

Push is a 4 channel constant current source solution. It caters LED lighting applications of up to 48 (4x12) high brightness LEDs.

Push is DALI or 0-10V controllable.

Push allows the flexibility needed in driving your high brightness LEDs.

Push is a common positive LED output.

Push can come at different driving current versions: 350/ 500/ 700mA.

Push's channels can be connected together or unified, which allows achieving higher driving current: 1050/ 1400mA.

Dimensions

121mm x 106mm x 59mm

Protection

Short circuit

Open line

Wrong wiring

Active Thermal Protection

LED power output

Max. 48VDC (depends on PSU)

350/ 500/ 700mA per channel

Max. 48 LEDs 4 Channels



Power Input

External power supply 24 - 48VDC

Connections

Screwable terminal blocks

Chapter 1: **Introduction**

1.1 Applications

- Architectural Use
- LED lighting effects
- Theatrical and studio lighting
- Commercial and retail
- Domestic and commercial use

1.2 Features:

- DIN-Rail and infrastructure attachment
- Either 0-10V / DALI Standard
- Smooth fade control with continuous current output
- High efficiency (up to 95%)
- From 1 and up to 12 serial LEDs per channel
- Self diagnostic protocol
- Output protections
- Active Thermal protection
- Easy connection and installation
- Power, communication and output state LEDs indication
- Common Positive compatible
- Normally On

Chapter 2: Mounting and Installation

2.1 Assembly and installation:

For proper installation and subsequent operation of each Unit, pay special attention to the following recommendations :

- ❖ Upon unpacking the product, inspect the contents of the carton for shipping damages.
Do not install damaged Units.
- ❖ Ensure proper ventilation of each Unit and avoid areas where corroding, deteriorating or explosive vapors, fumes or gases may be present.
- ❖ Allow for proper clearance of Unit enclosure and wiring terminals for easy access, hardware configuration and maintenance.
- ❖ Ensure that the Unit is securely attached, properly mounted, and free of excessive vibration.



- ❖ Ensure that power is disconnected before installing, wiring, or servicing the Unit.

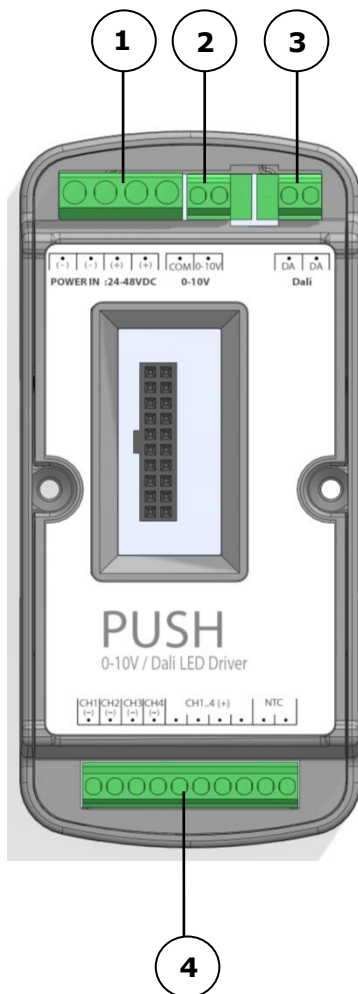
DO NOT HOT PLUG THE MAIN UNIT TO THE BASE!

- ❖ Do not attempt to install or use the Unit until you read and understand the installation instructions and safety labels.
- ❖ Do not use the Unit if power cables are damaged.
- ❖ Unit intended for maximum operating ambient 40°C.



The instructions and precautions set forth in this user guide are not necessarily all-inclusive, or relevant to all applications as d-led cannot anticipate all conceivable or unique situations.

2.2 Unit Connection



(1) Power In (24-48VDC):

Pin	Voltage Polarity
• (-)	-V
• (-)	-V
• (+)	+V
• (+)	+V

1050/1400mA wiring:

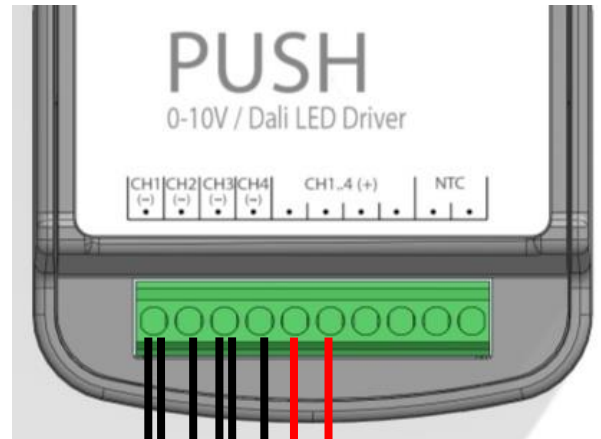
In order to connect 1050/1400mA fixtures to Push channels 1-2 and 3-4 must be wired together as follows:

(2) 0-10V Input:

Pin	Designation
• 0-10V	0-10V
• COM	COM

(3) DALI Input:

Pin	Designation
• DA	DALI
• DA	DALI

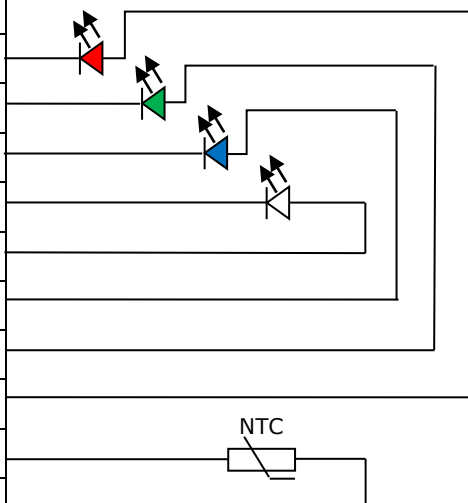


Notes:

F1 = fixture #1
F2 = fixture #2

(4) Output:

Pin	Designation
• CH1(-)	LED(-)
• CH2(-)	LED(-)
• CH3(-)	LED(-)
• CH4(-)	LED(-)
• CH1-4(+)	LED(+)
	LED(+)
	LED(+)
	LED(+)
• NTC	Thermal Feedback
• NTC	Thermal Feedback



- ❖ Maintain correct polarity when connecting the LEDs. Failure to do so may cause damage to the LEDs (especially at low number of serried LEDs per channel).
- ❖ If the NTC sensor is not connected, Thermal Protection will be disabled for the Output.

Power Wiring

- ❖ Please follow the PSU selection guidelines below in order to select the correct Power Supply.
- ❖ Use at least 18 AWG (0.75mm²) for DC Power In connection.
- ❖ It is highly recommended to connect all 4 terminals of the Power In screw terminal block.



Maintain correct polarity when connecting the Power Supply. Failure to do so may cause damage to the Unit.

2.3 PSU selection guidelines

The PSU must be selected while considering the maximal number of serried LEDs per channel in the application, output cable type/length and the power rating needed to drive the LEDs at the desired current.

Below is a table that illustrates the relationship between the variables.

PSU selection table for High-Power LED fixtures

Number of LEDs in Series per channel	Total V _f of LEDs (typ.)	Recommended PSU Voltage	Minimal PSU Power Rating for PUSH		
			@350mA	@500mA	@700mA
1	3.5V	24V	5.6W	8.1W	11.3W
2	7V	24V	11.3W	16.1W	22.5W
3	10.5V	24V	16.9W	24.2W	33.8W
6	21V	24V	33.8W	48.3W	67.6W
9	31.5V	48V	50.7W	72.5W	101.4W
12	42V	48V	67.6W	96.6W	135.2W



The calculations were made assuming the following conditions:

- ❖ All 4 channels are equally loaded.
- ❖ 15% power was added to the nominal ratings as a minimal compensation reserve for system efficiency and drop voltage on the output line.

The values presented in the tables of this section are general guidelines only, and as such should be used with caution. Always check the specifications of the LED fixtures used as a load and confirm whether the conditions stated above satisfy the needed requirements.

PSU selection table for COB LED fixtures

Number of COB fixtures in series per channel	Rated power of COB	Total V_f of COB		Recommended PSU Voltage		Minimal PSU Power Rating for PUSH
		@1050mA	@1400mA	@1050mA	@1400mA	
1	10W	9.5V	7.1V	24V	24V	23W
	15W	14.3V	10.7V	24V	24V	35W
	20W	19.0V	14.3V	24V	24V	46W
	25W	23.8V	17.9V	48V	24V	58W
2	10W	19.0V	14.3V	24V	24V	46W
	15W	28.6V	21.4V	48V	48V	69W
	20W	38.1V	28.6V	48V	48V	92W
	25W	X	35.7V	X	48V	115W
3	10W	28.6V	21.4V	48V	48V	69W
	15W	X	32.1V	X	48V	104W



The calculations were made assuming the following conditions:

- ❖ All 4 channels are equally loaded.
- ❖ 15% power was added to the nominal ratings as a minimal compensation reserve for system efficiency and drop voltage on the output line.
- ❖ Red color means that the specified COB chain cannot be used (due to high V_f).

The values presented in the tables of this section are general guidelines only, and as such should be used with caution. Always check the specifications of the LED fixtures used as a load and confirm whether the conditions stated above satisfy the needed requirements.

2.4 Cable type / length limitations for different LED loads:

At driving current 350mA

AWG COPPER*	Drop voltage (100m, 350mA)	max. LEDs 50m	max. LEDs 100m	max. LEDs 150m	max. LEDs 200m	max. LEDs 250m	max. LEDs 300m	max. LEDs 400m	max. LEDs 500m
26	9.6V	12	10	9	8	7	5	3	X
24	6.1V	12	12	11	10	9	8	6	5
22 (0.34mm ²)	3.8V	12	12	12	11	11	10	9	8
20 (0.5mm ²)	2.5V	12	12	12	12	11	11	10	10
18 (0.75mm ²)	1.6V	12	12	12	12	12	12	11	11
16 (1.5mm ²)	0.9V	12	12	12	12	12	12	12	12

At driving current 500mA

AWG COPPER*	Drop voltage (100m, 500mA)	max. LEDs 25m	max. LEDs 50m	max. LEDs 100m	max. LEDs 150m	max. LEDs 200m	max. LEDs 300m	max. LEDs 400m	max. LEDs 500m
26	13.8V	12	11	9	7	5	1	X	X
24	8.7V	12	12	11	10	8	6	3	1
22 (0.34mm ²)	5.4V	12	12	12	11	10	9	7	5
20 (0.5mm ²)	3.5V	12	12	12	12	11	10	9	8
18 (0.75mm ²)	2.4V	12	12	12	12	12	11	11	10
16 (1.5mm ²)	1.4V	12	12	12	12	12	12	12	11



- ❖ All max. LEDs' values are per channel.
- ❖ Green color means that full load can be used at the specified cable type / length.
- ❖ Yellow color means that only a limited amount of load may be used at the specified cable type / length as stated in the relevant row / column.
- ❖ Red color means that the specified cable type / length cannot be used.
- ❖ The calculations are true when 48V PSU is used.

The values presented in the tables of this section are general guidelines only, and as such should be used with caution. Always check the specifications of the LED fixtures used as a load and confirm whether the conditions stated above satisfy the needed requirements.

* Wires thicker than 1.5mm²/16AWG cannot be inserted directly into the Unit's output terminal blocks. Use additional intermediate terminal blocks suited for a thicker wire cross section to extend the output line.

At driving current 700mA

AWG COPPER*	Drop voltage (100m, 700mA)	max. LEDs 25m	max. LEDs 50m	max. LEDs 100m	max. LEDs 150m	max. LEDs 200m	max. LEDs 300m	max. LEDs 400m	max. LEDs 500m
26	19.3V	12	10	8	5	3	X	X	X
24	12.1V	12	11	10	8	7	3	X	X
22 (0.34mm ²)	7.6V	12	12	11	10	9	7	5	3
20 (0.5mm ²)	5V	12	12	12	11	10	9	8	6
18 (0.75mm ²)	3.3V	12	12	12	11	11	11	10	10
16 (1.5mm ²)	1.9V	12	12	12	12	11	11	10	9



- ❖ All max. LEDs' values are per channel.
- ❖ Green color means that full load can be used at the specified cable type / length.
- ❖ Yellow color means that only a limited amount of load may be used at the specified cable type / length as stated in the relevant row / column.
- ❖ Red color means that the specified cable type / length cannot be used.
- ❖ The calculations are true when 48V PSU is used.

The values presented in the tables of this section are general guidelines only, and as such should be used with caution. Always check the specifications of the LED fixtures used as a load and confirm whether the conditions stated above satisfy the needed requirements.

* Wires thicker than 1.5mm²/16AWG cannot be inserted directly into the Unit's output terminal blocks. Use additional intermediate terminal blocks suited for a thicker wire cross section to extend the output line.

At driving currents 1050/1400mA

AWG COPPER*	Drop voltage at 1050mA for a line length				Drop voltage at 1400mA for a line length			
	25m	50m	100m	200m	25m	50m	100m	200m
26	7.2V	14.4V	28.9V	X	9.6V	19.3V	38.5V	X
24	4.5V	9.1V	18.1V	36.4V	6.1V	12.1V	24.2V	X
22 (0.34mm ²)	2.9V	5.7V	11.4V	22.9V	3.8V	7.6V	15.2V	30.5V
20 (0.5mm ²)	1.9V	3.7V	7.4V	14.9V	2.5V	5V	9.9V	19.8V
18 (0.75mm ²)	1.2V	2.5V	5V	9.9V	1.7V	3.3V	6.6V	13.2V
16 (1.5mm ²)	0.7V	1.4V	2.8V	5.7V	1V	1.9V	3.8V	7.6V



- ❖ Red color means that the specified cable type / length cannot be used.
- ❖ The calculations are true when 48V PSU is used.

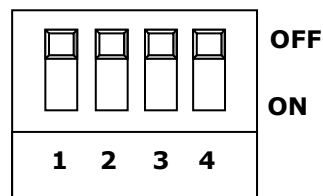
The values presented in the tables of this section are general guidelines only, and as such should be used with caution. Always check the specifications of the LED fixtures used as a load and confirm whether the conditions stated above satisfy the needed requirements.

* Wires thicker than 1.5mm²/16AWG cannot be inserted directly into the Unit's output terminal blocks. Use additional intermediate terminal blocks suited for a thicker wire cross section to extend the output line.

Chapter 3: Unit Setup and Operation

3.1 Dip-Switch Settings

DIP SW MODE			Rated Current [mA]			
DP1	DP2	DP3	CH1	CH2	CH3	CH4
OFF	OFF	OFF	350	350	350	350
ON	OFF	OFF	500	500	500	500
OFF	ON	OFF	700	700	700	700
ON	ON	OFF	350	500	500	500
OFF	OFF	ON	500	700	700	700
ON	OFF	ON	1050		1050	
OFF	ON	ON	1400		1400	
ON	ON	ON	700 (One Channel)			



DP4	DALI	0-10V
OFF	Upon Loss of DALI signal - all channels at 100%	N/A
ON	Upon Loss of DALI signal - all channels at 0	Enable External Analog 0-10V

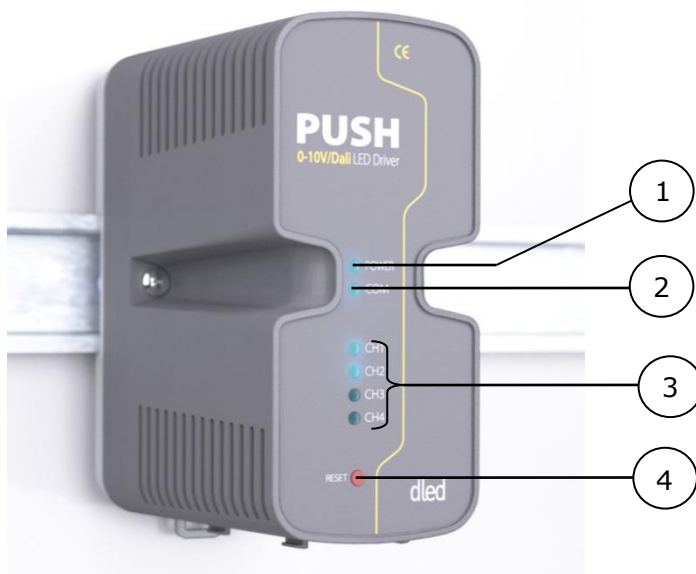


DO NOT HOT PLUG THE MAIN UNIT TO THE BASE!



Upon power up (at any mode) the Unit shall perform a short self-test sequence:
Channels 1-4 shall briefly flash.

3.2 Device Overview



- 1 – Power status indication LED
- 2 – Communication status indication LED
- 3 – Output channels status indication LEDs
- 4 – Reset Button

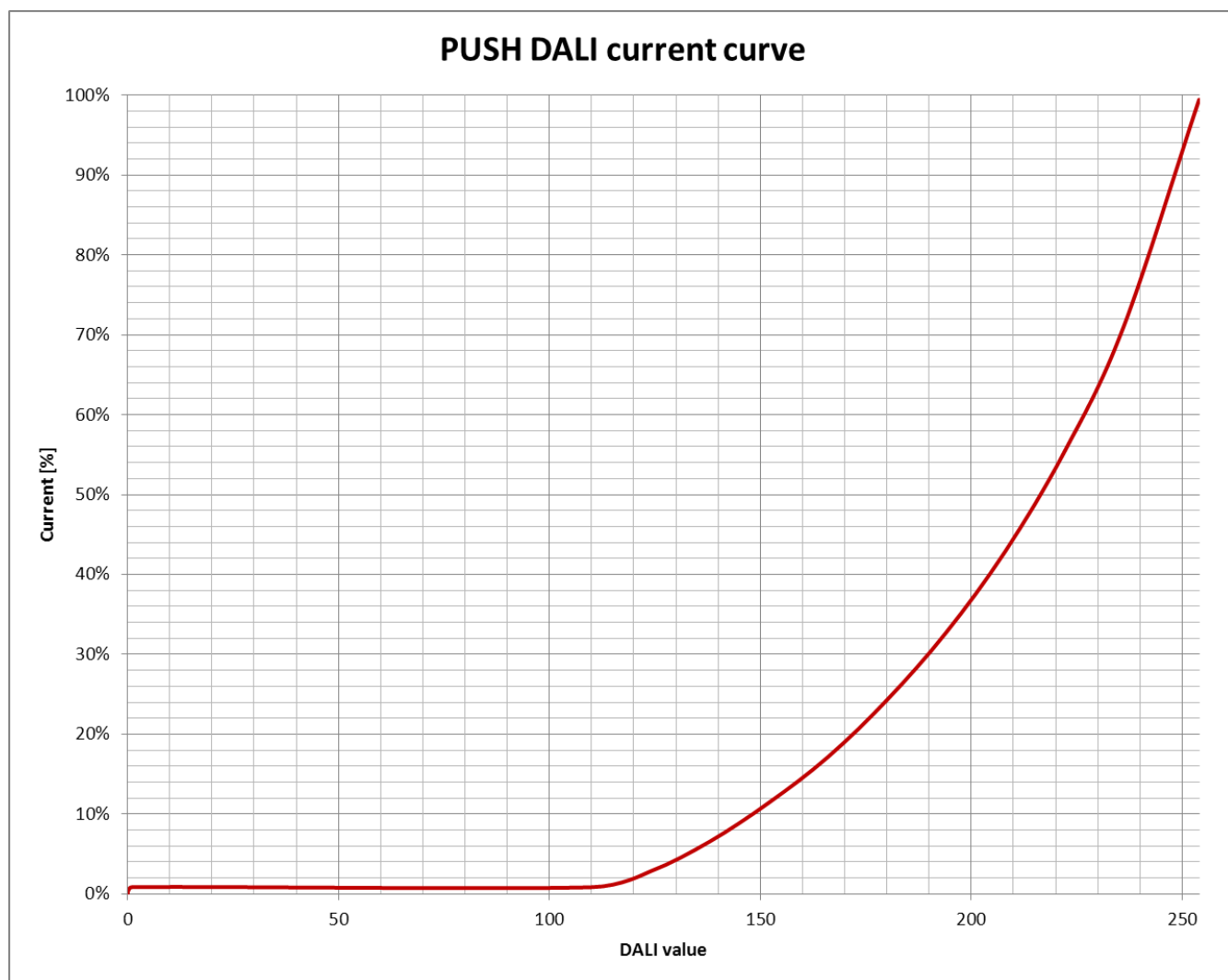
3.3 LEDs Indication

CH1-CH4 LEDs	Description
OFF	Channel dimmer value = 0
ON	Channel dimmer value > 0
Pulse	Channel open-circuit
Fast blink	Channel short-circuit
Power LED	Description
ON	Power is on, normal operation
Fast blink	PSU voltage is out of range
Pulse	Unit overheat
Double Pulse	Fixture Overheat (External NTC sensor)
Communication LED	Description
OFF	DALI signal present
ON	External 0-10v dimmer control
Fast blink	No DALI signal detected
Fast blink- freeze-blink	DALI signal present, received new data

3.4 Reset Button

Press duration	Function
Short press	Software reset (0~1 sec)
Long press	Short self-test, each channel briefly fades in and out one after another (>1sec)

3.5 DALI Current Curve



The DALI current curve of Push is optimized to accommodate proper function with most standard DALI systems (such as Lutron), meaning it responds as a ballast would:

- At DALI value '0' the LEDs are OFF.
- At values '1~110' the output shall be at minimal level (around 1% of the nominal current).
- At values >110 the output shall be according to current curve chart.



The current curve may be altered upon special request.

Chapter 4: Technical Data

4.1 Electrical

Specification	Notes/ Conditions	Value
Input Voltage	Via external stabilized power supply	24~48VDC
Rated output power	48V 24V	Max. 120W total Max. 60W total
Output voltage	Depends on PSU	2~48VDC
Driving current	Per channel	(350, 500, 700)mA x 4 channels (1050, 1400)mA x 2 channels
Output channels configuration		1-4 channels
Channel driving Capabilities (Hi-Power LEDs)	Dependant on Input Voltage and V_f of the LEDs	Min. 1 LED per channel Max. 12 LEDs per channel
Total driving Capabilities (COB LEDs)	At 48V/1050mA At 48V/1400mA	Max. 6x10W or 4x20W COB LEDs total Max. 6x15W or 4x25W COB LEDs total

4.2 Interface

Specification	Option 1	Option 2
Control Method	Analog 0-10V (controller must provide current source)	DALI
Working Mode	0-10V (4 channels work as a single channel)	DALI (1, 2 or 4 channels work synchronously or separately)
Loss of Input Signal	All channels OFF	Preserves previous state on all outputs, failure indication on front LEDs

4.3 Connections

Specification	Value
Power In Connection Type	Screw terminal block, 4 contacts, pitch 5mm Wire range: 22-14AWG/2.5mm ²
DALI/0-10V Connection Type	Screw terminal block, 2 contacts, pitch 3.5mm Wire range: 26-16AWG/1.5mm ²
Output Connection Type	Screw terminal block, 10 contacts, pitch 3.5mm Wire range: 26-16AWG/1.5mm ²

4.4 Protection

Specification	Value
Fixture Protection	Open line Short line
Fixture Protection	Active Thermal Protection*, triggered at >75°C on NTC, regulates output current according to fixture temperature
Device Thermal Protection	<p>Intrenal circuitry overheat protection:</p> <ul style="list-style-type: none"> thermal protection under poor ventilation conditions (internal circuitry temperature >70°C), regulates output current according to internal temperature lowers current on all channels to 10% at extreme thermal conditions (internal circuitry temperature >85°C), resets after power cycle

* If the NTC sensor is not connected, thermal protection for the fixture will be disabled

Environment

Specification	Value
Ingress Protection	IP20
Operating Ambient temp.	<p>Range:</p> <p>-18°C ~ +40°C</p> <p>(0°F ~ +104°F)</p>
Storage temp.	<p>Range:</p> <p>-18°C ~ +60°C</p> <p>(0°F ~ +140°F)</p>
Humidity	85% RH

4.5 Certifications

Certification	Standards
EU Safety	IEC/EN 61347-1, IEC/EN 61347-1
EMI	EN 55015, EN 61547, IEC 61000-3-2/3, CFR 47 FCC Class B
US/CA Safety	ANSI/UL 1598, CSA C22.2 NO. 250.0-08

Chapter 5: Problem Solving

5.1 Troubleshooting

The following table provides corrective actions for possible trouble situations. If further assistance is required, please contact a d-led customer service representative.

PUSH DALI/0-10V Troubleshooting table:

TROUBLE	POSSIBLE CAUSE(S)	CORRECTIVE ACTION
Device does not function, power LED is OFF	Unit is not receiving power from the external DC Power Supply	Verify POWER IN connections. Ensure PSU's AC circuit breaker is not tripped.
Device not responding to 0-10V input signal (COM LED on device's front is blinking constantly)	Unit is not in 0-10V Mode	Check DIP-Switch settings, make sure switch #4 is set to ON (down) position
	Bad 0-10V wiring or 0-10V signal is missing	Check 0-10V wiring, make sure it's wired to 0-10V (and not DALI) input and the polarity is correct. When Unit is receiving correct 0-10V signal the green COM LED on the device will be lit on.
	The 0-10V controller is of incompatible (current sink) type	Check the specifications of your 0-10V controller. Push DALI/0-10V is compatible with <u>current source</u> controller types only!
Device not responding to DALI input signal	Bad DALI wiring or DALI signal is missing	Check DALI wiring, make sure it's wired to DALI (and not 0-10V) input. When Unit is receiving correct DALI signal the green COM LED on the device will briefly flash each time a DALI command is received.

TROUBLE	POSSIBLE CAUSE(S)	CORRECTIVE ACTION
The device is standalone (no DALI/0-10V signal connected), but all channels are OFF	Wrong DIP-Switch settings	Check DIP-Switch settings, make sure switch #4 is set to OFF (up) position
CH(X) LED is blinking	Possible wiring problem with the X channel (X can be 1, 2, 3 or 4).	Check the load connection for possible short-circuit or open line.
Power LED blinking	Wrong power supply voltage	Check the power supply voltage; make sure it's in the correct range: 24-48VDC.
Power LED pulsing	Unit overheat	Verify proper ventilation conditions for the Unit
Power LED double-pulsing	LED fixture overheat	Verify proper ventilation conditions for the connected LED fixture
	Short-circuit on NTC line	Check the load connection for possible short-circuit.