Technical Information

EP2420

Product name
EP2420

Description	EP2420
	The ultra-compact and affordable EP series is designed for industrial applications that require reliable power in a small space. The EP units operate with a universal AC input range and provide full power up to 55°C. All models in the series are certified to IEC/EN/UL 60950-1 & IEC/EN/UL 62368-1 for Information Technology Equipment (ITE) and UL 508 Industrial Control Equipment (ICE) certified. The series is also fully compliant with the RoHS Directive. NEC Class 2 and Limited Power Source (LPS) approvals are also available for this product.

Characteristics	
	Universal AC input voltage range
	Built-in constant current circuit for charging application
	High efficiency of up to 94% at 230 Vac
	Power Boost of 150% for 5 seconds
	Advanced Power Boost (APB) of 200% for 50 ms
	SEMI F47 compliance at 120 Vac
	Extreme low temperature cold start at -40°C
	Built-in DC OK Contact and LED indicator for DC OK
	Conformal coating on PCBAs to protect against common Dust and chemical pollutants

Input	
Nominal Input Voltage	100 - 240 VAC
Input Voltage Range	100 - 264 VAC (88-100 VAC with Power Derating)
Nominal Input Frequency	50 - 60 Hz
DC Input Voltage Range	100-375 VDC (88-100 VDC with Power Derating)
Input Current	115 VAC: Typ. 5.52A, Max. 5.00A 230 VAC: Typ. 2.31A, Max. 2.50A
Efficiency	115 VAC: Typ. 92.55% , Min. 92% 230 VAC: Typ. 94%, Min. 93%
Average Efficieny	115 VAC: Typ. 91.55% , Min. 91% 230 VAC: Typ. 93%, Min. 91.43%
Max. Power Dissipation	115 VAC: Typ. 4.19W, Max. 10W (at 24V, 0A) 230 VAC: Typ. 4.4W, Max.11W (at 24V, 0A)

	115 VAC: Typ. 38.73W, Max. 47.73W (at 24V, 20A) 230 VAC: Typ. 30.85W, Max. 36.13W (at 24V, 20A)
Max. Inrush current (Cold Start)	115 VAC: Typ. 12.8A, Max. 40A 230 VAC: Typ. 30.6A, Max. 80A
Max. Inrush Energy (Cold Start)	Max. 2A²s
Power Factor	115 VAC: Typ. 0.99, Min. 0.99 230 VAC: Typ. 0.96, Min. 0.95
Leakage Current	< 0.49 mA / 1.12 mA (110 VAC, 50 Hz) < 0.58 mA / 1.29 mA (132 VAC, 50 Hz) < 1.12 mA / 2.55 mA (264 VAC, 50 Hz)

Output	
Nominal Output Voltage	24 V
Factory Set Point Tolerance	± 1.0 %
Output Voltage Adjustment Range	24-28 VDC
Nominal Output Current	0-20.0 A / 0-17.14 A (Continuously operating at 24V/28V) 30.0 A / 25.7 A (Power Boost for 5 seconds at 24V/28V) (Slew rate 0.1 A/µs)
Nominal Output Power	480 W / 480 W (Continuously operating at 24V/ 28V) 720 W / 720 W (Power Boost for 5 sec. at 24V/28V)
Power Boost Duration	Min. 5 seconds (Duration after which output voltage start to droop.)
Power Boost Recovery Time	Typ. 18 seconds (Required wait duration before next Power Boost can be delivered by the power supply)
Advanced Power Boost (Slew rate 0.1 A/µs)	Typ. 40A at 50ms, resistive load (output voltage will drop)
Line Regulation	Max. 0.5% (@ 88-264 Vac input, 100% load)
Load Regulation	Max. 1.0% (@ 88-264 Vac input, 0-100% load)
PARD	Max. 100 mVpp (20 Hz to 20 MHz, 50 Ohm, warm up for 5 mins)
Rise Time	Max. 150 ms at 24V, 20A
Start-up Time	Max. 400 ms at 24V, 20A
Hold-up Time	Typ. 21 ms at 24V, 10A Min. 15 ms at 24V, 10A
Dynamic Response (Overshoot & Under-shoot O/P Voltage)	Max. ± 5% @ 0-100% load Slew rate 0.1 A/µs (@ 5 Hz, 50 Hz & 1 kHz, 50% Duty Cycle)
Start-up with capacitive loads	Max. 10,000 µF
Functional	DC OK RelayContact Rated: 30 V at 1 A, resistive load

Protection	
Overvoltage	28.8 - 35.2 V, SELV Output, Hiccup Mode, Non-Latching (Auto-Recovery)
Overload/ Overcurrent	125 – 170% of rated load current, Constant current, Hiccup Mode (Auto-Recovery)
Over Temperature	< 80°C Surrounding Air Temperature @ 100% load, Non-Latching (Auto-Recovery)
Short Circuit	Hiccup Mode, Non-Latching (Auto-Recovery when the fault is removed)
Transient Surge Voltage Protection	MOV (Metal Oxide Varistor)
Internal Fuse at L Pin	T68A
Degree of Protection	IP20
Protection Against Shock	Class I with PE (Primary Earth) connection
MTBF (as per Telcordia SR-332)	1,041,600 hrs. I/P: 115 Vac, O/P: 24 V, 20 A, Ta: 25°C 621,000 hrs. I/P: 115 Vac, O/P: 24 V, 20 A, Ta: 40°C
Expected Cap Life Time	115 VAC: 131,400 hrs. O/P: 24 V, 20 A, Ta: 25°C 230 VAC: 131,400 hrs. O/P: 24 V, 10 A, Ta: 40°C 115 VAC: 15,400 hrs. O/P: 24 V, 20 A, Ta: 60°C 115 VAC: 30,500 hrs. O/P: 24 V, 15 A, Ta: 60°C 230 VAC: 20,300 hrs. O/P: 24 V, 20 A, Ta: 60°C 230 VAC: 38,500 hrs. O/P: 24 V, 15 A, Ta: 60°C

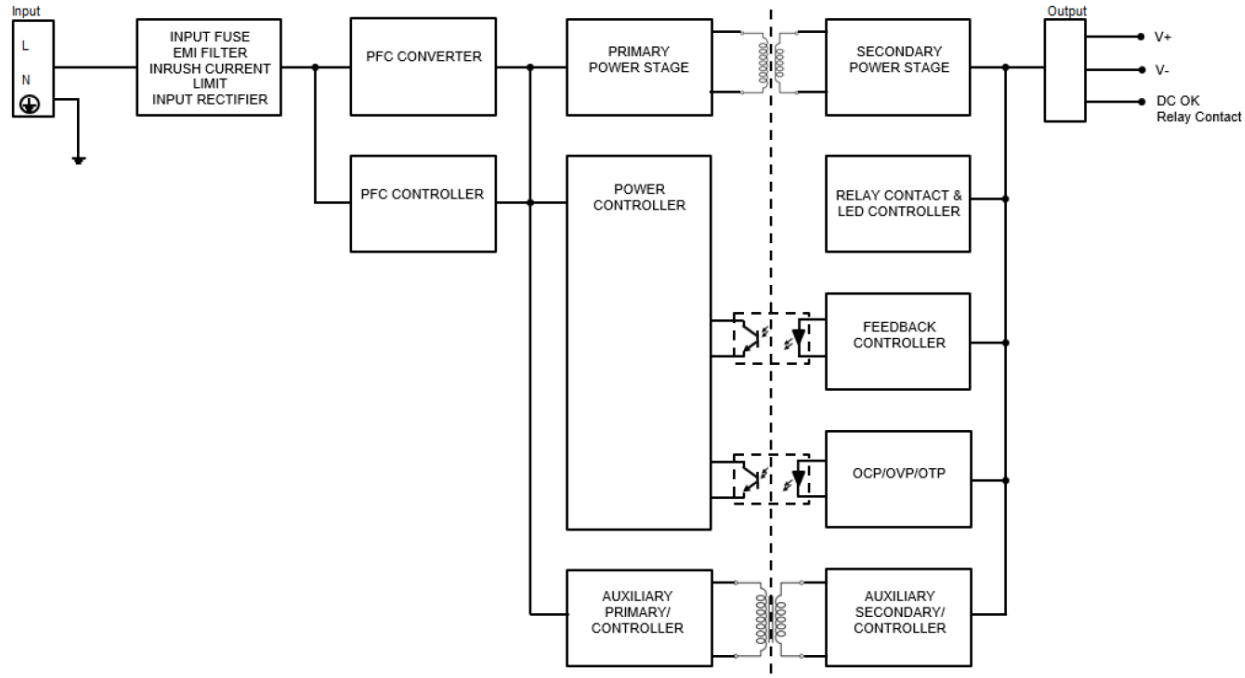
Environment	
Surrounding Air Temperature	-25°C to +70°C (Cold start -40)
Storage Temperature	-40 to +85°C
Power De-rating (temperature)	Vertical Mounting: AC Input: > 60°C de-rate power by 2.5%/°C Vertical Mounting: DC Input: > 50°C de-rate power by 2.5%/°C

	Horizontal Mounting: > 40°C de-rate power by 2.5%/°C
Power De-rating (Input Voltage)	AC input: < 100Vac de-rate power by 0.83% / V DC input: < 100Vdc de-rate power by 1.67% / V
Operating Humidity	5 to 95% RH (Non-Condensing)
Operating Altitude	0 – 5,000 m
Vibration	Non-operating: IEC 60068-2-6, Sine Wave: 10-500 Hz; 3 G peak; displacement of 0.35 mm; 60 min per axis for all X, Y, Z directions
Shock Test	Non-operating: IEC 60068-2-27, Half Sine Wave: 30 G for a duration of 18 ms; 3 times per direction, 9 times in total
Bump Test	Operating: IEC 60068-2-29, Half Sine Wave: 10 G for a duration of 11 ms, 1,000 times per direction, 6,000 times in total
Over Voltage Category	III (operating altitude 2.500m) II (operating altitude 5.000m)
Pollution Degree	2

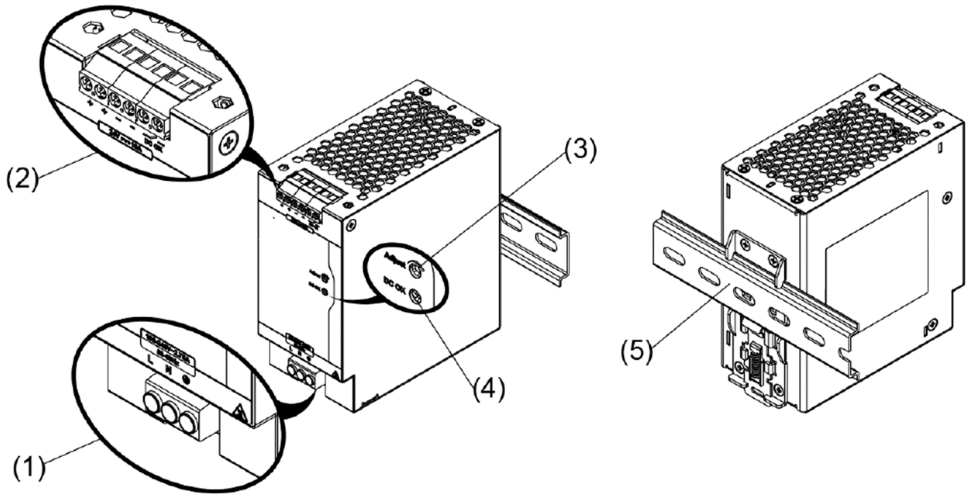
Safety/ EMC		
Electrical Equipment of machines	EN/BS EN 60204-1 (over voltage category III)	
Electrical Equipment for use in electrical power installations	IEC/EN/BS EN 62477-1 / IEC 62103	
Safety Entry Low Voltage	SELV (IEC 60950-1)	
Electrical Safety	SIQ Bauart EN 62368-1 UL/cUL recognized UL 60950-1 and CSA C22.2 No. 60950-1 (File No. E191395) UL 62368-1 and CSA C22.2 No. 62368-1 (File No. E191395) CB scheme I EC 60950-1, IEC 62368-1 UKCA BS EN 62368-1	
Industrial Control Equipment	UL/cUL listed UL 508 and CSA C22.2 No. 107.1-16 (File No. E315355)	
CE	In conformance with EMC Directive 2014/30/EU and Low Voltage Directive 2014/35/EU	
UKCA	In conformance with Electrical Equipment (Safety) Regulations 2016 No. 1011 and The Electromagnetic Compatibility Regulations 2016 No. 1091	
Galvanic Isolation	4.0 KVac Input / Output 2.0 KVac Input / PE 4.0 KVac Input / DC OK relay contact 1.5 KVac Output / PE 0.5 KVac Output / DC OK relay contact 1.5 KVac DC OK relay contact / PE	
PE Resistance	< 0.1 Ohm	
Emissions (CE & RE)	Generic Standards: EN/BS EN 61000-6-3 CISPR 32, EN/BS EN 55032, CISPR 11, EN/BS EN 55011, FCC Title 47: Class B	
Immunity	Generic Standards: EN/BS EN 55024, EN/BS EN 61000-6-2	
Electrostatic Discharge	IEC 61000-4-2	Level 4 Criteria A Air Discharge: 15 kV Contact Discharge: 8 kV
Radiated Field	IEC 61000-4-3	Level 3 Criteria A1 80 MHz – 1 GHz, 10 V/M, 80% modulation (1 kHz) 1.4 GHz – 2 GHz, 10 V/M, 80% modulation (1 kHz) 2 GHz – 2.7 GHz, 10 V/M, 80% modulation (1 kHz)
Electrical Fast Transient / Burst	61000-4-4	Level 4 Criteria A 4kV
Surge	IEC 61000-4-5	Level 4 Criteria A Common Mode: 4kV Differential Mode: 2kV
Conducted	IEC 61000-4-6	Level 3 Criteria A 150kHz-80MHz 10Vrms
Power Frequency Magnetic Fields	IEC 61000-4-8	Criteria A 30A/Meter
Voltage Dips and Interruptions	IEC 61000-4-11	0% of 100 Vac, 0 VAC, 20 ms, Criteria A 40% of 100 Vac, 40 VAC, 200 ms, Criteria B 70% of 100 Vac, 70 VAC, 500 ms, Criteria A 0% of 100 Vac, 0 VAC, 5000 ms, Criteria B

		0% of 240 Vac, 0 VAC, 20 ms, Criteria A 40% of 240 Vac, 40 VAC, 200 ms, Criteria A 70% of 240 Vac, 70 VAC, 500 ms, Criteria A 0% of 240 Vac, 0 VAC, 5000 ms, Criteria B
Low Energy Pulse Test	IEC 61000-4-12	Level 3 Criteria A Common Mode: 2 kV Differential Mode: 1 kV
Harmonic Current Emis-sion	IEC/EN/BS EN 61000-3-2, Class A	
Voltage Fluctuation and Flicker	IEC/EN 61000-3-3	
Voltage Sag Immunity SEMI F47-0706	80% of 120 Vac, 96 VAC, 1.000ms, Criteria A 70% of 120 Vac, 84 VAC, 500ms, Criteria A 50% of 120 Vac, 60 VAC, 200ms, Criteria A 80% of 200 Vac, 160 VAC, 1000ms, Criteria A 70% of 200 Vac, 140 VAC, 500ms, Criteria A 50% of 200 Vac, 100 VAC, 200ms, Criteria A	
VDE 0160	Over entrie load range: 750V, 1.3 ms, Criteria A	

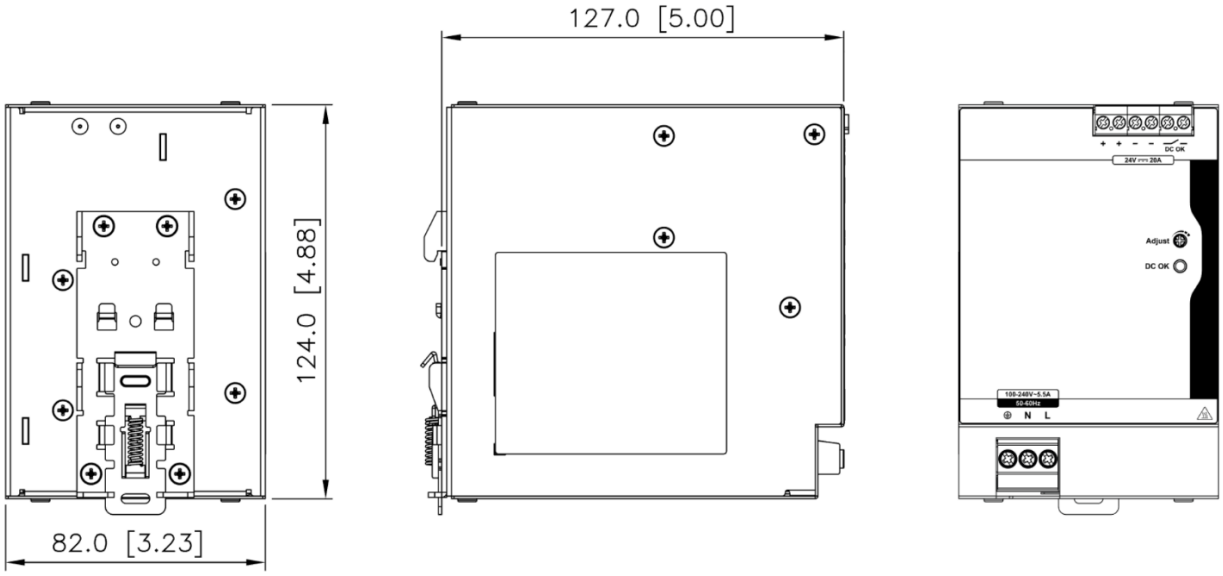
Block Diagram:



Mechanical Data



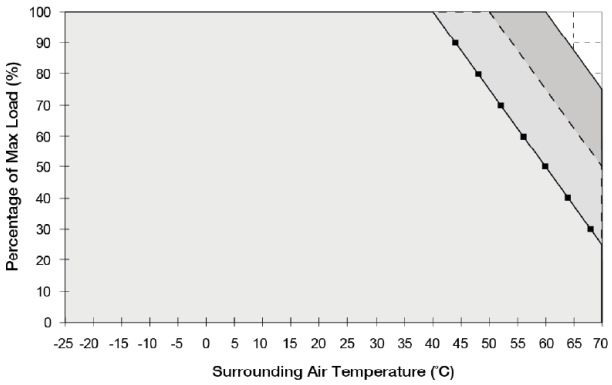
(1) Input terminal block connector
(2) Output terminal block connector
(3) DC voltage adjustment potentiometer
(4) DC OK LED (green)
(5) Universal mounting system



Dimensions L x W x D in mm	124 x 60 x 117
Weight in kg	0.84
Case Cover/ Chassis	Aluminium
Indicator	Green LED (DC-OK)
Cooling	Convection
Terminal	Input: 3 Pins (rated 600V/35A) Output: 4 Pins (rated 300V/28A) Signal: 2 Pins (rated 300V/28A)
Wire	Input: AWG 18-8 Output/ Signal: AWG 26-12
Mounting rail	Standard TS35 DIN rail in accordance with EN 60715
Noise (1 Meter from power supply)	SPL < 25dBA

Derating

Temperature/Load



	Vertical Mounting	Horizontal Mounting
AC input	——	—◆—
DC input	– –	—◆—

Input Voltage/Load