Technical Information

EP2405

Product name
EP2405

Description	EP2405
	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 91 % 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
	Extrem low temperature cold start at -40°C
	Certified according to IEC/EN/UL 62368-1

Input	
Nominal Input Voltage	100 - 240 VAC
Input Voltage Range	100 - 264 VAC
Nominal Input Frequency	50 - 60 Hz
Input Frequency Range	47 - 63 Hz
DC Input Voltage Range	100-375VDC
Input Current	<1.18 /115 VAC < 0.61A / 230 VAC
Efficiency	115 Vac: Typ. 87.92% Min. 89.5% 230 Vac: Typ. 91.49% Min 91%
Average Efficiency	115 Vac: Typ. 87,81%, Min. 87% 230 Vac: Typ. 88,37%, Min. 88%
Max Power Dissipation	Typ. 3.31W / 115 Vac 3.20W/ 230 Vac @ 24 V, 0 A Max, 5W/115Vac 5W/230Vac @ 24 V, 0 A Typ. 13.46W / 115Vac 11.16W/230 Vac @ 24 V, 5 A Max. 14W/115Vac 13W/230Vac @24 V, 5 A
Max. Inrush current (Cold Start)	Typ. 12.4 A/1 Vac 25.6A/230 Vac @ 24 V, 5 A. Max 35 A / 115Vac, 70 A /230 VAC
Max. Inrush Energy (Cold Start)	1A²s
Leakage Current	< 0.20 mA / 0.50 mA @ 110 Vac, 50 Hz, TN/TT system / IT system < 0.24 mA / 0.60 mA @ 132 Vac, 50 Hz, TN/TT system / IT system < 0.47 mA / 1.20 mA @ 264 Vac, 50 Hz, TN/TT sytsem / IT system

Output	
Nominal Output Voltage	24 VDC
Factory Set Point Tolerance	± 1.0 %
Output Voltage Adjustment Range	24 - 28 VDC
Output Current	Nom. 0-5.0 A / 0-4.28 A Continously operating @ 24 V / 28 V Nom. 7.5 A / 6.43 A (slew rate 0.1 A µs) Power Boost for 5 seconds @ 24 V / 28 V
Output Power	Nom. 120 W / 120 W Continously operating @ 24 V / 28 V Nom. 180 W / 180 W Power Boost for 5 seconds @ 24 V / 28 V
Line Regulation	< 0.5% (at 88-264 VAC, 100% load)
Load Regulation	< 1 % (at 88-264VAC, 0-100% load)
PARD	Max. 100 mVpp (20 Hz to 20 MHz, 50 Ohm, warm up for 5 mins)
Rise Time	< 60 ms at nominal input (@24 V, 5 A)
Start-up Time	<1500ms. at 115Vac & 230 Vac (@24 V, 5 A)
Hold-up Time	Typ. 35 ms at 115 Vac & 230 Vac (@24 V, 5 A) Min. 20 ms at 115 Vac & 230 Vac (@24 V, 5 A)
Dynamic Response (Overshoot & Undershoot O/P Voltage)	± 5% @ 0-100% load (Slew Rate: 0.1A/µs, @ 5Hz, 50Hz & 1 kHz, 50 Duty Cycle)
Start-up with Capacitive Loads	10,000 µF max.

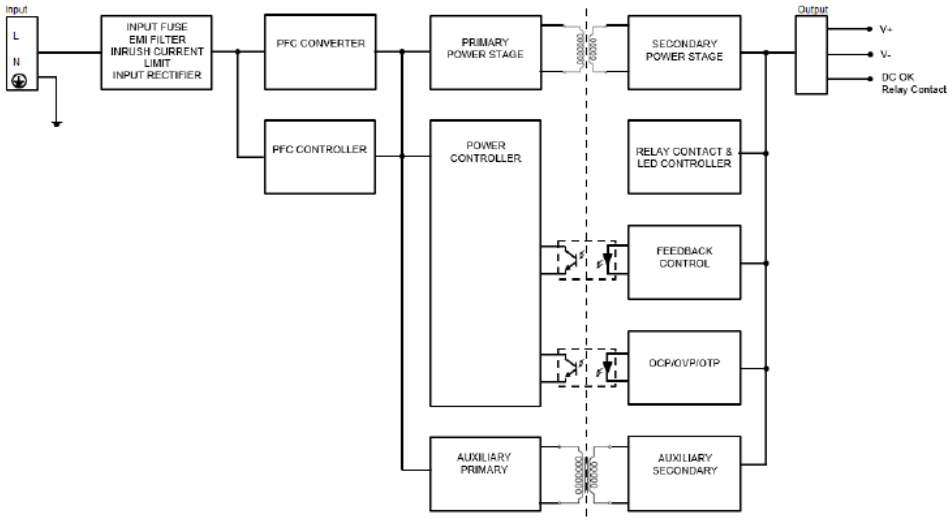
Protection	
Overvoltage	28.8 – 35.2 V, SELV utput, Hiccup Mode, Non-Latching (Auto-Recovery)
Overload/ Overcurrent	125 ~ 170% of rated load current, Constant Current, Hiccup Mode (Auto-Recovery)
Over Temperature	< 80°C Surrounding Air Temperature at 100% load, Non-Latching (Auto-Recovery)
Short Circuit	Hiccup Mode, Non-Latching (Auto-recovery when the fault is removed)
Internal Fuse at L Pin	T3.15A
Degree of Protection	IP20
Protection Against Shock	Class I with PE (Primary Earth) connection

Environment	
Surrounding Air Temperature	-25°C to +70°C (Cold start at -40°C)
Storage Temperature	-40 to +85°C
Power De-rating (temperature)	>60°C de.rate power by 2.5%/°C (Vertical Mounting) > 40°C de-rate power by 1.67% / °C (Horizonal Mounting)
Operating Humidity	5 to 95% RH (Non-Condensing)
Operating Altitude	0 – 5,000 m
Vibration	Non-operating: IEC 60068-2-6, Sinne Wave: 10-500 Hz; 3 G peak; displacement of 0.35 mm; 60 min per axis for al X, Y, Z directions
Shock Test	Non-operating: IEC 60068-2-27, Half Sine Wave: 30G for duration of 18 ms; 3 times per direction, 9 times in total
Bump Test	Operating: IEC 60068-3-29, Half Sine Wave: 10 G for a duration of 11 ms, 1000 times per direction, 6000 times in total
Over Voltage Category	II (operating altitude 5000 meters) III (operating alitude 2500 meters) According to IEC/EN 62477-1 / EN 60204-1 (clearence and creepage distances) and IEC 62103 (safety part)
Pollution Degree	2

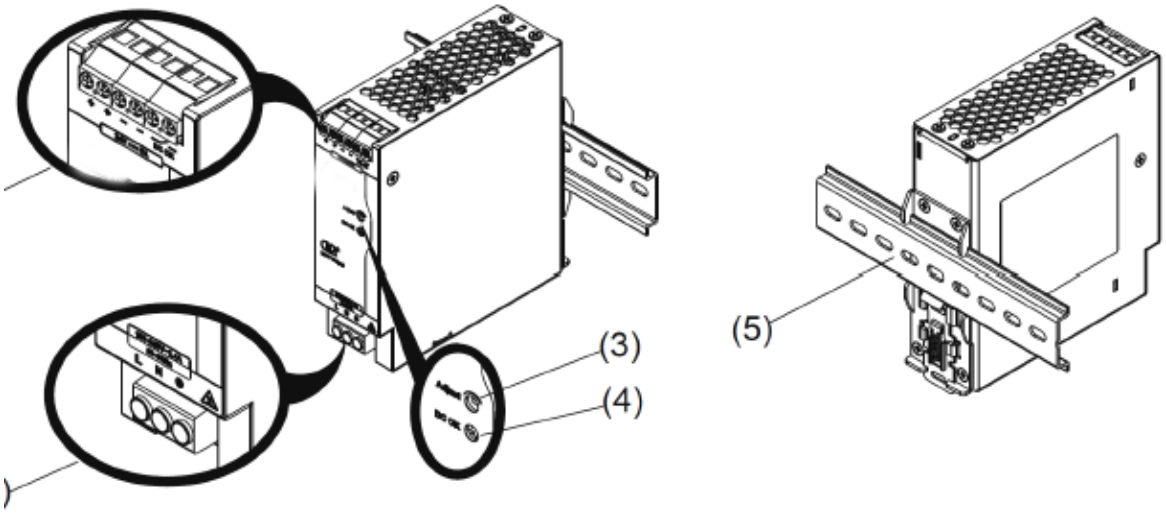
Safety/ EMC		
Safety Entry Low Voltage	SELV (IEC 60950-1)	
Electrical Equipment of Machines	EN/BS EN 60204-1 (over voltage category III)	
Electrical Equipment for Use in Electrical Power Installations	IEC/EN/BS EN 62477-1 / IEC 62103	
Electrical Safety	SIQ Bauart EN 62368-1 UL/cUL recognized UL 60950-1 and CSA C22.2 No 60950-1 (File No. E 191395); UL 62368-1 and CSA C22.2 No. 62368-1 (File No. E191395) CB scheme IEC 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	Input-Output: 4 KVAC Input-PE: 2 KVAC Input-DC OK relay contact: 4.0 KVAC Output/PE: 1.5 KVAC Output-DC OK relay contact: 0.5 KVAC DC OK relay contact / PE: 1.5 KVAC	
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	
Component Power Supply for Gerneral Use	EN 61204-3	
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: 15kV Contact Discharge: 8kV
Radiated Field	IEC 61000-4-3	Level 3 Criteria A 80 MHz – 1 GHz, 10 V/M with 1 kHz tone / 80% modulation 1.4 GHz – 2 GHz, 10 V/M with 1 kHz tone / 80% modulation 2 GHz - 2.7 GHz, 10 V/M with 1 kHz tone / 80% modulation
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 100Vac 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, 5000ms, Criteria B
Low Energy Pulse Emission	IEC 61000-4-12	Level 3 Criteria A Common Mode: 2kV Differential Mode: 1kV
Harmonic Current Emission	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, 1000 ms, 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, 1000 ms, Criteria A 70% of 200 Vac, 140 Vac, 500 ms, Criteria A 50% of 200 Vac, 100 Vac, 200ms, Criteria A
VDE 0160	Over entire load range 750 V, 1.3ms, Criteria A

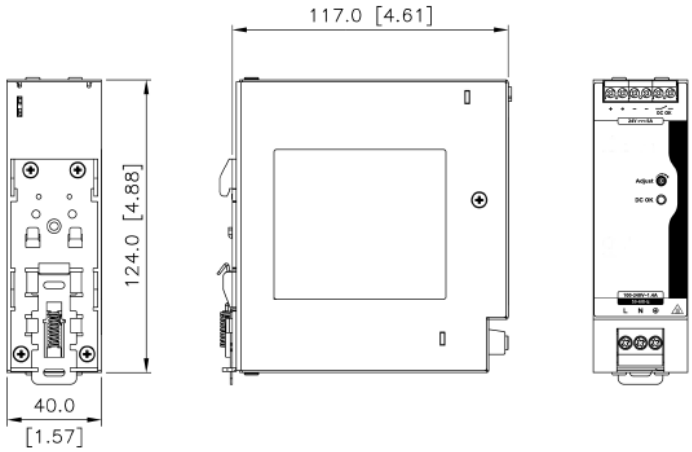
Block Diagram:



Mechanical Data



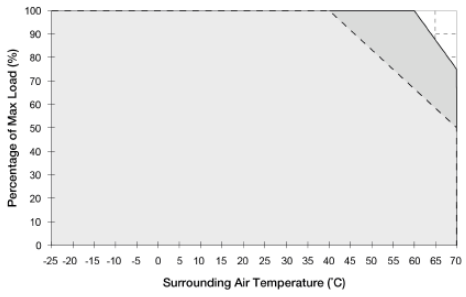
(1) Input terminal block connector
(2) Output/signal terminal block connector
(3) DC voltage adjustment potentiometer)
(4) DC OK LED (Green)
(5) Universal mounting rail –system



Dimensions L x W x D in mm	124 x 40 x 117
Weight in kg	0.58
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: AWG 18-12 Signal: AWG 18-12
Mounting rail	Standard TS35 DIN rail in accordance with EN 60715
Noise (1 Meter from power supply)	SPL < 25dBA

Derating

Temperature/Load



Input Voltage/Load