QDX

Installation manual

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Changes

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The environmental conditions as well as the servicing and maintenance regulations specified in this manual must be complied with by the customer.

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Disclaimer for network usage

Barco highly recommends to install the projector in a **closed network** environment to minimize the risk of leaking, hacking or corrupting of company confidential information; commercial sensitive information and/or personal data. Furthermore, strengthen your network security to protect the projector against unauthorized access by third parties. To the maximum extent permitted by law, Barco disclaims any liability for the use of the projector in an open network environment.

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1 Safety

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About this document

Read this document attentively. It contains important information to prevent personal injury while installing and using the QDX product. Furthermore, it includes several cautions to prevent damage to the unit. Ensure that all safety guidelines, safety instructions and warnings mentioned in this chapter are understood and followed before installing the QDX product.

Clarification of the term “QDX” used in this document

References in this document to the term “QDX” means that the content is applicable for following Barco products:

- QDX N4K45, QDX 4K45, QDX W45, QDX N4K35, QDX W35, QDX 4K35, QDX N4K25

Model certification name

- QDX W/4K Laph, QDX N4K Laph, QDX N4K RGB

Barco provides a guarantee relating to perfect manufacturing as part of the legally stipulated terms of guarantee. Observing the specification mentioned in this chapter is critical for optimal performance. Neglecting this can result in loss of warranty.

1.1 General considerations

WARNING: Be aware of suspended loads.

WARNING: When suspending loads, wear a hard hat to reduce the risk of personal injury.

WARNING: Be careful while working with heavy loads.

WARNING: Mind your fingers while working with heavy loads.

WARNING: In case of emergency, disconnect the device from the mains power supply. In case the power input at the projector side is not accessible, a readily accessible general disconnect device shall be incorporated.

General safety instructions

- Before operating this equipment please read this manual thoroughly and retain it for future reference.
- All warnings on the unit and in its documentation manuals must be adhered to.
- Installation and preliminary adjustments must be performed by qualified Barco personnel or by authorized Barco service dealers.
- This product contains no user serviceable parts. Attempts to modify/replace mechanics or electronics inside the housing or compartments will violate any warranties and may be hazardous.
- All instructions for operating and use of this equipment must be followed precisely.
- All local installation codes must be adhered to.

Notice on safety

This equipment is built in accordance with the requirements of the applicable international safety standards. These safety standards impose important requirements on the use of safety critical components, materials and insulation, in order to protect the user or operator against risk of electric shock and energy hazard and having access to live parts. Safety standards also impose limits to the internal and external temperature rises, radiation levels, mechanical stability and strength, enclosure construction and protection against the risk of fire. Simulated single fault condition testing ensures the safety of the equipment to the user even when the equipment's normal operation fails.

Notice on optical radiation

This projector embeds a light source incorporating high brightness lasers. The laser light is processed through the projector's optical path. Native laser light is not accessible by the end user in any use case. The light exiting the projection lens has been diffused within the optical path, representing a larger source and lower brightness than native laser light. Nevertheless the projected light can represent a significant risk for the human eye and skin when exposed directly within the beam. This risk is not specifically related to the characteristics of laser light but solely to the high thermal induced energy of the light source, which is equivalent with lamp based systems. Thermal eye injury is possible when exposed within the Hazard Distance (HD). The HD is defined from the projection lens surface towards the position of the projected beam where the intensity equals the applicable exposure limit as described in the chapter “Hazard Distance”.

This projector is classified as a laser product under IEC 60825-1: 2014, EN 60825-1:2014 +A11:2021. The projector, in particular the projection beam, is classified as a Risk Group (RG) under IEC EN 62471-5:2015.

WARNING: This projector has a built-in Class 4 laser module. Never attempt to disassemble or modify the laser module. Service only allowed by qualified service personnel.

WARNING: No direct exposure to the projection beam within the hazard distance shall be permitted for RG3 (Risk Group 3) IEC EN 62471-5:2015. Do not stare into the beam for RG2 (Risk Group 2) IEC EN 62471-5:2015.

CAUTION: Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

Optical radiation safety precautions

This projector is classified as CLASS 2 LASER PRODUCT - RISK GROUP 3.

Notice on laser radiation

The laser distance meter that is optional equipment for this projector can emit a class 2 laser ranging beam of 0.95 mW / 638 nm. When installed correctly, this distance meter is located on the front side of the projector (see red dot on Image 1–1). The laser beam can be enabled by either pressing the button on the equipment, via the projector menu, or via the projector software. Thermal retinal eye injury is possible when staring into the laser ranging beam.

Image 1–1

WARNING: Laser Radiation - Do not stare into laser ranging beam, Class 2 IEC 60825-1: 2014, EN 60825-1:2014 +A11:2021.

Users definition

These projectors are intended “FOR PROFESSIONAL USE ONLY”, this means installation can only be carried out by trained and authorized persons.

Throughout this manual, the terms SERVICE PERSONNEL, INSTALLER refers to persons having appropriate technical training and experience necessary to be knowledgeable of potential hazards to which they are exposed (including, but not limited to HIGH VOLTAGE ELECTRIC and ELECTRONIC CIRCUITRY, HIGH TEMPERATURES and HIGH BRIGHTNESS SOURCES) in performing a task, and of measures to minimize the potential risks to themselves or other persons.

The term USER or OPERATOR of RG2 projectors refers to any other person than SERVICE PERSONNEL or INSTALLER. The term USER or OPERATOR of RG3 projectors refers to any person trained and authorized to operate professional RG3 projectors. The USER or OPERATOR may only perform the maintenance tasks set forth in the user manual or the maintenance tasks for which they are trained and authorized. All other maintenance tasks and service tasks must be performed by qualified SERVICE PERSONNEL.

1.2 Important safety instructions

To prevent the risk of electrical shock

- This product should be operated from a mono phase AC power source. Ensure that the mains voltage and capacity matches the projector electrical ratings as mentioned on the product ID label. If you are unable to install the AC requirements, contact your electrician. Do not defeat the purpose of the grounding.
- This apparatus must be grounded (earthed) via the supplied 3 conductor AC power cable. If you are unable to insert the plug into the outlet, contact your electrician to replace your obsolete outlet. Do not defeat the purpose of the grounding-type plug.
- Do not allow anything to rest on the power cord. Do not locate this product where persons will walk on the cord. To disconnect the cord, pull it out by the plug. Never pull the cord itself.
- Use only the power cord supplied with your device. When no power cord for your region/country is provided, contact your dealer. The power cord must be suited for the electrical ratings indicated on the product ID label. Only power cords according to the local electrical code regulations can be used.

- Do not operate the projector with a damaged cord. Replace the cord.
- Do not operate the projector if the projector has been dropped or damaged - until it has been examined and approved for operation by qualified service personnel.
- Position the cord so that it will not be tripped over, pulled, or contact hot surfaces.
- If an extension cord is necessary, a cord with a current rating at least equal to that of the projector should be used. A cord rated for less amperage than the projector may overheat.
- Never push objects of any kind into this product through cabinet slots as they may touch dangerous voltage points or short out parts that could result in a risk of fire or electrical shock.
- Do not expose this projector to rain or moisture.
- Do not immerse or expose this projector in water or other liquids.
- Do not spill liquid of any kind on this projector.
- Should any liquid or solid object fall into the cabinet, unplug the set and have it checked by qualified service personnel before resuming operations.
- Do not disassemble this projector, always take it to qualified service personnel when service or repair work is required.
- Do not use an accessory attachment which is not recommended by the manufacturer.
- Lightning - For added protection for this video product during a lightning storm, or when it is left unattended and unused for long periods of time, unplug it from the wall outlet. This will prevent damage to the device due to lightning and AC power-line surges.

To prevent personal injury

- To prevent injury and physical damage, always read this manual and all labels on the system before powering the projector or adjusting the projector.
- To prevent injury, take note of the weight of the projector. Minimum 4 persons are needed to carry the projector. The projector weights about ±79 kg (±174 lbs) without lens and rigging frame.
- To prevent injury, ensure that the lens and all covers are correctly installed. See installation procedures.
- **Warning**: high intensity light beam. NEVER look into the lens ! High luminance could result in damage to the eye.
- **Warning: extremely high brightness projector**: This projector embeds extremely high brightness (radiance) lasers; this laser light is processed through the projectors optical path. Native laser light is not accessible by the end user in any use case. The light exiting the projection lens has been diffused within the optical path, representing a larger source and lower radiance value than native laser light. Nevertheless the projected light represents a significant risk for the human eye when exposed directly within the beam. This risk is not specific related to the characteristics of laser light but solely to the high thermal induced energy of the light source; which is comparable with lamp based systems.
  Thermal retinal eye injury is possible when exposed within the Hazard Distance. The Hazard Distance (HD) is defined from the projection lens surface towards the position of the projected beam where the irradiance equals the maximum permissible exposure as described in the chapter “High Brightness precautions: Hazard Distance”, page 18.
- High Brightness Warning: The projector light source may not be switched on or the shutter must be closed when no projection lens is installed.
- Based on international requirements, no person is allowed to enter the projected beam within the zone between the projection lens and the related Hazard Distance (HD). This shall be physically impossible by creating sufficient separation height or by placing optional barriers. Within the restricted area operator training is considered sufficient. The applicable separation heights are discussed in “High Brightness precautions: Hazard Distance”, page 18.
- **Warning**: Laser radiation. Do not stare into laser ranging beam. Class 2 laser beam could result in damage to the eye.
- Don’t put your hand in front of the beam.
- Before attempting to remove any of the projector's covers, you must turn off the projector and disconnect from the wall outlet.
- When required to switch off the projector, to access parts inside, always disconnect the power cord from the power net.
- **The power input at the projector side is considered as the disconnect device. When required to switch off the projector, to access parts inside, always disconnect the power cord at the projector side. In case the power input at the projector side is not accessible (e.g. ceiling mount), the socket outlet supplying the projector shall be installed nearby the projector and be easily accessible, or a readily accessible general disconnect device shall be incorporated in the fixed wiring.**

- Never stack more than 2 QDX projectors in a hanging configuration (truss) and never stack more than 3 QDX projectors in a base stand configuration (table mount).
- When using the projector in a hanging configuration, always mount 2 safety cables. See installation manual for the correct use of these cables.
- Do not place this equipment on an unstable cart, stand, or table. The product may fall, causing serious damage to it and possible injury to the user.
- It is hazardous to operate without lens or shield. Lenses or shields shall be changed if they have become visibly damaged to such an extent that their effectiveness is impaired. For example by cracks or deep scratches.
- **Cooling liquid circuit.** The projector contains a cooling circuit filled with Mono-ethylene glycol (1,2-ethane diol) and inhibitors in aqueous solution (34% active). When the cooling circuit leaks, switch off the device and contact qualified service personnel. The liquid is not for household use. Keep out of reach of children. Harmful by oral intake. Avoid exposure to pregnant women. Avoid contact with eyes, skin and clothing. Avoid inhale of the noxious fumes.
- Never point or allow light to be directed on people or reflective objects within the HD zone.
- All operators shall have received adequate training and be aware of the potential hazards.
- In case of using an external cooling system position the hoses of the cooling system so that they will not be tripped over, pulled, or contact hot surfaces.

To prevent fire hazard

- Do not place flammable or combustible materials near the projector!
- Barco large screen projection products are designed and manufactured to meet the most stringent safety regulations. This projector radiates heat on its external surfaces and from ventilation ducts during normal operation, which is both normal and safe. Exposing flammable or combustible materials into close proximity of this projector could result in the spontaneous ignition of that material, resulting in a fire. For this reason, it is absolutely necessary to leave an “exclusion zone” around all external surfaces of the projector whereby no flammable or combustible materials are present. The exclusion zone must be not less than 40 cm (16”) for this projector.
- Do not place any object in the projection light path at close distance to the projection lens output. The concentrated light at the projection lens output may result in damage, fire or burn injuries.
- Ensure that the projector is solidly mounted so that the projection light path cannot be changed by accident.
- Do not cover the projector or the lens with any material while the projector is in operation. Mount the projector in a well ventilated area away from sources of ignition and out of direct sun light. Never expose the projector to rain or moisture. In the event of fire, use sand, CO_2 or dry powder fire extinguishers. Never use water on an electrical fire. Always have service performed on this projector by qualified service personnel. Always insist on genuine Barco replacement parts. Never use non-Barco replacement parts as they may degrade the safety of this projector.
- Slots and openings in this equipment are provided for ventilation. To ensure reliable operation of the projector and to protect it from overheating, these openings must not be blocked or covered. The openings should never be blocked by placing the projector too close to walls, or other similar surface. This projector should never be placed near or over a radiator or heat register. This projector should not be placed in a built-in installation or enclosure unless proper ventilation is provided.
- Projection rooms must be well ventilated or cooled in order to avoid build up of heat. It is necessary to vent hot exhaust air from projector and cooling system to the outside of the building.
- Let the projector cool completely before storing. Remove cord from the projector when storing.

To prevent battery explosion

- Danger of explosion if battery is incorrectly installed.
- Replace only with the same or equivalent type recommended by the manufacturer.
- For disposal of used batteries, always consult federal, state, local and provincial hazardous waste disposal rules and regulations to ensure proper disposal.

To prevent projector damage

Electrical

- This apparatus must be grounded (earthed) via the supplied 3 conductor AC power cable.
- Unplug this product from the wall outlet before cleaning. Do not use liquid cleaners or aerosol cleaners. Use a damp cloth for cleaning. Never use strong solvents, such as thinner or benzine, or abrasive

cleaners, since these will damage the cabinet. Stubborn stains may be removed with a cloth lightly dampened with mild detergent solution.

Environment

- Allowed ambient temperature range: t_a= 0°C (32°F) to 40°C (104°F)
- Rated humidity = 0% RH to 80% RH Non-condensed.
- Ensure that nothing can be spilled on, or dropped inside the projector. If this does happen, switch off and remove all power from the projector. Do not operate the projector again until it has been checked by qualified service personnel.
- Do not use this equipment near water.

Air cleanness

- The projector must be installed in environments where the amount of dust particles is as low as expected in a standard office environment.
- The environment must be clean and free from hostile airborne particles which may have harmful effects, such as – and not limited to - airborne contaminants produced by smoke or snow machines, contaminants derived from chemical products such as (and not limited to) disinfectants, conducting types of dust, excessive dust.
  - These contaminants deposit a thin layer of greasy residue on the projectors internal optics and electronic boards, degrading performance and leading to failures.
    - Damage of this nature is under no circumstances covered under the manufacturer's warranty and may deem the warranty null and void.
    - The manufacturer reserves the right to refuse repair if a projector has been subject to knowingly neglect, abandon or improper use.
    - If the specified environmental conditions cannot be guaranteed, the projector must be removed, or switched off and fully protected until the requirements are fulfilled.
    - Devices or structures to extract or shield contaminated air well away from the projector are a prerequisite, if this is not a feasible solution then the projector must be relocated to a clean air environment
    - Failure to take suitable precautions to protect the projector from the effects of air contaminants as mentioned above will culminate in extensive and irreversible damage.

Cooling

- The projector must always be installed in a manner which ensures free flow of air into its air inlets.
- Do not block the projector cooling fans or free air movement around the projector.
- Slots and openings in the cabinet are provided for ventilation. To ensure reliable operation of the product and to protect it from overheating, these openings must not be blocked or covered. The openings should never be blocked by placing the product on a bed, sofa, rug, or other similar surface. This product should never be placed near or over a radiator or heat register. The device should not be placed in a built-in installation or enclosure unless proper ventilation is provided.
- If more than one projector is installed in a common projection booth, the exhaust air flow requirements are valid for EACH individual projector system. Note that inadequate air extraction or cooling will result in decreased life expectancy of the projector as a whole as well as causing premature failure of the lasers.
- The air filters of the projector must be cleaned or replaced on a regular basis. Cleaning the booth area would be monthly-minimum. Neglecting this could result in disrupting the air flow inside the projector, causing overheating. Overheating may lead to the projector shutting down during operation.
- In order to ensure that correct airflow is maintained, and that the projector complies with Electromagnetic Compatibility (EMC) and safety requirements, it should always be operated with all of it's covers in place.

DMD protection

- Special care should be used when DLP projectors are used in the same room as high power laser equipment. Direct or indirect hitting of a laser beam on to the lens can severely damage the Digital Mirror Devices™ in which case there is a loss of warranty.
- Never place the projector in direct sunlight. Sunlight on the lens can severely damage the Digital Mirror Devices™ in which case there is a loss of warranty.
- Add the optional external shutter to protect the projector optics from other light sources (e.g. direct sunlight, other laser light sources, etc) when the projector light source is off.

Operation

- Only use Barco projection lenses that are supported for the QDX. Using other lenses will damage the internal optics. For suitable lenses contact Barco or see Barco website.

- To ensure the highest optical performance and resolution, the projection lenses are specially treated with an anti-reflective coating, therefore, avoid touching the lens. To remove dust on the lens, use a soft dry cloth. For lens cleaning follow the instructions precisely as stipulated in the projector manual.

Shipment

- Save the original shipping carton and packing material. They will come in handy if you ever have to ship your equipment. For maximum protection, repack your set as it was originally packed at the factory.

On servicing

- Do not attempt to service this product yourself, as opening or removing covers may expose you to dangerous voltage potentials and risk of electric shock.
- Refer all servicing to qualified service personnel.
- Attempts to alter the factory-set internal controls or to change other control settings not specially discussed in this manual can lead to permanent damage to the unit and cancellation of the warranty.
- Replacement parts: When replacement parts are required, be sure the service technician has used original Barco replacement parts or authorized replacement parts which have the same characteristics as the Barco original part. Unauthorized substitutions may result in degraded performance and reliability, fire, electric shock or other hazards. Unauthorized substitutions may void warranty.
- Safety check: Upon completion of any service or repairs to this unit, ask the service technician to perform safety checks to determine that the product is in proper operating condition.

Malfunction unit

Remove all power from the product and refer servicing to qualified service technicians under the following conditions:

- When the power cord or plug is damaged or frayed.
- If liquid has been spilled into the equipment.
- If the product has been exposed to rain or water.
- If the product does not operate normally when the operating instructions are followed. Adjust only those controls that are covered by the operating instructions since improper adjustment of the other controls may result in damage and will often require extensive work by a qualified technician to restore the product to normal operation.
- If the product has been dropped or the cabinet has been damaged.
- If the product exhibits a distinct change in performance, indicating a need for service.

Stacking, suspending and transporting

Stacking flight cases

- Stack maximum 2 rental flight cases high. Never higher.
- Ensure the surface is level and can support the load safely.
- Check wheels and fixation screws for wear or defects before stacking.
- Ensure lock handles are in good working order and locked securely.
- Position the wheels of the upper flight case in the stacking dishes of the lower case.
- Do not move stacked flight cases. Position the lower case first.

Transporting flight cases

- Always transport flight cases with wheels facing down.
- Do not stack loaded flight cases in a truck unless strapped tight.
- Strap flight cases tight if a wheel breaks to prevent collapse.
- Use an appropriate forklift and take precautions to avoid injury.

Handling rigging frames

- Take into account the total weight of the rigging frame with a projector mounted.
- Lift the rigging frame and projector with four people to avoid injury.
- Never transport the rigging frame in portrait position with a projector mounted.
- Use rigging frames to suspend a maximum of 2 projectors from a truss.
- Use rigging frames to stack a maximum of **3** projectors.
- Follow the installation instructions for rigging frames precisely.

Stacking rigging frames

- Ensure the surface is level and can support the stacked rigging frames safely.
- Stack a maximum of **3** rigging frames.

Four points suspension

- Connect maximum 2 rigging frames together for suspension from a truss.
- Use four rigging points, equally spread, to suspend the rigging frame with a projector mounted.
- Installer must suspend the rigging frames safely and securely.
- Apply safety cables according to local regulations.

Single point suspension

- Connect maximum **2** rigging frames together for suspension from a truss.
- Use one of the two central rigging points of the rigging frame for single point suspension.
- Use four M8 bolts inserted at least 15 mm into the frame of the central rigging point.
- Do not incline the rigging frame more than 20° in single point suspension.
- Secure the single point truss mount after adjustment.
- Attach two safety cables from the truss to the frame bars of the lowest rigging frame.
- Use the two opposite frame bars to connect the safety cables.
- Ensure the projector cannot fall more than 20 cm if something goes wrong.

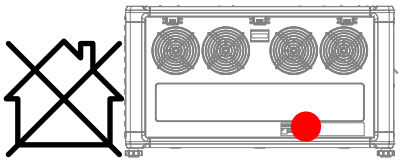
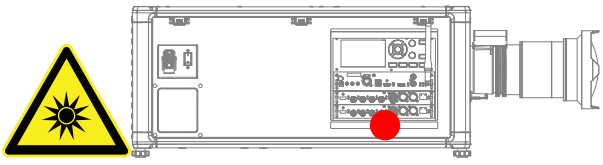
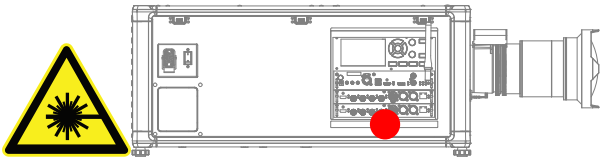
Safety Data Sheets for Hazardous Chemicals

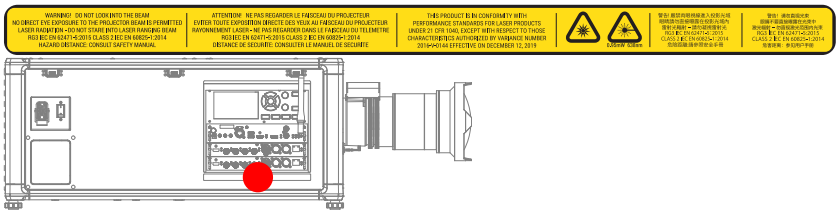
For safe handling information on chemical products, consult the Safety Data Sheet (SDS). SDSs are available upon request via safetydatasheets@barco.com.

1.3 Product safety labels

Light beam related safety labels

Safety labels explanation and location:

Hazard RG3: Not for household use symbol.	
Hazard RG3: Optical radiation warning symbol.	
Hazard class 2: Laser radiation warning symbol. 0.95 mW - 638 nm	



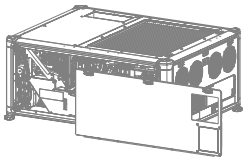
WARNING! DO NOT LOOK INTO THE BEAM. NO DIRECT EYE EXPOSURE TO THE BEAM IS PERMITTED. LASER RADIATION - DO NOT STARE INTO LASER RANGING BEAM. RG3 IEC EN 62471–5:2015. CLASS 2 IEC EN 60825–1:2014. HAZARD DISTANCE: CONSULT SAFETY MANUAL.

ATTENTION ! NE PAS REGARDER LE FAISCEAU DU PROJECTEUR. EVITER TOUTE EXPOSITION DIRECTE DES YEUX AU FAISCEAU DU PROJECTEUR. RAYONNEMENT LASER - NE PAS REGARDER DANS LE FAISCEAU DU TELEMETRE. RG3 IEC EN 62471-5:2015. CLASS 2 IEC EN 60825-1:2014. DISTANCE DE SECURITE : CONSULTER LE MANUEL DE SECURITE.

THIS PRODUCT IS IN CONFORMITY WITH PERFORMANCE STANDARDS FOR LASER PRODUCTS UNDER 21 CFR 1040, EXCEPT WITH RESPECT TO THOSE CHARACTERISTICS AUTHORIZED BY VARIANCE NUMBER 2016-V-0144 EFFECTIVE ON DECEMBER 12, 2019.

警告! 嚴禁肉眼視線進入投影光域. 眼睛請勿直接曝露在投影光域內. 雷射光輻射 – 請勿凝視雷射光. RG3 IEC EN 62471-5：2015 CLASS 2 IEC EN 60825-1：2014. 危險距離:請參照安全手冊.

警告！勿观看投影机光束 眼睛勿直接接触可允许暴露的光束 激光辐射-勿直视激光范围内光束 RG3 IEC EN 62471-5：2015 CLASS 2 IEC EN 60825-1：2014 危害距离：请参考安全手册.



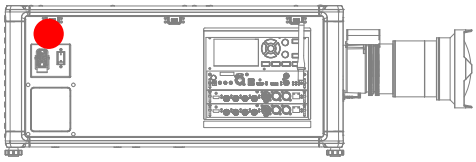
DANGER! CLASS 4 LASER RADIATION WHEN OPEN. AVOID EYE OR SKIN EXPOSURE TO DIRECT OR SCATTERED RADIATION.

DANGER! RAYONNEMENT LASER DE CLASSE 4 EN CAS D'OUVERTURE. EXPOSITION DANGEREUSE AU RAYONNEMENT DIRECT OU DIFFUS DES YEUX OU DE LA PEAU.

危险! 打开时有4类激光辐射。 避免眼或皮肤受到直射或散射辐射的照射。

Electric related safety labels

Electrical labels explanation and location:



WARNING : HIGH LEAKAGE CURRENT EARTH CONNECTION ESSENTIAL BEFORE CONNECTING SUPPLY.

ATTENTION : COURANT DE FUITE ÉLEVÉ RACCORDEMENT À LA TERRE INDISPENSABLE AVANT LE RACCORDEMENT AU RÉSEAU

警告：大漏電流，在接通電源之前必須先接地。

警告：大漏电流，在接通电源之前必须先接地。

Rigging frame related safety labels

Warning: Crushing of hands symbol

WARNING: Hazardous moving parts. Keep fingers and other body parts away. ATTENTION: Parties mobiles dangereuses. Tenir eloignés les doits et autres parties du corps. 警告：危险运动部件。 手指和身体其他部分请远离

1.4 High Brightness precautions: Hazard Distance

HD
Hazard Distance (HD) is the distance measured from the projection lens at which the intensity or the energy per surface unit becomes lower than the applicable exposure limit on the eye or on the skin. The light beam is considered (to be) unsafe for exposure if the distance from a person to the light source is less than the HD.

Restriction Zone (RZ) based on the HD

The HD depends on the amount of lumens produced by the projector and the type of lens installed. See chapter “HD in function of modifying optics”, page 22.

To protect untrained end users (as venue visitors, spectators) the installation shall comply with the following installation requirements: Operators shall control access to the beam within the hazard distance or install the product at a height that will prevent spectators' eyes from being in the hazard distance. Radiation levels in excess of the limits will not be permitted at any point less than 2.0 meter (SH) above any surface upon which persons other than operators, performers, or employees are permitted to stand or less than 1.0 meter (SW) lateral separation from any place where such persons are permitted to be. In environments where unrestrained behavior is reasonably foreseeable, the minimum separation height should be greater than or equal to 3.0 meter to prevent potential exposure, for example by an individual sitting on another individual's shoulders, within the HD.

These values are minimum values and are based on the guidance provided in IEC 62471-5:2015 section 6.6.3.5.

The installer and user must understand the risk and apply protective measures based upon the hazard distance as indicated on the label and in the user information. Installation method, separation height, barriers, detection system or other applicable control measure shall prevent hazardous eye access to the radiation within the hazard distance.

For example, projectors that have a HD greater than 1 m and emit light into an uncontrolled area where persons may be present should be positioned in accordance with “the fixed projector installation” parameters, resulting in a HD that does not extend into the audience area unless the beam is at least 2.0 meter above the floor level. In environments where unrestrained behavior is reasonably foreseeable, the minimum separation height should be greater than or equal to 3.0 meter to prevent potential exposure, for example by an individual sitting on another individual's shoulders, within the HD. Sufficiently large separation height may be achieved by mounting the image projector on the ceiling or through the use of physical barriers.

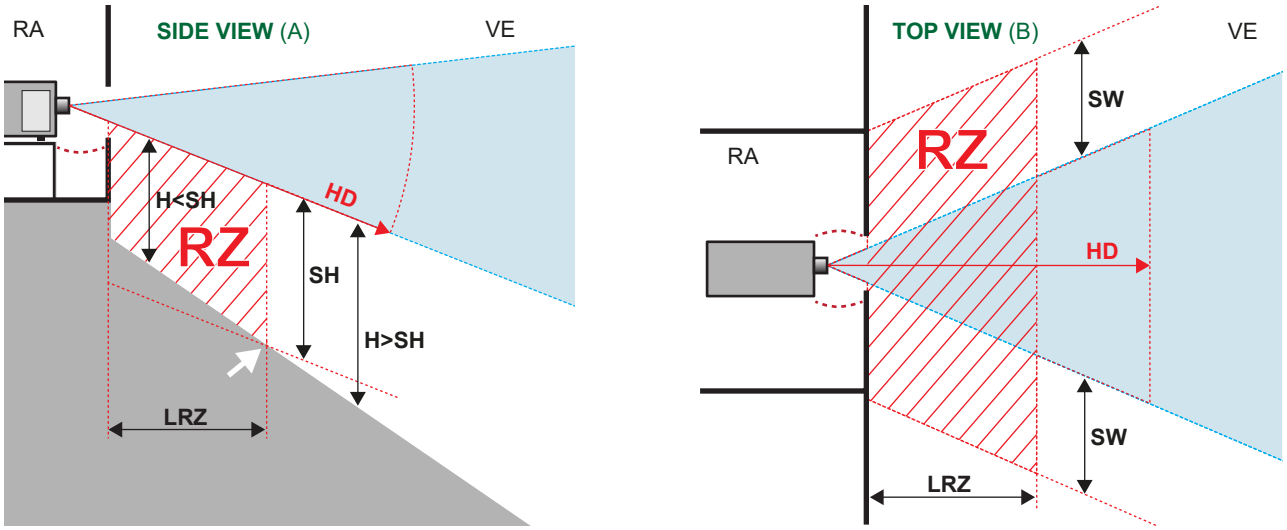


Image 1–2

A Side view
B Top view
RA Restricted Access location (boot area of projector).
VE Venue
RZ Restriction Zone
HD Hazard Distance
LRZ Length Restriction Zone
H Height between surface floor and the light beam
SH Separation Height
SW Separation Width

Based on national requirements, no person is allowed to enter the projected beam within the zone between the projection lens and the related hazard distance (HD). This shall be physically impossible by creating sufficient separation height or by placing barriers. The minimum separation height takes into account the surface upon which persons other than operator, performers or employees are permitted to stand.

On Image 1–3 a typical setup is displayed. It must be verified if these minimum requirements are met. If required a restricted zone (RZ) in the venue must be established. This can be done by using physical barrier, like a red rope as illustrated in Image 1–3.

The restricted area sticker can be replaced by a sticker with only the symbol.

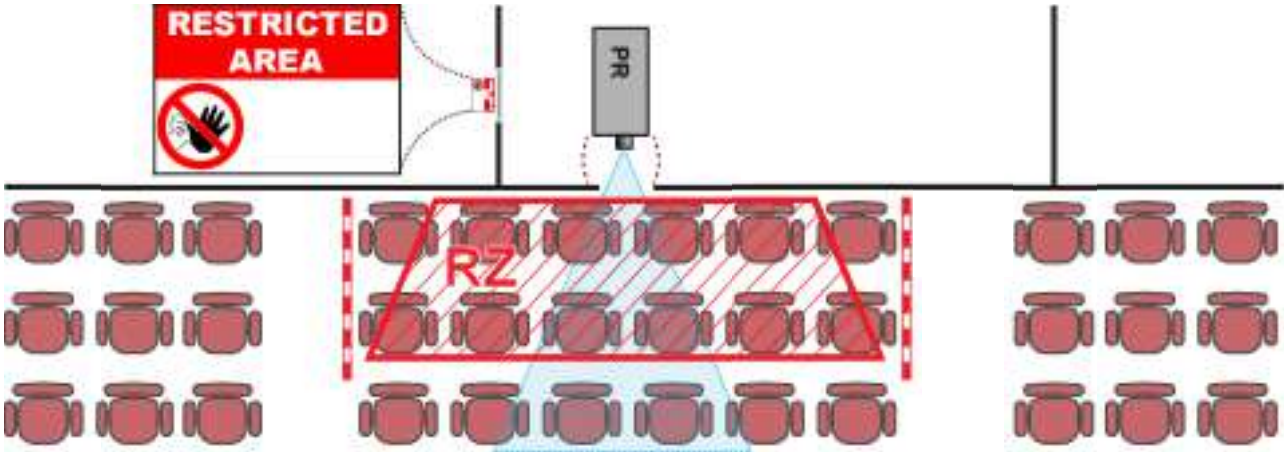


Image 1–3

USA market

For LIPs (Laser Illuminated Projectors) installed in the USA market other restriction zone conditions apply.

LIPs for installation in restrained environment (cinema theaters, business rooms, class rooms, museums ...) shall be installed at height vertically above the floor such that the bottom plane of the hazard distance zone shall be no lower than 2.5 meters above the floor. Horizontal clearance to the hazard distance zone shall be not less than 1 meter. Alternatively, in case the height of the separation barrier for the horizontal clearance is at least 1 meter high then the horizontal clearance (SW) can be reduced to:

- 0 meter if the height of the hazard zone is minimum 2.5 meter.
- 0.1 meter if the height of the hazard zone is minimum 2.4 meter.
- 0.6 meter if the height of the hazard zone is minimum 2.2 meter.

LIPs for installations in unrestrained environment (concerts, ...) shall be installed at a height vertically above the floor such that the bottom plane of the Hazard distance Zone shall be no lower than 3 meters above the floor. Horizontal clearance to the hazard distance zone shall be not less than 2.5 meters. Any human access horizontally to the Hazard Zone, if applicable, shall be restricted by barriers. If human access is possible in an unsupervised environment, the horizontal or vertical clearances shall be increased to prevent exposure to the hazard distance zone.

The LIP shall be installed by Barco or by a trained and Barco-authorized installer or shall only be transferred to laser light show variance holders. This is applicable for dealers and distributors since they may need to install the LIP (demo install) and/or they transfer (sell, rent, lease) the LIP. Dealers and distributors shall preserve sales and installation records for a period of 5 years. Variance holders may currently hold a variance for production of Class IIIB and IV laser light shows and/or for incorporating RG3 LIPs. Laser light show variance for RG3 LIPs can be requested by mailing the application to RadHealthCustomerService@fda.hhs.gov.

The installation checklist for laser illuminated RG3 projectors must be fully completed after the installation. The installation checklist can be downloaded from the Barco website. The installer shall preserve the checklist for a period of 5 years. A copy can remain on-site.

Install one or more readily accessible controls to immediately terminate LIP projection light. The power input at the projector side is considered as a reliable disconnect device. When required to switch off the projector, disconnect the power cord at the projector side. In case the power input at the projector side is not accessible (e. g. truss mount), the socket outlet supplying the projector shall be installed nearby the projector and be easily accessible, or a readily accessible general disconnect device shall be incorporated in the fixed wiring.

1.5 HD for fully enclosed projection systems

HD
Hazard Distance (HD) is the distance measured from the projection lens at which the intensity or the energy per surface unit becomes lower than the applicable exposure limit on the eye or on the skin. The light beam is considered (to be) unsafe for exposure if the distance from a person to the light source is less than the HD.

Restriction Zone (RZ) based on the HD

The projector is also suitable for rear projection applications; projecting a beam onto a defuse coated projection screen. As displayed in following graphic, two areas should be considered: the restricted enclosed projection area (RA) and the observation area (VE).

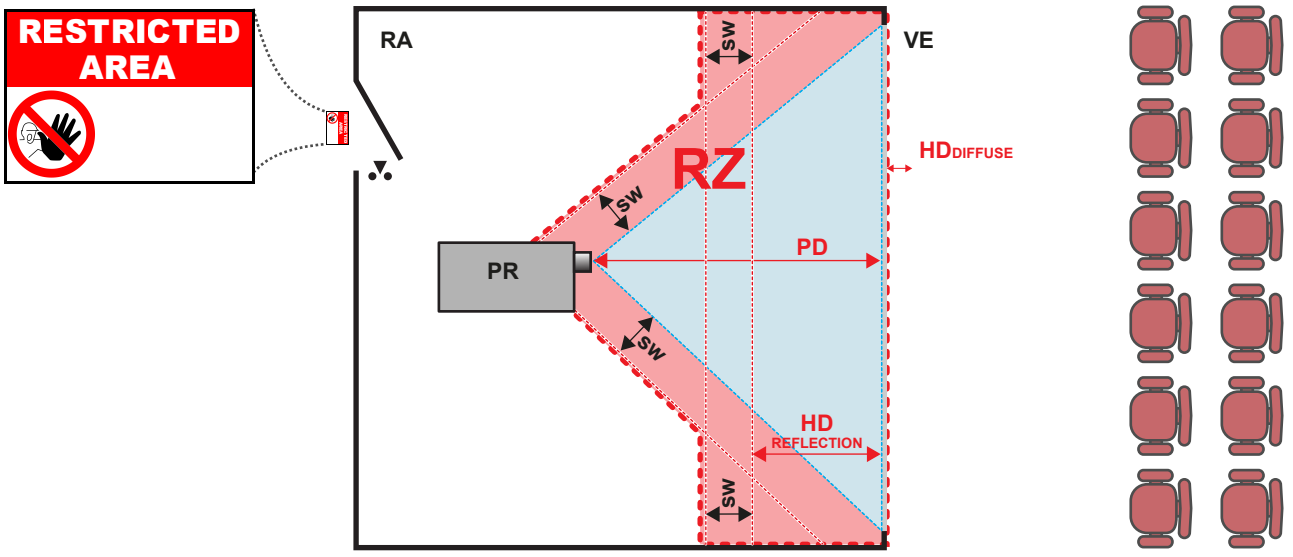


Image 1–4

RA Restricted Access location (enclosed projection area).
PR Projector.
VE Venue (observation area).
RZ Restriction Zone.
PD Projection Distance.
SW Separation Width. Must be minimum 1 meter.

For this type of setup 3 different HD shall be considered:

- HD as discussed in “High Brightness precautions: Hazard Distance”, page 18, relevant for intrabeam exposure.
- $HD_{reflection}$: the distance that has to be kept restrictive related to the reflected light from the rear projection screen.
- $HD_{diffuse}$: the relevant distance to be considered while observing the diffuse surface of the rear projection screen.

As described in “High Brightness precautions: Hazard Distance”, page 18, it is mandatory to create a restricted zone within the beam areas closer than any HD. In the enclosed projection area the combination of two restricted zones are relevant: The restricted zone of the projected beam toward the screen; taking into account 1 meter Separation Width (SW) from the beam onward. Combined with the restricted zone related to the rear reflection from the screen ($HD_{reflection}$); also taking into account a 1 meter lateral separation.

The $HD_{reflection}$ distance equals 25% of the difference between the determined HD distance and the projection distance to the rear projection screen. To determine the HD distance for the used lens and projector model see chapter “HD in function of modifying optics”, page 22.

$$HD_{reflection} = 25\% \ (HD - PD)$$

The light emitted from the screen within the observation shall never exceed the RG2 exposure limit, determined at 10 cm. The $HD_{diffuse}$ can be neglected if the measured light at the screen surface is below 5000 cd/m² or 15000 LUX.

1.6 HD calculation of multi-projector stacks

Sometimes two or more projectors are stacked (projecting on the same surface). In this case, because of the overlap of the images, possibly a system Hazard Distance needs to be applied instead of a single projector hazard distance.

Only projectors stacked along one axis (horizontal or vertical) should be considered. Physical stacking of projectors in two dimensions (for example 2x2), can be reduced to separate “N”x1 systems.

The information needed is:

- The Hazard Distance (**HD**) of a single projector with the given lens.
- The distance (**h**) between two adjacent projector lens centers in the stack.

For 3 or more projectors, in case the distances between adjacent lenses are not equal, take the shortest distance.

HD calculation:

- For stacking two-projectors:
  - **If the single projector hazard distance HD ≥ 9*h**, then the system hazard distance to implement is 1.15*HD.
  - **If the single projector hazard distance HD < 9*h**, then keep the original HD and risk zone per projector.
- For stacking “N” projectors along the same axis, “N” being 3 or more:
  - **If the single projector hazard distance HD ≥ 12*h**, then the system hazard distance to implement is (“N”/2 + 0.15) * HD.
  - **If the single projector hazard distance 9*h ≤ HD < 12*h**, then the system hazard distance to implement is 1.15*HD.
  - **If the single projector hazard distance HD < 9*h**, then keep the original HD and risk zone per projector.

1.7 HD in function of modifying optics

Hazard distance

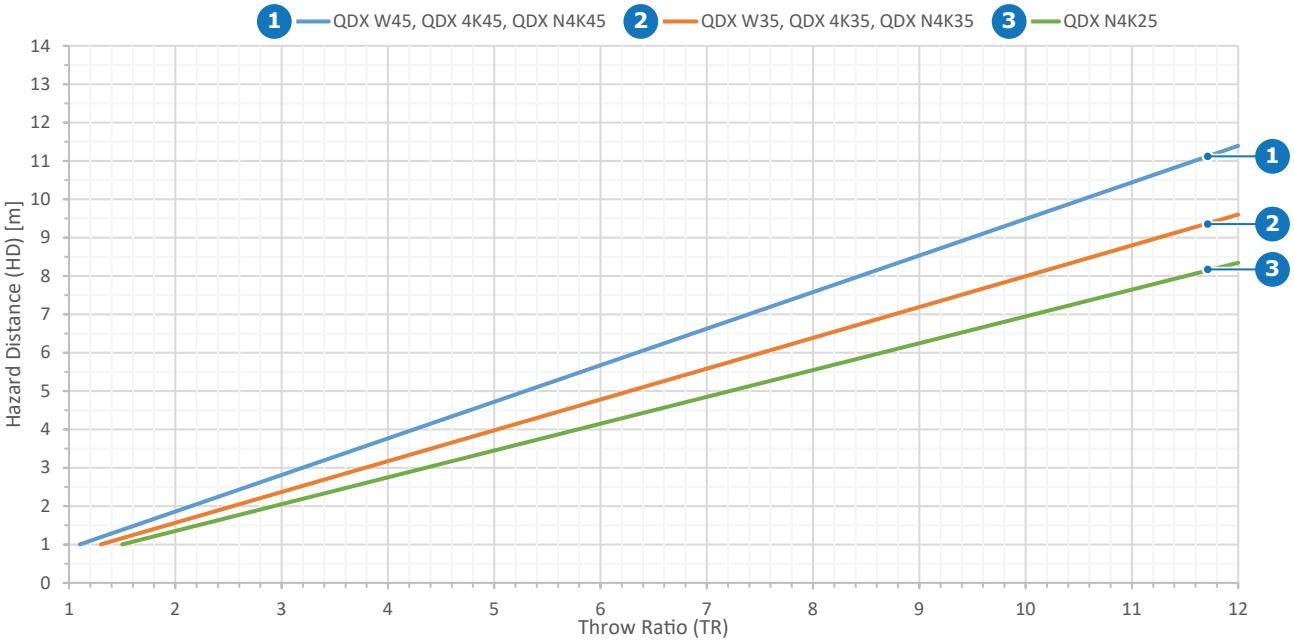


Image 1–5

HD Hazard Distance
TR Throw Ratio

No hazard distance measures required when the hazard distance is shorter than 1 meter. Do not stare into the beam and prevent close exposure to children.

1.8 Radio equipment

CE Conformity

The Pulse 4G module for the Pulse Input & Communication unit, which are fit for use in the European Union countries, EFTA and Turkey.

When using a WiFi dongle with the Pulse Input & Communication unit, the use is restricted to indoor use only when operating in the 5150 to 5250 MHz frequency range.

Hereby, Barco NV declares that the radio equipment type “4G module for the Pulse Input & Communication unit” is in compliance with the Directive 2014/53/EU. The full text of the EU declaration of conformity is available at the following internet address: *https://www.barco.com/en/support/docs/TDE12980*

For 4G LTE (Max EIRP: 20 dBm)
- Band 1: Frequency: 2100 MHz
- Band 3: Frequency: 1800 MHz
- Band 7: Frequency: 2600 MHz
- Band 8: Frequency: 900 MHz
- Band 20: Frequency: 800 MHz
- Band 28: Frequency: 700 MHz
- Band 34: Frequency: 2100 MHz
- Band 38: Frequency: 2600 MHz

For UMTS (Max EIRP: 20 dBm)
- Band 1: Frequency: 2100 MHz
- Band 8: Frequency: 900 MHz

1.9 Compliance

UK Compliance

This product is fit for use in the UK.
Authorised Representative: Barco UK Ltd
Address: Building 329, Doncastle Road
Bracknell RG12 8PE, Berkshire, United Kingdom

L'information des consommateurs sur la règle de tri

1.10 Download Product Manual

Download product manual

Product manuals and other related documentation are available online at https://www.barco.com. Search or browse to the product support page or scan the QR code on the product ID-label or on the box label. To see all service documentation (e. g., spare part list, service manuals, field loadable software ...) you must be registered and logged in.

IMPORTANT! Read Installation instructions before connecting equipment to the mains power supply.

2 Installation process

2.1 Preparation process 26
2.2 Installation process 26
2.3 Additional install options 27

About this chapter

This chapter, and by extension this whole document, the **QDX installation manual**, gives an overview of all the different stages in the installation process that has to be followed in chronological order to set the QDX projector up and running. The stages are grouped in three processes: Preparation, Installation and Options. Each stage is briefly described and refers to more detailed step by step procedures in this manual or reference is made to other online product manuals.

About the Pulse software

This manual does not describe the Pulse graphic user interface. Refer to the **Pulse software user guide** for all software features of the projector. Refer to the **QDX user guide** for info about general projector parts, compliance information, product specifications and much more.

The Pulse software has regular new releases due to continuous improvements. Hence, the ***Pulse OSD*** user guide is subject to updates. Download the latest version of the user guide from the Barco website using following link: *https://www.barco.com/support*.

2.1 Preparation process

Prepare for installation

1. Adhere all safety topics described in the chapter “Safety”, page 9.
2. Check if all installation requirements are fulfilled. For more info see chapter “Installation requirements”, page 30
3. Unpack the projector or pull out the projector from its flight case. See chapter “Unpacking the projector”, page 33 or see chapter “QDX flight case”, page 67.
4. In case of a first install perform an initial inspection of the projector. See “Initial inspection”, page 35.
5. Define the installation position of the projector. For detailed info and possibilities see chapters:
   - “Projector orientations”, page 35.
   - “Projector positioning”, page 36.
   - “Projector shift range”, page 37.
   - “Projector tilt range”, page 38
6. Select the lens that will best fit for the application. See chapter “Lens selection”, page 38, and “Available lenses”, page 39.

2.2 Installation process

Physical installation process overview

1. **Install the projector in the desired position.**

   Take the following into account:

   - Ensure that the physical setup of the projector complies with all safety requirements such as the hazard distance restriction zone etc. See safety chapter “High Brightness precautions: Hazard Distance”, page 18.
   - Use a solid pedestal in case of a standing installation.
   - Use QDX rigging frames for stacking the QDX projectors. Maximum 3 units high in standing configuration and maximum 2 units high in a hanging configuration. See chapter “Stacking QDX projectors”, page 71.
   - Use a QDX rigging frame to hang one QDX projector in portrait (wall mount).

   Note: Ceiling mount and wall mount of a single QDX projector can be realized without QDX rigging frame but then a 3rd party interface needs to be added between the projector and the surface to attach the projector on.

2. **Install the selected projection lens for the application.**

   For detailed instructions see “Installation of the projection lens”, page 43.

   Warning: Some projection lenses, more specific the heavy UST lenses, require a lens support. See chapter “Available lenses”, page 39, to know which lenses are subject to a lens support bracket. For installation instructions see chapter “UST lenses”, page 53.

3. **Install the batteries of the remote control unit** (RCU).

   See chapter “Pulse RCU battery installation”, page 42.

4. **Connect the projector with the power net.**

   See chapter “Connecting the projector with the power net”, page 46.

   Ensure that the power net complies with the main power requirements of the projector. See chapter “Installation requirements”, page 30.

5. **Switch on the projector for the first time.** See chapter “Powering on projector”, page 47.
6. **Perform the initial setup**, using either the projector LCD/OSD, or Pulse Prospector. For more info, see “Initial setup”, page 48.

The initial setup consists of the following:

- Selecting the UI language (default English),
- accepting the End User License Agreement (EULA), and
- defining the default administrator password.

The following options are possible to control the projector:

- Using the Pulse Remote Control Unit (RCU)
- Using the local keypad
- Using the LCD touch display
- Using Pulse Prospector

See QDX user guide, Pulse OSD user guide, and Pulse Prospector user guide.

7. **Project an image** (e.g., test pattern or video image) and let the projector and projection lens acclimatize.
8. **Calibrate the projection lens** and potential focus drift.
   - To calibrate the mounted lens, use the lens calibration menu in the Pulse OSD or Pulse Prospector.
   - To calibrate the focus drift, use Pulse Prospector.
9. **Alignment of the projected image**.

   If needed change the projector orientation (e.g. Front/Table, Front/Ceiling, Rear/Table, Rear Ceiling).

   1. Activate an internal test pattern to focus, zoom and shift the lens until the projected image is sharp and aligned with the screen. Use the following:
      - The focus, zoom and shift buttons of the RCU.
      - The lens adjustment button of the local keypad.
      - The Pulse Prospector software.
   2. Rotate and/or tilt the projector until the projected image is leveled and has a perfect rectangle shape:
      - See chapter “Alignment of a table mounted projector”, page 48.
      - See chapter “Alignment of motorized rigging frame”, page 76.
10. **Verify and adjust the convergence if required.**

    There are two ways of adjusting the convergence:

    1. Mechanical convergence done by a certified technician, for detailed instructions see the service manual.
    2. Electronic convergence, for detailed instructions see the Pulse OSD user guide.
11. **Check for the latest projector software package.** See the Pulse OSD user guide, or the Pulse Prospector user guide.
12. **Create a number of custom users** next to the default administrator, that will use the projector. See the Pulse OSD user guide, or the Pulse Prospector user guide.
13. **Safely shutdown the projector after usage.**

    See chapter “Powering off the projector”, page 50.

2.3 Additional install options

Overview

1. Installation of the rigging frame. For more info, see chapter “Flight case and rigging frame”, page 65.
2. Installation of an optional input board (e.g. **Quad DP 1.2 input** or the **SFP input**) or replacing an input board.
   - for installation see “Installing an input board”, page 45.
   - for configuring the SFP input see “Pulse SFP input use cases”, page 143.
3. Installation of the **Pulse 4G** module. For more info, see chapter “Installation of the Pulse 4G module”, page 102.
4. Installation of the **WiFi** dongle. For more info, see chapter “Installation of the WiFi dongle”, page 105.

5. Installation of the **distance meter** module For more info, see chapter “Distance meter and camera kit”, page 85.
6. Installation of the **external mechanical shutter**. For more info, see chapter “External mechanical shutter”, page 107.
7. Installation of the **external cooler** module. For more info, see chapter “External cooler”, page 115.

3 Prepare to install

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3.2 Unpacking the projector 33
3.3 Initial inspection 35
3.4 Projector orientations 35
3.5 Projector positioning 36
3.6 Projector shift range 37
3.7 Projector tilt range 38
3.8 Lens selection 38
3.9 Available lenses 39

About this chapter

Read this chapter thoroughly before installing the projector. It contains important information concerning installation requirements for the projector, such as minimum and maximum allowed ambient temperature, humidity conditions, required safety area around the installed projector, required power, etc.

In addition, careful consideration of things such as image size, projector placement and type of screen to use are critical to the optimum use of this projection system.

Barco provides a guarantee relating to manufacturing as part of the legally stipulated terms of guarantee. Observing the specification mentioned in this chapter is critical for the projector performance. Neglecting this can result in loss of warranty.

3.1 Installation requirements

WARNING: Ensure that the physical environment in which the unit is installed, complies at all times with the environmental requirements summarized in this chapter. Never use the unit in case not all requirements are fulfilled. Neglecting these will damage the unit and void the warranty.

Main Power requirements

- The projector operates from a nominal mono phase power net with a separate earth ground PE.
- Power requirements :
  - QDX W/4K Laph: 100-160 V (reduced power) / 200-240 V~, 22 A, 50/60 Hz.
  - QDX N4K Laph: 100-160 V (reduced power) / 200-240 V~, 22 A, 50/60 Hz.
  - QDX N4K RGB: 100-160 V (reduced power) / 200-240 V~, 20 A, 50/60 Hz.
- The projector must be grounded.

Environment conditions

Environment	Operating	Non-Operating
Ambient temperature	Temporary event: 0°C (32°F) to 40°C (104°F) Permanent install[1]: 5°C (41°F) to 30°C (86°F)	-10°C (-14°F) to 60°C (140°F)
Humidity	0% RH to 80% RH Non-condensed	5% RH to 90% RH Non-Condensed
Altitude	0 m (0 ft) to 3000 m (9843 ft)	-60 m (-197 ft) to 5000 m (16404 ft)
Air cleanness	Clean office environment[2]	n.a.
Air clearance	Air outlets: minimum 60 cm (2 ft) Air inlets: minimum 10 cm (4 inch)	n.a.
Air exhaust	Nominal: 140 l/s (300 CFM) Maximum: 300 l/s (650 CFM)	n.a.

Temporary event (up to one week)

- Always protect the projector from rain, moist, dust, smoke machine or polluted air.
- Use the Barco software tools (e.g., Insights Management Suite, Pulse Toolset, Pulse Prospector) to monitor the environment and performance of the projector.
- Check the filters daily and clean/replace if needed, as the air cleanness of the install site is unknown (e.g., not a clean office environment).
- Always use an environment protection housing if the air cleanness is unknown or has high pollution risk.
  - An active cooled environment protection housing will provide the best performance of the projector overtime.

Permanent install (more then one week)

- Always protect the projector from rain, moist, dust, smoke machine or polluted air.
- Use the Barco software tools (e.g., Insights Management Suite, Pulse Toolset, Pulse Prospector) to monitor the environment and performance of the projector.
- Clean or replace the filters within a defined interval. The interval will be based on the monitoring results of the environment.
- Always use an environment protection housing if the environment has high pollution.
  - An active cooled environment protection housing will provide the best performance of the projector overtime.

1. Recommended temperature range for fixed installs
2. Equivalent with cleanroom standard ISO 14644-1 ISO Class 9. If not, an environment protection housing must be used.

Air inlets and outlets clearance

The projector must be installed with sufficient free space around the air inlets and outlets to ensure sufficient air flow.

- Minimum 10 cm (4 in) at the projector front, top, left, and right sides (air inlets).
- Minimum 60 cm (23.6 in) at the projector rear side (air outlets).

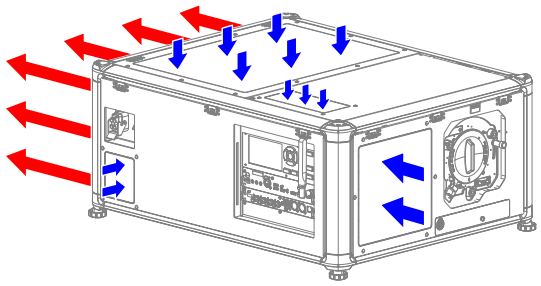

Image 3–1 Air inlets and outlets projector front view.

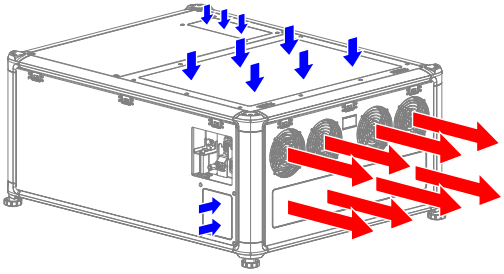

Image 3–2 Air inlets and outlets projector rear view.

If the outlets of the projector are too close to a solid object, the hot air from the air outlets may find its way back into the air inlets, which will rapidly increase the temperature inside the projector.

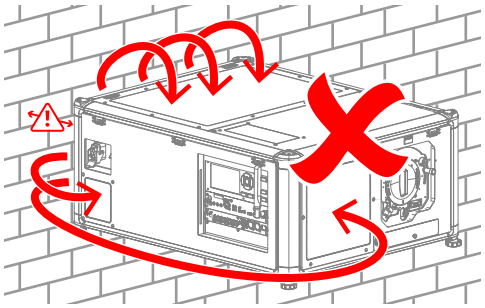

Image 3–3

Lower airflow will have impact on:

- the performance of the projector
- the lifetime of the components of the projector
- long exposure on low air flow can permanently damage projector components.

Grounding

- The projector must be grounded (earthed) via the supplied 3 conductor AC power cable.
  - Not grounding the projector can damage the input cards and other electronics and has a increased risk for electrocution.
- The protective conductor current is 13 mA in normal operation.

Lens cap

- Always remove the lens cap before turning on the project!
  - Not removing the lens cover will make it melt with a high risk of damaging the first lens element, prism, and DMD™.
  - After usage of the projector and removing the lens, the protective lens holder cap must be to installed to avoid foreign objects to enter the projector.

Smoke machine usage

- Avoid exposure to air contaminated by smoke machines.
- If the exposure can’t be avoided, an environment protection housing (climate case) must be used that has a clean cooled internal flow.
  - Contaminated air by smoke machines will have negative influence on the airflow and have impact on the projector performance (see also “Air inlets and outlets clearance”).

- Not using a climate case will require very frequent filter changes. If the filter changes are not executed on time can lead to overheating the projector with a performance drop and reduction of lifetime.
- It is important to understand that filters will not fully stop contaminated air to enter the projector. Hence the requirement to limit the unprotected exposure to smoke machines.

Chemical substances

- Avoid exposure to contaminated air by chemicals like chlorine(pool), ammoniac (urine refer to circus or zoo), sodium chloride (salt air), other.
  - These substances have a corrosive character on the components of the projector which will lead to early failures.
  - Permanent installations in these environments require a climate case with closed cooling circuit.

Dust environment usage

- Avoid exposure to air contaminated by excessive dust .
- If the exposure can't be avoided it is advised to use a climate case that has a clean cooled internal flow.
  - Not using a climate case will require very frequent filter changes.
  - If the filter changes are not executed on time this can lead to overheating the projector with a performance drop and reduction of lifetime.

Sun light & laser beams

- Use an external shutter to avoid exposer to powerful lights, lasers or direct sunlight to protect the optical parts of the projector.
- When the projector is used in an event of laser shows, ensure hat the laser beams cannot hit direct or indirectly the optics of the projection lens.
  - Laser beam, direct sunlight or powerful lights exposure on the lens can lead to lens, prism and DMD™ damage.
  - Laser beam damage on the DMD™ are not covered by the projectors' warranty.

Projector Weight

The projector weights about ±79 kg (±174 lbs) without lens or frame.

Ensure that the pedestal on which the projector will be installed is capable of handling five times the complete load of the system.

Projector security

The projector can be accessible from anywhere by anyone within the operating range of the (wireless) network, if the security settings of the (wireless) network and projector are insufficient. Malicious actors could access the projector, sensitive information may leak to outsiders, or the projector itself may be tampered with.

Barco recommends the following instructions to ensure that the projector is safely installed:

- On the **network side**, Barco recommends ensuring the **maximum** security on the network, in order to avoid any form of tampering. Some network devices may not be properly set for security when installed out of the box. Make sure to read the provided user documentation of the network device to properly set up the necessary security settings of the (wireless) network. Also make sure to only use **encrypted communication channels** when communicating with the projector.
- On the **projector side**, Barco recommends removing the default users, making a **limited** amount of **specific users**, and enforcing that all used passwords are **strong passwords**. For more information on user creation and password changing, see either the Pulse OSD user manual or Pulse Prospector user manual.
- On **the side of the venue site**, Barco recommends to make sure the projector interface (touch panel and local keypad) **cannot be accessed by unauthorized personnel**. Once the installation and configuration of the projector is completed, make sure the LCD panel and OSD projection cannot be seen by unauthorized personnel (e.g. **disabling the OSD**, and **enabling Stealth mode** on the LCD). For more information on how to use Stealth mode, see either the Pulse OSD user manual or Pulse Prospector user manual.

A strong password has a minimum of 8 characters and should be unique. The password should be a a mix of upper case letters, lower case letters, numbers and special characters.

3.2 Unpacking the projector

What has to be done ?

The projector is delivered in a cardboard box on a pallet and is secured with banding and fastening clips. Furthermore, to provide protection during transportation, the projector is surrounded with polymeric foam. Once the projector has arrived at the installation site, it needs to be removed from the box and pallet in a safe manner, without damaging the projector.

If the projector is delivered in the optional flight case instead, remove the projector from the flight case instead. For more info, see “QDX flight case”, page 67.

After unpacking let the projector acclimatize to a room temperature between 10°C (50°F) and 40°C (104°F). Neglecting this may result in a start up failure of the Light Processor Unit.

Required tools

- Side cutter
- Knife
- Hoisting or lifting tool

Required parts

Eye bolts M10 x 4

How to unpack

1. Remove the banding around the cardboard box and open the box. Use a cutter knife to cut the bands.
2. Cut the tape of the top lid and open the cardboard packaging.

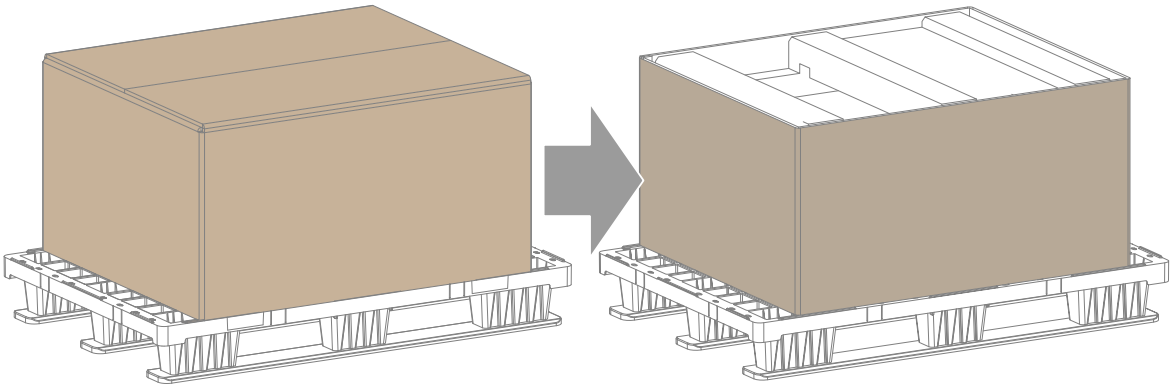

Image 3–4 Opening the box

3. Lift up and remove the cardboard box.
4. Remove the box on top of the projector. This box contains the accessories such as power cord, manuals, remote control, etc.

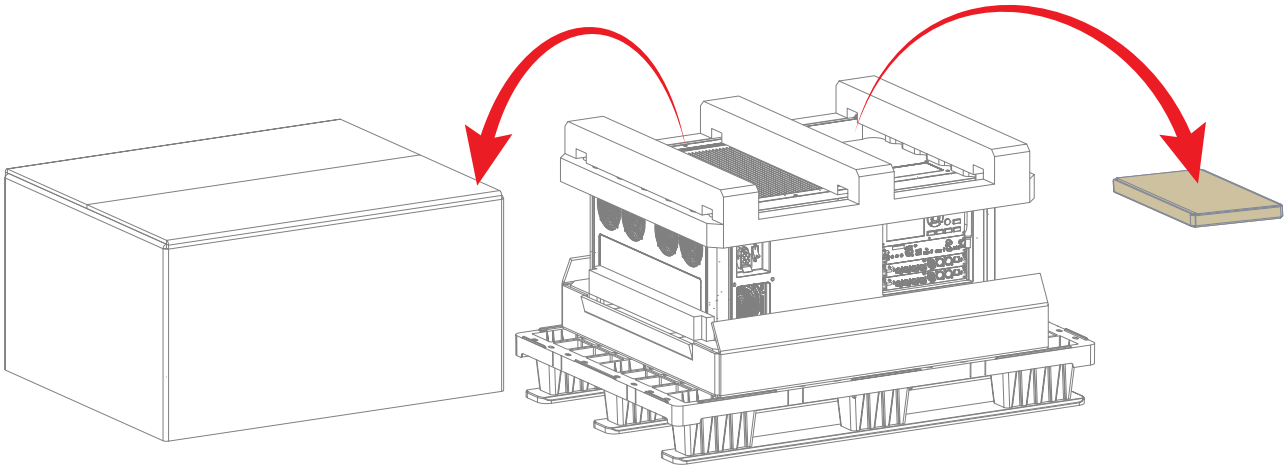

Image 3–5 Removing the cardboard box and box with accessories

5. remove the polymeric foam from the top of the projector.

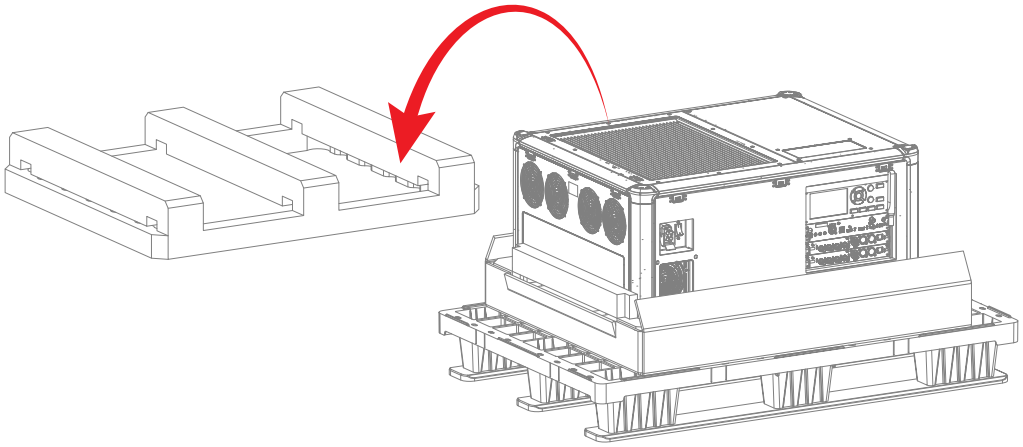

Image 3–6

6. Open the plastic bag containing the projector.

Image 3–7 Opening the plastic bag

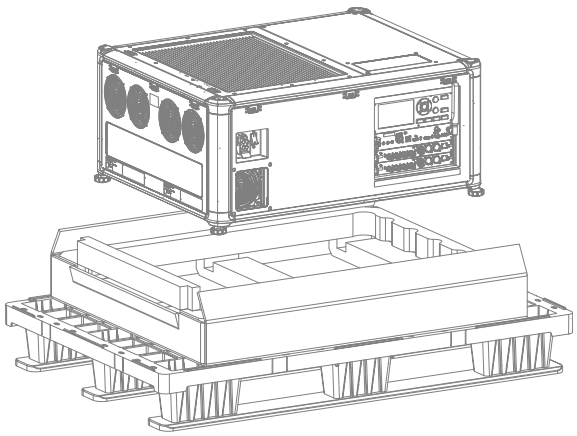

Image 3–8 Lifting the projector

7. Lift up the projector from the packaging.

   Take into account the weight of the projector when manipulating the projector. Use one of the following to lift up the projector:

   - Four people.
   - A hoisting or lifting tool, while mounting four eye bolts (M10) in the corners of the projector frames.

Save the original shipping cardboard box and packing material. They will be necessary if you ever have to ship your projector. For maximum protection, repack your projector as it was originally packed at the factory.

A plastic lens holder cover is placed into the lens opening of the projector. It's recommended to reuse this cover each time you transport the projector. This to prevent intrusion of dust and foreign particles.

The lens is delivered in a separate box.

3.3 Initial inspection

General

Before shipment, the projector was inspected and found to be free of mechanical and electrical defects. As soon as the projector is unpacked, inspect for any damage that may have occurred in transit. Save all packing material until the inspection is completed. If damage is found, file claim with carrier immediately. The Barco Sales and Service office should be notified as soon as possible.

Box content

After unpacking the projector it is recommended to check if all following items were included:

- One power cord of 2.7 m (3G10, 32A) (for specific regions/countries only)
- One quick start guide
- Two Safety manuals (W1 and W2)
- One website reference sheet
- One remote control unit (RCU) and silicone rubber sleeve
- One slipcover designed for the projector

Mechanical check

This check should confirm that there are no broken knobs or connectors, that the cabinet and panel surfaces are free of dents and scratches, and that the operating panel is not scratched or cracked. The Barco Sales and Service office should be notified as soon as possible if this is not the case.

3.4 Projector orientations

Supported projector orientations

The projector can be installed on a table or upside down on the ceiling and this in a front projection or rear projection configuration. Depending on the physical configuration of the projector the projected image has to be rotated and/or mirrored as well. The projected image can be adapted via the menu *Installation* > *Orientation*. Possible orientations are:

1. Front / Table (F/T)
2. Front / Ceiling (F/C)
3. Rear / Table (R/T)
4. Rear / Ceiling (R/C)

Front projection

The projector is installed, either in a table mount or ceiling mount configuration, at the same side of the screen as the audience.

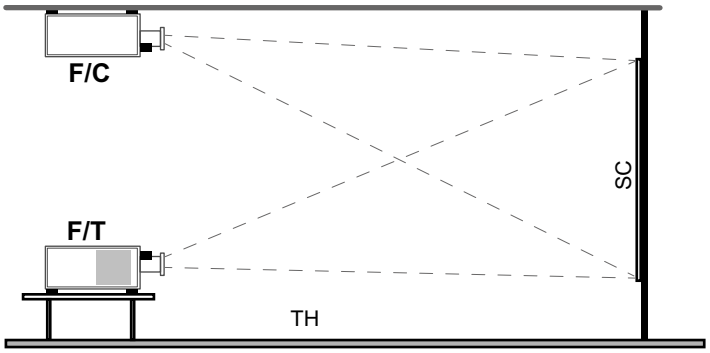

Image 3–9

FC Front/Ceiling projection
FT Front/Table projection
SC Screen
TH Theater (Audience area)

Rear projection

The projector is installed, either in a table mount or ceiling mount configuration, at the other side of the screen opposite the audience.

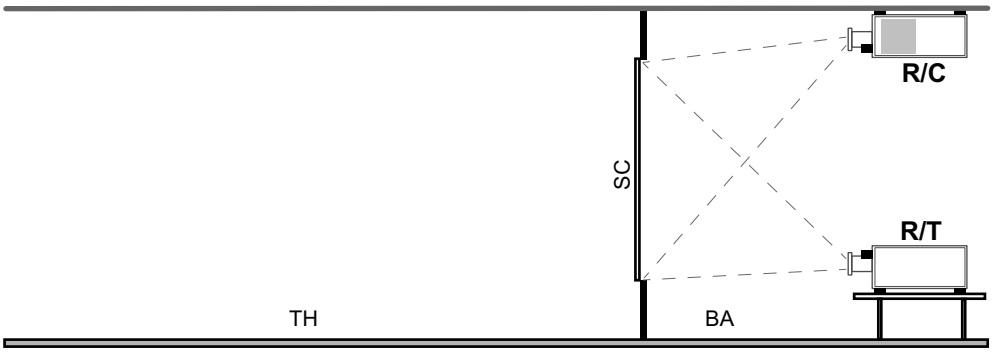

Image 3–10

RC Rear/Ceiling projection
RT Rear /Table projection
SC Screen
BA Backstage area
TH Theater (Audience area)

Some lenses (e.g. UST lenses) may require that the projector orientation needs to be adapted for the desired outcome.

3.5 Projector positioning

Positioning the projector

The projector should be installed at right angles (horizontally and vertically) to the screen at a distance PD. Note the distance (A) between lens centre and table surface is slightly variable. This distance (A) is nominal 132 mm in case all feet are turned in completely and the vertical lens shift is set to zero (0).

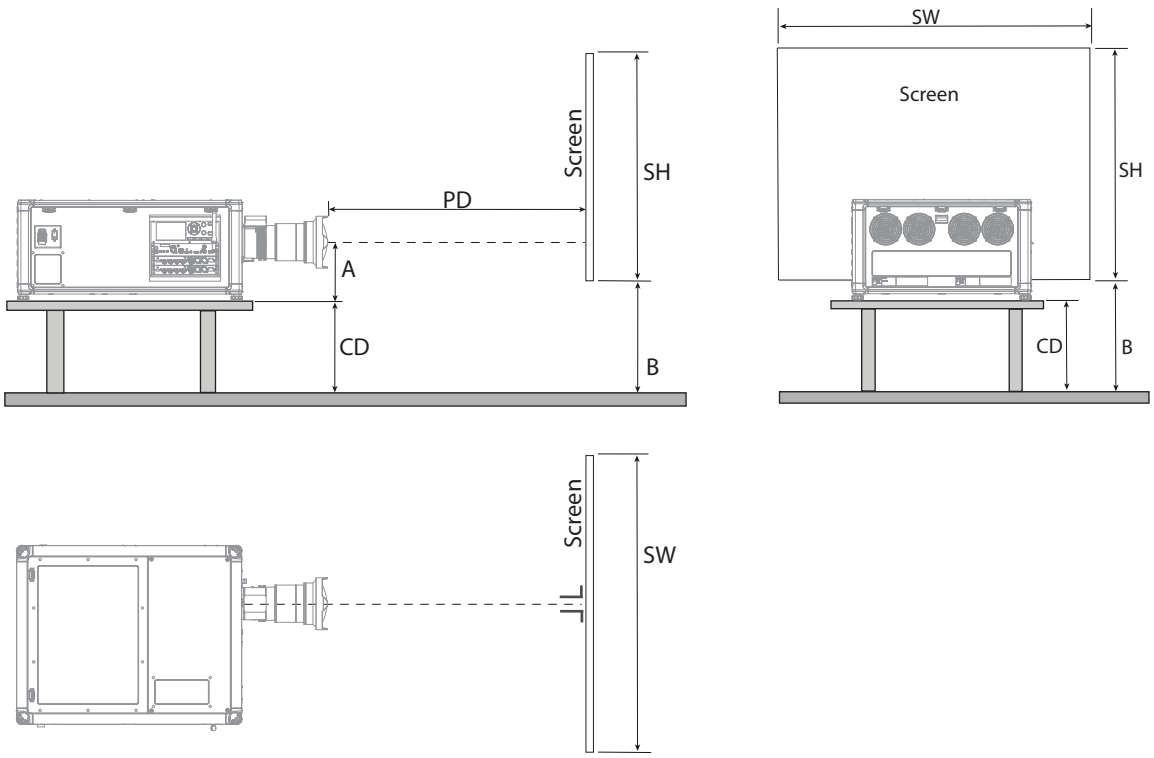

Image 3–11

On axis / off axis projection

The position of the projector with reference to the screen may also be different depending on the installation. Basically the projector can be positioned in On-Axis or Off-Axis configuration. On-Axis configuration means that the projector is positioned so as to have the centre of the lens coinciding with the centre of the screen. Off-Axis projection is obtained by shifting the lens up, down, left or right. Several parameters can be calculated determining the position in any installation.

Formula to calculate the distance CD for On-Axis projection: `CD = SH/2 + B - A`

3.6 Projector shift range

Horizontal and vertical shift range

The lens can be shifted with respect to the DMD (P) which result in a shifted image on the screen (Off-Axis). A 100% shift means that the centre point of the projected image is shifted by half the screen size. In other words, the centre point of the projected image falls together with the outline of the image in an On-Axis projection. Due to mechanical and optical limitations it's recommended to keep the shift values within the field of view (F) as illustrated below. Within these shift ranges the projector and lens perform excellently. Configuring the projector outside these shift ranges will result in a slight decline of image quality.

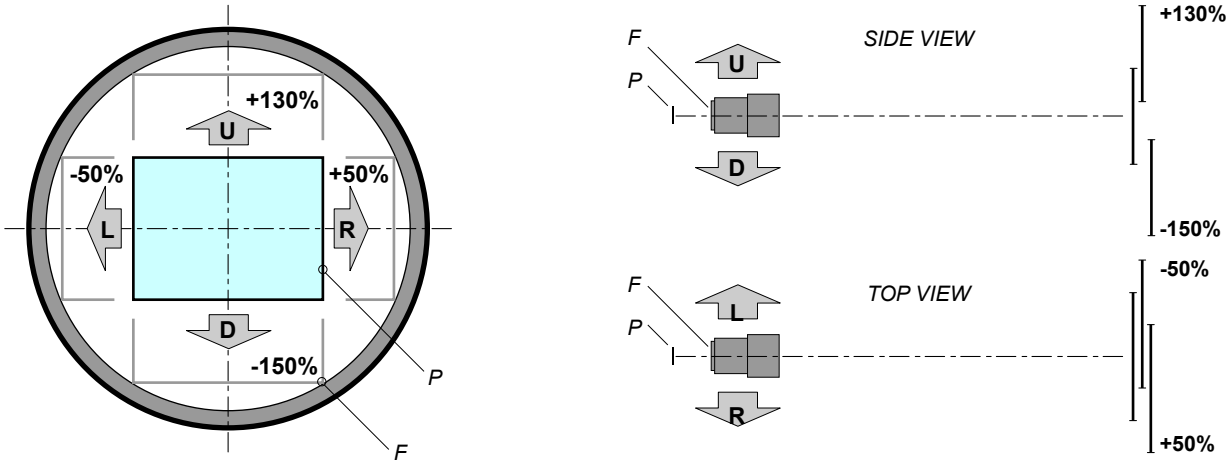

Image 3–12 Vertical and horizontal shift range.

P DMD.
F Field of view.
U Up (Table view)
D Down (Table view)
L Left (Table view)
R Right (Table view)

It is mechanical possible to shift outside the recommended field of view, but it will result in a decline of image quality depending on the used lens and the zoom position of the used lens. Furthermore, shifting too much in both directions will result in a blurred image corner.

Best image quality is projected in the On-Axis configuration.

3.7 Projector tilt range

Horizontal and vertical tilt range

The projector can be rotated and mounted at any angle.

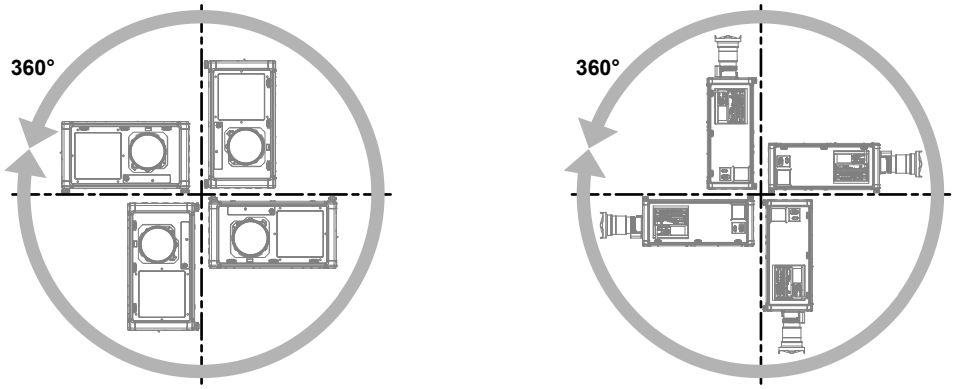

Image 3–13

3.8 Lens selection

How to select the best lens

1. Determine the required screen width (SW).
2. Determine the approximate position of the projector in the room.
3. Navigate to the *Lens Calculator* on the Barco website: https://lenscalculator.barco.com to determine the possible lenses for your configuration.

Note: The Lens Calculator can also be used to determine the position of the projector when the lens type and screen width is known.

Note: Due to lens tolerances the results of calculated values may be different from measured values. These difference may vary +/- 5%.

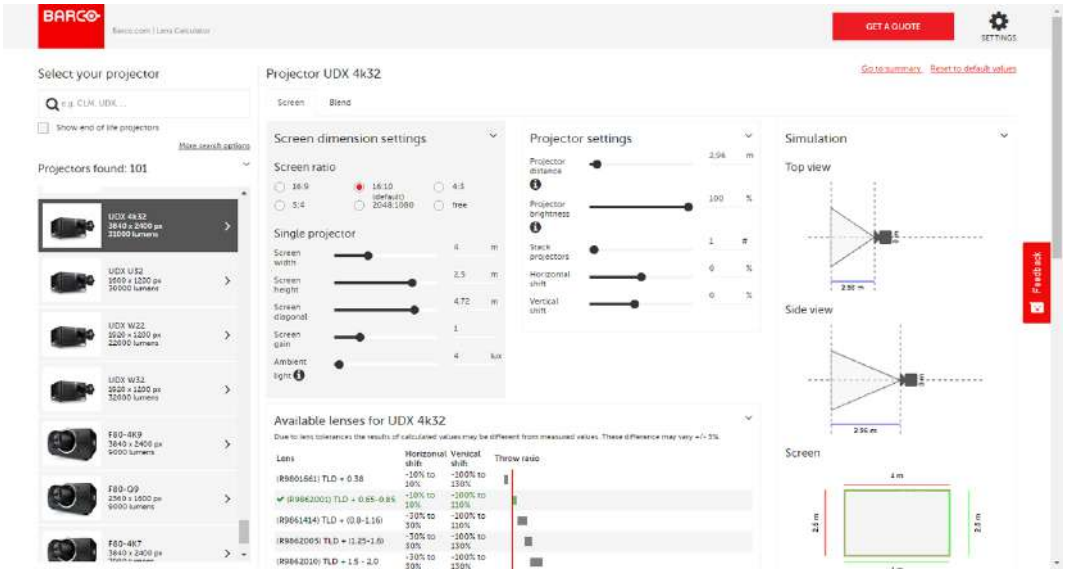

Image 3–14

3.9 Available lenses

Use the online *Lens Calculator* tool to determine the possible lenses for your configuration. See “Lens selection”, page 38.

CAUTION: Only the following **TLD+** lenses can be used on the QDX projector. Do not use other types of lenses.

List of available lenses

Order No	Name (Screening)	Image	Resolution	Throw Range
R9801661	TLD+ 90° UST (0.39) Fixed focal		WUXGA 0.9"	(0.38 : 1)
			4K 0.9"	(0.41 : 1)
R9862001	TLD+ 90° ST (0.65 - 0.85)		WUXGA 0.9"	(0.67 - 0.88 : 1)
			4K 0.9"	(0.72 - 0.94 : 1)
R9801414	TLD+ (0.85 - 1.15)		WUXGA 0.9"	(0.86 - 1.25 : 1)
			4K 0.9"	(0.93 - 1.33 : 1)
R9862005	TLD+ (1.14 - 1.39)		WUXGA 0.9"	(1.16 - 1.49 : 1)
			4K 0.9"	(1.24 - 1.60 : 1)
R9862010	TLD+ (1.39 - 1.8)		WUXGA 0.9"	(1.39 - 1.89 : 1)
			4K 0.9"	(1.49 - 2.02 : 1)

Order No	Name (Screening)	Image	Resolution	Throw Range
R9862020	TLD+ (1.8 - 2.6)		WUXGA 0.9"	(1.88 - 2.57 : 1)
			4K 0.9"	(2.01 - 2.75 : 1)
R9862030	TLD+ (2.6 - 4.1)		WUXGA 0.9"	(2.51 - 4.12 : 1)
			4K 0.9"	(2.69 - 4.41 : 1)
R9862040	TLD+ (4.1 - 6.9)		WUXGA 0.9"	(4.08 - 6.86 : 1)
			4K 0.9"	(4.37 - 7.35 : 1)
R9829997	TLD+ (6.9 - 10.3)		WUXGA 0.9"	(6.74 - 10.11 : 1)
			4K 0.9"	(7.22 - 10.83 : 1)

This table only takes into account active lenses at the moment of release of this manual. Lenses that have become end-of life or end-of service are not taken into account. Consult the Barco website for the most up-to-date information on active lenses.

Installation procedures

4

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4.11 Removing the projection lens 52

About this chapter

This chapter describes all basic procedures for the physical installation of the projector.

4.1 Pulse RCU battery installation

About the batteries for the remote control

Due to updated shipping regulations, batteries are no longer included in the packaging. It is up to the user to purchase the correct batteries.
Use two AA size (alkaline) batteries in the remote control.

Install the batteries before using the Pulse RCU.

CAUTION: Replace with the correct battery type. Use two AA size batteries. There is a risk of explosion if the battery is replaced with an incorrect type.

Required parts

AA size alkaline battery (two pieces)

How to install

1. Push the battery cover tab with the fingernail a little backwards (reference 1) and, at the same time, flip the cover outwards (reference 2).

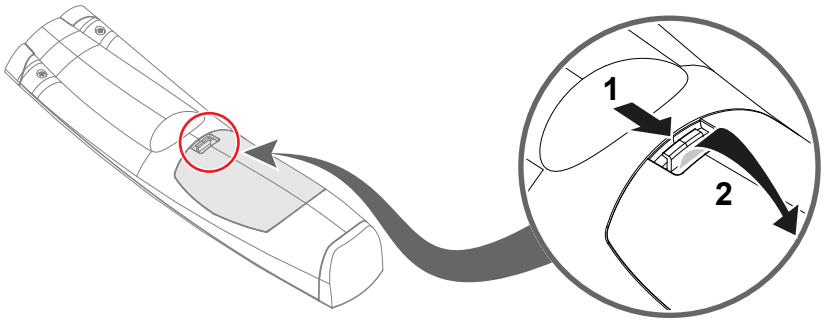

Image 4–1

2. Insert two AA size batteries into the battery compartment.

   making sure to match the polarities of the batteries to the + and - marks inside the battery compartment.

   Caution: Place the batteries as explained. There is a risk of explosion if the battery is incorrectly installed.

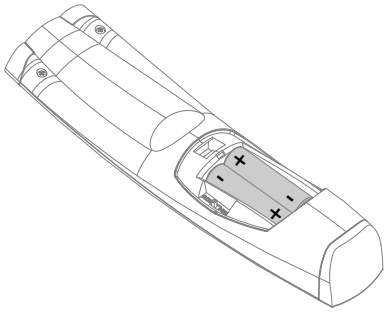

Image 4–2

3. Insert both lower tabs of the battery cover in the gaps at the bottom of the remote control (reference 3).
4. Press the top of the cover until in clicks in place (reference 4).

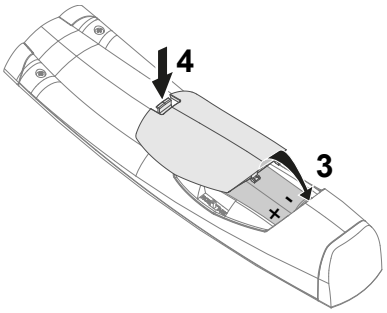

Image 4–3

Image 4–4

When replacing batteries, the broadcast address of the RCU will be reset to its default value '0'.

4.2 Installation of the projection lens

WARNING: Only use **TLD+ ZOOM** lenses. Using other lenses can touch and damage the mechanics of the build-in Actuator! This can result in loud rattling noises and a damaged Actuator.

How to install

1. Verify if the projector is switched off or that the projector shutter is activated (shutter is activated when the shutter icon on the projector keypad is red).
2. If present, remove the dust cover from the lens holder.

   Tip: While not placed in the projector, place the dust cover in a lockable plastic bag to prevent dust from gathering on the cover.

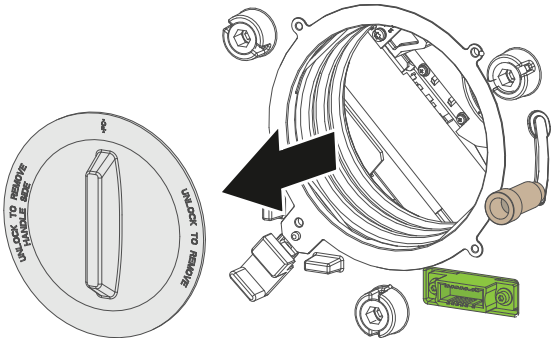

Image 4–5

3. Place the lens holder in the “unlocked” position as follows:. Do this by pulling the lens lock handle (reference 1) outward and then towards the electrical socket (reference 2) as illustrated.
   a) Pull the primary lens lock handle (reference 1) outward and then towards the electrical socket (reference 2).
   b) Pull the secondary lens lock (reference 3) slightly outwards until you hear an audible clicking sound.

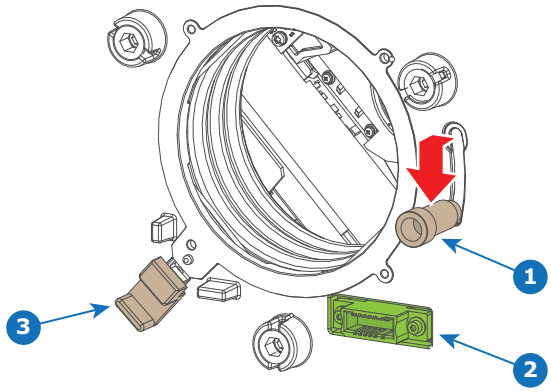

Image 4–6 Lens installation, preparation

4. Take the lens assembly out of its packing material and remove both lens caps from the lens.

   Caution: There are two lens caps on every new lens. One on the side of the projected surface, and one on the side of the lens holder.
   Damage may occur to the lens and/or the projector if the lens is installed while the lens cap on the lens holder side is not removed.

5. Gently insert the projection lens in the lens holder while aligning the lens connector with the electrical socket (reference 2) until a click is heard.

   Warning: Do not release the lens yet, as the lens may fall out of the lens holder.

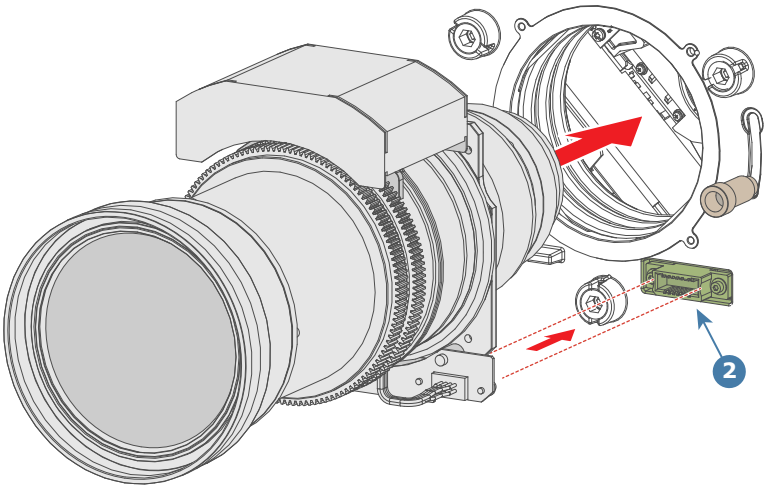

Image 4–7 Lens installation

6. Secure the lens by sliding the primary lens lock handle to the “locked” position. Ensure the lens touches the front plate of the lens holder.

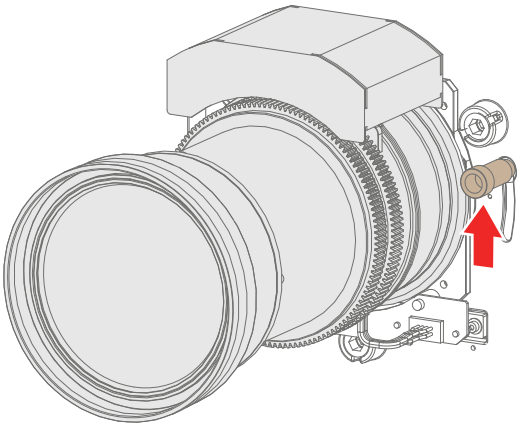

Image 4–8 Lock lens

7. Check if the lens is secured by trying to pull the lens out of the lens holder.

4.3 Installing an input board

CAUTION: Always wear a wrist band which is connected to the ground while handling the electrostatic discharge (ESD) sensitive parts.

This procedure assumes that no optional input board is installed and that the optional input slot is sealed with a dummy cover plate. However, the same procedure is applicable in case an input board of any type is installed and need to be replaced.

Required tools

Torx screwdriver T10

How to install

1. Switch off the projector and unplug the power cord of the projector. See procedure "Powering off the projector", page 50.
2. Loosen the 3 captive screws (reference 1) of the dummy cover plate of the optional input slot. Use a Torx screwdriver T10.

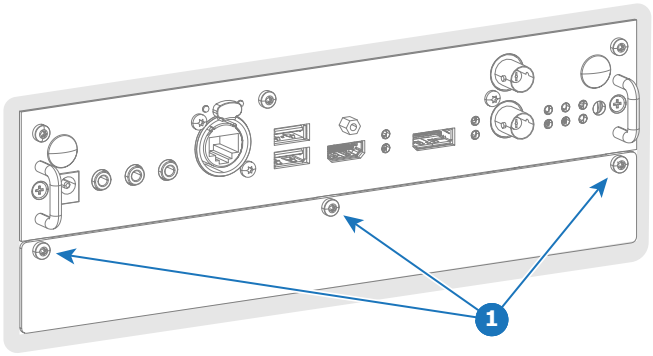

Image 4–9

3. Remove the dummy cover plate from the input slot.

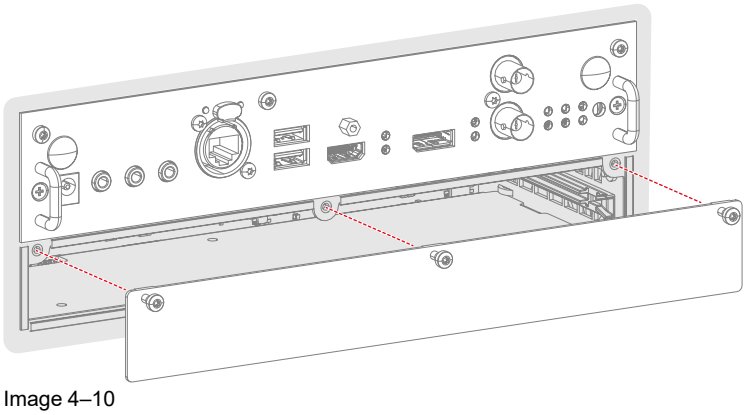

Image 4–10

4. Slide the input board in the input slot. Make sure the board seats in its sliders and is completely inserted in the slot.

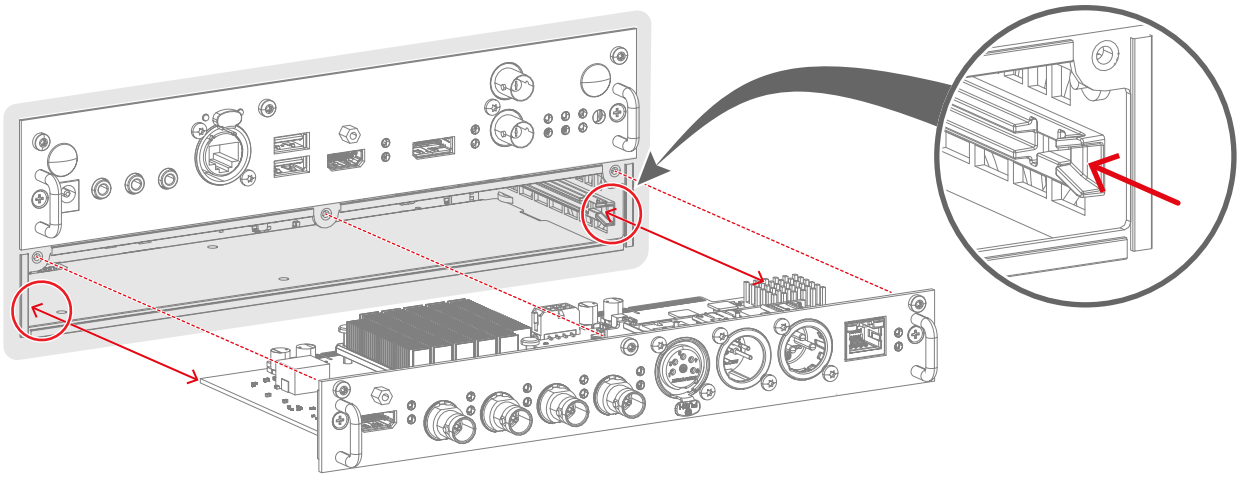

Image 4–11 The “Pulse Quad Combo Input” is used in this illustration.

5. Tighten the 3 captive screws (reference 2) of the input board.

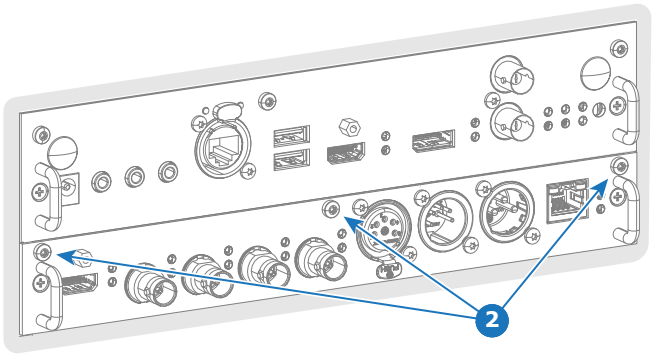

Image 4–12

6. Plug in the power cord of the projector and switch the projector on. See procedure “Powering on projector”, page 47.
7. Update the firmware of the installed input board. For more info, see the Pulse OSD user guide, or the Pulse Prospector user guide.

Tip: Use the complete software package to install the firmware via Pulse Prospector or USB stick. When a complete new software image is placed on the projector, all programmable components will be updated with the latest version.

CAUTION: Always install the dummy cover plate in case the optional input slot is not used.

4.4 Connecting the projector with the power net

CAUTION: Use only the power cord supplied with your device. When no power cord for your region/country is provided, contact your dealer. The power cord must be suited for the electrical ratings indicated on the product ID label. Only power cords according to the local electrical code regulations can be used.

WARNING: Do not attempt operation if the AC supply and cord are not within the specified voltage and power range.

How to connect with local power net

1. Ensure that the power switch is in the '0' (off) position (reference 1).

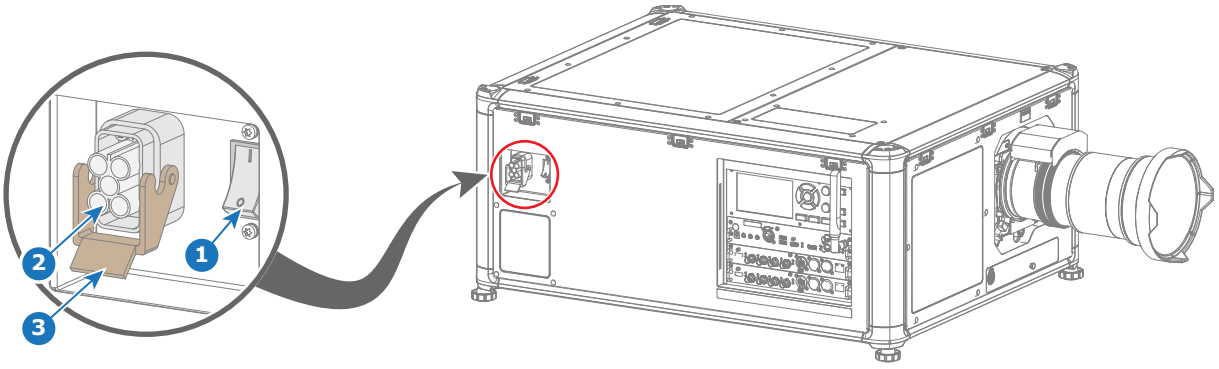

Image 4–13 Power input location

2. Connect the female side of the power cord with the power input socket of the projector (reference 2, Image 4–13).

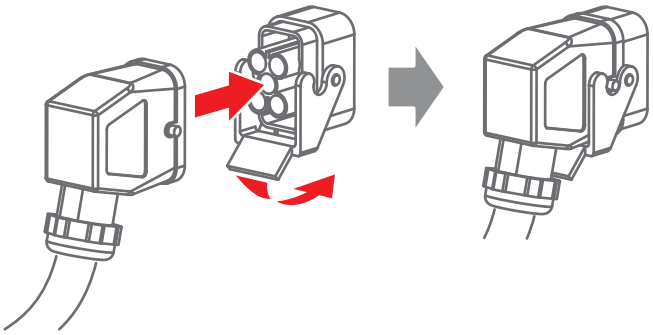

Image 4–14

3. Secure the power plug by locking the plug holder clamp (reference 3, Image 4–13).
4. Connect the male side of the power cord to the local power net.

CAUTION: Once the projector is switched from ready or on mode to standby mode, the cooling fans will continue to run for approximately 30 seconds to ensure that the projector and light source have sufficiently cooled, at which point the fans will automatically decrease to standby. To avoid thermal stress that can lead to premature light source failure, never unplug the power cord while the cooling fans are running. Never unplug the power cord to power down the projector, first switch off the power switch and then unplug the power cord.

4.5 Powering on projector

How to power on

1. Press the mains switch at the side of the projector to switch on this projector (reference 1)

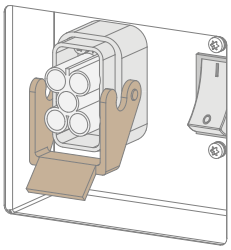

Image 4–15 Mains switch

- When '0' is pressed, the projector is switched off.
- When 'I' is pressed, the projector is switched on.

2. Ensure that the mains input of the projector is connected with the power net.

The projector starts up to **READY** mode. The **Power on/off** button will blink until **Ready** mode is achieved. Once in **Ready** mode, the **Power on/off** button will be lit **WHITE**. The start up screen is displayed on the touch panel. Once the startup is completed, the status screen will be displayed.

Image 4–16

3. Press the **Power on/off** button on the projector, or the **Power On** button on the remote control.

   The projector will continue to **ON** mode. The **Power on/off** button will blink until the projector is ready for projection. Once the projector is fully started up, the **Power on/off** button will be lit **BLUE**.

Image 4–17

4.6 Initial setup

Initial setup with Pulse OSD

1. Power up the projector.
2. Select the UI language.
3. Approve the End User License Agreement (EULA).
4. Define a new strong password for the default administrator.[3]

Initial setup with Pulse Prospector

Ensure the projector is powered and that the connected device and the projector operate within the same network or have full access to the projector network.

1. Open a browser and enter the IP address of the projector (default projector IP address is 192.168.1.101).[4]
2. Select the UI language.
3. Approve the End User License Agreement (EULA).
4. Fill in the default password: “**setup123**”.
5. Define a new strong password for the default administrator.[3]

4.7 Alignment of a table mounted projector

How to align

1. Place the projector in the desired location. Take into account the zoom range of the used lens and the size of the screen.
2. Project one of the internal hatch patterns on the screen.
3. Turn the adjustable feet in or out until the projected hatch pattern has a perfect rectangle shape and is leveled.

3. A strong password has a minimum of 8 characters and should be unique. The password should be a a mix of upper case letters, lower case letters, numbers and special characters.
4. The projector IP address is visible on the Dashboard of the projector LCD touch panel.

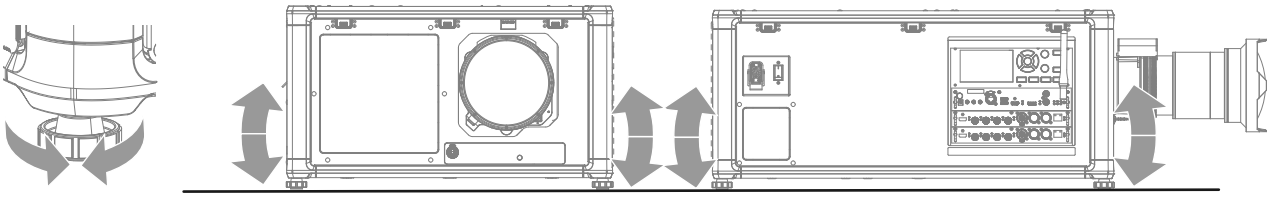

Image 4–18

When this is achieved, the projector is set horizontal and vertical at right angles to the screen.

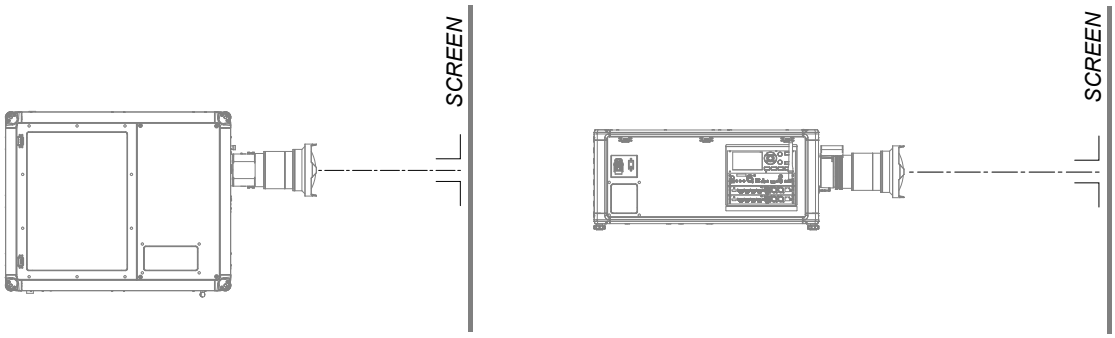

Image 4–19

4.8 Device registration

Why device registration

Device registration provides a detailed insight into what devices a customer has. The devices model, built year, serial numbers and more will be made visible in a central place. This takes away the administrative hurdles when calling for support. It also minimizes possible mistakes when providing service with information or details about the device.

Registered devices are visible on Barco's IoT platform: Insights Management Suite. This platform enables complete fleet management through remote monitoring of the device parameters. For more information, see the Insights Management Suite user guide.

Registration concept

The device registration concept relies on a **device identification file** installed during production, which is used to register the device in the cloud and retrieve the **device registration file** needed to complete the setup.

The registration process goes as follows:

1. **Obtain** the unique **device identification file** from the device.
2. **Upload** the device identification file to **the cloud**, using one of the software tools Barco provides.
3. **Install** the received **device registration file** on the device, either automatically or manually.

For more information on how to register the device with the desired method, see the following chapters.

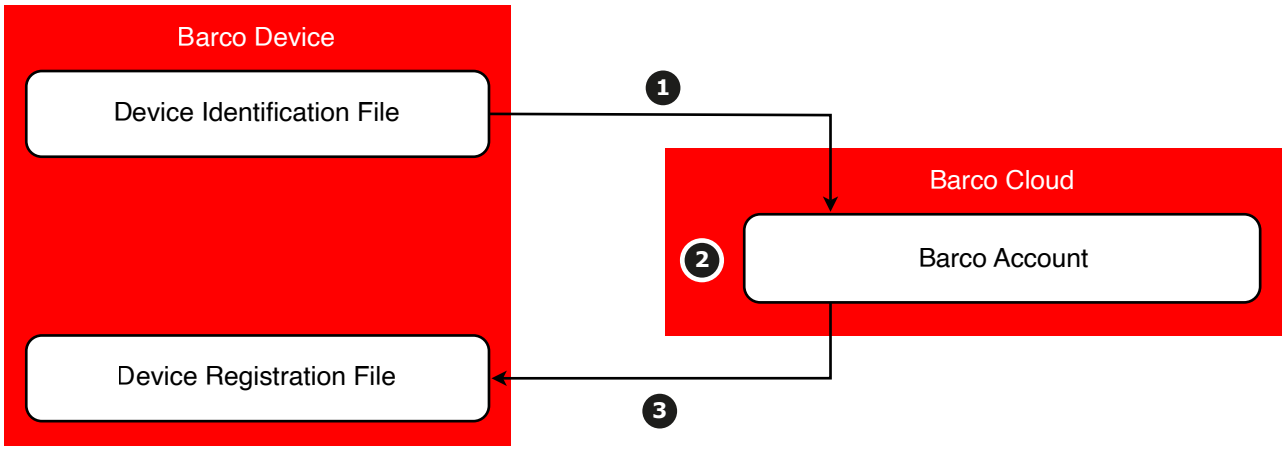

Image 4–20

Registration methods

There are several methods to register the desired device. Which method to use depends on:

- the available software tools,
- the version of the available software (tools),
- the type of device,
- the model family of the device, and
- the connection status of the device.

The following methods are available:

Method	Requirements	References (online)
Pulse Mobile (recommended)	• Mobile device with the Pulse Mobile app • Access to either the LCD or OSD of the projector or Pulse Prospector. • Software Pulse 2.6 or later	See *"Device registration using Pulse Mobile"* in the Pulse OSD user guide or *"Device registration using Pulse Mobile"* in the Pulse Prospector user guide.
Pulse OSD	• Access to either the LCD or OSD of the projector • Software Pulse 2.0 or later	See *"Device registration"* in the Pulse OSD user guide.
Pulse Prospector	• Computer or mobile device with access to both Pulse Prospector, as well as Insights Management Suite. • Software Pulse 2.5 or later	See *"Device registration"* in the Pulse Prospector user guide.
Projector Toolset (deprecated method)	• Computer with network access to both the projector, as well as Insights Management Suite. • Software Pulse 2.5 or earlier • Projector Toolset version 1.20 or later.	See the Projector Toolset user guide.

4.9 Powering off the projector

How to power off the projector

1. While the projector is in **ON** mode, shut down the light source by using one of the following methods:
   - ► Press and hold the **Power on/off** button on the local keypad.
   - ► Press and hold the **Power off** button on the remote control.

Note: If the **auto lights source off** feature is enabled, the projector will automatically transition to **READY** mode if no sync is detected on the chosen source input (default time-out 15 minutes). For more info, see the Pulse OSD or Pulse Prospector manual.

The projector will switch from **ON** to **READY** mode first in order to run through a cool down phase.

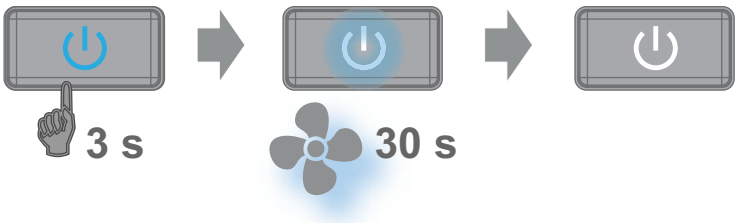

Image 4–21

2. While the projector is in **READY** mode, use one of the following methods to transition the projector from **READY** mode into **STANDBY** mode:
   - Press and hold the **Power on/off** button on the local keypad.
   - Press and hold the **Power off** button on the remote control.

   Note: If the **auto standby** feature is enabled, the projector will automatically transition to **STANDBY** mode if no activity is happening on the projector (default time-out 15 minutes). For more info, see the Pulse OSD or Pulse Prospector manual.

3. While the projector is in **STANDBY** mode, do one of the following to bring the projector from **STANDBY** mode into **ECO STANDBY** mode:
   - Press and hold the **Power on/off** button on the local keypad.
   - Press and hold the **Power off** button on the remote control.

   Note: If the **auto standby** feature is enabled, the projector will automatically go to **ECO STANDBY** mode after a time-out (default time–out 15 minutes). For more info, see the Pulse OSD or Pulse Prospector manual.

Some actions (like applying a grey test pattern) are done during the two minutes of the cool down phase. This is done in order to minimize the potential effect of burn-in and increase the projector lifetime.

CAUTION: Never switch off the projector by means of unplugging the mains cord or by cutting down the mains power.

Barco advises to keep the projector always powered and use the **ECO STANDBY** mode for low power consumption.

4.10 Unplugging the projector

Prerequisites

Power off the projector and wait at least 30 seconds. For more info, see “Powering off the projector”, page 50.

CAUTION: It is very important to wait few minutes before unplugging the power cord. If the cool down phase is not adhered, projector lifetime could be degraded.

How to unplug

1. Switch off the projector with the mains switch.

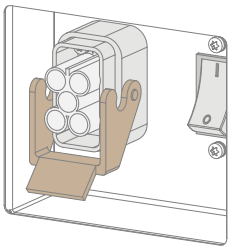

Image 4–22 Mains switch

- When '0' is pressed, the projector is switched off.
- When 'I' is pressed, the projector is switched on.

2. Unplug the power cord from the projector.

4.11 Removing the projection lens

Remove the projection lens

1. Support the projection lens with one hand while unlock the lens holder as follows:
   a) Place primary lens lock handle (reference 1) in the “unlocked” position.
   b) Pull the secondary lens lock (reference 3) outwards.
2. Gently pull the projection lens out of the lens holder.

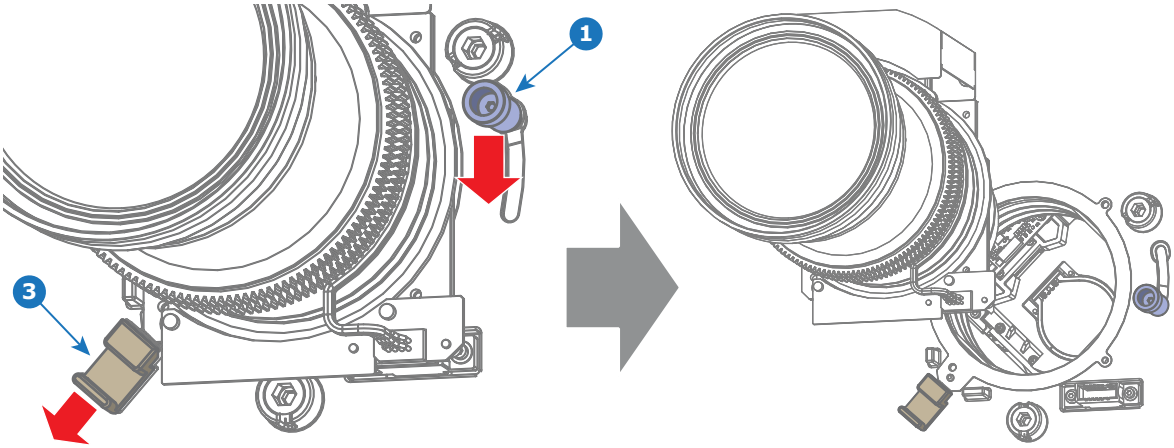

Image 4–23

3. Place the dust cover of the original projector packaging back into the lens opening to prevent intrusion of dust.

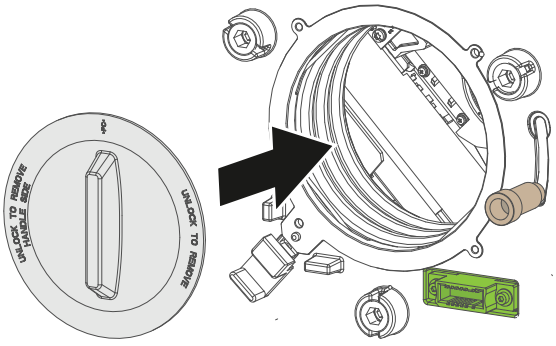

Image 4–24

It's recommended to place the lens caps of the original lens packaging back on both sides of the removed lens to protect the optics of the lens.

5 UST lenses

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5.2 Change the motor block orientation 55
5.3 Installing the UST lens 56
5.4 Adjustment of the UST lens 57

5.1 About UST lenses

About the TLD+ 90° Ultra Short Throw (UST) lenses

The UST lenses are exclusively designed to be used on Barco projectors. The lens output is turned 90°. This allows for an optimal use of the vertical shift range when projecting to the left seen from the rear side of the projector.

This lens is designed for ultra short throw video performance.

The lens shift can be +/-150%, depending on projector type. Use the lens calculator to calculate actual values for the projectors used in your setup. For more info on the lens calculator tool, see “Lens selection”, page 38.

Different motor block orientations

On older Barco rental projectors (HDX and HDF) there was a different lens holder, when compared to Barco’s current rental projectors (including this projector). One of the big differences between these two types of lens holder is that the socket for the electrical connection has a different orientation.

For this reason the UST lenses that can be used on both generations rental projectors are designed with a motor block that can easily be rotated around the lens body. This allows that the lens output direction remains the same while the electrical plug on the motor block can be turned to matches the electrical plug on the lens holder front plate. See the following example illustrations.

Image 5–1 Example of the 0.37:1 UST lens in both orientation

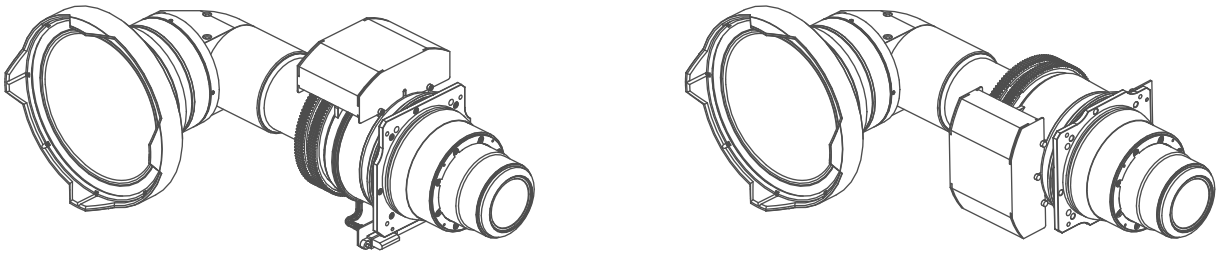

Image 5–2 Example of the 0.65 - 0.85:1 UST lens in both orientations

For our current projectors (including this projector), the motor block must always be located above the lens body (ref. 1) when facing the projector from the front side in table mount. For the older HDX and HDF projectors the motor block must always be located at the right side (ref. 2) of the lens body when facing the projector from the front side in table mount.

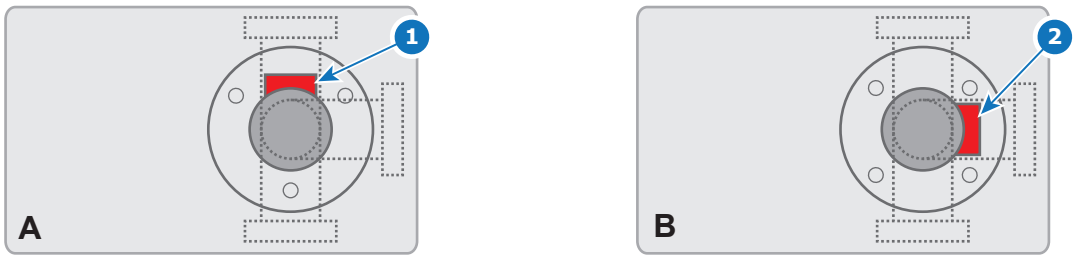

Image 5–3

A Method for current projectors (including this projector)
B Method for older HDX and HDF projectors

The lens body can be rotated per 90° relative to the motor block. However, the most common configuration is probably with the lens output oriented to the left seen from the rear side of the projector in table mount. Other

directions (e.g. downwards) may cause interference of the projector housing/rigging frame in the light path of the projected image.

A new Short Throw 90° zoom lens is delivered with the motor block mounted in the orientation for left projection of the current generation projectors in table mount. To change the motor block orientation, see “Change the motor block orientation”, page 55.

5.2 Change the motor block orientation

The illustrations in this procedure are a single example, shifting the motor block rotation from current left side projection to HDX/HDF left side projection (seen from the rear side of the projector in table mount). Other examples are possible, but will use the same method.

Required tools

Allen wrench 2.5 mm

Required parts

Set screw M5x8 DIN915

Rotate the motor block of the lens

1. Remove the eight screws (reference 1) as illustrated. Use a 2.5 mm Allen wrench.

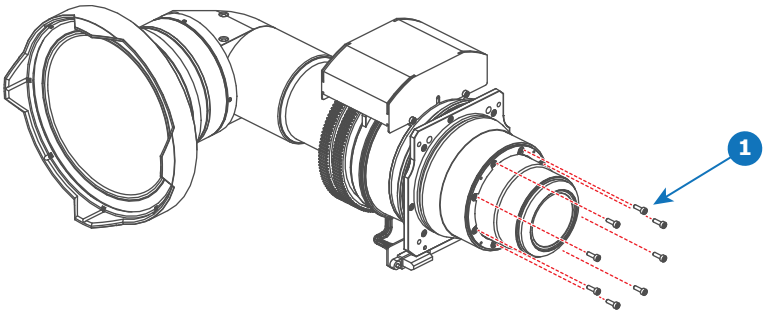

Image 5–4

2. Rotate the motor block around the lens body in to the desired position.

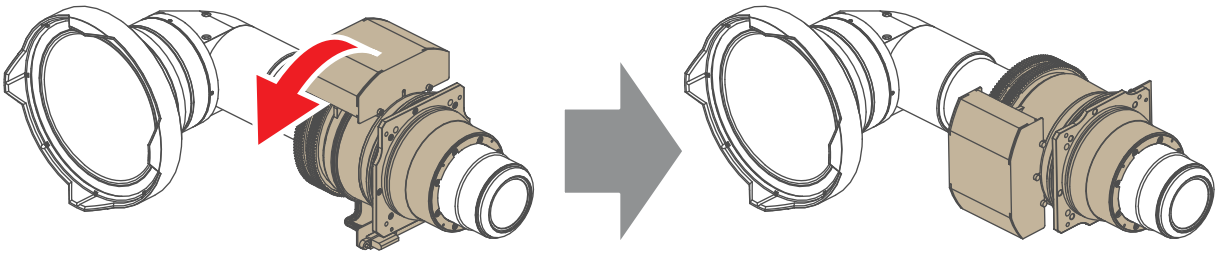

Image 5–5

3. Fasten the motor block with the eight screws removed in step 1.

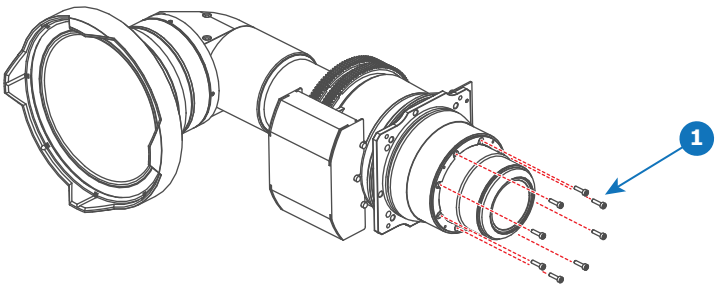

Image 5–6

4. Turn the set screws of the mounting plate, depending on the projector used:
   - If used on a current projector, turn the set screw into the mounting plate until it exceed 1.5 mm on the other side of the mounting plate.

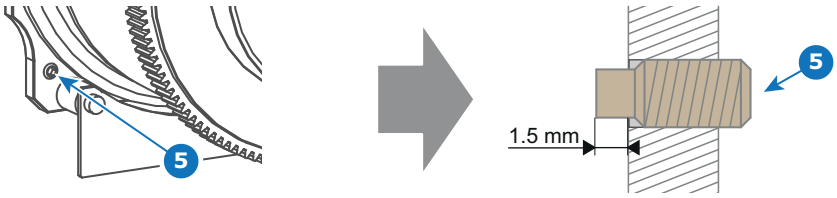

Image 5–7

   - If used on an older HDX or HDF projector, turn the set screw out of the mounting plate until it doesn't exceed on the other side of the mounting plate.

Image 5–8

5.3 Installing the UST lens

Prerequisites

Check if the motor block of the US lens is oriented for the current projector. If not, change the orientation. See “Change the motor block orientation”, page 55.

How to install the UST lens

1. Place the primary lens lock in “unlock” position. Handle (reference 1) towards electrical socket (reference 2).

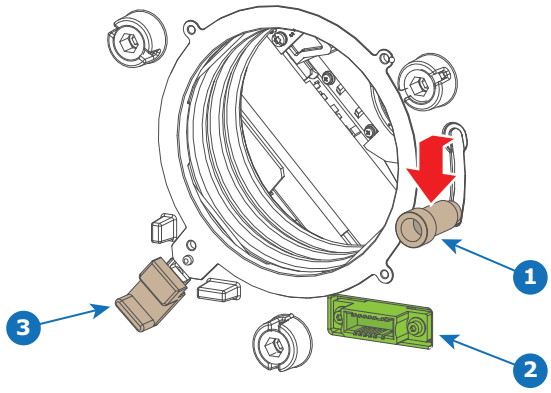

Image 5–9 Lens installation, preparation

2. Check if the secondary lens lock stands in the “unlock” position (reference 3, Image 5–9).
3. Check if the set screw (reference 5) in the lower left corner of the mounting plate on the UST lens is inserted. The set screw should exceed 1.5 mm.

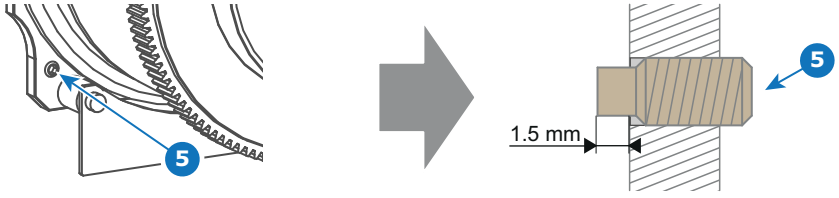

Image 5–10

4. Gently insert the lens. Ensure the lens connector matches the electrical socket on the lens holder.

   The secondary lens lock (reference 3) makes an audible clicking sound when latching.

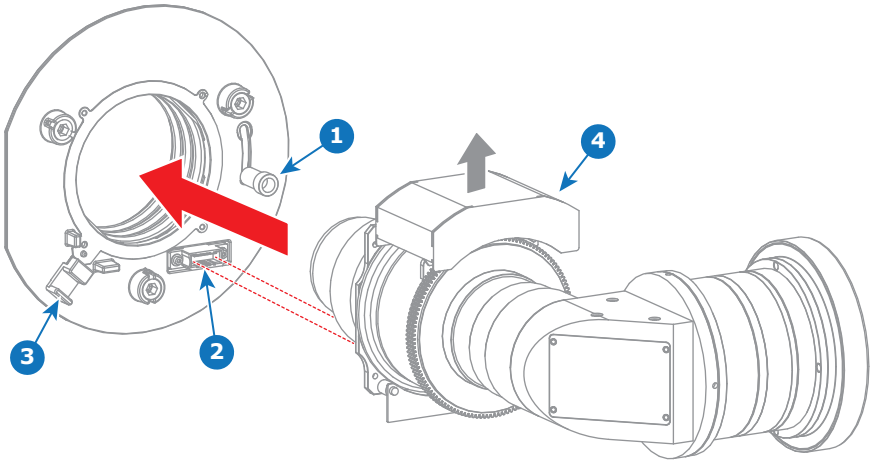

Image 5–11 Example of mounting the UST lens

5. Secure the lens in the lens holder by sliding the primary lens lock handle into the “locked” position (reference 1, Image 5–11).
6. Check if the lens touches the front plate of the Lens Holder.
7. Check if the lens is really secured by trying to pull the lens out of the lens holder.

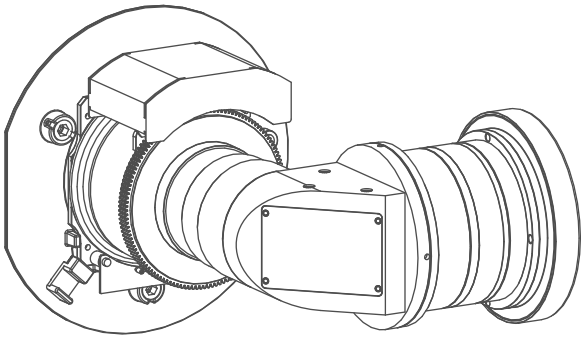

Image 5–12

After installation, the lens needs to be adjusted. See procedure “Adjustment of the UST lens”, page 57.

5.4 Adjustment of the UST lens

Because the 90 degrees lens makes use of an intermediate image in the optics of the lens, the projected image will be flipped (top becomes bottom). Because of this, the projector orientation settings have to be adapted accordingly: Ceiling mount becomes Table mount and Front projection becomes Rear projection. See the Pulse OSD user manual or the Pulse Prospector for more info on how to update the projector orientation.

About focus drift and dynamic focus

Due to the design of TLD+ lenses and ultra-short throw lenses (UST lenses), these type of lenses tends to heat up over time when used in projectors. This has the side-effect of a slight shift in focus between the lens in its cold state and the lens in its heated state. For this reason it is important to only adjust focus on the mounted lens while it is in its heated state. This can be achieved by projecting an image for 10 minutes or more.

Next to that, content that shifts a lot between dark and bright images can cause the focus to “drift” a little.

While there are external solutions available that perform a “focus drift compensation”, a dynamic focus feature has been implemented that handles this focus drift on projectors that support TLD+ lenses. While enabled, the projector will perform the necessary calculations in order to handle this drift in focus.

The amount of focus drift can differ between lenses. For that reason it is important to calibrate the focus drift when a new lens is mounted in the projector.
Use the calibration wizard in Pulse Prospector or Projector Toolset to calibrate focus drift. For more info on the focus drift calibration, consult the Pulse Prospector or Projector Toolset user guide.

How to adjust the UST lens

1. Start up the projector and project the focus pattern on the screen. See pulse OSD user manual for detailed instructions.
2. Rotate the "adjusting ring for various throw distance" (Ring-A) to the position of the desired throw distance.
   ► For example If the throw distance is 1.716 m, the mark should be located between 1.5 m and 2 m. (as shown in Image 5–13).
   ► For example: If the throw distance is 3.4 m, the mark should be located between 3 m and 4 m. (as shown in Image 5–14).

   Note: Ring-A is not motorized. Manual adjustment is needed.
3. Rotate "the focusing gear" (Ring-B) to get good focus in the center of the image.

   Note: Ring-B is motorized. Use the remote control or local keypad of the projector to adjust.

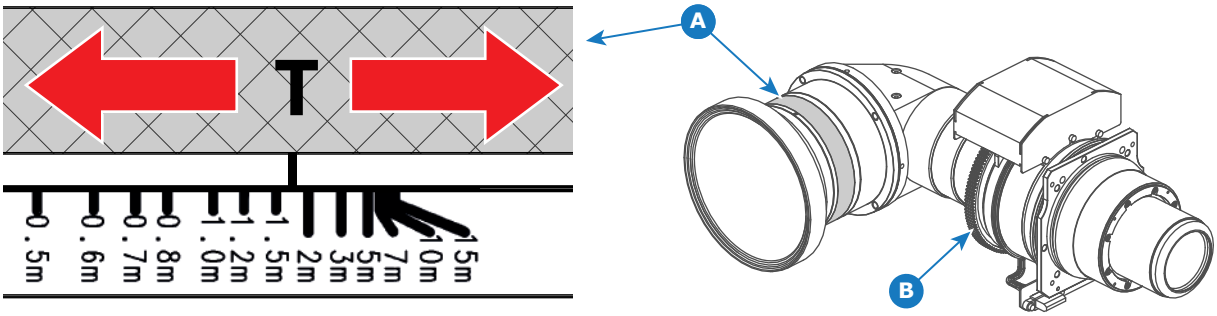

Image 5–13

A Adjustment Ring-A: various throw distance
B Adjustment Ring-B: focusing gear
T Throw distance (projection distance)

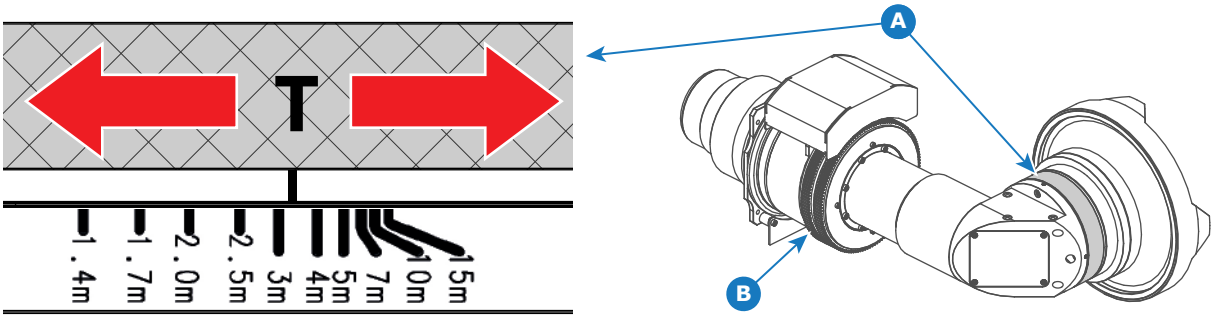

Image 5–14

A Adjustment Ring-A: various throw distance
B Adjustment Ring-B: focusing gear
T Throw distance (projection distance)

4. When unable to get a good focus in both the center and corners of the projected image, rotate Ring-A in the direction which results in better focus of the corners.
5. Rotate the Ring-B again to get good focus in the center of the image.

6. Repeat the previous steps until a good focus is achieved, both in the center and the corners of the projected image.

Scheimpflug (Boresight) 6

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6.1 Scheimpflug introduction

What is Scheimpflug?

The lens holder has to be adjusted so that the “sharp focus plane” of the projected image falls together with the plane of the screen (Fp1→Fp2). This is achieved by changing the distance between the DMD plane and the lens plane (Lp1→Lp2). The closer the lens plane comes to the DMD plane the further the sharp focus plane will be. It can occur that you won't be able to get a complete focused image on the screen due to a tilt (or swing) of the lens plane with respect to the DMD plane. This is also known as Scheimpflug's law. To solve this the lens plane must be placed parallel with the DMD plane. This can be achieved by turning the lens holder to remove the tilt (or swing) between lens plane and DMD plane (Lp3→Lp4).

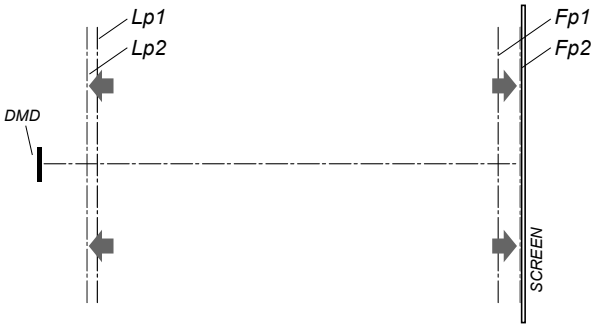

Image 6–1

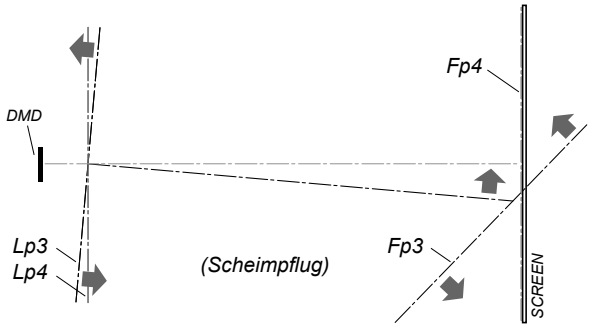

Image 6–2

Scheimpflug principle
The "plane of sharp focus" can be changed so that any plane can be brought into sharp focus. When the DMD plane and lens plane are parallel, the plane of sharp focus will also be parallel to these two planes. If, however, the lens plane is tilted with respect to the DMD plane, the plane of sharp focus will also be tilted according to geometrical and optical properties. The DMD plane, the principal lens plane and the sharp focus plane will intersect in a line below the projector for downward lens tilt.

Scheimpflug adjustment points

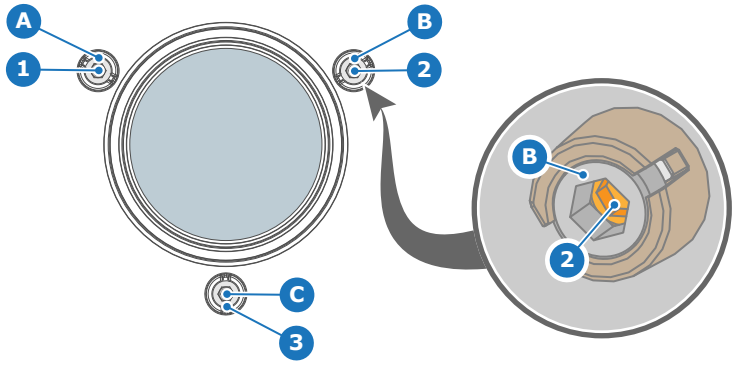

Image 6–3 Scheimpflug adjustments points on Lens holder - Projector front view. (Shape of the lens may vary with the model)

1 Scheimpflug adjustment screw
2 Scheimpflug adjustment screw
3 Scheimpflug adjustment screw

A Scheimpflug lock nut
B Scheimpflug lock nut
C Scheimpflug lock nut

When to apply Scheimpflug?

Only apply a Scheimpflug correction in case the overall focus of the projected image is not equally sharp (can be caused if the projector is **NOT in parallel** with the screen or a previous misaligned Scheimpflug). Take into account that the consequence of applying Scheimpflug correction upon a screen not in parallel with the projector is that the projected image differs from the rectangle shaped image. In other words “**distortion**” of the projected image occurs. **Masking** will be required to solve the distortion.

The disadvantage of Masking is loss of content. Therefore it is strongly **recommended** to place the projector **in parallel** with the projection screen and use the **SHIFT** functionality of the lens holder older to match the

projected image with the projection screen. In case the SHIFT range is not sufficient then the projector can be tilted and Scheimpflug can be applied.

6.2 Scheimpflug adjustment

Required tools

- Allen wrench 5 mm
- Allen wrench 8 mm
- Torque wrench with hex socket of 8 mm

Preparation steps

1. Verify that the throw ratio of the installed lens matches the requirements of the installation area (projection distance and screen size).
2. Check that the lens is correctly installed, and lens shift is in centre position.
3. Project the internal **Focus-Green** test pattern.
4. Zoom the lens to its widest opening (maximum image size on the screen).
5. Loosen the 3 Scheimpflug lock nuts a few turns (reference A, B and C). Use a 8 mm Allen wrench.

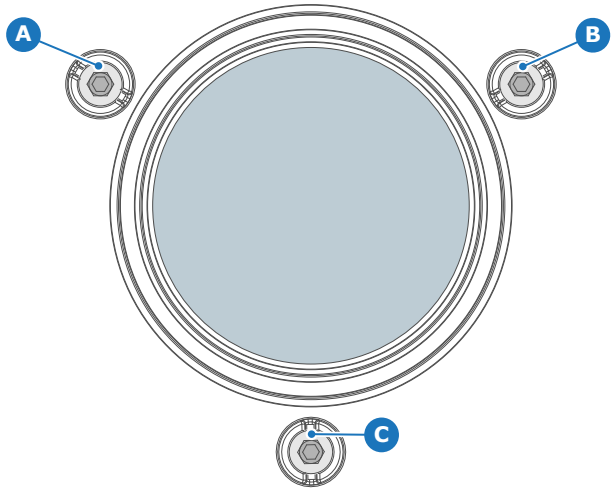

Image 6–4

6. Optimize the focus of the projected image in the center of the screen (F) using the motorized focus control (Local keypad or remote control).

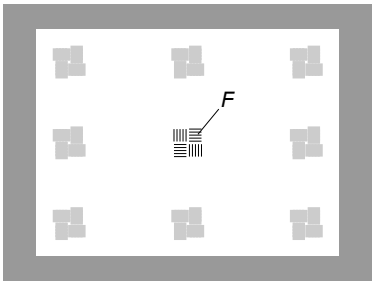

Image 6–5

Scheimpflug adjustment steps

1. Sharpen the image at the bottom right corner of the screen by turning the upper left Scheimpflug adjustment screw either clockwise or counterclockwise (reference 1) Use a 5 mm Allen wrench.

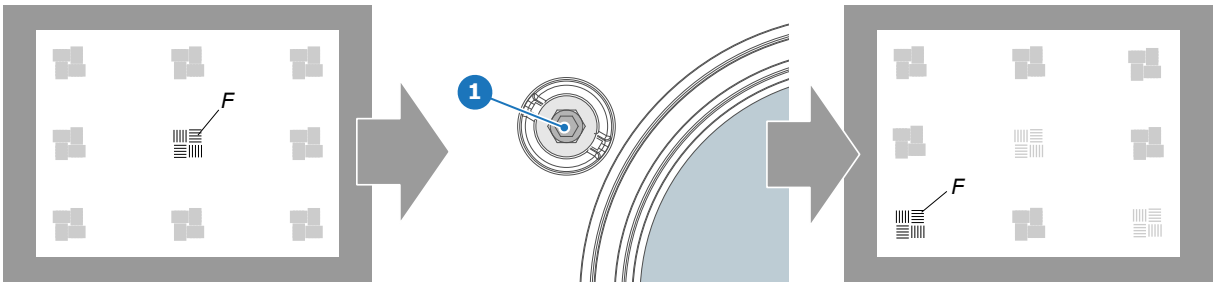

Image 6–6

As a result of this action, the focus in the center will fade a bit. This is expected behavior.

2. Sharpen the image at the lower left corner of the screen by turning the upper right Scheimpflug adjustment screw (reference 2).

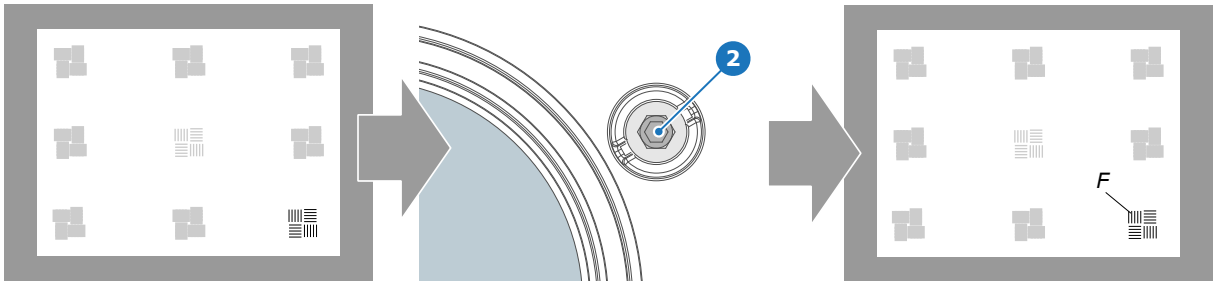

Image 6–7

3. Sharpen the image at the top center of the screen by turning the lower Scheimpflug adjustment screw (reference 3).

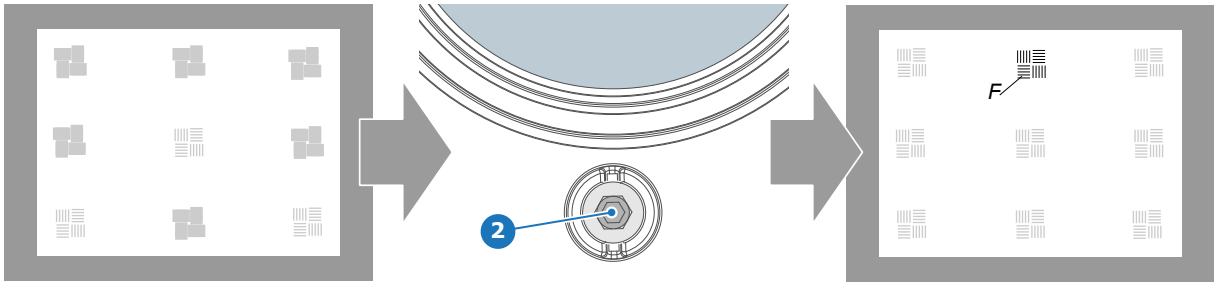

Image 6–8

4. Optimize the focus of the projected image in the center of the screen (F) using the motorized focus control (Local keypad or remote control).
5. Repeat the previous steps until the projected focus pattern is as sharp as possible in the center, left, right, top and bottom of the screen.
6. Fasten all Scheimpflug lock nuts (reference A, B and C Image 6–4). Use a torque wrench with a torque of 8.4 Nm.

Flight case and rigging frame

7

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7.2 QDX flight case 67
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7.7 Alignment of motorized rigging frame 76

7.1 QDX rigging frame

About the rigging frame

The QDX series multifunctional rigging frame is designed for the Barco QDX projectors, and can not be used for other equipment.

The rigging frame without projector weight about ±27 kg (±66 lbs).

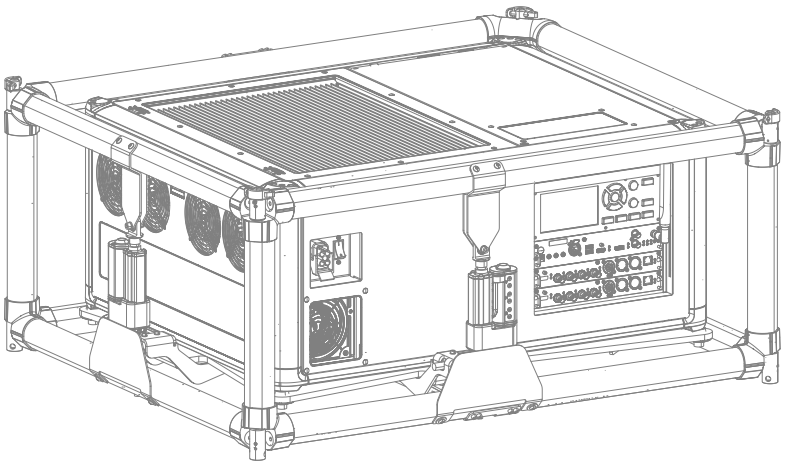

Image 7–1 Example of the projector in the rigging frame

Frame with or without projector

The frame can be ordered in two possible ways:

- With the projector already mounted in the frame (projector + frame + flight case bundle).
  In this case, just lift the projector with frame from the flight case. See also “QDX flight case”, page 67.
- With the projector bought separately from the frame (which can be bought as the frame + flight case bundle).
  In this case, it is required to fixate the frame to the projector. For more info, see “Fixating the frame onto the projector”, page 67.

Stacking and hanging projectors in the frame

For stacking projectors on top of each other, see “Stacking QDX projectors”, page 71.

For suspending projectors from a truss beam, do one of the following:

- If you use a set of rigging clamps, see “Suspending the projector using rigging clamps”, page 72
- If you use a single point hangar, see “Suspending the projector using a single point hanger”, page 74.

Transportation of the frame

Never transport the multifunctional frame in portrait position with a projector mounted. Failure to do so can cause damage the multifunctional frame. Refer to the following illustrationfor a bad and good example of transportation.

Image 7–2

This limitation only counts for **transportation** of a rigging frame with projector mounted. You can still **install** the projector in portrait position while in the rigging frame.

7.2 QDX flight case

Introduction of the QDX flight case

The QDX flight case is designed to transport the QDX in a safe and secure manner, with or without being mounted in its rigging frame. There's also sufficient space in the flight case to place the projector while mounted in the QDX rigging frame. The four caster wheels, provided with breaks, and the eight handles make the flight case easy to handle. The floor of the flight case wagon is equipped with two small covered compartments. These compartments can store things like the power cord, the remote control, manuals and others.

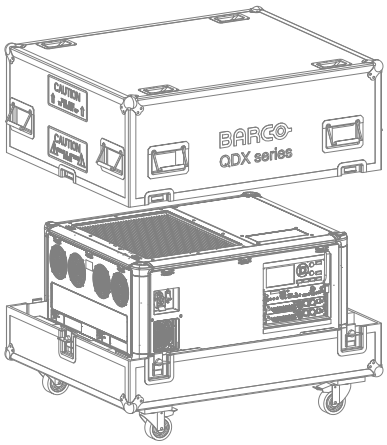

Image 7–3

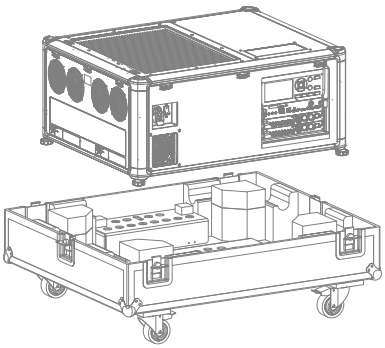

Image 7–4

The dimensions of the flight case are optimal for maximum utilization of the floor area of a truck. The cover of the QDX flight case has four stacking dishes, which allows to stack the flight cases.

WARNING: Maximum stack 2 QDX flight cases high. Never higher.

7.3 Fixating the frame onto the projector

Required tools

Torque Wrench with 6 mm and 8 mm hex bit

Required parts

- foam or cardboard buffer of 5 cm height.
- Hex screws with socket head M8 x 30 (x6)
- Hex screws with socket head M10 x 40 (x4)
- Spring washer M8 (x6)
- Spring washer M10 (x4)
- Plain washer M8 (x6)
- Plain washer M10 (x4)
- Locking pins (x4)

How to install

1. Place the projector upside down on an elevated surface of about 5 cm (2 in).

   Tip: Use foam pieces or cardboard buffers to elevate the projector.

   Caution: Do not underestimate the weight of the projector when trying to flip the device. Make sure to lift the projector (both with and without frame) with four people.

2. Remove the four projector feet. Turn the feet counterclockwise until you can remove the feet.

   Tip: Do not throw away the projector feet. Keep these in the storage compartment of the flight case.

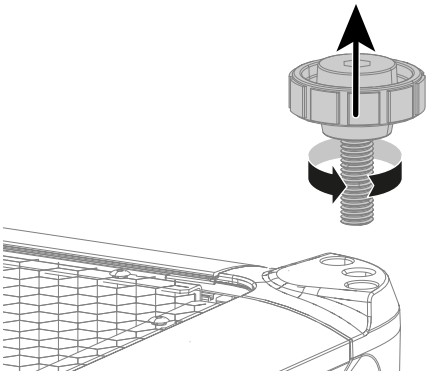

Image 7–5

3. Place the frame over the projector as illustrated. Align the mounting holes of the rigging frame to the mounting holes of the projector.

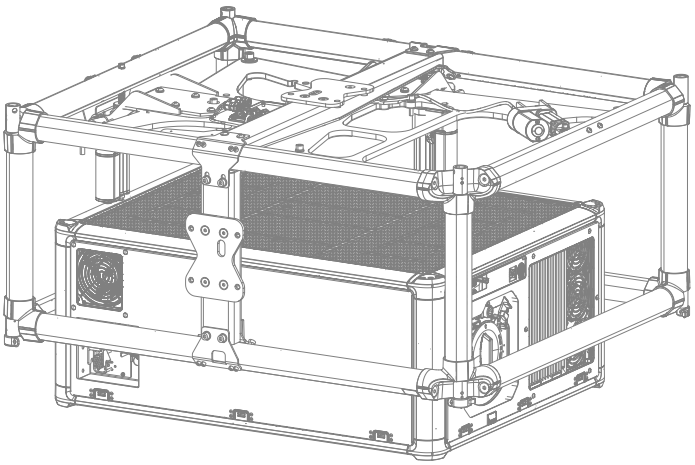

Image 7–6

4. Mount the six M8 hex screws (reference 1) + spring washer (reference 2) + plain washer (reference 3) on the bottom of the rigging frame to tie the two together.

⚠ *Caution:* Fasten the six screws with a torque of 20 Nm.

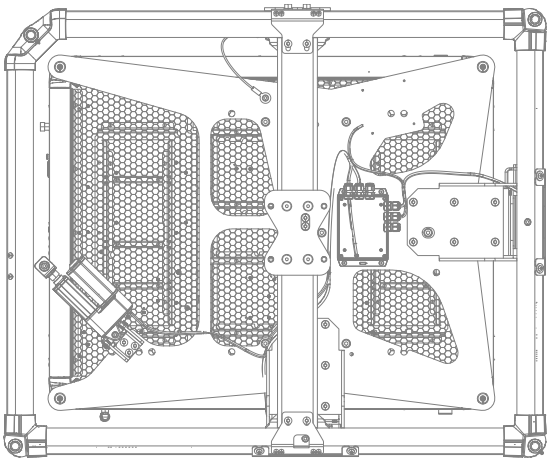

Image 7–7 Location of the six M8 hex screws

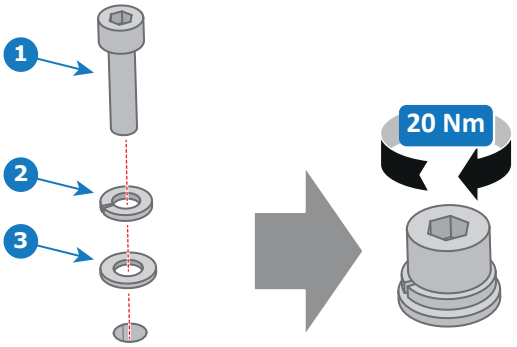

Image 7–8

5. Fixate the four M10 hex screws (reference 1) + spring washer (reference 2)+ plain washer (reference 3) on the bottom of the rigging frame on the location where the projector feet used to be.

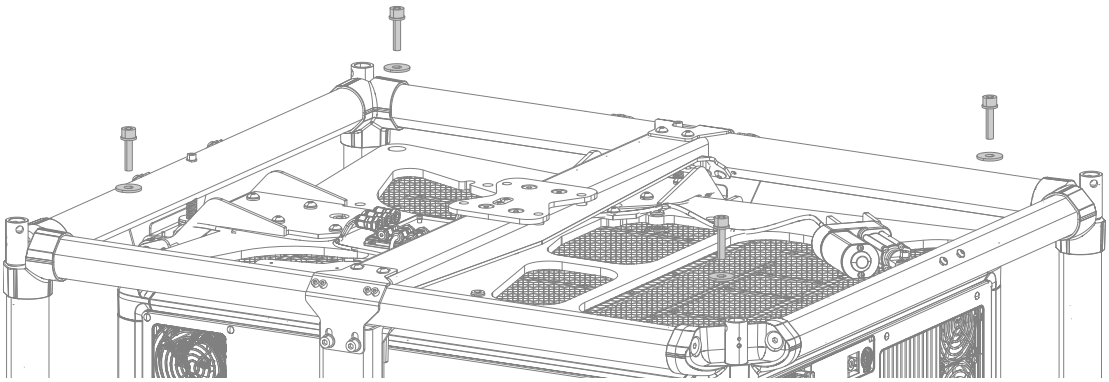

Image 7–9 Locations of the four M10 Hex screws

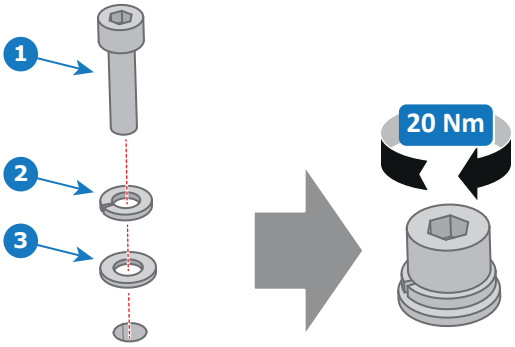

Image 7–10

6. Connect the XLR and USB wiring as follows:
   a) Release the XLR wire and USB wire from their respective cable clamps.

Image 7–11

b) Connect the XLR wiring to the front XLR connector of the projector (reference 2).
c) Connect the USB wiring to the USB connector on the side of the projector (reference 3).

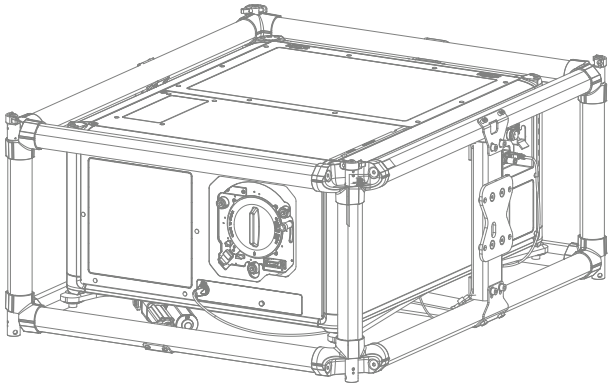

Image 7–12 Location of the wiring connection on the projector.

7. Lift up the frame with projector and flip it face-up.
8. Install the four locking pins (reference 1) in the top stacking pins.

Note: Skip this step if you immediately are going to stack or suspend multiple rigging frames.

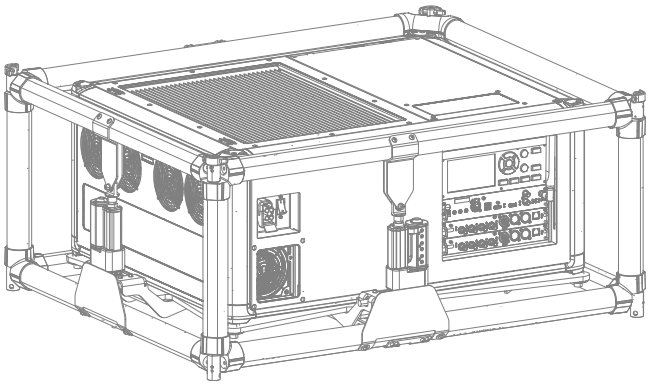

Image 7–13

1 Locking pin

Frame control

Once the frame has been fixated to the projector, power up the projector and check the following settings, either on the OSD, or by using Pulse Prospector.

- Enable the front XLR connector
- Set the front XLR voltage to +24V.
- Adjust the frame. For more info, see “Alignment of motorized rigging frame”, page 76.

For more info on how to change the settings, refer to the Pulse OSD manual or the Pulse Prospector user manual.

7.4 Stacking QDX projectors

WARNING: QDX projectors can be stacked up on top of each other on a flat surface, or suspended from a truss using the rigging frame. But keep the following in mind:
It is allowed to stack **maximum three** projectors
It is allowed to suspend **maximum two** projectors

How to stack

1. Make sure that each projector is installed in their respective rigging frame.
2. If pre-installed, remove all four locking pins (reference 1) from each rigging frame, except the frame that will be installed on top of the stack.

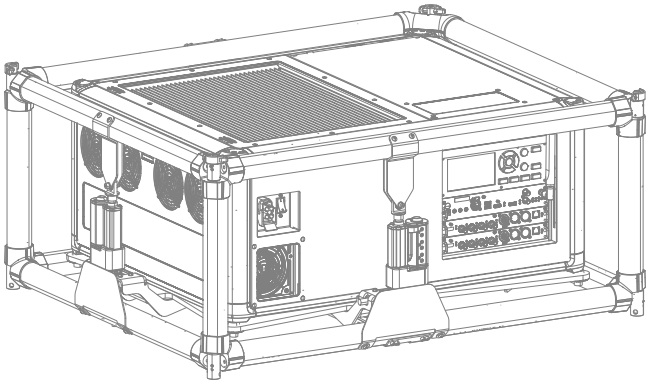

Image 7–14

1 Locking pin

Note: Even if not all pins are necessary in your current setup, it is important to keep all locking pins to their respective rigging frame for future use.

3. Stack the frames. Make sure the stacking pins of both frames are aligned.

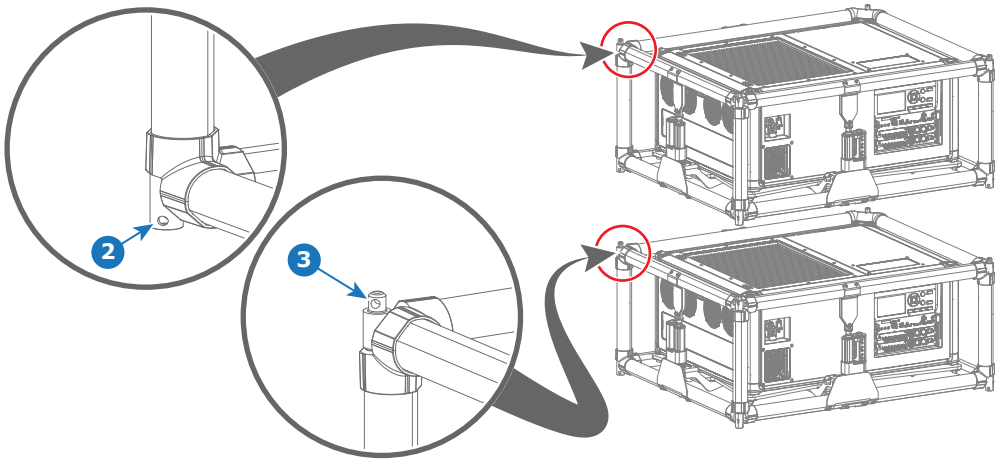

Image 7–15

2 Lower stacking pin
3 Upper stacking pin

4. Open the locking pin as illustrated.

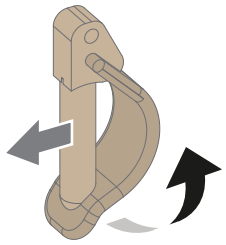

Image 7–16

5. Install an opened locking pin through the overlapping hole of both stacking pins.

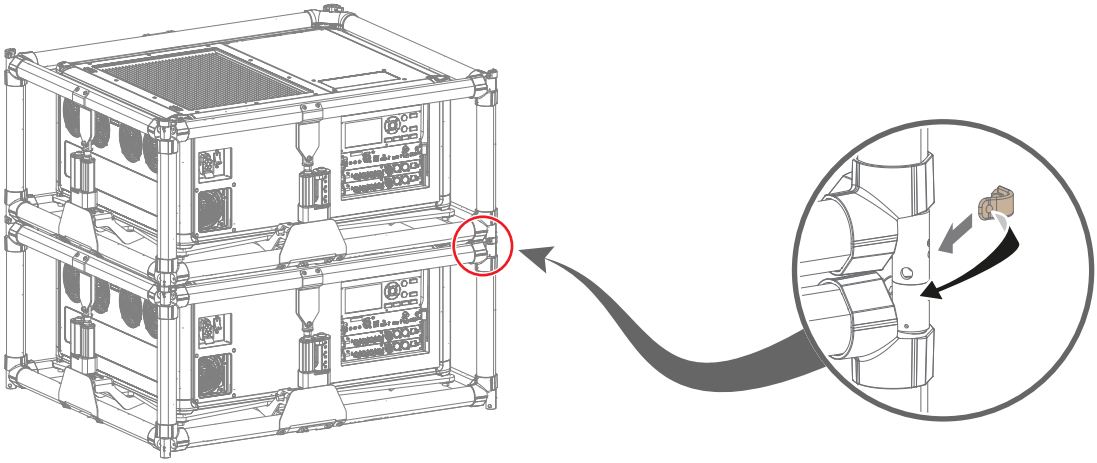

Image 7–17

6. Repeat the previous two steps for each overlapping corner of the stacked rigging frames.

In long-term installations, it is advised to also install swivels between the two projectors in order to make it easier to access the metal air filter on the top of the projector.

7.5 Suspending the projector using rigging clamps

WARNING: It is the responsibility of the installer to suspend the rigging frames in a safe and secure fashion. Safety cables must be applied according to local regulations and standards. Safety cables must be dimensioned for the applicable load and no drop distance is allowed or must be limited as much as possible.

Suspending the projector from a truss

The projector can be suspended from a truss using the multifunctional frame.

Take the following things into account:

- If suspension clamps are used, they can be placed on any of the round profiles of the frame. The number of clamps required depends on the types of clamps used. Always make sure you use at least 4 clamps: 2 clamps at 2 opposed sides of the frame. Make sure to take into account the total weight of all frames and projectors suspended from the truss.

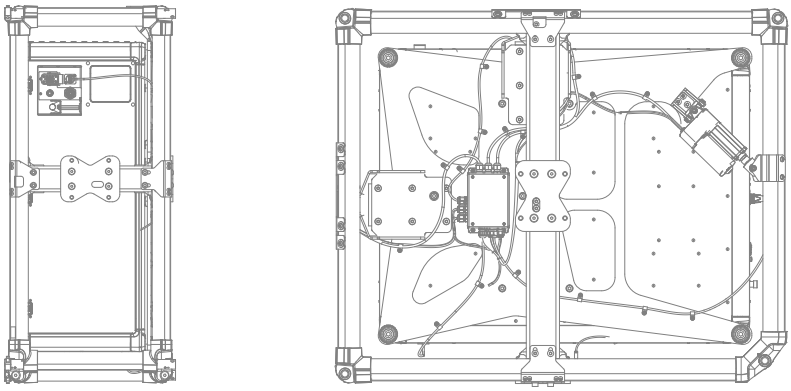

Image 7–18

- It is allowed to suspend **maximum two** stacked projectors.

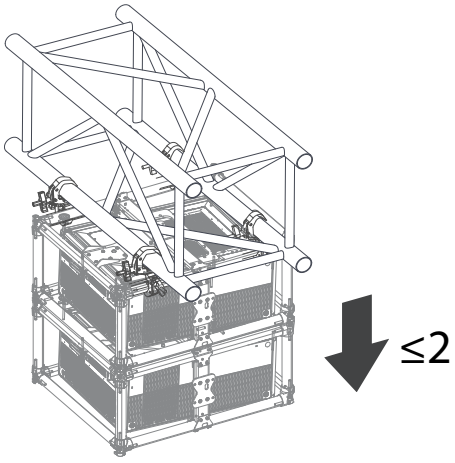

Image 7–19

CAUTION: When using single point suspension (both ceiling or portrait mode), it is not allowed to incline the frame for more than 20° towards the horizon.

Required parts

Double coupler clamps (x4)

How to suspend from a truss, using the rigging clamps

1. Measure the distance between the two used support bars of the truss, using the center tube as reference.

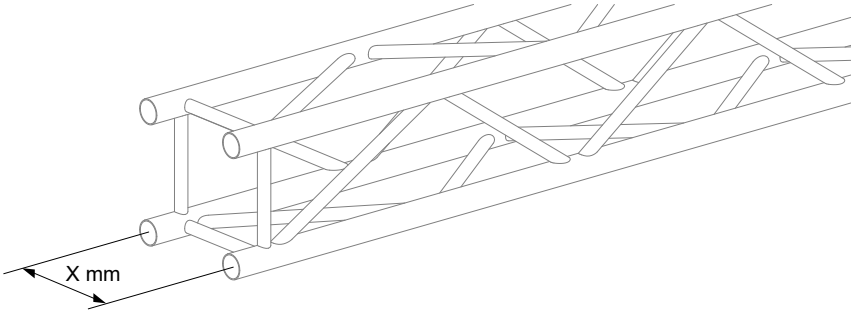

Image 7–20 Example of a truss beam

2. Flip the projector upside down.
3. If two projectors are suspended from each other, use the method described in “Stacking QDX projectors”, page 71.

Note: Make sure both projectors have the same orientation. Make sure both are flipped upside down

4. Install the rigging clamps, according the measured distance and secure this position. Ensure that the rigging points are symmetrically lined up, so that the projector will hang in balance.

   Warning: Always use four (4) rigging points, equally spread, to suspend the projector.

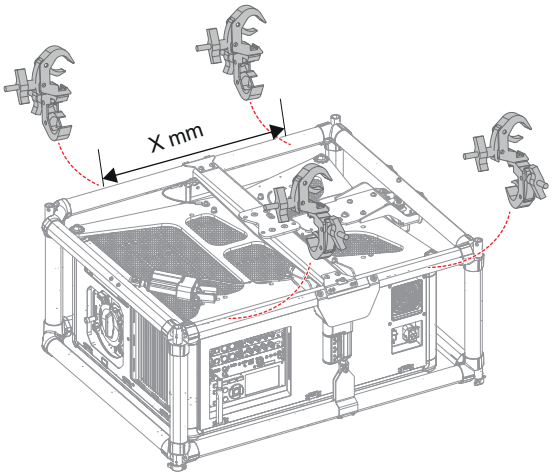

Image 7–21

5. Place the projector with clamps under the truss installation and lower the truss until the support bars of the truss are nearby the rigging clamps mounted on the projector.

   Warning: Always secure the rigging points after adjustment.

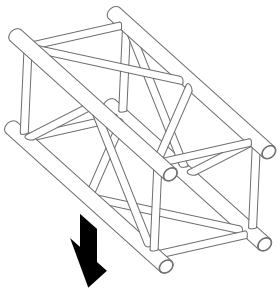

Image 7–22

6. Lock all four rigging clamps.
7. Lift up the truss with the attached projector to the desired height.

7.6 Suspending the projector using a single point hanger

WARNING: It is the responsibility of the installer to suspend the rigging frames in a safe and secure fashion. Safety cables must be applied according to local regulations and standards. Safety cables must be dimensioned for the applicable load and no drop distance is allowed or must be limited as much as possible.

Suspending the projector from a truss

The projector can be suspended from a truss using the multifunctional frame.

Take the following things into account:

- It is allowed to suspend **maximum two** stacked projectors.
- When using a single point of connection, you can use one of the two rigging points for suspending the frames. When using this method, also make sure to attach two safety cables. Tie these cables from the truss towards two of the frame bars opposing each other.
- Take into account that the four bolts connecting the single point hanger to the frame should be M8 bolts that must be inserted at least 15 mm into the frame rigging points.

CAUTION: When using single point suspension (both ceiling or portrait mode), it is not allowed to incline the frame for more than 20° towards the horizon.

How to suspend from a truss, using a single point hanger

1. Turn the projector upside down and install the single point hanger. Use the four big bolts to tighten it to the rigging frame.

   Caution: When using a single point hanger, take into account that the 4 bolts connecting the single point hanger to the frame should be M8 bolts that must be inserted at least 15 mm into the frame rigging points.

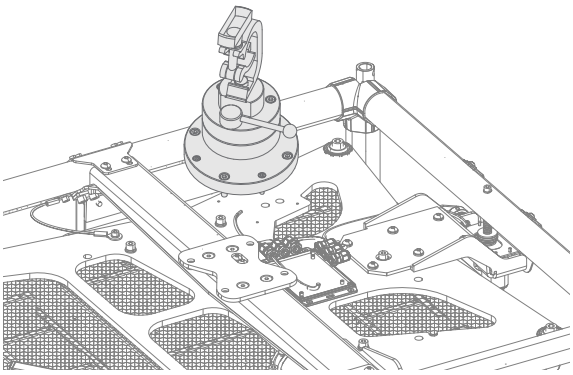

Image 7–23 Example of installing a single point hanger on the bottom side of the frame

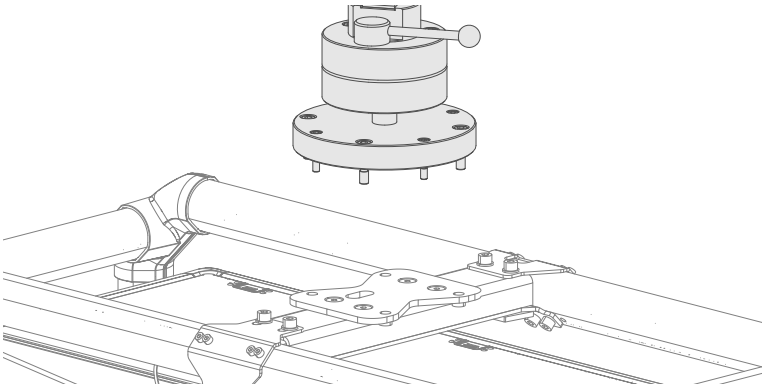

Image 7–24 Example of installing a single point hanger on the right side of the frame

2. Place the projector underneath the truss beam, with the single point hanger facing the truss.
3. Lower the truss until the support bars of the truss are near the single point hanger.

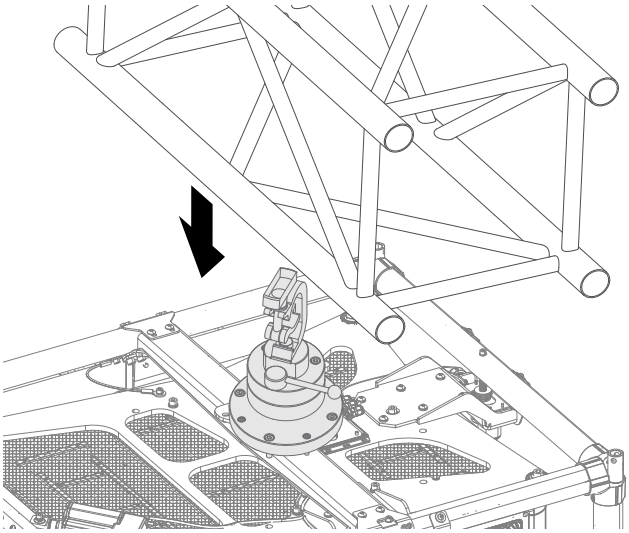

Image 7–25

4. Lock the single point hanger onto the truss.
5. Install two safety cables, one on both sides of the rigging frame, and around the truss.

   Mount safety cables around the frame bar (push the hook through the loop and then around the truss so that there is not to much play (maximum 20 cm). If necessary turn the cable a few times around the truss before clasping the safety hook around the cable.

   Note: Mount the 2 safety cables in such a way that when something goes wrong, the projector cannot fall more than 20 cm. If necessary, turn the cables a few times around the truss to obtain this maximum distance.

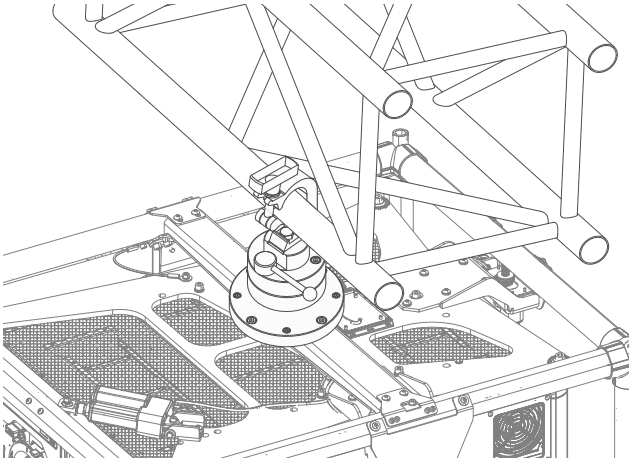

Image 7–26

6. Lift up the truss with the attached projector to the desired height.

7.7 Alignment of motorized rigging frame

How to align the motorized frame

Use one of the following methods to align the motorized frame:

- Use the motorized frame menu in the Pulse OSD. For more info, see the Pulse OSD user guide.
- Use the motorized frame menu in Pulse Prospector. For more info, see the Pulse Prospector user guide.
- Use the buttons on the local control panel. See the following procedure for more info.

Alignment using the local control panel

1. To tilt the projected image, use the up and down buttons. This will move the front and rear of the projector in the vertical direction.

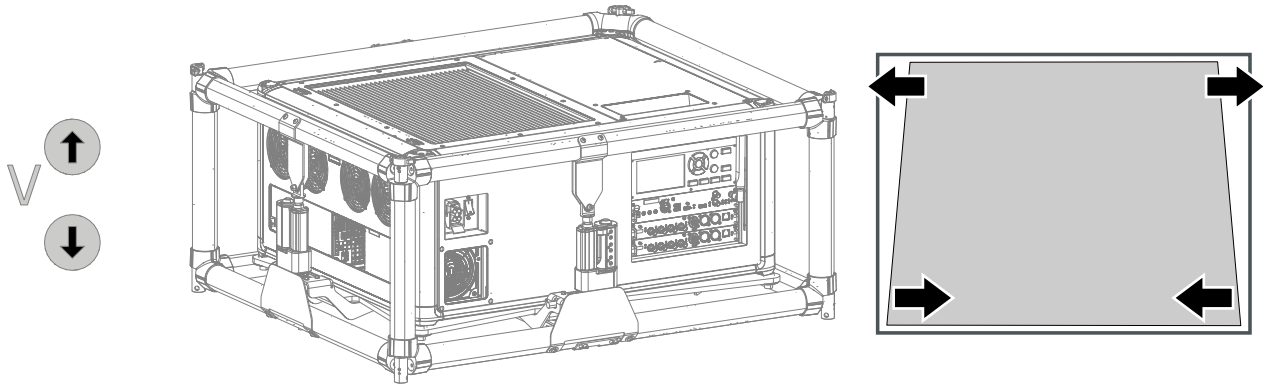

Image 7–27 Tilting the projected image

2. To skew the projected image, use the left and right buttons. This will move the front and rear of the projector in the horizontal direction.

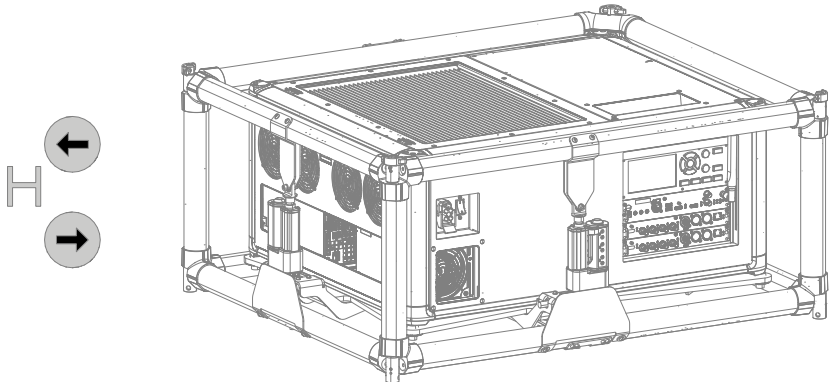

Image 7–28 Skewing the projected image

3. To rotate the projector and projected image, use the clockwise and counterclockwise buttons.

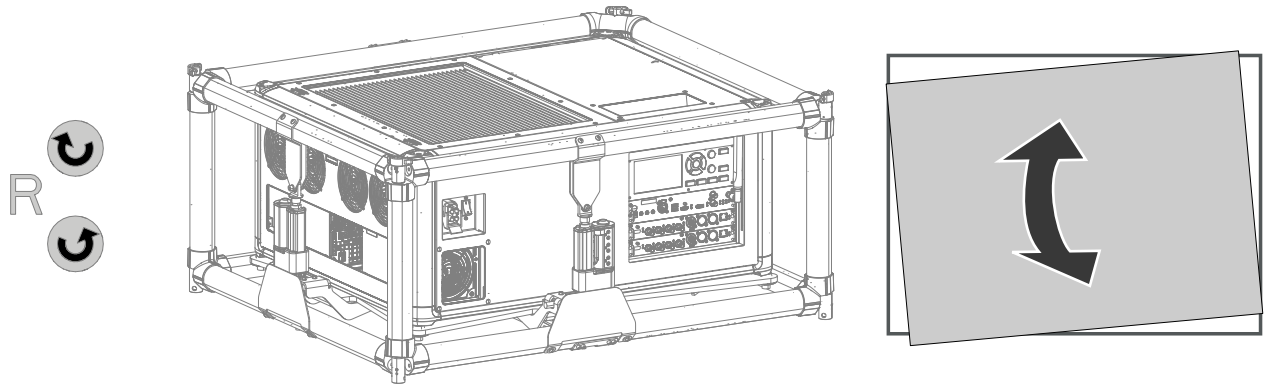

Image 7–29 Rotating the projected image

8 Projector covers

8.1 Cover locks 80
8.2 Removing a side, front or rear cover 80
8.3 Installing a side, front or rear cover 81
8.4 Removing the top covers 82
8.5 Installing the top covers 83

About this chapter

Most maintenance and service procedures demand removing one or more of the projector covers to gain access to the parts to maintain or to service.

The procedures in this chapter describe, with detailed step by step actions and illustrations, how to remove or install the projector covers.

8.1 Cover locks

About the cover locks

All the side covers are fastened with the same “easylock” type cover lock.

Required tools

Screwdriver (any type)

Opening a cover with cover locks

1. Push down the inner side of the easylock with any type of screwdriver.

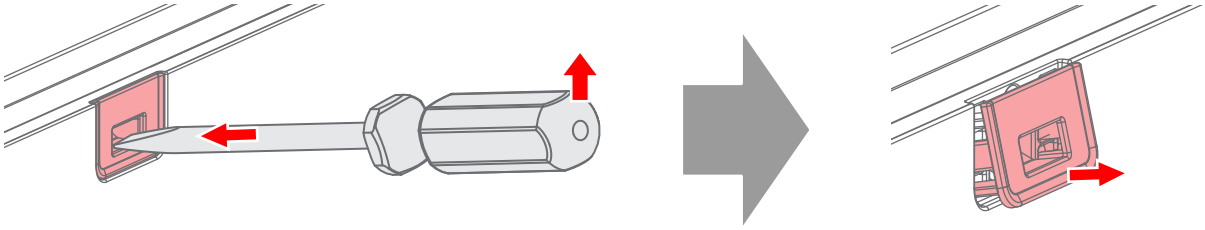

Image 8–1

The lock jumps loose.

Closing a cover with cover locks

1. Ensure that the cover is in the correct position.
2. Press the easylock into the housing.

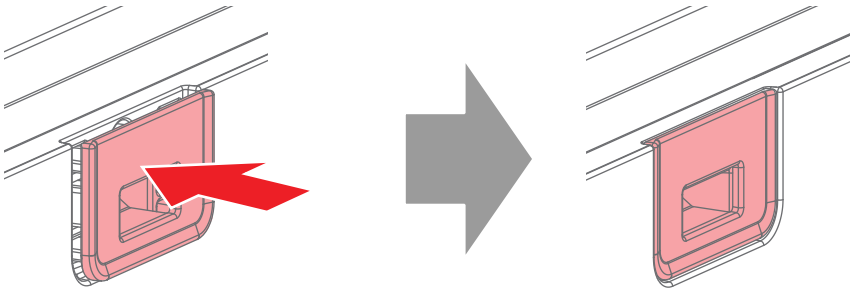

Image 8–2

8.2 Removing a side, front or rear cover

About removing a side cover

The method of removing the covers are equal for the following covers:

- Front cover
- Left side cover
- Rear cover
- Right cover

Prerequisites

Before removing a cover, make sure to do the following:

- For the front cover:
  - Remove the lens.
  - Disconnect anything connected to the front XLR connector (e.g. motorized frame, external shutter).

- For the right side cover:
  - Disconnect all connections to the inputs (LAN, HDMI, etc).
  - Unlock the 4G antenna (if installed) and slightly rotate the antenna to not hinder the cover.
  - Power off the projector.
  - Remove the mains power cord.
- For the left side cover:
  - Disconnect the motorized rigging frame connections (if installed)
  - Disconnect the external cooler connections (if installed)

Required tools

Flat screwdriver 5 mm

How to remove

1. Unlock the cover locks. For more info, see “Cover locks”, page 80.
2. Tilt the cover outwards and remove it.

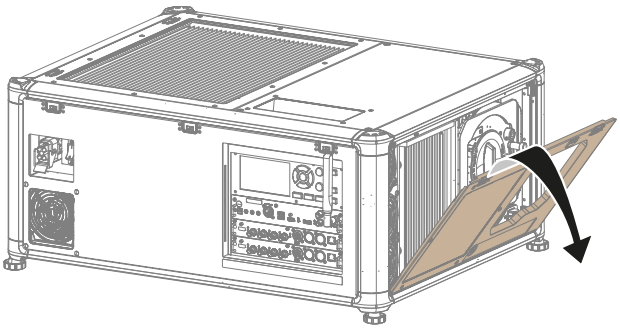

Image 8–3

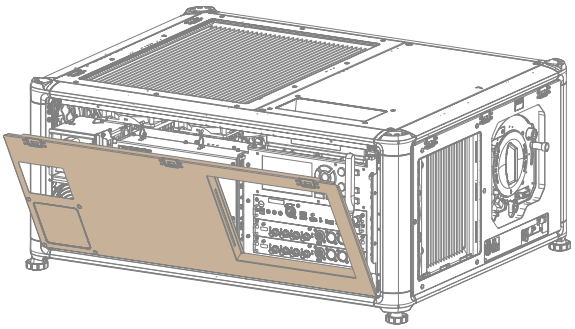

Image 8–4

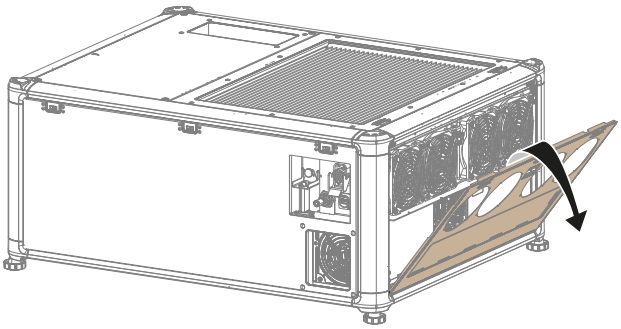

Image 8–5

Image 8–6

8.3 Installing a side, front or rear cover

How to install

1. Place the cover onto the bottom side of the projector and tilt it inwards.

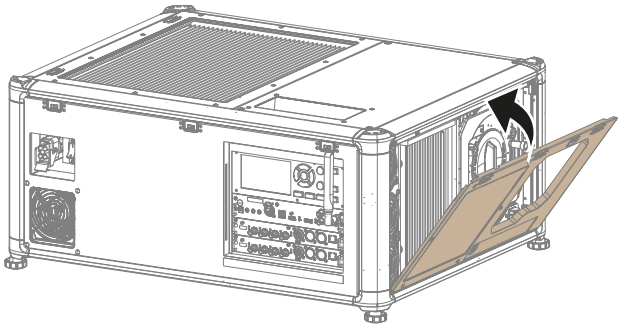

Image 8–7

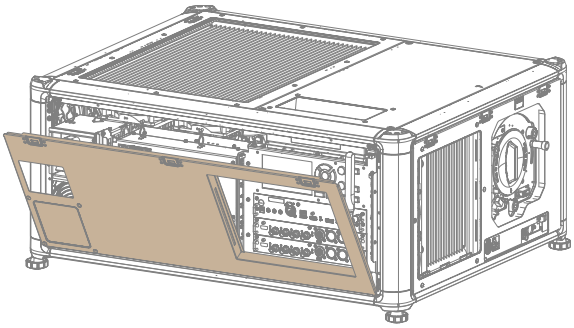

Image 8–8

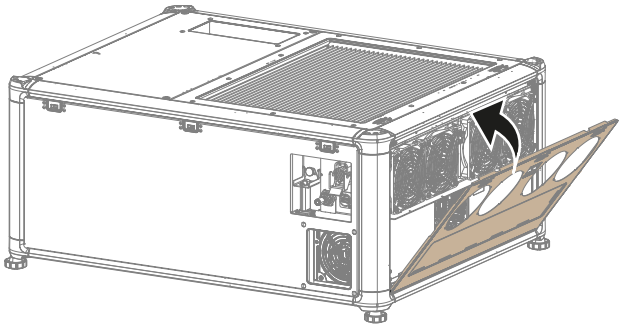

Image 8–9

Image 8–10

2. Lock the projectors in place, using the cover locks. For more info, see “Cover locks”, page 80.

8.4 Removing the top covers

About the two top covers

The projector has two top covers. The front half covers the light processor and the input and communication unit. The rear half covers the light source and power-related assemblies.

Both covers can be removed independently from each other.

Required tools

Torx screwdriver T20

How to remove both top covers

1. Loosen the four screws of the top cover. Use a T20 Torx screwdriver.
2. Lift up and remove the cover.

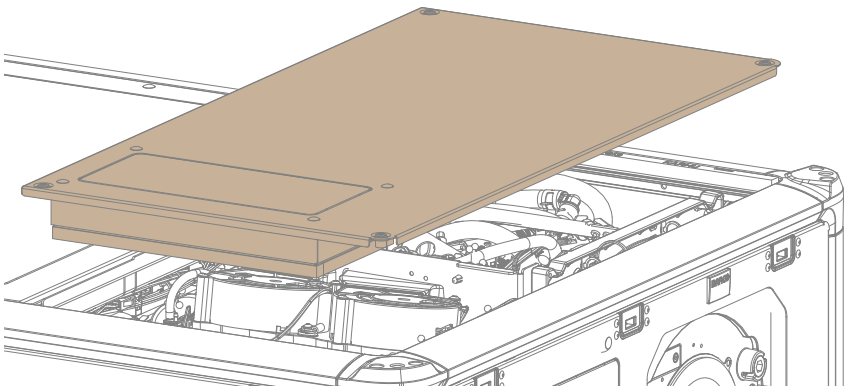

Image 8–11 Lifting up and removing the front side top cover.

3. Unlock the two cover locks at the rear top side of the projector. For more info, see “Cover locks”, page 80.

4. Lift up and remove the cover.

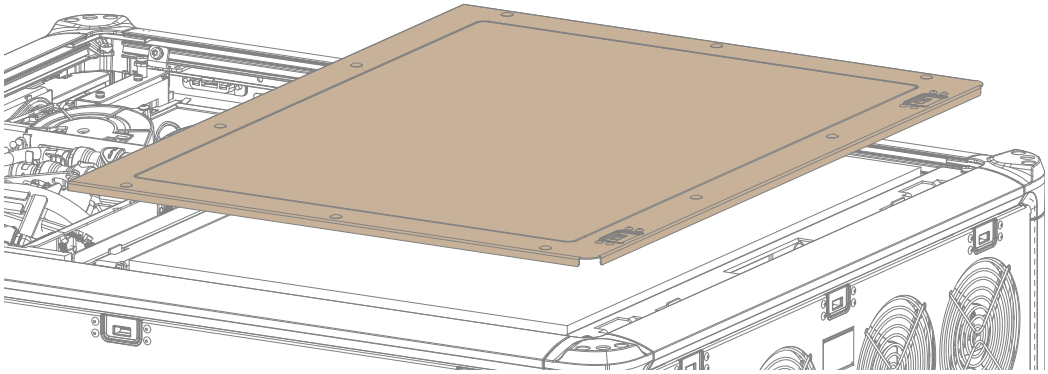

Image 8–12

8.5 Installing the top covers

About the top covers

Both covers can be installed independently from each other.

Required tools

Torx screwdriver T20

How to install both top covers

1. Place the rear top cover on the projector.

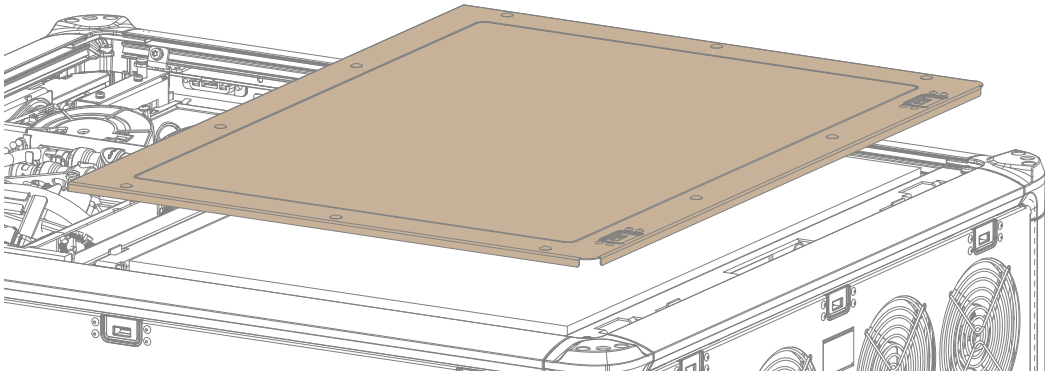

Image 8–13

2. Lock the two cover locks at the rear top side of the projector. For more info, see “Cover locks”, page 80.
3. Place the front top cover on the projector.

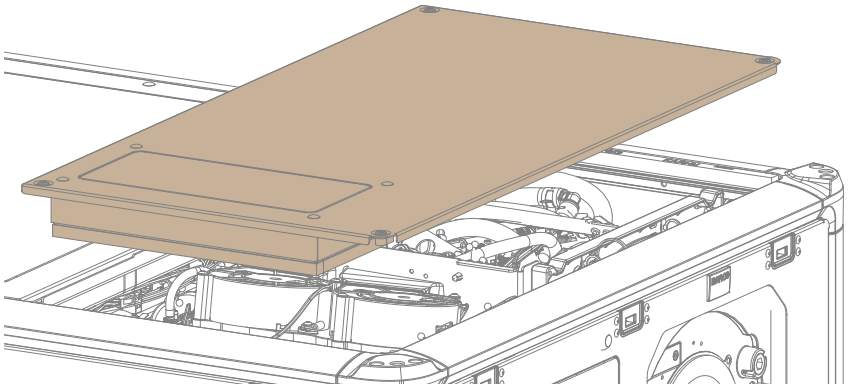

Image 8–14 Lifting up and removing the front side top cover.

4. Drive in the four screws of the top cover. Use a T20 Torx screwdriver.

Distance meter and camera kit

9

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9.3 Preparing the distance meter assembly 88
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9.10 Adjusting the distance meter 99

About the distance meter and camera kit

The distance meter and camera upgrade kit is designed to upgrade the projector with a distance meter and camera.

9.1 About the upgrade kit

Content of the upgrade kit

Consult the following table to see what parts are used on which projector type.

Description	Pcs	UDX	UDM/QDX
Distance meter + camera assembly	1	X	X
Hex screw M4 x 6 mm, DIN 912 Socket	2	X	
Torx screw M3 x 8 mm, countersunk	2	X	X
Torx screw M3 x 8 mm, flat head	2	X	X
Laser pointer extension button	1		X
Laser ranger board bracket	1		X
Battery holder plate	1	X	X
Distance meter shield	1		X
Cover plate for UDX (R8780180)	1	X	
Cover plate for UDM/QDX (R8792900)	1		X
Battery holder for two AA batteries	1	X	X
Laser exposure label	1	X	

The battery holder is fit for two AA batteries. Batteries are **not** included in the kit.

Notice on differences in screw types

In the second half of 2023, several of the screws on the upgrade kit have been updated from Phillips head screws to Torx head screws.

The following procedures generally assume the screws in the upgrade kit will be of the Torx type, and require a T10 Torx screwdriver.

Depending on purchase kit, the purchased kit may still come with Phillips screws. In this case, a Phillips PH1 screwdriver will be required in every step where it mentions a T10 Torx screwdriver.

Component overview distance meter assembly

The distance meter assembly can be used as-is for the UDX. For UDM and QDX, some remodelling is required.

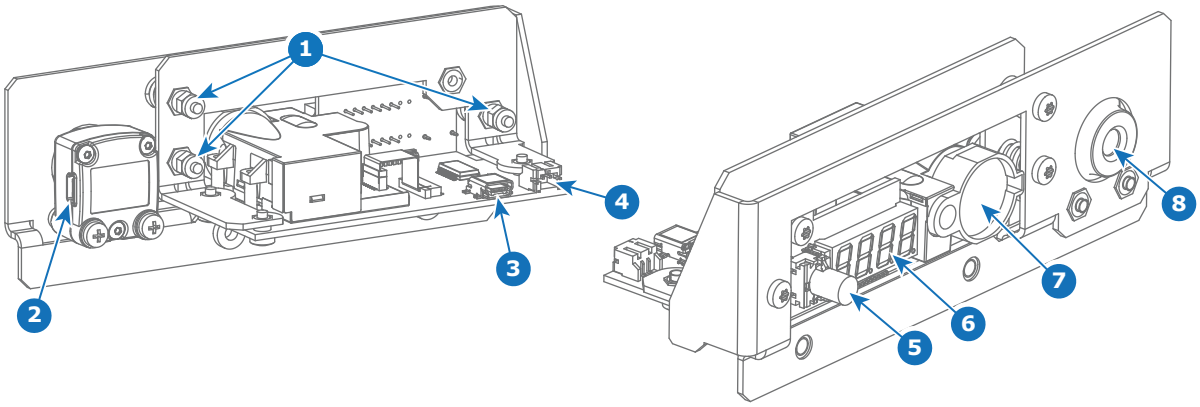


Image 9–1

1 Distance meter adjustment screws
2 USB connector camera
3 USB connector distance meter
4 Connector battery holder
5 Distance meter push button
6 Distance meter display
7 Distance meter
8 Camera

In the second half of 2023, the screws on the distance meter assembly have been updated from Phillips screws to Torx screws. Take into account that the screws can be of either type.

Cover plate UDX

The front side of the cover plate is painted black with a removable protective foil to protect it. The back side of the cover plate is painted black and has an adhesive placed on it.

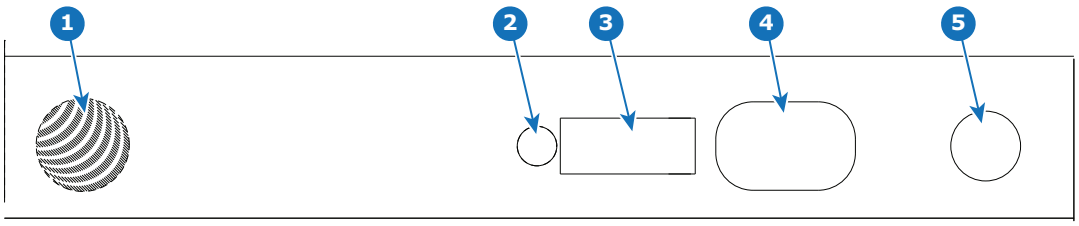


Image 9–2

1 IR (Infra-Red) filter
2 Hole for the distance meter push button
3 Clear part for distance meter display
4 Clear part for the distance meter
5 Clear part for camera

Cover plate UDM and QDX

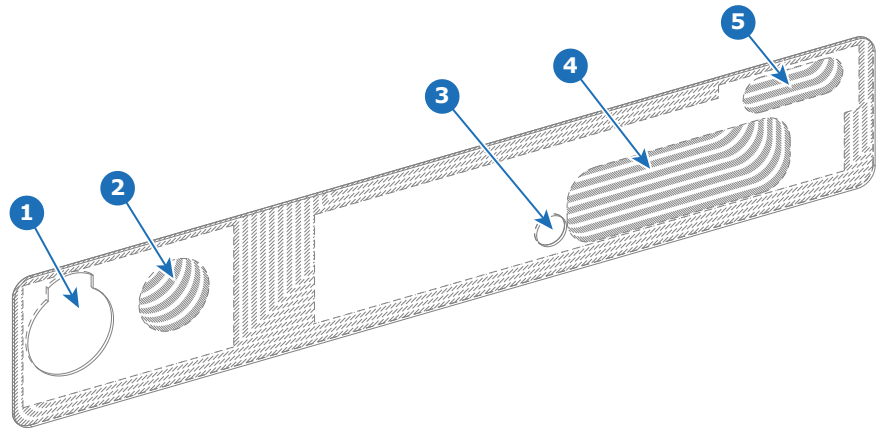


Image 9–3

1 Hole for the XLR Connector
2 Clear part for camera
3 Clearance for the distance meter push button
4 Clear part for distance meter display
5 IR (Infra red) Filter

9.2 Installation process of the distance meter assembly

Process flow

1. Remove the front and left side covers. For more info, see “Removing a side, front or rear cover”, page 80.
2. Power off the projector. For more info, see “Powering off the projector”, page 50.
3. Remove the communication bracket from the projector. For more info, see “Removing the communication bracket”, page 90.
4. Update the distance meter assembly to fit on the projector. For more info, see “Preparing the distance meter assembly”, page 88.
5. Install the parts of the distance meter kit onto the communication bracket. For more info, see “Upgrading the communication bracket”, page 92.
6. Install the battery holder on the left side of the projector. For more info, see “Installing the battery holder”, page 94.
7. Fixate the upgraded communication bracket onto the projector frame. For more info, see “Installing the upgraded communication bracket”, page 95.
8. Update the front cover of the projector with the one in the upgrade kit. For more info, see “Change front cover panel”, page 97.
9. Enable the camera kit and distance meter in the Pulse software. For more info, see “Enabling and using the camera and distance meter”, page 98.
10. Adjust the distance meter according to the local installation. For more info, see “Adjusting the distance meter”, page 99.

9.3 Preparing the distance meter assembly

About changing the distance meter

The distance meter assembly can be used as-is on the UDX. For QDX and UDM, a bit of retooling is required.

This retooling means removing the distance meter and camera from the front plate and adding a new support bracket to the distance meter.

Required tools

- Phillips screwdriver PH1
- Torx screwdriver T10
- Socket wrench with 5.5 mm hex bit

How to retool the distance meter

1. Remove the front bracket from the module. Use a T10 Torx screwdriver to release the screws, and a socket wrench with 5.5 mm hex bit to release the captive nuts.

   Tip: Keep all of the removed screws, springs and nuts. All of it will be re-used.

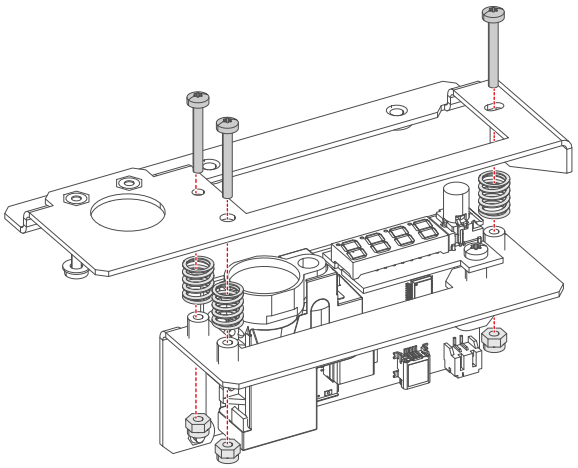


Image 9–4 Removing the cover

2. Remove the camera from the front bracket. To do so, use a T10 Torx screwdriver to release the two screws and washers.

Tip: Keep the screws and washers. These will be re-used

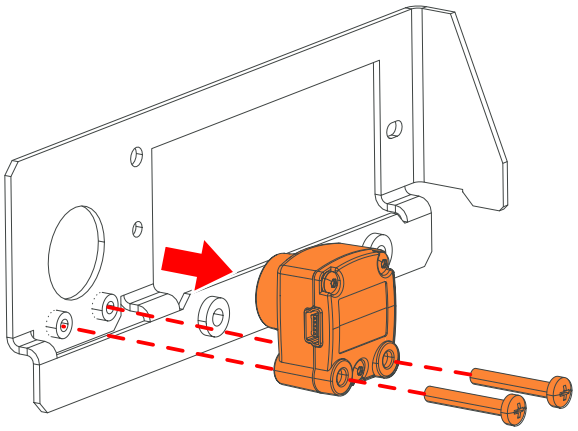


Image 9–5

3. Remove the bracket attached to the distance board by removing the four Torx screws. Use a T10 Torx screwdriver to release the screws.
4. Replace the bracket with the new laser ranger board bracket from the upgrade kit. Position the bracket on the board, and drive in the Torx screws.

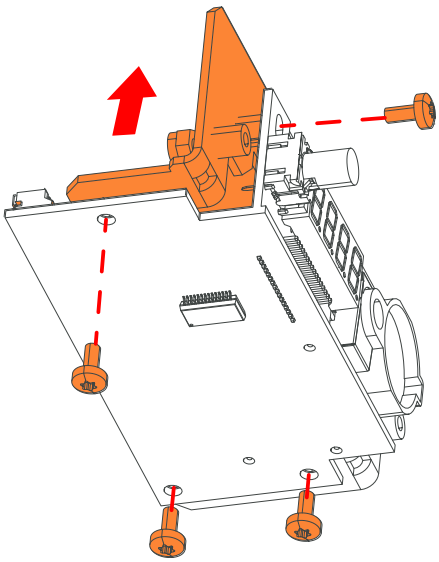


Image 9–6 Removing the old bracket

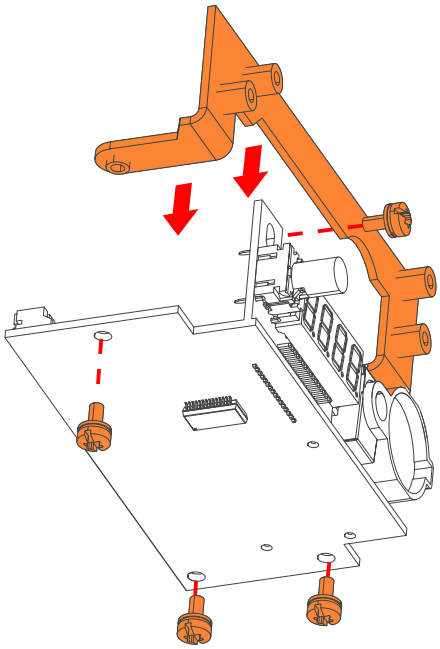


Image 9–7 Installing the new bracket

5. Place the sensor shield onto the laser sensor as illustrated.

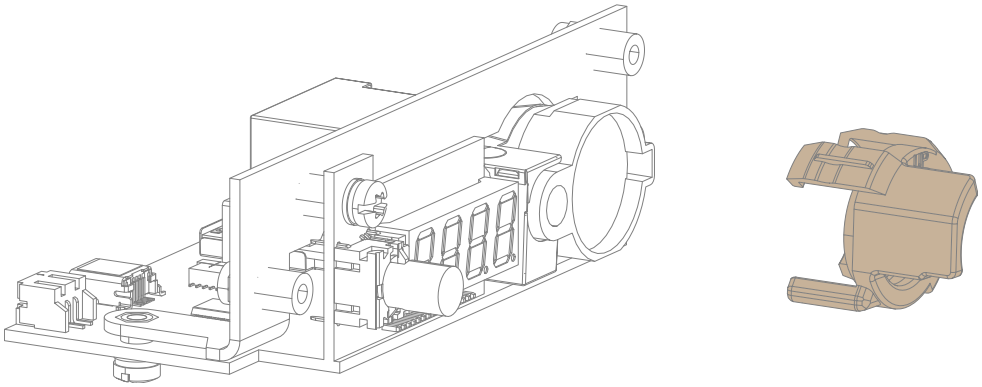


Image 9–8 Placing the shield on the laser sensor

9.4 Removing the communication bracket

How to prepare the front bracket

1. Remove the four screws of the front bottom profile, locking the profile to the projector corner blocks. Use a T20 Torx screwdriver to remove the four screws.
2. Remove the profile as illustrated.

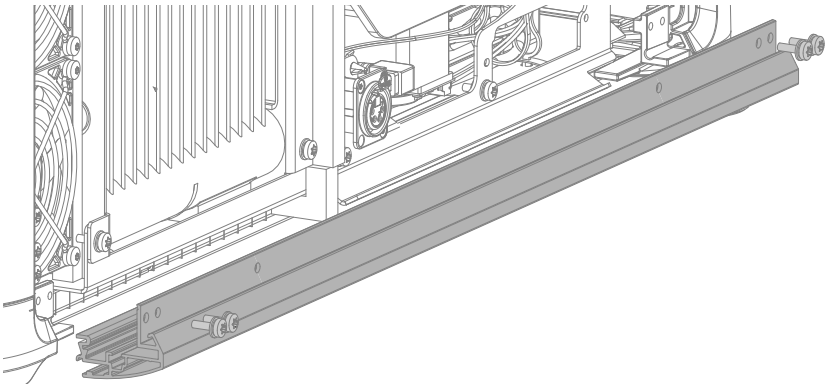


Image 9–9

3. Remove the front IR sensor from the front bracket as follows:
   a) Press the IR sensor down and pull it out slightly, until you can reach the connected wire unit.

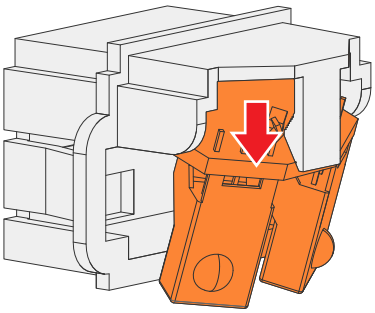


Image 9–10

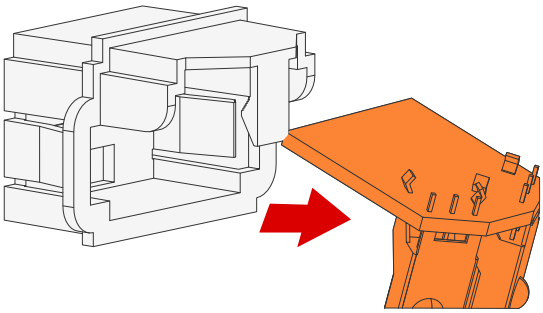


Image 9–11

   b) Disconnect the wire unit from the IR sensor board.

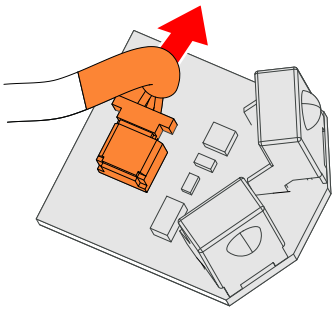


Image 9–12

   c) Carefully detach and remove the IR sensor holder from the bracket.

   Note: Remove the IR sensor wiring from the holder rear opening

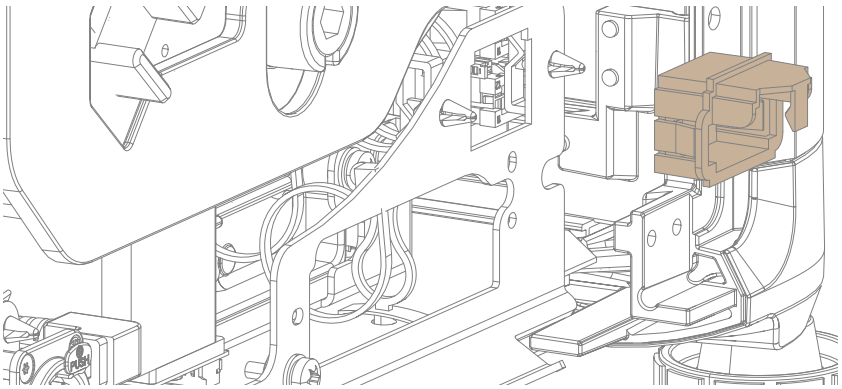


Image 9–13

4. Remove the two screws from the front bracket of the projector. Use a T20 Torx screwdriver.

5. Carefully remove the front bracket from the projector.

   Note: Move the bracket only as far as the wiring of the XLR connector allows you to.

6. Release the two mini-USB cables from the cable twist.

Image 9–14 Mini-USB cables connected to the front bracket

9.5 Upgrading the communication bracket

Prerequisites

Make sure to have done the following:

- Prepare the distance meter and camera kit assembly for this projector. For more info, see “Preparing the distance meter assembly”, page 88.
- Remove the communication bracket from the projector. For more info, see “Removing the communication bracket”, page 90.

Required tools

- Phillips screwdriver PH1
- Socket wrench with 5.5 mm hex bit

How to Install the camera and distance meter

1. Mount the camera to the front side of the communication bracket as illustrated. re-use the two 20 mm screws and washers from the disassembled distance meter assembly.

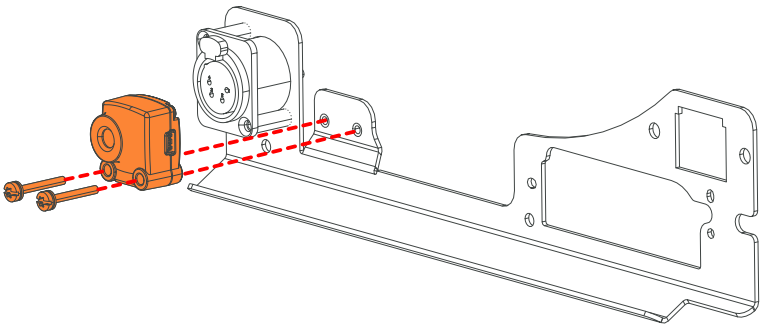


Image 9–15

2. Re-use the three 16 mm screws of the distance meter assembly and push these through the bracket from the front side (reference 3, Image 9–17).
3. Re-use the three springs of the distance meter assembly on the screws from the rear side of the bracket (reference 4, Image 9–17).

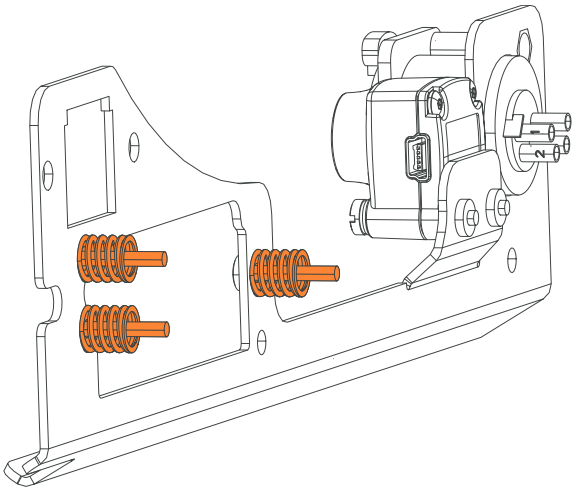


Image 9–16 Mounting the springs on the rear side of the bracket

4. Connect the distance meter assembly (reference 5) with the communication bracket, using the three screws (reference 3) and springs (reference 4). Use a T10 Torx screwdriver.

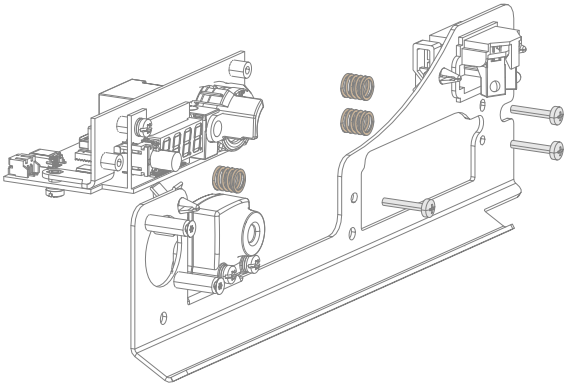


Image 9–17 Exploded view of mounting the assembly

5. Re-use the captive nuts (reference 6) of the distance meter assembly and lock them to the end of the screws. Use both a T10 Torx screwdriver and a socket wrench with 5.5 mm hex bit to lock the screws.

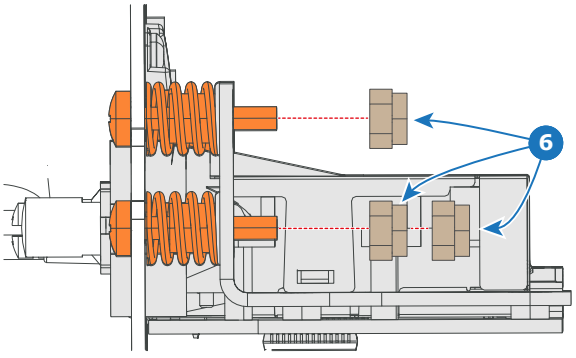


Image 9–18 Camera and distance meter installed, sideview

The end result should look similar to the following:

Image 9–19 Camera and distance meter installed

6. Tighten the three adjustment screws (reference 3, Image 9–17) until the springs are fully compressed. Use a T10 Torx screwdriver to turn the screws.

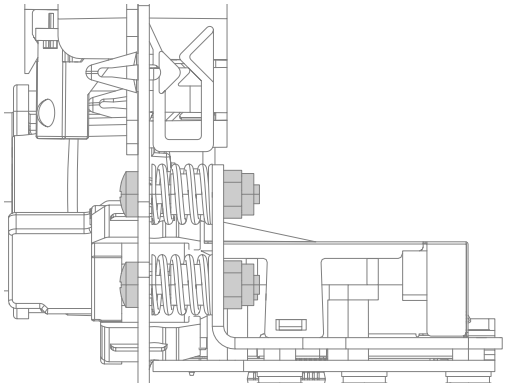


Image 9–20 Tightening the adjustment screws will compress the springs and bring the two brackets closer together

9.6 Installing the battery holder

Required tools

Torx screwdriver T10

Required parts

AA batteries x2 (not included in kit)

How to install

1. Assemble the battery holder to the bracket. Use a T10 Torx screwdriver to drive in the two M3 x 8 mm countersunk screws.

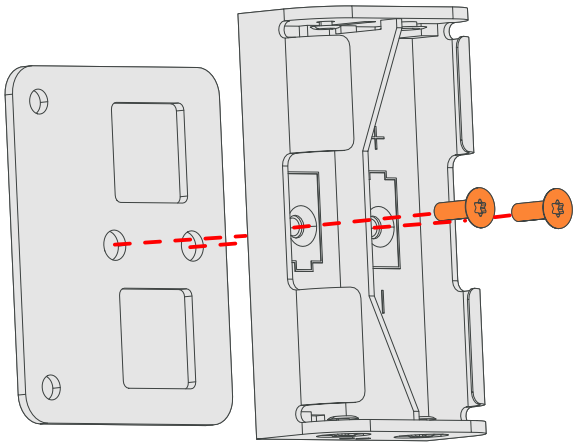


Image 9–21

2. Fixate the battery holder to the right side of the projector, with the cable facing downwards. Use a T10 Torx screwdriver to drive in the two screws of 3 x 8 mm.

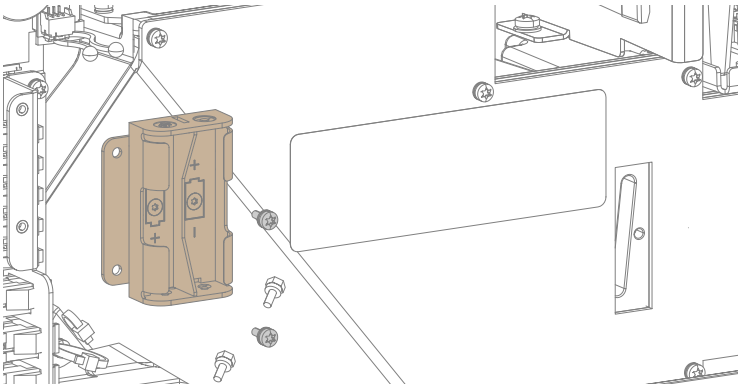


Image 9–22 Fixating the battery holder on the right side of the projector

3. Guide the cable from the battery holder to the front side of the projector as illustrated.

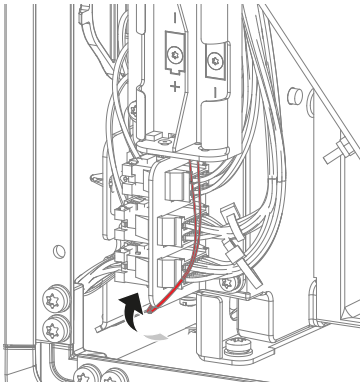


Image 9–23 Guide the wires (marked red) towards the front side of the projector

4. Place two AA batteries in the battery holder, making sure the polarities match the + and - marks inside the battery holder.

⚠ *Caution:* Place the batteries as explained. There is a risk of explosion if the battery is incorrectly installed.

⚠ *Caution:* Replace with the correct battery type. Use two AA size batteries. There is a risk of explosion if the battery is replaced with an incorrect type.

9.7 Installing the upgraded communication bracket

How to install

1. Place the upgraded communication bracket back into the projector as illustrated. Use a T20 Torx screwdriver to drive the screws back in.

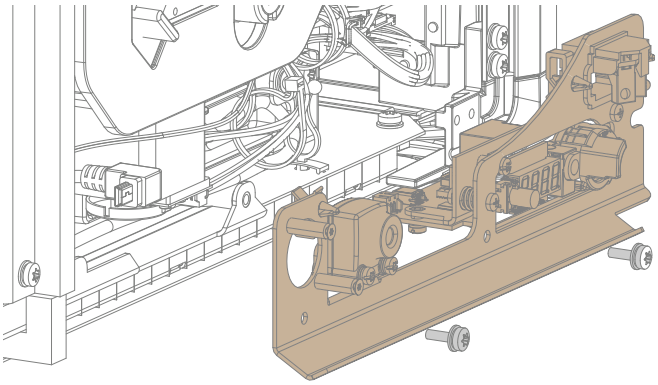


Image 9–24

2. Connect all wiring to the bracket. Do this as follows:
   a) Connect the mini USB cable coming from the left to the camera (reference 1).
   b) Connect the wiring from the battery holder to the leftmost connector on the distance meter reference 2).
   c) Connect the mini USB cable coming from the right to the distance meter (reference 3).
   d) Place the IR sensor wiring through the opening on top of the bracket (reference 4).

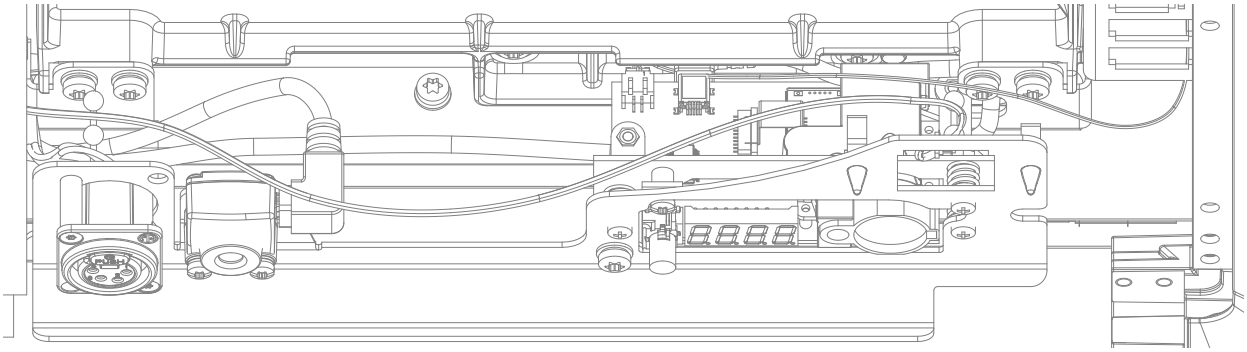


Image 9–25

3. Mount back the front IR sensor as follows:
   a) Pull the IR sensor wire unit through the top opening of the sensor holder.

Image 9–26

   b) Connect the wire unit to the IR sensor board.

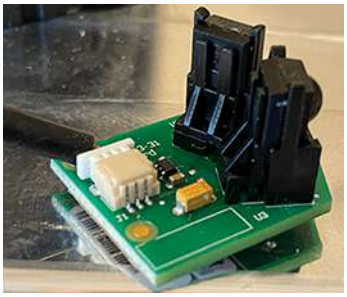


Image 9–27

   c) Insert the IR sensor board into the holder

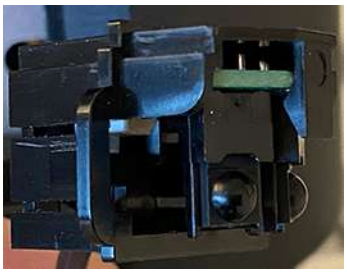


Image 9–28

d) Insert the sensor holder and board in to the communication bracket.

Image 9–29

4. Mount back the front bottom profile as illustrated. Use a T20 Torx screwdriver to drive in the four screws.

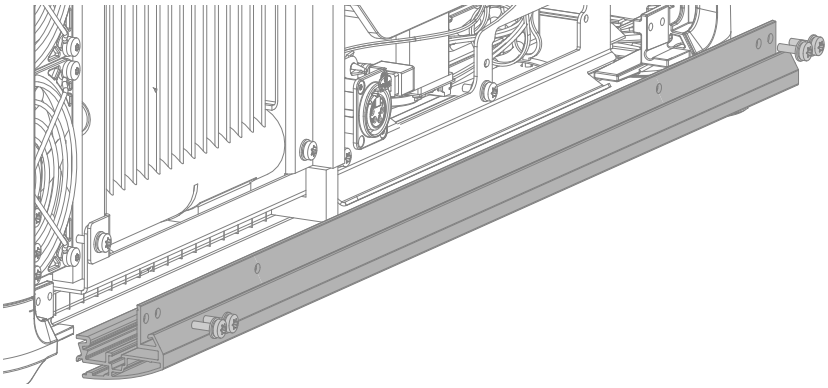


Image 9–30

9.8 Change front cover panel

About removing the front cover panel

The original cover plate is attached to the front cover by locking tabs on the rear side.

The replacement cover is attached to the front by using adhesive layer strips.

Required tools

No tools required.

Required parts

UDM/QDX cover panel

Remove the cover panel in the front cover

1. Release the cover plate by pressing directly on the locking tabs from behind. Hold the front cover, and use the thumbs to press on the clips. (Two at a time).

⚠ *Caution:* The cover can be hard to release, exercise caution when releasing.

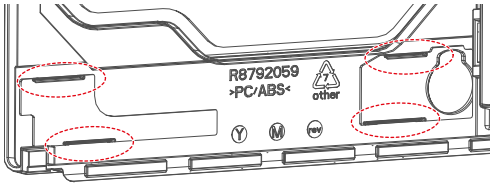


Image 9–31

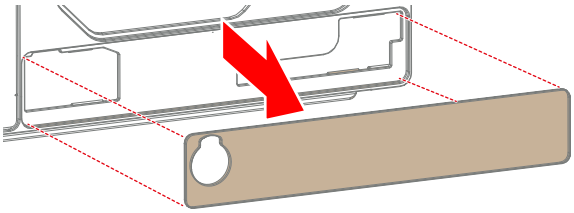


Image 9–32

2. Install the new cover that follows the kit by removing the cover paper on the rear side, align the correct position and push the cover against the front cover.

Note: Ensure that the cover properly glued to the front cover.

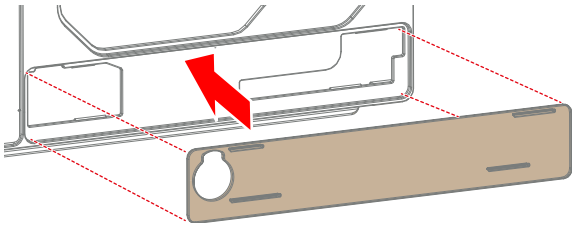


Image 9–33

9.9 Enabling and using the camera and distance meter

WARNING: Laser Radiation - Do not stare into laser ranging beam, Class 2 IEC 60825-1: 2014, EN 60825-1:2014 +A11:2021.

Enabling the camera

For security reasons, the installed camera will be disabled by default. In order to fully utilize the installed camera and distance meter, the following features will need to be enabled:

- Camera
- Source preview

These can only be enabled in the Security Menu in the Pulse OSD/LCD, while being logged in as power user or higher.

Only when the Camera and source preview are enabled, the Distance meter menu will be accessible in the OSD/LCD.

For more info on enabling the Security features on the Pulse OSD/LCD, see the Pulse OSD user guide.

About distance meter usage

When the distance meter is correctly connected with the projector using the USB wiring, new menu options will appear, both in the projector OSD menu, as well as in Pulse Prospector.

It is preferred to use either the Pulse OSD menu, or the Pulse Prospector to use the distance meter. For more info, see the Pulse OSD user guide, or the Pulse Prospector user guide respectively.

Next to this, it is also possible to use the distance meter assembly itself.

How to use the distance meter assembly

1. Place the projector, with distance meter installed, in its final projection position and point it towards the desired projected surface.
2. Press the push button to activate the distance meter and read the distance from the display. The laser will be active for 30 seconds.

3. In order to switch the unit of measurement, press the push button for 3 seconds. You can choose between meters and feet.

9.10 Adjusting the distance meter

WARNING: Laser Radiation - Do not stare into laser ranging beam, Class 2 IEC 60825-1: 2014, EN 60825-1:2014 +A11:2021.

Prerequisites

Make sure of the following:

- Make sure the projector is installed perpendicular to the screen.
- Make sure the projector is powered on.
- Make sure the front cover is not installed. For more info, see “Removing a side, front or rear cover”, page 80.

Required tools

Torx screwdriver T10

Adjusting the distance meter

1. Close the shutter.
2. Activate the distance meter by pressing the push button.
3. Check if the laser beam of the distance meter projects perpendicular to the screen, similar to the light source.
   ► If yes, no further actions are needed.
   ► If no, manipulate the three adjustment screws of the laser range finder (reference 1, Image 9–34) clockwise or counterclockwise in order to adjust the laser source. Use a T10 Torx screwdriver to adjust the adjustment screws.

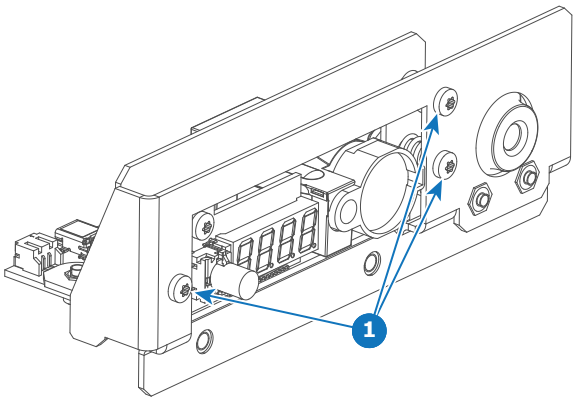


Image 9–34 Location of the adjustment screws.

10 GSM and WiFi

10.1 Security when using wireless LAN products 102
10.2 Installation of the Pulse 4G module 102
10.3 Installation of the WiFi dongle 105

About the GSM module and WiFi dongle

By default, the GSM module and WiFi dongle can be purchased as part of the projector bundle.

These procedures exist in case the GSM module and WiFi dongle are purchased separately from the projector.

10.1 Security when using wireless LAN products

Security when using Wireless LAN products

The radio waves that WiFi routers emit can be accessed from anywhere within a given range; even through obstacles such as windows, doors or walls. This may cause security problems if the network security settings are not set correctly:

- Transmitted data can be intercepted by a malicious third party. These third parties may intercept radio waves and obtain personal information sent through the radio waves (such as login names, passwords, and more).
- A malicious third party may illegally access the projector and manipulate its usage. This may vary from information leaks (passwords being stolen), hacking of the projected content or using the projector to spread harmful software such as computer viruses or ransomware.

Most wireless LAN adapters and access points are equipped with security features to take care of these problems. However, do take into account that not all wireless LAN devices are set for maximum security upon purchase. To reduce the possibility of these security problems occurring when using this projector, apply the appropriate security settings to your wireless LAN devices. For more information on how to set the correct security features, consult the user guide of the purchased wireless LAN devices.

Barco asks customers to thoroughly understand the risk of using this projector without applying the necessary security settings. Setting and applying the appropriate security settings on devices is done at the discretion and responsibility of the customer.

10.2 Installation of the Pulse 4G module

WARNING: The procedures below may only be performed by Barco trained and qualified technicians.

CAUTION: Always wear a wrist band which is connected to the ground while handling the electrostatic discharge (ESD) sensitive parts.

About the antenna connectors

While the Pulse 4G module has three antenna connectors, only one of them can be used: the main RF antenna (reference 3, Image 10–1).

Image 10–1 Overview Pulse 4G module

1 (Not used)
2 (Not used)
3 Main RF antenna (ANT)

Prerequisites

Power off the projector.

Remove the communication module from the projector. For more info on how to remove or install an input board from the input and communication unit, see “Installing an input board”, page 45.

Required tools

Torx screwdriver T10

Required parts

- Pulse 4G module kit
- SIM card (not delivered)

How to install

1. Remove the plug from the right side of the communication module.

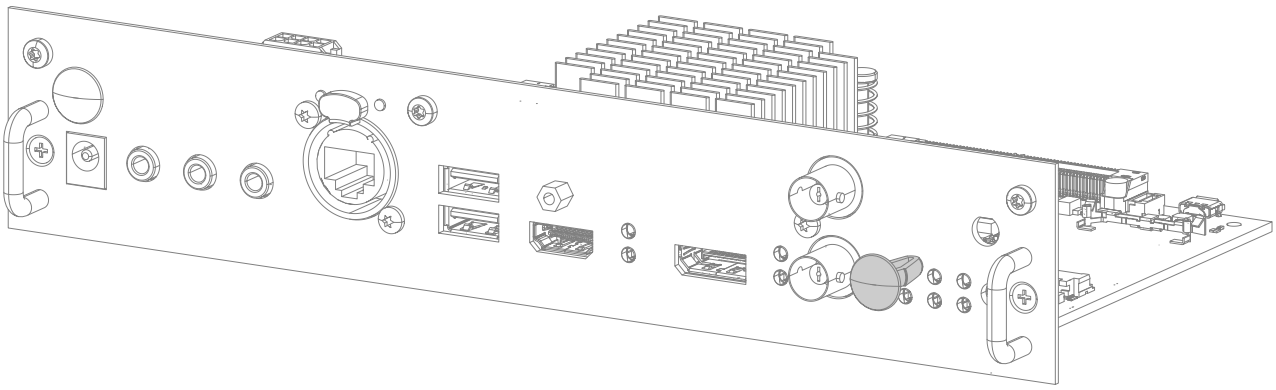


Image 10–2

2. Plug in the antenna wire in the Main RF antenna socket (reference 3) on the front side of the Pulse 4G module.

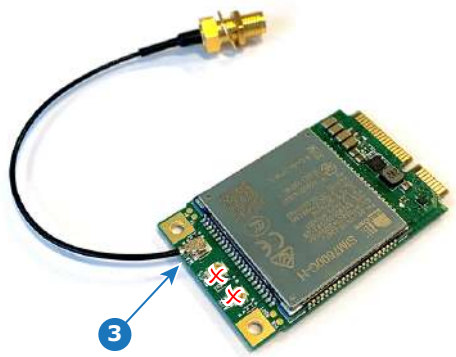


Image 10–3

3. Insert the Pulse 4G module with antenna wire into the connector (reference 1). Push the other side of the Pulse 4G module down until it clicks so that the module is secured (reference 2).

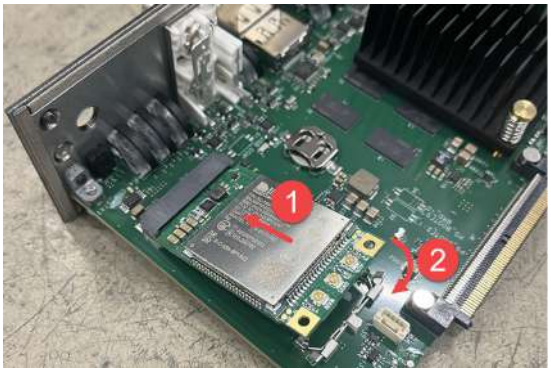


Image 10–4

4. Guide the antenna wire through the opening of the front panel.

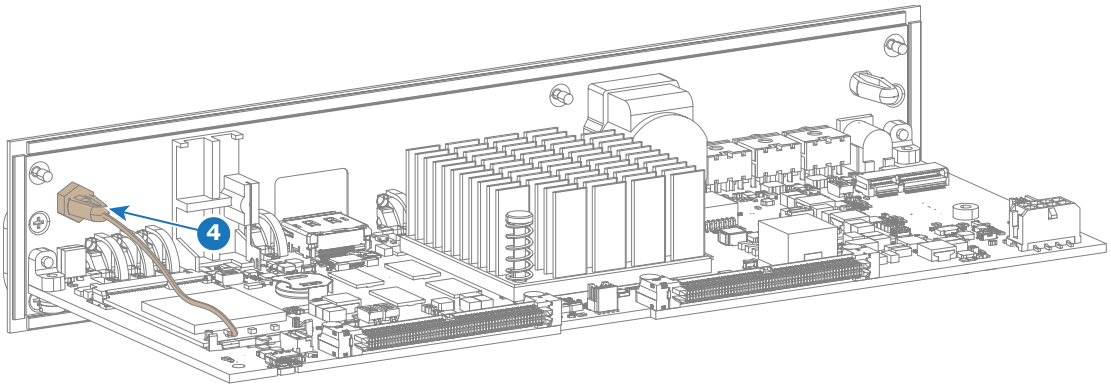


Image 10–5

5. Lock the antenna in place with the lock washer and nut.

Image 10–6 Antenna locked in place with lock washer and nut

6. Install the SIM card into the communication board as follows:
   a) Flip the communication module upside down.
   b) Unlock the SIM card holder and flip it over.
   c) Install the SIM card in the holder (reference 6).
   d) Flip the SIM card back and click the SIM card holder in place.

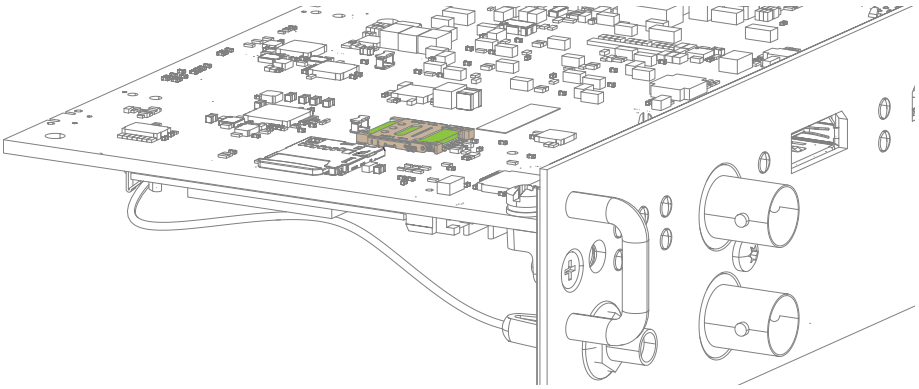


Image 10–7

7. Stick the black label with certification numbers on the front plate of the communication module (reference 7).
8. Install the antenna connector on the antenna wire (reference 8).

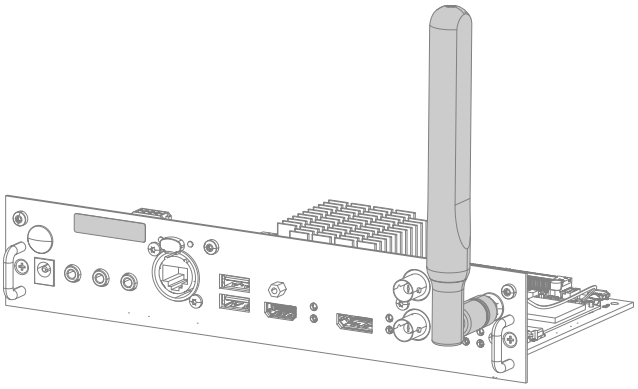


Image 10–8

9. Reinsert the communication module. For more info, see “Installing an input board”, page 45.

Activating the GSM

Once the projector has been powered on, the GSM menu will become available both on the Pulse OSD/LCD, as in Pulse Prospector.

For more info on how to activate the GSM using the Pulse OSD/LCD, see the Pulse OSD manual.

For more info on how to activate the GSM using Pulse Prospector, see the Pulse Prospector user manual.

10.3 Installation of the WiFi dongle

Required parts

WiFi Dongle

How to install

1. Power off the projector.
2. Remove the thumb screw and dongle holder bracket from the projector. Rotate the thumb screw counterclockwise to remove it.

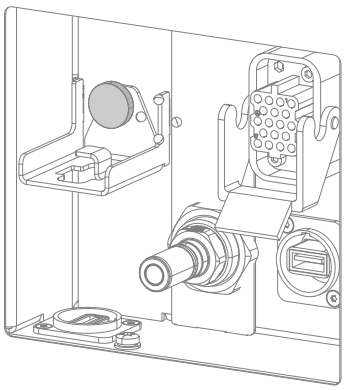
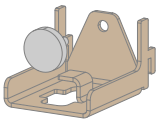


Image 10–9

3. Connect the WiFi dongle with the USB port on the projector as illustrated.

Image 10–10

4. Place the dongle holder bracket on top of the WiFi dongle as illustrated.
5. Fixate the dongle holder with the projector. Fixate the thumb screw by rotating it clockwise.



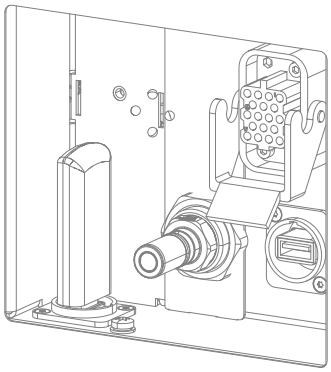


Image 10–11

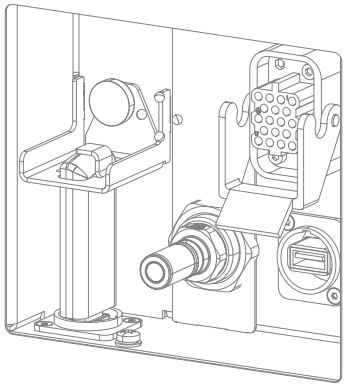


Image 10–12

Configuring WiFi

Once the projector has been powered on, the WiFi menu will become available both on the Pulse OSD/LCD, as in Pulse Prospector.

For more info on how to enable and configure the WiFi using the Pulse OSD/LCD, see the Pulse OSD manual.

For more info on how to enable and configure the WiFi using Pulse Prospector, see the Pulse Prospector user manual.

External mechanical shutter 11

11.1 About the external mechanical shutter 108
11.2 Assembling the shutter 109
11.3 Fixating the shutter 111
11.4 Activating and configuring the shutter 113

Purpose of the external shutter

Certain event locations or organizations may require to have a mechanical shutter on projectors that do not inherently have one. This in order to protect projector optics from the specific event setup.

By mounting the optional mechanical shutter on the rigging frame, you can protect the projector optics.

11.1 About the external mechanical shutter

Content of the kit

Content	Pieces
Shutter motor with XLR cable (60 cm length, 4-pin male connector)	1
Shutter flap	1
Coupler	1
Bracket	1
T-handle (longer)	1
T-handle (shorter)	1
Propeller screw & washer set for shutter flap	1
Ribbed washer	4
Safety wire	1
XLR 4-pin cable splitter (1x male – 2x female)	1

Parts identification

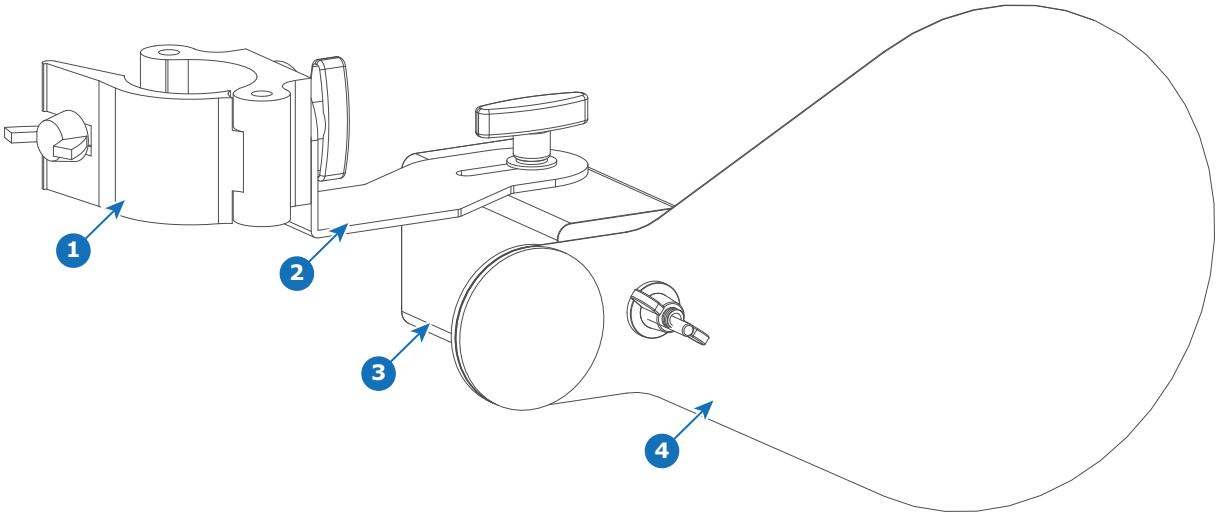


Image 11–1

1 Coupler
2 Bracket
3 Shutter motor
4 Shutter flap

Functionality of the shutter motor

Button	Function
Mode / Setup	Use a long press to enter the setup mode. While in setup mode, the display panel will blink. While in setup mode, use short presses to select the desired mode (1–4).
x100 / OK	A short press sets the digit of the DMX channel in multiples of hundreds. Use a long press on this button to confirm the selected channel or mode.
x10	A short press sets the digit of the DMX channel in multiples of tens.
x1 / Test	While in setup mode, a short press sets the digit of the DMX channel in multiples of one. While **not** in setup mode, this button functions as “test” button. A short press will test the shutter functionality for the chosen mode (open and close).

Image 11–2

1 Digit indicates the mode condition
2 Digits indicates the DMX channel
3 Mode / Setup button
4 x100 / OK button
5 x10 button
6 x1 / Test button

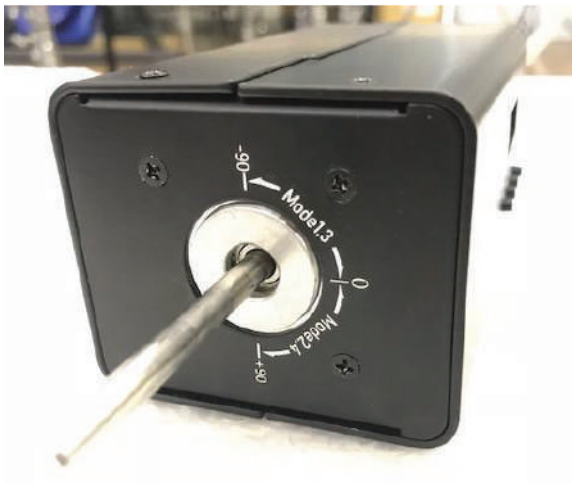


Image 11–3 Modes as depicted on the side of the motor

1 Linear, -90° (counterclockwise)
2 Linear, +90° (clockwise)
3 Switch, -90° (counterclockwise)
4 Switch, +90° (clockwise)

Preferred modes are mode 3 and 4.

11.2 Assembling the shutter

How to assemble the shutter?

1. Combine the coupler and the bracket as illustrated.

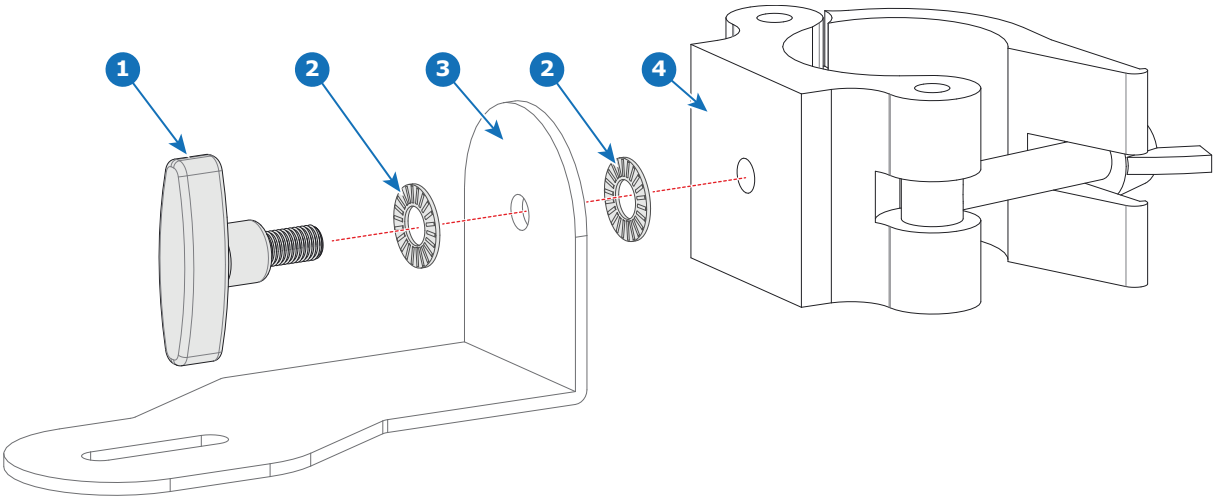


Image 11–4

1 T-handle (shorter one)
2 Washer
3 Bracket
4 Coupler

2. Combine the coupler bracket to the shutter motor as illustrated.

Tip: Don't tighten the wing nuts too hard. Leave some room for manipulation after you have mounted the shutter on the projector.

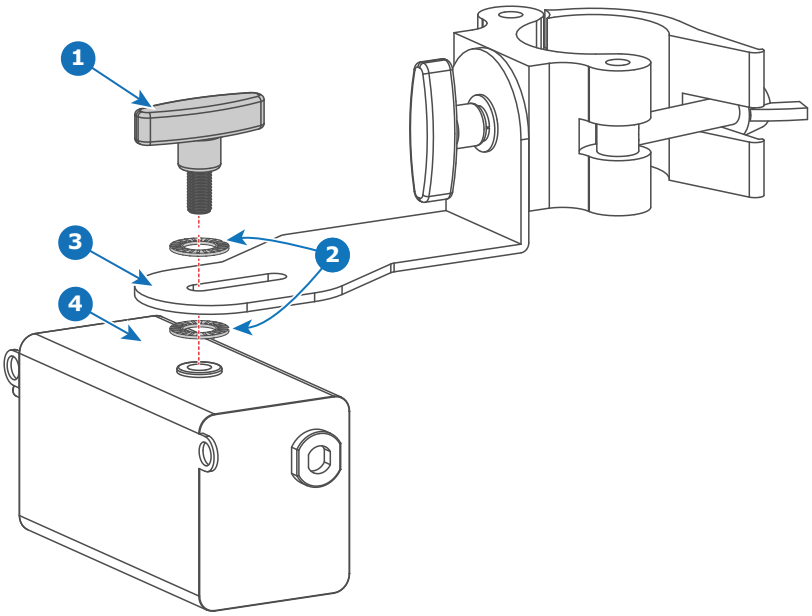


Image 11–5

1 T-handle (larger one)
2 Washers
3 Bracket
4 Shutter motor

3. Split apart and recombine the propeller screw & washer set to capture the shutter flap as illustrated.

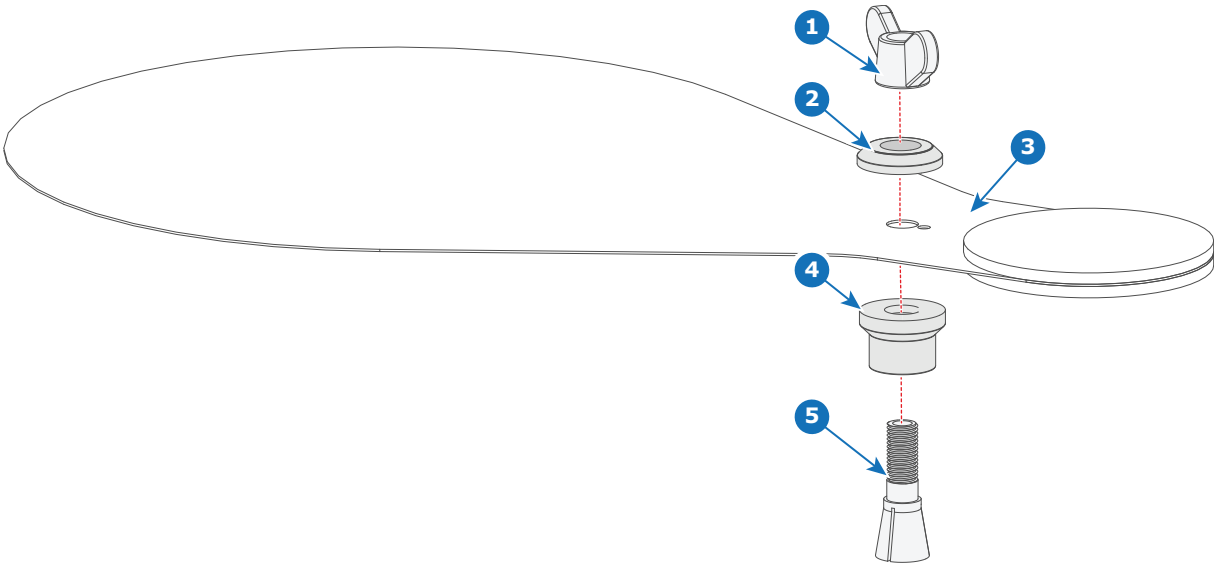


Image 11–6

1 Wing nut
2 Customized washer
3 Flap
4 Customized part
5 Special screw

4. Place the shutter flap onto the rest of the shutter as illustrated and tighten the screw.

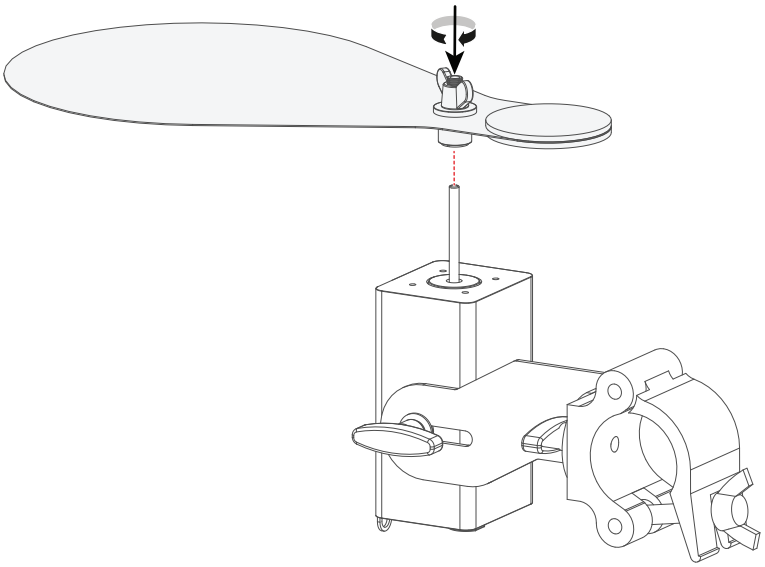


Image 11–7

Tip: The first time it might take a few tries to properly fit the open screw of the flap with the pin of the motor. If it doesn't immediately fit, try disassembling the flap assembly and move the screw by itself on and off the pin of the motor to create a bit of opening.

11.3 Fixating the shutter

Prerequisites

Make sure of the following:

- Make sure the projector is installed in the rigging frame.
- Make sure the projector is installed on the desired position.
- Make sure the desired lens is installed in the projector. In case of a UST lens that projects 90°, make sure the lens is fixated in the desired direction.

Choosing the fixation position

When deciding on which frame to mount the shutter, always make sure there is sufficient space to rotate the shutter flap 90° clockwise and/or counterclockwise.

The position of the shutter assembly will differ, depending on the chosen lens, and lens direction. Choose one of the following:

- If the lens is a straight barrel lens, mount the shutter on either the top, right or bottom frame, depending on what space is available (see following examples).

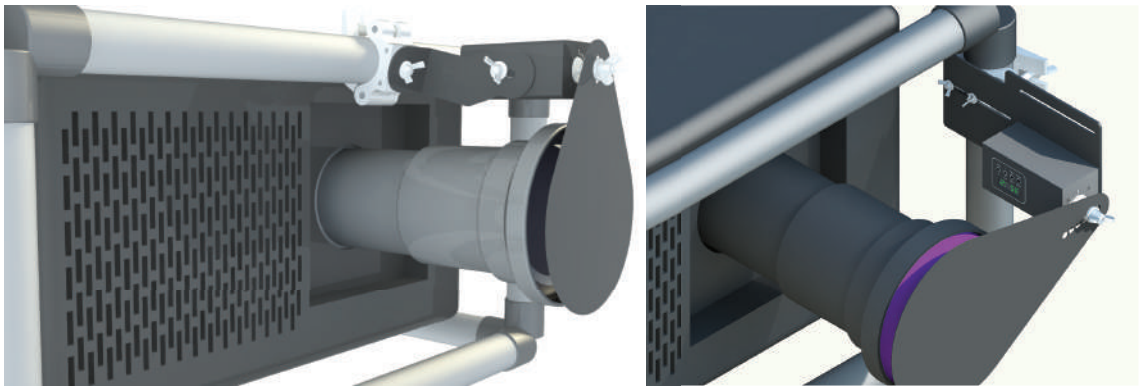


Image 11–8 Examples of shutter mounted on a straight barrel lens

- If the lens bends 90° towards the left or right side of the projector, mount the shutter on the top or bottom frame of the rigging frame, with the flap towards the lens.

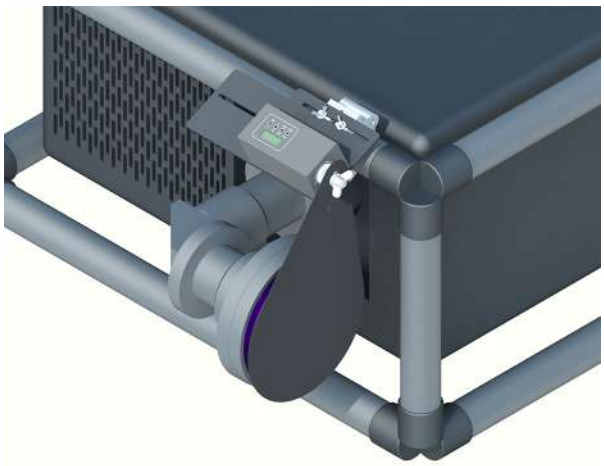


Image 11–9 Example of a shutter mounted to cover a lens bending to the right of the projector

- If the lens bends 90° towards the top or bottom of the projector, mount the shutter on the right side frame of the rigging frame, with the flap towards the lens.

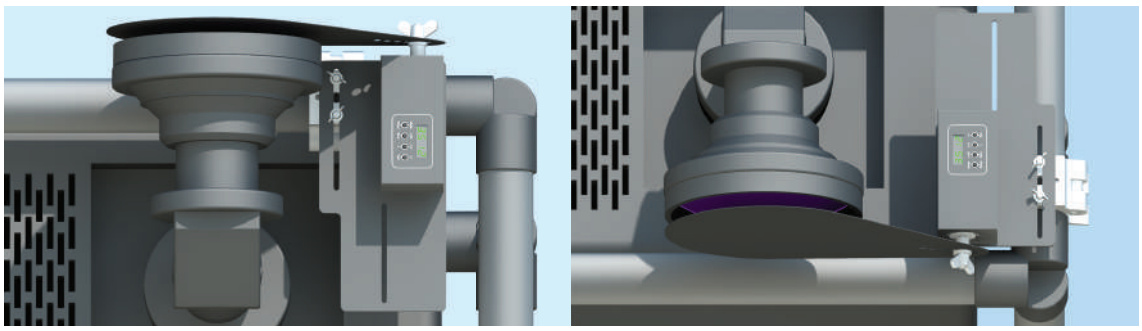


Image 11–10 Examples of shutters mounted to cover a lens bending to the top or bottom of the projector

Required parts

- External shutter assembly
- Safety cable

How to fixate?

1. Fixate the external shutter on the chosen frame bar, as previously explained.
2. Use the wing nut of the shutter flap to reposition the shutter flap if necessary. Make sure that the lens is completely covered by the flap in its neutral state.

   Tip: If necessary, loosen the T-handles of the bracket as well and reposition the shutter as a whole.

3. Mount the safety cable onto the external shutter as follows.
   a) Loop one side of the safety cable with one of the frames of the projector rigging frame.
   b) Click the hook connected to the other side of the safety cable onto the opening on the bottom of the shutter motor (reference 1).

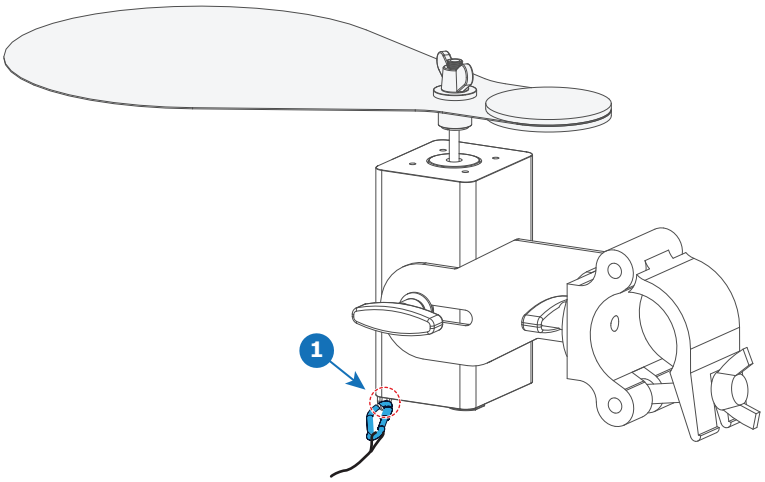


Image 11–11 Location of the safety cable

4. Connect the shutter motor to the front XLR connector of the projector.

   Tip: If the front XLR connector is already in use for another device (e.g. the motorized frame), use the XLR splitter delivered in this kit to connect both the shutter and the other device to this XLR connector.

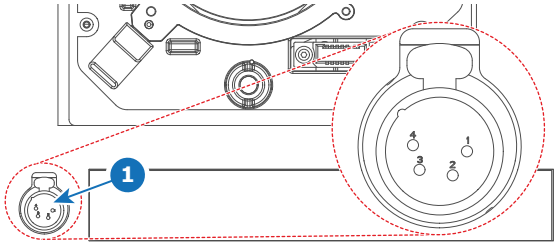


Image 11–12 Example of the location of the XLR connector on the UDX

11.4 Activating and configuring the shutter

How to configure

1. Power on the projector.
2. Enable the XLR connector and set the output voltage to 24V. To do so, use one of the following:
   ► Use the Front XLR connector menu in the projector OSD menu. For more info, see the Pulse OSD user guide.

► Use the Front XLR connector panel in the Pulse Prospector software. For more info, see the Pulse Prospector user guide

3. Use the shutter motor buttons to set the “mode” to one of the following:
   ► mode 3 (clockwise) , or
   ► mode 4 (counterclockwise).

   The shutter will perform a homing action. It will go to the “open” and “close” status of the chosen mode.
4. Perform a visual check the homing action of the shutter.

   Make sure of the following:

   - Make sure that the lens is fully covered when the shutter is in “close” status.
   - Make sure the projected image is not covered by the shutter in “open” status.

   Warning: Make sure the shutter does **not** cover the lens when you are projecting images. This may damage both the shutter and the mounted lens (due to reflected light).
5. Release the wing nuts to reposition the flap according to the shutter status.

12 External cooler

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12.2 External cooler installation requirements 117
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12.4 External cooler upgrade process 121
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About this chapter

This chapter explains the external cooler models, how they function and need to be installed. This chapter also explains how to upgrade your projector in order to be connected with an external cooler.

12.1 Introduction

About the external cooler

For functionality and reliability, events projector require accurate temperature control and cooling. Therefore a liquid cooling system is provided in the projector.

The option of an additional external cooling can be chosen in the following circumstances:

- If the projector stands in a public space and needs to play as silently as possible. Using the external cooler as a “replacement” cooling system, the projector will generate less noise (the amount varies per projector model).
- If you want your projector to produce less heat in the location it is mounted in. Using the external cooler as a “replacement” cooling system, the projector will dissipate less heat (the amount varies per projector model).
- If you want to extend the lifetime of the projector and the light source, you can use the external cooler as an upgraded cooling system.

If the option is chosen to have an external cooling system in addition to the integrated cooling system, the cooling circuit inside of the projector will be connected to an external cooler via hoses. Only coolers and hoses exclusively developed for this application and approved by Barco are allowed to be used in this setup.

The cooler is controlled by the projector and ensures that the ambient temperature of the laser banks, and all other components within the light source are within spec.

Overview L2A model

The Liquid-to-air model (L2A) of the external cooler has a set of five fans. This version of the external cooler uses the air of the environment to reduce the temperature of the cooling liquid flowing through the projector.

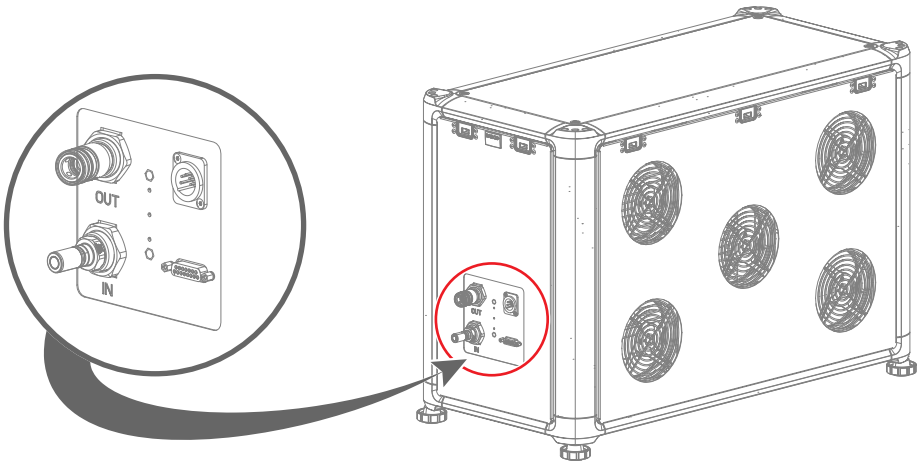

Image 12–1 External cooler Liquid to Air (L2A) model

1 Female connector liquid cooling
2 Male connector liquid cooling
3 XLR connector
4 Data connector
5 Air output fans

Overview L2L model

The Liquid-to-Liquid (L2L) model has a heat exchanger which can be connected to the cooling network of the installation site. This version uses the cold water coming from the local cooling network to reduce the temperature of the cooling liquid flowing through the projector (hence liquid-to-liquid).

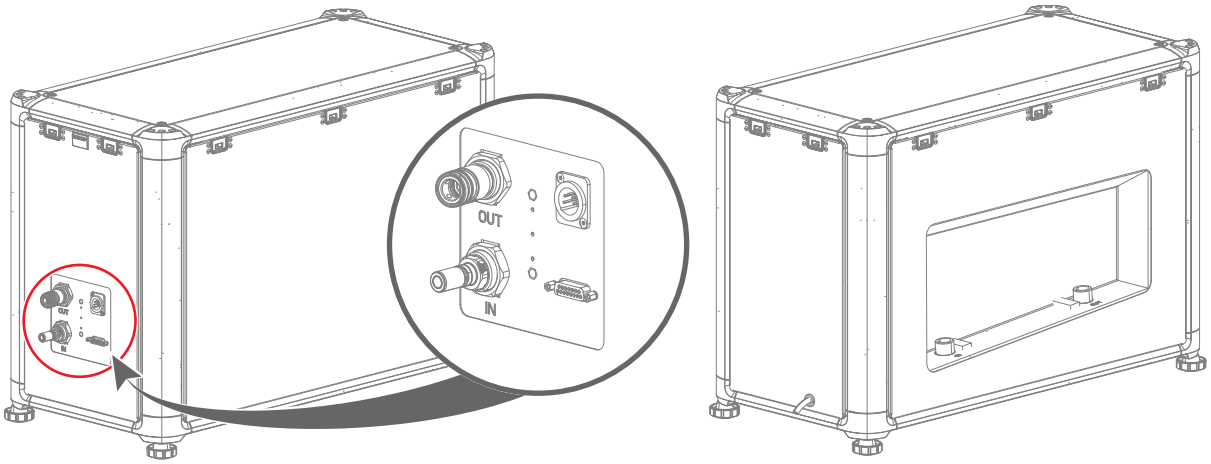

Image 12–2 External cooler Liquid to Liquid (L2L) model

1 Female connector liquid cooling
2 Male connector liquid cooling
3 XLR connector
4 Data connector
5 Water drain for condensed water
6 Cooling liquid connectors for connecting with local cooling system

12.2 External cooler installation requirements

Environment conditions

In general, keep in account that the external cooler must comply with the same environmental conditions as the projector it is connected to. It is not advised to have huge temperature differences between cooler module, tubing and projector, as this will have an influence on the cooling liquid flowing through it. Cooling liquid that is too hot or too cold may negatively impact the performance of the projector.

The following table summarizes the physical environment in which the cooler by itself may be safely operated or stored. However, keep in mind that if the environmental conditions table of the connected projector are more strict, those must apply to the cooler as well.

Environment	Operating	Non-Operating
Ambient Temperature	• Cooler by itself: - L2A model: 0°C (32°F) to 35°C (95°F) - L2L model: 5°C (41°F) to 40°C (104° F)[5] • In aspect to the projector: Within +/- 5°C. from projector environment (at startup) • Ideal environment: 15-18°C (59–64.5°F)	• Cooler by itself: -15°C (5°F) to 60°C (140°F) • In aspect to the connected projector: +/- 5°C. from projector environment
Humidity	0% RH to 80% RH Non-condensed	0% RH to 90% RH Non-Condensed
Altitude	• Cooler by itself: -60 m (-197 Ft) to 2500 m (8202 Ft)[6] • Cooler in aspect to the projector: less than +/- 5 meters from projector.	• Cooler by itself: -60 m (-197 Ft) to 10 000 m (32 810 Ft) • In aspect to the projector: less than +/- 5 meters from projector

Cooler modules weight

The L2A model of the external cooler weighs about 19.4 kg (42.77 lbs).

The L2L model of the external cooler weighs about 16.2 kg (35.71 lbs).

5. insulation is required for the cooling tubes. Barco does not provide insulation. Market available solutions can be used.
6. For PRC (People's Republic of China) the certified altitude is specified on the product label.

Air flow requirements L2A model

The L2A model of the external cooler is fan cooled and must be installed with sufficient space around the air inlets and outlets. Make sure a space of minimum 15 cm (6 in) is available to ensure sufficient air flow. For this reason, it is not allowed to position the cooler on the ground in landscape position.

It should be used in an area where the ambient temperature, as measured at the air inlets, does not exceed 35°C (95°F). Also take into account the airflow coming out of the cooler (maximum 185 CFM).

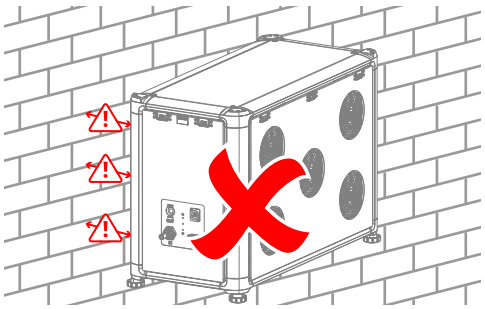

Image 12–3 No positioning a cooler too close to a wall or other solid surface

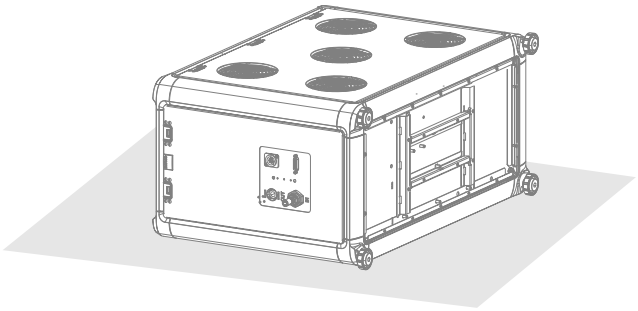

Image 12–4 No positioning the cooler in landscape position on the ground

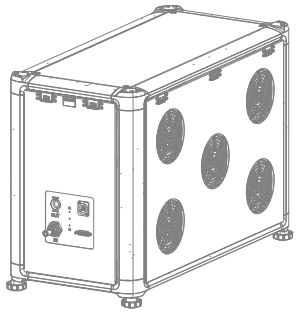

Image 12–5 Allow for good airflow

The L2L model of the external cooler is water-cooled and does not have any air flow restrictions.

Position limitation L2L model

Due to the nature of the heat exchanger and condense extraction, it is only allowed to install the L2L model in table-mount position. No other positioning is allowed

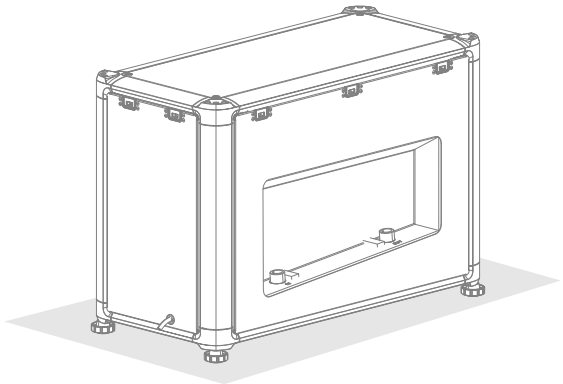

Image 12–6 The only correct installation position of the L2L cooler

Avoiding condensation buildup

In order to avoid building up of condensation in the projector, it is advised to have at the startup of the projector, the external cooler, tubes and projector to be in a room with similar ambient temperature (+/- 5°C difference).

During normal operation (after startup has completed and projector remains ON), the minimum ambient temperature of the external cooler should be within the specified allowed temperature range.

In air-conditioned rooms, make sure that at startup of the projector, the climatization of the room of the projector, cooler and tubes is active. If the projector is controlled remotely, make sure the room climatization can be controlled remotely as well and is included in the same control process / is in sync with the projector status.

CAUTION: For L2L models specifically, it is required to provide insulation to the cooling tubes (both the water cooling tubes as the cooling liquid tubes). While Barco does not provide insulation, market available insulation can be used.

Maximum height difference between projector and cooler

Regardless the mounting position or orientation of the cooler, the difference in height (H) between the two ends of the cooling tubes should always be less than 5 meters (16.4 feet).

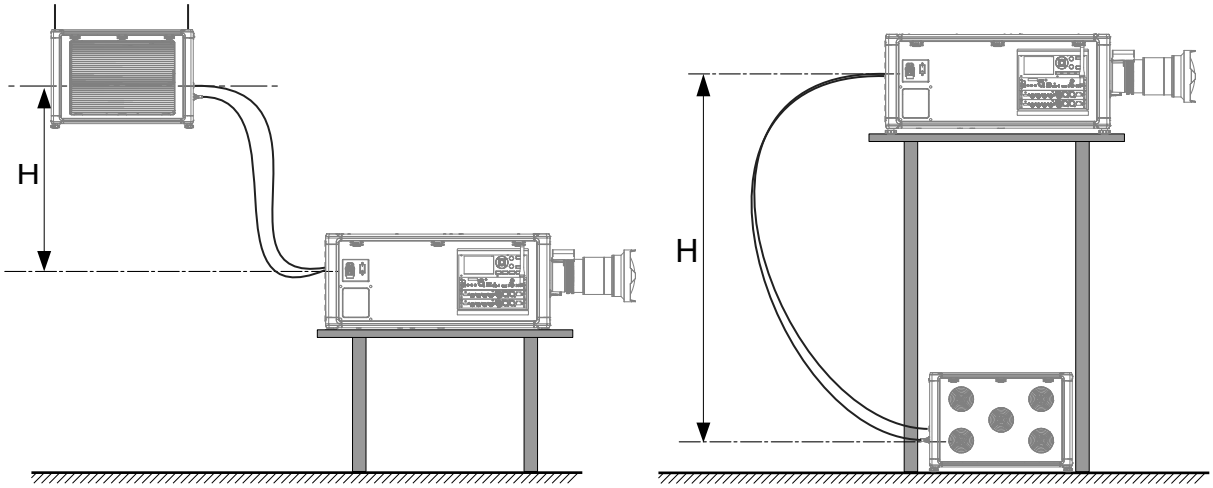

Image 12–7

CAUTION: Position the hoses of the cooling system so that they will not be tripped over, pulled, or in contact with hot surfaces.

Power requirement

The cooler module runs on 24 VDC, and should be connected with a data and power cable coming from the projector.

However, the projector can **only** operate in the range 200–240V while connected to the external cooler.

Extending the maximum length between projector and cooler

Regardless the mounting position or orientation of the cooler (on the floor, suspended from a truss), the length of cables and tubing is designed for 8 meters (8.75 yd) in distance.

If required, the cooling tubes can be concatenated with each other to a distance of 24 meters (26.25 yd) maximum. However, Barco doesn't supply extension cables for power and control of the external cooler. Market available solutions can be used, or alternatively, you can also build your own extension with the following instructions:

- A data cable of the desired length with the following specs:
  - RS232 cable
  - 15-pin D-Sub connectors: DA-15 and DB-15
- A custom power cable with the following specs:
  - 2 x 1.5 mm²
  - A male and female 5 pin XLR connector
  - Connect (+) = pin 2+3
  - Connect (-) = pin 4+5

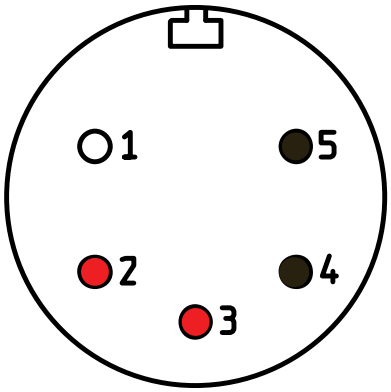

Image 12–8 Wiring of the XLR connector

Installing multiple coolers

Placing multiple L2A coolers right next to each other is not allowed. The air inlet of one cooler would take in the “hot” extracted air of the cooler next to it, even at a distance of one meter apart.

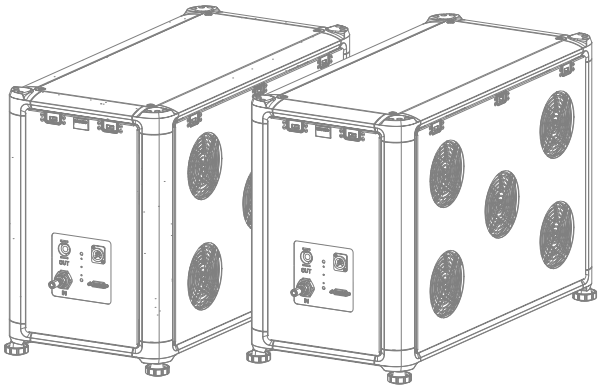

Image 12–9 The right-side cooler is taking in the hot extracted air of the cooler next to it. This is not allowed.

Stacking multiple coolers on top of each other is allowed. You can connect the bottom of one cooler with the top of a second cooler, by removing the feet of the top cooler and inserting M8 stud bolts (for example).

However, take into account the following when stacking coolers this way:

- Respect the maximum height difference between each cooler and the connected projector (maximum 5 meters, or 16.4 feet)
- The larger the stack, the easier it will topple over. Attach the stack to a fixed object or structure, or build a rack to prevent the stack from toppling.
- Make sure that every cooler in the stack is positioned in the same direction. Make sure the “hot” extracted air from one cooler cannot be taken in by other coolers.

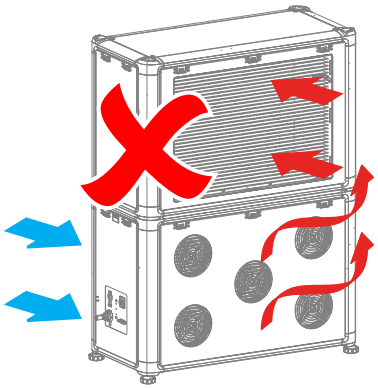

Image 12–10 Stacking coollers in opposite directions is not allowed

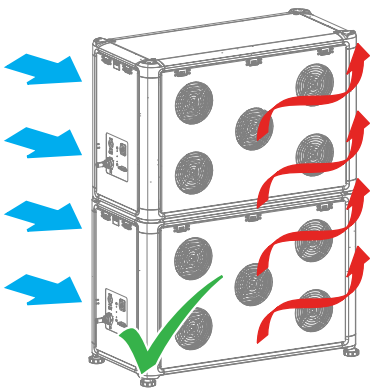

Image 12–11 Example of stacking two cooler units correctly

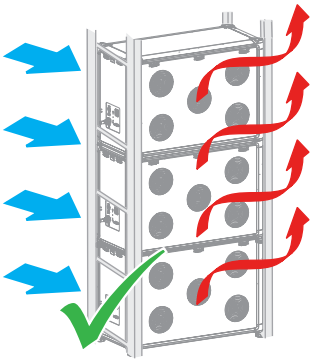

Image 12–12 Examples of multiple stacked coolers in a rack

12.3 About the upgrade kit

About the upgrade kit

In order to connect the projector with an external cooler, certain upgrade actions need to be performed on the projector.

Barco has provided an upgrade kit with all the necessary parts to ensure proper connection with the cooler can be guaranteed.

The upgrade process can only be done by a service technician, as several parts need to be disassembled.

General

Before shipment, the external cooler was inspected and found to be free of mechanical and electrical defects. As soon as the cooler is unpacked, inspect for any damage that may have occurred in transit. Save all packing material until the inspection is completed. If damage is found, file claim with carrier immediately. The Barco Sales and Service office should be notified as soon as possible.

Content of the upgrade kit

Consult the following table to see what parts are used:

Description	Pcs
Power plug assembly	1
rubber buffer for power plug assembly	1
Connector plate for power plug assembly	1
Cooler interconnection board	1
10–pin cable (Z3405496)	1
4–pin cable (Z3405492)	1
2–pin cable (Z3406332)	1
Hex screw M3 x 20	2
Torx screw M3 x8	4
Torx screw M2 x 4	1
Black cable tie	2
Cooling liquid tubes assembly, with temperature sensor wiring	1
dewpoint sensor	1

Mechanical check

This check should confirm that there are no broken knobs or connectors, that the cabinet and panel surfaces are free of dents and scratches, and that the operating panel is not scratched or cracked. The Barco Sales and Service office should be notified as soon as possible if this is not the case.

12.4 External cooler upgrade process

1. Make sure the projector is installed in the desired location. Follow the installation process of the projector. For more info, see chapter “Installation process”, page 25.
2. **Upgrade the projector** in order to connect with an external cooler. Do this as follows:
   1. Remove the left side and top cover. For more info, see chapter “Projector covers”, page 79.

2. Remove the light source cooling assembly. For more info, see “Removing the light source cooling assembly”, page 122.
3. Install the cooler interconnection board. For more info, see “Installing the cooler interconnection board”, page 124.
4. Install the power plug assembly. For more info, see “Installing the power plug”, page 127.
5. Install the liquid cooling hoses. For more info, see “Installing the cooler tubing”, page 130.
6. Reinstall the light source cooling assembly. For more info, see “Reinstalling the light source cooling assembly”, page 134.
7. Reinstall the removed covers. For more info, see chapter “Projector covers”, page 79.

3. Check if all installation requirements for the cooler are fulfilled. For more info see chapter “External cooler installation requirements”, page 117
4. **Unpack** the external cooler.
5. Perform an **initial inspection** of the cooler and the content of the upgrade kit. For more info, see chapter “About the upgrade kit”, page 121.
6. Define the installation position of the external cooler(s). In case of installing multiple coolers, make sure to follow the installation requirements on installing multiple coolers. For more info, see chapter “External cooler installation requirements”, page 117.
7. Connect the projector with the external cooler. For more info, see chapter “Connecting the projector to the external cooler”, page 135.
8. Power on the projector. For more info, see chapter “Powering on projector”, page 47.
9. Make sure no new errors or warnings are triggered, caused by the upgrade process. If so, power down the projector and see if any wiring or tubing is poorly connected.
10. **Check if the LEDs on the external cooler**. The LEDS are colored as follows:
    - White: External cooler is powered, but external cooler is not enabled.
    - Green: External cooler is powered and working.
    - Red: External cooler has triggered one or more notifications. Check the error log of the connected projector.
11. **Enable the external cooler** in the Pulse OSD, or by using Pulse Prospector.

    For more info on enabling the external cooler menu, see the Pulse OSD user manual or the Pulse Prospector user manual respectively.

12.5 Removing the light source cooling assembly

Prerequisites

Remove the rear top cover and the right side cover. For more info on how to remove covers, see “Projector covers”, page 79.

Remove the foam filter resting on the cooling assembly.

Required tools

Torx screwdriver T20

How to remove

1. Remove the four screws of the cooling assembly. Use a T20 Torx screwdriver to release the screws.

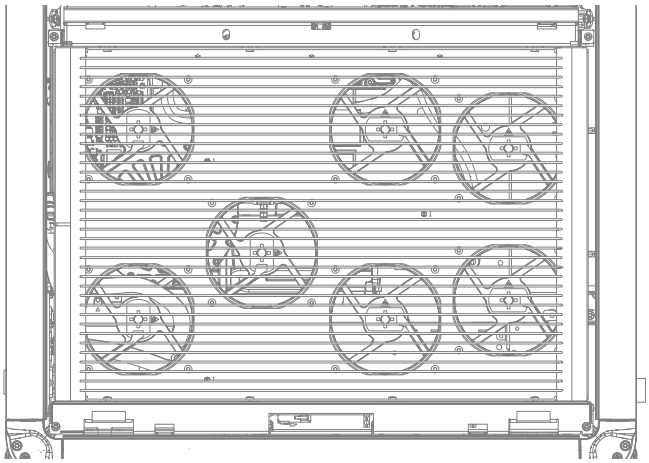

Image 12–13 Location of the screws

2. Disconnect the cooling assembly wiring on the LCB.

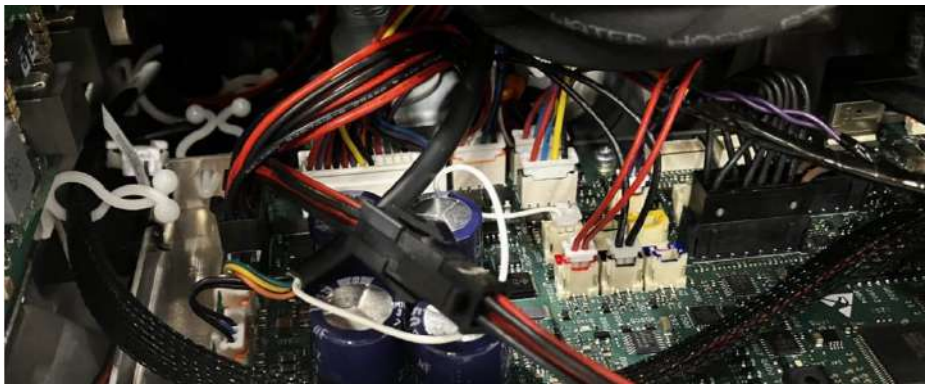

Image 12–14 Location of the wiring on the LCB

3. Disconnect the tubing.

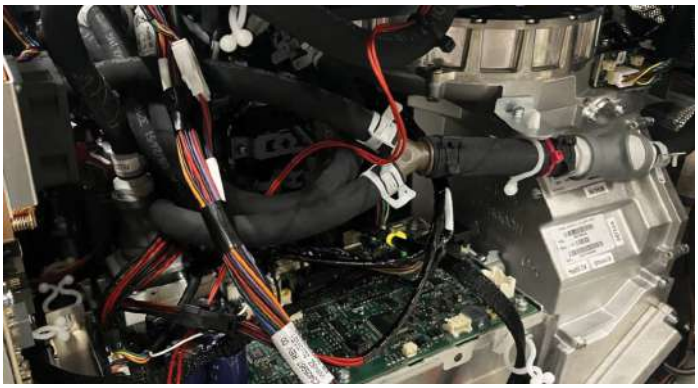

Image 12–15 Location of the tubes to be disconnected

4. Lift up and remove the cooling assembly.

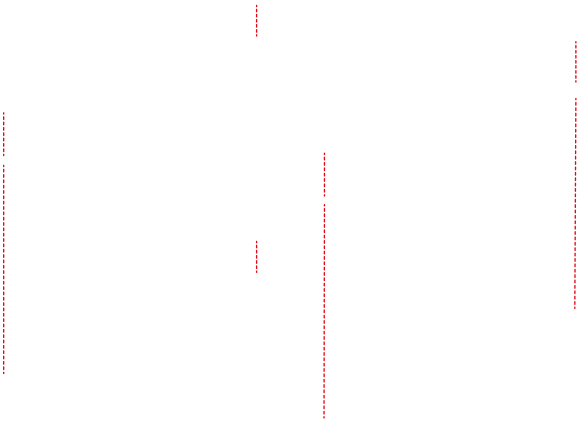

Image 12–16

Partial or full removal

The light source cooling assembly must be removed in order to perform service actions on other components in the light source compartment of the projector.

While it is advised to fully remove the cooling assembly each time, alternatively you can also do the following:

- Keep the wiring connected.
- Keep the tubing connected (if possible).
- Carefully lift up the cooling assembly a bit, and rotate it. Do this in a way the assembly can rest on the front top cover.

12.6 Installing the cooler interconnection board

Required tools

Torx screwdriver T10

How to install

1. Release the screws of the top bracket. Use a T10 Torx screwdriver to release the three screws.

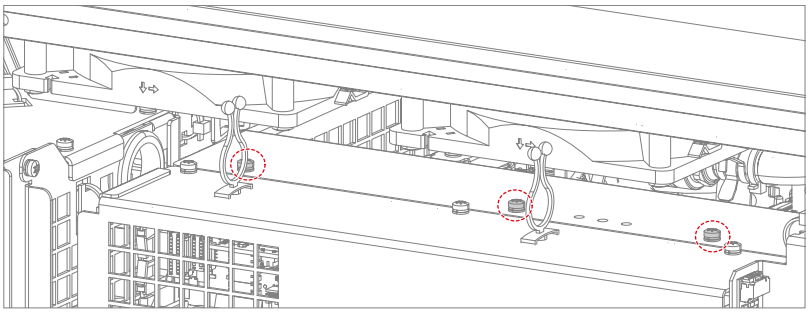

Image 12–17

2. Lift up and remove the bracket.

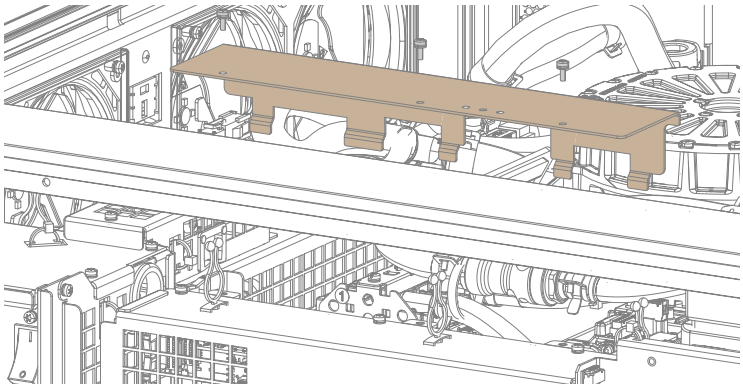

Image 12–18

3. Assemble the interconnection board from the kit as illustrated. Use a T10 Torx screwdriver to drive in the four M3 Torx screws.

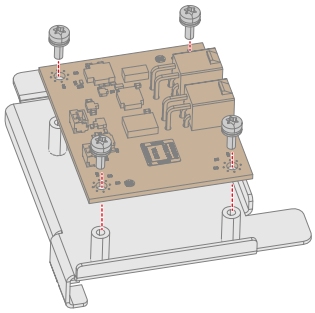

Image 12–19

4. Remove one of the screw of the filter board cage as illustrated. Use a T10 Torx screwdriver.

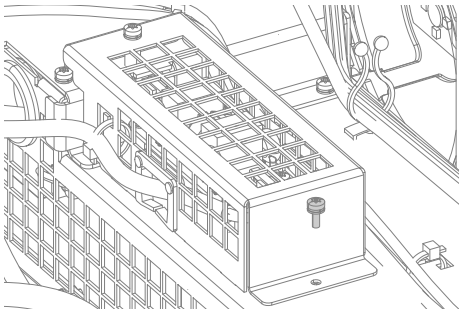

Image 12–20 Removing one screw of the filter board cage

5. Install the interconnection board assembly in the projector as illustrated. Use a T10 Torx screwdriver to reinstall the screw of the cage.

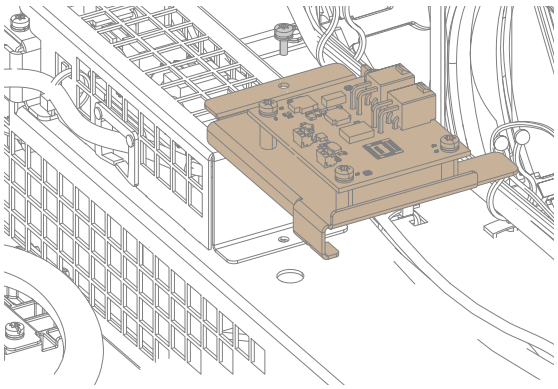

Image 12–21

6. Place one end of the 4-pin cable (Z3405492) in the SMPS as illustrated.

Image 12–22 4–pin cable inserted into the SMPS

7. Insert the other end of the cable into the interconnection board (reference 1).

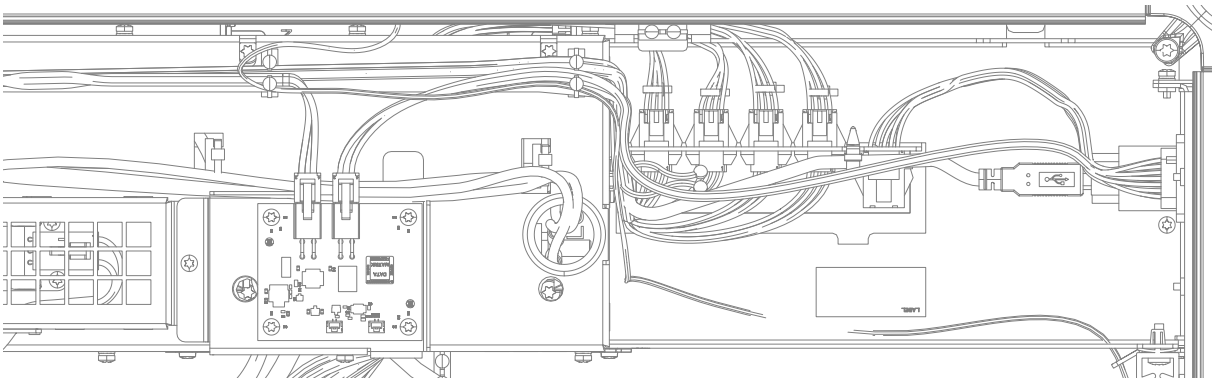

Image 12–23 Wiring of the cooler interconnection board

8. Install the top cover of the SMPS as follows:
   a) Place the bracket on the assembly as illustrated.

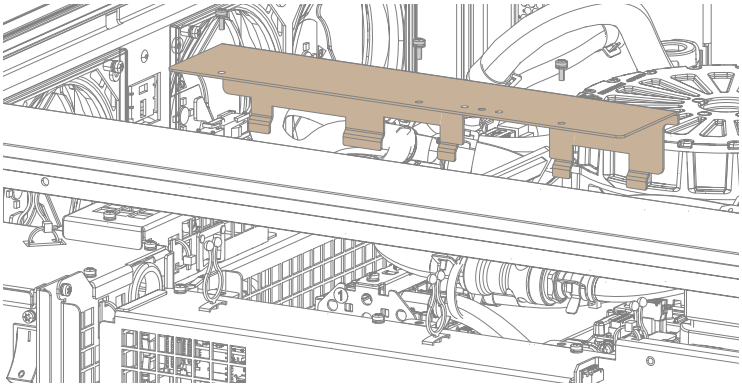

Image 12–24

   b) Fasten the screws of the top bracket. Use a T10 Torx screwdriver.

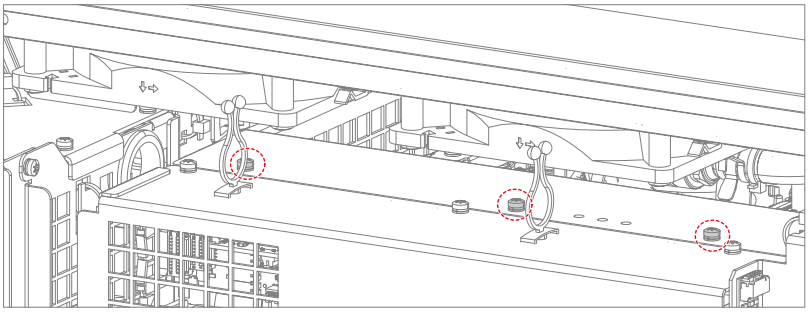

Image 12–25

9. Place the cable into all the wire clamps on top of the power box and mains input as illustrated in the following image.

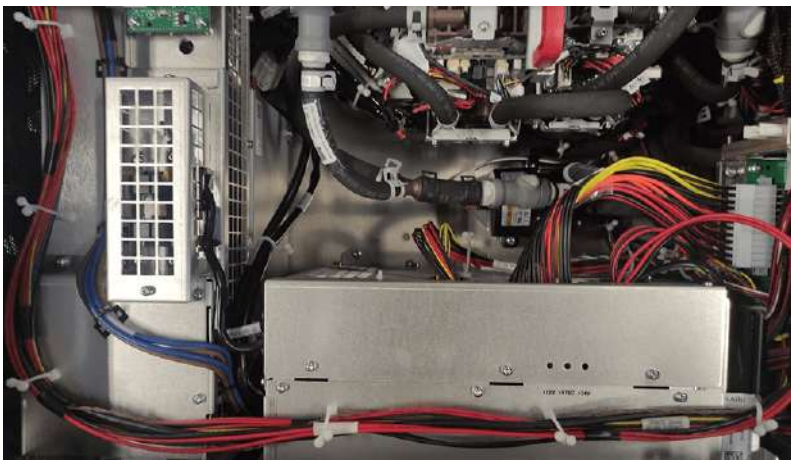

Image 12–26

Caution: the routing of the power cable is important for EMI reasons.

12.7 Installing the power plug

Required tools

- Torx screwdriver T10
- Allen wrench 2.5 mm

Required parts

- Power plug
- Rubber buffer for power plug
- Connector plate for power plug
- Hex screw M3 x 20

How to upgrade

1. Remove the plate covering the openings intended for the upgrade kit as illustrated. Use a T10 Torx screwdriver to remove the two screws.

Tip: The plate and screws will not be re-used. You can keep these in case the cooler upgrade would ever be uninstalled.

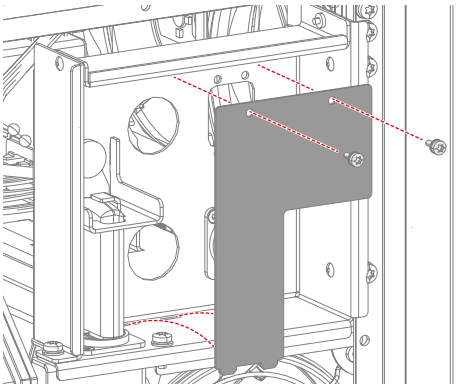

Image 12–27 Removing the cover plate

2. Place the rubber buffer over the wiring of the power plug as illustrated.

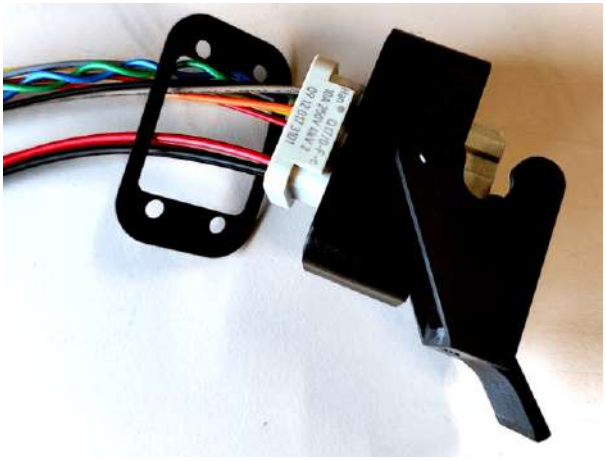

Image 12–28 Example of the rubber

3. Insert the power plug through the intended opening as illustrated.

Note: Pay attention to the orientation of the power plug. Make sure the lock can properly be applied to the connected power cable.

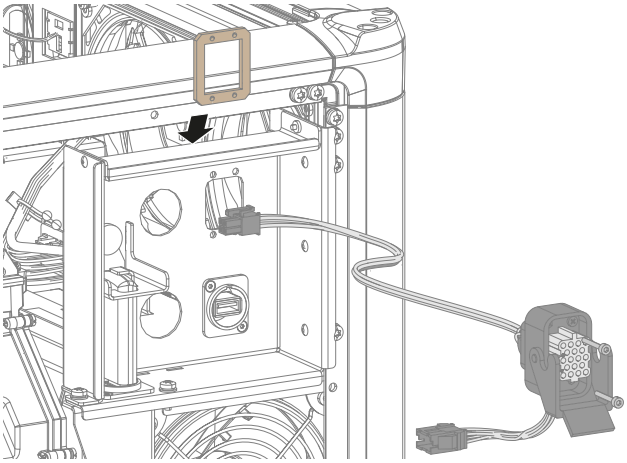

Image 12–29 Inserting the power plug

4. Connect the power plug with the projector using the two M3 hex screws and the connector plate from the kit. Use a 2.5 mm Allen wrench.
5. Insert the cable end with 4-pin connector on the interconnection board (reference 2).

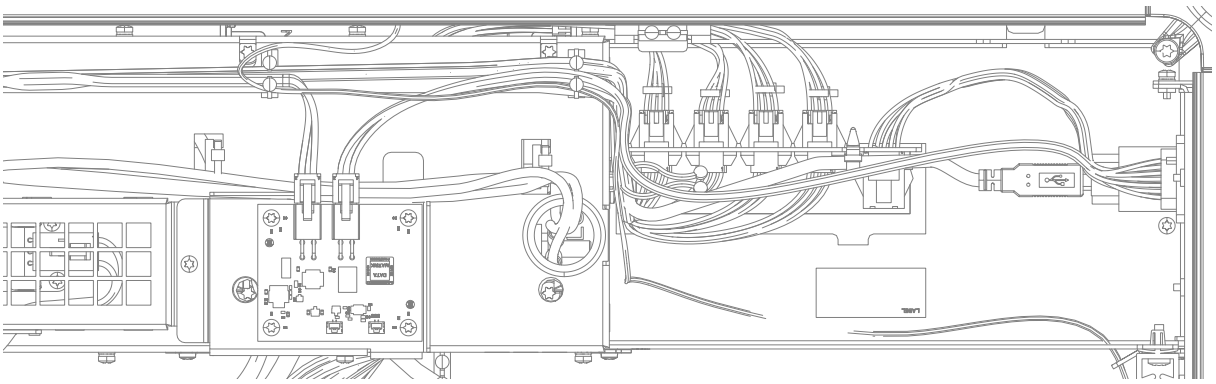

Image 12–30 Wiring of the cooler interconnection board

6. Insert the wire unit with plug in the open insert next to the fan connectors (reference 3, Image 12–30). Do this as illustrated in the following image.

Tip: The plug can only be inserted in one way. The looped black wire should be facing the power plug.

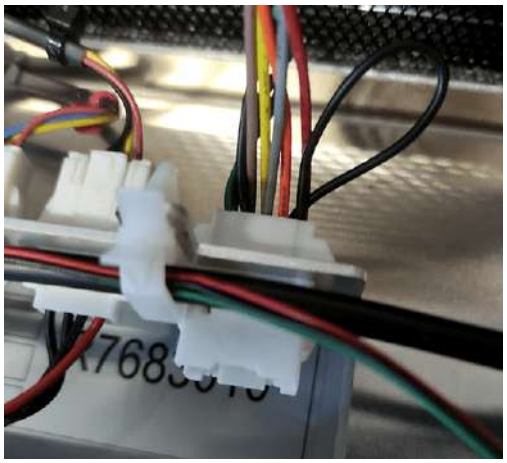

Image 12–31 Example of how to insert the plug.

7. Use the 10-pin cable (Z3405496) to connect the newly inserted plug (reference 3, Image 12–30) with the LCB (connector J801, reference 4).

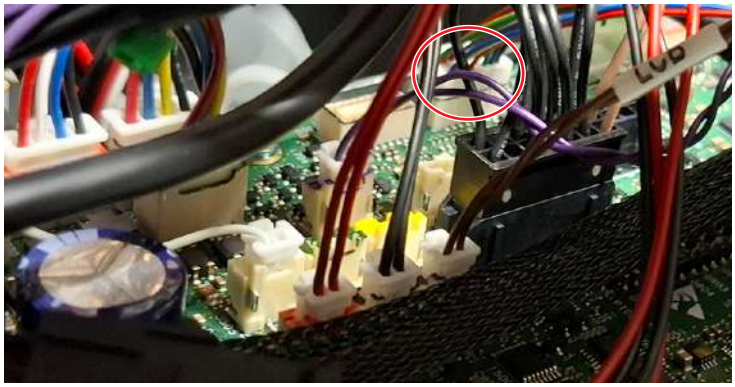

Image 12–32 Connecting the 10–pin cable on the LCB

8. Use the brown two-pin cable from the kit (Z3406332). Connect one side on the interconnection board (reference 5). Connect the other side to the LCB (reference 6).

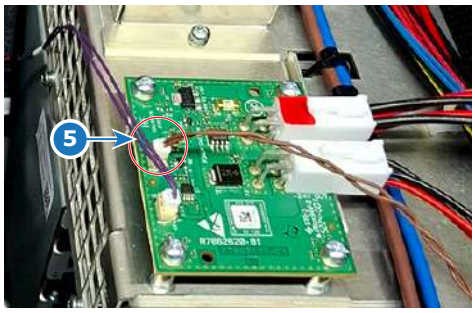

Image 12–33 Location of the two-pin cable on the interconnection board

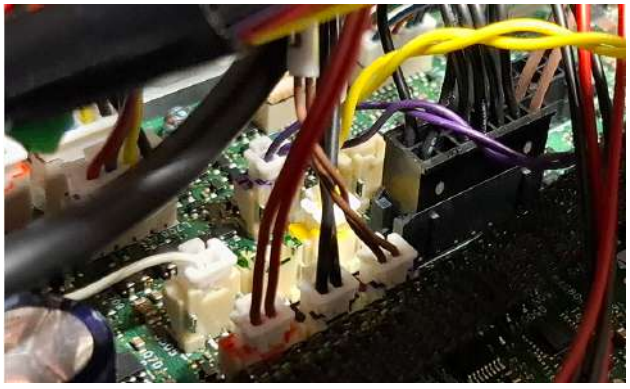

Image 12–34 Sensor connections on the LCB

9. Route the newly placed wiring as illustrated in the following images.

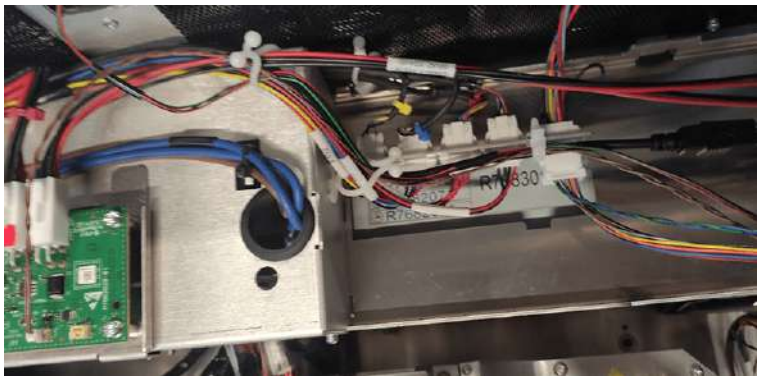

Image 12–35 Example of the routing of the wire units 1/3)

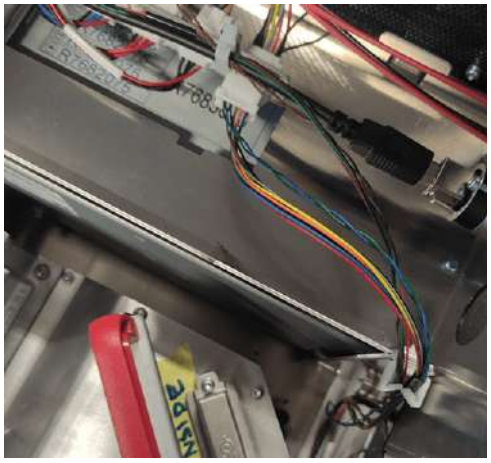

Image 12–36 Example of the desired routing of wire units (2/3)

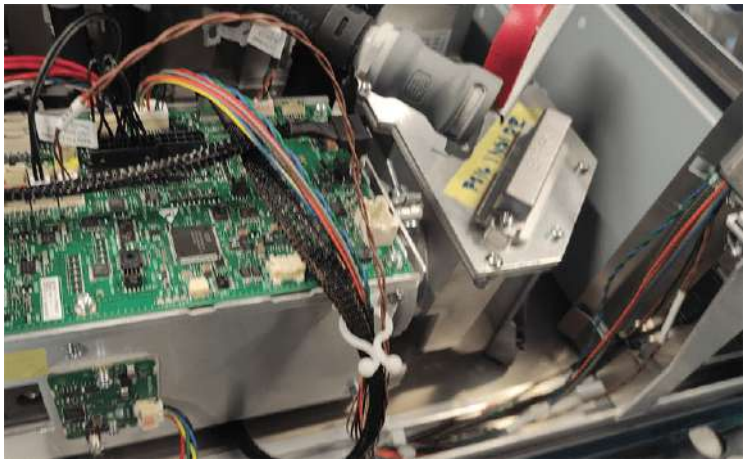

Image 12–37 Example of the desired routing of the wiring (3/3)

12.8 Installing the cooler tubing

Required tools

- Torx screwdriver T6
- Tape measure
- Black cable tie

Required parts

- Torx screw M2 x 4
- Cooling liquid tubes assembly, with temperature sensor wiring

- dew point sensor

How to install

1. Remove the lock nut of both the male and female **metal** tube connectors.

   Tip: Removing the lock nut is necessary to push the metal connectors through the cover openings.

Image 12–38 Remove the lock nut by rotating it counterclockwise

2. Connect the dew point sensor to the metal part of the long tube with plastic tube connector. use a T6 Torx screwdriver and a cable tie to carefully lock it in place.

   Caution: Make sure to handle the dew point sensor with care, as it is fragile.

Image 12–39 Desired location to lock the dew point sensor in place

3. Carefully insert the tubing into the projector as illustrated.

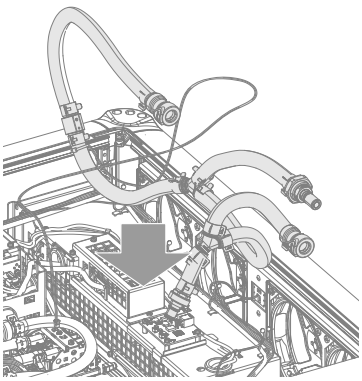

Image 12–40 Example of how the tubing needs to be inserted

4. Pull both the male and female metal connector through the openings in the cover as illustrated. Make sure the male connector is located on top and the female connector on the bottom.

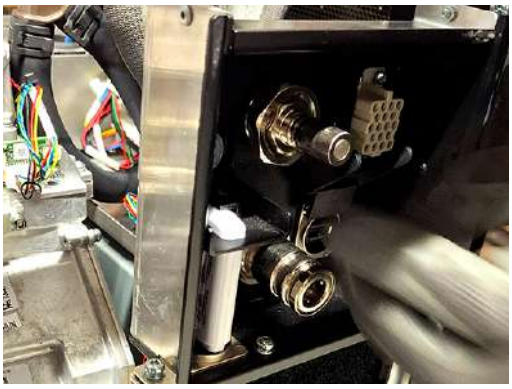

Image 12–41 Example of pulling the tube connectors through the cover openings.

5. Reconnect both lock nuts and tighten them hand-tight.
6. Carefully guide the polymer tube connector on the same side as the metal connectors downwards, towards the light source tube connector.

Image 12–42

⚠ *Caution:* Make sure the liquid cooling tube isn't crushed or bends unnaturally. This would hamper the flow of cooling liquid.

7. Lock the long end of the tubes as follows:
   a) Place the long end of the tubes in the cable clamp (reference 5) and guide it back towards the left side of the projector.

Image 12–43 Tubing and sensor connections on the cooler interconnection board

   b) Connect the tube with the filter cage, using a cable tie. Don't tighten it yet.

Image 12–44 Example of strapping the tube to the filter cage

c) Measure the length of the tube from the top of the filter cage to the end of the tube connector. This should be 25 cm (9.8 in).

Image 12–45 Example of measuring the length of the tube.

d) Once the length has been verified, tighten the cable tie to lock the tube in place.

8. Connect the sensor on the tubing as follows:
a) Connect the dewpoint sensor (purple wiring) to the interconnection board (reference 7, Image 12–43).
b) Connect the temperature sensor (yellow wiring) to the LCB (reference 8).

Tip: Route the yellow wiring along the same path the previous wire units have taken.

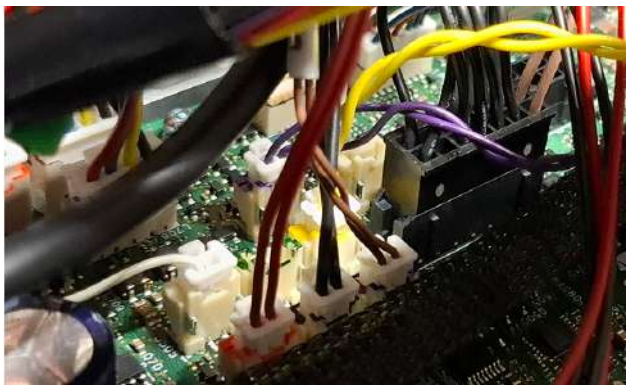

Image 12–46 Sensor connections on the LCB

9. Lock the tubes together with the big cable tie.

Image 12–47 Example of where to lock the tubes together

12.9 Reinstalling the light source cooling assembly

Required tools

Torx screwdriver T20

How to install

1. Carefully place the cooling assembly on the projector in a way you can reach the tube connectors on the bottom.
2. Connect the male tube connector on the cooling assembly with the female tube connector of the upgrade kit. Do this as illustrated.

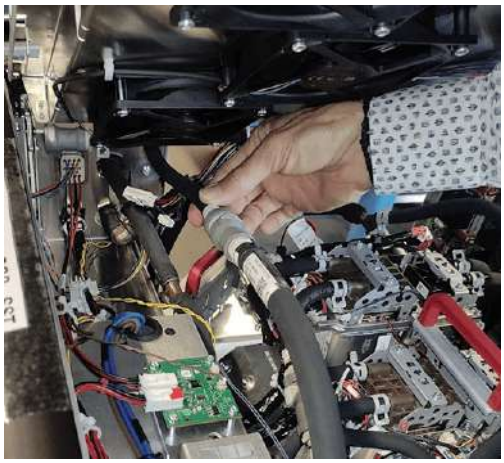

Image 12–48 Example of connected the tube connectors

3. Place the assembly down on the designated place.
4. Fasten the four screws of the cooling assembly. Use a T20 Torx screwdriver.

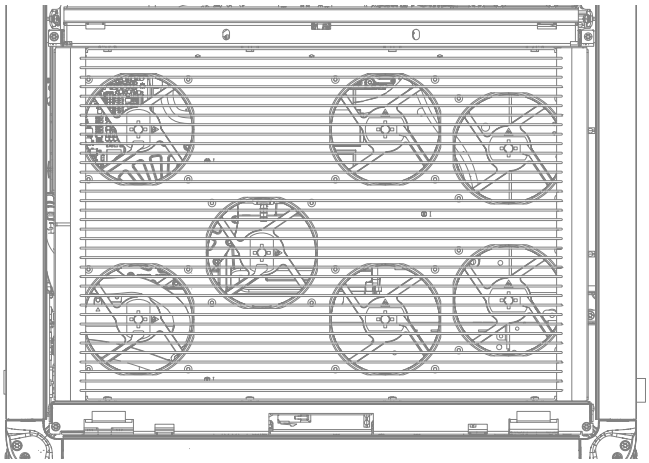

Image 12–49 Location of the screws

5. Reconnect the cooling assembly wiring on the LCB.

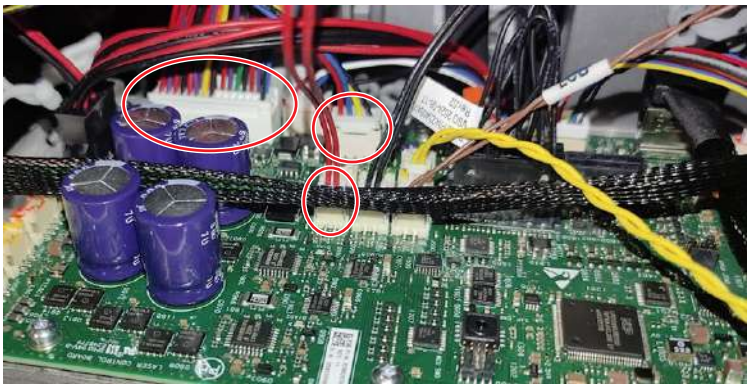

Image 12–50 Location of the wiring on the LCB

6. Reconnect the tubing.

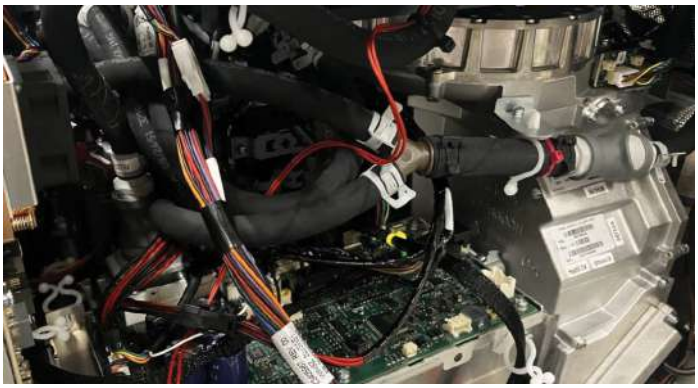

Image 12–51 Location of the tubes to be reconnected

7. Place back the large foam filter on top of the cooling assembly.
8. Install any removed cover. For more info on how to close covers, see “Projector covers”, page 79.

12.10 Connecting the projector to the external cooler

Prerequisites

Make sure of the following:

- Make sure the projector and cooler are positioned in the desired location.

- Make sure that all connectors of the hoses, chillers and projector are clean. Wipe away any dust before attaching.
- In case of an L2L cooler, make sure the cooler is connected to the local water cooling network.
- In case of an L2L cooler, make sure all liquid hoses (both water and liquid cooling hoses) are insulated.

CAUTION: For L2L coolers, the maximum allowed pressure of the connected water cooling network is 7 bar.
If the water cooling network has a higher pressure, the components of the external cooler will be damaged.

Required parts

- Cooling tube (2 x 8 meters)
- Data & power cable

How to connect

1. Connect the hoses between the projector and the L2L or L2A projector as illustrated in the following images.

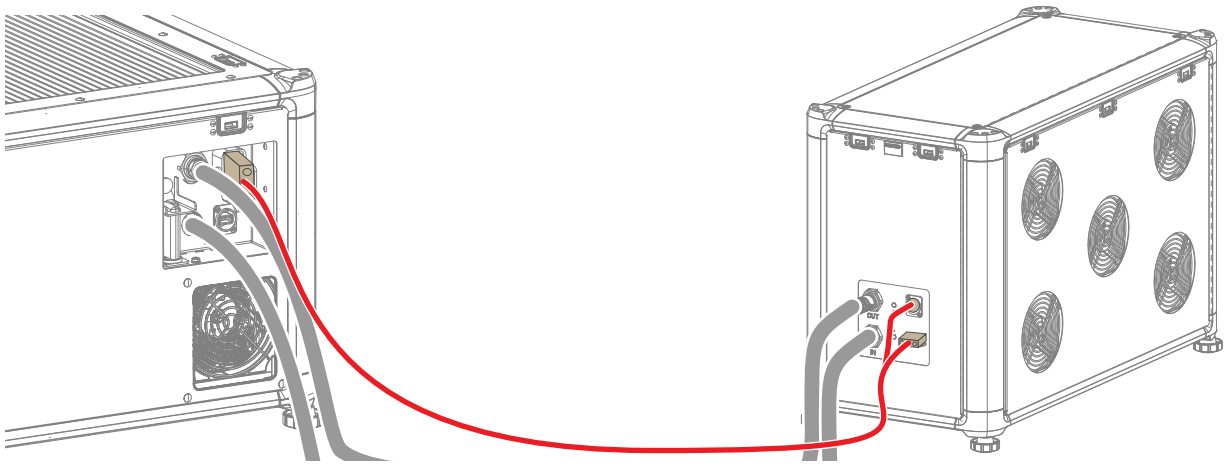

Image 12–52 Example illustration of connecting the projector with the L2A cooler

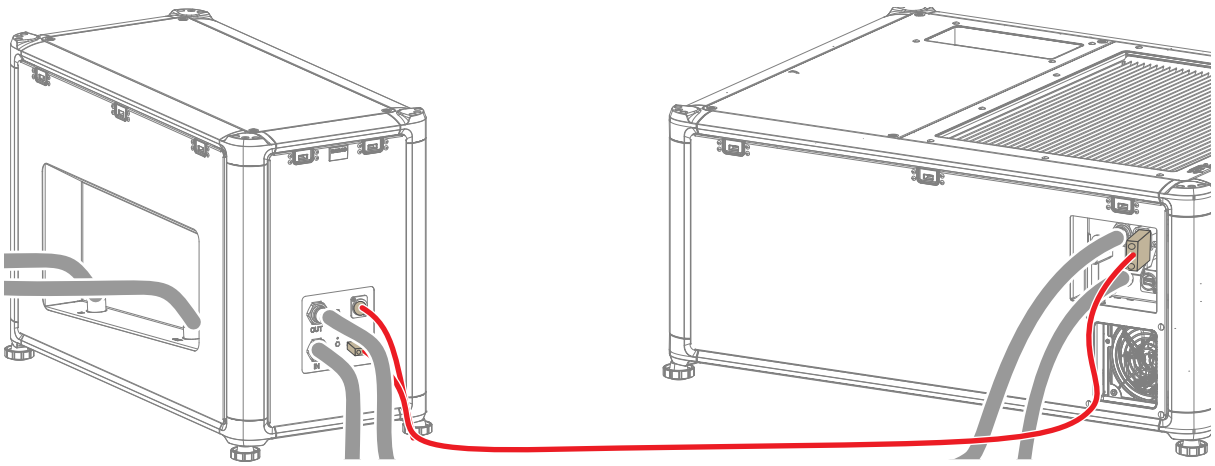

Image 12–53 Example illustration of connecting the projector with the L2L cooler

Tip: First move the latch (reference 1 Image 12–54) away from the connection while coupling the hose. Then release the latch and push the hose further until the latch locks.

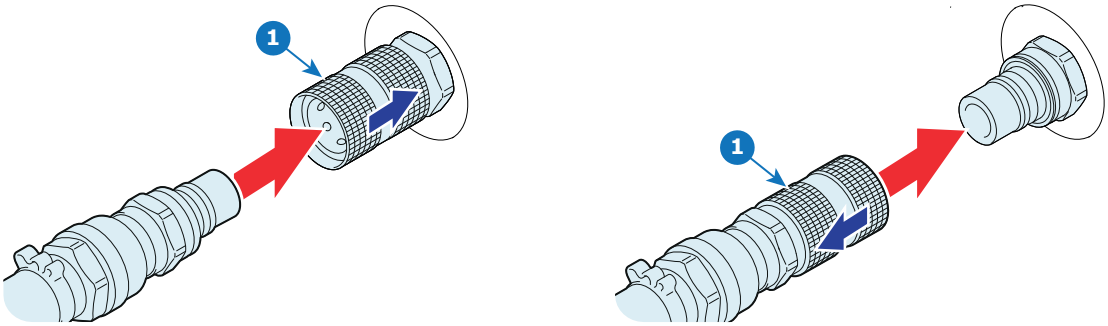

Image 12–54 Left: Male hose connection, right: Female hose connection

2. In case the plug holder clamp cannot be fully opened, temporarily remove the USB connector of the motorized rigging frame (if connected).

-

Image 12–55 Example of the clamp unable to be fully opened

3. Connect the power plug side of the communication and power cable with the power input socket of the projector.

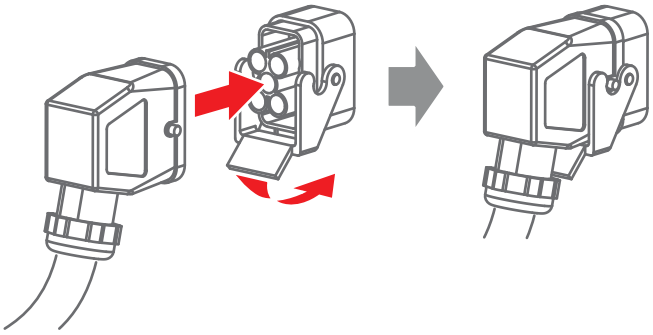

Image 12–56

4. Secure the power plug by locking the clamp.
5. If removed, reconnect the USB connector of the motorized rigging frame.
6. Connect the XRLconnector and 15-pin connector to the external cooler.

Tip: Guide the long communication cable together with the hoses.

Dimensional drawings

A

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A.3 Dimensions of the external coolers 142

A.1 Dimensions of the projector

Dimensional drawing

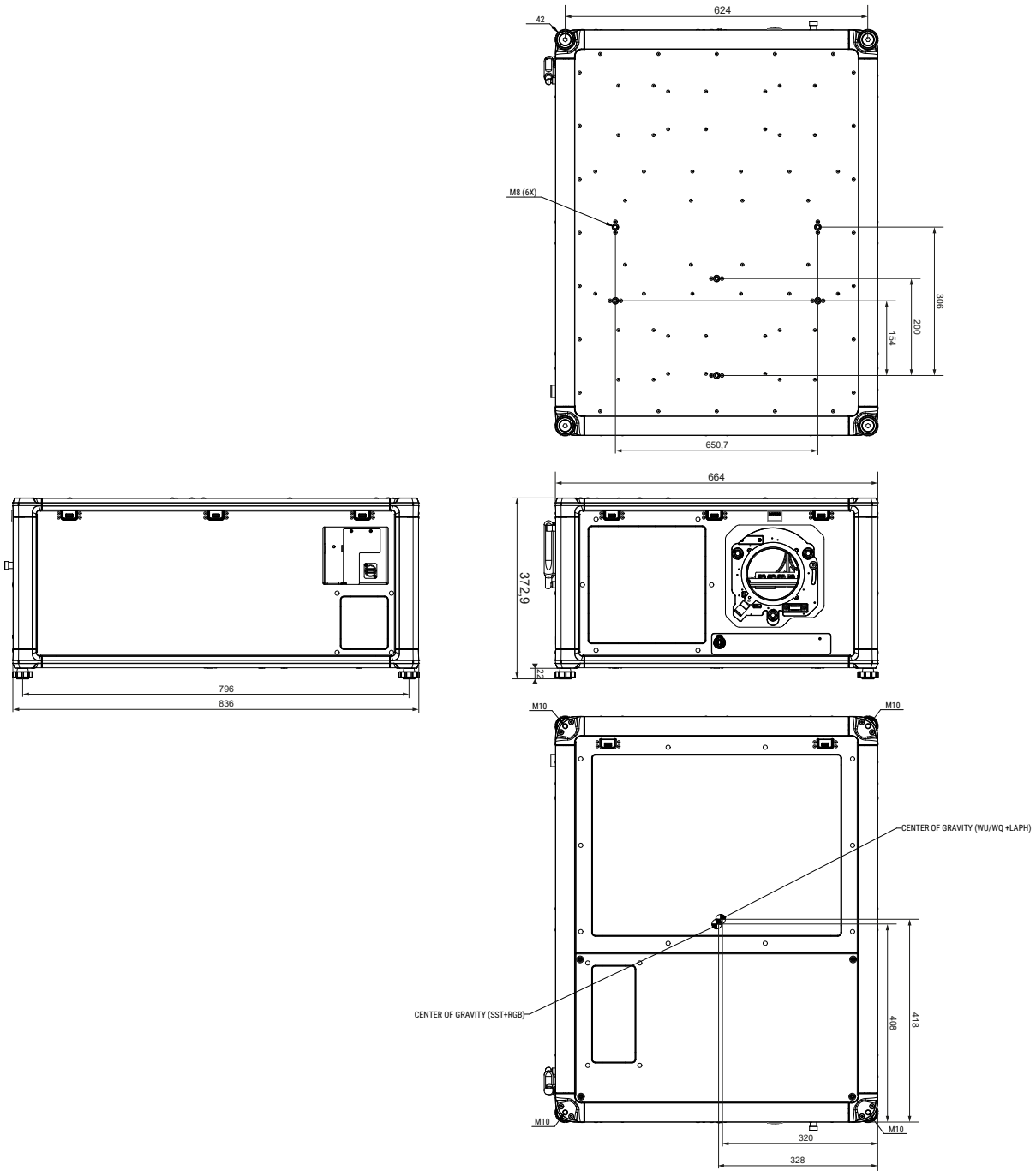

Image A–1

A.2 Dimensions of the flight case and rigging frame

Dimension drawing of the flight case

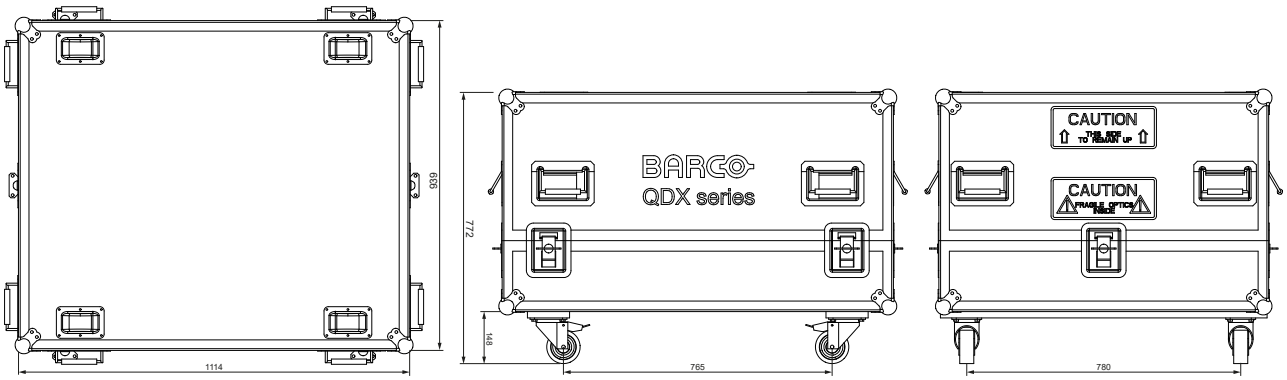

Image A–2

Dimension drawing of the rigging frame

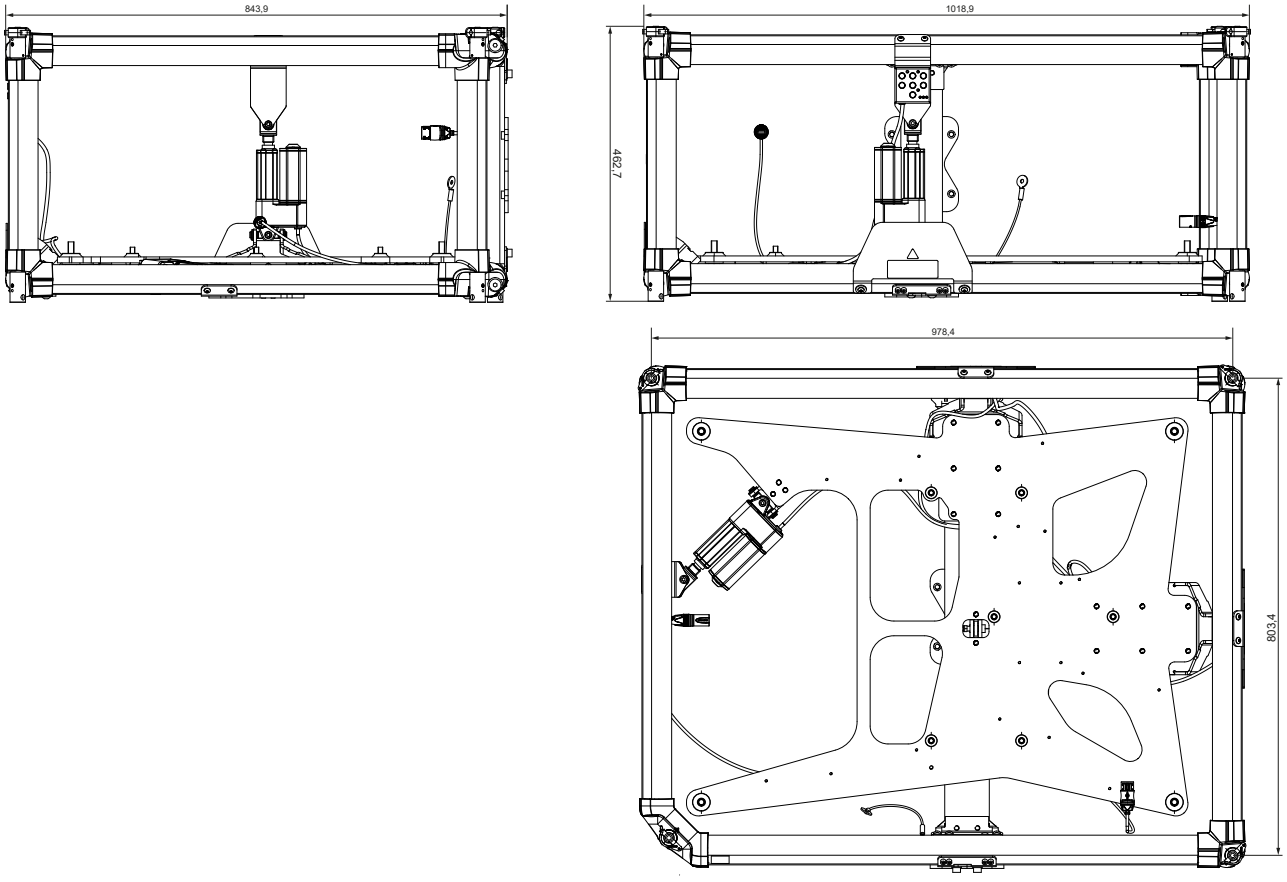

Image A–3

A.3 Dimensions of the external coolers

Dimension drawings

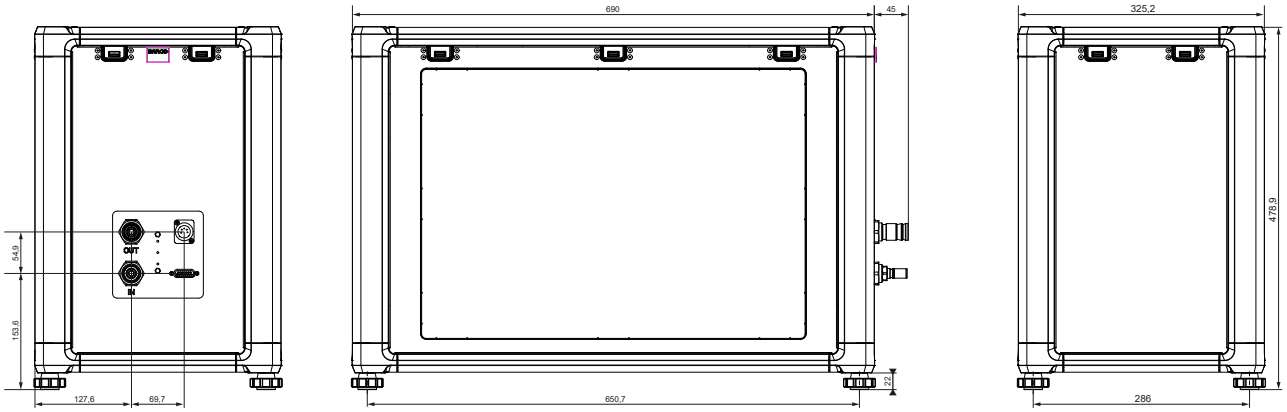

Image A–4 L2A model of the external cooler

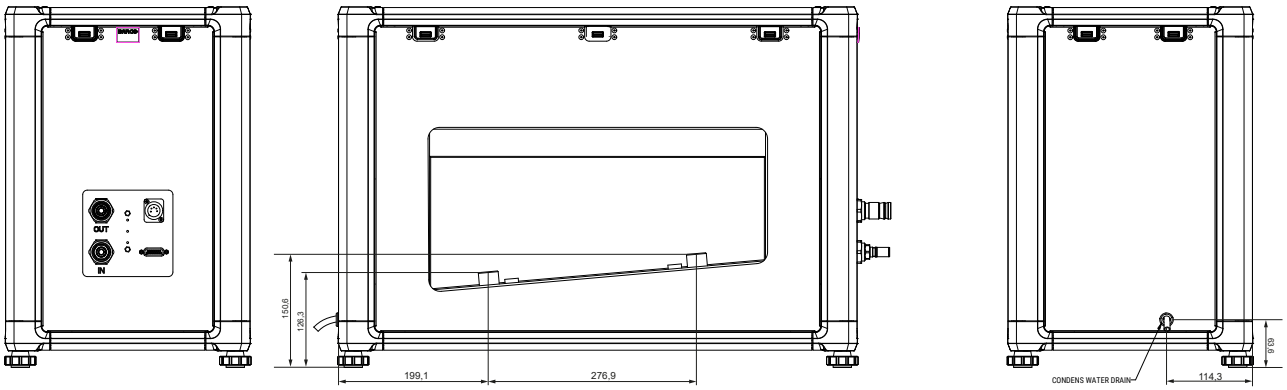

Image A–5 L2L model of the external cooler

Pulse SFP input use cases

B

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About this chapter

This chapter describes the several use cases of the SFP input. Each use case requires a different configuration of the SFP input. The SFP input needs to be configured before it is inserted in its slot of the Input & Communication module.

B.1 Use case 1: SFP+ transceiver + Fiber connection (integrated or separated)

SFP+ transceiver + Fiber connection (integrated or separated)

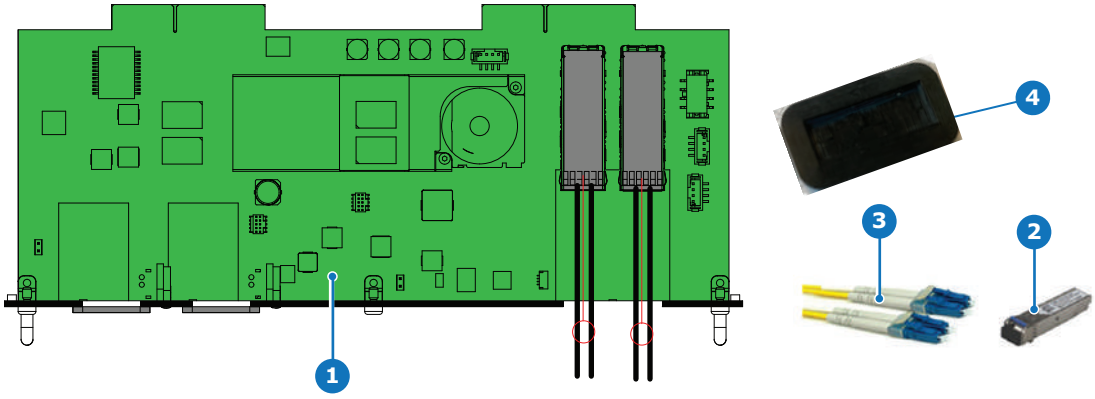

Image B–1

1 SFP input board
2 SFP+ fiber transceiver
3 Fiber optic cable
4 Dustproof Gasket

Barco delivers only the SFP input and SFP+ fiber transceivers. The customer has to buy the SFP+ transceiver and the optional breakout adapter or the fiber integrated cable.

How to configure the SFP input

1. Remove the plate covering the access to the SFP cages.
2. Insert the SFP+ transceivers
3. Connect the breakout adapter.
4. Install the SFP input in its slot of the Input & Communication module. See procedure “Installing an input board”, page 45.
5. Insert the dust proof gasket in the opening where the covering plate was removedd

B.2 Use case 2: Neutrik OpticalCon Duo + SFP+ transceiver + internal fiber

Neutrik OpticalCon Duo + SFP+ transceiver + internal fiber

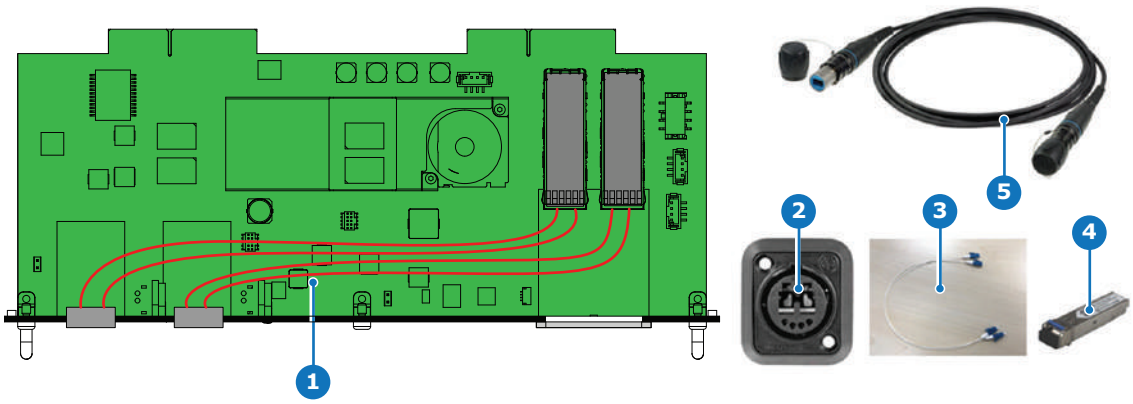

Image B–2

1 SFP input board
2 Neutrik OpticalCon DUO
3 Internal fiber cable
4 SFP+ fiber transceiver
5 Cable

Barco delivers only the SFP input and SFP+ fiber transceivers. The customer has to buy the SFP+ transceiver and the optional breakout adapter or the fiber integrated cable.

How to configure the SFP input

1. Remove both plates covering the access to the Neutrik connector locations.
2. Mount the Neutrik OpticalCon Duo connectors.
3. Remove the plate covering the access to the SFP cage and insert the SFP+ transceivers.
4. Re-install the cover plate.
5. Mount the optical internal cables between the Neutrik connectors and the SFP+ transceivers.
6. Install the SFP input in its slot of the Input & Communication module. See procedure “Installing an input board”, page 45.

B.3 Use case 3: Neutrik OpticalCon Quad + SFP+ transceiver + internal fiber

Neutrik OpticalCon Quad + SFP+ transceiver + internal fiber

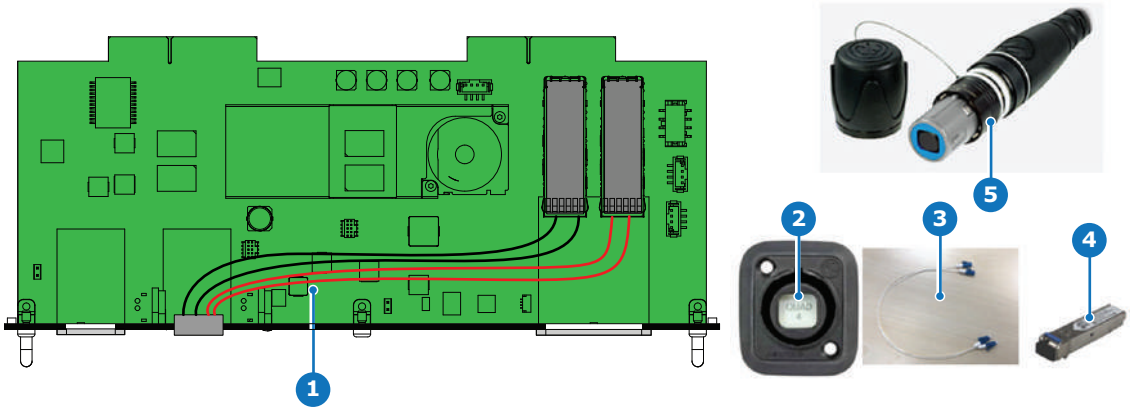

Image B–3

1 SFP input board
2 Neutrik OpitcalCon Quad
3 Internal fiber cable
4 SFP+ fiber transceiver
5 Advanced quad cable

Barco delivers only the SFP input and SFP+ fiber transceivers. The customer has to buy the SFP+ transceiver and the optional breakout adapter or the fiber integrated cable.

How to configure the SFP input

1. Remove one plate covering the access to a Neutrik connector location.
2. Mount the Neutrik OpticalCon Quad connector.
3. Remove the plate covering the access to the SFP cage and insert the SFP+ transceivers.
4. Re-install the cover plate.
5. Mount the optical internal cables between the Neutrik connector and the SFP+ transceivers.
6. Install the SFP input in its slot of the Input & Communication module. See procedure “Installing an input board”, page 45.

B.4 Use case 4: Loop-through mode

Loop-through mode

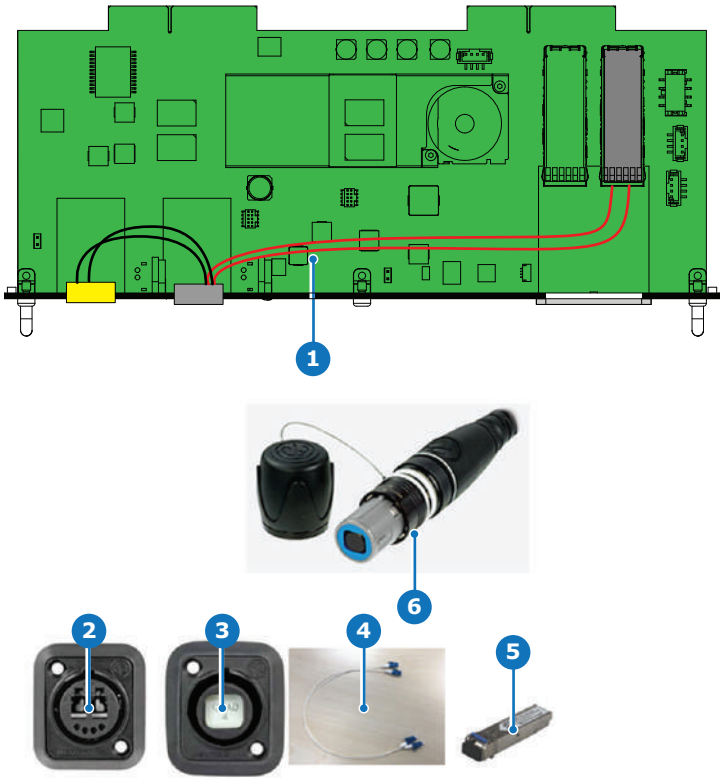

Image B–4

1 SFP input board
2 Neutrik OpticalCon Duo
3 Neutrik OpticalCon Quad
4 Internal fiber cable
5 SFP+ fiber transceiver
6 Advanced Quad cable

Barco delivers only the SFP input and SFP+ fiber transceivers. The customer has to buy the SFP+ transceiver and the optional breakout adapter or the fiber integrated cable.

How to configure the SFP input

1. Remove both plates covering the access to a Neutrik connector locations.
2. Mount the Neutrik OpticalCon Quad connector and the Neutrik OpticalCon Duo.
3. Remove the plate covering the access to the SFP cage and insert the SFP+ transceivers.
4. Re-install the cover plate.
5. Mount the fiber internal cables between the Neutrik OpticalCon Quad and the SFP+ transceivers.
6. Mount the fiber internal cables between the Neutrik OpticalCon Quad and the Neutrik OpticalCon Duo.
7. Install the SFP input in its slot of the Input & Communication module. See procedure “Installing an input board”, page 45.

C Regulatory

C.1 Trademark notice 148

C.1 Trademark notice

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Glossary

HD

Hazard Distance (HD) is the distance measured from the projection lens at which the intensity or the energy per surface unit becomes lower than the applicable exposure limit on the eye or on the skin. The light beam is considered (to be) unsafe for exposure if the distance from a person to the light source is less than the HD.

Scheimpflug principle

The "plane of sharp focus" can be changed so that any plane can be brought into sharp focus. When the DMD plane and lens plane are parallel, the plane of sharp focus will also be parallel to these two planes. If, however, the lens plane is tilted with respect to the DMD plane, the plane of sharp focus will also be tilted according to geometrical and optical properties. The DMD plane, the principal lens plane and the sharp focus plane will intersect in a line below the projector for downward lens tilt.

List of tools

Allen wrench 2.5 mm
Allen wrench 5 mm
Allen wrench 8 mm
Black cable tie
Flat screwdriver 5 mm
Hoisting or lifting tool
Knife
Phillips screwdriver PH1
Screwdriver (any type)
Side cutter
Socket wrench with 5.5 mm hex bit
Tape measure
Torque Wrench with 6 mm and 8 mm hex bit
Torque wrench with hex socket of 8 mm
Torx screwdriver T10
Torx screwdriver T20
Torx screwdriver T6

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