UDM

Installation manual

BARCO

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Changes

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

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Safety information 1

About this document

Read this document attentively. It contains important information to prevent personal injury while installing and using the UDM projector. Furthermore, it includes several cautions to prevent damage to the UDM projector. Ensure that you understand and follow all safety guidelines, safety instructions and warnings mentioned in this chapter before installing the UDM projector.

Clarification of the term "UDM" used in this document

When referring in this document to the term "UDM" means that the content is applicable for following Barco products:

•   UDM 4K15, UDM 4K22, UDM W15, UDM W19, UDM W22

Model certification name

•   UDM

> 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.

1.1 General Considerations

> **WARNING:** Be aware of suspended loads.

> **WARNING:** 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 optical radiation emergency, please disconnect the device from the mains current; this by employing the mains switch. In case the mains switch is not easily accessible, the projectors shall be disconnected by other means for example the mains junction box.
> It is advised to employ the shutter or select a black image on the projector in order to reduce the risk of the emergency.

General safety instructions

• 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.
• Do not stare into beam when the projector is on. The bright light may result in permanent eye damage.
• Before operating this equipment please read this manual thoroughly and retain it for future reference.
• Installation and preliminary adjustments must be performed by qualified Barco personnel or by authorized Barco service dealers.
• All warnings on the projector and in the documentation manuals must be adhered to.
• All instructions for operating and use of this equipment must be followed precisely.
• All local installation codes should be adhered to.

Notice on safety

This equipment is built in accordance with the requirements of the international safety standards IEC60950-1, as basis for National safety regulation world wide. The safety standard covers information technology equipment including electrical business equipment intended to operate in "normal" environments (offices and homes). This safety standard imposes 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 reduce the risk of hazards and contribute to ensure the safety of the equipment to the user even when the equipment's normal operation fails.

Notice on optical radiation

This projector embeds extremely high brightness (radiance) lasers; this 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 radiance value than native laser light. Nevertheless the projected light represents 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 retinal 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 irradiance equals the maximum permissible exposure as described in the chapter "Hazard Distance".

> **WARNING:** No direct exposure to the beam within the hazard distance shall be permitted, RG3 (Risk Group 3) 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.

Notice on laser radiation

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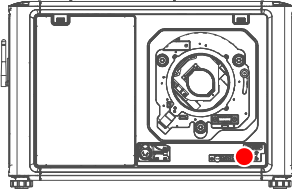
Image 1-1

> ☀️ **WARNING:** Laser Radiation — Do not stare into laser ranging beam, Class 2 IEC EN 60825-1:2014 See the product safety manual for details.

Users definition

Throughout this manual, the term SERVICE PERSONNEL refers to Barco authorized 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 and HIGH BRIGHTNESS PROJECTORS) in performing a task, and of measures to minimize the potential risk to themselves or other persons. The term USER and OPERATOR refers to any person other than SERVICE PERSONNEL, AUTHORIZED to operate professional projection systems.

The UDM projector is intended "FOR PROFESSIONAL USE ONLY" by AUTHORIZED PERSONNEL familiar with potential hazards associated with high voltage, high intensity light beams and high temperatures generated by the light source and associated circuits. Only qualified SERVICE PERSONNEL, knowledgeable of such risks, are allowed to perform service functions inside the product enclosure.

1.2 Important safety instructions

To prevent risk of electrical shock

- This product should be operated from a mono phase AC power source. Ensure that the mains voltage and capacity matches the projector electrical ratings: 120-180V / 200-240V (+/-10%), 16A-12A, 50-60Hz. If you are unable to install the AC requirements, contact your electrician. Do not defeat the purpose of the grounding.
- This apparatus must be grounded (earthed) via the supplied 3 conductor AC power cable.
- If none of the supplied power cables are the correct one, consult your dealer.
- 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.
- Never use 2- wire power cords, as this is dangerous and could lead to electrical shock. Always use a power connector with a ground terminal.
- Do not allow anything to rest on the power cord. Do not locate this product where persons will walk on the cord. To disconnect the cord, pull it out by the plug. Never pull the cord itself.
- Use only the power cord supplied with your device. While appearing to be similar, other power cords have not been safety tested at the factory and may not be used to power the device. For a replacement power cord, contact your dealer.
- If you are unable to insert the plug into the outlet, contact your electrician to replace your obsolete outlet. Do not defeat the purpose of the grounding-type plug.
- Do not operate the projector with a damaged cord. Replace the cord.
- Do not operate the projector if the projector has been dropped or damaged - until it has been examined and approved for operation by qualified service personnel.
- Position the cord so that it will not be tripped over, pulled, or contact hot surfaces.
- If an extension cord is necessary, a cord with a current rating at least equal to that of the projector should be used. A cord rated for less amperage than the projector may overheat.
- Never push objects of any kind into this product through cabinet slots as they may touch dangerous voltage points or short out parts that could result in a risk of fire or electrical shock.
- Make sure that no objects enter into the vents and openings of the set.
- Do not expose this projector to rain or moisture.
- The projector is designed for indoor use only. Never operate the unit outdoors.
- Do not immerse or expose this projector in water or other liquids.
- Do not spill liquid of any kind on this projector.
- Should any liquid or solid object fall into the cabinet, unplug the set and have it checked by qualified service personnel before resuming operations.
- Do not disassemble this projector, always take it to qualified service personnel when service or repair work is required.
- Do not use an accessory attachment which is not recommended by the manufacturer.
- Lightning - For added protection for this video product during a lightning storm, or when it is left unattended and unused for long periods of time, unplug it from the wall outlet. This will prevent damage to the device due to lightning and AC power-line surges.

To prevent personal injury

- To prevent injury and physical damage, always read this manual and all labels on the system before powering the projector or adjusting the projector.
- To prevent injury, take note of the weight of the projector. The weight of a basic projector is about 48 kg (105 lb) without lens.
- 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 15.

- High Brightness Warning: The projector light source may not be switched on or the shutter must be closed when no projection lens is installed.
- Based on international requirements, no person is allowed to enter the projected beam within the zone between the projection lens and the related Hazard Distance (HD). This shall be physically impossible by creating sufficient separation height or by placing optional barriers. Within the restricted area operator training is considered sufficient. The applicable separation heights are discussed in "High Brightness precautions: Hazard Distance", page 15.
- **Warning**: Laser radiation when optional laser distance meter is installed. Do not stare into laser ranging beam. Class 2 laser beam could result in damage to the eye.
- Don't put your hand in front of the beam.
- 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. This kind of operations shall only be performed by Barco authorized service personnel.
- Before attempting to remove any of the projector's covers, you must turn off the projector and disconnect from the wall outlet.
- When required to switch off the projector, to access parts inside, always disconnect the power cord from the power net.
- **The power input at the projector side is considered as the disconnect device. When required to switch off the projector, to access parts inside, always disconnect the power cord at the projector side. In case the power input at the projector side is not accessible (e.g. ceiling mount), the socket outlet supplying the projector shall be installed nearby the projector and be easily accessible, or a readily accessible general disconnect device shall be incorporated in the fixed wiring.**
- Do not stack or hang projectors without using the stacking frame.
- Max units in stacked configuration, 3 units.
- Max units in hanging configuration, 2 units.
- When hanging projectors on a truss with the Barco stacking frame, always secure the stack with safety cables between the projectors and the truss.
- 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.
- Only place the projector on a stable surface, or mount it securely using an approved ceiling mount rig.
- It is hazardous to operate without lens or shield. Always switch the output light off when replacing a lens.
- Lenses or shields shall be changed if they have become visibly damaged to such an extent that their effectiveness is impaired. For example by cracks or deep scratches.
- **Cooling liquid circuit.** The projector contains a cooling circuit filled with Mono-ethylene glycol (1,2-ethane diol) and inhibitors in aqueous solution (34% active). If the unlikely event that the cooling circuits have a leak, switch off the device and contact qualified service personnel. The liquid is not for household use. Keep out of reach of children. Harmful by oral intake. Avoid exposure to pregnant women. Avoid contact with eyes, skin and clothing. Avoid inhale of the noxious fumes.
- Never point or allow light to be directed on people or reflective objects within the HD zone.
- All operators shall have received adequate training and be aware of the potential hazards.
- In case of using an external cooling system position the hoses of the cooling system so that they will not be tripped over, pulled, or contact hot surfaces.

To prevent fire hazard

- Do not place flammable or combustible materials near the projector!
- Barco large screen projection products are designed and manufactured to meet the most stringent safety regulations. This projector radiates heat on its external surfaces and from ventilation ducts during normal operation, which is both normal and safe. Exposing flammable or combustible materials into close proximity of this projector could result in the spontaneous ignition of that material, resulting in a fire. For this reason, it is absolutely necessary to leave an "exclusion zone" around all external surfaces of the projector whereby no flammable or combustible materials are present. The exclusion zone must be not less than 40 cm (16") for this projector.
- Do not place any object in the projection light path at close distance to the projection lens output. The concentrated light at the projection lens output may result in damage, fire or burn injuries.

- Ensure that the projector is solidly mounted so that the projection light path cannot be changed by accident.
- Do not cover the projector or the lens with any material while the projector is in operation. . Mount the projector in a well ventilated area away from sources of ignition and out of direct sun light. Never expose the projector to rain or moisture. In the event of fire, use sand, CO_2 or dry powder fire extinguishers. Never use water on an electrical fire. Always have service performed on this projector by authorized Barco service personnel. Always insist on genuine Barco replacement parts. Never use non-Barco replacement parts as they may degrade the safety of this projector.
- Slots and openings in this equipment are provided for ventilation. To ensure reliable operation of the projector and to protect it from overheating, these openings must not be blocked or covered. The openings should never be blocked by placing the projector too close to walls, or other similar surface. This projector should never be placed near or over a radiator or heat register. This projector should not be placed in a built-in installation or enclosure unless proper ventilation is provided.
- Projection rooms must be well ventilated or cooled in order to avoid build up of heat. It is necessary to vent hot exhaust air from projector and cooling system to the outside of the building.
- Let the projector cool completely before storing. Remove cord from the projector when storing.

To prevent battery explosion

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

To prevent projector damage

- 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.
- The projector must always be installed in a manner which ensures free flow of air into its air inlets.
- 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.
- 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.
- 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.
- 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 block the projector cooling fans or free air movement around the projector.
- Do not use this equipment near water.
- **Special care for Laser Beams**: 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.
- 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.
- 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.
- 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.
- Only use **zoom** lenses of the Barco TLD+ series on the 4K models of the projector. Using other lenses will damage the internal optics. For suitable fixed TLD+ lenses contact Barco or see Barco website.

- Allowed ambient temperature range depends on altitude:
  - between 0 and 1000 meter altitude: ambient temperature range = 0°C (32°F) to 40°C (104°F)
  - between 1000 and 3000 meter altitude: ambient temperature range = 0°C (32°F) to 30°C (86°F)
- Rated humidity = 0% RH to 80% RH Non-condensed.

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 projector and cancellation of the warranty.
- Remove all power from the projector and refer servicing to Barco authorized service personnel 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.
- 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 projector, ask the service technician to perform safety checks to determine that the product is in proper operating condition.
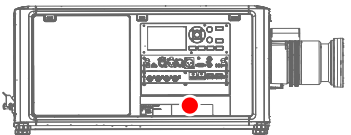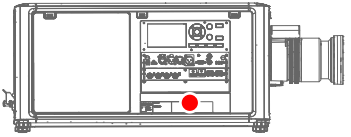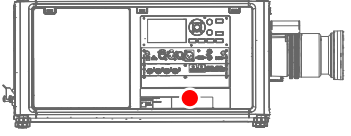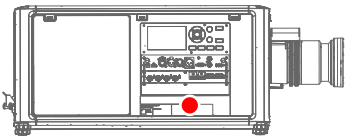
Stacking and transporting

- Stack maximum 2 rental flight cases high. Never higher.
- Surface on which flight case is standing must be level to ensure that the total load is evenly spread out among the four wheels. The surface must also be able to support the load safely.
- Before stacking or transporting flight cases, check the wheels and their fixation screws for wear or defects.
- Before stacking or transporting flight cases, check that the four lock handles on each flight case are in good working order and locked securely.
- When stacked, make sure the wheels of the upper flight case are precisely positioned in the stacking dishes of the flight case below.
- Stacked flight cases may not be moved. Before stacking, the lower flight case must already be in its final resting position before placing the second upon it.
- Never stack loaded flight cases in a truck or other transport medium, unless each flight case is rigidly strapped tight.
- In the event of a wheel breaking, flight cases must be rigidly strapped tight to prevent a stack collapsing.
- Use an appropriate forklift to raise flight cases and take the necessary precautions to avoid personnel injury.

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

Label image	Label description	Label location
	Hazard RG3: not for household use symbol	
	Hazard RG3: optical radiation warning symbol	
	Hazard class 2: laser radiation warning symbol. 0.95 mW - 638 nm.	

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

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

警告！勿觀看投影機光束 眼睛勿直接接觸可允許暴露的光束 鐳射輻射-勿直視鐳射範圍內光束 RG3 IEC EN 62471-5：2015 CLASS 2 IEC EN 60825-1：2014 危害距離：請參考安全手冊

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

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

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 cornea 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 cinema 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 the height that will prevent spectators' eyes from being in the hazard distance. Radiation levels in excess of the limits will not be permitted at any point less than 2.0 meter (SH) above any surface upon which persons other than operators, performers, or employees are permitted to stand or less than 1.0 meter (SW) lateral separation from any place where such persons are permitted to be. In environments where unrestrained behavior is reasonably foreseeable, the minimum separation height should be greater than or equal to 3.0 meter to prevent potential exposure, for example by an individual sitting on another individual's shoulders, within the HD.

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

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

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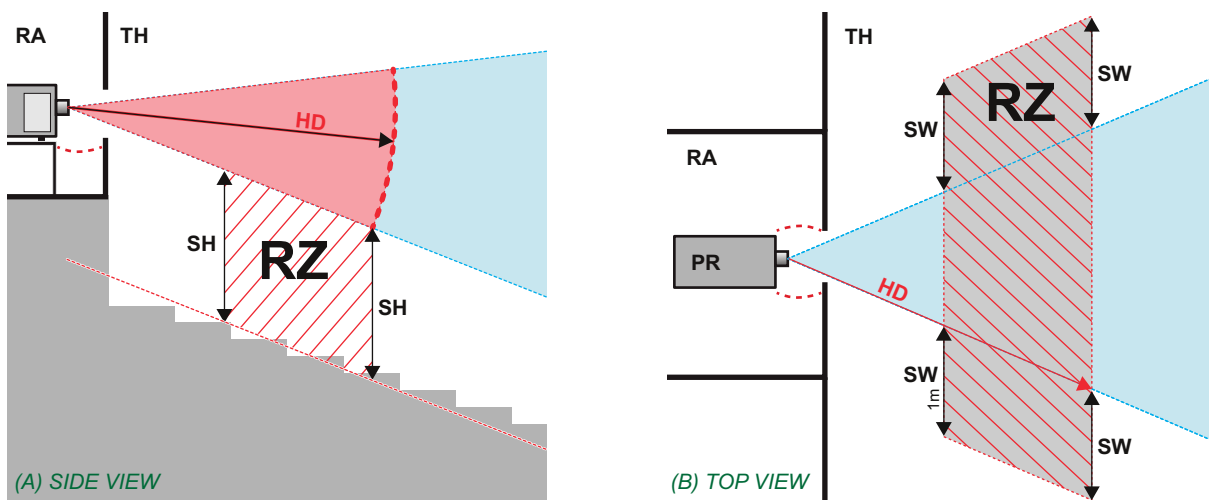

Image 1-2

A	Side view.	**TH**	Theater.
B	Top view.	**RZ**	Restriction Zone in the theater.
RA	Restricted Access location (boot area of projector).	**SH**	Separation Height.
PR	Projector.	**SW**	Separation Width.

Based on national requirements, no person is allowed to enter the projected beam within the zone between the projection lens and the related hazard distance (HD). This shall be physically impossible by creating

sufficient separation height or by placing barriers. The minimum separation height takes into account the surface upon which persons other than operator, performers or employees are permitted to stand.

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

The restricted area sticker can be replaced by a sticker with only the symbol.
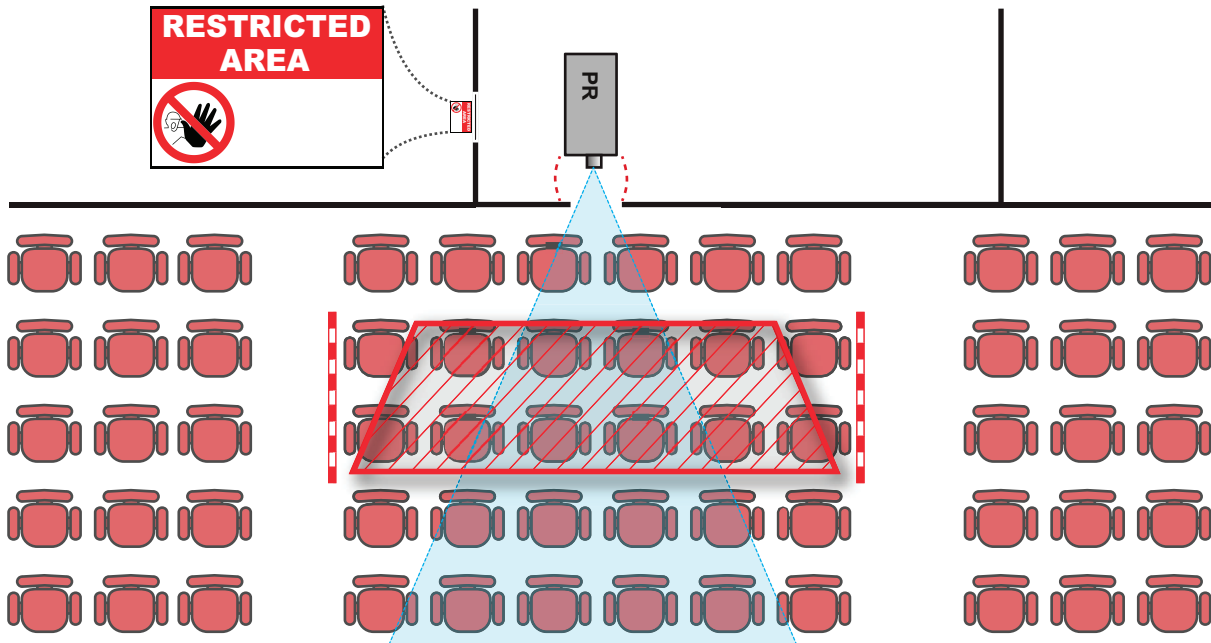
Image 1-3

USA market

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

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

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

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

The LIP shall be installed by Barco or by a trained and Barco-authorized installer or shall only be transferred to laser light show variance holders. This is applicable for dealers and distributors since they may need to install the LIP (demo install) and/or they transfer (sell, rent, lease) the LIP. 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 can be requested via the FDA online eSubmitter portal or via FDA Form 3147 referencing to Barco's variance approval 2016-V-0144.

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 last variance holder in the distribution chain is responsible to maintain the installation checklist and to make it available on request of the FDA. In case Barco is the last variance holder the checklist must be sent to pvg@barco.com.

In addition to temporary installations (e. g.: rental and staging, lease, events …) the following requirements apply:

- Rental companies shall have a laser light show variance because they have direct relationship with the installers of the rented equipment.
- This product shall be located in such a way that all propagating beam paths within the Restriction Zone, and the audience can be directly observed at all times.
- Communication shall be maintained with other personnel assisting in surveillance of the LIP projection.
- In the event of any unsafe condition, immediately terminates (or designate the termination) of LIP projection light.

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 cornea 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 Image 1-4 two areas should be considered: the restricted enclosed projection area (RA) and the observation area (TH).
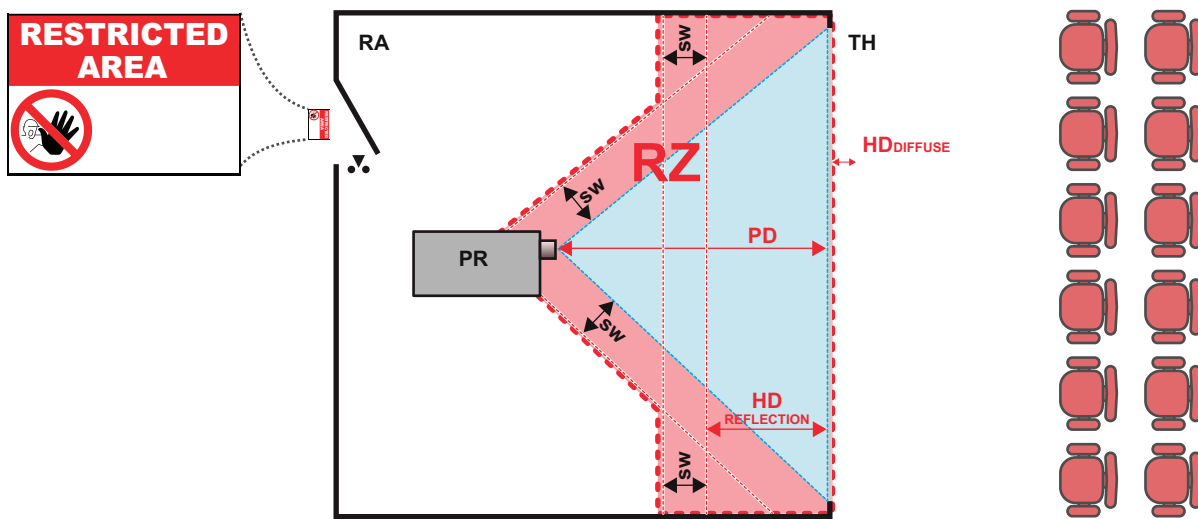
Image 1-4

RA Restricted Access location (enclosed projection area).
PR Projector.
TH Theater (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 15, 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 15, 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
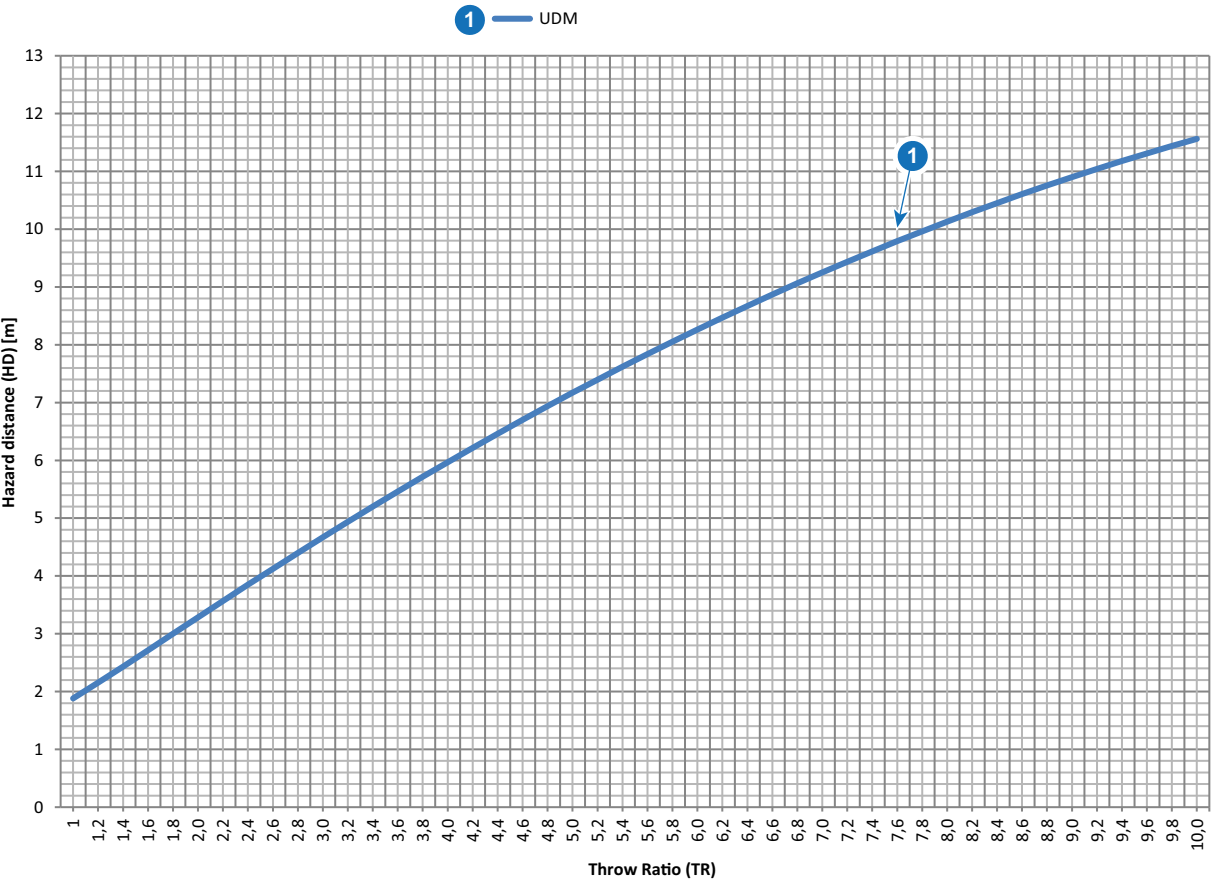
Image 1-5

HD   Hazard Distance
TR   Throw Ratio

1.7 Radio equipment (optional)

CE Conformity
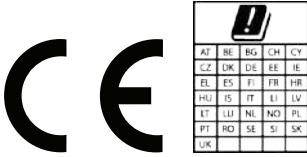
The UDM may be equipped with WiFi & GSM modules for Pulse Input & Communication unit, which are fit for use in the European Economic Area (EEA).

The UDM is restricted to indoor use only when operating in the 5150 to 5250 MHz frequency range.

Hereby, Barco declares that the radio equipment type UDM is in compliance with Directive 2014/53/EU. The full text of the EU declaration of conformity is available at the following internet address: *https://www.barco.com/support*

WiFi & GSM module

For WLAN:
- Frequency: 2402 MHz - 2482 Mhz
- Max EIRP: 19 dBm
- Frequency: 5150 – 5350 MHz / 5470 – 5725 Mhz
- Max EIRP: 23 dBm

For UMTS:
- Band 1:
  - Frequency: 2100 MHz
  - Max EIRP: 24 dBm
- Band 8:
  - Frequency: 900 MHz
  - Max EIRP: 24 dBm

For GSM:
- E-GSM:
  - Frequency: 900 MHz
  - Max EIRP: 33.5 dBm
- EDGE:
  - Frequency: 900 MHz
  - Max EIRP: 28 dBm
- DCS:
  - Frequency: 1800 MHz
  - Max EIRP: 30.5 dBm
- EDGE:
  - Frequency: 1800 MHz
  - Max EIRP: 27 dBm

1.8 Download Product Manual

Download Product Manual

Product manuals and documentation are available online at *www.barco.com/td*.

Registration may be required; follow the instructions given on the website.

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

Installation process 2

About this chapter

This chapter gives an overview of all the different stages in the installation process that has to be followed in chronological order to set the UDM 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.

2.1 Preparation process

Prepare for installation

1. Ensure that you understand all safety topics described in the chapter "Safety information", page 7.

2. Check if all installation requirements are fulfilled such as:
    *   the environmental conditions of the installation area,
    *   the electrical facilities,
    *   cooling requirements,
    *   the capabilities of the supporting structure (table/ceiling)
    *   etc ... for more info see chapter "Installation requirements", page 30.

3. Unpack the projector or pull out the projector from its flight case. See chapter "Unpacking the projector", page 32 or see chapter "Flight case", page 62.

4. In case of a first install perform an initial inspection of the projector. See chapter "Initial inspection".

5. Define the installation position of the projector. For detailed info and possibilities see chapters:
    *   "Projector orientations", page 35.
    *   "Projector positioning", page 37.
    *   "Projector shift and tilt range", page 38.

6. Select the lens that will best fit for the application. See chapter "Lens selection", page 39, and "Available lenses", page 40.

2.2 Installation process

Physical installation process overview

1. Install the projector in the desired position taking 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 15.
    *   Projector configuration:
        -   In case of a standing installation:
            ◦   Use a solid pedestal to place a single UDM projector on (with or without rigging frame)
            ◦   Use a solid pedestal and UDM rigging frames for stacking the UDM projectors up to maximum 3 units high.
        -   In case of a hanging installation:
            ◦   Use the UDM rigging frames to suspend up to maximum 2 stacked UDM projectors (Table Mount or Ceiling Mount).
            ◦   Use a UDM rigging frame to hang one UDM projector in portrait (wall mount)

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

            Note: Ceiling mount and wall mount of a single UDM projector can be realized without UDM rigging frame but then a 3rd party interface needs to be added between the projector and the surface to attach the projector on. See "Wall or ceiling mount without rigging frame", page 56 for more details.

2. Installation of the lens. For detailed instructions see "Lens installation", page 47.

    Caution: Instal the lens safety cable in case the projector is mounted above people. For detailed instructions see documentation of the lens safety cable. For ordering info see Barco website.

3. Electrical connection with the power net. See chapter "Connecting the projector with the power net", page 46.

4. Install the batteries of the Remote Control Unit (RCU). See chapter "Remote control, battery installation", page 44.

5. Installation of the Projector Toolset on local laptop. Download and install the latest version from the Barco website. See chapter "Download Projector Toolset", page 42.

6. Switch on the projector and start image projection. See user guide of the projector for details on how to operate the projector. Following options are possible to control the projector:
    *   using the RCU
        -   Remotely. Ensure that the RCU address matches the projector individual address for the IR receivers. For details see chapters:
            ◦   "Displaying and Programming addresses into the RCU", page 51.
            ◦   "Setting the projector addresses", page 53.
        -   Hard wired. RCU with XLR cable connected. See "Using the XLR connector of the RCU", page 52
    *   using the Local Keypad.
    *   using Projector Toolset. See manual of the Projector Toolset.

7. Alignment of the projected image with the screen. Activate an internal test pattern to focus, zoom and shift the lens until the projected image is aligned with the screen. Use for that the:
    *   Focus, Zoom and Shift buttons of the RCU.
    *   Lens adjustment button of the Local Keypad. For detailed instructions see user guide of the projector.
    *   Projector Toolset control software. For detailed instructions see user guide of Projector Toolset.

    To level the projector with the screen adjust the feed of the projector in case of a table mount installation (see "Alignment of a table mounted projector", page 54), or adjust the rotation of the rigging frame in case of a suspended installation (see "Alignment of projector in the rigging frame", page 55).

8. If needed change the projector orientation (e.g. Front/Table, Front/Ceiling, Rear/Table, Rear Ceiling). See user guide of the projector for the software settings of the projector orientation.

9. Projector registration in case of a first install. Depending on the country where the projector is installed the registration is mandatory. If mandatory the projector will show at startup the registration screen until the

registration is completed. When the registration screen appears choose for **REGISTER NOW** and follow the on-screen instructions.

⚠️ *Caution:* The light source will remain off if not registered after 100 hours run time.

10. Check for the latest projector software package. See chapter "Software update", 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 removal see "Removal of an input board", page 58.
   - for installation see "Installation of an input board", page 57.
   - for configuring the SFP input see "Pulse SFP input use cases", page 65.

2. Installation of the **WiFi & GSM** module. For installation instructions see installation manual of the WiFi & GSM module.

3. Installation of the **distance meter** module For installation and adjusting instructions see installation manual of the distance meter module.

Prepare to install 3

About this chapter

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

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

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

3.1 Installation requirements

Environment conditions

Table below summarizes the physical environment in which the projector safely operates or can be stored.

Environment	Operating	Non-Operating
Ambient Temperature (depends on altitude)	0-1000 meter: 0°C (32°F) to 40°C (104°F) 1000-3000 meter: 0°C (32°F) to 30°C (86°F)	-15°C (5°F) to 60°C (140°F)
Humidity	0% RH to 80% RH Non-condensed	0% RH to 90% RH Non-Condensed
Altitude	-60 m (-197 Ft) to 3000 m (9843Ft)[1]	-60 m (-197 Ft) to 10000 m (32810 Ft)

> 📄 Let the projector acclimatize after unpacking. Neglecting this may result in a startup failure of the Light Processor.

Keep projector air inlets and outlet free

The projector has three air inlets: one at the top, one at the front and one at the right side of the projector. There is only one air outlet which is located at the rear of the projector.
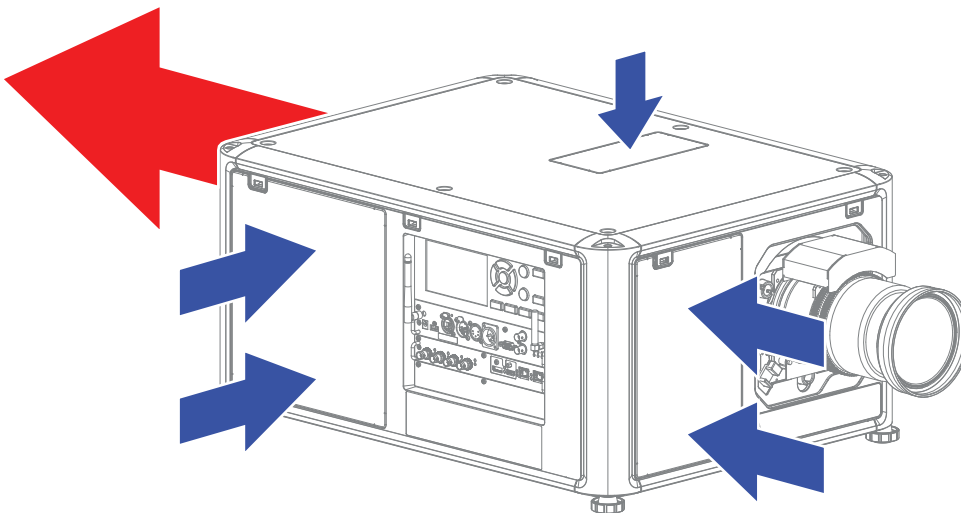
Image 3-1

> ⚠ **CAUTION:** Keep the air inlets and outlet at all times free. Make sure there is a minimum distance of 40 cm (15.7 in) between the air outlet and the nearest solid object.

Cooling requirements

The projector is fan cooled and must be installed with sufficient space around the projector front, minimum 40 cm (15.7 in) to ensure sufficient air flow. It should be used in an area where the ambient temperature, as measured at the projector air inlets, does not exceed 40°C (104°F).

Make sure to not install the backside of the projector near walls or other solid objects. Make sure there is a minimum distance of 40 cm (15.7 in) between the air outlet on the backside and the nearest solid object. If mounted too close to a solid object, the hot air from the air outlets may find its way back into the air inlets on the Light Source side of the projector, which will rapidly increase the temperature inside the projector.

1:     For PRC (People's Republic of China) the certified altitude is specified on the product label.
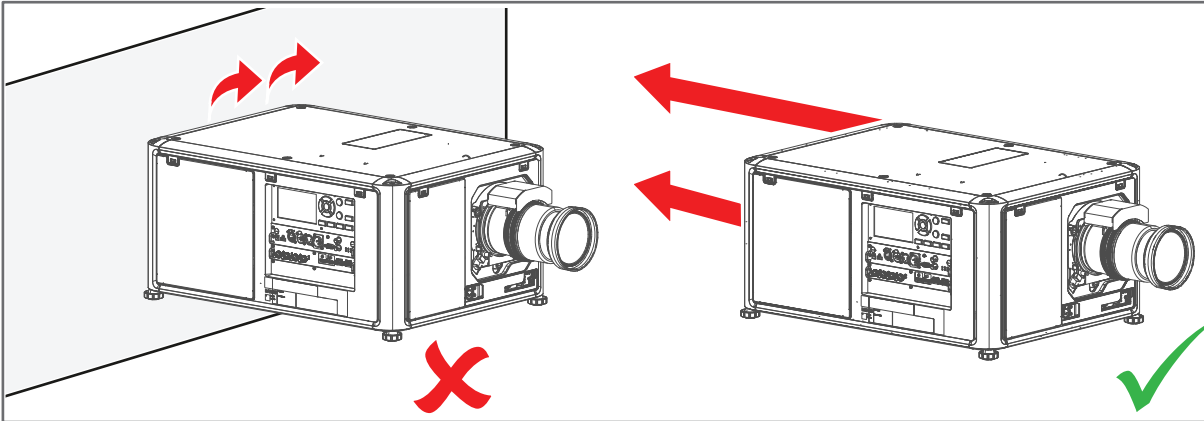
Image 3-2: Airflow, hot air

> Since the projector is foreseen to be stacked while in the rigging frame, the minimum distance space around the top and bottom air inlets should be the distance between two stacked projectors while in the rigging frame.

Clean air environment

A projector must always be mounted in a manner which ensures the free flow of clean air into the projectors ventilation inlets. For installations in environments where the projector is subject to airborne contaminants such as that produced by smoke machines or similar (these deposit a thin layer of greasy residue upon the projectors internal optics and imaging electronic surfaces, degrading performance), then it is highly advisable and desirable to have this contamination removed prior to it reaching the projectors clean air supply. 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 measures to relocate the projector to a clean air environment should be considered.

Only ever use the manufacturer's recommended cleaning kit which has been specifically designed for cleaning optical parts, never use industrial strength cleaners on the projector's optics as these will degrade optical coatings and damage sensitive optoelectronics components. Failure to take suitable precautions to protect the projector from the effects of persistent and prolonged air contaminants will culminate in extensive and irreversible ingrained optical damage. At this stage cleaning of the internal optical units will be noneffective and impracticable. Damage of this nature is under no circumstances covered under the manufacturer's warranty and may deem the warranty null and void. In such a case the client shall be held solely responsible for all costs incurred during any repair. It is the clients responsibility to ensure at all times that the projector is protected from the harmful effects of hostile airborne particles in the environment of the projector. The manufacturer reserves the right to refuse repair if a projector has been subject to knowingly neglect, abandon or improper use.

Main Power requirements

The projector operates from a nominal mono phase power net with a separate earth ground PE.

Power requirements : 120-180V / 200-240V (+/-10%), 16A-12A, 50-60Hz

The power cord required to connect the projector with the power net is delivered with the projector.

Projector Weight

Do not underestimate the weight of the projector. The projector weights about 48 kg (105 lb) without lens. Be sure that the pedestal on which the projector has to be installed is capable of handling five (5) times the complete load of the system. At least 2 persons are needed to lift the projector.

3.2 Unpacking the projector

Unpacking process and handling

The projector can be delivered in a cardboard box on a pallet or within a rigging frame inside a flight case. This chapter describes how to unpack the projector from the cardboard box. For how to handle the projector with rigging frame and flight case see "Flight case and rigging frame", page 61.

The box and pallet is secured with a banding and locking clips. To further protect the projector during transportation handling, it is surrounded with a sheet of polymeric foam. When the projector arrives the installation site, it needs to be removed from the box and pallet in a safe manner, without damaging the projector.

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

Required tools

Cutter knife

How to unpack

1. Use a cutter knife, or release as shown in the figure below to remove the banding around the cardboard box and pallet.

   Use the same knife to cut the adhesive tape that closes the box.
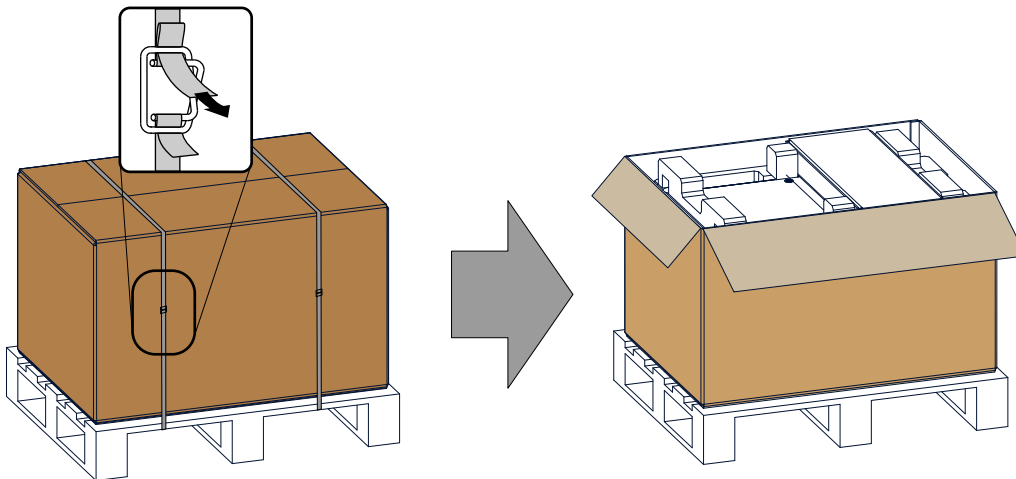
Image 3-3

2. Remove the foam inlays. These inlays also contain the accessories for the projector.

3. Remove the polymeric foam sheet.

4. Lift the projector out of the box.
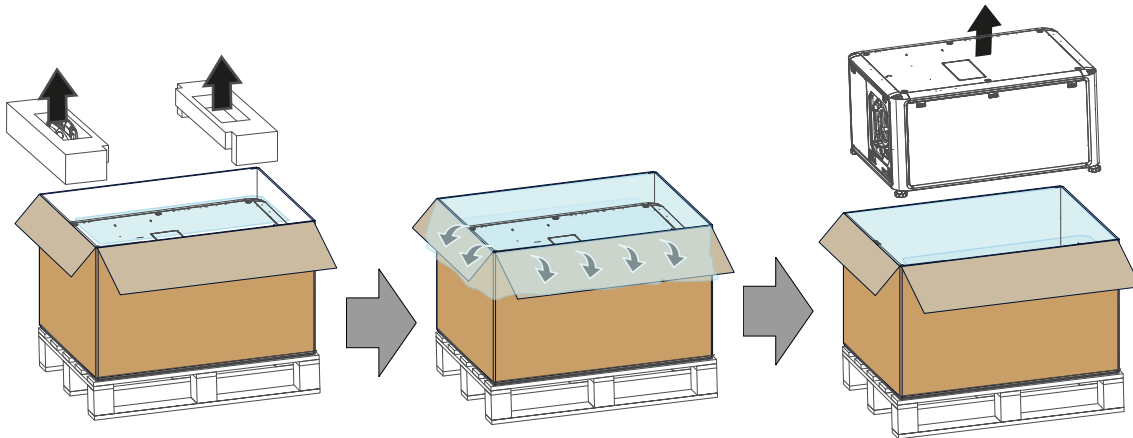
Image 3-4

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

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

> The lens is delivered in a separate box.

3.3 Initial inspection

General

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

Box content

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

- One power cord of 4 m (EUR 4m C19)
- One quick start guide
- One safety manual
- One web site reference sheet
- One remote control unit (RCU)
- Two batteries for the 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.

3.4 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.
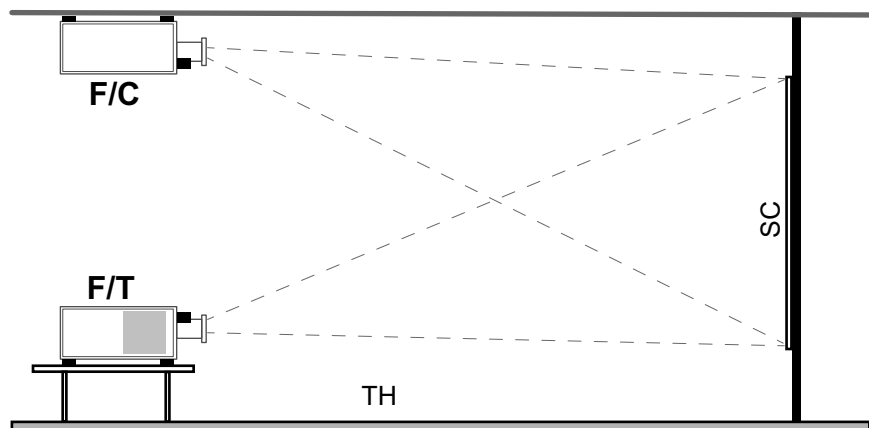
Image 3-5

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.
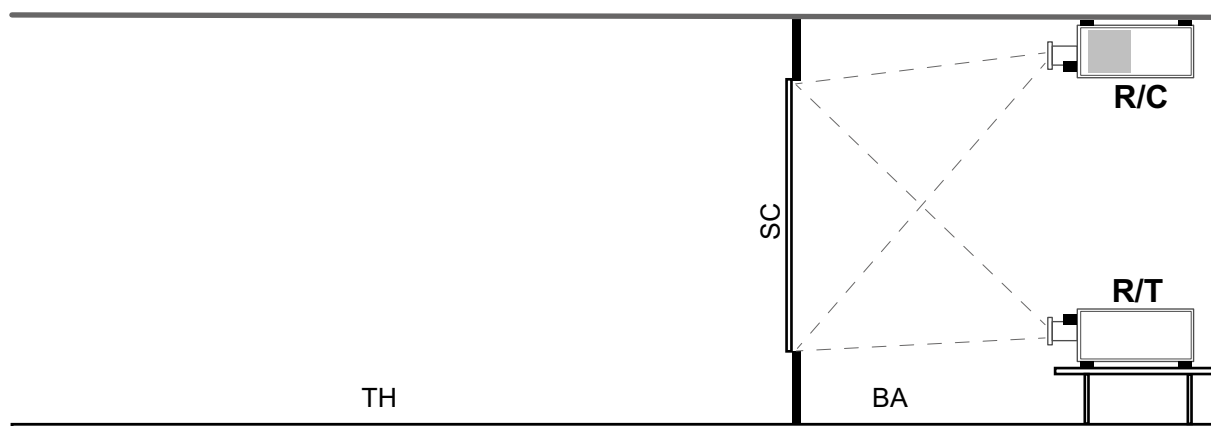
Image 3-6

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 223 mm in case all feet are turned in completely and the vertical lens shift is set to zero (0).
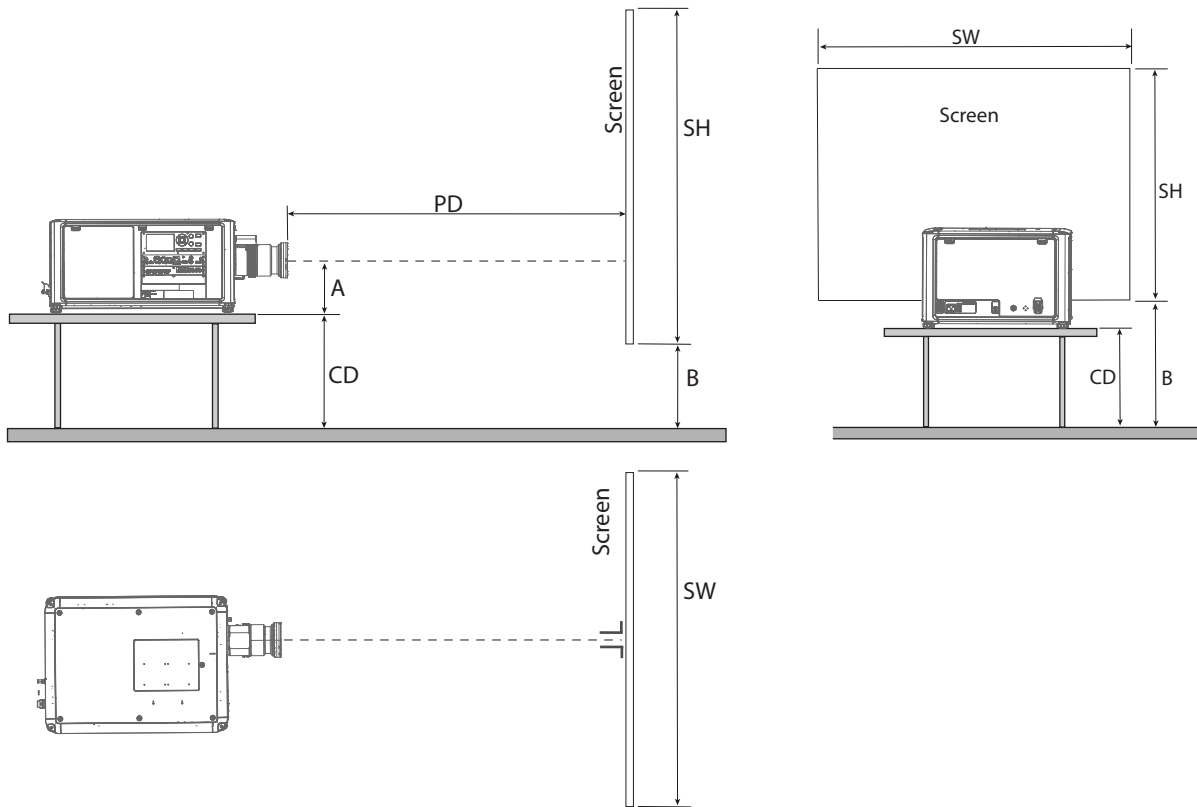
Image 3-7

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 and tilt range

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.
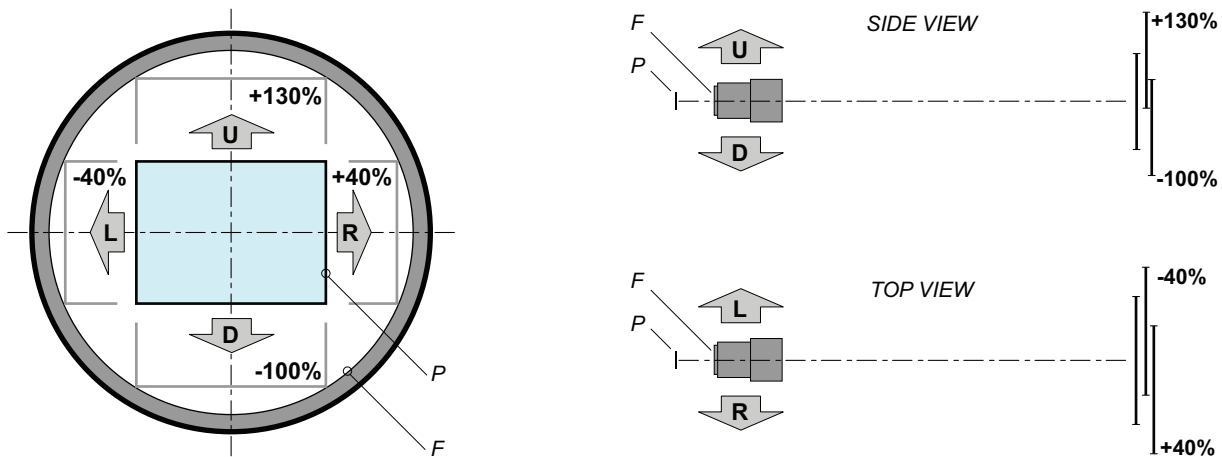
Image 3-8: Vertical and horizontal shift range.

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

Horizontal and vertical projector tilt ranges

The projector can be rotated and mounted at any angle.
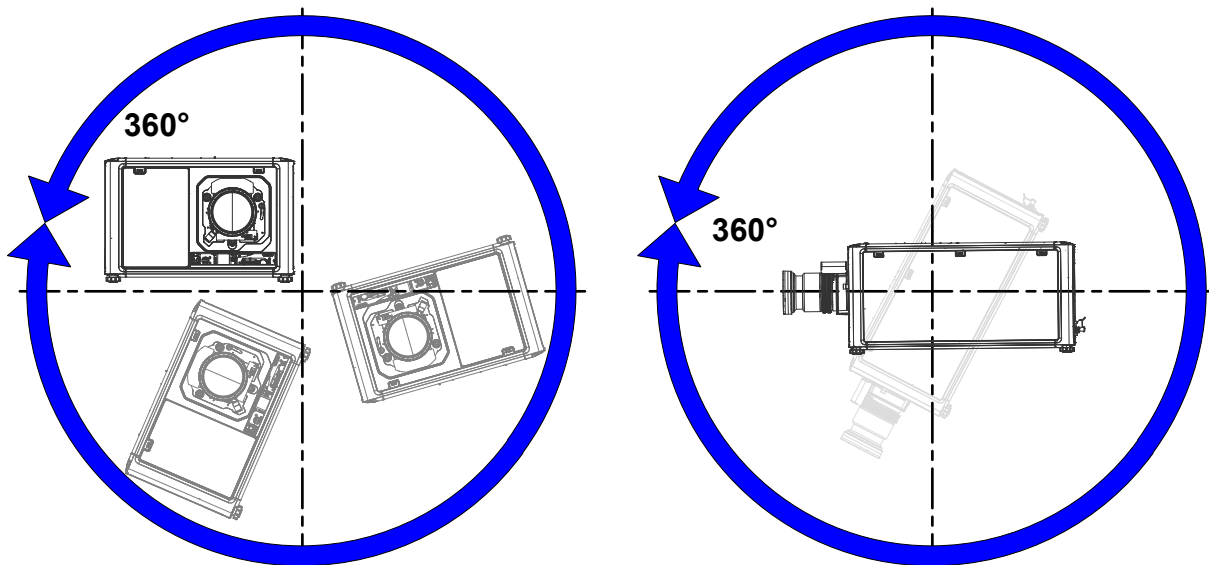
Image 3-9

3.7 Lens selection

How to select the right lens

1. Determine the required screen width (SW).

2. Determine the approximate position of the projector in the room.

3. Start up the *Lens Calculator* on the Barco website: *https://lenscalculator.barco.com/* to determine the possible lenses for your configuration.

   The Lens Calculator window opens.
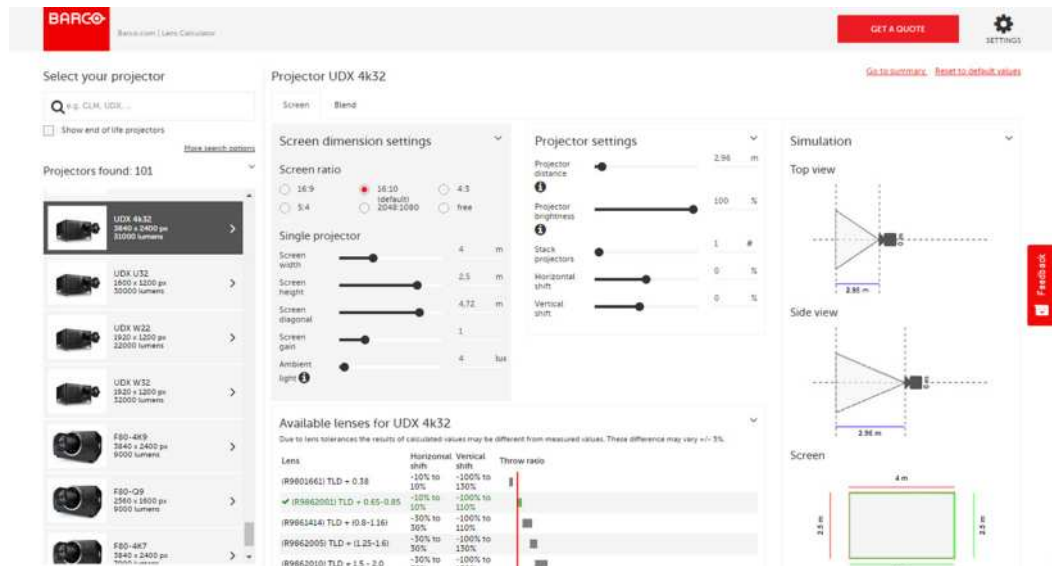
Image 3-10: Lens calculator

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

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

3.8 Available lenses

> ⚡ **WARNING:** Only use **TLD+ ZOOM** lenses on the 4k variants of the UDM projectors. Using other lenses can touch and damage the mechanics of the build-in Actuator! This can result in loud rattling noises and a damaged Actuator.

Limited amount of available lenses

The 4k variants of the UDM projectors have an Actuator built in them to help provide a clear 4K image. This extra device means that less space is available in the projector for lenses, thus causing a more restricted amount of lenses that can be used. Using lenses other than the lenses mentioned in this chapter may damage the mechanics of the Actuator, causing loud rattling noises in the process and possibly a distorted image.

An extra warning text has been added on the front plate of the lens holder of the 4K projectors to raise awareness of this limit.

Available lenses for the UDM projector

Only the following **TLD+** lenses can be used on the 4K UDM projector. Do not use other types of lenses.

> ☞ Use the online *Lens Calculator* tool to determine the possible lenses for your configuration. See

Order No	Name (Screening)	Image	Resolution	Throw Range
R9801661	TLD+ 90° UST (0.39) Fixed focal		WUXGA 0.9"	(0.38 : 1)
			WQXGA / 4K 0.9"	(0.41 : 1)
			UXGA 0.9"	(0.46 : 1)
R9862001	TLD+ 90° ST (0.65 - 0.85)		WUXGA 0.9"	(0.67 - 0.88 : 1)
			WQXGA / 4K 0.9"	(0.72 - 0.94 : 1)
			UXGA 0.9"	(0.81 - 1.05 : 1)
R9801414	TLD+ (0.85 - 1.15)		WUXGA 0.9"	(0.86 - 1.24 : 1)
			WQXGA / 4K 0.9"	(0.92 - 1.33 : 1)
			UXGA 0.9"	(1.03 - 1.49 : 1)
R9862005	TLD+ (1.14 - 1.39)		WUXGA 0.9"	(1.16 - 1.49 : 1)
			WQXGA / 4K 0.9"	(1.24 - 1.60 : 1)
			UXGA 0.9"	(1.39 - 1.79 : 1)
R9862010	TLD+ (1.39 - 1.8)		WUXGA 0.9"	(1.39 - 1.89 : 1)
			WQXGA / 4K 0.9"	(1.49 - 2.02 : 1)
			UXGA 0.9"	(1.67 - 2.26 : 1)
R9862020	TLD+ (1.8 - 2.6)		WUXGA 0.9"	(1.88 - 2.57 : 1)
			WQXGA / 4K 0.9"	(2.01 - 2.75 : 1)
			UXGA 0.9"	(2.25 - 3.08 : 1)

Order No	Name (Screening)	Image	Resolution	Throw Range
R9862030	TLD+ (2.6 - 4.1)		WUXGA 0.9"	(2.51 - 4.12 : 1)
			WQXGA / 4K 0.9"	(2.69 - 4.41 : 1)
			UXGA 0.9"	(3.01 - 4.94 : 1)
R9862040	TLD+ (4.1 - 6.9)		WUXGA 0.9"	(4.08 - 6.86 : 1)
			WQXGA / 4K 0.9"	(4.37 - 7.35 : 1)
			UXGA 0.9"	(4.89 - 8.23 : 1)
R9829997	TLD+ (6.9 - 10.3)		WUXGA 0.9"	(6.74 - 10.11 : 1)
			WQXGA / 4K 0.9"	(7.22 - 10.83 : 1)
			UXGA 0.9"	(8.09 - 12.13 : 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.

3.9 Download Projector Toolset

About Projector Toolset

Projector Toolset is a software tool to set up, configure, manage and control Barco projectors.

The Projector Toolset software works with configurations that can be loaded. Several configurations can be controlled simultaneously. Even when the configurations are connected via different ways.

Projector Toolset is a standalone application that runs on a Java Virtual Machine and that does not require extra services to run.

> Projector Toolset is only available in a download version, no CD can be ordered.

Where to find the download file(s)

The program and all necessary plug-ins, as well as the Reference manual can be downloaded for free from my.barco.com. Registration is necessary.

1. Go to the Barco website *www.barco.com*.
2. On the home page, click on **myBarco log in**.
3. On the Sign In page, enter your Email address and your password to login.
   If you are not yet registered click on **New to myBarco?** and follow the instructions. With the created login and password, it is possible to enter the Partner zone of Barco.
   When your login is correct, the Partner zone is free accessible.
4. In the search field, enter Projector Toolset and click on the search icon.
5. Select **Technical Downloads**.
6. Click on Application Software and download the Projector Toolset software package, which includes the device plug-in updates.

When downloading the complete Projector Toolset, this software contains already the latest device plug-ins. When you already have the latest core version of Projector Toolset, it is possible to download only device plug-in updates from the same web site location.

As Projector Toolset is a stand alone application, it is not necessary to install any other software. A Java virtual machine is included with this download.

To download the reference manual, select Reference Guide and download the latest version of the manual for your projector.

Installation

Download first the reference manual and follow the installation instructions as written in this manual.

Installation procedures

4

About this chapter

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

4.1 Remote control, battery installation

Where to find the batteries for the remote control ?

The batteries are not placed in the remote control unit to avoid control operation in its package, resulting in a shorter battery life time. At delivery the batteries can be found in a separated bag attached to the remote control unit. Before using your remote control, install the batteries first.

How to install

1. Push the battery cover tab with the fingernail a little backwards (1) and pull, at the same time, the cover upwards (2).
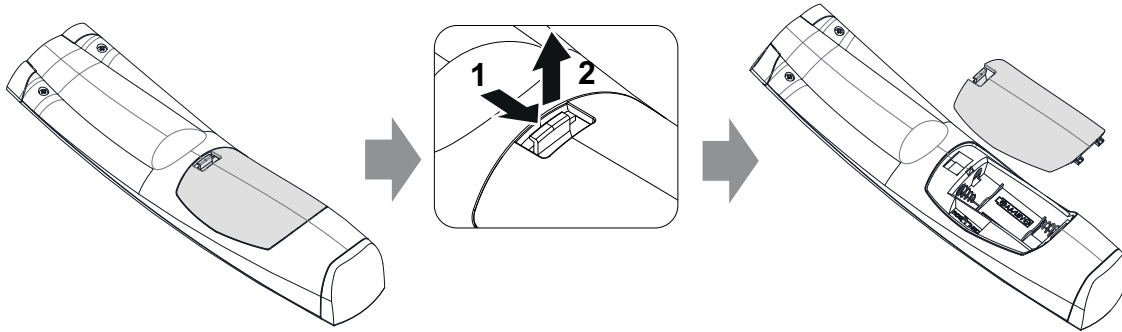
Image 4-1

2. Insert the two AA size batteries, making sure the polarities match the + and - marks inside the battery compartment.

    Tip: Use alkaline batteries for optimum range and life time.
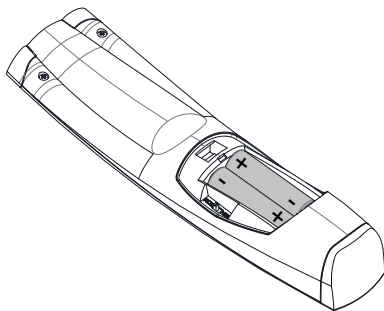
Image 4-2

3. Insert (1) both lower tabs of the battery cover in the gaps at the bottom of the remote control, and press (2) the cover until it clicks in place.
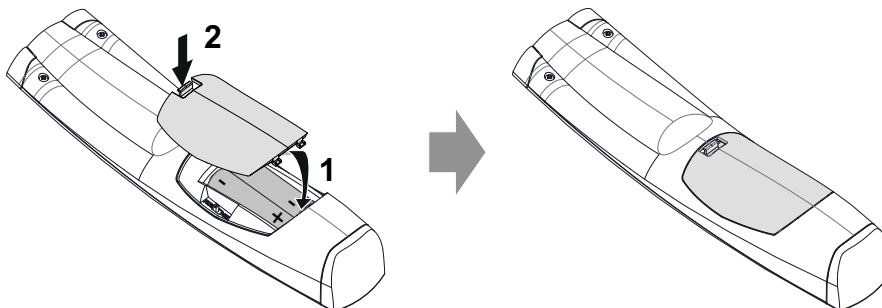
Image 4-3

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

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

4.2 Connecting the projector with the power net

⚠	**CAUTION:** Use only the power cord provided with the projector.

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

⚠	**CAUTION:** If the input voltage exceeds a defined limit, the "Overvoltage" will light up as an warning. Do NOT turn the power switch to "ON" when this occurs. .

How to connect with local power net

1. Ensure that the power switch (reference 1) stands in the '0' (OFF) position.

2. Connect the female side of the power cord with the power input socket of the projector.
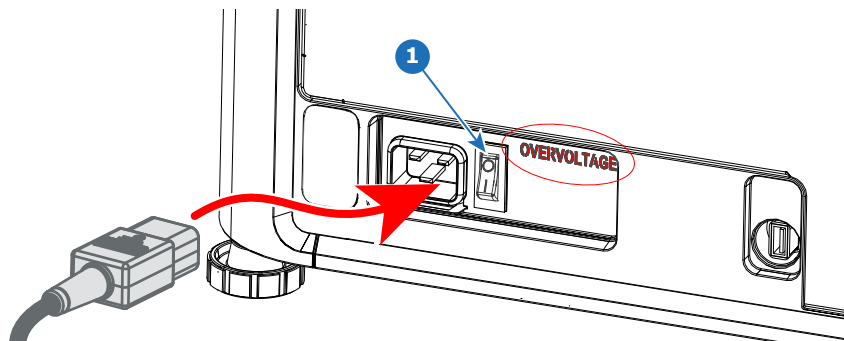
Image 4-4

3. Connect the male side of the power cord to the local power net.

4. If "Overvoltage" lights up when connecting the powercord, do NOT press the power switch to on.

    Pull out the powercord and check the mains voltage.

5. If "Overvoltage" is not lit, switch the projector ON by pressing power switch to the "I" (ON) position.

⚠	**CAUTION:** Once the projector is switched to standby, 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.

4.3 Lens installation

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

How to install

1. Place the lens holder in the "unlocked" position. Do this by pulling the lens lock handle (reference 1, Image 4-5) outward and then towards the lens power supply socket (reference 2) as illustrated.
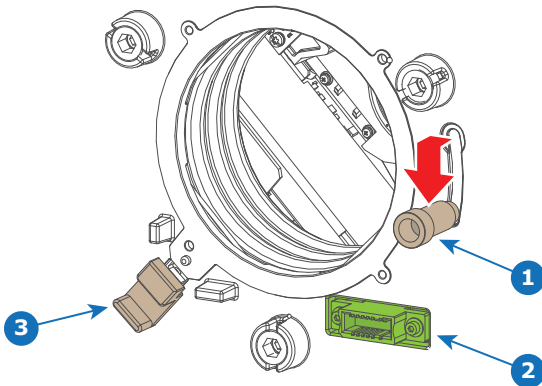
Image 4-5: Lens installation, preparation

2. Remove the dust cover from the lens opening.
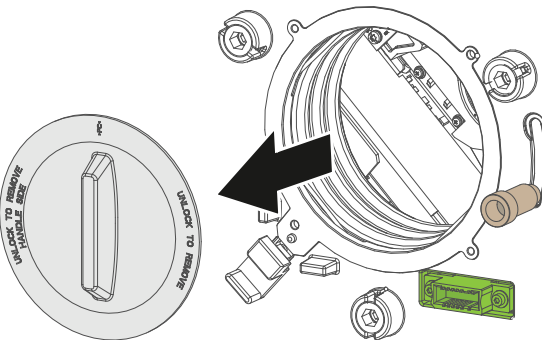
Image 4-6

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

3. Check if the secondary lens lock stands in the unlocked position (reference 3). If not, pull it slightly outwards until you hear an audible clicking sound.

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

5. Gently insert the lens in such a way that the lens connector matches the socket (reference 2).
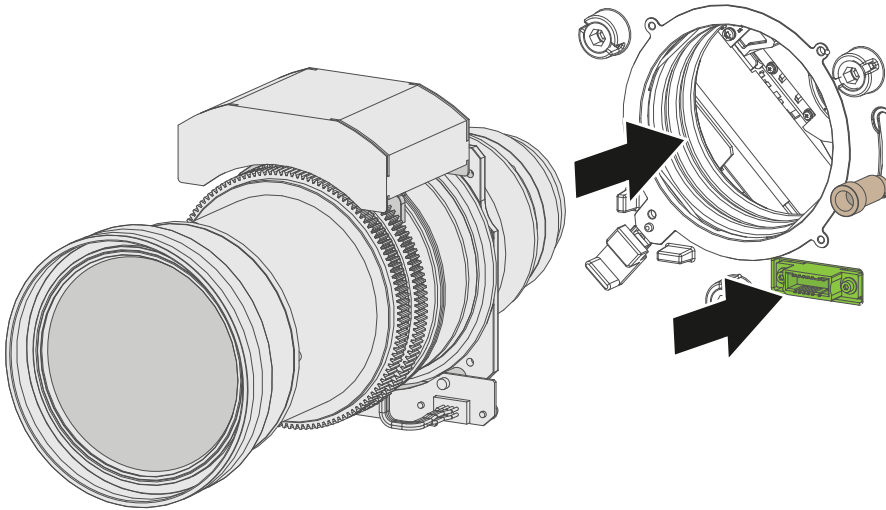
Image 4-7: Lens installation

6. Insert the lens until the connector seats into the socket and de secondary lock (reference 3) makes an audible clicking sound.

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

7. Secure the lens in the lens holder by sliding the primary lens lock handle into the "locked" position (away from the lens power supply socket). Ensure the lens touches the front plate of the lens holder.
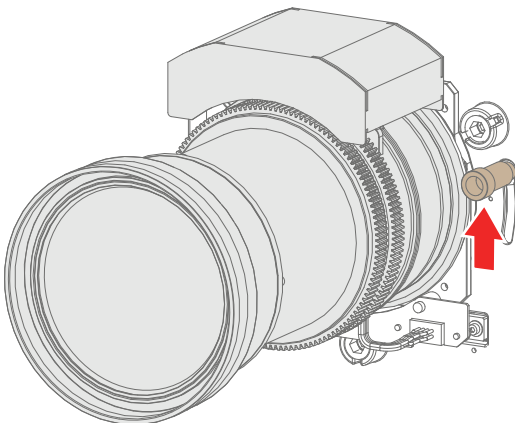
Image 4-8: Lock lens

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

4.4 Lens removal

How to remove

1. Support the lens with one hand while you unlock the lens holder by sliding the primary lock handle outwards and then towards the "unlocked" position as illustrated (Image 4-9).
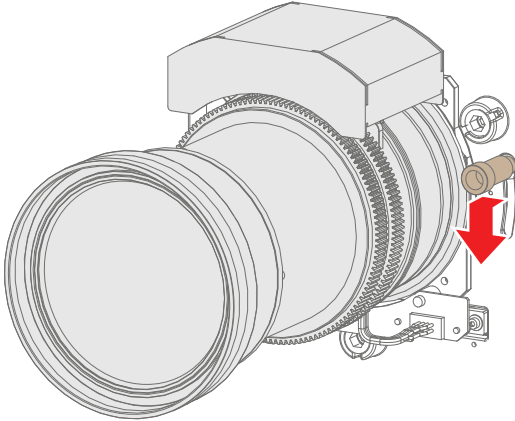
Image 4-9: Unlock the lens

2. Pull down the secondary lock on the lower left side of the lens holder as illustrated (Image 4-10).

3. Gently pull the lens out of the lens holder.
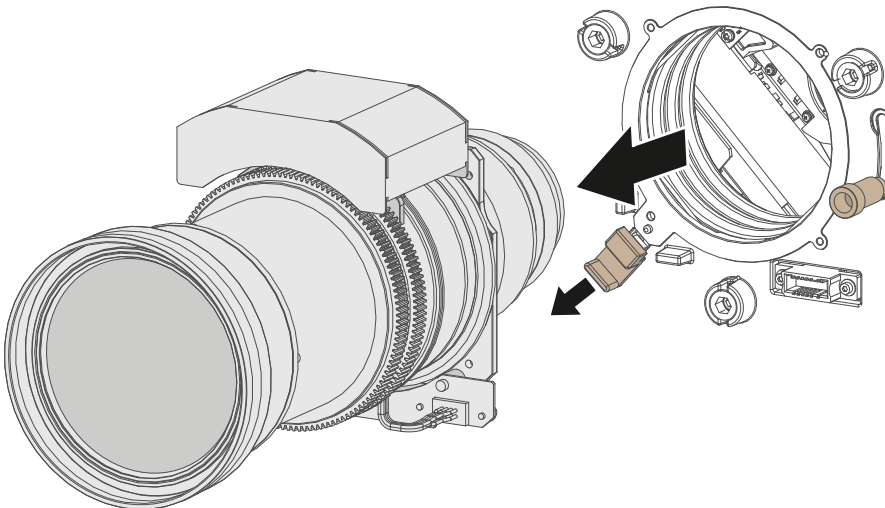
Image 4-10: Lens removal

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

> 👉 It's recommended to place the dust cover of the original projector packaging back into the lens opening to prevent intrusion of dust.
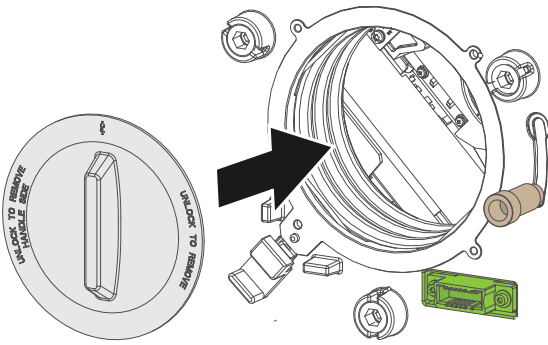
Image 4-11

4.5 Displaying and Programming addresses into the RCU

Displaying the Projector Address on the Screen.

1. If the projector is on, press the menu key and navigate to the Status page. The projector address and the broadcast address can be seen under the Communication heading.

   The projector's address is displayed on the LCD status screen and / or the OSD.

How to Program an Address into the RCU?

1. Press the **Address** button until the *Button pressed indicator* lights up continuously (proximately 5 seconds).

2. Enter the address with the digit buttons within the time the indicator lights up (also proximately 5 seconds).

   Note: That address can be any value between 0 and 31.

   Tip: A few examples:

   To enter address 3, press "3" digit button on the RCU to set the RCU's address to 3 and wait until the *button pressed indicator* is out. Alternatively, you can also press "0" and "3". This way, the *button pressed indicator* goes out immediately.

   To enter address 31, then press "3" and "1" on the digit button on the RCU and the *button pressed indicator* goes out immediately.

4.6 Using the XLR connector of the RCU

> 📄 Connecting a cable with the XLR connector will reset the broadcast address of the RCU to its default value '0'.

How to use the XLR connector

1. Remove the XLR cover by pulling it backwards.
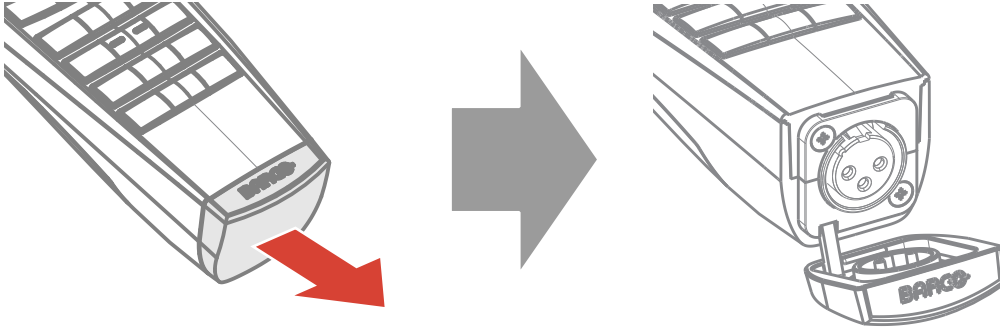
Image 4-12

2. Connect a cable with XLR plug into the XLR connector of the RCU.

3. Connect the other end of the cable with the XLR input of the projector.

   📄 *Note:* While the XLR cable is connected, the IR beam of the RCU is switched off.

4.7 Setting the projector addresses

> **Projector address**
> Address installed in the projector to be individually controlled via the RCU or via the serial communication.

> **Broadcast address**
> Projector will always execute the command coming from a RCU programmed with that broadcast address.

About individual projector address

As more than one projector can be installed in a room, each projector should be separately addressable with an RCU or with a computer using serial communication. Therefore each projector has its own address. The factory default individual projector address is '0'.

When the address is set, the projector can be controlled with the RCU. Only addresses between 0 and 31 are supported for the RCU.

Next to an individual projector address, each projector has also a broadcast address for group control.

About broadcast address

Broadcast address is a common address that can be set on the projector. That can be "0" or "1". The default broadcast address is '0'.

Any command coming from an RCU programmed with that common address will be executed.

How to set

1. In the main menu, select *System Settings > Communication > IR Control*.

   For detailed instructions see user guide of the projector.

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.
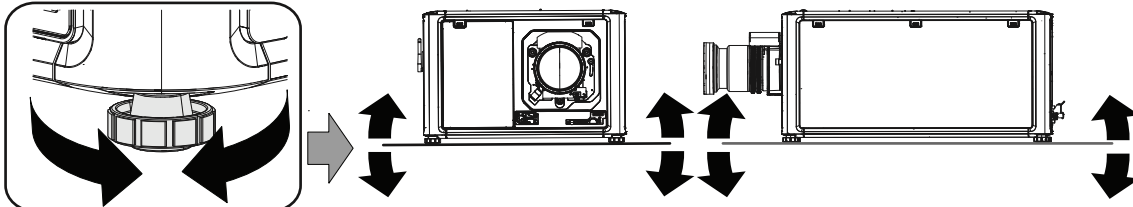
Image 4-13: Level alignment

When this is achieved, the projector is set horizontal and vertical at right angles to the screen.
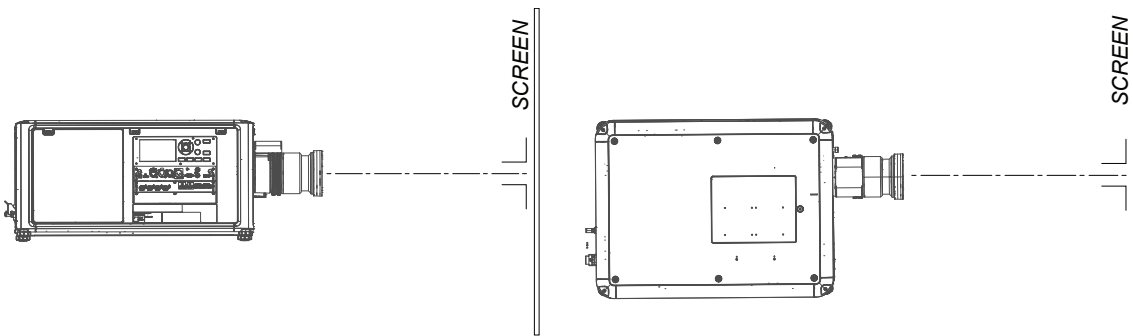
Image 4-14: Angle adjustment

4.9 Alignment of projector in the rigging frame

Skew the projector horizontally

1. Turn the skew knob at the rear to adjust the rotation.
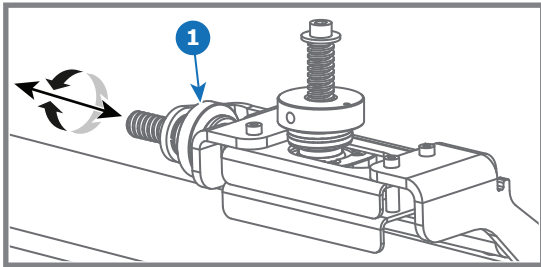
Image 4-15
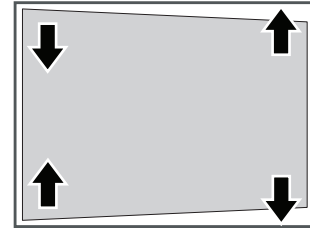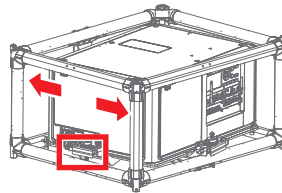
Tilt the projector

1. Turn the tilt adjustment knob at the rear to tilt the projector
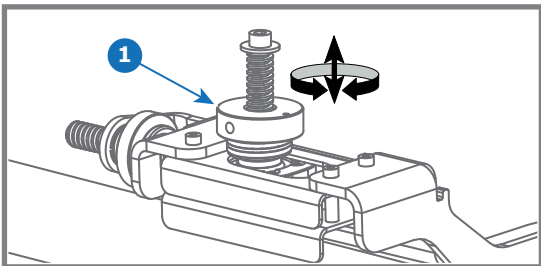
Image 4-16
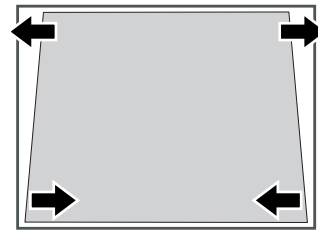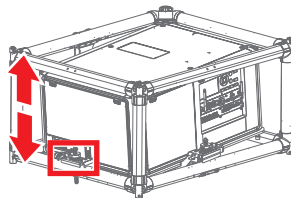
Rotating the projector

1. Turn the rotate adjustment knob on the right side to rotate the projector.
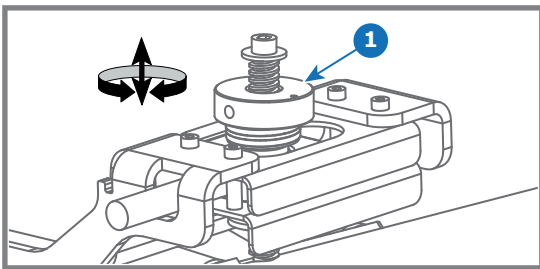
Image 4-17
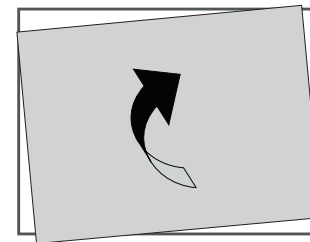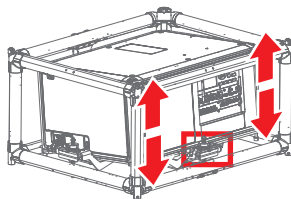
4.10 Wall or ceiling mount without rigging frame

General

In case of installing the projector to other positions than desktop or ceiling, it is preferred to use the rigging frame designed for this purpose. In cases where this is not possible, suitable 3rd part brackets for safe installation must be used to secure the unit from damage or causing injury. .

Attachment points.

The attachment points for additional rigging equipment are the same as for the adjustable feet at the bottom, and also the corresponding points at the top of the projector.

Attachment point specifications	
Attachment point screw dimension	M10, max 30mm deep
Tightening torque	20 Nm
Max load per attachment point	60 kg

Projectors attachment points
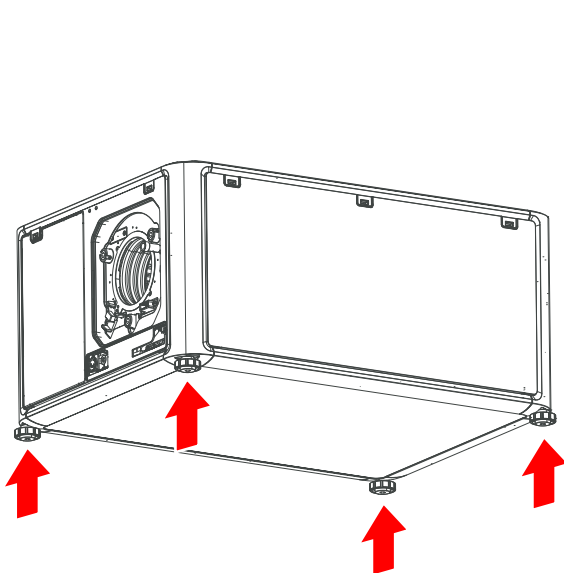
Image 4-18: Attachment points bottom.
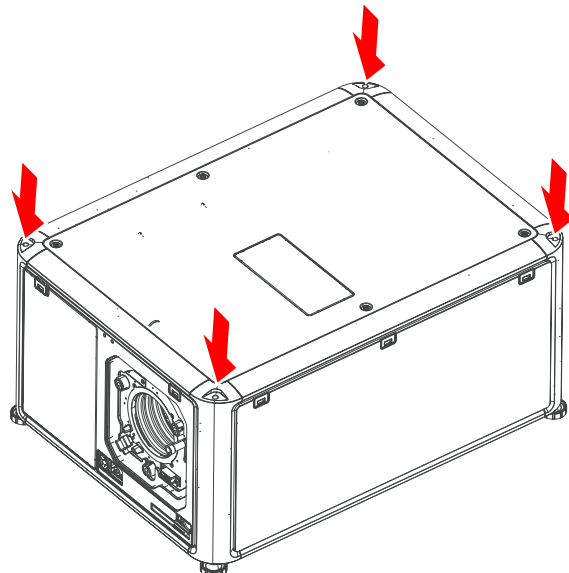
Image 4-19: Attachment points top.

4.11 Installation of an input board

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

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

	The procedure below is applicable to all the input modules of the Input & Communication Unit of the projector.

Required tools

Phillips screwdriver PH1

How to install

1. Switch off the projector and unplug the power cord of the projector.

2. Push the input module in the Input & Communication module using the handles. Make sure the module seats in its sliders (2).

   Pull in the module until the contacts (3) are fully inserted into the connectors.
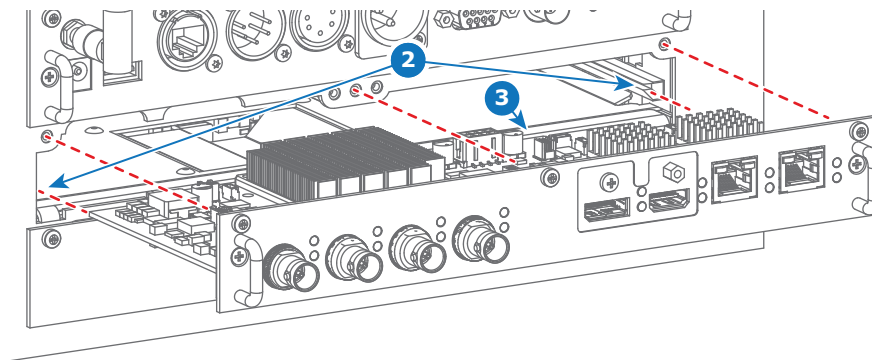
Image 4-20

3. Tighten the captive screws of the input module.
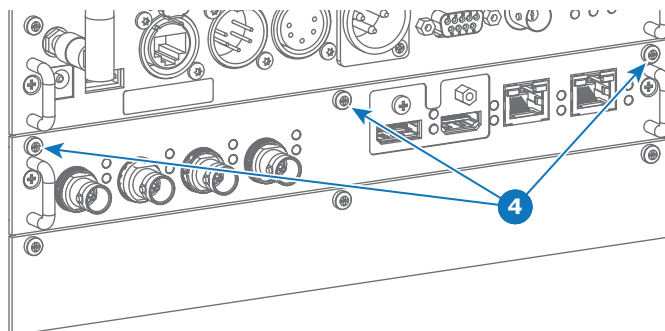
Image 4-21

4. Plug in the power cord of the projector.

5. **IMPORTANT LAST STEP** — Update the firmware of the installed module. Use the complete software package to install the firmware via Projector Toolset or USB stick.

	Tip: When a complete new software image is placed on the projector, all programmable components will be updated with the latest version.

4.12 Removal of an input board

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

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

📄	The procedure below is applicable to all the input modules of the Input & Communication Unit of the projector.

Required tools

Phillips screwdriver PH1

How to remove

1. Switch off the projector and unplug the power cord of the projector.

2. Release the 3 captive screws of the input module (4).
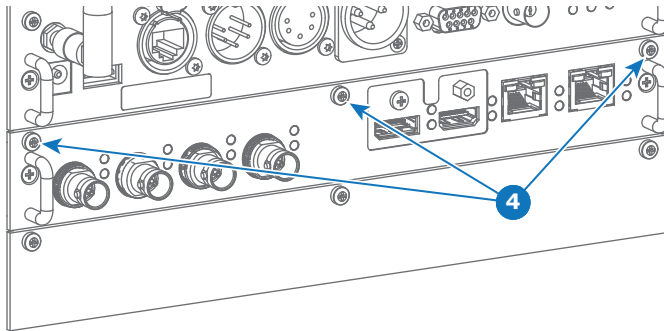
Image 4-22

3. Pull out the input module of the Input & Communication module using the handles.
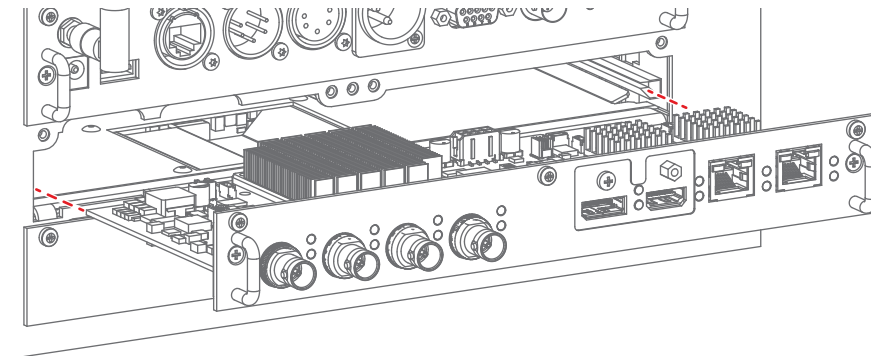
Image 4-23

⚠️	**CAUTION:** Ensure that unused input slots of the Input & Communication Unit are always covered with a dummy front plate. After removing one of the input modules, immediately replace with another one or install a dummy front plate on the unused input slot.

4.13 Software update

> ⚠ **CAUTION:** Do not power off or unplug the projector while the software update is ongoing.

How to update the software

1. Power on the projector. Wait until the **Power on/off** button is lit white or blue.

2. Download and install the latest version of Projector Toolset for Pulse. The program can be downloaded for free from Barco's website, (URL: *http://www.barco.com*). Click on *myBarco* and log in to get access to secured information. Registration is necessary.

   If you are not yet registered, click on *New to myBarco* and follow the instructions. With the created login and password, it is possible to log in where you can download the software.

3. Download the latest firmware (format .fw) from Barco's website in the same way as for Projector Toolset.

4. Start Projector Toolset and make a connection with the projector. For more information, see the "*Projector Toolset*" user guide.

5. Select tab **Update settings**.

6. Fill out the path to the update file (1)
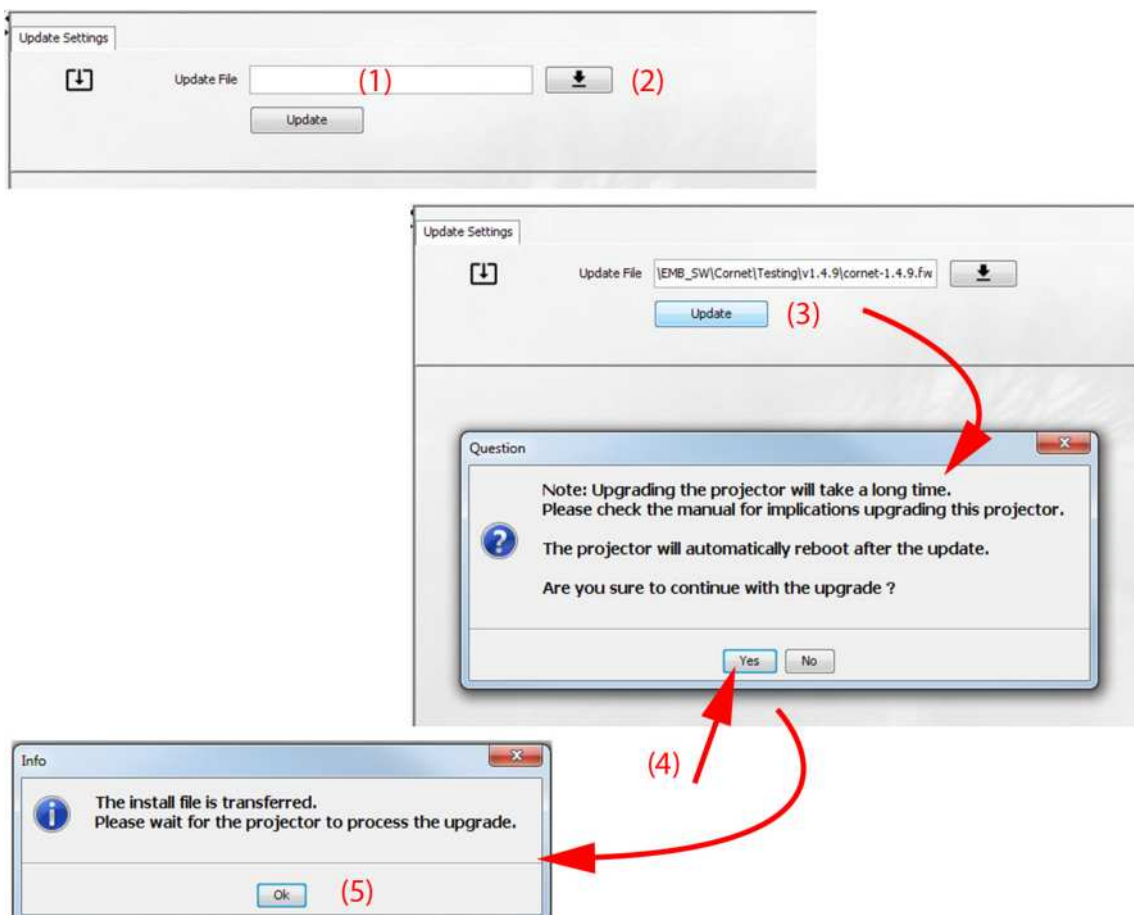
Image 4-24: Update Pulse projector

   or

   click on the path selection icon (2) to open a browser window.

7. Browse to the desired update package (format .fw) and click **Select Update Package**.

   The path will be filled out in the input field next to *Update File*.

8. Click **Update** (3).

   The update starts. This action can take a long time. A message is displayed.

9. Click **Yes** to continue (4).

   The update file will be transferred to the projector and installed. The projector will reboot.

   A message is displayed. Click **Ok** to clear the message.

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

1. Power on the projector. Wait until the **Power on/off** button is either lit white or blue.

2. Download the latest firmware file (format .fw) from Barco's website. The firmware can be downloaded for free from Barco's website, (URL: *http://www.barco.com*). Click on *myBarco* and log in to get access to secured information. Registration is necessary.

   If you are not yet registered, click on *New to myBarco* and follow the instructions. With the created login and password, it is possible to log in where you can download the software.

3. Place the firmware file on a clean USB flash drive.

   Note: Make sure the flash drive is FAT32 compatible & no other files are on the flash drive.

4. Plug the flash drive in the USB port on the Communication Panel.

   The update file will be transferred to the projector and installed. The projector will reboot when completed.

> ⚠️ **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.

> 📄 Take note that the update process can take a long time to complete.

> ☞ For more info about the Projector Toolset see user guide of the Projector Toolset.

Flight case and rigging frame

5

About flight case and rigging frame

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

5.1 Flight case

Flight case

The UDM flight case is designed to transport the UDM in a safe and secure manner, with or without being mounted in its rigging frame. There's also sufficient space in the flight case to place the projector while mounted in the UDM rigging frame. The four caster wheels, provided with breaks, and the eight handles make the UDM 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 flight case (empty) weight about ±47.5 kg (±105 lb).
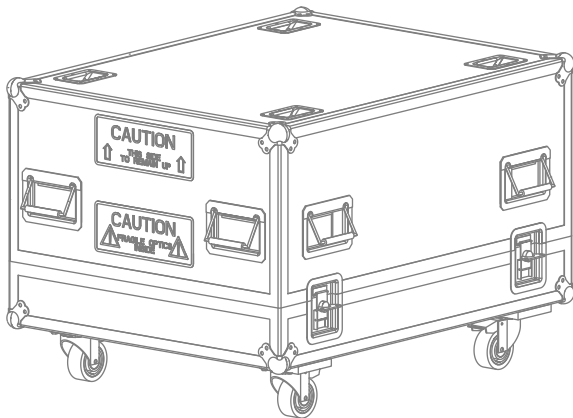
Image 5-1: Flight case
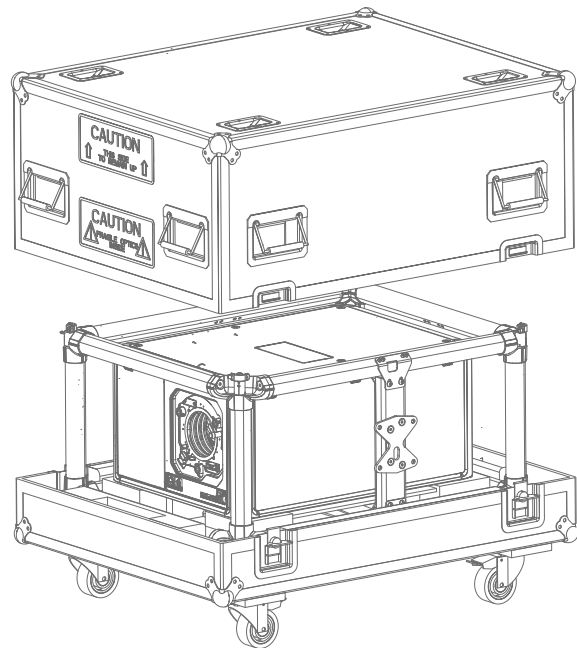
Image 5-2: Lift cover off.
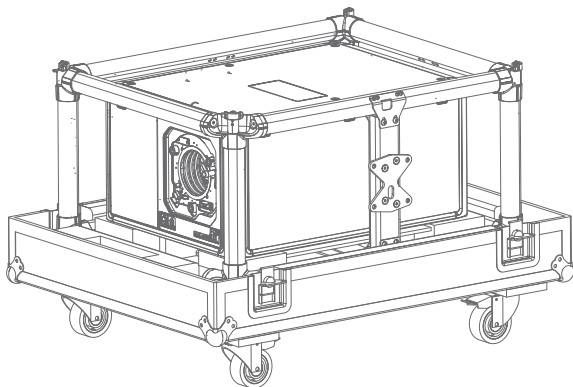
Image 5-3: Projector assembled with Rigging frame.
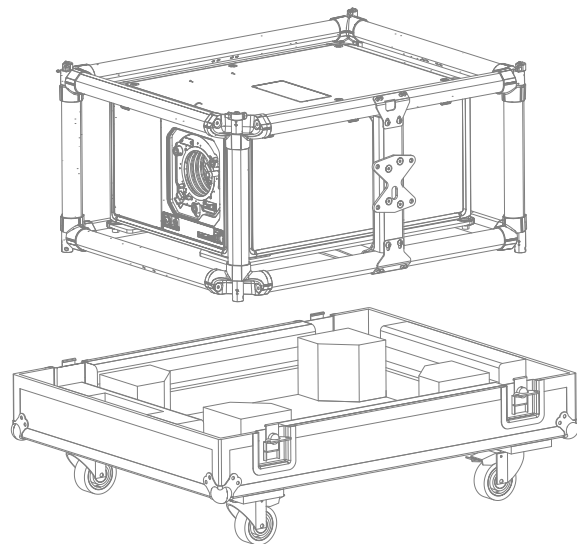
Image 5-4: Lift out the Projector.

> ⚠️ **WARNING:** Maximum stack 2 UDM flight cases high. Never higher.

5.2 Rigging frame

⚠️ **CAUTION:** Projectors installed without rigging frame requires bracket(s) for safe installation if it is to be placed in other positions than the ceiling or desktop. See "Wall or ceiling mount without rigging frame", page 56

Rigging frame

The UDM series multifunctional rigging frame is designed for the Barco UDM 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 is normally delivered complete assembled together if ordered. (See also "Flight case", page 62.

The rigging frame without projector weight about ±23 kg (±50 lb).
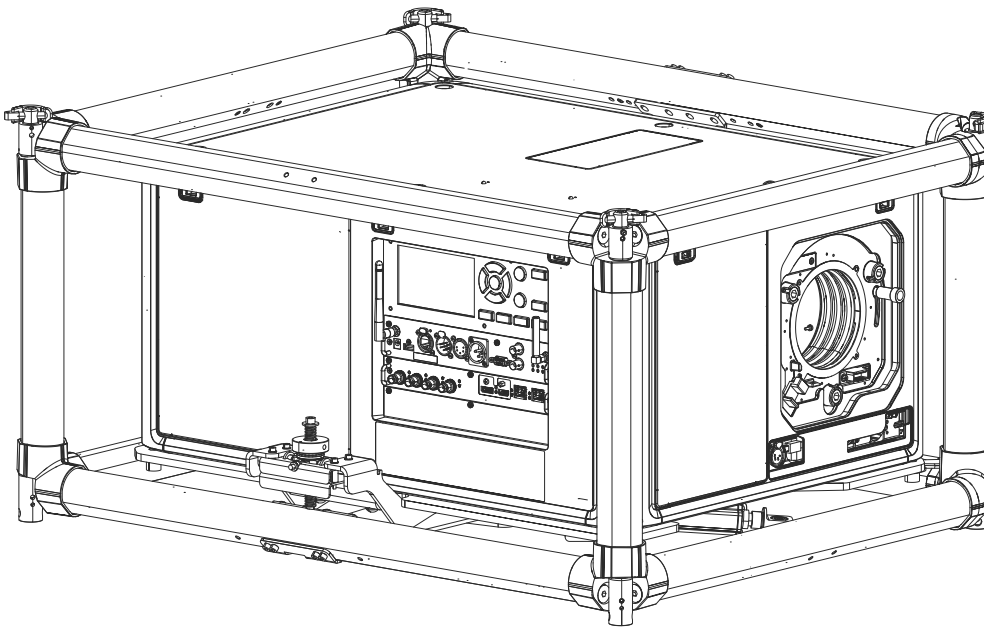
Image 5-5: Projector installed in the rigging frame.

Flight case and rigging frame

Pulse SFP input use cases

6

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.

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

SFP+ transceiver + Fiber connection (integrated or separated)
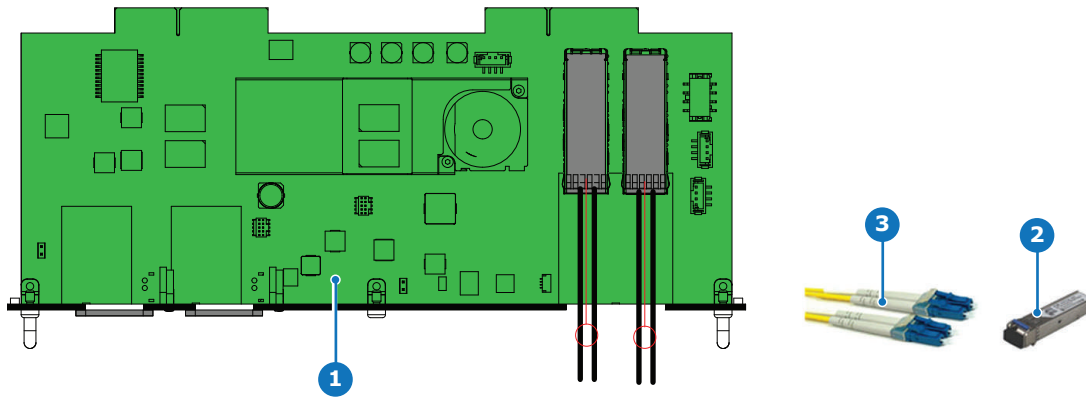
Image 6-1

1	SFP input board
2	SFP+ fiber transceiver
3	Optional breakout Optical adapter

> 📄 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 "Installation of an input board", page 57.

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

Neutrik OpticalCon Duo + SFP+ transceiver + internal fiber
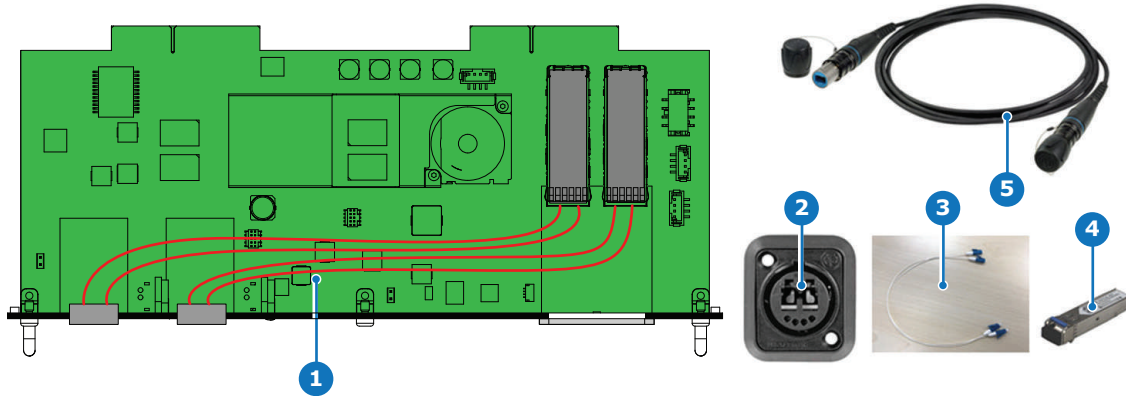
Image 6-2

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 "Installation of an input board", page 57.

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

Neutrik OpticalCon Quad + SFP+ transceiver + internal fiber
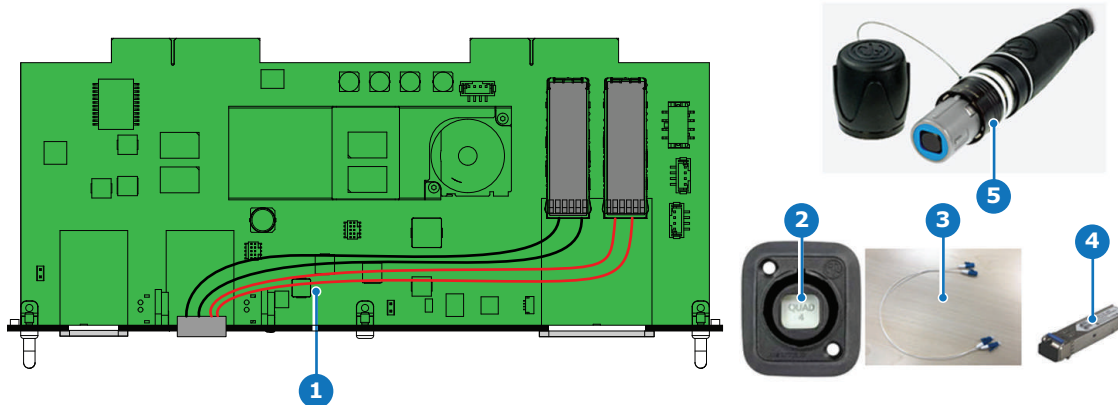
Image 6-3

1	SFP input board	**4**	SFP+ fiber transceiver
2	Neutrik OpitcalCon Quad	**5**	Advanced quad cable
3	Internal fiber 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 "Installation of an input board", page 57.

6.4 Use case 4: Loop-through mode

Loop-through mode
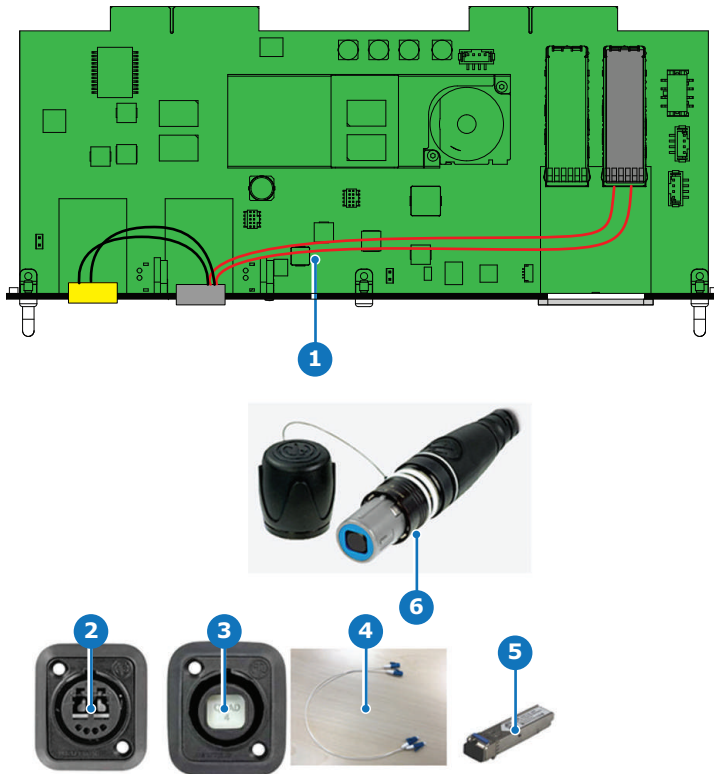
Image 6-4

1	SFP input board	**4**	Internal fiber cable
2	Neutrik OpticalCon Duo	**5**	SFP+ fiber transceiver
3	Neutrik OpticalCon Quad	**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 "Installation of an input board", page 57.

Pulse SFP input use cases

Projector covers

7

About this chapter

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

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

WARNING: Switch off the projector and disconnect the power cord from the projector and wait a few minutes (to discharge the capacitors) prior to start with this procedure, unless otherwise specified in the procedure.

WARNING: All procedures in this chapter must be performed by "Barco authorized service personnel".

7.1 Cover locks

About

All the covers are fastened with the same "easylock" tabs.

Required tools

Flat screwdriver 5 mm

Unlocking

1. Push down the inner side of the easylock with a screwdriver.
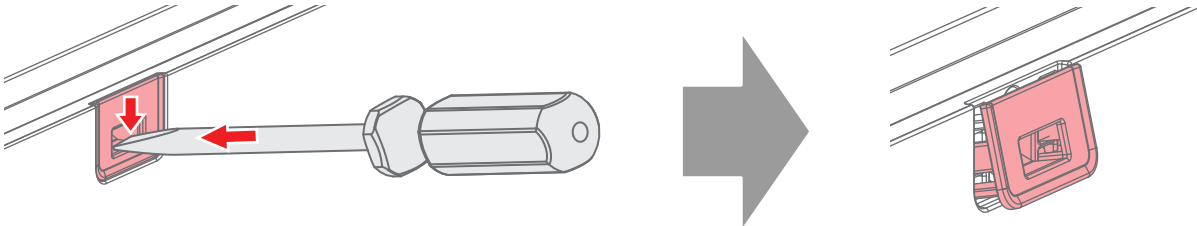
Image 7-1

As a result the lock jumps loose.

Locking

1. Ensure that the cover is in the correct position.

2. Press the easylock into the housing.
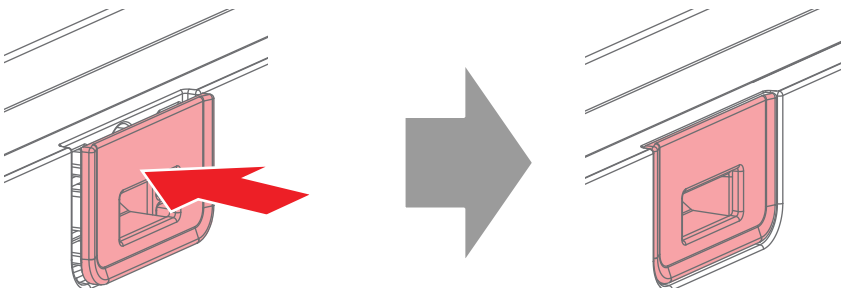
Image 7-2

7.2 Removal of the front, side and rear covers

About

The method of removing the covers are equal for the front, side and rear covers.

> 📄 Remove the lens before removing the front cover.

Required tools

Flat screwdriver 5 mm

How to remove the covers

1. Remove the lens.

2. Release the easylocks, and remove the cover by a movement indicated by the arrow. (Rotate out, and lift up).
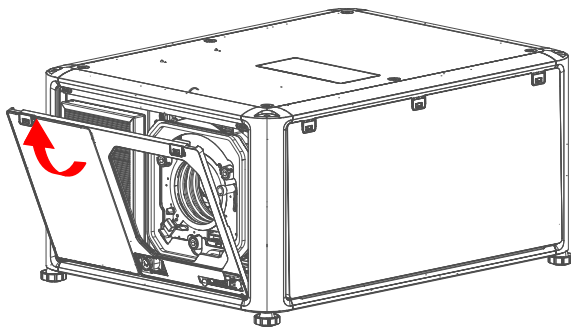
Image 7-3
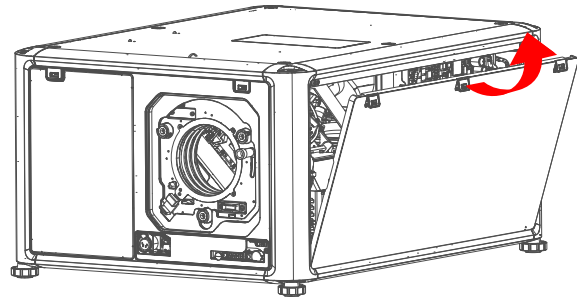
Image 7-4
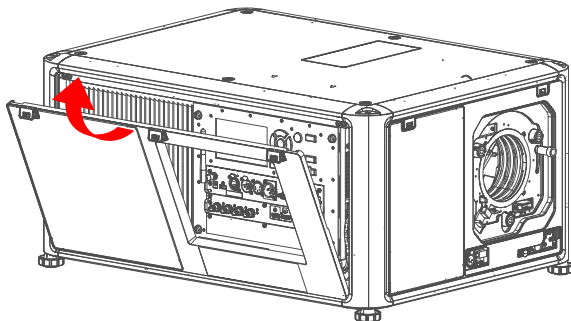
Image 7-5
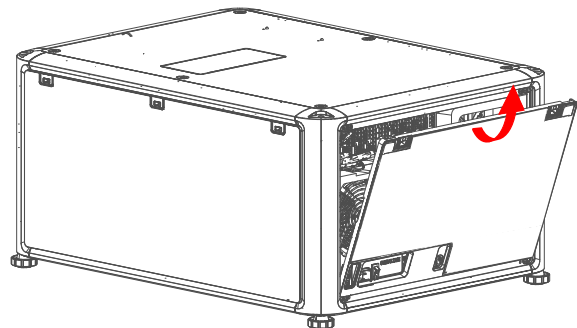
Image 7-6

7.3 Removal of top cover

Required tools

Torx screwdriver T20

How to remove the top cover.

1. Release the 6 Torx screws indicated in the illustration.
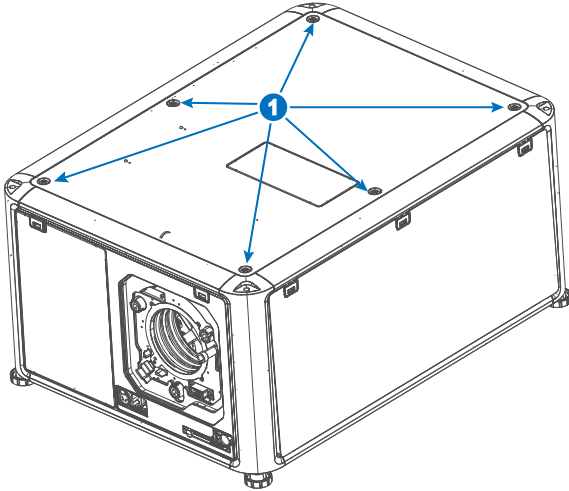
Image 7-7

2. Lift up the cover of the projector.

7.4 Installing the projector covers

> ⚠️ **CAUTION:** Ensure that the top cover is reinstalled in the correct way. It is possible to turn the top cover 180 degrees horizontally, and it will still fit the attachment points. But then the air intake for the light processor fan will be out of position, and by that the cooling will not be sufficient.

Install covers

The installation of the covers are performed in the reverse order as for the release.

Press the cover lock back in locked position after reinstalling the covers.

Dimensional drawings

A

A.1 Dimensions of the projector

Dimensional drawing
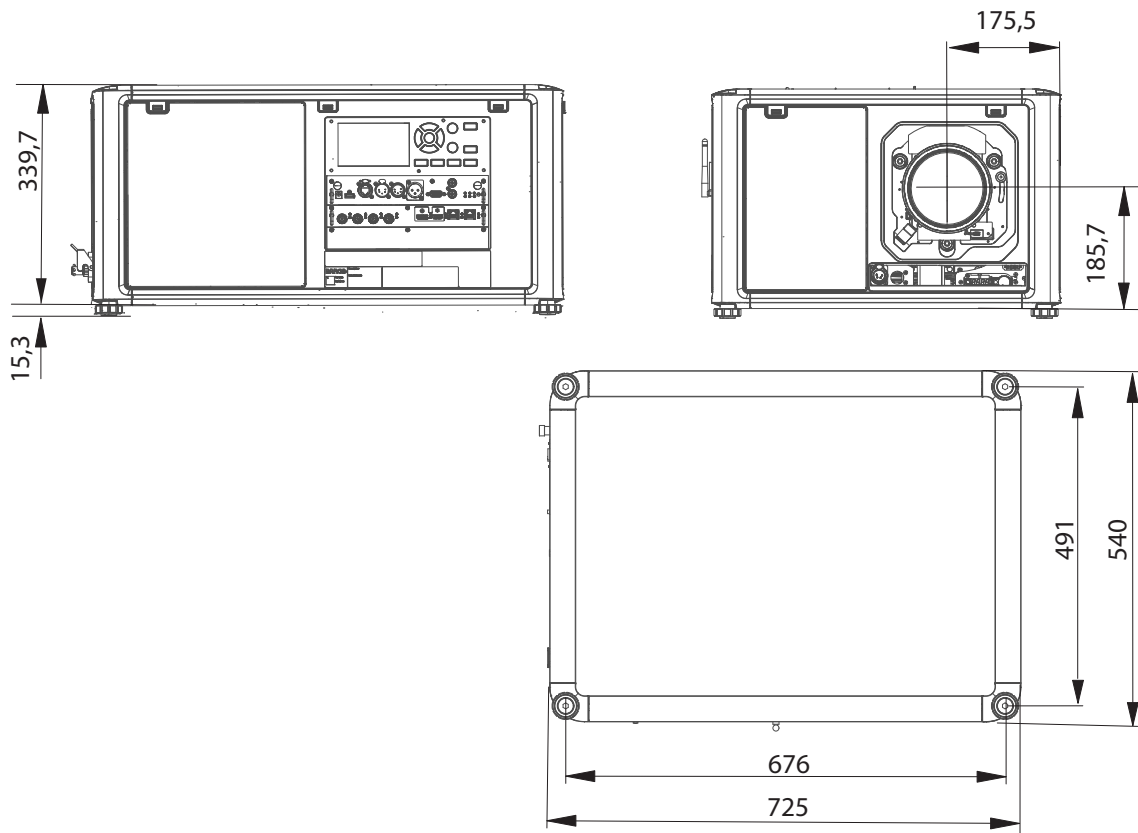
Image A-1: Dimensions are given in millimeters.

A.2 Dimensions of the rigging frame

Dimensional drawing
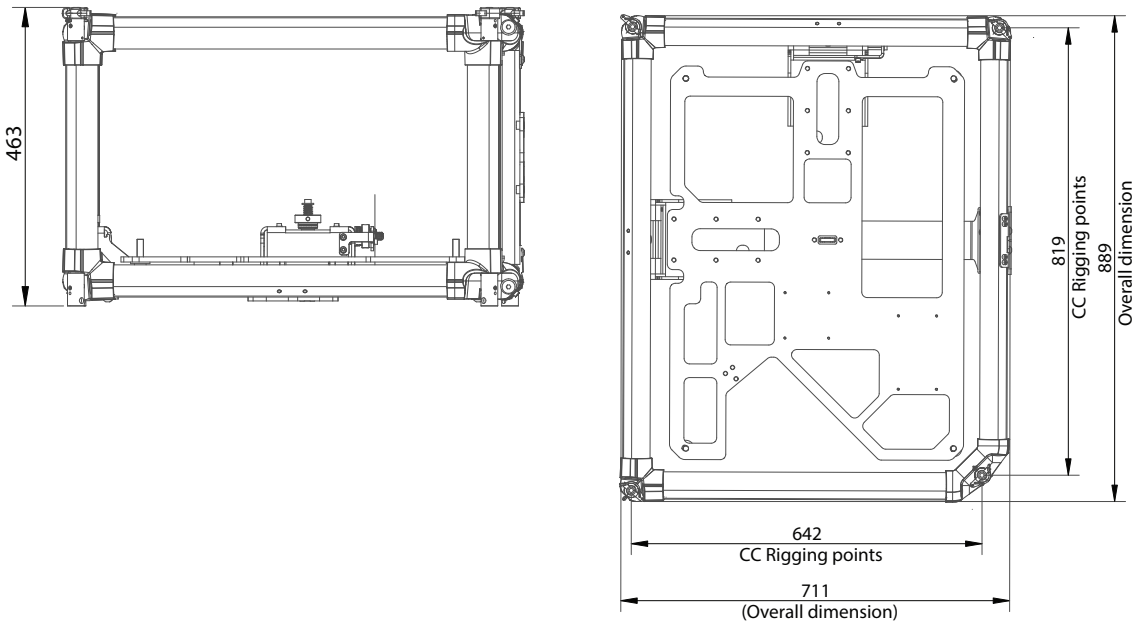
Image A-2: Dimensions are given in millimeters.

A.3 Dimensions of the flight case

Dimensional drawing
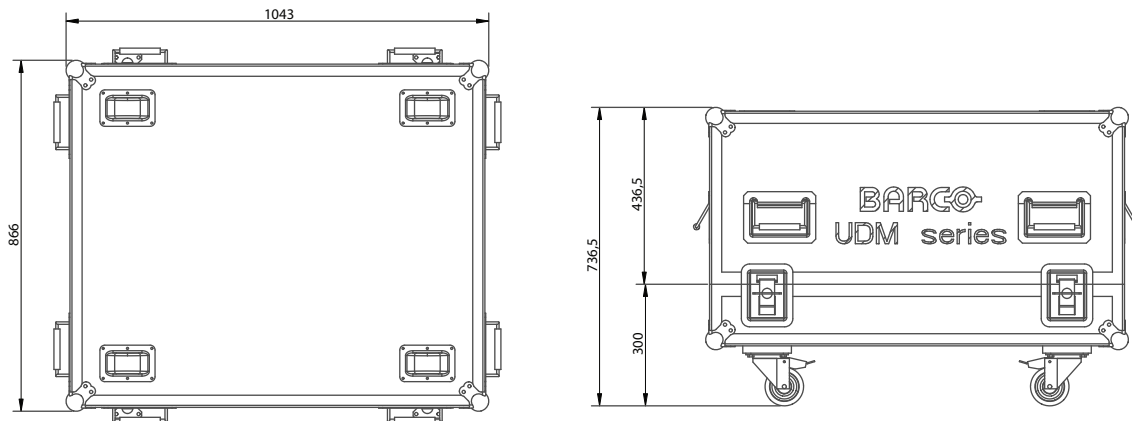
Image A-3: Dimensions are given in millimeters.

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 cornea 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.

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 cornea 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.

Light Processor

Heart of the projector, unit inside the projector which creates the image to be projected on the screen.

Projector address

Address installed in the projector to be individually controlled via the RCU or via the serial communication.

Broadcast address

Projector will always execute the command coming from a RCU programmed with that broadcast address.

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X

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List of tools

Cutter knife
Flat screwdriver 5 mm
Phillips screwdriver PH1
Torx screwdriver T20