Application Note:

EMERGENCY SOLUTIONS FOR XITANIUM SR DRIVERS & COMPATIBLE SENSORS: DISTRIBUTED AND CENTRAL EMERGENCY INTEGRATION OPTIONS USING PHILIPS BODINE PRODUCTS

June 2016

1. Distributed emergency solution with Philips 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 the MCU-controlled models BSL310LP and BSL36LP, and in the 2-4s range for the BSL310 model) 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 other ones will still provide light on the path of egress.

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 2W-ITS device is necessary because some of the emergency drivers do not have self-test capability. This device is represented outside the fixture as, e.g., it can be remotely mounted up to 100ft from the BSL310LP or the BSL36LP Emergency Drivers; for the BSL310, please consult, e.g., the "Remote Distances" Table of the corresponding Spec Sheet. 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 – as illustrated in the wiring diagrams included later in this section – that for proper emergency driver operation, an un-switched hot 120-277Vac input wire should be present, allowing the detection of a power failure. In addition, depending on the wireless control sensor manufacturer's preference, the wall switch may or may not be wired in. One needs to also consider the fact that for these "emergency fixtures" the output of the Xitanium SR AC driver is routed to the LED module via the emergency driver, which adds a diode drop on 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 500-550mV during normal mode, leading to a 150-450mW power drop. .

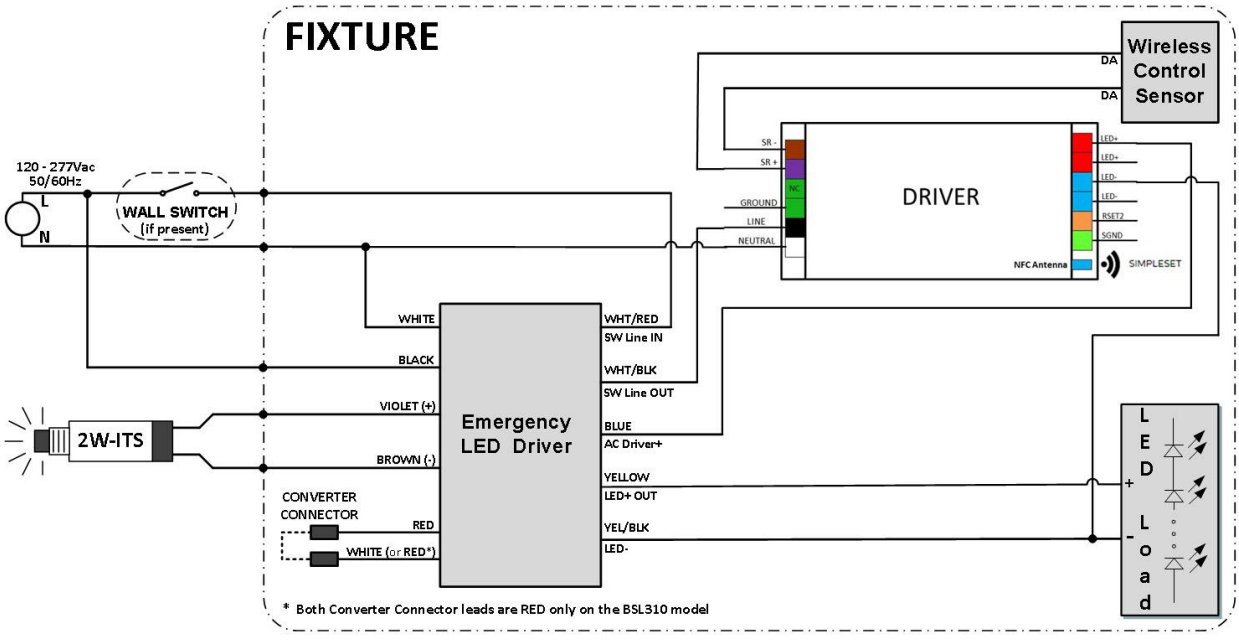

Figure 1 – Wiring diagram for the Distributed Emergency solution for Xitanium SR LED Driver

Using Bodine BSL310/BSL310LP/BSL36LP – 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: 12-15W (unregulated), dependent on the output (LED load) voltage, ambient temperature, state of charge of the internal battery pack, etc. Over the required 90 minutes, the output power is NFPA-101 and NEC 700.12 compliant
- Output voltage range: 10-29Vdc (with selector) or 30-50Vdc (without selector)
- Case: polycarbonate, 14.5"x2.25"x1.18"

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 metal, 22.5" x1.18"x1.18"

BSL36LP:

- Initial power: 6.1-6.4W (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: 15-52Vdc
- Case: galvanized metal, 21.5" x1.18"x1.18"

2. Central emergency solution with Philips Bodine GTD

Central emergency is chiefly found in buildings where auxiliary/back-up generators are used. Only highly sensitive circuits are powered off the generator during power outages, downstream from a Transfer Switch, requiring dedicated branch circuits and associated hardware. Often a GTD (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 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 would sense the loss of normal power and switch the AC driver input power connection to an un-switched, 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 Philips Bodine GTD requires a direct, un-switched connection to a generator (or central inverter) supplied emergency panel and an un-switched source on the same branch circuit as the switched supply.

The distributed emergency solutions, described and illustrated in Section 1, have the advantage that if any of the emergency drivers fail, the other ones will still provide light on the path of egress. Obviously, in the central emergency case, if the central generator/inverter or the connection to the emergency lighting branch fails, the entire path of egress will not be lit.

Figure 2 – Philips Bodine GTD

Rather than using an actual Emergency Driver, the central emergency solution proposed by Philips Bodine for the wireless connected lighting systems will make use of a GTD, but in an unconventional way. In essence, rather than effecting a typical circuit switching in the input of the AC driver (as described above), the GTD is "gating" the communication protocol by either normally connecting both DALI lines (between the Xitanium SR and the WCS), or shorting the DALI lines towards the Xitanium SR (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. It thus causes the unconventional manipulation of a provision ("Interface Failure") of the IEC62386-102 standard (which spells out the DALI General Requirements for a control gear connected to a DALI bus, the likes of the Xitanium SR for our particular circuit solution). 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 translate to a 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 floor. This default value would hence result in the maximum light being provided in emergency mode, which would thus provide a perfect retrofit to the solution and light level existent prior to the installation of the wireless Connected Lighting system.

Illustrative drawings of the proposed solution (by means of a wiring diagram) for Central Emergency integration with a wireless Connected Lighting network is shown below, in Figure 3. Note that the power failure detection circuit (present in the emergency driver for the distributed emergency solution) is now included in the GTD device (commercially available from Philips Bodine) and the wall switch is omitted. As explained in the previous subsection, the GTD provides the means for short-circuiting the DALI lines towards the Xitanium SR AC driver, and thus both cutting the power to the WCS and activating the full output power to the LED lamp load from the Xitanium SR acting as "emergency driver", powered by the building's generator.

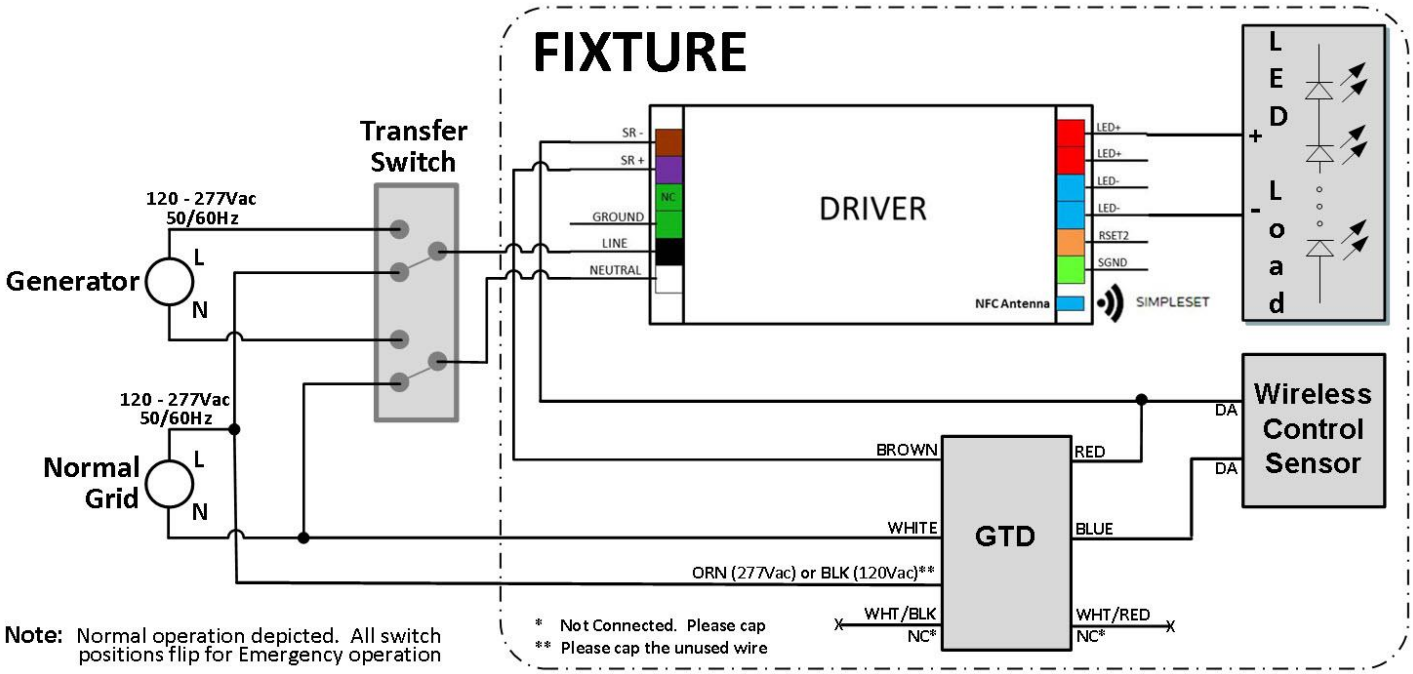

Figure 3 – Wiring diagram for the Central Emergency solution with a Philips Bodine GTD