

DESCRIPTION

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

- 14 Safe digital Inputs
- up to 20 safe digital I/O's
- 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
- » Easy and transparent programming and parametrization in the EtherCAT environment via SafePLC²
- » 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 basic 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 :
 - additional field bus interface and PROFIsafe / FSoE / CIP Safety-slave stack for secure connectivity to higher levels of control
 - safe kinematics module for up to 6/12 axes with spatial speed and position monitoring
- » The mechanical structure of SCU-2-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 = $7,96 \cdot 10^{-9}$
	MTTFd = 126 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	20
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*

** **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+, X45.1 / AQ2+, X49.1 / AQ3+	min. 30 VDC; max. 10A
Max. Power consumption (logic)	SCU-2-EC/x	3,1 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 *
	pulse outputs (clock outputs)	24 VDC; 250mA
	safe digital I/O	
	00 - 04 10 - 14	24 VDC; 0,5A
	05 - 09 15 - 19	24 VDC; 2A *
Rated data safe 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
SCU-2-EC/x	QX 00 – QX 03 / IQx5 – IQx9	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)

ENVIRONMENTAL DATA

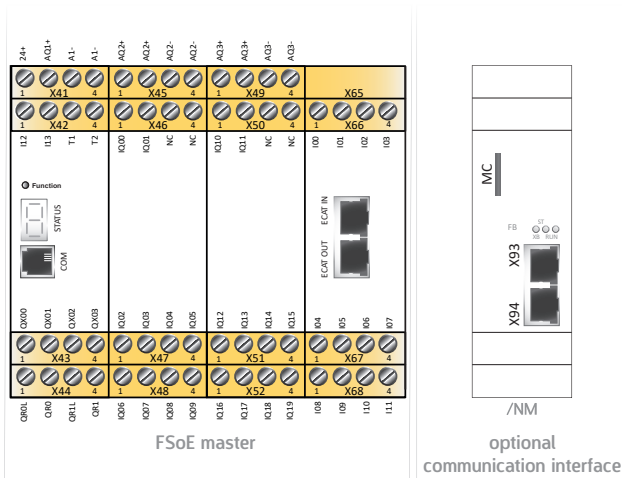
Temperature	0°C ... +50°C operation -25°C ... +70°C storage and transport
Class of protection	IP 20
Climatic category	3K3 acc. to DIN EN 60721-3
Min-, Maximum relative humidity (no condensation)	5% - 85%
EMC	DIN EN 61000-6-2, DIN EN 61000-6-4, DIN EN 61000-6-7, DIN EN 61800-3, DIN EN 61326-3, DIN EN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

MECHANICAL DATA

Dimensions (HxDxW [mm])	SCU-2-EC	100x115x90
	SCU-2-EC/x *	100x115x112,5
Weight [g]	SCU-2-EC	512
	SCU-2-EC/x *	602
Mounting	to snap on top-hat rail	
Min. terminal cross-section / AWG	0,2 mm ² / 24	
Max. terminal cross-section / AWG	2,5 mm ² / 12	

* Specification, see: „Optional integrated communication interface“

DEVICE INTERFACES



Interface	Description of interface
X41 – X52 / X65 – X68	Voltage supply and I/O interface
COM	Diagnostic and configuration interface
ECAT IN / OUT	Fieldbus interfaces *
X93 / X94	Fieldbus interfaces *

* fieldbus configurable via SafePLC²

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- 4 - A1-	Voltage supply device 0 VDC	
X42			
Pin	1 - I12 2 - I13	Safe digital inputs	
	3 - T1 4 - T2	Clock outputs	
	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	

X45			
Pin	1 - AQ2+ 2 - AQ2+	Voltage supply device +24 VDC outputs	
	3 - AQ2- 4 - AQ2-	Voltage supply 0 VDC	
	X46		
	Pin	1 - IQ00 2 - IQ01	Safe digital inputs / outputs
3 - NC 4 - NC		No function	
X47			
Pin		1 - IQ02 2 - IQ03 3 - IQ04 4 - IQ05	safe digital inputs / outputs
	X48		
	Pin	1 - IQ06 2 - IQ07 3 - IQ08 4 - IQ09	safe digital inputs / outputs

X49		
Pin	1 - AQ3+	Voltage supply device +24 VDC outputs
	2 - AQ3+	
	3 - AQ3-	Voltage supply device 0 VDC
	4 - AQ3-	
X50		
Pin	1 - IQ10	Safe digital inputs / outputs
	2 - IQ11	
	3 - NC	No function
	4 - NC	
X51		
Pin	1 - IQ12	Safe digital inputs / outputs
	2 - IQ13	
	3 - IQ14	
	4 - IQ15	
X52		
Pin	1 - IQ16	Safe digital inputs / outputs
	2 - IQ17	
	3 - IQ18	
	4 - IQ19	

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	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 / 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 fieldbuses: FSoE, PROFIsafe

ORDER INFORMATIONS

FSoE MASTER

item	description	item no.
SCU-2-EC	FSoE Master - modular base module with 20 safe digital I/O's	1693
SCU-2-EC/NM	FSoE Master + ethernet-based fieldbus interface + Memory Card	2393

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-2-EC (/NM)	on request
SXxxx-x	Terminal connector, spring terminals (set), encoded for cabling SCU-2-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 (current+ voltage)	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 (current+ voltage)	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 ² 1st	Programming software, 1te License incl. Hardlock	1244
SafePLC ² 2nd	Programming software, 2te License incl. Hardlock	1646
SafePLC ² 3rd	Programming software, 3te License incl. Hardlock	1647