Quick Start and Safety Manual

KNV SYSTEM

KNV DOT

KNV LINE

Software Version 23

GLP

GLP® KNV Dot and Line Quick Start and Safety Manual – Revision A

This manual covers fixture software version 23

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1. Safety

Key to symbols

The following symbols are used in this Guide:

Warning! Safety hazard. Risk of severe injury or death.

Warning! Hazardous voltage. Risk of lethal or severe electric shock.

Warning! See user manual for important safety information.

Warning! Fire hazard.

Warning! Risk of eye injury.

General safety information

Read this manual carefully before installing, using or servicing the KNV Dot, KNV Line or KNV PSU.

If you have any doubts or questions about how to use the fixture or PSU safely, please contact your GLP® supplier who will be happy to help.

The user documentation for KNV Dot and KNV Line lighting fixtures and the KNV PSU consists of:

- The **KNV Dot and Line Quick Start and Safety Manual**, supplied with fixtures and with the PSU, and available for download from www.glp.de. The Quick Start and Safety Manual contains important safety information and installation instructions that the installer and user must read.
- The **KNV Dot and Line User Manual**, available for download from www.glp.de. The User Manual explains features and control of these fixtures.
- The **KNV Dot DMX Channel Index** and **KNV Line DMX Channel Index**, available for download from www.glp.de. The Channel Indexes are separate guides to the DMX control channel layouts and DMX commands available in these fixtures.

All documents are available for download from www.glp.de.

KNV Dot and Line fixtures are intended for use by experienced professionals with the knowledge and skills to set up, operate, and maintain high-powered, remotely controlled lighting equipment safely and efficiently. These operations require expertise that may not be provided in the user documentation.

- Respect all warnings and directions given in the user documentation and on KNV Dot and Line products. Read the user documentation and familiarize yourself with the safety precautions it contains before installing or using the products. GLP and affiliated companies will take no responsibility for damage or injury resulting from disregard for the information in the user documentation.
- Check the GLP website at www.glp.de and make sure that you have the latest version of this manual. Check the PSU software version indicated on page 2 of this manual and then check the version displayed in the KNV PSU's control panel. If the versions are not the same, this manual may still cover your KNV installation because software updates do not always affect the way you use the elements in the system. However, it is possible that this manual does not match the system perfectly. Software release notes can help clarify this question. You can consult software release notes and download the correct version of this manual on the GLP website if necessary.
- Make all user documentation – this Quick Start and Safety Manual as well as the User Manual – available to all installers and operators. Save both documents for future reference.
- If you have any questions about the safe operation of KNV Dot and Line products, please contact an authorized GLP distributor (see list of distributors at www.glp.de).
- Use KNV Dot and Line products only as directed in this manual. Observe all markings in this manual and on the products.
- Refer all repairs and any service operation not described in this manual to a technician authorized by GLP.
- The light source in KNV Dot and Line fixtures must not be changed by the end user.
- Read and follow the user documentation for all additional equipment.

Electrical safety

- Do not allow the fixture or PSU to become immersed. Do not expose the fixture or PSU to high-pressure water projections.
- Keep all unused connectors on the fixture and PSU sealed with their protective caps at all times, both when they are in use and when not in use.
- Use only a source of AC mains power that complies with local building and electrical codes and has both overload and ground fault (earth fault) protection.
- Ensure that the fixture is electrically connected to ground (earth).
- Disconnect the system from AC mains power before carrying out any installation or maintenance work and when the system is not in use.
- Disconnect the PSU from power immediately if any seal, cover, cable, connector or other component is damaged, defective, deformed or showing signs of overheating. Do not reapply power until the item has been repaired and the installation judged to be safe by a technician authorized by GLP.

- Check that all power distribution equipment, cables and connectors are in perfect condition, rated for the electrical requirements of all connected devices, suitable for their application and suitable for the installation environment.
- Use only Neutrik powerCON TRUE1 cable connectors for AC mains power input at the PSU's mains POWER IN connector and for relaying AC mains power from one PSU's mains POWER THRU connector to another PSU's mains POWER IN connector.
- Use minimum 14 AWG or 1.5 mm^2 power input and relay cables that are minimum 16 A-rated and temperature-rated to suit the application. In the USA and Canada the cables must be UL-listed, type SJT or equivalent. In the EU the cables must be type H05VV-F or equivalent.
- Do not connect devices to power in a chain if the total maximum current draw of all the devices in the chain when added together will exceed the current rating of any cable or connector used at any point in the chain. The power input cable supplied with PSUs is rated as follows:
  - US power cable: 16 A, 14 AWG, UL listed, E304117, SJT, 4.9 ft.
  - EU power cable: 16 A, 1.5 mm^2, H05VV-F, 1.5 m.

  Do not connect more than two (2) KNV PSUs to power in a chain at 100-120 V, 60 Hz.

  Do not connect more than four (4) KNV PSUs to power in a chain at 200-240 V, 50 Hz.
- The voltage and frequency at the mains POWER THRU socket are the same as the voltage and frequency applied to the mains POWER IN socket. Only connect devices to the Mains THRU socket that accept this voltage and frequency.
- KNV Dot and Line fixtures do not have a user-replaceable fuse. If you suspect that a fuse has blown, disconnect the fixture from the PSU and send it to a technician authorized by GLP for repair.

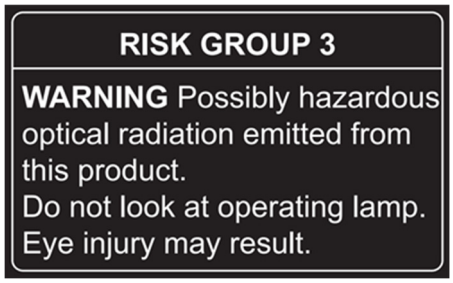
Fire safety and protection from burns

- Do not operate the fixture or PSU if the ambient temperature (Ta) exceeds 45° C (115° F).
- The surface of the fixture's casing can reach up to 65° C (149° F) and the front screen can reach 80° C (176° F) during operation. Avoid contact by persons and materials. Do not install the fixture in a location where there is a risk of accidental contact. Allow the fixture to cool for at least 20 minutes before handling
- Keep flammable materials well away from the fixture.
- Keep all combustible materials (e.g. fabric, wood, paper, curtains, stage scenery) at least 0.2 m (8 in.) away from the fixture.
- Ensure that there is free and unobstructed airflow around the fixture and PSU. Provide a minimum clearance of 100 mm (4 in.) around fans and air vents.
- Do not illuminate surfaces within 1 m (3.3 ft.) of the fixture. The light output from the fixture is powerful enough to cause burns or fire in illuminated objects at close range.

- Do not place any optical components other than KNV accessories onto the front of the fixture.
- Do not stick filters, masks or other materials onto the fixture. Do not block the light output in any way. The front surface becomes hot during operation and can melt or ignite objects that are in contact with the surface. Ensure that the front surface Is clean and unobstructed at all times in order to prevent a fire hazard and damage to the fixture.
- The fixture's optical components can focus the sun's rays, creating a risk of fire and damage. Do not expose the front of the fixture to sunlight or any other intense light source, even from an angle.

Eye safety

- KNV Dot and Line fixtures are classified as a Risk Group 3 lighting fixture according to EN 62471. Possibly hazardous radiation emitted. Do not stare into the light output from the fixture. May be harmful to the eyes.
- Do not look at the fixture's light output with optical instruments or any device that may concentrate the light output.
- Make sure that persons near to or working on the fixture are not looking directly into the light output when the fixture lights up suddenly. This can happen when power is applied, when the fixture receives a DMX signal, or when certain control menu items are selected.
- The warning below is printed on KNV Line fixtures and added as a tag on KNV Dot cable tails. Do not remove or cover the warning. If the warning becomes impossible to read, replace it with a label reproduced from this illustration:



- Provide well-lit conditions to reduce the pupil diameter of anyone working on or near the fixture.

Strobe safety

- Flashing light, particularly at 5 - 30 Hz, may cause seizures in persons with photosensitive epilepsy. Do not use strobe effects for extended periods.
- Comply with local regulations on the use of strobe lighting and notify the public in advance with highly visible warning signs when strobe effects are used.
- If a seizure occurs, stop using strobe effects. Seek professional medical help. Note the time that the seizure starts and finishes. Call emergency medical help urgently if the seizure lasts more than five minutes, if it is the person's first seizure, or if the person is injured. While waiting for help to arrive, protect the affected person from injuring themselves on hard or sharp objects. If necessary, move the person to a safe place. Lay them on their side with their head supported to prevent it from hitting the floor. Loosen any tight clothing around their neck. Do not use force to hold the person or restrict their movements. Do not put anything in their mouth, including your fingers.

Installation safety and protection from personal injury

- Installation must be performed by qualified personnel only and carried out in accordance with applicable regulations such as DIN VDE 0711-217.
- The safety of the installation is the responsibility of the installer. If in any doubt about the safety of a physical installation, consult a static engineer and seek advice from your GLP supplier before starting installation work.
- KNV Dot and Line fixtures and the KNV PSU are not portable when installed.
- Ensure that the supporting structure and installation hardware used can hold at least ten times the weight of the load that they support.
- Install fixtures and PSUs on structures or surfaces only as directed in this manual.
- Respect the safety limits given in this manual for the maximum number of fixtures that may be fastened to each other and suspended in columns or arrays.
- Columns and arrays of multiple fixtures must be protected from lateral forces that are intensified when the column or array acts as a lever. When forces are leveraged, there is an increased danger that sideways pressure at the bottom of an array can cause installation hardware at the top of the array to fail. Secure the extremities of columns and arrays against movement as described in this manual so that lateral forces cannot be applied to them.
- Install products only with hardware that is specifically designed and rated for its purpose. Do not use a safety cable as the primary means of support. Check that all installation hardware is in perfect condition. Fasteners must be steel grade 8.8 strength or better.

- If a fixture or PSU is installed in a location where it may cause injury or damage if it falls, install as directed in this manual a safety cable or similar secondary attachment that will hold the device if a primary attachment fails. The secondary attachment must be approved by an official body such as TÜV as a safety attachment for the load that it secures, it must comply with EN 60598-2-17 Section 17.6.6, and it must be able to support a static suspended load that is ten times the load that it secures.
- If a fixture or PSU is installed in a location where it may be exposed to forces such as wind pressure, vibration or movement, make sure that the installation can withstand these forces. Monitor weather forecasts constantly. Take down the installation immediately if there is any risk of weather conditions that could destabilize the installation.
- Check that all covers and items of rigging hardware are secure before using KNV Dot and Line products. Do not operate products with missing or damaged covers, shields or any optical component.
- Restrict access below the work area and work from a stable platform whenever installing, servicing or moving fixtures or PSUs.
- If a KNV product becomes damaged, stop using it immediately and disconnect it from power. Do not attempt to use a product that is obviously damaged.
- Do not modify the fixture or PSU in any way not described in its user documentation.
- Install genuine GLP parts only.

2. Avoiding damage

Important! Follow the directions in this section carefully, or the fixture may suffer damage that is not covered by the product warranty.

General precautions

Do not drop KNV Dot and Line products or expose them to mechanical stress.

Do not expose products to heat (from other lighting fixtures for example).

Clean optical components only as directed. Oils, solvents, and other chemicals commonly used for cleaning can damage the lens coatings and surfaces.

Protect the LCD display and control panel on the PSU from shocks, or they may suffer damage that is not covered by the product warranty.

Use only original spare parts. Do not make any structural modifications, or you will void the product warranty.

Avoiding damage from light sources

Do not point the front of the fixture towards the sun or other strong light sources. Strong light can cause internal damage to the fixture, melting components or starting an internal fire within seconds.

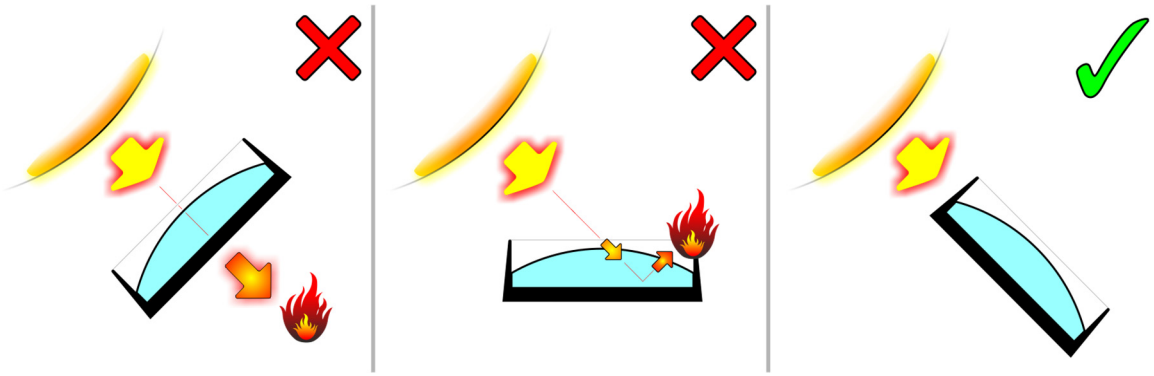


Figure 1. Avoiding damage from light sources

Damage can occur whether the fixture is powered on or off. See Figure 1. Damage can also occur if the light hits the front of the fixture at an angle: the fixture does not need to be pointing *directly* at the sun or other light source.

To avoid problems from strong light sources:

- Do not expose the front of the fixture to sunlight or any other strong light source.
- In outdoor applications during daylight, make sure that the front face of the fixture is shielded or points away from the sun, even when not in use.
- Do not aim other high-powered beam lights directly at the fixture.

IP rating

KNV fixtures and the KNV PSU are IP54-rated:

- **IP** stands for Ingress (entry into the fixture) Protection.
- The figure **5** in the rating means that products are protected against the entry of solid bodies larger than 1 mm (fingers, tools, etc.) and have limited protection against the entry of dust and airborne particles.
- The figure **4** in the rating means that products are protected against the entry of rain and water spray (splashing) that arrives from vertically above or at an angle of up to 60° from vertically above the product. Products are not protected against immersion in water and they are not protected against low or high-pressure water jets.

Avoiding damage from water and humidity

- Do not install KNV fixtures or PSUs in a location where water can pool around them or allow them to become submerged in any other way. Do not aim low- or high-pressure water jets at them.
- Keep all unused connectors sealed with their protective caps, both when the product is being used and when it is not in use.
- In outdoor and high-humidity environments, use IP65-rated power and data connectors and cable (an IP65 rating means that the item is protected against the entry of water from rain, projections and low-pressure jets as well as the entry of dust). When assembling connectors and installing them on cable, follow the manufacturer's instructions (see www.neutrik.com) and ensure that an IP65 rating is maintained for the complete assembly.
- Use only the following IP65-rated connectors at the KNV PSU:
  - Neutrik NAC3FX-W to connect to POWER IN
  - Neutrik NAC3MX-W to connect to POWER THRU.
  - Neutrik NC5FX-TOP to connect to DMX IN (5-pin XLR)
  - Neutrik NC5MX-TOP to connect to DMX THRU (5-pin XLR)
  - Neutrik NE8MX6 to connect to data IN and THRU Ethernet ports
- Use only the cables supplied by GLP for the KNV Dot and Line products to connect Dot and Line fixtures to the PSU and to each other.
- Apply a dielectric grease (available from most electrical suppliers) to connector terminals and caps to prevent corrosion and/or electrical short circuits.
- Make sure that cables open into dry areas or sealed junction boxes. Moisture can be drawn along cables by capillary action or pressure variations resulting from thermal expansion.
- Create loose cable bends (recommended minimum bend radius 5 cm / 2 ins.) only. Do not subject connections to bending forces or allow connections to bear the weight of long lengths of cable.

- Arrange cables so that they arrive at connectors from below. Make sure that it is impossible for water to flow down cables and accumulate at connectors. See Figure 2. If necessary, provide extra cable slack and create 'drip loops' before connectors.

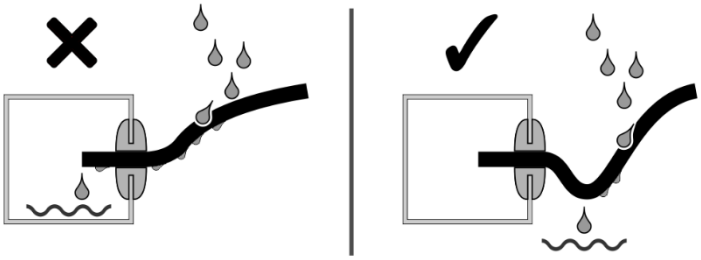


Figure 2. Drip loop

Avoiding damage from dust and airborne particles

- Carry out regular visual inspections of the fixture to make sure that there is no accumulation of dirt, especially on the front of the fixture.
- If cleaning is necessary, follow the instructions in 'Cleaning and maintenance' on page 53.

Transportation and storage

- Transport the fixture either in a flightcase or in its original packaging to protect it from damage caused by shocks during transportation.
- Store the fixture in a dry location when not in use.

3. KNV Dot overview

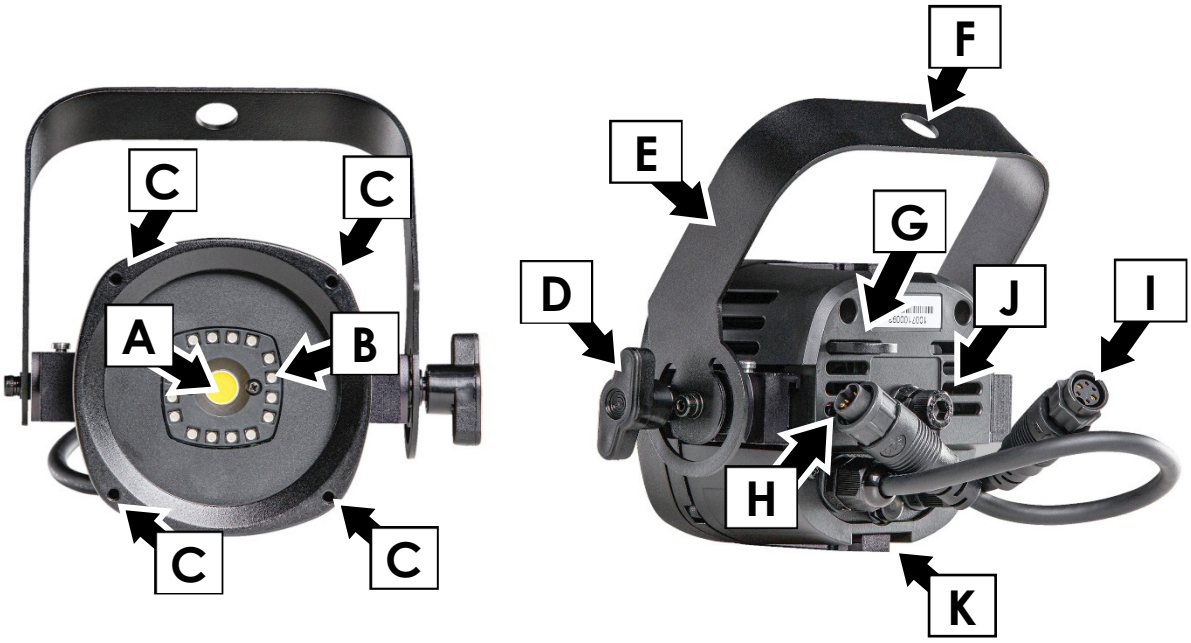


Figure 3. KNV Dot overview

A – White LED

B – 16 x RGB LEDs

C – Mounting points for optical accessories (M3 threaded holes)

D – Handscrew for KNV Dot Bracket adjustment

E – KNV Dot Bracket

F – 13 mm hole for rigging clamp bolt or mounting bolt

G – Safety cable attachment point

H – Combined DC power and data IN connector

I – Combined DC power and data THRU connector

J – M8 Allen screw for custom mounting hardware

K – KNV Dot Slide Connector channel (4 x channels: top, bottom, left, right)

4. KNV Line overview

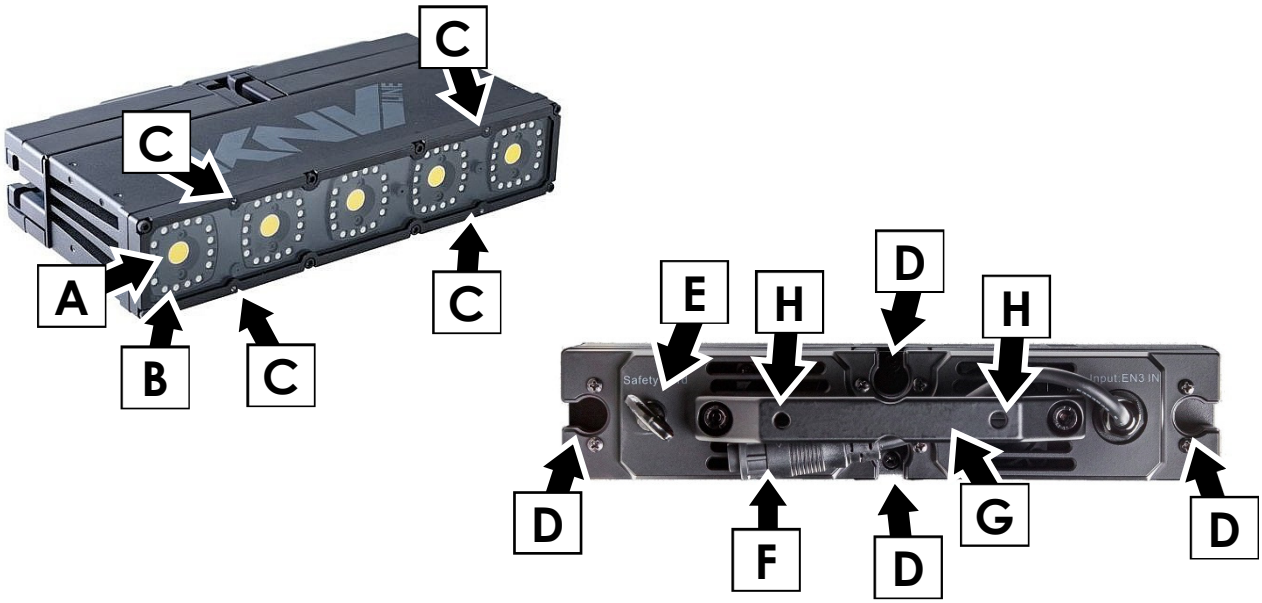


Figure 4. KNV Line overview

A – White LED

B – 16 x RGB LEDs

C – Mounting points for optical accessories (M3 threaded holes)

D – Channels for KNV system connectors

E – Safety cable attachment point

F – Combined DC power and data IN connector

G – Carrying handle

H – Threaded holes for M6 fasteners on mounting hardware such as KNV system connector plate or on custom mounting hardware

5. KNV PSU overview

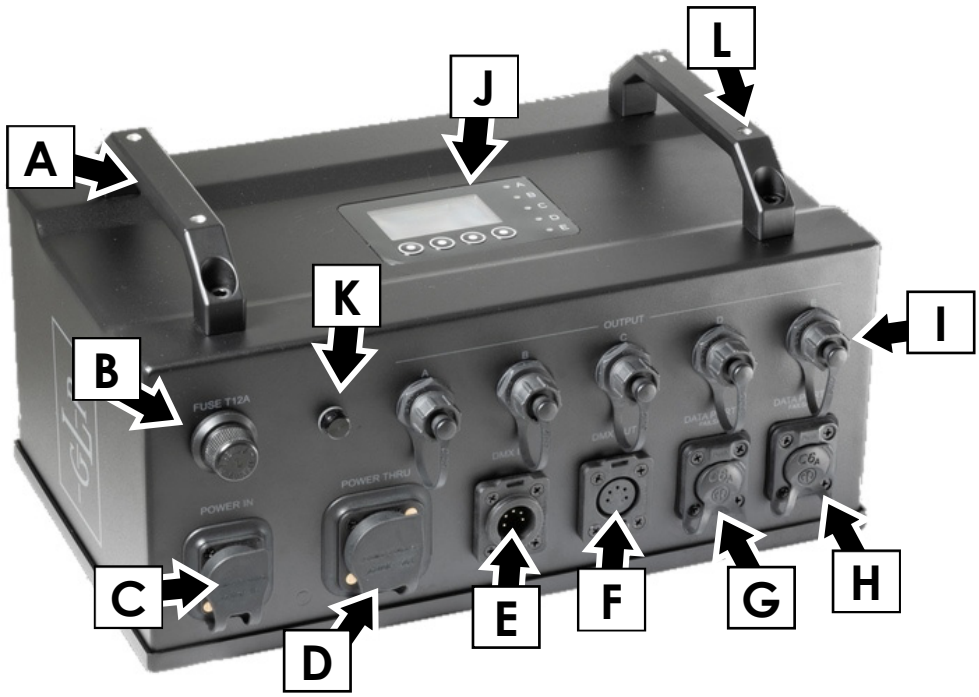


Figure 5. KNV PSU overview

A – Carrying handle

B – Primary fuse

C – Mains POWER IN connector

D – Mains POWER THRU connector

E – DMX IN connector, 5-pin XLR

F – DMX THRU connector, 5-pin XLR

G – Data port A (Art-Net/SACN), Neutrik EtherCON, failsafe

H – Data port B (Art-Net/SACN), Neutrik EtherCON, failsafe

I – Combined control data and DC power outputs A – E

J – Control panel with backlit display

K – Pressure relief valve

L – M6 threaded holes for custom mounting hardware (4 x holes total)

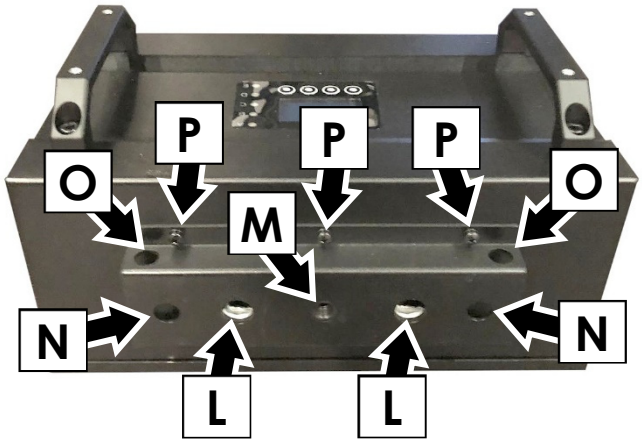


Figure 6. PSU mounting points

L – Quarter-turn fastener attachment points for 89 mm GLP Omega Bracket

M – Threaded hole for M10 mounting bolt

N – Safety cable / rigging clamp attachment point (Ø13 mm)

O – Safety cable attachment point

P – Mounting plate screw (6 x Phillips head screws total)

If it is more convenient, you can reposition the PSU's mounting plate (the plate with the attachment points shown in Figure 6) by unscrewing the six mounting plate screws **P**, moving the mounting plate around to the side of the PSU that is opposite the control panel and reinstalling the six screws in the corresponding holes in that side.

6. Features

The KNV Dot and KNV Line expand GLP's KNV Cube and Arc range to give even more flexibility in the creation of permanent and temporary dynamic lighting installations.

The KNV Dot is a single-pixel source with full RGBW color mixing capability and a powerful output. It can be installed individually or joined with other KNV fixtures to give pixel-level flexibility in creative installations.

The KNV Line has 5 high-powered RGBW pixels in a simple linear format. It features an attachment point on each side, allowing it to join seamlessly with the KNV Cube and KNV Arc.

KNV Dot and Line fixtures contain the same RGBW pixels as in other fixtures in the KNV range, with full color mixing, dimming and shutter power as well as complete pixel mapping capabilities.

The KNV Dot and Line's rugged construction and IP54 rating means that they can also be used outdoors in temporary installations if precautions are taken to prevent immersion in water and damage from direct sunlight. Fixtures can be placed upright on level surfaces and suspended from suitable structures as directed in this manual.

To simplify installation, power and data can be daisy-chained to KNV Dots, and KNV Dots can be physically locked together.

The range of installation hardware items available from GLP allows KNV fixtures to be installed in an endless number of creative configurations.

KNV products are not suitable for household use, for use in any location where unattended children have access to it, or for use in permanent outdoor installations.

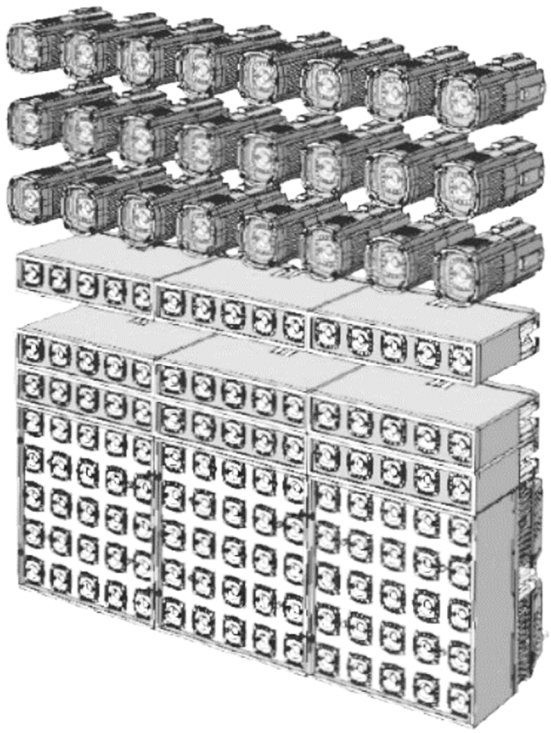


Figure 7. Array of KNV Dot and Line fixtures

Control and functions

This Quick Start and Safety Manual gives a very basic overview of control options and functions. See the KNV Dot and Line User Manual available for download from www.glp.de for full details of control, pixel layout, etc.

7. Installation: general

Warning!

Read 'Safety' starting on page 5 for important safety information that you must understand before you install or operate the fixture. Install KNV Dot and Line fixtures only as described in this chapter, or you may create an installation that is unsafe.

The safety of the installation is the responsibility of the installer. If in any doubt about safety, consult a static engineer and your GLP supplier for advice.

It is the installer's responsibility to provide a stable, secure supporting structure that is suitable for the environment and the application. The structure must be capable of safely supporting at least ten times the weight of all the devices and hardware that will be installed on it.

Multiple KNV fixtures fastened together in columns or creative arrays are vulnerable to twisting or bending forces with a large amount of leverage. This places extra demands on the installer. The installer must respect the instructions and warnings given in this chapter and must also use their professional experience and knowledge to ensure that the installation is safe.

Pixel mapping

Important! The location of fixtures in the installation and the order in which you connect fixtures to the KNV PSU are important for pixel mapping in the installation. If you are going to install multiple KNV Dot and Line fixtures, download the KNV Dot and Line User Manual from the GLP website at www.glp.de and read the chapter on pixel mapping.

Working together with the lighting designer if necessary, you will need to plan the layout of the fixtures in the installation and plan how they will be connected to PSUs.

Securing with a safety cable

If a fixture or PSU can cause injury or damage if it falls, as soon as you have fastened it into position you must secure it with a secondary attachment such as a safety cable that is in perfect condition and approved by an official body such as TÜV or UL for the load that it secures.

Each fixture must have its own safety cable except for configurations where two or more fixtures are fastened together with GLP Slide Connectors and suspended in a vertical column from KNV hardware as described in this manual. In this configuration, fixtures that are fastened together by means of KNV Module Connectors are considered to be one unit. It is therefore acceptable to provide secondary attachment by attaching the top fixture to a secure anchoring point with a safety cable that is approved for the total load that it will secure.

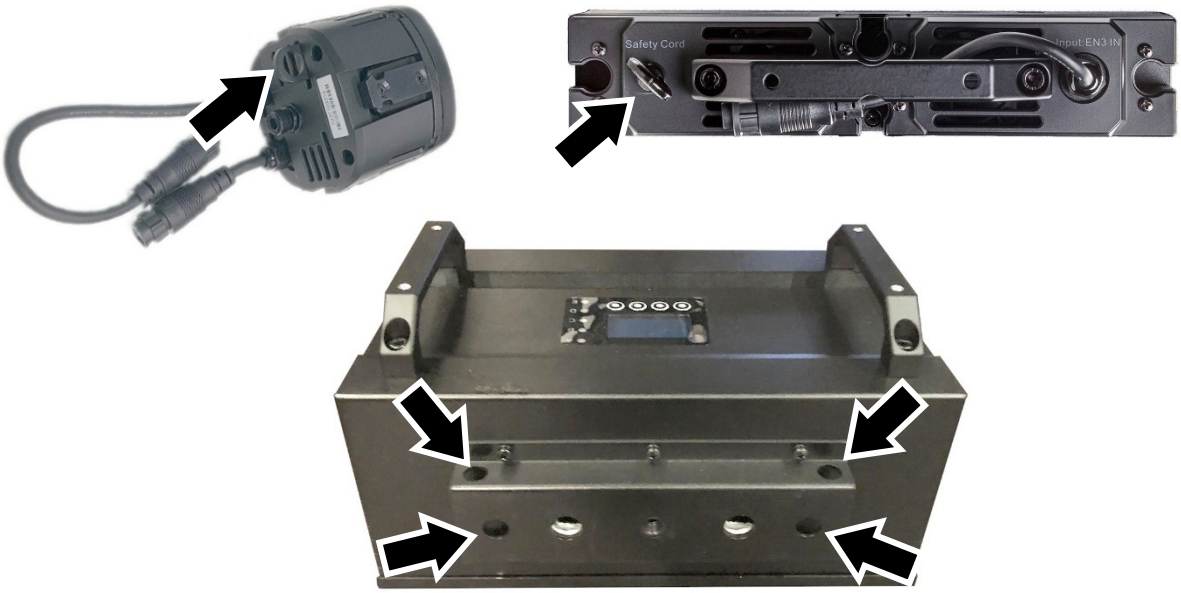


Figure 8. Safety cable attachment points

To secure a KNV Dot, KNV Line or KNV PSU with a safety cable:

1. See Figure 8. Fasten the safety cable to the attachment point (arrowed) in the back of the fixture or PSU.
2. Fasten the safety cable to a secure anchoring point such as a truss chord or an eyebolt screwed into a secure surface, taking up as much slack as possible in the safety cable (by looping it more than once around the truss chord, for example).
3. Check that the safety cable will catch the device safely if a primary attachment fails.

8. KNV Dot Installation

KNV Dot installation options

A KNV Dot may be installed as follows:

1. Fastened into a KNV Dot Bracket and suspended vertically alone or in a single column maximum five (5) fixtures tall from a rigging truss or similar structure.
2. Fastened to a connector from the GLP Slide Connector system and suspended alone or vertically in a single column maximum ten (10) fixtures tall from a rigging truss or similar structure.
3. Fastened to other KNV Dots vertically and horizontally with GLP Slide Connectors to form an array maximum five (5) fixtures tall, where every second column and every outer column in the array is independently suspended from a rigging truss using a connector from the KNV Slide Connector system.
4. Fastened to other KNV Dots vertically and horizontally with GLP Slide Connectors to form an array maximum ten (10) fixtures tall, where every column in the array is independently suspended from a rigging truss using a connector from the GLP Slide Connector system.

KNV Dot Installation hardware

The following items of installation hardware are available from GLP for the KNV Dot. Use them only as directed in this manual. Respecting all warnings on the hardware and in this manual. If you use any other installation hardware than those items listed below, check with GLP or with the hardware supplier to make sure that you do not exceed safety limits.

KNV Dot Bracket

Fastens to a KNV Dot to allow the Dot to be suspended from a rigging clamp (illustration on left shows clamp with a KNV 5/8" (16 mm) Spigot accessory installed).

Also allows a KNV Dot to be bolted to a surface or structure.

Rigging Clamp 13-55/45/15

Mounts on 13-55mm truss chord or similar bar. Max. load 15 kg. Includes mini TV spigot / M10 panel adapter.

Accepts KNV 5/8" (16 mm) Installation Spigot and Slide Connector assembly to allow a KNV Dot to be suspended from a truss chord or similar bar.

GLP 5/8" (16mm) Installation Spigot incl. screw
Mounts on Rigging Clamp 13-55/45/15 or GLP Slide connector.

GLP Slide Connector
Slides and locks into two KNV Dots to allow the Dots to be fastened together with a 1:2 pixel pitch compared to KNV Line and KNV Cube fixtures.

GLP Half-Slide Connector and 5/8" (16 mm) Installation Spigot assembly
Slides and locks into a KNV Dot to allow the Dot to be suspended from a Rigging Clamp 13-55/45/15.

Fastening KNV Dots together

See Figure 9. Channels (arrowed) are provided on the top, bottom, left and right sides of KNV Dots. These channels accept GLP Slide Connectors and the fasteners on KNV Dot Brackets. Each Slide Connector incorporates a safety mechanism that allows the connector to be locked into the channel.

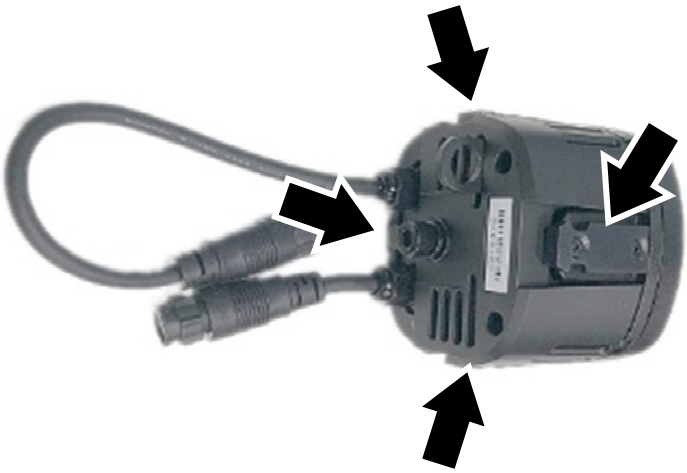


Figure 9. Channels for Slide Connectors in KNV Dot

To fasten two KNV Dots to each other:

1. Line up the Dots next to each other.
2. See Figure 10. Push down on the locking button **A** on a GLP Slide Connector and slide the connector into the connector channels **B** on both Dots as shown at **C**.
3. Release the locking button **A** so that the locking tab **D** engages in the cutouts in the connector channels of both Dots. Check that the GLP Slide Connector is locked into the channels and that the Dots are locked securely together.

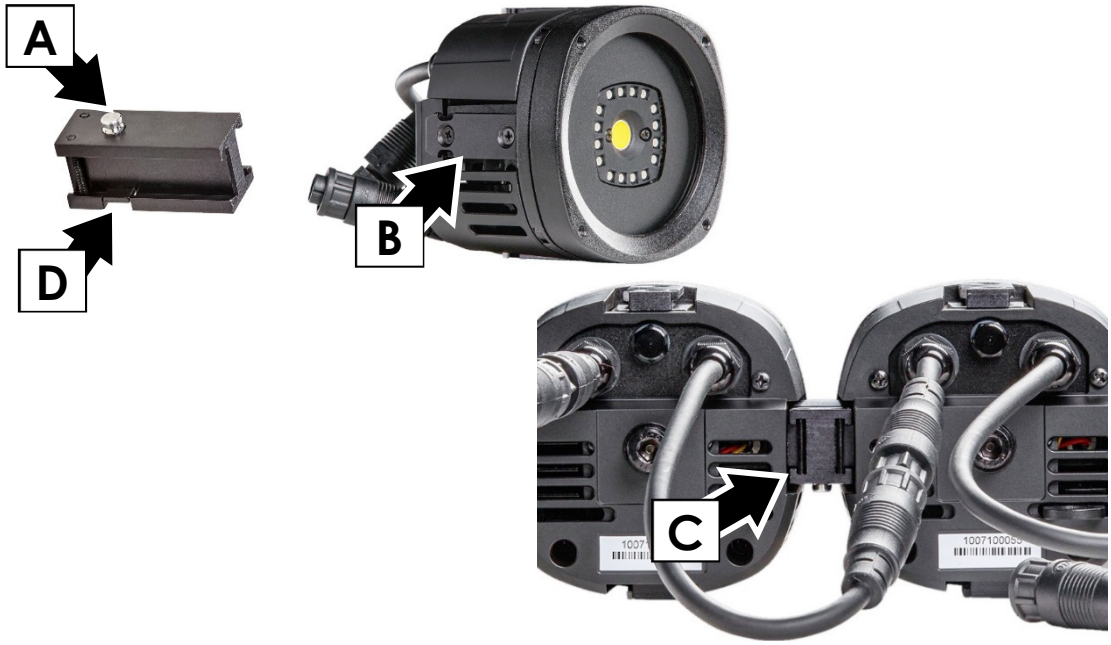


Figure 10. Fastening KNV Dots to each other using a GLP Slide Connector

Flying a single KNV Dot using a KNV Dot Bracket

To fly a single KNV Dot from a rigging truss using a KNV Dot Bracket, see Figure 11:

1. Either:
   - fasten a 5/8" KNV Spigot into a KNV Rigging Clamp 13-55/45/15, or
   - obtain a Half-Coupler Clamp that is approved for the load that it will support.
2. Fasten a KNV Dot into the KNV Dot Bracket.
3. Fasten the KNV Dot and bracket to the Rigging Clamp spigot or Half-Coupler Clamp using the screw supplied with the Rigging Clamp.
4. Fasten this assembly to the truss.
5. If there is any risk that the KNV Dot will cause injury or damage if it falls, secure it with an approved safety cable as described in 'Securing with a safety cable' on page 19.

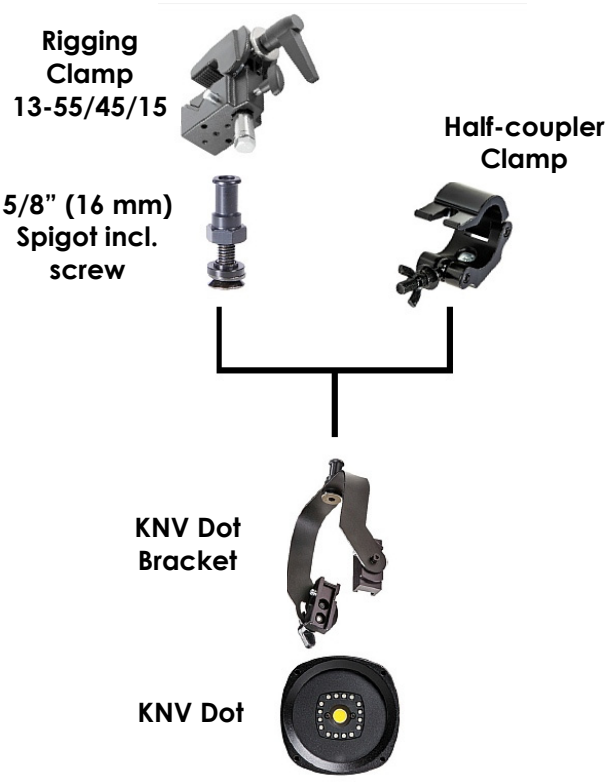


Figure 11. Flying a single KNV Dot using a KNV Dot Bracket

Flying a single KNV Dot using a Half-Slide Connector

To fly a single KNV Dot from a rigging truss using a GLP Half-Slide Connector, see Figure 12:

1. Fasten a 5/8" KNV Spigot into a GLP Half-Slide Connector.
2. Fasten the Half-Slide Connector into a KNV Dot.
3. Fasten the Dot, Half-Slide Connector and Spigot assembly into a Rigging Clamp 13-55/45/15.
4. Fasten this assembly to the truss.
5. If there is any risk that the KNV Dot will cause injury or damage if it falls, secure it with an approved safety cable as described in 'Securing with a safety cable' on page 19.

Figure 12. Flying a single KNV Dot using a GLP Half-Slide Connector

Flying a column of KNV Dots using a KNV Dot Bracket

Warning!

You can install up to a maximum of five (5) KNV Dots in total hanging vertically from a KNV Dot Bracket in one single, independently supported column.

A column of KNV Dot fixtures that are joined together using GLP Slide Connectors and suspended vertically is considered to be one unit. The top KNV Dot must be secured by a safety cable that is approved for the total load that it secures.

Any sideways movement at the bottom of a column of KNV Dots can cause Slide Connectors or rigging hardware to fail because of the leverage involved. Make sure that no lateral force can be applied to the bottom of a column of KNV Dots by immobilizing it: fasten the bottom of the column to secure anchoring points. Do not add to the load on rigging hardware by applying downwards tension to the column when immobilizing it.

To create a single column of KNV Dots suspended from a rigging truss using a KNV Dot Mounting Bracket:

1. See Figure 13. Obtain either:
   - a KNV Rigging Clamp 13-55/45/15 and 5/8" Spigot, or
   - a Half-Coupler Clamp that is approved for the total load that it will support.
2. Obtain an approved safety cable.
3. Fasten the KNV Dot Bracket to the Rigging Clamp and Spigot or Half-Coupler Clamp using a screw that is approved for the load that it will support.
4. Fasten the first KNV Dot into the KNV Dot Bracket.
5. Fasten the Dot, Bracket and Rigging Clamp assembly to the truss.
6. If there is any risk that the KNV Dot will cause injury or damage if it falls, secure it with an approved safety cable as described in 'Securing with a safety cable' on page 19.

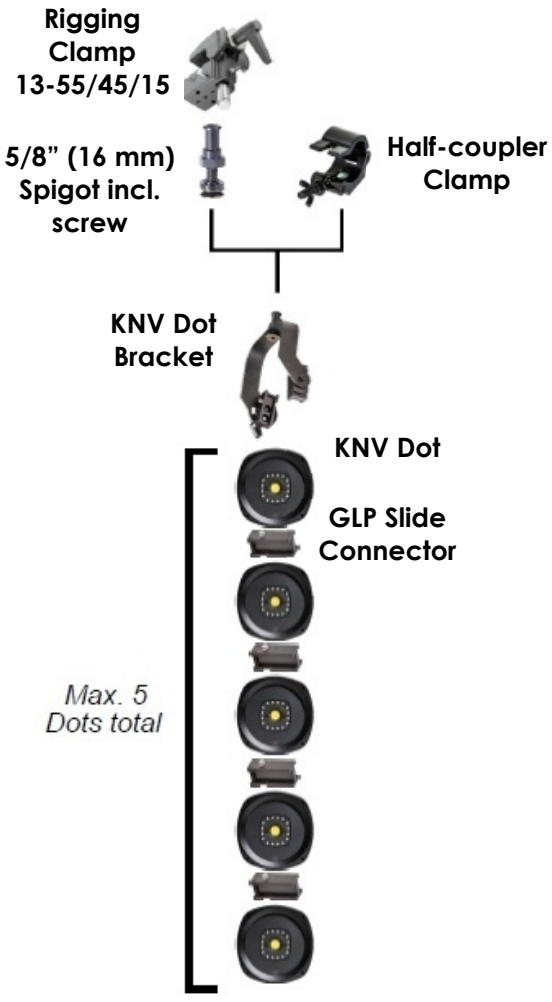


Figure 13. Single column of 5 x KNV Dots suspended using a KNV Dot Bracket

7. Fasten a KNV Dot under the first Dot using a GLP Slide Connector as described in 'Fastening KNV Dots together' on page 22.
8. Continue adding KNV Dots as described above. Do not exceed a maximum of five (5) KNV Dots in total for any column that is suspended using a KNV Dot Bracket. If you want to install more than five KNV Dots in a vertical column, bear in mind that you can install up to ten (10) KNV Dots in one column if you suspend them from a GLP Half-Slide Connector instead of a KNV Dot Bracket (see next section).
9. Fasten the bottom of the column to secure anchoring points so that no point in the column can be pushed or pulled sideways. When immobilizing the bottom of the column in this way, do not increase the load on rigging hardware by applying downwards tension to the column.

Flying a column of KNV Dots using a Half-Slide Connector

Warning!

You can install up to a maximum of ten (10) KNV Dots in total hanging vertically from a GLP Half-Slide Connector in one single, independently supported column.

A column of KNV Dot fixtures that are joined together using GLP Slide Connectors and suspended vertically is considered to be one unit. The top KNV Dot must be secured by a safety cable that is approved for the total load that it secures.

Any sideways movement at the bottom of a column of KNV Dots can cause Slide Connectors or rigging hardware to fail because of the high amount of leverage involved. Make sure that no lateral force can be applied to the bottom of a column of KNV Dots by immobilizing it: fasten the bottom of the column to secure anchoring points. Do not add to the load on rigging hardware by applying downwards tension to the column when immobilizing it.

To suspend a single column of KNV Dots from a rigging truss using a GLP Half-Slide Connector:

1. See Figure 14 on page 27. Obtain either:
   - a KNV Rigging Clamp 13-55/45/15, a KNV 5/8" Spigot and a GLP Half-Slide Connector, or
   - a Half-Coupler Rigging Clamp, a GLP Half-Slide Connector and a high-tensile screw or bolt to fasten the Half-Slide Connector to the Rigging clamp. All these items must be capable of safely supporting the total weight of the column.
2. Obtain a safety cable that is approved for the total load that it will secure.
3. Fasten the GLP Half-Slide Connector to the rigging clamp using the 5/8" KNV Spigot or screw/bolt, depending on rigging clamp type, and fasten the Half-Slide Connector into a KNV Dot.
4. Fasten the Dot, Connector and Clamp assembly to the truss.

5. If there is any risk that the KNV Dot will cause injury or damage if it falls, secure it with an approved safety cable as described in 'Securing with a safety cable' on page 19.
6. Fasten a KNV Dot under the first Dot by means of a GLP Slide Connector as described in 'Fastening KNV Dots together' on page 22.
7. Continue adding KNV Dots as described above. Do not exceed a maximum of ten (10) KNV Dots in total for any column that is suspended using a GLP Half-Slide Connector. If you want to install more KNV Dots vertically below this column, you must create a new column with its own suspension point.
8. Fasten the bottom of the column to secure anchoring points so that no point in the column can be pushed or pulled sideways. When immobilizing the bottom of the column in this way, do not increase the load on rigging hardware by applying downwards tension to the column.

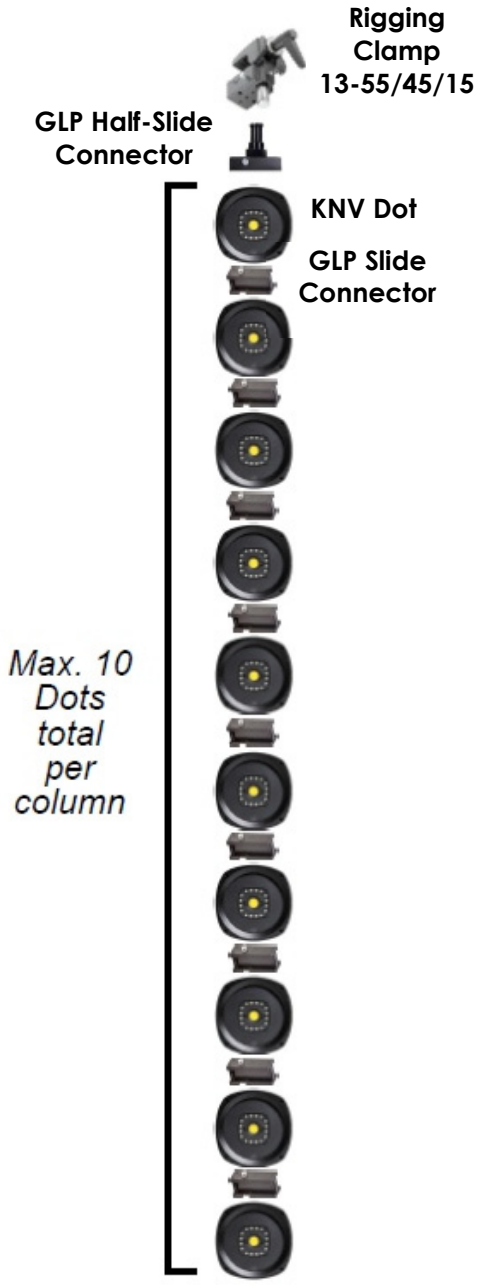


Figure 14. Single column of 10 x KNV Dots suspended using a GLP Half-Slide Connector

Flying an array of KNV Dots using Half-Slide Connectors

Warning!

You can install an array or matrix consisting of columns that are a maximum of **ten (10) KNV Dots** in height hanging vertically from GLP Half-Slide Connectors where **every column in the array** is independently supported.

You can install an array or matrix consisting of columns that are maximum **five (5) KNV Dots** in height hanging vertically from GLP Half-Slide Connectors where the **columns at the left- and right-hand edges of the array** are independently supported and where **at least every second column in the array** is independently supported.

Each KNV Dot must be fastened to all the Dots above, below and beside it using GLP Slide Connectors. All KNV Dots that are not in an independently supported column must be fastened on both sides to KNV Dots that are in independently supported columns: do not create an installation where any KNV Dot is supported on only one side.

A column of KNV Dot fixtures that are joined together using GLP Slide Connectors and suspended vertically is considered to be one unit. The top KNV Dot must be secured by a safety cable that is approved for the total load that it secures.

Any sideways movement at the bottom of an array of KNV Dots can cause Slide Connectors or rigging hardware to fail because of the high amount of leverage involved. Make sure that no lateral force can be applied to the array of KNV Dots by immobilizing it: fasten the bottom of the array to secure anchoring points. Do not add to the load on rigging hardware by applying downwards tension to the array when immobilizing it.

Array where each column is independently supported

To create an array of multiple KNV Dots hanging vertically from a rigging truss using GLP Half-Slide Connectors where every column in the array is independently supported:

1. See Figure 15 on page 29. For each column in the array, obtain either:
   - a KNV Rigging Clamp 13-55/45/15, a KNV 5/8" Spigot and a GLP Half-Slide Connector, or
   - a Half-Coupler Rigging Clamp, a GLP Half-Slide Connector and a high-tensile screw or bolt to fasten the Half-Slide Connector to the Rigging clamp. All these items must be capable of safely supporting the total weight of the column.
2. Obtain a safety cable for each column in the array. Each safety cable must be approved for total load that it will secure.
3. Create the top row of KNV Dots by fastening each Dot into a GLP Half-Slide Connector and rigging clamp and fastening this assembly to the rigging truss following the instructions in 'Flying a column of KNV Dots using a Half-Slide Connector' on page 26.

   Each time you add a new Dot to the row, fasten it to the Dot beside it using a GLP Slide Connector as described in 'Fastening KNV Dots together' on page 22.

4. Continue adding KNV Dots horizontally as described above until you reach the desired width of the array.
5. Secure every Dot in the top row with an approved safety cable as described in 'Securing with a safety cable' on page 19.
6. Add KNV Dots underneath the top row. Do not allow any column of Dots to exceed the limit of maximum of ten (10) Dots high in total. Each time you add a Dot, fasten it to the Dots on all sides using GLP Slide Connectors as described in 'Fastening KNV Dots together' on page 22.
7. Fasten the bottom of the array to secure anchoring points so that no point in the array can be pushed or pulled sideways. When immobilizing the bottom of the array in this way, do not increase the load on rigging hardware by applying downwards tension to the array.

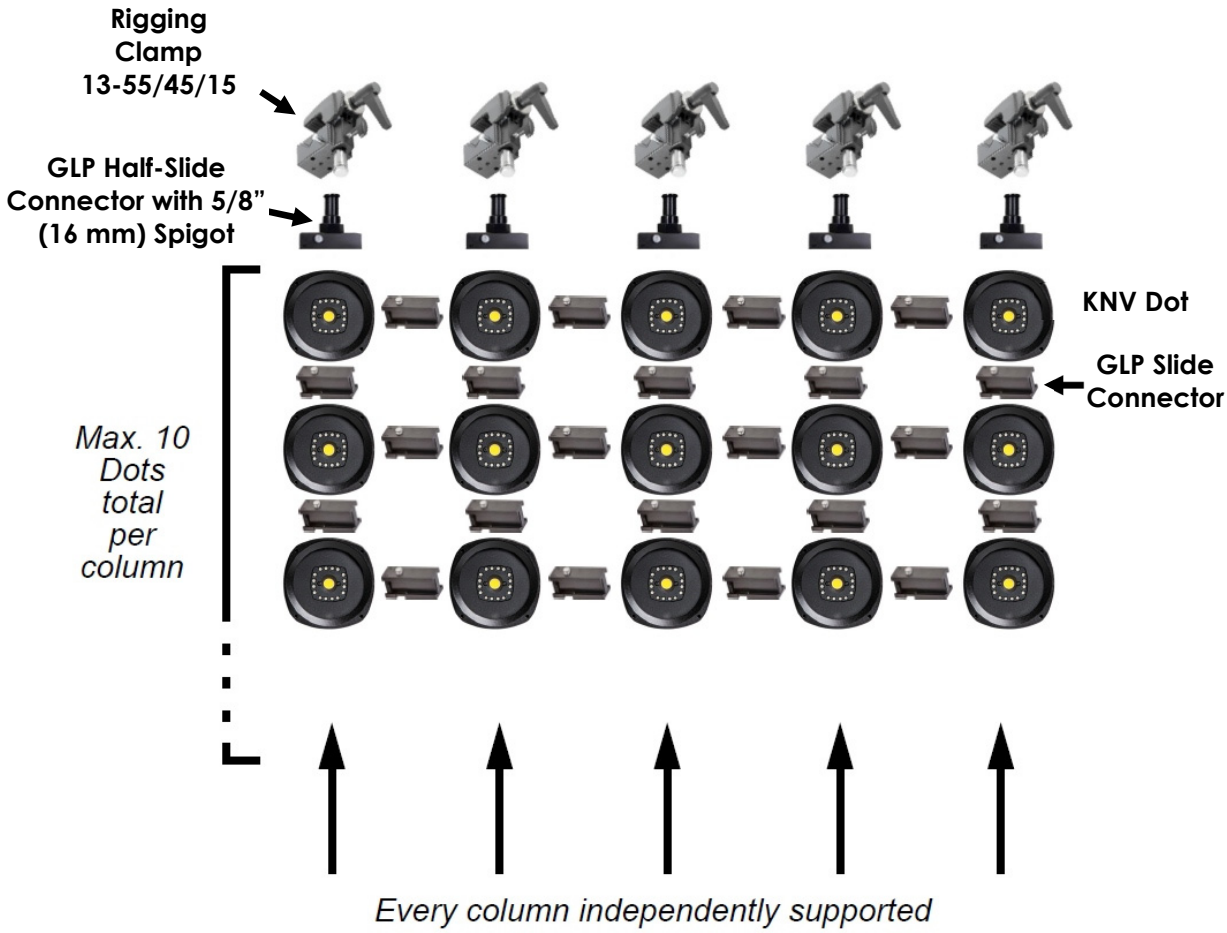


Figure 15. KNV Dots array, each column independently supported

Array where at least every second column is supported

To create an array of multiple KNV Dots suspended from a rigging truss using GLP Half-Slide Connectors where every second column in the array and the columns at the left- and right-hand edges are independently supported:

1. See Figure 16 on page 31. For both columns at the outside of the array and for at least every second column inside the array, obtain either:
    - a KNV Rigging Clamp 13-55/45/15, a KNV 5/8" Spigot and a GLP Half-Slide Connector, or
    - a Half-Coupler Rigging Clamp, a GLP Half-Slide Connector and a high-tensile screw or bolt to fasten the Half-Slide Connector to the Rigging clamp. All these items must be capable of safely supporting the total weight of the column.

- Obtain a safety cable for each column in the array. Each safety cable must be approved for the total load that it will secure.

2. Fasten the first two KNV Dots into GLP Half-Slide Connectors and rigging clamps following the instructions in 'Flying a column of KNV Dots using a Half-Slide Connector' on page 26. Hang the rigging clamps loosely on the truss. If you are going to install an unsupported column between two supported columns, add a third KNV Dot between the first two Dots and fasten the three Dots together with GLP Slide Connectors as described in 'Fastening KNV Dots together' on page 22.
3. Fasten the rigging clamps securely to the truss and secure each of the three Dots with a safety cable as described in 'Securing with a safety cable' on page 19.
4. Continue adding KNV Dots horizontally to the top row as described above until you reach the desired width of the array. At least every second Dot must be supported, and the Dots at both ends of the top row must be supported. Every Dot must be secured with a safety cable as described in 'Securing with a safety cable' on page 19.
5. Add KNV Dots underneath the top row. Do not allow any column of Dots to exceed the vertical limit of maximum of five (5) Dots high for an array where every second column is supported. Each time you add a Dot, fasten it to the Dots on all sides using GLP Slide Connectors as described in 'Fastening KNV Dots together' on page 22.
6. Fasten the bottom of the array to secure anchoring points so that no point in the array can be pushed or pulled sideways. When immobilizing the bottom of the array in this way, do not increase the load on rigging hardware by applying downwards tension to the array.

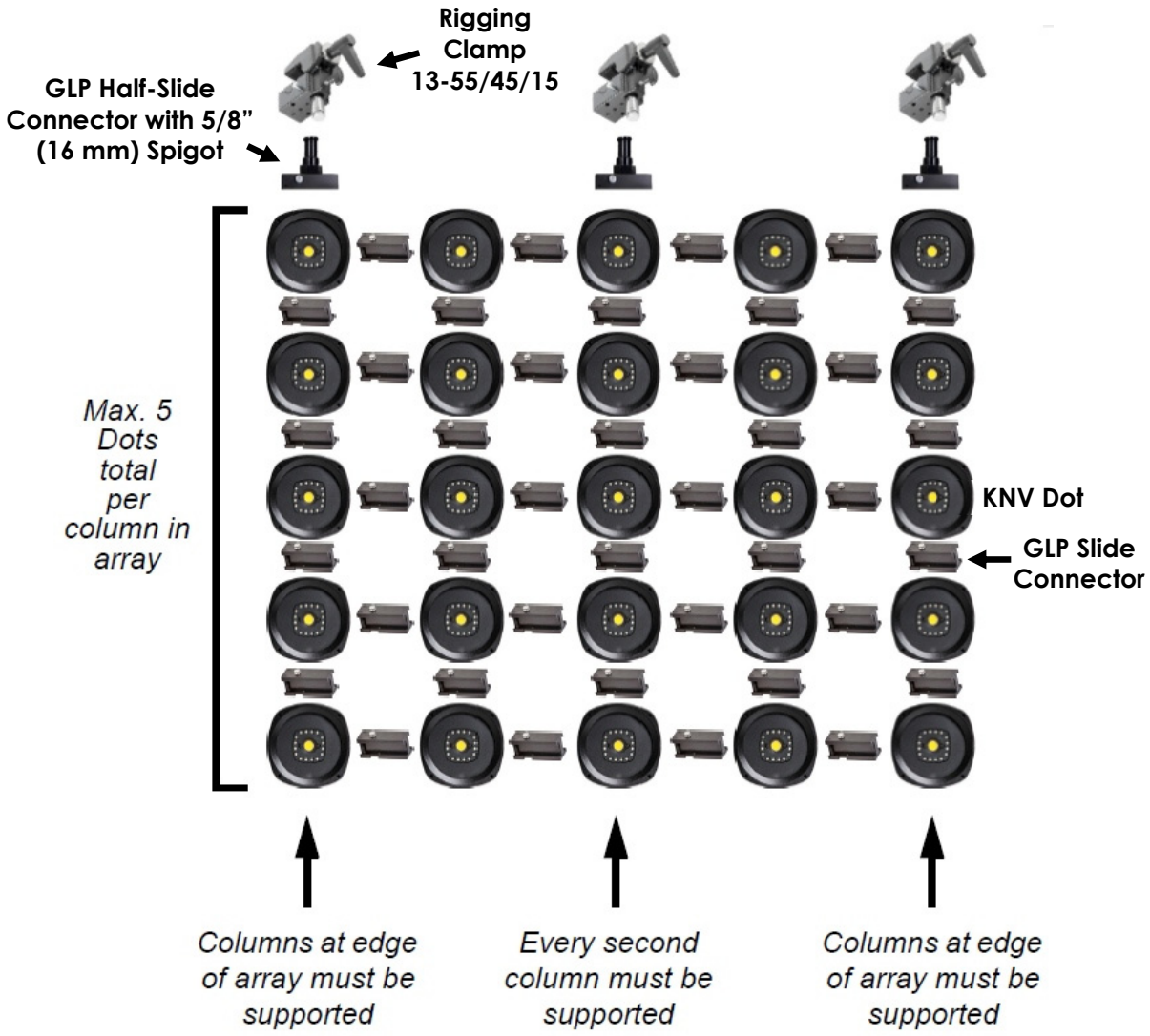


Figure 16. KNV Dots array, every second column independently supported

KNV Dot arrays containing single Dots between columns

Warning!

Any KNV Dot that is not part of an independently supported column must be fastened on both sides to KNV Dots that are in independently supported columns: do not create an installation where any KNV Dot is supported on only one side.

See Figure 17. You can create an array of KNV Dots with single Dots installed between full columns of Dots, but you must observe the following precautions:

- Use the instructions given in the section 'Array where at least every second column is supported' starting on page 30 as a guide.
- Make sure that the columns on the left- and right-hand edges of the array and every second column inside the array are complete, unbroken columns of Dots and that they are correctly supported using rigging clamps.
- Respect the maximum limit of five Dots vertically.
- Make sure that any single Dot that is installed between full columns is fastened to Dots on both sides using GLP Slide Connectors.

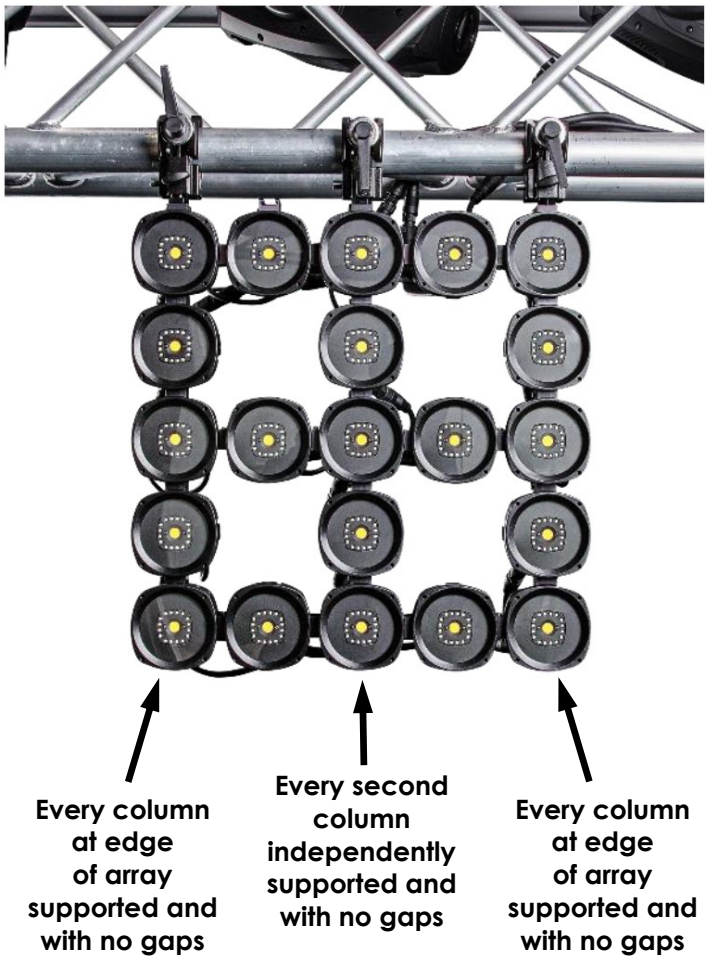


Figure 17. KNV Dot array with single Dots between full columns

9. KNV Line installation

KNV Line installation options

A KNV Line may be installed as follows:

1. Fastened into an adjustable KNV Floorstand / Hanging Bracket and standing on a stable horizontal surface.
2. Fastened into an adjustable KNV Floorstand / Hanging Bracket that is fastened to a rigging truss at any angle using a rigging clamp or fastened to a surface or structure.
3. Fastened into a non-adjustable KNV Installation Bracket that is fastened to a rigging truss or similar structure at any angle using a rigging clamp.
4. Fastened to other KNV Lines vertically and horizontally with KNV Module Connectors to form an array that is:
    - maximum ten (10) fixtures tall if every column in the array is independently suspended from a rigging truss, or
    - maximum five (5) fixtures tall wherever a column inside the array is supported by the fixtures on both sides of it instead of being independently suspended from a rigging truss.
5. Supported on both sides by two KNV fixtures that are fastened to it using KNV Module Connectors. Each of the two outer fixtures must be fastened to a rigging truss or other structure at any angle using a half-coupler rigging clamp.

KNV Line and Cube pixel layout

Five KNV Line fixtures fastened to each other side-to-side have the same number of pixels with the same dimensions as one KNV Cube.

Mechanical connectors on the KNV Line

See Figure 18. Channels (arrowed) for mechanical connectors are provided on the top, bottom, left and right-hand sides of KNV Lines. These channels accept KNV Module Connectors, the fasteners on KNV Installation Brackets and the fasteners on KNV Floorstand / Hanging Brackets. The channels incorporate catches that work together with the two different types of locking mechanism found on KNV installation hardware.

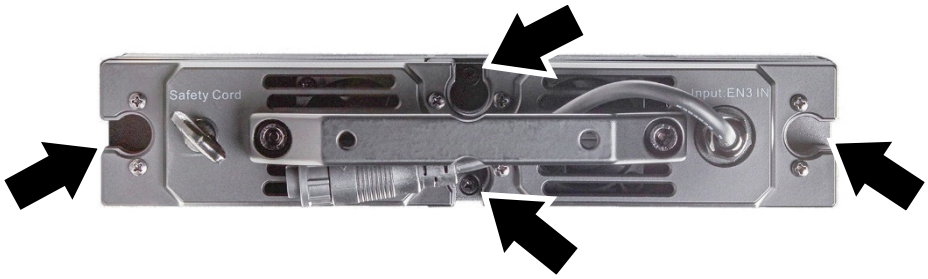


Figure 18. Mechanical connector channels on KNV Line

KNV Line installation hardware

The following items of installation hardware are available from GLP for the KNV Line. Use them only as directed in this manual. Respecting all warnings on the hardware and in this manual. If you use any other installation hardware than those items listed below, check with GLP or with the hardware supplier to make sure that you do not exceed safety limits.

KNV Floorstand / Hanging Bracket

Adjustable.

May be used to stand one KNV Line or KNV Cube fixture on a stable horizontal surface.

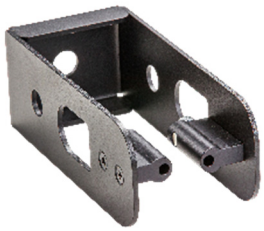
May be used to support one KNV Line or KNV Cube fixture hanging vertically from a rigging truss, bar or similar support.

KNV Installation Bracket

Non-adjustable.

May be used to fasten a KNV Line, Cube or Arc to a supporting structure.

May be used in combination with rigging clamps to provide the required points of support in larger and creative arrays of KNV Line, Cube and/or Arc fixtures.



KNV Line Bracket

Non-adjustable.

May be used in combination with a rigging clamp to provide a point of support for a KNV Line fixture. Gives flexibility in creative arrays of KNV Line fixtures.

KNV Module Connector

May be used to lock two KNV Line, KNV Cube or KNV Arc fixtures to each other vertically and side-by-side.

You can use this fastener to support the weight of fixtures if you respect the safety limits given in this manual. You can use it to align fixtures in all situations where the weight of the fixtures is correctly supported.

KNV Rigging Connector

Fastens to a KNV Line, Cube or Arc for use as a rigging clamp attachment bracket.

May be used in combination with a rigging clamp to support a vertical column of up to twenty (20) KNV Line fixtures.

Locks on KNV Line brackets

KNV Line Floorstands, Installation Brackets and Line Brackets incorporate a spring-loaded locking mechanism:

- See Figure 19. Push both locking knobs in, towards the fixture, to lock.
- Push the locking knobs out, away from the fixture, to unlock.

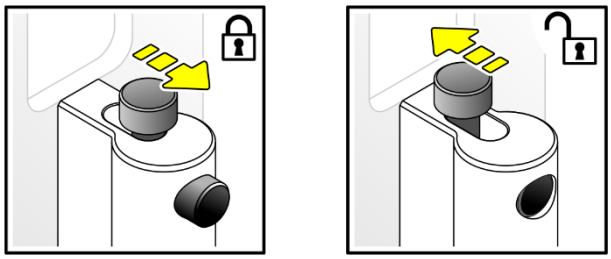


Figure 19. Locking mechanism on KNV Line Floorstand and Brackets

Locks on KNV Line mechanical connectors

KNV Line Module Connectors and Rigging Connectors incorporate a locking mechanism:

- To lock a connector, see Figure 20. Push the connector into the channels in fixtures and twist the connector knob 90° clockwise to lock.
- To release a connector, press the connector knob, twist 90° counterclockwise, and pull the connector out of the channels.

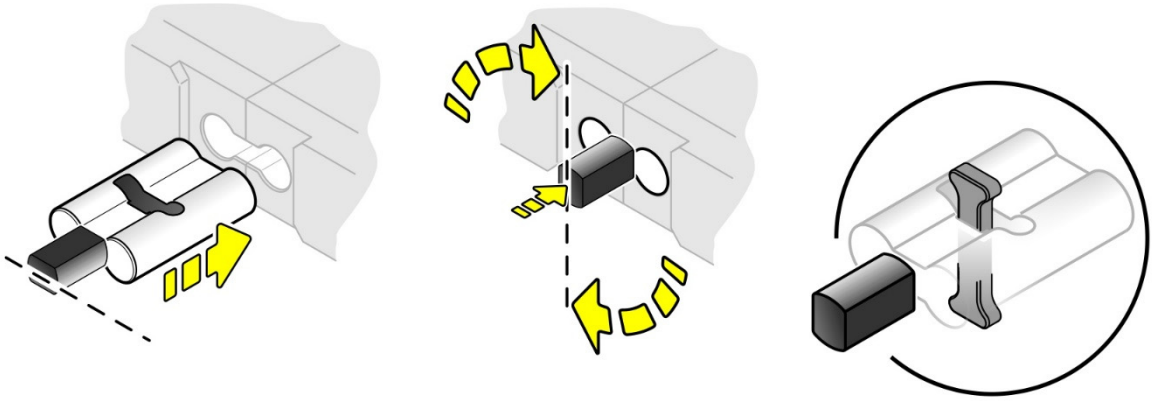


Figure 20. Locking mechanism on KNV Line mechanical connectors

Standing a KNV Line on a level surface

You can place the KNV Line standing horizontally on a stable, flat horizontal surface. You can also place it standing *vertically* on the surface if you take precautions to make sure that the KNV Line cannot fall and become damaged.

If you want to aim the KNV Line at any other angle than horizontal or vertically upwards, fasten the KNV Line into the adjustable KNV Floorstand / Hanging Bracket accessory before placing on the surface (see instructions below).

Whether you place KNV Line fixture directly on the surface or use an adjustable Floorstand / Hanging Bracket, make sure that the fixture and cables will not present a danger. Make sure that persons cannot accidentally touch or trip over the fixture when it is installed. If there is a danger of injury or damage if the fixture falls, secure the fixture with a safety cable as described in 'Securing with a safety cable' on page 19.

Standing using a Floorstand / Hanging Bracket

To use the Floorstand / Hanging Bracket to stand a KNV Line on a surface:

1. Place the Floorstand / Hanging Bracket on a stable horizontal surface and move its legs to the fully open position at about 90° apart as shown in Figure 21.
2. See Figure 19 on page 35. Move the mechanical connector locking knobs on both sides of the Floorstand to the Unlocked position.
3. Slide the mechanical connector profiles on the Floorstand into the channels on both ends of the KNV Line.
4. See Figure 19. Push the locking knobs on both sides of the Floorstand towards the fixture into the Locked position. The locks snap into place under spring pressure.
5. Check that the fixture is held securely in the Floorstand.
6. If necessary, loosen the handscrews (arrowed in Figure 21) on both sides of the Floorstand and adjust the fixture's tilt angle, then retighten the handscrews.

Figure 21. KNV Line Floorstand / Hanging Bracket

Flying a single KNV Line from a rigging truss

Suspending from a KNV Line Bracket

The KNV Line Bracket fastens into channels on the top and bottom of KNV Lines. It lets you fasten a rigging clamp to a KNV Line and fly the fixture from a rigging truss.

To fly a KNV Line from a rigging truss using a KNV Line Bracket:

1. See Figure 22. Bolt a half-coupler type rigging clamp **A** to the KNV Line Bracket **B** using a suitable hardened steel bolt and a new self-locking nut.
2. See Figure 19 on page 35. Push the locking knobs on both of the Bracket's connector profiles **C** to the Unlocked position.
3. Push the connector profiles **C** fully into the mechanical connection channels **D** on the KNV Line.

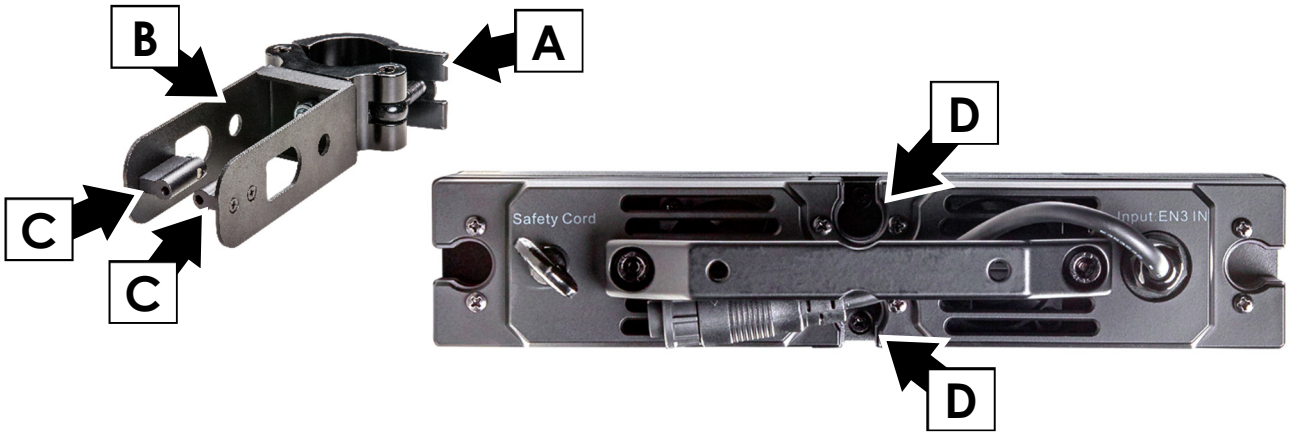


Figure 22. Connection channels and KNV Line Bracket

4. Push the locking knobs on both sides of the Bracket towards the fixture into the Locked position (see Figure 19 on page 35). The locks snap into place under spring pressure. Check that the Bracket is securely locked to the fixture on both sides.
5. Lift the rigging clamp, bracket and fixture up to the rigging truss and fasten the clamp around the truss.
6. If there is a danger of injury or damage if the fixture falls, secure it with a safety cable that is approved for the total load that it will secure as described in 'Securing with a safety cable' on page 19.

Suspending from a KNV Rigging Connector

As an alternative to suspension from a KNV Line Bracket, you can suspend a KNV Line fixture from a KNV Rigging Connector (see Figure 23) and half-coupler type rigging clamp.

Figure 23. KNV Rigging Connector

The KNV Rigging Connector fastens into one of the connector channels on the top, bottom or sides of KNV Lines.

To fly a KNV Line from a rigging truss using a KNV Rigging Connector:

1. Bolt an approved half-coupler rigging clamp to the KNV Rigging Connector.
2. See Figure 24 on page 39. Push the KNV Rigging Connector into one of the channels on the KNV Line, push and twist the Connector knob **A** 90° clockwise so that the latch **B** locks the Connector into the channel, then release the knob **A** and check that the Connector is locked into the channel. The Rigging Connector mechanism is similar to the Module Connector mechanism shown in Figure 20 on page 35.
3. Lift the rigging clamp, rigging connector and KNV Line up to the truss and fasten the clamp around the truss.
4. If there is a danger of injury or damage if the fixture falls, secure it with a safety cable that is approved for the total load that it will secure as described in 'Securing with a safety cable' on page 19.

Flying multiple KNV Lines in a vertical column

Warning!

Do not use a KNV Rigging Connector to support a load of more than 45 kg/ 100 lbs. total hanging vertically.

Do not use a KNV Rigging Connector to support the weight of more than twenty (20) KNV Line fixtures.

You may use a KNV Rigging Connector to support a vertical load only. Do not use it to support weight in any other configuration than hanging vertically below the connector. Do not expose a KNV Rigging Connector to twisting forces.

A column of KNV Line fixtures that are joined together using KNV Module Connectors and suspended vertically is considered to be one unit. The top KNV line must be secured by a safety cable that is approved for the total load that it secures.

Any sideways force applied to a column of KNV Line fixtures can cause Rigging Connectors, Module Connectors and other rigging hardware to fail because of the large amount of leverage involved. A failure of this kind will cause the column or a part of the column to collapse. Immobilize the bottom of the column by fastening it to secure anchoring points. Do not add to the load on rigging hardware by applying downwards tension to the column when immobilizing it.

You can use KNV Module Connectors to fasten a maximum of twenty (20) KNV Line fixtures together in a single column that is suspended vertically from a rigging truss. The column may consist of KNV Line fixtures fastened to each other end-to-end or side-to-side.

To fly a vertical column consisting of up to twenty (20) KNV Lines from a rigging truss:

1. Obtain the following:
   - A Half-Coupler Rigging Clamp and a high-tensile screw or bolt to fasten the KNV Rigging Connector to the rigging clamp. These items must be capable of safely supporting the total load that will be suspended from them.
   - A KNV Rigging Connector.
   - Enough KNV Module Connectors (see under KNV Line installation hardware starting on page 34) to fasten the KNV Line fixtures together in a column.
   - A safety cable that is approved for the total load that it will secure.

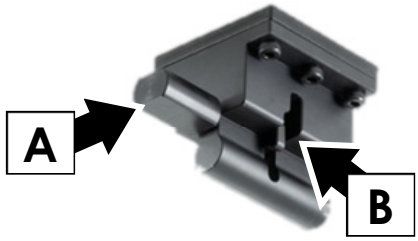


Figure 24. KNV Rigging Connector lock

2. Bolt the rigging clamp to the KNV Rigging Connector.
3. See Figure 24. Push the KNV Rigging Connector into one of the connection channels on the ends or sides of the KNV Line, push and twist the Connector knob **A** 90° clockwise so that the latch **B** locks the Connector into the channel, then release the knob **A** and check that the Connector is locked into the channel. The Rigging Connector mechanism is similar to the Module Connector mechanism shown in Figure 20 on page 35.
4. Lift the rigging clamp, rigging connector and KNV Line up to the truss and fasten the clamp around the truss.
5. Secure this first KNV Line with an approved safety cable as described in 'Securing with a safety cable' on page 19.

6. See Figure 26. Lift up the second fixture so that the connector channels **D** of both fixtures are next to each other and push a KNV Module Connector **C** fully into the channels on both fixtures.
7. Press the Module Connector locking knob **A** and twist it 90° clockwise so that the latch **B** engages in the channels in both fixtures, then release the locking knob **A** and check that the fixtures are locked securely together. This procedure is shown in shown in Figure 20 on page 35.
8. Continue adding KNV Line fixtures one below the other in the same way, but do not exceed the permitted maximum of 20 fixtures total in the column.
9. Immobilize the bottom of the column so that no lateral movement of the column is possible. If the bottom of the column is not immobilized, any sideways force applied to the column can cause hardware to fail, resulting in a full or partial collapse of the column.

Figure 25. Flying vertical columns of KNV Lines

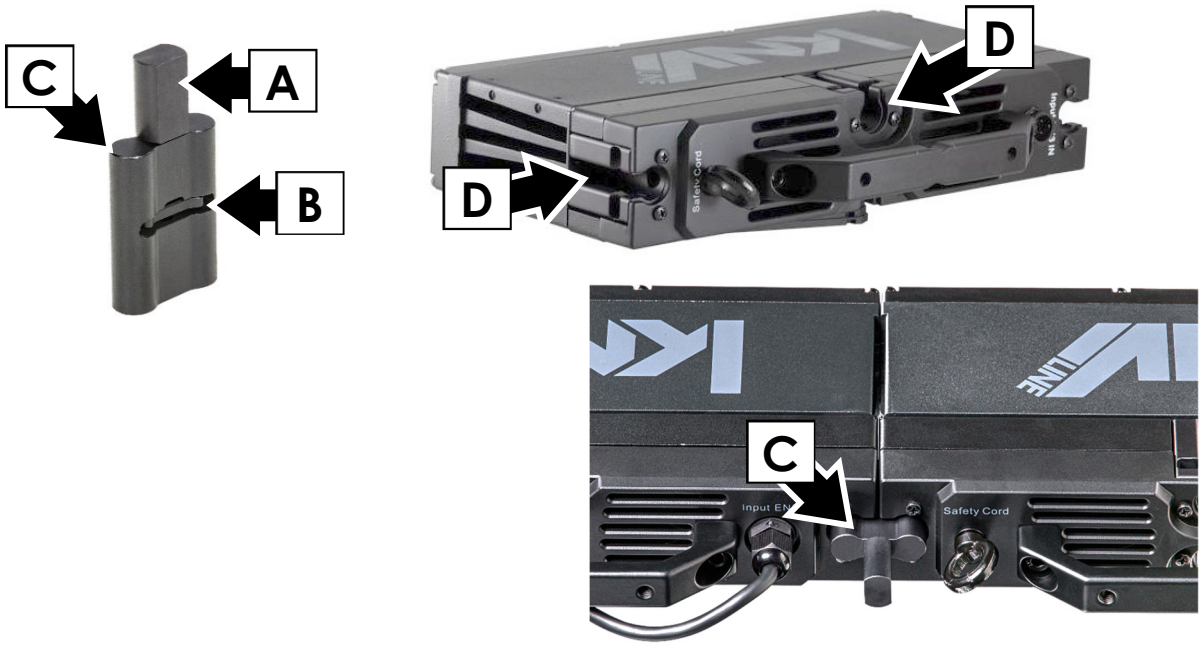


Figure 26. Fastening KNV Lines together with a KNV Module Connector

You can also use KNV Module Connectors to fasten KNV Lines, KNV Cubes and KNV Arcs to each other. If you mix fixtures in an installation in this way, consult the user documentation of all the fixture types and respect all safety precautions given.

Flying multiple KNV Lines in a horizontal row

See Figure 27. To fly a row of KNV Line fixtures from a rigging truss:

1. Mount the first two KNV Lines on the truss as described in 'Flying a single KNV Line from a rigging truss' on page 37, fastening them end-to-end using KNV Module Connectors with reference to Figure 26.

Figure 27. KNV Line fixtures flown from rigging truss

2. If there is any risk that a fixture will cause injury or damage if it falls, secure it with an approved safety cable as described in 'Securing with a safety cable' on page 19 as soon as you have fastened it to the truss.
3. Continue adding KNV Line fixtures one at a time in the same way. You can add an unlimited number of fixtures side-by-side, but each KNV Line must be either:
   - suspended independently of the other KNV Lines with its own rigging clamp, or
   - fastened with KNV Module Connectors on both sides to KNV Lines that are suspended independently with their own rigging clamps.

   Do not use a KNV Module Connector to bear the weight of a KNV Line that is hanging freely at any other angle than vertically downwards.

   Support the weight of every KNV Line that you install until it is either suspended from its own rigging clamp or supported on both sides.

Flying an array of KNV Lines

Warning!

You can install an array consisting of columns that are a maximum of **twenty (20) KNV Lines** in height hanging vertically from KNV Rigging Connectors where **every column in the array** is independently supported.

You can install an array consisting of columns that are maximum **ten (10) KNV Lines** in height hanging vertically from GLP Half-Slide Connectors where the **columns at the left- and right-hand edges of the array** are independently supported and where **at least every second column in the array** is independently supported.

A column of KNV Line fixtures that are joined together using KNV Module Connectors and suspended vertically is considered to be one unit. The top KNV line must be secured by a safety cable that is approved for the total load that it will secure.

Each KNV Line must be fastened to all the Lines above, below and beside it using KNV Module Connectors. All KNV Lines that are not in an independently supported column must be fastened on both sides to KNV Lines that are in independently supported columns: do not try to create an installation where any KNV Line is supported on only one side.

Any sideways movement at the bottom of an array of KNV Lines can cause Module Connectors or rigging hardware to fail because of the high amount of leverage involved. Make sure that no lateral force can be applied to the array of KNV Lines by immobilizing it: fasten the bottom of the array to secure anchoring points. Do not add to the load on rigging hardware by applying downwards tension to the array when immobilizing it.

Installation procedure

The procedure for installing KNV Lines in an array or matrix is the same as for KNV Dots, and KNV Lines can be installed in the same configurations as KNV Dots, but you must use the hardware and methods described in 'Flying multiple KNV Lines in a vertical column' on page 38.

Respect the warnings and safety limits that apply to KNV Dots but note the specific safety limits stated on this page (see above) that apply to KNV Line arrays. Note also the universal requirement that safety cables must be approved for the total load that they secure.

10. KNV PSU installation

KNV PSU installation options

The KNV PSU may be installed as follows:

1. Standing on a horizontal surface.
2. Fastened to a rigging truss or similar structure by means of an omega bracket and single rigging clamp. This arrangement is preferable if you want to be able to install and remove the rigging clamp very quickly.
3. Fastened to a rigging truss or similar structure by means of two rigging clamps bolted directly to the PSU's mounting plate using the two 13 mm holes in the mounting plate.*
4. Fastened to a rigging truss or similar structure by means of a rigging clamp with a bolt fastened into the M10 threaded hole in the PSU's mounting plate.*
5. Fastened to a structure or surface using custom hardware with the M6 threaded holes in the PSU's handles.*

** Make sure that all screws or bolts used pass completely through the mounting plate or handles but do not press against the housing of the PSU, or they may distort the housing of the PSU and affect the PSU's protection against humidity and dust.*

Repositioning the mounting plate

See Figure 28**Error! Reference source not found.** on page 44. It is possible to install the PSU's mounting plate in position **A** or **B**. To reposition the mounting plate, remove the six mounting plate screws **C**, move the mounting plate 90° around to the other free side of the PSU, and reinstall it by fastening the six screws into the corresponding holes in that side of the PSU.

Installation considerations

When installing the KNV PSU, do not allow any weight (in the form of cable runs, for example) to hang from connectors, as this may affect their sealing ability and allow water to enter connections. Keep rubber seals installed on all unused connectors at all times.

Install in a well-ventilated area only.

KNV PSU installation hardware

Rigging clamp and 89 mm omega bracket assembly

You can use a rigging clamp and the 89 mm omega bracket from GLP to support a KNV PSU hanging downwards from a rigging truss, bar or similar support.

Rigging clamps

You can use two half-coupler rigging clamps and M12 bolts passed through the 13 mm holes in the KNV PSU mounting plate and fastened into self-locking nuts to support a KNV PSU mounted at any angle on a rigging truss, bar or similar support.

You can also use one half-coupler rigging clamp and M10 bolt fastened into the M10 threaded hole in the KNV PSU mounting plate to support the KNV PSU.

1. Standing a KNV PSU on a horizontal surface

You can stand the KNV PSU on a stable, flat horizontal surface. Make sure that the PSU and cables will not present a danger of tripping.

2. Mounting on a truss using an omega bracket

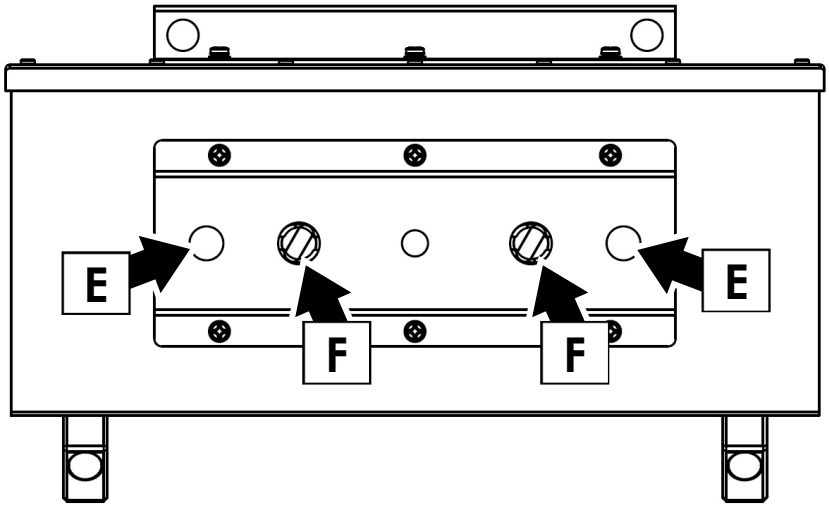


Figure 28. KNV PSU mounting options

To mount a KNV PSU on a rigging truss using an omega bracket:

1. Obtain an omega bracket with 89 mm center-to-center quarter-turn fasteners (available from GLP) and a half-coupler type rigging clamp. The bracket and clamp must be approved for the weight that they will support.

1. Fasten the rigging clamp to the omega bracket with a high-tensile bolt or screw.

2. See Figure 28. Fasten the omega bracket to the mounting plate on the PSU by fastening the bracket's quarter-turn fasteners into holes **F**. Turn fasteners a full 90° clockwise to lock.

3. Lift the complete assembly up to the rigging truss and fasten the rigging clamp to the truss.

4. If there is a risk of injury or damage if the PSU falls, secure it with an approved safety cable passed through one of the holes **E** in the mounting plate (or through one of the PSU's handles) and then looped around a secure anchoring point. Take up as much slack as possible in the safety cable before you fasten it.

3. Mounting on a truss using two rigging clamps and M12 bolts

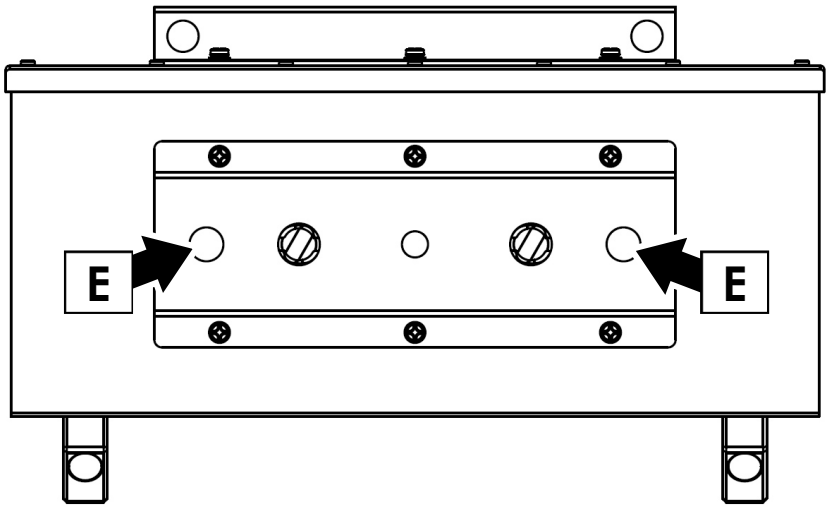


Figure 29. KNV PSU 13 mm threaded holes

To mount a KNV PSU on a rigging truss using two rigging clamps and M12 bolts:

1. Obtain two half-coupler type rigging clamps and high-tensile M12 bolts or screws. The clamps and bolts must be approved for the total weight that they will support.
2. See Figure 29. Fasten the rigging clamps to the PSU's mounting plate by passing the M12 bolts through the clamps and through the 13 mm holes **E** in the mounting plate. Install washers and self-locking nuts on the end of the bolts and tighten the bolts. The bolts must not touch the PSU's housing. Use shorter bolts if necessary.
3. Lift the complete assembly up to the rigging truss and fasten the rigging clamp to the truss.
4. If there is a risk of injury or damage if the PSU falls, secure it with an approved safety cable passed through one of the PSU's handles and then looped around a secure anchoring point. Take up as much slack as possible in the safety cable before you fasten it.

4. Mounting on a truss using one rigging clamp

To mount a KNV PSU on a rigging truss using a single rigging clamp and M10 bolt:

1. Obtain a half-coupler type rigging clamp and a high-tensile M10 bolt or screw. The clamp and the screw or bolt must be approved for the total weight that they will support.

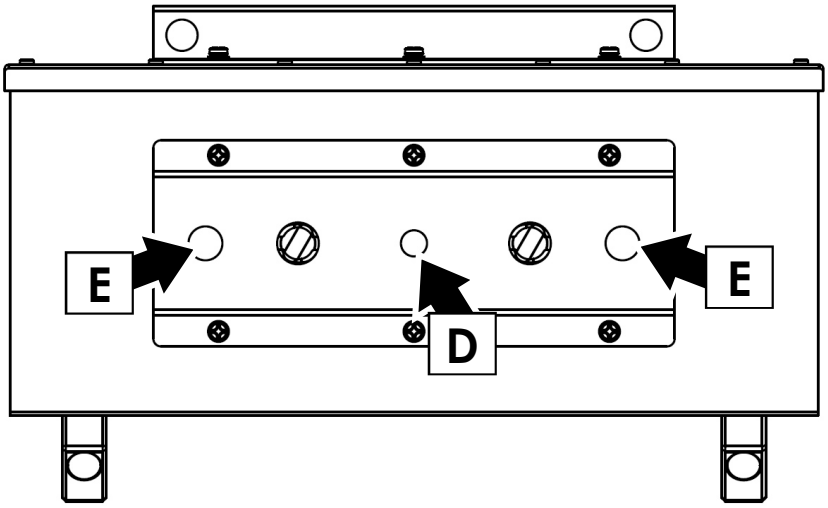


Figure 30. KNV PSU M10 threaded hole

2. See Figure 30. Fasten the rigging clamp to the PSU's mounting plate by passing the M10 bolt or screw through the rigging clamp and tightening it into the M10 hole **D** in the mounting plate. The bolt must thread fully into hole **D** but it must not touch the PSU's housing.
3. Lift the complete assembly up to the rigging truss and fasten the rigging clamp to the truss.
4. If there is a risk of injury or damage if the PSU falls, secure it with an approved safety cable passed through one of the holes **E** in the mounting plate (or through one of the PSU's handles) and then looped around a secure anchoring point. Take up as much slack as possible in the safety cable before you fasten it.

5. Mounting on a truss using custom rigging hardware

To mount a KNV PSU on a rigging truss using custom brackets or other suitable rigging hardware:

1. Obtain suitable hardware and rigging clamps. All hardware and clamps must be approved for the weight that they will support. Check that all custom hardware used is suitable for its purpose and strong enough to safely support the loads applied to it.
2. See Figure 31 on page 47. Bolt mounting hardware to the M6 threaded holes (arrowed) in the PSU's handles using high-tensile M6 bolts. The bolts must thread fully into the handles but they must not touch the PSU's housing.
3. Fasten the PSU to a secure structure such as a rigging truss using high-tensile fasteners and hardware that is approved for the weight that it will support.
4. If there is a risk of injury or damage if the PSU falls, secure it with an approved safety cable passed through one of the holes (**E** in Figure 28) in the mounting plate or

through one of the PSU's handles and then looped around a secure anchoring point. Take up as much slack as possible in the safety cable before you fasten it.

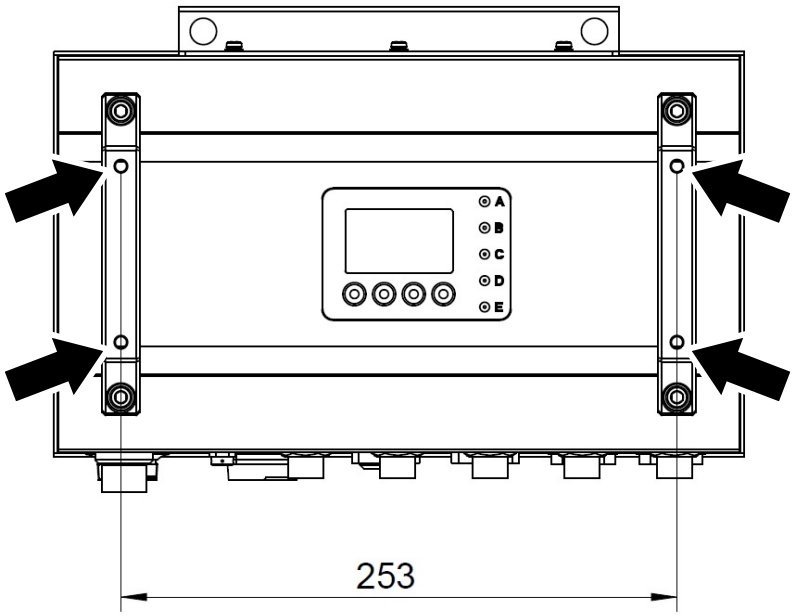


Figure 31. Using PSU handles for mounting

AC mains power

Warning! Read 'Safety' starting on page 5 for important safety information that you must understand before you install or operate the fixture.

Check that all cables and connectors are suitable for the installation environment and application (see recommendations in 'Avoiding damage' on page 11).

Keep connectors sealed with their rubber caps at all times when not in use.

Do not allow any weight (in the form of cable runs, for example) to hang from connectors, as this may affect their sealing ability and allow water to enter connections.

KNV Dot and Line fixtures are supplied with DC power from the KNV PSU. This external power supply unit is connected to mains power.

Connecting the KNV PSU to power

The AC mains power supply must include a connection to ground / protective earth. It must be protected against ground / earth leakage and overload. The fixture's internal auto-sensing power supply accepts AC power at 100-240 V, 50/60 Hz. Do not connect the fixture to power at any other voltage or to an external dimmer.

The KNV PSU does not have a power ON/OFF switch. Power is applied to the PSU as soon as the power cable becomes live.

The KNV PSU has a 3-conductor Neutrik powerCON TRUE1 Mains IN power input socket that accepts AC power from a TRUE1 female cable connector. Although TRUE1 connectors support hot-plugging, it is still good practice to shut down power to power cables before connecting them to fixtures.

To connect the PSU to power:

1. If possible, shut down power to the power input cable.
2. Note the position of the keys and keyways on the TRUE1 power cable connector and Mains IN socket and align them with each other. Insert the cable connector into the socket and twist clockwise to lock.
3. Before applying power by energizing the power cable, check that nobody is looking directly into the front of any fixtures that are connected to the PSU.

To disconnect the PSU from power, pull the latch on the cable connector outwards to release it, then twist the connector counterclockwise and pull to remove it from the socket.

Installing power connectors

It is possible to install a cord cap / mains power plug that is suitable for your local convenience receptacles / mains power sockets on the supplied power input cable. If you do this, check that the cord cap / plug is rated minimum 250 V, 16 A, that it has a

connection to ground / earth and that it has an integral cable grip. Follow the cord cap / plug manufacturer's assembly instructions.

If you need to install a Neutrik powerCON TRUE1 connector on a power cable, follow the instructions given in the Support area of the Neutrik website at www.neutrik.com.

Respect the color coding used in the supplied power cable and in your local mains power wiring system. US and EU systems use the color coding shown below:

	Live or L	**Neutral or N**	**Ground / Earth or ⏚**
US system	Black	White	Green
EU system	Brown	Blue	Yellow/green

Connecting multiple KNV PSUs to power in a chain

You can connect KNV PSUs to power in a daisy-chain to simplify the power circuit layout.

Warning!

Do not connect more than two (2) KNV PSUs in total to power in one chain at 100-120 V, 60 Hz. Do not connect more than four (4) KNV PSUs in total to power in one chain at 200-240 V, 50 Hz.

The power input cable supplied with the KNV PSU is rated 16 A maximum.

Add together the maximum current draw ratings of all the devices that you intend to connect to power in a daisy chain and do not create a chain with a total maximum current draw of more than 16 A, or you will create a risk of fire and electric shock.

Do not allow any weight (in the form of cable runs, for example) to hang from connectors, as this may affect their sealing ability and allow water to enter connections.

To connect PSUs to power in a chain:

1. Obtain power relay cables that have male and female Neutrik powerCON TRUE1 connectors. Cables must be minimum 14 AWG or 1.5mm^2, rated minimum 16 A and suitable for the environment and application.
2. Shut down power to the installation.
3. Connect the power input cable to the Mains IN socket of the first PSU.
4. Connect a relay cable to the Mains OUT / THRU socket of the first PSU and to the Mains IN socket of the second PSU.
5. If you are using 100-120 V, 60 Hz AC mains power, do not connect any devices to the Mains OUT / THRU socket of the second PSU. If you are using 200-240 V, 50 Hz AC mains power, you may connect a maximum of two (2) more PSUs, Mains OUT to Mains IN, so that the chain contains a maximum of four (4) PSUs in total.

11. Connecting fixtures to the PSU

The KNV PSU drives up to five (5) KNV Dot fixtures or one (1) KNV Line fixture at each of its five power/data outputs. In other words, one KNV PSU can drive up to 25 pixels.

Important! The maximum permitted distance from a PSU power/data output to the last device on a power/data link is 50 m / 164 ft.

The KNV Dot and Line system's power/data connections are hot-pluggable, but it is still good practice to shut down power to the PSU before cabling and connecting KNV fixtures.

To connect KNV Dot or Line fixtures to the PSU:

1. Shut down power to the installation.
2. Obtain enough KNV 6-pin ODS DC power/data extension cables from GLP to create a cable run from each PSU output to either:
   - the first of up to five (5) interconnected KNV Dots or
   - one KNV Line.
3. Removing rubber sealing caps from connectors where necessary, connect data/DC power extension cables to the PSU and to the KNV Dot fixtures or KNV Line fixtures.
4. In outdoor installations or any installation where there may be water projections or high humidity levels, check that all unused connectors are sealed with their caps.

   Install rubber seals on the unused THRU cable tails of the last KNV Dot in each group of Dots.

   Do not allow any weight (in the form of cable runs, for example) to hang from connectors, as this may affect their sealing ability and allow water to enter connections.

12. Connecting the PSU to control data

Warning!

Check that all cables and connectors are suitable for the installation environment and application (see recommendations in 'Avoiding damage' on page 11).

Keep unused connectors sealed with their rubber caps at all times.

Do not allow any weight (in the form of cable runs, for example) to hang from connectors, as this may affect their sealing ability and allow water to enter connections.

The KNV PSU supports USITT DMX 512A, Art-Net and sACN DMX control data signal protocols. It also supports RDM (Remote Device Management).

Two types of data connection are available:

- Two 5-pin XLR connectors for IN and THRU connections on a DMX link using standard DMX protocol. Use standard DMX cable that is suitable for the installation environment if connecting to the PSU's XLR connectors.
- Two EtherCON sockets for IN and THRU connections on a DMX data link using Art-Net or sACN protocol. It makes no difference which socket you use for data IN and which for data THRU. Use CAT6 or better Ethernet cables for the data link if connecting to the PSU's Ethernet ports.

  The EtherCON ports are failsafe. This means that Art-Net or sACN data will still be forwarded even if the KNV PSU is accidentally or deliberately powered off.

If you would like advice with planning and installing a DMX link, your GLP supplier will be happy to provide assistance.

13. Starting and stopping operation

Warning! Before you apply power to the KNV installation or operate it after a blackout, make sure that nobody is looking directly into the front of the fixtures.

The KNV PSU's TRUE1 AC mains power input connector supports hot-plugging, and it can be quickest to disconnect a live power cable if you need to shut down power urgently, but it is still good practice to shut down power to the AC mains power circuit before connecting and disconnecting power cables.

To start operation, check that nobody is looking into the front of any connected fixtures, then apply power to the AC mains power circuit.

To stop operation, shut down power to the AC mains power circuit.

Transportation and storage

We strongly recommend that you transport KNV fixtures and PSUs either in flightcases or in their original packaging to protect them from damage during transportation. The product warranty does not cover damage caused by abnormal shocks during transportation and handling.

When KNV products are not being used, disconnect them from power and store them in a dry location.

14. Cleaning and maintenance

Warning! There are no user-serviceable parts inside KNV fixtures or PSUs. Opening a KNV product can compromise its IP54 rating and cause damage that is not covered by the product warranty. Any service operation that requires removal of a cover must be performed by a GLP technician only.

Cleaning

KNV products require occasional cleaning to prevent the buildup of dust, dirt, and residue from atmospheric effects. Pay special attention to the front of fixtures. Failure to keep a fixture clean will significantly reduce light output and may cause damage that is not covered by the product warranty. Regular cleaning will ensure maximum performance and reliable operation.

You can clean the front of a fixture using a soft cloth slightly dampened with a household or automotive glass cleaning product.

The cleaning schedule depends on the operating environment. We recommend that you inspect fixtures soon after installation and at regular intervals until you begin to see visible dirt. Use the time it takes for dirt to appear as the basis for deciding on a cleaning schedule.

GLP Service and Support

Contact information for the nearest GLP Service and Support is available online at www.glp.de/en/service, by email at info@glp.de, or by telephone at the following numbers:

- GLP Germany: +49 (7248) 927 19-55
- GLP N. America: +1 818 767-8899
- GLP UK: +44 1392 690140
- GLP Asia: +852 (3151) 7730
- GLP Nordic: +46 737 57 11 40

15. Technical specifications

Optics, KNV Dot

Total output: 2200 lumens
Total LED power: 34 W
Beam angle: 120° cutoff (3%)

White LED
LED power: 30 W
Number of LEDs: 1
Lifetime: 50 000 hrs. to > 70% luminous output
Refresh rate: 9600 Hz

RGB LEDs
LED power: 0.25 W
Number of LEDs: 16
Lifetime: 50 000 hrs. to > 70% luminous output
Refresh rate: 38 400 Hz

Optics, KNV Line

Total output: 11 000 lumens
Total LED power: 170 W
Beam angle: 120° cutoff (3%)

White LEDs
LED power: 5 x 30 W
Number of LEDs: 5 (1 x white LED per pixel)
Lifetime: 50 000 hrs. to > 70% luminous output
Refresh rate: 9600 Hz

RGB LEDs
LED power: 80 x 0.25 W
Number of LEDs: 80 (16 x RGB LEDs per pixel)
Lifetime: 50 000 hrs. to > 70% luminous output
Refresh rate: 38 400 Hz

Effects

Color mixing: RGB + W, continuously variable, 8 and 16-bit
Shutter/strobe: RGBW, RGB or White strobes with pulse, flare and continuous output effects
Strobe control: Adjustable flash intensity, rate (max. 16.67 Hz) and duration,
Dimmer: 0-100% continuous, two dimming curve options
Multilayer FX engine with multiple fixture synchronization options

Control

Control protocols: DMX (USITT DMX512-A), RDM (ANSI/ESTA E1.20), Art-Net, sACN
DMX control modes: 8
DMX channel footprint: 10 / 23 /40 / 86 / 35/ 102 / 202 / 116 depending on mode
Pixel mapping options, KNV Dot: 1 x RGBW pixel
Pixel mapping options, KNV Line: 1 x RGBW pixel, 5 x RGBW pixels
KNV PSU onboard interface: Control panel with backlit LCD graphic display
Setting and addressing: Onboard control panel / RDM

Construction

KNV Dot

Color: Black
Housing main shell: Flame-retardant high-impact thermoplastic, aluminum
Ingress protection rating: IP54
Modular system

KNV Line

Color: Black
Housing main shell: Flame-retardant high-impact thermoplastic, aluminum
Ingress protection rating: IP54
Modular system

KNV PSU

Color: Black
Housing: Aluminum
Ingress protection rating: IP54

Installation

Operating position: Any
Minimum distance to combustible materials: 0.2 m (8 in.)
Minimum distance to illuminated surfaces: 1.0 m (39.4 in.)
Installation environment: Temporary or permanent Indoor installation, temporary outdoor installation (IP54)
Secondary attachment points: Eyelets for safety cable

KNV Dot

Mounting options

Free-standing on horizontal surface, suspended alone or in multiple arrays from a rig or other structure, fastened to surface or structure

Installation hardware

KNV Dot Bracket
GLP Slide Connector
GLP Half-Slide Connector
13-55/45/15 Rigging Clamp
5/8" (16 mm) Spigot with screw

KNV Line

Mounting options

Free-standing on horizontal surface directly or in adjustable floorstand, suspended alone or in multiple arrays from a rig or other structure, fastened to surface or structure

Installation hardware

KNV Rigging Connector
KNV Module Connector
KNV Floorstand / Hanging Bracket
KNV Line Bracket
KNV Installation Bracket

KNV PSU

Mounting options

Free-standing on horizontal surface, suspended from rig or other structure, fastened to surface or structure

Installation hardware

Repositionable mounting plate with 1 x M10 threaded hole, 2 x 13 mm installation hardware holes and 2 x quarter-turn locking points for 89 mm omega bracket
4 x M6 threaded holes in integrated handles

Connections

KNV Dot

Data/DC power in: Cable tail with 6-pin ODS power and data connector with seal
Data/DC power thru: Cable tail with 6-pin ODS power and data connector with seal

KNV Line

Data/DC power in: Cable tail with 6-pin ODS power and data connector with seal
Data/DC power thru: Cable tail with 6-pin ODS power and data connector with seal

KNV PSU

AC mains power in and thru: Neutrik powerCON TRUE1 with sealing cap
DMX/RDM data in and thru: 5-pin XLR
Data and DC power to fixtures: 5 x 6-pin ODS power and data connectors with sealing caps
Art-Net, sACN: EtherCON in and thru with sealing cap
Fixture software update: Over data link using DProg

Electrical

KNV Dot

DC power source: KNV PSU
Maximum number of fixtures per KNV PSU Data/DC power output: 5
Maximum distance from PSU to last device on Data/DC power link: 50 m/164 ft.

KNV Line
DC power source: KNV PSU
Max. number of fixtures per KNV PSU Data/DC power output: 1
Max. distance from PSU to last device on Data/DC power link: 50 m/164 ft.

KNV PSU
AC mains power: 100-240 V nominal, 50/60 Hz
Power supply unit: Auto-ranging electronic switch mode
Max. number of PSUs in AC mains power daisy chain at 100-20 V, 60 Hz: 2
Max. number of PSUs in AC mains power daisy chain at 200-240 V, 50 Hz: 4
Idle power consumption, zero output: <45 W
Max. power consumption, fully loaded, all LEDs at 100% output: 800 W

Included items

KNV Dot
KNV Dot Bracket

KNV Line
KNV Line Installation Bracket

KNV PSU
US power cable: 16 A, 14 AWG, UL-listed, E304117, SJT, 4.9 ft.
EU power cable: 16 A, 1.5 mm², H05VV-F, 1.5 m

Thermal

Cooling: Combined convection and forced air (temperature-regulated)
Maximum surface temperature, housing: 55° C (149° F)
Minimum ambient temperature: 5° C (40° F)
Maximum ambient temperature: 45° C (113° F)
Max. total heat dissipation (calculated): 2750 BTU/hr.

Dimensions and weight

KNV Dot
Height: 92 mm/3.62 in.
Width: 92 mm/3.62 in.
Depth: 76 mm/2.99 in.
Min. center-to-center distance: 100 mm/3.94 in.
Weight without bracket: 0.7 kg/1.54 lbs.
Weight of KNV Dot Bracket: 0.23 kg/0.51 lbs.

KNV Line
Height: 49 mm/1.93 in.
Width: 249 mm/9.8 in.
Depth: 162 mm/6.36 in.
Min. center-to-center distance: 249 mm/9.8 in. and 49 mm/1.93 in.

Weight without bracket: 2.17 kg/4.78 lbs.
Weight of installation bracket: 0.42 kg/0.93 lbs.

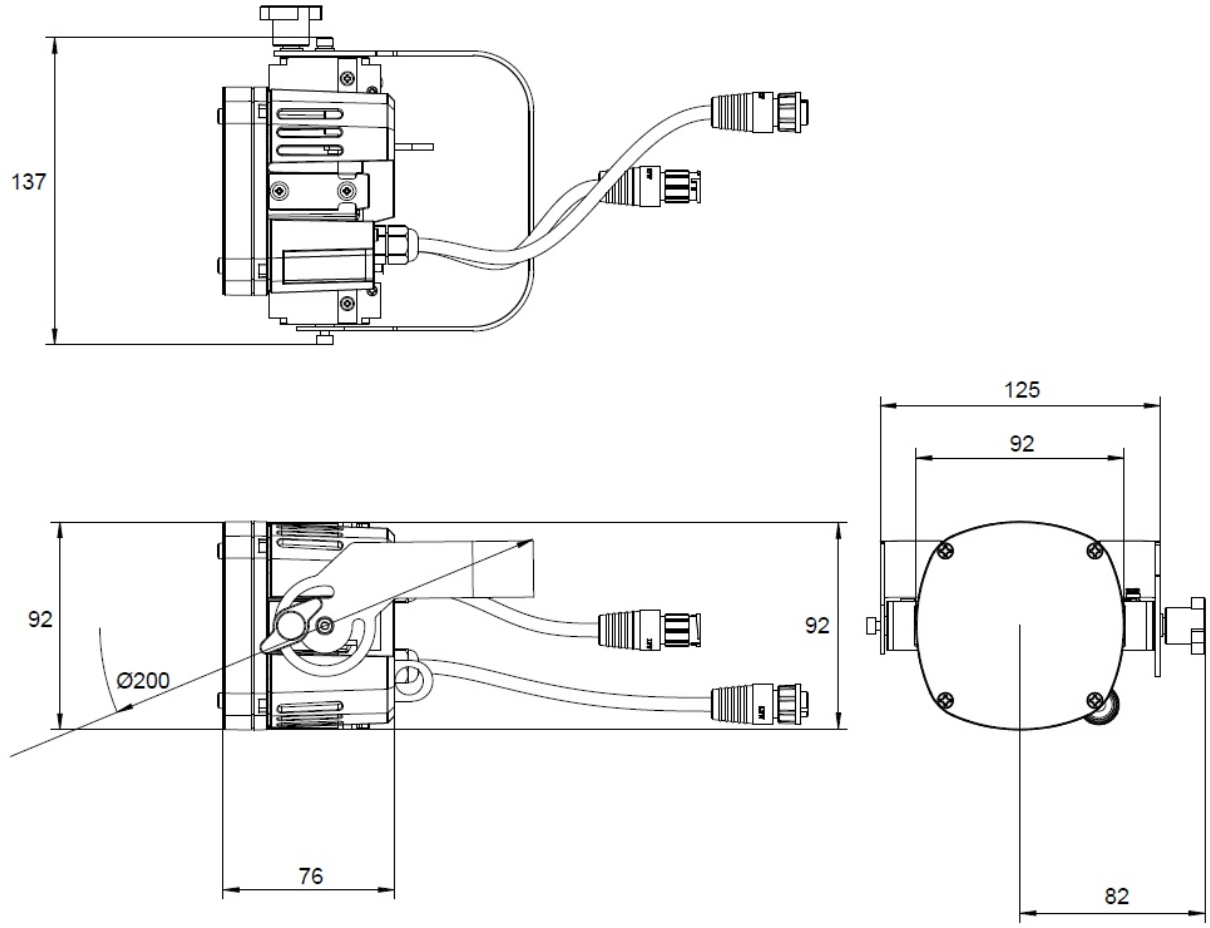
KNV PSU

Height: 121 mm/4.74 in.
Width: 314 mm/12.36 in.
Depth: 168 mm/6.59 in.
Min. center-to-center distance: 320 mm/12.6 in.
Weight without omega bracket: 6.82 kg/15.04 lbs.

16. Dimensions

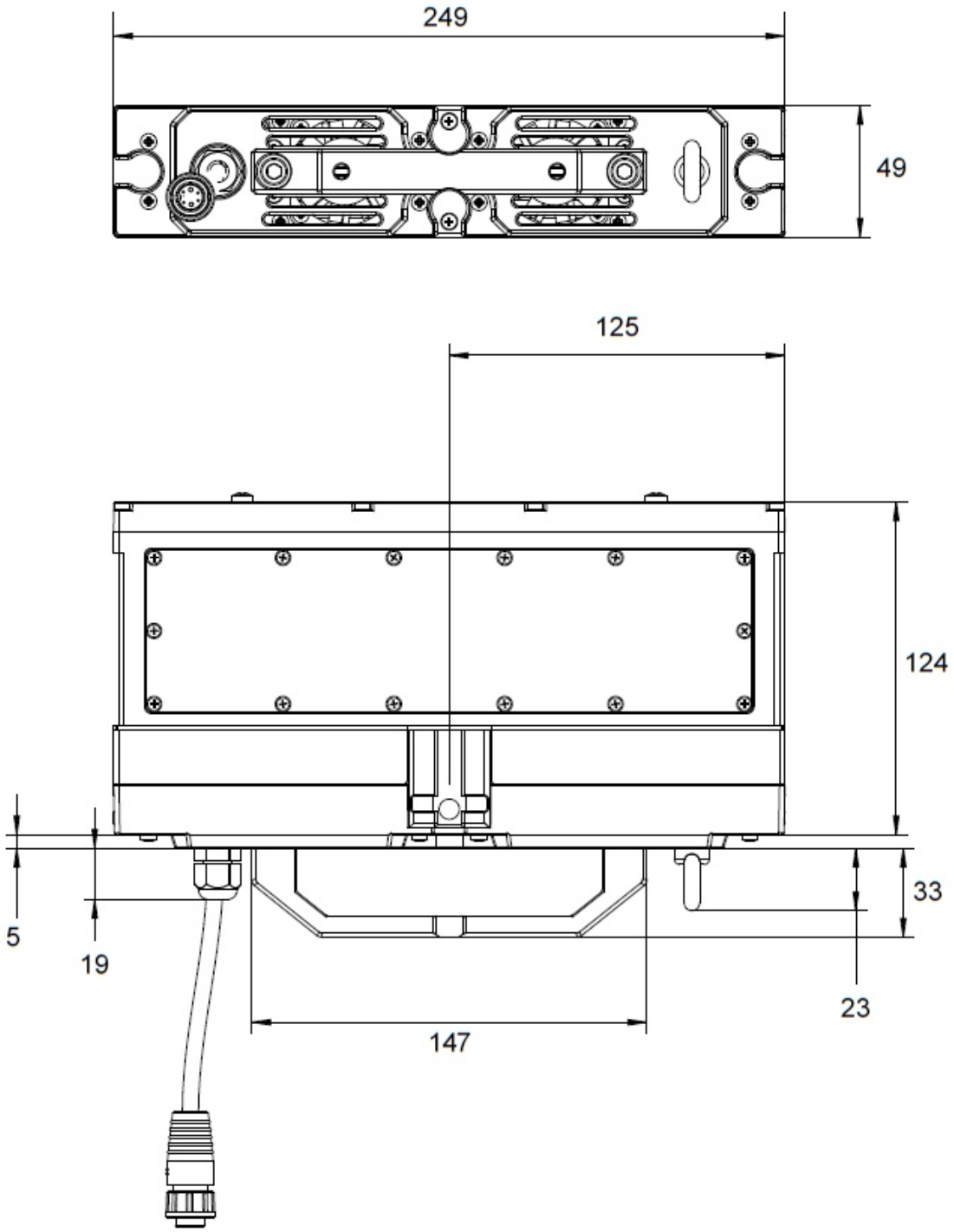
KNV Dot

All dimensions are in millimeters



KNV Line

All dimensions are in millimeters



KNV PSU

All dimensions are in millimeters