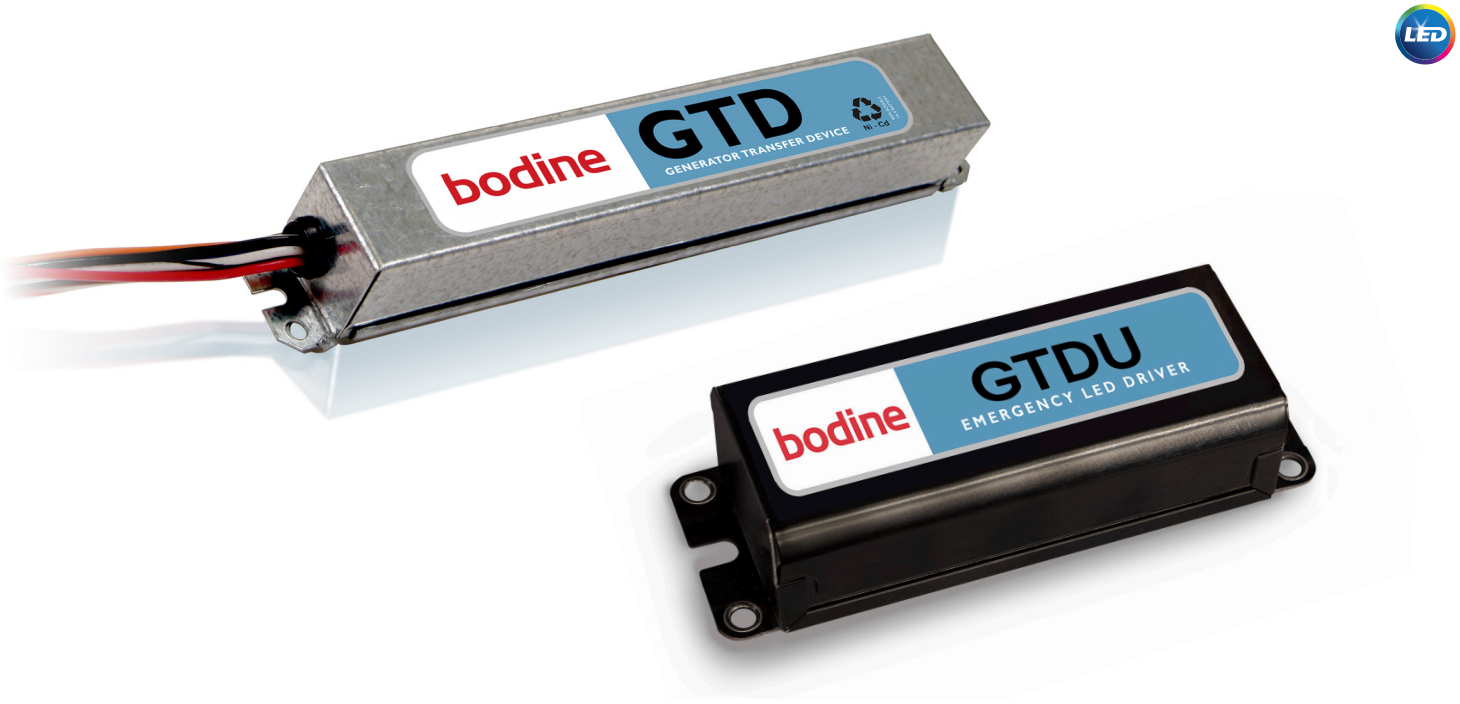
bodine

Emergency Solution

Xitanium SR Drivers and Compatible Sensors

Application Note



Emergency solutions for Xitanium SR drivers and compatible sensors

Distributed and central emergency integration options using Bodine products

1. Distributed emergency solution with Bodine drivers

This solution pertains to the “distributed emergency” category. Namely, in addition to the Xitanium SR (AC driver), the Wireless Control Sensor (WCS) such as EasySense, and the LED module, the wirelessly connected LED fixtures on the path of egress will contain an Emergency Driver. The Emergency Driver is seamlessly integrating the needed emergency-related functions within those “emergency fixtures”, and does not interfere with the connected lighting functionality during the normal mode (i.e., while the mains power is on), other than a small delay in energizing the load upon the transition from power failure to normal mode. This delay (in the 300-500ms range for most Bodine products) is entirely controlled by the electronics in the emergency driver, and is necessary in order to ensure a smooth transition in the power provided to the LED load between the emergency and AC driver, with no overlap.

This arrangement is by far the most popular in commercial buildings - when compared to the central emergency arrangement described in Section 2, and has the following advantage: if any of the emergency drivers fail, the others will still provide sufficient light on the path of egress.

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A “Two-Wire Illuminated Test Switch” (2W-ITS) is also provided, allowing the manual actuation of the code-mandated monthly and yearly emergency functionality/duration tests. The inclusion of the 2W-ITS device is necessary because some of the emergency drivers do not have self-testing capability. This device is represented outside the fixture as, e.g., it can be remotely mounted up to 50ft from most Bodine emergency drivers. The 2W-ITS wiring should be specific to a Class 2 device. For additional details please consult the Installation Instructions and/or spec sheets (accessible on-line, at www.bodine.com).

It is important to note for proper emergency driver operation, an un-switched hot 120-277Vac input wire must be present, allowing the detection of a power failure (see wiring diagrams). In addition, depending on the wireless control sensor manufacturer’s preference, the wall switch may or may not be required. Another consideration for these “emergency fixtures” is the Xitanium SR AC driver output is routed to the LED module through the emergency driver, which adds a diode voltage drop along the Xitanium SR output path. For the purpose of power budgeting, the voltage/power drop on the diode needs to be taken into account. For total lamp currents in the 300-800mA range, the voltage drop is about 500-700mV during normal mode, leading to a 150-560mW power drop.

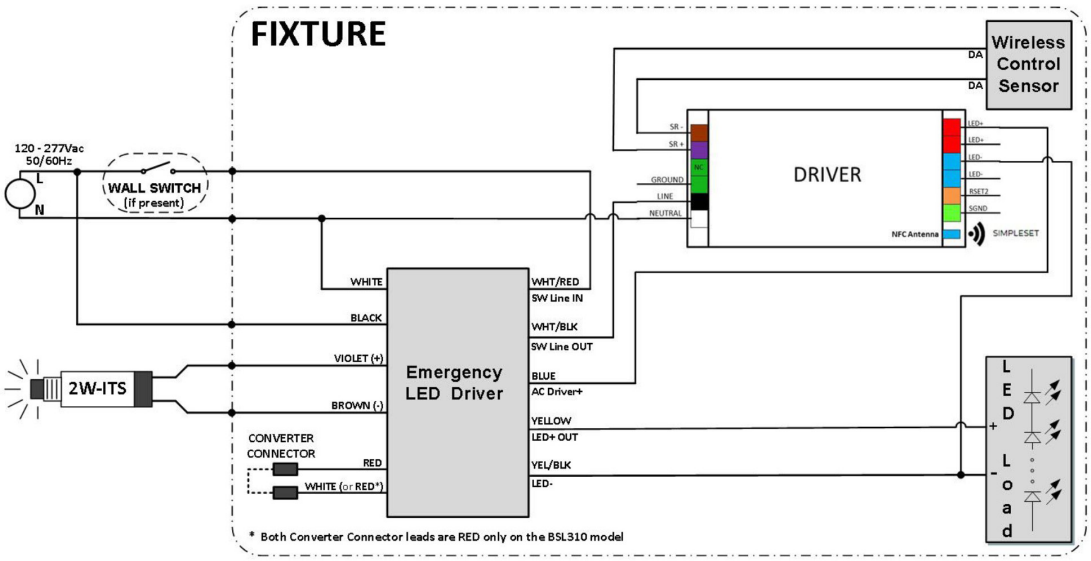

Figure 1. Wiring diagram for the distributed Eemergency solution for Xitanium SR LED driver.

Using Bodine BSL310/BSL310LP/BSL10ST/BSL6LST – Emergency Driver Selection Considerations

Please refer to the selection features listed below when selecting the Philips Bodine Emergency LED driver to be used in conjunction with the Xitanium SR driver in your fixture. For additional parameter/feature detail information please visit www.bodine.com.

BSL310
Initial power: 10.0-10.4W (regulated), chiefly dependent on ambient temperature. Over the required 90 minutes, the output power is NFPA-101 and NEC 700.12 compliant.

Output voltage range: 15-50Vdc

Case: polycarbonate, 14.5" x 2.25" x 1.18"

BSL310LP
Initial power: 10.1-10.5W (regulated), chiefly dependent on ambient temperature. Over the required 90 minutes, the output power is NFPA 101 and NEC 700.12 compliant.

Output voltage range: 15-52Vdc

Case: galvanized steel, 22.5" x 1.18" x 1.18"

BSL10LST
Initial power: 10W initial (regulated), chiefly dependent on ambient temperature. Over the 90 minutes, the output power is NFPA 101 and NEC 700.12 compliant.

Output voltage range: 15-54Vdc

Case: galvanized steel, 16.6" x 1.18" x 1.0"

BSL6LST
Initial power: 6W initial (regulated), chiefly dependent on ambient temperature. Over the 90 minutes, the output power is NFPA 101 and NEC 700.12 compliant.

Output voltage range: 15-54Vdc

Case: galvanized steel, 16.6" x 1.18" x 1.0"

2. Central emergency solution with Bodine GTD

Central emergency is chiefly found in buildings where auxiliary/back-up generators are used. Only critical circuits are powered from the generator during power outages, downstream from a Transfer Switch, requiring dedicated branch circuits and associated hardware. Often a GTD or GTDU (Generator Transfer Device) is used, working in conjunction with the auxiliary generator or the central inverter system to power the existing AC drivers in the "emergency fixtures" for path of egress lighting regardless of the wall switch open or closed position. Usually one GTD or GTDU per fixture is used to bypass the fixture's wall switch, allowing the building's generator (or central inverter) to unconditionally turn on the switchable "emergency fixtures" during a power failure. The GTD/GTDU senses the loss of normal power and switches the AC driver input power connection to an unswitched, generator (or central inverter) supplied lighting circuit. Obviously (as illustrated in the spec sheet picture – readily available at www.bodine.com - and in the wiring diagrams depicted in this section), the Bodine GTD/GTDU requires a direct, unswitched connection to a generator (or central inverter) supplied emergency panel and an unswitched source on the same branch circuit as the switched supply.

Figure 2. Bodine GTD.

Figure 3. Bodine GTDU.

Rather than using an actual emergency driver, the central emergency solution proposed by Bodine for the wireless connected lighting systems will make use of a GTD/GTDU, but in an unconventional way. In essence, rather than affecting a typical circuit switching the AC driver input (as described previously), the GTD/GTDU "gates" the communication protocol by either normally connecting both DALI lines (between the Xitanium SR and the WCS), or shorting the DALI lines at the Xitanium SR (a condition that is sustained indefinitely by the DALI bus-powering output of the Xitanium SR) while simultaneously opening them towards the WCS.

In a nutshell, during an AC mains power failure, the proposed solution causes the occurrence of a failure-like hardware condition on the DALI bus. This condition causes the unconventional manipulation of an "Interface Failure" provision of the IEC 62386-102 standard. This defines the DALI general requirements for control gear connected to a DALI bus, the Xitanium SR driver in this case. The provision mandates the activation of an output light level per the particular value stored in an internal variable (of the Xitanium SR memory) when the DALI lines remain longer than 500ms below a voltage threshold. This is certainly attained with the lines shorted towards the DALI-bus-power-provider Xitanium SR. The default (and "reset") value of this variable translates to 100% output power, but in principle the variable can be programmed to any other desired value – although a clearly defined minimum value should be set in accordance with the code-mandated minimum light level on the path of egress. This default value would result in the maximum light being provided in emergency mode, which would provide an optimal retrofit to the solution and light level existent prior to the installation of the wireless connected lighting system.

The wiring diagram for central emergency integration with a wireless connected lighting network is shown on the next page, in Figures 4 and 5. Note the power failure detection circuit (present in the emergency driver for the distributed emergency solution) is now included in the GTD/GTDU device (commercially available from Bodine) and the wall switch is omitted. As explained in the previous subsection, the GTD/GTDU provides the means for short-circuiting the DALI lines at the Xitanium SR AC driver, and both cutting the power to the WCS and activating the full output power to the LED load from the Xitanium SR acting as "emergency driver", powered by the building's generator.

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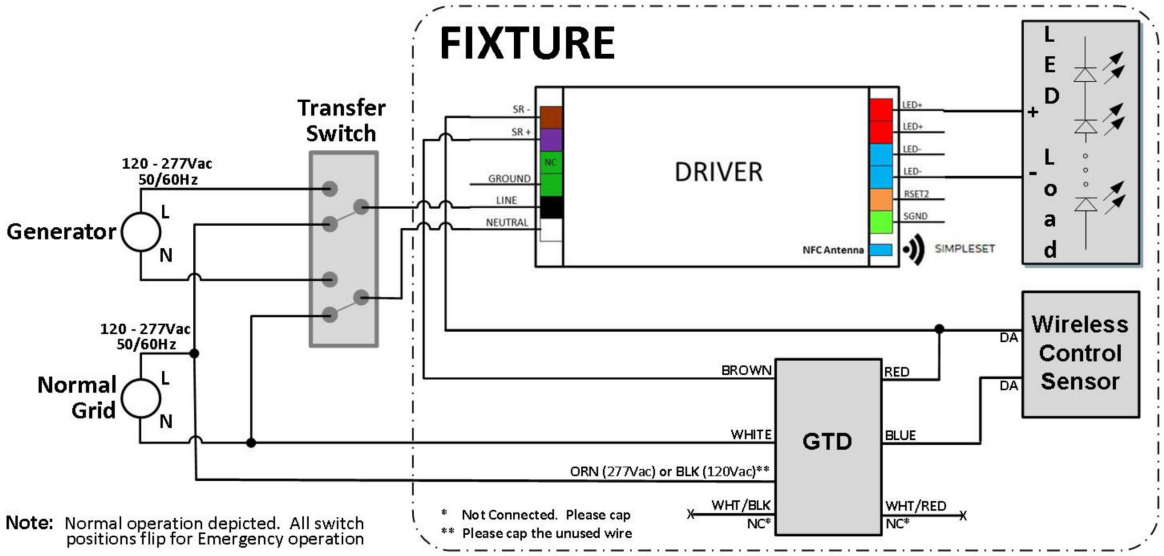

Figure 4. Wiring diagram for the central emergency solution with a Bodine GTD.

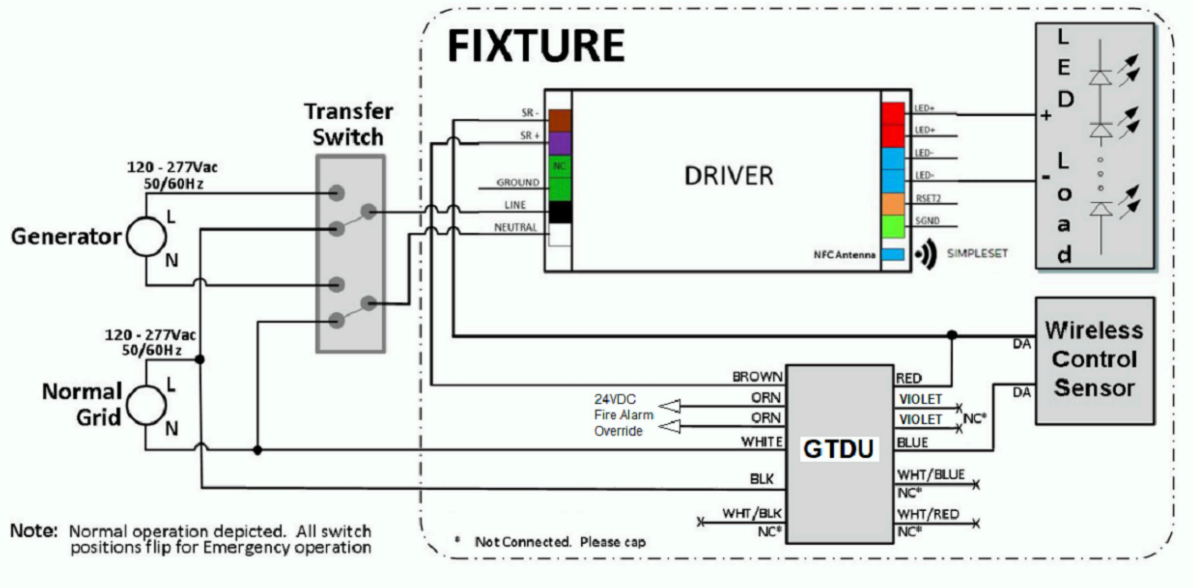

Figure 5. Wiring diagram for the central emergency solution with a Bodine GTDU.

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