

## Installation manual PSUP

# Mains modules



DOC-0006-01

**PSU-Manual-Set**

- ◆ Installations-Handbuch PSUP deutsch
- ◆ Installation Manual PSUP english

192-120147N9 PSUP Manual

2019-06

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We checked the contents of this publication for compliance with the associated hard and software. We can, however, not exclude discrepancies and do therefore not accept any liability for the exact compliance. The information in this publication is regularly checked, necessary corrections will be part of the subsequent publications.

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# 1. Introduction

## In this chapter you can read about:

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## 1.1 Device assignment

**This manual is valid for the following devices:**

- ◆ PSUP10D6
- ◆ PSUP20D6
- ◆ PSUP30D6

## 1.2 Scope of delivery

The following items are furnished with the device:

- ◆ Manuals
  - ◆ Installation manual (German, English)
- ◆ Device accessories
  - Device accessories for PSUP
    - ◆ Matching plug for the PSUP connectors X9, X40, X41
    - ◆ 2 bus terminal connectors (BUS07/01) for mains module and the last axis controller in the combination

Type specification plate: PSUP (example)

 	Parker Hannifin GmbH Robert-Bosch-Straße 22 77656 Offenburg Tel. +49 (0) 781/509-0 www.parker-eme.com		
	1      2      3      4	PN: PSUP20D6USBM00	
	5	Tested: 6      21.07.2010	
9	SN: 2828100002 		
<b>Power Input *: 7</b> 3*400VAC (50/60 Hz) , 44A			
<b>Power Output *: 7</b> 565VDC , 20kW Aux. Supply 24VDC, class 2 IP20 * see manual for further ratings (192-120147)			
<b>Made in Germany</b>			

### Explanation:

1	Type designation: The complete order designation of the device (2 - 4).
2	<b>PSUPx0</b> :Mains module 3AC 230...480V, nominal power in kW (10=10kW) <b>D6</b> : Designation nominal supply
3	Configuration and parameterization interface: <b>USB</b> :USB connection
4	Options: <b>Mxx</b> : I/O extension
5	Unique number of the particular device
6	Date of factory test
7	Nominal supply voltage: Power Input: Input supply data Power Output: Output data
8	CE compliance
9	UL certified (corresponding to the logo displayed on the device)

## 1.3 Packaging, transport, storage

### Packaging material and transport



#### Caution!

The packaging material is inflammable, if it is disposed of improperly by burning, lethal fumes may develop.

The packaging material must be kept and reused in the case of a return shipment. Improper or faulty packaging may lead to transport damages.

Make sure to transport the drive always in a safe manner and with the aid of suitable lifting equipment (**Weight** (see on page 25)). Do never use the electric connections for lifting. Before the transport, a clean, level surface should be prepared to place the device on. The electric connections may not be damaged when placing the device.

### First device checkup

- ◆ Check the device for signs of transport damages.
- ◆ Please verify, if the indications on the Type identification plate correspond to your requirements.
- ◆ Check if the consignment is complete.

### Disposal

This product contains materials that fall under the special disposal regulation from 1996, which corresponds to the EC directory 91/689/EEC for dangerous disposal material. We recommend to dispose of the respective materials in accordance with the respectively valid environmental laws. The following table states the materials suitable for recycling and the materials which have to be disposed of separately.

Material	suitable for recycling	Disposal
Metal	yes	no
Plastic materials	yes	no
Circuit boards	no	yes

Please dispose of the circuit boards according to one of the following methods:

- ◆ Burning at high temperatures (at least 1200°C) in an incineration plant licensed in accordance with part A or B of the environmental protection act.
- ◆ Disposal via a technical waste dump which is allowed to take on electrolytic aluminum condensers. Do under no circumstances dump the circuit boards at a place near a normal waste dump.

### Storage

If you do not wish to mount and install the device immediately, make sure to store it in a dry and clean environment. Make sure that the device is not stored near strong heat sources and that no metal chippings can get into the device.

Please note in the event of storage >1 year:

#### Forming the capacitors

**Forming the capacitors only required with 400VAC axis controllers and PSUP mains module**

If the device was stored longer than one year, the intermediate capacitors must be re-formed!

#### Forming sequence:

- ◆ Remove all electric connections
- ◆ Supply the device with 230VAC single phase for 30 minutes
  - ◆ via the L1 and L2 terminals on the device or
  - ◆ multi axis devices via L1 and L2 on the PSUP mains module

## 1.4 Safety instructions

### In this chapter you can read about:

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Safety-conscious working .....	7
Special safety instructions .....	8

### 1.4.1. General hazards

#### General Hazards on Non-Compliance with the Safety Instructions

The device described in this manual is designed in accordance with the latest technology and is safe in operation. Nevertheless, the device can entail certain hazards if used improperly or for purposes other than those explicitly intended.

Electronic, moving and rotating components can

- ◆ constitute a hazard for body and life of the user, and
- ◆ cause material damage

#### Designated use

The device is designed for operation in electric power drive systems (VDE0160). Motion sequences can be automated with this device. Several motion sequences can be combined by interconnecting several of these devices. Mutual interlocking functions must be incorporated for this purpose.

### 1.4.2. Safety-conscious working

This device may be operated only by qualified personnel.

Qualified personnel in the sense of these operating instructions consists of:

- ◆ Persons who, by virtue to their training, experience and instruction, and their knowledge of pertinent norms, specifications, accident prevention regulations and operational relationships, have been authorized by the officer responsible for the safety of the system to perform the required task and in the process are capable of recognizing potential hazards and avoiding them (definition of technical personnel according to VDE105 or IEC364),
- ◆ Persons who have a knowledge of first-aid techniques and the local emergency rescue services.
- ◆ persons who have read and will observe the safety instructions.
- ◆ Those who have read and observe the manual or help (or the sections pertinent to the work to be carried out).

This applies to all work relating to setting up, commissioning, configuring, programming, modifying the conditions of utilization and operating modes, and to maintenance work.

This manual and the help information must be available close to the device during the performance of all tasks.

### 1.4.3. Special safety instructions



#### Caution!

Due to movable machine parts and high voltages, the device can pose a lethal danger. Danger of electric shock in the case of non-respect of the following instructions. The device corresponds to DIN EN 61800-3, i.e. it is subject to limited sale. The device can emit disturbances in certain local environments. In this case, the user is liable to take suitable measures.

- ◆ Check that all live terminals are secured against contact. Perilous voltage levels of up to 850V occur.
- ◆ Do not bypass power direct current



#### Caution!

Due to movable machine parts and high voltages, the device can pose a lethal danger. Danger of electric shock in the case of non-respect of the following instructions. The device corresponds to DIN EN 61800-3, i.e. it is subject to limited sale. The device can emit disturbances in certain local environments. In this case, the user is liable to take suitable measures.

- ◆ The device must be permanently grounded due to high earth leakage currents.
- ◆ The drive motor must be grounded with a suitable protective lead.
- ◆ The devices are equipped with high voltage DC condensers. Before removing the protective cover, the discharging time must be awaited. After switching off the supply voltage, it may take up to 10 minutes (with additional capacity modules it may take up to 30 minutes) to discharge the capacitors. Danger of electric shock in case of non respect.
- ◆ Before you can work on the device, the supply voltage must be switched off at the L1, L2 and L3 clamps. Wait at least 10 minutes so that the power direct current may sink to a secure value (<50V). Check with the aid of a voltmeter, if the voltage at the DC+ and DC- clamps has fallen to a value below 50V. Danger of electric shock in case of non respect.
- ◆ Do never perform resistance tests with elevated voltages (over 690V) on the wiring without separating the circuit to be tested from the drive.
- ◆ Please exchange devices only in currentless state and, in an axis system, only in a defined original state.
- ◆ If the axis controller is replaced, it is absolutely necessary to transfer the configuration determining the correct operation of the drive to the device, before the device is put into operation. Depending on the operation mode, a machine zero run will be necessary.
- ◆ The device contains electrostatically sensitive components. Please heed the electrostatic protection measures while working at/with the device as well as during installation and maintenance.
- ◆ Operation of the PSUP30 only with line choke.



#### Attention - hot surface!

The heat dissipater can reach very high temperatures (>70°C)





### Protective seals

#### Caution!

The user is responsible for protective covers and/or additional safety measures in order to prevent damages to persons and electric accidents.

Please note in the event of storage >1 year:

### Forming the capacitors

**Forming the capacitors only required with 400VAC axis controllers and PSUP mains module**

If the device was stored longer than one year, the intermediate capacitors must be re-formed!

#### Forming sequence:

- ◆ Remove all electric connections
- ◆ Supply the device with 230VAC single phase for 30 minutes
  - ◆ via the L1 and L2 terminals on the device or
  - ◆ multi axis devices via L1 and L2 on the PSUP mains module

## 1.5 Warranty conditions

- ◆ The device must not be opened.
- ◆ Do not make any modifications to the device, except for those described in the manual.
- ◆ Make connections to the inputs, outputs and interfaces only in the manner described in the manual.
- ◆ Fix the devices according to the **mounting instructions**. (see on page 15)  
We cannot provide any guarantee for other mounting methods.

#### Note on exchange of options

Device options must be exchanged in the factory to ensure hardware and software compatibility.

- ◆ When installing the device, make sure the heat dissipators of the device receive sufficient air and respect the recommended mounting distances of the devices with integrated ventilator fans in order to ensure free circulation of the cooling air.
- ◆ Make sure that the mounting plate is not exposed to external temperature influences.

## 1.6 Conditions of utilization for CE-conform operation

### - Industry and trade -

The EC guidelines for electromagnetic compatibility 2014/30/EU and for electrical operating devices for utilization within certain voltage limits 2014/35/EU are fulfilled when the following boundary conditions are observed:

**Operation of devices only in the state in which they are delivered.**

**Mains filter:** A mains filter is required in the mains input line if the motor cable exceeds a certain length. Filtering can be provided centrally at the system mains input or separately for each axis system.

### Use of the devices in the industrial area (limit values class C3 in accordance with EN 61800-3)

The following mains filters are available for independent utilization:

Device: PSU	Limit value class	Reference: Axis system with motor cable	Mains filter Order No.:
P10	C3	< 6 x 10 m	NFI03/01
P10	C3	< 6 x 50 m	NFI03/02
P20	C3	< 6 x 50 m	NFI03/03
P30	C3	< 6 x 50 m	NFI03/03

### Connection length: Connection between mains filter and device:

unshielded: < 0.5 m

shielded < 5 (fully shielded on ground - e.g. ground of control cabinet)

**Grounding:** Connect the filter housing and the device to the cabinet frame, making sure that the contact area is adequate and that the connection has low resistance and low inductance.

Never mount the filter housing and the device on paint-coated surfaces!

**Cable installation:**

- ◆ Signal lines and power lines should be installed as far apart as possible.
- ◆ Signal lines should never pass close to excessive sources of interference (motors, transformers, contactors etc.).
- ◆ Do not place mains filter output cable parallel to the load cable.

**Accessories:** Make sure to use only the accessories recommended by Parker

**Connect all cable shields at both ends, ensuring large contact areas!**

**Warning:** This is a product in the restricted sales distribution class according to EN 61800-3. In a domestic area this product can cause radio frequency disturbance, in which case the user may be required to implement appropriate remedial measures.

# 1.7 Conditions of utilization for UL approval PSUP

## UL approval for mains modules PSUP

<b>Conform to UL:</b>	◆ in accordance with UL508C
<b>Certified</b>	◆ E-File_No.: E142140

The UL approval is documented by a "UL" logo on the device (type specification plate).



UL approval PSUP30 in preparation!

### Conditions of utilization

- ◆ The devices are only to be installed in a degree of contamination 2 environment (maximum).
- ◆ The devices must be appropriately protected (e.g. by a switching cabinet).
- ◆ Tightening torque of the field wiring terminals ( green Phoenix plugs)

Device	X40: Ballast resistor	X41: Mains connector	X9: 24VDC
PSUP10	0.5 Nm (4.43Lb.in)	1.2 Nm (10.62Lb.in)	1.2 Nm (10.62Lb.in)
PSUP20	0.5 Nm (4.43Lb.in)	1.7 Nm (15Lb.in)	1.2 Nm (10.62Lb.in)
PSUP30	UL approval in preparation		

- ◆ Temperature rating of field installed conductors shall be at least 60°C. Use copper lines only  
Please use the cables described in the accessories chapter, they feature a temperature rating of at least 60°C.
- ◆ Maximum Surrounding Air Temperature: 40°C.
- ◆ Control voltage supply (24VDC) only permissible with "class 2" power supply.
- ◆ Suitable for use on a circuit capable of delivering not more than 5000 rms symmetrical amperes and 480 volts maximum and protected by (see below).
- ◆ The devices need a "branch circuit protection".

### PSUP10D6

<b>Maximum fuse rating per device</b>	Measure for line and device protection: MCB miniature circuit breaker (K characteristic) 25A in accordance with UL category DIVQ (ABB) S203UP-K25 (480VAC)
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### PSUP20D6

<b>Maximum fuse rating per device</b> <b>2 special purpose fuses in line are required</b>	<b>Cable protection measure:</b> MCB (K characteristic) with a rating of 50A / 4xVAC (depending on the input voltage). (ABB) S203U-K50 (440VAC) <b>Device protection measure:</b> Fuses 80A / 700VAC per supply leg in accordance with UL category JFHR2: Bussmann 170M1366 or 170M1566D
--	--



### Caution!

Risk of electric shock.  
Discharge time of the bus capacitor is 10 minutes.

## 1.8 Current on the mains PE (leakage current)



**Caution!**

This product can cause a direct current in the protective lead. If a residual current device (RCD) is used for protection in the event of direct or indirect contact, only a type B (all current sensitive) RCD is permitted on the current supply side of this product. Otherwise, a different protective measure must be taken, such as separation from the environment by doubled or enforced insulation or separation from the mains power supply by means of a transformer.

Please heed the connection instructions of the RCD supplier.

Mains filters do have high leakage currents due to their internal capacity. An internal mains filter is usually integrated into the servo controllers. Additional discharge currents are caused by the capacities of the motor cable and the motor winding. Due to the high clock frequency of the power output stage, the leakage currents do have high-frequency components. Please check if the FI protection switch is suitable for the individual application.

If an external mains filter is used, an additional leakage current will be produced.

The figure of the leakage current depends on the following factors:

- ◆ Length and properties of the motor cable
- ◆ Switching frequency
- ◆ Operation with or without external mains filter
- ◆ Motor cable with or without shield network
- ◆ Motor housing grounding (how and where)

### Remark:

- ◆ The leakage current is important with respect to the handling and usage safety of the device.
- ◆ A pulsing leakage current occurs if the supply voltage is switched on.

### Please note:

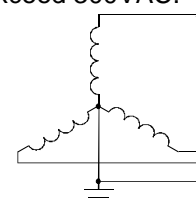
The device must be operated with effective grounding connection, which must comply with the local regulations for high leakage currents (>3.5 mA).

Due to the high leakage currents it is not advisable to operate the servo drive with an earth leakage circuit breaker.

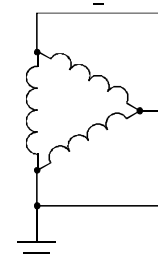
## 1.9 Supply networks

This product is designed for fixed connection to TN networks (TN-C, TN-C-S or TN-S). Please note that the line-earth voltage may not exceed 300VAC.

- ◆ When grounding the neutral conductor, mains voltages of up to 480VAC are permitted.



- ◆ When grounding an external conductor (delta mains, two-phase mains), mains voltages (external conductor voltages) of up to 240VAC are permitted.



Devices which are to be connected to an IT network must be provided with a separating transformer. Then the devices are operated locally as in a TN network. The secondary sided center of the separating transformer must be grounded and connected to the PE connector of the device.

## 1.10 EC declaration of conformity PSUP



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### EU KONFORMITÄTSERKLÄRUNG EU DECLARATION OF CONFORMITY

Dokumenten Nr. **DoC004-R 7.0**  
*Declaration No.*

Der Hersteller **Parker Hannifin Manufacturing Germany GmbH & Co. KG**  
*The Manufacturer*

Anschrift **Robert-Bosch-Straße 22**  
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**Deutschland**

erklärt in alleiniger Verantwortung die Konformität der folgenden Produktreihe  
*declares under sole responsibility the conformity of the following product series*

Produkt **Netzversorgungs-Einheit**  
*Product* **PSU – Power Supply Unit**

Produktname **Mehrachsfamilien**  
*Product name* **Multi axis families**

Angewandte harmonisierte Normen / *Applied harmonized standards:*

Norm / <i>Standard</i>	Titel / <i>Title</i>
EN 61800-5-1:2007	Elektrische Leistungsantriebssysteme mit einstellbarer Drehzahl Teil 5-1: Anforderungen an die Sicherheit – Elektrische, thermische und energetische Anforderungen <i>Adjustable speed electrical power drive systems</i> <i>Part 5-1: Safety requirements - Electrical, thermal and energy</i>
EN 61800-3:2004 + A1:2012	Drehzahlveränderbare elektrische Antriebe Teil 3: EMV-Anforderungen einschließlich spezieller Prüfverfahren <i>Adjustable speed electrical power drive systems</i> <i>Part 3: EMC product standard including specific test methods.</i>
EN50581:2012	Technische Dokumentation zur Beurteilung von Elektro- und Elektronikgeräten hinsichtlich der Beschränkung gefährlicher Stoffe <i>Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances</i>

Die Produkte entsprechen den Anforderungen der Niederspannungs-Richtlinie 2014/35/EU, der EMV-Richtlinie 2014/30/EU und der RoHS Richtlinie 2011/65/EU  
*The products are in accordance with the Low Voltage Directive 2014/35/EU, EMC Directive 2014/30/EU and the RoHS directive 2011/65/EU*

#### Bemerkungen / *Notes:*

Den im Produkthandbuch beschriebenen Sicherheits-, Installations- und Bedienungshinweisen muss Folge geleistet werden.

*These products must be installed and operated with reference to the instructions in the product manual. All instructions, warnings and safety information of the product manual must be adhered to.*

Die Produkte sind für den Einbau in eine andere Maschine bestimmt. Die Inbetriebnahme ist solange untersagt, bis die Konformität des Endproduktes gemäß der Maschinen-Richtlinie 2006/42/EG festgestellt ist.

*The products are components to be incorporated into machinery and may not be operated alone. The complete machinery or installation may only be put into service when the safety considerations of the Machinery Directive 2006/42/EC are fully adhered to.*

Offenburg, 2017-07-21

Jürgen Killius, *Operations Manager*

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## 2. Device description

### In this chapter you can read about:

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Mounting and dimensions.....	15
PSUP Connections.....	17
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### 2.1 Meaning of the status LEDs - PSUP (mains module)

PSUP Status LEDs	Left LED (green)	Right LED (red)
Control voltage 24 VDC is missing	off	off
Error of mains module*	off	on
Address assignment CPU active or incorrect wiring	flashes quickly	-
Address assignment CPU completed	flashes slowly	-
Device state: INIT Mains voltage is missing or built up	flashes	flashes quickly
Device state: ERROR One or multiple errors occurred	flashes	on
Device state: RUN	on	off
Device in bootloader state	flashes slowly	flashes slowly

\*can be read out in each axis controller



#### **Caution!**

When the control voltage is missing there is no indication whether or not high voltage supply is available.

## 2.2 Mounting and dimensions

**Ventilation:** During operation, the device radiates heat (power loss). Please provide for a sufficient mounting distance below and above the device in order to ensure free circulation of the cooling air. Please do also respect the recommended distances of other devices. Make sure that the mounting plate is not exhibited to other temperature influences than that of the devices mounted on this very plate. The devices must be mounted vertically on a level surface. Make sure that all devices are sufficiently fixed.

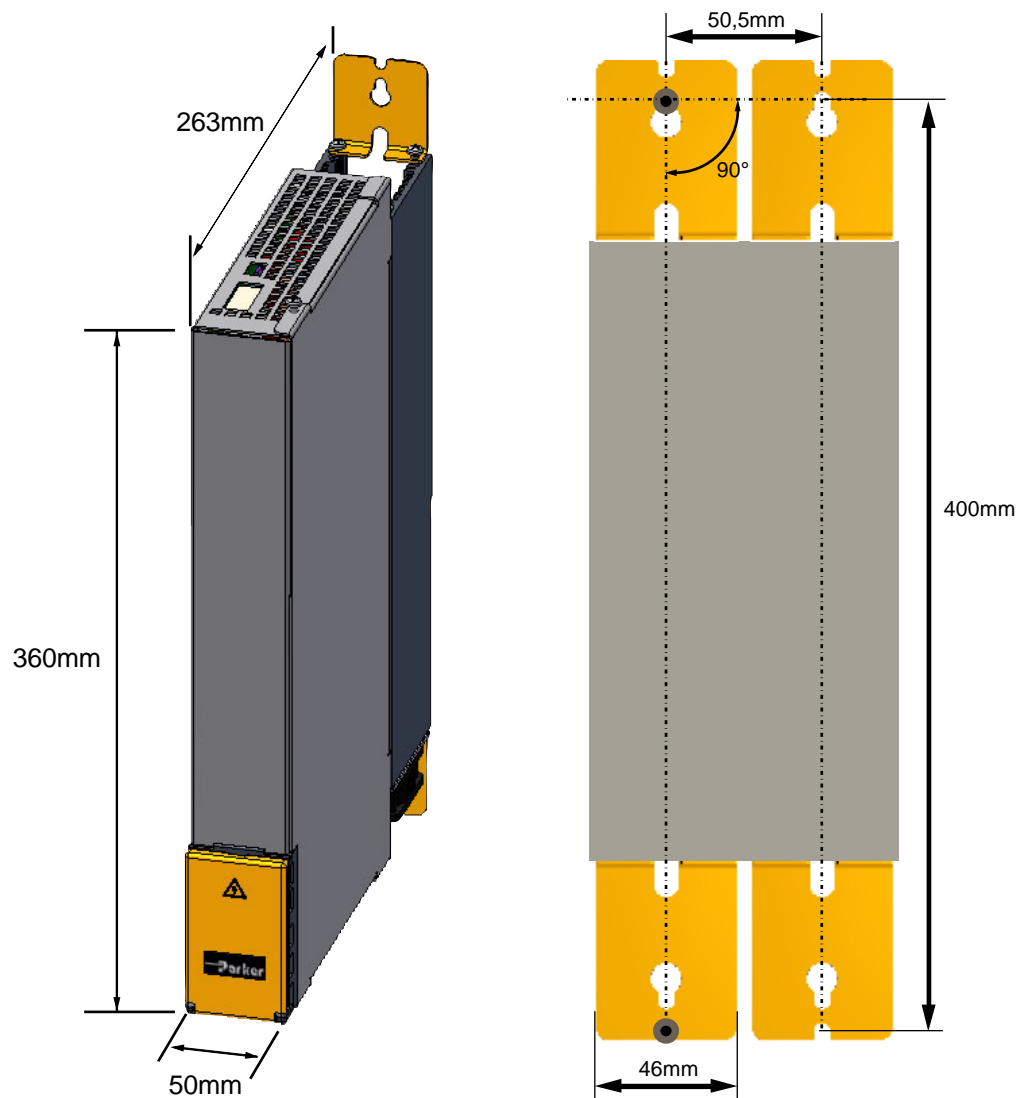
### 2.2.1. Mounting and dimensions PSUP10

**The devices are force-ventilated via a ventilator fan fixed to the lower part of the heat dissipator!**

Mounting spacing: At the top and below: at least 100mm

Information on PSUP10D6

**Mounting:**  
2 socket head screws M5



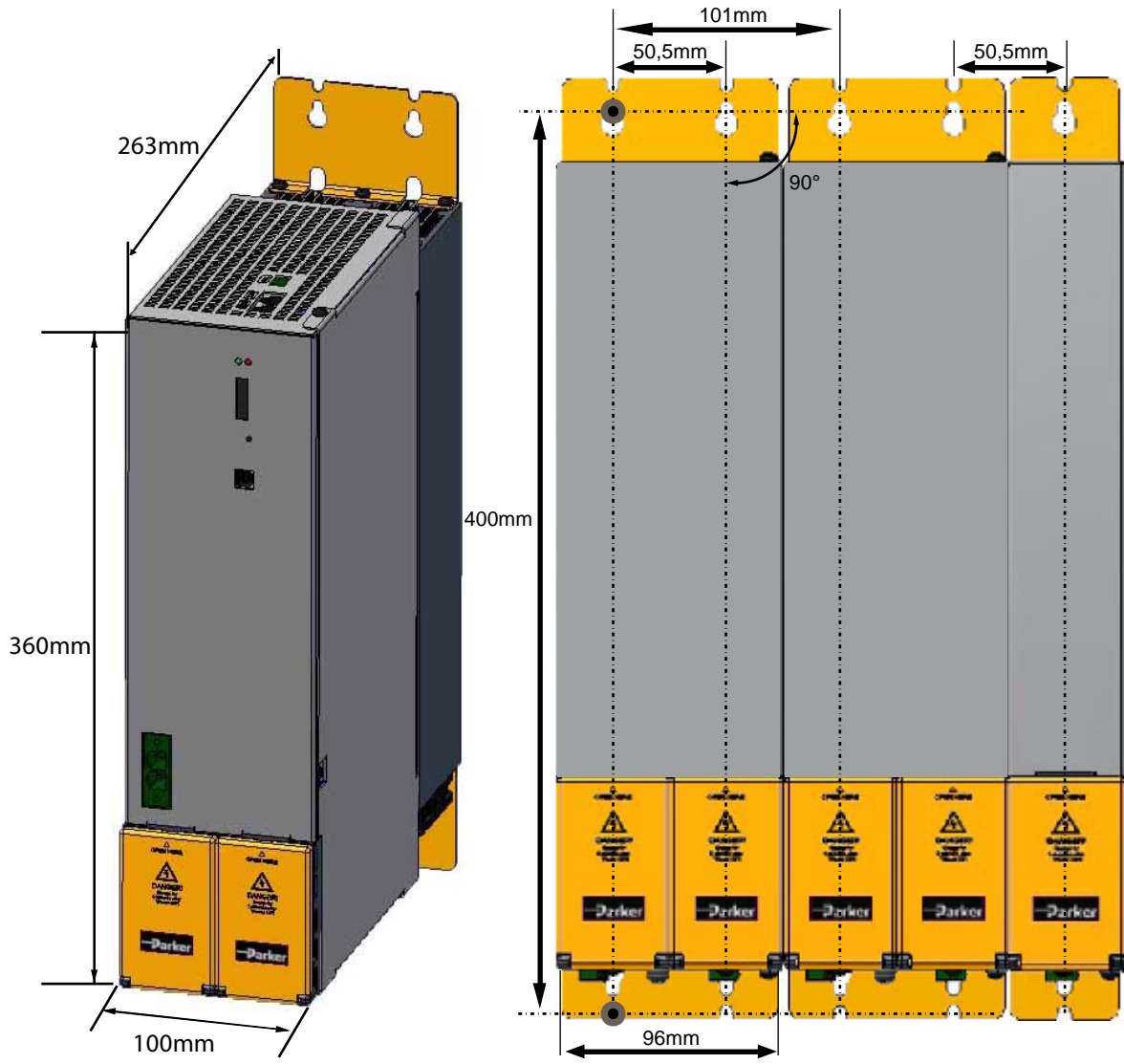
Tolerances: DIN ISO 2768-f

## 2.2.2. Mounting and dimensions PSUP20/PSUP30

Information on PSUP20/PSUP30

**Mounting:**

4 socket head screws M5



Tolerances: DIN ISO 2768-f



## 2.3 PSUP Connections

In this chapter you can read about:

Front connector ..... 17  
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 Connections of the axis combination ..... 19  
 Control voltage 24VDC PSUP (mains module) ..... 20  
 Mains supply PSUP (mains module) X41 ..... 20  
 Braking resistor / temperature switch PSUP (mains module) ..... 23

### 2.3.1. Front connector



P	Mains module PSUP
LED1	Status LEDs Mains module
S1	Basic address
X3	Configuration interface (USB)
X9	Supply voltage 24VDC
1	Behind the yellow protective covers you can find the rails for the supply voltage connection. ♦ Supply voltage 24VDC ♦ DC power voltage supply

### 2.3.2. Connections on the device bottom



**Caution - Risk of Electric Shock!**

Always switch devices off before wiring them!  
Dangerous voltages are still present until 10 min. after switching off the power supply.



**Caution!**

When the control voltage is missing there is no indication whether or not high voltage supply is available.



**Attention - PE connection!**

PE connection with 10mm<sup>2</sup> via a grounding screw at the bottom of the device.



**Attention - hot surface!**

The heat dissipater can reach very high temperatures (>70°C)



P	Mains module PSUP
X40	Ballast resistor
X41	Power supply
1	Central ground connection for the axis system, with 10mm <sup>2</sup> to the ground screw on the housing.
4	Fan*

\* is internally supplied.

**Line cross-sections of the power connections**

<b>PSUP10</b>	Mains supply: 0.5 ... 6 mm <sup>2</sup> (AWG: 20 ... 10) Braking resistor: 0.25 ... 4 mm <sup>2</sup> (AWG: 23 ... 11)
<b>PSUP20 &amp; PSUP30</b>	Mains supply: 0.5 ... 16 mm <sup>2</sup> (AWG: 20 ... 6) Braking resistor: 0.25 ... 4 mm <sup>2</sup> (AWG: 23 ... 11)

### 2.3.3. Connections of the axis combination

The axis controllers are connected to the supply voltages via rails.

- ◆ Supply voltage 24VDC
- ◆ DC power voltage supply

The rails can be found behind the yellow protective covers. In order to connect the rails of the devices, you may have to remove the yellow plastic device inserted at the side.

#### CAUTION: Risk of Electric Shock



##### Caution - Risk of Electric Shock!

##### Please note before opening:

- ◆ **Warning** - Possible risk of electric shock; disconnect power before removing cover.
- ◆ **Caution!** - Dangerous electric voltage! Respect discharge time.



##### Caution - Risk of Electric Shock!

Always switch devices off before wiring them!

Dangerous voltages are still present until 10 min. after switching off the power supply.



##### Caution!

When the control voltage is missing there is no indication whether or not high voltage supply is available.

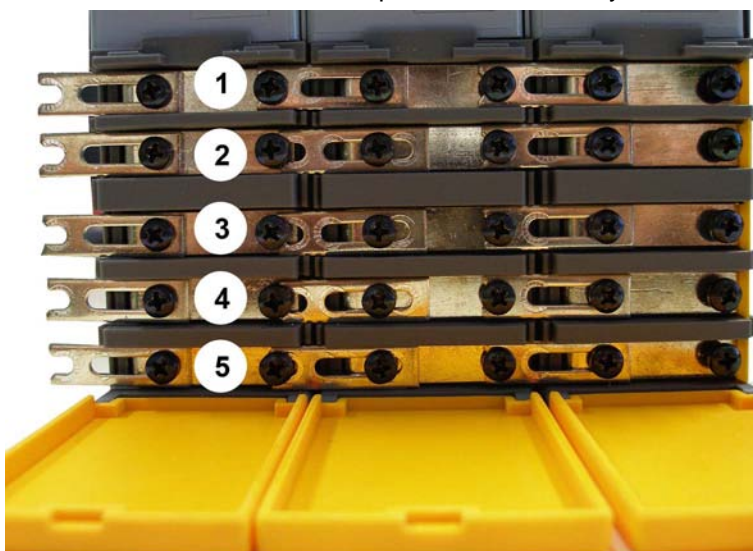
#### Protective seals



##### Caution - Risk of Electric Shock!

In order to secure the contact protection against the alive rails, it is absolutely necessary to respect the following:

- ◆ Insert the yellow plastic comb at the left or right of the rails.  
Make sure that the yellow plastic combs are placed at the left of the first device and at the right of the last device in the system and have not been removed.
- ◆ Setup of the devices only with closed protective covers.



- |   |        |
|---|--------|
| 1 | 24VDC  |
| 2 | GND24V |
| 3 | -HV DC |
| 4 | PE     |
| 5 | +HV DC |

#### Note:

External components **may not** be connected to the rail system.

#### Maximum capacity in the axis system:

- ◆ PSUP10: 2400  $\mu$ F
- ◆ PSUP20 & PSUP30: 5000  $\mu$ F

**Reference value for the required capacity in an axis system**

100 µF per kW of the temporal medium value of the total power (transmissions + power dissipation) in the axis system.

**Example: PSUP20 (1175 µF) with one axis controller (440 µF)**

Total power 15 kW, 100 µF/kW => 1500 µF required in the axis system.  
Axis system: 1615 µF are sufficient.

**Protective seals**

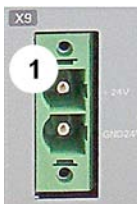


**Caution!**

The user is responsible for protective covers and/or additional safety measures in order to prevent damages to persons and electric accidents.

**2.3.4. Control voltage 24VDC PSUP (mains module)**

**Connector X9**



Pin	Designation
1	+24 V
2	GND24V

Line cross sections:  
minimum: 0.5mm<sup>2</sup> with conductor sleeve  
maximum: 6mm<sup>2</sup> with conductor sleeve  
(AWG: 20 ... 10)

**Control voltage 24 VDC PSUP**

Device type	PSUP
Voltage range	21 - 27VDC
Ripple	0.5Vpp
Requirement according to safe extra low voltage (SELV)	yes (class 2 mains module)
Current drain PSUP	PSUP10: 0.2A PSUP20 / PSUP30: 0.3A

**2.3.5. Mains supply PSUP (mains module) X41**

**Device protection**

By cyclically switching on and off the power voltage, the input current limitation can be overloaded, which may cause damage to the device.

**Wait at least one minute between two switching on processes!**

**Operation of the PSUP30 only with mains filter!**

**Connector X41**



Pin	Designation
PE	Earth conductor
L3	Phase 3
L2	Phase 2
L1	Phase 1

**Mains connection PSUP10D6**

Device type PSUP10	230V	400V	480V
Supply voltage	230VAC ±10% 50-60Hz	400VAC ±10% 50-60Hz	480VAC ±10% 50-60Hz
Rated voltage	3AC 230V	3AC 400V	3AC 480V
Input current	22Arms	22Arms	18Arms
Output Voltage	325VDC ±10%	565VDC ±10%	680VDC ±10%
Output power	6kW	10 kW	10 kW
Pulse power (<5s)	12kW	20kW	20kW
Heat dissipation	60W	60W	60W
Maximum fuse rating per device	Measure for line and device protection: MCB miniature circuit breaker (K characteristic) 25A in accordance with UL category DIVQ Recommendation: (ABB) S203UP-K25 (480VAC)		

**Mains connection PSUP20D6**

Device type PSUP20	230V	400V	480V
Supply voltage	230VAC ±10% 50-60Hz	400VAC ±10% 50-60Hz	480VAC ±10% 50-60Hz
Rated voltage	3AC 230V	3AC 400V	3AC 480V
Input current	44Arms	44Arms	35Arms
Output Voltage	325VDC ±10%	565VDC ±10%	680VDC ±10%
Output power	12kW	20kW	20kW
Pulse power (<5s)	24kW	40kW	40kW
Heat dissipation	120W	120W	120W
Maximum fuse rating per device 2 special purpose fuses in line are required	<b>Cable protection measure:</b> MCB (K characteristic) with a rating of 50A / 4xxVAC (depending on the input voltage) Recommendation: (ABB) S203U-K50 (440VAC) <b>Device protection measure:</b> Circuit breakers 80A / 700VAC per supply leg in accordance with UL category JFHR2 Requirement: Bussmann 170M1366 or 170M1566D		

**PSUP30D6 Mains connection**

Device type PSUP30	230V	400V	480V
Supply voltage	230VAC ±10% 50-60Hz	400VAC ±10% 50-60Hz	480VAC ±10% 50-60Hz
Rated voltage	3AC 230V	3AC 400V	3AC 480V
Input current	50Arms	50Arms	42Arms
Output Voltage	325VDC ±10%	565VDC ±10%	680VDC ±10%
Output power	17kW	30kW	30kW
Pulse power (<5s)	34kW	60kW	60kW
Heat dissipation	140W	140W	140W
Maximum fuse rating per device 2 special purpose fuses in line are required	<b>Cable protection measure:</b> MCB (K characteristic) with a rating of 63A / 4xxVAC (depending on the input voltage) Recommendation: (ABB) S203U-K63 (440VAC) <b>Device protection measure:</b> Circuit breakers 125A / 700VAC per supply leg in accordance with UL category JFHR2 Requirement: Bussmann 170M1368 or 170M1568D		

**Caution!**

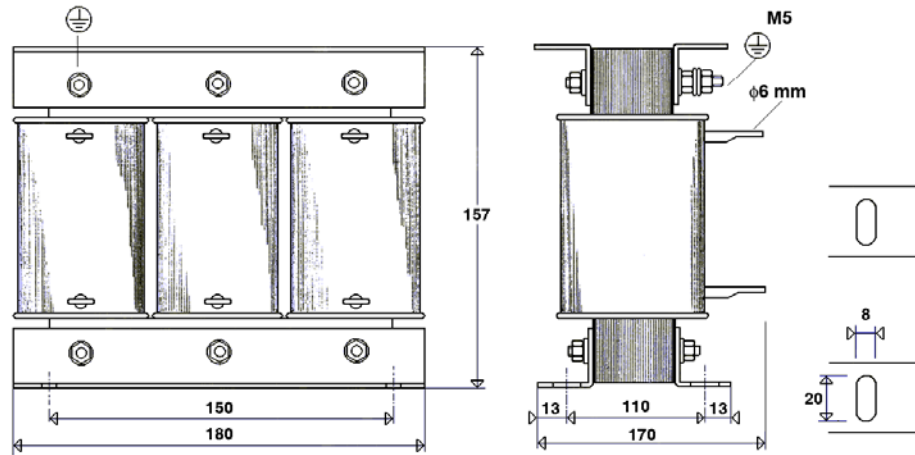
***Only three-phase operation of the PSUP devices is permitted!  
The PSUP30 mains module may only be operated with mains filter***

**Required mains filter for the PSUP30:** 0.45 mH / 55 A

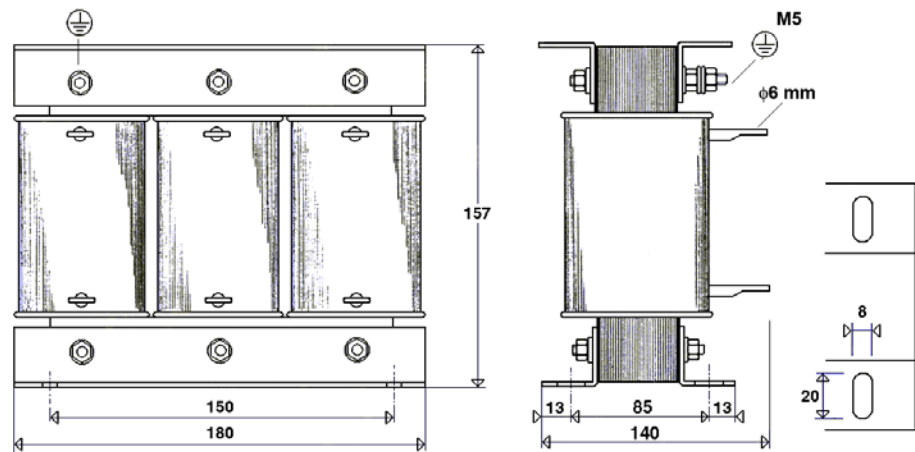
We offer the following mains filters:

- ◆ LCG-0055-0.45 mH (WxDxH: 180 mm x 140 mm x 157 mm; 10 kg)
- ◆ LCG-0055-0.45 mH-UL (with UL approval) (WxDxH: 180 mm x 170 mm x 157 mm; 15 kg)

Dimensional drawing: LCG-0055-0.45 mH



Dimensional drawing: LCG-0055-0.45 mH-UL

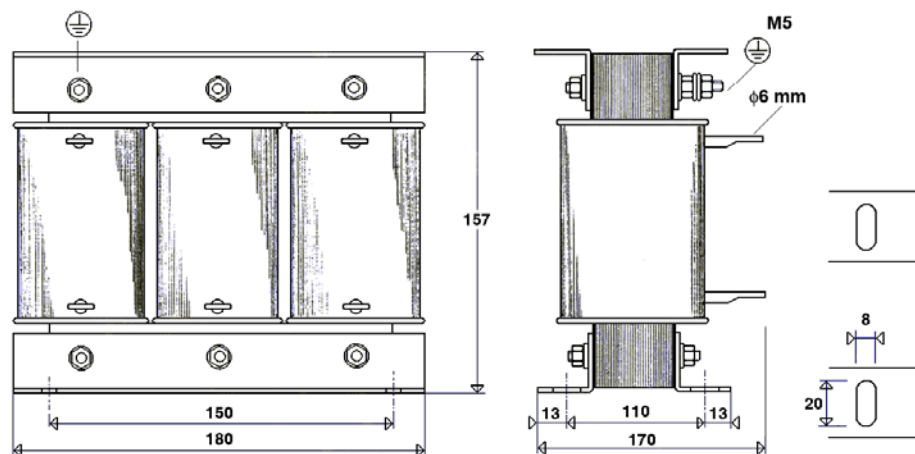


**Caution - Risk of Electric Shock!**

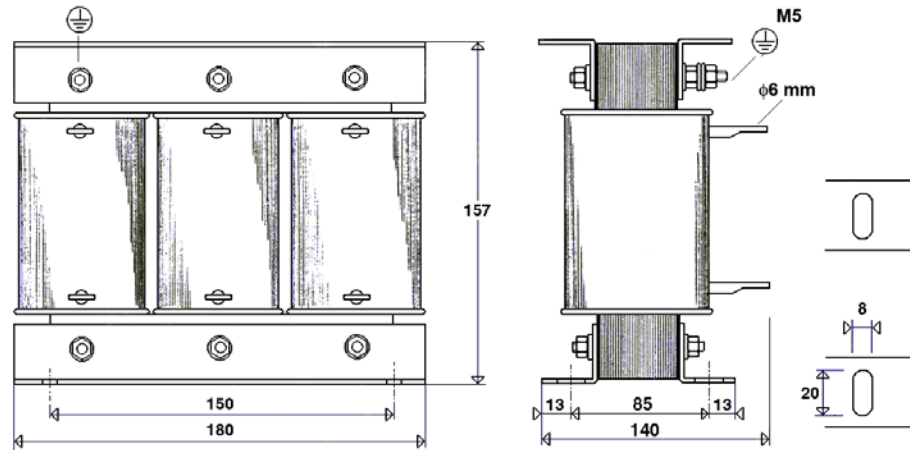
Always switch devices off before wiring them!  
 Dangerous voltages are still present until 10 min. after switching off the power supply.

**2.3.5.1 LCG-0055-0.45 Mains filter dimensions**

Dimensional drawing: LCG-0055-0.45 mH



Dimensional drawing: LCG-0055-0.45 mH-UL



### 2.3.6. Braking resistor / temperature switch PSUP (mains module)

The energy generated during braking operation must be dissipated via a braking resistor.

#### Connector X40



Pin	Description	
+R	+ Braking resistor	short-circuit proof!
-R	- Braking resistor	
PE	PE	
T1R	Temperature Switch	
T2R	Temperature Switch	

#### Braking operation PSUPxxD6 (mains module)

Device type	PSUP10	PSUP20	PSUP30
<b>Capacitance / storable energy</b>	550 µF/ 92 Ws at 400 V 53 Ws at 480 V	1175 µF/ 197 Ws at 400 V 114 Ws at 480 V	1175 µF/ 197 Ws at 400 V 114 Ws at 480 V
<b>Minimum braking-resistance</b>	27 Ω	15 Ω	10 Ω
<b>Recommended nominal power rating</b>	500 ... 1500 W	500 ... 3500 W	500 ... 5000 W
<b>Pulse power rating for 1s</b>	22 kW	40 kW	60 kW
<b>Maximum permissible continuous current</b>	13 A	15 A	15 A

#### Maximum capacity in the axis system:

- ◆ PSUP10: 2400 µF
- ◆ PSUP20 & PSUP30: 5000 µF

#### Reference value for the required capacity in an axis system

100 µF per kW of the temporal medium value of the total power (transmissions + power dissipation) in the axis system.

#### Example: PSUP20 (1175 µF) with one axis controller (440 µF)

Total power 15 kW, 100 µF/kW => 1500 µF required in the axis system.  
Axis system: 1615 µF are sufficient.

#### Connection of a braking resistor on PSUP (mains module)

Minimum line cross section:	1.5 mm <sup>2</sup>
Maximum line length:	2 m
Maximum intermediate circuit voltage:	810 VDC
Switch-on threshold:	780 VDC
Hysteresis	20 VDC

### 2.3.6.1 Temperature switch PSUP (mains module)

#### Connector X40 Pin T1R, T2R

##### Temperature monitoring:

The temperature switch (normally closed contact) must be connected, unless an error message will be issued.

##### Temperature switch/relay

No galvanic separation, the temperature sensor (normally closed contact) must comply with the safe separation according to EN 60664.

If there is no temperature monitoring due to the connected braking resistor, the T1R and T2R connections must be connected by a jumper.



##### Caution!

Without temperature monitoring, the braking resistor might be destroyed.

## 2.4 Communication interfaces

### 2.4.1. Adjusting the basic address

On the mains module, the basic address of the device combination is set in steps of 16 with the aid of the first three dip switches.

The mains module contains the set basic address while the axes placed at the right in the combination contain the following addresses.



#### Switch S1

##### Address setting

##### Basic addresses

Switch	Value upon ON
1	16
2	32
3	64

##### Settings:

left: OFF

right: ON

##### Settable value range: 0, 16, 32, 48, 64, 80, 96, 112

Address of the 1st axis = basic address+1

The addresses of the axis controllers are newly assigned after PowerOn.

##### Example:

Basic address = 48; mains module with 6 axis controllers in the combination

1. Axis right: Address = 49

2. Axis right: Address = 50

...

6. Axis right: Address = 54



# 3. Technical Characteristics

## Size / weight PSUP

Device type	Dimensions HxWxD [mm]	Weight [kg]
PSUP10D6	360 x 50 x 263	3.95
PSUP20D6 & PSUP30D6	360 x 100 x 263	6.3

## Protection type IP20

### Mains connection PSUP10D6

Device type PSUP10	230V	400V	480V
Supply voltage	230VAC ±10% 50-60Hz	400VAC ±10% 50-60Hz	480VAC ±10% 50-60Hz
Rated voltage	3AC 230V	3AC 400V	3AC 480V
Input current	22Arms	22Arms	18Arms
Output Voltage	325VDC ±10%	565VDC ±10%	680VDC ±10%
Output power	6kW	10 kW	10 kW
Pulse power (<5s)	12kW	20kW	20kW
Heat dissipation	60W	60W	60W
Maximum fuse rating per device	Measure for line and device protection: MCB miniature circuit breaker (K characteristic) 25A in accordance with UL category DIVQ Recommendation: (ABB) S203UP-K25 (480VAC)		

### Mains connection PSUP20D6

Device type PSUP20	230V	400V	480V
Supply voltage	230VAC ±10% 50-60Hz	400VAC ±10% 50-60Hz	480VAC ±10% 50-60Hz
Rated voltage	3AC 230V	3AC 400V	3AC 480V
Input current	44Arms	44Arms	35Arms
Output Voltage	325VDC ±10%	565VDC ±10%	680VDC ±10%
Output power	12kW	20kW	20kW
Pulse power (<5s)	24kW	40kW	40kW
Heat dissipation	120W	120W	120W
Maximum fuse rating per device 2 special purpose fuses in line are required	<b>Cable protection measure:</b> MCB (K characteristic) with a rating of 50A / 4xVAC (depending on the input voltage) Recommendation: (ABB) S203U-K50 (440VAC) <b>Device protection measure:</b> Circuit breakers 80A / 700VAC per supply leg in accordance with UL category JFHR2 Requirement: Bussmann 170M1366 or 170M1566D		

**PSUP30D6 Mains connection**

Device type PSUP30	230V	400V	480V
Supply voltage	230VAC ±10% 50-60Hz	400VAC ±10% 50-60Hz	480VAC ±10% 50-60Hz
Rated voltage	3AC 230V	3AC 400V	3AC 480V
Input current	50Arms	50Arms	42Arms
Output Voltage	325VDC ±10%	565VDC ±10%	680VDC ±10%
Output power	17kW	30kW	30kW
Pulse power (<5s)	34kW	60kW	60kW
Heat dissipation	140W	140W	140W
Maximum fuse rating per device 2 special purpose fuses in line are required	<b>Cable protection measure:</b> MCB (K characteristic) with a rating of 63A / 4xVAC (depending on the input voltage) Recommendation: (ABB) S203U-K63 (440VAC) <b>Device protection measure:</b> Circuit breakers 125A / 700VAC per supply leg in accordance with UL category JFHR2 Requirement: Bussmann 170M1368 or 170M1568D		

**Control voltage 24 VDC PSUP**

Device type	PSUP
Voltage range	21 - 27VDC
Ripple	0.5Vpp
Requirement according to safe extra low voltage (SELV)	yes (class 2 mains module)
Current drain PSUP	PSUP10: 0.2A PSUP20 / PSUP30: 0.3A

**UL approval for mains modules PSUP**

Conform to UL:	◆ in accordance with UL508C
Certified	◆ E-File_No.: E142140

The UL approval is documented by a "UL" logo on the device (type specification plate).



UL approval PSUP30 in preparation!

**Insulation requirements**

Enclosure rating	Protection class in accordance with EN 60664-1
Protection against human contact with dangerous voltages	In accordance with EN 61800-5-1
Overvoltage category	Voltage category III in accordance with EN 60664-1
Degree of contamination	Degree of contamination 2 in accordance with EN 60664-1 and EN 61800-5-1

**Ambient conditions PSUP**

<b>General ambient conditions</b>	In accordance with <b>EN 60 721-3-1 to 3-3</b> Climate (temperature/humidity/barometric pressure): Class 3K3	
<b>Permissible ambient temperature:</b>		
Operation	0 to +40 °C	Class 3K3
storage	-25 to +70 °C	
transport	-25 to +70 °C	
<b>Tolerated humidity:</b>	no condensation	
Operation	<= 85% class 3K3	(Relative humidity)
storage	<= 95%	
transport	<= 95%	
<b>Elevation of operating site</b>	<=1000m above sea level for 100% load ratings <=2000m above sea level for 1% / 100m power reduction please inquire for greater elevations	
<b>Sealing</b>	Protection type IP20 in accordance with EN 60 529	
<b>Mechanic resonances:</b>	Class 2M3, 20m/s <sup>2</sup> ;8-200Hz	

**Cooling PSUP**

<b>Cooling mode:</b>	Forced air ventilation with fan in the heat dissipator
----------------------	--

**EMV limit values PSUP**

<b>EMC interference emission</b>	Limit values in accordance with EN 61 800-3, Limit value class C3 with mains filter.
<b>EMC disturbance immunity</b>	Industrial area limit values in accordance with EN 61 800-3

**EC directives and applied harmonized EC norms**

<b>EC low voltage directive 2014/35/EU</b>	<b>EN 61800-5-1</b> , Standard for electric power drives with settable speed; requirements to electric safety <b>EN 60664-1</b> , isolation coordinates for electrical equipment in low-voltage systems <b>EN 60204-1</b> , <b>machinery norm</b> partly applied
<b>EC-EMC-directive 2014/30/EU</b>	<b>EN 61800-3</b> , <b>EMC standard</b> Product standard for variable speed drives

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