

## DESCRIPTION

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

- 14 Safe digital Inputs
- up to 5 safe cut-off channels
- 2 Safe relay outputs
- Fast-Channel task for logic processing with a guaranteed response time of 4 ms
- Simple integration of safe drives (Safe Drive Profile)
- Safety controller up to PL e acc. to EN ISO 13849-1 or SIL3 acc. to IEC 61508
- optional:
  - kinematics module, PROFIsafe / FSoE / CIP safety-slave stack

## CHARACTERISTIC OF THE MODULE

- » Connection of up to 32 FSoE Slave units
- » Safe logic processing of input, output, status and activation signals
- » Simple and transparent programming and parametrization in the EtherCAT environment via SafePLC<sup>2</sup>
- » Fast response time with integrated Fast Channel Task with guaranteed processing time of 4 ms
- » Central or decentralized drive monitoring possible
- » Complete set of Drive monitoring for single axes and charged axes (based on Kinematics function)
- » Temporary deterministic data communication and processing for safe position und speed functions via distributed sensor / multiple axes
- » Specific profiles for process data exchange and central parametrization that can be adapted to converter/manufacture
- » Safe cross communication (**Safe Master- Master Communication**) for data exchange between FSoE masters via EAP
- » Storage of safe parameters in the base module
- » Coded status display via front-side 7 segment display and status LEDs
- » Multifunction button (quit, start, reset) can be operated from the front side
- » Optional integrated Communication interface :
  - safe kinematics module for up to 6/12 axes with spatial speed and position monitoring
  - additional fieldbus interface and PROFIsafe / FSoE / CIP Safety-Slave stack for secure connectivity to higher levels of control
- » The mechanical structure of SCU-1-EC (x\*) is depended on the respective forms of the base module

\* *Optional: integrated Communication interface (/NM)*

## SAFETY RELATED CHARACTERISTIC DATA

Performance Level	PL e (EN ISO 13849-1)
PFH / architecture	PFH = $7,86 \cdot 10^{-9}$
	MTTFd = 280 years = high
	DCavg = high
Safety Integrity Level	SIL 3 (IEC 61508)
Proof test interval	20 years = max. operating period

## GENERAL DATA

Max. no. of expansion modules	32
Interface for expansion modules	RJ-45 (Ethernet)
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 safe relay outputs	2
Number of safe analogue inputs	–
Number of auxiliary outputs	–
Number of pulse outputs (clock outputs)	2
Type of connection	Plug-in terminals with spring or screw connection
Cycle time PLC	16 ms
Fast Channel central / SCU	4 ms
Fast Channel decentralized SSB / standard Slave	4 ms
Safe Master	FSoE
Safe Slave **	PROFIsafe / FSoE / CIP Safety
Non-safe Slave	EtherCAT

\* pn / pp can be parameterized via SafePLC<sup>2</sup>

\*\* **optional**: integrated communication interface (/NM)

## ELECTRICAL DATA

Supply voltage (tolerance)		24 VDC (-10%, +15%)
Fuse	X41.1 / 24+	min. 30 VDC; max. 3,15A
	X41.2 / AQ1+	min. 30 VDC; max. 10A
Max. Power consumption (logic)	SCU-1-EC/x	3,1 W
Rated data safe 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 *
	pulse outputs (clock outputs)	24 VDC; 0,5 A
Rated data safe relays		
	Normally open DC 13	24 VDC; 2A
	AC 15	230 VDC; 2A

## DERATING OUTPUTS

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

type of module	outputs	temperature 30°C / 50°C
SCU-1-EC/x	QX 00 – QX 03	2A / 1,8A

**2A outputs can be fully loaded at an ambient temperature of up to 30°C.**  
**From an 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)**



## ENVIRONMENTAL DATA

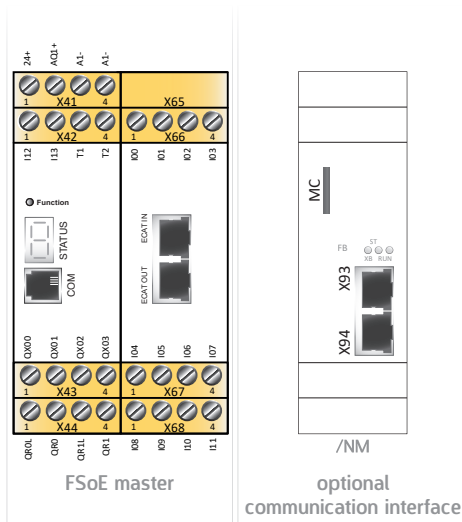
Temperature	0°C ... +50°C operation
	-25°C ... +70°C storage and transport
Class of protection	IP 20
Climatic category	3K3 acc. to DIN EN 60721-3
Min-, Maximum relative humidity (no condensation)	5% - 85%
EMC	DIN EN 61000-6-2, DIN EN 61000-6-4, DIN EN 61000-6-7, DIN EN 61800-3, DIN EN 61326-3, DIN EN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

## MECHANICAL DATA

Dimensions (HxDxW [mm])	SCU-1-EC	100x115x45
	SCU-1-EC/x *	100x115x67,5
Weight [g]	SCU-1-EC	312
	SCU-1-EC/x *	398
Mounting	to snap on top-hat rail	
Min. terminal cross-section / AWG	0,2 mm <sup>2</sup> / 24	
Max. terminal cross-section / AWG	2,5 mm <sup>2</sup> / 12	

\* Specification, see: „Optional integrated communication interface“

## DEVICE INTERFACES



Interface	Description of interface
X41 – X44 / X65 – X68	Voltage supply and I/O interface
COM	Diagnostic and configuration interface
ECAT IN / OUT	Fieldbus interfaces *
X93 / X94	Fieldbus interfaces *

\* configurable via SafePLC?

## VOLTAGE SUPPLY AND I/O INTERFACE

X41		
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-	
X42		
Pin	1 - I12	Safe digital inputs
	2 - I13	
	3 - T1	Clock outputs
	4 - T2	
X43		
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
X44		
Pin	1 - QR0L	Safe relay input
	2 - QR0	Safe relay output
	3 - QR1L	Safe relay input
	4 - QR1	Safe relay output

X65		
Pin	1 - NC	No function
	2 - NC	
	3 - NC	
	4 - NC	
X66		
Pin	1 - I00	Safe digital inputs
	2 - I01	
	3 - I02	
	4 - I03	
X67		
Pin	1 - I04	Safe digital inputs
	2 - I05	
	3 - I06	
	4 - I07	
X68		
Pin	1 - I08	Safe digital inputs
	2 - I09	
	3 - I10	
	4 - I11	

## DIAGNOSTIC AND CONFIGURATION INTERFACE

### Pin assignment

RJ 10, 4-pin		
Pin	Beschreibung	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.

## FIELD BUS INTERFACES

### Pin assignment female connector

EtherCAT interface / optional Ethernet-based fieldbus interface (RJ45)				
Pin	Name	Description	Colour	EtherCAT IN/OUT , 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	

## OPTIONAL INTEGRATED COMMUNICATION INTERFACE

» The optionally integrated communication interface expands the FSoE-Master with a additional safe fieldbus interface (/NM)

General data	
Fieldbus interface	/N 2x RJ 45 *
Memory Card (safety program)	/xM 1x Mini SD (front side)
Status LED's	4

\* available field buses: FSoE, PROFIsafe



## ORDER INFORMATIONS

### FSoE MASTER

item	description	item no.
SCU-1-EC	FSoE Master - modular basic module	1655
SCU-1-EC/NM	FSoE Master + ethernet-based fieldbus interface + Memory Card	2261

### ACCESSORIES

item	description	item no.
FSoE License	Field bus license for FSoE	2366
PROFIsafe License	Field bus license for PROFIsafe	2319
SMX91	Programming adapter	1010
SXxxx-x	Terminal connector, screw terminals (set), encoded for cabling SCU-1-EC (/NM)	on request
SXxxx-x	Terminal connector, spring terminals (set), encoded for cabling SCU-1-EC (/NM)	on request

### FSoE SLAVES

item	description	item no.
SSB-3-AD-x	Axis expansion module for up to 3 axes + analog / digital	on request
SSB-6-EnDAT-x	Axis expansion module for up to 6 axes + EnDAT 2.2	1656
SSB-6-DSL-x	Axis expansion module for up to 6 axes + HyperfaceDSL	1665
SIO-1	Decentralized IO expansion module	2234
SIO-2	Decentralized IO expansion module	2235
SDU-11	Decentralized axis expansion module for one axis	2394
SDU-11/NM	Decentralized axis expansion module for one axis, safe PROFIsafe / FSoE-slave	2471
SDU-11-PXV	Decentralized axis expansion module for one axis, with safePXV encoder interface	2472
SDU-12	Decentralized axis expansion module for one axis	2395
SDU-21	Decentralized axis expansion module for 2 axes	2396
SDU-22	Decentralized axis expansion module for 2 axes	2397
SDU-21A	Decentralized axis expansion module for 2 axes + Analog Option	2398
SDU-21A-I	Decentralized axis expansion module for 2 axes + Analog Option (current)	2399
SDU-21A-U	Decentralized axis expansion module for 2 axes + Analog Option (voltage)	2400
SDU-22A	Decentralized axis expansion module for 2 axes + Analog Option	2401
SDU-22A-I	Decentralized axis expansion module for 2 axes + Analog Option (current)	2402
SDU-22A-U	Decentralized axis expansion module for 2 axes + Analog Option (voltage)	2403

### SOFTWARE

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