

# LET480 Series

## 480 W 3-Phase AC-DC DIN Rail Switching Power Supply



LET480 Series is Bel Power Solutions three-phase AC-DC DIN-Rail switching power supply. It features cost-effective, high efficiency and high reliability. With 150% power reserve, enough to support starting DC motor or capacitive load and other heavy load.

The units provide good EMC performance, and are compliant to EMC standards EN 55032 and EN 55035, safety standards UL 61010, CSA C22.2 No. 61010-1 and EN 62368-1.

They are widely used in areas of industrial control equipment, factory automation and mechanical and electrical equipment and other industrial control fields.

### FEATURES

- Three-phase input voltage with active PFC  
Input range: 342 - 528 VAC (Rated: 380 - 480 VAC)
- Operating ambient temperature range -30°C to +70°C (for more details see Derating Curves)
- Efficiency up to 95.6%
- High reliability
- PF >0.95
- Output short circuit, over-current, over-voltage & over-temperature protection
- 150% peak power lasts for 4.5 s
- Fault alarm function, DC OK, against backflow voltage
- LED indicator for output status
- Double-sided conformal coating, salt-spray proof
- RS485 Communication, remote shutdown (PS ON)
- Operating altitude up to 5000 m
- OVC III
- UL 61010-1 and CSA C22.2 No. 61010-1 certified, EN 62368-1 compliant
- Dimensions 80 x 124 x 127 mm ( 3.15 x 4.88 x 5.00 in)

### APPLICATIONS

- Industrial control equipment
- Factory automation
- Mechanical and electrical equipment



## 1. MODEL SELECTION

MODEL	RATED INPUT VOLTAGE RANGE	NOM OUTPUT VOLTAGE	MAX OUTPUT CURRENT	EFFICIENCY <sup>1</sup>	MAX. CAPACITIVE LOAD	MAX OUTPUT POWER
LET480-24	380 - 480 VAC	24 V	20 A	95%	20 000 µF	480 W
LET480-36	380 - 480 VAC	36 V	13.3 A	95.3%	13 000 µF	480 W
LET480-48	380 - 480 VAC	48 V	10 A	95.6 %	10 000 µF	480 W

<sup>1</sup> Typical, at 400 VAC

## 2. INPUT SPECIFICATIONS

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

PARAMETER	DESCRIPTION / CONDITIONS	MIN	TYP	MAX	UNIT
Input voltage	Rated (Certified) Range	380 342		480 528	VAC VAC
Input frequency	Rated (Certified) Range	50 45		60 63	Hz
Input current	Rated (Certified) 400 VAC 480 VAC			1.0 1.0 0.8	A
Inrush current <sup>2</sup>	400 VAC / 480 VAC		1.34	10	A
Power factor <sup>3</sup>	400 VAC / 480 VAC	0.95			
Leakage current	480 VAC			2.0	mA
Switching frequency	PFC	40		300	kHz

<sup>2</sup> Cold start

<sup>3</sup> Normal temperature, rated load

## 3. OUTPUT SPECIFICATIONS

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

PARAMETER	DESCRIPTION / CONDITIONS	MIN	TYP	MAX	UNIT
Adjustable output voltage <sup>5</sup>	LET480-24	24		28	VDC
	LET480-36	36		42	
	LET480-48	48		56	
Output current	LET480-24			20	A
	LET480-36			13	
	LET480-48			10	
Output voltage accuracy	At full load range		± 1		%
Line regulation	Rated load		± 0.5		%
Load regulation	0% - 100% load		± 0.5		%
Ripple & noise <sup>6</sup>			100		mV
Temperature coefficient			± 0.03		%/°C
Minimum load			0		%
Dynamic minimum load		10			%
Stand-by power	400 VAC		8.2	12	W
	480 VAC		10	15	
Hold-up time	400 VAC / 480 VAC	18	22		ms

<sup>5</sup> The actual adjustment range may extend outside the values stated, care should be exercised to ensure that the output voltage and power levels remain within the published maximum values (≤ 240 W). Turn clockwise to decrease.

<sup>6</sup> Measured with 20 MHz bandwidth (peak-to-peak value), output parallel 47 µF electrolytic capacitor and 0.1 µF ceramic capacitor.



## 4. PROTECTIONS

PARAMETER	DESCRIPTION / CONDITIONS	MIN	TYP	MAX	UNIT
Short circuit protection	Constant current mode, continuous, self-recovery				
Over current protection	After 4.5 s, the power supply enters constant current mode, automatic recovery after fault condition is removed	120		150	% Io
	The power supply enters constant current mode, automatic recovery after fault condition is removed	≥ 150			% Io
Over voltage protection	Hiccup, self-recovery			35	V
				53	
				60	
Over temperature protection	Start			85	°C
	Release	65			

## 5. FUNCTIONAL SPECIFICATIONS

PARAMETER	DESCRIPTION / CONDITIONS	MIN	TYP	MAX	UNIT
Remote Control Switch	Power turn-on	0		0.8	VDC
	Power turn-off	4		20	
DC_OK Signal <sup>7</sup>	DC_OK power on DC_OK power off		0.95 Vo - Vo < 0.90		Vo
ORing <sup>8</sup>	Supports direct parallel use, achieve 2+1 parallel redundancy				
Current Sharing Accuracy <sup>9</sup>	When multiple are connected in parallel, the sub-module shunts a single machine above 50% of the rated load.		± 5		%
LED Signal	Main output status indication	Normal operation		Green On	
		Peak power operation or about to enter over temperature protection		Red On	
		Power Off ( No AC Input or PS ON off)		Turn Off	
RS485-B, RS485-A	RS485 communication				

<sup>7</sup> Full input voltage range, full load range

<sup>8</sup> For all applications, please refer to LET480 Series User Manual.

<sup>9</sup> When multiple prototypes work with current sharing, the output voltage deviation of each prototype working alone shall not exceed 100mV.

## 6. ENVIRONMENTAL SPECIFICATIONS

PARAMETER	DESCRIPTION / CONDITIONS	MIN	TYP	MAX	UNIT
Operating temperature		-30		+70	°C
Storage temperature		-40		+85	°C
Temperature derating	+60°C to +70°C	2.5			%/°C
Input voltage derating	320 VAC - 350 VAC	0.667			%/VAC
Humidity	Operating, non-condensing	10		95	%RH
	Storage, non-condensing	20		90	
Altitude	Operating			2000	m
	Derating of 3.5°C / 1000 m for operating altitude > 2000 m				
MTBF	MIL-HDBK-217F @ 25 °C	250 000			hrs
Sinusoidal vibration	GB2423.10, IEC 60068-2-6 (10 - 200 Hz, 2 g, three directions of X, Y, Z axis)				
Pollution degree	2				



## 7. 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
Voltage flicker	IEC/EN 61000-3-3	Fulfilled
ESD immunity	IEC/EN 61000-4-2, Contact $\pm 8$ kV / Air $\pm 15$ kV	Performance Criterion A
Radiated field immunity	IEC/EN 61000-4-3, 20 V/m	Performance Criterion A
Electrical fast transient <sup>10</sup>	IEC/EN 61000-4-4, Input: $\pm 4$ kV; Output: $\pm 2$ kV; DC OK: $\pm 2$ kV	Performance Criterion A
Surge immunity	IEC/EN 61000-4-5, Input: Line to line $\pm 2$ kV / Line to PE $\pm 4$ kV Output: Vo+ to Vo- $\pm 500$ V; Vo+/Vo- to PE DC OK: DC OK to PE $\pm 1$ kV	Performance Criterion A
Conducted immunity	IEC/EN 61000-4-6, 20 V <sub>RMS</sub>	Performance Criterion A
Voltage dips, interruptions	IEC/EN 61000-4-11, 0%, 70%	Performance Criterion A
Intercom interference test	MS-SOP-DQC-007	Performance Criterion A

<sup>10</sup> EFT, output voltage accuracy within 5%, in accordance with perf. Criteria A standards.

## 8. SAFETY SPECIFICATIONS

PARAMETER	DESCRIPTION / CONDITIONS	MIN	TYP	MAX	UNIT
Safety approvals	UL 61010-1 and CSA C22.2 No. 61010-1 certified, EN 62368-1 compliant				
Safety class	Class I				
Isolation test	Input to Output (test for 1min., leakage current < 5 mA)	4000			VAC
	Input to PE (test for 1min., leakage current < 5 mA)	2500			
	Output to PE (test for 1min., leakage current < 10 mA)	1500			
	Output to DC (test for 1min., leakage current < 1 mA)	500			
Insulation resistance	Environment temperature: $25 \pm 5^\circ\text{C}$ Relative humidity: < 95%, Non-condensing Test voltage: 500 VDC	50			M $\Omega$

## 9. MECHANICAL SPECIFICATIONS

PARAMETER	DESCRIPTION / CONDITIONS	MIN	TYP	MAX	UNIT
Dimensions			80 x 124 x 127 3.15 x 4.88 x 5.00		mm in
Weight			1250		g
Case material <sup>10</sup>	Metal (AL5052, SPCC)				
Cooling	Convection (Natural air flow)				

<sup>10</sup> When the power supply is in use, the enclosure of the product needs to be connected to the system grounding.

### 10. DERATING CURVES

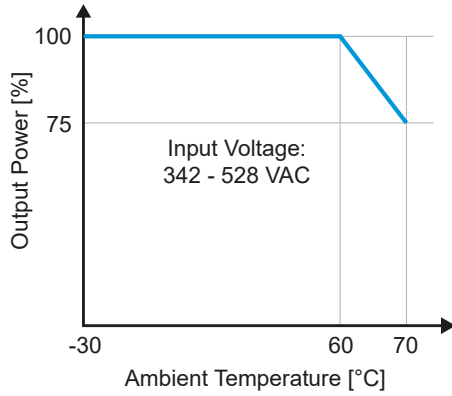


Figure 1. Temperature Derating Curve

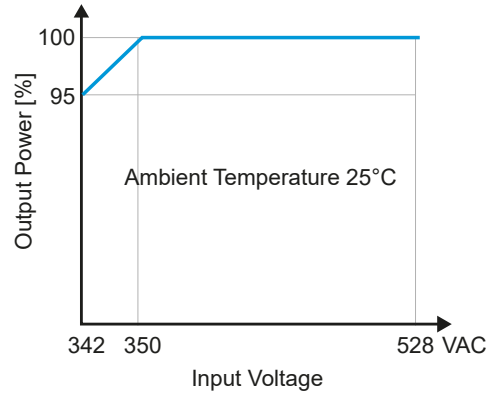


Figure 2. Input Voltage Derating Curve

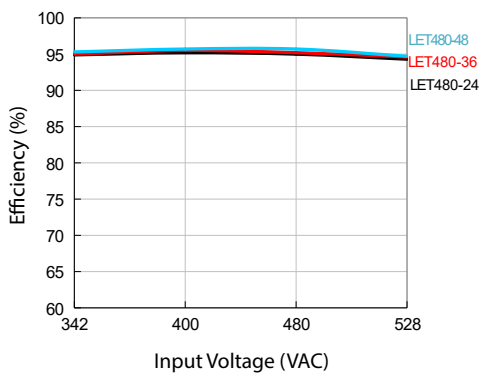


Figure 3. Efficiency vs Input Voltage Derating Curve (Full Load)

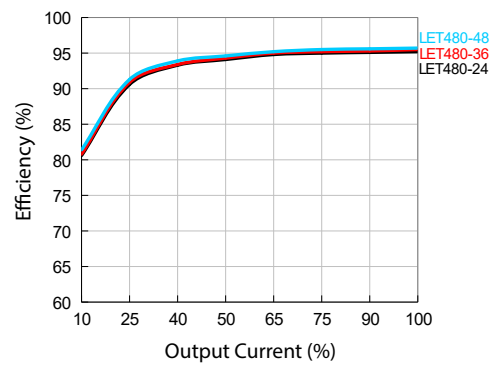


Figure 4. Efficiency vs Output Load Derating Curve (Vi = 400 VAC)



## 11. MECHANICAL DRAWINGS

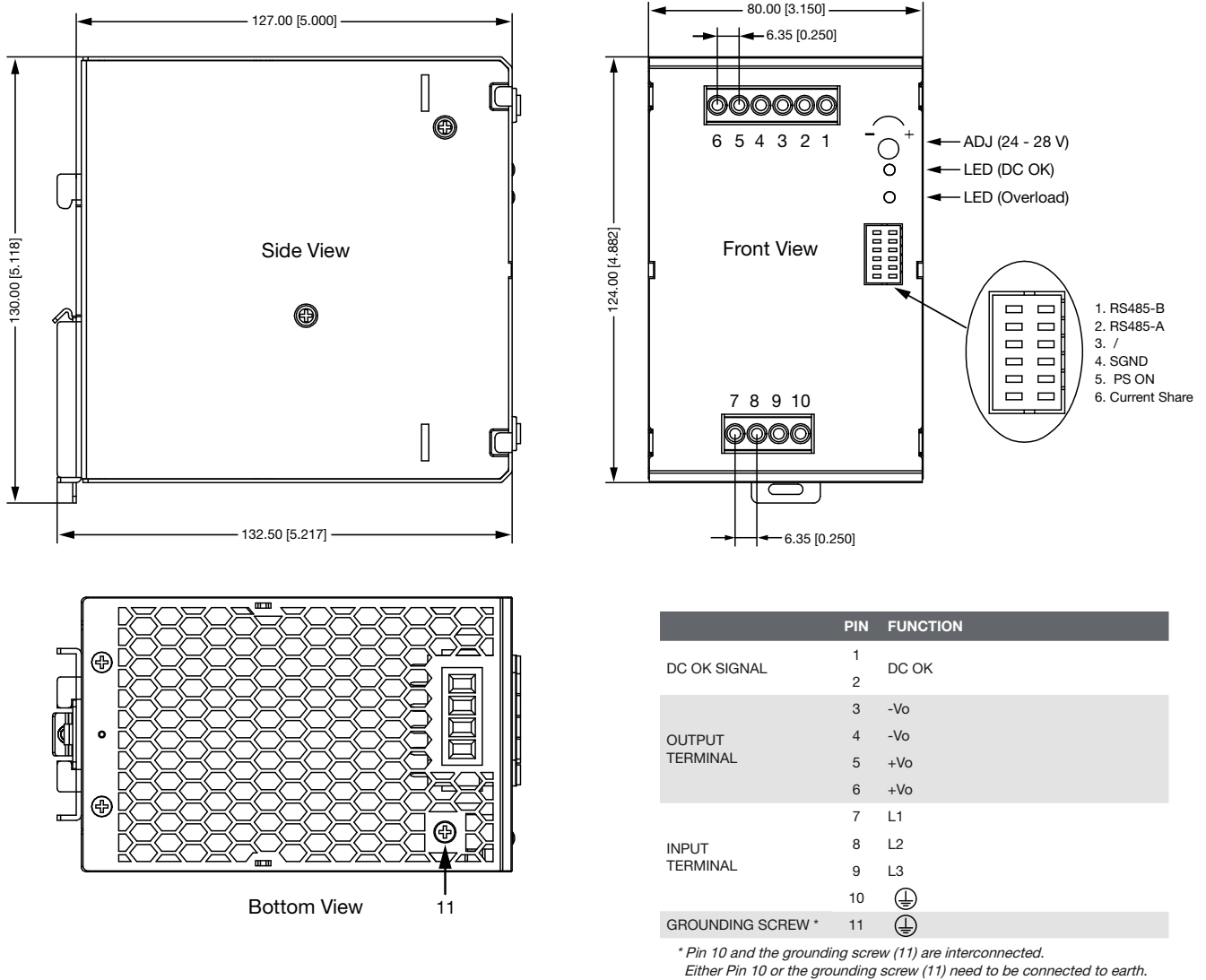


Figure 5. Mechanical Drawing

All dimensions are in mm [in]

General tolerance  $\pm 1.00$  mm [ $\pm 0.039$  in]

Wire range: Input: 22-10 AWG

Output: 24 V: 14-10 AWG

36 V: 16-10 AWG

48 V: 18-10 AWG

Signal: 22-18 AWG

Tightening torque: Input: max. 0.5 Nm

Output: max. 0.5 Nm

Mounting DIN Rail TS35 (rail needs to be connected to safety ground)

**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.

