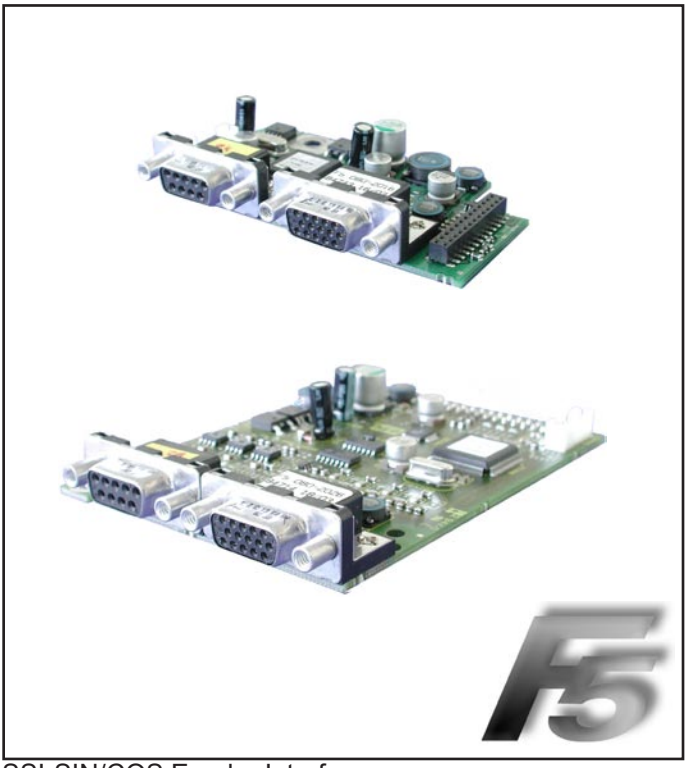
COMBIVERT



SSI-SIN/COS Enoder Interface

DS.F5.ZEM-K010

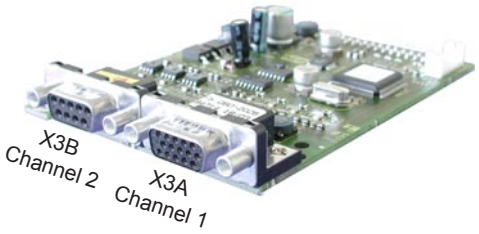
KEB

01/2006

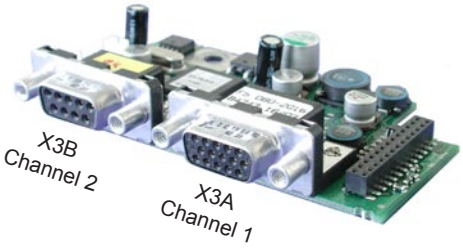
Contents

1. Product description

For housing size G…U



For housing size D and E



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 channel 1

	SSI-SIN/COS
Encoder type:	SIN/COS => Incremental track SSI => Absolute track
Voltage level:	1 Vss
Inputs/Tracks:	A, B (process data channel) Data (parameter channel) Clock (clock signal)
Particularities:	-

1.3 Part number

2M.F5.K8G-P Z 2 X

Term of delivery	0: installed	Z: Option, spare part
2. Encoder interface	V: TTL-output	U: TTL-input
applicable for housing size	1: D, E	2: G…U

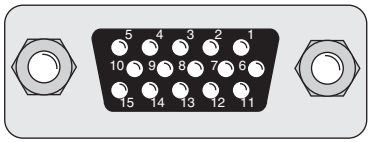
1.4 Scope of delivery (option or replacement delivery)

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

1.5 Description of socket X3A

Socket X3A (top view)

SubD 15pole



PIN	Name	Description
1	-	-
2	-	-
3	A-	Signal input A- (difference signal to A+)
4	B-	Signal input B- (difference signal to B+)
5	-	-
6	Clock+	Clock signal RS485
7	Clock-	Clock signal RS485
8	A+	Incremental signals A for counter and direction detection
9	B+	Incremental signals B for counter and direction detection
10	-	-
11	-	-
12	+5,25 V	Power supply for encoder
13	COM	Reference potential for supply voltage
14	-DATA	data channel RS485
15	+DATA	data channel RS485

1.6 Power supply

1.6.1 Max. load capacity in dependence of voltage supply

Max. load capacity at +5,25 V: 300 mA

The specified current is reduced by the current taken from the second interface (see application manual Chapter 6.10).

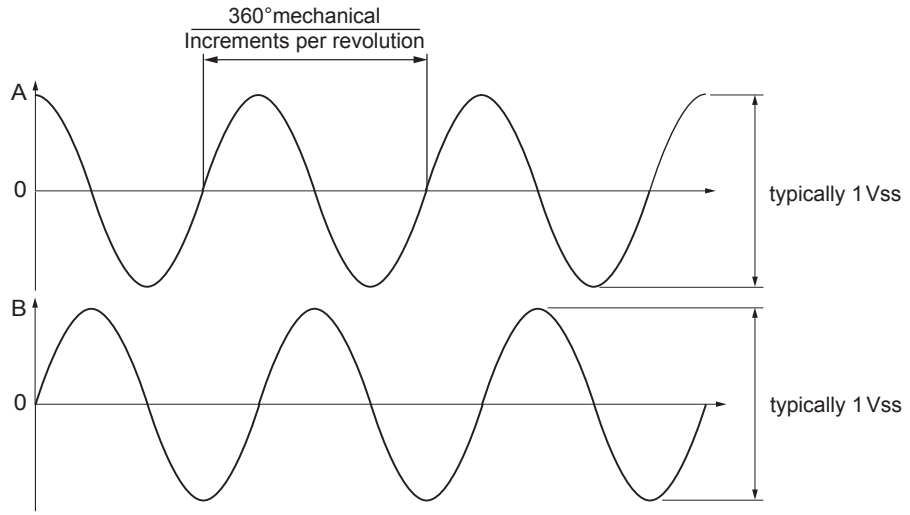
1.7 Signal inputs and outputs

1.7.1 Technical data

Input resistance:	120 Ω
Process data channel:	1 Vss typical (0,6…1,2)
Parameter channel:	EIA RS485 half duplex, synchronous serial
Clock signal output:	EIA RS485
Limiting frequency:	200 kHz
Encoder line number:	1…2048 Inc (Recommendation: 1024 Inc at rotary speed < 4500 rpm
Max. line length:	see annex

1.7.2 Input signals of encoder inputs

Input Signals of the Process Data Channel



Signal form A and B respectively to differential operation

1.7.3 Description of encoder signals

During start-up and then all 30 ms an inquiry is transmitted to the encoder and the absolute position is serial read out. Thus a reference point search is not necessary.
A position difference is tracked after filter with ramp time. If this difference increases to quickly, so that it cannot keep tracked or a max. value is exceeded (e.g.at encoder breakage), the interface state Ec.37 changes to „69“ and the inverter switches off.
The clock signal is used for synchronization.

1.7.4 Encoder breakage recognition

The recognition of encoder breakage is a software function and dependent on the encoder type. It is possible to insert the encoder during operation. By writing on Ec.0 the initialization starts. After fault-free initialization the correct position will be send.
The incremental track is monitored approx. all 16 ms. An error is triggered, if the permissible signal levels are fallen below. Dependent on the encoder type the response time can be 100 ms and more.

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

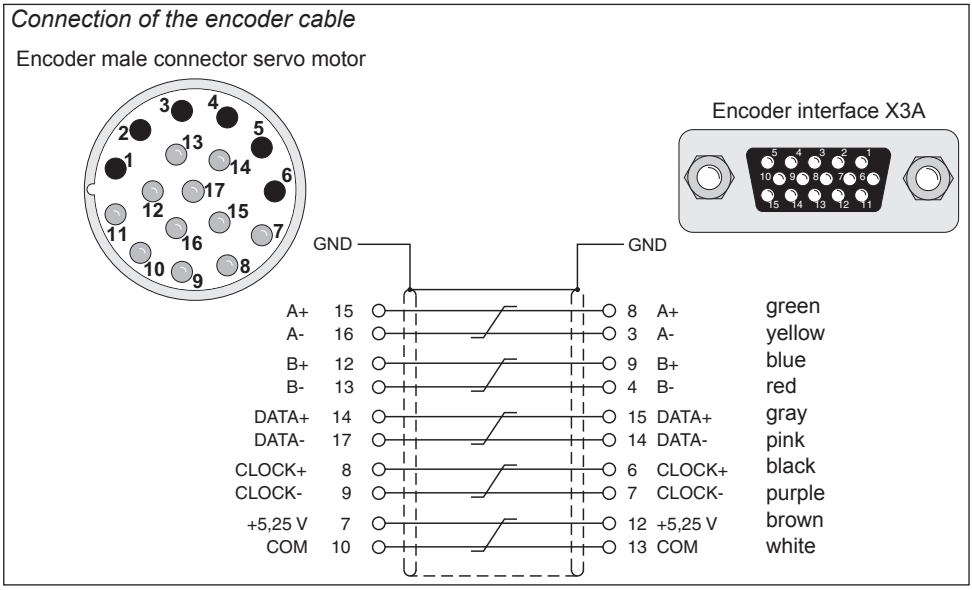
2.2 Encoder

The following encoder can be used dependent on the interface and the control:

Software Interface	Software Control board	Encoder type
<=1.3	–	Encoder with 256 inc./rev. and 10 bit binary SSI-word (e.g. Hübner MHGA 400). At this the following parameters are not adjustable: Ec.1 = 256 Ec.43 = 0 Ec.44 = 10
>= 1.4	>=2.9 (Multi) >=3.2 (A-Servo)	Number of increments per revolution of the encoder as well as data code and data word length of the SSI data word are adjustable (e.g. Heidenhain ECN1313).

2.3 Electrical installation

Connection of the encoder cable



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
- when using synchronous motors set ud.2 to F5-S
- Select parameter Ec.0 and control whether „SSI-SIN/COS“ is entered. **The displayed value has to be confirmed by „ENTER“ in any case.**
- Select parameter Ec.10 and carry out the same for the 2. encoder interface
- Depending on the encoder interface and control card (see 2.2) control/adjust the number of increments per rev. (Ec.1), the SSI data code (Ec.43) and the SSI data word length.
- Select parameter Ec.37 and control encoder status.

2.5 Encoder 1 status (Ec.37)

This parameter displays, by means of different status messages, the status of encoder and interface. Dependent on the encoder only special messages are possible. All errors are only set at control release, although they are already displayed in Ec.37.

The following value is displayed at correct operation:

16: position values are being transferred, encoder and interface are working

The following status messages triggers **„Error Encoder Change“ (E.EncC)** because the correct evaluation of the position is no longer guaranteed:

67: The signals of the incremental track are not correct, e.g. no encoder is connected or the encoder cable is defective.

69: position deviation too high. The position determined by the incremental signals and the absolute position (of absolute track, zero signal or serial selected) does no longer correspond or cannot be corrected.
71: interface type is unknown: Interface has not been recognized.
<98: Interface is busy

Error E.EncC can only be reset via parameter Ec.0.

Following status messages trigger error **„Error Hybrid“ (E.HYb)**:
0, 255: no communication between interface and control card

2.5 SSI Data code (Ec.43)

This parameter adjusts the SSI data format (see also 2.2).

Ec.43	Data format
0	Binary code
1	Gray code

Valid from interface software 1.4 and control card software 3.2

2.6 SSI Data word length (Ec.44)

This parameter adjusts the number of bits of the SSI data word (see also 2.2). Only valid for singleturn encoders.

3. 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 Imax:	see encoder description
Supply voltage U:	5,25 V
min. supply voltage Umin:	4,75 V
KEB encoder cable resistance R:	0,036 Ω/m

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