QDCD QuadDCDrive® Multi-Channel DC to DC Driver
Installation Guide

- To reduce the risk of death, personal injury or property damage from fire, electric shock, falling parts, cuts/abrasions, and other hazards please read all warnings and instructions included with and on the fixture box and all fixture labels.
- Before installing, servicing, or performing routine maintenance upon this equipment, follow these general precautions.
- Installation and maintenance should be performed by qualified person(s) familiar with the products' construction & operation & any hazards involved. Regular maintenance programs recommended.
- **DO NOT INSTALL DAMAGED PRODUCT!** This product has been properly packed so that no parts should have been damaged during transit. Inspect to confirm. Any part damaged or broken during or after assembly should be replaced.

READ AND FOLLOW ALL SAFETY INSTRUCTIONS! SAVE THESE INSTRUCTIONS

AND DELIVER TO OWNER AFTER INSTALLATION

IMPORTANT SAFEGUARDS

When using electrical equipment, basic safety precautions should always be followed including the following:

a) READ AND FOLLOW ALL SAFETY INSTRUCTIONS.
b) Do not use outdoors.
c) Do not mount near gas or electric heaters.
d) The use of accessory equipment not recommended by the manufacturer may cause an unsafe condition.
e) Do not use this equipment for other than intended use.
f) NOT SUITABLE FOR USE IN DAMP OR WET LOCATIONS

SAVE THESE INSTRUCTIONS

MESURES DE SÉCURITÉ IMPORTANTES

Lors de l'utilisation d'équipements électriques, des précautions de sécurité de base doivent toujours être respectées, y compris les suivantes :

a) LISEZ ET SUIVEZ TOUTES LES INSTRUCTIONS DE SÉCURITÉ.
b) Ne pas utiliser à l'extérieur.

c) Ne pas installer à proximité de chauffages à gaz ou électriques.
d) L'utilisation d'équipements accessoires non recommandés par le fabricant peut entraîner une situation dangereuse.
e) N'utilisez pas cet équipement à d'autres fins que celle prévue.

CONSERVEZ CES INSTRUCTIONS

NOT SUITABLE FOR USE IN DAMP OR WET LOCATIONS;
· DO NOT INSTALL OUTPUT CONDUCTORS LONGER THAN _____ m;
· DO NOT CONNECT TWO OR MORE POWER SUPPLIES IN PARALLEL;
· installation and servicing should be performed by qualified personnel;
· How to determine the number of luminaires and the lamp wattage to be used with the power unit.
· specific instructions for maximum ambient [45°C], mounting, wiring, minimum wire size, grounding, and servicing if applicable.

· NON ADAPTÉ POUR UNE UTILISATION DANS DES ENDROITS HUMIDES OU MOUILLÉS ;
· NE PAS INSTALLER DE CONDUCTEURS DE SORTIE D'UNE LONGUEUR SUPÉRIEURE À _____ m ;
· NE PAS CONNECTER DEUX OU PLUSIEURS ALIMENTATIONS ÉLECTRIQUES EN PARALLÈLE ;
· L'installation et l'entretien doivent être effectués par du personnel qualifié ;
· Comment déterminer le nombre de luminaires et la puissance des lampes à utiliser avec l'unité d'alimentation ;
· Instructions spécifiques concernant la température ambiante maximale [45°C], le montage, le câblage, la section minimale des fils, la mise à la terre et l'entretien, le cas échéant.

ADDITIONAL SAFETY PRECAUTIONS

a) Installation must follow all national and local codes for electrical equipment.
b) Do not lift or move the QuadDCDrive® using the input or output wires to avoid product damage.
c) Do not expose QuadDCDrive® to corrosive gas or liquids.
d) Ensure the QuadDCDrive® is used with the proper low voltage electrical loads as referenced in the specification sheet available from the SmartDCLighting website.
e) Ceiling-mount considerations - The minimum hole diameter to insert a QuadDCDrive through an installed ceiling is 105 mm (4.13 in) with input and output cables disconnected.
f) Do not install output conductors longer than indicated on table A (see further instructions).
g) Do not connect two or more power supplies in parallel.

ETL listed to UL 924 standard

When combined with the SW4 input device and/or the SDCS CIO System Controller, the QuadDCdrive® multi-channel driver is UL 924 listed for use as an emergency LED driver. Combine with an emergency power source, such as a generator, inverter, or UPS and an external emergency control device that monitors power to send a signal to the SmartDCLighting system to provide a fully code compliant emergency lighting system.

Important: Emergency power source equipment must be UL 924 listed and adequately sized to provide minimum 90-minute runtime based on lighting load.

QuadDCDrive® offers a variety of installation and mounting options. The device is Class 2 low voltage (under 100W per channel of LED drive conditions) and is intended to live externally away from a light fixture(s), in a ventilated enclosure or freely in air (non-plenum locations). Do not exceed 45 degrees C.

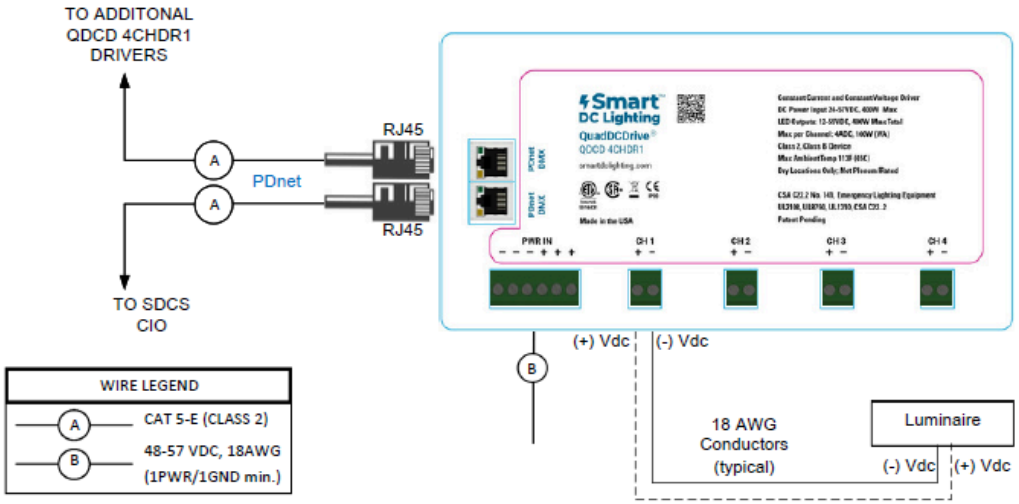
Electrical and Wiring Specifications:

Driver Type: constant current and/or voltage (user configurable)
Number of LED outputs: Four (4) (UL Class B/2)
Maximum LED output power: 400W; Up to four (4) x 100W (VA) outputs
Programmable LED output current range: 100mA to 4A
LED output type: programmable in ~100mA increments within the specified current range
LED output voltage range: programmable 12-55V (high level dependant on Vin)
Nominal input voltage range (DC): 24V to 57V
Control Protocol: DMX & PDnet with optional wireless Casambi (consult factory for additional protocols)
Control Channels: Four (4) independently configured as CV or CC, with levels
Protection Features: Automatic resetting overload and short-circuit protection on Class 2 output
Efficiency: >95%
Standby Power: 1W
LED output current tolerance: +-1%

Operating Environment:
Operating temperature: 32° to 113°F (0° to 45°C)
Relative humidity (non-condensing): 0% to 95%
Not plenum rated

Typical Wiring Diagrams

Static Color Temperature Constant Current or Constant Voltage Luminaire on Channel One



Remote Mounting

Please follow the maximum wiring distances listed in Table A below when selecting an appropriate wire gauge.

Output Current (mA)	AWG Wire Size					
	12	14	16	18	20	22
350	900	566	356	224	141	89
500	630	396	249	157	99	62
700	450	283	178	112	70	44
1000	315	198	125	78	49	31
1100	286	180	113	71	45	28
1400	225	141	89	56	35	22
1750	180	113	71	45	28	18

Table A. Max allowed distance (ft.) between the QDCDC multi-channel driver and the LED luminaire (based on 1V drop). QDCD drivers support up to 4000mA. For additional wire size calculations, please contact **SmartDC.**

Additional Wiring Diagrams may be found at smartdclighting.com

Power Input Connector: Six-pin terminal, 12 - 18 AWG wire using the provided terminal connectors. Follow Class 2 wiring methods. Strip length = 7 mm (¼ in). Torque rating = 0.5–0.6 N·m (4.4–5.3 in-lb)

Output Channels 1 thru 4: Two-pin terminal, 12 - 18 AWG wire using the provided terminal connectors. Follow Class 2 wiring methods. Strip length = 7 mm (1/4 in). Torque rating = 0.5–0.6 N·m (4.4–5.3 in-lb)

Auto Sensing PDnet / DMX Connector: Dual RJ45. Use 0.25 mm2 (23 AWG) or larger conductors in Category type cable. Terminate to T568B standard.

Auto Sensing Wireless Casambi: Casambi enabled units communicate via DMX and/or SDCnet and/or Casambi. Last command takes precedence.

Programming / USB C Connector: Allows the configuration of the multiple driver channels' driver type (constant voltage or constant current), dimming curve, min/max intensity, and fade rate. *(If the QDCD is connected to a SDCS CIO, configuration may also be done from the SDCS CIO.)*

Multiple Colored LED Indicator lights: There are visible green and yellow LEDs on both of the PDNet RJ45 jacks that can be used to determine the operating, or error state of the QDCD. There are also LEDs below/inside of the white plastic cover that can be visualized through the plastics as faint indicators, or can be seen through the small gaps in plastic between the plastic and the RJ45 jacks.

QDCD Normal Operation
Normal operation can be visualized by no LED activity on the PDNet jacks, or flashing or solid green LEDs, which signify that either PDnet data or DMX data is flowing from another control source. See the RJ45 Jack LED section below for more details on the green and yellow LEDs on the PDNet jacks. Note that internal two blue flashing LEDs at about a one second flashing rate signifies that the QDCD is operating correctly.

QCDC in Error
Both sets of green and yellow LEDs on the PSNet jacks will dance when there is an internal error, which can be a low voltage indicator, or an over power (>100VA or Watts) on any one of the channels. Internal red LEDs may also be seen that signify

that the QCDC is in error condition. Normally the QDCD will retry to correct the error within three minutes, if the error(s) persists the red LEDs will never stop flashing.

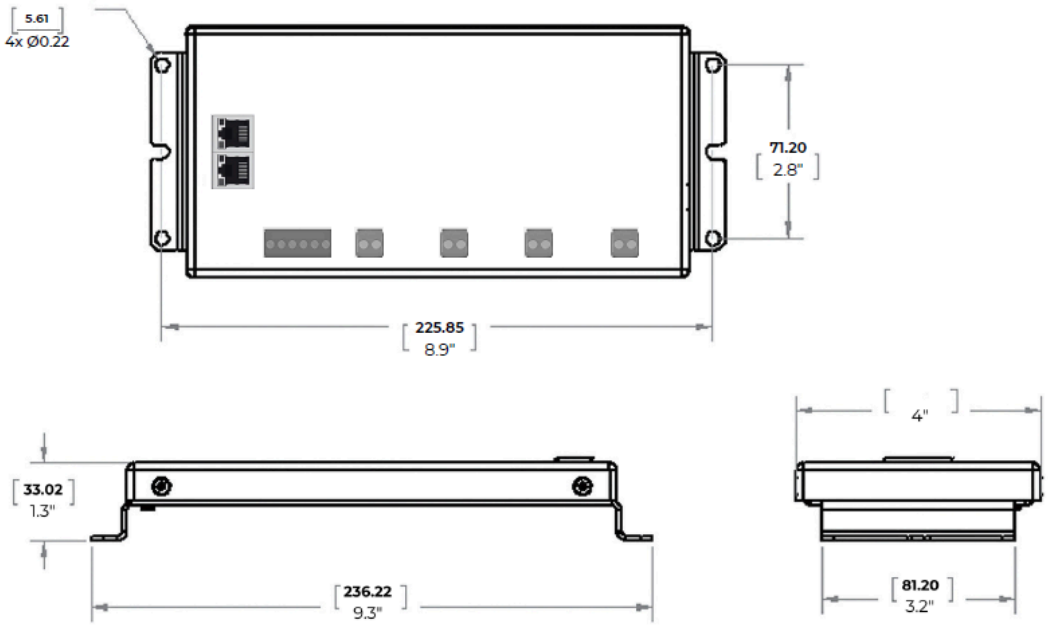
RJ45 Jack LEDs
Green LEDs - there is one green LED on each of the two PDNet jacks that define either PDnet or DMX data is flowing. PDNet data will illuminate both green LEDs on a timed period, meaning that they will illuminate and hold for a half second, unless continuous PDnet data is present.

DMX on the other hand will illuminate just one green LED, and that LED will be always on as DMX data is present. This is because DMX normally is a repeating flow of intensity data which holds the single LED illuminated. When DMX data is removed, the green LED will go out.

Any yellow LED indicator will be in the presence of an error condition, in which both the yellow and the green LEDs will be flashing in a repeating fast sequence..

Installing a QuadDCDrive®

Mount the QuadDCDrive®



QuadDCDrive® may be surface-mounted to any structure capable of supporting its weight or hung from a support structure using a tether (not included).

1. Set the QuadDCDrive on a flat surface. **Do not block airflow from under the QDCD mounting bracket.**
2. Using a Phillips screwdriver, attach it to the mounting surface with two M5 (#10) screws, not included. If tethering the device, hang the QuadDCDrive on to one of the eyes on the QuadDCDrive.
3. If Casambi enabled, do not install it in a metal enclosure. Plastic enclosure is acceptable for Casambi enabled units.

Wire the Input Power

1. Prepare the wires for the provided screw-terminal plug. See Electrical and Wiring Specification on page 5 for the wire gauges accepted by the screw-terminal connectors and strip the wires according to the strip length listed.
2. Connect the input power to the input terminal block.
   a. Up to 400W may be connected to a single pair of input terminals or the 400W may be spread out across the three pairs of input terminals.
   b. See the image above, page 4, for polarity of the input terminals.
   c. Wire the positive and negative wires from the input power to separate securing the terminal screws onto the wires.
   d. Tug gently on the wires to ensure they are secure.
   e. Insert the screw-terminal plug into the input terminal.

Apply Power

1. If any phenomenon occurs (such as tripping, power cycling, or irregular operation), disconnect the input power cable and the connection to the load before investigating the problem.
2. Upon powering up, the default mode of CH1 thru 4 of each QDCD is 48V constant voltage at 100mA of maximum current. This is done so that in the event the installer has already connected the loads, they can verify power is flowing properly to the loads without damaging the loads by providing them with too much current or voltage.
3. If the QuadDCDrive is found to be defective, please replace it; or contact the appropriate SmartDC representative for resolution.

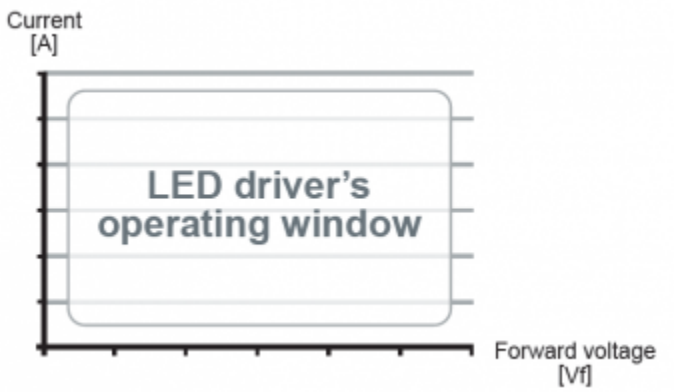
Configure each output of the QuadDCDrive to provide the correct currents and voltages for your luminaires or loads.

CAUTION: Setting the QuadDCDrive multiple channel driver to output more current and/or voltage than the manufacturer's recommended fixture driver current and voltage may reduce the lifetime of the fixtures or cause damage to the fixtures.

Each channel of the QuadDCDrive has adjustable output current and voltage and is factory-set to output 100mA. You must configure each channel of the driver to provide the correct current for the connected luminaire(s). For more information about configuring the output current, see the QuadDCDrive configurator software application located at www.smartdclighting.com. All configurations must be commissioned and programmed through the Windows configuration user interface connected to the USB port on the SDCS CIO or QDCD.

Selecting/Configuring the QDCD driver output for your application

If you know what type of LED you will be using, you can easily select/configure the QDCD driver output to match the LED's operating window.



If you do not know the operating window of the load, please look at the data / specification sheet for the load.

If constant current: identify its max forward voltage (Vf) and its milliamp draw (mA).

If constant voltage: identify its voltage (V) and wattage.

Check to make sure the load is within the driver's operating window (see page 4).

If wiring multiple constant voltage loads in parallel

- luminaires must have the same constant voltage rating between 12 & 55VDC.
- Add up the mA draw of the luminaires. Up to 4000mA & 100W per channel.

If wiring multiple constant current loads in series:

- luminaires must have the same constant current rating.
- Add up the voltage of the luminaires. Total voltage may not exceed 55VDC per QDCD channel.

If wiring multiple constant current loads in parallel:

- luminaires must have the same constant current rating.
- Add up the mA draw of the luminaires. Up to 4000mA & 100W per channel.

After configuration of the Luminaire or Loads, disconnect the input power to the QDCD.

Wire Luminaires or Loads

1. Before wiring the luminaires or Loads, disconnect the DC input power cable to the QDCD.
2. Prepare the wires for the provided screw-terminal plugs. See Electrical and Wiring Specification on page 5 for the wire gauges accepted by the screw-terminal connectors and strip the wires according to the strip length listed.
3. Connect the loads to outputs CH 1, CH 2, CH 3, and CH 4.
   a. See the image above for polarity of the output terminals.
   b. Wire the positive and negative wires from the load to separate terminals on the plug, securing the terminal screws onto the wires.
   c. Tug gently on the wires to ensure they are secure.
   d. Insert the screw-terminal plug into the CH 1, CH2, CH3, or CH4.
   e. Reconnect power to the QDCD.
   f. If any phenomenon occurs (such as tripping, power cycling, or irregular operation), disconnect the input power cable and the connection to the load before investigating the problem.
   g. If the QuadDCDrive is found to be defective, please replace it; or contact the appropriate SmartDC representative for resolution.

UL 924 applications

The SDCS CIO with or without the SW4 is capable of receiving a dry contact from a 3rd party normal power circuit monitoring device such as a Functional Devices ESR2401B. Upon sensing loss of power to its monitored circuit, the SDCS CIO will enter “Emergency Mode”. During Emergency Mode, configured LED outputs or LED channels on a connected QuadDCDrive® will go to the user-defined Emergency Mode dimming level. Default 100% (adj). Any wall controllers, sensors or other input devices that are connected to the SDCS CIO, will be disabled while in Emergency Mode. Once the SDCS CIO senses the power returning, the device will return to normal operation. Any connected wall controls, sensors or other input devices will resume as normal. For wiring information, please see below or go to the website.

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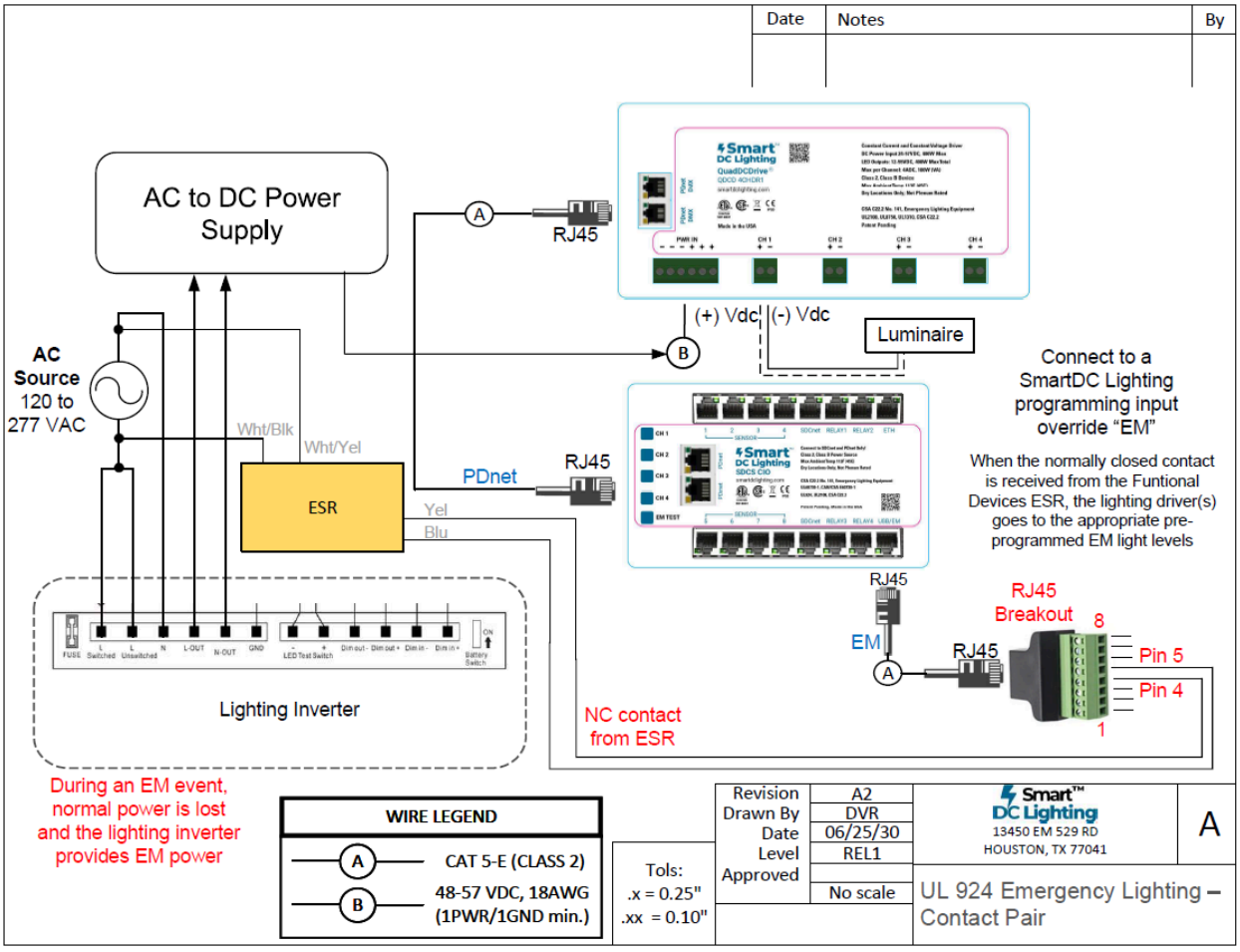
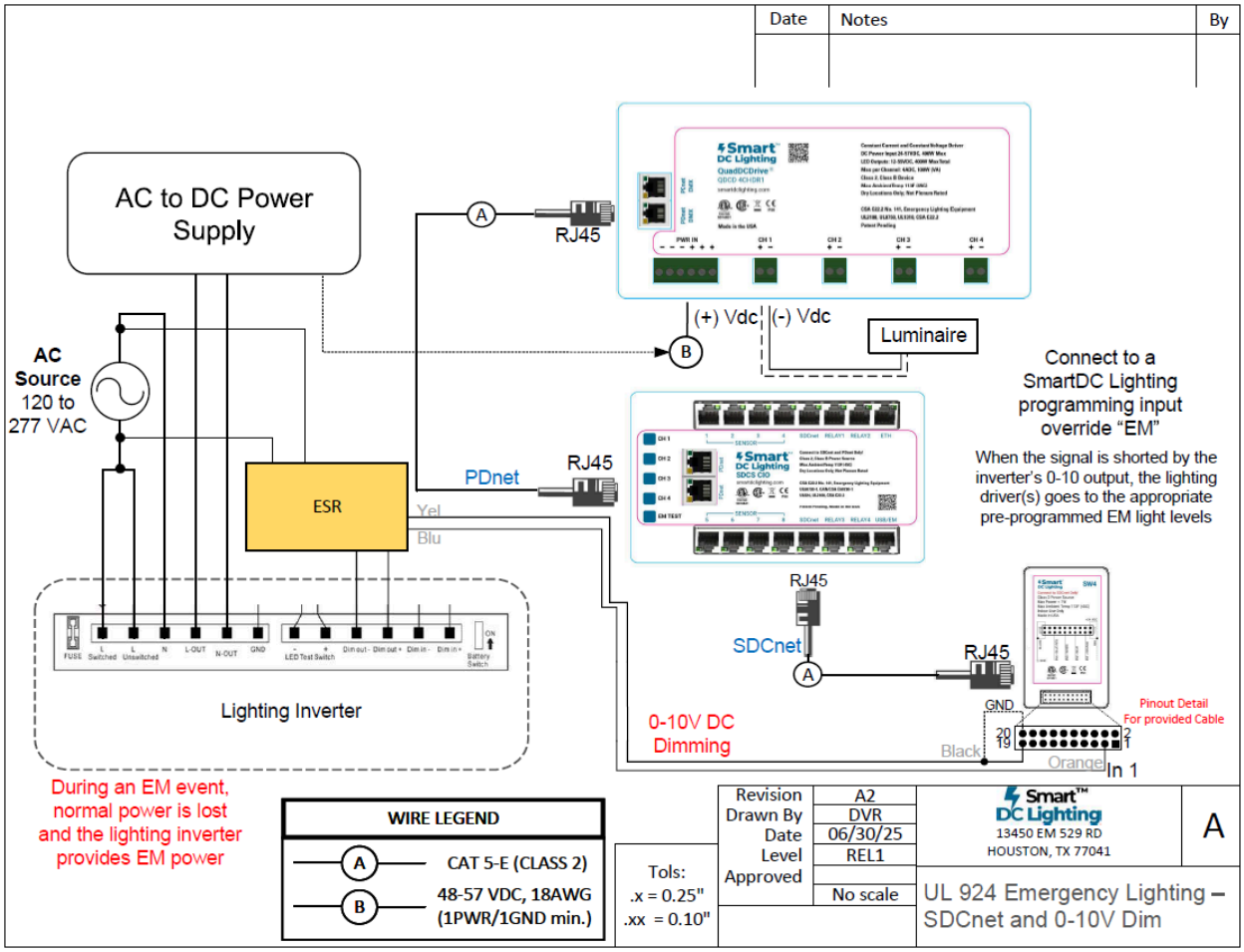
QDCD DC to DC Driver with SDCS CIO for Emergency Lighting & UL 924



QDCD DC to DC Driver with SDCS CIO and SW4 for Emergency Lighting & UL 924



Troubleshooting

1. All fixtures on the output channel of the QDCD are off:
   a. The control system may have lights off, so check the SmartDCLighting wall switch and/or sensor. Observe LED from QDCD port: if PDnet or DMX data is flowing, you will either see a solid or blinking green LED(s). If observed, proceed to “B”. (Activate the wall switch to observe green LED flash)
   b. If the lights restore on full after removing the sDCnet cables and cycling the power, proceed with typical sDCnet troubleshooting. If the problem remains, proceed to “C”.
   c. Check the first DC connection into the luminaires leaving QCDC. The reading should measure > 5 VDC. If no DC voltage is present, reconnect the wiring and proceed to “D”.
   d. Remove the cable from the output of the QCDC and verify DC voltage on the pin power input connector per the below image. If no DC voltage is present, reconnect the cable and proceed to “E”.
   e. DC output present after load removed – check for shorts on the luminaire cable.
   f. AC input is present, and there is no DC output: AC power at the fixture is not allowed.
   g. DC light fixtures towards the end of the run are not not as bright at those closer to the beginning of the run: Adjust cable run length and wire size to minimize voltage drop
   h. Some of the DC light fixtures on a run are non-illuminated: check wiring and ensure fixtures are receiving power using a multimeter.

Additional SmartDC Technical Info may be found at www.smartdclighting.com

QuadDCDrive® Specification Sheet

Wiring Diagrams

WARRANTY 5-year limited warranty. Full warranty terms located at: www.smartdclighting.com

Note: Specifications subject to change without notice.

Actual performance may differ as a result of the end-user environment and application.