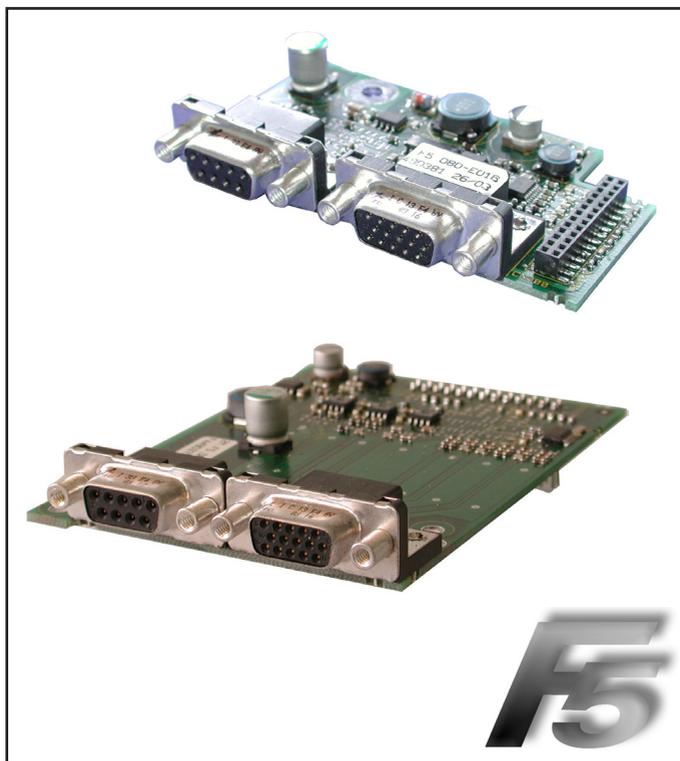


COMBIVERT

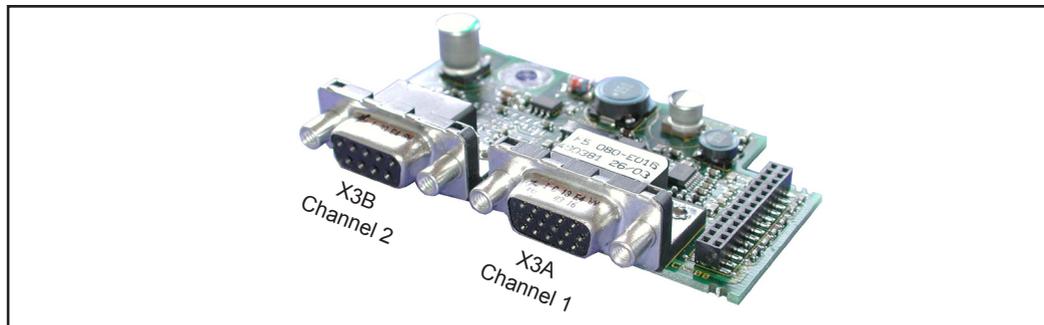


Incremental Encoder Input TTL at Channel 1

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1. Product description



1.1 General

Each of the interface cards delivered by KEB include two interfaces. As there are numerous different combinations available each interface will be described by means of separate instructions. The instruction covers the installation of the interface card, the connection as well as the start-up of a suitable encoder. Further information and the parameter adjustments are described in the application manual for the inverter/servo.

1.2 Description of encoder interface

For encoder type:	Incremental encoder
Voltage level:	TTL
Inputs/Tracks:	A, B and N with the respective inverted signals
Particularities:	alarm at channel 1

1.3 Part number

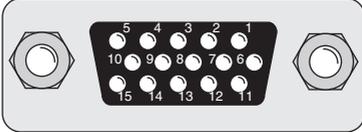
2M.F5.K80- D Z X X

2. Encoder interface	Term of delivery	0: installed	Z: Option, spare part
		4: SSI	D: TTL-output
		7: Tacho sensor	G: TTL-input
		A: Initiator	
applicable for housing size		1: D, E	2: G...U

1.4 Scope of delivery (option or replacement delivery)

- encoder interface
- two instruction manuals
- fixing bolt
- packing material

1.5 Description of socket X3A

Socket X3A		
		
PIN	Name	Description
3	A-	Differential signal to A+
4	B-	Differential signal to B+
8	A+	Incremental encoder track A
9	B+	Incremental encoder track B
11	24V	Voltage output 20...30V
12	5V	Voltage output 5V, power supply for the encoders
13	COM	Reference potential for voltage supply
14	N-	Differential signal to N+
15	N+	Zero track
-	GND	Connection for shield at connector housing - is directly connected with the inverter earth.

1.6 Power supply

1.6.1 Max. load capacity in dependence of voltage supply

Max. load capacity at +5 V: 500mA

Max. load capacity in case of external supply 1A (dependent on external voltage source)

The specified currents are reduced by the current taken from the second interface (see application manual Chapter 6.10). In the case the specified currents are not sufficient an external supply can be connected via the control unit (see application manual Chapter 3.1).

1.6.2 Line length

The maximum line length results from the voltage drop of the supply line. The value is calculated as follows:

$\text{Encoder cable length} = \frac{U - U_{\min}}{I_{\max} \cdot 2 \cdot R}$
max. encoder current input I_{\max} : see encoder description
Supply voltage U : 5,25V
min. supply voltage U_{\min} : 4,75V
KEB encoder cable resistance R : 0,072 Ω /m

1.7 Signal inputs

1.7.1 Technical data

Input resistance:	150 Ω
Logic level:	5V TTL
Limiting frequency:	300 kHz

Encoder line number:	1...16383 Inc (Recommendation: 2500 Inc at rotary speed < 4500 rpm)
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1.7.2 Signal Characteristic of the Encoder

At this TTL-encoder interface the signals A+ and B+ are electrically phase-shifted by 90° rectangular signals with the respective inverted tracks A- and B-.

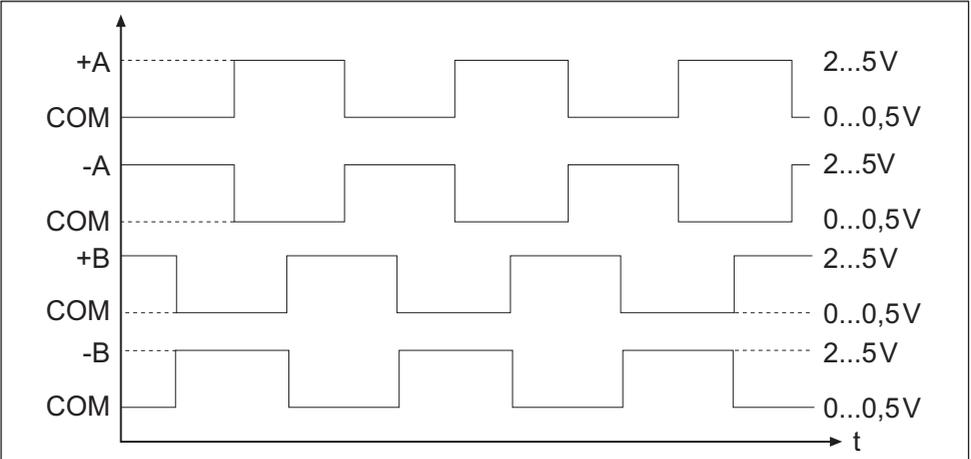


Figure 1.7.2 Signal tracks A+ and B+

1.7.3 Evaluation of the Zero Signal

The zero impulse is required to determine valid position points. In case of pure speed controls the signal does not need to be connected. In the following signal sequence the maximum permissible length of the zero impulse of the encoder is visible. The zero signal will be acquired if A+ ,B+ and N+ are at high level. By that there is only one valid position point which is independent from the travel direction.

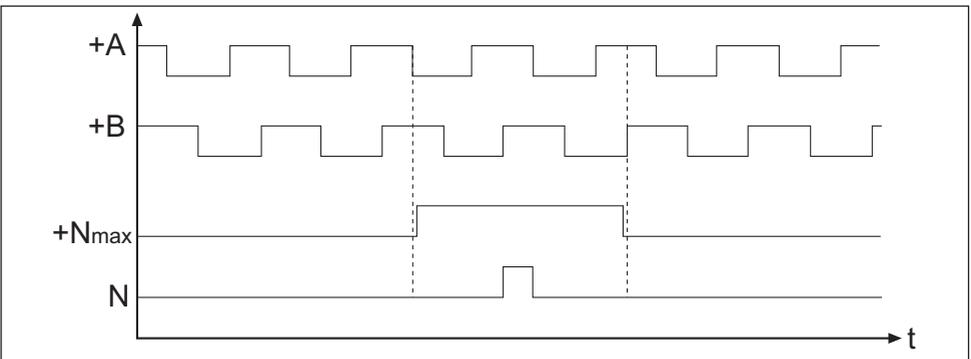


Figure 1.7.3 Evaluation of the Zero Signal

Installation and Start-up

1.7.4 Alarm Input

For a monitoring of the encoder to channel 1 and the encoder cable the signal tracks and the zero track are monitored. If the connected encoder has no zero track, then the the 5V-supply must be assigned to track N+ and COM to N- at the encoder plug. The monitoring for channel 1 will be switched on/off with parameter Ec.20 Bit 2.

The recognition of encoder breakage triggers an „error! Encoder 1“ (value 32), if the voltage between two signal pairs is smaller than 625mV.

2. Installation and Start-up

2.1 Mechanical installation

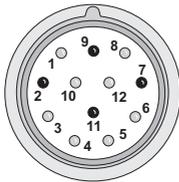
All kind of works on the inverter may be carried out by authorized personnel in accordance with the EMC and safety rules only.

- Switch inverter de-energized and await capacitor discharge time
- Pull off operator
- Remove plastic cover
- Remove fixing bolt
- Fix interface board beginning from the socket connector straightly
- Screw in fixing bolt
- Attach plastic cover

2.2 Electrical installation

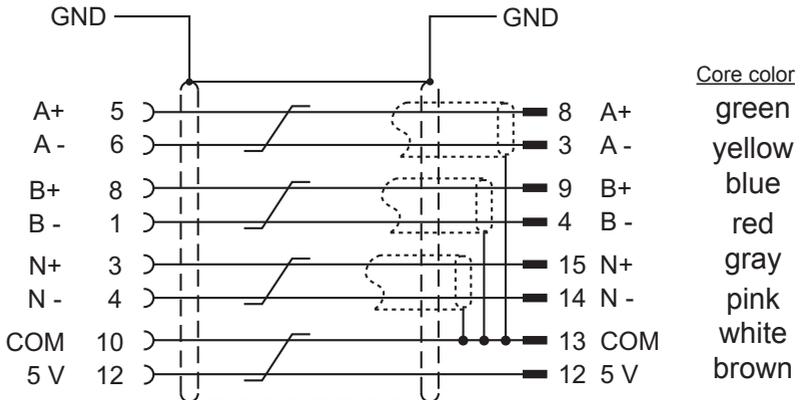
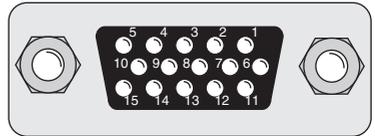
Connection of the encoder cable

Motor encoder plug



Connect-up external shield at the respective connector housing!

Socket X3A



2.3 Tested encoder

The following TTL-incremental encoder have been tested by KEB on it application:

- Heidenhain ROD 426

However, this does not restrict the use of rotary encoder with same specifications of other manufacturers.

2.4 Start-up

After the installation or exchange of an encoder interface some adjustments of the inverter/servo software have to be done before operation:

- Switch on inverter
- Select application mode
- Select parameter Ec.0 and control whether value „1“: incremental encoder input TTL In“ is entered. **The displayed value has to be confirmed by „ENTER“ in any case.**
- Select parameter Ec.1 and adjust increments per revolution
- Select parameter Ec.20 and adjust the alarm function dependent on operation with Bit 2.

2.5 Error Messages

Error messages and their meaning are described in Chapter 9 of the application manual.



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