I600

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.

Patent protection

Please refer to *https://www.barco.com/about-barco/legal/patents*.

Table of contents

1 Safety

About this document

Read this document attentively. It contains important information to prevent personal injury while installing and using the I600 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 I600 product.

Clarification of the term “I600” used in this document

References in this document to the term “I600” means that the content is applicable for following Barco products:

- I600-4K8, I600-4K10, I600-4K15

Model certification name

- I600-4K8 : GPI-A
- I600-4K10 : GPI-B
- I600-4K15 : GPI-C

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.

전원코드 사양

한국용: KC 인증품을 구매하여 사용하세요 - 플러그: 250 V~, 16 A; 전원 코드: 60227 IEC 53, 3G01.5 mm2; 커넥터: 250 V~, 16 A.

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 1 LASER PRODUCT - RISK GROUP 3.

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 match the projectors electrical ratings. If you are unable to install the AC requirements, contact your electrician. Do not defeat the purpose of grounding.
- 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.
- This apparatus must be grounded (earthed) via the power cord.
- 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.
- 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 a qualified service technician.
- 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.
- 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 an authorized trained service person 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.
- 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.
- 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.
- Ensure that the main power cord complies with the national regulations at the site where the equipment is used.
- Do not use unauthorized replacements.
- Make sure that no objects enter into the vents and openings of the set.
- The projector is designed for indoor use only. Never operate the unit outdoors.

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. The projector weights about 23.7 kg (52.3 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 16.

- 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 16.
- Don’t put your hand in front of the beam.
- 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.
- A special device (“rigged frame”) based on an external frame must be used when the projector is deployed in a hanging configuration, or when several projector must be stacked. See installation manuals for the correct use of these devices.
- Never stack more than 2 projectors in a hanging configuration (truss) and never stack more than 3 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, shields or ultra violet screens 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.
- 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 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 in the exhaust area must be not less than 100 cm (40”). The exclusion zone on the intake area must be not less than 50 cm (20”).
- 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.
- Do not cover the projector or the lens with any material while the projector is in operation. Keep flammable and combustible materials away from the projector at all times. 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.
- Ensure no misalignment can occur. Prolonged exposure of wooden walls at close distance (< 20 cm) can represent a fire risk. After alignment the projector shall be securely mounted to the pedestal.
- 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= 5°C (41°F) to 40°C (104°F)
- Rated humidity = 10% 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 I600. 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 4 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

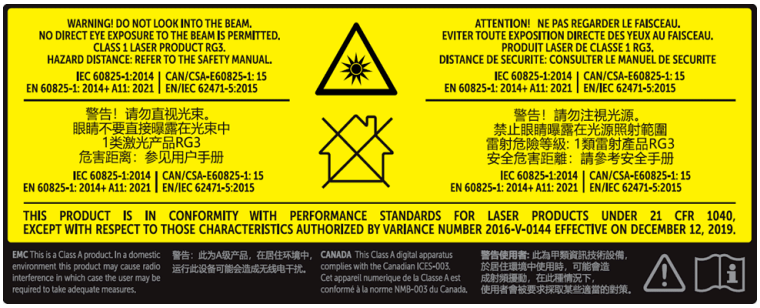
Light beam related safety labels

Safety labels explanation and location:

Refer to user manual for further information!

Hazard RG3:
Not for household use symbol.

Hazard RG3:
Optical radiation warning symbol.



WARNING! DO NOT LOOK INTO THE BEAM. NO DIRECT EYE EXPOSURE TO THE BEAM IS PERMITTED.CLASS 1 LASER PRODUCT RG3. HAZARD DISTANCE: REFER TO THE SAFETY MANUAL.

ATTENTION! NE PAS REGARDER LE FAISCEAU.EVITER TOUTE EXPOSITION DIRECTE DES YEUX AU FAISCEAU.PRODUIT LASER DE CLASSE 1 RG3. DISTANCE DE SECURITE: CONSULTER LE MANUEL DE SECURITE.

警告! 请勿直视光束。眼睛不要直接曝露在光束中 1类激光产品RG3 危害距离：参见用户手册

警告! 請勿注視光源。 禁止眼睛曝露在光源照射範圍雷射危險等級: 1類雷射產品RG3 安全危害距離：請參考安全手冊

IEC 60825-1:2014 | EN 60825-1: 2014+ A11: 2021 | CAN/CSA-E60825-1: 15 | EN/IEC 62471-5:2015

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 DECEMBER 12, 2019.

EMC This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

警告：此为A级产品，在居住环境中，运行此设备可能会造成无线电干扰。

警告使用者: 此為甲類資訊技術設備，於居住環境中使用時，可能會造成射頻擾動，在此種情況下，使用者會被要求採取某些適當的對策。

CANADA This Class A digital apparatus complies with the Canadian ICES-003. Cet appareil numerique de la Classe A est conformé à la norme NMB-003 du Canada.

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 19.

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.

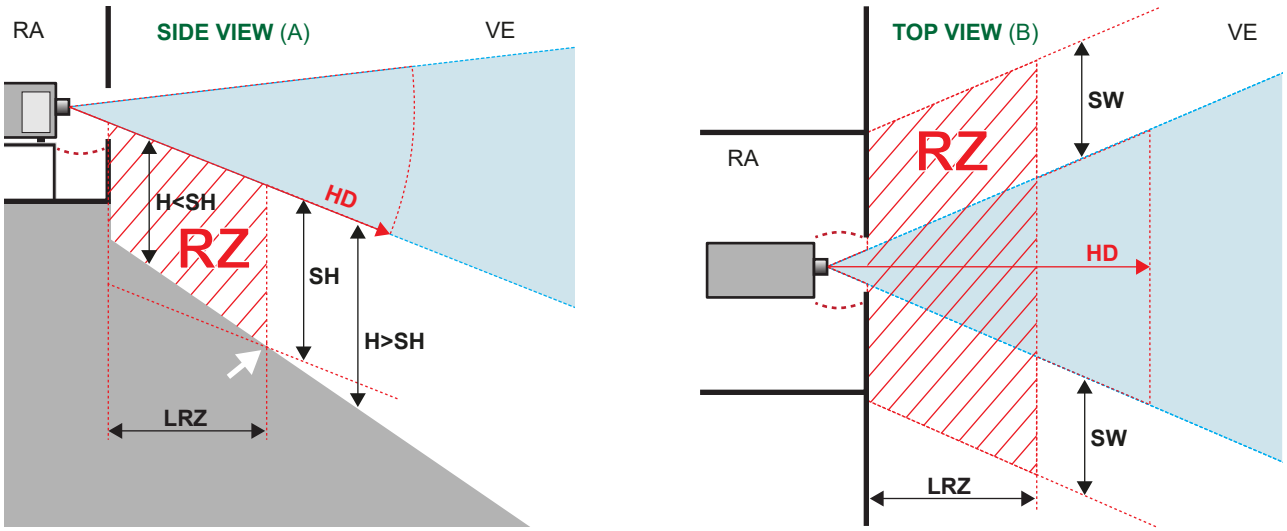


Image 1–1

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 1–2 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 1–2.

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

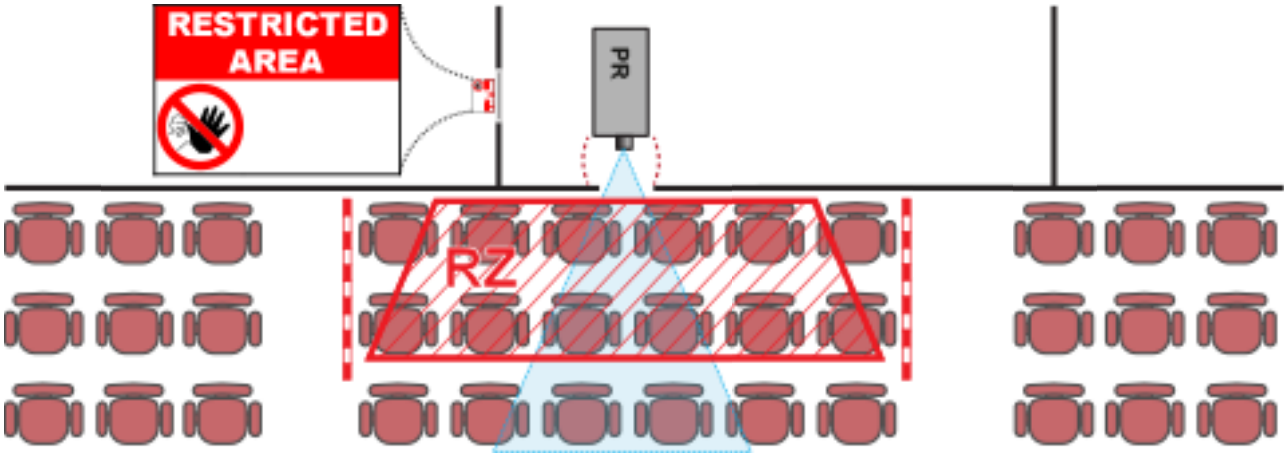


Image 1–2

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).

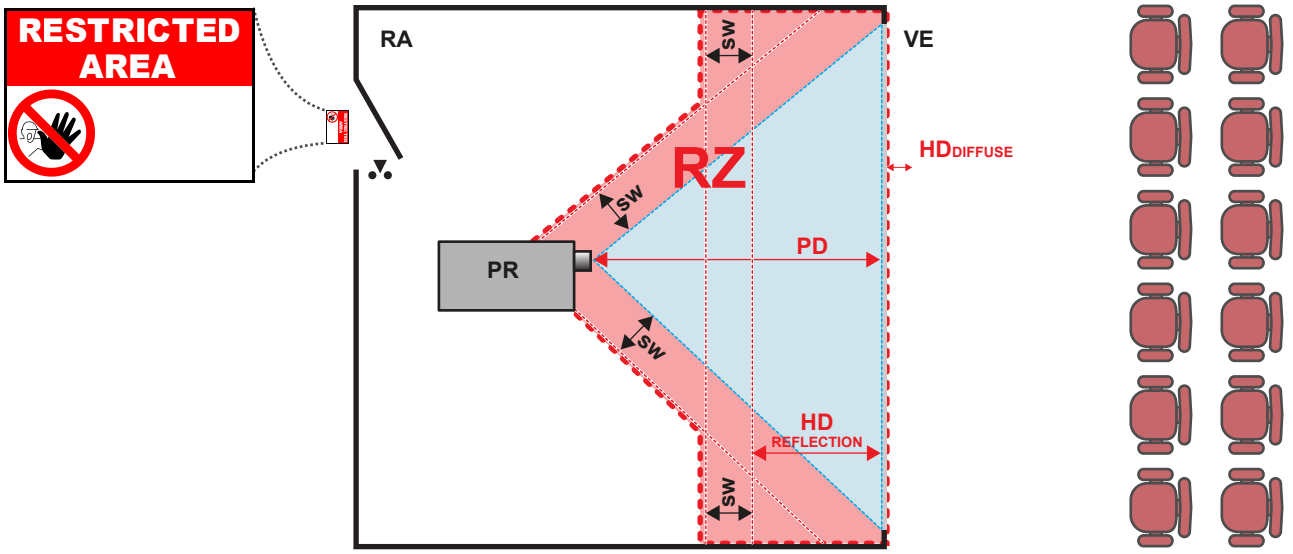


Image 1–3

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 16, 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 16, 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 19.

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

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 in function of modifying optics

Hazard distance

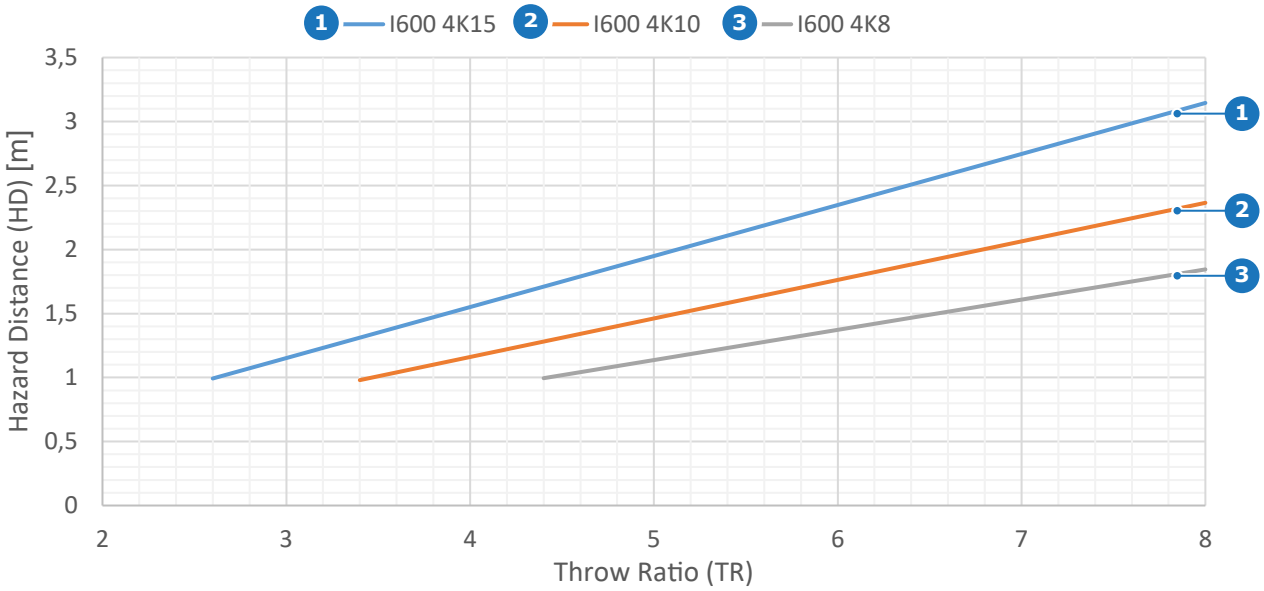


Image 1–4

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.

1.7 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.

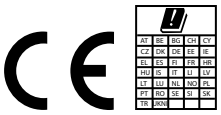
For 3 or more projectors, in case the distances between adjacent lenses are not equal, take the shortest distance.

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.

1.8 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

About this chapter

This chapter, and by extension this whole document, the **I600 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 I600 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.

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 7.
2. Check if all installation requirements are fulfilled. For more info see chapter “Installation requirements”, page 32
3. Unpack the projector or pull out the projector from its flight case. See chapter “Unpacking the projector”, page 35 or see chapter “Flight case”, page 84.
4. In case of a first install perform an initial inspection of the projector. See “Initial inspection”, page 37.
5. Define the installation position of the projector. For detailed info and possibilities see chapters:
   - “Projector orientations”, page 38.
   - “Projector positioning”, page 39.
   - “Projector shift range”, page 40.
   - “Projector tilt range”, page 41
6. Select the lens that will best fit for the application. See chapter “Lens selection”, page 42, and “Available lenses”, page 43.

2.2 Installation process

Physical installation process overview

1. Installation of the projector in the desired position. Take following points into account:
   - Ensure that the physical setup of projector complies with all safety requirements such as the hazard distance restriction zone etc. See safety chapter “High Brightness precautions: Hazard Distance”, page 16.
   - Use a solid pedestal in case of a standing installation.
   - Use the I600 rigging frames for stacking I600 projector:
     - standing installation: maximum stack 3 units high.
     - hanging installation: maximum stack 2 units high (Table Mount or Ceiling Mount).
   - Use the I600 rigging frame to hang one I600 projector in portrait (wall mount)

   Note: For detailed instructions on how to use (install, suspend, stack, adjust, ...) the I600 rigging frame see separate documentation of the I600 rigging frame.

   Note: Ceiling mount and wall mount of a single I600 projector can be realized without I600 rigging frame but then a 3rd party interface needs to be added between the projector and the surface to attach the projector on.

2. Installation of the selected projection lens for the application. For detailed instructions see “Lens installation”, page 46.

   Warning: Some projection lenses, more specific the heavy UST lenses, require a lens support. See chapter “Available lenses”, page 43, to know which lenses are subject to a lens support bracket. For installation instructions see chapter “ILD UST lenses”, page 63.

   Caution: Install the lens safety cable in case the projector is mounted above people. For detailed instructions see “Installation of the projection lens safety cable”, page 48. For ordering info see the Barco website.

3. Installation of the batteries of the Remote Control Unit (RCU). See chapter “Basic remote batteries”, page 49.
4. Connecting the I600 projector with the power net. See chapter “Connecting the projector with the power net”, page 52.

   Ensure that the power net complies with the main power requirements of the projector. Refer to chapter “Installation requirements”, page 32.
5. Switch on the projector for the first time. See chapter “Power On the projector”, page 53. Upon first startup the projector boot screen will ask the following:
   - To select the preferred language (default English).
   - To accept the EULA (mandatory)
   - To register the projector. Registration is optional for I600 but recommended. See chapter “Device registration”, page 54.

   The following options are possible to control the projector:

   - Using the remote control unit
   - Using the local keypad
   - Using Pulse Prospector

   See I600 user guide, Pulse OSD user guide, and Pulse Prospector user guide.
6. Project an image (e.g., test pattern or video image) and let the projector and projection lens acclimatize.
7. 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.

8. 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.
      - Adjust the feed of the projector (see “Alignment of a table mounted projector”, page 56) or adjust the rotation of the rigging frame.

   ⚠ *Warning:* In case a lens support is installed ensure that all lens support brackets are detached from the lens body before adjusting the horizontal and vertical shift. After shift adjustment disable the shift features in the Pulse software and fasten all lens support brackets. See chapter “ILD UST lenses”, page 63.

9. Check for the latest projector software package. See chapter “Software update”, page 57.
10. Safely shutdown the projector after usage. See chapter “Power Off the projector”, page 59.

2.3 Additional install options

Overview

1. 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 50.
   - for configuring the SFP input see “Pulse SFP input use cases”, page 91.
2. Installation of the **Wi-Fi** dongle. Plug the USB Wi-Fi dongle in an available USB port.

   Note: Wireless connectivity options, such as Wi-Fi and GSM, are not supported in certain countries due to local regulatory restrictions. Consult your Barco representative for more information on availability.

3. Installation of the dust filter. See chapter “Dust filter”, page 87.

3 Prepare to install

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 perfect manufacturing as part of the legally stipulated terms of guarantee. Observing the specification mentioned in this chapter is critical for 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 : 100-160 V (reduced power) / 200-240 V~, 14 A, 50/60 Hz.
- The projector must be grounded.

Environment conditions

Environment	Operating	Non-Operating
Ambient temperature	5°C (41°F) to 40°C (104°F)	-20°C (-4°F) to 60°C (140°F)
Humidity	10% RH to 80% RH Non-condensed	10% RH to 90% RH Non-Condensed
Altitude	0 m (0 Ft) to 2500 m (8202 Ft)	-60 m (-197 Ft) to 10000 m (32810 Ft)
Air cleanness	Clean office environment[1]	n.a.
Air clearance	Air outlets: minimum 40 cm (15.7 in) Air inlets: minimum 10 cm (4 in)	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.

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 inch) at the projector front side (air inlets).
- Minimum 40 cm (15.7 inch) at the projector rear side (air outlets).

1. Equivalent with cleanroom standard ISO 14644-1 ISO Class 9. If not, an environment protection housing must be used.

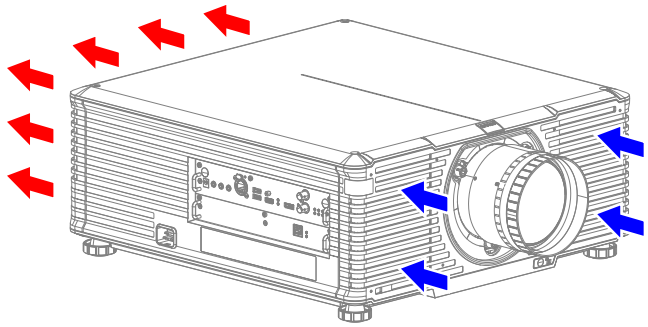


Image 3–1 Air inlets and outlets of the projector.

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.

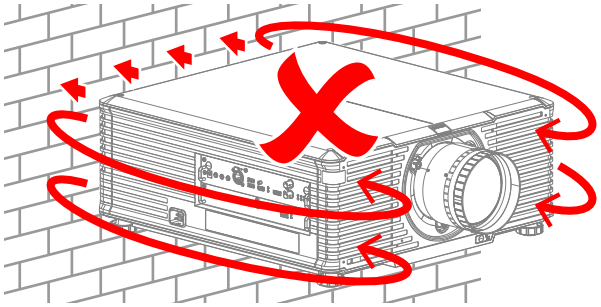


Image 3–2

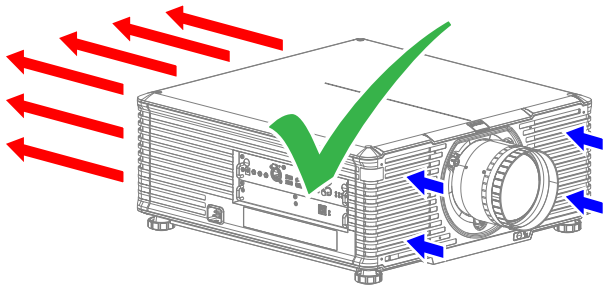


Image 3–3

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.

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.

DMD™ protection

- Avoid at all times that laser beams hits direct or indirectly the optics of the projection lens.
  - 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.
- Avoid at all times that direct sunlight hits the optics of the projection lens.
  - Sunlight on the lens can severely damage the Digital Mirror Devices™ in which case there is a loss of warranty.

Projector Weight

The projector weights about 23.7 kg (52.3 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. 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 in a safe manner, without damaging the projector.

Required tools

Cutter knife

How to unpack

1. Open the cardboard box.
2. Remove the two small boxes placed on side of the projector.

   One box contains the power cord[2] (reference 1 Image 3–4) and the other box contains manuals, remote control etc. (reference 2 Image 3–4).
3. Lift the projector and surrounding foam out of the cardboard box.

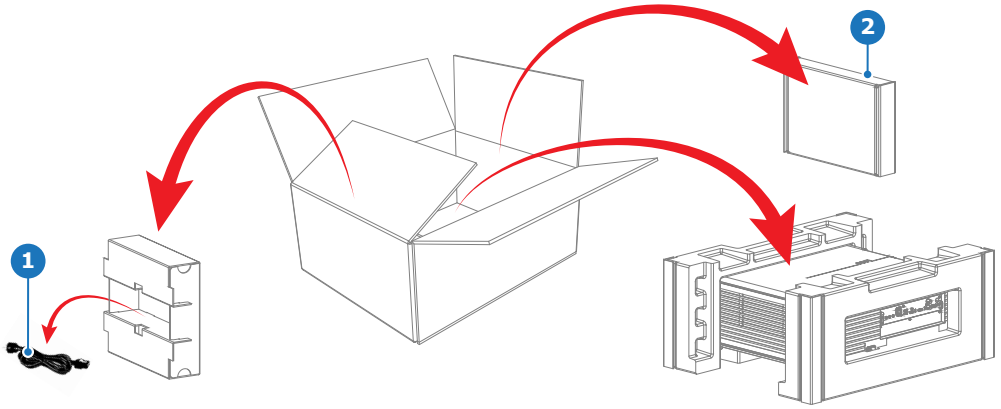


Image 3–4

4. Remove the surrounding foam from the projector.

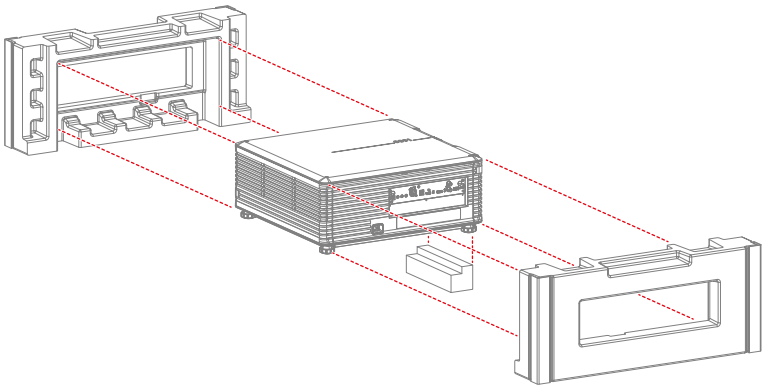


Image 3–5

5. Place the projector on solid and stable surface, then remove the protected plastic bag.

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.

2. 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.

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 2.5 m (3G1.5, 16A, 250VAC)[3]
- One quick-start guide
- One safety manual
- One web site reference sheet
- One remote control unit (RCU)

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. Power cord is not included for the Korean market.

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.

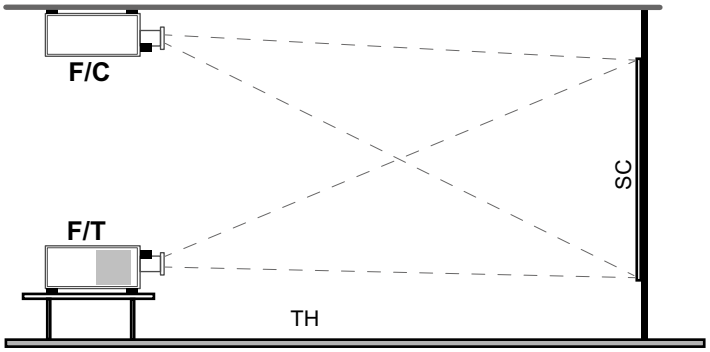


Image 3–6

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.

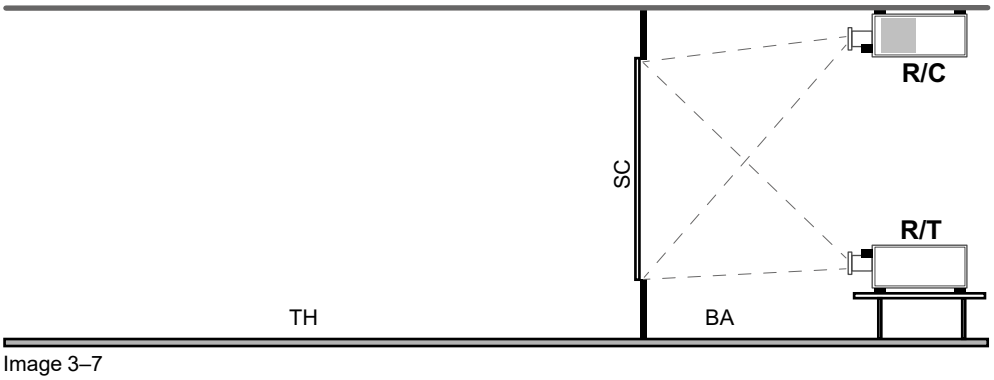


Image 3–7

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).

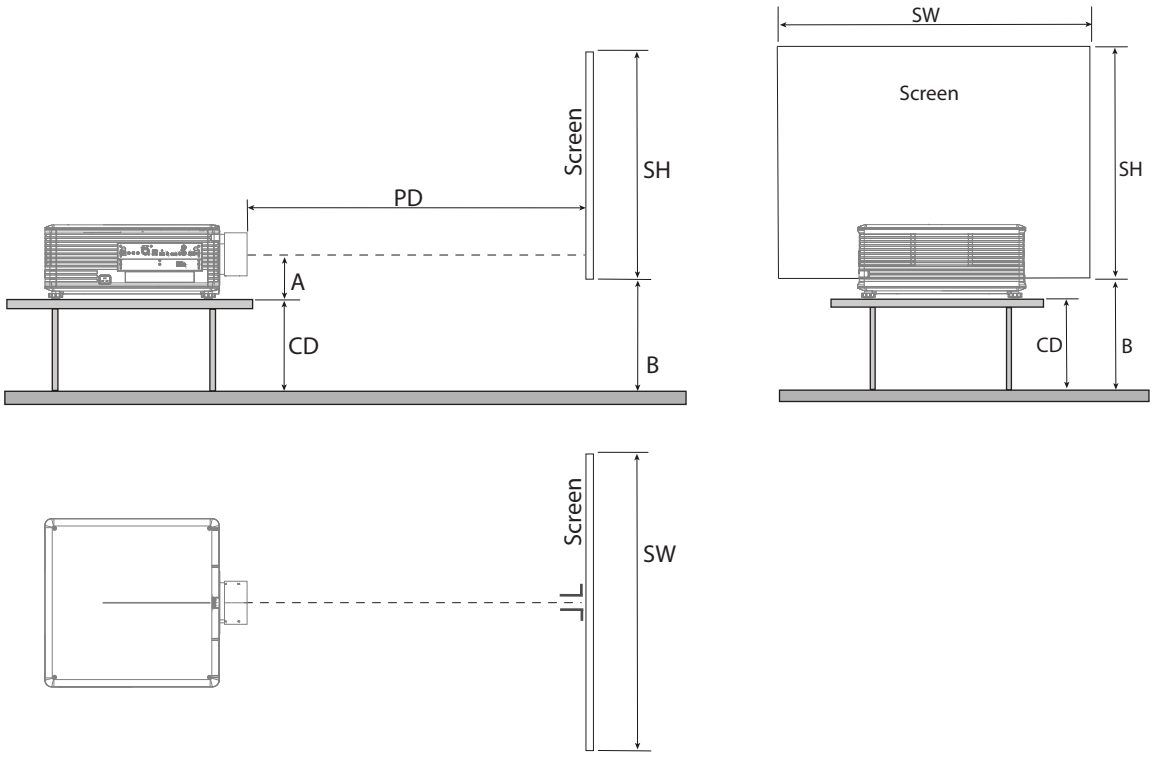


Image 3–8

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.

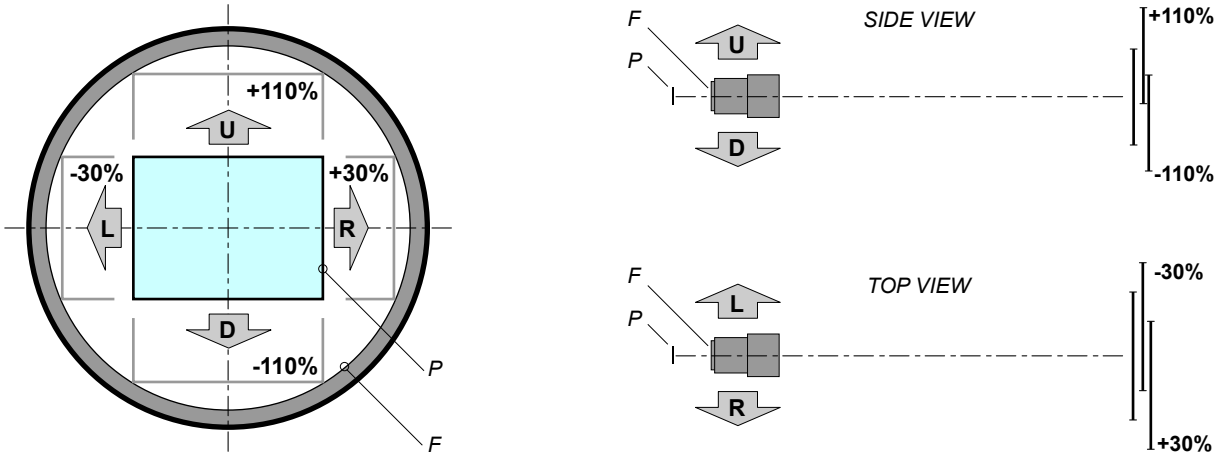


Image 3–9 Vertical and horizontal shift range.

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.

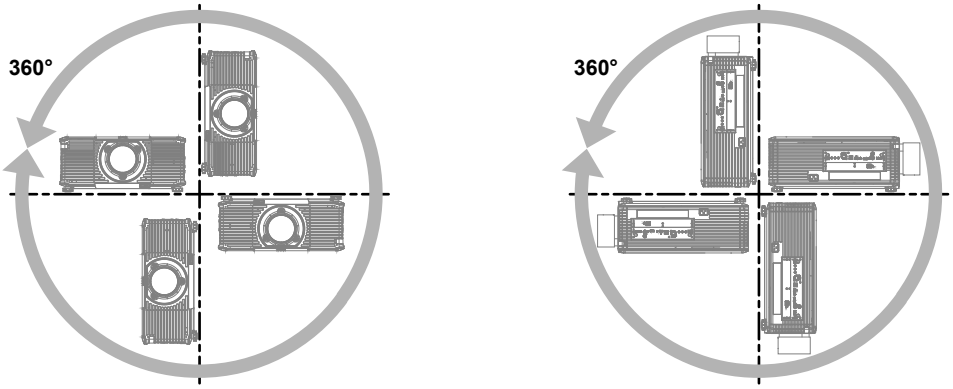


Image 3–10

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%.

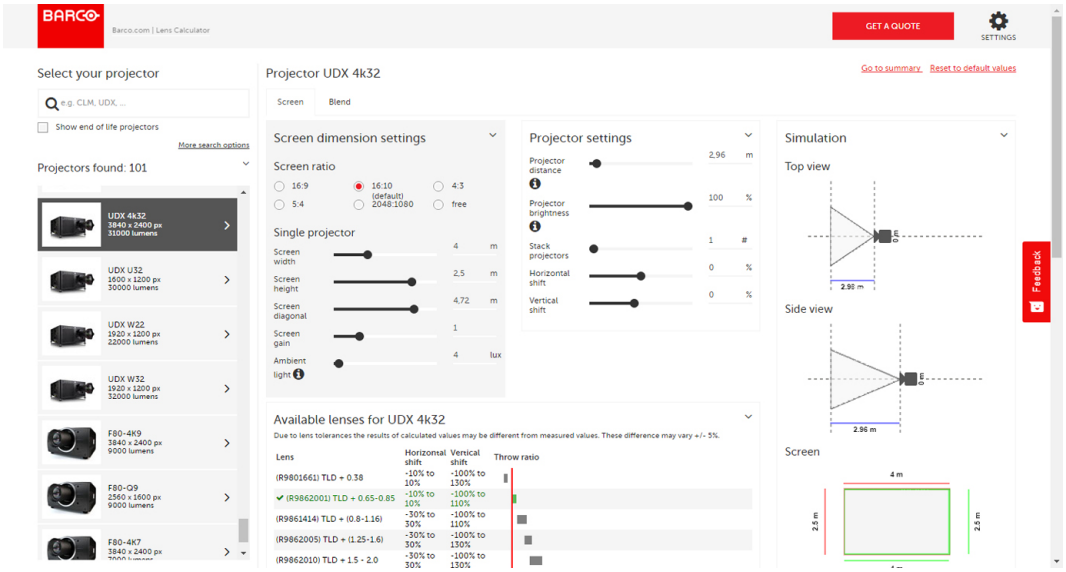


Image 3–11

3.9 Available lenses

Use the online *Lens Calculator* tool to determine the possible lenses for your configuration. See “Lens selection”, page 42.

Available lenses for the I600 projector

Order No	Name (Screening) / Comments	Image	Resolution	Throw Range
R9803077	ILD lens 0.37 : 1 UST 90° (requires lens support and Pulse v2.5.10 or higher)		4K UHD 0.8"	(0.37 : 1)
R9803076	ILD lens 0.5 : 1 UST (requires Pulse v2.5.10 or higher)		4K UHD 0.8"	(0.5 : 1)
R9803072	ILD lens 0.65 - 0.8 : 1		4K UHD 0.8"	(0.65 - 0.8 : 1)
R9803071	ILD lens 0.8 - 1.0 : 1		4K UHD 0.8"	(0.8 - 1.0 : 1)
R9803070	ILD lens 1.0 - 1.4 : 1		4K UHD 0.8"	(1.0 - 1.4 : 1)
R9803061	ILD lens 1.4 - 2.1 : 1		4K UHD 0.8"	(1.4 - 2.1 : 1)
R9803075	ILD lens 2.1 - 4.0 : 1		4K UHD 0.8"	(2.1 - 4.0 : 1)
R9803073	ILD lens 4.0 - 7.4 : 1		4K UHD 0.8"	(4.0 - 7.4 : 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.

WARNING: In case the projector is installed above the head of people, then the projection lens must be secured with a lens safety cable. See chapter “Installation of the projection lens safety cable”, page 48.

For lenses that requires a lens support, see “ILD UST lenses”, page 63.

Installation procedures

4

About this chapter

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

4.1 Lens installation

Prerequisites

Some ILD Ultra Short Throw (UST) lenses require a lens support. See chapter “Available lenses”, page 43, to know if the lens support is required for the lens. The lens support must be (partially) installed before installing the projection lens. See chapter “ILD UST lenses”, page 63.

How to install

1. Set the lens holder in the center position.
   - ► Using Pulse OSD: *Menu* > *Installation* > *Optics* > *Shift to center*
   - ► Using Pulse Prospector: *Setup* > *Optics* > *Optical Shift* > *Shift to center*

   A shift to the center ensures that the lens holder is in the on-axis position, which avoids damaging the internal optics when inserting the lens.
2. Switch off the projector or activate the projector shutter.(shutter is activated when the shutter icon on the projector keypad is red).
3. Make sure to remove all protective caps present on the lens and lens holder.
4. Gently insert the lens in the lens holder while aligning the **short red line** on the lens body with the red line on the projector top cover (reference 1).

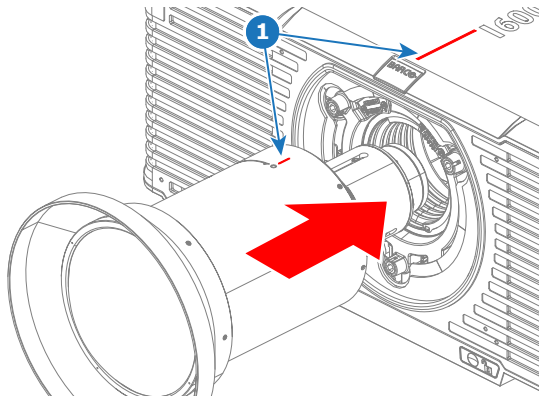


Image 4–1

5. Once the lens is completely inserted, rotate the lens body clockwise until the **long red line** on the lens body is aligned with the red line on the projector top cover.

   A click indicates that the lens mount mechanism is locked.

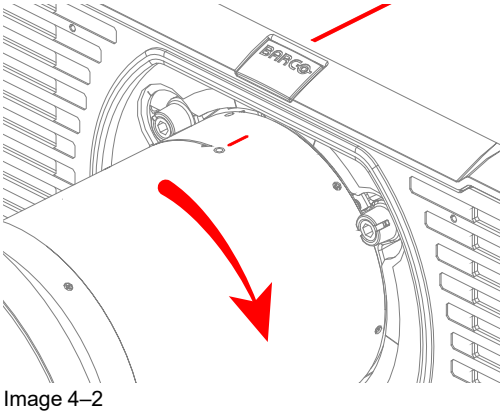


Image 4–2

6. Check if the lens is securely locked by trying to rotate the lens body counter clockwise. This should not be possible!

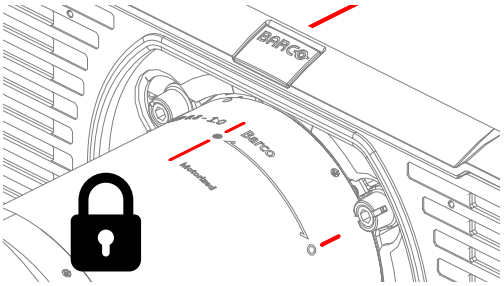


Image 4–3

7. Perform a lens focus and zoom calibration.
   - ► Using Pulse OSD: *Menu* > *Settings* > *Maintenance* > *Lens calibration* > *Lens focus* and *Lens zoom*
   - ► Using Pulse Prospector: *Setup* > *Optics* > *Zoom & Focus* > *Focus calibration* and *Zoom calibration*

   In case of fixed focal lenses, the zoom calibration is skipped.

WARNING: In case the projector is installed above the head of people, then the projection lens must be secured with a lens safety cable. See chapter “Installation of the projection lens safety cable”, page 48.

4.2 Installation of the projection lens safety cable

When to use the lens safety cable

The projection lens must be secured with a safety cable in any circumstance where the projector is mounted above people.

For ordering information see Barco website: *https://www.barco.com*

How to install

1. Check if the safety cable and its accessories are in good condition (not damaged).
2. Put the safety cable around the lens body and guide one cable end through the loop (reference 1, Image 4–4) of the other end to create a lasso.
3. Apply some cable clips (reference 2 Image 4–4) on the lens body to keep the safety cable in position.
4. Pull the lasso tight around the lens body and lock this position with the cable clamp (reference 3).

Warning: Ensure that the loop cable and the cable going through the loop are clamped together.

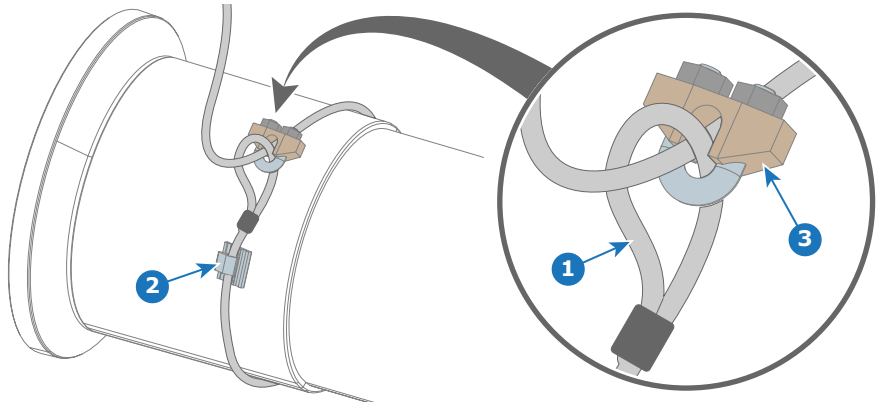


Image 4–4

5. Attach the other end of the safety cable with the projector body, rigging frame, truss installation, or ceiling.

Note: The safety cable is mounted as backup so that the drop distance is as small as possible. Keep the possible drop distance of the lens as short as possible!

4.3 Basic remote batteries

Battery placement & replacement

The basic remote control is powered by two (2) standard AAA batteries. The needed batteries are not included in the packaging.

The battery compartment is on the back side of the basic remote control. The following image illustrates how to open the battery compartment.

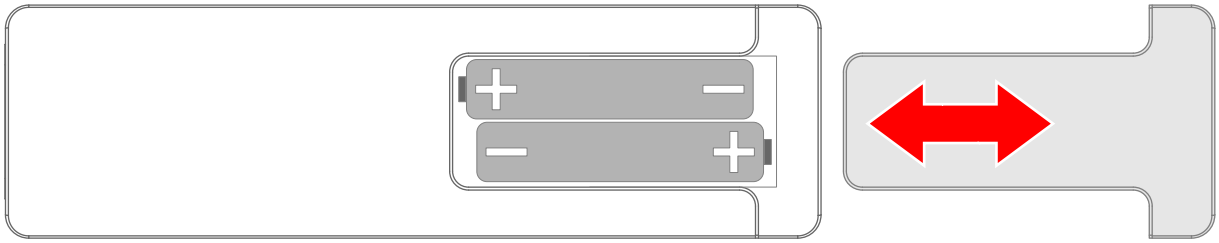


Image 4–5 Position of batteries in basic remote.

CAUTION: Replace batteries with the correct battery type. Only use AAA size batteries. There is a risk of explosion if the battery is replaced with an incorrect type.
Make sure the polarities match the + and - marks, as depicted on the inside of the battery compartment. There is a risk of explosion if the batteries are installed incorrectly.

4.4 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 “Power Off the projector”, page 59.
2. Loosen the 3 captive screws (reference 1) of the dummy cover plate of the optional input slot. Use a Torx screwdriver T10.

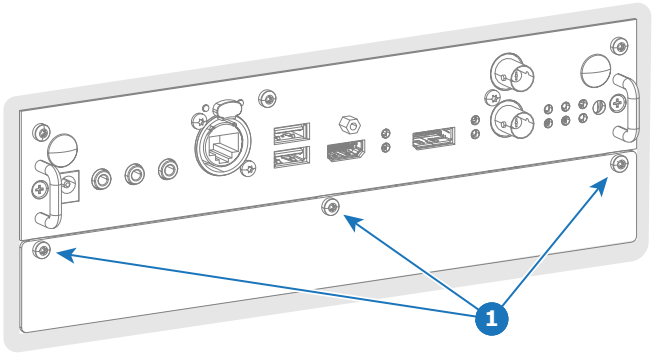


Image 4–6

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

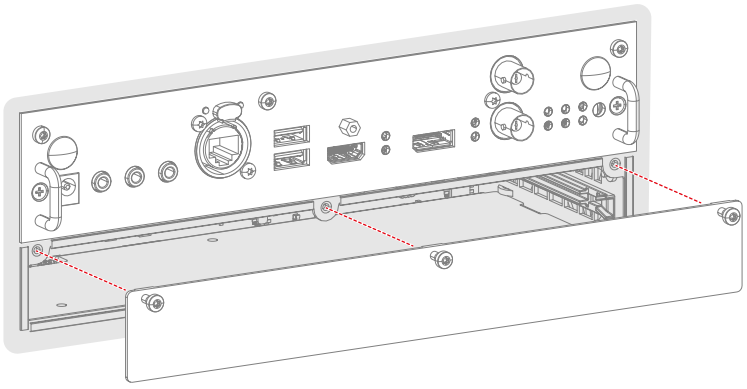


Image 4–7

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

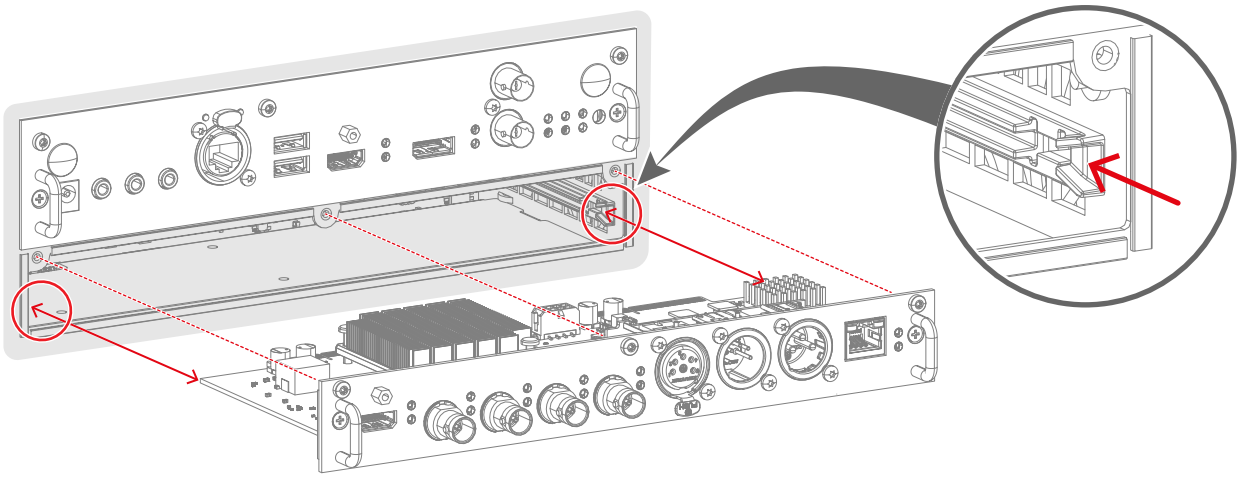


Image 4–8 The “Pulse Quad Combo Input” is used in this illustration.

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

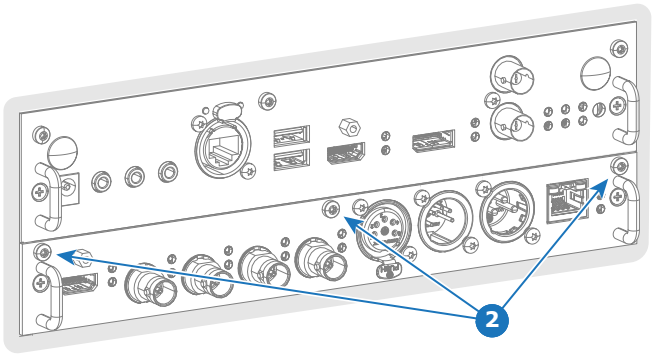


Image 4–9

6. Plug in the power cord of the projector and switch the projector on. See procedure “Power On the projector”, page 53.
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.

4.5 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.

Prerequisites

Before connecting the projector with the main power net, check if the main power net meets the specification as described in the chapter “Installation requirements”, page 32.

How to connect with local power net

1. Connect the female side of the power cord with the power input socket of the projector.

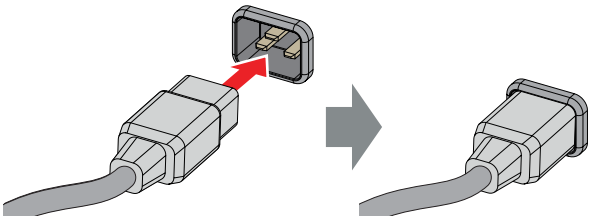


Image 4–10

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.

4.6 Power On the projector

How to power on the projector

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

   The projector starts up to **READY** mode as soon as the projector is connected with power net. 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 4–11

2. 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 4–12

4.7 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.

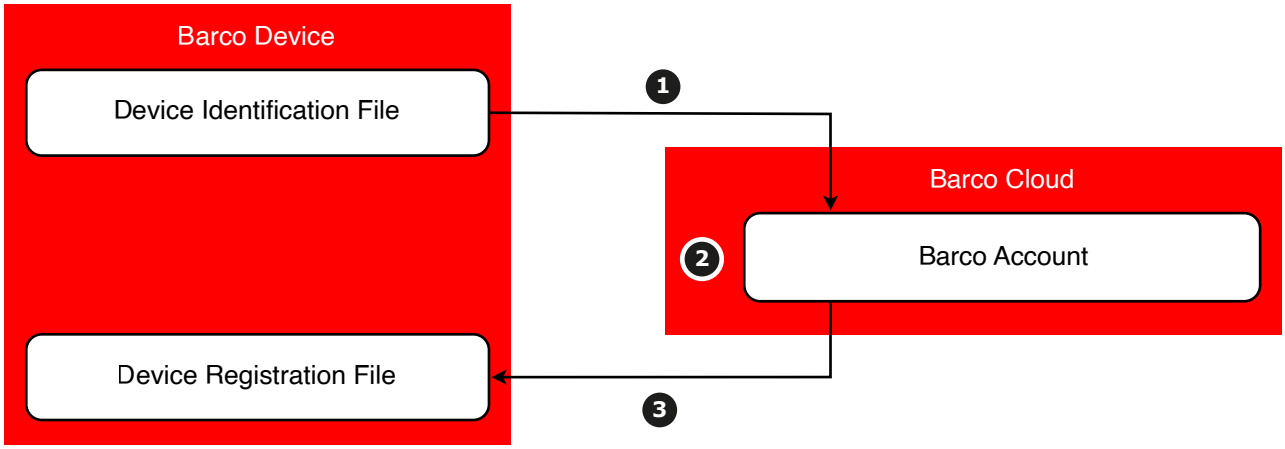


Image 4–13

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.
Pulse Toolset	• Computer with network access • Pulse Toolset version 1.3 or later	See *"Device registration using Pulse Toolset"* in the Pulse Toolset 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.

4.8 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.

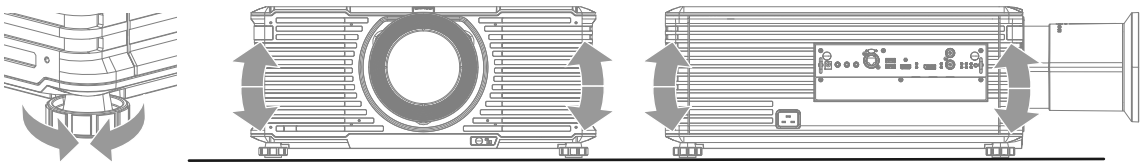


Image 4–14

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

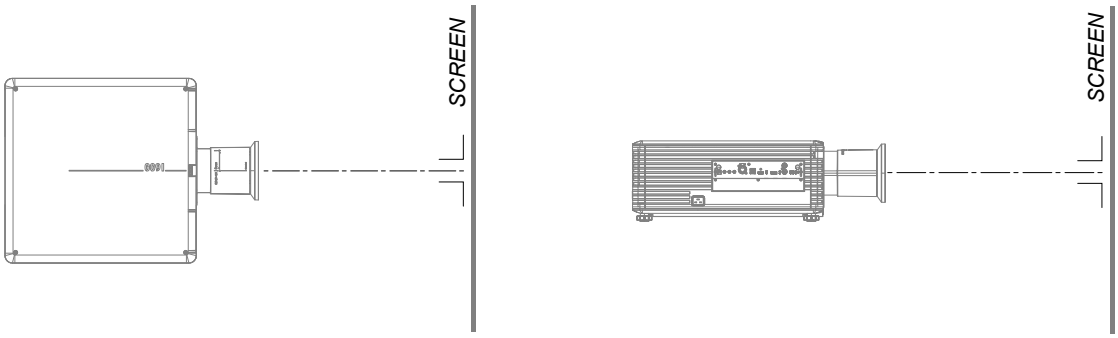


Image 4–15

4.9 Software update

CAUTION: Do not power off or unplug the projector while the software update is ongoing. Similarly, do not remove the USB flash drive while the software update is ongoing.

Prerequisites

First download the latest projector software package from the Barco's website, using the following link: *https://www.barco.com/support*.

Required tools

USB flash drive

How to update the software if the projector isn't connected to the network

1. Take a clean USB flash drive and create the following folder structure:

   `/Barco/Firmware`

   Note: Make sure the flash drive is formatted in FAT32. If the folder structure does not exist, the Software update menu tile will remain disabled.

2. Place the correct projector update file (format .fw) in the Firmware folder.
3. Ensure the projector is in Ready mode.
4. Log in with the credentials of Power user or higher.
5. Plug the flash drive in the USB port on the Communication Panel.

   A window will be prompted with the available software update packages.

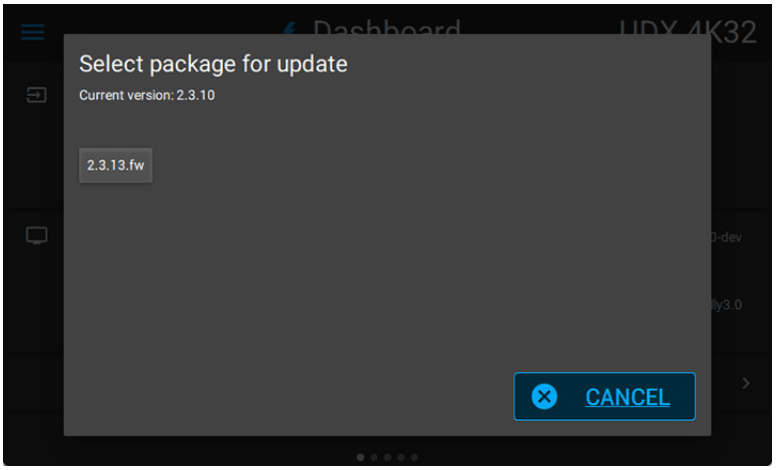


Image 4–16 Example of software packages available on the flash drive.

6. Select the desired package and confirm.

   A software update dialog will be prompted, requesting confirmation.

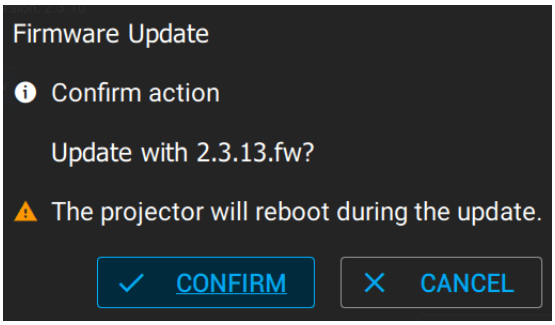


Image 4–17 Example of a Software update dialog prompt

7. Select *Confirm* to start the software update process.

   Note: Once initiated, the update procedure can take up to 20 minutes to complete. During this process the projector will reboot at least once.
   The LCD display will show the current status of the update during the update process.

8. Once the LCD display shows that the update process has been completed, it is safe to remove the USB flash drive.

CAUTION: While it is technically possible to “downgrade” the software to an older version using this method, it is **NOT** recommended and should be avoided as much as possible. Certain features will no longer be supported, projectors can display unwanted behavior during the downgrade and in some rare cases, this may even bring damage to the device. Always contact Barco if you want to make sure a downgrade will not hurt your device.

4.10 Power Off the projector

How to power off the projector

1. While the projector is in **ON** mode, press and hold the **Standby** button on the local keypad, or the **Power Off** button on the remote control, to shut down the light source of the projector.

   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.

2. While the projector is in **READY** mode, press and hold the **Standby** button on the local keypad, or the **Power Off** button on the remote control, to bring the projector from the **READY** mode in the **STANDBY** mode.

   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, press and hold the **Standby** button on the local keypad, or the **Power Off** button on the remote control, to bring the projector from the **STANDBY** mode in the **ECO STANDBY** mode.

   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.

How to unplug the projector

1. Follow the previous power off procedure to switch off the projector.
2. Wait at least two minutes.

   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.

3. Remove the power cord from the AC outlet or unplug it from the projector.

   Note: Some power cords have a clip that must be pressed to release the cord from the projector.

4.11 Lens removal

Prerequisites

Some lenses are installed with a lens support. The lens support must be detached from the lens body before removing the lens from the projector. See chapter “ILD UST lenses”, page 63.

How to remove the lens

1. Set the lens holder in the center position.
   - ► Using Pulse OSD: *Menu* > *Installation* > *Optics* > *Shift to center*
   - ► Using Pulse Prospector: *Setup* > *Optics* > *Optical Shift* > *Shift to center*

   A shift to the center ensures that the lens holder is in the on-axis position, which avoids damaging the internal optics when removing the lens.
2. Switch off the projector or activate the projector shutter.(shutter is activated when the shutter icon on the projector keypad is red).
3. Support the lens with one hand.
4. Push the lens unlock button with the other hand while rotating the lens a few degrees counter clock wise.

   The lens unlock button is located bottom right of the lens holder.

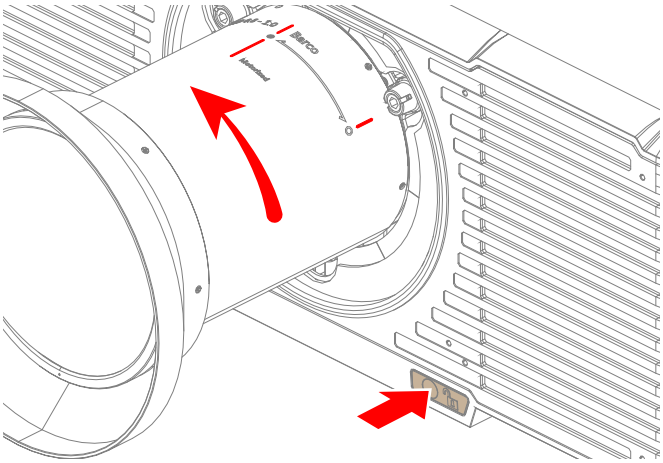


Image 4–18

5. Hold the lens with both hands and rotate it further counter clockwise until the **short red line** on the lens body is aligned with the red line on the projector top cover (reference 1).

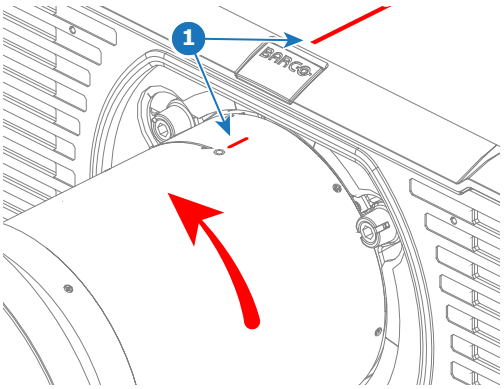


Image 4–19

6. Pull the lens straight out of the lens holder.

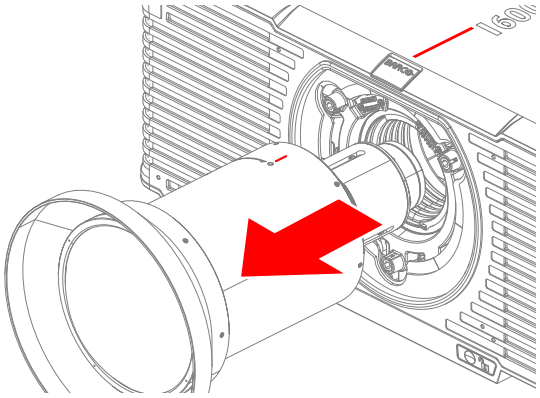


Image 4–20

7. Mount protective caps on the lens and lens holder.

ILD UST lenses 5

About this chapter

This chapter mainly describes the installation and adjustment procedures for the **ILD 0.5 UST** lens and the **ILD 0.37 UST 90°** lens. The process overview provides a high-level description of the different installation stages and refers to detailed step-by-step procedures.

All UST lenses requires Pulse v2.5.10 or higher.

5.1 UST lens introduction

About UST lenses

The narrow depth of field in Ultra Short Throw (UST) lenses makes precise installation and adjustment critical for achieving sharp focus across the entire image. Here are a few key points to keep in mind:

1. **Follow instructions**: Always adhere to the specific guidelines in this manual for installing and adjusting the UST lens. These instructions are designed to help you achieve the best possible image quality.
2. **Precise alignment**: Ensure that the projector is perfectly level and positioned at the correct distance from the screen. Even small deviations can significantly impact focus due to the narrow depth of field.
3. **Back Focal Length**: Having the back focal length in its nominal position before installing the UST lens is crucial. This ensures that the focus plane is correctly aligned with the screen.
4. **Solid position**: Ensure that the projector and projection screen cannot move. Even a slight position change can result in a loss of sharp focus.

The ILD 0.37 UST 90° lens

- The ILD 0.37 UST 90° lens has a primary motorized focus for precise adjustments and a secondary manual adjustment ring for fine-tuning at different throw distances. The secondary ring has a limited impact on overall focus, hence it's called secondary manual focus.
- Due to optical and mechanical tolerances, the position of the primary motorized focus can vary. Each UST lens is measured at the factory, and the reference position of the primary motorized focus is indicated on a label on the lens body. This reference value is crucial for starting the adjustment of the primary motorized focus, especially given the narrow depth of field..
- A 90° lens uses an intermediate image in its optics, causing the top to become the bottom and left become right. Therefore, the projector orientation settings must be adjusted: Ceiling Mount becomes Table Mount and Front Projection becomes Rear Projection.
- The UST 90° lens can be configured to project left, right, up, or down by repositioning the lens body relative to the lens flange. The default orientation is to the left.
- The UST 90° lens is quite large and heavy. To avoid vibrations in the projected image and ensure that the lens axis remains parallel to the projector optics, the installation of the lens support is mandatory.

For correct installation see “ILD 0.37 UST 90° lens installation process”, page 66, and related detailed step-by-step procedures.

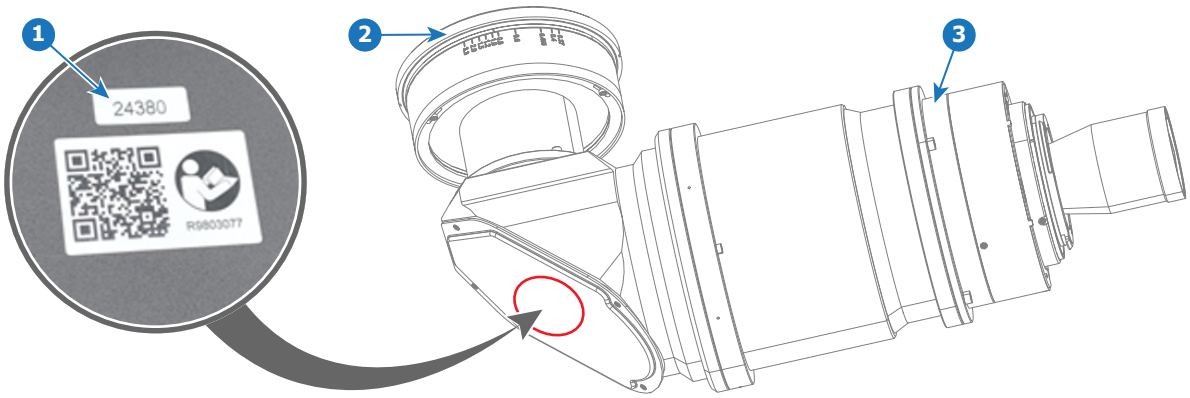


Image 5–1 ILD 0.37 UST 90° lens

1 Value reference position primary motorized focus
2 Secondary manual focus
3 Primary motorized focus

The ILD 0.5 UST lens

The installation of the ILD 0.5 UST lens is more straightforward. The lens support is not required. However, in case of vibrations the lens support is recommended. To install the lens with lens support see following procedures:

- “Installing the lens support bottom plate”, page 67.
- “Lens installation”, page 46.
- “Installing the lens support bracket”, page 73.

The ILD 0.5 UST lens has a secondary manual adjustment ring for fine-tuning at different throw distances. The secondary ring has a limited impact on overall focus, hence it's called secondary manual focus.

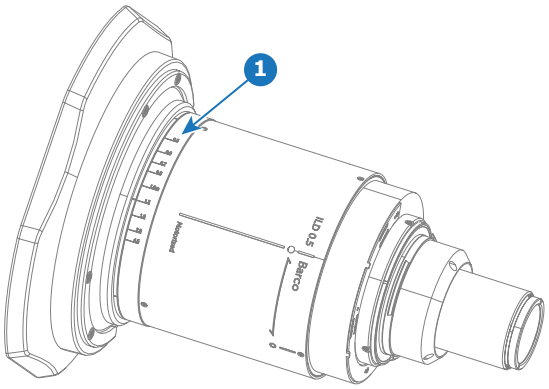


Image 5–2 ILD 0.5 UST lens

1 Secondary manual focus

Lens support

In the case where the heaviness of the lens leads to vibrations in the project image and to ensure that the lens axis remains parallel to the projector optics, it is recommended to install the lens support.

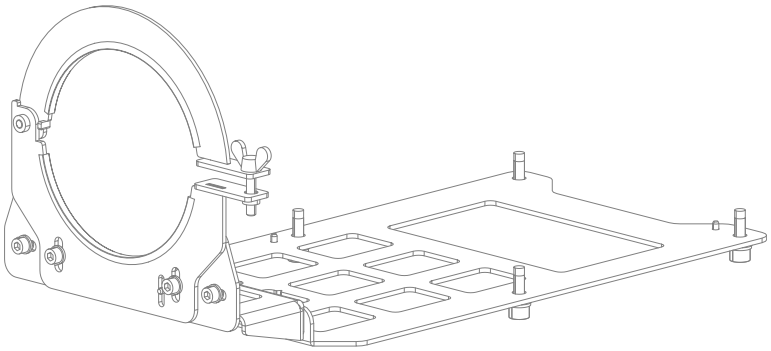


Image 5–3 Lens support for UST lenses.

CAUTION: The lens support secures the lens in place. After installation, do not shift the lens horizontally or vertically. To ensure this, disable the lens shift feature in the software.

5.2 ILD 0.37 UST 90° lens installation process

About this process

This process overview provides a high-level description of the different installation stages for the ILD 90° lens and refers to detailed step-by-step procedures. Follow this process flow and the instructions in the referred procedures precisely.

Process overview

1. **Install the bottom plate of the lens support.**

   See procedure “Installing the lens support bottom plate”, page 67.

2. **Set the Back Focal Length in nominal position.**

   See procedure “Set the Back Focal Length to nominal position”, page 68.

3. **Adapt the UST lens orientation for the application.**

   See procedure “Configure the ILD 0.37 UST 90° lens”, page 69.

4. **Install the UST lens.**

   See procedure “Lens installation”, page 46.

5. **UST lens pre-alignment.**

   See “ILD 0.37 UST 90° lens pre-alignment”, page 70.

6. **Install the lens support bracket.**

   See “Installing the lens support bracket”, page 73.

7. **Final installation of the projector with UST lens and lens support.**

8. **Fine tuning the UST lens.**

   See “ILD 0.37 UST 90° lens fine tuning”, page 75.

5.3 Installing the lens support bottom plate

Required tools

Allen wrench 6 mm

How to install the bottom plate

1. Turn the projector upside down.

   Note: Use a clean blanket to prevent scratches on the projector top cover.

2. Install the bottom plate of the lens support on the bottom side of the projector. Use 4 bolts M8 x 15 (reference 1) and apply a torque of 6 Nm.

   Note: The M8 fixation points for ceiling mount are used. See note on bottom plate.

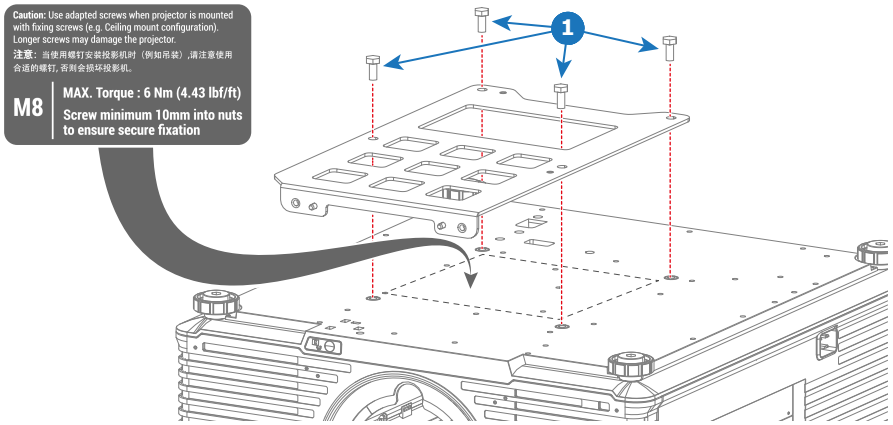


Image 5–4

Tip: Now that the projector is placed upside down, it is a good opportunity to loosen the projector feet a little bit. On first delivery, the feet are firmly tightened.

3. Place the projector back on its feet.

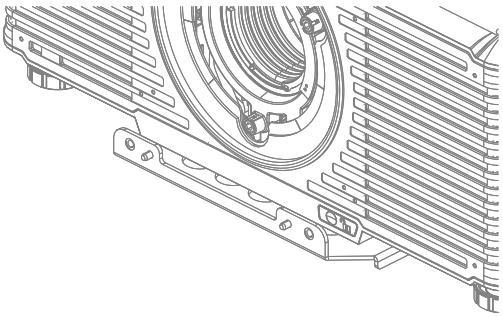


Image 5–5

5.4 Set the Back Focal Length to nominal position

What is Back Focal Length adjustment

Back Focal Length (BFL) adjustment involves moving the lens plane (Lp) closer to or further from the DMD plane. The closer the lens plane is to the DMD plane, the further and larger the depth of field (DoF) will be. Depth of field is the range of distances within which objects appear in sharp focus.

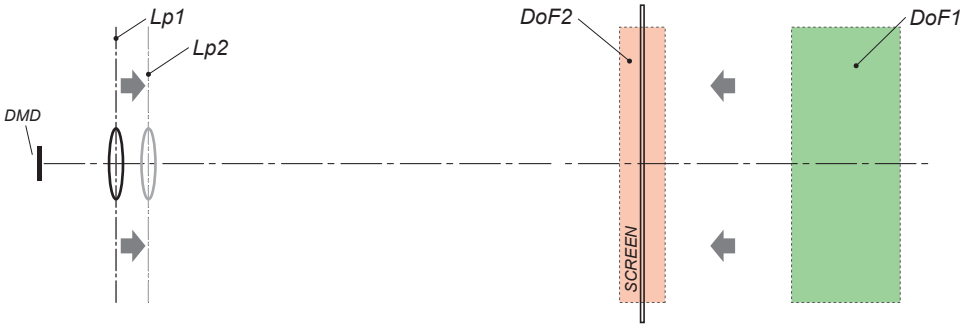


Image 5–6

When adjusting the Back Focal Length

The Back Focal Length (BFL) is factory-set to a nominal position suitable for all supported lenses, so adjustment is typically unnecessary. However, for Ultra Short Throw (UST) lenses with a narrow depth of field, slight BFL adjustments may be needed due to mechanical tolerances.

Required tools

- Allen wrench 5 mm
- Allen wrench 4 mm
- Torque wrench with hex socket of 4 mm
- Torque wrench with hex socket of 5 mm

How to set the Back Focal Length to nominal position

1. Remove the projection lens if installed.
2. Loosen the three Scheimpflug **lock nuts** a half turn (reference A, B, and C). Use an Allen wrench 5 mm.

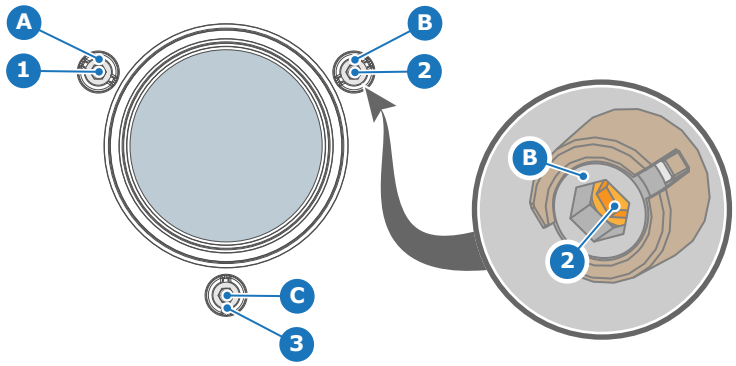


Image 5–7

3. Turn the three Scheimpflug **adjustment screws** clockwise (reference 1, 2, and 3 image Image 5–7) until resistance is noticed. Use a torque wrench with hex socket of 4 mm and apply a torque of maximum 2 Nm.
4. Turn the three Scheimpflug **adjustment screws** exactly 2 complete turns counterclockwise for nominal Back Focal Length.
5. Fasten the three Scheimpflug **lock nuts**. Use a torque wrench with a torque of 6 Nm.

5.5 Configure the ILD 0.37 UST 90° lens

Possible configurations

The lens body can be rotated per 90° relative to the lens flange containing the electrical socket towards the lens holder. 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.

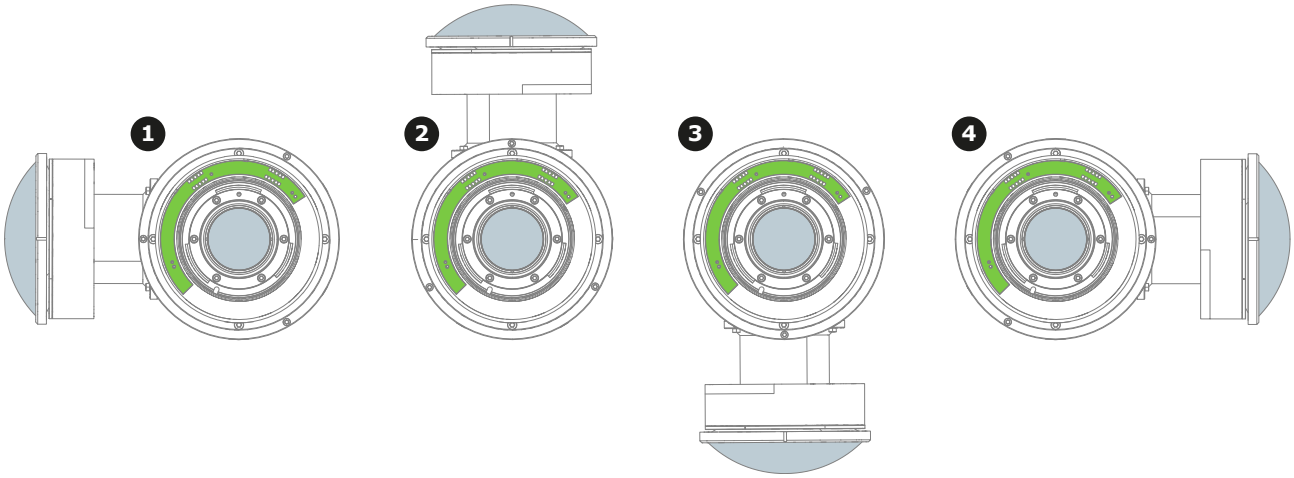


Image 5–8 UST 90° lens configurations.

1 Left (default)
2 Up
3 Down
4 Right

Required tools

Allen wrench 3 mm

How to configure

1. Remove the lens flange (reference 2 Image 5–9) from the lens body (reference 1 Image 5–9). Use a 3 mm Allen wrench to release the 4 bolts (reference 3 Image 5–9) .
2. Carefully place the lens flange back on the lens body in the desired orientation (up, left, down or right).

Note: Make sure the gears fit together.

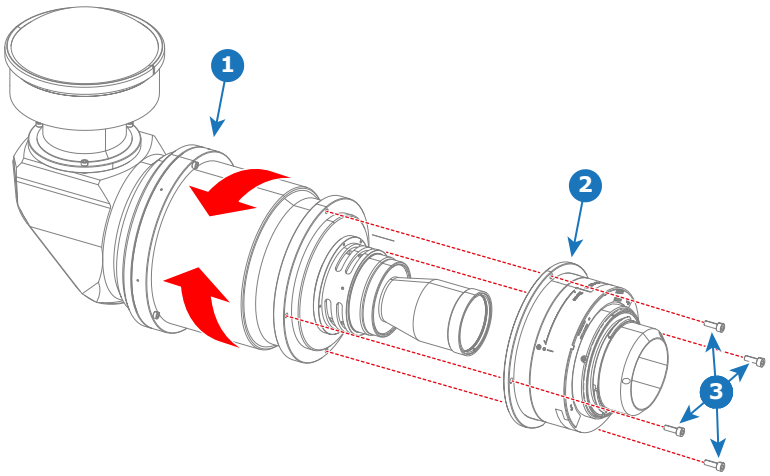


Image 5–9

3. Fasten the lens flange with 4 bolts.

5.6 ILD 0.37 UST 90° lens pre-alignment

Why pre-alignment

It is not always possible to make precise adjustments in the final projector position. The alignment phase is best performed when there is good visibility of the entire screen and the adjustment points are easily accessible. After pre-alignment, the projector can be installed in its final position. By fine-tuning a few parameters, the projector can then be adjusted to fit perfectly.

Prerequisites

This procedure assumes that the UST 90° lens is installed and configured in the applicable orientation and that the lens support bottom plate is attached to the bottom of the projector. See procedures:

- “Set the Back Focal Length to nominal position”, page 68.
- “Configure the ILD 0.37 UST 90° lens”, page 69.
- “Installing the lens support bottom plate”, page 67.

Required tools

- Tape measure
- Allen wrench 5 mm
- Allen wrench 4 mm
- Torque wrench with hex socket of 5 mm

How to pre-align the UST lens

1. Position the projector with UST lens in an easy accessible temporally configuration that equals the final setup.
   - Same environmental conditions.
   - Same screen size.
   - Same projection distance (throw).
2. Power on the projector and display the checkerboard test pattern.

   Note: Allow the projector to warm up for at least 30 minutes. This ensures that the optics stabilize, preventing any focus drift after adjustments.

3. Adapt the image orientation according the configuration of the UST 90° lens. For example: Lens left orientation for projector table mount = Ceiling rear.
   ► Using Pulse OSD: *Menu* > *Installation* > *Position* > *Orientation* > *Ceiling rear.*
   ► Using Pulse Prospector: *Setup* > *Position* > *Projector position* > *Ceiling rear.*
4. Adjust the horizontal and vertical shift. Aim for the same shift that is required in the final installation.
   ► Using Pulse OSD: *Menu* > *Installation* > *Optics* > *Shift*
   ► Using Pulse Prospector: *Setup* > *Optics* > *Optical Shift*
5. Align the projector and lens exactly perpendicular to the screen. Projected image should be square and level. Proceed as follows:
   a) Project the green focus test pattern.
   b) Ensure that the left and right image height is the same.

      If the left side of the image is larger than the right side, the projector is rotated toward the screen. If the right side is larger than the left side, the projector is rotated away from the screen.

   c) Ensure that the top and bottom image width is the same.

      A keystone effect is visible if the top of the image is smaller than the bottom, indicating that the projector is leaning toward the screen. In this case, the projector and lens need to be tilted backwards. Conversely, if the top is larger than the bottom, the projector and lens are leaning away from the screen and need to be tilted toward the screen.

   d) Ensure that the image is leveled.

If both the left and right sides of the image are the same height, and the top and bottom are the same width, the projector is correctly squared to the screen. If the image is still not horizontal and level in this case, the projector needs to be leveled front to back, parallel to the screen

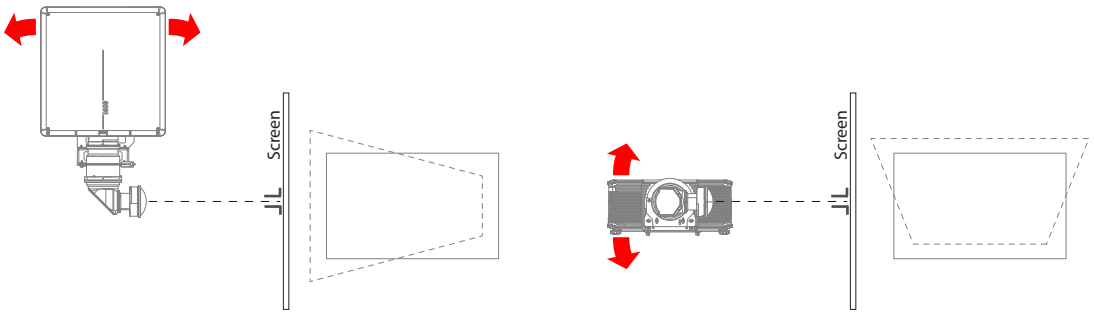


Image 5–10

6. Perform a lens focus calibration.

   Caution: Do not calibrate the horizontal and vertical lens shift. The lens is very heavy and the calibration will potentially get stuck.

   ► Using Pulse OSD: *Menu* > *Settings* > *Maintenance* > *Lens calibration* > *Focus*
   ► Using Pulse Prospector: *Setup* > *Optics* > *Zoom & Focus* > *Focus calibration*

7. Set the primary motorized focus as close as possible to the **reference position** (reference 1) indicated on the label on the lens body.

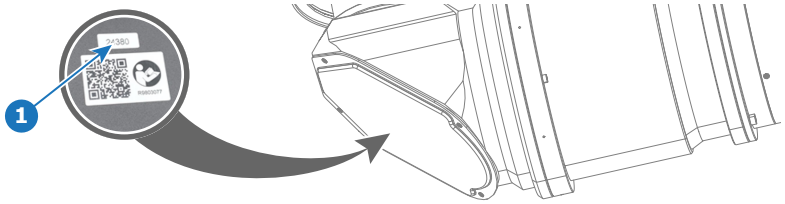


Image 5–11

The current focus position is displayed on screen and LCD when adjusting focus from the lens menu. The outer limits are 0 and 65535.

8. Rotate the barrel of the secondary focus to match the **throw distance** for the application (distance in meter).

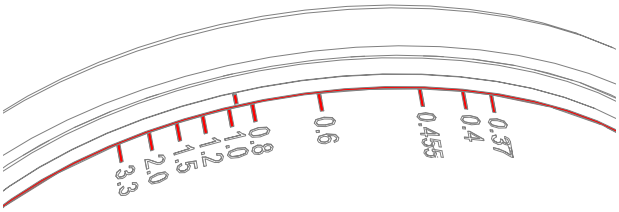


Image 5–12

9. Check if the depth of field (DoF) area is located behind the projection screen. Move a white paper from the projection screen towards the projection lens and check if the image comes into focus somewhere in between.
   ► If nowhere focused, the DoF lies behind the projection screen. Proceed with the next step.
   ► If somewhere focused, the DoF lies in front of the screen. The Back Focal Length is probably not in the nominal position. See “Set the Back Focal Length to nominal position”, page 68.

10. Adapt the Back Focal Length to gain good focus as follows:

    Caution: Do not adjust the primary motorized focus and the secondary manual focus of the lens while adjusting the Back Focal Length. Rotating the Scheimpflug nuts will move the lens holder to where the lens is in focus.

    a) Loosen the three Scheimpflug lock nuts (reference A, B, and C Image 5–13). Use a 5 mm Allen wrench.

b) Turn each of the three Scheimpflug screws (reference 1, 2, and 3) **counterclockwise 1/8th of a turn** at a time until the top and center of the projected image are in focus. Stop when the focus is good. Use a 4 mm Allen wrench.

c) Ensure the focus is even between the left and right sides of the projected image by adjusting the left and right Scheimpflug screws (reference 1 and 2). It doesn't need to be perfect, just consistent. If the previous step was done evenly, minimal adjustment should be needed.

d) Even out the focus at the top and bottom by adjusting the bottom Scheimpflug screw (reference 3). This step corrects for the lens weight. In this configuration, turn the bottom Scheimpflug screw **counterclockwise**.

e) Fasten the three Scheimpflug lock nuts. Use a 5 mm Allen torque wrench with a torque of 6 Nm.

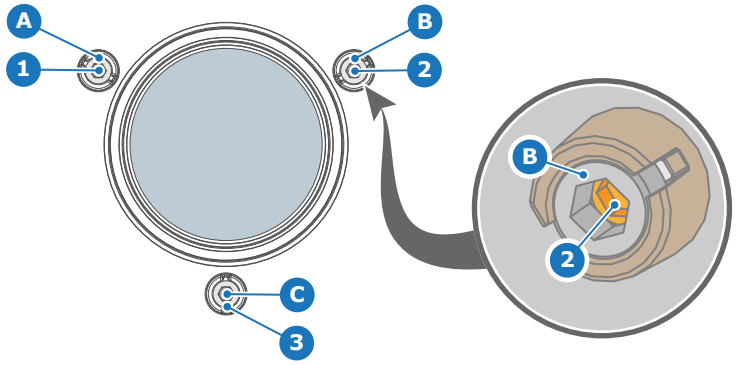


Image 5–13

11. Slightly adjust the primary motorized focus to gain good focus in the center of the projected image.

12. Install the lens support bracket. See procedure “Installing the lens support bracket”, page 73.

5.7 Installing the lens support bracket

Prerequisites

This procedure assumes that the bottom plate of the lens support is already attached to the projector and that the projection lens is installed. See procedures:

- “Installing the lens support bottom plate”, page 67.
- “Lens installation”, page 46.

Required tools

Allen wrench 5 mm

How to install the lens support bracket

1. Disable the Horizontal and Vertical shift via Pulse Prospector: *Setup* > *Optics* > *Optical Shift*

   Note: It’s important to disable the lens shift feature in the software to prevent lens holder damage from unintentional shift movements while the lens is mechanically fixed in the lens support.

2. Install the 3 bottom brackets of the lens support. Do not tighten the screws (reference 12 and 13) of the brackets 2 and 3. Provide each screw with a plain washer.

   Caution: Ensure that all positioning pins fits in their slots.

   Note: The hook attached to the third bracket (reference 3) can maximum turn 90° open.

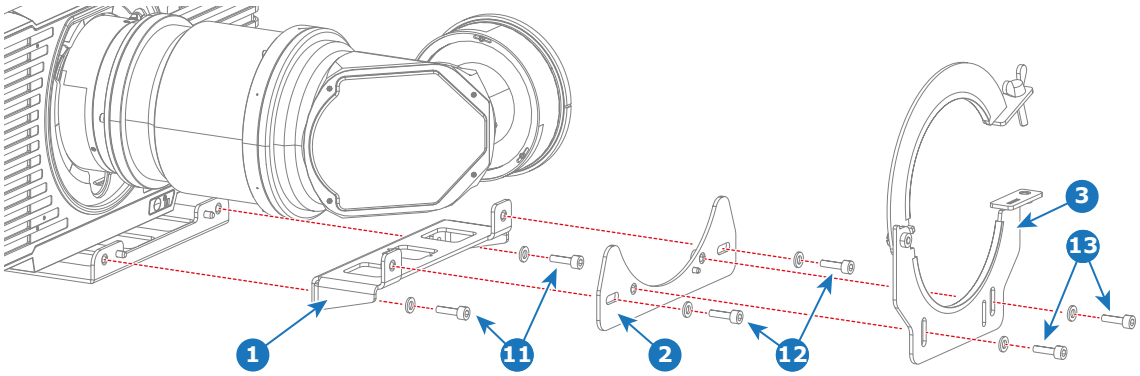


Image 5–14

3. Close the top bracket (reference 4) of the lens support and secure with a wing nut (reference 5).

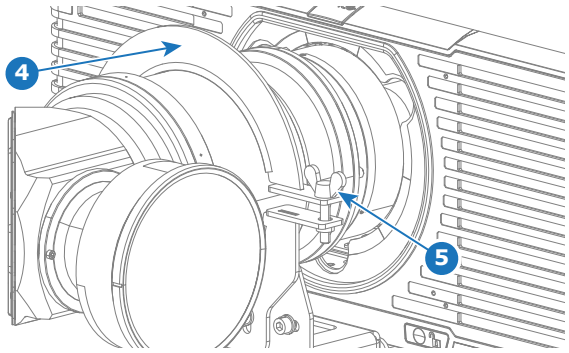


Image 5–15

4. Firmly tighten the four screws (reference 12 and 13).

   Tip: Due to the weight of the lens, it may sag slightly. Therefore, gently push the lens up while tightening the screws (reference 13) to ensure it is perfectly aligned with the projector optics.

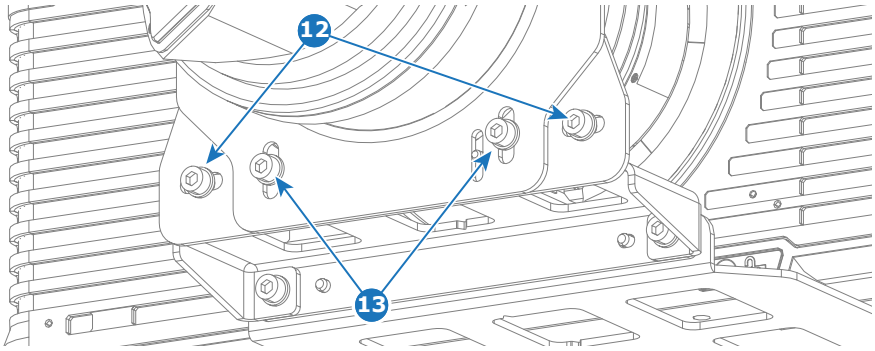


Image 5–16

5.8 ILD 0.37 UST 90° lens fine tuning

Prerequisites

This procedure assumes that the projector is installed in its final position and that the UST lens is pre-aligned and secured with the lens support. See procedures:

- “ILD 0.37 UST 90° lens pre-alignment”, page 70.
- “Installing the lens support bracket”, page 73.

Required tools

- Allen wrench 5 mm
- Allen wrench 4 mm
- Allen wrench 3 mm
- Torque wrench with hex socket of 5 mm

How to fine tune the UST lens in its final position

1. Power on the projector and display the checkerboard test pattern.

   Note: Allow the projector to warm up for at least 30 minutes. This ensures that the optics stabilize, preventing any focus drift after adjustments.

2. Check If the projector is perfectly aligned with the screen. Projected image should be square and level. Project the green focus test pattern.
3. Rotate the barrel of the secondary focus to achieve the best focus for the projected image. If the UST lens is correctly pre-aligned, the best focus should correspond with the throw distance on the scale.

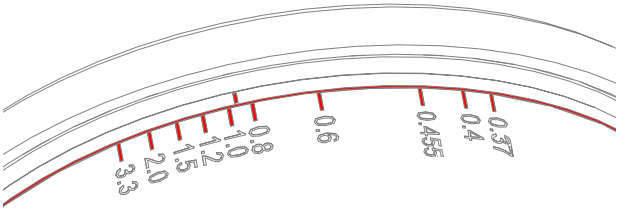


Image 5–17

4. If needed, fine tune the horizontal and vertical shift. Proceed as follows:
   a) Loosen the four fixation screws (reference 12 and 13) of the lens brackets to allow horizontal and vertical shift movements. Use a 3 mm Allen wrench.
   b) Enable the Horizontal and Vertical shift via Pulse Prospector: *Setup* > *Optics* > *Optical Shift*
   c) Adjust the horizontal and vertical shift.
   d) Disable the Horizontal and Vertical shift via Pulse Prospector: *Setup* > *Optics* > *Optical Shift*
   e) Fasten the four fixation screws (reference 12 and 13) of the lens brackets. Use a 3 mm Allen wrench.

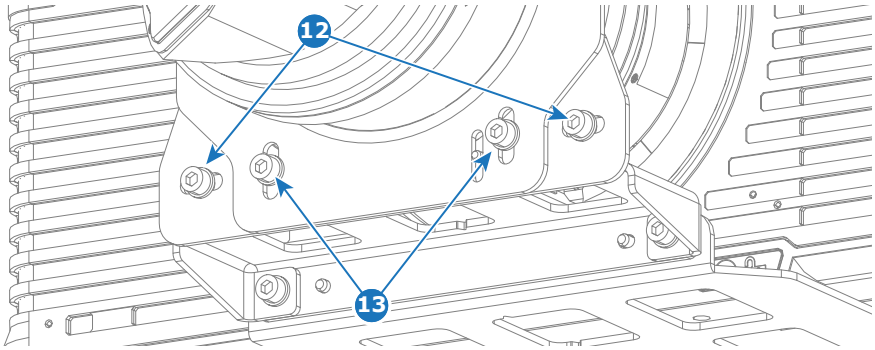


Image 5–18

5. If needed, the Scheimpflug can be slightly adjusted while the lens is fixed in the lens support to correct any focus issues in the corners. Proceed as follows:
   a) Loosen the Scheimpflug lock nut (reference A, B, or C). Use a 5 mm Allen wrench.
   b) Slightly turn the Scheimpflug screw (reference 1, 2, and 3) to improve focus. Use a 4 mm Allen wrench

c) Fasten the Scheimpflug lock nut. Use a 5 mm Allen torque wrench with a torque of 6 Nm.

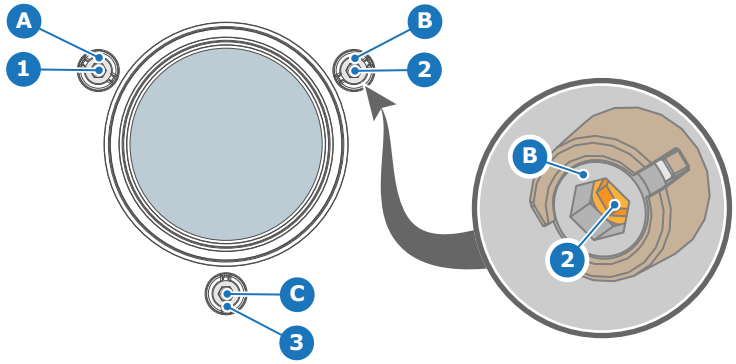


Image 5–19

Scheimpflug (Boresight)

6

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).

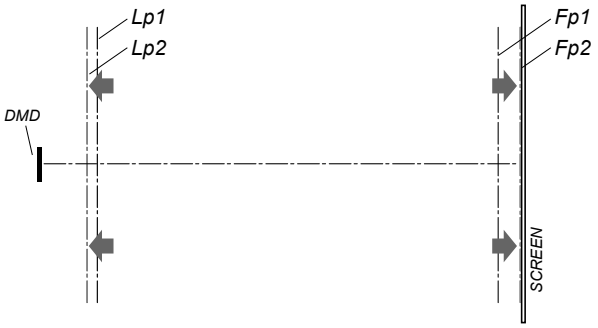


Image 6–1

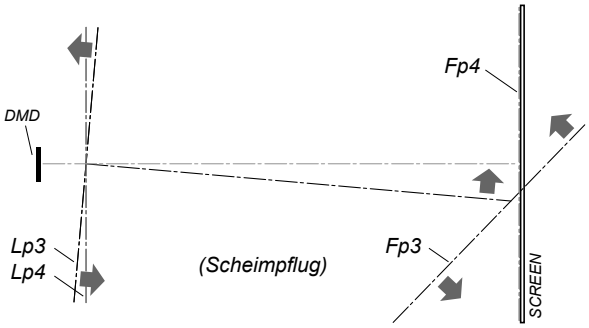


Image 6–2

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

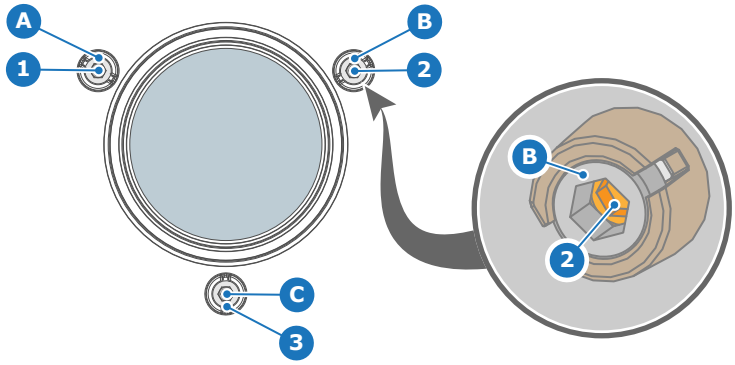


Image 6–3 Scheimpflug adjustments points on Lens holder - Projector front view. (Shape of the lens may vary with the model)

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 4 mm
- Torque wrench with hex socket of 5 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 half turn (reference A, B and C).

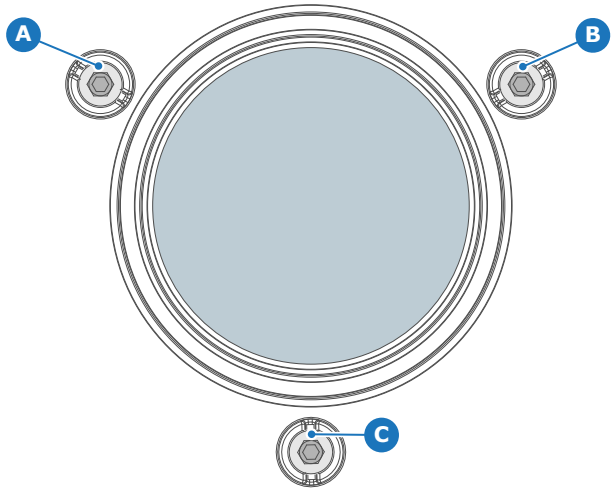


Image 6–4

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).

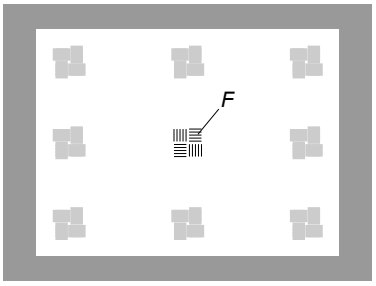


Image 6–5

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 4 mm Allen wrench.

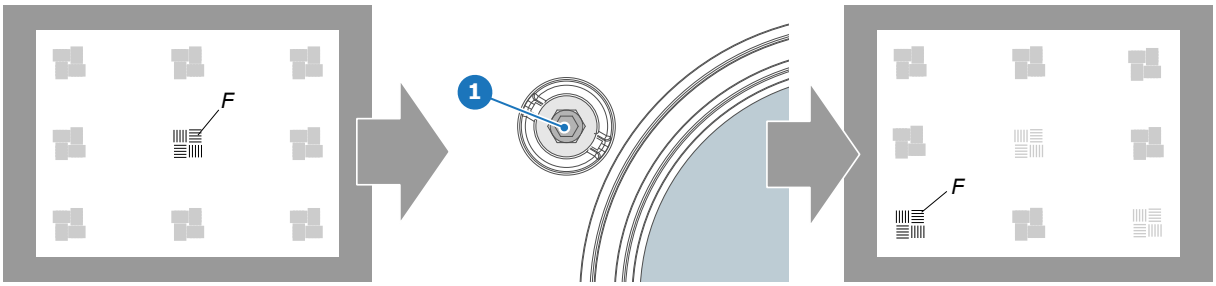


Image 6–6

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).

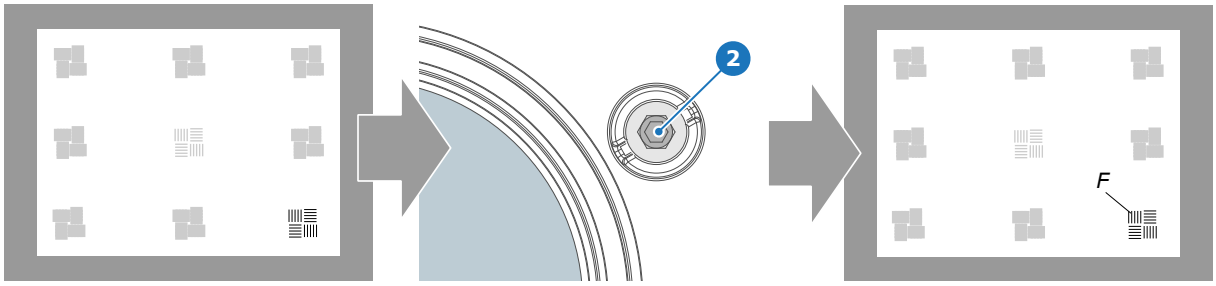


Image 6–7

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

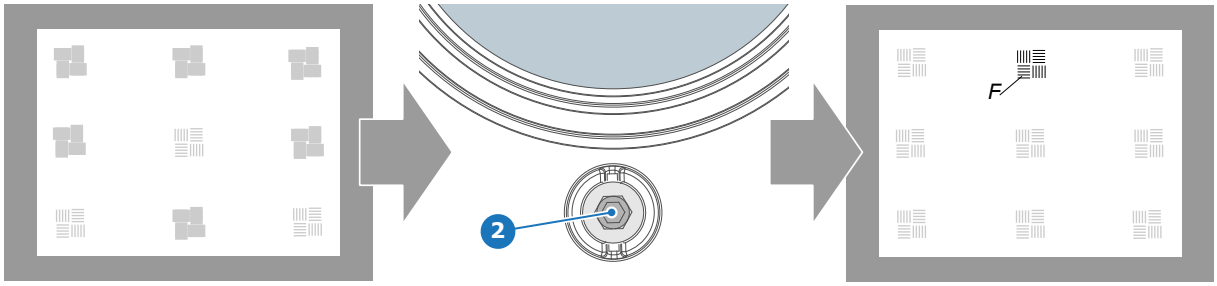


Image 6–8

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 6 Nm.

Flight case and rigging frame

7

About flight case and rigging frame

The projector can also be delivered with rigging frame installed inside a flight case.

The I600 flight case and I600 rigging frame are not yet available for the market. See Barco website for availability.

7.1 Flight case

About the flight case

The flight case is designed to transport the I600 in a safe and secure manner. There's also sufficient space in the flight case to place the projector while mounted in its rigging frame. The four caster wheels, provided with breaks, and the four handles make the flight case easy to handle. The floor of the flight case wagon is equipped with two small covered compartments to store the remote control and the rigging clamps.

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

Image 7–1

WARNING: Maximum stack 4 flight cases high. Never higher.

7.2 Rigging frame

About the rigging frame

The rigging frame is designed for the Barco I600 projectors, and can not be used for other equipment. See rigging frame specific documentation for how to install the projector in to the frame. Projector and rigging frame are normally delivered complete assembled together if ordered.

Image 7–2

8 Dust filter

Why filter condition matters

A clean dust filter is essential for optimal projector performance and longevity. Dust and debris can clog filters, leading to overheating, dim images, loud fans, and potential damage. Regular inspection and maintenance prevent these issues.

8.1 When and how to inspect the projector’s dust filter

When to inspect and replace

- **Initial Period:** Inspect every 100-200 hours of use or monthly, especially in dusty environments.
- **Ongoing:** If dust buildup is minimal, extend the interval between checks. Always inspect sooner if you notice overheating, dimming, or increased fan noise.
- Check the dust filter sooner if you notice overheating, dimming, or loud fans.
- Clean the dust filter if you see a light layer of dust. If dust is thick, embedded, or the dust filter remains dirty after cleaning, replace it.
- Replace the dust filter if you see:
  - Discoloration: Original color is lost (e.g., white turns brown/black, black turns grey).
  - Physical damage: Tears, rips, warped frame, or holes.
  - Caked-on dirt: Dust remains after cleaning, or filter looks opaque when held to light.
  - Mold or residue: Any mold, sticky, oily, or unusual contaminants.

How to inspect

1. **Power down:** Turn off and unplug the projector before removing the dust filter.
2. **Remove:** For instructions see procedure “Installing the dust filter”, page 89.
3. **Inspect:** Use bright light to check both sides for dust, discoloration, or damage.
4. **Clean:** Use a vacuum or compressed air. If the dust filter remains dirty or airflow is not restored, replace it.

CAUTION: Handle gently: Avoid damaging the dust filter during inspection or cleaning.

8.2 Installing the dust filter

Required tools

Torx screwdriver T10

How to install

1. Position the dust filter assembly (foam + holder) on the front cover of the projector.

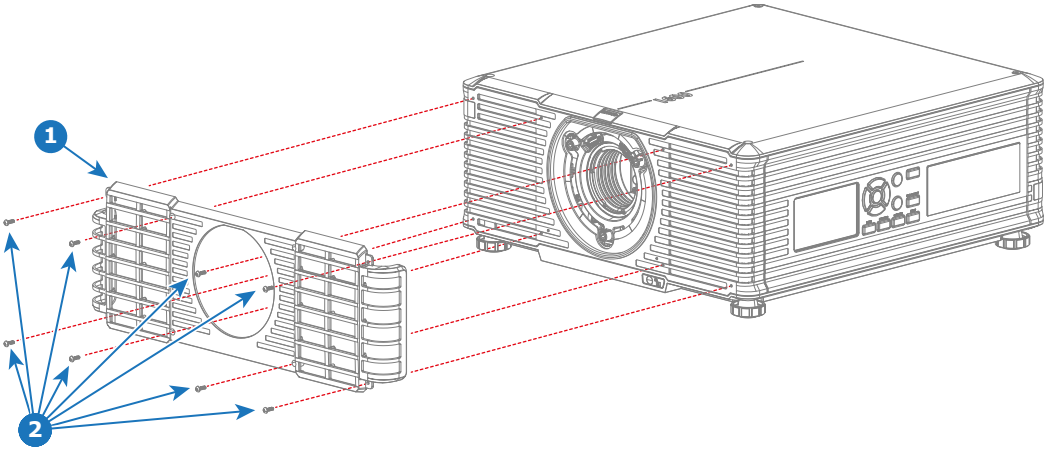


Image 8–1

2. Fasten the dust filter assembly with 8 screws (Image 8–1 reference 2). Use a Torx screwdriver T10.

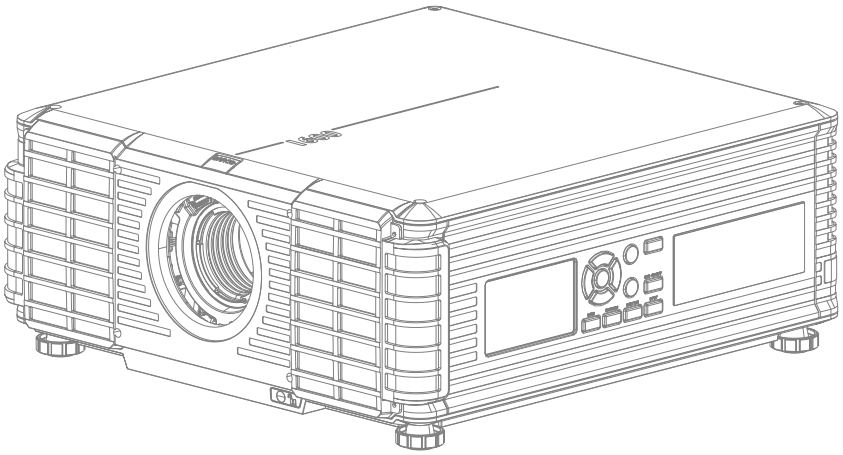


Image 8–2 Dust filter installed.

Pulse SFP input use cases

9

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.

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

SFP+ transceiver + Fiber connection (integrated or separated)

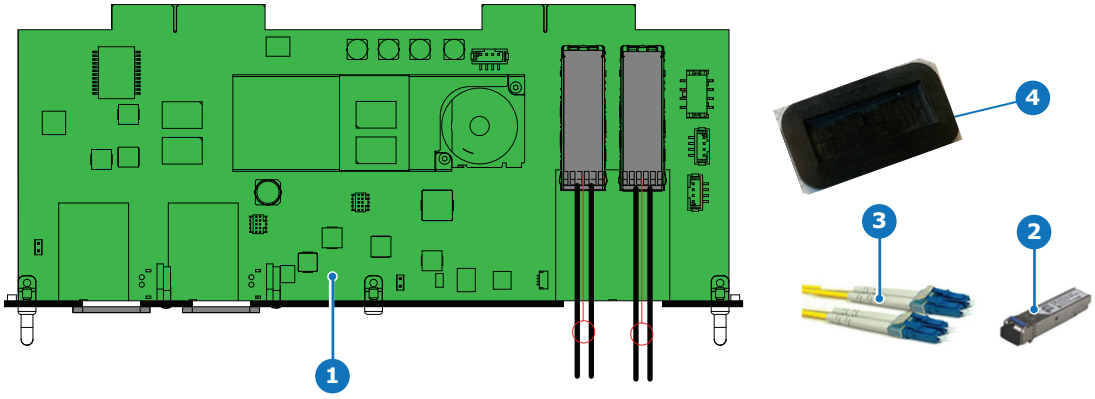


Image 9–1

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 50.
5. Insert the dust proof gasket in the opening where the covering plate was removedd

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

Neutrik OpticalCon Duo + SFP+ transceiver + internal fiber

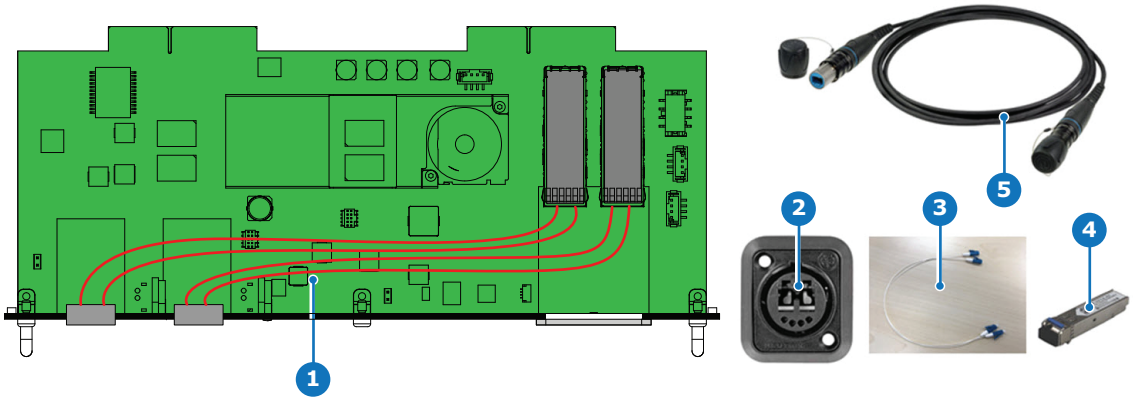


Image 9–2

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 50.

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

Neutrik OpticalCon Quad + SFP+ transceiver + internal fiber

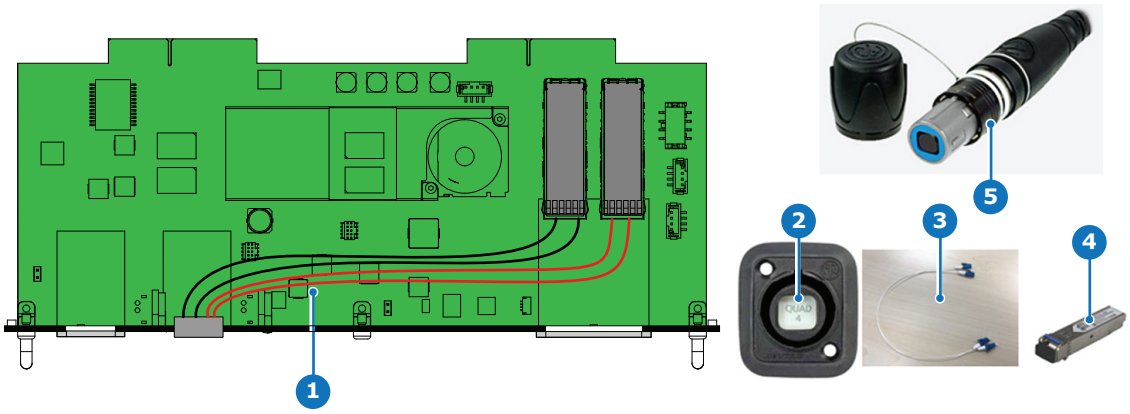


Image 9–3

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 50.

9.4 Use case 4: Loop-through mode

Loop-through mode

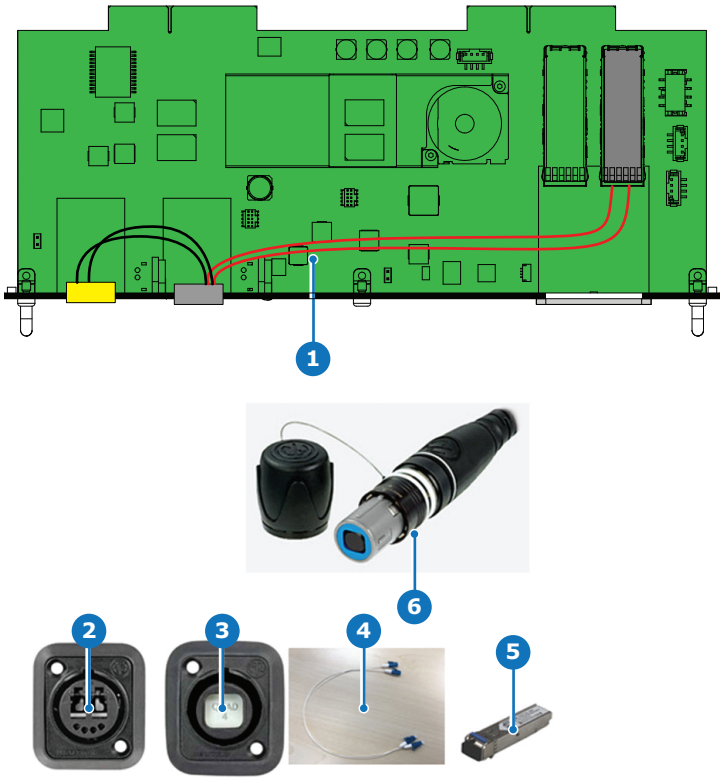


Image 9–4

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 50.

Regulatory

A

A.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 3 mm
Allen wrench 4 mm
Allen wrench 5 mm
Allen wrench 6 mm
Cutter knife
Tape measure
Torque wrench with hex socket of 4 mm
Torque wrench with hex socket of 5 mm
Torx screwdriver T10
USB flash drive

Index

M

N

O

P

R

S

T

U

W

R5917790 /07 | 2025-10-16