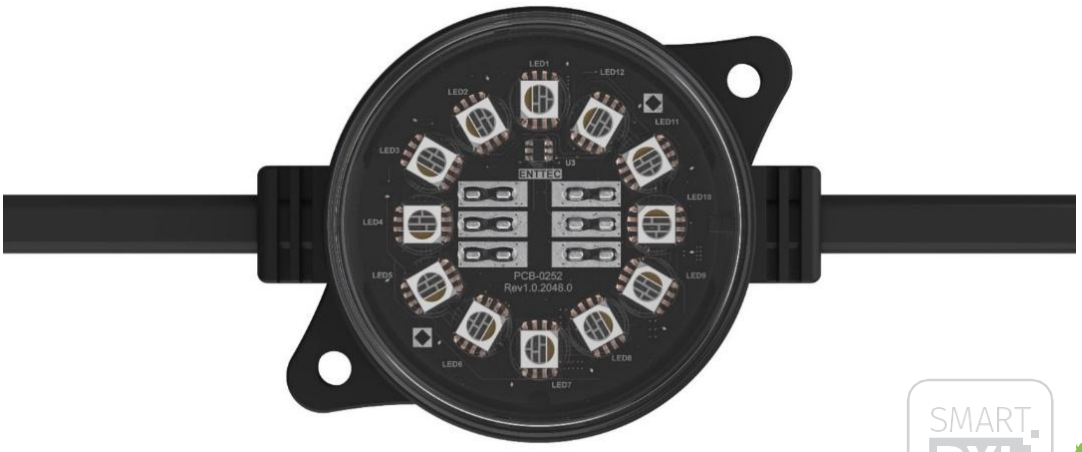
SMART PXL60 Dot (24V)- Installation Guide

60mm diameter RGB/RGBW LED pixel dot in 24V with high resolution dimming.



SMART PXL 16-BIT

AUSTRALIAN DESIGNED + MADE

Contents

Safety

Check and respect all directions and warnings given within this installation guide before specifying, installing and operating a Smart PXL Dot installation. If you are unsure or still have any questions about how to install or operate this product safely, please contact your ENTTEC supplier or speak with ENTTEC directly.

Key Electrical Safety

- This product must be installed in accordance with applicable national and local electrical and construction codes by a person familiar with the construction and operation of the product and the hazards involved. Failure to comply with the following installation instructions may result in death or serious injury.
- This device can be damaged by excess voltage. The installation of an overvoltage protection device on the electrical system may reduce the risk of damage.
- Isolate the installation from power immediately if Smart PXL Dots, accessories power cables or connectors is in any way damaged, defective, shows signs of overheating or are wet (if not an IP67 component).
- Do not exceed the maximum numbers of Smart PXL Dots and accessories that can be connected and the maximum cable lengths specified in this guide and other product documentation.
- To reduce the risk of fire or electrical faults do not exceed the ratings and limitations defined in the product datasheet or this guide.
- Do not hot swap Smart Pixel strings or accessories.
- Shut down power to the installation during cleaning in addition to when the installation is not in use.

Electrical Information

- This device operates on DC power and excludes an earth connection.
- This product in 24V variant is UL certified as Class 2 Luminaires, use Class 2 or LPS power unit only for US and Canada UL Standards.

Input Voltage	24V DC			
Maximum Power per Dot	RGB: 1.6W			
	RGBW: 2.1W			
Maximum Current Draw per Dot	RGB: 65mA			
	RGBW: 88mA			
Rated Current Throughput Capacity	4.17A (Class 2 or LPS power unit only)			
Cable Resistance	0.0132 Ohm/m			
Cable Thickness	16AWG			
Dot Pitch	Min: 150mm Max: 2000mm Increment: 25mm			
Lead In Cable Length (Connector to first dot)				
Lead Out Cable Length (Last dot to connector)				
Connector Type	ATM/ATF (Amphenol AT Series Male in/Female out) BET (Bare End Tinned)			
Connector Pinout	Pin 1	Pin 2	Pin 3	Pin 4
	0V	Data	N/C	+24V
Max Operating Ambient Temperature	50°C			

Installation Safety

- Do not bend the Smart PXL Dot cable into a curve of less than 30mm(1.18in) radius.
- Do not over stretch cabling sections of your Smart PXL Dots.
- Do not operate the Smart PXL Dots if the ambient temperature exceeds 50°C (122°F).
- The Smart PXL Dots are convection cooled, ensure sufficient airflow can reach each dot to allow heat to be dissipated.
- Do not cover or enclose Smart PXL Dots without a suitable and proven method of dissipating heat.
- To contribute to an optimum operating temperature, where possible keep this device out of direct sunlight.
- Do not modify the Smart PXL Dots in any way.
- Follow all steps in the installation guidelines section of this document.

Protection From Injury During Installation

- Always use suitable personal protective equipment when installing ENTTEC products.
- When installing the Smart PXL Dots above ground level, ensure that the installation hardware and supporting structure can hold the weight of all the devices they support.
- In an overhead installation or where the Smart PXL Dots may cause injury if it falls. Block access below the work area and work from a stable platform whenever installing, servicing or moving the Smart PXL Dots.
- Once installation is completed, check that all hardware and components are securely in place and fastened to supporting structures.

PXL Dot Planning and Specification

Before planning or installing your PXL Dot, ensure you are familiarised with all key information within this guide and other relevant ENTTEC documentation. If you are in any doubt about PXL Dot safety, or you plan to install ENTTEC's Smart PXL Dots in a configuration that is not covered within this guide, contact ENTTEC or your ENTTEC supplier for assistance.

ENTTEC's Return to Base warranty for this product does not cover damage caused by inappropriate use or application or modification to the product.

Key Safety & Functional Limits

Given the versatility and flexibility of the Smart PXL Dot, it is imperative that the PXL Dot layout stays within the limits defined within this document. If two or more different limits apply to a configuration, you must always follow the lowest.

To comply with UL standards, the PXL Dot design and installation must respect the key safety and functional limits defined within this guide.

These limits are:

- **Power Draw**
- **Voltage Drop**
- **Max current throughput limit per string (5A for UL Class 2 Luminaire only.)**
- **Control channel availability**

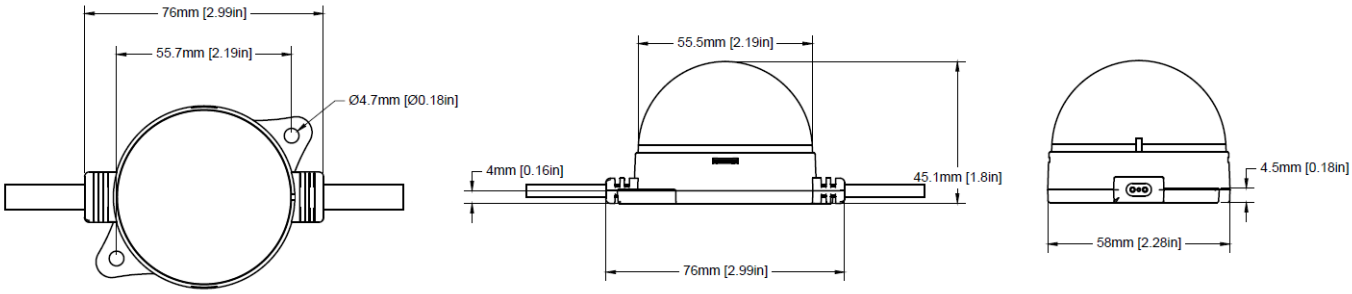
Voltage Drop

- The longer the cable distance from the power source to each dot the more voltage is dropped. Significant voltage drop can result in lower brightness and in more extreme cases colour shift.
- This is an important consideration for Smart PXL installations with custom pixel pitch and can inform the quantity of dots per string between power injections.
- If cable length can be reduced across your installation, this is recommended.
- If you are concerned about voltage drop and the impact on your installation, contact ENTTEC team or your reseller.

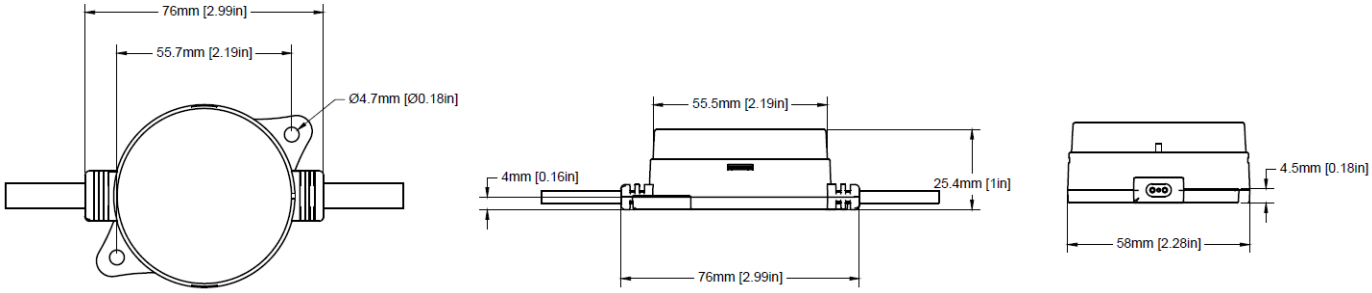
Physical Dimensions

Note: Lenses are non-removable & recommended in the absence of protective measure against external impact in installation. Force to remove will damage the notch on the cover.

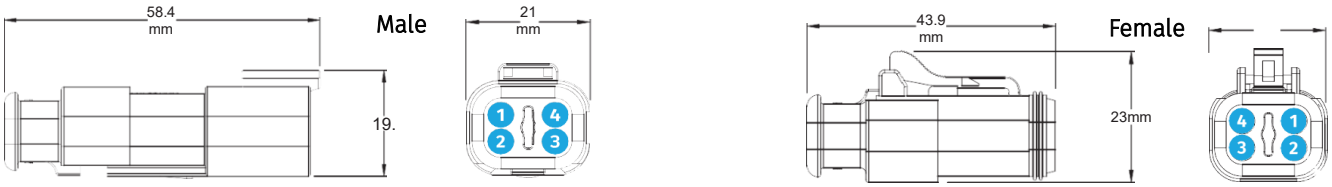
Smart PXL60 Dot - Dome Lens



Smart PXL60 Dot - Flat Lens



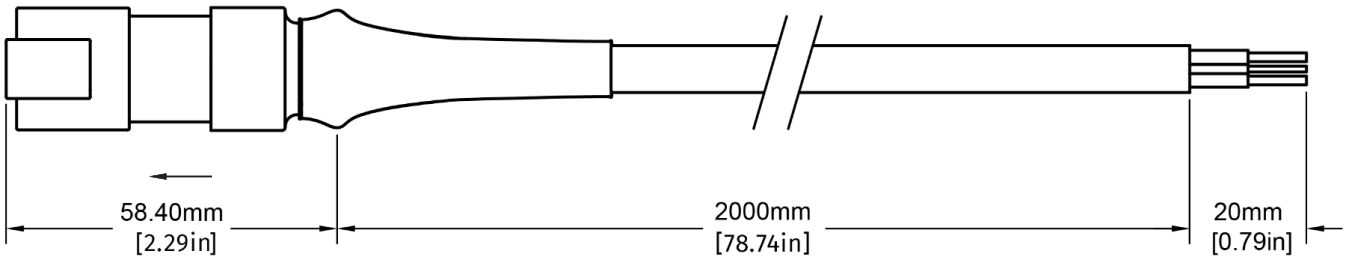
Amphenol AT Series Connector



All ENTTEC Smart PXL Dot accessories are fitted with the same Amphenol AT series connectors and industrial grade heat shrink as the Smart PXL Dots to provide additional durability. Each cable accessory has a bend radius – *View each accessory's datasheet for more information.*

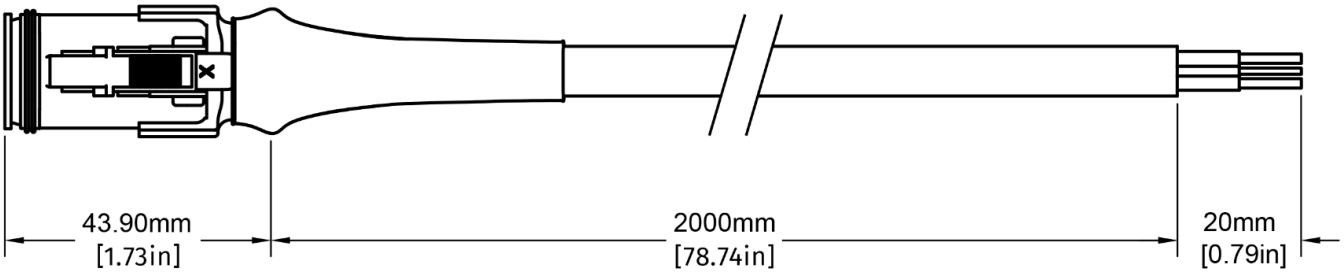
Smart PXL – 2m Male Cable

Used as a convenient method to connect your Smart PXL Dot's output to a connection block or other device.



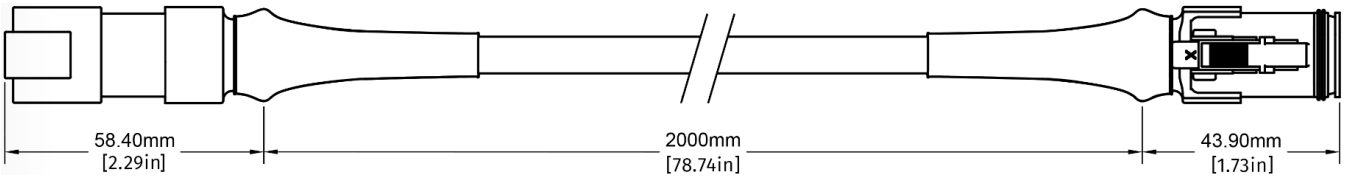
Smart PXL – 2m Female Cable

Used as a convenient method to connect your Smart PXL Dot strings to a connection block or other device.



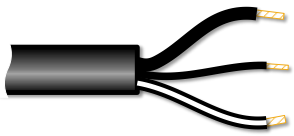
Smart PXL – 2m Extension

Used as a convenient method extend the distance between each Smart PXL Dot string. Refer to voltage drop section for maximum extension length.



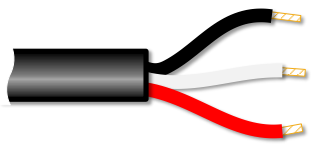
Cable Core Identification Chart

Smart PXL DOT string supplied with bare end tined (BET), the pinout is as below:



24V		
Cable colour / AWG size	**Function**	**Pin on Amphenol Connector**
Black / 16AWG	0V	1
Black / 20AWG	Data	2
Black + White stripe / 16AWG	+24V DC	4
48V		
Cable Colour	**Function**	**Pin on Amphenol Connector**
Black / 16AWG	0V	1
Black / 20AWG	Data	2
Black + White stripe / 16AWG	+48V DC	3

Some accessories are supplied with different cable colour, the pinout is as below:



24V		
Cable Colour	**Function**	**Pin on Amphenol Connector**
Black	0V	1
White	Data	2
Red	+24V DC	4
48V		
Cable Colour	**Function**	**Pin on Amphenol Connector**
Black	0V	1
White	Data	2
Red	+48V DC	3

ENTTEC recommend the use of cable ferrules when connecting non-tinned cable.

DC PSU Connection

To comply with UL standard requirement, your power supply must be mounted at least 460mm (18 inches) away from the luminaire. However, to minimise voltage drop, the cable length to the start of the Smart PXL Dots chain should be kept as short as possible.

In the Smart PXL installation complying UL Class 2 luminaires, only one Class 2 power unit can be connected to provide power to each chain of Smart PXL Dots to prevent overload.

ENTTEC recommend power supplies with IP67 rated or above where applicable with your installation requirement.

The total power consumption of a chain of Smart PXL Dots complying with UL standard must not exceed:

- Smart PXL Dot: max. 17 dots.
- The Class 2 or LPS PSU's maximum power rating.

To determine the total power consumption of a chain of ENTTEC Smart PXL Dots, add together the power consumption for all individual Dots by referring to electrical information.

If UL compliance is not required for your installation, contact ENTTEC for further assistance.

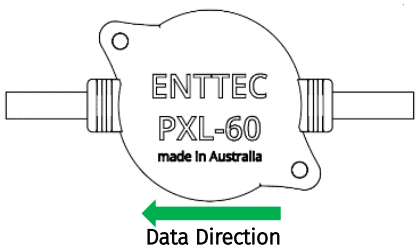
Data Cable Length & Direction

Smart PXL Dots are controlled using ENTTEC's proprietary SPXL-16 protocol. This protocol sequentially addresses each Smart PXL Dot automatically. This reduces commissioning time by eliminating the need for individual addressing.

Each Smart PXL Dot contains its own data buffering and data, re-shaping circuit. The maximum permissible distances distance between devices is as follows:

Max. distance between SPXL-16 data source	3000mm
Max. distance between Smart PXL string interconnects	3000mm

SPXL data flow through each dot in one direction only. This direction is indicated by the direction of the arrow printed on surface of the dot (centre of PCB). In the event surface of PCB is inaccessible, data direction always flows as illustrated with respect to ENTTEC logo on bottom of housing.



- **For best practice keep all cable run lengths to a minimum to avoid electrical noise.**
- **Avoid running data cabling close to mains power or devices that emit electromagnetic noise (i.e. air conditioning units).**
- **If data direction instructions are not followed, Smart PXL Dots will not operate.**

Control Channels

Each RGB Smart PXL Dot consumes the equivalent of 6 DMX channels of data.

Each RGBW Smart PXL Dot consumes the equivalent of 8 DMX channels of data.

The maximum number of dots that can be run from a single data feed is determined by the number of data channels per output.

Each Smart PXL Dot, whether operating in 8-Bit, 16-Bit, or grouped configuration, will be sequentially addressed one after another in a chain, based on the configuration set by the controller.

DMX Channel Footprint:

- **16-Bit Smart PXL Dot - RGB**

Channel Order	1	2	3	4	5	6
Attribute	Red	Red Fine	Green	Green Fine	Blue	Blue Fine

- **16-Bit Smart PXL Dot - RGBW**

Channel Order	1	2	3	4	5	6	7	8
Attribute	Red	Red Fine	Green	Green Fine	Blue	Blue Fine	White	White Fine

Always consider all limiting factors before finalising your system design.

Smart PXL Dot Control Options

ENTTEC provides a range of controllers specifically designed to manage Smart PXL Dots, catering to diverse use case scenarios.

Application diagrams showcasing the functionality of select ENTTEC controllers are included in the following section.

Note: The controller mentioned in this section are optional and are sold separately. Visit ENTTEC website for the latest information.

Controlling Smart PXL Dots with ENTTEC's OCTO

The ENTTEC OCTO Series is a compact, 4-DIN module-wide device designed to convert pixel data from Art-Net, sACN, or KiNet, supporting a wide operating voltage range.

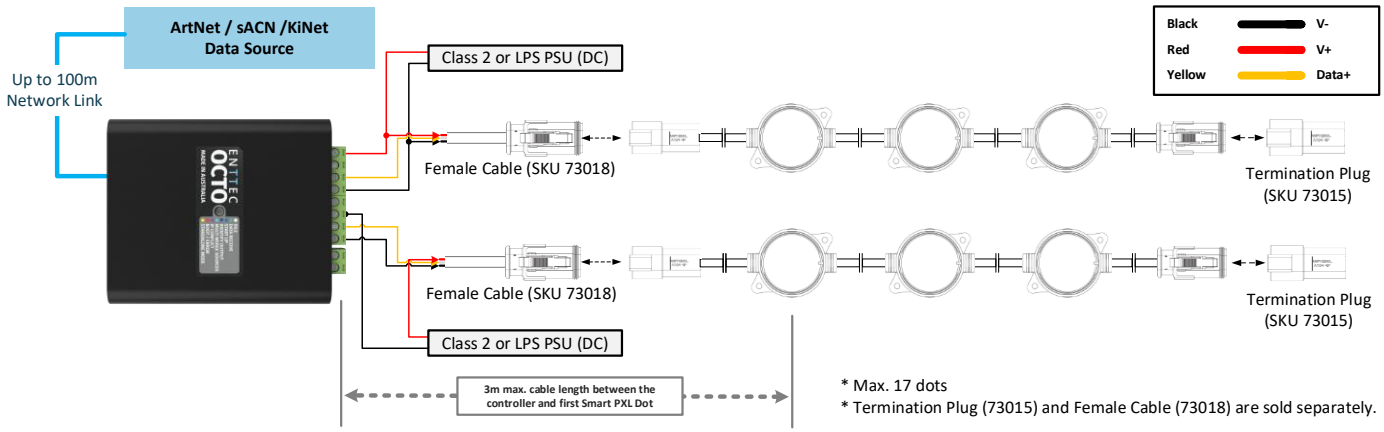
With expandable network daisy-chain connectivity, the OCTO allows seamless device linking, enabling distances of up to 100 metres between each connected unit. Its built-in web interface provides intuitive configuration options and supports basic standalone effects generation—perfect for installations that do not require a centralised playback device.

ENTTEC Controller	SKU	Form Factor	Dimming Control Resolution	Outputs per Device	Total DMX Channels Per Output
OCTO MK2	71521	4 module DIN (IP-20)	8-Bit / 16-Bit	2	4096 (8U)

ENTTEC OCTO Application Diagram

Key OCTO Installation Guidelines:

- Follow all safety guidelines outlined in this installation guide and related product documentation to ensure compliance and proper functionality.
- The OCTO MK2 is rated for damp locations only. If installed outdoors, it must be housed in a properly rated waterproof enclosure with adequate airflow to prevent overheating.
- Position the OCTO MK2 and power supply at least 460mm (18 inches) away from the luminaire, but as close as possible to the first Smart PXL Dot in the chain to minimise voltage drop.
- To reduce the risk of voltage interference on control signal lines, where possible, route control cabling away from mains power lines or high-EMF-emitting devices (e.g., air conditioning units).
- ENTTEC recommends using cable ferrules for all stranded cables connected to the OCTO MK2's screw terminals to ensure a secure and reliable connection.



Note: If the power or data source to your controller drops out whilst the Smart PXL Dots remain powered, the last state will be held until either the data feed resumes or power to the Smart PXL Dots is disconnected and re-connected.

Installation Guidelines

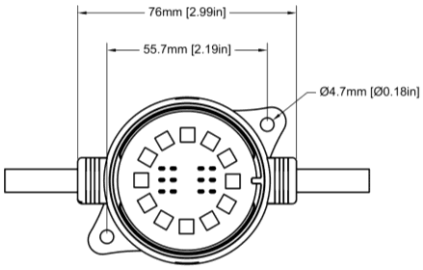
Always work with a plan of the installation that respects all system limitations as defined within this guide and adheres to the safety information.

- **Ensure data is flowing from your controller through the string of dots following the data direction.**
- **Do not cover Smart Pixel Dots with insulating material of any kind.**
- **When installing dots or accessories DO NOT exert any tension on the cabling whilst tightening.**

- **Installation of this product must be performed by qualified personnel. If ever unsure always consult a professional.**
- **Ensure that no part of the installation is or can be connected to power until all work is complete.**
- **Do not install Smart PXL Dots if cabling is damaged.**
- **Before connecting Smart PXL Dots to a power supply, verify that the operating voltage and frequency are compatible and the power supply is appropriately fused in.**
- **Do not crush or clamp Smart PXL Dot or accessory cabling during installation.**
- **Do not leave connections unprotected or disconnected in damp or wet environments. All exposed connectors should be fitted with a Termination Plug (SKU 73015) to give a watertight seal to protect against corrosion.**
- **Do not handle Smart PXL Dot strings in an energised state.**
- **Do not bend the Smart PXL Dot cabling to a radius smaller than 30mm (1.18in).**
- **Do not 'hot swap' Smart PXL Dot strings or their accessories.**
- **Do not leave connectors or accessory cabling in a position where they could cause a short circuit.**
- **Isolate the installation from power immediately if Smart PXL Dots, accessories power cables or connectors is in any way damaged, defective, shows signs of overheating or are wet (if not an IP67 component).**

Surface Installation of Smart PXL60 Dots & Accessories

The Smart PXL60's body features 2 * 4.7mm Dia holes designed for use with suitable fasteners to support the weight of the full Smart PXL Dot string.



Cable termination end caps (SKU: 73015) feature a single M5 hole for use with pan head screws and bolts.

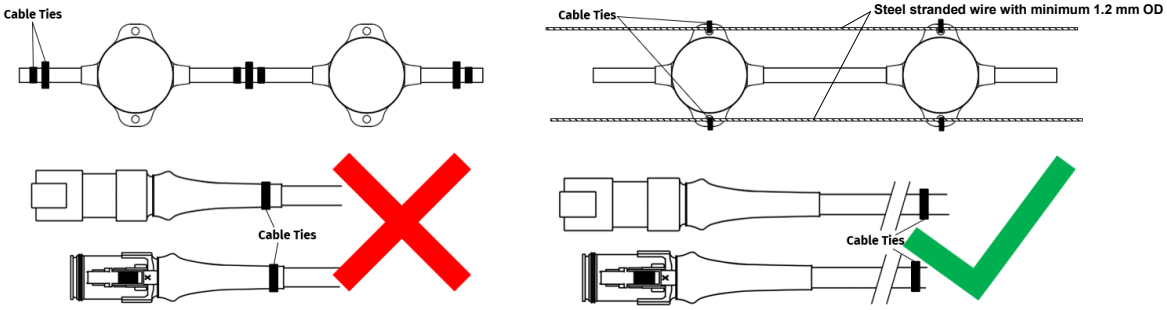
ENTTEC produces Smart PXL Dot cable accessories for increased convenience on site. All accessories use the same connectors as the Smart PXL Dot's. Cabling should be restrained with cable clips suited to the surface you are mounting your Smart PXL installation to every 0.5m.

Ordering information can be found at the end of this document.

Catenary Mounting

ENTTEC recommends UV resistance nylon cable tie, minimum 3.52mm width and 50lbs tensile strength cable ties for 2 wire catenary support of the Smart PXL dots via the mounting holes to eliminate any rotational stress. Do not place cable tie directly to cable leading in/out of Smart PXL dot. Positioning cable ties over cable close to dot body will prevent cable from acting as strain relief for the installation and may void the warranty.

If the pitch cable is sagging and needs to be restrained for aesthetic purposes, a cable tie can be used but should be positioned as far away from the dot or heat shrink parts as possible. Do not tighten the cable tie to the catenary cable as this will prevent the installation from flexing and dampening strain on the cable. It can also cause the cable to rub against the catenary wire and wear away the insulation.



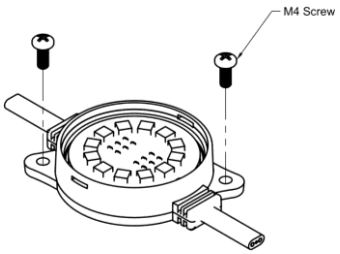
- **Only drill holes or tighten screws into a surface that do not have cabling, pipework or other services directly behind.**
- **Never energise a Smart PXL Dot system until installation is complete and it is safe to do so.**
- **Ensure the surface you are attaching Smart PXL Dots and accessories can support the weight of all items you attach.**
- **When mounting Smart PXL Dots and accessories, ensure the mounting method is suitably rated to support the weight of the full Smart PXL Dot string.**
- **Never drill a hole or tighten screws into a surface using a Smart PXL Dot or accessory as a guide. This can result in damage and compromise the strength of the product.**
- **If installing Smart PXL Dots outdoors, only use corrosion proof galvanised, or stainless-steel fixings rated for the installation conditions.**
- **Never allow a string of dots to hang from a structure during installation, this can result in strain to cabling and damage to the Smart PXL Dots.**
- **CAUTION: The mounting means provided with this luminaire has not been evaluated for reliability. If installed where failure of the mounting means could cause injury to persons or damage to property below, supplemental means of securement should be considered.**

Marking The Surface

Hold a Smart PXL60 Dot or your Cable termination end cap up to the surface and accurately mark the hole positioning with a pencil, ensuring that the spacing between each dot and accessory will not exert any strain on the Smart PXL Dot cable.

Protect the Smart PXL Dot's from debris or swarf whilst drilling pilot holes.

Note: When installing, DO NOT connect the Smart PXL Dot cabling until the screw has been fully tightened to protect it from any un-necessary strain.



Screws

If securing Smart PXL Dots or accessories using machine or self-tapping screws.

Drill a pilot hole or partially wind a self-tapping screw on the pencil mark as defined in the previous section before positioning the Smart PXL Dot. Position each Smart PXL Dot in-line with the entry points, then insert and fully tighten the screws.

DO NOT exert any tension on the cabling whilst tightening.

Bolts

If securing Smart Pixel Dots using bolts, ensure a locking nut is used that cannot become undone due to vibration.

DO NOT exert any tension on the cabling whilst tightening. ENTTEC recommend the use of washers.

Servicing, Inspection & Maintenance

- **Servicing, inspection & maintenance should only be carried out by qualified technicians familiar with all safety information within this document and the Smart PXL Dot system.**
- **Smart PXL Dots and accessories have no user serviceable parts. If your installation has become damaged, parts should be replaced.**

- **Power down the entire system and ensure a method is in place to stop the system from becoming energised during Servicing, Inspection & Maintenance.**

Key areas to examine during inspection:

- **Ensure all connectors are mated securely and show no sign of damage.**
- **Ensure all connectors show no sign of corrosion.**
- **Ensure all cabling has not obtained physical damage or been crushed.**
- **Ensure all Smart PXL Dots and accessories are secured to the surface and have been installed in accordance with the guidelines set out within the installation guide.**
- **Check for dust or dirt build up on the Smart PXL System and schedule cleaning if necessary. – Dirt or dust buildup can limit the ability for the Smart PXL Dot system to dissipate heat and can lead to damage.**

If deemed necessary for a Smart PXL Dot string or accessory to be replaced, it should be removed in a reverse order to installation as defined in this guide.

The replacement string or accessory should be an appropriate size and be installed in accordance with all steps within the installation guide.

To order replacement parts contact your reseller or ENTTEC directly.

Cleaning

Dust and dirt build up can limit the ability for the Smart PXL Dot system to dissipate heat resulting in damage. It's important that the Smart PXL Dot system is cleaned in a schedule fit for the environment it is installed within to ensure maximum product longevity.

Cleaning schedules will vary greatly depending on the operating environment of your Smart PXL Dots. Generally, the more extreme the environment, the shorter the interval between cleanings.

- **Before cleaning, power down the system and ensure a method is in place to stop the system from becoming energised until cleaning is complete.**

- **Do not use abrasive, corrosive or solvent-based cleaning products on a Smart PXL Dot system.**
- **Do not spray Smart PXL Dots or accessories with a high-pressure water jet.**

To clean an ENTTEC Smart PXL system, use low-pressure compressed air to remove dust, dirt and loose particles. If deemed necessary, wipe the Smart PXL Dots with a damp microfiber cloth.

A selection of environmental factors that may increase demand for frequent cleaning include:

- Use of stage fog, smoke or atmospheric devices.
- High airflow rates (i.e. in close proximity to air conditioning vents).
- High pollution levels or cigarette smoke.
- Airborne dust (from building work, the natural environment or pyrotechnic effects).

If any of these factors are present, inspect all elements of the system soon after installation to see whether cleaning is necessary, then check again at frequent intervals. This procedure will allow you to determine a reliable cleaning schedule for your installation.

Ordering Information

Product	SKU
Smart PXL60 Dot	Refer to DATASHEET

Please refer to datasheet or contact ENTTEC team to discuss your customisation and installation requirements.

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Due to constant innovation, information within this document is subject to change.