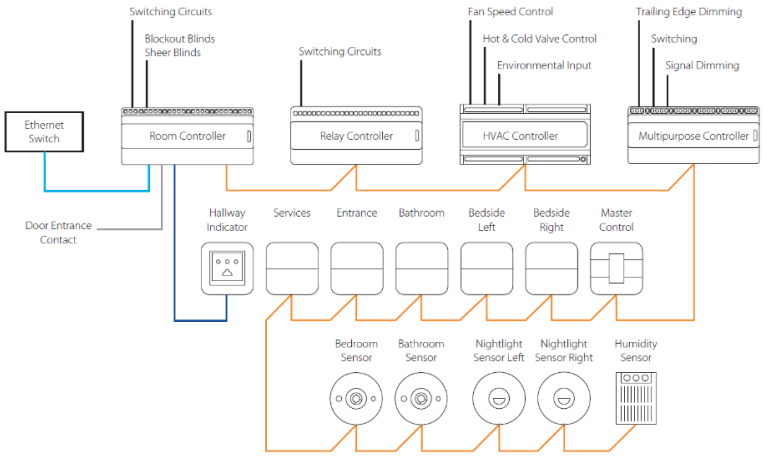
PHILIPS

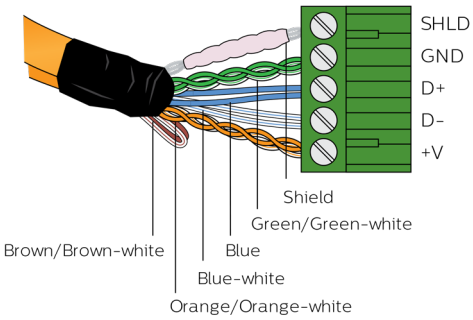
dynalite

Electrical & Hardware

Installation Guide

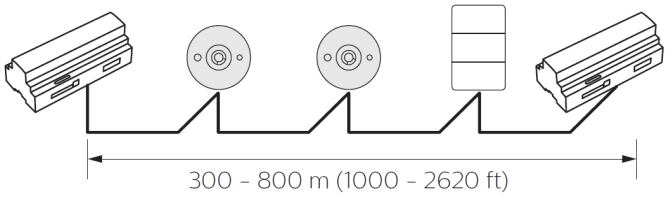


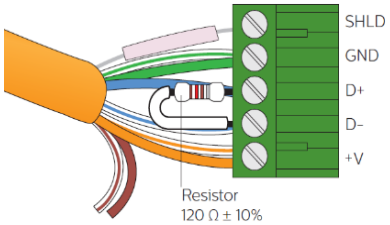
Installing the Data Network



Do NOT connect DALI or mains power to DyNet data terminals.

1. The data cable is connected to all devices as per the project schematic following correct color code and DyNet terminations. Devices may be wired in any order.
2. The recommended connection method is to 'daisy chain' devices in sequence, starting at the first device, then looping in and out of each device, with a single cable terminating at the last device. There should not be any branching, and only the first and last device should terminate a single cable, all other devices should terminate two cables.
3. A data cable that is connected to an energized device is live. Do not cut or terminate live data cables.
4. The cable tail can be returned to the original distribution board. Ground wire and power wire (+V) can be connected in a loop but D+ and D– must NOT be connected in a loop. Do not connect power wire (+V) in a loop where segmentation is required between network sections that have multiple power supplies deployed, to ensure Network cable current limits are not exceeded.
5. Maximum allowed power supply rating and data cable current for any section of the network is the lowest of either 2 Amps or the Cable rating per local wiring code or cable manufacturer specification. Where required, apply power wire (+V) segmentation per network design to prevent exceeding limits. Use only approved DyNet power supplies to ensure network reliability and safety.
6. The data cable should be segregated from mains cables by a minimum of 50 mm (2 in) for shielded cable and 300 mm (12 in) for unshielded cable or as per local wiring code specification (whichever is greater). If the data cable crosses over any mains cables, it should cross at 90°, whilst maintaining correct segregation. The wiring segregation distance may be reduced if either data cables, mains cables or both are fitted in separate grounded metal conduits.
7. On Button Panels and Sensors, the Shield wires must be terminated into the shield terminal. Shield wires are automatically earthed on each controller. For controllers that do not have a shield terminal, the shield should be twisted together and taped to the cable sheath to maintain continuity.
8. The maximum recommended length for DyNet cables between two network bridges is 800 m (2620 ft). For cable runs over 300 m (1000 ft), (or baud rates over 9600 bps), 120 Ohm, 2 W end-of-line resistors must be installed across the D+ and D- terminals of the DyNet connector strip on the first and last devices.

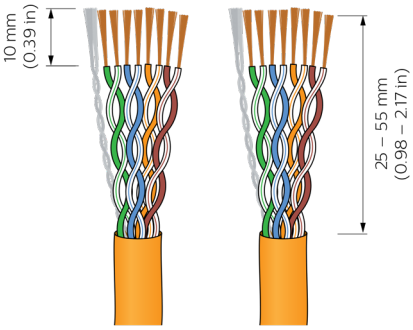




Data Cable Termination

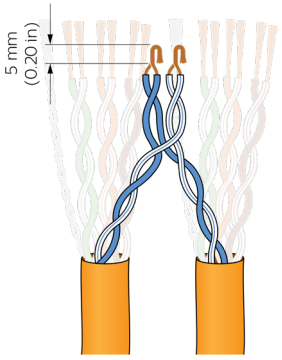
1. Strip off outer jackets of cables being daisy chained.

   Shielded cables only: Cut foil or braid flush to outer jacket. DO NOT cut drain (shield) wire.



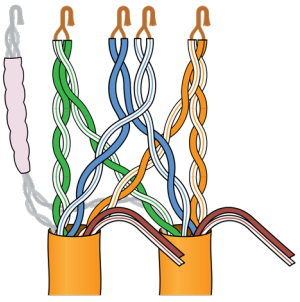
2. Strip insulation from each of the conductors.

3. Bind the two cables around the end with electrical tape or use a cable tie (see final drawing).



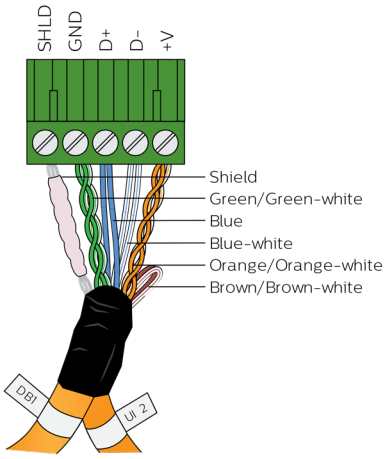
4. Separate the blue and the blue-white wires from each other. Then combine them with the matching wires from the other cable; blue to blue and blue-white to blue-white.

5. Twist remaining conductors ends with the matching colored wires and fold ends in half. Isolate the unused pair with a connector or tape.



6. Reuse a wire insulation offcut (or heat shrink tubing) and fit over drain wire.

7. Terminate the wires on the pluggable screw terminal block. (If used, shrink the heat-shrink tubing)



8. Label or tag the cable appropriately.

Recommended cable types

For serial port connections, the recommended cable is screened RS-485/Cat5e/6 data cable, such as DyNet-STP-CABLE-LSZH.

Supplier	Cable
Dynalite	DyNet-STP-CABLE-LSZH
Dynalite	DyNet -SFLAT6-CABLE. Limited to 9600 bps. Maximum length 100 m (330 ft).
Belden	1502R or 1502P (P = plenum)
Belden	9503
Garland	MCP3S

We recommend maximum 300 m segments @ 9600bps for a spur with mixed topology. For long lengths up to 800 m and on trunks with up to 115 kbps speed, 120 Ohm, 2 W terminating resistors must be added on both ends of the network (like in DMX512 case) and daisy chain is the only topology option.

Belden 1502 or equivalent, with low or no DC load on +V power wire, can achieve distances over 300 m (1000 ft). CAT5e/6 has higher resistance, so we recommend 300 m (1000 ft) for those with 0.2 mm^2 (24 AWG) wires as a conservative limit, provided GND and +V use a twisted pair in parallel as shown on drawings.

- Other STP CAT5/6 cable types may be used, provided their specifications meet or exceed Dynalite specifications and local Wiring Code requirements.
- Use of UTP (unshielded) CAT5/6 cables is not recommended, however, may perform acceptably for short runs of under 15 m (50 ft) where there is no risk of noise coupling.

  UTP cables shall not be used in installations with capacitive sensing technology products (User Interfaces with DACM), otherwise correct operation may not be achieved. UTP cables must be installed in grounded metal conduits if there is a risk of noise coupling from Mains or UL Class 1 cables (switched power circuits, high-frequency power electronics devices, HVAC, and motor drives, etc.).

  If the installation conditions dictate use of UTP CAT5/6 cables (e.g., retrofit scenarios where existing cabling is reused), it may require Proximity Sensing feature to be disabled on related products, with the installer taking full responsibility for any related performance issues.

Number of devices on a single cable run

The Dynalite network uses a trunk and spur topology. Trunks can be RS-485 or Ethernet. Spurs are RS-485 only. Each spur is connected to a network gateway that connects to the trunk network. If required, a spur can be separated into network segments with network isolator devices (such as the DDNI485).

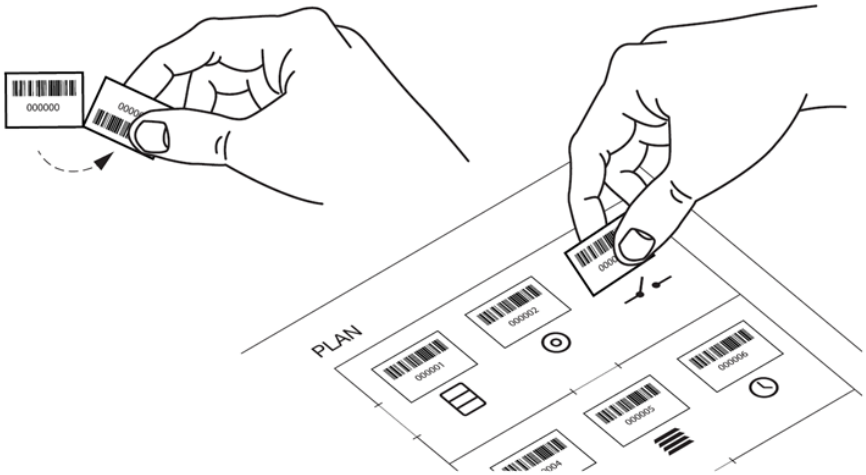
If >128 devices are needed on a spur, repeaters must be added (such as the DDNG485) to separate segments and refresh the signal levels (and filter traffic where needed). The maximum number of devices of the same type in a network segment is limited to 100.

Using multiple trunks and spurs with isolators and network repeaters, removes any realistic limitation on a single Dynalite network.

Cable Length	Belden 1502P, 1502R (18 AWG)	Cat5 STP, 8 x 0.2 mm^2 (24 AWG)	Cat5 UTP, 8 x 0.2 mm^2 (24 AWG)
< 15 m (50 ft)	128	128	64 (no capacitive sensing products)
75 m (250 ft)	128	100	-
150 m (500 ft)	128	75	-
300 m (1000 ft)	128	50	-

All devices come with three serial number/barcode labels:

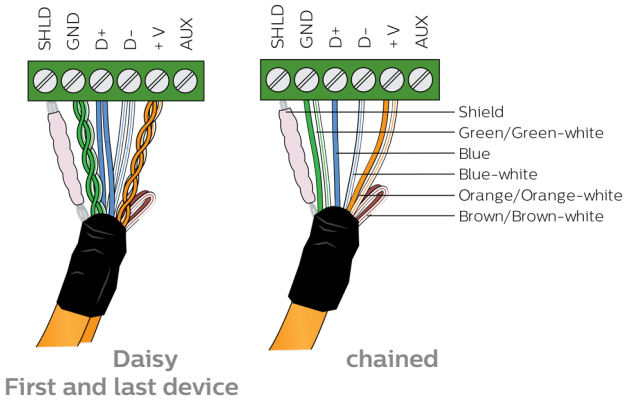
- One on the device
- One for the plan used for commissioning
- One for site documentation



Standard terminations

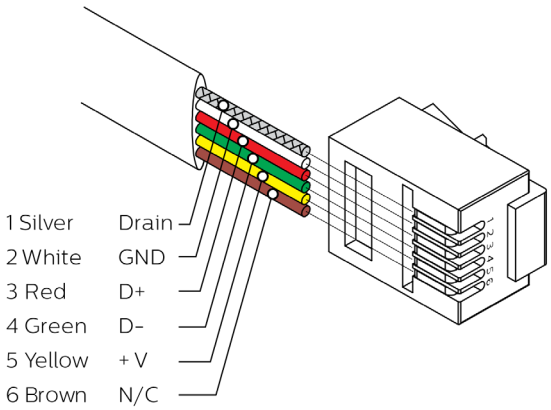
DyNet-STP-CABLE-LSZH

Color	Signal
Shield	Earth (cover with insulated sleeve)
Green/Green-White	Paralleled for Ground
Blue	Data +
Blue-White	Data –
Orange/Orange-White	Paralleled for +V 12/24 VDC
Brown/Brown-White	Spare pair can potentially be used to replace a damaged pair.



DyNet-SFLAT6-CABLE

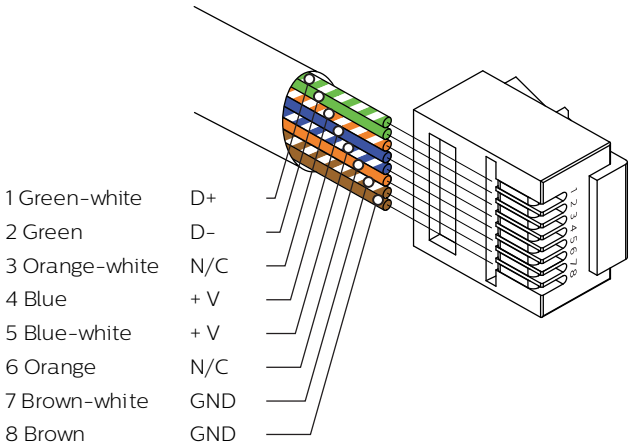
RJ12 Pins	Color	Signal
-		
1	Silver	Ground
2	White	Ground
3	Red	Data +
4	Green	Data –
5	Yellow	+V 12/24 VDC
6	Brown	+V 12/24 VDC
-		



Cat5e Ethernet cable

RJ45 Pins	Color	Signal
1	Green-White	Data +
2	Green	Data –
3*	Orange-White	Not connected
4	Blue	+V 12/24 Volts
5	Blue-White	+V 12/24 Volts
6*	Orange	Not connected
7	Brown -White	Ground
8	Brown	Ground

*Pins 3 and 6 may be used for Shield connection.

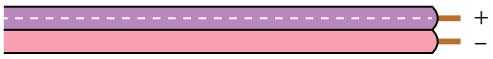


Other control cable types

There are two types of data cable commonly used to connect to electronic lamp drivers (ballasts).

1-10V cabling

1-10V uses mains rated polarized cabling; typically, a single pair “figure-8” cable. Positive wire may have a dashed line.



DDBC, DBC, DMB, DDMC, DMC controllers and DGBM, DMD modules provide 1-10 V control and automatically sink or source current depending on the connected driver. The DDBC1200 controller can provide 0-10 V or 1-10 V dimming in sinking and sourcing mode.

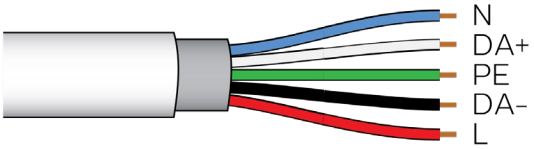
Typical considerations when installing a 1-10 V circuit:

- Loads must not use a mixture of sinking and sourcing drivers.
- An analogue circuit can typically accommodate around 10 luminaires per controller. The maximum number of drivers allowed on an analogue output depends on controller specifications such as, box loading, channel loading and circuit characteristics. Check the controller/module specification sheet for detailed information.
- 0/1-10 V control signal is polarity sensitive. Positive and negative outputs from the controller must be connected to the corresponding positive and negative inputs on the driver. The circuit will not work if wires are reversed.
- If the control signal is not connected or a wire is broken, the driver shall go to the maximum value or the system failure level, if applicable, to keep the lights on.
- If 0/1-10 V wiring is run in parallel with AC wiring, for improved noise immunity, it is recommended to use shielded cabling with the shield grounded to Earth at the controller. Unshielded analog control wiring can act as antennae, which may be interpreted by the driver as changes in the control voltage resulting in a flicker effect.
- As 0/1-10 V is an analogue protocol, the signal can suffer from voltage drop over a long cable run >30 m (100 feet), directly impacting the light intensity. Therefore, stranded wire should be used with a cross sectional area of at least 0.82 mm^2 (18 AWG) and the cable run should be less than [90 m] (300 feet).

DALI Cabling

DALI and DSI use mains rated non-polarized cabling; typically, a single pair “figure-8” cable or more often combined with lighting gear supply cabling, DALI has free wiring topology (daisy-chain, star or combined) but ring shaped connections should be avoided. No termination resistor is required.

Safety warning: DALI is not touch-safe and shall be treated as FELV (functional isolation only, not Safety) per IEC Classification. DALI could be at a mains potential (LIVE), because only basic isolation is provided. The DALI control cable must be handled as any other LIVE mains cable, potentially up to 230 VAC. This must be considered when installing DALI devices such as DALI Sensors and Dry Contact Interfaces on the DALI bus.



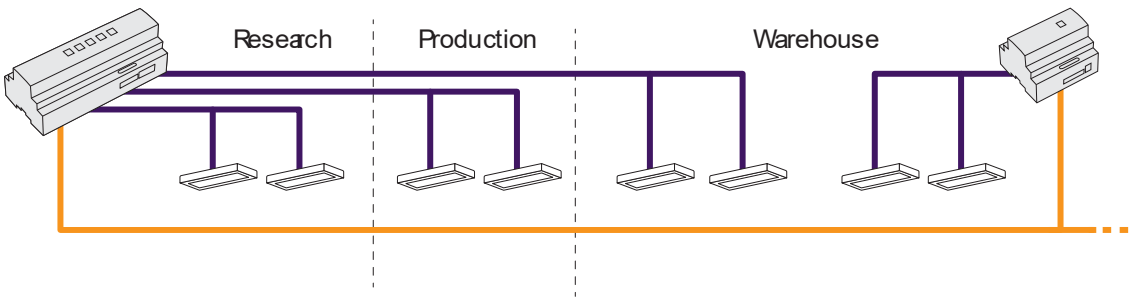
DALI voltage range: 12-21 VDC, nominal 14-16 V. Maximum combined DALI Power Supply current rating (nominal and short circuit): 250 mA per Universe or Galaxy (output).

Maximum bus length from any point to the DALI controller should not exceed 300 m (1000 ft), with max. 2.5 mm^2 (12 AWG) wires, to ensure signal integrity is not adversely impacted by cable inductance and capacitive loading (providing they are not dedicated comms cables with controlled impedance).

Smaller gauge wires are allowed providing the resistance limit of 4 Ohms (end-to-end wire loop resistance) is not exceeded.

Wire gauge	Maximum cable distance
0.5 mm^2 (20 AWG)	Up to 100 m (330 ft)
0.75 mm^2 (18 AWG)	Up to 150 m (500 ft)
1.5 mm^2 (16 AWG)	Up to 300 m (1000 ft)

To extend a DALI lighting zone beyond the standard-length limits, a DyNet network of multiple DALI controllers is often used, enabling combined install lengths of > 800 m.

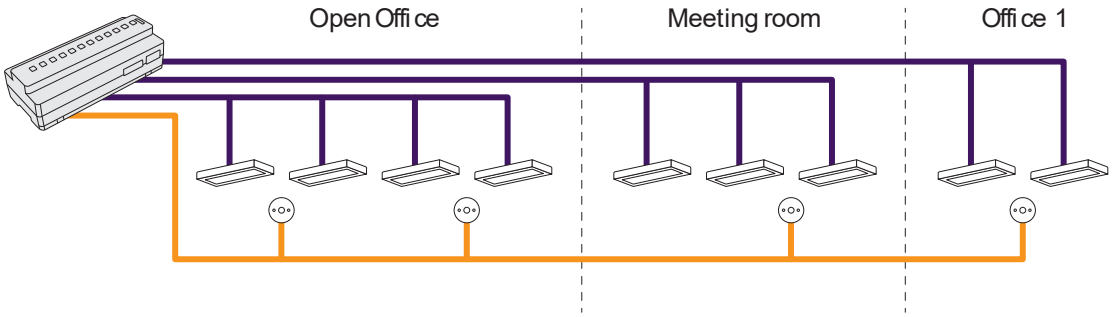


DALI Topology

DALI Cable DyNet Cable

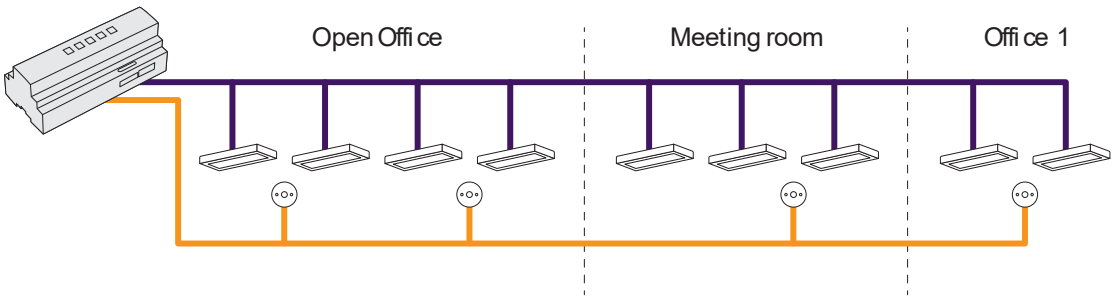
DALI Broadcast

Each independent lighting group requires individual wiring.



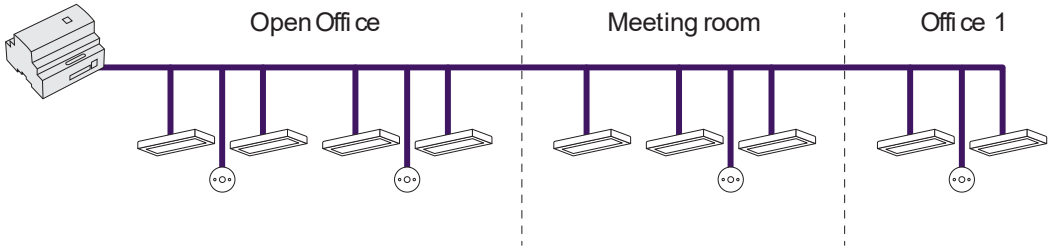
DALI Addressable

The same DALI bus wiring to DALI enumerated lamp drivers. A single universe has up to 64 driver addresses.

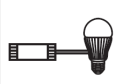


DALI with multi-master

The same DALI bus wiring to DALI enumerated lamp drivers and DALI multi-master devices such as sensors (e.g. DUS360CS-DALI) and dry contact input devices (e.g. DPMI940-DALI).



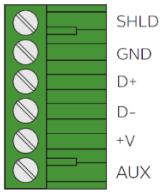
DALI Multimaster device and driver limits per output.

	
10	64
11	59
12	54
13	49
14	44
15	39
16	34

Installing load controllers

Safety warning: The control equipment is connected to potentially lethal power supplies. To ensure safety during system maintenance, Installers must always follow safety installation rules and isolation procedures as per the applicable Electrical Code.

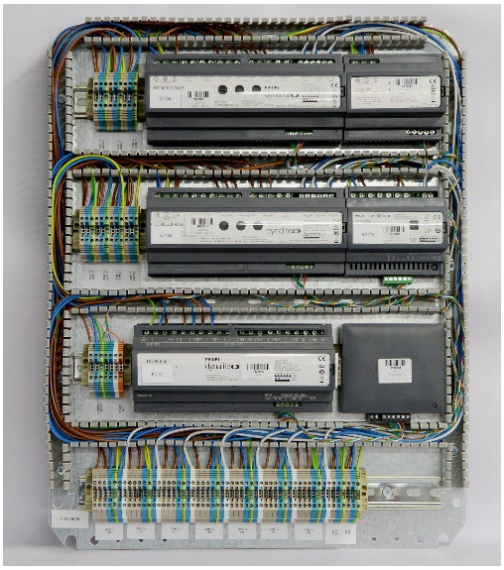
1. When deciding on the mounting position, controllers must be mounted in a dry, well-ventilated location. Consider that controllers may emit some mechanical noise.
2. Observe recommended spacing around controllers.
3. Ensure suitable circuit overload and safety protection is installed and labelled.
4. DIN rail controllers must be mounted horizontally (unless otherwise stated in the design) in a Standard Electrical Enclosure.
5. Wall mounted controllers must be mounted vertically (unless otherwise stated in the design) following ventilation guidelines.
6. Power and data wires should be segregated as per standard practice. Terminate according to the installation instructions in compliance with the applicable Electrical Code.
7. Mains controlled loads must be correctly installed and connected to the load controller output terminals.
8. Individual and total channel loading must be within the specified ratings limits for each type of load.
9. PWM controllers require a suitable DC power supply. All other load controllers are connected to mains supply.
10. Auxiliary/UL924 input is a programmable dry contact interface that is active low. A dry contact input is connected between the AUX/UL924 and GND terminals on the DyNet connector strip. Ensure that the cable length between the dry contact and terminal strip is no longer than 20 m (65 ft). DyNet and Dry contact wiring must meet SELV installation and insulation requirements as per applicable Electrical Code.



DyNet RS-485 Serial Connector with Auxiliary terminal

11. DALI Controllers:
    a. If DALI is not included with mains cable, or bundled with fixture, then run a two core DALI bus cable to the fixtures. This cable is in addition to the mains feed.
    b. DALI must have no more than 64 drivers per universe.
    (Recommend approximately 50 drivers per universe to allow for expansion).
    c. From 2022, the DDBC320-DALI joins the DDBC120-DALI in supporting a limited number of Dynalite user interface/sensor devices on each universe. For more information, refer to the DALI Multimaster device and driver table (on previous page), and specification sheets.
    d. DALI Controllers have an inbuilt DALI power supply. No external additional third-party DALI power supplies are allowed to be connected.

Example Installations



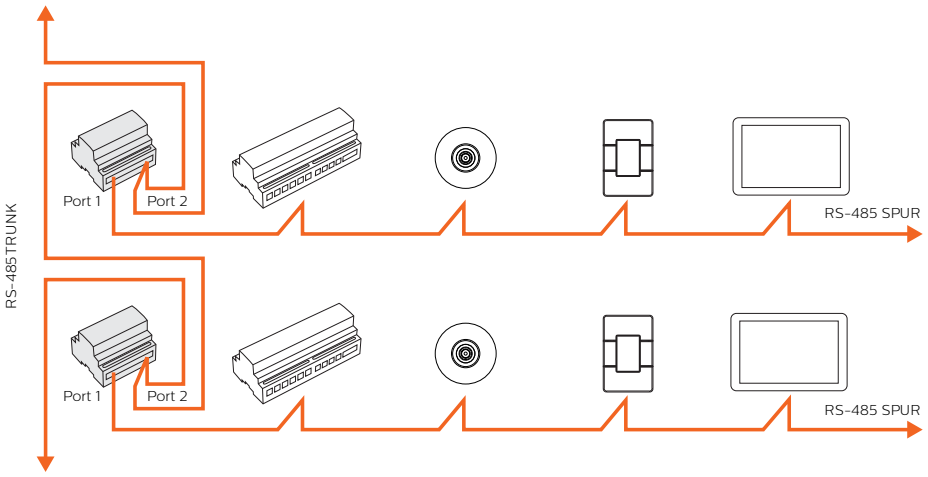
DIN rail mounted controllers

Wall mounted controllers

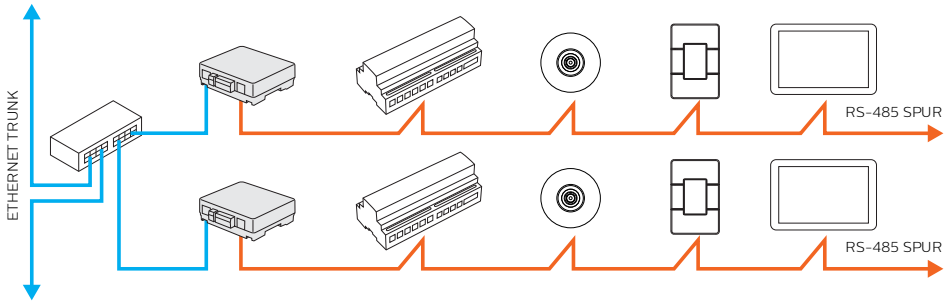
Installing Gateways

In multi-story buildings, each floor typically contains an independent network segment called a spur. Spurs can be joined via network gateways to a trunk network (RS-485 or Ethernet) installed in a riser linking all floors together. The trunk typically connects to the System Manager head-end software or to a BMS enabling full access to the entire system.

All circuits and cables connected to gateways must be SELV/Class 2 (UL).

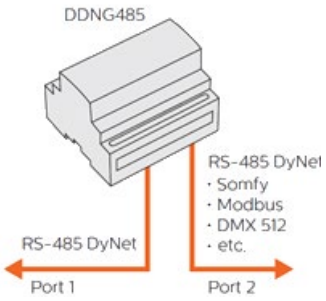


DyNet RS-485 trunk network and DyNet RS-485 spur network



Ethernet trunk network and DyNet RS-485 spur network

1. For RS-485 networks, terminate both trunk and spur connections to gateway.
    a. Spur (Floor sub-network) is terminated to Port 1.
    b. Trunk (Building backbone) is terminated to Port 2.
2. An RS-485 gateway is powered from the DyNet network spur connected to Port 1. Up to 150mA of power from the DyNet network on Port 1 is fed to Port 2, so providing there is sufficient power available on the spur, it is not necessary to provide a network power supply for the trunk network.
3. When implementing repeaters for long runs, connect the link to Port 2 of both bridges. Shielded cable must be used for long runs (refer to Recommended cable types). Provide additional DyNet power supplies where required and ensure end-of-line resistors are in place.
4. DDNG485 bridges are required when there are more than 100 devices on a run, or the current may exceed the cable limit.
5. DDNG485 Port 2 is used for DMX Receive/Transmit or for third-party integration.



RS-485 Gateway with third party integration options

Installing user interfaces

1. Follow device Installation Instructions to select appropriate physical placement of user interfaces.
2. Take care not to damage the wall surface surrounding user interfaces particularly when they have the light wash feature (PDTS, PAxBP, PADP and PATP).
3. All devices must be level and mounted consistently (vertically or horizontally) using the screws provided. A wall box may be required to comply with local electrical standards. The mounting plate must sit flat onto the wall surface.
4. Wall box screw holes must be horizontal when mounting Revolution user interfaces.
5. Where panels and buttons are engraved, check all labels are in the correct position before clipping into position.
6. Do not remove buttons from their protective/alignment sheet until the project is handed over.
7. User Interface sensor holes must be positioned at the bottom of the device. Devices have arrows to show correct orientation. If mounting Touchscreen in portrait mode Ethernet port must face downwards.
8. User Interface panels should have 30 cm (12 in) clearance from any metal objects or nearby cables (mains and data). Unearthed nearby metal objects such as stud work and door frames, may lead to false triggering of the lightwash effect. Ensure wall box and mounting plate are earthed according to the supplied installation instructions.
9. For all user interfaces, the cable should exit towards the bottom of the panel to avoid moisture ingress.
10. Touchscreens require an external power supply.

Revolution

Antumbra

Touchscreen

Installing sensors

Motion detection positioning

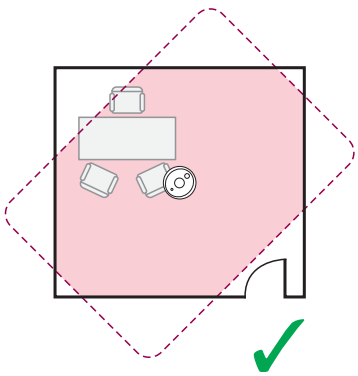
A single Dynalite sensor can perform motion detection, light regulation and IR receive simultaneously.

Typical detection range is measured at ≤25°C (77°F).
Range is reduced at ambient temperatures above 32°C (90° F)

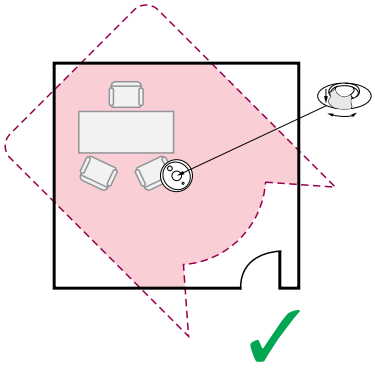
Sensors must receive specified supply voltage 15 V or 24 V ± 10% from the DyNet network. If necessary, add a network power supply to ensure adequate network voltages are maintained during day to day fluctuations. Ensure the 2 A limit is not exceeded on any data cabling.

Position sensor to detect motion in the specified area:

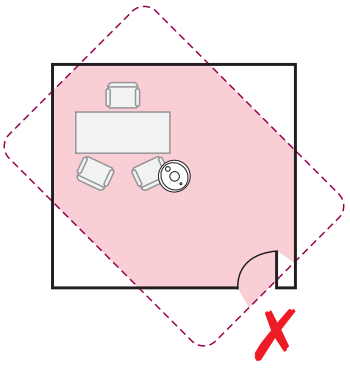
1. Install correct sensor type for location and application (wall or ceiling mounted, PE, PIR, ultrasonic, high bay, outdoor). Ensure DUS 30/90/AHB/WHB/LHB sensors go to the correct locations.
2. Ensure correct orientation for long and short field of view.
3. Install sensor out of direct sunlight.
4. Install sensors away from air conditioning vents and sources of electromagnetic interference.
5. Except for ultrasonic detection, avoid obstructions when installing sensors,
6. Lift inbuilt mask where applicable, to limit sensor detection area.



Lights trigger only upon entry



Using detection area mask



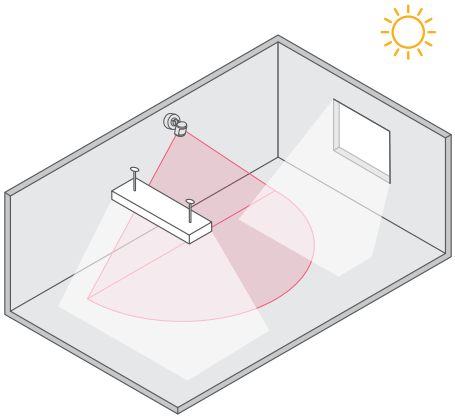
May trigger from passersby

For detailed information, refer to the sensor positioning guide on Dynalite.org.

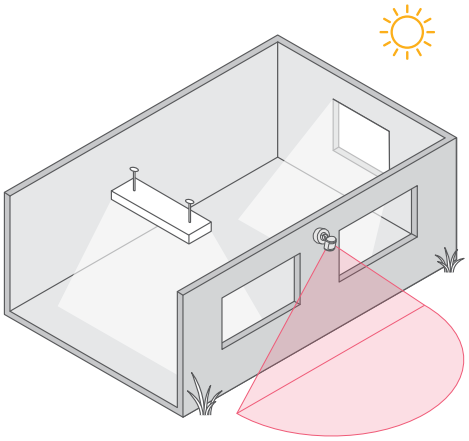
Light regulation positioning

When positioning sensors, there are two methods of light regulation to consider:
(speak to design engineer if unsure):

- If the sensor is used for Closed loop sensing, then position the sensor so it sees a mixture of indoor and outdoor light.
- If the sensor is used for Open loop sensing, then position the sensor so it sees the light level from one light source such as daylight, to adjust light levels elsewhere.



Closed loop light regulation



Open loop light regulation

Testing using the inbuilt indicator LED.

When first connected and powered from the network the red indicator LED on the sensor will flash for 3 minutes when it receives a button message. This allows the installer to confirm that the sensor is terminated correctly and communicates with other networked devices.

Indicator LED:
Red = PIR motion detection (All sensors).
Green = Ultrasonic motion detection (DUS804CS-UP).
Blue = Low network voltage (DUS804CS-UP)

Installing dry contact input devices

DLLI8I8O and DPMI940-DALI

Safety Note: DALI Dry Contact inputs are FELV (not touch safe) and they are galvanically connected to the DALI network. ONLY Dry Contact switches with mains rated safety isolation shall be interfaced. Refer to device installation instructions for cable length, safety insulation, requirements, and limitations.

1. Install as close to the switching source as possible. This also applies to AUX/UL924 inputs on controllers. Refer to the Installation Instructions for allowed cable lengths.
2. DLLI8I8O has an RS-485 interface and can be connected to eight open/close contacts and eight indicator LEDs.
3. DPMI940-DALI has a DALI interface and can be connected to four open/close contacts (must be used with a DDBC120-DALI controller).

DLLI8I8O

DPMI940-DALI

DDMIDC8

Safety Note: Analog input circuits must be SELV/Class 2 (UL).

1. Robust device recommended for locations with potential EMF noise, long cable runs up to 50 m (165 ft), where additional optical isolation for dry contacts is required or for analog control integration.
2. Can be installed without a DIN rail by extending DIN rail clips to expose mounting screw holes.
3. If used, connect voltage-free contacts or 0-24V AC/DC inputs to any of the eight opto-isolated inputs. Remove the cover and ensure that the internal jumpers for each input are set to the appropriate 0-24V or voltage-free setting, according to the input type.
4. Setting the internal jumper to the volt-free position increases the current consumption of the device from 15mA to 40mA. This must be considered when selecting DyNet data cable and supply capacity.
5. If used, connect 0-5 V or 0-10 V inputs to the analog ports. Ensure the input is a maximum of 10 VDC. Faders can be directly connected to the analog inputs by using the adjacent +5V terminal as a supply. Suggested fader value is 10K ohm.
6. Only draw a maximum of 25mA from the +5V terminal.

DDMIDC8

Energizing the System

Power-up tests

Danger: The manual override buttons/switches on the controllers do not provide permanent isolation. Controllers may be fed from multiple circuits. To isolate the controller outputs, power must be disconnected at the circuit breakers feeding mains to the controller and to any pass-through circuits.

1. Once the network is connected and energized, a button press on any panel, controls all the dimmers (refer to Preset table below). An unresponsive light indicates that the driver or lamp is faulty or incorrectly wired.
2. Go to the last panel in the run according to the wiring diagram and push buttons 1 and 4 (on and off) to confirm the integrity of the wiring all the way back to the distribution board. Lights should respond within 2 seconds and relays should turn off when all lights are set to 0%. Sensors will flash for 3 minutes.
3. On each panel, push the buttons to confirm that the panel is working. The indicator LED should illuminate on the pushed button. Buttons on other panels should match to track the button pushes (note: dry contact UIs may not have indicators fitted).
4. If a button LED indicator does not light, remove the panel and check the wiring and network voltage. Repair network wiring as necessary (refer to the troubleshooting section).
5. For touchscreens, use the Preset buttons or Sliders on the page to dim channels and confirm that the touchscreen is communicating with the network.
6. All devices are pre-programmed for out-of-the-box operation. Dynalite load controllers (dimmers) are set to provide full output by default, irrespective of having the network connected.
7. Where provided, use the manual override switches to test output circuits and loads. Ensure the correct circuits switch accordingly Be aware that relay controller outputs configured for double-throw operation (blind/curtain control), will respond differently when using override switches.
8. To turn the lights on to full, push the service switch on the load controller three times in succession.
9. To run the DALI flash sequence, push the service switch on the DALI controller four times in succession. Drivers will flash the lights for 5 minutes, then return to their original state. Hold down the service switch for 5 seconds to reset the controller and stop the flash sequence.

Default Preset Scenes

The factory default presets for User Interface panels are listed below. Note that some panel types hide or occupy more than one button position.

Button	Preset	Light level	Button	Preset	Light level
1	Preset 1	100% (ON)	5	Preset 5	80%
2	Preset 2	70%	6	Preset 6	60%
3	Preset 3	40%	7	Preset 7	50%
4	Preset 4	0% (OFF)	8	Preset 8	20%

Controller Service Switch functions

The relevant Service Switch functions are:

- **3 pushes** = All Channels 100%. You should do this to normalize the connected driver settings. (DALI Broadcast Channels will setup the connected drivers with Min/Max/PowerOn/SystemFail levels, and 2 second Fade Time).
- **4 pushes** = A DALI enumerated controller will go into test mode and run a flash sequence for 5 minutes.
- **Push and hold for 5 seconds and release** = Device reset

Controller Service LED functions

The Service LED has four signaling modes:

- **Blinking slowly (0.5Hz)** = Normal operation.
- **Blinking normally (1Hz)** = Network activity detected or DMX reception.
- **Blinking fast (4Hz)** = Device communicating.
- **Permanently ON or OFF** = Fault.

Some devices support a bicolor service LED. The same blinking pattern is valid for both Red and Green LEDs. Red is the standard color for all devices. Green shows reception of DyNet heartbeat from another DyNet device, such as a Gateway.

Fault finding

DyNet bus issues

After completing the power up tests, all controllers should react to a single button push message. If not, check for any discrepancies between the installation and the installation instructions and check troubleshooting symptoms. To rectify problems, follow these five steps:

1. Analyze the symptoms.
2. Diagnose the cause.
3. Repair the problem.
4. Verify the solution.
5. Prevent the issue occurring again.

Electrical characteristics

If faults are occurring, one of the first things to check is the typical RS-485 DyNet voltages. Incorrect voltages may indicate short/open/crossed circuit or the need for an additional power supply.

Electrical Property	Values
Correct Min – Max network supply voltages:	European (EU): 12 to 18 V (nominal 15 VDC) between Gnd and +V terminals North American (NA): 20 V to 26 V (nominal 24 VDC) between Gnd and +V terminals
Typical Data voltages with reference to Gnd:	D- between 0.2 VDC to 1.0 VDC D+ between 0.5 VDC to 3.8 VDC D- to D+ must be greater than 300 mV during transmission
Max DyNet network supply/load current	2 Amps

Important: Mains fed load controllers and power supplies contribute power to the network. Gateways, button panels, dry contacts and sensors consume power from the network.

Unresponsive devices

If the controls are not responding as expected, follow the procedure below to isolate the fault. If you are still unable to rectify the fault, make a list of device model numbers used in the system and contact technical support, via the Signify Partner Portal.

Isolate a fault in the network:

1. Find the midway point of the spur.
2. Break the network into two halves at a field device (user interface or sensor) and power both halves.
3. Perform power-up tests (refer to page 11) in each half of the network; this will identify which half has the problem.
4. Continue to break the half into quarters etc. Repeat power-up tests until you have found the fault.

DALI Bus Issues

Tools required:

- Digital Oscilloscope 10 MHz bandwidth or greater
- Safety Isolated Differential Probes 1 MHz bandwidth or greater

Measurements are taken between DALI wires. This method is the most comprehensive and can uncover issues which other "static" methods (like digital multimeter test) cannot.

Important: Standard Digital Oscilloscope probes must not be used.

Safety Notice: DALI wiring is not touch safe. Before taking measurements ensure devices are properly installed with appropriate Earthing. If unsure do not perform test and seek advice from qualified personnel.

Using a digital multimeter, check presence of DALI power and confirm continuity/no short circuits on wiring. Measurements are taken across DA terminals on DALI device. Expected reading in idling state: 12-21 VDC.
If the reading in idling state is between 2-12V, potential causes could be:

- Overload (too much DALI bus load)
- Faulty device online.

If the reading is < 2 V, there is potential wiring fault on DALI line.

When the built-in test sequence is initiated, an occasional repetitive voltage dip is noticeable on multimeter because of data packets creating short supply interruptions. This is a normal indication of dataflow.

If potential mis-wiring or short circuit is suspected on an output or between two different outputs, a way to test with the multimeter is to connect one DALI Bus at a time to the Controller & Power Supply side and check Bus voltage on all DALI circuits: if any of the disconnected and unpowered DALI circuits is still returning a 12-21 VDC reading there is likely a “cross short”.

Advanced DALI troubleshooting

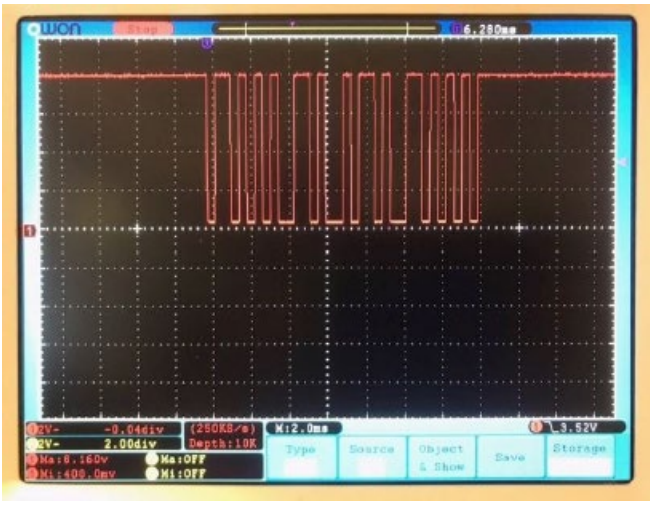
Tools: Digital Oscilloscope with 1 channel, min. 10MHz and Safety Isolated Differential Probes with min 1MHz bandwidth. Standard Digital Oscilloscope probes must not be used. Measurements are (as in the previous multimeter method) taken between DALI wires. This method is the most comprehensive and can uncover issues which other “static” methods (like digital multimeter test) cannot.

Overall signal edges shall show a clear and sharp rise/fall time.

Idling at 16 V must be within 12-21 V (1:20 probe used)

The time between a rising and falling edge is 416 µS apart which equates to 2400 baud.

Signal low level must be < 4 V.
It can vary depending on type of DALI device, physical position on network, distance from power supply etc.



Troubleshooting tables

Load Controller Issues

Symptom	Probable cause	Solution
Controller does not operate at all. No Service LED activity.	• Faulty mains supply connection. • No power available. • Controller is damaged.	Check power supply connections to the device. Check Fuse if fitted. Replace controller or modules if faulty.
Service LED not lit.	• Supply voltage too low. • Short circuit on network wiring. • Faulty controller.	Check supply voltage. Check for correct DyNet voltages at each device. Isolate and energize to determine if the fault is external to the controller. Replace controller or modules if faulty.
Device appears to be operating but all channels stay at full output.	• Incorrect wiring on DyNet port. • Panic/UL294 function activated. • Check Manual override switches.	Check DyNet port wiring, verify button panel is operating correctly. Check if emergency state has been activated. Disable or isolate DMX.
Device operates properly but circuit breakers/RCD/RCBO continually trip.	• Earth leakage is exceeded or Short circuit on load. • Device overloaded. • Incompatible load.	Check load wiring for short circuits. Verify device loading with current tester (remember to de-rate for specific loads and install conditions). Check total earth leakage. Check wiring terminals are tight. Perform a full power cycle to clear fault condition.
Dimmable lights won't dim or continuously flash.	• Wrong type of driver or driver incorrectly wired. • Wrong lamp type. • Missing or mis-wired dimming bus cable. • Device may be in test mode	Check that bus cable is connected to drivers. Inspect the driver to confirm the driver type. Check cable polarity if using 1-10V control. Check wiring against the driver manufacturer's diagram. Check if the driver is DALI certified. Check for correct DALI bus voltage: 12–21 VDC.
Can't control lights that were previously working.	• Integrated third party system may require configuration. • Fault on RS-485 DyNet bus	Disconnect third party equipment to isolate the system and identify the cause. Perform standard fault finding tasks

Button Panel, Sensor and Dry Contact issues

Symptom	Probable cause	Solution
Device does not operate or indicator/display flashes.	• Wiring issue on DyNet bus. • No or insufficient power available. • Low voltage	Check power supply to the device. Check for broken wires. Check controllers are online and contributing to the network supply. Add power supply to boost voltage.
Light Wash effect false triggers	• Unearthed metal objects within 30cm (12 in) of panel. • Wall box and mounting plate earthing not applied as per installation instructions. • Strong electrical noise from nearby VRV Air Conditioner / Motor Drives, AV equipment or a non-compliant Light Source / Appliance	Ensure that all metal in the wall and surrounding metal is Earthed. Connect the DyNet shield, wall box and mounting plate to Earth. Ensure that unused wires have been connected correctly to Earthed shield terminal (for example Brown/Brown-white pair). De-energize potential noise sources in a sequence and run a test to localize problem. Further segregate cabling where required and separate Earth return to minimize noise contamination on network. Isolate and replace any non-compliant equipment found.

Touchscreen issues

Symptom	Probable cause	Solution
Device does not operate at all	• No power available. • Wiring issue.	Check power supply adaptor and ensure correct supply voltage and current. Check for shorted or broken wires.
Device is on but not able to control anything	• Broken power supply wire. • Broken wire on RS-485 bus.	Check plug is inserted correctly. Check for shorted or broken RS-485 wires. Check voltage at device for correct electrical values.
Light Wash effect false triggers	• Device is mounted to close to other objects	Correct the mounting position Remove nearby objects

Third party system integration issues

Symptom	Probable cause	Solution
One or both systems no longer operate	• Bus contention (incompatibility)	Install a suitable conversion gateway/interface (for example, a DTK622-232).
Dynalite controls operate intermittently	• Third party system (such as such as AMX, DMX or Crestron) is streaming messages and overriding DyNet.	Install a suitable conversion gateway/interface (for example, a DTK622-232). Disable or isolate DMX.

To ensure safety and prevent damage to the system, appropriate isolation shall be provided. Only SELV/Class 2 (UL) systems shall be connected to non-isolated DyNet interfaces.

Document Revision: 08