nur für werksinterne Einstellungen)	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	opened (offen)	only for factory use (nur für werksinterne Einstellungen)	<input type="checkbox"/>	<input type="checkbox"/>
B25	closed (zu)	only for factory use (nur für werksinterne Einstellungen)	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	opened (offen)	only for factory use (nur für werksinterne Einstellungen)	<input type="checkbox"/>	<input type="checkbox"/>
B26	closed (zu)	only for factory use (nur für werksinterne Einstellungen)	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	opened (offen)	only for factory use (nur für werksinterne Einstellungen)	<input type="checkbox"/>	<input type="checkbox"/>
B27	closed (zu)	only for factory use (nur für werksinterne Einstellungen)	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	opened (offen)	only for factory use (nur für werksinterne Einstellungen)	<input type="checkbox"/>	<input type="checkbox"/>

			def.	user
B28	closed (zu)	only for factory use (nur für werksinterne Einstellungen)	<input type="checkbox"/>	<input type="checkbox"/>
	opened (offen)	only for factory use (nur für werksinterne Einstellungen)	<input checked="" type="checkbox"/>	<input type="checkbox"/>
B29	closed (zu)	only for factory use (nur für werksinterne Einstellungen)	<input type="checkbox"/>	<input type="checkbox"/>
	opened (offen)	only for factory use (nur für werksinterne Einstellungen)	<input checked="" type="checkbox"/>	<input type="checkbox"/>
B30	closed (zu)	only for factory use (nur für werksinterne Einstellungen)	<input type="checkbox"/>	<input type="checkbox"/>
	opened (offen)	only for factory use (nur für werksinterne Einstellungen)	<input checked="" type="checkbox"/>	<input type="checkbox"/>
B31	closed (zu)	only for factory use (nur für werksinterne Einstellungen)	<input type="checkbox"/>	<input type="checkbox"/>
	opened (offen)	only for factory use (nur für werksinterne Einstellungen)	<input checked="" type="checkbox"/>	<input type="checkbox"/>

			def.	user
B32	closed (zu)	Active pulse (aktiver Impuls) 24V DC (Pin 1-2) – adjusted by hopf	<input type="checkbox"/>	<input type="checkbox"/>
	opened (offen)	Active pulse (aktiver Impuls) 5/12V DC (Pin 2-3) – adjusted by hopf	<input type="checkbox"/>	<input type="checkbox"/>

4 VG Ledge 64-pole (DIN 41612)

Row B **not** connected!

Pin No.	ROW A		ROW B		ROW C	
	Signal	Connection	Signal	Connection	Signal	Connection
1	GND (Signal)				Signal A	
2	GND (Signal)				Signal B	
3	GND (Signal)				Signal C	
4	GND (Signal)				Signal D	
5						
6						
7						
8						
9	GND (Signal)				Receive Signal X1	
10	GND (Signal)				Receive Signal X2	
11	GND (Signal)				Receive Signal X3	
12	GND (Signal)				Receive Signal X4	
13						
14						
15						
16						
17						
18	Vdd				Vdd	
19	GND1				GND1	
20						
21					RESB	
22					DCFT	
23	CLKB				SERD	
24	PPSB				KHZ1	
25	BREQ				BREQ	
26	SEDA				SEDA	
27	ARES				ARES	
28	CSDA				CSDA	
29						
30						
31	GND				GND	
32	VCC				VCC	

5 Configuration of Board

In this chapter the configuration of board according to the appropriate type is described. Which type is delivered is noticed on the board.

Types of Boards

The following types are available:

- Signal output via optical couplers ⇒ Imprint = **OC-Out**
- Signal output via relays ⇒ Imprint = **Rel-Out**
- Digital signal output ⇒ Imprint = **Receiver**

Optional voltages for active pulses

Is there an internal board voltage for the output of active pulses available, a marking in the field "**Active Pulse**" on the board is shown.

Optionally one of the following voltages are available:

- 5V DC
- 12V DC
- 24V DC

5.1 Configuration of the signal outputs via optical couplers/relays

There is the possibility to configure the board for the output of different signals via jumper.

5.1.1 Configuration table

This table is also shown as an imprint on the board. It describes the signals which can be distributed onto the outputs and the jumper configurations for the required signal output of the outputs. Each available signal can be distributed onto the outputs. Please note the following allocation:

- Jumper Bank **JB1** ⇒ Output **X1**
- Jumper Bank **JB2** ⇒ Output **X2**
- Jumper Bank **JB3** ⇒ Output **X3**
- Jumper Bank **JB4** ⇒ Output **X4**

This table is shown as an imprint on the board.

I = Jumper closed
o = Jumper opened

a	b	c	d	Output
o	o	o	o	Signal A (VGL1-c1)
o	o	o	I	Signal B (VGL1-c2)
o	o	I	o	Signal C (VGL1-c3)
o	o	I	I	Signal D (VGL1-c4)
o	I	o	o	DCF77 pulse
o	I	o	I	PPS pulse (50 msec)
o	I	I	o	PPS pulse (100 msec)
o	I	I	I	PPS pulse (250 msec)
I	x	x	x	Signal inverted

5.1.2 Signals A-D

The signals A up to D are signals available at the internal VG ledge of the board. There can be used pulses in TTL level and “Dry Contact Pulses” as signals.

- Signal A = Signal at the VG ledge, pin C1
- Signal B = Signal at the VG ledge, pin C2
- Signal C = Signal at the VG ledge, pin C3
- Signal D = Signal at the VG ledge, pin C4

5.1.3 PPS pulses and DCF77 pulse (only with system bus)

On operating the board at the system bus of the systems 6000 and 7001 the board can put out the DCF77 pulse or a PPS pulse, configurable in length, without taking any additional actions at the systems.

Notice: The output of signals via relays with a switching cycle < 10 sec. should be avoided based on the mechanical lifetime of relays.

5.1.4 Signal reversion

Before the output each of the output signals can be reversed on the board via jumper “a” (see the table).

5.2 Configuration active/passive pulses

The output of passive and active pulses from the board are possible. The configuration is realized via jumper directly at the output connector. Please note the following allocation:

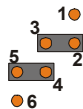
Jumper Bank **JB5** ⇒ Output **X1**

Jumper Bank **JB6** ⇒ Output **X2**

Jumper Bank **JB7** ⇒ Output **X3**

Jumper Bank **JB8** ⇒ Output **X4**

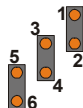
5.2.1 Output of passive pulses



2-3 / 4-5 = Output **PASSIVE**

5.2.2 Output of active pulses (optionally)

In order to put out active pulses, this option must be provided on the board. When there is a voltage for active pulses, its value is shown in the field "**Active Pulse**".



1-2 / 3-4 / 5-6 = Output **ACTIVE**

Notice: Pay attention to the fact that the active pulses are not potential free to each other.

With regard to active pulses those are internally protected against short circuit.

A short circuit of the active pulse does not destroy the components. After a short circuit has released the internal fuse the unit must be switched voltage-free for 20 seconds in order to reset the internal fuse element.

Only specialists are allowed to take it into operation.

5.3 Configuration of digital signal inputs

In this board configuration different digital signals can be read. The output of the read signals is executed at the internal VG ledge. Please note the following allocation:

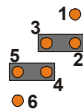
- Signal at **X1** = Output at the VG ledge, pin C9
- Signal at **X2** = Output at the VG ledge, pin C10
- Signal at **X3** = Output at the VG ledge, pin C11
- Signal at **X4** = Output at the VG ledge, pin C12

The configuration is realized via jumper directly at the according input connector X1-X4.

Please note the following allocation:

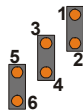
- Jumper Bank **JB5** ⇨ Output **X1**
- Jumper Bank **JB6** ⇨ Output **X2**
- Jumper Bank **JB7** ⇨ Output **X3**
- Jumper Bank **JB8** ⇨ Output **X4**

5.3.1 Reading active pulses from 5-60V DC



2-3 / 4-5 = Active pulse 5-60V DC

5.3.2 Reading of TTL pulses and voltage-free pulses (dry contact)



1-2 / 3-4 / 5-6 = TTL / DRY Contact

Notice: Please pay attention to the fact that in this configuration the inputs are not potential free to each other.

5.3.3 Reversion of read signals

Before the output at the VG ledge each of the read signals can be reversed on the board via jumper "a" (jumper bank JB1-4). In the board configuration with digital inputs the jumper "b", "c" and "d" are not equipped.

6 Connection

The connection is made via four 2-pole, pluggable screw terminals (cable core max. 1.5 mm²).

6.1 Signal output via optical couplers

The internal allocation of the contact depends on the according board configuration.

Passive signal output at X1-X4:

Contact 1 = Collector

Contact 2 = Emitter

Active signal output at X1-X4:

Contact 1 = Active signal

Contact 2 = GND

6.2 Signal output via relays

The internal allocation of the contact depends on the according board configuration.

Passive signal output at X1-X4:

Contact 1 = NO (closing contact)

Contact 2 = COM (common)

Active signal output at X1-X4:

Contact 1 = Active signal

Contact 2 = GND

Notice: The output of signals via relays with a switching cycle < 10 sec. should be avoided based on the mechanical lifetime of relays.

6.3 Digital signal output

The connection of the external signals depends on the according board configuration.

Active signals from 5-60V DC at X1-X4:

Contact 1 = Active signal

Contact 2 = GND

TTL signals and voltage-free signals at X1-X4:

Contact 1 = Signal

Contact 2 = GND

7 Technical Data

General

Dimensions	Euro-board 100 x 160, 3U / 4 HP
Power supply	5V DC \pm 5%
Power consumption (max. with 4 opt. transmitters)	500 mA
Temperature range	
Storage/operation	- 30 ... + 85 °C / 0 ... + 70 °C
Humidity	95 %, not condensed
Standards	CE
Protection	none
MTBF	> 600.000 hours
Electrical parameters (at VG ledge)	TTL compatible

Optical coupler outputs

Passive signal output (dry contact)	U_{\max} : 80V DC I_{\max} : 30mA ohm load *
Active signal output	on request

Relay outputs

Passive signal output (dry contact)	U_{\max} : 80V DC I_{\max} : 200mA ohm load
Active signal output	on request
Expected life (min. operations)	mechanical: 1×10^8

Digital signal inputs

Signal output	active signal with 5-60V DC ** Dry contact ** TTL low active **
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* not TTL compatible

** depending on configuration of jumper banks JB5-JB8

8 Glossary

GPS	Global Positioning System	weltweites Positionierungssystem
UTC	Universal Time Coordinated	UTC Weltzeit mit Korrektur der Schaltsekunde
GPS-UTC	Continuous world time without correction of the leap second	UTC Weltzeit ohne Korrektur der Schaltsekunde
DCF77	German "long wave signal" Frankfurt	Deutscher Langwellensender Frankfurt
IRIG	Inter Range Instrumentation Group	amerikanische militärische Behörde
AFNOR	Association française de normalisation	französische Normenbehörde
NTP	Network Time Protocol	Netzwerk Zeitprotokoll
3D	three dimensional determination of position, longitude, latitude and altitude	3-dimensionaler Empfang von Position, Längen-, Breitengrad und Höhe.
GHz	one billion Hertz	eine Milliarde Hertz
pps	pulses per second	Impulse pro Sekunde
ppb	part per billion = 1E -9	Genauigkeitsangabe 1 : 1 Milliarde
ppm	part per million = 1E -6	Genauigkeitsangabe 1 : 1 Million
msec	one thousandth second	eine tausendstel Sekunde
µsec	one millionth second	eine millionstel Sekunde

