FULHAM FHSAC1-UNV-40L HotSpot Plus LED Driver with Integrated Emergency Backup Instruction Manual

Contents

FULHAM FHSAC1-UNV-40L HotSpot Plus LED Driver with Integrated Emergency Backup

Product Information

The FHSAC1-UNV-40L is a LED driver that operates LED modules designed to accept input voltage range of 11-55VDC and can operate up to current of 250-1400mA. It has an input voltage range of 120-277VAC, 50/60Hz, and has an input current of 0.43A @ 120VAC. The driver has a power factor greater than 0.9 and has a THD less than 100%-1%,0%. It is equipped with LiFePO4 battery type with a capacity of available battery recharge time. It has a test switch and comes with RFI/EMI output type. The driver has a maximum case temperature and ambient operating temperature range.

Product Usage Instructions

Before installing the LED driver, ensure that the LED module is designed to accept input voltage range of 11-55VDC and can operate up to current of 250-1400mA. Follow the below instructions for the proper installation of the driver:

1. Turn off the mains power supply.
2. Connect the LED module to the output channels of the driver.
3. Connect the input voltage to the driver within the specified range (120-277VAC).
4. Ensure that the battery type is properly installed and charged.
5. Turn on the mains power supply and switch on the test switch to check if the driver is functioning properly.
6. Dimming controllers may be used to control the brightness of the LED lights by connecting them to the dimming controller type / dimming range of the driver.

It is important to note that the ambient operating temperature range should be considered during installation to prevent overheating of the driver. The product must be installed by a qualified electrician and in accordance with the local electrical codes and regulations.

INSTALLATION INSTRUCTIONS

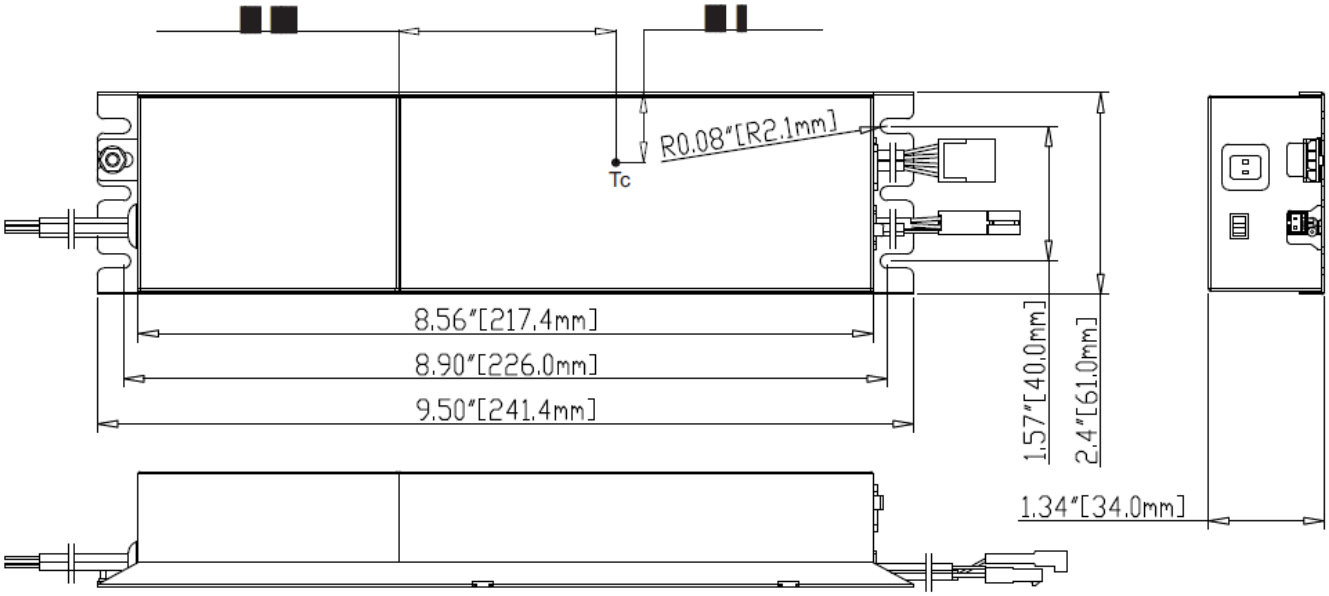
- LED Driver with integrated emergency backup
- Universal Voltage: 120-277V ~ , 50/60Hz
- Output Wattage: 40W Max.
- Output Current: 250-1400mA
- Output voltage range of 11-55V ⎓
- Linear Case with side leads
- Suitable for class I luminaire

This Driver Will Operate The Following LED Modules: Any LED module designed to accept input voltage range of 11-55VDC and can operate up to current of 250-1400mA.

General Specifications

- **Input Voltage:** 120-277VAC, 50/60Hz
- **Input Current:** 0.43A @ 120VAC
- **Input Power:** 54W
- **Power Factor:** >0.9
- **THD:** <20%
- **Standby Input Power:** <0.85W
- **Driver Type:** Constant Current
- **Output Current:** 250-1400mA [TPSB 100 (Program Box) , Figure 1] ; Record New Setting On 1″x0.5″ Label
- **Output Voltage Range:** 11-28VDC (250-1400mA) , 11-40VDC (250-1000mA) , 11-55VDC (250-730mA)
- **Output Power:** 40W Max. (Figure 1)5W or 10W @ Emergency Mode (Min. 180 Minutes @ 5W, Min. 90Minutes @ 10W)
- **Number of Output Channels:** 1 Channel
- **Dimming Controller Type / Dimming Range:** 0-10V / 100% – 1% ,0%(Figure 2) / Custom Dimming Curve / Dimmed To Off
- **RFI/EMI:** FCC Part 15A Non-Consumer, EN55015
- **Output Type:** LED Class 2
- **Battery Type:** LiFePO4 6.4VDC (Part# FHSBATL2-3.2)
- **Battery Capacity Available:** 3200mAh
- **Battery Recharge Time:** 12 Hours
- **Test Switch Remote Mounting Distance:** 20′ (6m) Max.
- **Max. Case Temperature:** 85°C (185°F)
- **Ambient Operating Temperature Range:** 0°C to 50°C(32 to 122°F)
- **Sound Rating:** A
- **Input Surge Protection:** Line-Neutral 3kV , Line & Neutral-Gound 6kV , Ring Wave ANSI/IEEEC62.41
- **Protections:** Input Current Protection Output Open Circuit Protection Overload Protection Over Temperature Protection
- **Service Life:** 50,000 hours
- **Approvals / Class:** RoHS , cULus LISTED, CE, CEC , Dry or Damp Locations

MECHANICAL DATA



Fulham extends a limited warranty to the original purchaser or first user for a period of 5 years @Tc 62°C from the date of manufacture when properly installed and operated under normal conditions of use. For complete terms and conditions, please refer to the Warranty Center at **www.fulham.com**. Specifications subject to change without notice.

Important Safety Instructions

When using electrical equipment and this lighting device basic safety precaution should be followed at all times including but not limited to the following:

PLEASE READ CAREFULLY AND FOLLOW ALL INSTRUCTIONS FOR YOUR OWN SAFETY

IMPORTANT: An un-switched AC power source of 120VAC to 277VAC is required for the yellow/black and white leads.

IMPORTANT: A switched or un-switched AC power source of 120VAC to 277VAC is acceptable for the black lead only.

- This device is designed for use in fixtures listed for dry and damp locations.
- **CAUTION:** Make sure all electrical connections conform to the National Electrical Code and all applicable local regulations.
- **CAUTION:** Do not let power supply cords touch hot surfaces.
- **CAUTION:** Do not mount near gas or electric heaters.
- **CAUTION:** Do not use this emergency driver with accessory equipment other than recommended by the manufacturer; failure to follow this may cause an unsafe condition. Servicing should only be performed by qualified service personnel.
- **CAUTION:** Do not use this emergency driver for other than intended use.
- **CAUTION:** Battery is rechargeable LiFePO4 type and must be recycled or disposed of properly.
- **CAUTION:** Equipment should be mounted in locations and at heights where it will not readily be subjected to tampering by unauthorized personnel.
- **CAUTION:** Not suitable for high-risk task area lighting.
- **ASSEMBLY** and FIELD INSTALLATION WIRING: WARNING: AC power must be off before proceeding with assembly, installation or servicing of emergency driver. Additionally ensure that the battery is disconnected

(Battery Switch set to OFF).

- **TESTING SYSTEM:** The emergency battery requires a minimum charge time of one (1) hour before testing the circuit. A minimum of twelve (12) hours is required for a full charge.
- **IMPORTANT:** In order to maintain proper operation and warranty coverage, the battery must be recharged once per year prior to installation.

RATED EMERGENCY OPERATION: Ninety (90) minutes for the 10W load or one hundred eighty (180) minutes for the 5W load. The 10W or 5W option is determined by the position of Dip Switch 1 (Emergency Power Selection Switch).

Fulham Head Quarters: Fulham Co., Inc 12705 South Van Ness Ave.

Manufacturer

- North China
- Fulham Electronic Co. Ltd.
- No. 9 Xingchang Road, Nanshao Zhen Changping Science Park, Beijing, P.R. China

SAVE THESE INSTRUCTIONS

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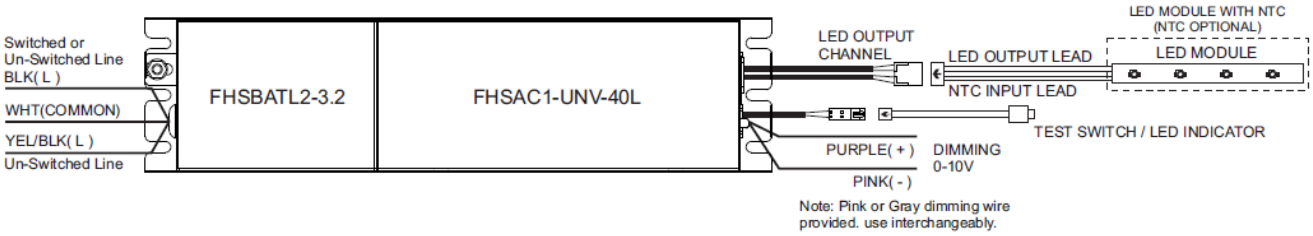
NOTE:This driver has six mounting holes , three on each side Either four round holes or two semi-round holes are need for mounting.

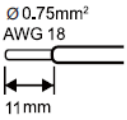
- **A** Mounting the LED driver

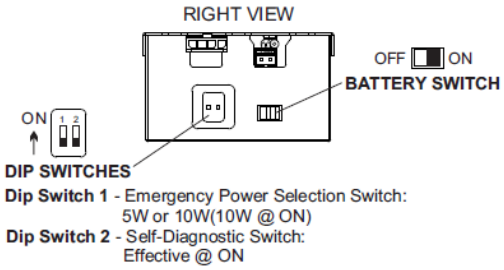


Case	Dimensions
Length	9.50"[241.4mm]
Width	2.4"[61.0mm]
Height	1.34"[34.0mm]

INPUT SIDE	LENGTH
BLACK	12"[304.8mm]
WHITE	12"[304.8mm]
YEL/BLK	16"[406.4mm]

OUTPUT SIDE	LENGTH
LED OUTPUT	8"[203.2mm]
TEST LEAD	8"[203.2mm]
PURPLE	12"[304.8mm]
PINK	12"[304.8mm]





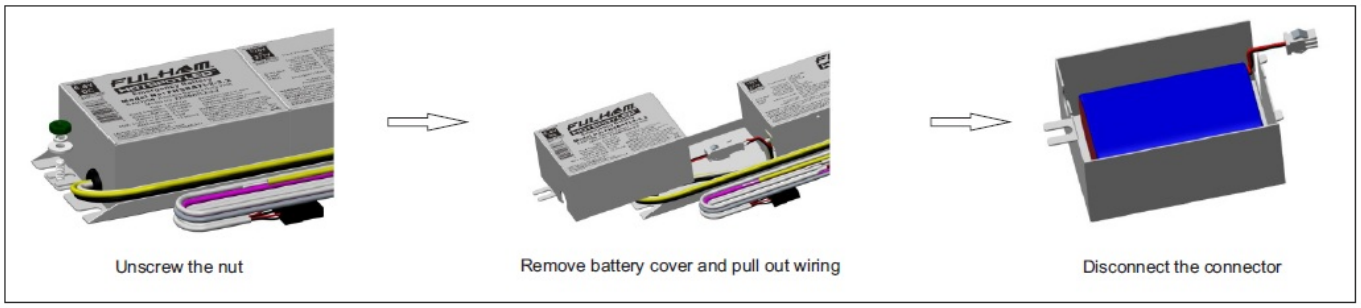
NOTE

1. The driver must be grounded.
2. Once assembly, installation or servicing is complete, set the BATTERY SWITCH to the ON position.
3. Double insulation between the input wire and battery wire.

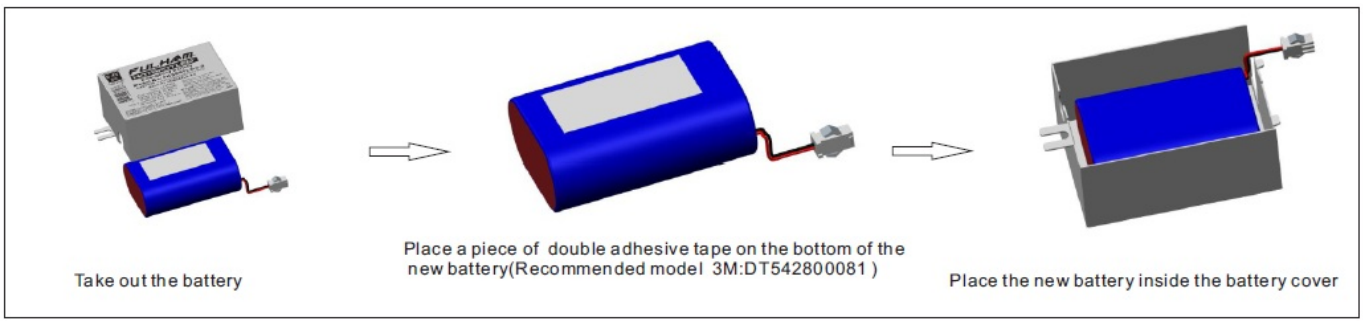
B Wiring diagram

BATTERY REPLACEMENT/SERVICING INSTRUCTION

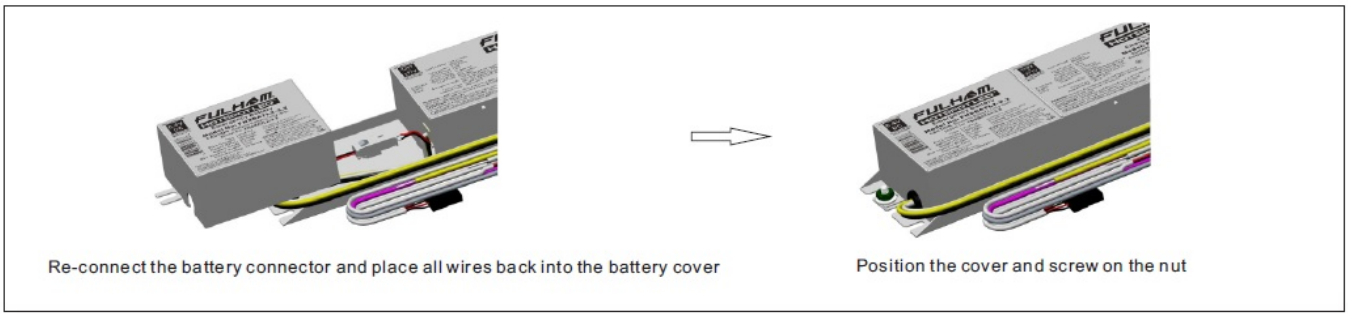
Warning: Disconnect power when servicing fixture.



STEP 1: Remove the battery cover

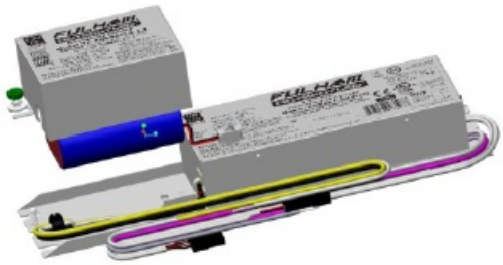


STEP 2: Install new battery



STEP 3: Re-assemble the battery cover

- **C** Replacing the battery



Guideline on calculating emergency illumination level

The purpose of this guideline is to identify the illumination level of the LED luminaire when used with Fulham's FHSAC1-UNV-40L LED emergency driver. The path of egress illumination level during emergency operation is determined by types of luminaires, Luminaire Efficacy, Luminaire Mounting Height, Emergency Power and some other effects in real application.

Step 1: Select an LED Luminaire, and make sure the LED light source is electrically compatible with Fulham's LED emergency driver. Get the Light Distribution data (usually an .ies file) and Rated Efficacy data (lumen per watt) from luminaire supplier.

If the luminaire is DesignLights ConsortiumTM (DLC) compliant, you can also get the efficacy information from DLC website

- Open DLC Qualified Product List(QPL) database search page: **https://www.designlights.org/search/**
- Searching keywords by model, brand name or manufacturer for the luminaire used.
- Find the "Efficacy" data listed on website or calculated by dividing "Light output" by "Wattage", the efficacy value should be shown in lumen per watt (lm/W).

If the luminaire is ENERGY STAR compliant, you can also get the luminaire efficacy information from ENERGY STAR website.

- Open ENERGY STAR certified Light Fixtures database search page: **https://www.energystar.gov/productfinder/product/certified-light-fixtures/results**
- Searching keywords by model, brand name or manufacturer for the luminaire used.
- Find the "Energy Efficiency" data listed on website. If it is showed as "Measured at the Source", please contact

with luminaire supplier for additional light loss for this light source inside the fixture. The value should be shown in lumen per watt (lm/W).

Step 2: Determine the Emergency Power and calculate the Emergency Light Output. FHSAC1-UNV-40L is programmable output; setting a proper Emergency Power is vital to achieve desired illumination. Emergency Light Output is equal to the Emergency Power multiply by luminaire efficacy. For example, if the luminaire is 120lm/W and in 3W emergency operation, the total Emergency Light Output is 120lm/W * 3W = 360lm.
Step 3: Use industry lighting design software to calculate the illumination level according to the luminaire layout in room, luminaire mounting height, the original .ies file and Emergency Light Output calculated above. If the illumination level cannot meet life safety codes, go back to Step2 to use a higher Emergency Power or go back to Step1 to select a higher efficacy luminaire or use more luminaires in the room. Fulham's FHSAC1-UNV-40L LED emergency driver is compliant with UL 924 standard, according to UL test data, Table 1 and Table 2 below give basic indication to determine the min. Emergency Power and Luminaire Max. Mounting Height for 1 foot-candle illumination based on a single luminaire with typical Lambertian distribution. It is the light designer/ construction contractor's responsibility to validate the real illumination level on site, to assure the emergency light illumination level is in accordance with the requirement of Federal, state and local municipal codes. It may diff to the theoretical calculation or simulation on computer.

Table 1. Min. EM Power for 1fc @ 10ft vs. Luminaire Efficacy

Luminaire Efficacy (lm/W)	**Min. EM Power to achieve 1 fc @ 10ft Mounting Height**
80	5.0 W

Table 2. Max. Mounting Height vs. Luminaire Efficacy

Luminaire Efficacy (lm/W)	**Max. Mounting Height for 1fc**	
	EM 5W	**EM 10W**
80	10.1 ft	13.9 ft
100	11.2 ft	15.4 ft
120	12.1 ft	16.8 ft
140	13.0 ft	18.1 ft
160	13.9 ft	19.3 ft
180	14.6 ft	20.4 ft

SELF-DIAGNOSTIC INSTRUCTIONS / OPERATION

If Dip Switch 2 (Self-Diagnostic Switch) is set to the OFF position: The self diagnostic feature is disable. A functionality test shall be manually conducted every thirty (30) days to ensure the emergency LED light source illuminates as intended. A full discharge test shall be conducted once a year; the LED light source shall illuminate for a minimum of ninety (90) minutes for the 10W load (Dip Switch 1 is set to the ON position) or one hundred eighty (180) minutes for 5W load (Dip Switch 1 is set to the OFF position). If Dip Switch 2 (Self-Diagnostic Switch) is set to the ON position: The self diagnostic feature is enable .The emergency LED driver will conduct a self check for thirty (30) seconds every thirty (30) days; and ninety (90) minutes or one hundred eighty (180) minutes self check every 12 months. After every self check the LED indicator light will indicate a status signal. A single self-diagnostic test can be activated by pressing the test switch three (3) times. Refer to Indicators Status Table for details. When user toggle the Dip Switch, the LED indicator on Switch button would flash 3 times, 2.5S ON/0.5S OFF for Enabled, while 0.5S ON/2.5S OFF for Disabled.

TEST SWITCH INDICATOR STATUS

LED Indicators Status	EM Driver Status/Mode
• Solid Green	Sys tem OK/AC OK(Self-diagnos tic Enabled or Dis abl ed).
• Slow Flas hing Red, 4 s on/1 s off	Battery not detected, check battery s witch or connection.
• Flas hing Red, 1 s on/1 s off	Battery Failure, replace battery.
• Flas hing Green, 1 s on/1 s off	Self-Diagnos tic tes t underway.
• Fas t Flas hing Red, 0 .1 s on/0 .1 s off	Abnorm al driver perform ance, replace driver.
• Very Slow Flas hing Red, 4 s on/4 s off	Over tem perature.
• None. Both LEDs OFF	Norm al working in EM m ode.
• Green/Red alternative flas hing, 1 s green/1 s red.	No load or output over voltage protection triggered.

1. EM Test: Press and hold test button (>1s) to enter EM mode for testing in normal AC powered. Subsequent tests can be performed after a minimum 20 Second delay in pressing the Test Switch.
2. Manual Self-Diagnostic(When Self-Diagnostic Enabled – Dip Switch 1 set to the ON position): After charging twelve (12) hours or battery fully charged, quickly press the test button three (3) times within three (3) seconds to force the controller to enter a Self-Diagnostic cycle. To quit the self-diagnostic cycle after engaged press and hold the test button for ten (10) seconds.

Programming

This driver can be programmed using the TPSB-100(E). Programming features include the following:

- Output Current: 250-1400mA
- Dimming Curve
- LED NTC Thermal Protection

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Documents / Resources

	**FULHAM FHSAC1-UNV-40L HotSpot Plus LED Driver with Integrated Emergency Backup** [pdf] Instruction Manual CEC-2017-735, FHSAC1-UNV-40L, FHSAC1-UNV-40L HotSpot Plus LED Driver with Integrated Emergency Backup, HotSpot Plus LED Driver with Integrated Emergency Backup, Plus LED Driver with Integrated Emergency Backup, LED Driver with Integrated Emergency Backup, Integrated Emergency Backup

References

- Fulham: Lighting Solutions | LED Drivers | Ballasts | Emergency | Modules
- Site Search - DesignLights
- ENERGY STAR Certified Light Fixtures | EPA ENERGY STAR