

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 ² 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"> $P_{min.load}/W = 335 - 3 \cdot V_{ACin}/V - 1.2 \cdot T_{amb}/^{\circ}\text{C}$ (at 85-112 V_{ACin}) $P_{min.load}/W = 540 - 2.7 \cdot V_{ACin}/V - T_{amb}/^{\circ}\text{C}$ (at 184-195 V_{ACin})
Rippled depends on output characteristics Single operation Parallel operation	Incl. spikes (20 MHz bandwidth), 50 Ω measurement <20 mV _{SS} (<0.1%) <40 mV _{SS} (In: 230 VAC, Out: 24 V / 20 A) <100 mV _{SS} (In: 184 VAC, Out: 24 V / 20 A)
Overvoltage protection	At 33 V ± 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"> Green LED on when $V_{out} > U_T$, whereby U_T is approx. 2 V below adjusted V_{out} (24 V to 28 V) Red LED on when $V_{out} < U_T$
Efficiency, reliability	
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, $T_U = +40$ °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.
Start / overload behavior	
Startup delay	Typ. 500 ms
Startup time	Approx. 20-80 ms, depending on load (at $V_{in} < 100$ VAC depending on T_{amb} up to 6.5 s)
Overload behavior (see "Output characteristics" on page 6)	<ul style="list-style-type: none"> Power boost: Short-term (<30 s) 125% output power without voltage drop. Electronic current limiting, protects against overload and short-circuit. High overload/short-circuit behavior ($V_{out} < 14$ V) 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.
Overload Design (continuous current)	<ul style="list-style-type: none"> No disconnection/hiccup, thus overloading is possible, also for a long period of time (load start-up), ideal for parallel operation. High overload/short-circuit current due to straight characteristic; each bias point of the V/I characteristic exceeds 20 A. <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"> Unit switches off when high overload occurs ($V_{out} < \text{approx. } 14$ V) with subsequent periodical switch-on attempts (hiccup mode): <ul style="list-style-type: none"> - Duration of switch-on attempt: approx. 100 ms when short-circuit or approx. 1 s when overload - Duration between switch-on attempts: approx. 1.5 s $V_{out} > \text{approx. } 14$ V: 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.
Connection	
Terminals	Robust screw terminals
Connection cross section Input / output	Solid: 1.5 - 6 mm ² / flexible: 1.5 - 4 mm ² 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"> All terminals are easy to reach because they are mounted on the front panel. Inputs and outputs are distinctly separate from each other and cannot be mixed up
Operational conditions	
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 (◇ 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"> • Simple snap-on system • Sits safely and firmly on the DIN rail • No tools required for removal
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

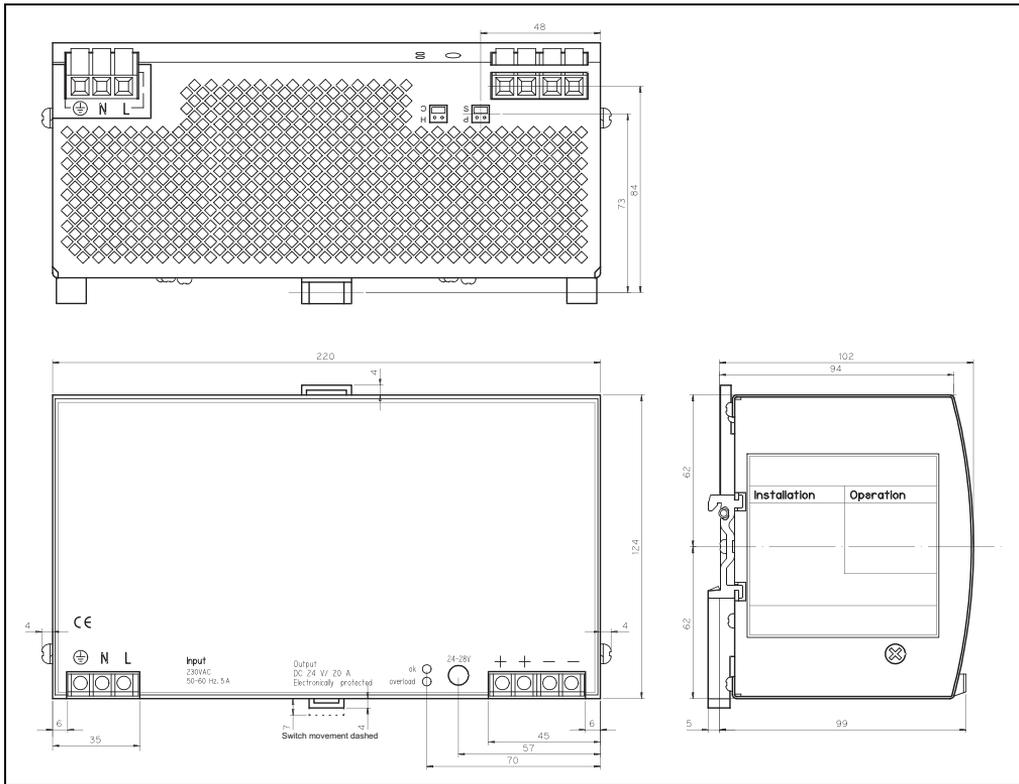


Figure 1: PS120 - dimensions

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

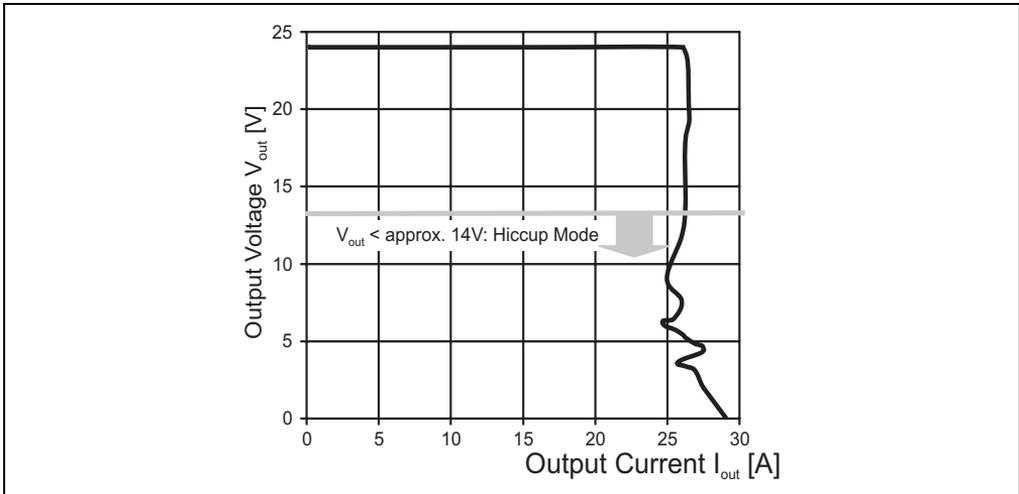


Figure 2: PS120 - output characteristics (min.)

6.2 Efficiency

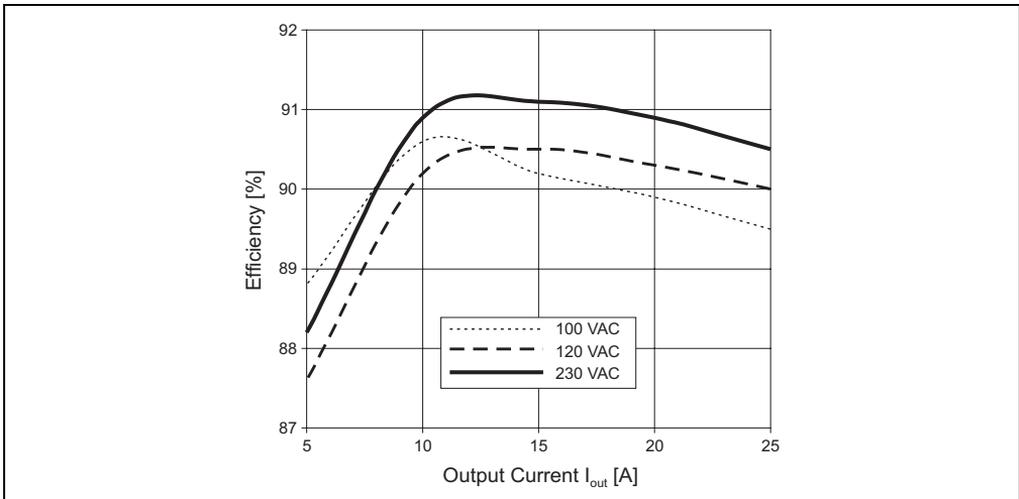


Figure 3: PS120 - efficiency (typ.)

6.3 Hold-up time

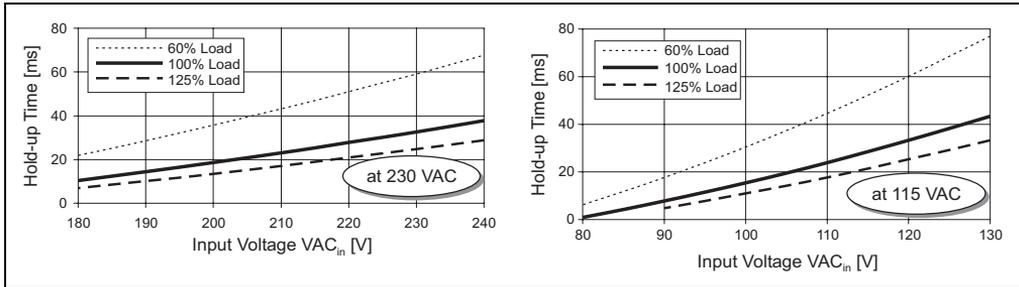


Figure 4: PS120 - hold-up time (typ., at V_{out} = 24 V)

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 ₁ ->PE) Common mode (L ₁ ->L ₂ /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 safety certifications 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 electronic equipment in electrical power installations EN 50178.						
    						
<table border="0"> <tr> <td>EMC and w Volt. Directive Guidelines</td> <td>UL1950 E137006 CUL/CSA-C22.2 No 950-M90</td> <td>UL508 LISTED IND. CONT. EQ. 18 WM, 60°C</td> <td>IEC60950</td> <td>EN 60950 EN 50178 IEC 50081-1 EN 61000-6-2</td> </tr> </table>		EMC and w Volt. Directive Guidelines	UL1950 E137006 CUL/CSA-C22.2 No 950-M90	UL508 LISTED IND. CONT. EQ. 18 WM, 60°C	IEC60950	EN 60950 EN 50178 IEC 50081-1 EN 61000-6-2
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