

DESCRIPTION



FSoE slave module for safe speed and Position of up to 6 axes for further evaluation in an FSoE master module

- Depending on the encoder type and combination, applications up to PL e or SIL3 can be realized
- Update time minimal up to 1 ms
- 1 ms for safe data; 62,5 µs for non-safe encoder values
- Optional additional safe inputs and outputs

CHARACTERISTIC OF THE MODULE

- » Secure detection of speed and position for up to 6 axes suitable for applications up to SIL3 (IEC 61508) / PL e (EN ISO 13849-1)
- » Parametrisable interface for digital and analog digital encoders
- » With an update time of minimal up to 1ms, applications with a high dynamic security requirement can also be implemented
- » Time resolution 1 ms for safe data of speed and position, 62.5 µs for non-safe encoder values
- » Optional: additional safe inputs and outputs (8/10)
- » The mechanical construction of the SSB-x* is dependent on the respective forms of the module

SAFETY RELATED CHARACTERISTIC DATA

Performance Level	PL e (EN ISO 13849-1)	
PFH / architecture	EnDat 2.2	DSL
MTTFd	1,713*10 ⁻⁸ / Cat. 4	1,795*10 ⁻⁸ / Cat.4
DCavg	43 years	41,7 years
Safety Integrity Level	high	high
Proof test interval	SIL 3 (IEC 61508)	
	20 years = max. operating period	

GENERAL DATA

Number of safe digital inputs (optional)	8
Number of safe digital outputs (optional)	10
Resolution of safe speed	2 ¹⁶
Resolution secure position	2 ²⁴
Resolution non-safe position	up to 2 ⁴⁸
Cycle time safe data	Min 1 ms
Cycle time non-safe data	Min 62,5 µs
Number of pulse outputs (clock outputs)	2
Type of Connection	plug connector
Encoder	M8-plug
EtherCAT fieldbus interface	M12-plug
Supply voltage device	M12-plug
Supply voltage I/O	M12-plug
Axis monitoring (axis / encoder interfaces)	
	SSB-3-x 3 / 6
	SSB-6-x 6 / 6
Encoder technology*	EnDAT 2.2, Hiperface DSL, Digital-analogue Encoder technology (in preparation)
Encoder voltage supplies (monitoring)	5 V, 8V, 10V, 12V, 20V, 24V

* see „ encoder specifications“

ELECTRICAL DATA

Supply voltage	19,2 V ... 30 V, Typ SELV / PELV	
Fuse	device supply	8A
	brake supply	8A
Max. Power consumption (logic)	SSB-x	3 W
Rated data digital inputs	24 VDC; 20 mA, Typ1 acc. to EN 61131-2	
Rated data digital outputs	4x 0,5A, 5x 1A, 1x 2A	
	2x	SDO_7 - 8 0,5 A (leakage current <1,2 mA)
	5x	SDO_1 - 5 1 A (leakage current < 5 mA)
	1x	SDO_6 2 A (leakage current < 5mA)
		pulse outputs (clock outputs) 2x 0,5 A
Securing of voltage supply device / outputs	2A / 10 A	

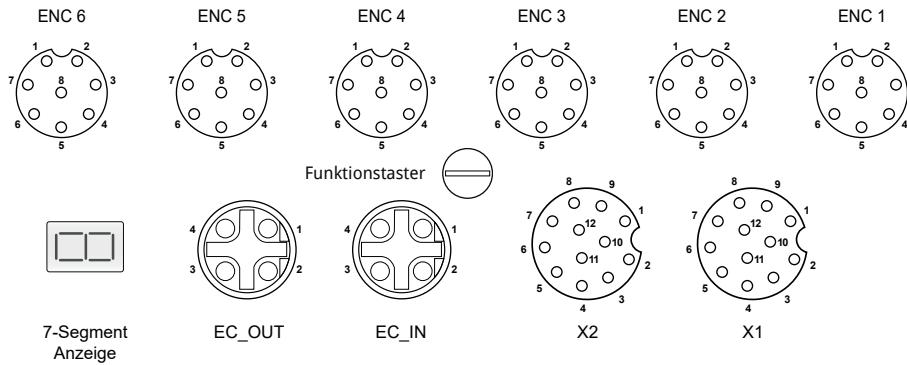
ENVIRONMENTAL DATA

Temperature	0°C ... +50°C operation
	-25°C ... +70°C storage and transport
Class of protection	IP 67
Climatic category	3K3 acc. to DIN EN 60721-3
Min-, Maximum relative humidity (no condensation))	5% - 85%
EMC	DIN EN 55011, DIN EN 61000-6-2, DIN EN 61131-2:2007

MECHANICAL DATA

Dimension (HxDxW [mm])	SSB-x	ca. 64x176x170mm
Weight [g]	SSB-x	720
Mounting	mounting plate	

DEVICE INTERFACES

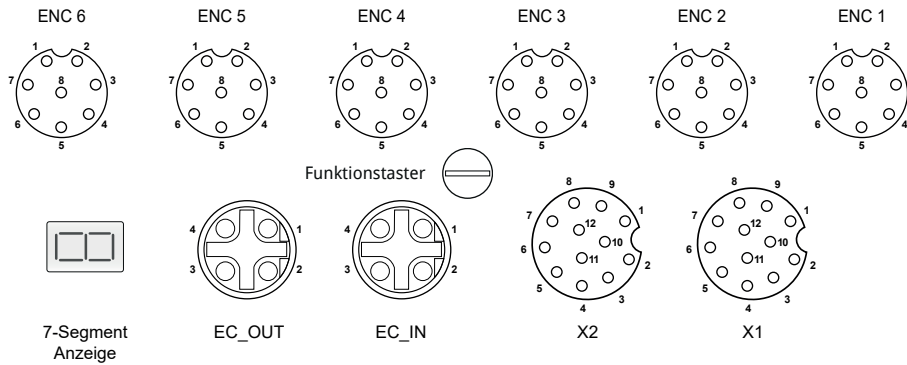


PIN ASSIGNMENTS SSB-6-ENdAT

EC_IN			X2 (optional)			X1			
Pin	1 - TX1_P	Transmit Data +	Pin	1 - SDO_8	Safe digital output	Pin	1 - DI_2	Safe digital Input (optional)	
	2 - RX1_P	Receive Data +		2 - SDO_7	Safe digital output		2 - DI_1	Safe digital Input (optional)	
	3 - TX1_N	Transmit Data -		3 - U24_A_EXT	Voltage supply device +24 VDC		3 - GND	Voltage supply device 0 VDC	
	4 - RX1_N	Receive Data -		4 - U24_A_EXT	Voltage supply device +24 VDC		4 - DI_8	Safe digital Input (optional)	
EC_OUT				5 - U24_A_EXT	Voltage supply device +24 VDC		5 - DI_7	Safe digital Input (optional)	
Pin	1 - TX2_P	Transmit Data +		6 - U24_A_EXT	Voltage supply device +24 VDC		6 - DI_6	Safe digital Input (optional)	
	2 - RX2_P	Receive Data +		7 - GND	Voltage supply device 0 VDC		7 - DI_5	Safe digital Input (optional)	
	3 - TX2_N	Transmit Data -		8 - P2	Clock output		8 - DI_4	Safe digital Input (optional)	
	4 - RX2_N	Receive Data -		9 - P1	Clock output		9 - DI_3	Safe digital Input (optional)	
ENC 1-6				10 - GND	Voltage supply device 0 VDC		10 - U24+	Voltage supply device +24 VDC	
Pin	1 - ENC_x_DATA_P	Encoder Data input +		11 - GND	Voltage supply device 0 VDC		11 - GND	Voltage supply device 0 VDC	
	2 - ENC_x_DATA_N	Encoder Data input -		12 - GND	Voltage supply device 0 VDC		12 - U24+	Voltage supply device +24 VDC	
	3 - ENC_x_CLK_P	Encoder Clock +							
	4 - ENC_x_CLK_N	Encoder Clock -							
	5 - UB_ENC_x	Voltage supply encoder +							
	6 - GND	Ground							
	7 - SDO_x	Safe digital output							
	8 - GND	Ground							

x = 1 ... 6

DEVICE INTERFACES



PIN ASSIGNMENTS SSB-6-DSL

EC_IN		
Pin	1 - TX1_P	Transmit Data +
	2 - RX1_P	Receive Data +
	3 - TX1_N	Transmit Data -
	4 - RX1_N	Receive Data -
EC_OUT		
Pin	1 - TX2_P	Transmit Data +
	2 - RX2_P	Receive Data +
	3 - TX2_N	Transmit Data -
	4 - RX2_N	Receive Data -
ENC 1-6		
Pin	1 - DSLx_P	Encoder Data input +
	2 - DSLx_N	Encoder Data input -
	3 - NC	No function
	4 - NC	
	5 - NC	
	6 - NC	
	7 - NC	
	8 - NC	

X2 (optional)*		
Pin	1 - SDO_8	Safe digital output
	2 - SDO_7	Safe digital output
	3 - U24_A_EXT	Voltage supply device +24 VDC
	4 - U24_A_EXT	
	5 - U24_A_EXT	Voltage supply device +24 VDC
	6 - U24_A_EXT	
	7 - GND	Voltage supply device 0 VDC
	8 - P2	Clock output
	9 - P1	
	10 - GND	Voltage supply device 0 VDC
	11 - GND	
	12 - GND	

X1		
Pin	1 - DI_2	Safe digital Input (optional)
	2 - DI_1	
	3 - GND	Voltage supply device 0 VDC
	4 - DI_8	Safe digital Input (optional)
	5 - DI_7	
	6 - DI_6	Safe digital Input (optional)
	7 - DI_5	
	8 - DI_4	Safe digital Input (optional)
	9 - DI_3	
	10 - U24+	Voltage supply device +24 VDC
	11 - GND	Voltage supply device 0 VDC
	12 - U24+	Voltage supply device +24 VDC

x = 1 ... 6

* = SSB-6-DSL optional available with I/O's

ENCODER SPECIFICATIONS

EnDAT 2.2		
Standard specification	Mixed / Clk+ Date	
Resolution	12 bit multi turn (only EQI) 19 bit single turn for non-safe position 10 bit single turn for safe position	
Clock frequency	10 MHz	
Sampling cycle	Non-safe position: 62,5 µs, safe position. 1 ms	
Transmission of non-safe position (EtherCAT)	62,5 µs / 125 µs / 250 µs (configurable)	
Hiperface DSL		
Standard specification	Mixed / Clk+ Date	
Resolution	11 bit / 12 bit multi turn (only EKM) 18 bit / 20 bit single turn for non-safe position 9 bit single turn for safe position	
Sampling cycle	Non-safe position: 125 µs, safe position. 1 ms	
Transmission of non-safe position (EtherCAT)	125 µs / 250 µs (configurable)	
SinCos / TTL		in preparation
Max. Frequency	500 kHz	
Amplitude SinCos	1 VSS + / - 0,3 V	
Phase fault	max. 30°	
Type of connection	M8-plug	
SSI-Absolut		in preparation
Data interface	Serial Synchronous Interface (SSI) with variable data length of 12 – 28 bits	
Data format	Binary, gray-code	
Type of connection	M8-plug	
Mode	Master or Listener	
SSI-Master operation		
clock rate	250 - 1500 kHz	
SSI-Listener operation		
clock rate	250 - 1500 kHz	
Max frame length/data length	32 / 28	
Resolver		in preparation
Input	max. 16 VSS (an 16 Ω)	
Resolution	9 Bit / Pol	
Support poles	2 - 16	
Type of connection	M8-plug	
Mode	Master or Listener	
Resolver Master operations		
Reference frequency	8 kHz	

Resolver Listener operations	
Reference frequency	4 kHz - 16 kHz
Reference amplitude	8 VSS - 28 VSS
Reference signal	Sinusoidal, triangle
Transmission ratio	2:1, 3:1, 4:1
Phase fault	max. 8°

ENCODER COMBINATIONS

		2. Encoder				
		1. Encoder	none	SSI	SinCos	Resolver
6-axis	EnDAT 2.2	V/P ¹⁾				
	Hiperface DSL	V/P ¹⁾				
	SinCos ⁴⁾	V ²⁾				
	Resolver ⁴⁾	V				
	TTL ⁴⁾	V ³⁾				
3-axis	EnDAT 2.2		V/P	V/P	V/P	V/P
	Hiperface DSL		V/P	V/P	V/P	V/P
	SSI ⁴⁾		V/P	V/P	V/P	V/P
	SinCos ⁴⁾			V	V	V
	Resolver ⁴⁾			V	V	V
	TTL ⁴⁾			V	V	V

SIL2/PL d
SIL3/PL e

- V safe speed
- P safe position
- ¹⁾ SIL3/PL e in preparation
- ²⁾ SIL3/PL e only in conjunction with qualified encoder types
- ³⁾ Only allowed for dynamic monitoring (no standstill monitoring)
- ⁴⁾ in preparation

ORDER INFORMATIONS

SLAVES

	item	description	item no.
	SSB-6-EnDAT	FSoE Slave, Axes enhancement module 6 Axes, EnDat2.2, without IO	1656
	SSB-6-EnDAT	FSoE Slave, Axes enhancement module 6 Axes, EnDat2.2 with IO	on request
	SSB-6-DSL	FSoE Slave, Axes enhancement module 6 Axes, HiperfaceDSL, without IO	1665
	SSB-6-DSL	FSoE Slave, Axes enhancement module 6 Axes, HiperfaceDSL, with IO	on request
in preparation	SSB-3-AD	FSoE Slave, Axes enhancement module 3 Axes, digital / analog Encoder, without IO	on request
in preparation	SSB-3-AD	FSoE Slave, Axes enhancement module 3 Axes, digital / analog Encoder, with IO	on request