

# B&R Power Supply PS120

## 1. General Information

Features of the B&R power supply PS120:

- Input: AC 115/230 V **auto-range**
- Output: 24-28 V / 480 W (600 W)
- 90% efficiency
- Ideal for parallel operation
- **Adjustable overload behavior!**  
(continuous current / hiccup)
- Robust mechanics and EMC
- DIN rail mounting, unit holds even with vibrations or lateral pressure
- Clearly arranged and user-friendly
- Large, robust screw terminals
- Sealed metal housing
- Fine ventilation grid

## 2. Order Data

Model number	Short description	Figure
0PS120.1	24 VDC power supply, 1 phase, 20 A, input 115/230 VAC, auto select, DIN rail mounting	

Table 1: PS120 - order data

### 3. Technical Data

Also see "Technical data" data sheet, which is delivered with the power supply.

Product ID	PS120
General Information	
C-UL-US Listed	Yes
Input	
Input voltage, nominal	AC 100-120 V / 220-240 V, 47-63 Hz, auto-range
Rated tolerances of input voltage Continuous operation Short-term (1 min) at 24 V / 20 A	85-132 VAC respectively 184-264 VAC 85-140 VAC respectively 170-280 VAC
Input current, nominal	<12 A (115 V range) <6 A (230 V range)
Starting current	Typ. <85 A at 264 VAC and cold restart
Fuse loading	<20 A <sup>2</sup> s (cold start)
External fusing	With standard thermomagnetic circuit-breaker (16 A, B-type), which is also used to protect the input lines
Transient immunity	Transient resistance acc. to VDE 0160 / W2 (750 V / 1.3 ms), over <i>entire</i> load range
Hold-up time	30 ms at 24 V / 20 A, 230 VACin 30 ms at 24 V / 20 A, 120 VACin 15 ms at 24 V / 20 A, 100 VACin
Output	
Output voltage	24-28 VDC, adjustable by (covered) front panel potentiometer, adjustable range guaranteed
Voltage regulation	Better than 2% overall At $T_{amb} < 25^{\circ}\text{C}$ and $V_{in} < 112\text{ V}$ or $V_{in} < 195\text{ V}$ : In order to maintain regulation accuracy at load change, the minimum load recommended is as follows: <ul style="list-style-type: none"> <li><math>P_{min.load}/W = 335 - 3 \cdot V_{ACin}/V - 1.2 \cdot T_{amb}/^{\circ}\text{C}</math> (at 85-112 V<sub>ACin</sub>)</li> <li><math>P_{min.load}/W = 540 - 2.7 \cdot V_{ACin}/V - T_{amb}/^{\circ}\text{C}</math> (at 184-195 V<sub>ACin</sub>)</li> </ul>
Rippled depends on output characteristics Single operation Parallel operation	Incl. spikes (20 MHz bandwidth), 50 $\Omega$ measurement <20 mV <sub>SS</sub> (<0.1%) <40 mV <sub>SS</sub> (In: 230 VAC, Out: 24 V / 20 A) <100 mV <sub>SS</sub> (In: 184 VAC, Out: 24 V / 20 A)
Overvoltage protection	At 33 V $\pm$ 10%: switch to hiccup mode
Output noise suppression	Radiated EMI values below EN 50081-1 (Class B), even with long, unshielded output cables
Rated continuous loading $T_{amb}=0^{\circ}\text{C} - 60^{\circ}\text{C}$	With convection cooling 24 V / 20 A respectively 28 V / 18 A Short-term (<30 s) up to 24 V / 25 A respectively 28 V / 22 A
Protection functions	Output is protected against short-circuit, open circuit and overload
Derating	12 W/K (at $T_{amb}=+60^{\circ}\text{C}$ to $+70^{\circ}\text{C}$ )
Parallel operation	Yes, up to ten PS120 To achieve current sharing, the output V/I characteristics can be altered to be "softer" (25 V at 0.4 A, 24 V at 20 A). This is done by repositioning a jumper (without opening the unit).
Power back immunity	Up to at least 30 V

Table 2: PS120 - technical data

Product ID	PS120
Front panel indicators	<ul style="list-style-type: none"> <li>Green LED on when <math>V_{out} &gt; U_T</math>, whereby <math>U_T</math> is approx. 2 V below adjusted <math>V_{out}</math> (24 V to 28 V)</li> <li>Red LED on when <math>V_{out} &lt; U_T</math></li> </ul>
<b>Efficiency, reliability</b>	
Efficiency	Typ. 90% (230 VAC, 24 V / 20 A),
Loss	Typ. 53 W (230 VAC, 24 V / 20 A)
MTBF (reliability)	270,000 h acc. to Siemens standard SN 29500 (24 V / 20 A, 230 VAC, $T_U = +40\text{ °C}$ )
Life cycle (electrolytics)	The unit exclusively uses long-life electrolytics, specified for +105 °C High reliability and lifespan, as only five aluminum electrolytics and no small aluminum electrolytics are used.
<b>Start / overload behavior</b>	
Startup delay	Typ. 500 ms
Startup time	Approx. 20-80 ms, depending on load (at $V_{in} < 100\text{ VAC}$ depending on $T_{amb}$ up to 6.5 s)
Overload behavior (see "Output characteristics" on page 6)	<ul style="list-style-type: none"> <li>Power boost: Short-term (&lt;30 s) 125% output power without voltage drop.</li> <li>Electronic current limiting, protects against overload and short-circuit.</li> <li>High overload/short-circuit behavior (<math>V_{out} &lt; 14\text{ V}</math>) switchable between overload design and hiccup mode. Switching by jumper on bottom of the unit; it is not necessary to open the unit for this purpose.</li> </ul>
Overload Design (continuous current)	<ul style="list-style-type: none"> <li>No disconnection/hiccup, thus overloading is possible, also for a long period of time (load start-up), ideal for parallel operation.</li> <li>High overload/short-circuit current due to straight characteristic; each bias point of the V/I characteristic exceeds 20 A.</li> </ul> <p>Advantages: Due to the high and continuously supplied overload current, the unit starts reliably even with heavy or demanding loads (DC/DC converters, motors). No "sticking" as can occur with fold-back characteristics. Secondary fuses trigger more reliably.</p>
Hiccup mode	<ul style="list-style-type: none"> <li>Unit switches off when high overload occurs (<math>V_{out} &lt; \text{approx. } 14\text{ V}</math>) with subsequent periodical switch-on attempts (hiccup mode): <ul style="list-style-type: none"> <li>- Duration of switch-on attempt: approx. 100 ms when short-circuit or approx. 1 s when overload</li> <li>- Duration between switch-on attempts: approx. 1.5 s</li> </ul> </li> <li><math>V_{out} &gt; \text{approx. } 14\text{ V}</math>: The output current is continuous. The V/I characteristic equals that of the Overload Design; each bias point of the V/I characteristic exceeds 20 A.</li> </ul>
<b>Connection</b>	
Terminals	Robust screw terminals
Connection cross section Input / output	Solid: 1.5 - 6 mm <sup>2</sup> / flexible: 1.5 - 4 mm <sup>2</sup> 2 connectors per output
Current handling capacity	30 A per output
Grid	9 mm distance between adjacent connectors
Additional features	<ul style="list-style-type: none"> <li>All terminals are easy to reach because they are mounted on the front panel.</li> <li>Inputs and outputs are distinctly separate from each other and cannot be mixed up</li> </ul>
<b>Operational conditions</b>	
Environmental temperature during operation	0 °C to +70 °C (starting at 60 °C derating)
Relative humidity during operation	Max. 95%, non-condensing

Table 2: PS120 - technical data (cont.)

## Technical Data

Product ID	PS120
Storage and transport conditions	
Storage temperature	-25 to +85 °C
Relative humidity during storage	Max. 95%, non-condensing
Transport temperature	-25 to +85 °C
Relative humidity during transport	Max. 95%, non-condensing
Mechanical characteristics	
Dimensions	
Width	220 mm
Height	124 mm
Depth	102 mm (+ DIN rail)
Weight	1800 g
Housing	Robust sealed metal housing with fine ventilation grid ( $\diamond$ 3.5 mm, IP20)
Installation	Mounting on DIN rail (TS35/7.5 or TS35/15, 1 to 1.5 mm thick), therefore: <ul style="list-style-type: none"> <li>• Simple snap-on system</li> <li>• Sits safely and firmly on the DIN rail</li> <li>• No tools required for removal</li> </ul>
Ventilation/cooling	Normal convection, no fan required
Free space for ventilation	Above/below 70 mm and left/right 25 mm recommended
Special features	All operational elements (incl. terminals) are clearly labeled and are easy to reach as they are mounted on the front pane.

Table 2: PS120 - technical data (cont.)

Specifications are valid for 230 VAC, +25 °C ambient temperature and 5 min run-in time, unless otherwise stated. They are subject to change without prior notice.

## 4. Dimensions

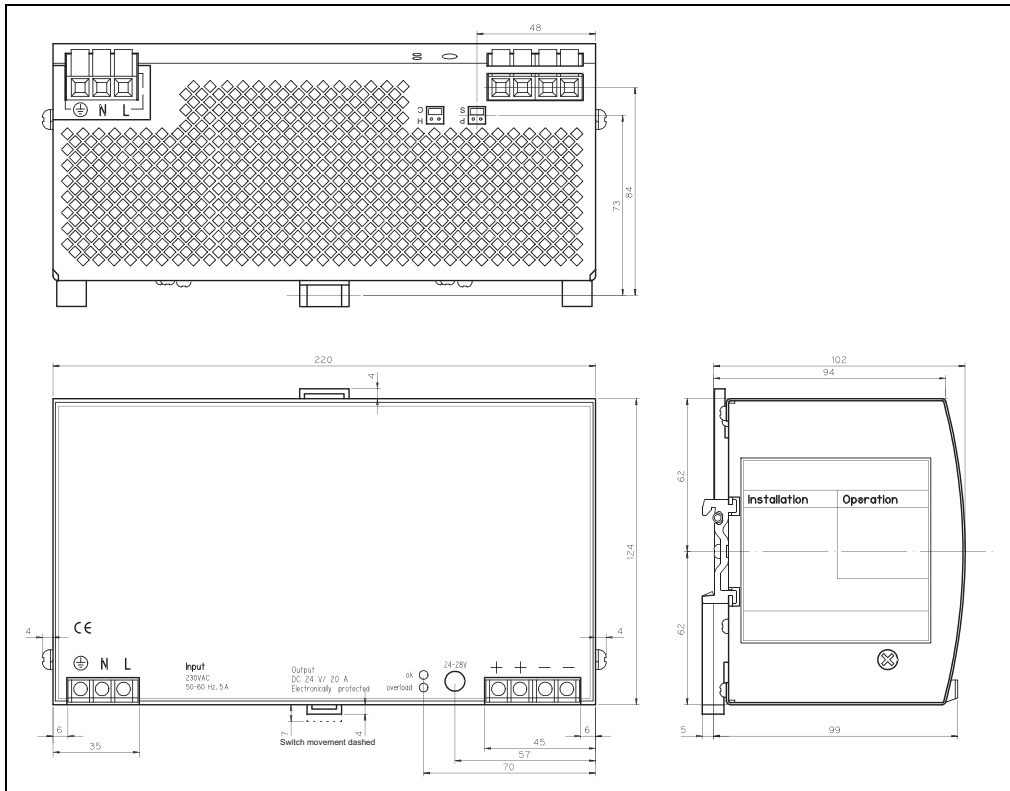


Figure 1: PS120 - dimensions

## 5. Installation

Also see the basic installation manual "Installation and Operation". The basic installation manual is delivered with each power supply.

## 6. Diagrams

### 6.1 Output characteristics

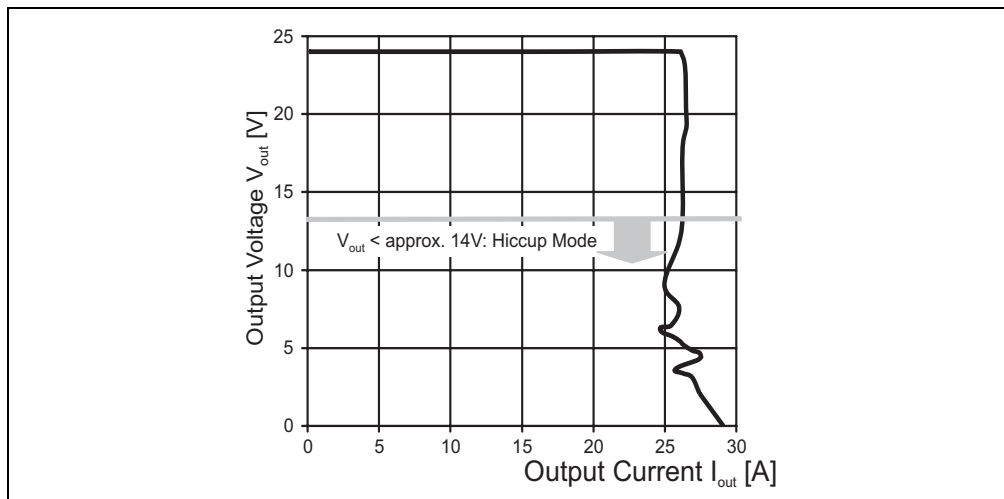


Figure 2: PS120 - output characteristics (min.)

### 6.2 Efficiency

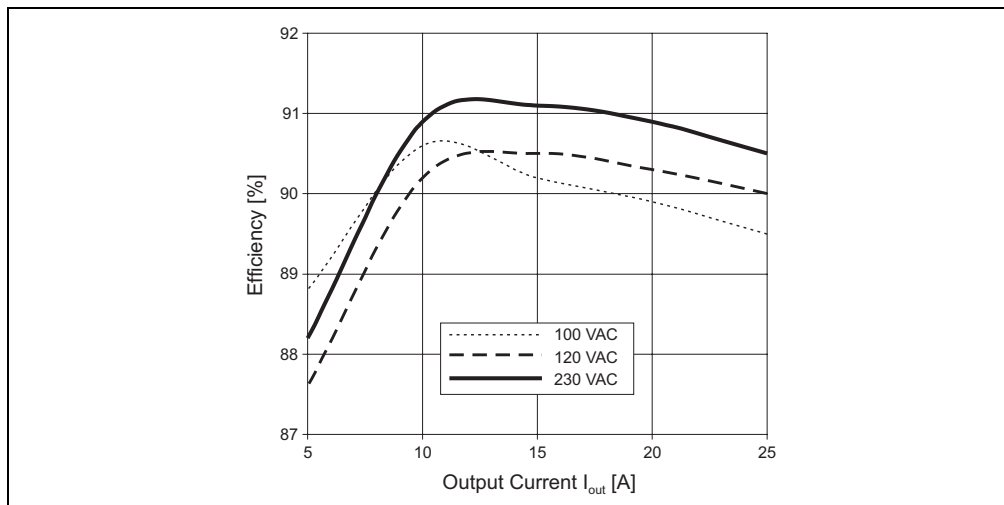


Figure 3: PS120 - efficiency (typ.)

### 6.3 Hold-up time

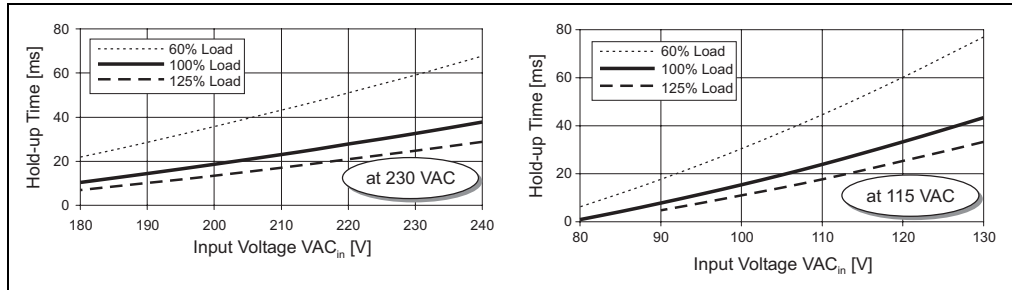


Figure 4: PS120 - hold-up time (typ., at V<sub>out</sub> = 24 V)

## 7. Standards and Certifications






Electromagnetic emissions (EME)	EN 50081-1 (includes EN 50081-2) Class B (EN 55011, EN 55022) conducted and radiated noise, incl. Annex A, thanks to noise suppression
Immunity to disturbances Static discharge (ESD) Electromagnetic radiated fields Burst, coupled to: ACin lines DCout lines Surge transients Differential (L <sub>1</sub> >PE) Common mode (L <sub>1</sub> >L <sub>2</sub> /N) Conducted noise immunity Mains breaks Transient immunity	EN 61000-6-2 (includes EN 55024) EN 61000-4-2, Level 4 (withstands 8 kV direct discharge, 15 kV air discharge) EN 61000-4-3, Level 3 (10 V/m, ENV 50204 (10 V/m)  EN 61000-4-4, Level 4 (4 kV) EN 61000-4-4, Level 3 (2 kV)  EN 61000-4-5, Installation class 4 (4 kV) (SLD2.5: class 3 (2 kV)) EN 61000-4-5, Installation class 4 (2 kV) (SLD2.5: class 3 (1 kV)) EN 61000-4-6, Level 3 (10 V, 150 kHz-80 MHz) EN 61000-4-11 Transient resistance according to VDE 0160 / W2 over entire load range
Safe low voltage	SELV (EN 60950, VDE0100/T.410), PELV (EN 50178)
Protection class/degree	Class I (EN 60950) / IP20 (EN 60529)
The power supply PS120 complies with all major <b>safety certifications</b> for EU (EN 60950, EN 60204-1), USA (UL 1950, UL508 LISTED), Canada (CUL/CSA-C22.2 No 60950), CB Scheme (IEC 60950), and meets the European Standard for <b>electronic equipment</b> in electrical power installations EN 50178.	
<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">               EMC and w Volt. Directive Guidelines         </div> <div style="text-align: center;">               UL1950 E137006 CUL/CSA-C22.2 No 950-M90         </div> <div style="text-align: center;">               UL508 LISTED IND. CONT. E.Q. 18 WM, 60°C         </div> <div style="text-align: center;">               IEC60950         </div> <div style="text-align: center;">               EN60950 EN50178 IEC50081-1 EN61000-6-2         </div> </div>	

Table 3: PS120 - standards and certifications

