LEC120 Series

120 W AC-DC DIN Rail Switching Power Supply



LEC120 Series is Bel Power Solutions AC-DC converter series featuring a cost-effective, energy efficient explosion proof solution for standard DIN-rail mounting. The products offer a high level of stability and immunity to noise, compliant with international IEC 62368-1 standards for EMC and safety specifications meet IEC/EN/UL 62368, UL 61010, UL 508.

These light weight AC-DC converters also have an extremely compact design for space saving and are ideal for applications as industrial control equipment, machinery and variety of harsh environment applications.

RoHS Compliant

CE

FEATURES

- Input voltage 85 - 264 VAC (universal) or 120 - 370 VDC
- Output voltage 12 V, 24 V, 48 V (adjustable)
- Operating ambient temperature range -40°C to +70°C
- Efficiency up to 94%
- High reliability
- DC OK function
- Active PFC
- 150% peak load output for 3 seconds
- DC ON output status indicator LED
- Output short circuit, over-current, over-voltage & over-temperature protection
- Meets the requirements of IEC/EN/UL 62368-1, UL 61010, UL 508
- Dimensions 32 x 124 x 110 mm (1.26 x 4.88 x 4.33 in)

APPLICATIONS

- Industrial control equipment
- Machinery
- Harsh environment applications

1. MODEL SELECTION

MODEL	INPUT VOLTAGE RANGE	OUTPUT VOLTAGE	MAX OUTPUT CURRENT	EFFICIENCY [1]	MAX. CAPACITIVE LOAD	MAX OUTPUT POWER [2]
LEC120-12	85 - 264 VAC (120 - 370 VDC)	12 V	10 A	93.5 %	80 000 µF	120 W
LEC120-24	85 - 264 VAC (120 - 370 VDC)	24 V	5 A	94 %	50 000 µF	120 W
LEC120-48	85 - 264 VAC (120 - 370 VDC)	48 V	2.5 A	94 %	30 000 µF	120 W

[1] *Typical, at 230 VAC input*
[2] *See DERATING CURVES on page 4*

2. INPUT SPECIFICATIONS

All specifications are measured at Ta = 25°C, humidity <75 % nominal input voltage and rated output load unless otherwise specified.

PARAMETER	DESCRIPTION / CONDITIONS	MIN	TYP	MAX	UNIT
Input voltage	Rated AC Input DC Input	100 85 120		240 264 370	VAC VAC VDC
Input frequency		47		63	Hz
Input current	115 VAC 230 VAC			1.5 0.75	A
Inrush current	115 VAC 230 VAC		15 30		A
Power factor	115 VAC 230 VAC		0.98 0.94		
Start-up delay time	230 VAC		300	1000	ms
Leakage current	240 VAC			1	mA

3. OUTPUT SPECIFICATIONS

All specifications are measured at Ta = 25°C, humidity <75 % nominal input voltage and rated output load unless otherwise specified.

PARAMETER	DESCRIPTION / CONDITIONS	MIN	TYP	MAX	UNIT
Adjustable output voltage [3]	LEC120-12 LEC120-24 LEC120-48	11.8 23.5 48.5		14.0 28.0 53.0	VDC
Output current	LEC120-12 LEC120-24 LEC120-48			10 5 2.5	A
Output voltage accuracy	At full load range		± 1		%
Line regulation	Rated load		± 0.5		%
Load regulation	0% - 100% load		± 1		%
Ripple & noise [4]	LEC120-12 / LEC120-24 LEC120-48			100 200	mVpp
Stand-by power consumption			2		W
Hold-up time			20		ms
Switching frequency			100		kHz
DC-OK signal [5]	30 VDC / 1 A max.				

[3] *The output voltage can be adjusted by the output adjustable resistance ADJ, turn clockwise.*
[4] *Measured with 20 MHz bandwidth, output parallel 47 µF electrolytic capacitor and 0.1 µF ceramic capacitor.*
[5] *When the output voltage is normal, the relay is connected. As soon as the output voltage dips below 90% Vo, the relay is disconnected.*

4. PROTECTIONS

PARAMETER	DESCRIPTION / CONDITIONS		MIN	TYP	MAX	UNIT
Short circuit protection	Constant current up to 1s, after 1s Hiccup mode applied. Auto recovery. Recovery time < 10s after the SC disappear.					
Over current protection [6]	Normal / high temperature: auto recovery Low temperature: respecting derating rules in Fig. 1, auto recovery		105 105		200	% Io
Over voltage protection	Hiccup mode, auto recovery	LEC120-12 LEC120-24 LEC120-48			18 35 60	V
Over temperature protection [7]	OTP start OTP release (auto recovery)		 60	90		°C

[6] *230 VAC, rated load. Constant current up to 1s, after 1s Hiccup mode applied.*
[7] *230 VAC, 70% load*

5. ENVIRONMENTAL SPECIFICATIONS

PARAMETER	DESCRIPTION / CONDITIONS	MIN	TYP	MAX	UNIT
Operating temperature		-40		+70	°C
Storage temperature		-40		+85	°C
Temperature derating	-40°C to -25°C +55°C to +70°C (85 - 164 VAC) +60°C to +70°C (165 - 264 VAC)	3.34 2.0 3.0			%/°C
Input voltage derating	AC Input voltage between 85 - 100 VAC /120 - 140 VDC	0.67			%/VAC
Humidity	Operating, non-condescending Storage, non-condescending	 20		95 95	%RH
Altitude	Operating Derating of 5°C / 1000 m for operating altitude > 2000 m			2000	m
MTBF	MIL-HDBK-217F @ 25 °C	300 000			hrs

6. EMC SPECIFICATIONS

PARAMETER	DESCRIPTION / CONDITIONS	CLASS / LEVEL / CRITERION
Conducted emissions	EN 55032 / CISPR 32	Class B
Radiated emissions	EN 55032 / CISPR 32	Class B
Harmonic current	IEC/EN 61000-3-2	Class A & Class D
ESD immunity	IEC/EN 61000-4-2, Contact ±6 kV / Air ±8 kV	Performance Criterion A
Radiated field immunity	IEC/EN 61000-4-3, 10 V/m	Performance Criterion A
Electrical fast transient	IEC/EN 61000-4-4, ± 4 kV	Performance Criterion A
Surge immunity	IEC/EN 61000-4-5, Line to line ±2 kV / Line to ground ±4 kV	Performance Criterion A
Conducted immunity	IEC/EN 61000-4-6, 10 V_{RMS}	Performance Criterion A
Voltage dips, interruptions	IEC/EN 61000-4-11, 0%, 70%	Performance Criterion B

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7. SAFETY SPECIFICATIONS

PARAMETER	DESCRIPTION / CONDITIONS	MIN	TYP	MAX	UNIT
Safety standards & approvals	Meets the requirements of EN 62368-1, UL 61010-1, UL 508				
Safety class	Class I				
Isolation test [8]	Input to Ground Input to Output Output to Ground	1500 3000 500			VAC
Insulation resistance	At 500 VDC	50			MΩ

[8] *Electric strength test for 1 min., leakage current <15 mA*

8. MECHANICAL SPECIFICATIONS

PARAMETER	DESCRIPTION / CONDITIONS	MIN	TYP	MAX	UNIT
Dimensions			32 x 124 x 110 1.26 x 4.88 x 4.33		mm in
Weight			490 ± 10%		g
Case [9]	Material: Metal (AL1100, SPCC) and Plastic (PC940)				
Cooling	Convection (Natural air flow)				

[9] *When the power supply is in use, the enclosure of the product needs to be connected to the system grounding.*

9. DERATING CURVES

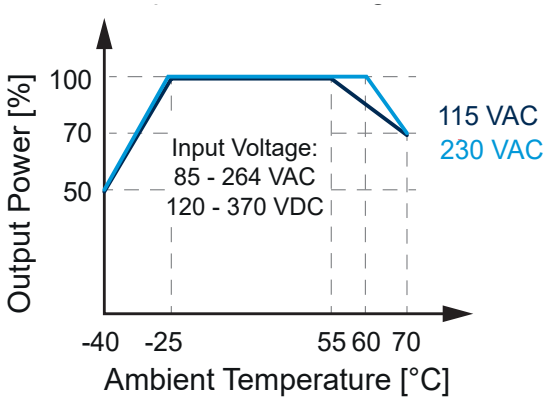


Figure 1. Temperature Derating Curve

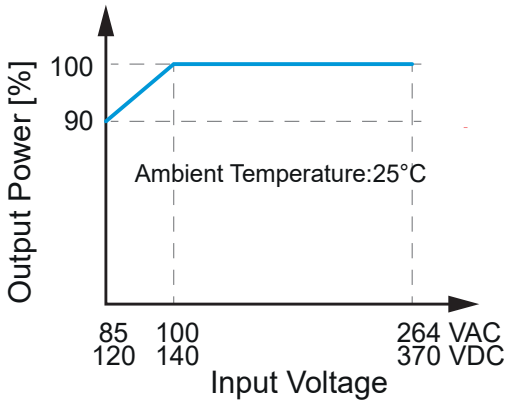


Figure 2. Input Voltage Derating Curve

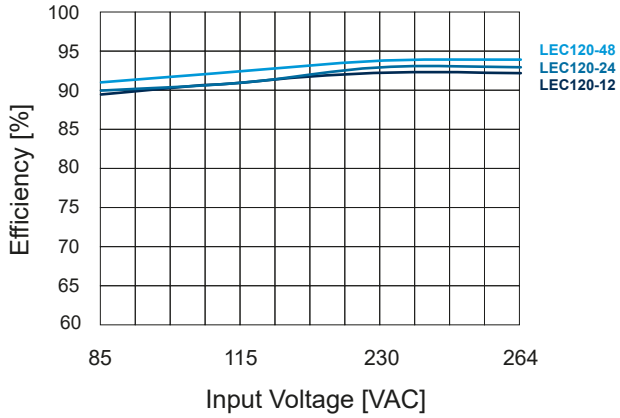


Figure 3. Efficiency vs Input Voltage Derating Curve (Full Load)

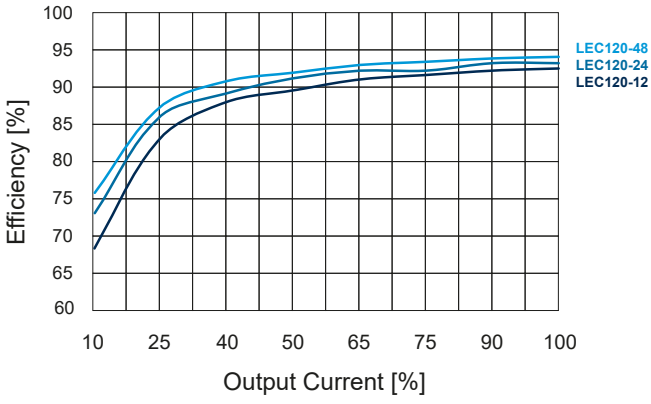
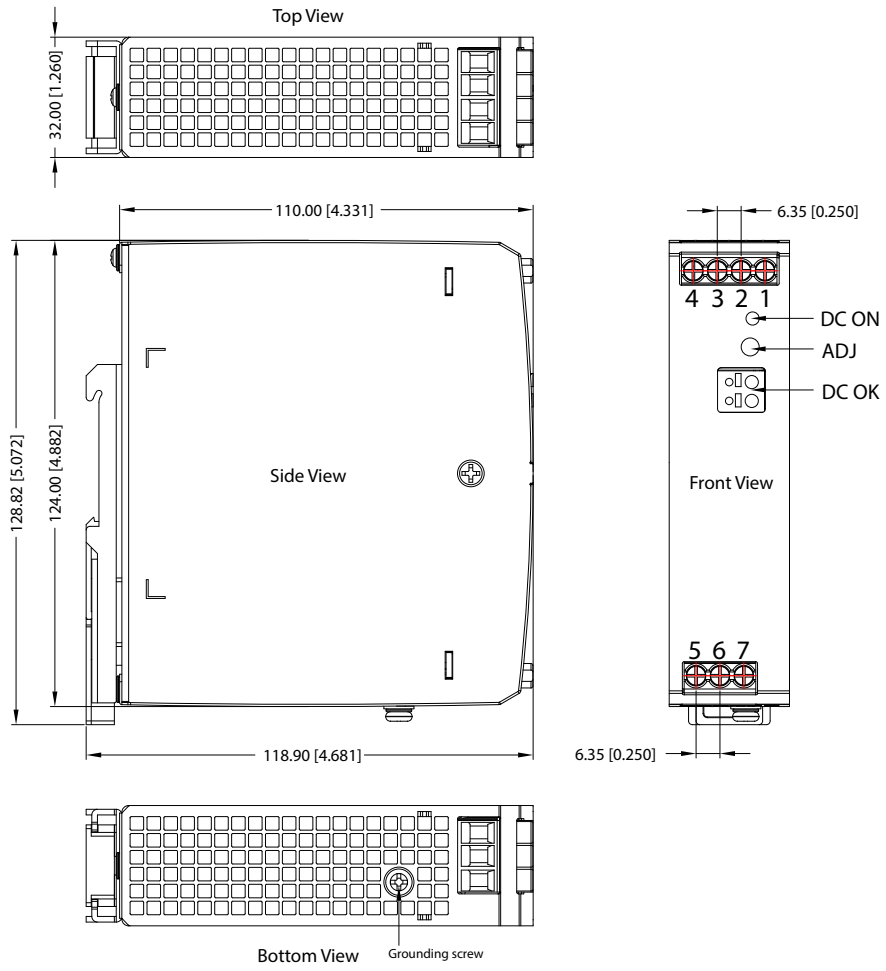


Figure 4. Efficiency vs Output Load Derating Curve (Vi = 230 VAC)

10. MECHANICAL DRAWINGS



All dimensions are in mm [in]
General tolerance ±1.00 mm [±0.039 in]
Wire range 26-10 AWG
Tightening torque max. 0.4 Nm
Mounting DIN Rail TS35
(rail needs to be connected to safety ground)

	PIN	FUNCTION
OUTPUT TERMINAL	1	-Vo
	2	-Vo
	3	+Vo
	4	+Vo
INPUT TERMINAL	5	AC (N)
	6	AC (L)
	7	⏚
GROUNDING SCREW *		⏚
DC ON LED		Output status indicator (green)
ADJ		Output adjustable resistor
DC OK SIGNAL		Monitors the output voltage on the output terminals

** Pin 7 and the grounding screw are interconnected. Either Pin 7 or the grounding screw need to be connected to earth.*

Figure 5. Mechanical Drawing

NUCLEAR AND MEDICAL APPLICATIONS - Products are not designed or intended for use as critical components in life support systems, equipment used in hazardous environments, or nuclear control systems.

TECHNICAL REVISIONS - The appearance of products, including safety agency certifications pictured on labels, may change depending on the date manufactured. Specifications are subject to change without notice.

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