Design and Application Guide
volume 2



WaveLinx DALI

DALI-2 compliant wired networked lighting control solution

Flexible. Interoperable. Powerful.







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WaveLinx DALI

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WaveLinx DALI

WaveLinx DALI brings the power of DALI-2 (IEC 62386) to the WaveLinx ecosystem, combining open-standard devices enabling interoperability with the simplicity of WaveLinx app-based commissioning.

It delivers deterministic wired control, granular addressability (groups, scenes, tunable white), and streamlined compliance with modern energy codes.

Can be paired with other WaveLinx technologies, including our wireless PRO products, for hybrid deployments—one app, one platform, total design freedom.

WaveLinx DALI scales to building and campus level management via WaveLinx CORE, sharing actionable lighting and occupancy insights while maintaining a secure, segmented control network.

Flexible. Interoperable. Powerful.



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What is DALI?

DALI, or Digital Addressable Lighting Interface, is a protocol or language for wired lighting systems, allowing them to 'talk' to and 'understand' each other, all standardized under IEC 62386 and DALI Alliance specifications. It allows precise and intelligent communication between various lighting components, enabling designers to create more versatile, responsive, and innovative lighting solutions.

Terms and Definitions (common in the DALI world)

TERM	DEFINITION
Application Controller	A DALI controller that is connected to the bus and sends commands to control input devices and/or control gear connected to the same bus. In the case of WaveLinx DALI, the application controller is the WaveLinx DALI hub that is installed in the WaveLinx DALI Panel.
Ballast	A type of control gear, typically referring to those for fluorescent lamps. These are typically referred to as Device Type 0 (DT0).
Broadcast	A method of sending a command to all DALI devices on the bus simultaneously.
Bus Power Supply	A component that provides power to the bus to enable communications, and as the supply for bus-powered devices.
Bus Current	Maximum Bus Current: This is defined by the DALI standard at 250 mA and it is the maximum current a component that powers the bus to enable communication can provide. Guaranteed Bus Current: A defined lower-bound current that the power supply will sustain; typically below the 250 mA max to ensure reliable operation – accounting for tolerance, aging, and environmental conditions.
Commissioning	The process of configuring and setting up DALI devices and networks, including assigning addresses, creating groups (or zones), and defining scenes.
Commissioning Tool	Software or hardware used to configure and commission DALI systems. The WaveLinx application software (with the WaveLinx Area Controller) enables easy commissioning of a DALI system.
Control device	Device that is connected to the bus and sends commands to other devices connected to the same bus. Control devices are typically input devices. These devices are typically powered by the DALI bus.



TERM	DEFINITION
Control gear	Device that is connected to the bus and receives commands to control at least one output, typically a lamp, in a direct or indirect way. These devices are typically externally powered. Some output devices like the Digital to Analog Converter and Field Relay are powered by the DALI bus.
DALI Bus	2 conductors that connect various DALI devices together.
Dimming Curve	A predefined curve that determines how a DALI ballast or driver dims the light output in response to control commands (level instructions).
Driver	A type of control gear, typically referring to those for LED light sources. These are typically referred to as Device Type 6 or 8 (DT6 or DT8).
Emergency Lighting	Devices and luminaires that support emergency lighting functionality, ensuring illumination during power outages. These devices may or may not have a DALI interface.
Gateway	A control device that allows DALI devices to be controlled or used by other communication protocols. In the case of WaveLinx DALI, the DALI Hub, located inside the DALI panel acts as the translator between DALI and Ethernet.
Group	A grouping of DALI control gear or control devices instances that can be simultaneously addressed by a command sent to the group. In the context of WaveLinx, treat a DALI group as a Zone.
Input device	A type of control device that provides information or measurements to application controllers. Examples are wallstations, occupancy sensors and light sensors.
Multi-master	A control device that is designed to share the bus with other multi-master control devices. The WaveLinx DALI solution is a multi-master device.
Single-master	A control device that is not capable to share the bus with multi-masters, except possibly when polling input devices.
Scene	A predefined lighting state, including light level and color, that can be recalled to create different lighting moods or scenarios.
Sensor	An input device that detects occupancy, light levels, or other environmental factors.
Short Address	A unique identifier assigned to each DALI device on the bus for individual control, configuration, or querying.



Components of a DALI System

Wired DALI Bus

- A 2-wire cable or conduit carrying power for bus-powered devices, as well as data to interconnect all components

Control Devices

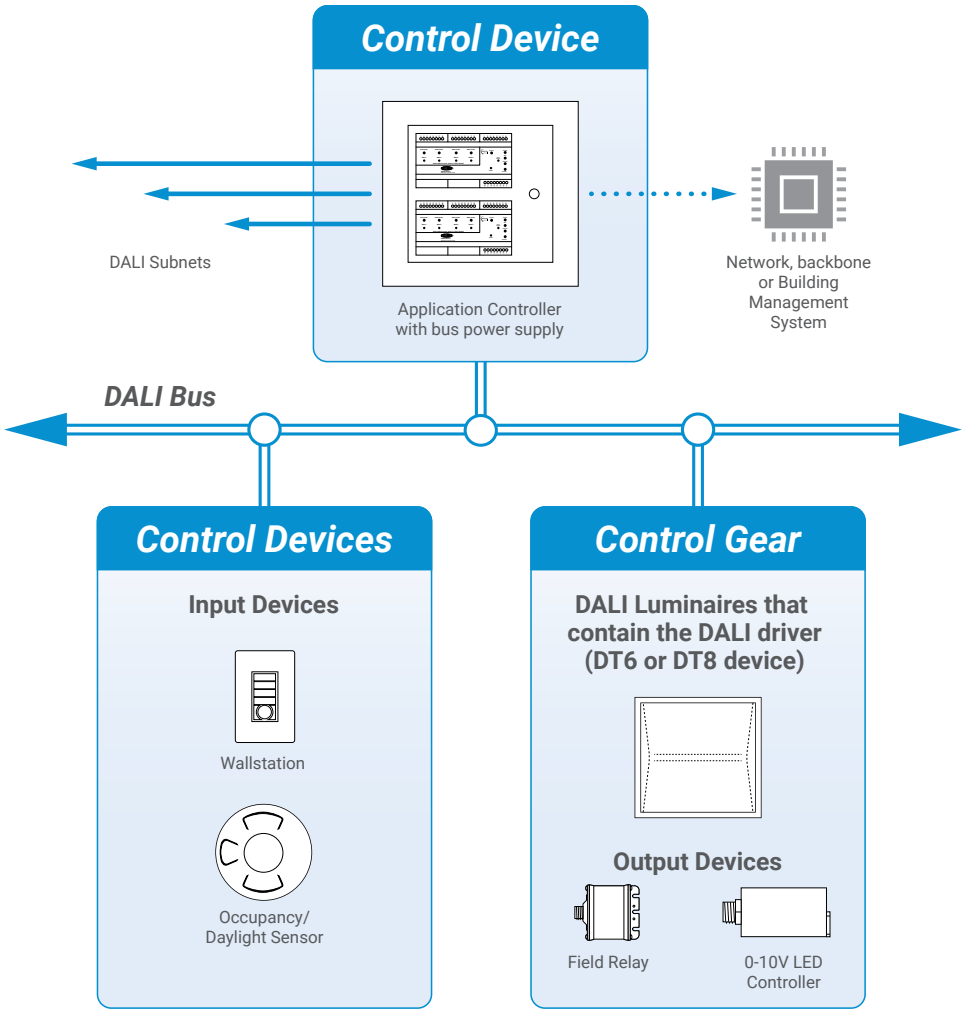
- Application Controllers
- Input Devices

Control Gear

- LED drivers, externally powered (e.g. by AC mains)
- Output Devices (Digital to Analog Converters, Field Relays, etc...)

Bus Power Supplies

- Provide typically 16V, up to 250 mA to power the bus.
- Bus power could be either separate or integrated with an existing device (e.g. application controller)



WaveLinx DALI panel with the DALI Hub

Small

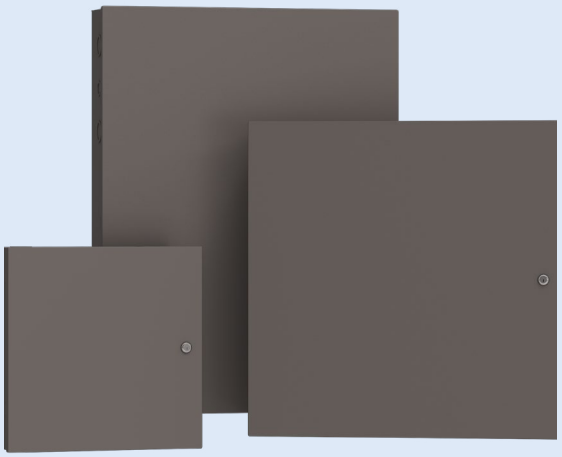
WDP-D2-S1-* Small panel with 1 DALI Hub (4 DALI buses)
WDP-D2-S2-* Small panel with 2 DALI Hubs (8 DALI buses)

Medium

WDP-D2-M3-* Medium panel with 3 DALI Hubs (12 DALI buses)
WDP-D2-M4-* Medium panel with 4 DALI Hubs (16 DALI buses)

Large

WDP-D2-L5-* Large panel with 5 DALI hubs (20 DALI buses)
WDP-D2-L6-* Large panel with 6 DALI hubs (24 DALI buses)



Input Devices



Ceiling Sensor

OCS-D2-P06
OCS-D2-P12

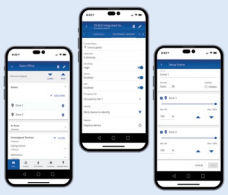


Wallstation

WST-D2-1L-*
WST-D2-1DL-*
WST-D2-2L-*
WST-D2-2DL-*
WST-D2-3L-*
WST-D2-4S-*
WST-D2-4DS-*
WST-D2-6S-*

Area Controller



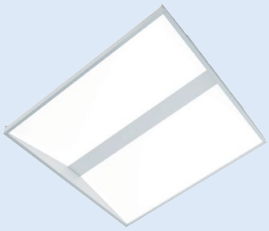


WaveLinx Area Controller with WaveLinx Mobile App

WAC2-POE
WAC2-120
WPOE2-120

W-APP

Control Gear



DALI-2 Drivers
(typically installed in fixtures)

DT6
DT8
DT8 (Tunable White - Tc)



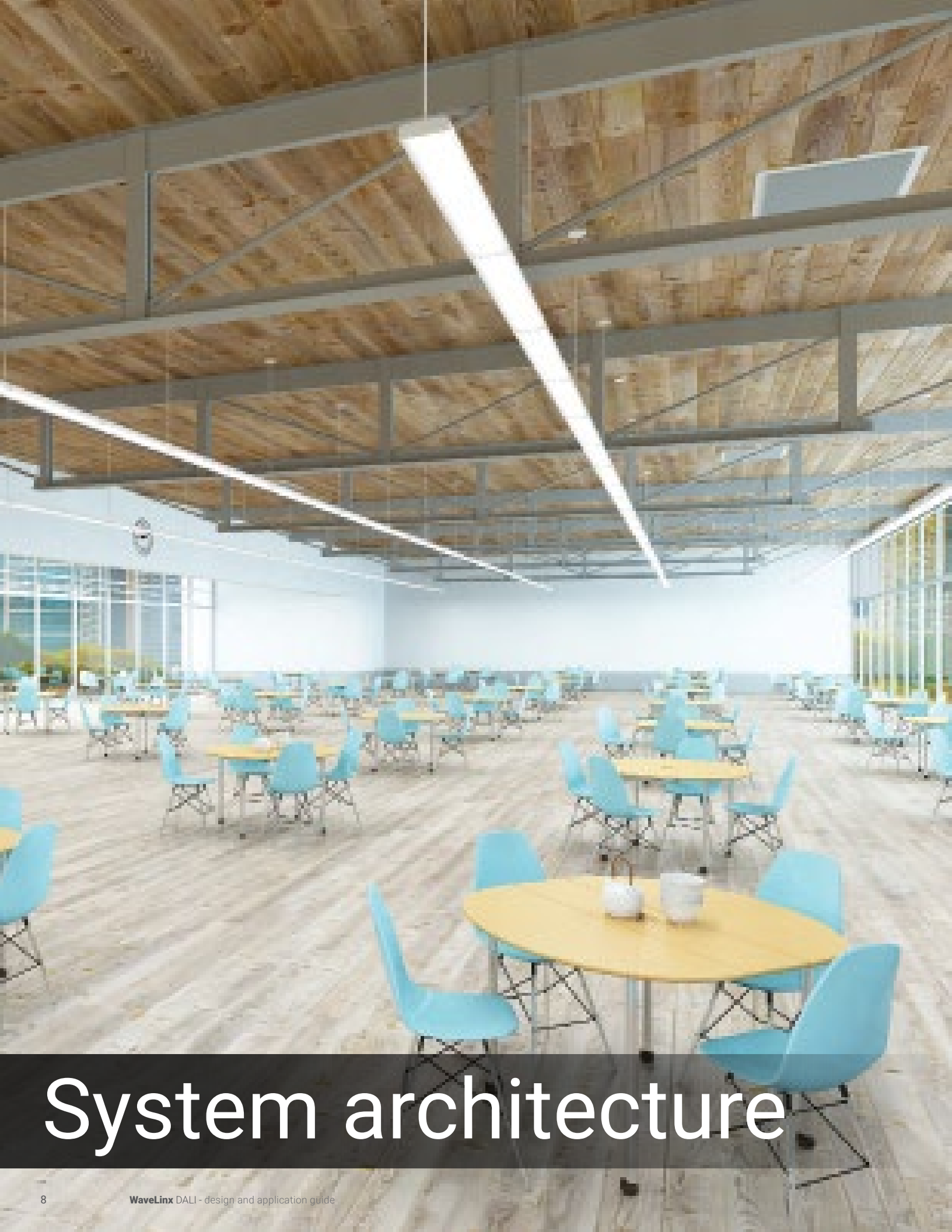
DAC
(DALI-1 Device)

DAC-DC1
DAC-DC2



Field Relay
(DALI-1 Device)

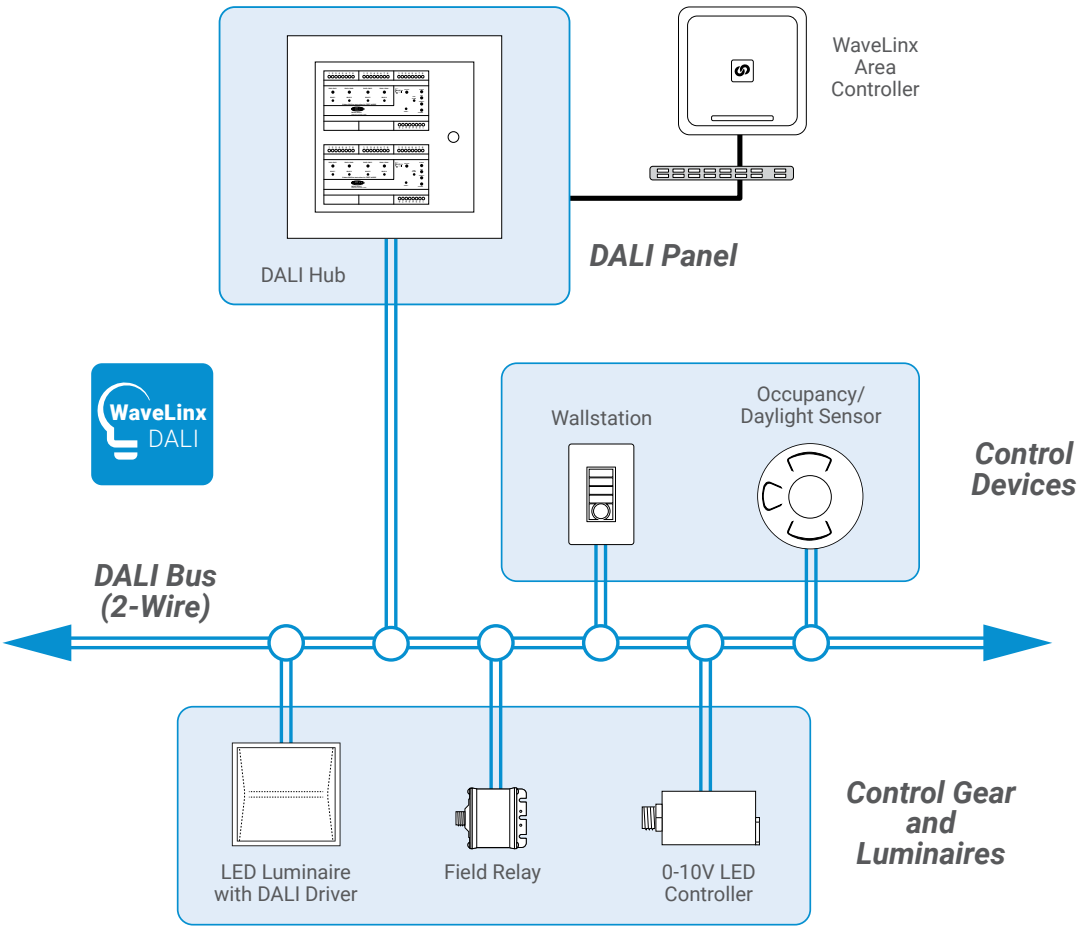
FRS-DA



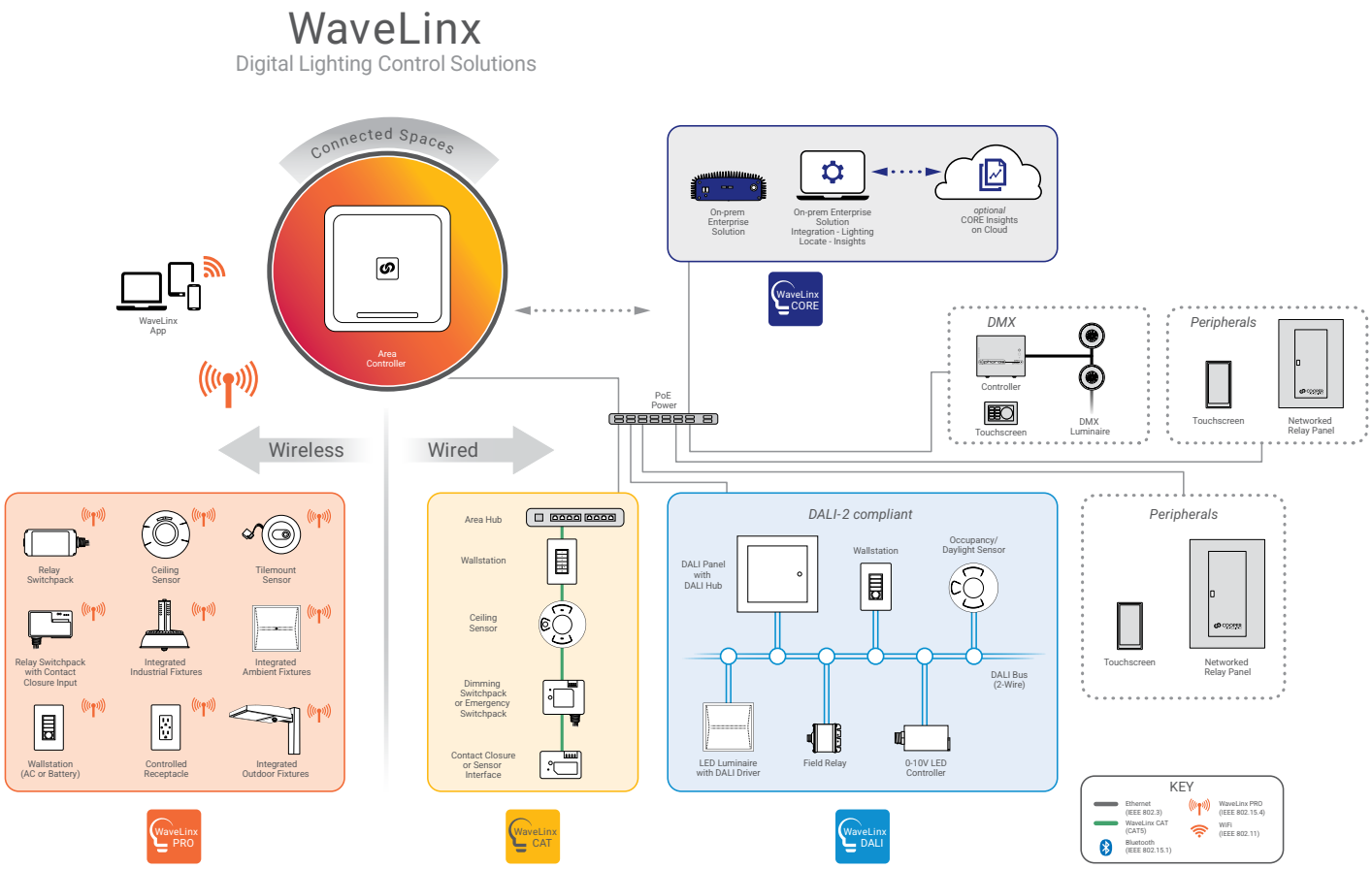
System architecture

WaveLinx DALI Sub-System Overview

This diagram shows the main components and topology of the WaveLinx system with DALI devices. The WaveLinx DALI enables DALI certified luminaries/drivers and peripherals to function with other WaveLinx devices.



WaveLinx System Architecture with WaveLinx DALI





Build a DALI system

Wiring in a DALI system

Wiring in a DALI system is relatively straightforward. It follows a primary-responder architecture where the WaveLinx DALI Hub (located inside the WaveLinx DALI panel) sends information and instructions, and the luminaires respond to these instructions or information requests.

Structure and Signal Flow

DALI uses a two-wire bus to transmit data and supply power on the same pair of wires, eliminating the need for a separate bus cable and simplifying the overall structure. Depending on local code requirements, DALI control wires can be run in the same conduit or cable as AC mains.

Wiring Examples

MANUFACTURER	PRODUCT
Cooper Lighting Solutions	Modular Wiring Systems (MWS)
Southwire	MC-PCS Duo (Power & Control/Signal cable)

Wire Size and Distance

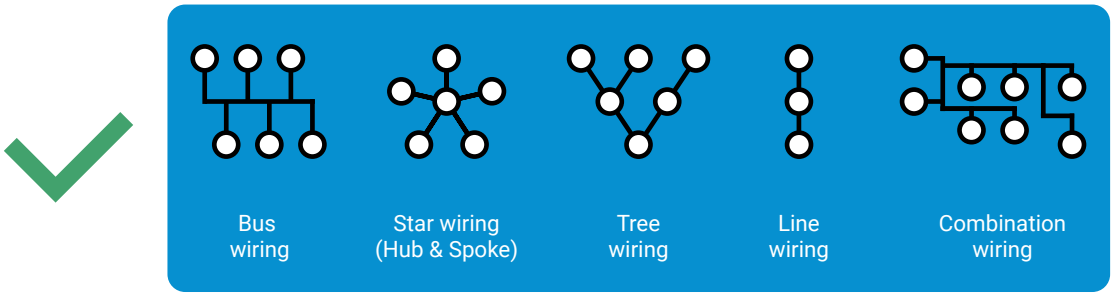
WIRE SIZE (AWG / mm2)	MAXIMUM DISTANCE (ft / m)
16 / 1.5 (recommended)	980 / 300
18 / 0.8	325 / 100

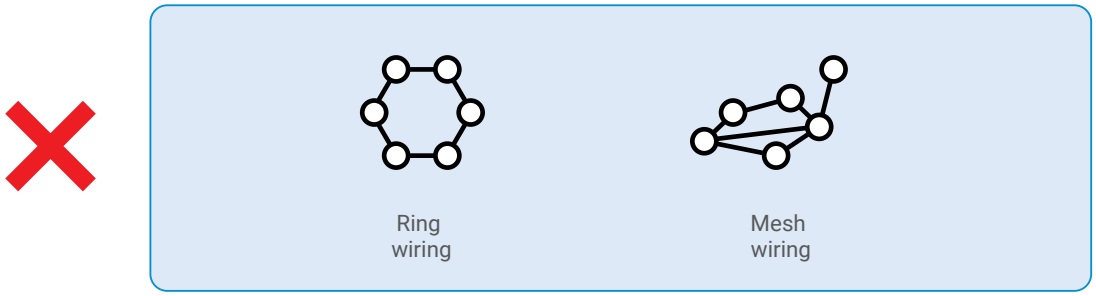
Ease of Installation

Except for devices containing a bus power supply, where the connection will be marked 'DA+' and 'DA-', the wires in a DALI system are not polarity sensitive, meaning the cores can be connected to any terminal. This feature significantly reduces the likelihood of wiring errors commonly encountered in traditional lighting systems and ensures a smoother installation process.

Topology Flexibility

DALI supports flexible wiring topologies like daisy-chain, star connections, or a combination of these using a standard 16 AWG or 1.5mm² two-core cable. This flexibility allows for ease of installation and adaptability to different layout needs. The total cabling distance is limited to 300m (except in cases where the cable layout and characteristics are specially designed and selected) and allows a maximum bus current of 250mA. It recommended to design to the guaranteed bus current of the WaveLinx DALI hub for each DALI bus (238 mA).





General DALI System Design Parameters

This table serves as a reference of the general design parameters of DALI. Where possible, the WaveLinx Area Controller (WAC) manages these rules internally and will provide a notification if there is an error.

DESIGN PARAMETER	VALUE	REMARK
Bus Length	**300 m (984 ft)**	Between furthest devices (from DALI panel to the last device on the DALI bus) using 16 AWG Wire
Control Gear Addresses per bus	**64**	64 Addresses is the maximum per the DALI-2 standard. Best practice is to limit to 55 addresses. Keep in mind the current (mA) draw of the devices. If the current (mA) draw is exceeded for a bus, the WAC will report the error.
Control Devices Addresses per bus	**64**	64 Addresses is the maximum per the DALI-2 standard. Best practice is to limit to 55 addresses. Keep in mind the current (mA) draw of the devices. If the current (mA) draw is exceeded for a bus, the WAC will report the error.
Bus Current Capacity per bus	**250 mA (238 mA for WaveLinx DALI)**	250 mA is the maximum bus current per the DALI-2 standard. The Guaranteed Bus Current for each DALI bus is 238 mA. The DALI bus voltage is typically 16 VDC and ranges between 9.5 and 22.5 VDC. If the current (mA) draw is exceeded for a bus, the WAC will report the error.
Topology	**Line, Tree, Star, Bus, Combination**	No Loop or Mesh

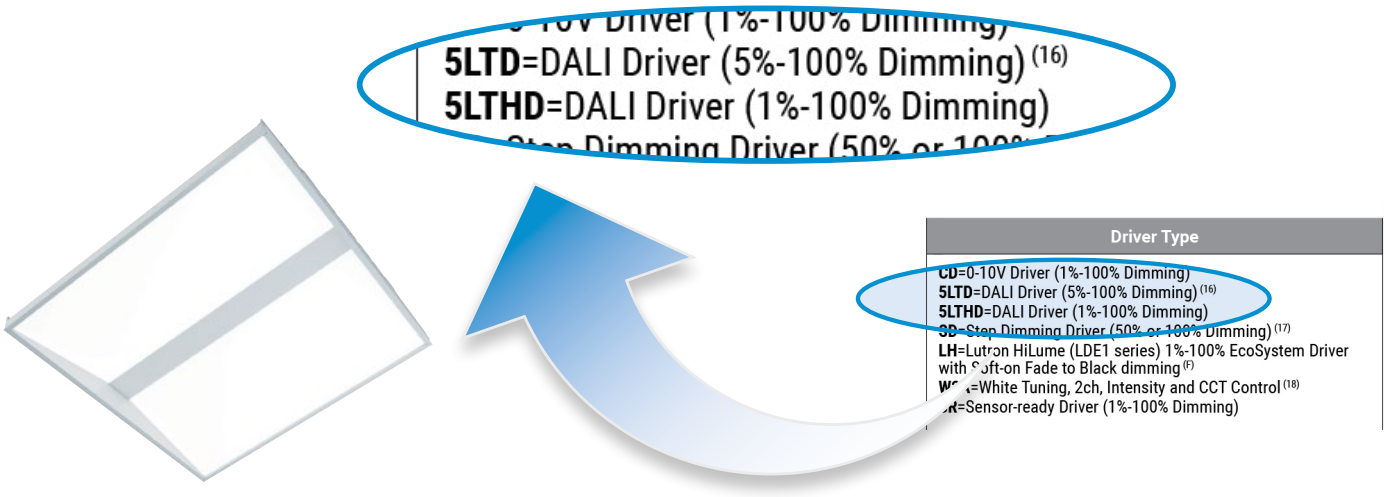
General notes on groups in the context of WaveLinx:

- The WAC automatically manages DALI grouping by prioritizing devices into native DALI groups based on the group size.
- It is possible to have groups (or Zones) across DALI busses and technologies (PRO and CAT).

Steps to Build a DALI System

Step 1: Define the DALI Luminaires and output devices

- Select the appropriate Cooper luminaires you wish to control. These DALI luminaires will contain the control gear (DALI driver). The catalog logic for the driver type should be **-5LTH or -5LTHD** (single channel, DT6 driver).
- Select the appropriate output devices. For example, a Digital to Analog Converter may be used to control 0-10 luminaires or a Field Relay may be used for plug load control.
- For White Tuning application (DT8 drivers), submit this as an ETO and specify that a **DT8** driver required.
- Below is an example of the Encounter fixture:



Per the DALI standard the maximum number of control gear addresses per DALI bus is 64.

Step 2: Define the control devices (Input devices)

Control devices are typically powered by the DALI bus.

- Select the appropriate input devices (see page 28-30) to control your lighting. Input devices are Wallstations or sensors.

Step 3: Count your addresses and compute the DALI bus current

- Count the number of addresses of Luminaires with DALI drivers (control gear) and output devices like DACs and Field Relays.
- Count the number of addresses of control devices (devices powered by the DALI bus like Wallstations, Occupancy Sensors, etc.)
- Compute the required bus current for all the devices **add an additional 20% to the computed bus current or 10 mA, whichever is greater.**
    - Assume 2mA for DALI luminaires with a DALI driver
    - For control devices, refer to their specification sheet

DEVICE TYPE	CURRENT DRAW	NUMBER OF ADDRESSES
DALI Driver (Control Gear)	**2 mA**	1
DALI-2 Wallstation (Control Device)	**7 mA**	1
DALI-2 Ceiling Sensor (Control Device)	**7 mA**	1
DALI DAC (0-10V fixture control) (Control Gear)	**3.75 mA**	1
DALI Field Relay (Control Gear)	**3.75 mA**	1

PARAMETER	VALUE
Total Control Gear Addresses	A
Total Control Device Addresses	B
Total Addresses	C = A + B
Total DALI Bus Current	D0
Total DALI Bus Current w/ Margin	D = (D0 + 10mA or D0 × 1.2 (whichever is greater)

Step 4: Determine the number of DALI buses

- Per the DALI standard, one DALI bus can support up to 64 control gear (DALI driver or output devices) addresses and up to 64 control devices (sensors, wallstations,etc.).
- It is recommended to plan for 50 – 55 devices per device type per bus or load up to 80% per device type per bus.

ACTION	VALUE
Divide the number of control gear addresses by 55	E = A ÷ 55
Divide the number of control device addresses by 55	F = B ÷ 55
Divide the total DALI bus current by 238 mA	G = D ÷ 238

H = Maximum of these three values

H = # of DALI Buses, rounded up. Example: 2.3 → 3



Step 5: Define the DALI panel size and the number of DALI devices

CATALOG #	NUMBER OF DALI HUBS	NUMBER OF DALI BUSES	TOTAL GUARANTEED CURRENT DRAW (mA)	NUMBER OF ADDRESSES (RECOMMENDED)
WDP-D2-S1	1	4	4 x 238 = 952	Control Gear = 55 x 4 = 220 Control Devices = 55 x 4 = 220
WDP-D2-S2	2	8	8 x 238 = 1,904	Control Gear = 55 x 8 = 440 Control Devices = 55 x 8 = 440
WDP-D2-M3	3	12	12 x 238 = 2,856	Control Gear = 55 x 12 = 660 Control Devices = 55 x12 = 660
WDP-D2-M4	4	16	16 x 238 = 3,808	Control Gear = 55 x 16 = 880 Control Devices = 55 x16 = 880
WDP-D2-L5	5	20	20 x 238 = 4,760	Control Gear = 55 x 20 = 1,100 Control Devices = 55 x20 = 1,100
WDP-D2-L6	6	24	24 x 238 = 5,712	Control Gear = 55 x 24 = 1,320 Control Devices = 55 x 24 = 1,320

- Select the size based on “H” computed in step 4.
- It is recommended to limit a DALI panel to one floor.
- Order the panel size that matches your project. As an example, you cannot order a large panel with just one DALI hub.

Step 6: Determine the number of WaveLinx Area Controllers required

The following WAC2 details are relevant to all WaveLinx Technologies (including WaveLinx DALI):

PARAMETER	REMARKS
WAC2 R4 (firmware updated to SR17 or beyond) Supported Devices	The WAC2 R4 supports up to 800 WaveLinx Devices . • All 800 devices (800 best practice) can be used with WaveLinx CAT and WaveLinx DALI devices or WaveLinx Relay Panel outputs (wired devices) • A maximum of 200 of the devices may be WaveLinx PRO devices (wireless) • Up to 50 of the devices may be actively using RTLS functionality • The combination of WaveLinx PRO, WaveLinx Relay Panel, WaveLinx CAT, WaveLinx DALI and RTLS support devices cannot exceed 800 devices Example: 50 RTLS Devices + 150 WaveLinx PRO + 200 WaveLinx CAT + 400 WaveLinx DALI = 800 Devices
WAC2 (firmware prior to SR17) Supported Devices	The WAC2 supports up to 400 WaveLinx Devices . • All 400 devices can be used with WaveLinx CAT and WaveLinx DALI devices or WaveLinx Relay Panel outputs (wired devices) • A maximum of 150 of the devices may be WaveLinx PRO devices (wireless) per WAC2 • Up to 50 of the devices may be actively using RTLS functionality • The combination of WaveLinx PRO, WaveLinx Relay Panel, WaveLinx CAT, WaveLinx DALI and RTLS support devices cannot exceed 400 devices. Example: 50 RTLS Devices + 150 WaveLinx PRO + 100 WaveLinx CAT + 100 WaveLinx DALI = 400 Devices
Areas (WAC2 & WAC2 R4)	The WAC2 supports up to 50 areas. • 49 user defined areas plus 1 default construction area.

Zones (WAC2 & WAC2 R4)	• The WAC2 creates one default dimmable zone per area. • The WAC2 supports up to 200 zones (including sub zones in partitioned areas) total. • There is no restriction to the number of zones per area.
Scenes (WAC2 & WAC2 R4)	The WAC2 supports up to 16 scenes per standard area and 32 scenes per partitioned area.
Occupancy Sets (WAC2 & WAC2 R4)	The WAC2 supports up to 100 occupancy sets amongst all defined areas (including occupancy sub sets in partitioned areas). Areas are not limited to a certain quantity of occupancy sets.
Closed Loop Daylighting (WAC2 & WAC2 R4)	The WAC2 will create a closed loop daylight set when an applicable device is paired. Closed loop daylighting must be manually enabled.
Open Loop Daylighting (WAC2 & WAC2 R4)	The WAC2 supports up to 6 open loop daylight sets per area using the following sensor types: WaveLinx Ceiling Sensor, WaveLinx Outdoor Lighting Control Module, Ambient, Industrial, and Outdoor Integrated Sensors[1], Tilemount Sensor[1]. Open Loop Daylighting must be programmed.
Partitioning (WAC2 & WAC2 R4)	The WAC2 supports up to 2 partitioned areas. Each partitioned area can contain up to 10 partition walls or 10 subareas.
Emergency Sets (WAC2 & WAC2 R4)	**WaveLinx PRO:** The WAC2 supports creation of up to 6 Emergency Sets for WaveLinx PRO devices. A maximum of 6 Normal Power Sense (NPS) WaveLinx PRO devices can be assigned amongst ALL defined Emergency Sets. **WaveLinx CAT:** Emergency Sets are automatically created through the Area Hub import based on the devices connected to the port. No more than 3 Normal Power Sense (NPS) WaveLinx CAT devices may be assigned to any WaveLinx CAT Emergency Set. **WaveLinx DALI:** There are no emergency sets. In the case of DALI, when the DALI bus gets disconnected, this is considered a "System Failure" and all luminaires will go to 100% light level and will not react to any input devices like (Wallstations or Sensors)

1. WaveLinx Integrated Sensor and Tilemount Sensor assignment for open loop control is contingent on the use of WaveLinx Area Controller with minimum version 10.0.x.x and updated device firmware.

If only DALI devices are on the project:

- Do not exceed the total number of supported devices per WAC2.
- Best practice is 800 DALI devices per WAC2 (WAC updated to SR17 firmware).
- Best practice is 40 DALI buses per WAC2.

ACTION	VALUE
Divide the number of addresses by 800	I = C ÷ 800
Divide the number of DALI buses by 40	J = H ÷ 40

K = Maximum of these two values

K = # of WACs, rounded up. Example: 2.3 → 3

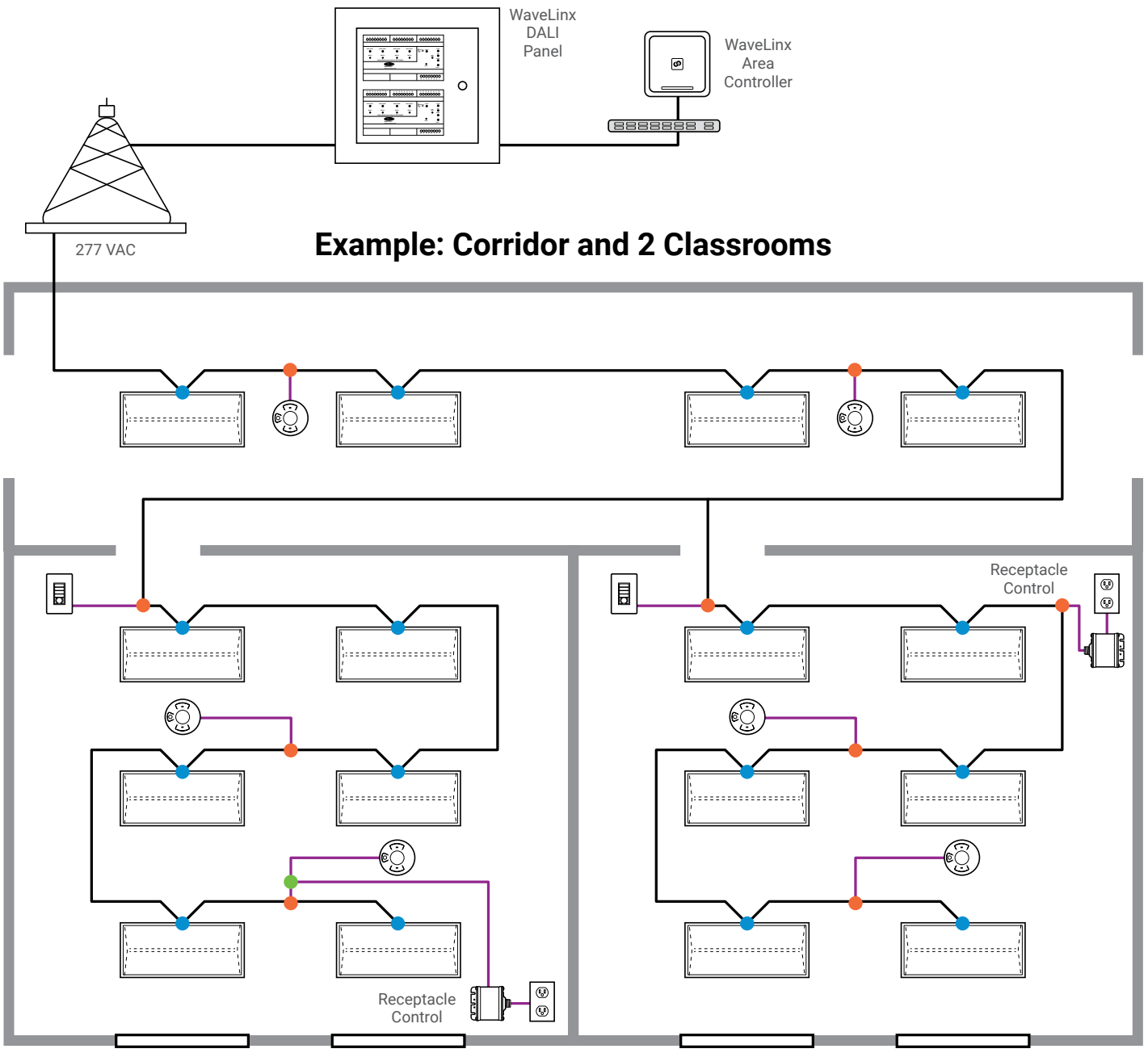
If it's a hybrid system, a mixture of wired and wireless devices:

PARAMETER	VALUE
Total number of wired devices (CAT, Panel, touchscreen, etc..), excluding DALI	L
Total number of wired devices (w/ DALI)	M = C + L
Total number of wireless (PRO) devices	N
Total number of devices (wired and wireless)	O = M + N

ACTION	VALUE
Divide the number of wireless devices by 150	P = O ÷ 150
Divide the number of wired devices by 800 – 150 = 650	Q = M ÷ 650
Divide the number of DALI buses by 40	J = H ÷ 40

R = Maximum of these three values

Example Calculations



Example Calculations

1. Fixture with a DALI driver is selected at 277 VAC. Catalog Logic for the driver has -5LTH. Field Relays are also selected (FRS-DA) for receptacle control.
2. Wallstation (WST-D2-*) and Occupancy/Daylight Sensor (OCS-D2-*) are selected.
3. Count the number of addresses of the control gear and devices. Compute the required DALI bus current. Add an additional 20% or 10 mA, whichever is greater.

DEVICE	# OF DEVICES	# OF ADDRESSES	DALI BUS CURRENT DRAW (mA)
WST-D2-* / Control Device	**2**	2	14
OCS-D2-* / Control Device	**6**	6	42
FRS-DA / Control Gear	**2**	2	7.5
DALI Driver / Control Gear	**16**	16	32
Total	**26**	**26**	**95.5**

Additional margin: 95.5 x (1.2) = 114.6 mA

4. Determine the number of DALI buses

ACTION	VALUE
Divide the number of control gear addresses by 55	18 ÷ 55 = 0.3
Divide the number of control device addresses by 55	8 ÷ 55 = 0.2
Divide the total DALI bus current by 238 mA	114.6 ÷ 238 = 0.5

Choose the maximum of these and rounded up.

In the case the number of DALI buses needed is 1.

5. Select the WDP-D2-S1
6. Determine the number of WACs

ACTION	VALUE
Divide the number of addresses by 800	26 ÷ 800 = 0.03
Divide the number of DALI buses by 40	1 ÷ 40 = 0.02

Choose the maximum of these and rounded up.

In this case the number of WACs needed is 1.

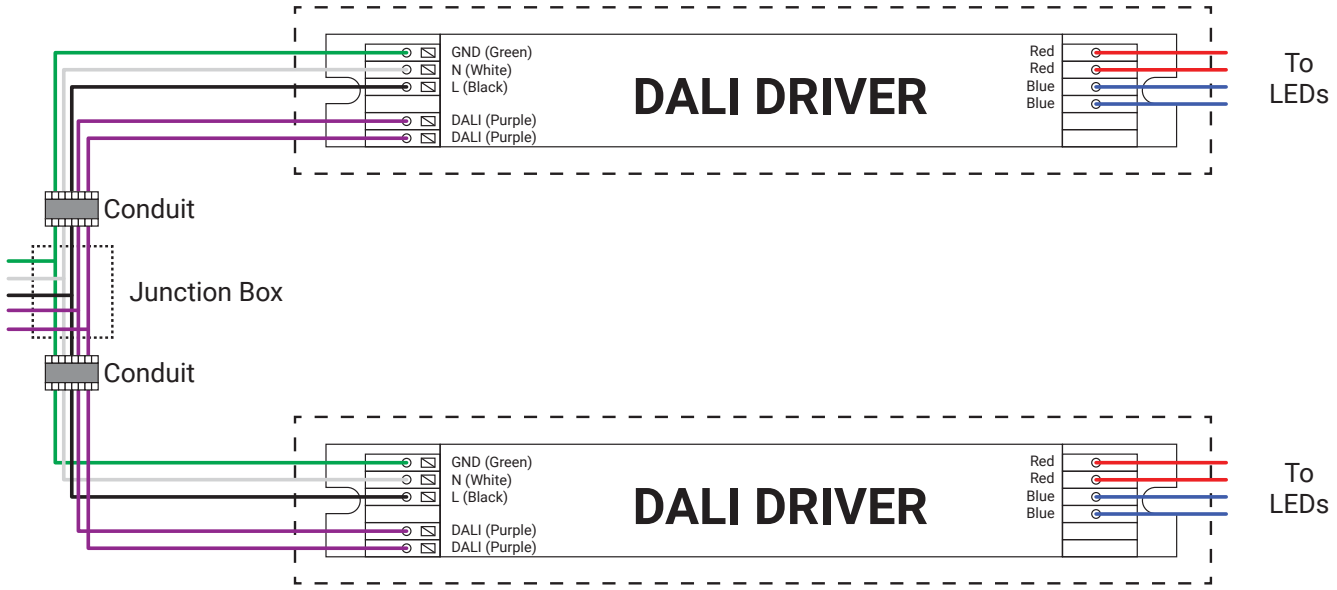
Note: Per the DALI standard, each DALI bus can support a total of 64 control gears and 64 control devices, however keep in mind the current (mA) draw of each DALI device on the bus. Maximum distance between the furthest devices (between the WaveLinx DALI panel and the last device on the DALI bus) on a DALI bus using 16 AWG conductors is 984 ft. (if needed use an additional DALI bus).

DALI Driver Class 1 and Class 2 wiring

DALI drivers are connected together by a 2-wire low voltage bus that is suitable for Class 1 or Class 2 wiring installations.
This application note explains how both Class 1 and 2 wiring are made and how they both meet National Electric Code (NEC) regulations.

Wiring Details – Class 1:

The DALI drivers seen below are wired in a Class 1 configuration.



DALI Bus Wired Class 1

Note: Class 1 wiring methods follow the NEC Requirement 724.48.
Class 1 circuits shall be permitted to be installed with other circuits as specified in 724.48 (A) and 724.48 (B)

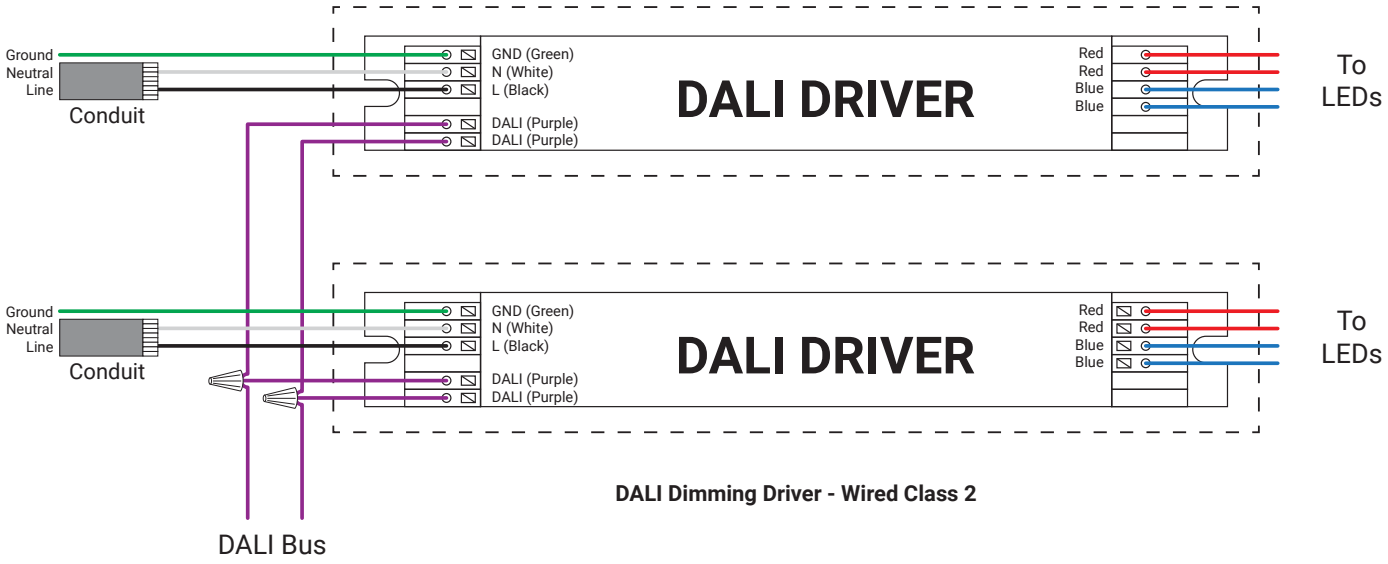
(A) **Two or More Class 1 Circuits** – Class 1 circuits shall be permitted to occupy the same cable, cable tray, enclosure, or raceway regardless of whether individual circuits are alternating current or direct current if all conductors are insulated for the maximum voltage of any conductor in the cable, cable tray, enclosure, or raceway.

(B) **Class 1 Circuits with Power-Supply Circuits** – Class 1 circuits shall be permitted to be installed with power-supply conductors as specified in 724.48 (B) (1)

(1) **In cables, Enclosures, or Raceways** – Class 1 circuits and power-supply circuits shall be permitted to occupy the same cable, enclosure, or raceway without barrier only where the equipment powered is functionally associated. Class 1 circuits shall be permitted to be installed together with the conductors of electric light, power, non-power-limited fire alarm systems, and medium-power network-powered broadband communication circuits where separated by a barrier.

Wiring Details – Class 2:

The ballasts and drivers seen below are wired together in a Class 2 configuration.



DALI Dimming Driver - Wired Class 2

Note: Class 2 wiring of the DALI driver follows the NEC requirement 722.15 (D)

(D) **Associated Systems Within Enclosures** – Limited energy cables shall be permitted to be placed in outlet boxes, junction boxes, compartments, or similar with power conductors where such conductors are introduced solely for power supply to the limited energy equipment and on the following is met:

(1) The power circuit conductors are routed within the enclosure to maintain a minimum of 6 mm (0.25 in.) separation from the limited energy cables.

(2) The circuit conductors operate at 150 volts or less to ground and either of the following is met:

a. The limited-energy circuit conductors are installed as a Class 1 circuit.

b. The limited energy cable of CL3, CL3R, CL3P or a permitted substitute and the conductors that emerge from the cable jacket are separated by a minimum 6 mm (0.25 in.) or by a non conductive barrier from all other conductors.

The DALI drivers have a minimum spacing of 0.25 inches between line voltage and the DALI bus (purple wires) for class 2 installations.

Reference Information

Code quotation, guidance, and wiring guides above are listed for reference only. Always follow local and national wiring requirements.

NFPA 70 / National Electrical Code 2026 Edition was used as a reference. More recent releases of the National Electrical Code should always be consulted.

The National Electrical Code (NEC) is a registered trademark of the National Fire Protection Association, Quincy, MA.



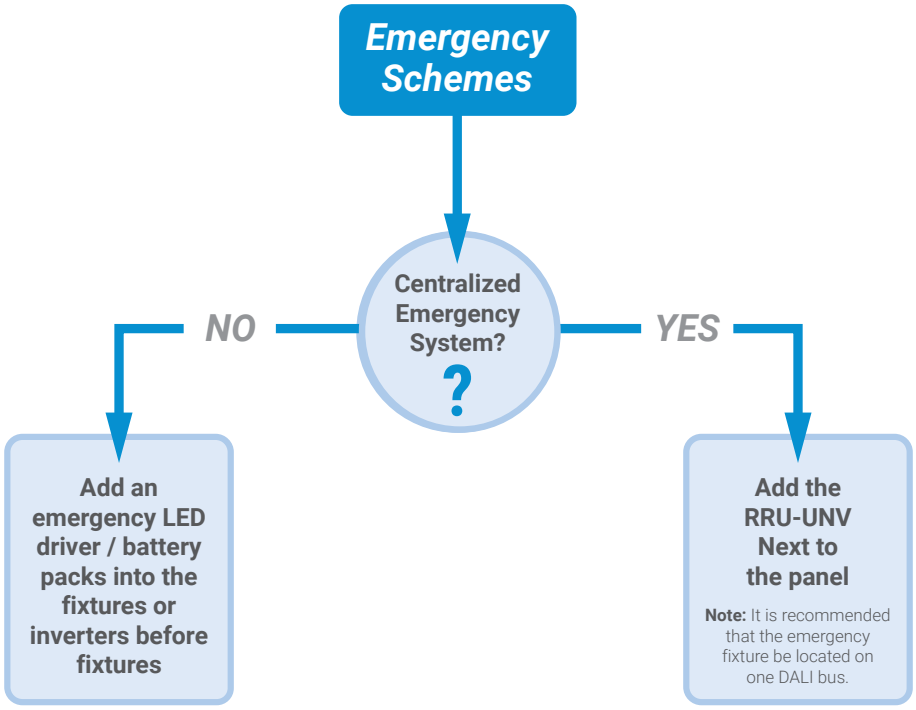
Emergency Schemes

Selecting the Right Emergency Scheme

Since DALI is compatible with Class 1 wiring, it is recommended, that in the case of centralized emergency system, all fixtures designated as fixtures providing emergency illumination be connected to a dedicated DALI bus.

Per the NFPA 70 (2026 edition) section 700.24

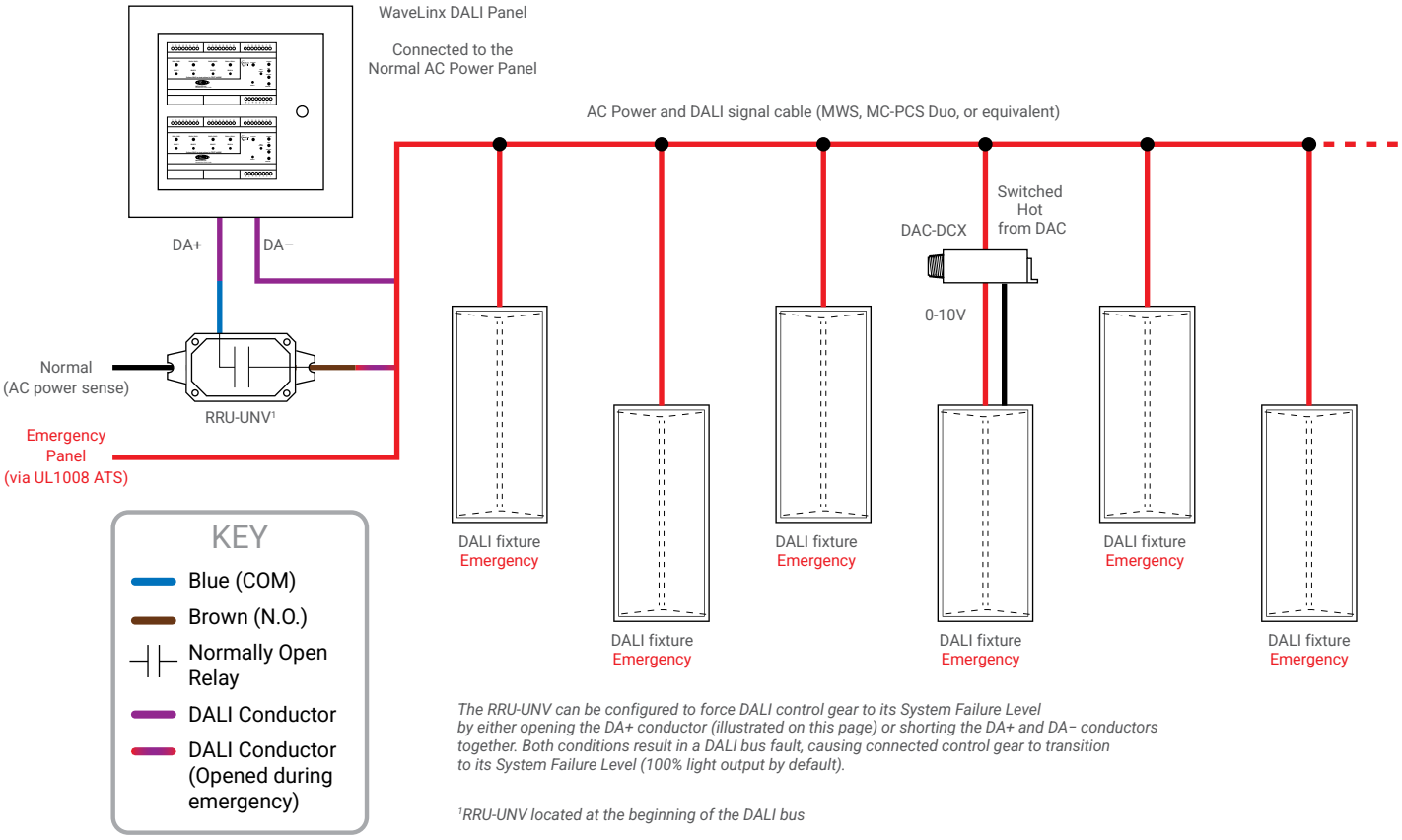
- Luminaires with control inputs that provide emergency illumination shall comply with 700.24 (A) and 700.24 (B)
    - A. Directly controlled emergency luminaires (DCEL). Where emergency illumination is provided by one or more DCELs that, upon loss of normal power, respond to an external active control signal on their control input from a listed Emergency Lighting Control Device (ELCD) to establish the required emergency illumination level, such DCELs shall be listed for use in emergency systems.
    - B. Directly Controlled Luminaire (DCLs). Where emergency illumination is provided by one or more DCLs by disconnection of their control input by a listed ELCD upon loss of normal power, such DCLs shall not be required to be listed for use in emergency systems. If a DCL has configurable behavior for control input disconnection, it shall be set to provide full luminaire output upon control input disconnection.
- In the case of DALI luminaires, disconnection of the DALI bus is recognized as “System Failure” and the DALI luminaire will go to its “SystemFailureLevel” which, by default, is maximum light output.





Central Emergency System with the RRU-UNV

Emergency Power fed to designated fixtures via a UL1008 ATS. All emergency designated fixtures on one DALI Bus.

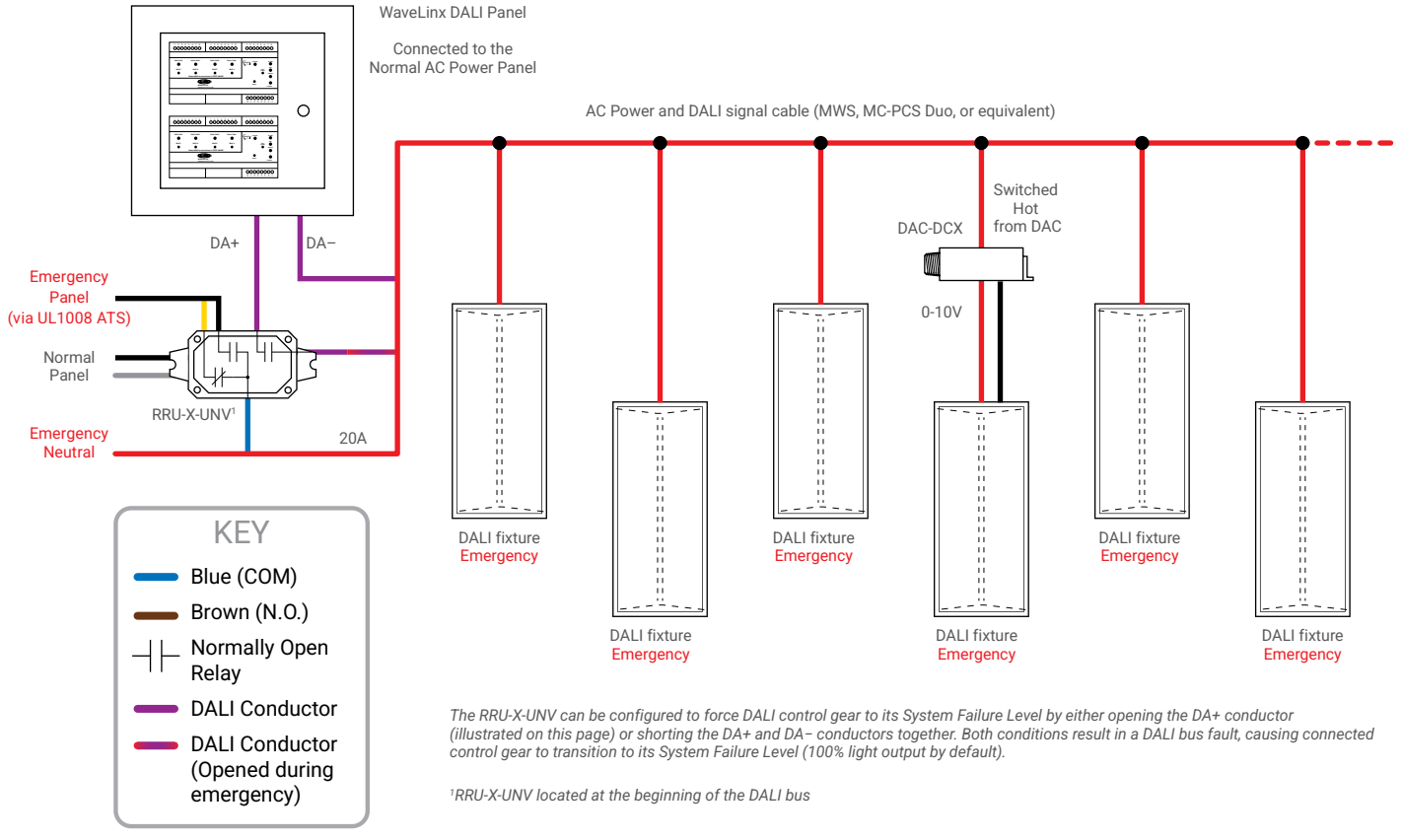


The RRU-UNV can be configured to force DALI control gear to its System Failure Level by either opening the DA+ conductor (illustrated on this page) or shorting the DA+ and DA– conductors together. Both conditions result in a DALI bus fault, causing connected control gear to transition to its System Failure Level (100% light output by default).

[1]RRU-UNV located at the beginning of the DALI bus

Central Emergency System with the RRU-X-UNV

Emergency Power fed to designated fixtures via RRU-X-UNV. All emergency designated fixtures on one DALI Bus.



The RRU-X-UNV can be configured to force DALI control gear to its System Failure Level by either opening the DA+ conductor (illustrated on this page) or shorting the DA+ and DA– conductors together. Both conditions result in a DALI bus fault, causing connected control gear to transition to its System Failure Level (100% light output by default).

[1]RRU-X-UNV located at the beginning of the DALI bus



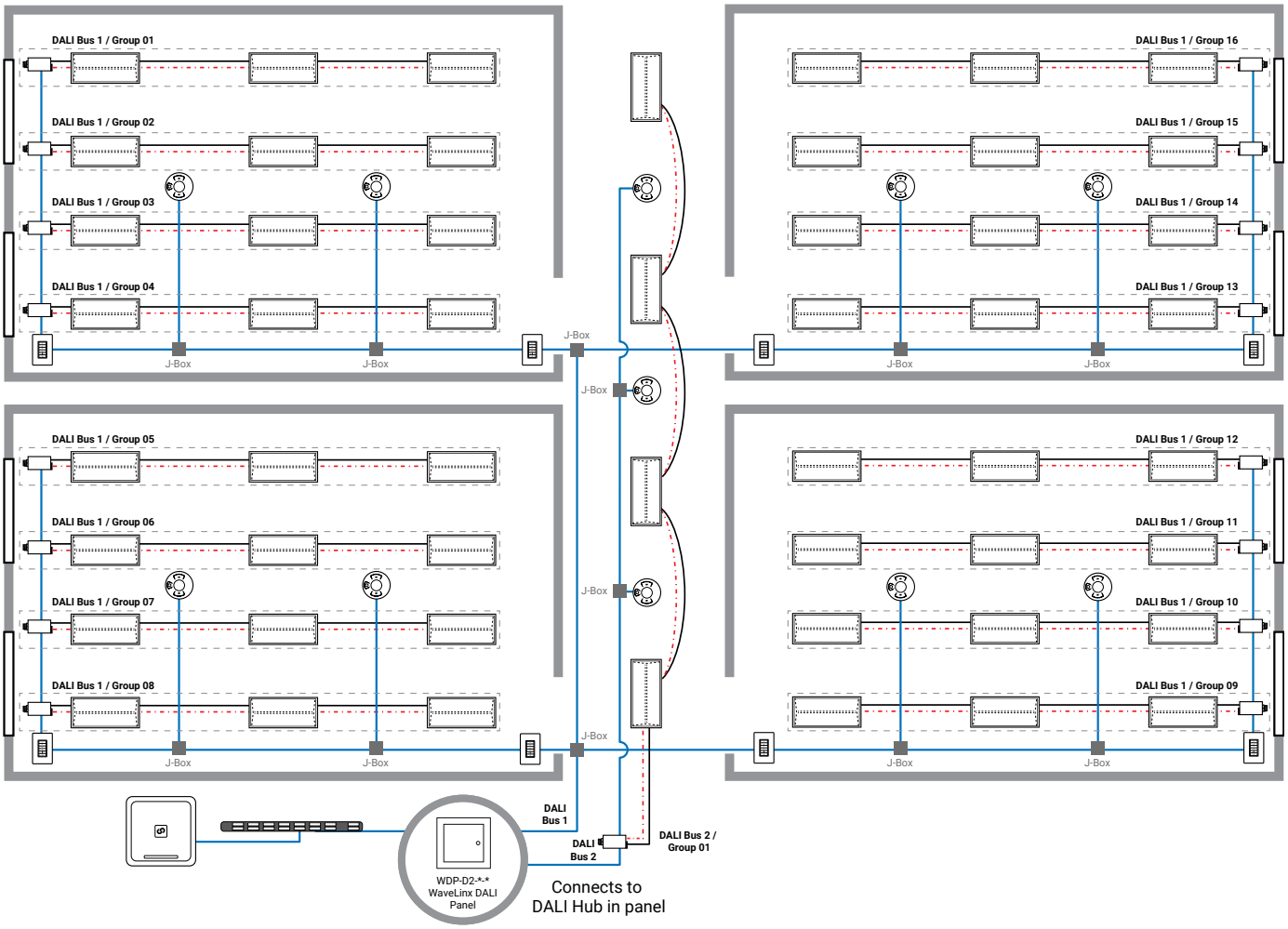
Application examples

0-10V Luminaires with DAC Installation

DEVICE	DEVICE TYPE	# OF DEVICES	# OF ADDRESSES	DALI BUS CURRENT DRAW (mA)
DAC	Control Gear	17	17	17 x 3.75 mA = 63.75 mA
OCS-D2-*	Control Device	11	11	11 x 77 mA = 77 mA
WST-D2-*	Control Device	8	8	8 x 7 mA = 56 mA
Total		**36**	**36**	**196.75 mA**

DESIGN PARAMETER	VALUE	REMARK
Total Number of Control Gear Addresses	17	
Total Number of Control Device Addresses	19	
Total Number of Addresses	36	
Total Bus Current (w/ 20% margin)	196.75 x 1.2 = 236.1 mA	
# of DALI Buses (rounded up)	$\text{Max}\left(\frac{17}{55}, \frac{19}{55}, \frac{236.1}{238}\right) = 1$	Calculation reveals 1 bus is sufficient but since we have 16 groups assigned, a second bus is used for the corridor. **A total of 2 DALI buses are used.**
Cat Logic of DALI Panel	WDP-D2-S1	
# of WAC2 (rounded up)	$\text{Max}\left(\frac{36}{800}, \frac{2}{40}\right) = 1$	Number of Addresses = 36 Number of DALI buses = 2

This example utilizes 2 DALI buses. A WDP-D2-S1 was selected.

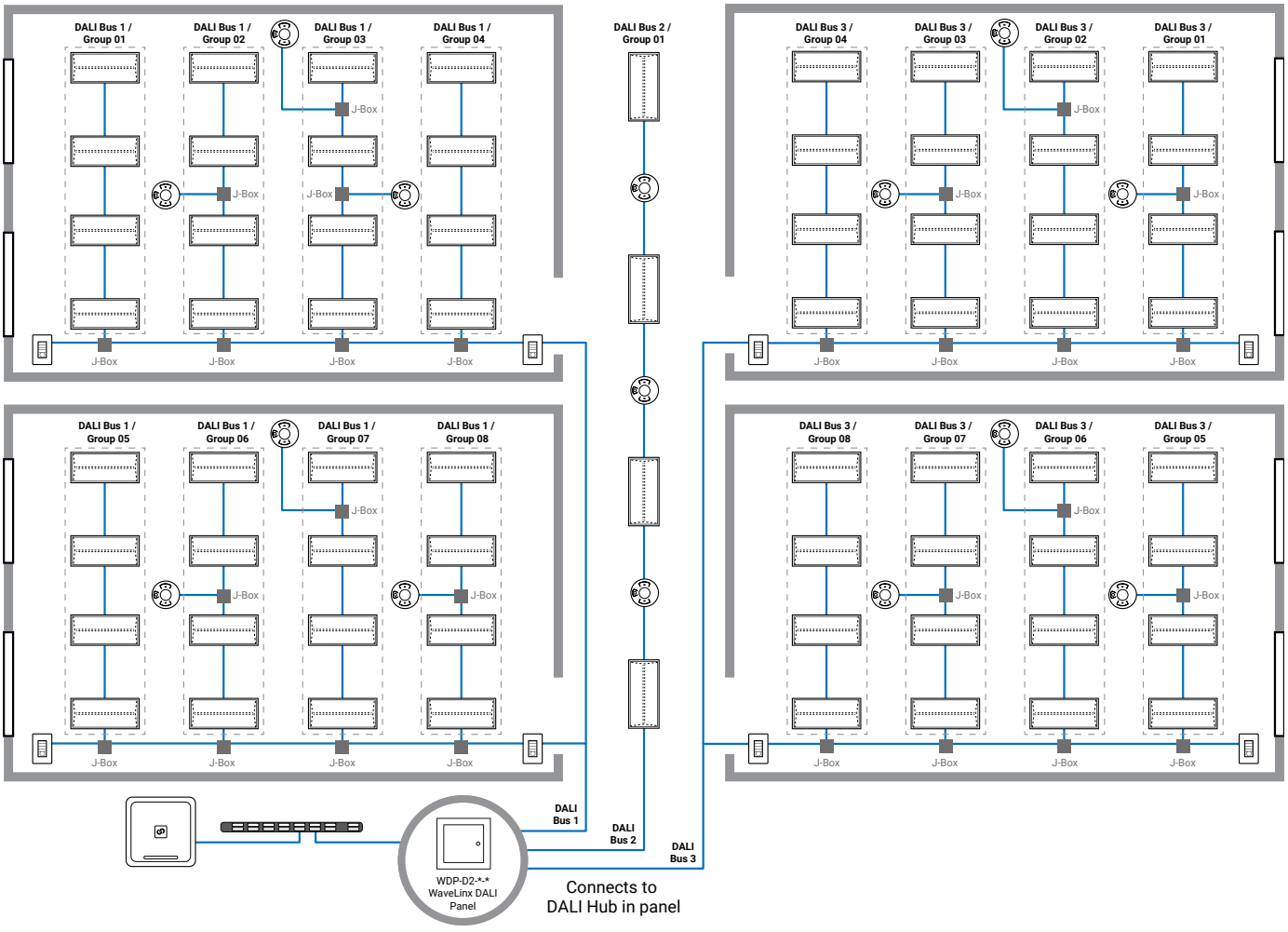


DALI Luminaires Installation

DEVICE	DEVICE TYPE	# OF DEVICES	# OF ADDRESSES	DALI BUS CURRENT DRAW (mA)
DALI Luminaires	Control Gear	68	68	68 x 2 mA = 136 mA
OCS-D2-*	Control Device	15	15	15 x 7 mA = 105 mA
WST-D2-*	Control Device	8	8	8 x 7 mA = 56 mA
Total		**91**	**91**	**299 mA**

DESIGN PARAMETER	VALUE	REMARK
Total Number of Control Gear Addresses	68	
Total Number of Control Device Addresses	23	
Total Number of Addresses	91	
Total Bus Current (w/ 20% margin)	299x 1.2 = 358.8 mA	
# of DALI Buses (rounded up)	Max ($\frac{68}{55}$, $\frac{23}{55}$, $\frac{358.8}{238}$) = 2	Calculation reveals 2 buses are sufficient. However, we will assign one bus to the classrooms to the left, another bus to the classrooms on the right and another bus for the corridor fixtures. **A total of 3 DALI buses are used.**
Cat Logic of DALI Panel	WDP-D2-S2	Future-proofing with a small panel that has two DALI hubs.
# of WAC2 (rounded up)	Max ($\frac{91}{800}$, $\frac{3}{40}$) = 1	Number of Addresses = 91 Number of DALI buses = 3

This example utilizes 3 DALI buses. A WDP-D2-S2 was selected to allow for additional capacity for future additions.

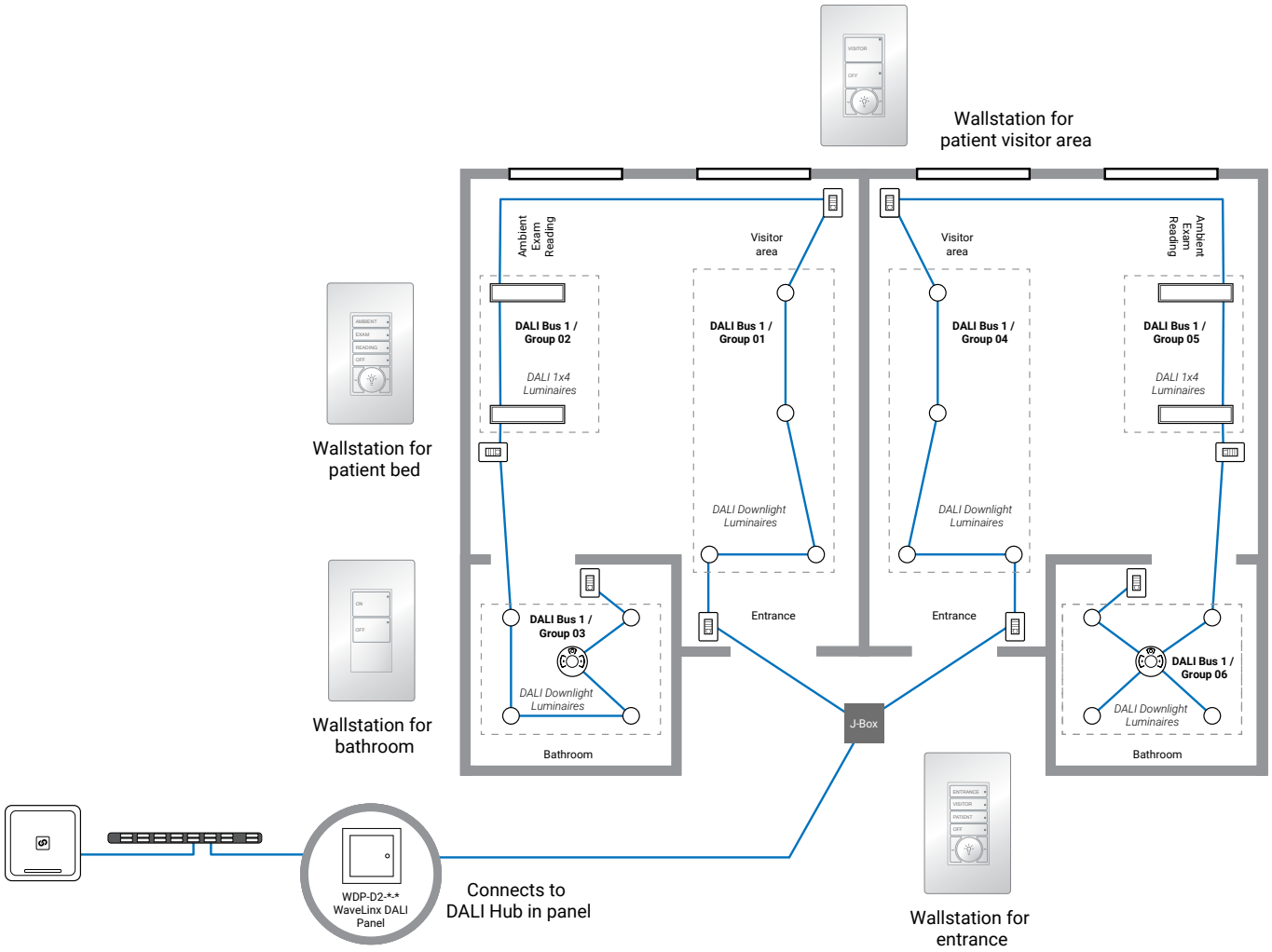


DALI Luminaires in healthcare patient room

DEVICE	DEVICE TYPE	# OF DEVICES	# OF ADDRESSES	DALI BUS CURRENT DRAW (mA)
DALI Luminaires	Control Gear	20	20	20 x 2 mA = 40mA
OCS-D2-*	Control Device	2	2	2 x 7 mA = 14 mA
WST-D2-*	Control Device	8	8	8 x 7 mA = 56 mA
Total		**30**	**30**	**110 mA**

DESIGN PARAMETER	VALUE	REMARK
Total Number of Control Gear Addresses	20	
Total Number of Control Device Addresses	10	
Total Number of Addresses	30	
Total Bus Current (w/ 20% margin)	110 x 1.2 = 132 mA	
# of DALI Buses (rounded up)	Max ($\frac{20}{55}$, $\frac{10}{55}$, $\frac{132}{238}$) = 1	
Cat Logic of DALI Panel	WDP-D2-S1	
# of WAC2 (rounded up)	Max ($\frac{30}{800}$, $\frac{1}{40}$) = 1	Number of Addresses = 30 Number of DALI buses = 1

This example utilizes just 1 DALI bus. A WDP-D2-S1 was selected to control these 2 patient rooms in a hospital.





System components

WaveLinx DALI: System components

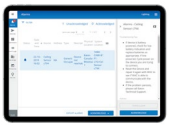
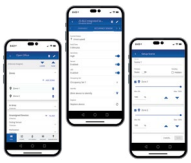
Distributed Wired Control System

WaveLinx DALI is the most comprehensive and cost effective distributed wired controls system on the market. It provides out-of-the-box functionality that facilitates basic occupancy code compliance while also providing an energy saving high end trim. A wired control system that is so simple that it can be setup without lighting controls knowledge is extremely rare. WaveLinx DALI is setup using a mobile application that connects with Bluetooth programming module in each room, WaveLinx DALI does the rest using automatic code commissioning.

WaveLinx CORE component

WaveLinx PRO component

WaveLinx DALI component

WAVELINX COMPONENTS		
	DESCRIPTION	CATALOG NUMBER
WaveLinx CORE Pro, Enterprise and Virtual CORE Enterprise		TRX-TCPRO2 TRX-TCENT2 TRX-TCVRT2
WaveLinx CORE Licenses		TRX-LGT250 TRX-API TRX-BACNET TRX-OPNADR
WaveLinx Mobile app		W-APP
WaveLinx Area Controller		WAC2-POE WAC2-120

WAVELINX DALI COMPONENTS

	DESCRIPTION	CATALOG NUMBER
DALI-2 Panel Series WaveLinx DALI Hubs (Mounted inside the DALI panel) to control DALI fixtures and peripherals		WDP-D2-S1-* WDP-D2-S2-* WDP-D2-M3-* WDP-D2-M4-* WDP-D2-L5-* WDP-D2-L6-*
DALI-2 Occupancy Ceiling Sensor		OCS-D2-P06 OCS-D2-P12
DALI-2 Wallstation		WST-D2-1L-* WST-D2-1DL-* WST-D2-2L-* WST-D2-2DL-* WST-D2-3L-* WST-D2-4S-* WST-D2-4DS-* WST-D2-6S-*
DALI Digital to Analog Converter		DAC-DC1 DAC-DC2
DALI Field Relay		FRS-DA

WaveLinx DALI:

Panel with Hub

PRODUCT	GTIN	PRODUCT ID
WaveLinx DALI Hub	080083457595	12122

Click to view certified device on the DALI product certification page

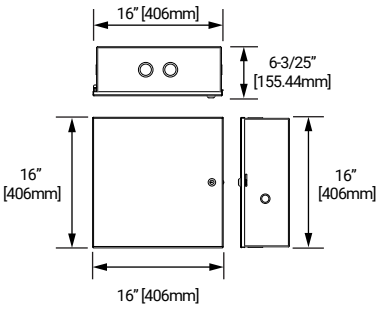
The WaveLinx DALI solution from Cooper Lighting Solutions incorporates DALI-2 certified drivers and peripherals into the WaveLinx system. It connects to the WaveLinx Area Controller through an Ethernet switch. Designed for scalability, ease of installation, and rich features, the DALI Hub modules within the panel ensure code compliance and support individually addressable lighting. Available in three enclosure sizes and up to 6 DALI hub options, the DALI system is commissioned and controlled via the WaveLinx Mobile app.



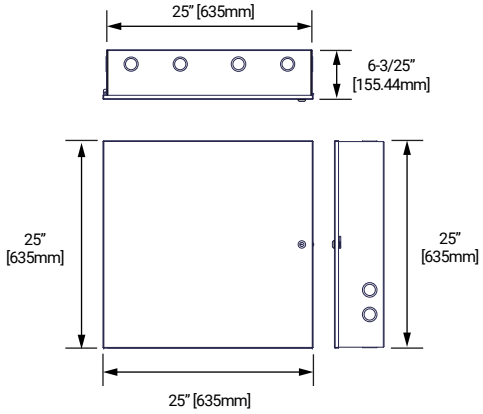
Depending upon the size of the job and the limitations of the electrical closet and/or equipment room spaces, the WaveLinx DALI comes in 3 different Panel sizes. Each Panel comes with a Network switch for IP connection with WaveLinx Area Controller.

catalog number:

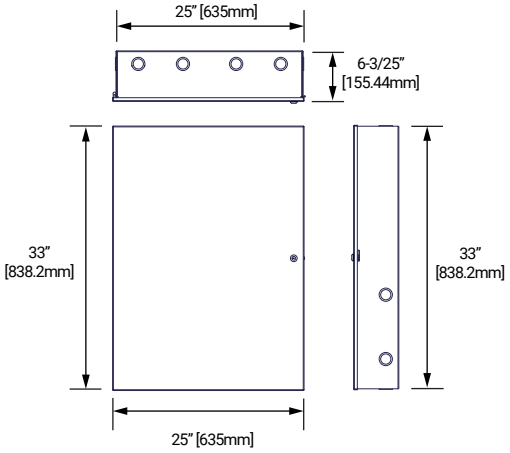
WDP-D2-S1-*	Small panel with 1 DALI Hub (4 Buses), 122/277 VAC or 347 VAC
WDP-D2-S2-*	Small panel with 2 DALI Hubs (8 Buses), 122/277 VAC or 347 VAC
WDP-D2-M3-*	Medium panel with 3 DALI Hubs (12 Buses), 122/277 VAC or 347 VAC
WDP-D2-M4-*	Medium panel with 4 DALI Hubs (16 Buses), 122/277 VAC or 347 VAC
WDP-D2-L5-*	Large panel with 5 DALI Hubs (20 Buses), 122/277 VAC or 347 VAC
WDP-D2-L6-*	Large panel with 6 DALI Hubs (24 Buses), 122/277 VAC or 347 VAC



Small panel configuration

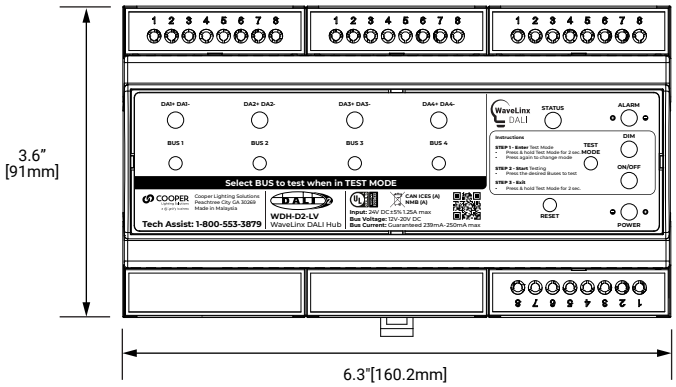


Medium panel configuration



Large panel configuration

WaveLinx DALI Hub (Mounted inside the DALI panel)





WaveLinx DALI:

Occupancy and Daylight Sensor

WaveLinx DALI-2 ceiling sensor combines daylight sensing and occupancy detection into a single device. The ceiling sensor communicates over the DALI-2 bus and allows for all device settings and groups to be adjusted remotely

PRODUCT	GTIN	PRODUCT ID
WaveLinx DALI Sensors	08008345770	12070

Click to view certified device on the DALI product certification page

catalog number:

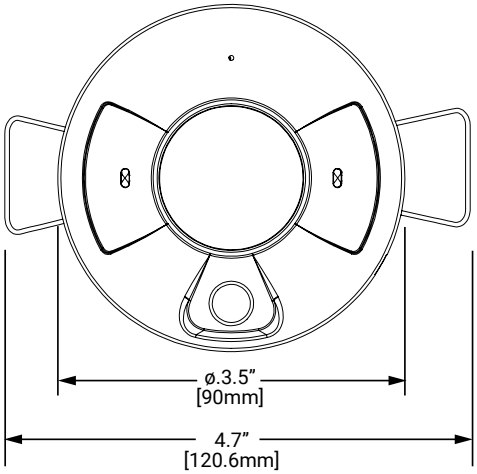
OCS-D2-P06 WaveLinx DALI PIR Ceiling Sensor, 600 sqft

OCS-D2-P12 WaveLinx DALI PIR Ceiling Sensor, 1200 sqft

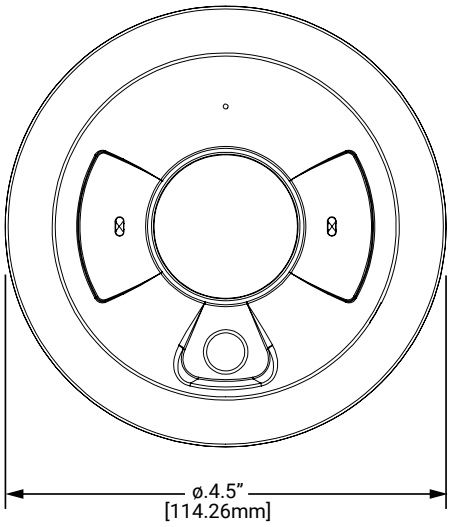


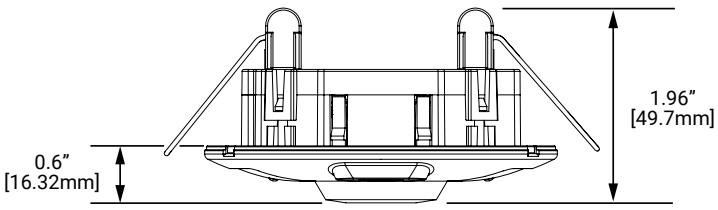
Sensor is designed to be installed into ceiling tile or onto a junction box.

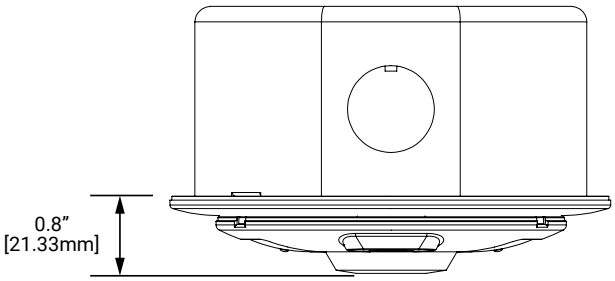
Tilemount



4" Octagon, 2 1/8" deep Junction Box with adapter plate and trim ring







WaveLinx DALI:

Wallstations

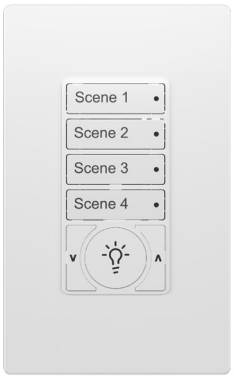
PRODUCT	GTIN	PRODUCT ID
WaveLinx DALI Wallstations	080083457717	12013

Click to view certified device on the DALI product certification page

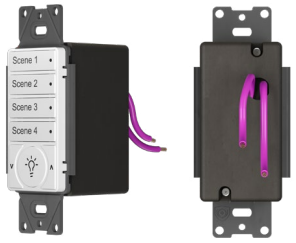
WaveLinx DALI-2 Wallstation offers the specification grade range of wallstations, which combines the easiest user interface in the industry with a large circular On/Off button, a universal module with up to 8 different configurations, large or small button, color, and engraving options. Designed to fit with standard decorator wallplates, the Wallstation can be ganged together to meet specific project needs. Individual buttons have backlight indicator lights and strong tactile feedback.

catalog number:

WST-D2-1L-* WST-D2 Wallstation, 1 Large Button
WST-D2-1DL-* WST-D2 Wallstation, 1 Large Button with Dimming, ON/OFF
WST-D2-2L-* WST-D2 Wallstation, 2 Large Buttons
WST-D2-2DL-* WST-D2 Wallstation, 2 Large Buttons with Dimming, ON/OFF
WST-D2-3L-* WST-D2 Wallstation, 3 Large Buttons, ON/OFF
WST-D2-4S-* WST-D2 Wallstation, 4 Small Buttons
WST-D2-4DS-* WST-C Wallstation, 4 Small Buttons with Dimming, ON/OFF
WST-D2-6S-* WST-C Wallstation, 6 Small Buttons



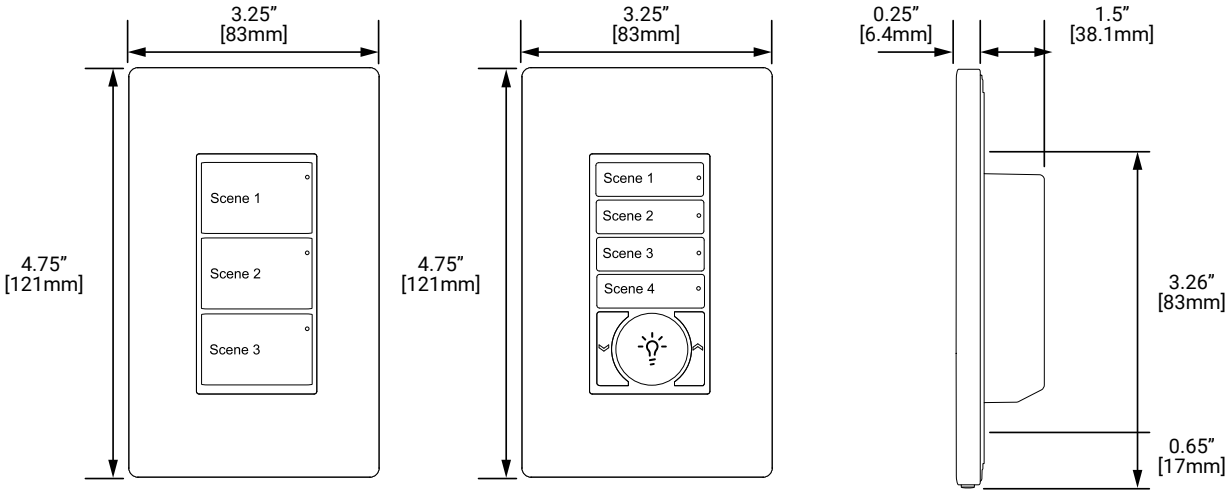
small and large button configurations available



*Colors available



[BLANK] White | G Gray | B Black | A Light Almond | V Ivory | R Red



Description	Image
1 Large Button **WST-D2-1L**	
1 Large Button Dimming ON/OFF **WST-D2-1DL**	

Description	Image
2 Large buttons **WST-D2-2L**	
2 Large buttons Dimming ON/OFF **WST-D2-2DL**	
3 Large buttons ON/OFF **WST-D2-3L**	

Description	Image
4 Small buttons **WST-D2-4S**	
4 Small buttons Dimming ON/OFF **WST-D2-4DS**	
6 Small buttons **WST-D2-6S**	

WaveLinx DALI:

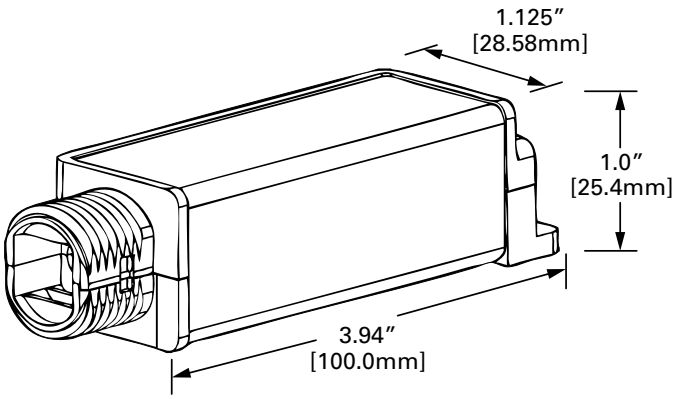
DAC (DALI TO Analog Converter)

The DALI Digital to Analog Converter (DAC) is a lighting control device used to control any standard 0-10V current sourcing dimmable ballast/driver. It allows dimming control by sending 0-10V dimming and on/off commands 0-10V luminaire via the DALI Bus.

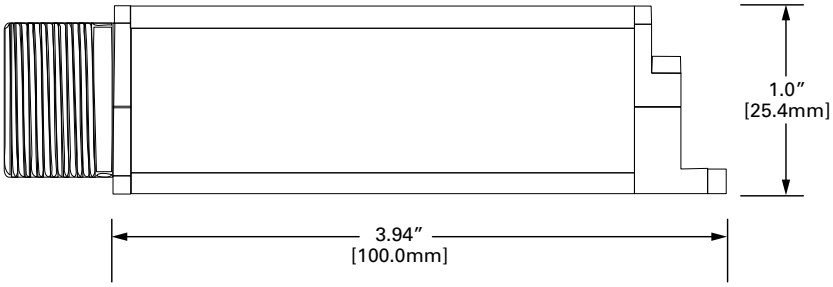
catalog number:

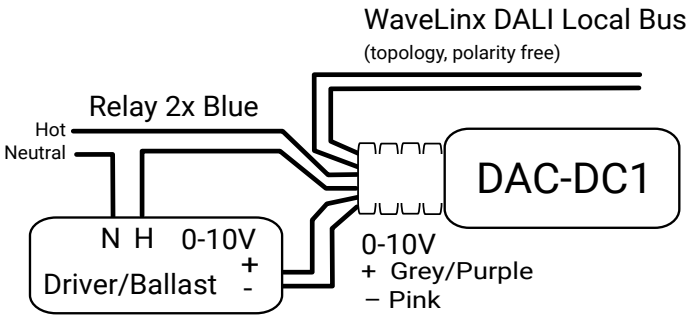
DAC-DC1	Digital to Analog Converter (Class 1 wiring)
DAC-DC2	Digital to Analog Converter (Class 2 wiring)

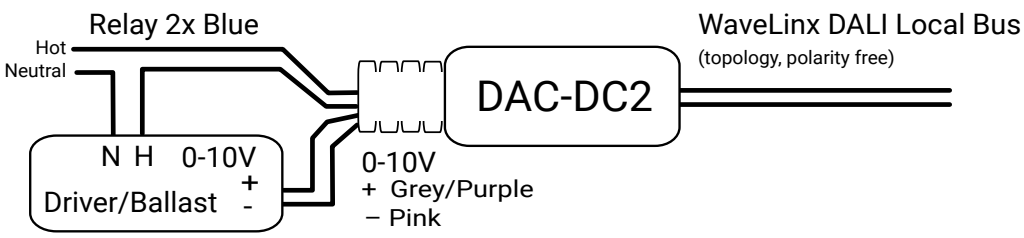












WaveLinx DALI:
Field Relay

The DALI Field Relay (FRS-DA) provides On/Off control and network connectivity in order to conserve energy and effectively manage the lighting system. It offers 20A 120/277/347VAC (Single Phase) field relay control. Designed to manage lighting and receptacle loads effectively.

Catalog number:

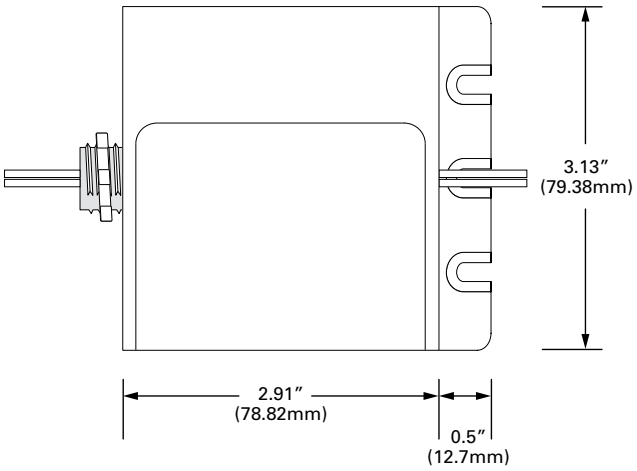
FRS-DA	Single pole, single throw, 20A latching relay 120/277/347V



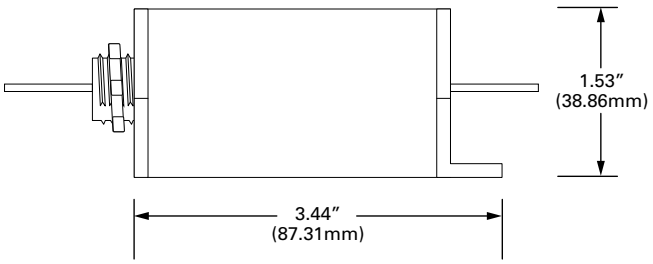


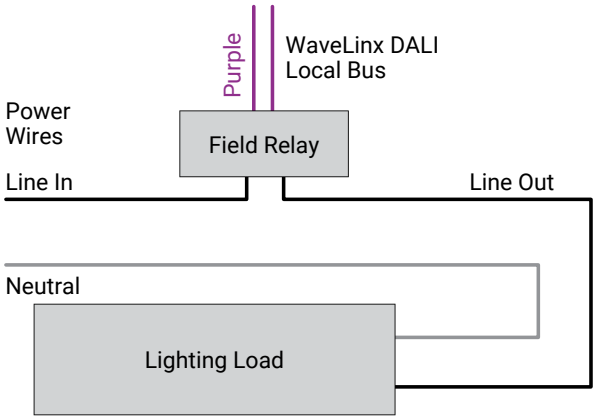


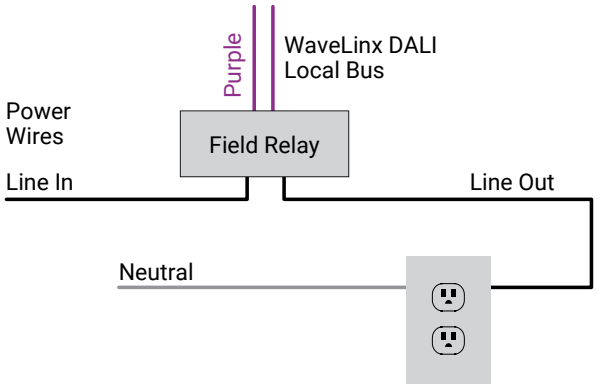
TOP VIEW



SIDE VIEW







WaveLinx DALI







Designers, electrical contractors and building owners/operators use the WaveLinx connected lighting system to comply with latest energy codes, maximize energy savings and improve occupant experience.

Service and Support

A WaveLinx system creates incredible value, from the cost savings of occupancy detection to the flexibility and power of scheduled lighting control.

To maximize the return on your lighting system investment, your WaveLinx system must perform at its peak.

We can help. With a network of experienced and skilled control specialists and a national presence, we can help with everything from system design, quote, implementation, and on-going maintenance.

We offer:

Field Project Design Services

Pre-commissioning Support

Field Project Startup

Verification Walkthrough

Optimization Services

Service Plans

Service Plans offer proactive, onsite, and remote diagnostics, configuration changes, training, and software/firmware updates typical of maintaining lighting control systems. Service Plans help facility managers and owners maintain their investment for optimal performance and maximum value.

- Prepaid, budgeted services, with coverage options for planned and unplanned visits.
- Fully customizable to meet your unique requirements
- Optimize your system as your building needs evolve
- Our Service Plans are available in single or multi-year arrangements and are customized to fit your exact needs. Cooper Lighting Solutions has two Service Plans designed to fit your service requirements and budget.

SCAN
for more
Support and Services
information





Support

The services and support team simplifies design and specification. We're committed to supporting your project needs from design to occupancy and beyond.

Technical Support:

Phone:
+1 (800) 553-3879 (24/7 Support)

Email (US):
controltechsupport@cooperlighting.com

COOPER Lighting Solutions

a signify business

Why Cooper Lighting Solutions?

At Cooper Lighting Solutions, we build forward-thinking lighting solutions that make people's lives safer, while making buildings, homes and cities smarter and more sustainable. We deliver an industry-leading portfolio of residential, sports, infrastructure, industrial, and commercial LED lighting; plus lighting controls and smart lighting systems.

We question, we seek, and we solve. Because building a better world means asking tough questions and pushing harder for answers. Together with our customers, we create solutions that build a better world. At Cooper Lighting Solutions, we push past the ordinary to build brighter.

Cooper Lighting Solutions is a business unit of Signify, the world leader in lighting. Together we have a shared purpose to unlock the extraordinary potential of light for brighter lives and a better world.



Lighting Brands
Ametrix
AtLite
Corelite
Ephesus
Fail-Safe
HALO
HALO Commercial
Invue
iO
Iris
Lumark
LumarkAP
Lumière
McGraw-Edison
Metalux
MWS
NeoRay
Portfolio
PrentaLux - 3D Printed Lighting
RSA
Shaper
Streetworks
Sure-Lites

Controls Brands
Greengate
Fifth Light
Intelligent Lighting Controls

Connected Lighting Systems and Smart Spaces Platform
WaveLinx
Trellix

SCAN
for more
WaveLinx DALI
information

COOPER Lighting Solutions
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