User Manual

JetMove 1000 – Option Card T1 SinCos/TTL Encoder

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NOTE:

This document does not replace the user manual JM-1000. Please note the information about "Measures for your Safety", "Correct Use" and "Responsibility" that you will find in user manual JM-1000 with the Article numbers (60879030 BA DE; 60879032 BA EN) and JM-1432 with the Article numbers (60879031 BA DE; 60880301 BA EN).

Option card T1 is installed in the JM-1000 servo amplifiers with the option name "T1" in option slot 2.

Option card "T1" is available for JM-1000 and JM-1432.

Please refer to the online help from JetSym for notes on commissioning and configuration for this encoder connection.

Contents

1   Option Card T1 - SinCos/TTL Encoder

1.1   Modes

SinCos encoders are designed as optical encoders and meet the highest requirements with regard to precision. They emit 2 sinusoidal signals A and B that are offset by 90° and that are die scanned with analog-digital converters. The signal periods are counted and the direction of rotation and counting are calculated from the phase position of signals A and B.

Digital interface:

The digital, discrete-time interface is based on a transmission protocol. Current position information is transmitted from the encoder to the receiver. This can be done serially or in parallel. Since transmission is only at certain times, it is a discrete-time interface.

Encoders are specified with regard to their rated voltage and power consumption and their pin assignment. In addition, maximum permitted cable lengths are stated.

The encoder interface X8 allows evaluation of the encoder types listed below. The technical specifications of the various encoder types can be found in the rotary encoder manufacturer's documentation.
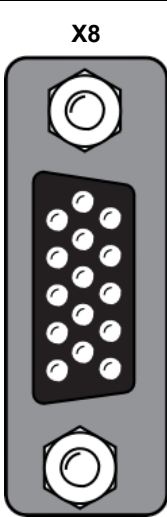
Fig.		Function
Encoder/SinCos	**X8** **female**	SinCos encoder with zero impulse: e.g. Heidenhain ERN1381, ROD486
		Heidenhain SinCos encoder with EnDat interface: e.g. 13-bit single-turn encoder (ECN1313) and 25-bit multi-turn encoder (EQN1325)
		Heidenhain encoder with purely digital EnDat interface: e.g. 25bit single-turn encoder and 12-bit multi-turn encoder (EQN 1337)
		SinCos encoder with SSI interface: e.g. 13-bit single-turn and 25-bit multi-turn encoder (ECN413-SSI, EQN425-SSI)
		Encoder with purely digital SSI interface: e.g. Kübler encoder 12-bit single-turn and 12-bit multi turn (F3663.xx1x.B222)
		TTL encoder with zero impulse: e.g. Heidenhain: ROD 426, ERN 1020

Table 1.1: Encoder types that can be used on X8

⚠ CAUTION!

Only an encoder with purely digital EnDat or SSI interface can be used at the X8 and/or X7 plugs.

1.2   Technical Data

1.2.1   SinCos/TTL Signal Evaluation

Specification			
Interface	■ Differential voltage input, RS422 compatible; Note voltage range! ■ Max. cable length: 100 m ■ Connecting plug: 15-pin D-SUB, High-Density, female ■ Wave terminating resistor integrated in the device: 120 Ω		
	min.	max.	
Input frequency	0 Hz	500 Hz	
Input voltage	min.	max.	
Differential switch signals "High"	+ 0.1 V		
Differential switch signals "Low"		- 0.1 V	
Signal level ground-related	0 V	+ 5 V	

Table 1.2: SinCos/TTL encoder input at X8

1.2.2   Absolute Encoder

Specification			
Interface	■ Complies with RS485 ■ Connecting plug: 15-pin D-SUB, High-Density, socket ■ Wave terminating resistor integrated in the device: 120 Ω		
Frequency:	min.	max.	typ.
EnDat		2 MHz	
SSI		1 MHz	
Output voltage:	min.	max.	typ.
Signal level ground-related	0 V	+ 3.3 V	-
Differential output voltage IUI	1.5 V	3.3 V	Wave resistance ≥ 57 Ω
Input voltage:	min.	max.	typ.
Differential switch signals "High"	- 0.2 V		
Differential switch signals "Low"		- 0.2 V	
Signal level ground-related	- 7 V	+ 12 V	

Table 1.3: Absolute encoder input at X8

1.2.3   Power Supply for External Rotary Encoders

Specification			
	min.	max.	typ.
Output voltage for SinCos, TTL, EnDat, SSI encoders	+ 4.75 V	+ 5.25 V	+ 5 V
Output current for SinCos, TTL, EnDat, SSI encoders		250 mA	

Table 1.4: Power Supply for External Rotary Encoders to X8

NOTE:

The encoder supply to X8/3 is short-circuit-proof when operated at 5 V.

The controller remains in operation, so that a relevant error message can be generated when   the encoder signal is evaluated.

Encoders with a power supply of 5 V ± 5 % must have a separate sensor cable connection. The sensor cable is used to record the actual power supply at the encoder, thus achieving compensation of the voltage drop on the cable.

Only use of the sensor cable ensures that the encoder is supplied with the correct voltage. Always connect the sensor cable.

If a SinCos encoder does not provide a sensor cable, pins 12 and 13 (+/- sense) should be connected to pins 3 and 8 (5 V/Ground) at the cable end of the encoder.

1.2.4   Cable Type and Laying

The cable type should be designed in accordance with the motor/encoder manufacturer's instructions.
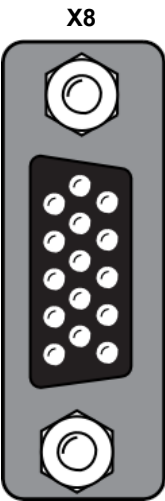
The following conditions must be observed:

- Only use shielded cables
- Apply shield on both sides
- The differential track signals A, B, R or DATA and CLK should be connected via twisted pair cable cores.
- The encoder cable must not be separated, for example to guide the signals via terminals in the switching cabinet.

1.3   Terminal Assignment

Assignment of the 15-pin D-Sub socket at plug-in location X8 is described in the table below.

Connection	Pin	SinCos TTL encoder signal	Absolute encoder SSI, EnDat signal
X8 **Encoder/SinCos** **female**	1	Track A -	
	2	Track A +	
	3	+ 5 V encoder supply	
	4	R+ / Data+	
	5	R- / Data-	
	6	Track B -	
	7	-	
	8	GND	
	9	R-	
	10	R+	
	11	Track B +	
	12	Sense +	
	13	Sense -	
	14		CLK+
	15		CLK-

Table 1.5: Terminal Assignment of Encoders to X8

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