

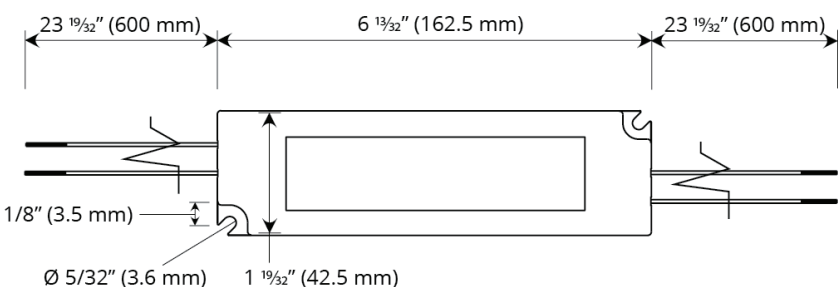


# HARDWIRE POWER ADAPTER

12V-60W Power Supply



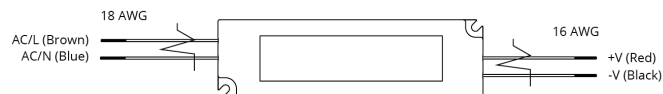
- Low cost, 60W constant voltage hardwire power adapter with UL Class 2 certification
- Consistent voltage design
- Epoxy encapsulated with IP67 level
- Withstand 3000 VAC surge input for 5 seconds
- Protections: short circuit / overload / over voltage
- Fully isolated plastic case
- Cooling by free air convection
- Class 2 power unit
- 10% full load burn-in test
- Low cost, high reliability



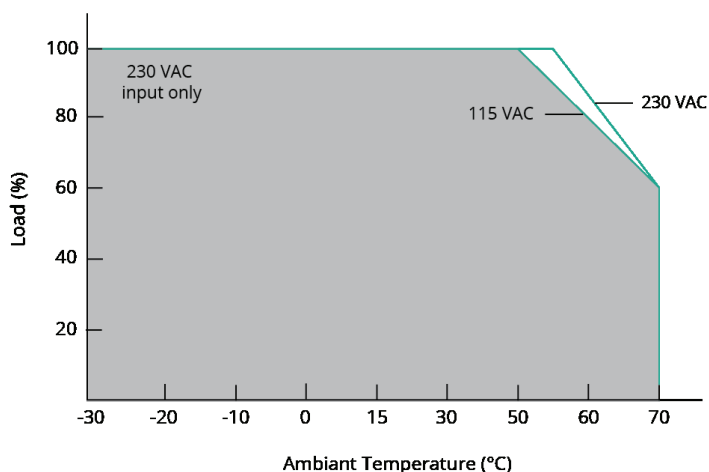
Front View



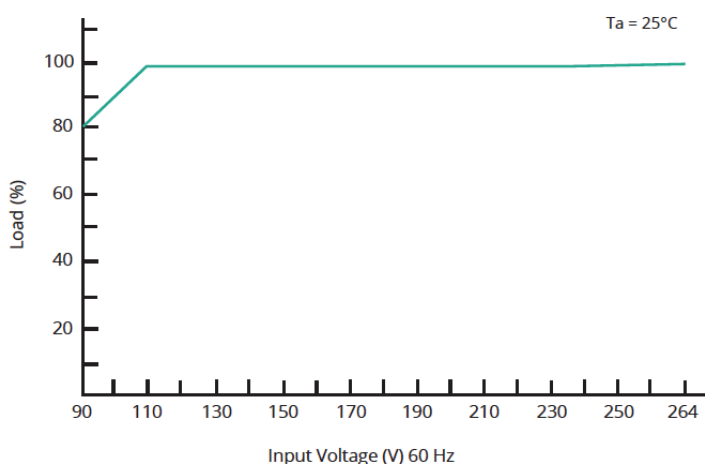
Profile View



Electrical Components



Derating Curve



Static Characteristics





# HARDWIRE POWER ADAPTER

12V-60W Power Supply

## SPECIFICATIONS

### INPUT

Voltage Range	90 ~ 264 VAC
Frequency Range	47 ~ 36 Hz
Power Factor	PF 0.95 / 230 VAC; PF 0.98 / 115 VAC at full load and rated output voltage; PF 0.9 at 75 ~ 100% load
Efficiency	83%
AC Current	1.2 A (rms) / 115 VAC; 1 A (rms) / 230 VAC
Inrush Current	Cold start 30 A / 115 VAC; 60 A / 230 VAC
Leakage Current	< 250 uA / 240 VAC

### OUTPUT

DC Voltage	12 VDC
Constant Current Region <sup>1</sup>	9 ~ 12 V
Rated Current	5 A
Power	60 W
Current Range	0 ~ 5 A
Ripple and Noise <sup>2</sup>	120 mVp-p
Voltage Tolerance <sup>3</sup>	± 5%
Line Regulation	± 1%
Load Regulation	± 2%
Setup, Rise Time <sup>4</sup>	500 ms, 20 ms / 230 VAC / 115 VAC; 500 ms, 20 ms / 115 VAC at full load (for 5 ~ 36 V)
Hold Up Time (Typ.)	50 ms / 230 VAC; 16 ms / 115 VAC at full load

### PROTECTION

Over Current <sup>5</sup>	100 ~ 150% rated output power
Over Voltage <sup>6</sup>	13.8 V ~ 16.2 V

### ENVIRONMENT

Operating Temperature	-30°C ~ +70°C (refer to output load derating curve)
Storage Temperature	-40°C ~ +80°C
Operating Humidity	20% ~ 90% RH non-condensing
Storage Humidity	10% ~ 90% RH
Temp. Coefficient	± .03% / °C (0 ~ +50°C)
Vibration	10 ~ 500 Hz, 2G 10 minutes / 1 cycle, period for 60 minutes each along X, Y, Z axes
Class 2 Compliant	Yes
Withstanding Voltage	I/P-O/P: 3 kVAC
Isolation Resistance	I/P-O/P: >100 M Ohms / 500 VDC / 25°C / 70% RH
EMI Conduction & Radiation	Compliance to EN55022 (CISPR22) Class B
Harmonic Current	Compliance to EN61000-3-2,-3
EMS Immunity	Compliance to EN61000-4-2,3,4,5,6,8,11; ENV50204, EN55204, light industry level, criteria A
Certifications	UL Class 2, CAN / CSA, IP67 approved
Material	Plastic case
Dimensions	6-13/22" (162.5 mm) L x 1-11/16" (42.5 mm) W x 1-1-4" (32 mm) H

### ADDITIONAL

Mean Time Between Failures	> 732 000 MIL-HDBK-217F (25°C)
Packaging	0.4 Kg; 32 pcs / 13.8 Kg / .56 ft <sup>3</sup>

Notes:

- <sup>1</sup> Constant current operation region is within 75% ~100% rated output voltage. This is the suitable operation region for LED related applications, but please reconfirm special electrical requirements for some specific system design
- <sup>2</sup> Ripple and noise are measured at 20 MHz of bandwidth by using a 12" twisted pair-wire terminated with a .1uf and 47uf parallel capacitor
- <sup>3</sup> Tolerance: includes set up tolerance, line regulation, and load regulation
- <sup>4</sup> Length of set up time is measured at first cold start. Turning on / off the power supply may lead to an increase in the set up time
- <sup>5</sup> Derating may be needed under low input voltage. Please check the derating curve for more details
- <sup>6</sup> Protection Type: Shut down o / p voltage, re-power on to recover
- All parameters not specially mentioned are measured at 230 VAC input, rated load and 25 °C of ambient temperature
- The power supply is considered a component which will be installed a final equipment. The final equipment must be re-confirmed to ensure it still meets EMC directives. Protection Type: Hiccup mode recovers automatically after fault condition is removed
- Recommended load: 90%
- FSL strives to maintain tight control over specification factors. However, specifications are subject to change on rare occasion. These changes may not be reflected here.

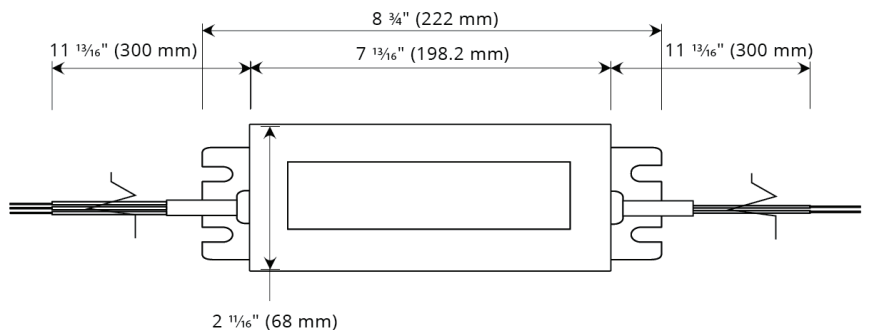


# HARDWIRE POWER ADAPTER

12V-150W Power Supply



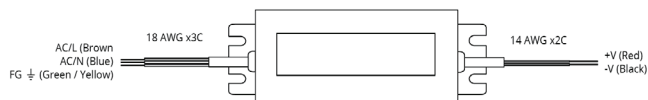
- 150 W constant voltage hardwire power adapter, accommodates either 100 - 240 VAC or 277 VAC power sources
- Universal AC input / full range (up to 280 VAC)
- IP65/IP67 level
- Built-in-active PFC function
- Protections: short circuit / overload / over voltage / over temperature
- Cooling by free air convection
- OCP point adjustable through output cable or internal potential meter
- Compliance to worldwide safety regulations for lighting
- Low cost, high reliability



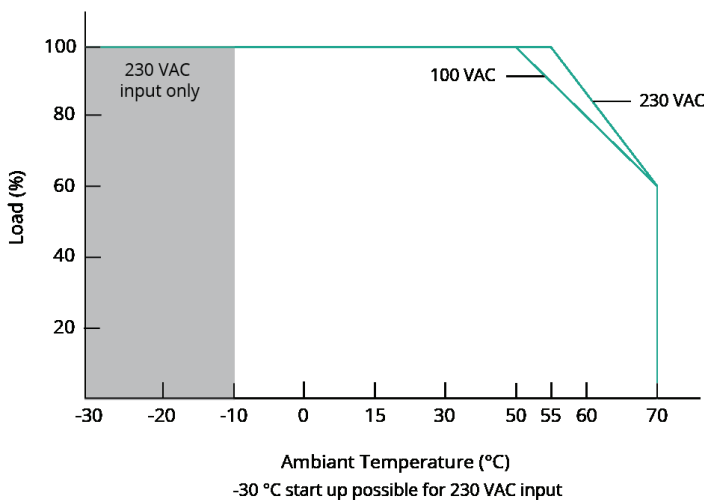
Front View



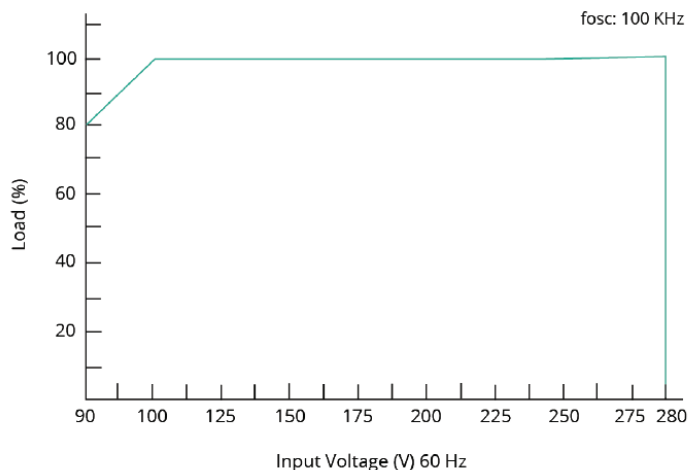
Profile View



Electrical Components



Derating Curve



Static Characteristics





# HARDWIRE POWER ADAPTER

## 12V-150W Power Supply

### SPECIFICATIONS

#### INPUT

Voltage Range <sup>1</sup>	100 ~ 240 / 277 VAC
Frequency Range	47 ~ 63 Hz
Power Factor	PF 0.95 / 230 VAC; PF 0.98 / 115 VAC at full load and rated output voltage; PF 0.9 at 75 ~ 100% load
Efficiency	88%
AC Current	2 A / 115 VAC; 1 A / 230 VAC
Inrush Current	Cold start 65 A / 230 VAC
Leakage Current	< 1 mA / 240 VAC

#### OUTPUT

DC Voltage	12 VDC
Constant Current Region <sup>2</sup>	9 ~ 12 V
Rated Current	11 A
Power	150 W
Rated Power	132 W
Ripple and Noise <sup>3</sup>	150 mVp-p
Voltage Adj Range <sup>4</sup>	9 ~ 13 V
Current Adj Range (adjustable by internal potential meter / output cable)	5.5 - 11 A
Voltage Tolerance <sup>5</sup>	± 2%
Line Regulation	± .5%
Load Regulation	± 1%
Setup, Rise Time	3000 ms, 80 ms at full load 230 VAC / 115 VAC
Hold Up Time (Typ.)	50 ms / 230 VAC; 16 ms / 115 VAC at full load

#### PROTECTION

Over Current <sup>6</sup>	95 ~ 108%
Short Circuit <sup>7</sup>	Hiccup mode, recovers automatically after fault condition is removed
Over Voltage <sup>8</sup>	13.8 V - 16.2 V
Over Temperature <sup>9</sup>	100°C ± 10°C (RTH2)

#### ENVIRONMENT

Operating Temperature <sup>9</sup>	-30°C ~ +55°C at full load; 70°C at 60% load
Storage Temperature	-40°C ~ +80°C
Operating Humidity	20% ~ 95% RH non-condensing
Storage Humidity	10% ~ 95% RH
Temp. Coefficient	± .03% / °C (0 ~ +50°C)
Vibration	10 ~ 500 Hz, 5G 12 minutes / 1 cycle, period for 72 minutes each along X, Y, Z axes
Withstanding Voltage	I/P-O/P: 3.75 kVAC; I/P-FG: 1.88 kVAC; O/P-FG: 0.5 kVAC
Isolation Resistance	I/P-O/P, I/P-FG: 100 M Ohms / 500 VDC / 25°C / 70% RH
EMI Conduction & Radiation	Compliance to EN55015, EN55022 (CISPR22) Class B
Harmonic Current	Compliance to EN61000-3-2 Class C (75% load); EN61000-3-3
EMS Immunity	Compliance to EN61000-4-2,3,4,5,6,8,11; ENV50204, EN61547, EN55024, light industry level (surge 4 kV), criteria A
Certifications	UL1012; EN61347-1, EN61347-2-13 independent; UL60950-1, TUV EN60950-1 (TBD)
Dimensions	8-3/4" (222 mm) L x 2-11/16" (68 mm) W x 1-17/32" (39 mm) H

#### ADDITIONAL

Mean Time Between Failures	> 303 700 hours MIL-HDBK-217F (25°C)
Packaging	1.0 Kg; 12 pcs / 13 Kg / .49 ft <sup>3</sup> (CLG-150-A/B); 1.0 Kg; 12 pcs / 13 K / .96 ft <sup>3</sup> (CLG-150-C)

Notes:

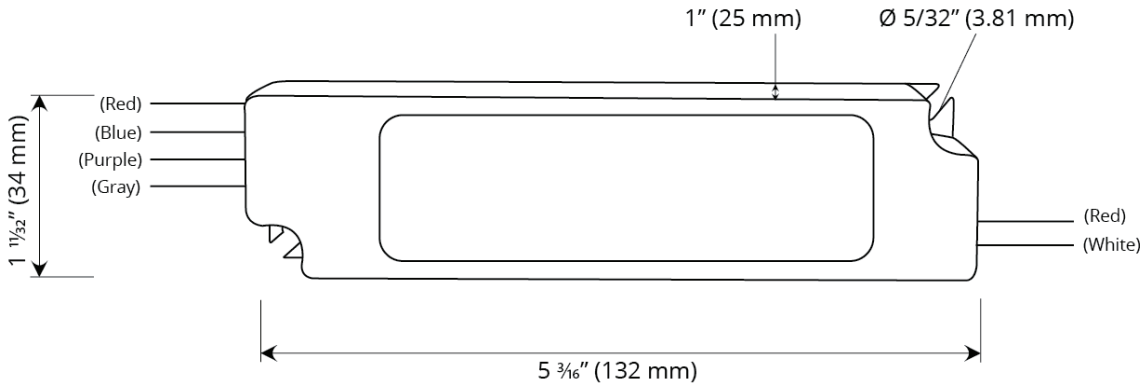
- <sup>1</sup> Derating may be needed under low input voltages. Please check the derating curve for more details
- <sup>2</sup> Constant current operation region is within 75% ~100% rated output voltage. This is the suitable operation region for LED related applications, but please reconfirm special electrical requirements for some specific system design
- <sup>3</sup> Ripple & noise are measured at 20 MHz of bandwidth by using a 12" twisted pair-wire terminated with a 0.1uf & 47uf parallel capacitor
- <sup>4</sup> Type A and type C only
- <sup>5</sup> Tolerance : includes set up tolerance, line regulation and load regulation
- <sup>6</sup> Constant current operation region is within 75% ~100% rated output voltage. This is the suitable operation region for LED related applications, but please reconfirm special electrical requirements for some specific system design. Protection Type: Constant current limiting, recovers automatically after fault condition is removed
- <sup>7</sup> Refer to OLP characteristics
- <sup>8</sup> Protection Type: Shut down o/p voltage, re-power on to recover
- <sup>9</sup> Refer to derating curve
- <sup>10</sup> Safety and EMC design refer to EN60598-1, subject 8750(UL), CNS15233, GB7000.1, FCC part 18
- Recommended load: 90%
- FSL strives to maintain tight control over specification factors. However, specifications are subject to change on rare occasion. These changes may not be reflected here.

# LED DIMMING MODULE

0 - 10



- A dimmer that uses pulse width modulation, controlled by 0-10 VDC switches. Offers smooth dimming with no flickering.
- Easy installation
- UL Class 2 certified
- Short circuit protection
- IP66 rated
- Works for 12 V and 24 V applications



**Front View**

## SPECIFICATIONS

### ELECTRICAL

Input Voltage	12 VDC	24 VDC
Rated Wattage	Max. 60 W	Max. 98.4 W
Output Current	< 5 A	< 4.1 A
Output Voltage	12 VDC	24 VDC
Dimming Control	0 - 10 V	
Efficiency	> 98% typical	
Certification	UL	

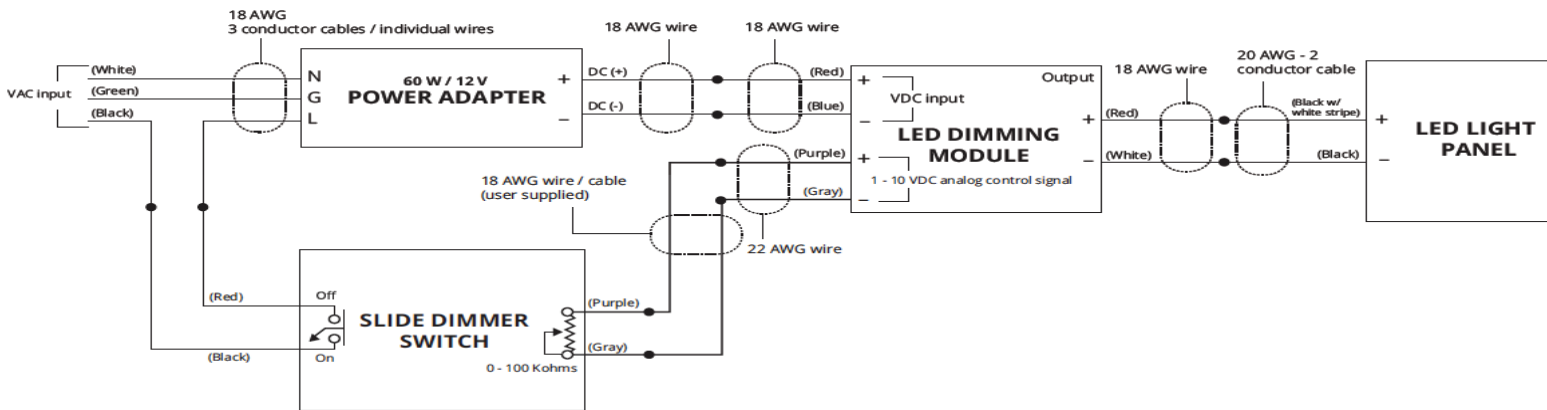
### PHYSICAL

Operating Temperature	-40°C (-40°F) ~ +60°C (+140°F)
Ambient Temperature	-40°C (-40°F) ~ +80°C (+176°F)
Lifespan	50 000+ hours
Dimensions	5-3/16" (132 mm) L x 1-11/22" (34 mm) W x 1" (25 mm) D

# LED DIMMING MODULE

0 - 10

- Notes:
- The light output of the LEDs operated by the Dimmable Driver is controlled by DC voltage applied to the control input leads (0-10 V DIM purple and gray)
  - The control device must be capable of accepting, or sinking, the DC current flow from the driver. The maximum under any condition is 500 microamps per driver
  - The control terminals of the driver are isolated from the power lines and are suitable for use as Class 2 terminals. As many drivers as desired for use with the particular control device may be connected in parallel in a bus configuration. The length of the bus, the wire size of the bus and the number of drivers connected on the bus must be configured so that the DC voltage drop as a function of the resistance of the wire and the control current flowing does not exceed 0.2 volts for dimming controls. For controls used as a minimum / maximum, or hi-lo 2-level application, the maximum DC voltage drop must not exceed 0.5 volt
  - If the control bus is opened, or if the control device internally opens the control bus under some conditions, the voltage on the control bus will then be a function of the ballast, which is  $10 \pm 0.5$  volts. Maximum light output will be delivered under this condition
  - If the control bus is shorted either by a mechanical switch in the control or by the circuitry of the control device, or inadvertently in the wiring, the current on the control bus will be 500 microamps per driver maximum. All drivers on the control bus will then operate at minimum light level
  - As can be determined from the two above items, simple two-level operation of the driver can be achieved by proper usage and application of a simple open / close switch on the control bus with maximum light being achieved when the switch is open and minimum light when the switch is closed
  - The driver is intended for use with control voltages between 0 and 10 VDC. The control equipment must not impose a voltage greater than 11.0 - volt peak maximum on the driver control terminals
  - The DC control voltage should have a maximum peak to peak ripple (low and high frequency ripple) not exceeding 10% of the average VDC. Short-term transient voltage of the control devices must not exceed 14 volts. Control equipment intended to control more than one driver must be capable of sinking the current supplied to the control bus by the maximum number of drivers specified for the control device. At any given level setting it must maintain control bus voltage constant within a range of  $\pm 5\%$  as the number of drivers connected to the control bus varies from a minimum of one driver up to the maximum number specified for the control device
  - Drivers of various input ratings (120 V, 230 V, 277 V) may be used in this control system
  - Since the control bus is Class II wiring, all control devices that are connected to the power line must have proper isolation between the power line and the control leads. Any control devices that are connected to the power line must have UL approval / recognition as Class II equipment



**Wiring Example**