



Installation guide

Koledo Affinium LED string high power

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Introduction

Thank you for choosing the Koledo Affinium LED string high power.

This guide tells you all about this system. If you require any further information or support please consult your local Koledo office or visit:

www.koledo.com/support or

www.koledo.com/signage.

The Affinium LED string high power system from Koledo is an RoHS*-compliant solid-state alternative to neon and fluorescent lighting for signage and band lighting. It enables you to connect any number of channel letters to create any length of band lighting. It is suitable for new constructions as well as retrofit installations and offers a host of wonderful new possibilities for the design of decorative, built-in architectural applications. The range includes red, green, blue, cool white and warm white LEDs with a broad viewing angle.

Our LED string high power system enables you to help your customers promote their brands and offers reliable long-life sign lighting at a low cost of ownership. It is exceptionally easy to install and can be used in virtually any situation, thanks to its IP66 rating.

The broad viewing angle ensures excellent light quality and uniformity. The flexible string wiring also allows accurate positioning of the individual LED devices.

The LED strings are robust and will not break during shipping or handling.

Retrofitting can also be carried out on the spot because no additional measures are required for outdoor applications.

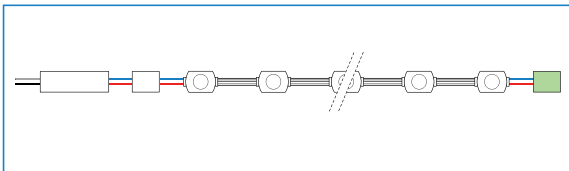
* RoHs is Restriction of Hazardous Substances directive



Koledo Affinium high power

Description

The LED string high power is a flexible chain of LED devices connected by 4-pole flat band cable (AWG24). It is designed to be mounted with the mandatory LS HP mounting clip, on the back plate of a sign or other substrate. The string is powered by a Philips LED power driver. This is a one-piece device that converts the mains voltage to the safe, low DC voltage required for direct operation of the high power LED string. A range of accessories and tools complement the overall system, making it easy for you to connect and install.

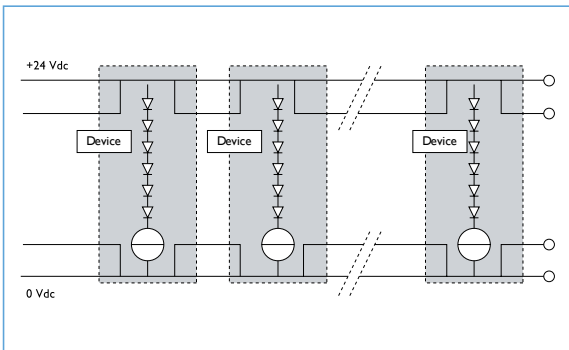


Principle of operation

From left to right: LED power driver, LS connector Xtend, the LED string with LED devices interconnected by the 4-pole flat band cable, LS HP connector end cap

Principle of operation

The LED string high power is designed in such a way as to ensure that all of the LEDs in the system generate the same light intensity and a uniform light distribution. Furthermore, thanks to the architecture of the LED string system the long length of string can be connected to one driver without the wires losing their flexibility. The string consists of identical devices connected in parallel on a 24 V DC LED power driver. Each LED device consists of a small printed circuit board comprising multiple LEDs with a broad viewing angle that are connected in series and have specially designed optics, four separate print tracks for the 24 V DC and a linear driver (current source). With the exception of the optical part, the entire device is encapsulated in a top cover filled with a resin. This encapsulation protects against the ingress of dust and heavy seas or water jets, in accordance with the IEC 60529 IP66 classification. All devices are interconnected by means of a 4-pole flat band cable (AWG 24). The last device in the string requires the connector end-cap to protect the wire against moisture and to prevent short circuiting.



Schematic diagram of a LED string



LED string device

Specification LED string high power

Definitions

String : Chain of LED devices

LED device : Encapsulated LED device (including six LEDs)

Type	Suitable LED power driver	Wavelength nanometer	Color temperature Kelvin	Power per LED device (typical) W	Lumen per LED device (typical) Lm	Lumen per meter (typical) Lm/m	Beam angle °
Affinium LED string hp red P17	20W / 60W / 100W	625+/-15	-	0.8	30	180	130
Affinium LED string hp blue P17	20W / 60W / 100W	470+/-6	-	0.8	10	62	130
Affinium LED string hp green P17	20W / 60W / 100W	528+/-7	-	0.7	22	134	130
Affinium LED string hpW3000 P17 (warm white)	20W / 60W / 100W	-	3000+/-175	0.7	31	184	130
Affinium LED string hpW6300 P17 (cool white)	20W / 60W / 100W	-	6300+/-700	0.8	50	300	130

Type	Ambient temperature range °C min/max	Ambient temperature range °F min/max	Spacing between devices cm min/max*	Spacing between devices Inch min/max
Affinium LED string hp red P17	- 20 / 60	-4 / 140	90 / 175	3.5 / 6.9
Affinium LED string hp green P17	- 20 / 60	-4 / 140	90 / 175	3.5 / 6.9
Affinium LED string hpW3000 P17 (warm white)	- 20 / 60	-4 / 140	90 / 175	3.5 / 6.9
Affinium LED string hpW6300 P17 (cool white)	- 20 / 60	-4 / 140	90 / 175	3.5 / 6.9

Note:

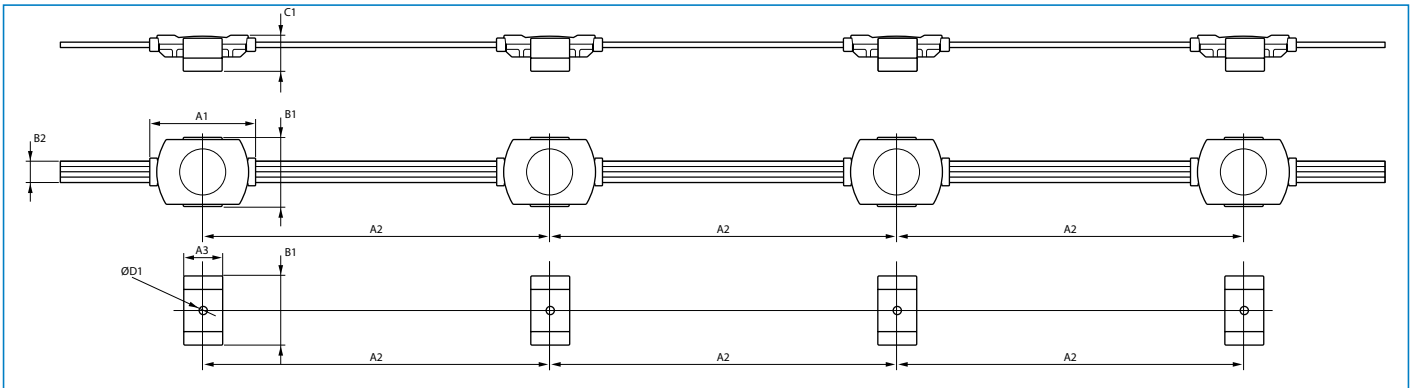
*The pitch between the LED devices is set at 175 mm for all three types. In practice the pitch will be 167 mm when the devices are in use.

The 13-mm overshoot (175-167) is to allow space for maneuver when creating curves in the application. Special lengths are available upon request.

Matching of optical specifications

All LED string high power devices supplied within one standard packing unit (SPU = 10 m in one box) are matched to ensure similar wavelength or color temperature and luminous flux.

Mechanical dimensions



Mechanical dimensions

Dimensions	mm	inch
A1	56	2.2
A2	175	6.89
A3	20	0.79
B1	35	1.42
B2	8.67	0.43
C1	18	0.71
D1	4.2	0.17

Characteristics

The LED string system is a 24 V constant voltage system. The LED devices are driven at a constant current. In each device there is a built-in 'V to I' converter to ensure equal light output per LED module.

LED string high power	Input voltage V DC	Input current per LED device I DC mA
Red	24	35
Blue	24	35
Green	24	30
Cool white	24	35
Warm white	24	30

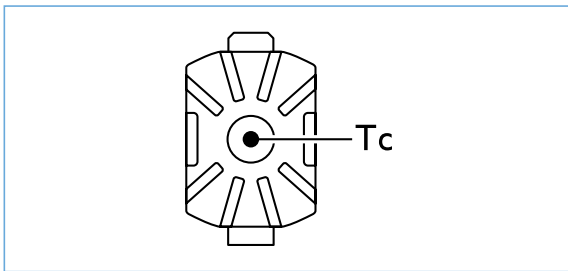
Temperature and impact on lumen output

Temperature is one of the main factors that influences the performance of LED lighting. Lumen output falls as ambient temperature rises.

Item	Parameter	Minimum	Maximum	Unit
Ambient storage temperature	T _{storage}	-40/-48	+85/+185	°C/°F
Ambient operating temperature	T _{operating}	-20/-4	+60/+140	°C/°F
LED device temperature at T _a = 20°C	T _c	-	+45/+112	°C/°F
Relative Humidity storage (no dewing)	RH	5	95	%
Expected Lifetime*		50,000	50,000	hrs
Failure rate after 50.000 hrs at T _{case}		0.5	0.5	%

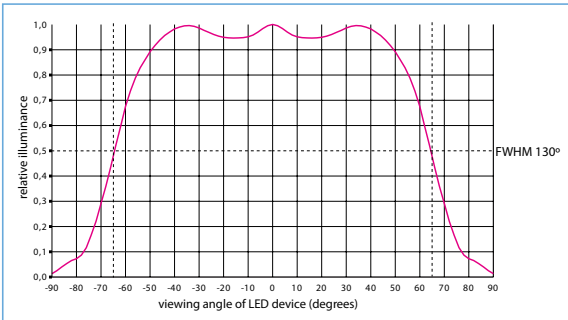
Note:

* The lumen maintenance of the system is 50% at 50,000 hours at an ambient temperature of 40°C.
Based on calculations and extrapolated test data.



Test point for temperature

The maximum allowed case temperature $T_{c \text{ max.}}$ of the LED device can be measured at the indicated T_c test point.

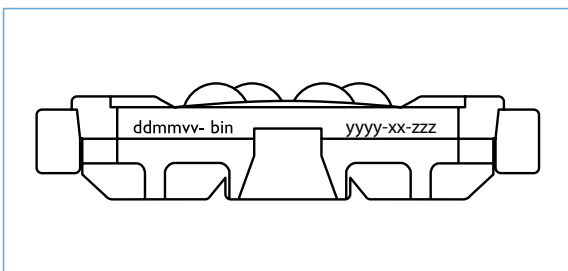


Viewing angle of a LED device

Viewing angle of a LED device

Relative illuminance versus viewing angle of a LED device

FWHM: full width high maximum



Identification codes of the LED string

Identification codes on the LED string

The LED device bears an identification number with date and origin codes.

Code at device	Meaning	Example	Explanation	Additional information
ddmmyy	Production date of the LED string	230606	23 June 2008	
bin	Binning information of the LED	Acc. coding of the applied LED (tbd)	<ul style="list-style-type: none"> Luminous flux bin code + Color bin code 	<ul style="list-style-type: none"> Code according datasheet of the applied LED
yyy	Manufacturing date code of the LED	Acc. coding of the applied LED (tbd)	<ul style="list-style-type: none"> Year Week (Month) 	<ul style="list-style-type: none"> Code according datasheet of the applied LED
xx	Type of the LED string	HP	<ul style="list-style-type: none"> High Power 	<ul style="list-style-type: none"> Always a two letter-code
zzz	Color indicator	R B G W 30 W6 3	<ul style="list-style-type: none"> Red Blue Green White 3000 K White 6 300 K 	<ul style="list-style-type: none"> Color dependent Max. three positions (alpha numeric)

Compliance and approval

The Affinium LED string high power complies with the following international standards:

Affinium LED string high power

- Only suitable for dry and damp locations
- Only suitable for connection to a circuit from a class 2 power source

Safety

- EN 60598-1, EN 60598-2-20, UL 48

EMC compliance

- EN55015, EN61547, FCC 47 part 15

Environment

- RoHS compliant
- Affinium LED string high power is a Koledo 'Green' product

Approvals

- ENEC-05
- UL marking
- CSA marking
- Declaration of conformity: CE

ISO

- Quality standard ISO 9001-2000
- Environmental standard ISO 14001

Climate tests, operational

- Cold test IEC 68-2-1; test Ad, temperature 40°C, time: 1000 hrs
- Dry Heat test, IEC 68-2-2; test Bb, temperature 85°C, time: : 1000 hrs
- Temperature Change test, IEC 682-14; test Nb, temperature 20° +60°C 3°C/min, dwell time 30 min, number of cycles:500, bias: 5 min on/ 5 min off
- Accelerated damp heat, IEC 68-2-67; test Db, temperature 85°C, R.H.:85%, time: 1000 hrs

Climate tests, non-operational, storage

- Cold test, IEC 68-2-1; test Ad, temperature 40°C, time: 96 hrs
- Dry heat test, IEC 68-2-2; test Bb, temperature 85°C, time: : 96 hrs
- Damp heat test, IEC 68-2-78
- Temperature change test, IEC 682-14; test Nb, temperature 40° +85°C, 5°C/min, dwell time 20 min, number of cycles: 100

Transport tests, non-operational, non packed

- Vibration test, IEC 68-2-6; test Fc, amplitude: 035 mm, frequency: 10-55-10 Hz, sweep rate 1 octave/min, time:30 min /direction, 3 directions
- Bump test, IEC 68-2-29; test Eb, peak acceleration 10G, pulse:16 msec, number: 1000/direction, 6 directions
- Shock test, IEC 68-2-27; test Ea, peak acceleration: 50G, pulse:18 msec, pulse shape half sine, number 3/direction, 6 directions

Specification LED power drivers

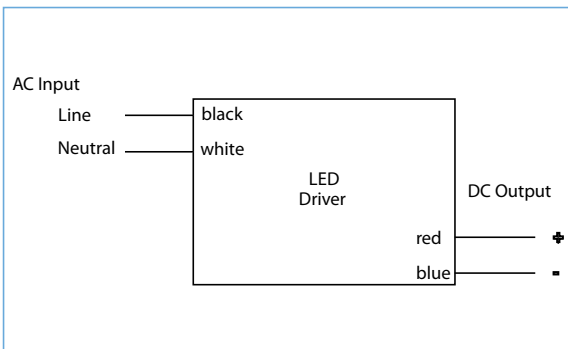


LED power driver 20 W

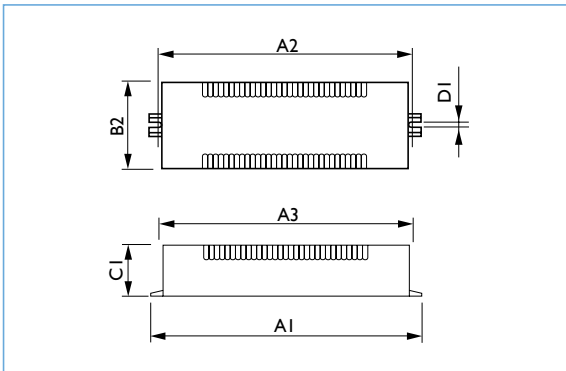
Philips LED power drivers are used with the LED string high power system. All types have a universal mains input (100 V-240 V) and generate a 24 DC voltage. The range consists of a slim 20 W version with a plastic housing and 60 W and 100 W versions with a metal housing. All types have been tested to ensure they fulfill the IP66 rating.



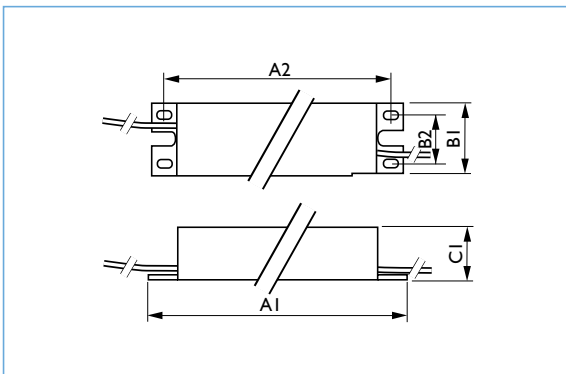
LED power driver 60 W and 100 W



Schematic wiring diagram for Philips LED power drivers



20 W LED power driver



60 W and 100 W LED power driver

Mechanical dimensions

Driver type	A1	A2	B1	B2	C1	D1
20W	130	140	27	18.5	25	4.4
60W	241	229	43.1	26.2	30.0	4.4
100W	241	229	43.1	26.2	30.0	4.4

Notes:

- All dimensions are given in millimeters.
- Drawings are not to scale.
- Drivers feature two (20 W) or four (60 W and 100 W) slots for mounting with M4 or M6 size screws.
- Lead wires: 300 mm in length, 0.825 mm² solid-core copper.

Electrical characteristics - input

Parameter	Symbol	20W Driver	60W Driver	100W Driver	Units
Input voltage range	V	100 - 240	100 - 240	100 - 240	V
Frequency	f	47 - 63	47 - 63	47 - 63	Hz
Power consumption range max.	Pin max	25	75	120	W
Power factor	Pf	0.9 min	0.9 min	0.9 min	-
Total harmonic distortion	THD	20	20	20	%
Efficiency	-	80% typical	80% typical	80% typical	%

Electrical characteristics - output

Parameter	Symbol	20W Driver	60W Driver	100W Driver	Units
Output voltage range	Vo	23 - 25.6	23 - 25.6	23 - 25.6	V
Output current	Io	0.85	2.5	4.1	A
Output voltage ripple	-	1.0	1.0	1.0	%
Short-circuit protection	-	yes	yes	yes	-

Notes:

- Electrical characteristics at 25°C ambient temperature.
- Output insulation 3.25 kV 60 Hz.
- The Affinium LED string high power products are only suitable for connection to a circuit from a Class 2 power source (Philips LED power driver)
- Class 2 source – limited energy supply

Temperature and lifetime

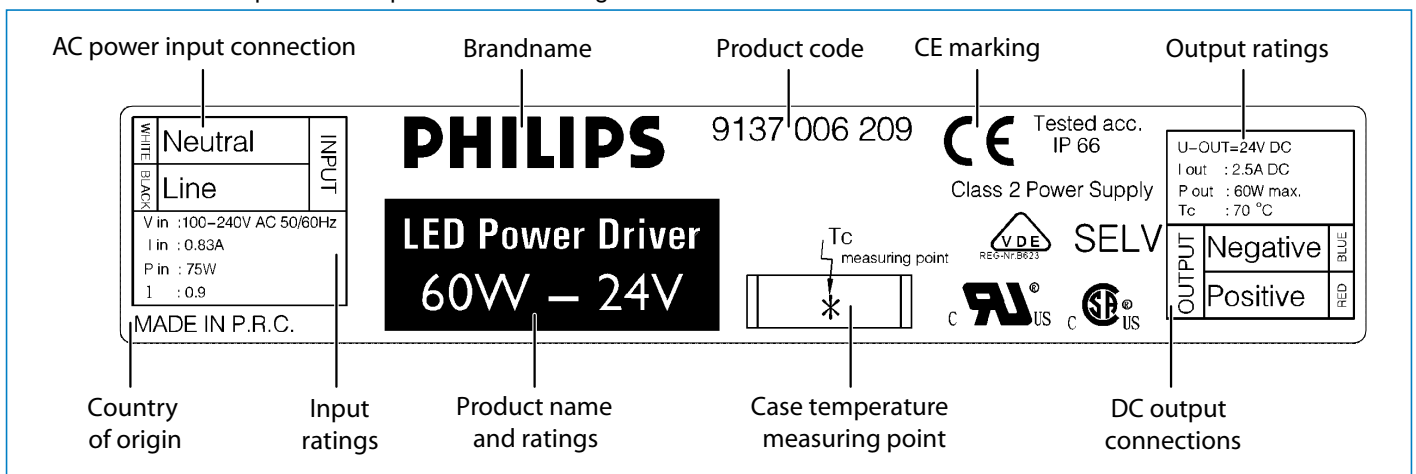
Parameter	Symbol	Minimum	Maximum	Units
Ambient storage temperature	Tstorage	-40/-40	+85/+185	°C/°F
Ambient operating temperature	Toperating	-30/-22	+60/+140	°C/°F
Case temperature	Tc	-	+90/+194	°C/°F
Lifetime (failures after 50,000 hrs)	L50K	-	5	%

Notes:

1. Case temperature should be measured at test point Tc, as marked on driver label.
2. The housing provides protection against the ingress of dust and heavy seas, according to the IEC 60529 IP66 classification for luminaires.

Driver label information

The label of a 60 W LED power driver provides the following information:

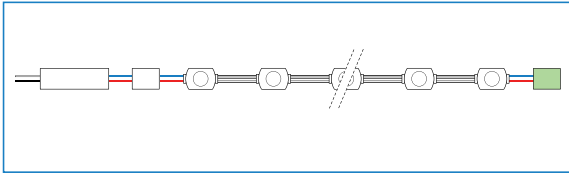


Driver label information

The labels of the 20W and 100W versions give similar information.

For further information see the product data sheet for Philips 20W,60W and 100W 100- 240V LED power drivers.

Building a sign



Principle of operation

Introduction

The minimum configuration for using a LED string high power in a channel letter or band light application is one LED power driver with a single LED device and two connectors.

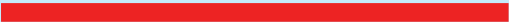
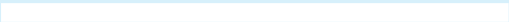


There is no maximum configuration size within a design because each configuration can be extended using extra LED power drivers and LED string, of course always taking into account the maximum LED string length per LED power driver type. The connection to the LED power driver is made using the dedicated LS connector Xtend. A connector end cap is fitted to the end of a string.

The red (+) AWG 18 wire coming from the LED power driver is connected to the red wire of the LED string band cable (AWG 24 wire, red marking).

The blue (-) AWG 18 wire coming from the LED power driver is connected to the blue wire of the LED string band cable.

In the case of Affinium LED string high power, there are red and blue markings on the top of the band cables to enable easy connection to other red and blue markings on the driver and /or AWG 18 or 24 cables. Here, the color coding on top of the band cable is not an issue as this will not be visible in signs larger than 3 meter with a built-in depth of at least 16 cm, where Affinium LED string high-power will be used. This in contrast to the Affinium LED string low- and medium-power, which are used in smaller signs where color coding might be visible. Here, the color coding of the LED string is not visible on top.

Specification of the flat band cable AWG24 connecting the LED devices

Signal	Marking
24V DC	
24V DC	
Ground	
Ground	

The LS connectors have been developed especially for the LED string system. They are dedicated, easy-to-use (no stripping pliers necessary) insulation displacement connectors (IDC) filled with gel, which ensure IP66-rated connections.

Mounting clip

Dedicated LS HP mounting clips are mandatory to install the LED string devices. In retrofit installations in particular, the clips facilitate easy installation as they can be fixed to the sign or band light before the string is installed.

The hole in the clip can be used during installation to pinpoint the exact location of the LED device within the design and enables the clip to be screwed or fixed with a blind rivet to the back plate of the design.

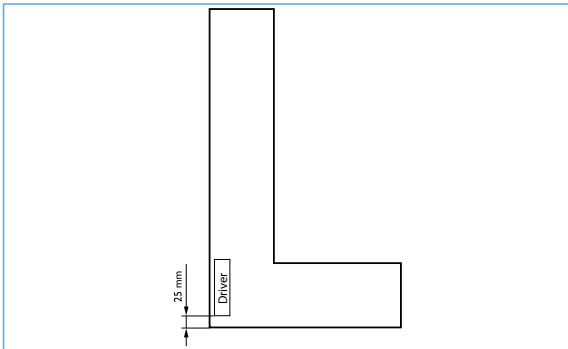
Important: Make sure that drilled holes are free of burrs so that LED devices can be mounted flush with the base plate. In cases where it is not possible to use screws or blind rivets the LS HP mounting clip can also be mounted to a back plate using two pieces of double-sided self-adhesive Koledo LS mounting tape pads.



LS HP mounting clip



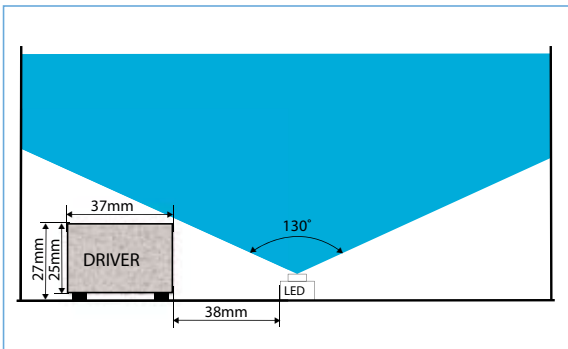
LS mounting tape pads



Position of the LED power driver in a channel letter

Installing the LED power driver

Even though the LED power driver is an outdoor-type driver, it needs to be installed inside an enclosure (channel letter, band light or dedicated installation box), especially since the mains wiring connections need to be protected from direct human contact. Although channel letters and band light applications normally have a facility to prevent the collection of water inside the enclosure, the driver must be installed at least 2.5 cm above the bottom of the enclosure. When mounting the driver inside a channel letter enclosure, make sure the driver does not block the light from the LED devices, as this will cause dark spots on the letter surface. A distance of 30 mm away from any LED device is sufficient, as shown in the figure below.

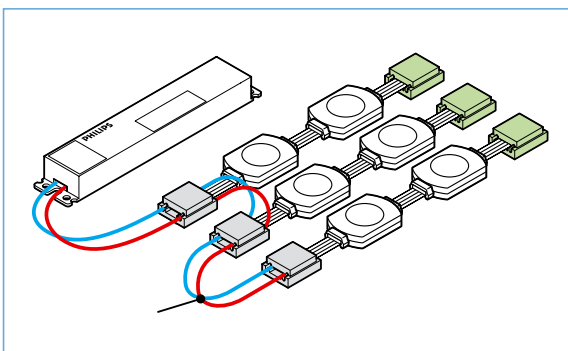


Example of the position of a LED power driver, ensuring it does not block the light from the LED device.

Maximum length of LED string high power devices per driver

The maximum length of LED string high power devices that can be connected to a LED power driver is determined by a number of electrical parameters.

The tables shows the minimum and maximum number of LED devices that can be used for each LED power driver as well as the number of LED string branches that can be connected in parallel. If it is not possible or desirable to install the driver close to the LED string, you should take into account the length of the wires that connect the driver and the string.



Example of a parallel connection, no extra wiring between the driver and the first LED device

Number of LED devices per driver (for up to three branches), no extra wiring

Affinium LED string high power	Max. number of LED devices	LED power driver		
		20W	60 W	100 W
red	per driver ¹	24	72	120
	per branch ²	24	60	60
blue	per driver ¹	24	72	120
	per branch ²	24	60	60
green	per driver ¹	24	72	120
	per branch ²	24	60	60
warm white	per driver ¹	24	72	130
	per branch ²	24	60	60
cool white	per driver ¹	24	72	120
	per branch ²	24	60	60

Notes:

¹ per driver: the total number of LEDs per driver may not be exceeded.

² per branch: if more branches (upto three) are used, the number of LEDs may not be exceeded.

At page 16 you can find various installation examples.

Number of LED devices per driver (for up to three branches), extra wiring with AWG 18 (solid core Ø1.024 mm, 0.823 mm²)

Affinium LED string high power	Max. number of LED devices	Cable between power driver and first LED (LED driver device) of the string											
		0 m			10 m			20 m			30 m		
		LED power driver			LED power driver			LED power driver			LED power driver		
		20 W	60 W	100 W	20 W	60 W	100 W	20 W	60 W	100 W	20 W	60 W	100 W
red	per driver	24	60	120	24	48	48	24	28	28	18	18	18
	per branch	24	60	60	24	24	24	14	14	14	9	9	9
blue	per driver	24	60	120	24	48	48	24	28	28	18	18	18
	per branch	24	60	60	24	24	24	14	14	14	9	9	9
green	per driver	24	60	120	24	48	48	24	28	28	18	18	18
	per branch	24	60	60	24	24	24	14	14	14	9	9	9
warm white	per driver	24	60	120	24	48	48	24	28	28	18	18	18
	per branch	24	60	60	24	24	24	14	14	14	9	9	9
cool white	per driver	24	60	120	24	48	48	24	28	28	18	18	18
	per branch	24	60	60	24	24	24	14	14	14	9	9	9

Number of LED devices per driver (for up to three branches), extra wiring with AWG24 (solid core Ø0.511 mm, 0.2047 mm²)

Affinium LED string high power	Max. number of LED devices	Cable between power driver and first LED (LED driver device) of the string											
		0 m			10 m			20 m			30 m		
		LED power driver			LED power driver			LED power driver			LED power driver		
		20 W	60 W	100 W	20 W	60 W	100 W	20 W	60 W	100 W	20 W	60 W	100 W
red	per driver	24	60	120	14	14	14	6	6	6	4	4	4
	per branch	24	60	60	7	7	7	3	3	3	2	2	2
blue	per driver	24	60	120	14	14	14	6	6	6	4	4	4
	per branch	24	60	60	7	7	7	3	3	3	2	2	2
green	per driver	24	60	120	14	14	14	6	6	6	4	4	4
	per branch	24	60	60	7	7	7	3	3	3	2	2	2
warm white	per driver	24	60	120	14	14	14	6	6	6	4	4	4
	per branch	24	60	60	7	7	7	3	3	3	2	2	2
cool white	per driver	24	60	120	14	14	14	6	6	6	4	4	4
	per branch	24	60	60	7	7	7	3	3	3	2	2	2

Note:

- per driver 1* per driver the maximum permitted number of LED devices spread over the branches must not be exceeded, and
- per branch 2* if more branches (up to 4) are used, the maximum permitted number of LED devices per branch must not be exceeded
- ** if you want to use more than 4 branches, please contact your local Koledo office.

Example 1. Affinium high power LED string, green, on AWG 24 (solid core Ø0.511 mm, 0.2047 mm²) 10 meter wiring
 Can I use two branches of 8 green LED devices on a 100 W LED power driver?
 No, this is not possible! With 16 LED devices you will exceed the maximum number of 14 LED devices permitted per driver.

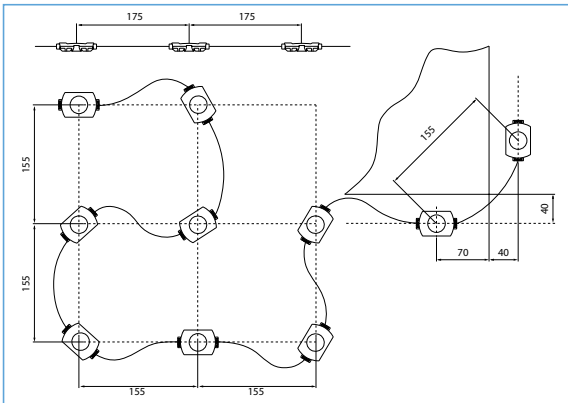
You could, for example, use:

- an extension wire for AWG 18 and then use a 20 W driver operating one branch of 16 LED devices

Example 2. Affinium high power LED string, white, on AWG 18 (solid core Ø1.024 mm, 0.823 mm²) 10 meter wiring
 Can I use two branches of 24 LED devices on a 20 W LED power driver?
 No, this is not possible! With 48 LED devices in total you will exceed the maximum number of 24 LED devices permitted per driver.

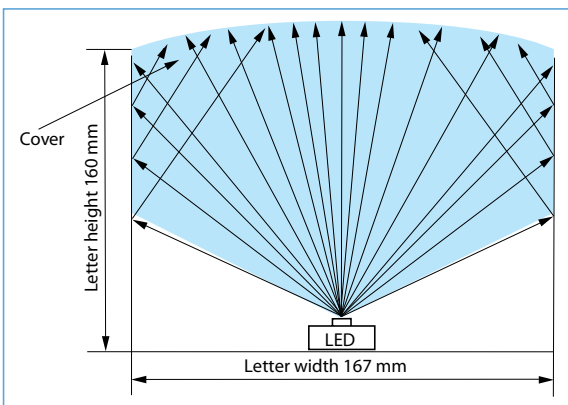
You could, for example, use:

- two branches of 2 x 24 LED devices on a 60 W driver
- as long as you do not exceed the maximum of 48 LEDs per driver.



Example of a string track in a sign using a Koledo LED string high power.

An optical pitch of 155 mm is achievable based on a nominal string pitch of 175 mm



Beam effect of a LED string high power

Important

Avoiding spots with these high intensity LED devices

- If the depth of a channel letter is 160-200 mm then use acrylics with a transmission value of max 30%.
If the depth is > 200 mm then use acrylics with a value of max 48%

Installation, pitch between the devices

When calculating the number of LED string high power sections required, there are a few basic factors that need to be taken into account;

- The smallest applicable unit is one LED device.
- The total number of devices used in a design can be tailored exactly to meet the luminous flux requirements for the design. The string can be cut at any point.

The maximum spacing between individual devices is determined by the pitch (167 mm application/optical pitch) between the individual devices. Because it is so flexible, the dimensions of the device only limit the minimum spacing.

Uniformity

Technically, the main difference between a LED string and a neon or fluorescent lamp is that the LED string consists of individual light spots. Because of this, care has to be taken to ensure that individual LED beams overlap one another in order to provide uniform illumination. There is a minimum depth for each channel letter in order to prevent the individual LEDs being visible within the channel letter. The optical pitch of 167 mm is the pitch required to illuminate a channel letter in a uniform way. Use two or more LED strings in parallel to cover wider channel letters.

In the paragraphs before further information is given on how many LED devices can be used with different wiring and string lengths.

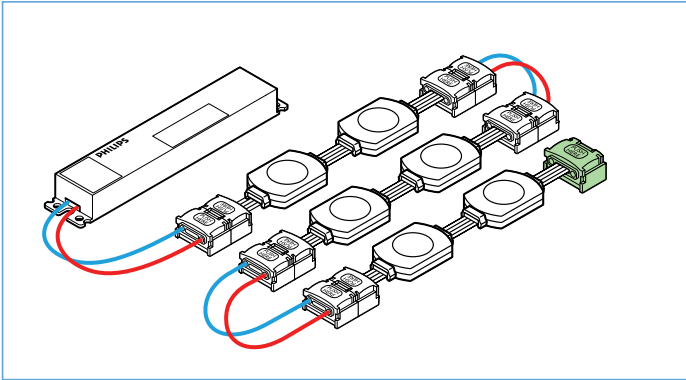
One factor that greatly influences the uniformity of the channel letter is the match between the light spectrum (color) transmitted by the LED and the transmission window (color) of the acrylic diffuser. If these two factors are matched effectively, the minimum channel letter depth can be reduced.

Spacing

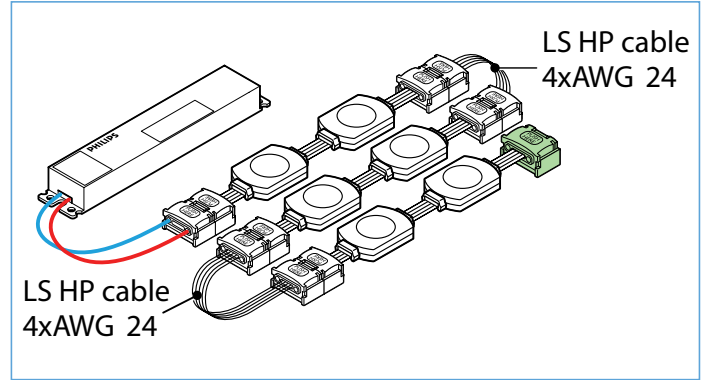
The spacing of the individual LED devices in a design depends primarily on the uniformity required.

- Always apply the LED strings in straight lines wherever possible.
- Start mounting the first LED device as close to the side of the channel letter as possible. This will help to prevent any dark corners.
- Spread the rest of the LED devices evenly over the channel letter.
- If a channel letter design requires two parallel LED strings, for instance, apply the same ratio of LED devices.
- The pitch between the LED devices is set at 175 mm for all three types. In practice the pitch will be 167 mm when the devices are in use. The 8-mm overshoot (175-167) is to allow room for maneuver when creating curves in the application. If this causes a problem in your design, high power LED strings with dedicated spacings are available upon request. Special lengths are available upon request.

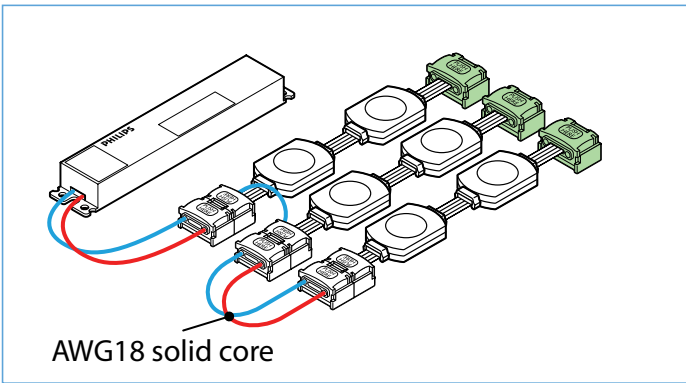
Schematic installation examples



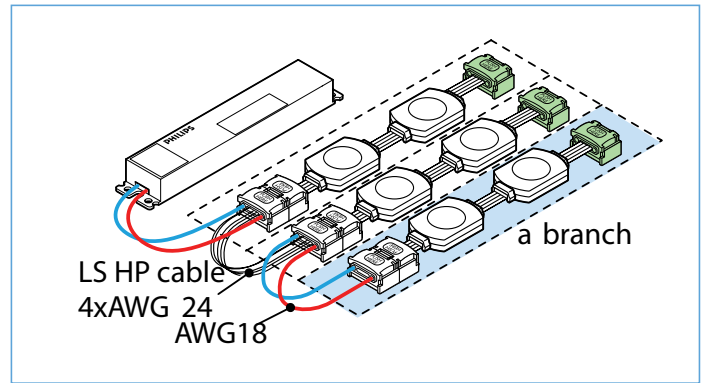
LED string connected in series using AWG 18 solid core wiring



LED string connected in series using Koledo LS HP cable 4xAWG24, solid core wire AWG 24 (this is not recommended due to cable power losses)

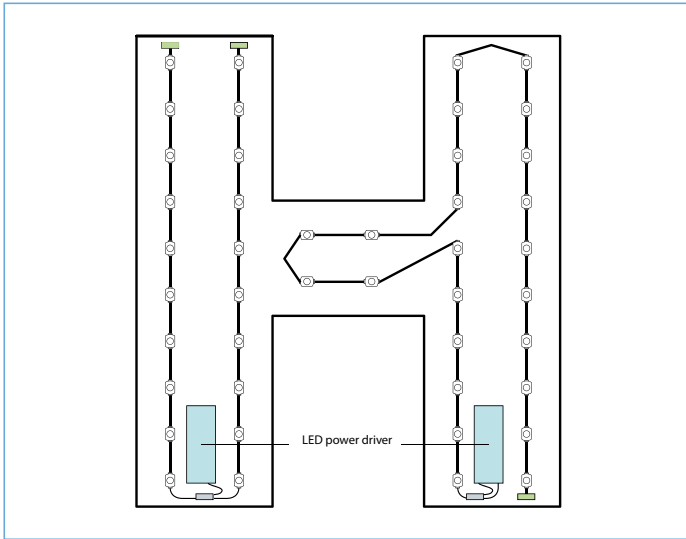


LED string connected in parallel using AWG 18 solid core wiring

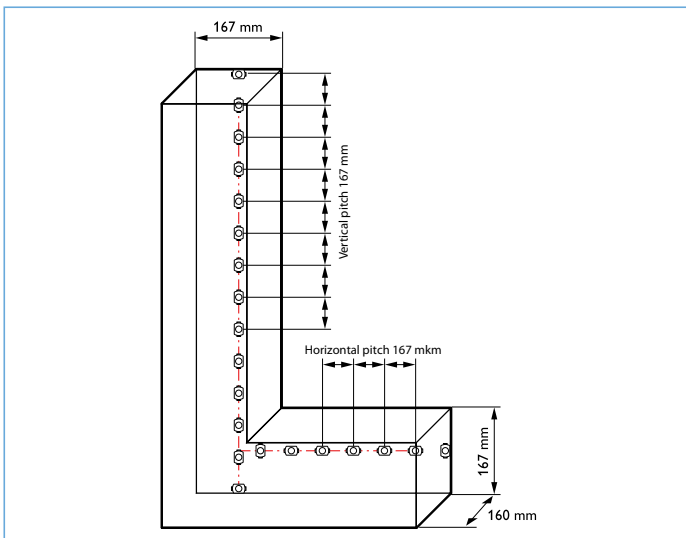


LED string connected in parallel using a combination of Koledo LS HP cable 4xAWG24 and AWG 18 solid core wiring

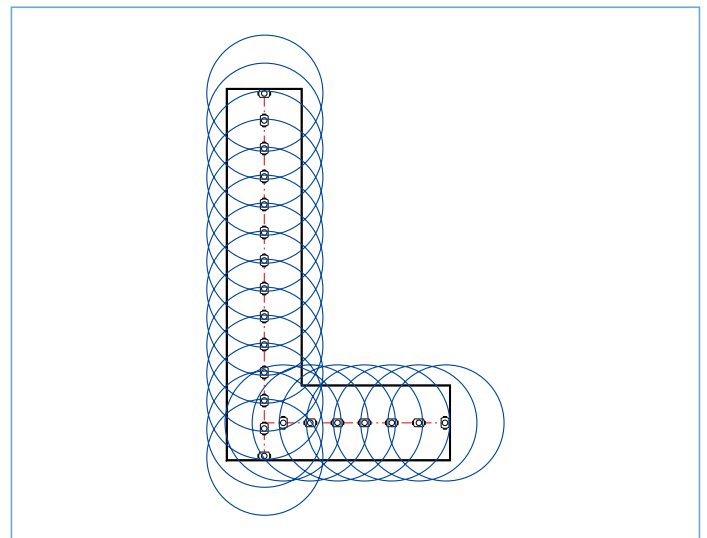
Practical installation examples



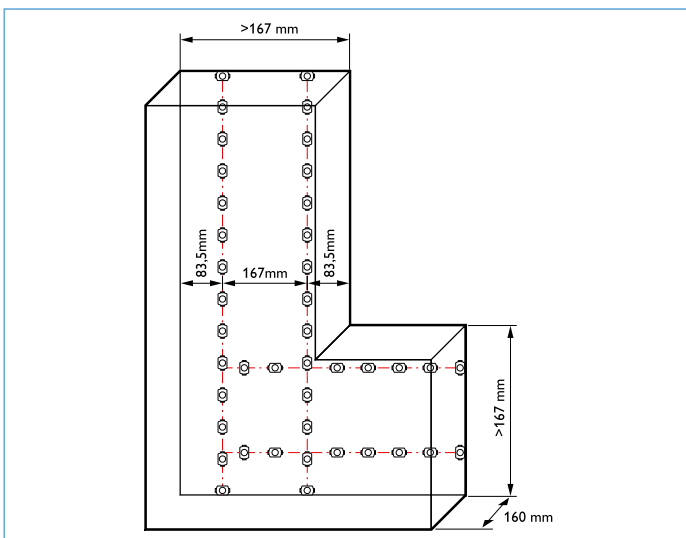
Installation example of a combination of two LED strings and drivers in one channel letter



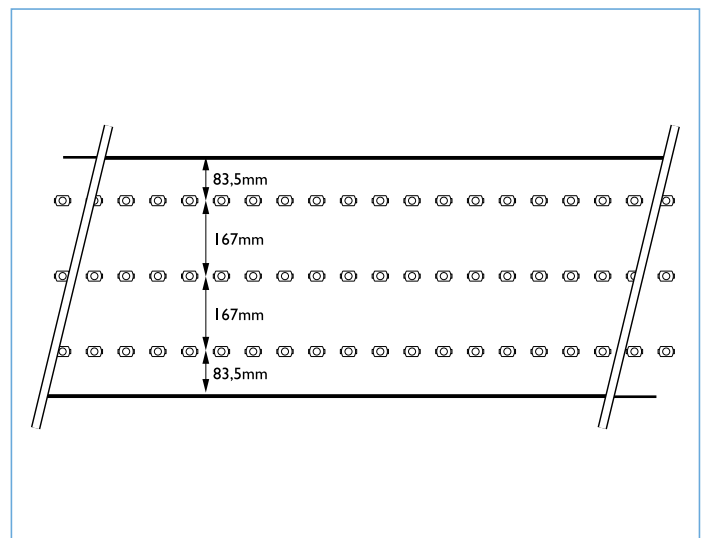
Installation of one LED string



Light distribution achieved



Installation of two LED strings next to each other



Example of a band lighting application

Installation guide



LS HP mounting clip (mandatory for mounting the LED string device)

Materials

Mounting clip

Dedicated LS HP mounting clips are mandatory to install the LED string devices. In retrofit installations in particular, the clips facilitate easy installation as they can be fixed to the sign or band light before the string is installed.

The hole in the clip can be used during installation to pinpoint the exact location of the LED device within the design and enables the clip to be screwed or fixed with a blind rivet to the back plate of the design.

Important: Make sure that drilled holes are free of burrs so that the mounting clips with the LED devices can be mounted flush with the base plate. In cases where it is not possible to use screws or blind rivets the LS HP mounting clip can also be mounted to a back plate using two pieces of double-sided self-adhesive Koledo LS mounting tape pads.

Recommended connectors

Two types of connectors are required to configure the LED string system:

1. The LS connector Xtend. This is used to connect:

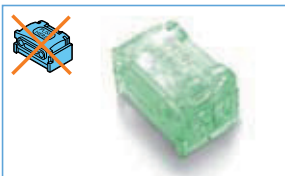
2. LS HP connector end cap (with green color). This is fitted at the end of the string. It makes the return connection for the LED current and prevents short circuiting of the internal flat cable wiring. Do not apply the blue colored connector end cap as this is suitable for different products, not for the LED string high power.

Note:

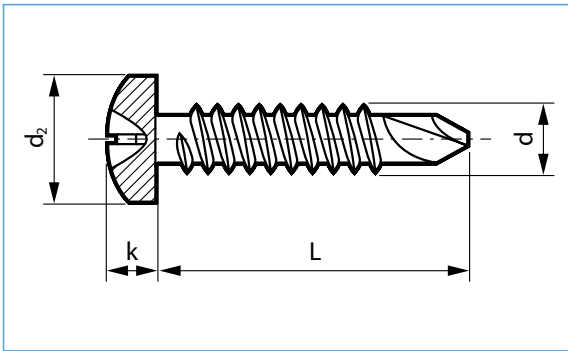
the insulation must remain on the wires to ensure that the wires can be inserted as far into the connector as possible



LS connector Xtend



LS HP connector end cap



Stainless steel self-drilling tapping screw, DIN 7504 M max. 4 mm in diameter

Recommended fixing materials

The LED devices are designed to be mounted to the back plate of a sign or other substrate using the dedicated mounting clips. These clips can be fitted using double-sided self-adhesive tape, Koledo LS mounting tape pads (19 x 12 mm and 0.6 mm thick) or stainless steel self-drilling tapping screws, DIN 7504 M max. 4 mm diameter.

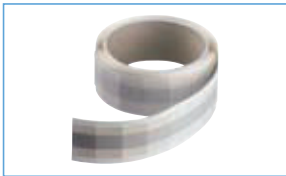
Note:

The fasteners are not included with the LED string High Power system and must be ordered locally.

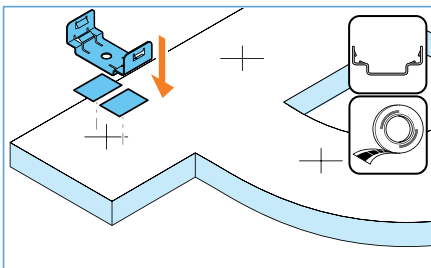
DO NOT use countersunk screws.

Note:

The Koledo LS mounting tape has been tested for use with the mounting clips and stainless steel, aluminum and PMMA. If other materials or coatings are used, please ensure that these are compatible with the adhesive pads.



LS mounting tape pads



Applying Koledo mounting tape pads to place the mandatory LS HP mounting clips.

Using double-sided self-adhesive tape

Below are details of the surface preparation techniques we suggest you use before applying the recommended LS mounting tape. The basic cleaning method is the same for many adhesives and coatings on a wide variety of substrates. There are only a limited number of situations where more specialized procedures are required.

When using Koledo mounting tape pads, it is advisable to clean most substrates with isopropyl alcohol (IPA). If there is any heavy oil or grease on the substrate, use a degreasing solvent followed by an IPA cleaning procedure to ensure that any residue or film is removed. Some plastics or paints may contain additives, such as low-surface-energy materials, that can impede adhesion. These may have to be removed by abrasion (using a very fine Scotch-Brite), priming or it may be better to use a self-adhesive tape that is suitable for that specific surface.

Procedure

Spray or wipe the solution onto the surface and then wipe with a clean cloth or paper towel until dry. Be sure to use a clean cloth to avoid smearing around the substrate and recontaminating surfaces that are already clean. Once the surface has been cleaned, two pads must be applied per mounting clip and pressed into place. The ultimate bond performance is determined primarily by the surface preparation technique used. Any extra pressure applied using mechanical means will not lead to greater bond strength than when pressure is applied carefully by hand.

Quick installation guide

In every packing of the LED string we have added a quick installation guide, equal to the information on the next pages.

1

- 1 LED Power Driver
- 2 LS HP Cable 4xAWG24
- 3 Affinium LED posterbox modules
- 4 LS Connector Xtend
- 5 LS Connector End Cap
- 6 LPM mounting tape

- 7 3M tissues
- 8 VHB™ cleaner

2

Quick installation guide for single and double sided boxes

WARNING
Turn power off before installing terminal or connector. All work should be done according to appropriate electrical codes.

The diagram shows the installation process for both double-sided and single-sided boxes. It includes a 'WARNING' box and a series of numbered steps (1-7) illustrating the placement of the LED string, the connection of the power driver, and the final assembly of the posterbox modules. A '2 Kg' weight is shown being applied to the assembly.






3

Note :
Applying the LS Connector Xtend is not allowed for the mains voltage connection.

4

The diagram shows the final assembly of the posterbox modules, including the application of the LPM mounting tape and the final check of the installation.

Ordering data

Koledo Affinium LED string	Box packaging Qty	Dimensions (cm)			Weight incl. packaging (g)	EOC
		L	W	H		
Affinium LED string hp red P17	 1x10 mtr	47	56	4.5	2150	8727900 887556 00
Affinium LED string hp green P17	 1x10 mtr	47	56	4.5	2150	8727900 805857 00
Affinium LED string hp blue P17	 1x10 mtr	47	56	4.5	2150	8727900 815559 00
Affinium LED string hp W3000 P17 (warm white)	 1x10 mtr	47	56	4.5	2150	8727900 805871 00
Affinium LED string hp W6300 P17 (cool white)	 1x10 mtr	47	56	4.5	2150	8727900 805864 00

Accessories	Box packaging Qty	Dimensions (cm)			Weight incl. packaging (g)	EOC
		L	W	H		
LS HP Mounting Clip ¹	62 pcs	15	15	15	450	8727900 805895 30
LS HP Cable 4xAWG 24	76 mtr	18	18	1.5	250	8727900 805901 00
LS Connector Xtend	10 pcs	7.7	4.8	4.2	50	8727900 880885 00
LS HP Connector End Cap	10 pcs	7.7	4.8	4.2	50	8727900 880908 00
LS Mounting Tape 210 pads ²	1 reel of 210 pads	11	11	2.5	85	8711559 764016 00
LS Mounting Tape 1700 pads ³	1 reel of 1680 pads	25	25	2.5	680	8711559 764030 00

LED Power Driver (IP66)	Box packaging	EOC
100-240V 20W- 24V	10	8711500 911940 30
100-240V 60W- 24V	10	8711500 911469 30
100-240V 100W- 24V	10	8711500 911964 30

3M Accessories	
3MTissues	available from supplier 3M at www.3m.com
VHB™ Cleaner	available from supplier 3M at www.3m.com

Note:

1 The dedicated mounting clips are mandatory, when installing Koledo Affinium LED string high power. The use of self-adhesive tapes has been tested for stainless steel, aluminium and PMMA.
If other materials or coatings are used, please ensure that these are compatible with the adhesive tape.

LED Power Drivers are advised for indoor and outdoor use (IP66).

In the USA Xitanium outdoor LED drivers can be applied.

Your distributor or local Koledo Advance office can provide more detailed information.

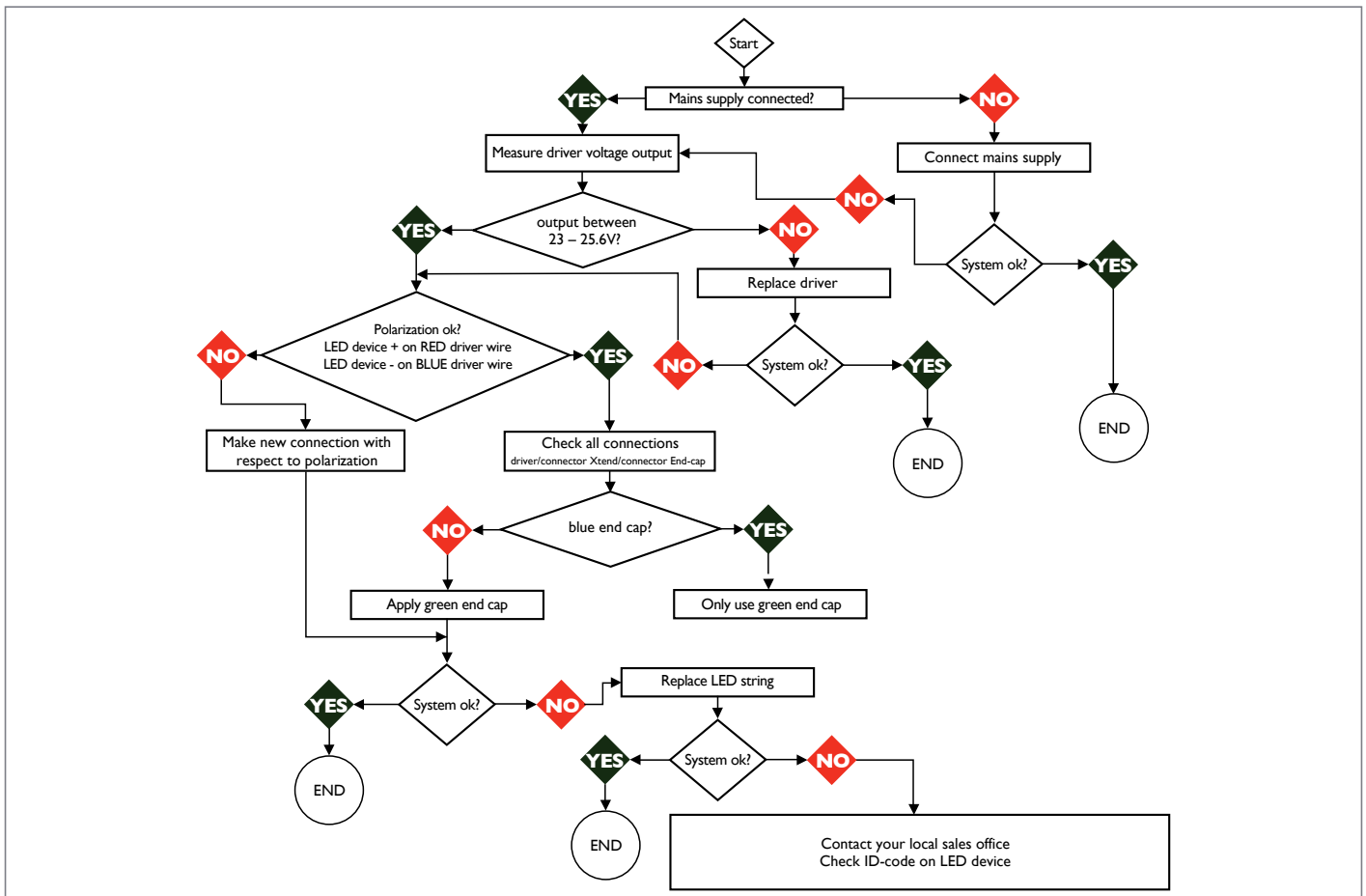
3M Accessories

3MTissues	available from supplier 3M at www.3m.com
VHBTM cleaner	available from supplier 3M at www.3m.com

Fault-finding

This chapter gives details of fault-finding plans which may help you to solve the most common system and application issues. Please contact your local sales office or visit www.koledo.com/support or www.koledo.com/signage if you have any further questions.

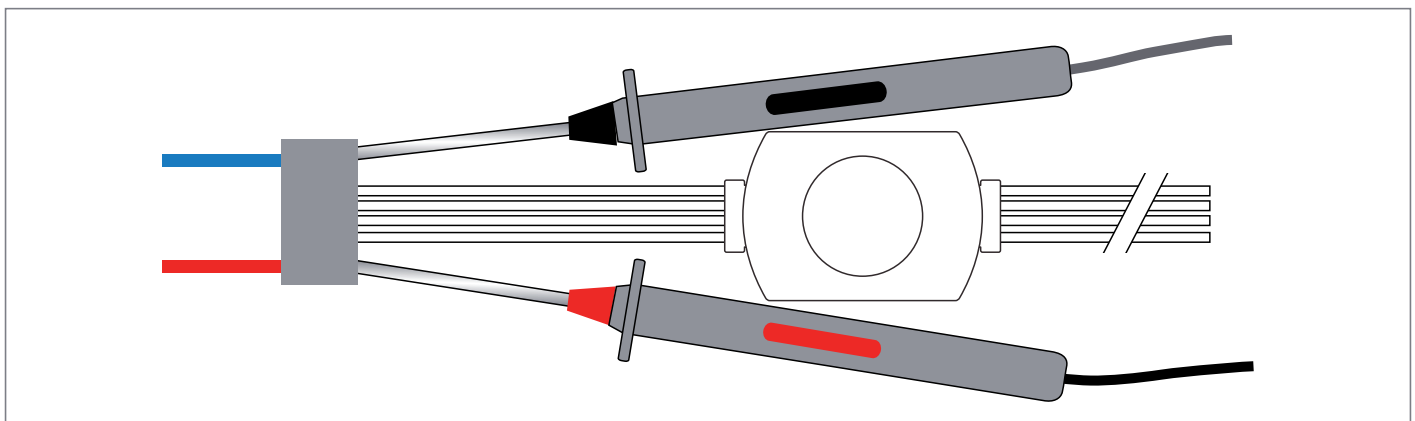
No light output



No light output

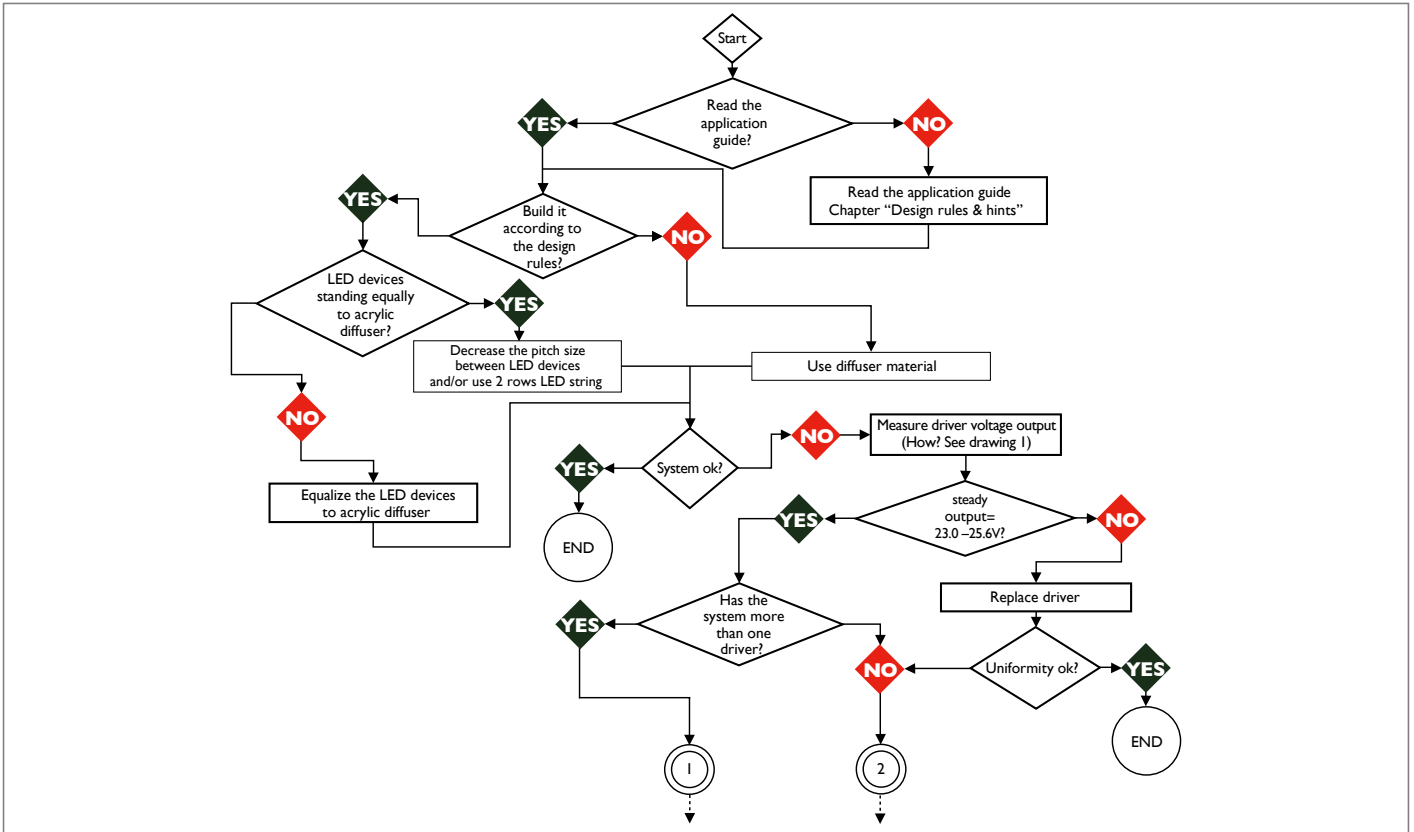
Measuring the driver output without damaging the system

Materials needed: multimeter with needle probes (tip diameter max.2 mm). The unused LS connector Xtend terminals can be used to take voltage measurements.



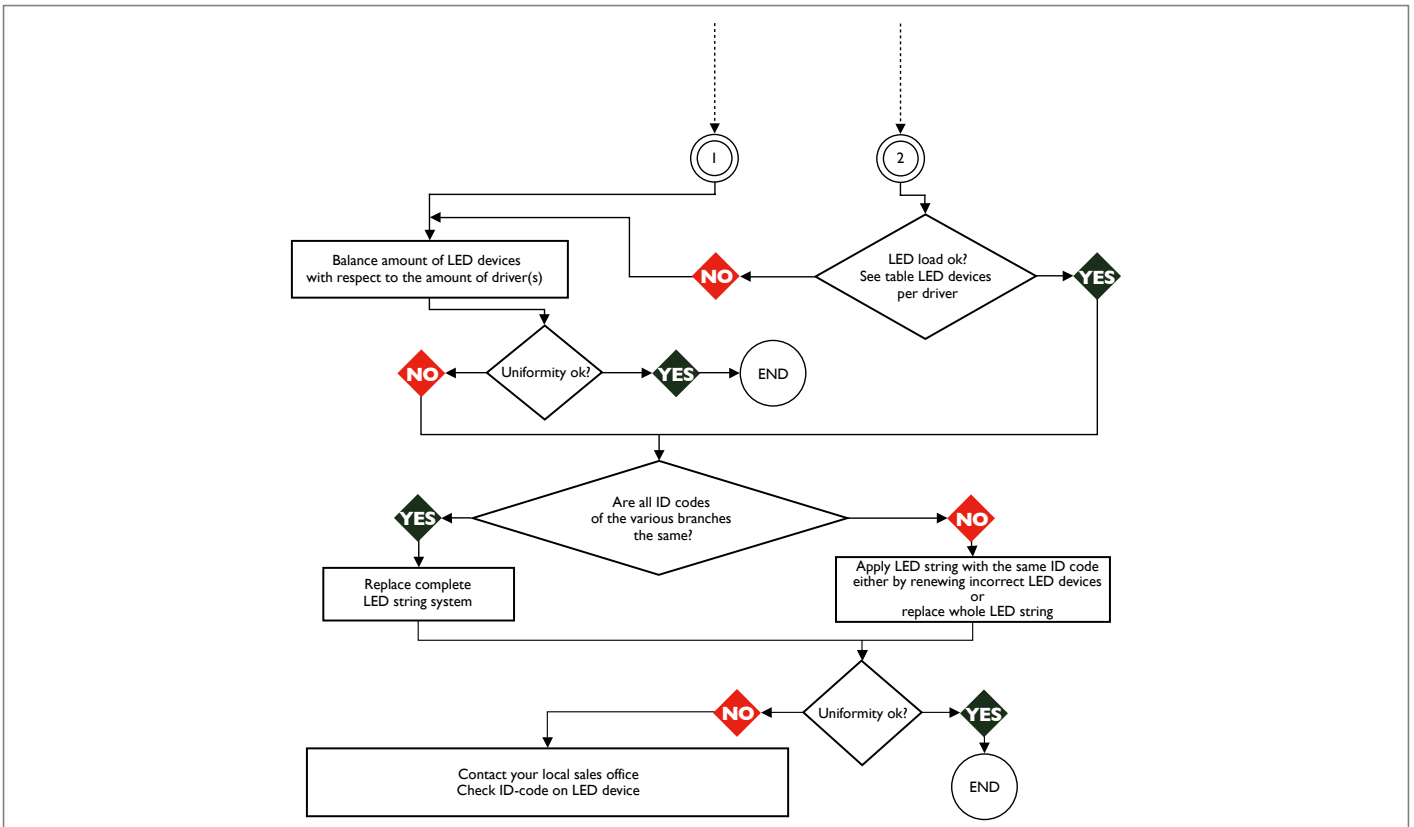
Measuring the driver output without damaging the system

Poor uniformity of the new system, part 1



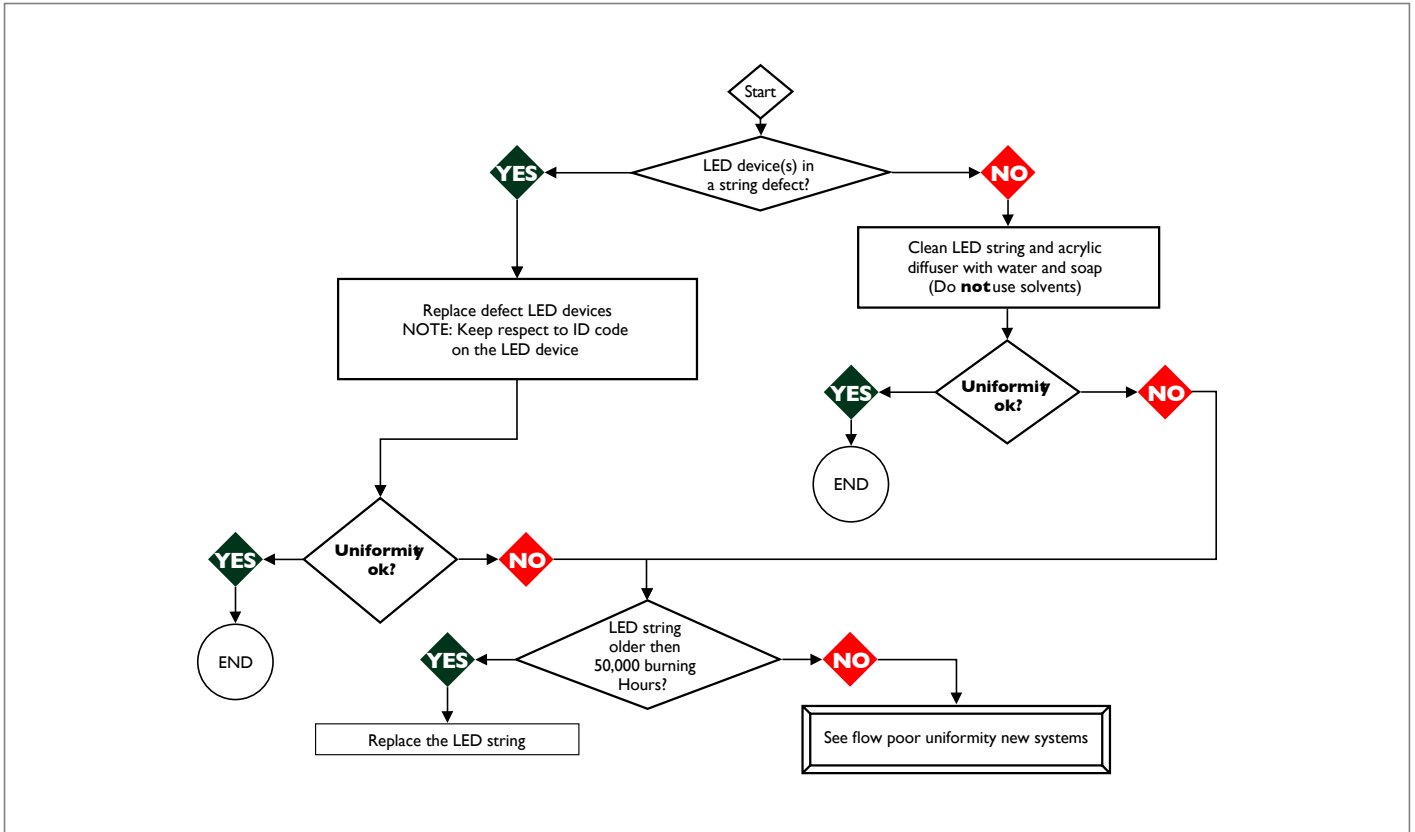
Poor uniformity of the new system, part 1

Poor uniformity of the new system, part 2



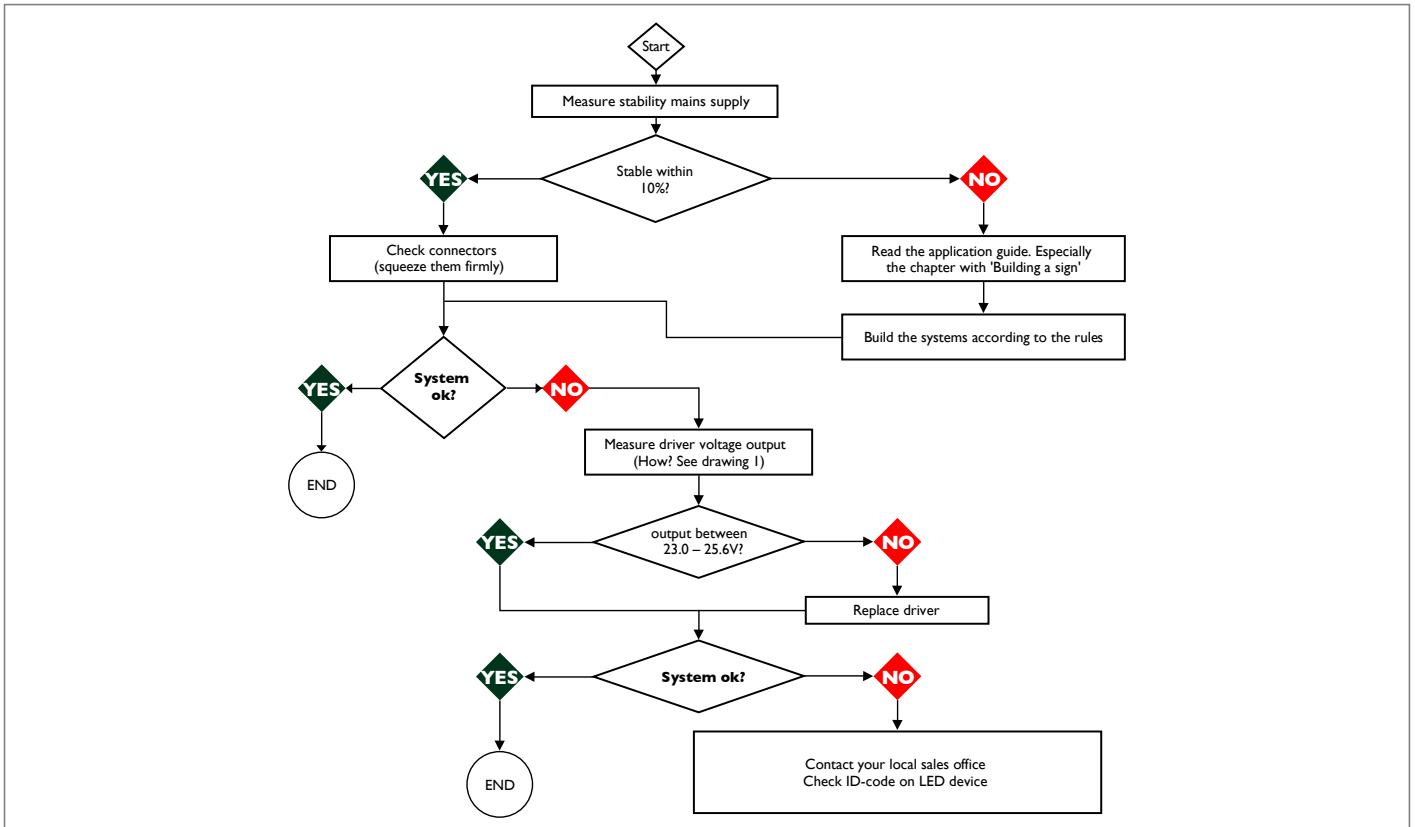
Poor uniformity of the new system, part 2

Poor uniformity in the field system



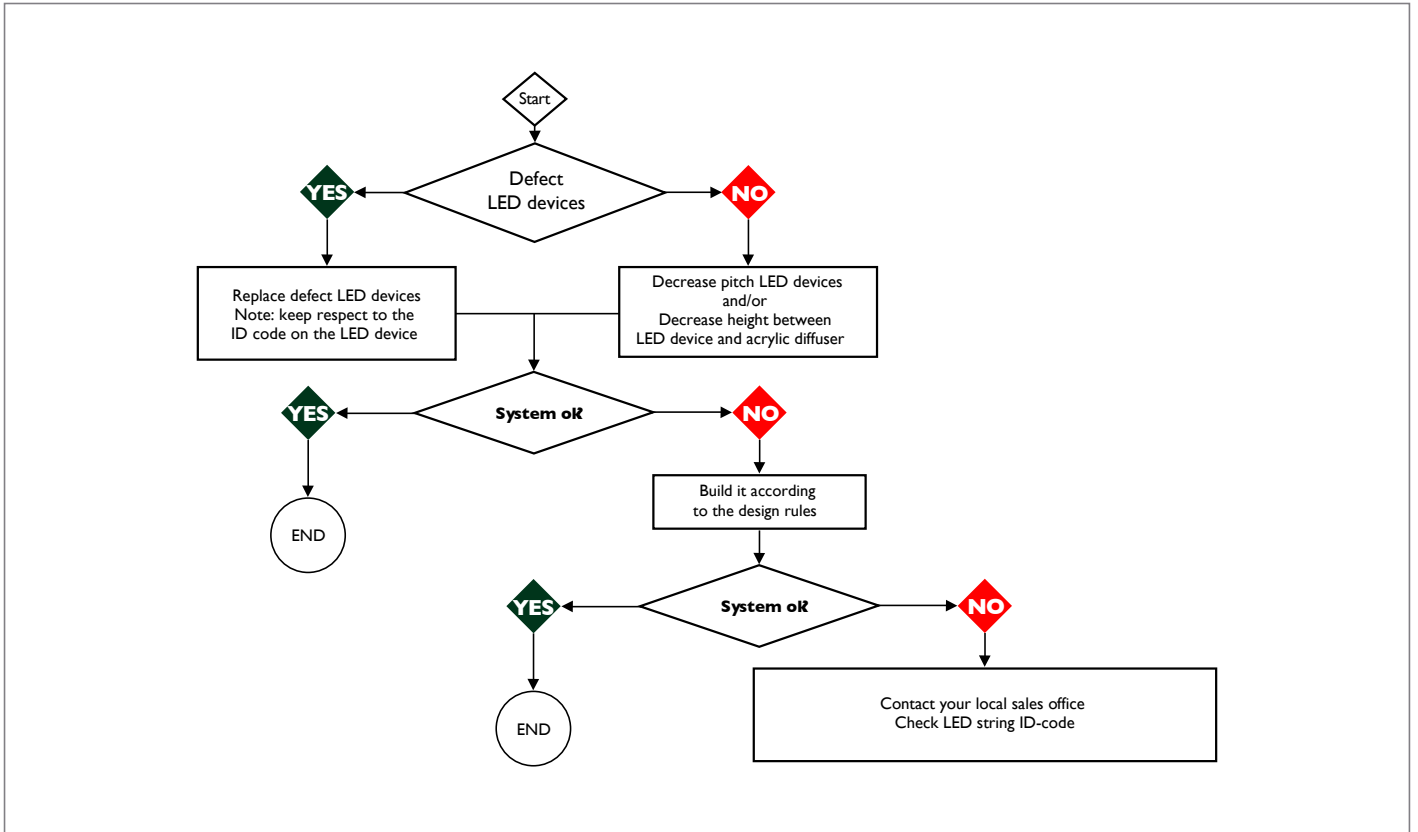
Poor uniformity in the field system

Fluctuation in light output



Fluctuation in light output

Partial light output



Partial light output

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