

SMART PXL40 Dot - Installation Guide

42mm diameter RGB & RGBW pixel dot in 24V with high resolution dimming.



Contents

Safety.....	2
Key Electrical Safety.....	2
Electrical Information.....	2
Installation Safety.....	3
Protection From Injury During Installation.....	3
PXL Dot Planning and Specification.....	3
Key Safety & Functional Limits.....	3
Voltage Drop.....	3
Physical Dimensions.....	4
Cable Core Identification Chart.....	6
Power Supply Planning.....	6
Data Cable Length & Direction.....	7
Control Channels.....	7
Smart PXL Dot Control Options.....	8
Controlling Smart PXL Dots with ENTTEC’s OCTO.....	8
Installation Guidelines.....	9
Surface Installation of Smart PXL40 Dots & Accessories.....	9
Catenary Mounting.....	10
Marking The Surface.....	10
Servicing, Inspection & Maintenance.....	11
Cleaning.....	11
Revision History.....	12
Ordering Information.....	12

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 are in any way damaged, defective, show 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 PXL 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. No earth conductor is provided.
- The Smart PXL40 Dot 24V holds UL certification as a Class 2 Luminaire. For installations requiring UL compliance (US and Canada), use a Class 2 or LPS power supply.

Input Voltage	24V DC			
Maximum Power per Dot	RGB: 1.6Watts			
	RGBW: 1.8Watts			
Maximum Current Draw per Dot	RGB: 60mA			
	RGBW: 73mA			
Current Throughput Capacity	10A			
	For UL Class 2 installations, the chain's total current draw must not exceed the output rating of the Class 2 or LPS power supply.			
Cable Resistance	0.0132 Ohm/m			
Cable Thickness	16AWG			
Dot Pitch	Min: 125mm Max: 2000mm Increment: 25mm			
Lead In Cable Length (Connector to first dot)				
Lead Out Cable Length (Last dot to connector)				
Connector Type	ATM/ATF (Automotive style Male in/Female out) BET (Bare End Tinned)			
Connector Pinout	Pin 1	Pin 2	Pin 3	Pin 4
	0V	Data	N/C	+24V
Operating Ambient Temperature	-20°C to 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:

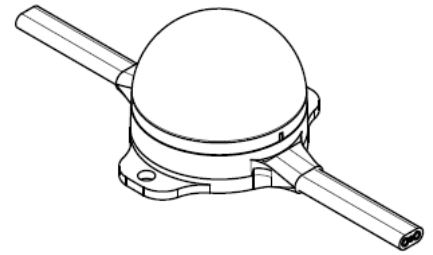
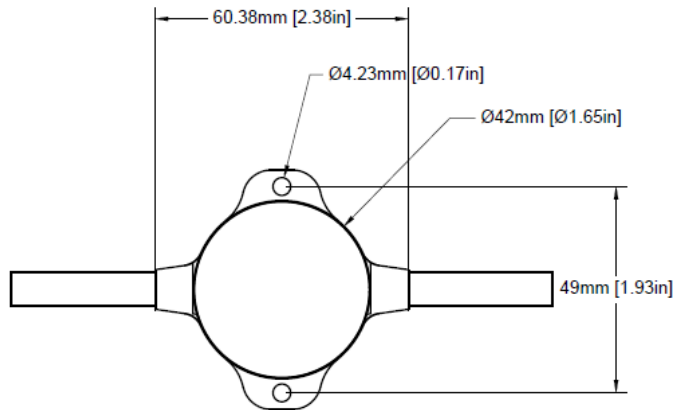
- **Power Draw**
- **Voltage Drop**
- **Current throughput capacity (for UL Class 2 installations, limited to Class 2 or LPS PSU rated output)**
- **Control channel availability**

Voltage Drop

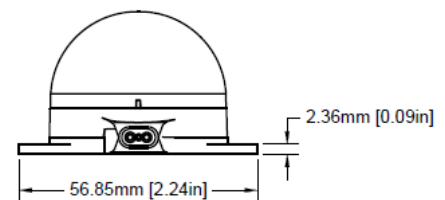
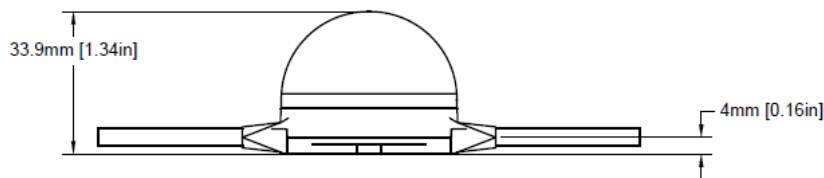
- The longer the cable distance from the power source to each dot the more voltage is dropped. Significant voltage drop can result in lower brightness and in more extreme cases colour shift.
- This is an important consideration for Smart PXL installations with custom pixel pitch and can inform the quantity of dots per string between power injections.
- Where possible, minimize cable lengths to reduce voltage drop across the installation.
- For voltage drop calculations specific to your installation, contact ENTTEC or your authorized reseller.

Physical Dimensions

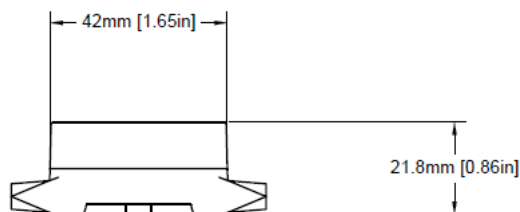
Note: Lenses are non-removable & recommended in the absence of protective measure against external impact in installation. Force to remove will damage the notch on the cover.



Smart PXL40 Dot – Dome Lens

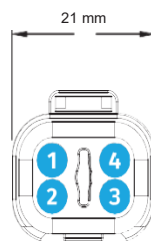
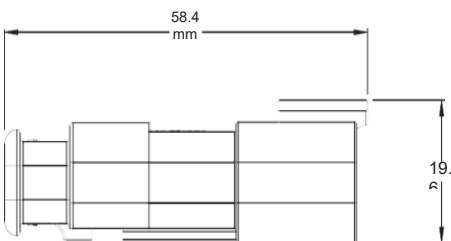


Smart PXL40 Dot – Flat Lens

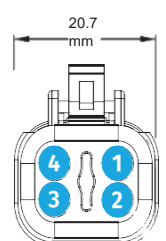
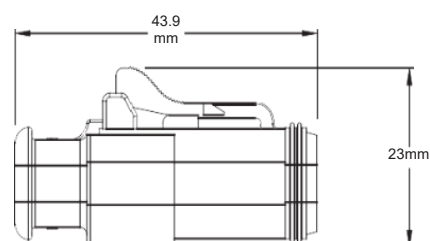


Premium Connector

Male



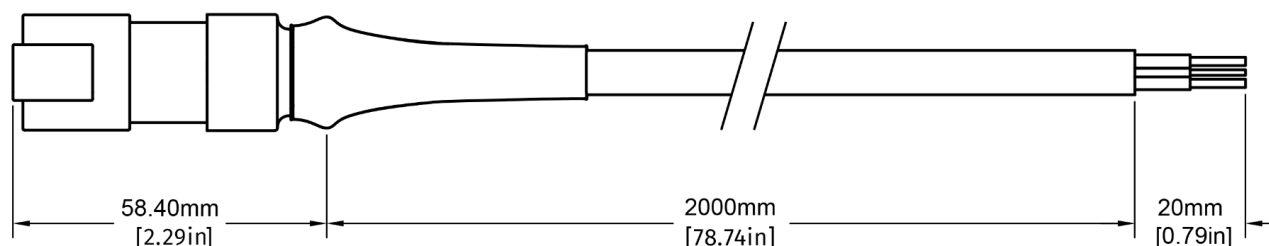
Female



All ENTTEC Smart PXL Dot accessories feature premium IP-rated automotive-style connectors with an integrated latching system. Cables and connectors are reinforced with industrial-grade heat shrink for enhanced durability and long-term reliability. *View each accessory's datasheet for more information.*

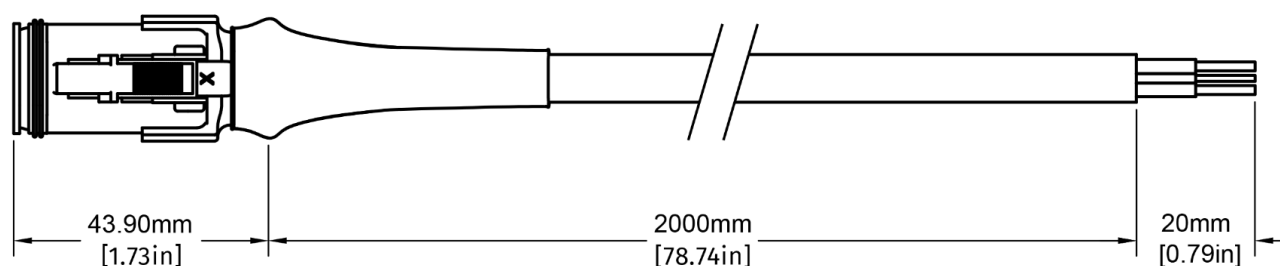
Smart PXL – 2M Male Cable

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



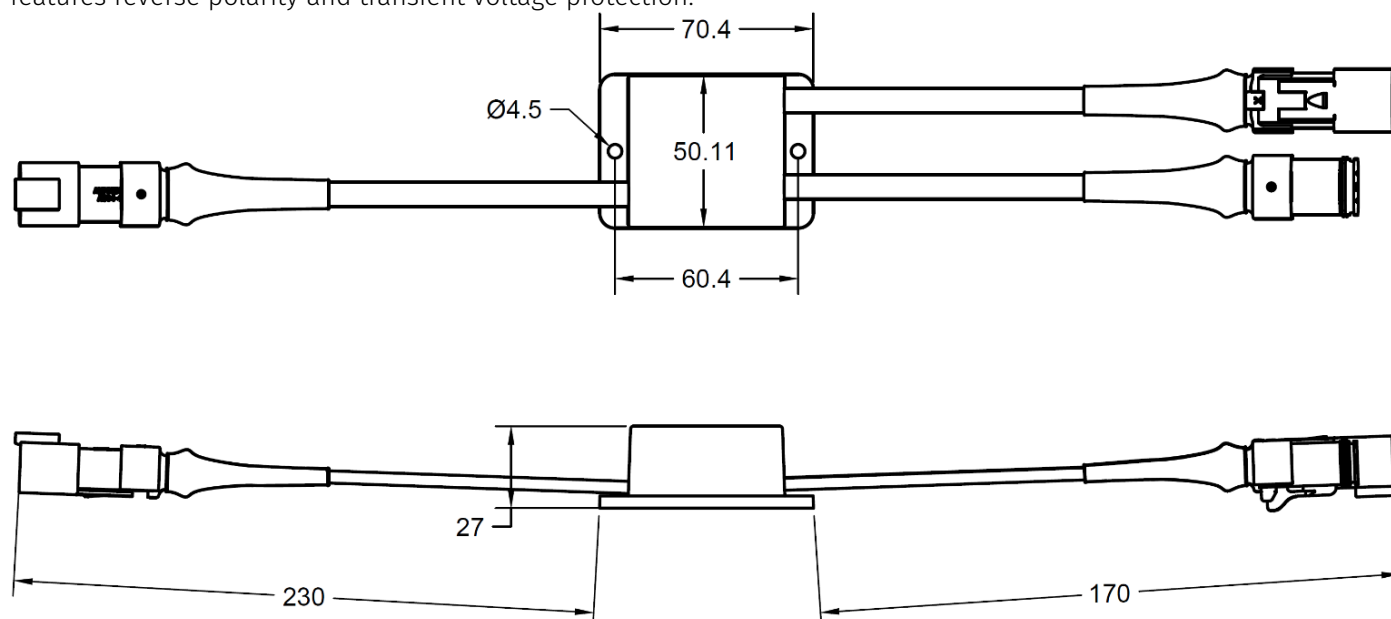
Smart PXL – 2M Female Cable

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



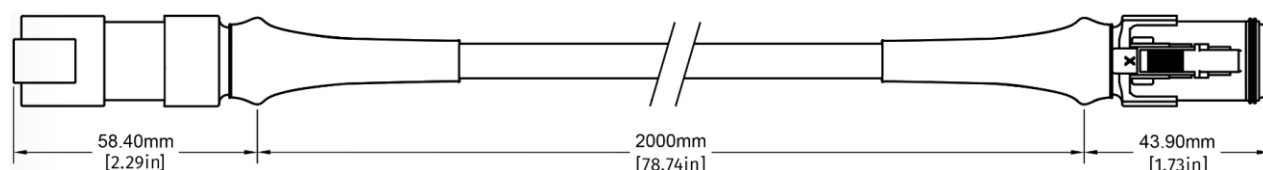
Smart PXL – Power Injector

Used to inject up to 10A of power to combat voltage drop and extend chain capacity. The power injector accessory features reverse polarity and transient voltage protection.



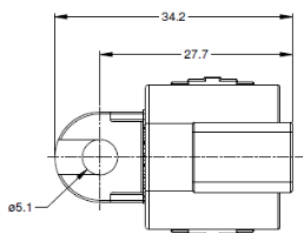
Smart PXL – 2M Extension

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



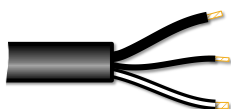
Smart PXL – Termination End Cap

The Smart PXL Termination End Cap should be attached at the end of a chain of Smart PXL Dots to protect the final female connector from short circuiting and corrosion in wet conditions. This can be secured to a surface using an M5 screw or bolt.



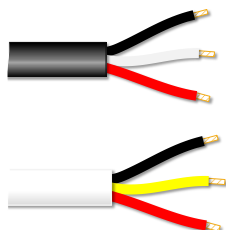
Cable Core Identification Chart

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



24V		
Cable colour (Cable size)	Function	Pin on Connector
Black (16AWG)	0V	1
Black (18AWG)	Data	2
Black + White stripe (16AWG)	+24V DC	4

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



24V		
Cable colour	Function	Pin on Connector
Black (16AWG)	0V	1
White / Yellow (16AWG)	Data	2
Red (16AWG)	+24V DC	4

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

Power Supply Planning

The Smart PXL Dot system supports scalable installations through appropriate power supply selection and chain configuration.

Sizing Your Power Supply

To determine the power supply requirement for a chain of Smart PXL Dots:

$$\text{Total Chain Power} = \text{Number of Dots} \times \text{Power per Dot}$$

Refer to Smart PXL Dot datasheet for the power and current draw values.

Your PSU's rated output must equal or exceed this total.

Account for cable losses and PSU efficiency when selecting your power supply.

PSU Placement

To minimise voltage drop, position your power supply as close as practical to the start of the Smart PXL Dot chain. For UL-compliant installations, the power supply must be mounted at least 460mm (18 inches) from the luminaire, in accordance with applicable UL requirements.

ENTTEC recommends IP67-rated or higher power supplies where your installation environment requires it.

UL Class 2 Installations (US / Canada)

For installations requiring UL Class 2 certification:

- Use a single **Class 2 or LPS rated** power supply per chain.
- The total power consumption of the chain must remain within the PSU's rated output.
- Only one Class 2 power unit may be connected per chain to prevent overload.

Use the power calculation method above to determine the appropriate chain length for your chosen PSU.

Beyond Class 2
For installations where UL Class 2 compliance is not required, chain configurations can be extended to suit your installation requirements through appropriate PSU selection and power injection planning. Contact ENTTEC or your authorised reseller for system design assistance.

Always consider all limiting factors – power draw, voltage drop, current throughput capacity, and control channel availability – before finalising your system design. Where two or more limits apply, the lowest takes precedence.

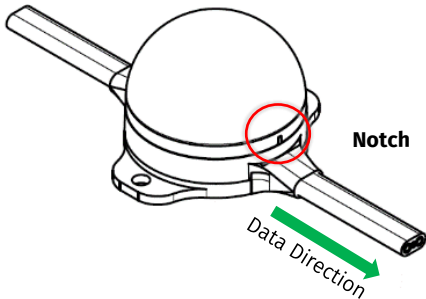
Data Cable Length & Direction

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 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. In the event the surface of PCB is inaccessible, data direction always flows toward the notch side (Data Out).



-
- 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 requires 6 DMX channels of data.

Each RGBW Smart PXL Dot uses 8 DMX channels.

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 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 installation.

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.

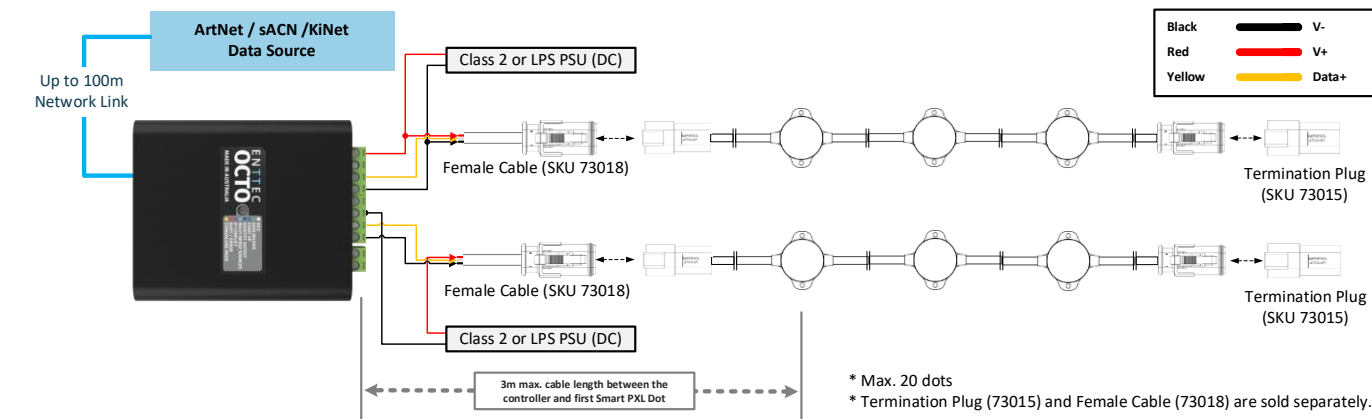
ENTTEC Controller	SKU	Form Factor	Dimming Control Resolution	Outputs per Device	Total DMX Channels Per Output
OCTO MK2	71521	4 module DIN (IP-20)	16-Bit	2	4096 (8U)

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 limitations as defined within this guide and adheres to the safety information on the first page.



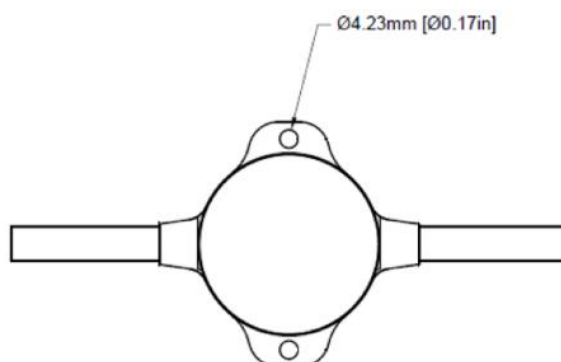
- **Ensure data is flowing from your controller through the string of dots following the data direction.**
- **Do not cover Smart PXL Dots with insulating material of any kind.**
- **When installing dots or accessories DO NOT exert any tension on the cabling whilst tightening.**



- **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 are in any way damaged, defective, show signs of overheating, or are wet (if not an IP67 component).**
- **Ensure all Smart PXL Dot and accessory cabling is appropriately restrained, secure and not under tension from the way it has been installed.**

Surface Installation of Smart PXL40 Dots & Accessories

The Smart PXL40's body features 2 * 4.23mm 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.

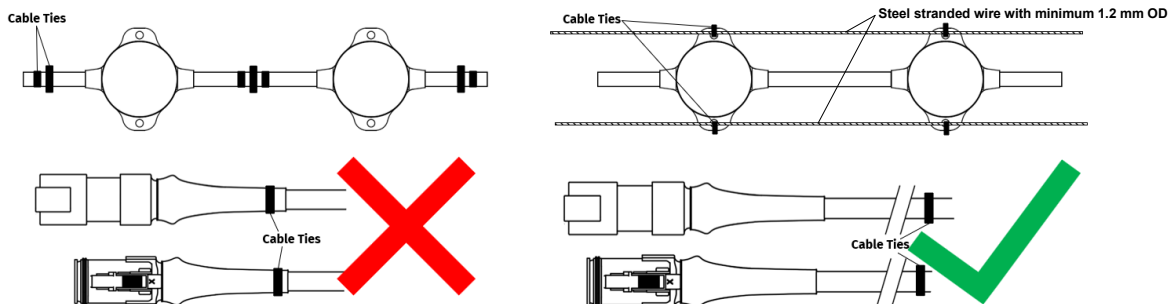
ENTTEC produces Smart PXL Dot cable accessories for increased convenience on site. All accessories use the same connectors as the Smart PXL Dots. Cabling should be restrained with cable clips suited to the surface you are mounting your Smart PXL installation to every 0.5m.

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 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:** Where failure of the mounting method could cause injury to persons or damage to property below, supplemental means of securement should be considered.

Marking The Surface

Hold a Smart PXL40 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 Dots 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.

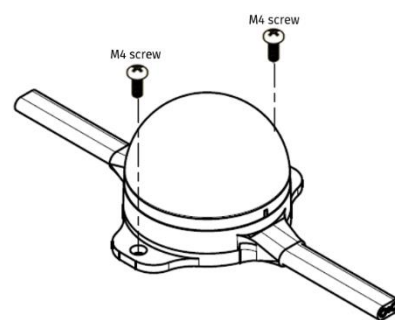
Drill a pilot hole or partially wind a self-tapping screw on the pencil mark as defined in the previous section before positioning the Smart PXL Dot. Position each Smart PXL Dot in-line with the entry points, then insert and fully tighten screws suitable for your mounting surface and material.

DO NOT exert any tension on the cabling whilst tightening.

■ Bolts

If securing Smart PXL 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.**



- **Smart PXL Dots and accessories have no user serviceable parts. If your installation has become damaged, parts should be replaced.**
- **Power down the entire installation and ensure a method is in place to stop the installation 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 and schedule cleaning if necessary. – Dirt or dust buildup can limit the ability for the Smart PXL Dot 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 to dissipate heat resulting in damage. It's important that the Smart PXL Dot 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 installation and ensure a method is in place to stop the installation from becoming energised until cleaning is complete.**



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

To clean an ENTTEC Smart PXL, 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 installation 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.

Revision History

- For the Smart PXL40 Dot manufactured after July 2024, the logo design direction has been aligned with ENTTEC pixel dot range.

Ordering Information

Please refer to datasheet or contact ENTTEC team to discuss your customization and installation requirements. Accessories must match the voltage of your dot string.

Product	Colour	SKU
Smart PXL Dots		
Smart PXL40 Dot	Black	Refer to DATASHEET
	White	
Accessories - Cables		
2m Male Cable (24V)	Black	73017
	White	73017-WHITE
2m Female Cable (24V)	Black	73018
	White	73018-WHITE
2m Extension Cable (24V)	Black	73020
	White	73020-WHITE
Accessories - Power & Protection		
Power Injector (24V)	Black	73019
	White	73019-WHITE
Termination End Cap	Black	73015
	White	73015-WHITE

enttec.com

MELBOURNE AUS / LONDON UK / RALEIGH-DURHAM USA / DUBAI UAE

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