

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

Push is DMX-512 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
- DMX-512 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):

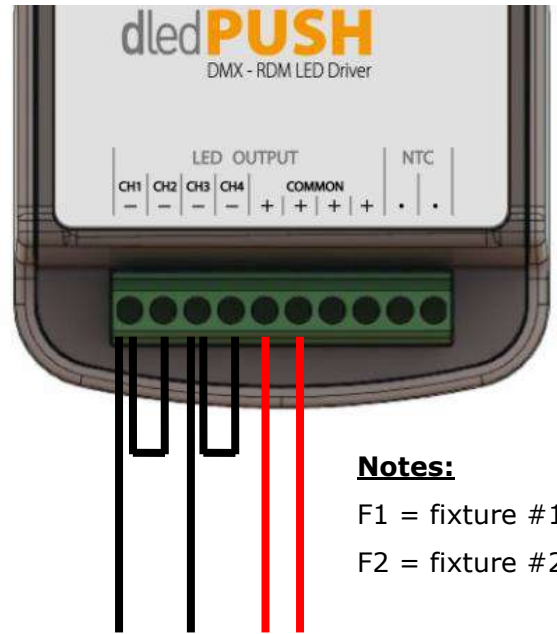
Pin	Voltage Polarity
• (-)	-V
• (-)	-V
• (+)	+V
• (+)	+V

(2, 3) DMX IN/OUT:

Pin	Designation
• COM	Signal Common
• (-)	Data -
• (+)	Data +

1050/1400mA wiring:

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



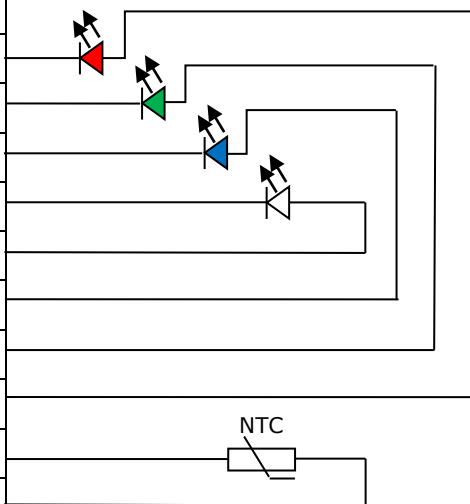
Notes:

- F1 = fixture #1
- F2 = fixture #2

F1(-) F2(-) Common(+)

(4) Output:

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



- ❖ 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.

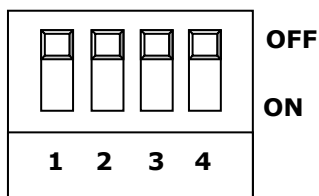
The values presented in the tables of this section are general guidelines only, and as such should be used with caution. Always check the specifications of the LED fixtures used as a load and confirm whether the conditions stated above satisfy the needed requirements.

* 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]				MODE
DP1	DP2	DP3	DP4	CH1	CH2	CH3	CH4	
OFF	OFF	OFF	OFF	350	350	350	350	4 channels/350mA
ON	OFF	OFF	OFF	500	500	500	500	4 channels/500mA
OFF	ON	OFF	OFF	700	700	700	700	4 channels/700mA
ON	OFF	ON	OFF	1050		1050		2 channels/1050mA
OFF	ON	ON	OFF	1400		1400		2 channels/1400mA
OFF	OFF	OFF	ON	350				1 channel/350mA
ON	OFF	OFF	ON	500				1 channel/500mA
OFF	ON	OFF	ON	1050				1 channel/1050mA
ON	ON	ON	ON	700/1400				1 channel/700/1400mA
ON	ON	OFF	OFF	700	0	0	0	R test mode ⁴
OFF	OFF	ON	OFF	0	700	0	0	G test mode ⁴
ON	ON	ON	OFF	0	0	700	0	B test mode ⁴
ON	ON	OFF	ON	0	0	0	700	W test mode ⁴
ON	OFF	ON	ON	700 (RGB sequence ²)			0	RGB test mode ⁴
OFF	ON	ON	ON	700 (RGBW sequence ³)				RGBW test mode ⁴



DO NOT HOT PLUG THE MAIN UNIT TO THE BASE!

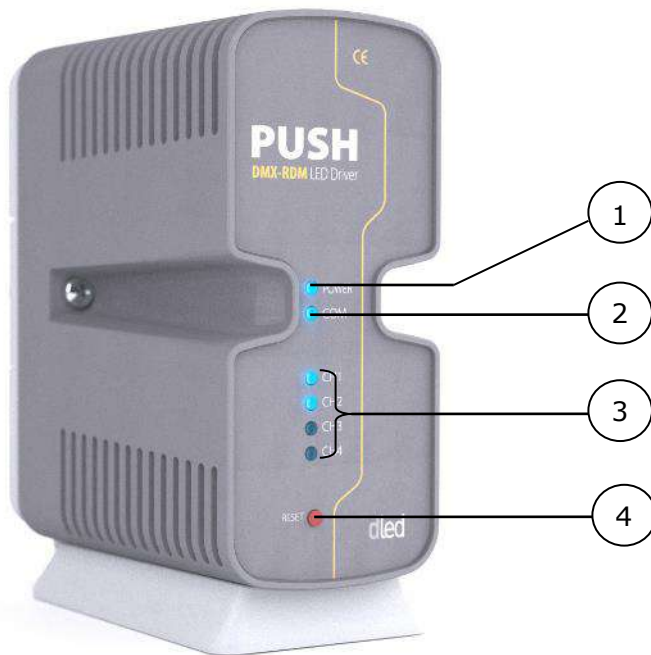
Notes:

- In case no DMX connected all channels shall be at 100%.
- Channels 1-3 shall fade in the following looping sequence: R→RG→G→GB→B→BR
Color transition time: 4sec (adjustable).
- Channels 1-4 shall fade in the following looping sequence: R→RG→G→GB→B→BR→W
Color transition time: 4sec (adjustable).
- Standalone only.



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	No DMX512 signal detected
ON	DMX512 signal present

3.4 Reset Button Functions

#	Press duration	Function
0	Press 0~1 sec	Fixture Identify mode
1	Press 2~4 sec	System Test mode
2	Press 6~9 sec	Set DMX Address mode
3	Press 10~12 sec	Power Up Level mode
4	Press 14~17 sec	Reset mode

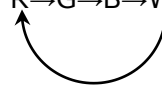


How to use:

1. Press and hold the Reset button for time duration corresponding the desired "mode".
2. While holding the Reset button, CH1+CH2 LEDs will flash alternating with CH3+CH4. The LEDs will flash faster during time window of (any) "mode" and slower during time window of "break".
3. During the time window of the desired "mode" – release the Reset button. If the button is released during time window of a "break", the unit shall return to normal operation.

3.5 (0) Fixture Identify Mode

1. Short press the Reset button for 0~1 sec to activate this mode.
2. This mode can be used to identify the LEDs that are connected to the unit. When activated channels 1-4 shall fade in the following looping sequence: R→G→B→W
3. To exit this mode short-press the Reset button.



3.6 (1) System Test Mode

1. Press and hold the Reset button for 2~4 sec to activate this mode.
2. This mode can be used to test the system after the installation without connecting DMX. Short-press the Reset button to turn on each channel sequentially: R→G→B→W→RGBW
3. To exit this mode long-press (>2 sec) the Reset button.



3.7 (2) Set DMX Address Mode

To set the DMX address, follow the next simple steps:

1. On the DMX control panel, set the value of the desired address to '255' (Hexadecimal 'FF').
2. On the PUSH unit press and hold the Reset button for duration of 6~9 sec and then release the button. PUSH will assume the address of the channel on which '255' was detected.

If the operation was successful, the LEDs on the Unit shall flash in a sequence:

CH1→CH2→CH3→CH4

If the operation was not successful, PUSH will return to previous operation mode after a 30 sec timeout.

Note: If more than one channel was set to '255' on the DMX control panel, then PUSH will disregard it and return to previous operation mode after a 30 sec timeout.

3.8 (3) Power Up Level Mode

1. Press and hold the Reset button for 10~12 sec to activate this mode.
2. When working standalone, this mode can be used to set the light level upon power up: Press and hold the Reset button – the light will fade up and down. Full scale one-way duration is 8 sec. Maximal current level is 700mA per channel.
3. Release the button when the light reaches the desired intensity.
4. If further adjustment is required – repeat steps 1 and 2 (the fade shall resume from the point it previously stopped at).
 - To save the current level and exit short-press the button 3 times. If the operation was successful, the LEDs on the Unit shall flash in a sequence: CH1→CH2→CH3→CH4.
 - To exit without saving short-press the button 5 times or more, alternatively wait for a 60 sec timeout.

Notes:

In case the button was short pressed any other number of times, the unit will disregard it and stay in "Set Level Upon Power Up Mode" until timeout.

3.9 (4) Reset Mode

1. Press and hold the Reset button for 14~17s to activate this mode.
Reset the following settings to default values:
 - DMX Address = 1
 - Power Up Level = 100%
 - RGB/RGBW test mode speed = 7 sec.



After Reset the Unit shall perform a short self-test sequence:

CH1-CH4 shall briefly flash one after another.

3.10 RGB/RGBW Test Modes

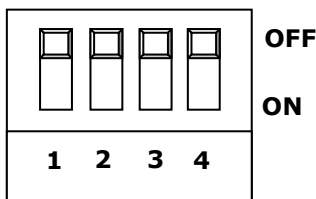
RGB and RGBW test modes can be used to:

- Test the system with no DMX communication signal connected
- Run a preset color changing sequence at standalone mode

In order to set RGB/RGBW test mode:

1. Set the DIP-Switches to the corresponding state:

DIP SW MODE				Rated Current [mA]				MODE
DP1	DP2	DP3	DP4	CH1	CH2	CH3	CH4	
ON	OFF	ON	ON	700 (RGB sequence)			0	RGB test mode
OFF	ON	ON	ON	700 (RGBW sequence)				RGBW test mode

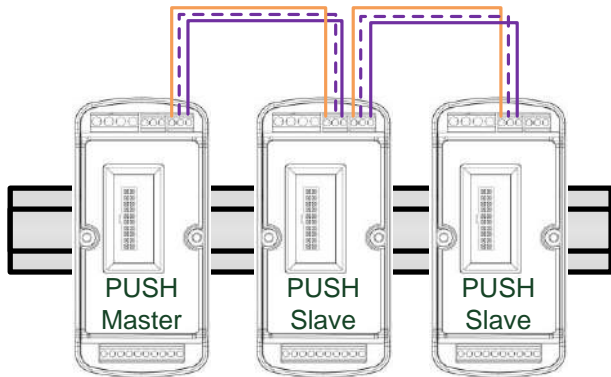


2. The sequence speed can be changed by pressing the Reset button. Each button press sets a different speed, which is immediately saved. Upon power cycle the Unit shall use the last speed that was set:

#	Fade time [sec]	Wait time [sec]	Note
1	0.15	0.15	
2	0.30	0.15	
3	0.45	0.15	
4	0.60	0.15	
5	0.75	0.15	
6	0.90	0.15	
7	1	1	
8	2	1	
9	4	1	Default speed
10	6	1	
11	8	1	
12	10	1	
13	12	1	

3.11 Master/Slave Modes

There is an option to daisy-chain a few Push DMX Units (mounted in the same cabinet) and use the first unit in the chain as a Master to transmit a color changing sequence to the rest of the Units. Example of a typical Master/Slave daisy chain connection:



1. Set the Master unit to RGB or RGBW test Mode (see previous section above).
2. Set only DIP-Switch 2 to ON state (4 channels/700mA) on all Slave units, DIP-Switches 1, 3 and 4 should be set to OFF.
3. On the Master Unit adjust the sequence speed as desired by pressing the Reset button. Each button press sets a different speed, which is immediately saved. Upon power cycle the Units shall use the last speed that was set.



- In order for such system to operate properly, total number of daisy chained Units for Master/Slave should not exceed 5 Units (including Master).
- Do not connect any other Master Units or DMX Signal to the DMX input of a Master Unit!

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
Output resolution	Output curve is optimized for the best visual performance	256 steps (per channel), 8 bit

4.2 Interface

Specification	Value
Control Method	DMX512
Working Modes	DMX512 (1, 2 or 4 channels work synchronously or separately), Master/Slave
Loss of Input Signal	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
DMX IN/OUT Connection Type	Screw terminal block, 3 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
Output 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	Intrenal circuitry overheat protection: <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.	Range: -18°C ~ +40°C (0°F ~ +104°F)
Storage temp.	Range: -18°C ~ +60°C (0°F ~ +140°F)
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(Pending)	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 DMX 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 DMX-512 input signal (COM LED on device's front is off)	Unit is not in DMX-512 Run Mode	Check DIP-Switches setting, make sure it's on either 1/2/4 channels working mode
	Bad DMX-512 wiring or DMX-512 signal is missing	Check DMX-512 wiring. When Unit is receiving correct DMX-512 signal the green COM LED on the device will be lit on.
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.

TROUBLE	POSSIBLE CAUSE(S)	CORRECTIVE ACTION
Cannot set the desired DMX address	Unit is not in DMX-512 Run Mode	Check DIP-Switches setting, make sure it's on either 1/2/4 channels working mode
	Wrong execution order of steps in the procedure	Make sure to follow exactly the procedure described in the Mode Button Functions and Set DMX Address Mode sections
	DMX controller doesn't transmit exactly '255' (Hexadecimal 'FF')	Make sure that your DMX controller is capable of transmitting exactly '255' (Hexadecimal 'FF'), some DMX controllers may display '100%' but the DMX actual value may be less than '255'. It is highly recommended to use professional DMX tester for this procedure
	Two or more transmitted channels are set to '255' (Hexadecimal 'FF')	Make sure that only the desired channel is set to '255'