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# 1 Safety Information

The user must have read and understood this documentation before carrying out any operation on hardware. Please contact us in case of missing information or doubt regarding the installation procedures, safety or any other issue.



## Caution

We disclaims all responsibility to possible industrial accidents and material damages if the procedures & safety instructions described in this manual are not followed.

- Never use the device for purposes other than those described in this manual.
- The device must be installed by trained personnel only and in accordance with applicable regulations of the respective country concerning both safety and EMC aspects.
- Troubleshooting and servicing are permitted only by Beshow technicians.
- The safety symbols placed on the device or written in this manual must be respected.
- If this device is integrated into a machine, the manufacturer of this machine must ensure that it fulfills the 2004/108EC directive on EMC before operating the system.



## Danger

To avoid electric arcing and hazards to personnel and electrical contacts never connect/disconnect the device while the power source is on.



## Danger

Power cables can carry a high voltage, even when the motor is not in motion. Disconnect the hardware from all voltage sources before it is disassembled for servicing.

After shutting off the power and removing the power source from the equipment, wait at least 10 minutes before touching or disconnecting parts of the equipment that are normally loaded with electrical charges (such as capacitors or contacts). Measuring the electrical contact points with a meter before touching the equipment is recommended.



## Caution

The device contains hot surfaces and electrically-charged components during operation.



## Caution

The maximum AC power supply connected to this hardware must comply with the parameters outlined in this guide.

In a one phase configuration, never connect the phase without the corresponding neutral wire.

Read the paragraph Overvoltage on possible mechanical damage that may occur if an external brake resistor is missing or improperly dimensioned.

## 2 Product Description

SP devices contain:

- A Single-phase rectifier, in-rush current limiter
- A large capacitance to recuperate motion energy
- An internal brake resistor
- DC-Bus output connectors for up to two drives
- Air Cooling with fans
- Status LED

The devices also include the following protective functions:

- Energy dissipation by internal brake resistor
- Short circuit protection of brake resistor
- Short circuit protection on DC-Bus on power up
- Over temperature of the device

### 2.1 Internal brake

All power supplies can be ordered with an internal brake resistor (standard).

### 2.2 Block Diagram

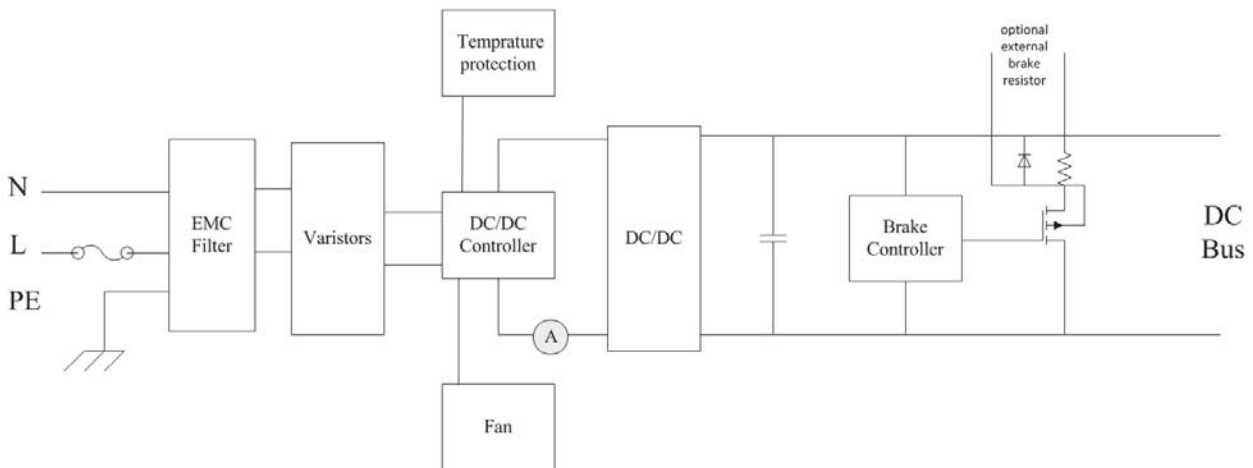


Figure 1: Block Diagram

## 3 Technical Specifications

### 3.1 Environmental Conditions

#### 3.1.1 Transport and storage conditions

During the transport and the storage, the device must remain inside their original packaging which complies with the ESD standard.

- The transport conditions must respect the class 2K3 of the IEC 60721-3-2 standard (temperature between  $-25^{\circ}\text{C}$  ( $-13^{\circ}\text{F}$ ) and  $+70^{\circ}\text{C}$  ( $+158^{\circ}\text{F}$ ), and humidity  $<95\%$  without condensation) and
- The storage conditions must respect the class 1K2 of the IEC 60721-3-1 standard (temperature between  $+5^{\circ}\text{C}$  ( $+41^{\circ}\text{F}$ ) and  $+45^{\circ}\text{C}$  ( $+113^{\circ}\text{F}$ ), and humidity between 5 and 85% without condensation). If either storing for more than two years or at temperatures higher than  $35^{\circ}\text{C}$ , observe the reforming procedure as shown under „Capacitor reforming“.

#### 3.1.2 General Operating conditions

The device has the following electrical safety degree: IP 20 (according to EN 60529 standards).

The power supplies are designed to operate in a non-aggressive and clean environment, with a (no condensing) humidity ranging between 5% and 85%, an altitude  $< 2000\text{m}$  (6562 ft), and a temperature ranging between  $+5^{\circ}\text{C}$  ( $50^{\circ}\text{F}$ ) and  $+40^{\circ}\text{C}$  ( $104^{\circ}\text{F}$ ).

The electronics must be in an enclosure respecting a pollution degree of 2 (refer to UL 508C and EN 61800-5-1 standards for more information). They are not designed or intended for use in the on-line control of air traffic, aircraft navigation and communications, explosive atmosphere, as well as critical components in life support systems or in the design, construction, operation and maintenance of any nuclear facility.

### 3.2 Electrical Specifications

All the specifications are given for an ambient temperature ranging from +10°C (50°F) to +40°C (104°F) .

Power Supplies	BS-SP1200-80
<b>Input</b>	
Input voltage range	180Vac~264Vac
Power frequency	47Hz~63Hz
Efficiency	typ. 86%
Input current limitation	15A
Internal fuse	35A
<b>Output</b>	
Output voltage	80V
Rated. Ouput power	1200W
Max. Ouput power	up to 190 - 200%
Ripple	250mV
Noise voltage	300mV
Temperature coefficient	$\pm 0.03\%/^{\circ}\text{C}$
Start-up delay	$\leq 1.5\text{S}$
Rise time	$\geq 40\text{mS}$
<b>Regulation</b>	
Line regulation	$\pm 0.2\%$
Load regulation	$\pm 0.5\%$
Capacitance	1.5 $\pm 20\%$ mF
Internal brake resistor	18 Ohm /100W
External brake Min resistance	4 Ohm
Brake-point $U_{\text{Brake}}$ brake	86V $\pm 1\%$
<b>Protection and Controlling</b>	
Over temperature protection	Air Cooling
Safety/Standards	
IEC60950/UL60950/UL508/CSA22.2-60950/CSA22.2-107.1/IP20,safety class 1/pollution degree 2	
<b>Operating Data</b>	
Temperature range	-30°C~70°C
Humidity range	20%~90%RH
Weight	2.5kg
Size	315 × 75 × 195mm

### 3.3 Overvoltage

A system of a motor coupled with a load has a certain amount of energy. This energy is mainly kinetic when the load is moving or rotating. While stopping these loads, the energy must either be stored or dissipated. The same applies during moves where gravitational energy or spring energy is involved.

The drives recuperate this energy back to the SP and Output voltage rises.

#### 3.3.1 Internal Brake Capability

The following measures are provided device internally to store and dissipate energy. The internal capacitors can store a certain amount of energy

$$E_C = 0.5 * C * (U_2 - U_{dcSupply})^2$$

Since the maximum voltage is given, the energy stored is defined by the Output voltage  $U_{dcSupply}$ .

See technical electrical specification sheet.

Above  $U_{Brake}$ , the brake (internal or external) will be activated to dissipate energy. The internal resistor can dissipate a short term energy  $E_A$  but only a small continuous power  $P_C$ . If high mechanical energy is involved the internal brake resistor might reach its thermal limit. It will turn off and the DC-bus voltage might increase further until the drives turn off. Then the axis does not stop and might cause mechanical damage.

This failure is avoided by using an external brake resistor or reducing the deceleration of the drives. Slower stopping reduces the load on the brake resistor.

#### 3.3.2 External Brake Resistor

The optional external brake resistor must be dimensioned properly to account for the amount of energy to be dissipated in the axis system.

It is recommended to use a resistor that is protected against over-temperature. Contact manufacturer for dimensioning.

#### 3.3.3 Overvoltage Protection

If the external braking resistor is not dimensioned correctly, the DC-Bus voltage may exceed the maximum DC voltage level. The SP indicates this by switching the Status output to OV. If the voltage further increases and reaches the internal limit of the drives, they will protect themselves by turning off their semiconductor switches. The axis is not decelerated anymore and the voltage will not increase any further. However, turning off the drives during fast motion leaves the axis at the original speed. The axis might crash into its end-limits, which might cause significant damage to the mechanical system.

Therefore it is important to choose a well dimensioned braking resistor. Also, the Status output signal and the overvoltage error message of the drives may be used by the control system for damage prevention.

### 3.3.4 Diagnostics and Status

There are four LEDs for diagnostics.

	ON	OFF
<b>PD</b>	<b>Discharging DC-Bus</b>	\
<b>AD</b>	<b>Brake active</b>	\
<b>MD</b>	<b>Overvoltage</b>	\
<b>PW</b>	<b>Ready</b>	<b>No line power</b>

## 4 Mounting and Wiring

The device should be protected against any splashes of liquid and any contacts with smoke and dust. It must be installed inside a closed cabinet and mounted as mentioned below.

### 4.1 Dimensions

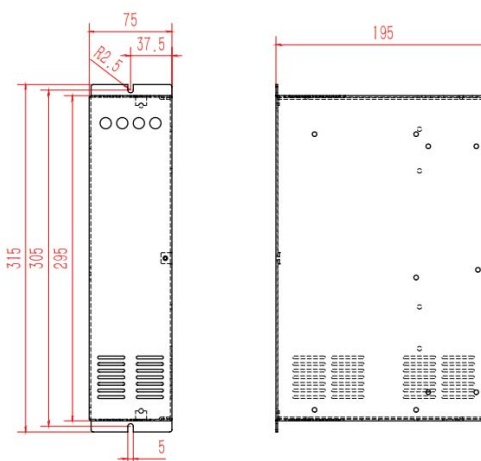
Dimensions:

**Width:** 75mm

**Height:** 315mm

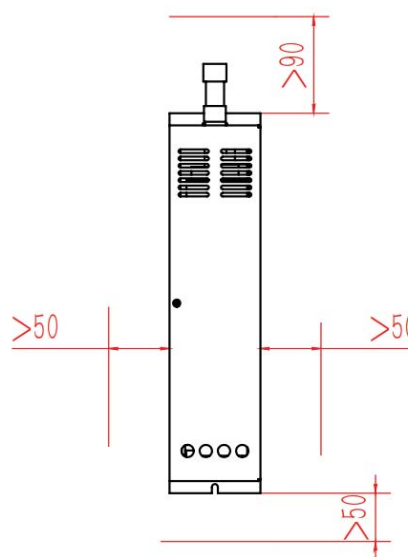
**Depth:** 195mm

Recommended distance  
for the mounting screws is 305mm.



**Figure 2: SP mounting Dimensions (Unit: mm)**  
(Front View)

When installing the product, ensure that there is no other equipment around (except the equipment related to the product) and flammable and explosive items, enough space should be reserved to ensure the installation of heat dissipation and safety isolation requirements.



**Figure 3: SP mounting Dimensions (Unit: mm)**

## 4.2 Brake resistor

Use only resistors with thermal shutdown protection. The use of an undersized power and energy withstand capability resistor might cause damage to the system. See section 3.3 for dimensioning.



### Caution

The cables connected to the external brake resistor must be shielded.

## 4.3 Capacitor reforming



### Caution

If the device has been stored without power for more than two years after shipment or after last time use, the internal capacitors require reforming. The same applies if storing above 35°C for more than one month without power.

## 4.4 Wiring and Connectors

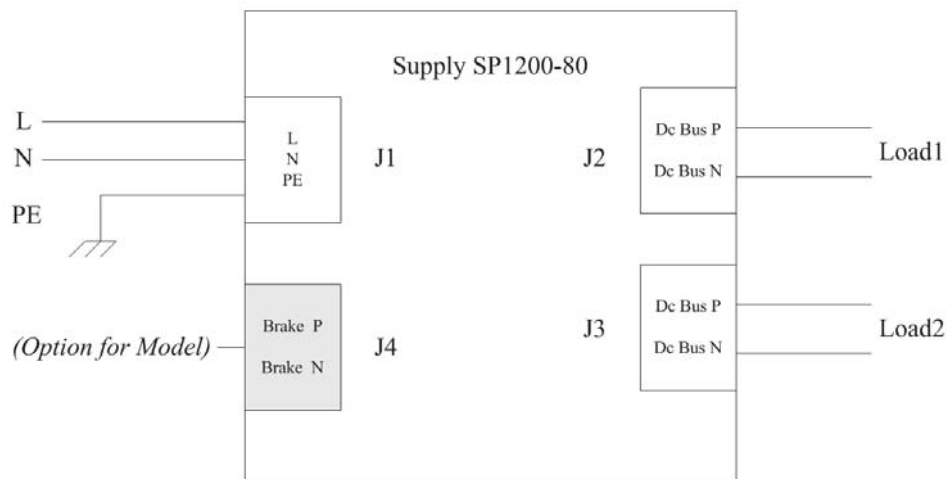


Figure 4: SP connections

connector	Dir.	Name	Connector counterpart)	Cross-section
J1	IN	AC-Line	M16 Aviation socket NO:WXM-M16-S-A-I-F-3P-S-P	2mm <sup>2</sup> Min, 2.5 mm <sup>2</sup> typ
J2	OUT	DC-Bus	5.08mm 2EDGKM-5.08mm	2.5 mm <sup>2</sup> Min
J3	OUT	DC-Bus	5.08mm 2EDGKM-5.08mm	2.5 mm <sup>2</sup> Min
J4	\	\	optional	optional



The following measures must be taken to ensure personal safety and EMC requirements

- There must be connection to earth. Each must have at least the same diameter as the AC-Line wires.



**Danger**  
**Must!**

Always connect first the protective earth (PE) to the dedicated screw in the housing!

## 5 Appendix

### 5.1 Warranty Information

The products covered in this manual are warranted to be free of defects in material and workmanship and conform to the specifications stated either within this document or in the product catalog description. All products are warranted for a period of 12 months from the time of installation, or 18 months from time of shipment, whichever comes first. No other warranties, expressed or implied – and including a warranty of merchantability and fitness for a particular purpose – extend beyond this warranty.

### 5.2 Service

We are committed to quality customer service. In order to serve in the most effective way, please contact the Customer Support .

## 6 Revision History

Version	Date	Editor	Comment
001	2022-12-12	Yoyo	First edit

A company of Controlway Group

**CONTROLWAY**

## 全国办事处

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