SDU-11/NM

*SCU*SERIE » *SCU Slaves*

DESCRIPTION

EtherCAT/PROFINET slave module for safe speed and Position of 1 axis for further evaluation in an master device.

- 14 safe digital inputs
- 3 Encoder interfaces
- 2 Relay / pulse outputs
- 2 Auxiliary outputs
- Up to 4 safe digital outputs
- 1 additional fieldbus interface
- Safety controller up to PL e acc. to EN ISO 13849-1
  or SIL3 acc. to IEC 61508

CHARACTERISTIC OF THE MODULE

» Decentralized safe axle assembly for the EtherCAT environment
» Safe detection of speed and position from one axis
» Complete speed and position-related safety functions for drive monitoring IEC 61800-5-2 integrated into firmware
» Speed monitoring
» RPM-monitoring
» Standstill monitoring
» Sense of rotation monitoring
» Safe incremental dimension
» Emergency Stop monitoring
» Position monitoring
» Position range monitoring
» Trend range monitoring
» Target position monitoring
» Pulse outputs for cross-shorting detection of digital input signals
» External contact monitoring of connected switchgear (EMU)
» Monitored relay outputs for safety-relevant functions
» Switchable safe semi-conductor outputs pn-, pp-switching for safety-relevant functions
» Functionplan-oriented parametrization
» Parameter management for expansion modules in base device
» Comprehensive diagnostics functions integrated
» Multifunction button (Quit, Start, Reset) can be operated from the front side
» Coded status display via front-side 7 segment display and status LEDs
» Additional fieldbus interface: EtherCAT, PROFINET

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SAFETY RELATED CHARACTERISTIC DATA

Performance Level	PL e (EN ISO 13849-1)
PFH / architecture	$2,0 * 10^{-9}$ / Cat 4
Safety Integrity Level	SIL 3 (IEC 61508)
Proof test interval	20 years = max. operating period

GENERAL DATA

Max. no. of expansion modules		–
Interface for expansion modules		–
Number of safe digital inputs		14
Number of safe digital outputs		
	pp-switching *	4
	pn-switching *	2
Number of safe digital I/O		–
Number of relay outputs		2
Number of safe analogue inputs		–
Number of auxiliary outputs		2
Number of pulse outputs (clock outputs)		2
Type of connection		Plug-in terminals with spring or screw connection
Axis monitoring		1
Encoder interfaces (D-Sub / screw terminals/ virtual EtherCAT-interface)		1 / 1 / 1 **
Encoder technology (See Encoder specifications)		**D-SUB Enc 1.1:** SSI-Absolut, SinCos, Incremental-TTL **Terminal X23:** HTL proximity sensor (10kHz) **Fieldbus:** speed and position via EtherCAT
Cycle time PLC		8 ms
Fast Channel		2 ms
Safe Slave		PROFIsafe

* pn/pp are configurable via SafePLC²

** maximum 2 encoder / axis

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ELECTRICAL DATA

Supply voltage (tolerance)		24 VDC; 2A (-10%, +20%)
Fuse	X11.1 / 24+	min. 30 VDC; max. 3,15A
	X11.2 / AQ1+	min. 30 VDC; max. 10A
Max. Power consumption (logic)		
	SDU-11/NM	5,2 W
Rated data digital inputs		24 VDC; 20 mA Typ1 acc. to IEC 61131-2
Rated data digital outputs		
	pn-switching	24 VDC; 2A
	pp-switching	24 VDC; 2A
	auxiliary outputs	24 VDC; 250mA
	pulse outputs (clock outputs)	24 VDC; 250mA
Rated data relays		
Normally open	DC 13	24 VDC; 2A
	AC 15	230 VAC; 2A

DERATING OUTPUTS

» **Maximum current load based on temperature.**
» **The maximum total current is 10A.**

type of module	outputs	temperature 30°C / 50°C
SDU-11/NM	QX 00 – QX 03	2A / 1,8A

*2A outputs can be fully loaded at an ambient temperature of up to __30°C__.
__From__ a ambient temperature from __30°C__ to maximum __50°C__, the 2A outputs can be loaded to a maximum of __1.8A__.*

*The maximum total current is __10A__. (IO-Board)*

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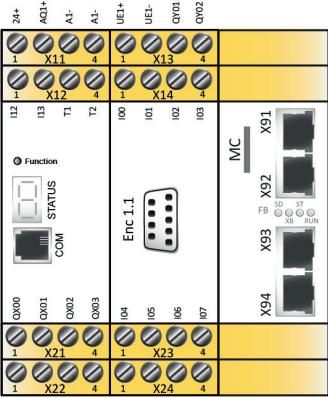
ENVIRONMENTAL DATA

Temperature	0°C … +50°C operation
	-25°C … +70°C storage and transport
Class of protection	IP 20
Climatic category	3K3 acc. to DIN EN 60721-3
Min-, Maximum relative humidity (no condensation)	5% - 85%
EMC	DIN EN 61000-6-2, DIN EN 61000-6-4, DIN EN 61000-6-7, DIN EN 61800-3, DIN EN 61326-3, DIN EN 62061
Operating altitude	2000m

MECHANICAL DATA

Dimension (HxDxW [mm])	SDU-11/NM	100x115x67,5
Weight [g]	SDU-11/NM	390
Mounting		to snap on top-hat rail
Min. terminal cross-section / AWG		0,2 mm² / 24
Max. terminal cross-section / AWG		2,5 mm² / 12

BBH PRODUCTS GMBH

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SDU-11/NM

SCU*SERIES* » SCU Slaves

DEVICE INTERFACES

Slave

Interface	Description of interface
X11 – X14 / X21 – X24	Voltage supply and I/O interface
COM	Diagnostic- and configuration interface
X91 - ECAT IN / X92 - ECAT OUT	Fieldbus interface
X93 / X94	Fieldbus interfaces *
X23 / Enc 1.1	Encoder interfaces
* configurable via SafePLC²	

VOLTAGE SUPPLY AND I/O INTERACE

X11		
Pin	1 - 24+	Voltage supply device +24 VDC
	2 - AQ1+	Voltage supply device +24 VDC outputs
	3 - A1-	Voltage supply device 0 VDC
	4 - A1-	

X12		
Pin	1 - I12	Safe digital inputs
	2 - I13	
	3 - T1	Clock outputs
	4 - T2	

X21		
Pin	1 - QX00	Safe output pn-/ pp-switching 00
	2 - QX01	Safe output pn-/ pp-switching 01
	3 - QX02	Safe output pn-/ pp-switching 02
	4 - QX03	Safe output pn-/ pp-switching 03

X22		
Pin	1 - QR0L	Safe relay input
	2 - QR0	Safe relay output
	3 - QR1L	Safe relay input
	4 - QR1	Safe relay output

X13		
Pin	1 – UE1+	Voltage supply +24 VDC encoder
	2 – UE1-	
	3 - QY01	Auxiliary outputs
	4 - QY02	

X14		
Pin	1 - I00	Safe digital inputs
	2 - I01	
	3 - I02	
	4 - I03	

X23		
Pin	1 - I04	Safe digital inputs
	2 - I05	
	3 - I06	
	4 - I07	

X24		
Pin	1 - I08	Safe digital inputs
	2 - I09	
	3 - I10	
	4 - I11	

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DIAGNOSTIC AND CONFIGURATION INTERFACE

Pinbelegung
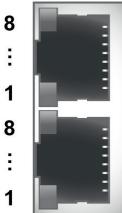
RJ 10, 4-pin		
Pin	Description	COM front side
1	GND	
2	RS485-	
3	RS485+	
4	VCCH	

» With existing Ethernet-based fieldbus interface, it can be used as a diagnostic and configuration interface.

FIELDBUS INTERFACES

Pin assignment female connector

EtherCAT interface and safe fieldbus interface (RJ45)				
Pin	Name	Description	Colour	X91 / X92 , X93 / X94
1	TX+	Transmit Data +	white-orange	
2	TX-	Transmit Data -	orange	
3	RX+	Receive Data +	white-green	
4	nc	Not used	blue	
5	nc	Not used	white-blue	
6	RX-	Receive Data -	green	
7	nc	Not used	white-brown	
8	nc	Not used	brown	

INTEGRATED COMMUNICATION INTERFACE

» The integrated communication interface includes a EtherCAT interface and one interface for ethernet-based fieldbuses or safe interface (PROFIsafe) for decentralized communication with a master device.

General data			
Fieldbus interfaces			
X91 / X92	EtherCAT	2x RJ 45	
X93 / X94	/N	2x RJ 45*	
Memory Card (safety program)			
	/xM		1x Mini SD (front side)
Status LED`s	3		

* available fieldbusses: EtherCAT, Ethernet TCP/IP, Modbus TCP/IP and PROFINET / PROFIsafe

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ENCODER INTERFACES

Pin assignment Enc 1.1

Pin	Inc / Sin/Cos / SSI	Front side SDU
1	n.c.	
2	GND_ENC	
3	n.c.	
4	B- / COS - / Clk -	
5	A + / SIN + / Data +	
6	A- / SIN - / Data -	
7	n.c.	
8	B+ / COS + / Clk +	
9	U_ENC	

Enc 1.1

Pin assignment X23

Pin	Z1 – Z1 / Z2 – Z2	Terminal
1	$A (\bar{A}) / A (\bar{A})$	
2	$-- / B (\overline{B})$	
3	$A (\bar{A}) / A (\bar{A})$	
4	$-- / B (\overline{B})$	

IO4 IO5 IO6 IO7

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ENCODER SPECIFICATIONS

Incremental - TTL	
Physical Layer	RS-422 compatible
Measuring signal A/B	Track with 90 degree phase difference
Type of connection	D-SUB 9pole
Max. frequency of input cycles (X31)	200 kHz

Sin/Cos	
Physical Layer	RS-422 compatible
Measuring signal A/B	Track with 90 degreee phase differnece
Type of connenction	D-SUB 9pole
Standard Mode	
Max. frequency of input clock pulses (X31)	200 kHz
High Resolution Mode	
Max. frequency of input clock pulses (X31)	–

SSI-Absolut	
Data interface	**S**erial **S**ynchronous **I**nterface (**SSI**) with variable data length of 12 – 28 Bit
Data format	Binary, Gray code
Physical Layer	RS-422 compatible
Type of connenction	D-SUB 9pole
Mode	**Listener**
SSI Listener Mode	
Clock rate (Enc 1.1.)	100 kHz ... 250 kHz
Min. clock pause time	150 µsec
Max. clock pause time	1 msec

HTL proximity sensor	
Signal level	24V / 0V
Max. counting pulse frequency (circuit logic de-bounced)	10 kHz
Pulse width	50 µsec
Type of connection (X23)	Plug-in terminals with spring or screw connection

HTL proximity switch - extended monitoring	
Signal level	24V / 0V
Max. counting frequency (circuit logic de-bounced)	4 kHz
Physical Layer	PUSH / PULL
Measuring signal A/B	Track with 90 degree phase difference
Type of connection (X23)	Plug-in terminals with spring or screw connection

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ORDER INFORMATION

SLAVE DEVICE

item	description	item no.
SDU-11/NM	Decentralised axis expansion module for one axis with additional fieldbus interface	2471

ACCESSORIES

item	description	item no.
SMX91	Programming adapter	1010
PROFIsafe License	Fieldbus license for PROFIsafe	2319
SX*xxxx-x*	Terminal connector, screw terminals (set), encoded for cabling SDU-11/NM	on request
SX*xxxx-x*	Terminal connector, spring terminals (set), encoded for cabling SDU-11/NM	on request

SOFTWARE

item	description	item no.
SafePLC² 1st	Programming software, 1te License incl. Hardlock	1244
SafePLC² 2nd	Programming software, 2te License incl. Hardlock	1646
SafePLC² 3rd	Programming software, 3te License incl. Hardlock	1647

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