

120W POWER LINE COMMUNICATIONS SMART LED POWER DRIVER



LFL-120-0XX-P Digital Power Supply

Overview

gridComm offers a state-of-the-art module consisting of a 120W LED power driver integrated with Power Line Communications (PLC) functionality (as shown above). It is ideal for Smart Street Light control, transforming traditional street lighting into energy-aware, remotely managed monitored networks. The core elements in the design are gridComm’s proven robust OFDMA (Orthogonal Frequency Division Multiple Access) PLC GC8800 module (Figure 1), which is based on gridComm GC2200 PLC transceiver chip, and the patented digital power supply technology. This complete unit, **known as LFL-120-0XX-P Digital Power Supply (DPS)**, is housed within a compact waterproof enclosure.

Other components from gridComm that complement the LFL-120-0XX-P DPS are the Master Light Controller, and the backend Street Light Management Software (SLMS) that together form a complete Smart Street Light control and management system. The complete Smart Street Light system enables real-time control and automatic scheduling of switching on and off, and dimming levels of individual lights from a central location. This enables the delivery of appropriate lighting levels based on predetermined schedules according to the time

of day, seasons, and weather conditions or in response to emergencies. Key accident black spots on roads can have their lighting tailored to ensure optimal lighting for maximum road user safety.

The LFL-120-0XX-P DPS also provides metering functions for real-time monitoring of operational status, power consumption, current, voltage, and power factor of individual street lights. This tremendously increases efficiency by reducing the need for manual checking of lights, and facilitates the timely repair of faulty lights.

Field proven for its acclaimed robustness and reliability, gridComm’s PLC streetlight solution serves as the cornerstone in the building of a Smart City with a reduced carbon footprint.

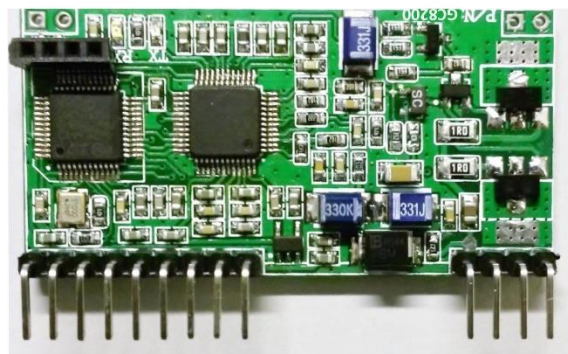


Figure 1 - PLC Module, GC8800

Benefits

gridComm's streetlight solution comprising the SLMS, the Master Light Controller, and the intelligent LFL-120-0XX-P DPS delivers key benefits including:

- Less energy usage by using automatic lighting schedules, hence reducing the carbon footprint
- Savings in operating and maintenance costs
- Efficient remote monitoring system, thus doing away with using surveillance vehicles to check for faulty lights
- Flexibility in mixing different lamp types and technologies
- Scalability and extendibility to support other applications such as traffic, weather, and motion monitoring
- Display of street light locations on a map for real-time control and monitoring.

Features

Digital Power Supply LFL-120-0XX-P:

- Direct LED light driver
- Wide Input Power Voltage: 90 VAC~ 277 VAC
- Auto Power Factor Correction: >0.95

- Electronics Protection: Short-Circuit, Over-Voltage, Over-Current Over-Heating, Over-Loading, Electrostatic protection
- IP67 protection for outdoor and indoor
- Unique PHY_ID address to correspond with GIS information of streetlight on GUI map
- Support real-time data read-back such as power consumption, current, voltage, light status
- Support sending of system alerts to central management system
- Highly reliable compliant with worldwide lighting standards- CE, CCC
- Five-year warranty
- Life span > 60,000 hrs
- PLC Rx Sensitivity: -60dBV
- PLC Tx Signal Voltage Level under 1 ohm load: 2~ 8V
- Transparent PLC protocol
- Self-adaptive link, auto-routing PLC network topology
- Operating temperature range- -40 to 60 degrees Celsius
- Lightning protection- 10KV surge

Specifications

Part Number		LFL-120-024-P	LFL-120-030-P	LFL-120-036-P	LFL-120-042-P	LFL-120-048-P
Output	Rated Output Voltage	24VDC	30VDC	36VDC	42VDC	48VDC
	Rated Output Current	5.0A	4.0A	3.33A	2.86A	2.5A
	Rated Output Power	120W	120W	120W	120W	120W
	Constant Current Voltage Regulation Range	16~24V	22~30V	24~36V	30~42V	36~48V

	Current Regulation Range	10% - 100%				
	Voltage Accuracy	±1%	±1%	±1%	±1%	±1%
	Load Regulation	±1%	±1%	±1%	±1%	±1%
Input	Voltage Range	90VAC – 277VAC				
	Frequency Range	47Hz – 63Hz				
	Power Factor (Typical)	PF>0.98/115V, PF>0.95/230V, PF>0.90/277VAC (full load)				
	Efficiency (Typical)	91.5%	92.5%	92.5%	93%	93.5%
	AC (Typical)	1.2A/115VAC, 0.6A/230VAC, 0.5A/277VAC				
	Leakage Current	< 0.7mA @ 277VAC				
Environment	Operating Temperature	-40°C~+60°C (refer to Derating Curve)				
	Operating Humidity	20%~95% RH (no condensation)				
	Storage Temperature Humidity	-40°C~+80°C, 10%~95% RH (no condensation)				
	Anti-vibration	10~500Hz, 5G 12min/cycle, period for 72min., each along X, Y & Z axis				
Safety and EMC	Safety compliance	IEC61347, UL60950-1, TUV EN60950-1, IP67				
	Maximum Voltage	I/P-O/P:3.75KVAC, I/P-FG:2.0KVAC, O/P-FG:1.5KVDC				
	Insulation Impedance	I/P-O/P, I/P-FG, O/P-FG:100MΩ/500VDC/25°C/70%RH				
	Electro-magnetic Compatibility	Compliance to EN55015, EN55022 (CISPR22) Class B, EN61000-3-2 Class C (≥50% load); EN61000-3-3				
Others	MTBF	> 300Khrs				
	Dimensions	220mm*68mm*38.8mm(L*W*H), 20pcs/23.8kg/0.74CUFT				
	Weight	1150g				

Smart Functions

Table 1 Descriptions of DPS Alarm Conditions

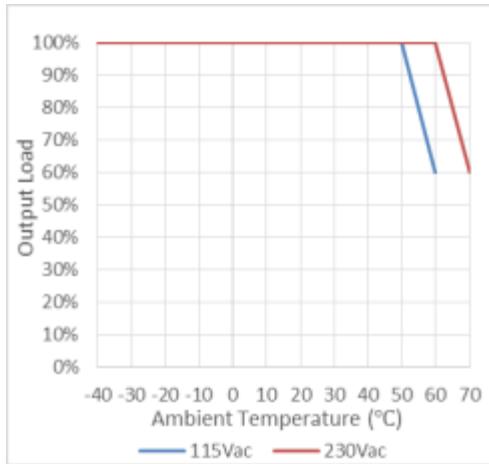
Alarm Type	Alarm Condition	Executing Action	Remarks
Over Temperature	$> 95^{\circ}\text{C}\pm 2^{\circ}\text{C}$	Report alarm condition, shutdown device, restore to status before shutdown when temperature $< 90^{\circ}\text{C}\pm 2^{\circ}\text{C}$.	Device internal temperature, not external temperature
Under Temperature	$< -25^{\circ}\text{C}\pm 2^{\circ}\text{C}$	Report alarm condition, no shutdown of device, clear alarm condition when temperature $> 25^{\circ}\text{C}\pm 2^{\circ}\text{C}$.	Device internal temperature, not external temperature
Short Circuit	Output short circuit	Report alarm condition, shutdown device, clear alarm condition during power on when output returns to normal condition	
Open Loop	Output voltage $>$ specified output voltage	Report alarm condition, shutdown device, clear alarm condition when fault is removed.	
Over Voltage	$> 285\text{V}\pm 3\text{V}$	Report alarm condition, shutdown device, restore to status before shutdown when input voltage $< 280\text{V}\pm 3\text{V}$.	
Under Voltage	$< 95\text{V}\pm 3\text{V}$	Report alarm condition, shutdown device, restore to status before shutdown when input voltage $> 100\text{V}\pm 3\text{V}$.	

Table 2 Descriptions of Smart Features

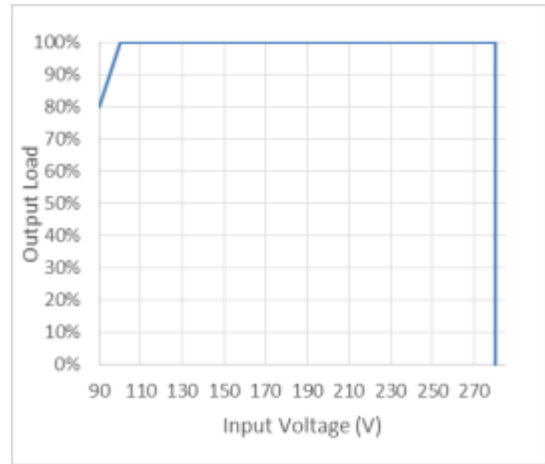
Feature	Feature Description
Dimming	By adjusting the output current of DPS through power line carrier signal, dimming level range is 10%~100%, with step-less dimming, dimming mode can be in single node dimming, group dimming or broadcast dimming.
Energy Measurement	DPS has built-in electrical measurement function, through power line carrier signal the electrical data is reported to concentrator, measurable electrical data includes: input voltage, input current, power, power factor, output voltage, output current and temperature, measurement accuracy can be up to 2%.
Fault Reporting	Through power line carrier signal report real-time DPS operating condition, including: temperature, short circuit, open loop, over voltage, under voltage, normal, dimming status.

Characteristic Curves

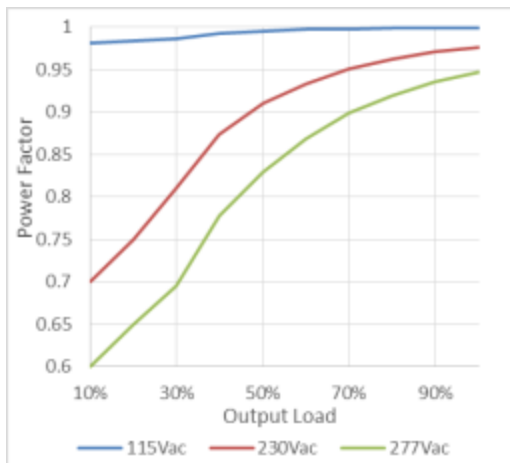
● Derating Curve



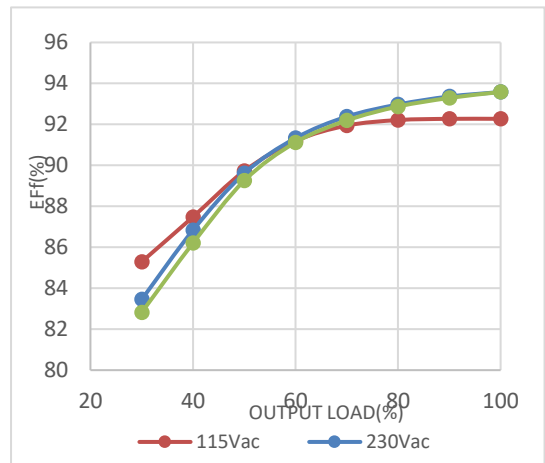
● Input Characteristics



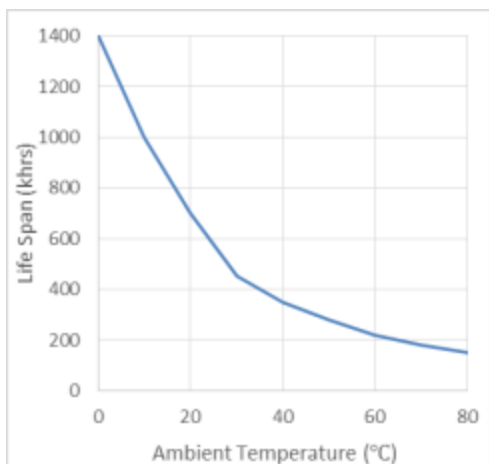
● Power Factor Characteristics



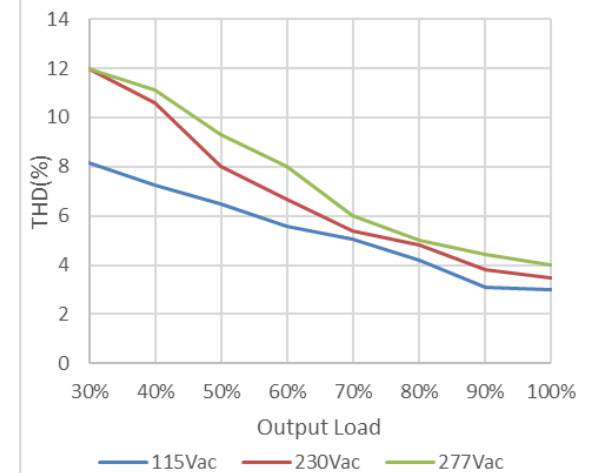
● Efficiency Characteristics



● Life Span vs Temperature Characteristics



● Total Harmonics Distortion Characteristics



Mechanical Dimensions

Overall dimensions of LFL-120-0XX-P shown in Figure 2, which are 220mm L x 68mm W x 38.8mm H.

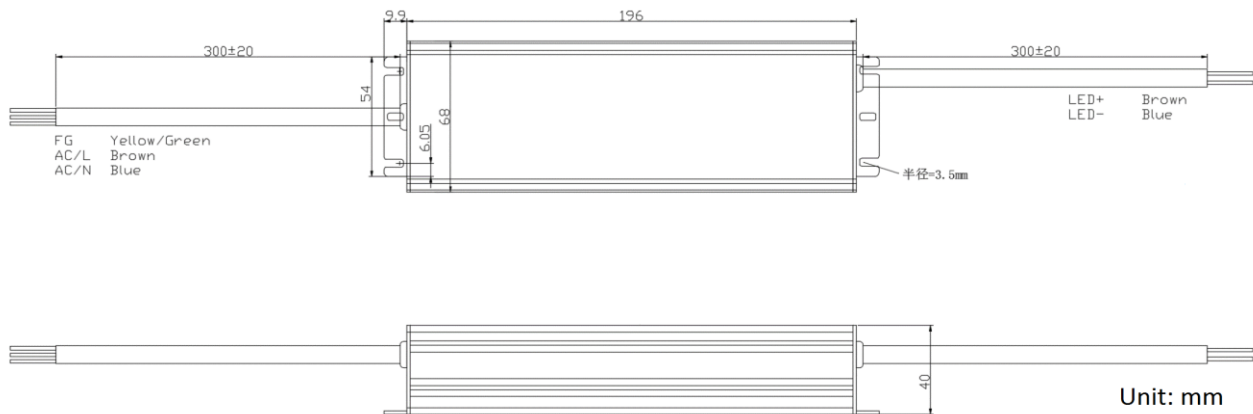
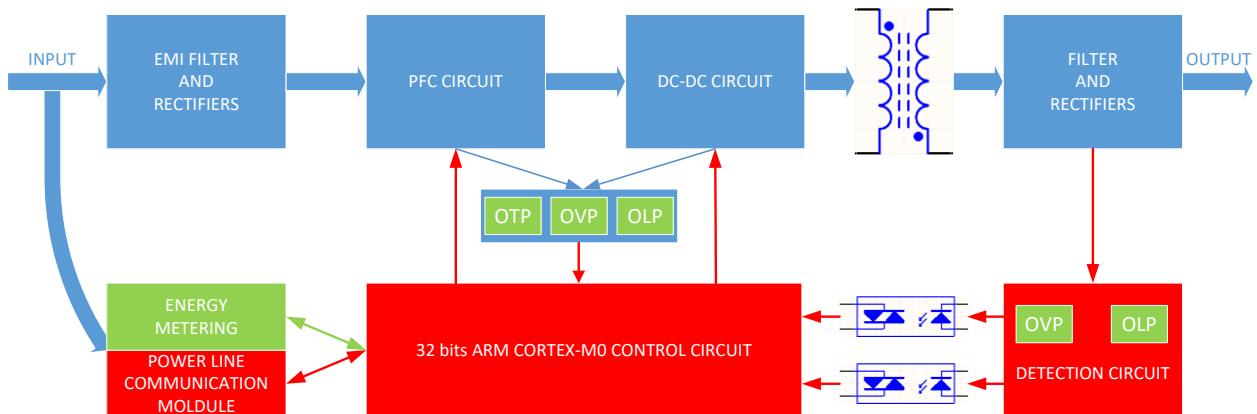


Figure 2 – LFL-120-0XX-P Dimensions and Wire identifications

Block Diagram of Streetlight DPS



Contact Information

For more information regarding the LFL-120-0XX-P including reference design, pricing, and ordering please contact:

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Revision

Version	Description	Date
1.00	Initial Release	2/29/2016
2.00	Revision	10/28/2016