

Thank you for purchasing the Enertex® LED Power Supply 160-24. Please read this information sheet carefully to use the product correctly.



## 1 Safety notice

Installation and assembly of electrical equipment must be carried out by qualified electricians. Ignoring the instructions can damage the unit or lead to fire or other hazards.

These instructions are part of the product and must remain with the end user.

The manufacturer is not liable for any costs or damages incurred by the user or third parties through the use of this device, misuse or malfunction of the connection, malfunction of the device or user equipment.

Opening the case, other unauthorized alterations or modifications of the device will expire the warranty!

The manufacturer is not liable for improper use.

## 2 Functional description

The product LED PowerSupply 160-24 in DIN rail mount housing (4 Units) supplies lamps with a DC voltage of 24 VDC and a maximum power of 160 W.

The following loads can be operated at the 24V output:

- 24 V LED strips
- 24 V LED lamps
- Conventional 24 V lamps (incandescent lamps, halogen lamps, ..)
- LED dimmers
- Resistive loads

Due to the large and durable output capacitors, the device is ideal for supplying LED dimmers with PWM dimming.

To compensate the line losses, the output voltage may be increased in 0.5 V steps up to 28.5 V by the rotary switch.

The green "POWER" LED signals the correct power supply and operation of the controller.

The green "NORMAL LOAD" LED indicates, that the device is in voltage control mode (CV). Changes in brightness indicate the activity of the voltage regulator. Since the controller operates at low load in the power-saving burst mode, the controller even shows activity in this operational mode.

The yellow "MAX LOAD" LED indicates, that the unit is in current control mode (CC). Changes in brightness indicate here the activity of the current controller.

For operating larger loads the power supplies can be operated in parallel (Consider the instructions in the following chapter "Connection"! ). The devices detect the parallel operation and balance the load between each other (+ -10%).

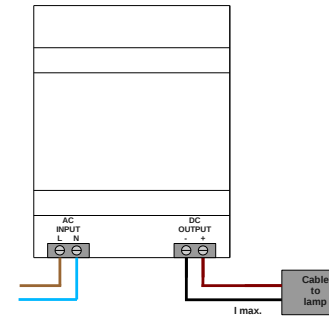
The power supply has a built-in short-circuit protection, overload protection and overtemperature protection. All protective functions are self-healing, i.e. removing the fault will cause an automatic restart and restore of the output voltage.

The overtemperature protection protects the device from damage in case of an excessively high ambient temperature (over 45 °). This is an automatically resetting protection function, which causes an electronic shutdown of the controller.

## 3 Connection

### ATTENTION DANGER!

**Electric shock on contact with live parts. Electrical shock can result in death. Cut out the mains and cover live parts in the area before working on the device!**



The mains voltage is connected to the left 2-pin screw terminal "AC INPUT".

The 24 V lamps or LED dimmers are connected to the right 2-pin screw terminal "DC OUTPUT". Consider the polarity there!

After switching on the input voltage, the "POWER" LED is continuously lighting green.

The green "NORMAL LOAD" LED indicates the activity of the voltage regulator (CV mode). Brightness changes indicate the activity of the voltage regulator.

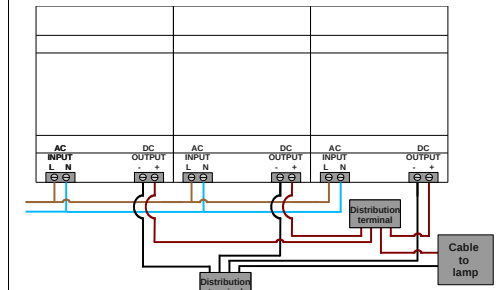
The yellow "MAX LOAD" LED indicates the activity of the current controller (CC mode). Changes in brightness indicate the activity of the current controller.

The cable length to the lamp must not exceed 50m.

Outside the control cabinet only wires are allowed, where the forward and return conductors are laying side by side, for example twin wires or cables with a common coat. Recommendations for cable cross-sections can be found in section 5.

The power supply is suitable for supplying LED dimmers between its DC output and the lamps.

### Information on parallel connection:



At maximum three power supplies can be connected in parallel.

The parallel connection must be realized by distribution terminals. The lines from the distribution terminal to all paralleled power supplies must be of approximately equal length (+ -20cm tolerance). The cable length must not exceed 50m between the distribution block and the lamp.

In parallel operation the following power derating should be considered:

- 2 devices: max. 300 W output power
- 3 devices: max. 450 W output power

## 4 Commissioning

Before turning on the power supply, the rotary switch should be set to the position 0 (= 24 V) in order to prevent over-voltage at the load.

After switching on the input voltage the "POWER" LED lights continuously green.

The green "NORMAL LOAD" LED indicates the activity of the voltage regulator (CV mode). Changes in brightness indicate the activity of the voltage regulator.

## 5 Adjusting the output voltage

The output voltage can be adjusted with the rotary switch. By increasing the output voltage the voltage drop at the cable can be compensated. The following tables provide recommendations for the switch positions. Also conduction losses are shown there. The recommended settings are shown in green. The recommendations assume that the voltage at the input of the lamp should be between 23 V and 24 V. The lengths are valid for the length of a twin wire, i.e. a 50 m twin wire corresponds to 50m forward wire and a 50m return wire.

## Recommendations:

### Nominal lamp load between 145W and 150W:

Cross Section	Length [m]	5	10	15	20	30	50
1.5 mm <sup>2</sup> (AWG 15 - 16)	Switch Position	24	24.5	-	-	-	-
	Losses [W]	4.5	8.9	-	-	-	-
2.5 mm <sup>2</sup> (AWG 13 - 14)	Switch Position	24	24	24.5	-	-	-
	Losses [W]	2.7	5.3	8	-	-	-
4.0 mm <sup>2</sup> (AWG 10 - 12)	Switch Position	24	24	24	24.5	25	-
	Losses [W]	1.7	3.3	5	6.7	10	-

### Nominal lamp load between 135W and 145W:

Cross Section	Length [m]	5	10	15	20	30	50
1.5 mm <sup>2</sup> (AWG 15 - 16)	Switch Position	24	24.5	25.5	-	-	-
	Losses [W]	4.1	8.2	12.3	-	-	-
2.5 mm <sup>2</sup> (AWG 13 - 14)	Switch Position	24	24	24.5	25	25.5	-
	Losses [W]	2.5	4.9	7.4	9.8	14.8	-
4.0 mm <sup>2</sup> (AWG 10 - 12)	Switch Position	24	24	24	24.5	25	26
	Losses [W]	1.5	3.1	4.6	6.2	9.2	15.4

### Nominal lamp load between 115W and 135W:

Cross Section	Length [m]	5	10	15	20	30	50
1.5 mm <sup>2</sup> (AWG 15 - 16)	Switch Position	24	24.5	25	26	26	-
	Losses [W]	3.6	7.2	10.7	14.3	14.3	-
2.5 mm <sup>2</sup> (AWG 13 - 14)	Switch Position	24	24	24.5	25	25.5	26
	Losses [W]	2.1	4.3	6.4	8.6	12.9	14.3
4.0 mm <sup>2</sup> (AWG 10 - 12)	Switch Position	24	24	24	24	24.5	25.5
	Losses [W]	1.3	2.7	4	5.4	8	13.4

### Nominal lamp load between 60W and 115W:

Cross Section	Length [m]	5	10	15	20	30	50
1.5 mm <sup>2</sup> (AWG 15 - 16)	Switch Position	24	24.5	25	25.5	26.5	28.5
	Losses [W]	2.6	5.3	7.9	10.5	15.8	26.3
2.5 mm <sup>2</sup> (AWG 13 - 14)	Switch Position	24	24	24	24.5	25	26.5
	Losses [W]	1.6	3.2	4.7	6.3	9.5	15.8
4.0 mm <sup>2</sup> (AWG 10 - 12)	Switch Position	24	24	24	24	24.5	25.5
	Losses [W]	1	2	3	3.9	5.9	9.8

### Nominal lamp load up to 60W:

Cross Section	Length [m]	5	10	15	20	30	50
1.5 mm <sup>2</sup> (AWG 15 - 16)	Switch Position	24	24	24	24.5	25	26
	Losses [W]	0.7	1.4	2.1	2.9	4.3	7.1
2.5 mm <sup>2</sup> (AWG 13 - 14)	Switch Position	24	24	24	24	24.5	25
	Losses [W]	0.4	0.9	1.3	1.7	2.6	4.3
4.0 mm <sup>2</sup> (AWG 10 - 12)	Switch Position	24	24	24	24	24.5	24.5
	Losses [W]	0.3	0.5	0.8	1.1	1.6	2.7

## Legend:

Green: Recommended combination of nominal lamp load, cable length, cable cross-section and rotary switch position  
 Yellow: Max. conduction losses for the combination.  
 Red: Combination should not be used, since line losses and voltage drop across the line are too high

If a dimmer is connected between power supply and lamp, the proposals apply only to the cable length between power supply and dimmer. The cable between dimmer and lamp is not included.

If the power supply and the dimmer are mounted in a common cabinet, the above proposals can also be used as a rough guide for the cable between the dimmer and the lamp. However, if the output voltage is increased, it has to be ensured, that no overvoltage occurs at the dimming channels.

When, for example, supplying a 150W RGB LED strip with a four-wire cable (three conductors for the individual colors and a common return conductor), it has to be taken into account, that the forward current divides up into the 3 forward lines for the colors. Thus in this configuration the voltage drop on the forward line is less than the drop assumed in the above table. The proposed rotary switch settings for this configuration may therefore lead to a higher voltages at the lamp. In such configurations the maximum permissible rotary switch position **must be definitely determined by voltage measurements** at the lamp.  
 If in doubt, the rotary switches should never be set higher than the maximum permissible input voltage of the lamp.

## 6 Technical specifications



SMPS, which contains a **short circuit proven safety transformer** (conditional or unconditional)

### Mains power supply

Rated supply voltage: 230 VAC, 50 Hz  
 Fusing of supply line: max. 16 A (Type B)  
 Power consumption: max. 174 W  
 Mains current: 0.76 A max.  
 Power factor  $\cos\phi = 0.96$  (at rated current)  
 Max. efficiency  $\eta = 94.5\%$   
 Standby Power Consumption: 0.1 W typ.

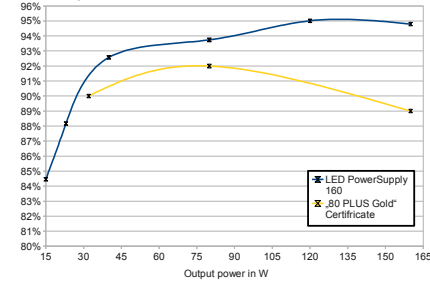
### Outputs

Rated output power: 160 W

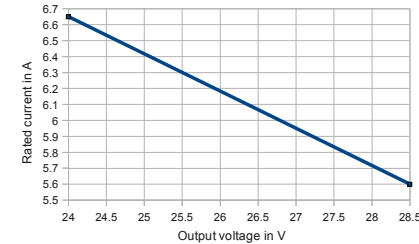
Rated output voltage: 24 .. 28.5 V DC SELV

Isolation (input-output): 4 kV AC

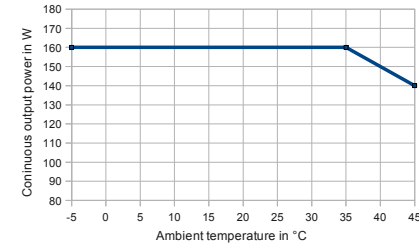
### Efficiency characteristic:



### Rated current at different output voltages:



### Power derating at high ambient temperatures:



### Display- and control elements

LEDs:  
 - Power (green), indicating the operation of the regulator  
 - Normal Load (green), indication of activity of the voltage regulator (CV mode)  
 - Max Load (yellow) indication of the activity of the current controller (CV mode)  
 Rotary switch for setting the output voltage

### Connections

Mains power supply:  
 2 pole screw terminal block  
 cross section: 0.25 to 4 mm (fixed)

0.25 to 2.5 mm<sup>2</sup> (flexible)

Output:  
 2 pole screw terminal block  
 cross section: 0.25 to 4 mm (fixed)  
 0.25 to 2.5 mm<sup>2</sup> (flexible)

### Housing

DIN rail mount housing for 35 mm rail  
 Width: 4 Units  
 Dimensions: 72 x 90 x 63 mm (L x W x H)  
 Protection: IP20  
 Flammability: V0

### Other



For indoor use only

For operation in the control cabinet

Permissible ambient temperatures: -5 °C .. 45 °C

Security: Tested according to IEC 61347-2-13

EMC: Tested in accordance with DIN EN 55015 and EN 61547

Class: 2

Overvoltage category: III

## 7 Support

The e-mail product support via the address [mail@enertex.de](mailto:mail@enertex.de)