

# LEC480 Series

## 480 W AC-DC DIN Rail Switching Power Supply



LEC480 Series is Bel Power Solutions AC-DC converter series featuring a cost-effective, energy efficient green power supply solution for standard DIN-rail mounting. The products offer a high level of stability and immunity to noise for industrial control equipment, machinery, and other industrial equipment in a variety of harsh environments.

These light weight AC-DC converters have an extremely compact design and the standard rail installation for space saving. Having good EMC performance, the series is compliant with international IEC/EN/UL/BS EN 62368-1, UL 61010-1, EN 61558 standards for safety.

### FEATURES

- Input voltage 85 - 264 VAC (universal)
- Output voltage 12 V, 24 V, 48 V (adjustable)
- Operating ambient temperature range -40°C to +70°C
- Efficiency up to 94%
- High I/O isolation test voltage up to 3000 VAC
- DC OK function
- Active PFC, PF > 0.95
- Output short circuit, over-current, over-voltage & over-temperature protection
- UL 61010-1 safety certified
- DIN rail TS-35/7.5 or 15 mountable
- Ultra slim design
- Withstands 305 VAC input voltage 5S
- Dimensions 48 x 125 x 131.5 mm (1.89 x 4.92 x 5.17 in)



### APPLICATIONS

- Industrial control equipment
- Machinery
- Harsh environment applications



## 1. MODEL SELECTION

MODEL	INPUT VOLTAGE RANGE	OUTPUT VOLTAGE	MAX OUTPUT CURRENT	EFFICIENCY <sup>1</sup>	MAX. CAPACITIVE LOAD	MAX OUTPUT POWER <sup>2</sup>
LEC480-24	85 - 264 VAC (120 - 370 VDC)	24 V	20 A	94 %	4700 µF	480 W
LEC480-48	85 - 264 VAC (120 - 370 VDC)	48 V	10 A	94 %	2700 µF	480 W

<sup>1</sup> Typical, at 230 VAC input

<sup>2</sup> 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	AC Input	85		264	VAC
	DC Input	120		370	VDC
Input frequency		47		63	Hz
Input current	115 VAC			5	A
	230 VAC			2.5	A
Inrush current <sup>3</sup>	115 VAC		20		A
	230 VAC		40		A
Power factor	115 VAC	0.99			
	230 VAC	0.95			
Leakage current	240 VAC			0.8	mA

<sup>3</sup> Cold start

## 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 <sup>3</sup>	LEC480-24	24		28	VDC
	LEC480-48	48		55	VDC
Output current	LEC480-24			20	A
	LEC480-48			10	A
Output voltage accuracy	Full load range		± 1		%
Line regulation	Rated load		± 0.5		%
Load regulation	0% - 100% load		± 1		%
Ripple & noise <sup>4</sup>	LEC480-24			100	mVpp
	LEC480-48			120	mVpp
Temperature coefficient			± 0.03		%/ °C
Minimum load		0			%
Hold-up time		16	22		ms
DC-OK signal <sup>5</sup>	30 VDC / 1 A max.				

<sup>3</sup> The output voltage can be adjusted by the output adjustable resistance ADJ, turn clockwise.

<sup>4</sup> Measured with 20 MHz bandwidth, output parallel 47 µF electrolytic capacitor and 0.1 µF ceramic capacitor.

<sup>5</sup> 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	Hiccup mode, continuous, auto recovery Recovery time < 10s after the short circuit disappear				
Over current protection	Normal / high temperature: Vout shutdown, auto recovery Low temperature: auto recovery	110 105		200	% Io
Over voltage protection	Vout may clamp (auto recovery) or latch off (restart required)	LEC480-24 LEC480-48	29 56	35 60	V
Over temperature protection <sup>6</sup>	OTP start OTP release (auto recovery)			90 60	°C

<sup>6</sup> 230 VAC, 100% Io

## 5. ENVIRONMENTAL SPECIFICATIONS

PARAMETER	DESCRIPTION / CONDITIONS	MIN	TYP	MAX	UNIT
Operating temperature		-40		+70	°C
Storage temperature		-40		+85	°C
Temperature derating	+50°C to +70°C	2.5			%/°C
Input voltage derating	AC Input voltage between 85 - 100 VAC / 120 - 140 VDC	1.0			%/VAC
Humidity	Operating, non-condensing Storage, non-condensing	20 10		90 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, ± 2 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 <sub>RMS</sub>	Performance Criterion A
Voltage dips, interruptions	IEC/EN 61000-4-11, 0%, 70%	Performance Criterion A

## 7. SAFETY SPECIFICATIONS

PARAMETER	DESCRIPTION / CONDITIONS	MIN	TYP	MAX	UNIT
Safety standards & approvals	UL 61010-1, UL 61010-2-201 safety certified Design refers to IEC/UL 62368-1, EN 61558-1, EN 61558-2-16				
Safety class	Class I				
Isolation test <sup>7</sup>	Input to Ground Input to Output Output to Ground	2000 3000 500			VAC
Insulation resistance	At 500 VDC	100			MΩ

<sup>7</sup> Electric strength test for 1 min., leakage current <10 mA



### 8. MECHANICAL SPECIFICATIONS

PARAMETER	DESCRIPTION / CONDITIONS	MIN	TYP	MAX	UNIT
Dimensions			48 x 125 x 131.5 1.89 x 4.92 x 5.17		mm in
Weight			980		g
Case <sup>8</sup>	Material: Metal (AL1100, SPCC) and Plastic (PC940)				
Cooling	Convection (Natural air flow)				

<sup>8</sup> When the power supply is in use, the enclosure of the product needs to be connected to the system grounding.

### 9. DERATING CURVES

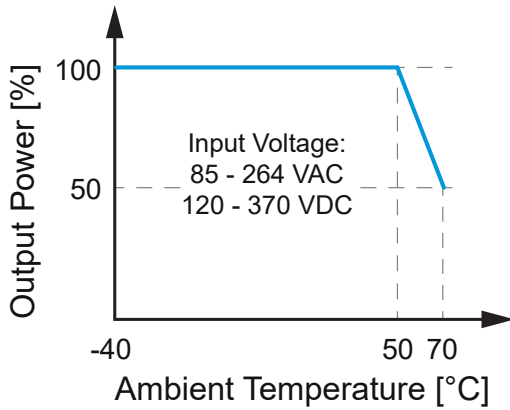


Figure 1. Temperature Derating Curve

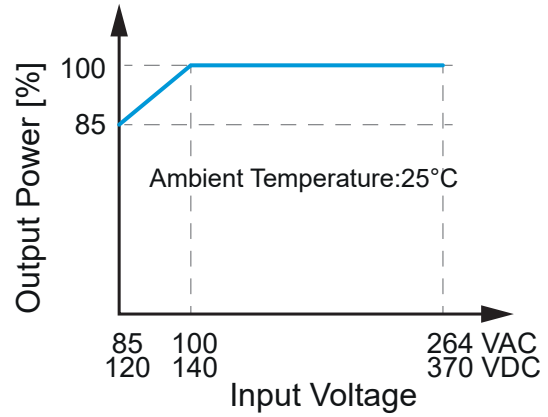


Figure 2. Input Voltage Derating Curve

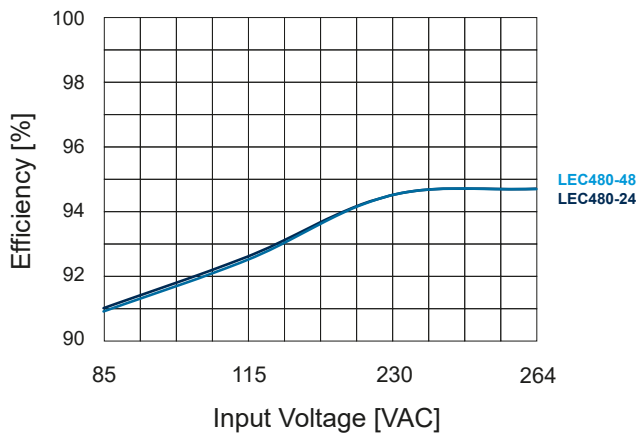


Figure 3. Efficiency vs Input Voltage Derating Curve (Full Load)

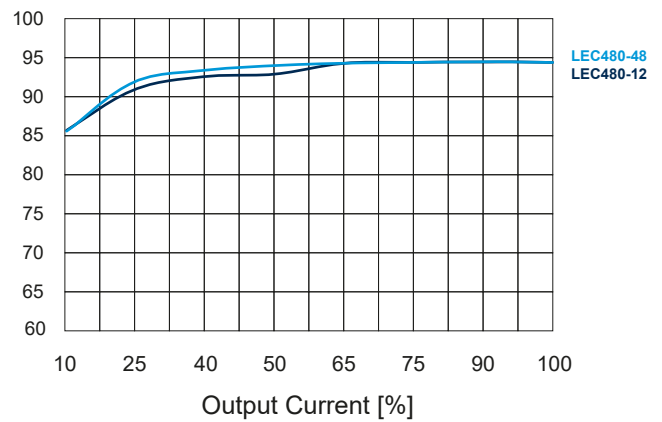
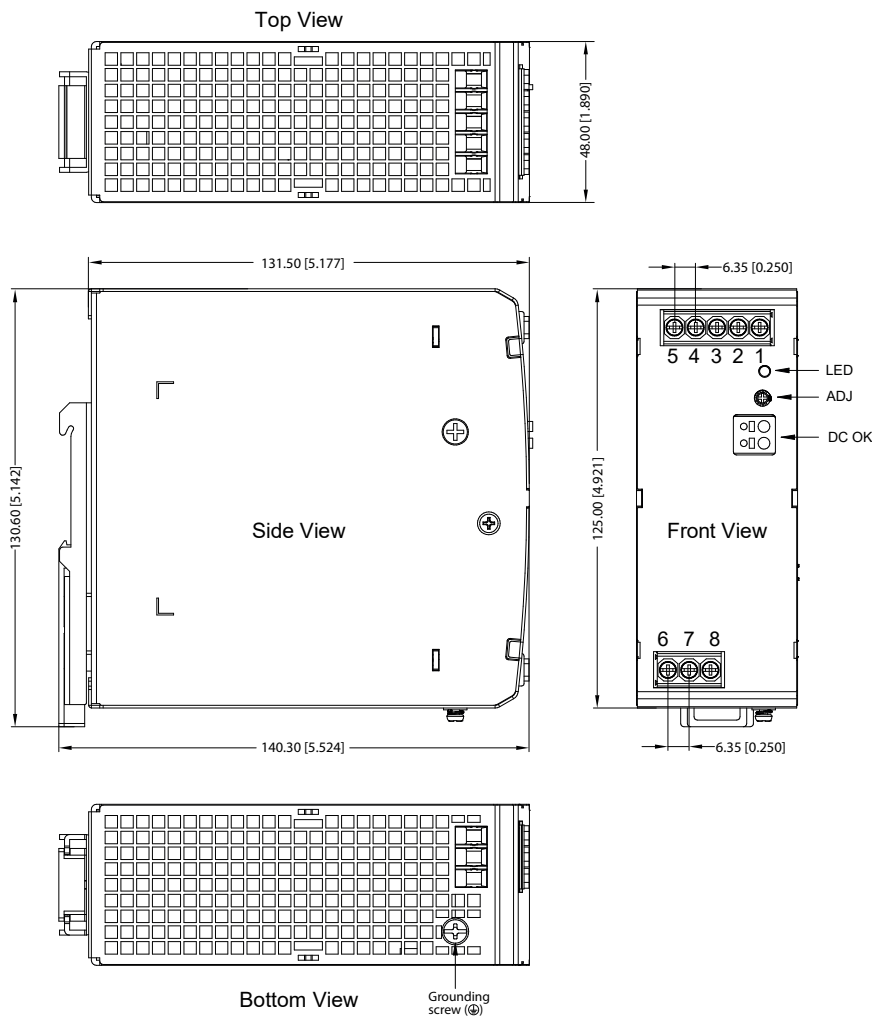


Figure 4. Efficiency vs Output Load Derating Curve (Vi = 230 VAC)

### 10. MECHANICAL DRAWINGS



All dimensions are in mm [in]  
 General tolerance  $\pm 1.00$  mm [ $\pm 0.039$  in]  
 Wire range 28-10 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
	5	+Vo
INPUT TERMINAL	6	AC (N)
	7	AC (L)
	8	⊕
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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