B&R Power Supply PS120

1. General Information

Features of the B&R power supply PS120:

- Input: 115 / 230 VAC **Auto-range**
- Output: 24 - 28 VDC / 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
- Closed metal housing
- Fine ventilation grid

2. Order Data

Model Number	Short Description	Image
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

See also data sheet "Technical data", which is delivered with the power supply.

Name	PS120
General Information	
C-UL-US Listed	Yes
Input	
Nominal Input Voltage	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 or 184 - 264 VAC 85 - 140 VAC or 170 - 280 VAC
Nominal Input Current	<10 A (115 V range) <5 A (230 V range)
Starting Current I_{pk}	<18 A at 264 VAC (T_U = +25°C, cold restart) <37 A at 264 VAC (T_U = +50°C, cold restart)
Fuse Load I^2t	<5 A^2s (T_U = +25°C, cold restart) <8 A^2s (T_U = +50°C, cold restart)
External Over-Current Protection	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 *entire* load range
Hold-Up Time	30 ms at 24 V / 20 A, 230 VAC_{in} 30 ms at 24 V / 20 A, 120 VAC_{in} 15 ms at 24 V / 20 A, 100 VAC_{in}
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°C and V_{in}<112 V or V_{in}<195 V: In order to maintain regulation accuracy at load change, the minimum load recommended ís as follows: • $P_{min.load}/W = 335 - 3 \cdot VAC_{in}/V - 1.2 \cdot T_U/°C$ (at 85 - 112 VAC_{in}) • $P_{min.load}/W = 540 - 2.7 \cdot VAC_{in}/V - T_U/°C$ (at 184 - 195 VAC_{in})
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)
Over-voltage protection	At 33 V ± 10%: Switches to hiccup mode
Output Noise Suppression	Radiated EMI values below EN 61000-6-3 (Class B) even with long, unshielded output cables
Permitted Output Load T_{amb}=0° C - 60° 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°C to +70°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	30 V

Table 2: PS120 - Technical data

Name	PS120
Front panel indicators	• 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)	519,000 h (24 V / 20 A, 230 VAC, T_U = +40°C)
Life Cycle (Electrolytic Capacitors)	The unit exclusively uses long-life electrolytic capacitors, specified for +105°C High reliability because only 4 aluminum electrolytic capacitors and no small aluminum electrolytic capacitors are used.
Start / Overload Behavior	
Startup Delay	Typ. 550 ms
Startup Time	Approx. 20 - 80 ms depending on the load (at V_{in}<100 VAC depending on T_{amb} up to 6.5 s)
Overload Behavior (See “Output characteristics" on Page 6)	• 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)	• 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. 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.
Hiccup Mode	• Unit switches off when high overload occurs (V_{out} < approx. 14 V) with subsequent periodical switch-on attempts (hiccup mode): - 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} > 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 CrossSsection Input / Output	Solid: 1.5 - 6 mm² / flexible: 1.5 - 4 mm² 2 connectors per output
Load Capacity	30 A per output
Grid	9 mm distance between adjacent connectors
Additional Features	• All terminals are easy to reach as 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.)

Name	PS120
Storage and Transport Conditions	
Storage Temperature	-25°C to +85°C
Relative Humidity During Storage	Max. 95%, non-condensing
Transport Temperature	-25°C to +85°C
Relative Humidity During Transport	Max. 95%, non-condensing
Mechanical Characteristics	
Dimensions (W x H x D [mm])	220 x 124 x 102 (+ 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: • Simple snap-on system • Sits safely and firmly on the DIN rail • No tools required for removal
Ventilation / Cooling free space for ventilation	Normal convection, no fan required Above/below 70 mm and left/right 25 mm recommended
Special Features	All operational elements (incl. terminals) should be clearly labeled and easy to reach on the front pane of the device.

Table 2: PS120 - Technical data (cont.)

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

4. Dimensions

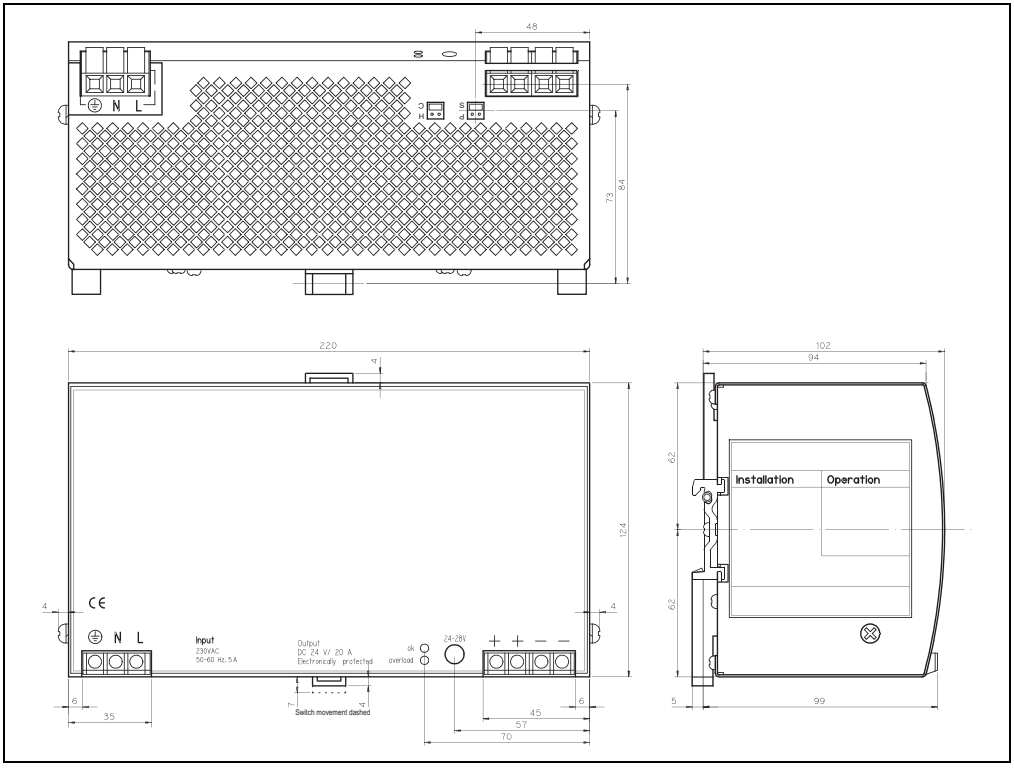

Figure 1: PS120 - Dimensions

5. Installation

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

6. Diagrams

6.1 Output characteristics

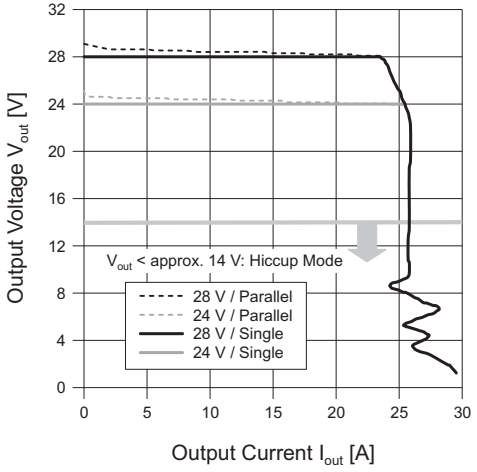

Figure 2: PS120 - Output characteristics (min.)

6.2 Efficiency

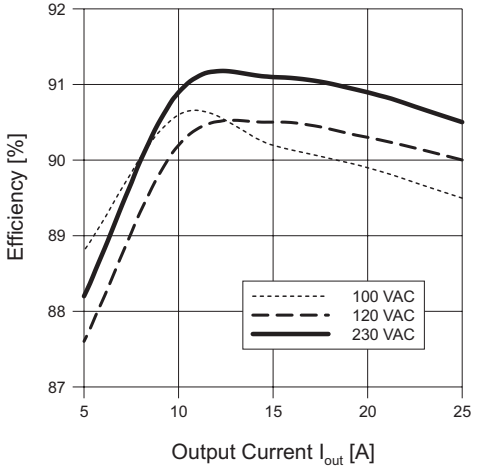

Figure 3: PS120 - efficiency (typ.)

6.3 Hold-up time

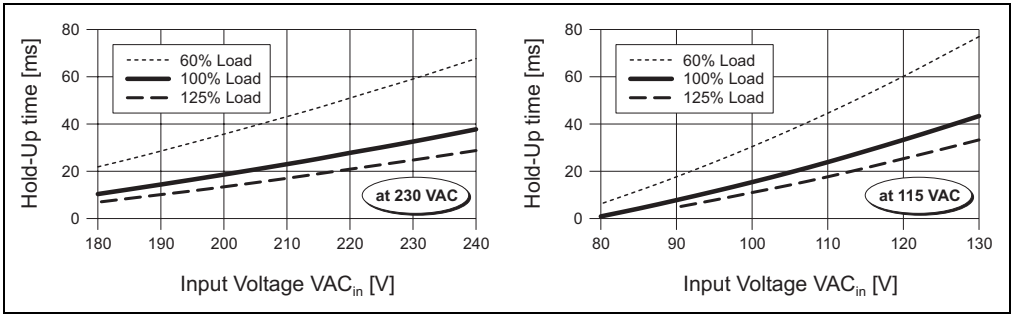

Figure 4: PS120 - Hold-up time (typ., at V_{out} = 24 V)

7. Standards and Certifications

Electromagnetic emissions (EME)	EN 61000-6-3 (also includes EN 61000-6-4) Class B (EN 55011, EN 55022) incl. Annex A through noise suppression
Immunity to disturbances Static discharge (ESD) Electromagnetic radiated fields Burst, coupled to: AC_{in} lines DC_{out} lines Surge transients Differential (L_n->PE) Common mode (L_1->L_2/N) Conducted noise immunity Mains breaks Transient immunity	EN 61000-6-2 (also includes EN 61000-6-1) 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.	
EMC and Low Volt. Directive UL60950 E137006 CUL/CSA-C22.2 No 60950 UL508 LISTED IND. CONT. EQ. 18 WM, 60°C IEC60950 EN60950 EN50178 EN61000-6-3 EN61000-6-2	

Table 3: PS120 - Standards and certifications