HAL-EMG-2X3W-2L LED emergency lighting system

Installation & maintenance information

APPLICATION

The LED emergency lighting system is designed to automatically provide illumination to designated areas during failure or interruption of power to the normal lighting system. The is factory assembled and wired, and consists of one (1) battery and two (2) lamp heads.

When properly installed, the following marine rated emergency lighting systems are UL and cUL Listed for use in:

NEC/CEC:

- Class I, Division 2, Groups B, C, D
- Class II, Division 2, Groups F, G
- Class III
- Wet locations, IP66, Type 4X, Marine
  - The assembly is not IP66 rated when utilizing the ECD18 stainless steel breather/drain
- Ambient temperature: -20°C to +55°C
- T6 operating temperature code for Class I, Division 2 and Class II, Division 2

NOTE: When a UX7 hazardous location LED exit sign is included in the assembly, the certification ratings are affected. Please see page 5 for additional information.

The power supply consists of a battery supply and battery recharging system housed inside a corrosion-resistant Krydon® material enclosure with all the circuitry to automatically turn on emergency DC lighting fixture(s) when the normal power supply fails. A pilot light indicates when normal power is being supplied to the unit. A push-to-test pushbutton switch is provided for periodic testing of the unit.

The light fixture used on the system is a rugged, epoxy coated corrosion-resistant assembly, fully adjustable and lockable, and houses two (2) LED lamp heads.

The luminaire shall be installed in accordance with the Code of Federal Regulations 46CFR111.75-15 and 46CFR112.

DETAIL INDICATION LOGIC IS GIVEN BELOW:

Status indication	Status description	Status definition
	No light	AC power removed from circuit
*	Steady light (no blinks)	Fully charged or Test in Process
* _ *	Light blinks once	Battery charging
_	Light blinks twice	Battery failure
_	Light blinks three times	Circuit failure
****_****	Light blinks four times	Lamp failure

Table 1. Detail Indication Logic

Immediately after supply power is initiated, the indicating lamp will blink/pulse to indicate that the unit is charging. Once installed with supply power, the requires 15 hours to charge the battery. Once the unit has completed charging, the pilot light will stop blinking and go to steady.

The pilot light does not supply diagnostics for the UX7 exit sign when installed on the enclosure. Please see page 5 for details on the UX7 exit sign's charging parameters.

Every 12 months, the unit will automatically perform a 90 minute battery discharge test. At the completion of the test, if it is determined not to have met the 90 minute requirement or if the battery connection is not adequate, the pilot lamp will blink twice, indicating battery failure. Every 30 days, the unit will also automatically perform a 30 second self-test. If the battery, board or lamp has been compromised, the indicator light will blink accordingly.

For battery warranty compliance, the unit must be discharged every 6 months for evaluation. This can be accomplished by performing the manual 90 minute run time test. Refer to the MANUAL TESTING section on page 4 for instructions.

IMPORTANT SAFEGUARDS – READ AND FOLLOW ALL SAFETY INSTRUCTIONS



Ratings

Power supply	Input	• 120-277 VAC, 50 or 60 Hz • 2.45 watts maximum
	Output	• 12 VDC; 0.5 amperes maximum • 6 watts maximum for 1½ hours at +55°C
Lamp fixtures	Input	• 12 VDC

STORAGE ENVIRONMENT

The luminaire and accessories must be stored in an ambient temperature from -20°C to +40°C. This includes units that have already been installed and may be powered down for extended periods of time (i.e. facility maintenance shutdowns). Store in a dry location.

⚠ IMPORTANT

Emergency lighting system should be installed, inspected, operated and maintained by qualified and competent personnel.

⚠ WARNING

Explosion hazard: this luminaire is provided with a factory installed emergency lighting battery pack. Do not conduct ANY maintenance (including CONNECTING/DISCONNECTING the battery pack) until the area is deemed to be clear of hazardous atmospheres and all incoming power is turned OFF.

⚠ WARNING

To avoid personal injury, electric shock or equipment failure:

1. Do not use this equipment for other than intended use.
2. Do not use accessory equipment not recommended by the manufacturer.
3. Electrical power must be turned OFF before and during installation and maintenance.
4. Equipment should be mounted in locations and at heights where it will not readily be subjected to tampering by unauthorized personnel.
5. Do not mount near heat-producing equipment.
6. In Class I or Class II areas, install and seal all equipment in accordance with the National Electrical Code® and Canadian Electrical Code articles pertaining to hazardous (classified) locations, plus any other applicable codes.
7. Install only wiring systems with an equipment grounding conductor (which may be the conduit system) to supply.
8. Free installation area of hazardous atmospheres before wiring.
9. Observe all battery handling precautions contained herein.

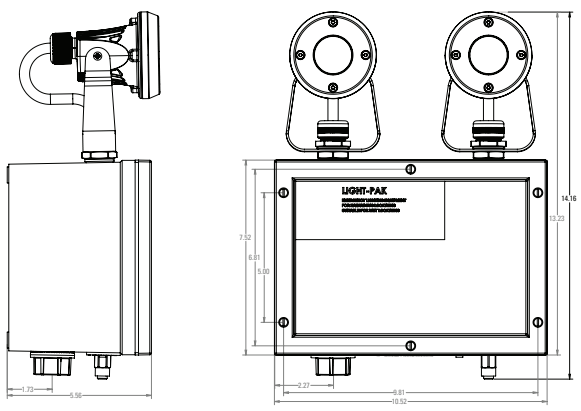


Figure 1. Overall Dimensions

SAVE THESE INSTRUCTIONS FOR FUTURE REFERENCE

INSTALLATION

A. INSTALL SYSTEM

1. Refer to overall dimensions (see Figure 1) to select a mounting location that will provide suitable strength and rigidity for supporting power supply and attached fixtures. See Figure 2 for mounting dimensions.
2. Loosen (do not remove) the (6) captive cover screws of the power supply housing and carefully place the cover aside for reassembly later.
3. Securely fasten the enclosure to the mounting location using appropriate length 1⁄4" diameter hardware through the four (4) mounting holes shown in Figure 2.

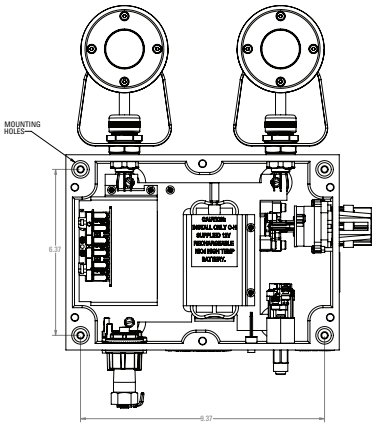


Figure 2. Mounting Dimensions

> **⚠ CAUTION**
>
> To avoid impairing operation and/or damage to the equipment, mount the enclosure with the back wall fastened to the vertical surface with the indicator light, test pushbutton and breather drain located on the bottom of the enclosure.

4. Adjust the lighting fixtures:

a. Loosen (do not remove) the two (2) vertical adjustment screws on both sides of the lamp head bracket. Adjust the lamp head to the desired position and re-tighten the two (2) screws. Torque the screws to 20 in.-lbs. minimum. Perform this vertical orientation adjustment on both lamp heads before moving on to step (b) below.

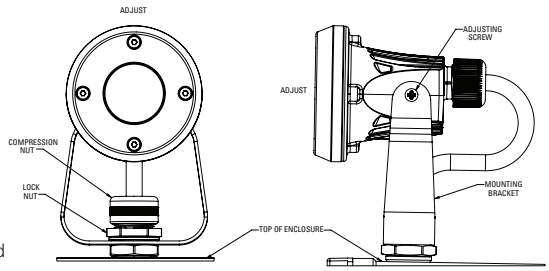


Figure 3

b. Loosen (do not remove) the gland nut and locknut at the mounting bracket center (see Figure 3). Adjust the lamp head to the desired horizontal position and re-tighten both the gland nut and locknut. Torque the gland nut to 10-15 ft.-lbs. using a soft-jawed wrench to prevent damage or stripping of the corrosion protective paint. Perform this horizontal orientation adjustment on both lamp head assemblies.

B. CONDUIT CONNECTION, WIRING AND BATTERY INSTALLATION

> **⚠ WARNING**
>
> To avoid explosion, electrical power must be turned OFF before and during installation and maintenance, and installation area must be free of hazardous atmospheres before wiring.

1. Connect enclosure to wiring system in accordance with the National Electrical Code, Canadian Electrical Code and any other applicable codes.

2. Make all wiring connections following wiring diagram provided in Figure 4.

   NOTE: Although generally not required, the interior assembly may be removed to facilitate wire pulling. Remove four (4) 1⁄4-20 screws and lock washers and disconnect wire leads at the pilot light, pushbuttons and lamp heads. DO NOT handle interior roughly or place it in an area where dirt, dust or grime will damage it. Replace as soon as all wiring has been pulled into enclosure. Torque four (4) screws to 21-25 in.-lbs.

> **⚠ WARNING**
>
> To avoid potential explosion, make wiring connection using methods that comply with the NEC, CEC and any local codes.
>
> To prevent dangerous electrical shocks, use only on grounded wiring systems.

NOTE: Main lamp head wires may vary in color. Instead of WHITE (+), BLACK (-) and GREEN (ground), wires may be BROWN (+), BLUE (-) and BLACK (ground), respectively.

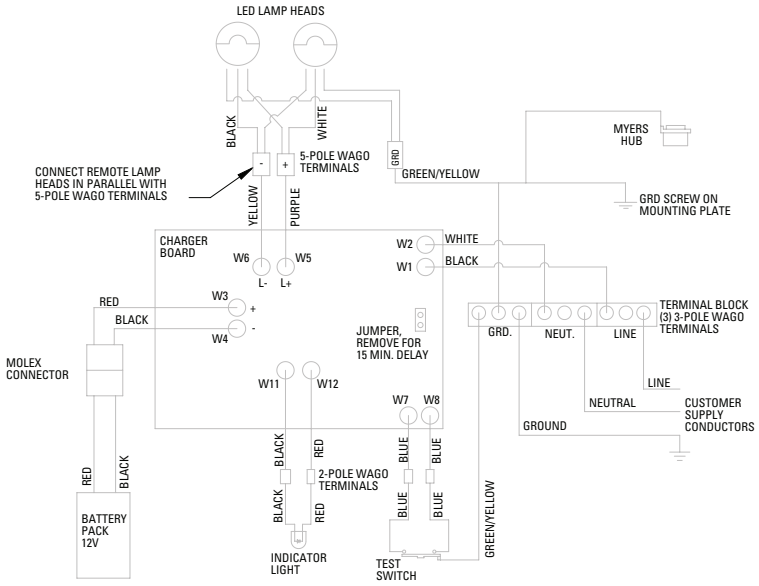


Figure 4. Wiring Diagram

2a. Connect line voltage to the line input of the terminal block. Connect neutral to neutral input of terminal block. Connect all equipment grounding conductors to terminal GRD.

2b. Connect battery connector to circuit board (see Figure 4).

2c. Standard system is provided with two factory assembled and factory wired LED lamp heads. (No additional fixture wiring connections need to be made by the installer).

2d. Test wiring for correctness with continuity checks and also for unwanted grounds with insulation resistance tester.

2e. If NOT installing remote fixture assemblies for connection to the power supply, proceed to Section C, "Complete Installation."

2f. If additional remote fixture heads are to be connected to the power supply, refer to "Related Products" section on page 5 for N2RFM2 information and installation instruction.

> **⚠ WARNING**
>
> To avoid electrical shock, use fixture only on systems with an equipment grounding conductor.

NOTE

Unit needs to charge for 15 hours before conducting any tests. Do not disconnect AC power until unit is fully charged.

C. COMPLETE INSTALLATION

1. Install CID101 corrosion inhibitor device (supplied in plastic envelope with instruction sheet). Recommended location is on the inside surface of the top of the enclosure near the right side fixture stem.
2. Close cover and torque all six (6) cover screws to 25 in.-lbs.
3. Test emergency lighting system for proper operation (see Table 1 on page 1 for detail indication logic):

   Turn on the AC power and observe:

- Indicating light should be operating
- Momentarily press the push-to-test button and observe – emergency lights should be operating

  NOTE: If emergency lights do not operate initially, allow battery to charge for at least 15 minutes or more, then repeat the test procedure.

4. Allow 15 hours charge time before depending on battery to operate at full capacity.

INSPECTION OF BREATHER/DRAIN

The breather/drain is installed to provide ventilation to minimize condensation and also allow liquids to drain out. A small amount of standing liquid may still reside in the bottom of the enclosure due to construction of drain. Perform visual and mechanical inspections on a regular basis. Frequency should be determined by the environmental conditions. However, it is recommended that checks should be made at least once per year.

⚠ CAUTION

To minimize condensation, never disassemble breather or drain assemblies.

1. Remove drain or breather and replace it with either a UL Listed, Type 4X plug or clean ECD18 breather/drain. Ensure a minimum engagement of three (3) full threads.
2. Clean breather/drain by following "Flush Cleaning" instructions below.



⚠ CAUTION

To avoid damaging breather/drain, do not force handle or cap during inspection.

FLUSH CLEANING

Flush cleaning may be required by the user's periodic maintenance program or when a drain or breather becomes clogged with foreign material.

1. Attach drain or breather to a clean water line with threaded end facing upstream (see Figure 5).

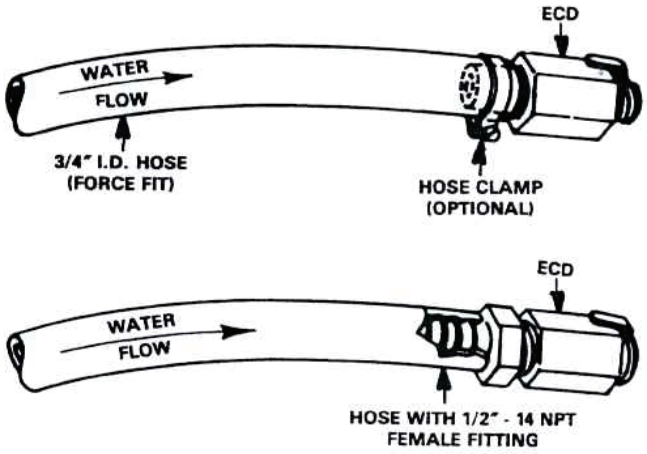


Figure 5

2. Flush ECD with water under line pressure (typically 30 to 75 psi). Discard the drain or breather if the foreign material is not removed.

   NOTE: Different styles and sizes of ECD fittings will allow different amounts of water or air to pass through. To determine if a breather or drain has been cleaned, compare the volume or water passing through a clean, unused breather or drain of the same style and size.
3. After cleaning, attach the breather or drain to a pressurized dry air supply line in a similar manner to that used with the water line in Step 1.
4. Blow the fitting dry, inside and out, with the dry air.
5. Reinstall the ECD into the Myers hub, ensuring engagement of three (3) full threads. Use thread lubricant and torque fitting to wrench-tight.

PERIODIC TESTING

Article 700 of the National Electrical Code states, "Systems shall be tested periodically on a schedule acceptable to the authority having jurisdiction to assure their maintenance in proper operating condition." It also states, "A written record shall be kept of such tests and maintenance."

In the absence of periodic testing requirements by a local authority, the following recommendations from the NFPA 101 (2018) Life Safety Code® are strongly recommended:

1. **Monthly:** Momentarily operate push-to-test switch. Observe that emergency lighting fixtures are on full brightness for the entire test cycle. Record the test on the Maintenance Record Card (provided on page 5).
2. **Semi-annually:** Shut off AC power at the distribution panel. Verify that the emergency lighting fixtures remain ON for a minimum of 1-1⁄2 hours.

   NOTE: We suggest that this test be continued until the power supply automatically shuts the emergency light(s) off. This will help maintain full battery capacity.

   Record the test on the Maintenance Record Card.

   Allow 15 hours charging time before depending on the battery to operate at full capacity.

   Failure to function properly in either test may indicate the need for battery or lamp replacement.

BATTERY REPLACEMENT

⚠ WARNING

Explosion hazard: this luminaire is provided with a factory installed emergency lighting battery pack. Do not conduct ANY maintenance (including CONNECTING/DISCONNECTING the battery pack) until the area is deemed to be clear of hazardous atmospheres and all incoming power is turned OFF.

1. Ensure power to the unit is OFF and ensure the area is clear of hazardous atmospheres before performing maintenance.
2. Loosen (do not remove) the (6) captive cover screws of the power supply housing and carefully place the cover aside for reassembly later.
3. Disconnect the battery by unplugging the quick connect plug connector attached to the unit.
4. Remove the two (2) screws that fasten the battery hold-down bracket to the mounting plate. Remove battery. Retain hardware for use with replacement battery.

⚠ WARNING

To avoid potential explosion, do not short circuit the battery or connector terminals.

5. Reinstall new battery using hold-down bracket and two (2) screws previously removed. Torque screws to 20 in.-lbs.
6. Reconnect black and red battery conductors to the board via the plug connector.
7. Close cover and torque all (6) cover screws to 25 in.-lbs.
8. Reconnect power to the system by turning on the line voltage into the unit.
9. Test replacement battery following Step 3 of Section C, "Complete Installation."

⚠ WARNING

To avoid explosion:

1. Exercise care in handing cells/batteries in order to prevent shorting of the cell with conductive materials, such as rings, bracelets and keys. The cell or conductor may overheat and cause burns.
2. Do not dispose of the cell/battery in open flame; cells may burst.
3. Do not open or mutilate cell/battery. Opened cells may release corrosive electrolytes which may have harmful effects on the skin and eyes, and may be toxic if ingested.

REPLACEMENT CIRCUIT BOARD AND BATTERY KIT

Contact manufacturer.

FIXTURE HEAD REPLACEMENT

⚠ WARNING

All electrical power must be turned OFF before and during installation and maintenance. Area should be free of hazardous atmospheres before maintenance is performed to reduce the risk of accidental explosion due to inadvertent shorting of battery during maintenance.

1. Disconnect AC power by opening the supply circuit at the distribution panel.
2. After removing all AC power to the fixture, loosen (do not remove) the captive cover screws of the power supply enclosure and carefully place the cover aside for reassembly later.
3. Disconnect battery from charger board via the plug connector.
4. Disconnect fixture head wire leads, noting color coding of wires.
5. Remove nut from underside of fixture head threaded stem and remove fixture head/CGB fitting assembly from the power supply housing.

   NOTE: Do not discard the internal nut or external sealing gasket, which will be used with the replacement fixture head.
6. Insert wiring for new fixture head assembly through the sealing gasket (removed in Step 5), and then through the power supply opening. Then insert the fixture CGB fitting.
7. Install the nut (removed in Step 5) while holding the fixture head assembly in the desired position.

⚠ WARNING

To prevent injury from electric shock, all power must be removed from the fixture during maintenance.

⚠ WARNING

Even after disconnect, batteries will still be live. To prevent electrical shock and explosion, take extra care not to touch leads together or to ground.

⚠ WARNING

To avoid explosion, always disconnect primary power source using designated disconnect switch before opening enclosure for inspection or service.

MAINTENANCE

1. Conduct periodic testing in accordance with local authority and Periodic Testing section of these instructions.
2. Clean fixture lens and exterior surfaces periodically. We recommend every three (3) months or more frequently, if appropriate.
3. Frequent interior inspection should be made. A schedule for maintenance check should be determined by the environment and frequency of use. It is recommended that it should be at least once a year.
4. Perform visual, electrical and mechanical checks on all components on a regular basis.

- Visually check for undue heating evidenced by discoloration of wires or other components, damage, or worn parts or leakage evidenced by water or corrosion in the interior.
- Electrically check to make sure that all connections are clean and tight.
- Mechanically check that all parts are properly assembled.

BATTERY DAMAGE PREVENTION

- In the event of a complete power loss, the unit will turn off the lamps to prevent overdischarging of the battery. **NOTE:** The charger board will still be putting a small drain on the battery even after the lamps turn off. To prevent damage to the battery, seek to restore power to the system as soon as possible.
- In the event of a power outage that may last longer than 12 hours, disconnect the battery by turning off the external battery disconnect switch or unplugging the battery plug receptacle.
    - If the battery has been connected to a unit without power for longer than 12 hours, the battery will experience a deep discharge. If this happens, when power is restored, the charger board will take 45 minutes to an hour to overcome the deep discharge and before the status light will begin to flash. Some lamp flickering may occur as the battery is being recharged.

Troubleshooting guide

Symptom	Solution
Pilot light does not light	Verify power to fixture
Pilot is blinking twice	Verify battery is properly connected to circuit board
Pilot light is blinking three times	Verify battery voltage under no load is 13V or higher after 15 hour charge. If less than 13V, consult factory for battery replacement. If replacing the battery does not satisfy the blink code error, consult factory for circuit board replacement.
Pilot light is blinking four times	Check lamp connections

Table 2

WIRE SIZING FOR REMOTE INSTALLATION
(FOR COPPER WIRE)

Maximum running distance between power supply and remote lighting fixtures to be 100 ft. regardless of wire size, lighting fixture load and ambient temperature. This will ensure limited voltage drop and proper function of lighting fixture.

INITIAL OPERATION

When the unit is first powered up, it will go into a 15 hour fast charge, indicated by the status light flashing. Once the unit has fully charged, it will perform a self-calibration, after which the status light will change to steady on, indicating the unit is fully charged and float charging the battery to maintain readiness.

After the first full 15 hour charge cycle, the lamp current will be recorded and stored in memory to be used for all subsequent checks.

If the number of lamps utilized in the assembly is changed, a new board calibration must occur to take into account the additional load on the system. To reset the board calibration, disconnect the battery and AC power to initiate an automatic system reset. Reconnect the battery and AC power to complete the self-calibration thereafter.

MANUAL TESTING

- 10 Second "Installation" Test – Press and release the test button once during fast charge (blinking status light) to initiate a 10 second quick test. The charger will switch to emergency mode for 10 seconds, allowing the installer to verify proper installation of the unit.
- 30 Second Test – Press and release the test button once during float charge (steady on). During this test, the lamps will turn on for 30 seconds.
- 90 Minute Test – Press and release the test button a second time during the 30 second test to change to a 90 minute test. During this test, the circuit will perform a full battery capacity, charge circuit and LED test.
- Canceling Test – Press and release the test button during the 90 minute test to return the fixture to its original state (fast charge or float charge).

CLEARING FAILURE CODES

- A battery failure (two blinks) can be cleared by replacing the battery. Disconnecting the battery and AC power, or performing a full 90 minute discharge, will reset the error code; however, it will return if the battery is faulty.
- Charge circuit failure (three blinks) and lamp/LED failure (four blinks) will clear when the unit successfully passes a manual or automatic 30 second test.

LAMP TIME DELAY

The charger has an integrated time delay circuit that allows it to remain in emergency mode 15 minutes after power is restored.

RELATED PRODUCTS

N2RFM2 – LED REMOTE EMERGENCY LIGHTING FIXTURE

The N2RFM2 LED remote emergency lighting fixture is a corrosion-resistant Krydon® material assembly which is fully adjustable and houses up to two (2) highly reliable LED lamp heads. This remote fixture is designed to be wired directly to the enclosure to satisfy the potential need for additional lamp heads.

Configuration options:

- N2RFM21221 – Remote luminaire assembly with one (1) 12 volt, 1 watt LED lamp head
- N2RFM21222 – Remote luminaire assembly with two (2) 12 volt, 1 watt LED lamp heads.

NOTE: The total number of combined lamp heads between the enclosure and the N2RFM2 additional remote assemblies shall not exceed six (6) total lamp heads.

INSTALLATION

1. Disconnect AC power to the enclosure by opening the supply circuit at the distribution panel.
2. Ensure power to the unit is OFF and ensure the area is clear of hazardous atmospheres before performing maintenance.
3. Mount the N2RFM2 assembly in a location providing suitable strength and rigidity for support of the fixture.
4. Connect lead wires to WAGO terminals inside of N2RFM2 enclosure. Wires may be white or brown (+), black or blue (-) and green for ground.
5. Attach the N2RFM2 assembly to the enclosure via conduit connection at the Myers hub. Wire in accordance with NEC, CEC and any local codes pertaining to hazardous locations.
6. Loosen (do not remove) the six (6) captive cover screws of the power supply housing and carefully place the cover aside for reassembly later.
7. Disconnect the battery by unplugging the quick connect plug receptacle attached to the unit.
8. Attach the N2RFM2 wiring leads to the associated WAGO connectors located inside the enclosure. The number of terminals of the WAGO connectors in the fixture may not be sufficient for direct connection of all required N2RFM2 fixtures. In such a case, parallel wiring of the N2RFM2 fixtures outside of the fixture is required. The wiring method shall be in accordance with the National Electrical Code and Canadian Electrical Code articles pertaining to hazardous (classified) locations, plus any other applicable codes.
9. Adjust the orientation of the N2RFM2 lamp head assemblies to the desired position (see Step 4 of Section A for instructions).
10. Reconnect the battery by rejoining the quick connect plug receptacle attached to the unit.
11. Close the cover and torque all six (6) cover screws to 25 in.-lbs.
12. Reconnect power to the system by turning on the line voltage to the unit.
13. Test the complete assembly for functionality by following Step 3 of Section C, "Complete Installation."

LED EMERGENCY LIGHTING SYSTEM WITH UX7 EXIT SIGN

UX7 hazardous location LED exit signs are UL certified emergency luminaires provided with a battery back-up feature and intended for permanent installation in hazardous locations. They are intended to mark the means of egress during normal AC operation and in the event of a power failure. During normal AC operation, the charging circuits keep the batteries charged. Upon loss of AC power, the exit sign power source is switched to the back-up battery pack by the transfer circuitries. The UX7 exit sign requires a minimum of 24 hours charging time when installed.

When mounted directly to the enclosure, the complete assembly is UL Listed for use in:

NEC (only):

- Class I, Division 2, Groups B, C, D
- Wet Location, IP66
- Ambient temperature: -20°C to +50°C
- T6 operating temperature code for Class I, Division 2 and Class II, Division 2

NOTE: The certification and power supply input ratings of this complete assembly differ from the standalone power supply detailed on page 1. Install and seal all equipment in accordance with the National Electrical Code® articles pertaining to hazardous (classified) locations, plus any other applicable codes.

Ratings		
Power supply	Input	• 120, 240 or 277 VAC, 60 Hz • 7.15 watts maximum

Configuration options:

- UX71SDHAZ – UX series single-sided hazardous location LED exit sign (see Figure 6)
- UX72SDHAZ – UX series double-sided hazardous location LED exit sign (see Figure 7)

NOTE: The ECD18 stainless steel breather/drain cannot be used along with either UX7 exit sign due to construction restraints.

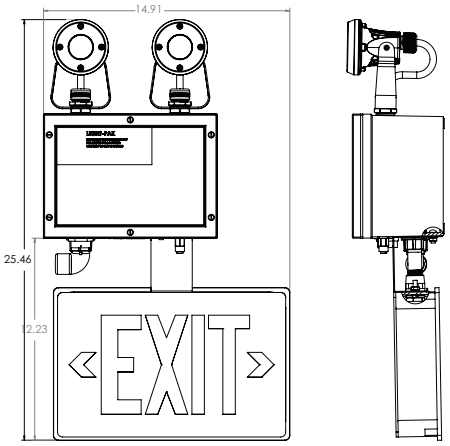


Figure 6. UX71SDHAZ

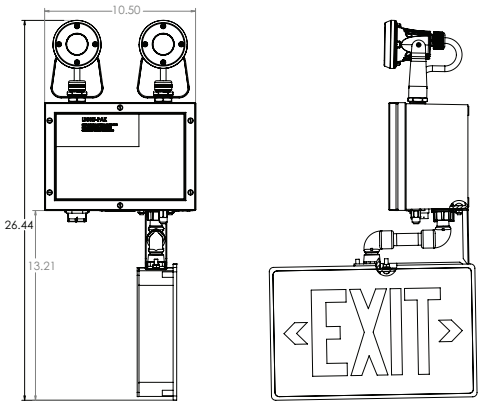


Figure 7. UX72SDHAZ

WIRING AND MAINTENANCE

⚠ WARNING

To avoid explosion, electrical power must be turned OFF before and during installation and maintenance, and installation area must be free of hazardous atmospheres before wiring.

Each exit sign emergency lighting system comes factory assembled and wired. For any wiring or maintenance needs, make all wiring connections following the wiring diagram provided in Figure 8 below.

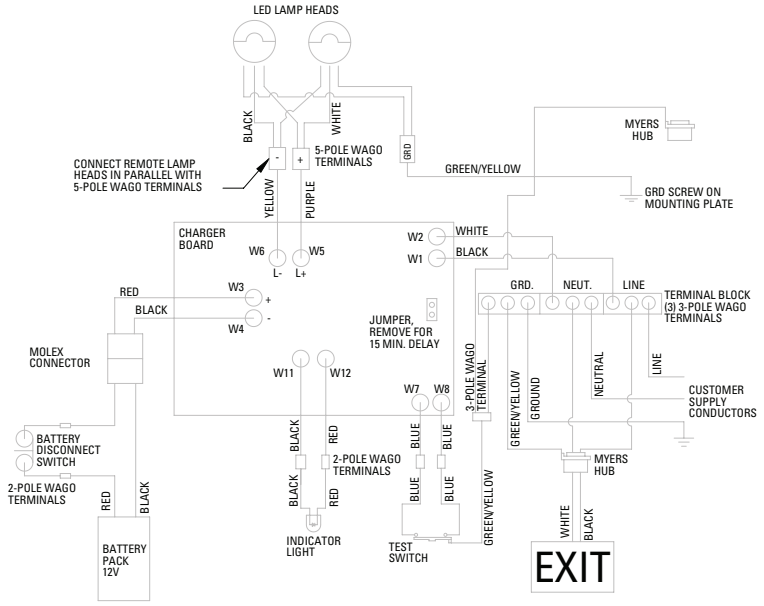


Figure 8. Exit Sign Wiring Diagram

MAINTENANCE RECORD

NFPA 101 (2003) REQUIREMENTS

"A FUNCTIONAL TEST SHALL BE CONDUCTED ON EVERY REQUIRED EMERGENCY LIGHTING SYSTEM AT 30 DAY INTERVALS FOR A MINIMUM OF 30 SECONDS. AN ANNUAL TEST SHALL BE CONDUCTED FOR THE 1-1/2 HOUR DURATION.

EQUIPMENT SHALL BE FULLY OPERATIONAL FOR THE DURATION OF THE TEST. WRITTEN RECORDS OF TESTING SHALL BE KEPT BY THE OWNER FOR INSPECTION BY THE AUTHORITY HAVING JURISDICTION."

EMERGENCY LIGHTING POWER SUPPLY

SEE INSTALLATION AND MAINTENANCE INSTRUCTION SHEETS FOR METHODS OF TESTING

	Duration of test						
Date	**30 sec.**	**1-1/2 hour**	**Other**	**Battery replaced**	**Inspected by**	**Lamp replaced (record fixture location)**	**Notes**