SBD
Short Guide

Doc. TR172102 (DRAFT)
Ed. 2.1 - English - 04 Oct 2021

Thank you for your preference on CMZ SISTEMI ELETTRONICI S.r.l. products.

DANGER: safety instructions

The non-observance of the precautions included in this document may cause risk of death, serious injuries or material damage. For a safe functioning, follow all the safety instructions in this document. The security officer must check that the staff working with the drives read and understood the contents of this document before using. The drive must be installed, used, removed by expert technical personnel and awared of the risks of the application and of the operative conditions; it is not appropriate for the use as safety component.

IMPORTANT: product version

What is written in this document refers to the product versions 2.0.0, except from any other different instructions.

Previous versions could not implement all the functionalities described in this document.

Note: prototype

This document is a draft version because the SBD product to which it refers to is a prototype. For every need please contact CMZ SISTEMI ELETTRONICI S.r.l..

Note: document purpose

This guide has the purpose to provide the essential information of the product and allows to the user to familiarize tieh the basic characteristics. It is advisable to keep this document with the product. For more complete information about the product refer to CMZ SISTEMI ELETTRONICI S.r.l..

Note: operative system

For the connection via micro USB it is advisable to use Windows 10.

1. Drives equipment

The drive package includes:

- the SBD drive
- this document
- according to the order code, some plug connectors may be present.

For any further accessory contact the CMZ sales office.

Before to begin to work with the drive, verify that there are not visible damages. Be sure that the drive in the package is the correct model for the application, that it corresponds to what has been ordered. Be sure that it can been provided a voltage supply as prescribed for the system.

2. Mechanical installation

The SBD drive is designed to be installed in vertical position (oriented as showed in *Figure 1*) on a wall through two clamps, that are present on the product rear, and that can be fasten with two M4 screws. It is preferable to install the drive on a metallic wall, providing even an adequate space around the drive to facilitate the dissipation. The reached temperature depends on the system use mode and on the working cycle.

Prevedere dello spazio libero da ogni lato per garantire dissipazione termica, ingombri per connettori e cavi, spazio d'accesso per operare sui dip-switch.

3. Dimensions and sizes

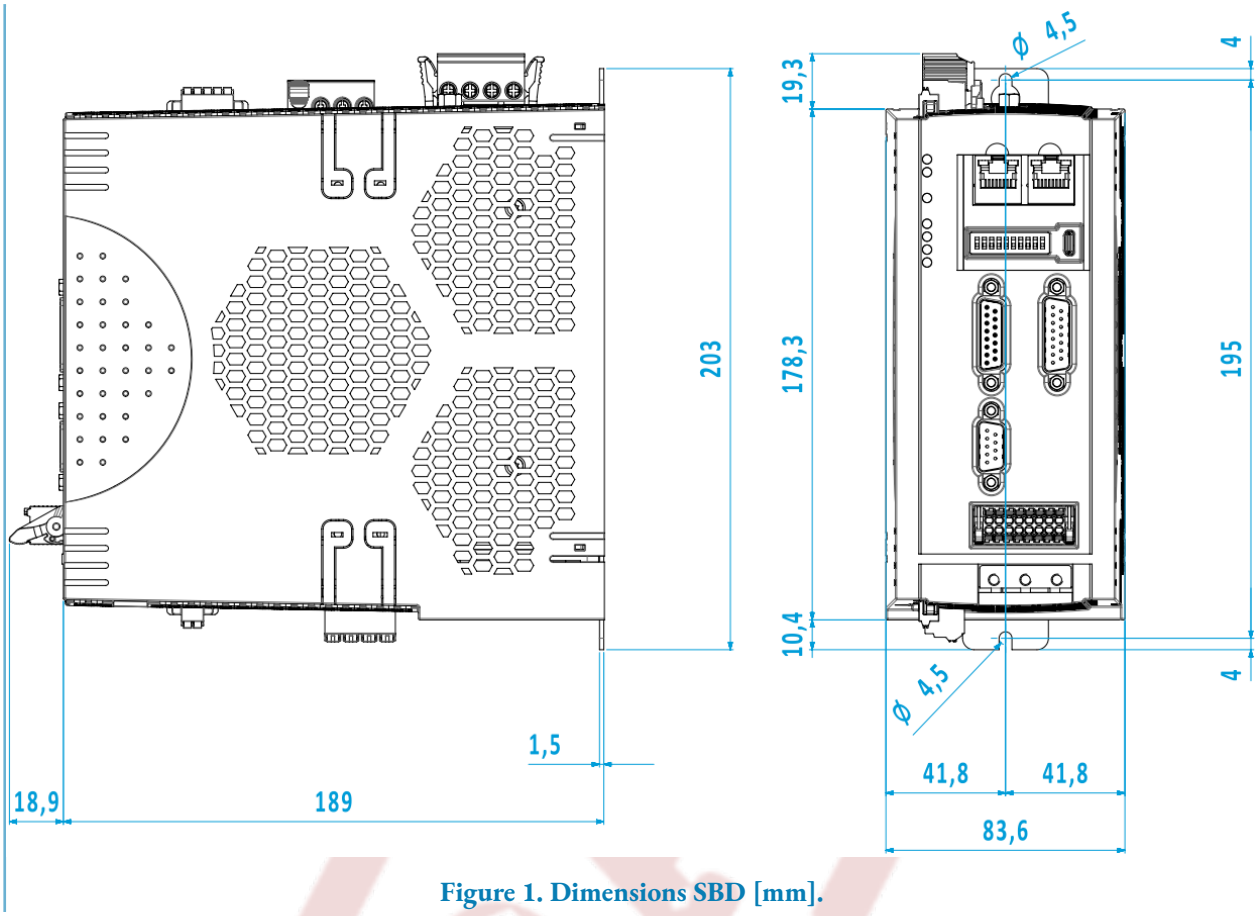


Figure 1. Dimensions SBD [mm].

4. Technical data

Control section[a]	
Quantity	**Value**
Control section voltage	+24 Vdc ± 15%
Typical absorbed current @24 Vdc control section	500 mA (without motor brake)

[a]The the control section supply must be generated with a power supply that is galvanically isolated from the power section and with PE connected reference (grounded).

Power section	
Quantity	**Value**
Power section voltage[a]	SBD230: 230 Vac single-phase (from 180 to 265 Vac) SBD400: 400 Vac three-phase (from 320 to 520 Vac)
System voltage (rated voltage between phase and ground)	MAX 300 Vac [category of overvoltage III]
Input line rated frequency	from 50 to 60 Hz (± 5%)
Rated shor-circuit current of the line (SCCR)	MAX 5 kA

Power section			
Quantity	**Value**		
Line filter	Integrated		
Line voltage unbalance (three-phase)	< 3% of the input line voltage		
Output continuous current		**I_{nom}**	**I_{pk}**[b]
	SBD230050	5 Arms	10 Arms
	SBD230085	8,5[c] Arms	17[c] Arms
	SBD400050	5 Arms	10 Arms
Motor braking output	PNP - rated voltage (obtained from the control voltage) 24 Vdc / max 1,4 A		

[a]The line voltage can be obtained from a TT or TN network.

[b]For a limited time

[c]Preliminary value

General features	
Quantity	**Value**
Working environment temperature	from 0 to +40 °C
storage environment temperature	from -20 to +70 °C
Storage and working relative humidity (without condensation)	from 5 to 95 %
Control section protection	- polarity reverse - short-circuit, with internal fuse- [a]of 4 A time delay (not replaceable).
Motor section protection	short-circuit and thermal
Weight	850 g
Maximum altitude	2000 m [a.s.l.]
Installation position	Vertical. Install the drive inside an electrical cabinet IP54, to protect it from dust and condensation (environmental pollution degree 2) and that respects the environmental temperature requirements.
Protection class	Open Type

[a]The breaking of a fuse probably implies even a damage of part of the electronics: in this case contact CMZ SISTEMI ELETTRONICI S.r.l..

Note: control section absorption

The brake is powered by the control supply, therefore the whole absorption on the 24 Vdc is the sum of the absorption of the control section and the brake (if connected).

Note: power reduction

Continuative power reduction by 1% for every 100 m starting from 1000 m.

Incremental encoder	
Output supply voltage	5,25 ± 0,1 Vdc
Output current	max 0,2 A
Input primary wave frequency	max [TBD] kHz
Phases input	differential line-drivers (max 5 Vdc)
Hall sensors input	open collector NPN: push-pull 5 Vdc or 24 Vdc

Encoder Hiperface (not yet implemented)	
Output supply voltage	10,7 ± 0,2 Vdc
Output current	max 0,2 A
Number of sin/cos per revolution	16, 128, 1024 [1/revolution]
sin/cos inputs frequency	[TBD] kHz

Resolver	
Excitation amplitude[a]	max 4 Vrms
Excitation frequency	10 kHz
Output current	max 70 mArms
Transformation ratio	0,5 (typical) ± 10%

[a]The real value depends on the resolver transformation ratio, on the cable leght or on the resolver absorption.

Auxiliary encoder input and Step/Dir	
Output supply voltage	5,25 ± 0,1 Vdc
Output current	max 0,2 A
Input type	push pull 3,3 V (6 mA) / 5 V (11,5 mA); open collector PNP or NPN 3,3 V (6 mA) / 5 V (11,5 mA)

Motor temperature sensor input	
Quantity	**Value**
Sensor type	PT1000, KTY84-130, PTC switch
Insulation	non isolato, sia su X7[a] che su X8[a].

[a]It must be guaranteed a double insulation between the motor phases and the thermal sensor

Digital inputs features	
Digital inputs number	7
Input type	PNP
Galvanic insulation	YES, through optoisolators
Input voltage	• Nominal: +24 Vdc • LOW signal (physical status 0): from -30 to +3 Vdc • HIGH signal (physical status 1): from +15 to +30 Vdc
Input current (typical) with Vin= 24 Vdc	3,3 mA for all the inputs, IN2 and IN3 excluded (fast inputs for capture) in which its value is 6,8 mA

Digital outputs features	
Digital outputs numbers	3
Output type	PNP
Galvanic insulation	YES, through optoisolators
Supply voltage	24 V (±20%) (isolated towards the control voltage. Da fornire esternamente sul connettore X10)
Maximum output current (for every output)	200 mA
Protection	Polarity inversion, overcurrent, short-circuit

Analog input features	
Maximum functioning differential voltage	±10 V (differential)

Analog outputs features	
Maximum functioning differential voltage	from 0 to 10 V (single-ended)

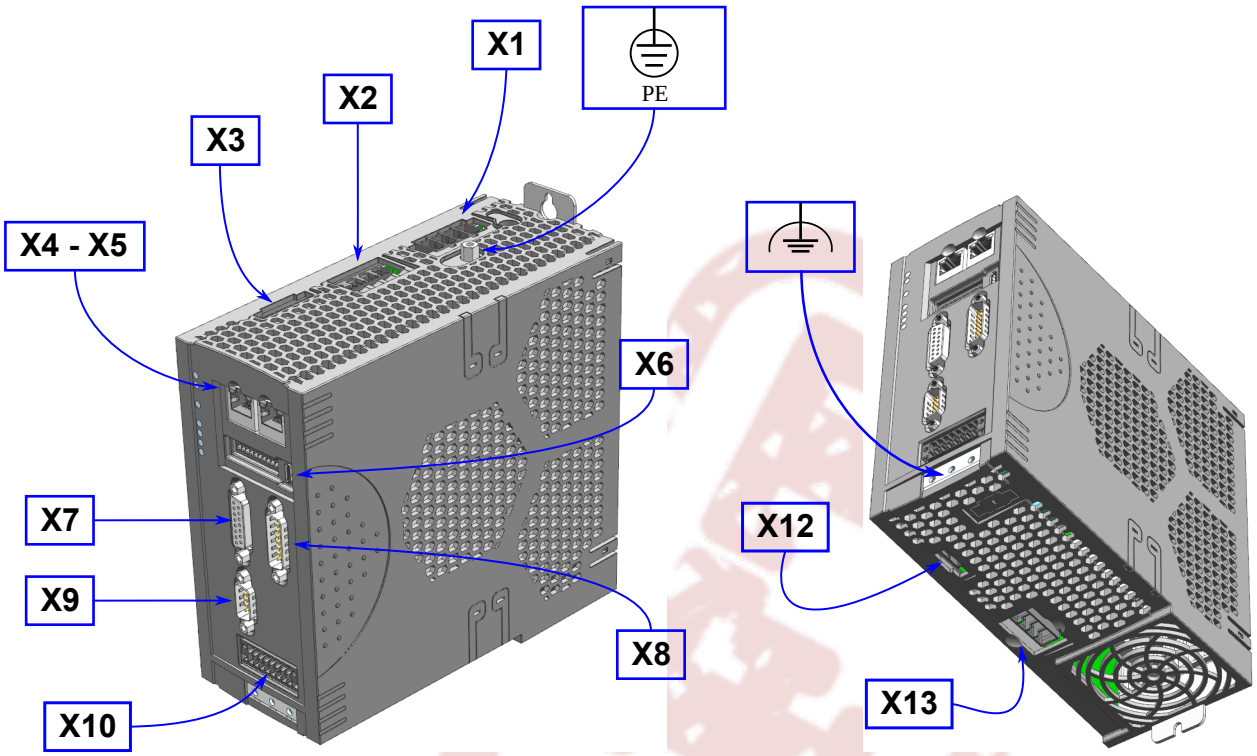
5. Connectors

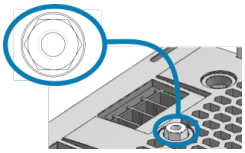
DANGER: insulation between the signals

The motor and the wiring must guarantee a double/reinforced insulation between the signals "Therm+/Therm-" and the motor phases. Similarly a double/reinforced insulation between the signals connected to the feedback sensors (X7, X8) and the motor phases and between the brake signals (X12) and the motor phases is required.

WARNING: electrical connections

A correct cable, grounding and shield wiring is essential for the drive safety, the immunity and the correct functioning of the product. It's better if the cables are not interrupted; if it is not possible, be sure that the interruptions are reduced to the shortest possible length.



Protection grounding screw	
	Screw M4, to be connected to the device ground (PE). It is on the X1 connector side.

Braking resistor and DC bus (NOT IMPLEMENTED)

X1

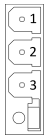
PIN	Signal	Description
1	R Brake -	External braking resistor
2	R Brake +	External braking resistor
3	DC+	Reserved - Do not connect
4	DC-	Reserved - Do not connect

DANGER: voltage on terminations

Even if this connector is not used, pay the highest attention during and after the use: presence of dangerous voltage! The connection of any device to this connector is not available on products with rev. < 2.0.0.

Power supply

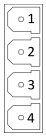
X2 single-phase



PIN	Signal	Description
1	PE	Protective Earth
2	L1	230 Vac Single-phase supply[a]
3	L2	

Power supply

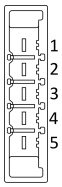
X2 three-phase



PIN	Signal	Description
1	PE	Protective Earth
2	L1	400 Vac Three-phase supply[a]
3	L2	
4	L3	

Control voltage and STO input (certification in progress)

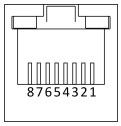
X3



PIN	Signal	Description
1	/STO1	Safe Torque Off Input, Channel 1 (the signal has inverted logic)
2	/STO2	Safe Torque Off Input, Channel 2 (the signal has inverted logic)
3	+24V	24 Vdc Control supply (it must be provided by an external PSU)
4		
5	GND	Ground of Control Supply and STO inputs

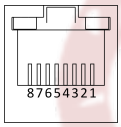
Communication bus CAN (SBD ver. CAN)

X4 CAN OUT



PIN	Signal	Description
1	CAN-H	CAN High
2	CAN-L	CAN Low
3	CAN-GND	Ground CAN
4	Reserved	Do not connect
5	Reserved	Do not connect
6	Reserved	Do not connect
7	CAN-GND	Ground CAN
8	Reserved	Do not connect

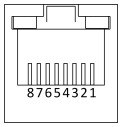
X5 CAN IN



PIN	Signal	Description
1	CAN-H	CAN High
2	CAN-L	CAN Low
3	CAN-GND	Ground CAN
4	Reserved	Do not connect
5	Reserved	Do not connect
6	Reserved	Do not connect
7	CAN-GND	Ground CAN
8	Reserved	Do not connect

Communication bus CAN + RS485 (SBD ver. PLC)

X4 (CAN+485) OUT

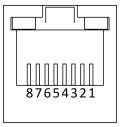


PIN	Signal	Description
1	CAN-H	CAN High
2	CAN-L	CAN Low
3	CAN-GND	Ground CAN
4	RS485+	RS485 Signal +

Communication bus CAN + RS485 (SBD ver. PLC)

PIN	Signal	Description
5	RS485-	RS485 Signal -
6	Reserved	Do not connect
7	485-GND	Ground of 485
8	Reserved	Do not connect

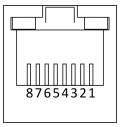
X5 (CAN+485) IN



PIN	Signal	Description
1	CAN-H	CAN High
2	CAN-L	CAN Low
3	CAN-GND	Ground CAN
4	RS485+	RS485 Signal +
5	RS485-	RS485 Signal -
6	Reserved	Do not connect
7	485-GND	Ground of 485
8	Reserved	Do not connect

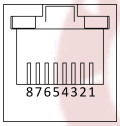
Communication bus EtherCAT (SBD ver. ETC)

X4 ETC OUT



PIN	Signal	Description
1	TX Data+	Transmit Data +
2	TX Data-	Transmit Data -
3	RX Data+	Receive Data +
4	Reserved	Do not connect
5	Reserved	Do not connect
6	RX Data-	Receive Data -
7	Reserved	Do not connect
8	Reserved	Do not connect

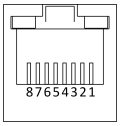
X5 ETC IN



PIN	Signal	Description
1	TX Data+	Transmit Data +
2	TX Data-	Transmit Data -
3	RX Data+	Receive Data +
4	Reserved	Do not connect
5	Reserved	Do not connect
6	RX Data-	Receive Data -
7	Reserved	Do not connect
8	Reserved	Do not connect

Communication bus PROFINET (SBD ver. PNT)

X4 e X5 PNT CH1 and CH2



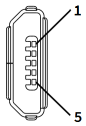
PIN	Signal	Description
1	TX Data+	Transmit Data +
2	TX Data-	Transmit Data -
3	RX Data+	Receive Data +
4	Reserved	Do not connect

Communication bus PROFINET (SBD ver. PNT)

PIN	Signal	Description
5	Reserved	Do not connect
6	RX Data-	Receive Data -
7	Reserved	Do not connect
8	Reserved	Do not connect

Micro USB

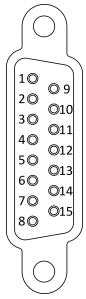
X6



PIN	Signal	Description
1	Vdc	+ 5V
2	Data-	Data -
3	Data+	Data +
4	Reserved	Do not connect
5	GND	Ground for Vdc and Data reference

Feedback sensor

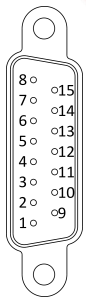
X7



RESOLVER

PIN	Signal	Description
1	Shield	Shield connection
2	Cos+	Cosine signal +
3	Sin-	Sine signal -
4	Exct-	Excitation signal -
5	Exct+	Excitation signal +
6	Reserved	Do not connect
7	Reserved	Do not connect
8	Reserved	Do not connect
9	Reserved	Do not connect
10	Cos-	Cosine signal -
11	Sin+	Sine signal +
12	Therm+	Motor thermal sensor +
13	Therm-	Motor thermal sensor -
14	Reserved	Do not connect
15	Reserved	Do not connect

X8



INCREMENTAL ENCODER + HALL SENSOR

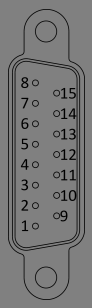
PIN	Signal	Description
1	A-	Encoder Phase A-
2	B-	Encoder Phase B-
3	Z-	Encoder Marker pulse Z-
4	Therm-	Motor thermal sensor -
5	VdcEnc_Hall	Supply Voltage for Incremental Encoder and Hall Sensor
6	Reserved	Do not connect

Feedback sensor

INCREMENTAL ENCODER + HALL SENSOR

PIN	Signal	Description
7	U_Hall	Encoder Hall sensor U+
8	W_Hall	Encoder Hall sensor W+
9	A+	Encoder Phase A+
10	B+	Encoder Phase B+
11	Z+	Encoder Marker pulse Z+
12	Therm+	Motor thermal sensor +
13	GND	Ground of VdcEnc_Hall
14		
15	V_Hall	Encoder Hall sensor V+

X8

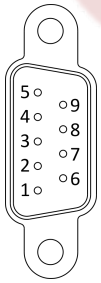


ABSOLUTE ENCODER (HIPERFACE) - not implemented

PIN	Signal	Description
1	Sin-	Sine signal -
2	Cos-	Cosine signal -
3	Data-	Data signal -
4	Therm-	Motor thermal sensor -
5	Reserved	Do not connect
6	VdcEnc	Supply Voltage for Hiperface Encoder
7	Reserved	Do not connect
8	Reserved	Do not connect
9	Sin+	Sine signal +
10	Cos+	Cosine signal +
11	Data+	Data signal +
12	Therm+	Motor thermal sensor +
13	GND	Ground of VdcEnc
14		
15	Reserved	Do not connect

Auxiliary encoder input or Step/Dir

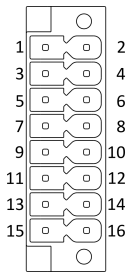
X9



PIN	Signal	Description
1	GND	Ground of VdcEnc
2	Reserved	Do not connect
3	Z+	Encoder Marker pulse Z +
4	B+ / Dir+	Encoder phase B + / Dir +
5	A+ / Step+	Encoder phase A + / Step +
6	VdcEnc	Supply Voltage for Incremental Encoder
7	Z-	Encoder Marker pulse Z -
8	B- / Dir-	Encoder phase B - / Dir -
9	A- / Step-	Encoder phase A - / Step -

Digital I/O

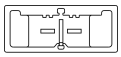
X10



PIN	Signal	Description
1	DInp0	Digital Input 0
2	DInp1	Digital Input 1
3	DInp2	Digital Input 2
4	DInp3	Digital Input 3
5	DInp4	Digital Input 4
6	DInp5	Digital Input 5
7	DInp6	Digital Input 6
8	DOut0	Digital output 0
9	DOut1	Digital output 1
10	DOut2	Digital output 2
11	+24V	+24 Vdc for digital Output (must be provided from external PSU)
12	DGND	Ground for Digital I/Os
13	AInp+	Analog Input (Positive reference)
14	AOut	Analog Output Reference
15	AInp-	Analog Input (Negative reference)
16	AGND	Ground for Analog Input and Output reference

Motor brake

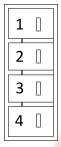
X12



PIN	Signal	Description
1	Motor BR (GND)	Motor brake (reference)
2	Motor BR (+24Vdc)	Motor brake supply

Motor

X13



PIN	Signal	Description
1	U	Motor phase U
2	V	Motor phase V
3	W	Motor phase W
4	PE	Protective Earth

[a]The neutral of the three-phase balanced system must be referred to the ground.

CAUTION: connectors X4 and X5 CAN + 485 (SBD ver. PLC)

The CAN is isolated towards the 485.
The pinout of the RJ45 connectors (X4 and X5) provides both the CAN and the 485, therefore it is necessary to pay attention to the wirings.

6. Led

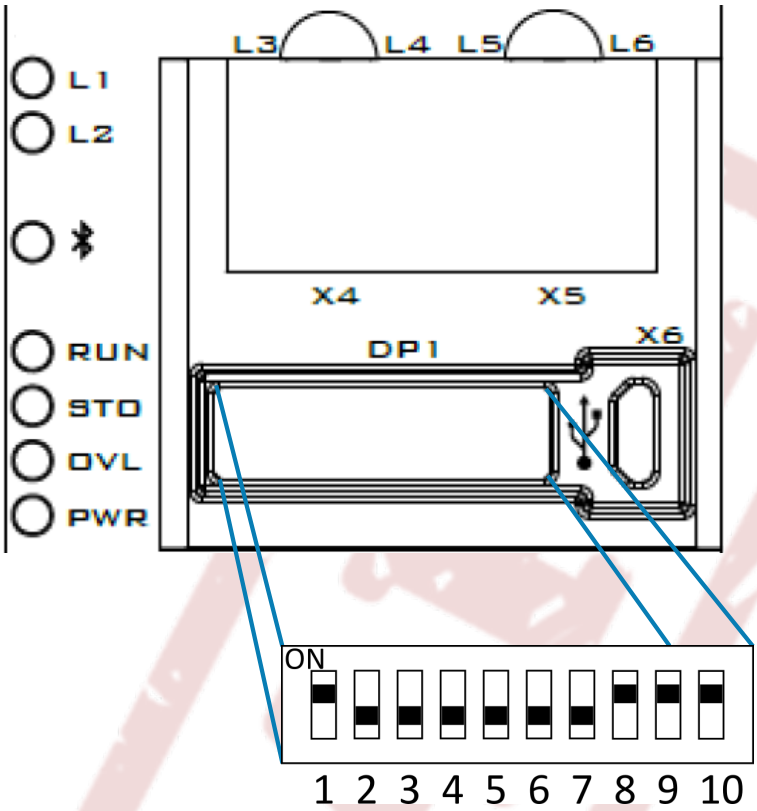


Figure 2. Leds and dip-switches arrangement.

The SBD is provided with 10 leds that can take the following statuses:

- *OFF*: led switched off;
- *ON*: led steady switched on;
- *1 FL* (1 flash): led 200 ms ON, 1 s OFF;
- *2 FL* (2 flash): led 200 ms ON, 200 ms OFF, 200 ms ON, 1 s OFF;
- *3 FL* (3 flash): led (200 ms ON, 200 ms OFF x 2) + 200 ms ON, 1 s OFF;
- *FLK* (flicker): led 50 ms ON, 50 ms OFF;
- *BLK* (blinking): led 200 ms ON, 200 ms OFF;

Status of the leds L1 and L2 in the CAN version

Interpretation of the leds status:

Meaning of the L1 led status in the CAN version	
***State machine* status**	**L1**
PRE-OPERATIONAL	BLK
STOPPED	1 FL

Meaning of the L1 led status in the CAN version	
***State machine* status**	**L1**
OPERATIONAL	ON

Meaning of the L2 led status in the CAN version		
CANopen port errors	**Description**	**L2**
No error	The CANopen port is working properly.	OFF
Warning limit reached	At leat one of teh error counters (TEC or REC) has reached or exceeded the notice level of 96.	1 FL
Error control event	The communication port is in Life Guard error.	2 FL
Sync error	SYNC controller error.	3 FL
Bus-off	The communication port in in Bus-off status.	ON

Status of the L1 and L2 leds in the ETC version

Interpretation of the leds status:

Meaning of the L1 led status in the ETC version	
EtherCAT state machine status	**L1**
INIT	OFF
PRE-OPERATIONAL	BLK
SAFE-OPERATIONAL	1 FL
OPERATIONAL	ON
BOOTSTRAP	FLK

Meaning of the L2 led status in the ETC version		
EtherCAT port errors	**Description**	**L2**
No error	The EtherCAT port is working properly.	OFF
Not valid configuration	Wrong settings in the EtherCAT communication port: the EtherCAT state machine status switching required by the Master is not possible.	BLK
Not required status switch	The drive has self-executed a status switch of the EtherCAT state machine without any command from the Master. Generally this situation occurs when a synchronization error happens.	1 FL
Sync Manager watchdog expired	The Sync Manager watchdog of the PDO RX is expired.	2 FL
Hardware failure	Serious error in the ET1100: contact CMZ SISTEMI ELETTRONICI S.r.l.	ON

Status of the leds L1 and L2 in the PNT version

Meaning of the L1 led status *Network Status* in the PNT version		
Status	**Colour**	**Description**
OFF	-	Offline: device off or no connection with the Controller

Meaning of the L1 led status *Network Status* in the PNT version		
Status	**Colour**	**Description**
ON	Green	Online (RUN): connection estabilished with the Controller, Controller in RUN status
1 FL	Green	Online (STOP): connection estabilished with the Controller, Controller in STOP status or not valid cyclic data
BLK	Green	Identification: continuous blinking to identify the drive (function DCP_Identify)
ON	Red	Fatal event: Internal serious error. The led L2 Module Status is steady on (ON) red
1 FL	Red	Errore Station Name: the Controller has not configured the Station Name on the drive
2 FL	Red	IP address error: the Controller has not configured the IP address on the drive
3 FL	Red	Configuration error: the expected identification is different from the real one

Meaning of the L2 led status *Module Status* in the PNT version		
Status	**Colour**	**Description**
OFF	-	Not initialized: drive off or module in the SETUP or NW_INIT status
ON	Green	Normal operativity: the module has exit from the NW_INIT status
1 FL	Green	Normal operativity: at least one diagnostics event is present
ON	Red	Fatal event: Internal serious error. The led L2 Module Status is steady on (ON) red
ON	Red	Fatal event: serious internal error. The led L1 Network Status is steady on (ON) red
BLK	Greed/Red	Anybus module firmware update in progress. Do not turn off the SBD during this operation. The turn off may cause permanent damages to the SBD.

Status of leds L3-L4 and L5-L6

The connectors X4 and X5 have 2 led each one, respectively identified from the couples L3-L4 and L5-L6.

Version	Leds function
CANopen	The leds are not used
EtherCAT	The leds L3 and L5 identify the data traffic, so if they blink it means that the communication is active. The leds L4 and L6 are not used.
PROFINET	

Led RUN status

Meaning of the RUN led status (enabling status)		
Status	**Colour**	**Description**
OFF	-	Control voltage missing
BLK	-	Drive disabled
ON	-	Drive enabled
-	Red	Fault or Fault Reaction Active present

Meaning of the RUN led status (enabling status)		
Status	**Colour**	**Description**
-	Orange	Warning present
-	Green	No alarm

Led STO status

Meaning of the STO led status (STO status)		
Status	**Colour**	**Description**
OFF	-	/STO input not present
ON	Green	/STO input present
BLK	Red	Fault detected on the /STO input

Led OVL status

Meaning of the OVL led status (overload status)		
Status	**Colour**	**Description**
BLK	Red	Fault: Overload
ON	Red	Warning: Drive enabled and overload limited
ON	Orange	Warning: Drive enabled and overload imminent
ON	Green	Motor enabled and no one of the previous alarm
BLK	Green	Motor disabled and no one of the previous alarm

Led PWR status

Meaning of the PWR led status (power section, supply and output status)		
Status	**Colour**	**Description**
OFF	-	Under voltage, supply not connected
ON	Red	Short-circuit
BLK	Red	Fault Over current
FLK	Red	Fault Over voltage
BLK	Orange	Warning Over current
FLK	Orange	Warning Over voltage
ON	Green	Drive enabled and no one of the previous alarm
BLK	Green	Drive disabled and no one of the previous alarm

7. Dip switch

For the arrangement of the dip-switches see *Figure 2*.
The drive is provided with a dip switch. Its use varies according to the drive version.

- For the CAN drive version: the switches from 1 to 7 identifies the node number (ID CANopen = from 1 to 127), the switches from 8 to 10 the communication speed (baud rate).
- For the ETC drive version: identifies the node address (Configured Station Alias).
- For the PNT drive version: it is not used.

CAUTION: dip-switch setting

The setting of the dip-switches are applied only at the turn-on of the SBD and must be made with not supplied drive. Comply with the prescriptions on the product management.

Setting of the NODE ID for the CAN drives							
Switch7	**Switch6**	**Switch5**	**Switch4**	**Switch3**	**Switch2**	**Switch1**	**Node address**
OFF	OFF	OFF	OFF	OFF	OFF	OFF	Memorized in the internal memory of the drive
OFF	OFF	OFF	OFF	OFF	OFF	ON	Node 1
OFF	OFF	OFF	OFF	OFF	ON	OFF	Node 2
OFF	OFF	OFF	OFF	OFF	ON	ON	Node 3
...	...	...	...	...	...	...	
ON	ON	ON	ON	ON	OFF	ON	Node 125
ON	ON	ON	ON	ON	ON	OFF	Node 126
ON	ON	ON	ON	ON	ON	ON	Node 127

Selection of the CANopen port baud rate			
Switch 10	**Switch 9**	**Switch 8**	**Baud rate**
OFF	OFF	OFF	1 Mb/s
OFF	OFF	ON	800 kbit/s
OFF	ON	OFF	500 kbit/s
OFF	ON	ON	250 kbit/s
ON	OFF	OFF	125 kbit/s
ON	OFF	ON	100 kbit/s
ON	ON	OFF	50 kbit/s
ON	ON	ON	20 kbit/s

Configured Station Alias setting for the ETC drives										
Sw10	**Sw9**	**Sw8**	**Sw7**	**Sw6**	**Sw5**	**Sw4**	**Sw3**	**Sw2**	**Sw1**	**Address**
OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	Written in the ESI EEPROM or positional
OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	Address 1
OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF	Address 2
OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	Address 3
...	...	...	...	...	...	...	...	...	...	
ON	ON	ON	ON	ON	ON	ON	ON	OFF	ON	Address 1021
ON	ON	ON	ON	ON	ON	ON	ON	ON	OFF	Address 1022
ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	Address 1023

8. Warnings

CAUTION: contents and responsibilities

CMZ SISTEMI ELETTRONICI S.r.l. can modify the described products in this document in any time and without any notice.

This manual was written by CMZ SISTEMI ELETTRONICI S.r.l. only for their customers use providing the most updated version of the products, in relation of the issue data.

The responsibility to use this manual belongs to every user and the use of some functionsdescribed in this document must be done under strict care to avoid any danger for the staff and the equipment damage.

No other warranty is provided by CMZ SISTEMI ELETTRONICI S.r.l., in particolar for possible imperfections, incompleteness, and/or any other difficulties.

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8.1. Precautions for the product handling

WARNING: electrostatic charges

The content includes parts that are sensitive to the electrostatic charges, under damage risk. Use suitable protections for the electrostatic charges before to touch the product and avoid the contact with the materials that are potentially electrostatically charged (e.g. insulating materials or exposed conductive parts).

WARNING: product handling

During the product handling, pay attention to avoid falls, strikes and cuts. Do not lift the product without the necessary protection measures.

CAUTION: environmental conditions

Pay attention to the environmental conditions required for the transport/storage as temperature, humidity and shock limits (see the technical data reported in the product manual).

Note: safekeeping

Do not keep the product in the storage room without the original packaging. Open the packaging only immediately before the installation.

8.2. Installation and wiring precaution

CAUTION: installation responsibilities

The SBD drives must be installed by trained personnel only that must have an in-depth knowledge about the safety requirements and the electromagnetic compatibility (EMC).
The system integrator has the responsibility to guarantee that the product or the final system comply to the pertinent regulations that are in force in the country in which the product (or the entire system) is used.
It is recommended to carefully select the conductors section, the fuses or other protection devices and the protective grounding connections.

DANGER: risk evaluation

The system integrator using the drives must analyse the risk for the device and implement the necessary measures to safeguard the device itself and the surrounding people from any unforeseen motions.

DANGER: risks of use

The drive must not be used in an explosive or corrosive environment, in the presence of inflammables, water or fuels. There can be risk of ffre, electrical shock or injuries.

In case of failures because of accidental circumstances or wiring errors the power section can even provoke electric arcs. The drive must be installed in an environment without any inflammables. This product is intended to be used in machines and systems in industrial environment, respecting the described application, environmental and functioning conditions It is recommended not to use the product for any further purpose than those specified.

DANGER: dangerous voltage

The product chassis is NOT a protection from direct contacts (the SBD is an "open type" device). The SBD is designed to be used exclusively in a protected area which access is allowed only to qualified electricians (CLOSED ELECTRICAL OPERATING AREA, for ex. adequate electrical panel). The product must be installed in an environment that complies the regulations that are related to the specific application, so that the parts with dangerous voltage cannot be reached during the use or the maintenance.

DANGER: dangerous voltage

Do not transport, install or make any connections or inspections and don't touch the connection terminations of the product when the product is powered or connected to other devices. Preventively unplug the connector X1! In case some devices are connected, between the terminations some dangerous voltages may be present even if the power input (line) is not supplied. After it has been disconnected and left without voltage supply, wait at least 10 min. to ensure that the resudual voltage on the terminations is not dangerous (< 50Vdc).

DANGER: hot surfaces

- Do not touch the heat-sink during the functioning: the surface temperature may cause burns.
- Provide an adequate heat dissipation.
- Do not place components that are flammables or sensitive to heat in the close proximity of the drive.
- In order to prevent risks of damages, do not obstruct or limit the ventilation. Keep any eventual object far from the ventilation openings.

The failure to comply with these precautions may provoke serious injuries or material damages.

DANGER: electrical insulation

The elements of the drive power section (that is the devices that are connected to the connectors X1, X2, X13 as cables, motors, external braking resistor, external EMI filter, etc. ...) must be correctly insulated:

- reinforced/double insulation between the others ELV circuits (< 50 Vdc) and to the box plastic parts;
- main insulation between the accessible metallic parts and to the PE terminations;

DANGER: electromagnetic fields

The magnetic and electromagnetic fields, that are generated by the conductors in which the current flows represent a serious danger for the people with the pacemaker, metallic prostheses and hearing aids. Be sure that these people have no access to the areas in which these systems are presents. Eventually, if these persons have to enter in the described areas, consult a doctor.

DANGER: electrical leakage

HIGH LEAKAGE ON THE PROTECTIVE EARTH: This drive may cause the presence of leakage currents > 3,5 mA on the protective earth.

DANGER: electrical shock

Electrical shock danger in case of intrusion of foreign body or break/violation of the device.

CAUTION: risk evaluation

When some Fault is found, the drive automatically disables: the motor is no longer in torque and it can move to another position and to damage the devices and/or the surrounding people. It must be made an evaluation of the risk. In consequence the user must take appropriate measures to avoid risks to the safety of the person.

CAUTION: noise emission

The drive has been designer and built so that the noise emissions are reduced to the minimum level. The noise emission of the machine and the related risks for the user, that are strongly dependent from the application, must be evaluated by the system integrator that integrates the drive.

CAUTION: Fault restore

When the drive is disabled due to a Fault, remove the cause of the Fault before to reboot it through a turn-off/turn-on cycle or through appropriate commands via fieldbus.

CAUTION: installation precautions

The drive SBD must be installed in an environment that guarantees the conditions that this manual prescribes, in particular it must be protected from excessive humidity and/or condensation. Furthermore all the environmental conditions must be respected, considering that the heat the is produced by the drive must be adequately dissipated so that the correct operating maximum temperature is not exceeded (see the technical data reported in the product manual). Plan regular checks in order to ensure the maximum possible reliability of the drive and the related installation.

CAUTION: UV ray exposure

The product must be protected from UV radiations.

CAUTION: grounding

The connection of the protective ground conductor must be realized so that to guarantee its functionality of "grounding", even in case of a not appropriate use of the drive (for example a wrong electrical connection).

CAUTION: electrostatic charges

The system is designed and buit so that to reduce the formation of potentially dangerous electrostatic charges and is provided with means that allows to discharge: the enclosure is made with metal and polymeric material. The metallic part is protected through the "grounding". The non metallic materials may form electrostatic charges in case of contact with other insulating materials.

CAUTION: risk evaluation

The section of the supply conductors must be adequate to the drive power. Always connect the protective ground and the functional ground with two separate cables (star connection of the grounds).

CAUTION: cables application

Absolutely avoid applying the I/Os signals cable in parallel with the power ones by choosing appropriate separated paths. It's recommended to use a shielded cable for the connection and to connect the shield to the metallic part of the connector on the SBD.

8.3. Maintenance and inspection

IMPORTANT: electrical precautions

- Before to modify the dip-switches settings, turn-off the drive and remove the voltage supply.
- The drive includes electrostatic-sensitive components, therefore it is recommended to pay particular attention when these settings are made in order to prevent damages to the drive. In particular, discharge in advance the static electricity of the body, place the drive on a conductive support and avoid the contact with highly insulating materials.

Note: product tampering

Do not open or modify the product: for the internal inspections or repairs refer to CMZ SISTEMI ELETTRONICI S.r.l.. In case of tampering the product the warranty expires.

9. Modality of waste disposal at life end of product

The device must be disposed as electric and electronic waste. For the recicling or the disposal of the product, CMZ invites to respect the local regulation in force and the most suitable procedures.

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