



DESCRIPTION

Open programmable and configurable FSoE master unit for operation on EtherCAT networks.

- Interface for up to 6 safe scanner units
- 16 Safe digital inputs
- 10 Safe digital Outputs
- 2 Configurable pulse outputs or safe digital outputs
- 2 Relay outputs
- Safety controller up to PL e acc. to EN ISO 13849-1 or SIL3 acc. to IEC 61508
- cULus approval

CHARACTERISTIC OF THE MODULE

- » Safe logic processing of input, output, status and activation signals
- » Easy and transparent programming and parametrization via SafePLC²
- » Scanner master functions, activation of monitoring areas and computing of monitoring result status
- » Complete set of Drive monitoring
- » Deterministic data communication and processing for safe position und speed functions via distributed sensor / multiple axes
- » Special AGV functions
- » Storage of safe parameters in the base module
- » Status LEDs for IO
- » Multifunction button (Quit, Start, Reset) front side
- » Integrated Communication interface :
 - EtherCAT interface and FSoE MainInstance stack for safe connectivity to higher levels of control
 - or Modbus TCP/IP
- » Optional: SARC functionality, see orderinformation: accessories

SAFETY RELATED CHARACTERISTIC DATA

Performance Level	PL e (EN ISO 13849-1)
PFH / architecture	PFH = $1,24 \cdot 10^{-8}$
Safety Integrity Level	one channel mode: Cat. 3 (EN 13849-1) / SIL2 (IEC61508) two channel mode: Cat. 4 (EN 13849-1) / SIL3 (IEC 61508)
Proof test interval	20 years = max. operation period

GENERAL DATA

Max. no. of expansion modules	2x Axis or 4x IO
Interface for expansion modules	2x RJ-45 (Ethernet)
Number of safe digital inputs	16
Number of safe digital outputs	
	pp-switching * 6 + 2** + 4
	pn-switching * 2
Number of relay outputs	2
Number of pulse outputs (clock outputs)	2 (configurable)**
Number of scanner connections (data interface)	6
Type of connection	Plug-in terminals with spring or screw connection

* pn/pp are configurable via SafePLC²

** configurable 2 pulse outputs or 2 pp-switching outputs

ELECTRICAL DATA

Supply voltage (tolerance)	24 VDC; 2A (-35%, +30%)
Fuse (should be provided)	Voltage supply device +24 VDC min. 32 VDC; max. 2A
	Voltage supply I/O +24 VDC min. 32 VDC; max. 10A
Max. Power consumption (logic)	
	SSCU/1 4,7 W
Rated data digital inputs	24 VDC; 20 mA Type 2 acc. to IEC 61131-2
Rated data digital outputs	24 VDC; 0,5A
	pn-switching 24 VDC; 2A
	pp-switching 24 VDC; 2A
	pulse outputs (clock outputs) 24 VDC; 250mA
Rated data relay outputs	240 VAC; 24 VDC; 2A

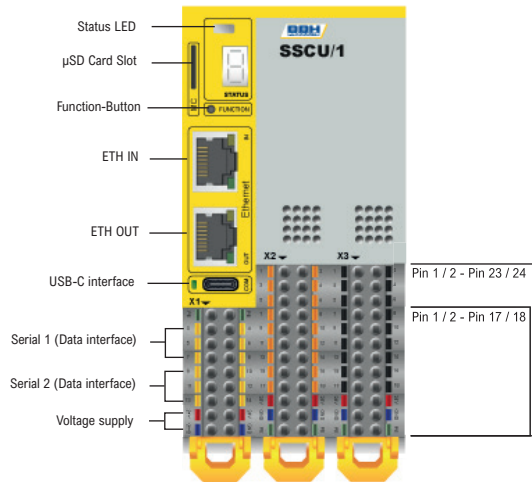
ENVIRONMENTAL DATA

Temperature	-25°C ... +55°C operation
	-25°C ... +70°C storage and transport
Class of protection	IP 20, connectors IP00 EN 60529
Climatic category	3K24 acc. to DIN EN 60721-3-3
Pollution class	2, EN 60664-1
EMC	DIN EN 61800-3, DIN EN 61800-5-1, DIN EN 62061, DIN EN 62477-1, DIN EN 55011
Shocks	15g/11ms, 10G/16ms and 5G/11ms in all three axes
Vibration/shock resistance	conforms to EN 60068-2-6 / EN 60068-2-27, IEC 60068-2-64
Max. appl. height	≤ 2000m

MECHANICAL DATA

Dimension (HxDxW [mm])	SSCU/1	124 x 95 x 57
Weight [g]	SSCU/1	326
Mounting		to snap on top-hat rail
Min. terminal cross-section / AWG		0,2 mm ² / 24
Max. terminal cross-section / AWG		1,5 mm ² / 16

DEVICE INTERFACES



Interface	Description of interface
X1 / Serial 1, Serial 2	Data Interface
X2 / I0.0-I0.15	Voltage supply and I/O interfaces
X3 / Q0.0-Q0.7, Q0.8-Q0.11, Q0.1x_Rx, P1-P2	I/O Interface
ETH OUT / ETH IN	Fieldbus interfaces
USB-C	Data interface
µSD Card Slot	Data interface

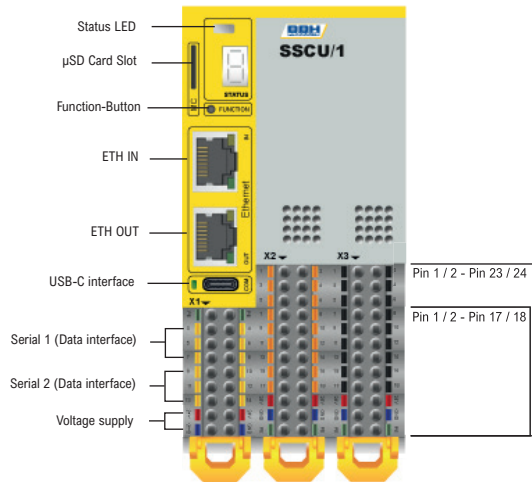
DATA INTERFACE, VOLTAGE SUPPLY & I/O INTERFACE

Pin assignment

X1			
Pin	1 – PE	2 – PE	Protective earth
	3 – UART_1+	4 – UART_1-	
	5 – UART_1+	6 – UART_1-	Serial interface 1
	7 – UART_1+	8 – UART_1-	
	9 – UART_2+	10 – UART_2-	Serial interface 2
	11 – UART_2+	12 – UART_2-	
	13 – UART_2+	14 – UART_2-	Voltage supply scanner
	15 – VCC_IN	16 – VCC_OUT	
17 – GND	18 – GND	Voltage supply 0 VDC	

X2				
Pin	1 – NC	2 – NC	Safe digital inputs	
	3 – I0.0	4 – I0.8		
	5 – I0.1	6 – I0.9		
	7 – I0.2	8 – I0.10		
	9 – I0.3	10 – I0.11		
	11 – I0.4	12 – I0.12		
	13 – I0.5	14 – I0.13		
	15 – I0.6	16 – I0.14		
	17 – I0.7	18 – I0.15		
	19 – VCC_IN	20 – VCC_IN		Voltage supply device +24 VDC
	21 – GND	22 – GND		Voltage supply device 0 VDC
	23 – PE	24 – PE		Protective earth

DEVICE INTERFACES



Interface	Description of interface
X1 / Serial 1, Serial 2	Data Interface
X2 / I0.0-I0.15	Voltage supply and I/O interfaces
X3 / Q0.0-Q0.7, Q0.8-Q0.11, Q0.1x_Rx, P1-P2	I/O Interface
ETH OUT / ETH IN	Fieldbus interfaces
USB-C	Data interface
µSD Card Slot	Data interface

I/O INTERFACE AND VOLTAGE SUPPLY

Pin assignment

X3				
Pin	1 – Q0.0	Safe digital outputs	2 – P1	Non-safe pulse output
	3 – Q0.1		4 – P2	Non-safe pulse output
	5 – Q0.2		6 – Q0.8_PP/Q0.8_P	Safe output pn- / pp switching 00
	7 – Q0.3	Safe digital outputs	8 – Q0.9_PP/Q0.9_N	Safe output, pn- / pp switching 01
	9 – Q0.4		10 – Q0.10_PP/Q0.10_P	Safe output, pn- / pp switching 02
	11 – Q0.5		12 – Q0.11_PP/Q0.11_N	Safe output, pn- / pp switching 03
	13 – Q0.12_R1.1	Relay output 1	14 – Q0.12_R1.2	Relay output 1
	15 – NC	No function	16 – NC	No function
	17 – Q0.14_R2.1	Relay output 2	18 – Q0.14_R2.2	Relay output 2
	19 – VCC_IN	Voltage supply I/O +24 VDC	20 – VCC_IN	Voltage supply I/O +24 VDC
	21 – GND	Voltage supply I/O 0 VDC	22 – GND	Voltage supply I/O 0 VDC
	23 – PE	Protective earth	24 – PE	Protective earth

FIELDBUS INTERFACES

Pin assignment ETH IN / ETH OUT , ethernet-based interface

EtherCAT interface (RJ45)				
Pin	Name	Description	Colour	ETH IN / ETH OUT
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	

ETHERNET INTERFACE

» The Ethernet based one is for fieldbus communication whereby the SSCU/1/AX acts as a safe SubInstance on the following fieldbus standards:

- EtherCAT with FSoE

Description	Type	Description
Technology	Ethernet	Ethernet Port for Fieldbus communication, Selection by parameter
Protocol	EtherCAT	EtherCAT Slave protocol with mandatory CoE, EoE
Safe protocol	FSoE	EtherCAT safe SubDevice data protocol
Functional data	18 / 34 Byte	18 Byte functional inputs 34 Byte functional outputs
DC Mode	Free sync and DC sync	Synchronization with top-level control
Min. cycle time	4 ms	

- or Modbus TCP/IP

Description	Type	Description
Technology	Ethernet	Ethernet Port for Fieldbus communication, Selection by parameter
Protocol	TCP/IP	Modbus Port 502
Functional data	18 / 34 Byte	18 Byte functional inputs 34 Byte functional outputs
Min. cycle time	4 ms	

DATA INTERFACES

Serial (Scanner) interface

The serial interface is exclusively reserved for communication with the Hokuyo-Type scanners by use of the proprietary Hokuyo protocol UAM-05LP. The SSCU/1 is MainDevice and can communicate with 3 SubDevices per interface. There are two serial interfaces on the SSCU/1, the MainDevice is instantiated twice, therefore up to 6 scanners can be connected on one SSCU/1.

Designation	Type	Description
Technology	Serial RS 485	Type and physical standard
Protocol	Hokuyo	Hokuyo protocol for MainDevice / SubDevice communication, standard data if any
Safe Protocol	Hokuyo UAM-05LP	Hokuyo protocol for safe MainDevice / SubDevice communication
Safe data	MainInstance to SubInstance	8 Byte process data + 9 Byte Overhead
	SubInstance to MainInstance	13 Byte process data + 9 Byte Overhead
Timing	As defined in UAM-05LP	Synchronization by MainDevice telegram with slots for return data of the SubDevice
Min. cycle Time	30 ms	

Serial interface

- Scanners 1...3 are connected to X1 (Serial Interface 1)
- Scanners 4...6 are connected to X1 (Serial Interface 2)

USB-C interface

A USB-C connection is available to connect an engineering PC directly to the device for tooling purposes.

Pin assignment USBC- interface					
Pin	Name	Pin	Name	Description	USB-C
A1	GND	B1	GND	Ground	
A2	TX1+	B2	TX2+	Not connected	
A3	TX1-	B3	TX2-	Not connected	
4A	V _{BUS}	B4	V _{BUS}	Voltage supply	
A5	CC1	B5	CC2	Not connected	
A6	D+	B6	D+	USB data +	
A7	D-	B7	D-	USB data -	
A8	NC	B8	NC	Not connected	
A9	V _{BUS}	B9	V _{BUS}	Voltage supply	
A10	RX2-	B10	RX1-	Not connected	
A11	RX2+	B11	RX1+	Not connected	
A12	GND	B12	GND	Ground	

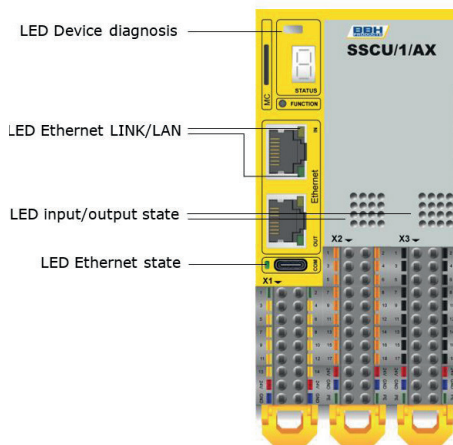
µSD-Card Slot

The µSD card slot is used to exchange devices without a technical PC and enables the backup / recovery of software on the devices.

Designation	Type	Description
Tooling connection	micro SD card connector	Backup / recovery of FW, parameterization and PLC code (esp. for device exchange)

HMI

The following table gives an overview of the LEDs:



Overview	Parameter	Description
LED Device diagnosis	Multicolor	Green / orange / red to show device status
LED Ethernet state	Green/red	1 LED
LED Ethernet LINK/LAN	Green & yellow	2 per Ethernet, following conventions
LED I/O state	Green	1 per I/O
LED voltage supply	Green/red	1 on 24V / GND supply
Function button	1 push button	Button for interaction with device on front panel
Display		1x 7-segment display

For further information see „Installation manual HSC Series

LED assignment

Input		Output		LED display X2, X3
LED	Name	LED	Name	
1	I0.0	1	Q0.0	
2	I0.1	2	Q0.1	
3	I0.2	3	Q0.2	
4	I0.3	4	Q0.3	
5	I0.4	5	Q0.4	
6	I0.5	6	Q0.5	
7	I0.6	7	Q0.6	
8	I0.7	8	Q0.7	
9	I0.8	9	Q0.8_PP/P	
10	I0.9	10	Q0.9_PP/N	
11	I0.10	11	Q0.10_PP/P	
12	I0.11	12	Q0.11_PP/N	
13	I0.12	13	Q0.12_R1 (Relay1)	
14	I0.13	14	Q0.14_R2 (Relay 2)	
15	I0.14	15	-	
16	I0.15	16	Voltage supply I/O	

ORDER INFORMATIONS

BASIC MODULES

item	description	item no.
SSCU/1	Base module with 16 safe inputs, 10 safe outputs	2918

EXTENSIONS

item	description	item no.
SSCU AX/1	Axis extension module	on request
SSCU IO/1	IO extension module (8 I + 8 IO)	on request

ACCESSORIES

item	description	item no.
SX0000-20	Terminal connector for cabling SSCU/1/x, (coded) (X3)	3195
SX0000-19	Terminal connector for cabling SSCU/1/x, (coded) (X2)	3194
SX0000-18	Terminal connector for cabling SSCU/1/x, (coded) (X1)	3193
FSoE License	Fieldbus license for FSoE	2366
SARC Safe ARithmetic Calculation	License without physical delivery	2766
SARC-F1	License for basic functionality (SARC Basic)	2950
SARC-F2	License for extended functionality (SARC Advanced)	2951

SOFTWARE

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