Technical Information TI-CSB20
SITEMA Safety Controller SiBox SB 20 1

- ☑ Very quick switching times due to active demagnetization
- ☑ Safety concept certified by TÜV for up to PLe according to ISO 13849
- ☑ With CE and UL conformity (certified by TÜV Süd)

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1 Purpose

The SiBox is the safe external controller for an electrical clamping head (e. g. SITEMA KSE). It is part of a complete system which consists of the SiBox, the clamping head, and all required cables.

The customer integrates the SiBox and the electrical clamping head that comes with it into a high-level control system (safety PLC). Different performance levels according to ISO 13849-1 can be reached. The *Safety Manual BA-SH-1* describes all requirements and prerequisites for this integration.

2 Properties

- Safe electrical actuation of SITEMA clamping heads
- Can be used up to performance level e (Performance Level according to ISO 13849-1)
- Preconfigured pairing with SITEMA clamping head
- Can be used worldwide - no additional power supply required
- Patented internal safety concept with controlled shutdown in case of disruptions
- Patented internal energy management
- Very quick switching times due to active demagnetization
- Redundant release signals for a secure shutdown in the power path, spark suppression, switching frequency monitoring, EMC signal monitoring
- Installation on top-hat rail (e.g. In control cabinet) or with adapter plate

3 Parameter assignment

SITEMA delivers each SiBox with a parametrization. This parameter assignment is a adapted configuration designed specially for the combination of SiBox and clamping head to be operated together by the customer. The parametrization also takes into account the length of the motor cable between the SiBox and the clamping head.

Each SiBox is supplied with a default set of parameters. For this default set of parameters, the resistance in the motor cable (considering forward and return line) may not exceed 1 Ohm Here a few examples of possible cable lengths and diameters:

Resistance	Cable diameter	Permissible cable length (forward and return lines)
≤ 1 Ohm	1.5 mm²	≤ 44 meter
	2.0 mm²	≤ 60 meter
	2.5 mm²	≤ 75 meter

Please contact SITEMA if you have any specific requirements.

A wrong parametrization can cause errors in operation.

Due to the specific parametrization of the safety controller, for a proper operation it is imperative that the right combination of SiBox, clamping head and motor cable is installed.

4 Design and functions

4.1 Connection blocks

The SiBox has the following connection blocks:

Fig. 1: SiBox connection blocks

No.	Identif.	Function
P1	Input 100-240 VAC 47-63 Hz	Power supply
P2	SENSOR	Proximity switch/sensor port
P3	-	Control of switching signal and error signal
P4	-	Control, release signals
P12	MAG Output	Clamping head power port

4.2 Overview of SiBox inputs and outputs

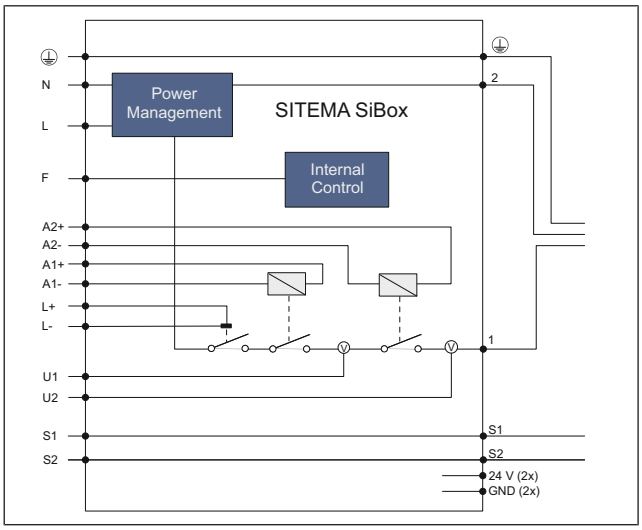

Fig. 2: Overview of SiBox inputs and outputs

SiBox inputs and outputs

The SiBox has the following inputs and outputs:

Abbr.	Block	Function	Input Output	Level	Remarks
S1	P2 Sensor	Proximity switch 1	INPUT(optional OUTPUT)	24 VDC	On P2 And P3, connected directly for input (P2) and forwarding (P3) of the sensor signals
S2		Proximity switch 2			
24 V		Power supply	OUTPUT(optional INPUT)	24 VDC	2x proximity switch power supply (P2 1, P2 4)
GND					
S1	P3	Proximity switch 1	OUTPUT(optional INPUT)	24 VDC	On P2 And P3, short-circuited together for input (P2) and forwarding (P3) of the sensor signals
S2		Proximity switch 2			
24 V		optional	INPUT(optional OUTPUT)	24 VDC	Optional, e.g. for connecting SELV 24 V power supply unit Maximum current consumption 50 mA
GND					
L+		Release (+)	INPUT	24 VDC	Switching signal, active high
L-		Release (-)		GND	
F+		Error (+)	OUTPUT	-	Open collector, PNP, R_{in} = 2.5 kΩ
F-		Error (-)			
A1+	P4	Safety 1 (+)	INPUT	24 VDC	Release signal 1
A1-		Safety 1 (-)		GND	
A2+		Safety 2 (+)		24 VDC	Release signal 2
A2-		Safety 2 (-)		GND	
U1+		Safety OK 1 (+)	OUTPUT	-	Sensor feedback of external contactor 1 Open collector, PNP, R_{in} = 2.5 kΩ
U1-		Safety OK 1 (-)			
U2+		Safety OK 2 (+)	OUTPUT	-	Sensor feedback of external contactor 2 Open collector, PNP, R_{in} = 2.5 kΩ
U2-		Safety OK 2 (-)			
	P12 MAG Output	PE conductor/ grounding	-	-	PE conductor/grounding
1		Clamping head 1	OUTPUT	0...380 VDC	Clamping head port; 1 and 2 interchangeable
2		Clamping head 2	OUTPUT		Clamping head port; 1 and 2 interchangeable
L	P1 Input 100-240 VAC 47-63 Hz	Phase	INPUT	100...240 VAC	Electrical supply
N		Neutral conductor	INPUT	-	Electrical supply, neutral conductor
		PE conductor/ grounding	-	-	Electrical supply: PE conductor/grounding

Inputs and outputs of SiBox SB 20

Subject to modification without prior notice

5 Operating conditions

Maximum ambient temperature	0 to 40 °C
Relative humidity	< 90 % non-condensing
Maximum operating height	2,000 meters above MSL
IP protection	IP 20
Electrical safety	according to EN 61010 or EN 62368
Overvoltage category (OVC)	II
Pollution degree (PD)	2

Mounted in a control cabinet. Suitable only for indoor use.

6 Technical data of electronics

Input	
Input voltage range (operating voltage)	100 - 240 VAC
Frequency range	47 - 64 Hz
Rated current	1.9 - 0.8 A
Peak current	20 ... 8.3 A
Inrush current	10 A max.
Output	
Rated voltage	380 VDC
Maximum current	8 A (< 0.5 s)
Pulse width modulation (PWM)	0 - 100 %
Peak power	> 2 kW
Rated power	170 W
Tolerance	3 %
Protection rating	IP20
Safety requirements	
Rated voltage	265 VAC
Protection class	I
Safety operating range	0 to 70 °C

7 Dimensions and weight

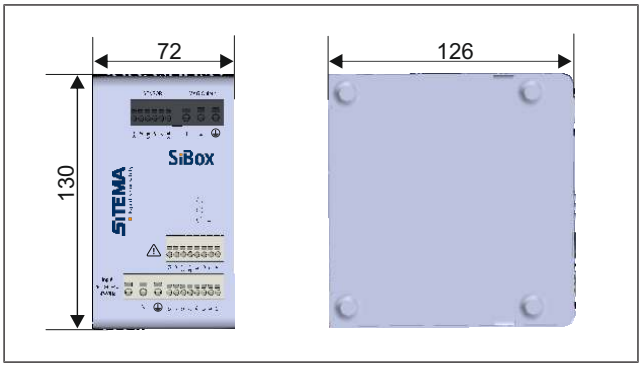

Fig. 3: SiBox dimensions in mm

Weight: 1.43 kilogram

8 Types and ID numbers

The SiBox SB 20 is available in the following versions:

Series	Type	ID no.	For clamping head
SB	SB 20	SB 20 1 KSE 16/S	1 x KSE 16
		SB 20 1 KSE 16/D	2 x KSE 16
		SB 20 1 KSE 22/S	1 x KSE 22
		SB 20 1 KSE 22/D	2 x KSE 22

The versions have different parameter sets:

- **Versions S**: Operating 1 clamping head with 1 SiBox
- **Versions D**: Operating 2 clamping heads with 1 SiBox

  Observe the following conditions which apply to using versions D:
  - The 2 clamping heads can only be operated simultaneously. One clamping head can not be operated individually.
  - SiBox version D has a special parametrization and may only be operated with 2 clamping heads.
  - The proximity switches of clamping head 1 and 2 must be connected directly to the high-level control system. The high-level control system must process the signals of clamping head 1 and 2 separately.

9 Integration in high-level control system

The system supplied by SITEMA, consisting of SiBox and electrical clamping head, must be integrated into a high-level control system (safety PLC) by the customer. There are several options for the integration of the SiBox and clamping head into the high-level control system.

IMPORTANT: The high-level control system is not part of the system supplied by SITEMA. The scope of delivery also does not include the connecting cables (stranded wires) between the SiBox and the high-level control system.

Consult SITEMA. We will gladly advise you about the requirements for the Performance Level you need.

10 Scope of delivery

A system of SiBox and clamping head usually comprises these components:

- The Safety Controller SiBox with parametrization for the accompanying clamping head
- A electromagnetically actuated clamping head, e. g. KSE Safety Brake

Not in scope of delivery:

- Proximity switches
- Motor cable between clamping head and SiBox
- Valve connector at the motor cable
- Connection cable between SiBox and high-level control system.

11 Connection cables and plugs

11.1 Motor cable: Connecting the clamping head to the SiBox

Mounting screws and valve connector are not in the scope of delivery.

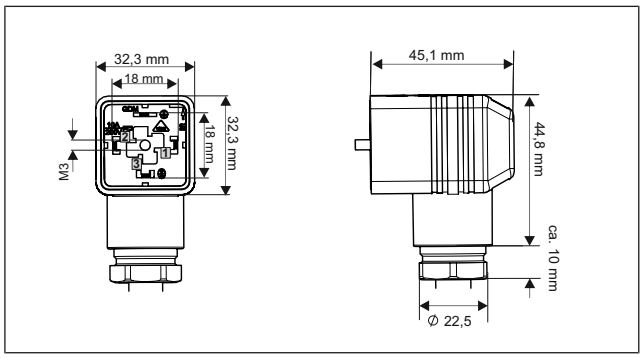

Fig. 4: Valve connector at the motor cable

Connector at the motor cable	Valve connector, style A
	Operating Voltage 400 VAC/DC
	Rated Current: 16 A
	Type GDMW 3011
Motor cable (cable connection clamping head with SiBox)	3-core, including 1 x PE
	Nominal conductor cross section: 1.5 mm²
	Temperature stability 0 to +70 °C
	Rated voltage: 300 / 500 V
	flame retardant
	shielded

Table 2: Specifications for motor cable, KSE – SiBox

Motor cable: The PE conductor and pins 1 and 2 are connected. Pin 3 on the connector (GDMW 3011) remains unused.

Observe the following important points:

- It is essential to route the PE conductor cable in the motor cable.
- Cables suitable for drag chains must be used if the cable is moved.

SITEMA recommends a cable from igus, type CF140.15.03.UL.

11.2 Connection of SiBox to high-level control system

Connection of SiBox to high-level control system	Separate stranded wires
	Nominal conductor cross section: 1.0 mm²
	Conductor design: IEC 60228 class 1; solid conductor
	Current-carrying capacity according to VDE 0298-4

12 Mounting in the control cabinet

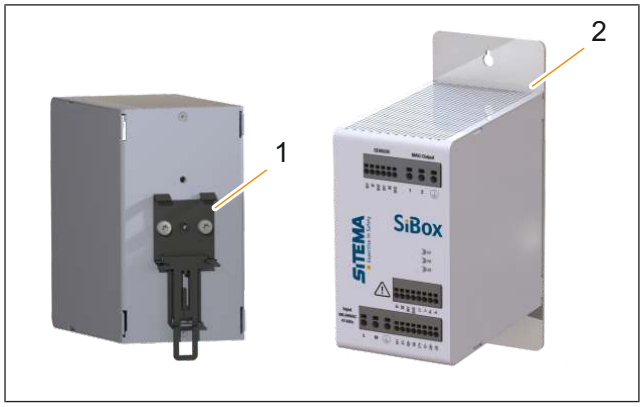

Fig. 5: Mounting options

The following mounting options are available:

(1) As a standard, a top-hat rail adapter (1) (according to DIN 35) is delivered. It is mounted with 2 screws (M4) to the SiBox housing.

(2) As an alternative, SITEMA offers an adapter plate (2) that can be mounted to the back side of the SiBox with 4 screws (M4). It has 2 through bore-holes (M6) for mounting.

For the installation in a control cabinet, observe the following:

- Ensure that the SiBox is mounted vertically as shown.
- Ensure that the SiBox ventilation openings are not covered. Sufficient distance to other components must be observed to ensure heat transfer though the SiBox (convection).
- Make sure that the SiBox is not placed directly above other electrical components which produce a lot of waste heat.

13 Further information

- *Operating Manual BA-CSB20*: comprehensive description of the functions, installation, and putting into service of the SiBox SB 20
- *Safety manual SH-CSB20*: Requirements of the high-level control (for SITEMA SiBox with electrical clamping head)

14 Accessories

We recommend the following accessories offered by SITEMA:

- Switching module DSM 24V 01 for manual operation during installation.