UDX

Installation Manual

BARCO

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Printed in Belgium

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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.

Federal Communications Commission (FCC Statement)

This equipment has been tested and found to comply with the limits for a class A digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area may cause harmful interference, in which case the user will be responsible for correcting any interference at his own expense

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment

EMC statements

EN55032/CISPR32 Class A MME (MultiMedia Equipment)

Warning : This equipment is compliant with Class A of CISPR 32. In a residential environment this equipment may cause radio interference.

Class A ITE (Information Technology Equipment)

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

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1. SAFETY

About this document

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

Clarification of the term "UDX" used in this document

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

*   UDX 4K22
*   UDX 4K32
*   UDX U32
*   UDX W22
*   UDX W32

Model certification name

*   UDX

	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 an black image on the projector in order to reduce the risk of the emergency.

General safety instructions

- Before operating this equipment please read this manual thoroughly and retain it for future reference.
- Installation and preliminary adjustments should be performed by qualified Barco personnel or by authorized Barco service dealers.
- All warnings on the projector and in the documentation manuals should 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, EN60950-1, UL60950-1 and CAN/CSA C22.2 No.60950-1, which are the safety standards of information technology equipment including electrical business equipment. These safety standards impose important requirements on the use of safety critical components, materials and insulation, in order to protect the user or operator against risk of electric shock and energy hazard and having access to live parts. Safety standards also impose limits to the internal and external temperature rises, radiation levels, mechanical stability and strength, enclosure construction and protection against the risk of fire. Simulated single fault condition testing ensures the safety of the equipment to the user even when the equipment's normal operation fails.

Notice on optical radiation

This projector embeds 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 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 62471-5:2015

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

Users definition

Throughout this manual, the term SERVICE PERSONNEL refers to persons having appropriate technical training and experience necessary to be knowledgeable of potential hazards to which they are exposed (including, but not limited to HIGH VOLTAGE ELECTRIC and ELECTRONIC CIRCUITRY 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 UDX projector is intended "FOR PROFESSIONAL USE ONLY" by AUTHORIZED PERSONNEL familiar with potential hazards associated with high voltage, high intensity light beams, ultraviolet exposure and high temperatures generated by the lamp 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 the risk of electrical shock

- This product should be operated from a mono phase AC power source. Ensure that the mains voltage and capacity matches the projector electrical ratings (120-160V / 200-240V (+/- 10%), 20A, 50-60 Hz). If you are unable to install the AC requirements, contact your electrician. Do not defeat the purpose of the grounding.

- This apparatus must be grounded (earthed) via the supplied 3 conductor AC power cable. If you are unable to insert the plug into the outlet, contact your electrician to replace your obsolete outlet. Do not defeat the purpose of the grounding-type plug.

- Do not allow anything to rest on the power cord. Do not locate this product where persons will walk on the cord. To disconnect the cord, pull it out by the plug. Never pull the cord itself.

- Use only the power cord supplied with your device. 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.

- Do not operate the projector with a damaged cord. Replace the cord.

- Do not operate the projector if the projector has been dropped or damaged - until it has been examined and approved for operation by qualified service personnel.

- Position the cord so that it will not be tripped over, pulled, or contact hot surfaces.

- If an extension cord is necessary, a cord with a current rating at least equal to that of the projector should be used. A cord rated for less amperage than the projector may overheat.

- Never push objects of any kind into this product through cabinet slots as they may touch dangerous voltage points or short out parts that could result in a risk of fire or electrical shock.

- Do not expose this projector to rain or moisture.

- Do not immerse or expose this projector in water or other liquids.

- Do not spill liquid of any kind on this projector.

- Should any liquid or solid object fall into the cabinet, unplug the set and have it checked by qualified service personnel before resuming operations.

- Do not disassemble this projector, always take it to qualified service personnel when service or repair work is required.

- Do not use an accessory attachment which is not recommended by the manufacturer.

- Lightning - For added protection for this video product during a lightning storm, or when it is left unattended and unused for long periods of time, unplug it from the wall outlet. This will prevent damage to the device due to lightning and AC power-line surges.

To prevent personal injury

- To prevent injury and physical damage, always read this manual and all labels on the system before powering the projector or adjusting the projector.
- To prevent injury, take note of the weight of the projector. Minimum 4 persons are needed to carry the projector. The projector weights about ±92 kg (±202 lbs) without lens and rigging frame.
- To prevent injury, ensure that the lens and all covers are correctly installed. See installation procedures.
- Warning: high intensity light beam. NEVER look into the lens ! High luminance could result in damage to the eye.
- **Warning: extremely high brightness projector**: This projector embeds extremely high brightness (radiance) lasers; this laser light is processed through the projectors optical path. Native laser light is not accessible by the end user in any use case. The light exiting the projection lens has been diffused within the optical path, representing a larger source and lower radiance value than native laser light. Nevertheless the projected light represents a significant risk for the human eye when exposed directly within the beam. This risk is not specific related to the characteristics of laser light but solely to the high thermal induced energy of the light source; which is comparable with lamp based systems.
  Thermal retinal eye injury is possible when exposed within the Hazard Distance. The Hazard Distance (HD) is defined from the projection lens surface towards the position of the projected beam where the irradiance equals the maximum permissible exposure as described in the chapter "High Brightness precautions: Hazard Distance (HD)", page 11.
- 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 (HD)", page 11.
- Don't put your hand in front of the beam.
- Before attempting to remove any of the projector's covers, you must turn off the projector and disconnect from the wall outlet.
- When required to switch off the projector, to access parts inside, always disconnect the power cord from the power net.
- **The power input at the projector side is considered as the disconnect device. When required to switch off the projector, to access parts inside, always disconnect the power cord at the projector side. In case the power input at the projector side is not accessible (e.g. ceiling mount), the socket outlet supplying the projector shall be installed nearby the projector and be easily accessible, or a readily accessible general disconnect device shall be incorporated in the fixed wiring.**
- Never stack more than 2 UDX projectors in a hanging configuration (truss) and never stack more than 3 UDX projectors in a base stand configuration (table mount).
- When using the projector in a hanging configuration, always mount 2 safety cables. See installation manual for the correct use of these cables.
- Do not place this equipment on an unstable cart, stand, or table. The product may fall, causing serious damage to it and possible injury to the user.
- It is hazardous to operate without lens or shield. Lenses, shields or ultra violet screens shall be changed if they have become visibly damaged to such an extent that their effectiveness is impaired. For example by cracks or deep scratches.
- **Cooling liquid circuit.** The projector contains a cooling circuit filled with Mono-ethylene glycol (1,2-ethane diol) and inhibitors in aqueous solution (34% active). When the cooling circuit leaks, switch off the device and contact qualified service personnel. The liquid is not for household use. Keep out of reach of children. Harmful by oral intake. Avoid exposure to pregnant women. Avoid contact with eyes, skin and clothing. Avoid inhale of the noxious fumes.
- Never point or allow light to be directed on people or reflective objects within the HD zone.
- All operators shall have received adequate training and be aware of the potential hazards.
- In case of using an external cooling system position the hoses of the cooling system so that they will not be tripped over, pulled, or contact hot surfaces.

To prevent fire hazard

- Do not place flammable or combustible materials near the projector!

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

- Do not place any object in the projection light path at close distance to the projection lens output. The concentrated light at the projection lens output may result in damage, fire or burn injuries.

- Ensure that the projector is solidly mounted so that the projection light path cannot be changed by accident.

- Do not cover the projector or the lens with any material while the projector is in operation. . Mount the projector in a well ventilated area away from sources of ignition and out of direct sun light. Never expose the projector to rain or moisture. In the event of fire, use sand, CO_2 or dry powder fire extinguishers. Never use water on an electrical fire. Always have service performed on this projector by 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. Using other lenses will damage the internal optics. For suitable fixed TLD+ lenses contact Barco or see Barco website.

- Allowed ambient temperature range: t_a= 0°C (32°F) to 40 °C (104 °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 qualified service technicians under the following conditions:
  - When the power cord or plug is damaged or frayed.
  - If liquid has been spilled into the equipment.
  - If the product has been exposed to rain or water.
  - If the product does not operate normally when the operating instructions are followed. Adjust only those controls that are covered by the operating instructions since improper adjustment of the other controls may result in damage and will often require extensive work by a qualified technician to restore the product to normal operation.
  - If the product has been dropped or the cabinet has been damaged.
  - If the product exhibits a distinct change in performance, indicating a need for service.
- 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/transporting UDX rental flight cases

- 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.

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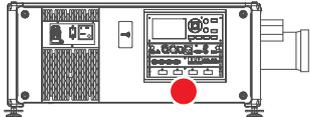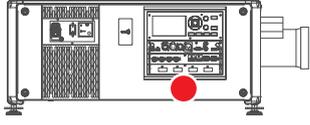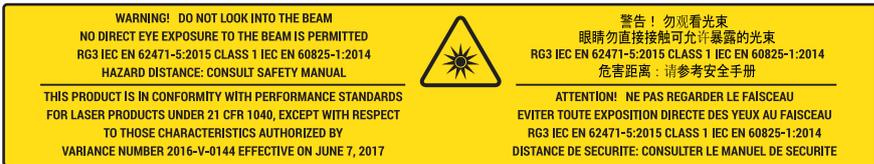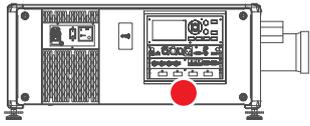
WARNING! DO NOT LOOK INTO THE LIGHT BEAM NO DIRECT EYE EXPOSURE TO THE BEAM IS PERMITTED. RG3 IEC EN 62471–5:2015. CLASS 1 IEC EN 60825–1:2014. HAZARD DISTANCE: CONSULT SAFETY MANUAL.

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 JUNE 7, 2017.

警告！ 勿观看光束 眼睛勿直接接触可允许暴露的光束 (RG3 IEC EN 62471-5:2015 CLASS 1 IEC EN 60825-1:2014) 危害距离：请参考 安全手册

DANGER ! NE PAS REGARDER LE FAISCEAU EVITER TOUTE EXPOSITION DIRECTE DES YEUX AU FAISCEAU. RG3 IEC EN 62471-5:2015. CLASS 1 IEC EN 60825-1:2014. DISTANCE DE SECURITE : CONSULTER LE MANUEL DE SECURITE.

1.4   High Brightness precautions: Hazard Distance (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.

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 next chapter"HD in function of modifying optics", page 14.

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 (SH) 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 6.6.5.

The installer 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.

For LIPs (Laser Illuminated Projectors) installed in the USA market the above limits do not apply. Lip's for installations other than in cinema theaters shall be installed at a height vertically above the floor such that the bottom plane of the Hazard Zone shall be no lower than 3 meters above the floor. Horizontal clearance to the hazard zone shall be 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 RG3 hazard zone.

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

•   This product can only be installed by Barco or sold or leased only to valid laser light show variance holders. In other words our installers are required to have an approved laser light show variance. Such installers may currently hold a valid variance for production of Class IIIb and IV laser light shows and/or for incorporation of the RG3 LIPs into their shows. Dealers and distributors are also required to obtain a valid laser light show variance.

•   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.

•   Effects other than front or rear screen projections shall not be performed.

•   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.

Laser light shows can be requested via the FDA online eSubmitter portal or via FDA Form FDA Form 3147 referencing to Barco's variance approval 2016-V-0144.
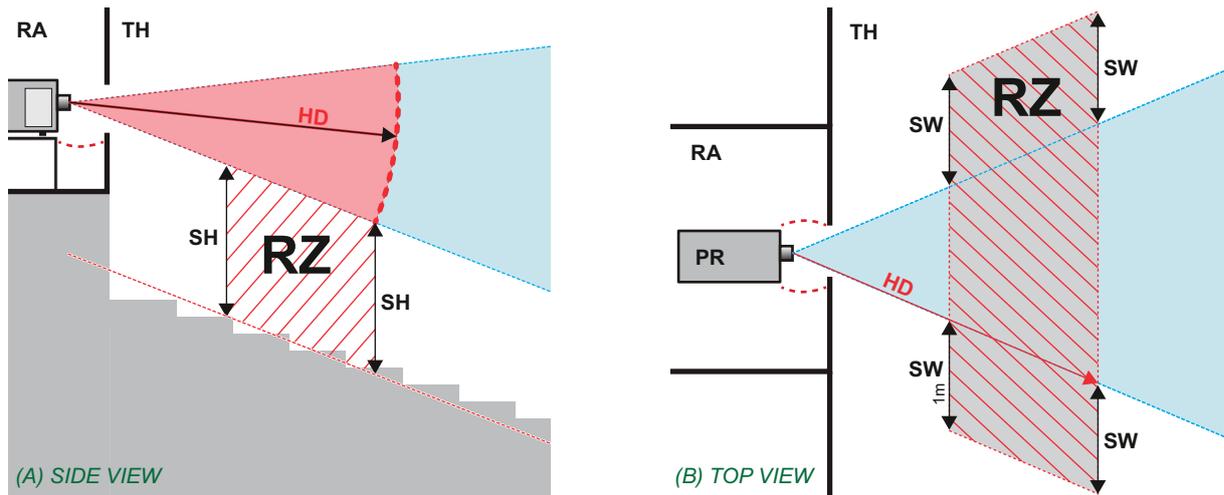
Image 1-1
A   Side view.
B   Top view.
RA   Restricted Access location (boot area of projector).
PR   Projector.
TH   Theater.
RZ   Restriction Zone in the theater.
SH   Separation Height.
SW   Separation Width.

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

On image 1-2 a typical setup is displayed. It must be verified if these minimum requirements are met. If required a restricted zone (RZ) in the theater must be established. This can be done by using physical barrier, like a red rope as illustrated in image 1-2.

The restricted area sticker can be replaced by a sticker with only the symbol.
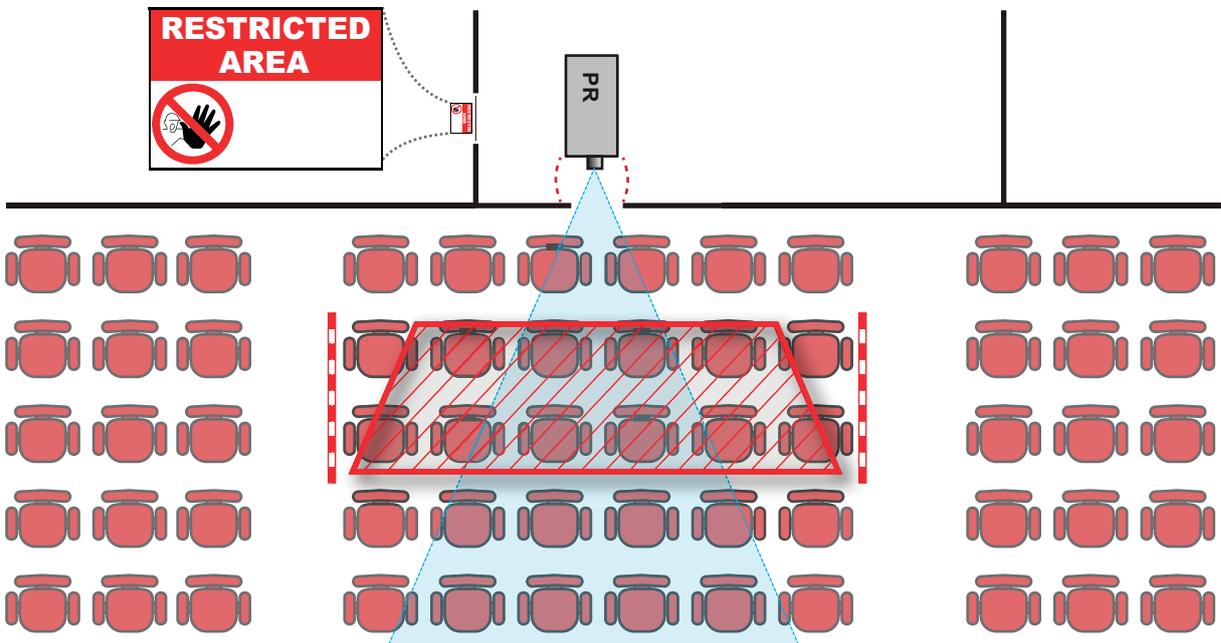
Image 1-2

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 1-3 two areas should be considered: the restricted enclosed projection area (RA) and the observation area (TH).
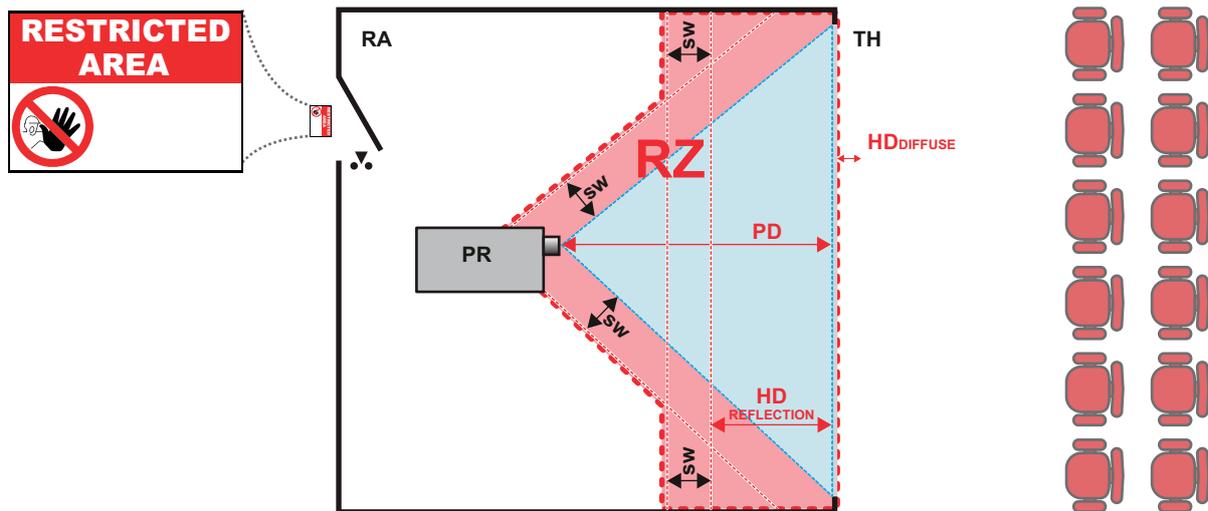

Image 1-3
RA   Restricted Access location (enclosed projection area).
PR   Projector.
TH   Theater (observation area).
RZ   Restriction Zone.
PD   Projection Distance.
SW   Separation Width. Must be minimum 1 meter.

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

- HD as discussed in "High Brightness precautions: Hazard Distance (HD)", page 11, 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 defuse surface of the rear projection screen.

As described in "High Brightness precautions: Hazard Distance (HD)", page 11, it is mandatory to create a restricted zone within the beam areas closer than any NOHD. 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 graphs in chapter "HD in function of modifying optics", page 14.

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HD_reflection = 25% (HD - PD)
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The light emitted from the screen within the observation shall never exceed the RG2 exposure limit, determined at 10 cm. The $HD_{diffuse}$ can be neglected if the measured light at the screen surface is below 5000 cd/m² or 15000 LUX.

## 1.6 HD in function of modifying optics

Hazard Distance
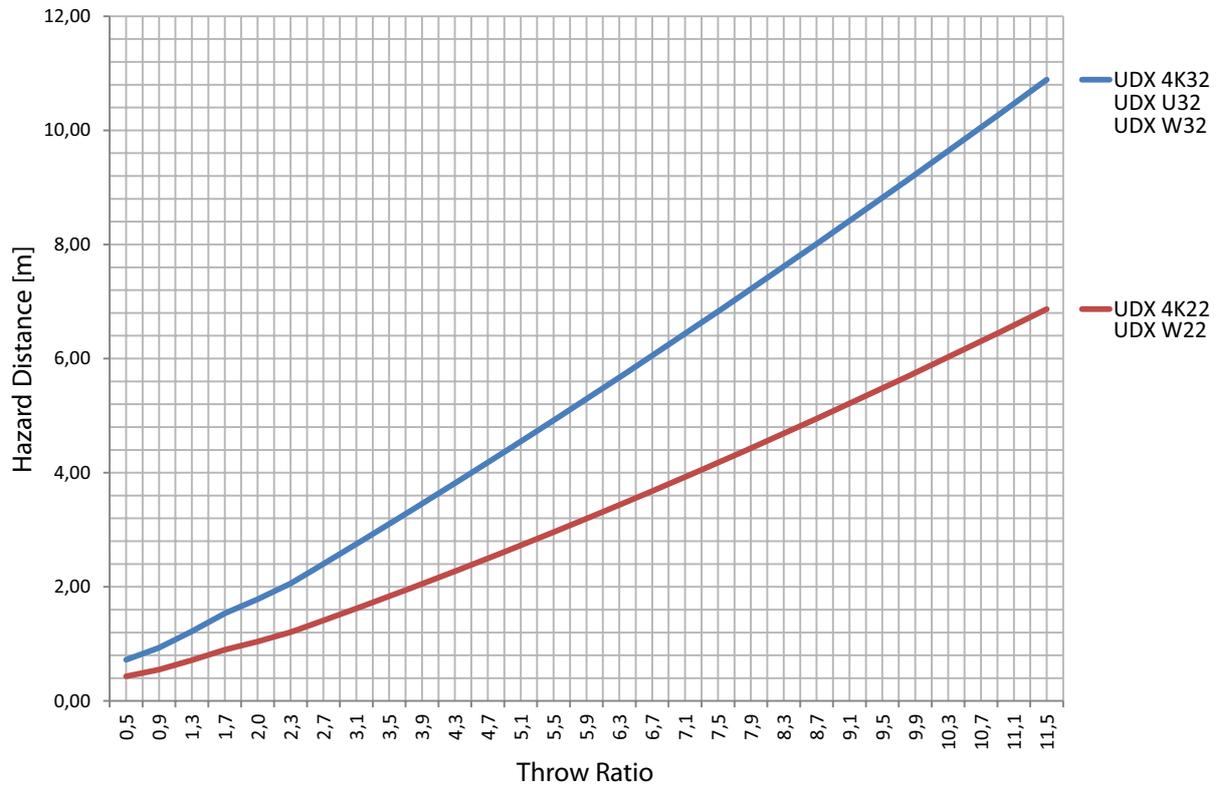
Image 1-4

2. INSTALLATION PREPARATIONS

About this chapter

Read this chapter before installing the UDX 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 net, etc.

Furthermore, careful consideration of things such as image size, ambient light level, projector placement and type of screen to use are critical to the optimum use of the projection system.

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

Overview

- Installation requirements
- Unpacking the projector
- UDX flight case
- Initial inspection
- Projector configurations
- Projector air inlets and outlets
- Free download of Projector Toolset

2.1 Installation requirements

Environment conditions

Table below summarizes the physical environment in which the UDX may be safely operated or stored.

Environment	Operating	Non-Operating
Ambient Temperature	0°C (32°F) to 40 °C (104 °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)	-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 Unit.

Cooling requirements

The projector is fan cooled and must be installed with sufficient space around the projector front, minimum 10 cm (4 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 60 cm (23.6 in) between the air outlets 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.
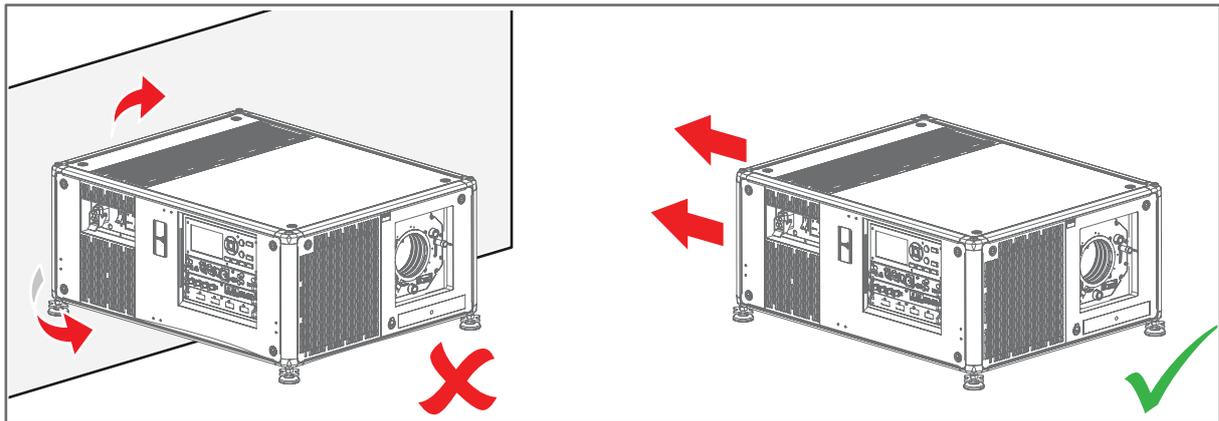

Image 2-1

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

Power requirements : 120-160V / 200-240V (+/-10%), 20A, 50-60 Hz

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 UDX. The projector weights about ±92 kg (±202 lbs) 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.

2.2 Unpacking the projector

What has to be done ?

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

> **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.**

Necessary tools

cutter knife

How to unpack

1. Remove the banding around the cardboard box and open the box. Do this by releasing the fastening clips as illustrated.
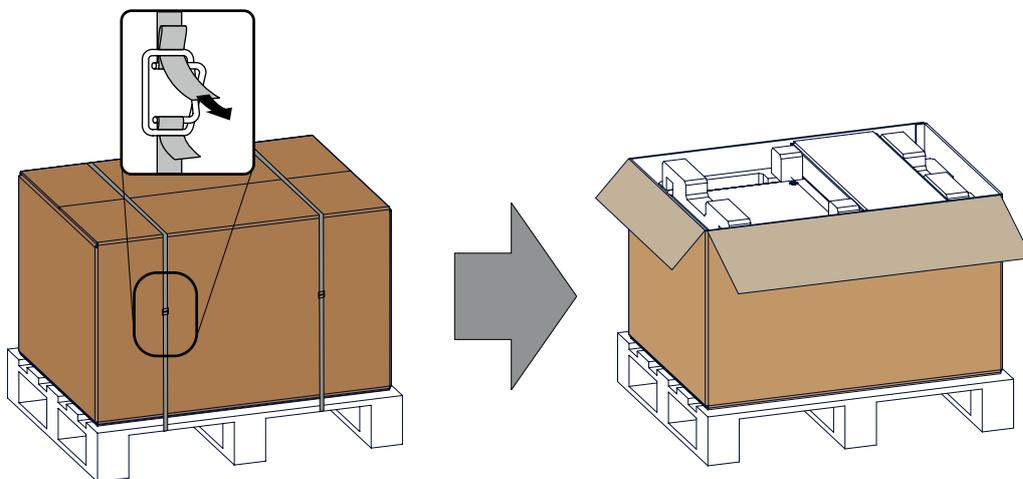
Image 2-2
Opening box

2. Remove the small box on top of the projector. This box contains the accessories such as manuals, remote control, etc.
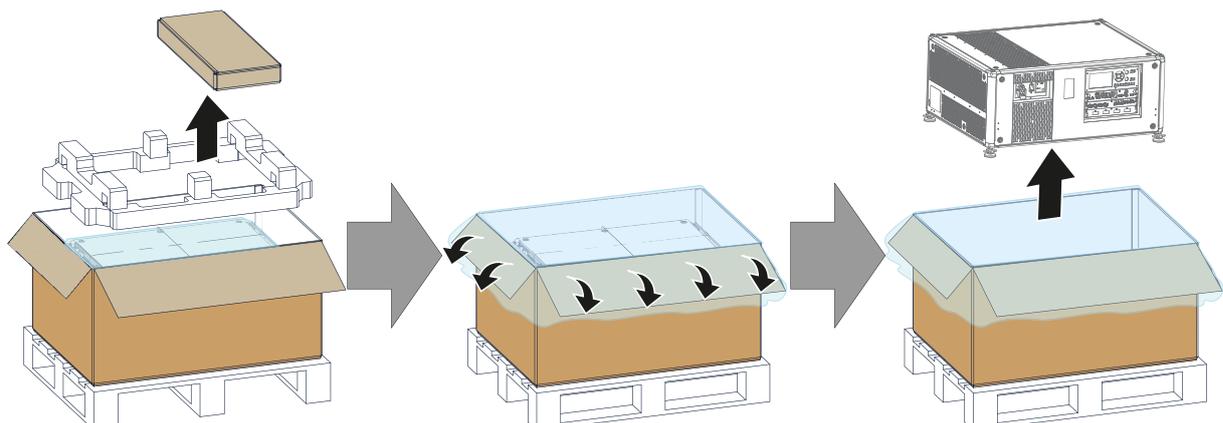
Image 2-3
Remove accessory box, polymeric foam and projector

3. Remove the polymeric foam from the top of the projector.

4. Open the plastic bag and lift the projector out of its packaging

> **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.

2.3 UDX flight case

Introduction of the UDX flight case

The UDX flight case is designed to transport the UDX 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 UDX rigging frame. The four caster wheels, provided with breaks, and the eight handles make the UDX 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.
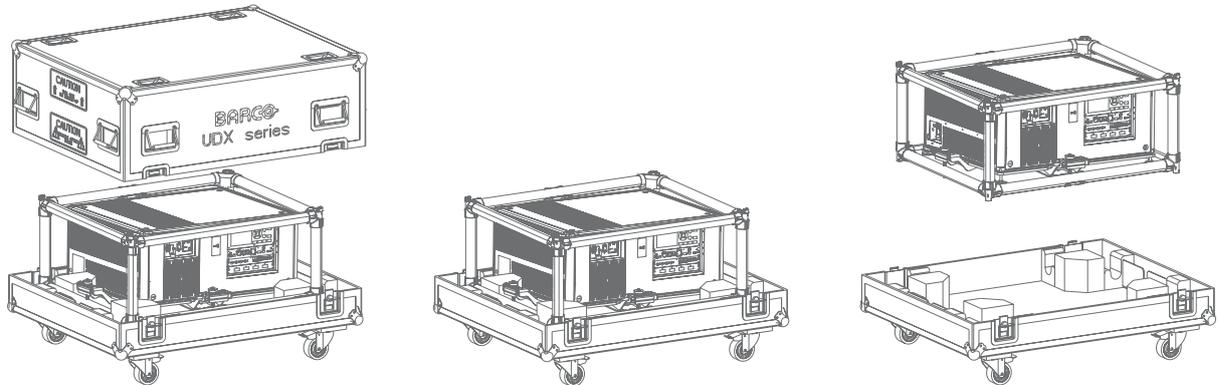
Image 2-4
UDX Flight case

Order number flight case: **R9855884**

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

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

2.4 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 where included:

• One power cords of 2.7 m (3G10, 32A)
• One Quick Start guide
• One Safety manual
• One Web site reference sheet
• One remote control unit (RCU)
• 2 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.

2.5 Projector configurations

The different configurations

Depending on the installation the projector can be mounted in different ways, the different configurations are:

1. Front / Table (F/T)
2. Front / Ceiling (F/C) (upside down)
3. Front / Ceiling (F/C) (table position)
4. Rear / Table (R/T)
5. Rear / Ceiling (R/C) (upside down)
6. Rear / Ceiling (R/C) (table position)

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.
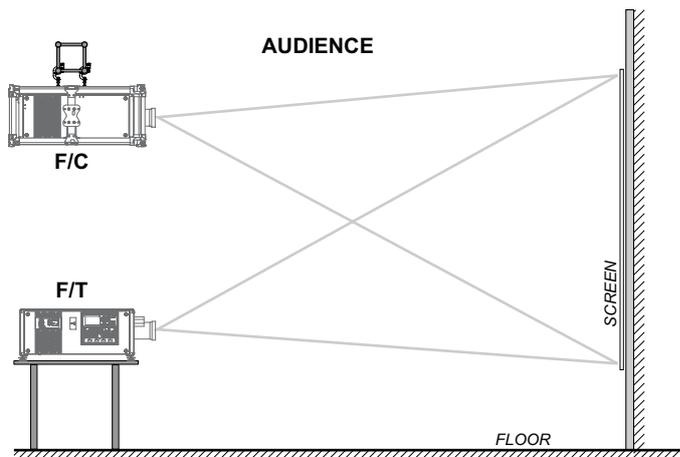
Image 2-5
Front projection
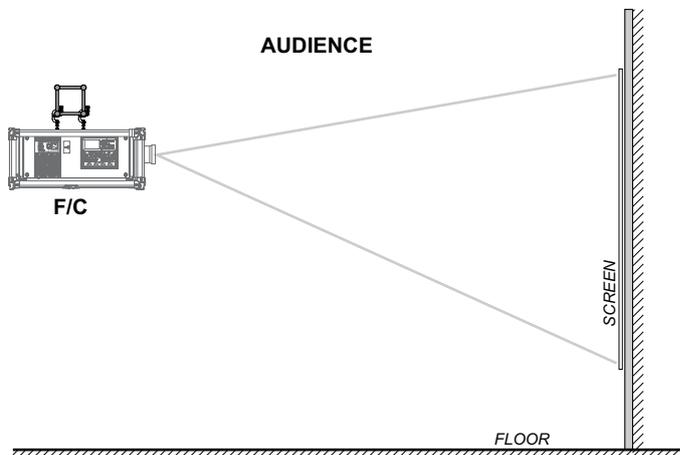
Image 2-6
Front projection, Ceiling mounted, in table position

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.
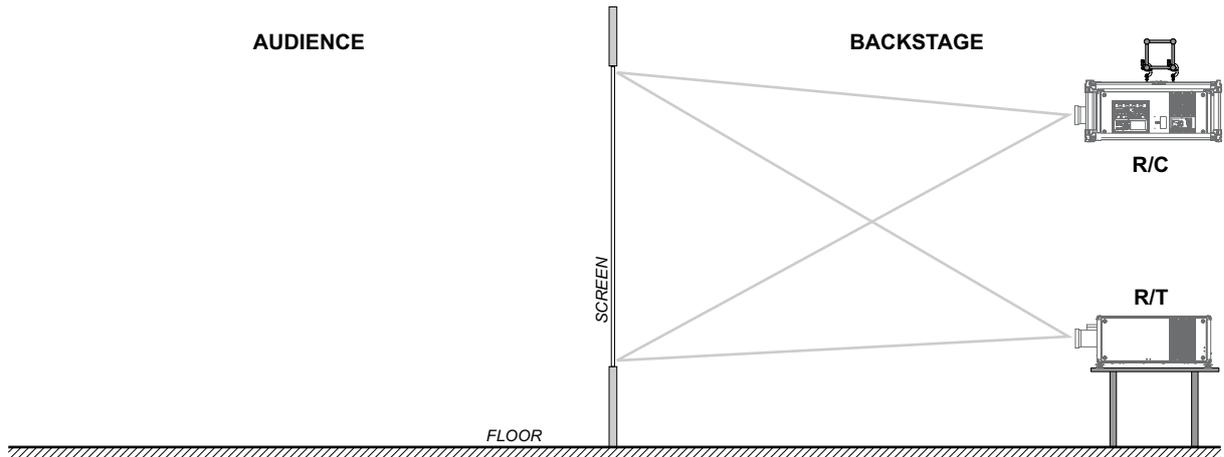
Image 2-7
Rear projection
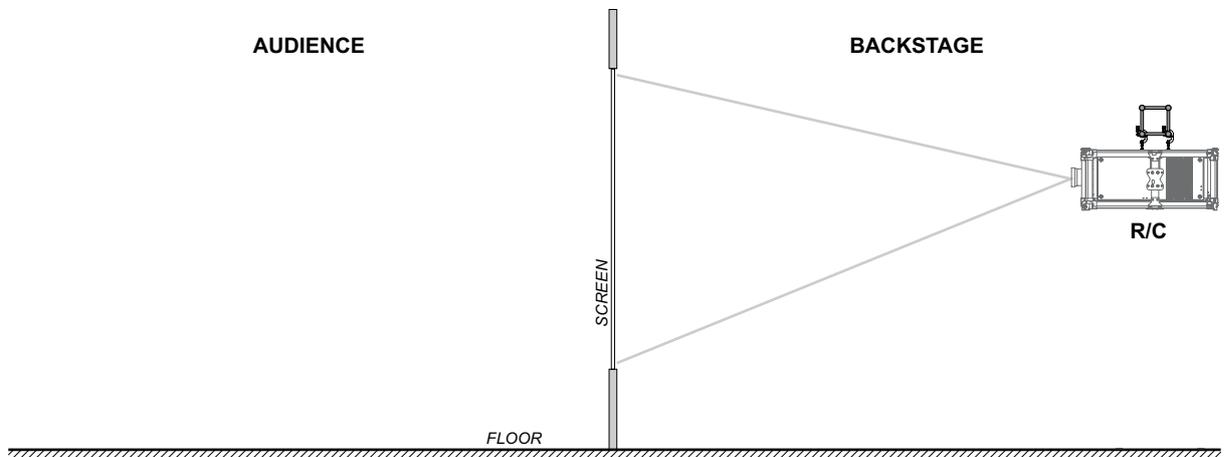
Image 2-8
Rear projection, ceiling mounted in table position

Positioning the projector
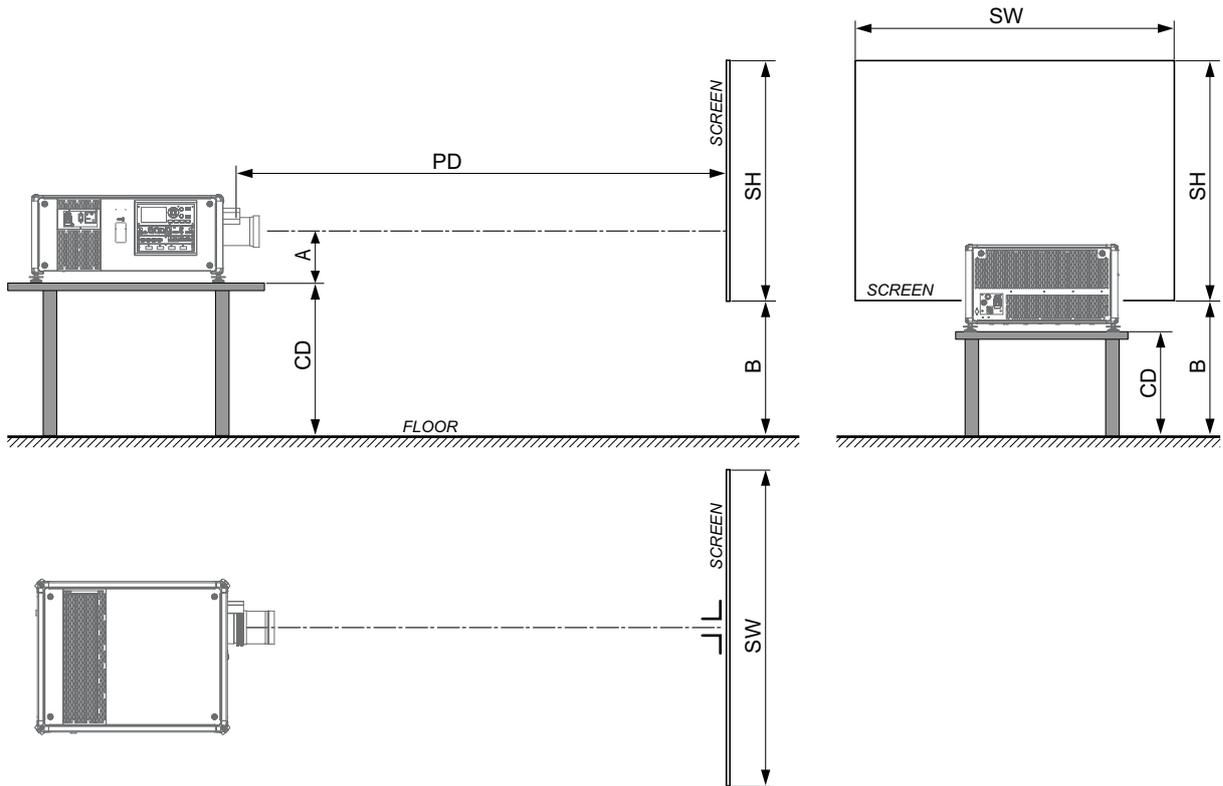
Image 2-9
Positioning the projector

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).

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: $CD = SH/2 + B - A$

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.
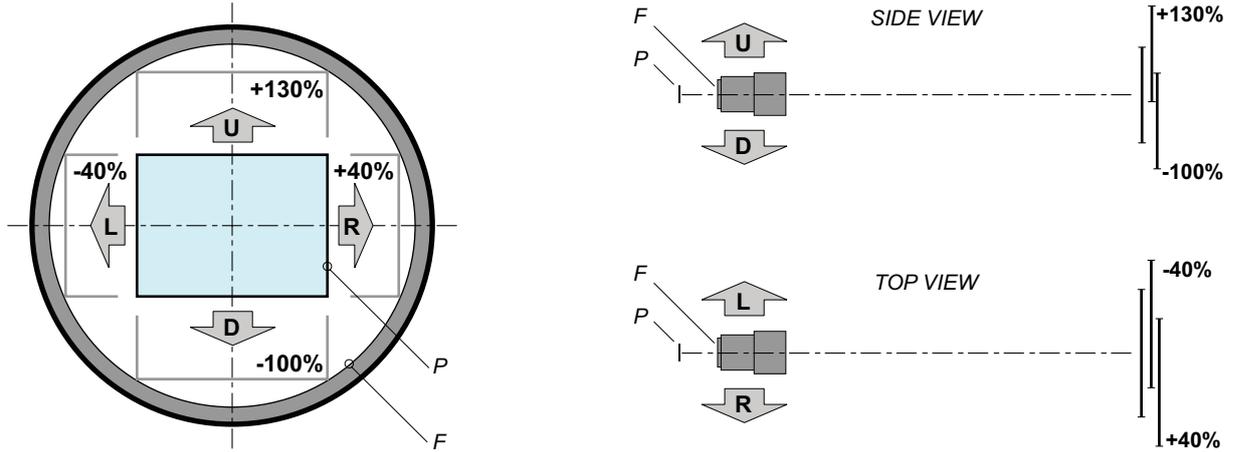
Image 2-10
Vertical and horizontal shift range

P   DMD.
F   Field of 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. In other words, you can tilt the projector as much as desired for your application.

In comparison to lamp-based projectors, the laser phosphor projector also has no limit on side to side tilt.
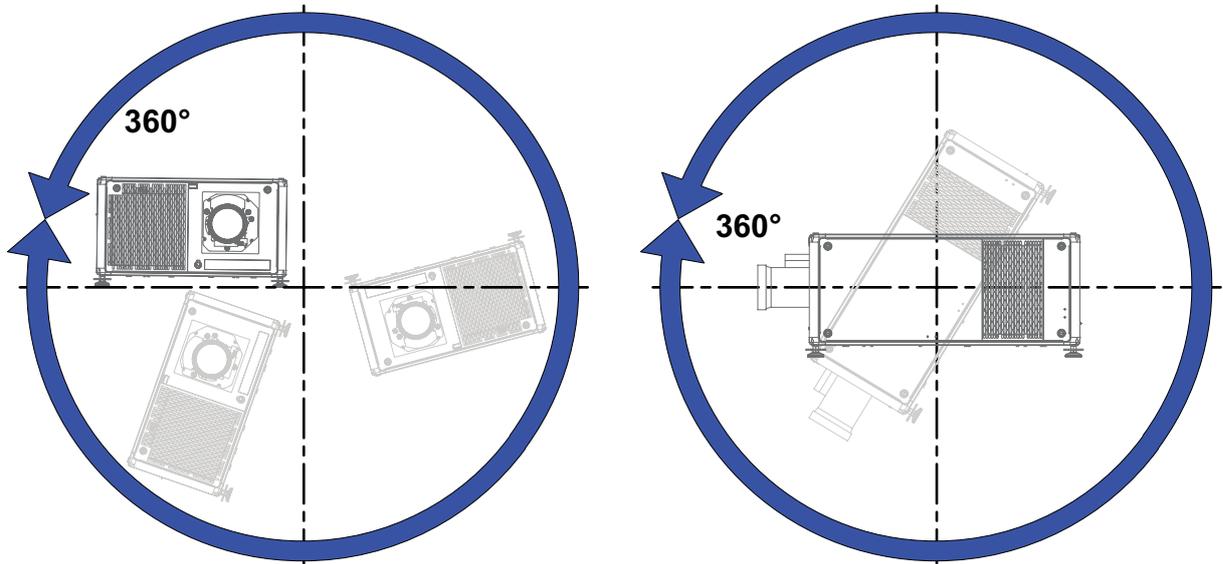
Image 2-11

2.6 Projector air inlets and outlets

Air inlets and outlets
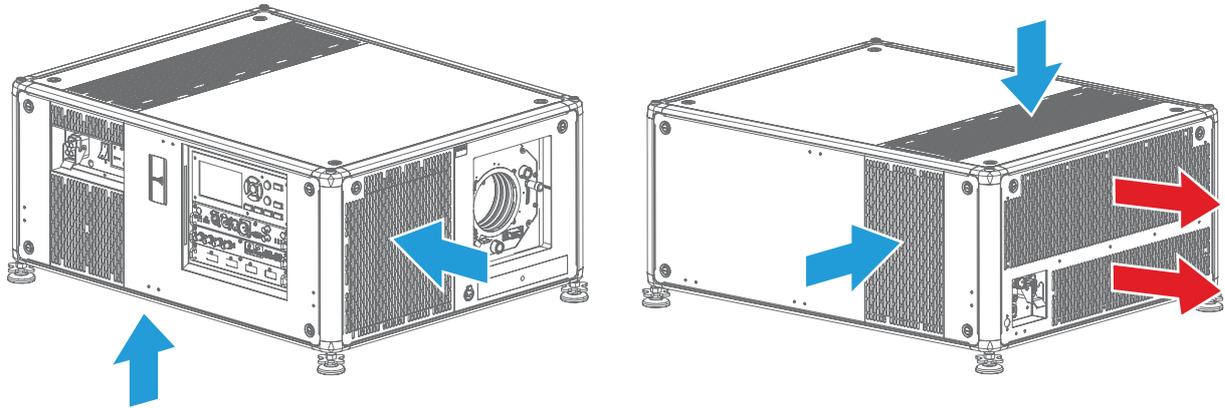
Image 2-12

The UDX has 4 air inlet channels and 2 air outlets. The air outlets are located at the rear of the projector. The air inlets are located at the top, bottom and right side of the projector.

2.7 Free download of Projector Toolset

About Projector Toolset

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

The concept of this Projector Toolset software is modular. The basic package can be extended with several optional device plug-in modules, now and in the future available.

The Projector Toolset software works with configurations that can be loaded. Within a configuration, different snapshots can be taken. A snapshot represents a current state of a configuration and can be reloaded to return to this typical state. These terms will be used through the complete software.

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

Several configurations can be controlled simultaneously. Even when the configurations are connected via different ways.

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 Partnerzone of Barco.
   When your login is correct, the Partnerzone 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.

3. PHYSICAL INSTALLATION

Overview

• Remote control, Battery installation
• Using the XLR connector of the RCU
• Remote control, protocol setup
• Remote control, on/off button
• Connecting the projector with the power net
• Alignment of a table mounted projector

3.1 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).
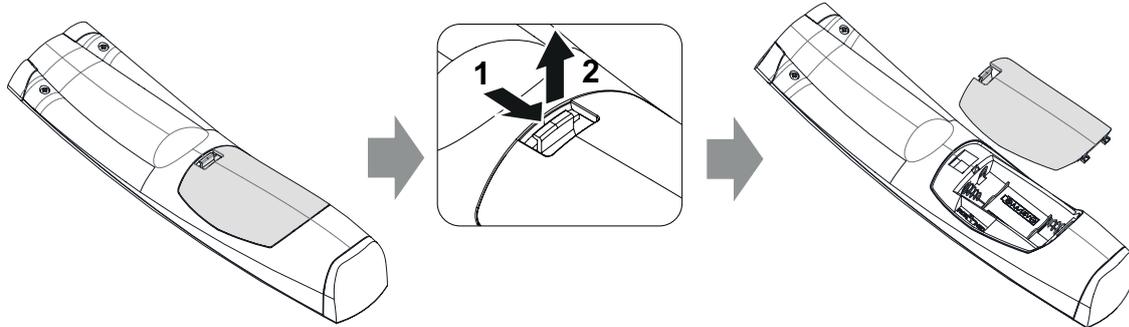
Image 3-1

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.
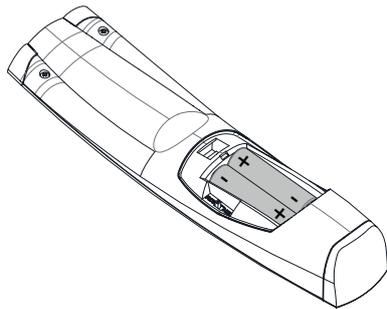
Image 3-2

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.
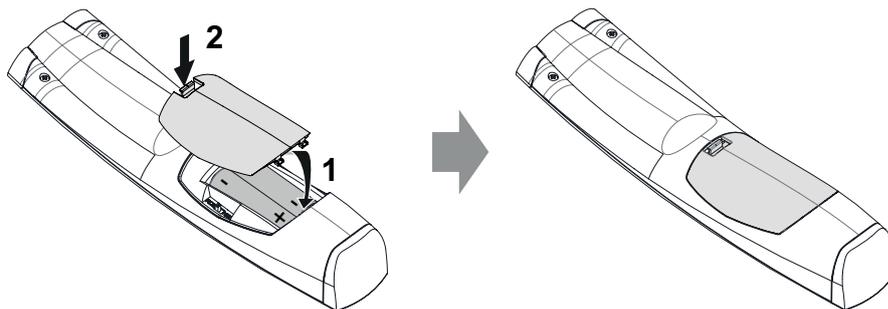
Image 3-3

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.

⚠	**CAUTION: Replace the battery as explained above. There is a risk of explosion if the battery is incorrectly installed.**

3.2 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.
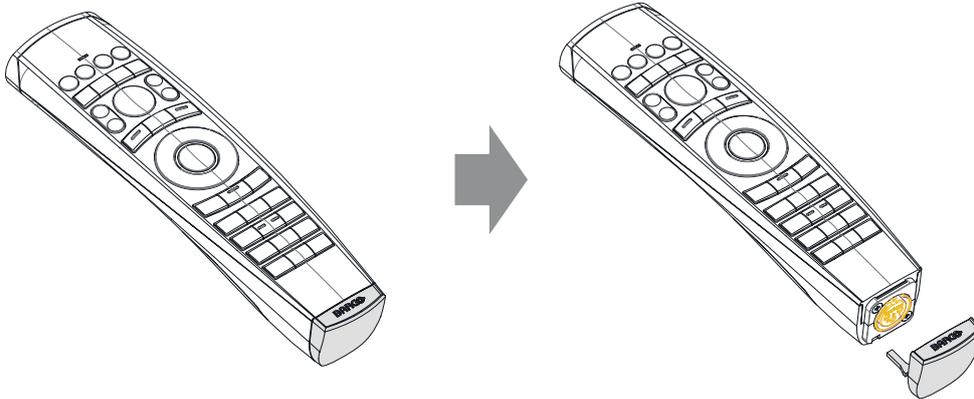
Image 3-4

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.

3.3 Remote control, protocol setup

About the used protocol

The protocol is the code send out by the remote control when a button is pressed. Depending on this code, the projector can decode the signals. The remote control can be used with two different protocols, RC5 and NEC. Depending on the projector to control the remote control can be switched between these protocols.

Which protocol to use

*   The **NEC** protocol have to be used for Barco projectors based on the Pulse platform: F70, F80, F90, HDX 4K, UDX, ...
*   The **RC5** protocol have to be use all other Barco projectors: HDX W, HDF W, HDQ 2K, ...

How to set

1. Remove the cover. For more info on how to remove, see "Remote control, Battery installation", page 30.

2. Place the switch in the NEC position.
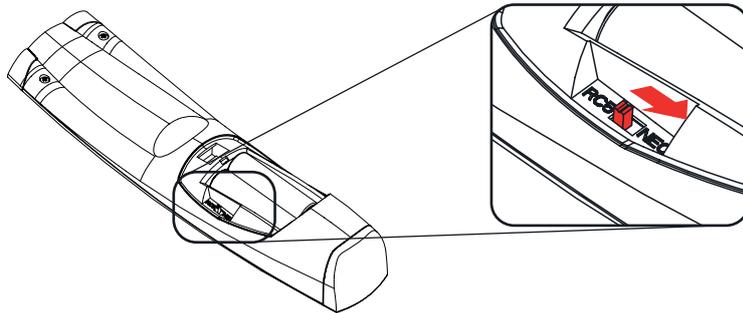
Image 3-5

Remark with RC5 protocol

Not all buttons of the Pulse RCU are one-to-one compatible with the legacy Barco RCU. Button pairs SHUTTER open/close and POWER on/off emit the same code (per pair) when in RC5 mode, because the legacy RCU's only had 1 button for Shutter and 1 button for Standby.

3.4 Remote control, on/off button

Purpose of the remote control on/off button

The Pulse remote control unit has at the front side an on/off switch (reference 1 image 3-6). Switching off the remote control prevents that unwanted commands are send due to an accidental key press. Furthermore, switching the RCU off will extend the battery life time of the remote control.

To activate the remote control press the on/off button.

To deactivate the remote control press the on/off button again.

Default when (re)placing batteries, is "ON".
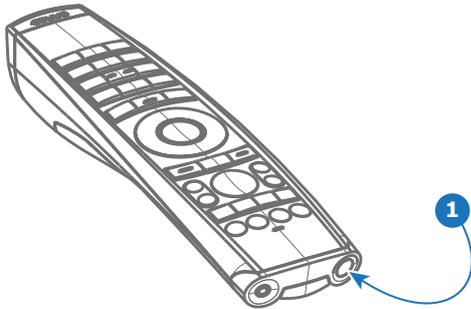
Image 3-6

3.5   Connecting the projector with the power net

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

How to connect with local power net

1. Ensure that the power switch stands in the '0' (OFF) position (reference 1 image 3-7).
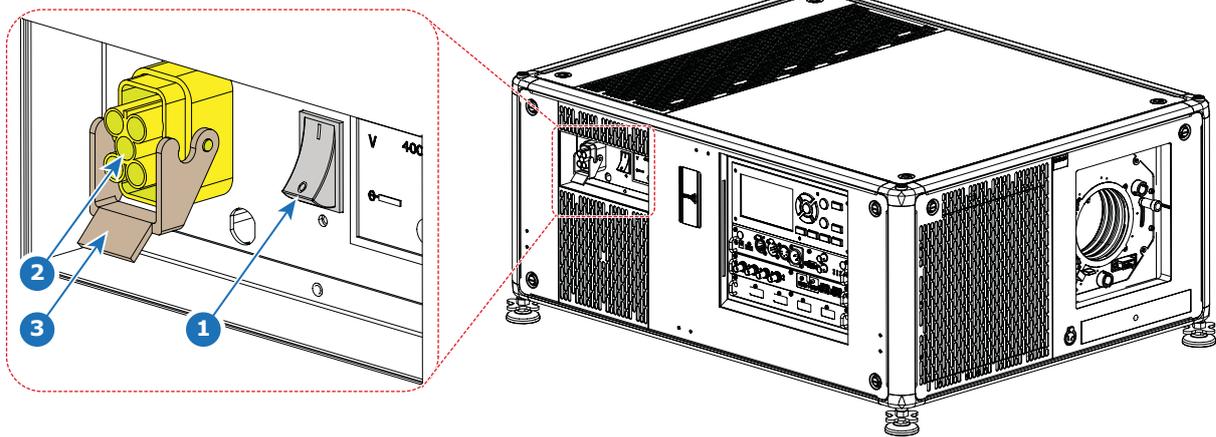
Image 3-7
Power input

2. Connect the female side of the power cord with the power input socket of the projector (reference 2).

3. Secure the power plug by locking the plug holder clamp (reference 3).

4. Connect the male side of the power cord to the local power net.
    Caution: *Ensure that the power net meets the power requirements of the projector.*

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

> ⚠️ 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.**

Fuses

The projector is protected with an automatic circuit breaker of 25 A which is built into the power switch.

The voltage meter is protected with a fuse (1A) which is located on the neutral bonding cable. If necessary to replace this fuse, consult a service technician.

3.6   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.
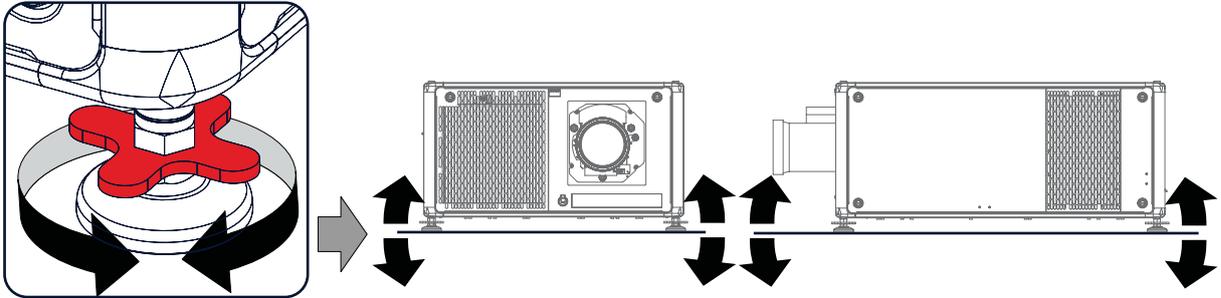
Image 3-8
Level alignment

When this is achieved, the projector is set horizontal and vertical at right angles to the screen.
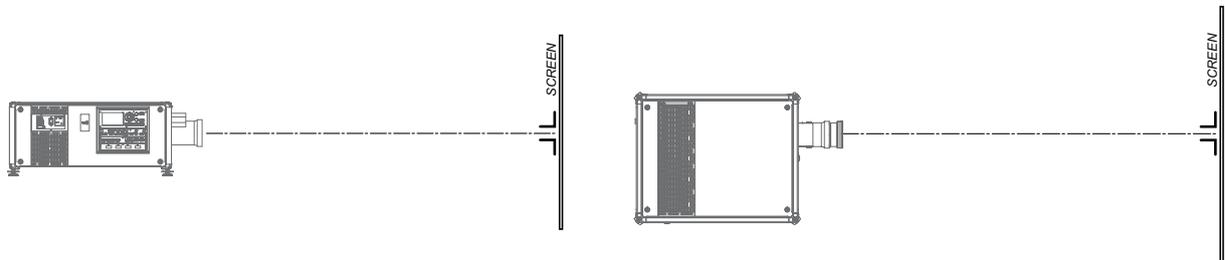
Image 3-9
Angle adjustment

4. LENSES & LENS SELECTION

Overview

- Available lenses
- Lens selection
- Lens installation
- Lens removal
- Scheimpflug adjustment

4.1   Available lenses

⚡ **WARNING:** Only use TLD+ ZOOM lenses on the 4k variants of the UDX 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 UDX 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 label has been added on the lens holder of the 4k projectors to raise awareness of this limit.

WARNING!

⚠️

ONLY USE
TLD+ ZOOM
LENSES
Using other lenses
will damage the
internal optics!
For details
check manual

Image 4-1
Warning label

Available lenses for the UDX projector

Only the following **TLD+ ZOOM** Lenses can be used on the 4k UDX projector. Do not use other types of lenses.

Image 4-2 **R9801414**: TLD+ zoom lens (0.8 - 1.16 : 1)	Image 4-3 **R9862005**: TLD+ zoom lens (1.16 - 1.49 : 1)	Image 4-4 **R9862010**: TLD+ zoom lens (1.5 - 2.0 : 1)
Image 4-5 **R9862020**: TLD+ zoom lens (2.0 - 2.8 : 1)	Image 4-6 **R9862030**: TLD+ zoom lens (2.8 - 4.5 : 1)	Image 4-7 **R9862040**: TLD+ zoom lens (4.5 - 7.5 : 1)

Image 4-8
R9829997: TLD+ zoom lens (7.5 - 11.2 : 1)

4.2 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://www.barco.com/en/media_entertainment/LensCalculator to determine the possible lenses for your configuration.

   The Lens Calculator window opens.

Image 4-9
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%.**

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 4-10) outward and then towards the lens power supply socket (reference 2) as illustrated.
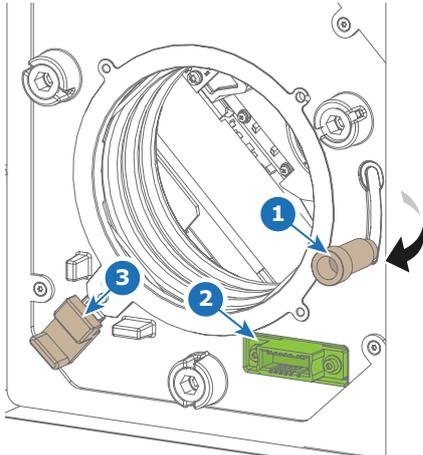
Image 4-10
Lens installation, preparation

2. Remove the dust cover from the lens opening.
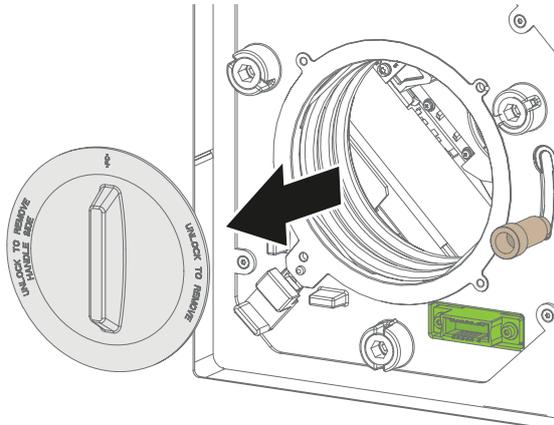
Image 4-11

> *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).
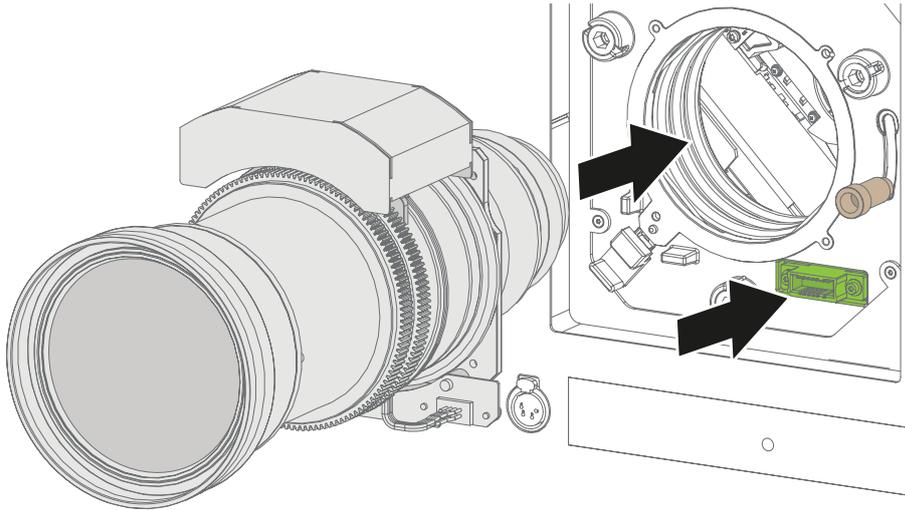
Image 4-12
Lens installation

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 (to the top of the projector). Ensure the lens touches the front plate of the lens holder.
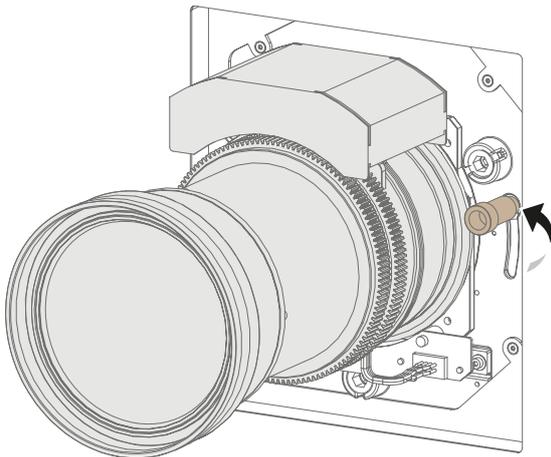
Image 4-13
Lock lens

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 4-14).
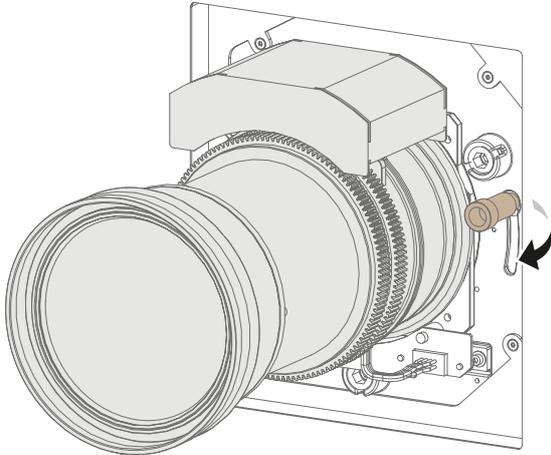
Image 4-14
Unlock the lens

2. Pull down the secondary lock on the lower left side of the lens holder as illustrated (image 4-15).

3. Gently pull the lens out of the lens holder.
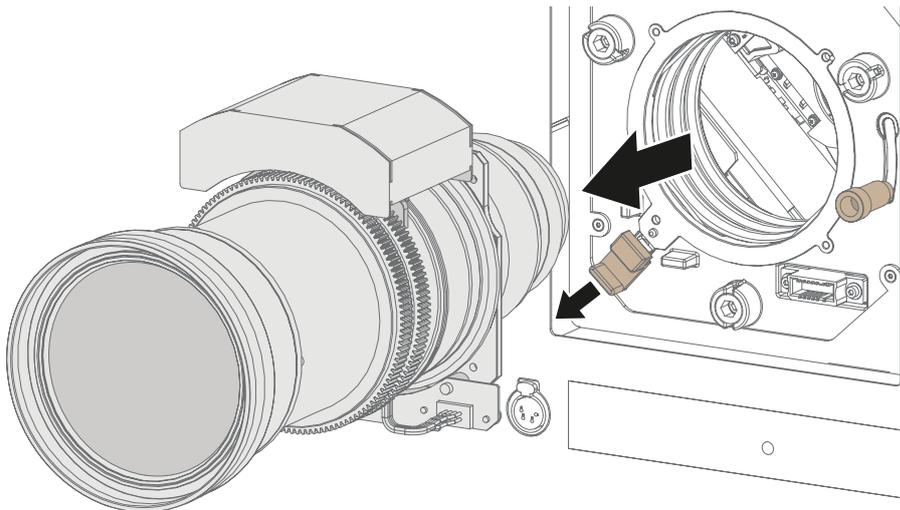
Image 4-15
Lens removal

> **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.**
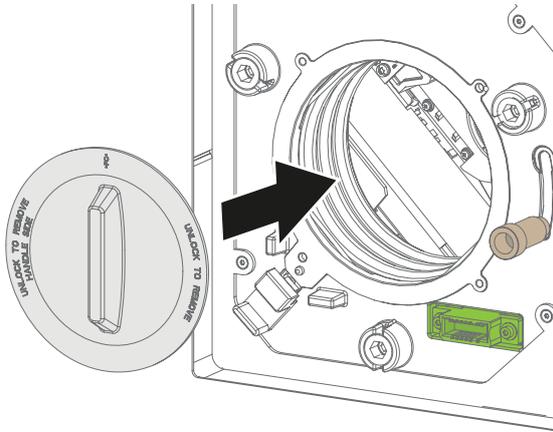
Image 4-16

4.5 Scheimpflug adjustment

What is Scheimpflug?

The lens holder has to be adjusted so that the "sharp focus plane" of the projected image falls together with the plane of the screen (Fp1→Fp2). This is achieved by changing the distance between the DMD plane and the lens plane (Lp1→Lp2). The closer the lens plane comes to the DMD plane the further the sharp focus plane will be. It can occur that you won't be able to get a complete focused image on the screen due to a tilt (or swing) of the lens plane with respect to the DMD plane. This is also known as Scheimpflug's law. To solve this the lens plane must be placed parallel with the DMD plane. This can be achieved by turning the lens holder to remove the tilt (or swing) between lens plane and DMD plane (Lp3→Lp4).
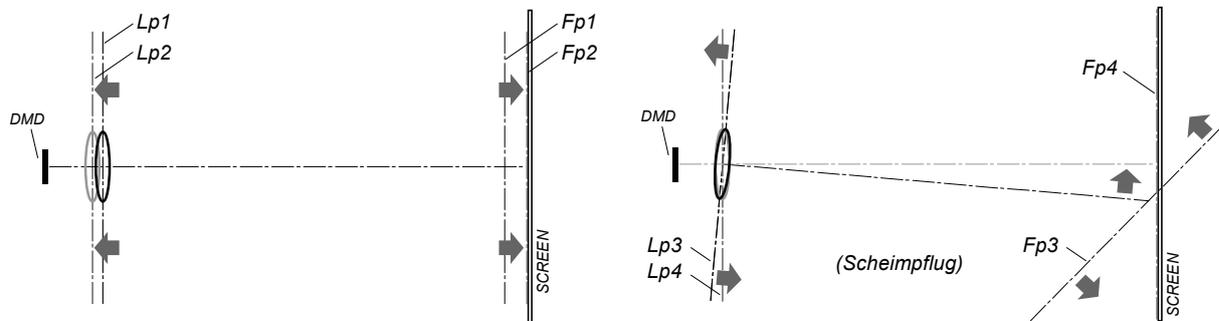
Image 4-17
Scheimpflug principle

Scheimpflug principle

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

Scheimpflug adjustment points
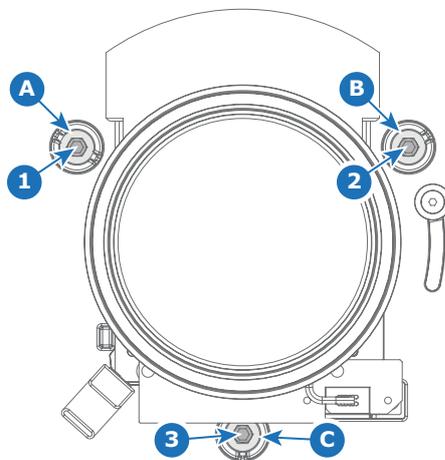
Image 4-18
Scheimpflug adjustments

Indication on drawing	Function
1, 2 and 3	Scheimpflug adjustment screws
A, B and C	Lock screws

1, 2 and 3 are adjustment points.

Necessary tools

- Allen wrench 5 mm
- Allen wrench 8 mm

Preparation steps:

1. Project a green focus test pattern in 4k.
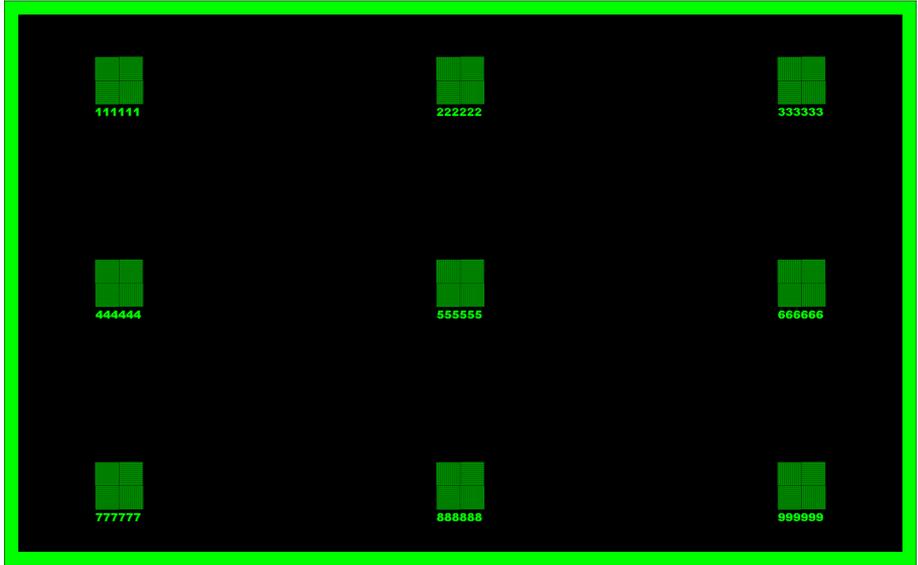
Image 4-19

2. Unlock and turn out the lock screws (reference A, B and C, image 4-20) of the Lens Holder . Use a 8 mm Allen wrench for the lock screws.

3. Optimize the focus of the projected image in the center of the screen (F) using the motorized focus control (Local Keypad).
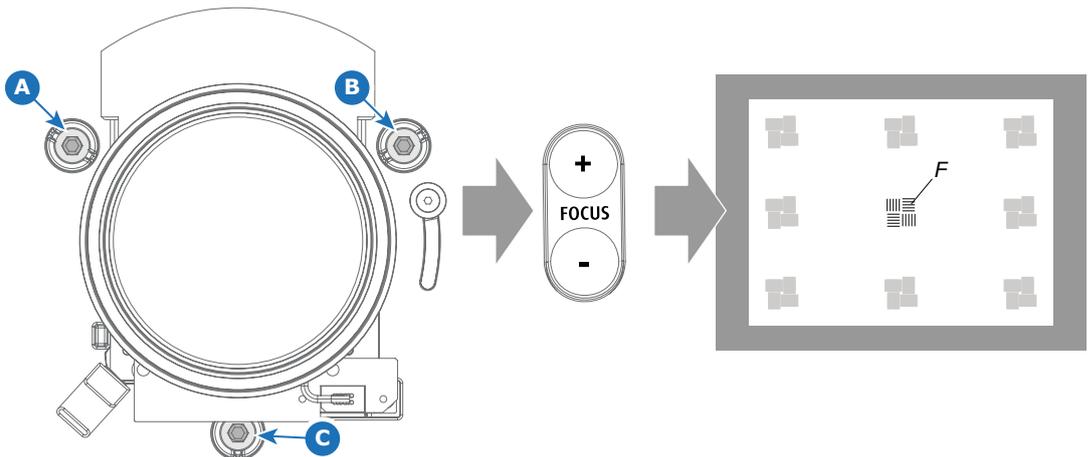
Image 4-20
Center focusing

Scheimpflug adjustment steps

1. Sharpen the image at the bottom left corner of the screen by turning the upper left Scheimpflug adjustment screw either clockwise or counterclockwise (reference 1 image 4-21). Use a 5 mm Allen wrench.
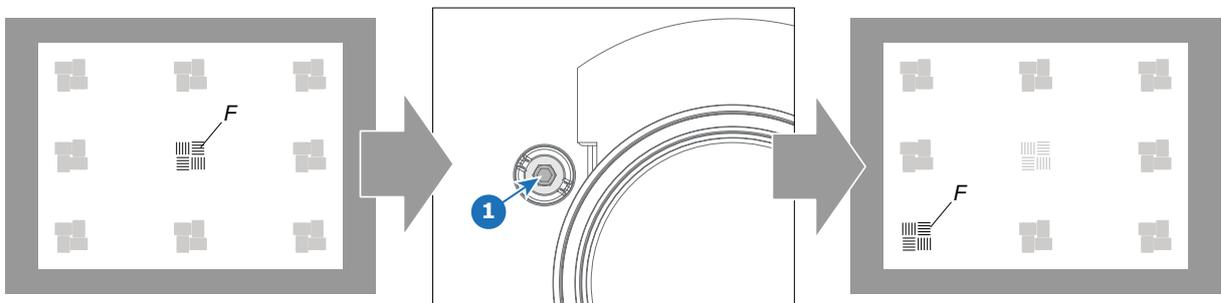
Image 4-21
Left bottom focusing

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

2. Sharpen the image at the lower right corner of the screen by turning the upper right Scheimpflug adjustment screw (reference 2 image 4-22).
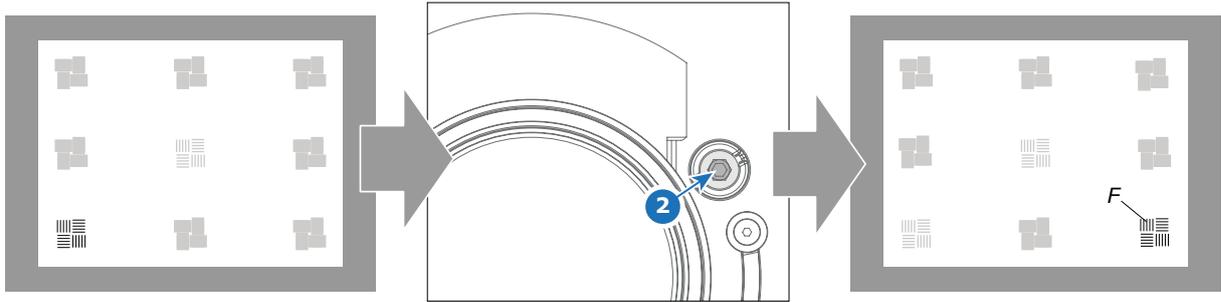
Image 4-22
Right bottom focusing

3. Sharpen the image at the top center of the screen by turning the lower Scheimpflug adjustment screw (reference 3 image 4-23).
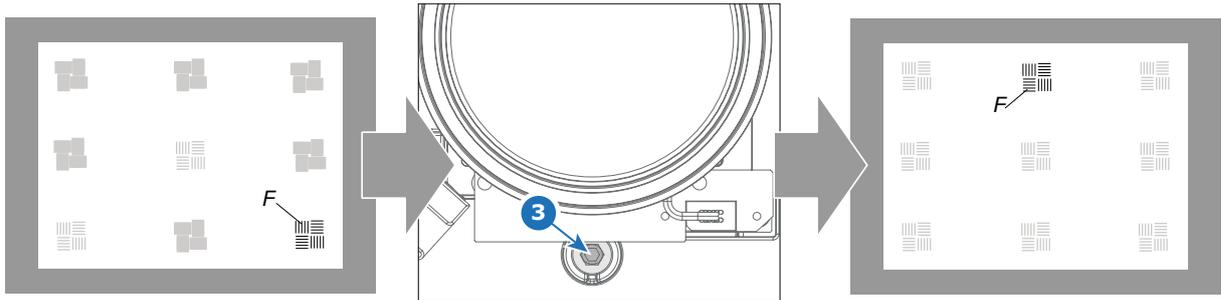
Image 4-23
Top focusing

4. Optimize the focus of the projected image in the center of the screen using the motorized focus control (Local Keypad).
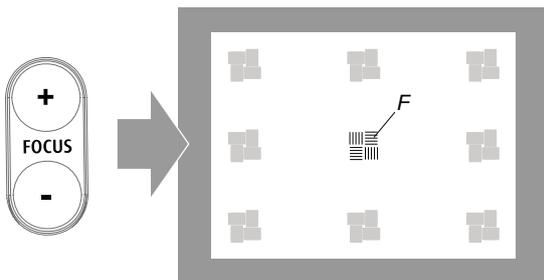
Image 4-24

5. Repeat from step 1 until the projected focus pattern is as sharp as possible in the center, left, right, top and bottom of the screen.

6. Fasten all three lock screws again.

5. INPUT & COMMUNICATION

Overview

- Introduction
- Removal of an input board
- Installation of an input board or a communication board
- Input source connections
- Communication connections
- Installation of the WiFi module
- Installation of the GSM module

5.1 Introduction

General

The Input & Communication side of the projector consists of a local keypad, a communication panel, a venues & hospitality Input (V&H) and a free input slots. The free input slot can be used for optional modules (e.g. Virtual & Augmented Reality Input (V&AR)).
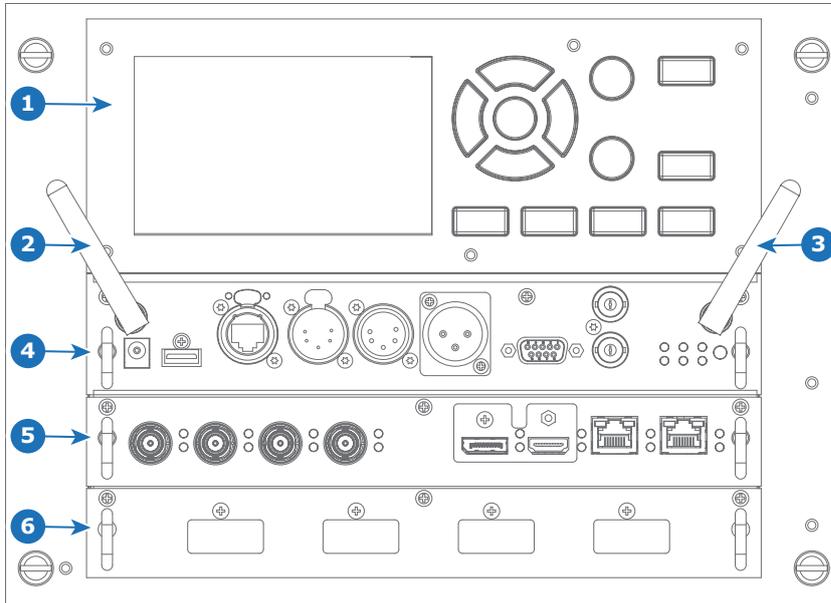
Image 5-1
1   Local Keypad and touch panel
2   Optional antenna for WiFi connection
3   Optional antenna for GSM
4   Communication Panel
5   Venues & Hospitality Input (V&H)
6   Free input slot (here filled with the V&AR module)

5.2 Removal of an input board

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

⚠️	**C**AUTION**: 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.**

How to remove

1. Switch off the projector and unplug the power cord at the projector back side.

2. Release the 3 captive screws of the input module (4).
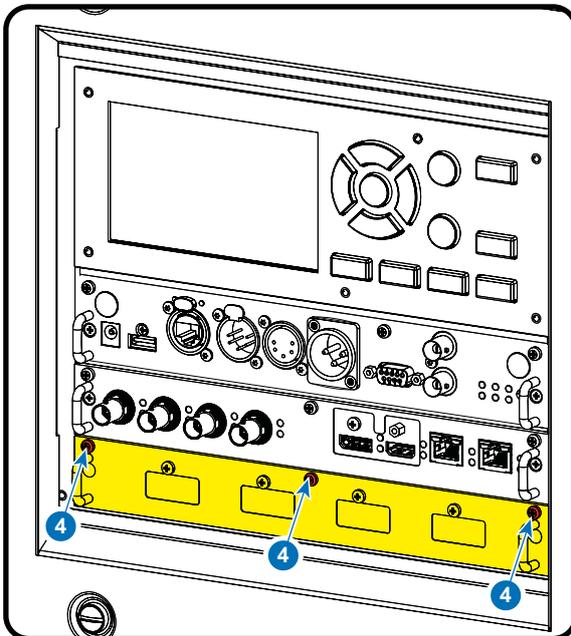
Image 5-2

3. Pull out the input module of the Input & Communication using the handles.
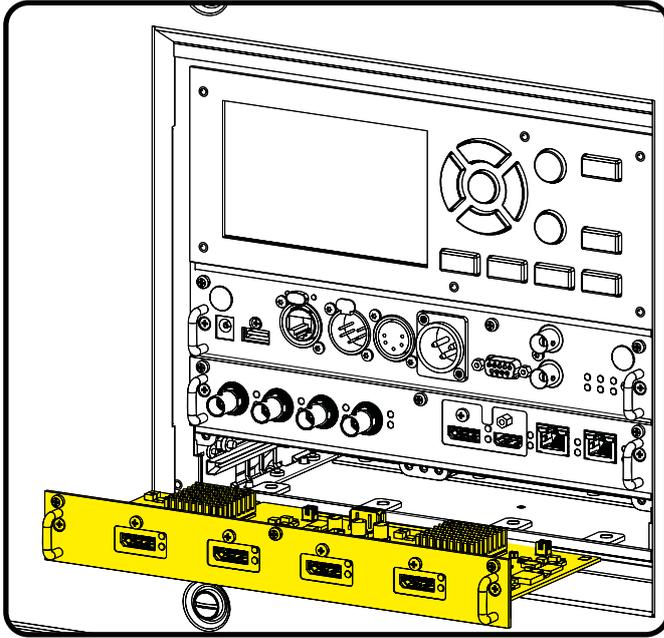
Image 5-3

⚠ 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 an other one or install a dummy front plate on the unused input slot.

5.3   Installation of an input board or a communication 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.**

Necessary tools

PH1 Phillips screwdriver

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

How to install

1. Switch off the projector and unplug the power cord at the projector back side.

2. Push the input module in the Input & Communication Unit 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.
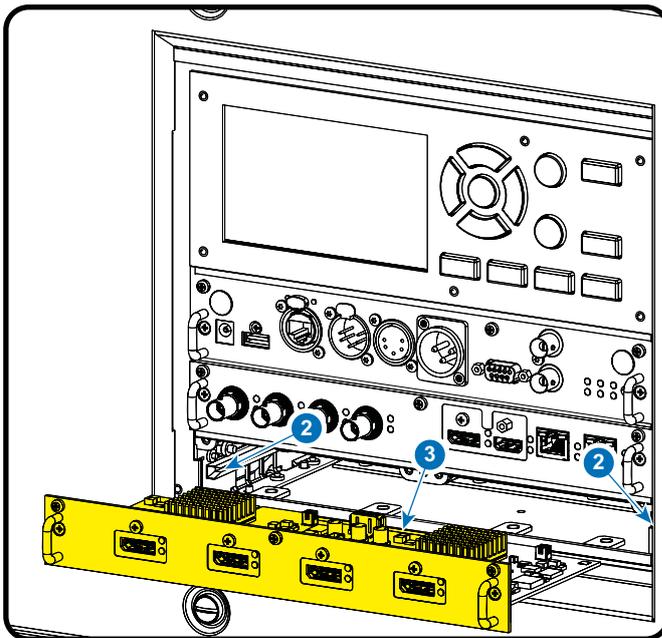
Image 5-4

3. Tighten the captive screws of the input module.
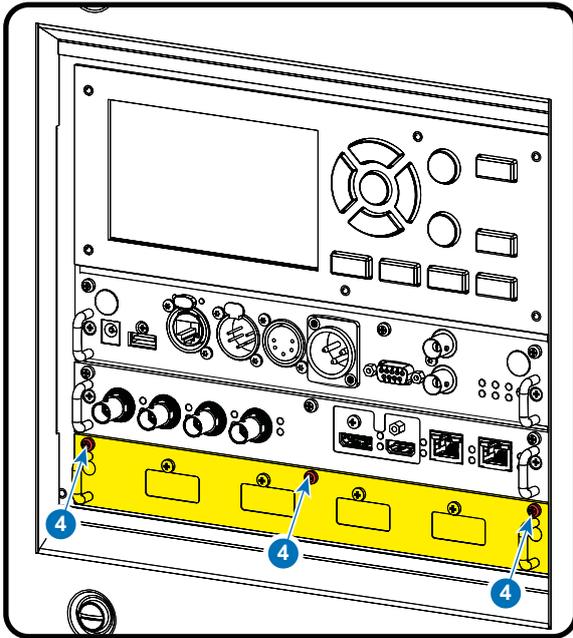
Image 5-5

4. Plug in the power cord at the projector back side.

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.*

5.4 Input source connections

Venues & Hospitality Input (V&H)
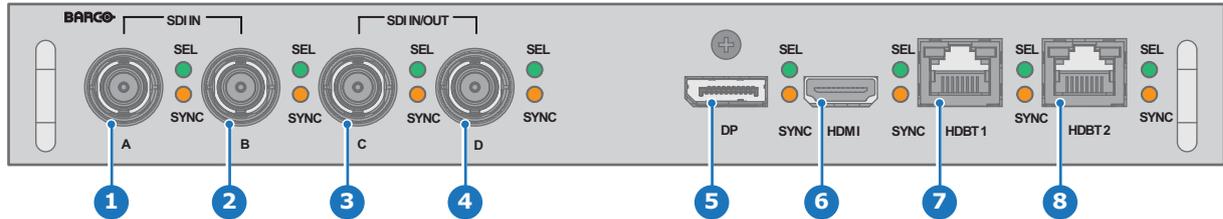
Image 5-6

1	Quad 3G SDI channel A Input	5	DisplayPort Input
2	Quad 3G SDI channel B Input	6	HDMI Input
3	Quad 3G SDI channel C Input	7	HDBaseT Input 1
4	Quad 3G SDI channel D Input	8	HDBaseT Input 2

The yellow LED lights up when valid input sync is detected.

The green LED lights up when the input is selected.

Input specifications

HDMI

Up to 297 MHZ pixel clock

YCbCr 4:4:4

For future release

- YCbCr 4:2:2 and YCbCr 4:2:0
- 3D support
- Interlaced support
- HDCP 1.4
- HDCP 2.2

HDMI 1.4a	Support for 'Deep Color' up to 12 bit per color
Audio	not supported
Video timings	

640 x 480 @60 Hz

720 x 480 @60 Hz

720 x 576 @50 Hz

800 x 600 @60 Hz

1024 x 768 @60 Hz

1280 x 720 @50 Hz

1280 x 720 @60 Hz

1280 x 800 @60 Hz

1280 x 960 @60 Hz

1280 x 1024 @60 Hz

1400 x 1050 @60 Hz

1600 x 1200 @60 Hz

1920 x 1080 @24 Hz

1920 x 1080 @25 Hz

1920 x 1080 @30 Hz

1920 x 1080 @50 Hz

HDMI

1920 x 1080 @60 Hz

1920 x 1200 @50 Hz

1920 x 1200 @60 Hz

2048 x 1080 @24 Hz

2048 x 1080 @25 Hz

2048 x 1080 @30 Hz

2048 x 1080 @48 Hz

2048 x 1080 @50 Hz

2048 x 1080 @60 Hz

2560 x 1600 @50 Hz

2560 x 1600 @60 Hz

3840 x 2160 @24 Hz

3840 x 2160 @25 Hz

3840 x 2160 @30 Hz

3840 x 2160 @50 Hz

3840 x 2160 @60 Hz

4096 x 2160 @24 Hz

4096 x 2160 @25 Hz

4096 x 2160 @30 Hz

4096 x 2160 @50 Hz

4096 x 2160 @60 Hz

HDBase-T

25 – 297 MHz pixel clock

Colors

- YCbCr 4:2:2
- YCbCr 4:4:4
- Color 24 bpp
- Color 30 bpp
- Color 36 bpp

For future release

- 3D support
- Interlaced support
- HDCP 1.4

Audio   not supported

Video timings

640 x 480 @60 Hz

720 x 480 @60 Hz

720 x 576 @50 Hz

800 x 600 @60 Hz

1024 x 768 @60 Hz

1280 x 720 @50 Hz

1280 x 720 @60 Hz

1280 x 800 @60 Hz

1280 x 1024 @60 Hz

1400 x 1050 @60 Hz

1600 x 1200 @60 Hz

HDBase-T

1920 x 1080 @24 Hz
1920 x 1080 @25 Hz
1920 x 1080 @30 Hz
1920 x 1080 @50 Hz
1920 x 1080 @60 Hz
1920 x 1200 @50 Hz
1920 x 1200 @60 Hz
2048 x 1080 @24 Hz
2048 x 1080 @25 Hz
2048 x 1080 @30 Hz
2048 x 1080 @48 Hz
2048 x 1080 @50 Hz
2048 x 1080 @60 Hz
2560 x 1600 @50 Hz
2560 x 1600 @60 Hz
3840 x 2160 @24 Hz
3840 x 2160 @25 Hz
3840 x 2160 @30 Hz
4096 x 2160 @24 Hz
4096 x 2160 @25 Hz
4096 x 2160 @30 Hz

SDI

3G SDI follows the SMPTE 425M standard Level A

HD-SDI follows the SMPTE 292M standard

Color space	YCbCr
	RGB : future release
Color depth	10 bpc
	12 bpc : future release
Chroma sampling	4:2:2 only
	4:2:0 and 4:4:4 : future release
Audio support	not supported
3D support	For future release

- Interlaced support
- Segmented frame support

Video timings
Progressive

Type	Port type	Format
HD-SDI	Single link	1280 x 720 @24 Hz
HD-SDI	Single link	1280 x 720 @25 Hz
HD-SDI	Single link	1280 x 720 @30 Hz
HD-SDI	Single link	1280 x 720 @50 Hz
HD-SDI	Single link	1280 x 720 @60 Hz
HD-SDI	Single link	1920 x 1080 @24 Hz
HD-SDI	Single link	1920 x 1080 @25 Hz
HD-SDI	Single link	1920 x 1080 @30 Hz

SDI

3G-SDI Level A	Single link	1920 x 1080 @50 Hz
3G-SDI Level A	Single link	1920 x 1080 @60 Hz
3G-SDI Level A	Single link	2048 x 1080 @50 Hz
3G-SDI Level A	Single link	2048 x 1080 @60 Hz
3G-SDI "BarcoLink"	Single link	1920 x 1200 @50 Hz
3G-SDI "BarcoLink"	Single link	1920 x 1200 @59.94 Hz
3G-SDI "BarcoLink"	Single link	1920 x 1200 @60 Hz

DisplayPort

Up to 600 MHz pixel clock

Colors

- YCbCr 4:4:4
- YCbCr 4:2:2

3D support   Field sequential 3D (active 3D)

For future release:

- Passive 3D support
- Interlaced support
- HDCP 1.4

Audio   not supported

DP 1.2   Support for 'Deep Color' up to 12 bit per color

Bitrate Support

- Reduced Bit Rate (RBR)
- High Bit Rate (HBR)
- High Bit Rate 2 (HBR2)

Video timings

640 x 480 @60 Hz

800 x 600 @60 Hz

960 x 2160 @120 Hz

960 x 2400 @120 Hz

1024 x 768 @60 Hz

1024 x 2160 @120 Hz

1280 x 800 @60 Hz

1280 x 960 @60 Hz

1280 x 1024 @60 Hz

1400 x 1050 @60 Hz

1600 x 1200 @60 Hz

1920 x 1080 @24 Hz

1920 x 1080 @30 Hz

1920 x 1080 @50 Hz

1920 x 1080 @60 Hz

1920 x 1200 @50 Hz

1920 x 1200 @60 Hz

1920 x 1200 @120 Hz

1920 x 2160 @60 Hz

1920 x 2160 @120 Hz

2048 x 1080 @24 Hz

DisplayPort

<div style="text-align:center">

2048 x 1080 @25 Hz

2048 x 1080 @30 Hz

2048 x 1080 @48 Hz

2048 x 1080 @50 Hz

2048 x 1080 @60 Hz

2048 x 1080 @120 Hz

2560 x 1600 @50 Hz

2560 x 1600 @60 Hz

3840 x 2160 @24 Hz

3840 x 2160 @25 Hz

3840 x 2160 @30 Hz

3840 x 2160 @50 Hz

3840 x 2160 @60 Hz

3840 x 2400 @50 Hz

3840 x 2400 @60 Hz

4096 x 2160 @24 Hz

4096 x 2160 @30 Hz

4096 x 2160 @50 Hz

4096 x 2160 @60 Hz

</div>

3D Support

<div style="text-align:center">

1280 x 720 @50 Hz

1280 x 720 @60 Hz

1920 x 1080 @50 Hz

4096 x 2160 @24 Hz

</div>

CAUTION: In order to display high resolution images (ex.: 3840X2160@60Hz) via the DP1.2 input, the quality of the cable must be adequate, in addition the length of the cable can also influence the performance. In case there is an issue with one of these criteria the automatic link-training initiated by the DP-standard may decide to switch to a lower resolution.

CAUTION: The HDBaseT inputs can bridge a distance of 100 m but is sensitive to radiated electromagnetic interference: radiated electromagnetic interference (e.g. from GSM or switching inductive or capacitive loads) within the limits of electromagnetic compatibility requirements of 3 V/m can cause random flashes or tempo-rary loss of the projected image.

As such, shielded CAT-6 cables with metal RJ-45 connectors are recommended; choose cable length no longer than required and route HDBT cable optimally screened from possible sources of electromagnetic emission.

Virtual & Augmented Reality Input (V&AR) (Optional)
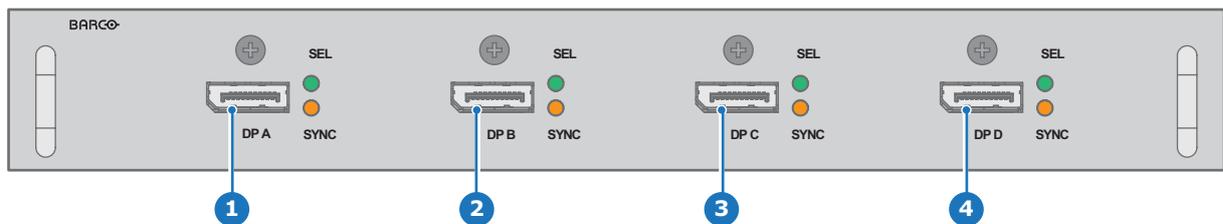
Image 5-7

1 Quad DisplayPort channel A Input		**3** Quad DisplayPort channel C Input	
2 Quad DisplayPort channel B Input		**4** Quad DisplayPort channel D Input	

The yellow LED lights up when valid input sync is detected.

The green LED lights up when the input is selected.

Input specifications

All inputs are DisplayPort 1.2 .

DP

Up to 600 MHz pixel clock

YCbCr 4:4:4

	For future release
	• YCbCr 4:2:2 and YCbCr 4:2:0
	• 3D support
	• Interlaced support
	• HDCP 1.4
Audio	not supported
DP 1.2	Support for 'Deep Color' up to 12 bit per color
Video timings	

640 x 480 @60 Hz

720 x 480 @60 Hz

800 x 600 @60 Hz

1024 x 768 @60 Hz

1280 x 720 @50 Hz

1280 x 720 @60 Hz

1280 x 960 @60 Hz

1280 x 1024 @60 Hz

1400 x 1050 @60 Hz

1920 x 1080 @24 Hz

1920 x 1080 @30 Hz

1920 x 1080 @50 Hz

1920 x 1080 @60 Hz

1920 x 2160 @60 Hz

2560 x 1600 @60 Hz

3840 x 2160 @24 Hz

3840 x 2160 @30 Hz

3840 x 2160 @60 Hz

4096 x 2160 @24 Hz

4096 x 2160 @30 Hz

5.5   Communication connections

Communication Panel
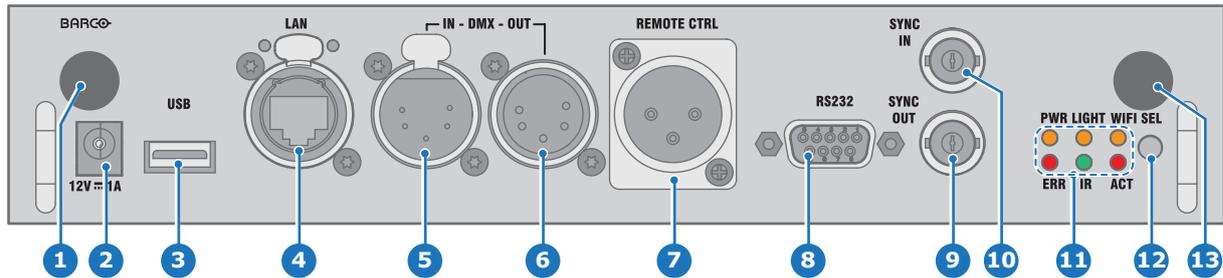
Image 5-8

1 WIFI antenna for wireless IP (optional)	**8**	RS232 for serial communication
2 12V 1A output	**9**	Sync Out 3D
3 Firmware update / USB backup custom settings	**10**	Sync In 3D
4 10/100 base-T for external control over IP and Art-Net	**11**	Status lights
5 DMX interface input	**12**	IR receive sensor
6 DMX interface output	**13**	GSM antenna input (optional)
7 XLR input for wired projector control		

12V output

12 V output, maximum 1A, available when projector is not in stand by.

DMX interface

DMX is used as communication bus between different devices in the light technic. Each device has an input and an output, so that the bus can be looped between the different devices. According the standard a five wire cable with XLR connector is used.

You can use the DMX input port to connect a DMX device (DMX console) to the projector. This way you can control the projector from that DMX device (console). The DMX output port can be connected with the next device in the loop.

Pin	Description
1	Earth
2	Cold
3	Hot
4	Return - (or not used)
5	Return + (or not used)

> **DMX**
>
> DMX-512 Lighting protocol over RS-485 interface. Carries information of 512 channels from a lighting controller to lighting devices. Standardized by USITT.

RS232/RS422 input

The communication interface of the UDX supports RS232 and RS422 serial communication on two different types of input connectors, a Sub-D connector and an USB connector acting as RS input when connected to an USB input of a PC.

You can use the RS232/RS422 input to connect a local PC to your UDX. By this way you can configure and control your UDX from your local PC.

Advantages of using RS232/RS422 serial communication:

- easy adjustment of the projector via PC (or MAC).
- allow storage of multiple projector configurations and set ups.
- wide range of control possibilities.
- address range from 0 to 255.
- sending data to the projector (update).
- copying data from the projector (backup).

RS232/422 input (Sub-D) port	
Pin	Description
1	DCD : Data Carrier Detect
2	RXD- : Receive Data
3	TXD- : Transmitted Data
4	DTR : Data Terminal Ready [RS232]
	TXD+ : Transmitted Data [RS422]
5	GND : Ground
6	DSR : Data Set Ready [RS232]
	RXD+ : Received Data [RS422]
7	— (not connected) —
8	CTS : Clear To Send
9	RI : Ring Indicator

RS232

An Electronic Industries Association (EIA) serial digital interface standard specifying the characteristics of the communication path between two devices using either D-SUB 9 pins or D-SUB 25 pins connectors. This standard is used for relatively short-range communications and does not specify balanced control lines. RS-232 is a serial control standard with a set number of conductors, data rate, word length and type of connector to be used. The standard specifies component connection standards with regard to computer interface. It is also called RS-232-C, which is the third version of the RS-232 standard, and is functionally identical to the CCITT V.24 standard. Logical '0' is > + 3V, Logical '1' is < - 3V. The range between -3V and +3V is the transition zone.

RS422

An EIA serial digital interface standard that specifies the electrical characteristics of balanced (differential) voltage, digital interface circuits. This standard is usable over longer distances than RS-232. This signal governs the asynchronous transmission of computer data at speeds of up to 920,000 bits per second. It is also used as the serial port standard for Macintosh computers. When the difference between the 2 lines is < - 0.2V that equals with a logical '0'. When the difference is > +0.2V that equals to a logical '1'..

USB port

The communication interface is equipped with a master USB port, type "A" connector. This USB port will simplify the service procedures for software updates or for taking backup files from the projector without network connection. An USB-stick is plugged into the USB port and files can be transferred from or to the projector using the local or remote control unit. Note that the USB-stick has to be Linux FAT16 compatible.

5.6   Installation of the WiFi module

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

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

📖	**After the installation, the WiFi module needs to be configured.**

Federal Communication Commission Interference Statement

FCC RF Radiation Exposure Statement: This device is capable of operating in 802.11a mode. For 802.11a devices operating in the frequency range of 5.15 - 5.25 GHz, they are restricted for indoor operations to reduce any potential harmful interference for Mobile Satellite Services (MSS) in the US. WiFi Access Points that are capable of allowing your device to operate in 802.11a mode (5 .15 - 5.25 GHz band) are optimized for indoor use only. If your WiFi network is capable of operating in this mode, please restrict your WiFi use indoors to not violate federal regulations to protect Mobile Satellite Services.

WiFi unit FCC ID: RYK-WUBR508N

Radio Frequency (RF) Exposure Information

The radiated output power of the Barco Wireless Device is below the Industry Canada (IC) radio frequency exposure limits. The Barco Wireless Device should be used in such a manner such that the potential for human contact during normal operation is minimized.

WiFi unit IC ID: IC: 6158A-WUBR508N

IC Antenna statement

Under Industry Canada regulations, this radio transmitter may only operate using an antenna of a type and maximum (or lesser) gain approved for the transmitter by Industry Canada. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that necessary for successful communication.

This radio transmitter 6158A-WUBR508N has been approved by Industry Canada to operate with the antenna types listed below with the maximum permissible gain and required antenna impedance for each antenna type indicated. Antenna types not included in this list, having a gain greater than the maximum gain indicated for that type, are strictly prohibited for use with this device.

Type: Dipole

Maximum Peak Gain: 2 dBi

Impedance: 50 Ohm

Informations concernant l'exposition aux fréquences radio (RF)

La puissance de sortie émise par l'appareil de sans fil Barco est inférieure à la limite d'exposition aux fréquences radio d'Industry Canada (IC). Utilisez l'appareil de sans fil Barco de façon à minimiser les contacts humains lors du fonctionnement normal.

IC ID module WiFi: 6158A-WUBR508N

Déclaration d'antenne d'Industrie Canada (IC)

Conformément à la réglementation d'Industrie Canada, le présent émetteur radio peut fonctionner avec une antenne d'un type et d'un gain maximal (ou inférieur) approuvé pour l'émetteur par Industrie Canada. Dans le but de réduire les risques de brouillage radioélectrique à l'intention des autres utilisateurs, il faut choisir le type d'antenne et son gain de sorte que la puissance isotrope rayonnée équivalente (p.i.r.e.) ne dépasse pas l'intensité nécessaire à l'établissement d'une communication satisfaisante.

Le présent émetteur radio 6158A-WUBR508N a été approuvé par Industrie Canada pour fonctionner avec les types d'antenne énumérés ci-dessous et ayant un gain admissible maximal et l'impédance requise pour chaque type d'antenne. Les types d'antenne non inclus dans cette liste, ou dont le gain est supérieur au gain maximal indiqué, sont strictement interdits pour l'exploitation de l'émetteur.

Type: Dipole

Gain maximum: 2 dBi

Impédance: 50 Ohm

Necessary tools

PH1 Phillips screwdriver

How to install

1. Remove the Communication board.

2. Remove the drive fastener (D) from the front side of the Communication module.
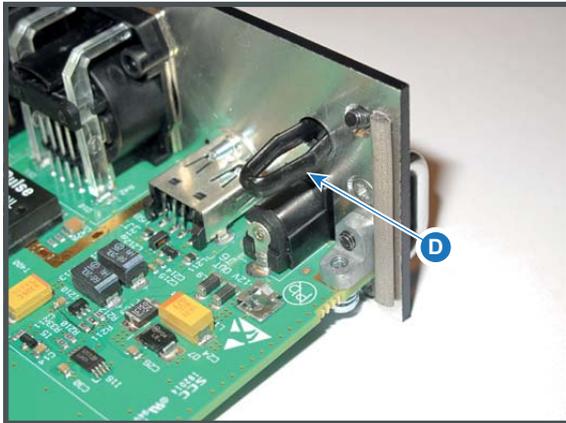
Image 5-9

3. Plug in the antenna wire connector on the WIFI module. Ensure to use bottom connection.
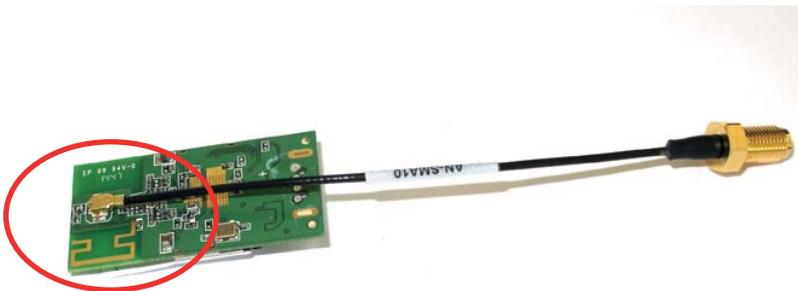
Image 5-10

4. Place the WiFi module (2) upon the plastic socket (1). Note that the plastic socket is provided with two positioning pins which fits the small holes of the WiFi module.

5. Press the plastic cover (3) upon the plastic socket containing the WIFI module as illustrated.
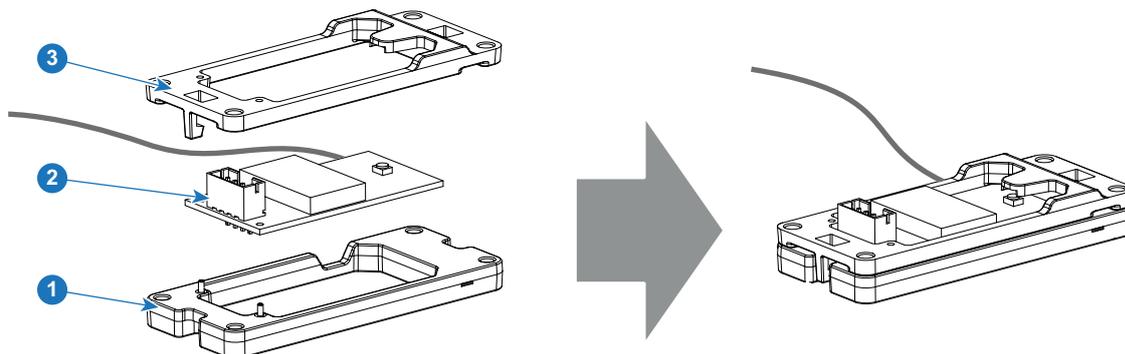
Image 5-11

6. Install the WiFi assembly on the Communication board as illustrated. Use four screws (4) and 4 nuts (5) to secure the WiFi assembly.
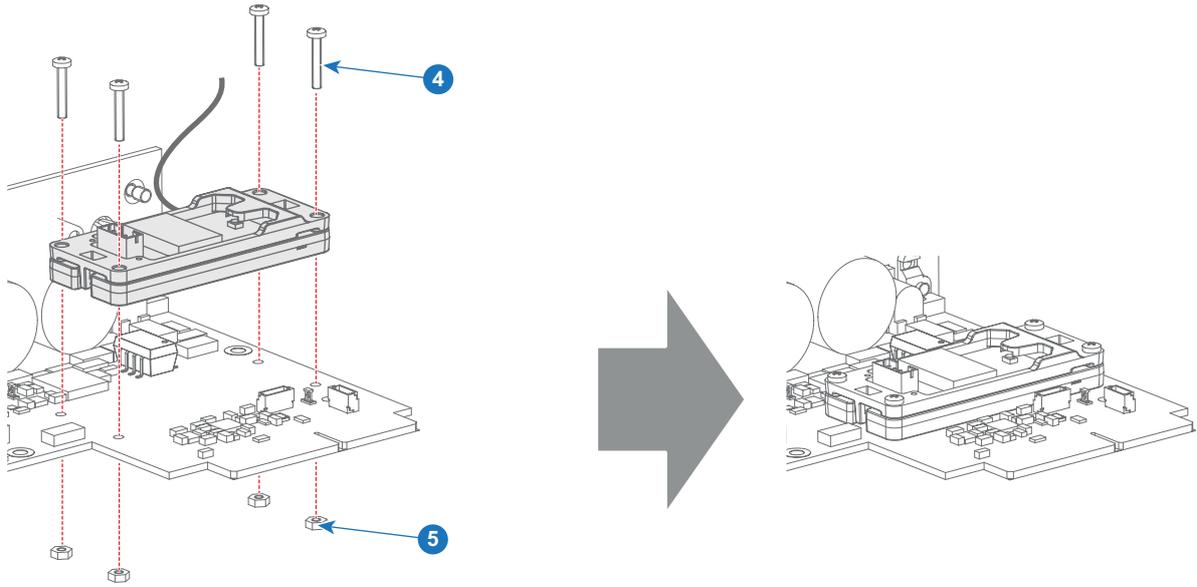
Image 5-12

7. Install the data wire by plugging in the electrical connectors (connector J327, reference 1).

Image 5-13

8. Position the antenna (7) in the hole on the front side of the Communication module.

9. Secure the antenna wire by installing the lock washer and nut (8).
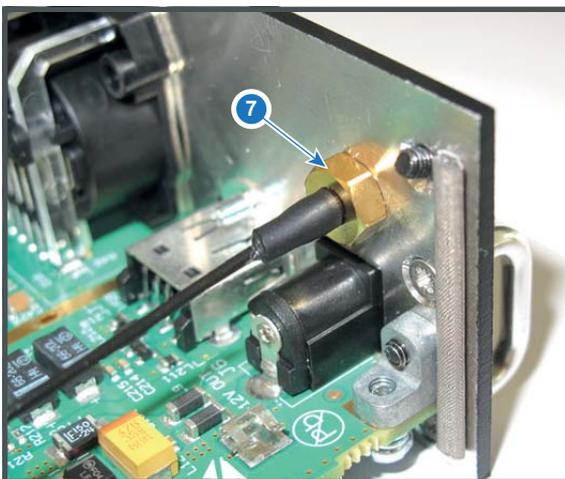
Image 5-14

10. Turn on the antenna (9).

Image 5-15

11. Stick the small white label with certification numbers on the front plate of the communication module somewhere next to the antenna.

12. Reinsert the communication board.

5.7 Installation of the GSM module

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

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

Necessary tools

PH1 Phillips screwdriver

Necessary parts

SIM card (not delivered)

How to install

1. Remove the Communication board.

2. Remove the drive fastener (1) from the front side of the Communication module.
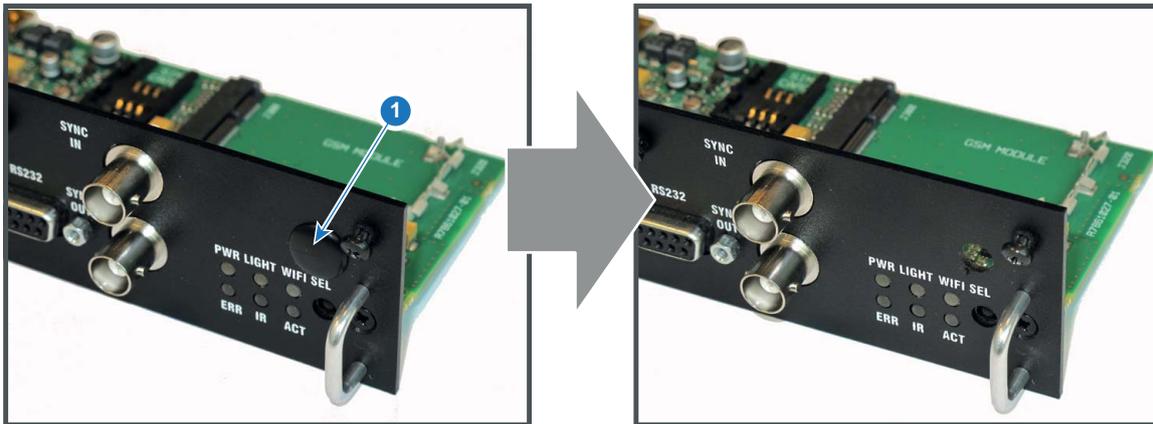
Image 5-16

3. Slide in the SIM card into the SIM card holder (2).
   Ensure that the truncated corner of the SIM card is facing the edge of the module (3).
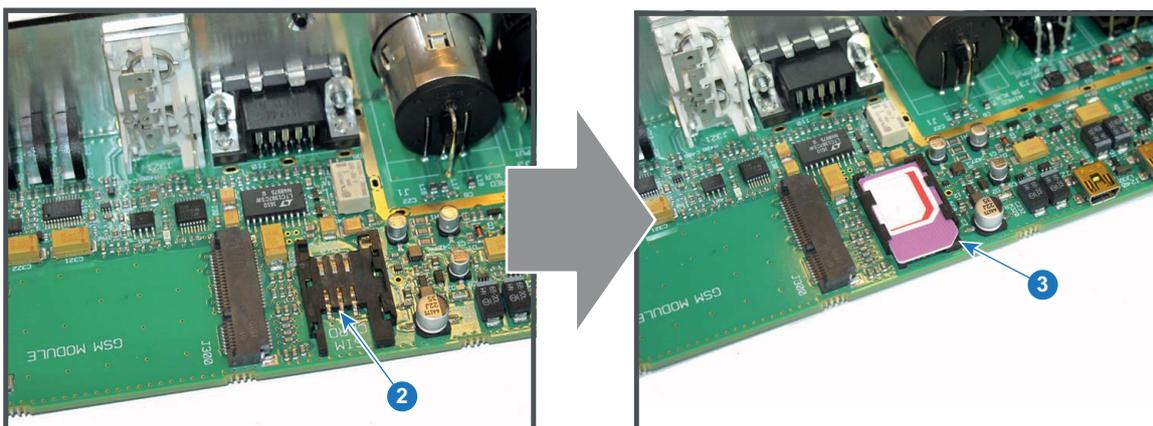
Image 5-17

4. Plug in the antenna wire connector on the front side of the GSM module (4).
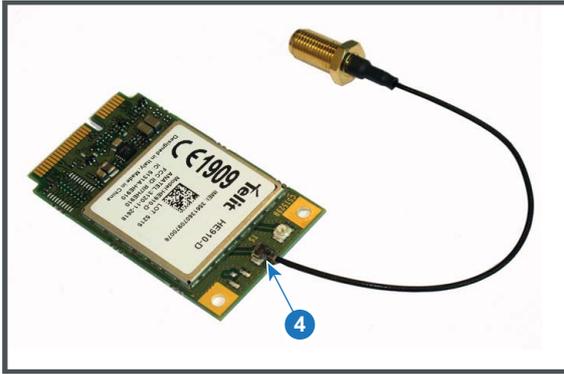
Image 5-18

5. Insert the GSM module with antenna wire into the connector (5). Push the other side of the module down until it clicks so that the module is secured (6).
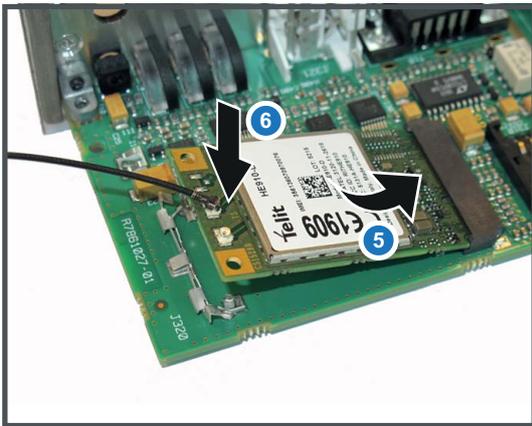
Image 5-19

6. Push the antenna connector through the hole in the front plate and secure the antenna wire by installing the lock washer and nut (7).
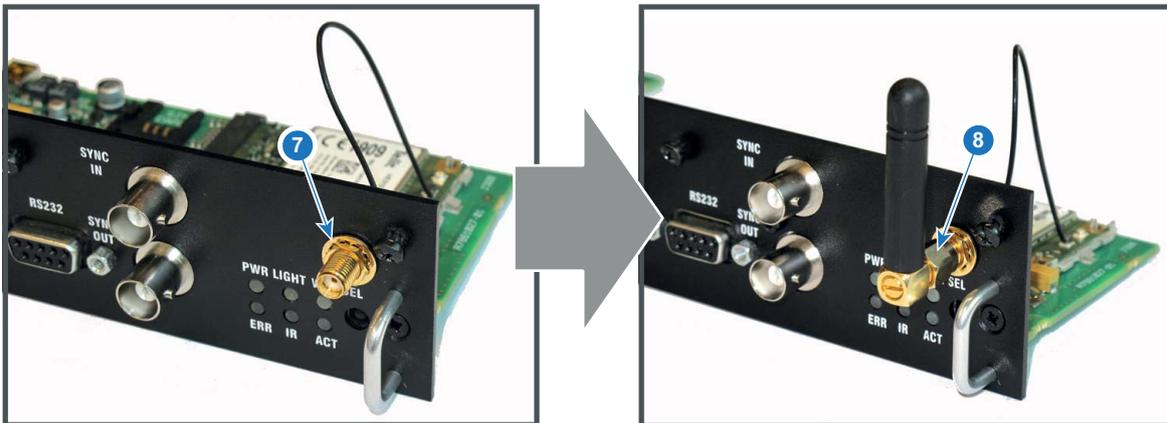
Image 5-20

7. Install the antenna by screwing it on its base (8).

8. Stick the FCC & IC label on the front panel of the Communication module near to the antenna.

9. Reinsert the communication board.

6. GETTING STARTED

How controlling the projector ?

The projector can be controlled by the local keypad, by the remote control unit or by browser application.

Location of the local keypad ?

The local keypad is located on the input side of the projector.

Remote control functions.

This remote control includes a battery powered infrared (IR) transmitter that allows the user to control the projector remotely. This remote control is used for source selection, control, adaptation and set up.

Other functions of the remote control are :

- switching between stand by and operational mode.
- switching to "pause" (blanked picture, full power for immediate restarting)
- direct access to all connected sources.

Overview

- Functionality overview
- Power on projector
- Switching to standby
- Power off projector
- Using the RCU
- Projector Address
- Quick setup via Direct access

6.1 Functionality overview

Local Keypad overview

1 Menu Selection.

2 Menu Activation, OK button

3 OSD On/Off.

4 Menu Back.

5 Power On/Off.

6 Touch Panel On/Off.

7 Input Selection.

8 Shutter Open/Close.

9 Test Patterns.

10 Lens Menu.

11 Touch Panel.
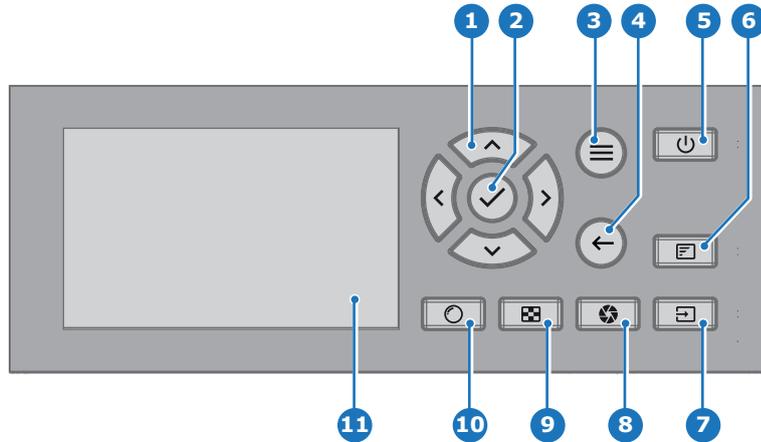
The Keypad gives direct access to several functions, in addition to access to the menu system.

The keypad has a back light that can be switched on and off manually. The light turns off automatically after a preselected time.

The keys are equipped with white and blue backlit LEDs. Power button is equipped with white, blue and red backlit. The LEDs are controlled according to the features available.

Remote Control Unit buttons
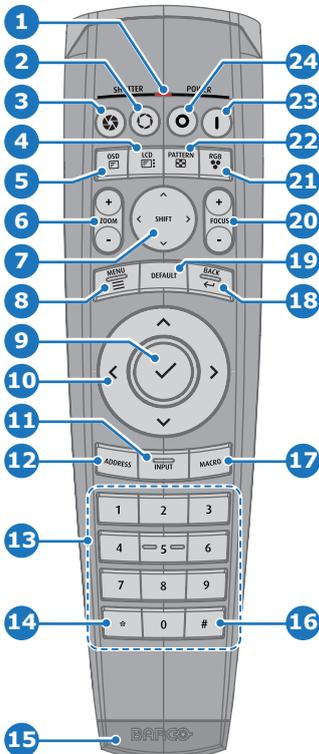
1 Button pressed indicator.

2 Shutter Open.

3 Shutter Close.

4 Touch Panel On/Off.

5 OSD On/Off.

6 Lens Zoom.

7 Lens Shift.

8 Menu Activation.

9 Menu Selection, OK button.

10 Menu Navigation.

11 Input Selection.

12 Address button.

13 Numeric buttons.

14 Backspace (while entering values)

15 XLR connector.

16 Decimal mark (while entering values)

17 Macro button.

18 Menu Back.

19 Default button.

20 Lens Focus.

21 Color On/Off.

22 Test Patterns.

23 Power On.

24 Power Off.

25 Stereo Jack.

26 RCU On/Off.

The projector remote control is a full feature wireless remote control, powered by two (2) standard AA batteries. The battery compartment is on the back side of the remote control.

The remote control is backlit for use in dark environments. It also has an XLR connector for wired connection to the projector. When the wire is connected, the IR beam is switched off.

LCD panel

The LCD panel has two main functions:

1. Showing the menus and adjustment information. and also a mirror of the OSD, (On Screen Display) described in *User Interface* when this is enabled.

2. Information regarding the status of the projector showing this data:
   - Projector status
   - Network address
   - Active source
   - Current firmware version
   - Operation Data
   - Active functions (Enabled Functions).

Toggle between the two indications by using the **Menu** button on the keypad, or on the remote control

The LCD Display will fade out 30 seconds after the last key operation.

6.2 Power on projector

How to power on

1. Press the mains switch at the side of the projector to switch on this projector.
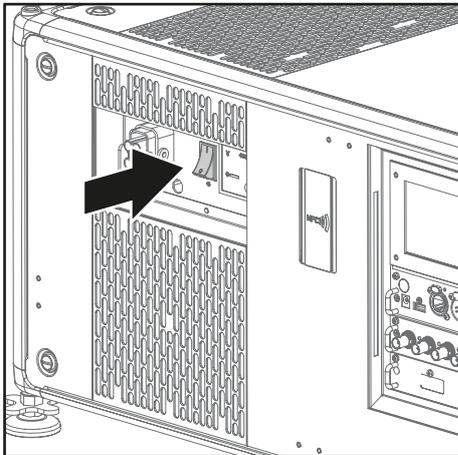
Image 6-1
Mains switch

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

The projector starts up to standby mode. The **Power on/off** button will blink until standby mode is achieved. Once in standby mode, the Power on/off button will be lit WHITE, but the display will be off.

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

The projector will continue to power on mode. The **Power on/off** button will blink until the projector is ready. Once the projector is ready, the Power button will be lit BLUE.

The start up screen is displayed on the touch panel and when fully started up, it changes to the overview screen.
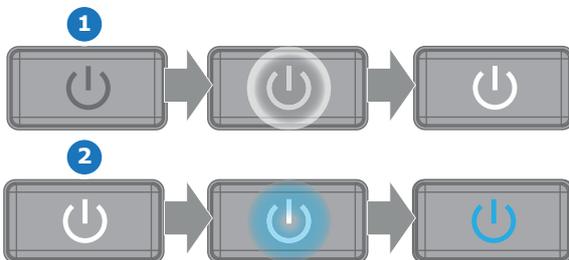
Image 6-2

> **The current mains input voltage is indicated on the voltmeter just above the power switch.**

> **The background image of the startup screen and info screens can be changed with Projector Toolset with an installed UDX plug-in.**

Status overview

Once the projector is started, press **Status** to get an overview of parameters such as :

- Device serial number and article number
- Current firmware version and model name
- Current illumination (in percentage)
- Projector runtime in hours
- Uptime in hours
- Chosen source
- Current resolution and refresh rate
- Chosen communication method and IP address (if connected)
- Active functions

Starting image projection

1. Make sure the available sources are connected to the appropriate input ports.
   Tip: *If properly connected, the "SYNC" LED will lit up ORANGE.*

2. Press the **Input Selection** button on the keypad or on the remote control until:
   - the LED of the selected source (the "SEL" LED) lit up GREEN, and
   - the image of the selected source is projected.
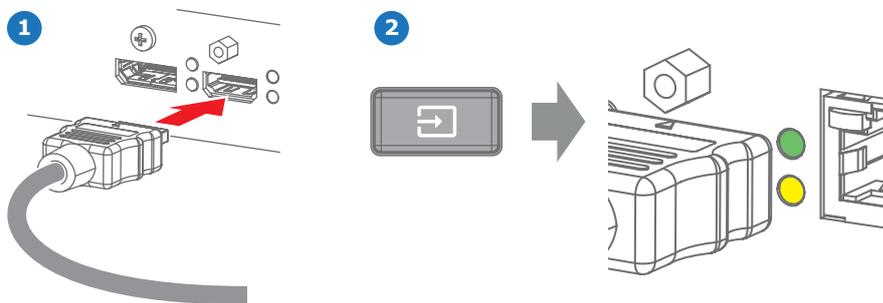
Image 6-3

6.3   Switching to standby

How to switch to standby

1. Press and hold the **Power on/off** button for 3 seconds on the local keypad, or press the **Power Off** button on the remote control.

   The projector goes to standby mode. The after-cooling cycle will start (about 30 seconds). During this period the Power on/off button will blink. Once the after-cooling cycle has ended, the projector will be in standby mode and the Power on/off button will be lit WHITE.
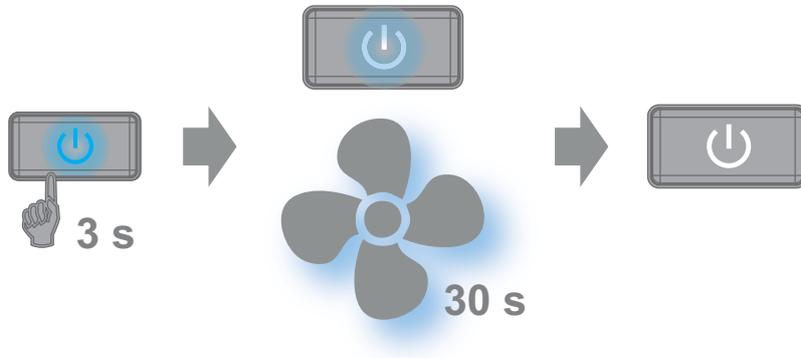
Image 6-4

6.4   Power off projector

⚠	CAUTION: **This procedure assumes the projector is in standby mode.**

How to power off

1. Switch off the projector with the mains switch. '0' must be pressed.
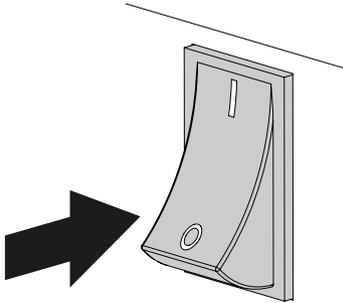
Image 6-5

2. Unplug the power cord from the projector.

6.5 Using the RCU

Pointing to the reflective screen

1. Point the front of the RCU to the reflective screen surface.
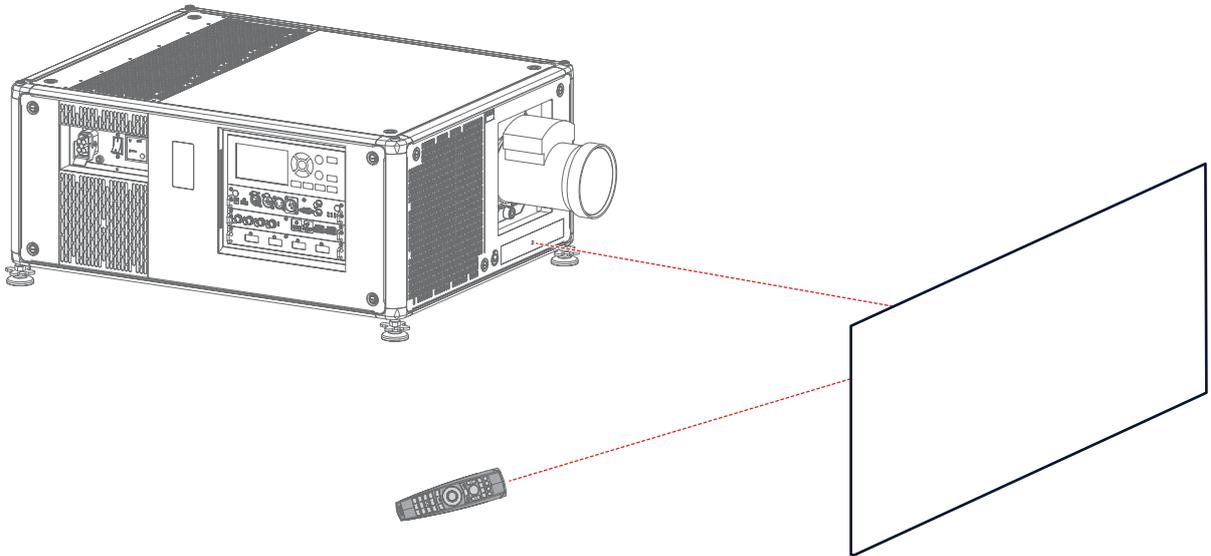
Image 6-6
IR control via reflective screen

Hardwired to the XLR input

1. Plug one end of the remote cable in the connector on the bottom of the RCU.

2. Plug the other end in the big connector on the communication interface of the projector, labelled **Remote CTRL**.
   Note: *Plugging the remote control will switch the broadcast address of the remote control to the default value '0'. This is the only broadcast address that will work when hardwired. If you want to change the broadcast address after disconnecting the remote control, see "Projector Address", page 77.*

Pointing directly to the IR sensor

When using the wireless remote control, make sure you are within the effective operating distance (30 m, 100 ft in a straight line). The remote control unit will not function properly if strong light strikes the sensor window or if there are obstacles between the remote control unit and the projector IR sensor.
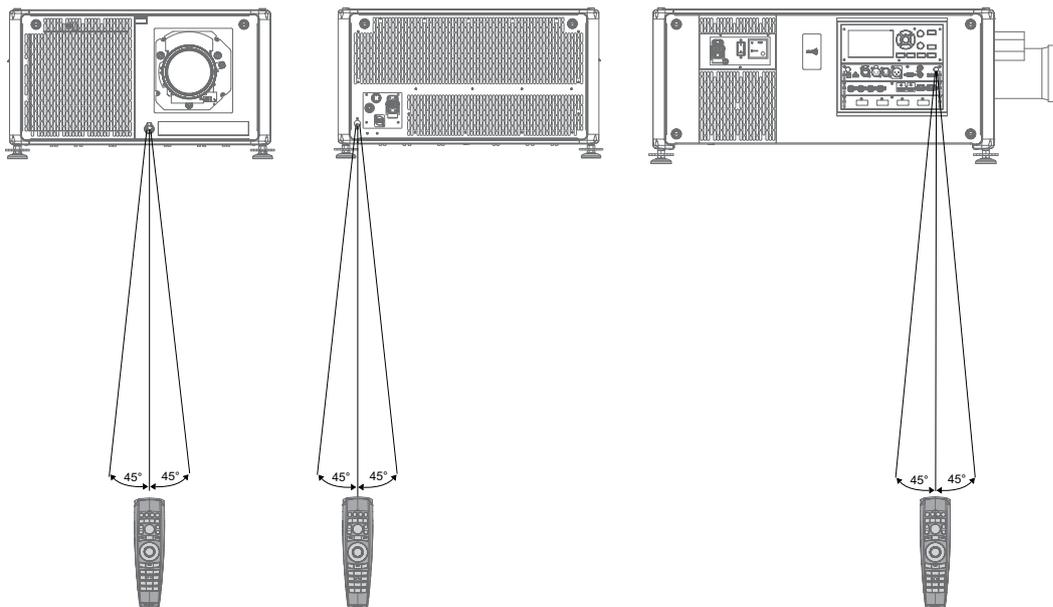
Image 6-7
RCU to one of the IR sensors

6.6   Projector Address

Projector address

Address installed in the projector to be individually controlled.

Broadcast address

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

6.6.1   Controlling the projector

Why a projector address?

As more than one projector can be installed in a room, each projector should be separately addressable with an RCU or computer. Therefore each projector has its own address.

Set up an individual Projector Address

The set up of a projector address can be done via the software.

Projector controlling

Every projector requires an individual address between 0 and 255.

When the address is set, the projector can be controlled now:
- with the RCU: only for addresses between 0 and 31.
- with a computer: for any address between 0 and 255.

Broadcast Address

Every projector has a broadcast (common) address '0' or '1'. The default address is '0'.

The choice between '0' and '1' can be selected in the GUI: "*System Settings*" → "*Communication*" →"*IR Control* ".

> **Placing new batteries in the remote control or plugging the remote to a projector via XLR cable will automatically reset the address back to its default value '0'.**

6.6.2 Displaying and Programming addresses into the RCU

Displaying the Projector Address on the Screen.

1. Press the **Address** button to see the projector address (proximately 2 seconds).

   The projector's address is displayed on the LCD status screen.

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, he 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.

6.7 Quick setup via Direct access

Quick source selection

1. Press the **Input** button on the remote control or local keypad.
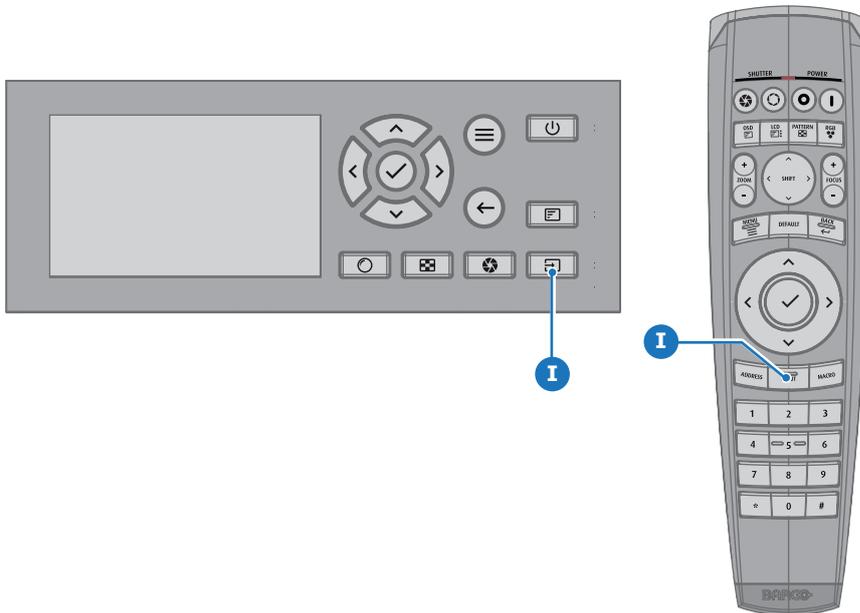
Image 6-8

The source selection menu opens.

Image 6-9
Input selection

2. Use the arrow keys to select the desired source.

Quick test pattern selection

1. Press the Test pattern button on the remote control or local keypad.
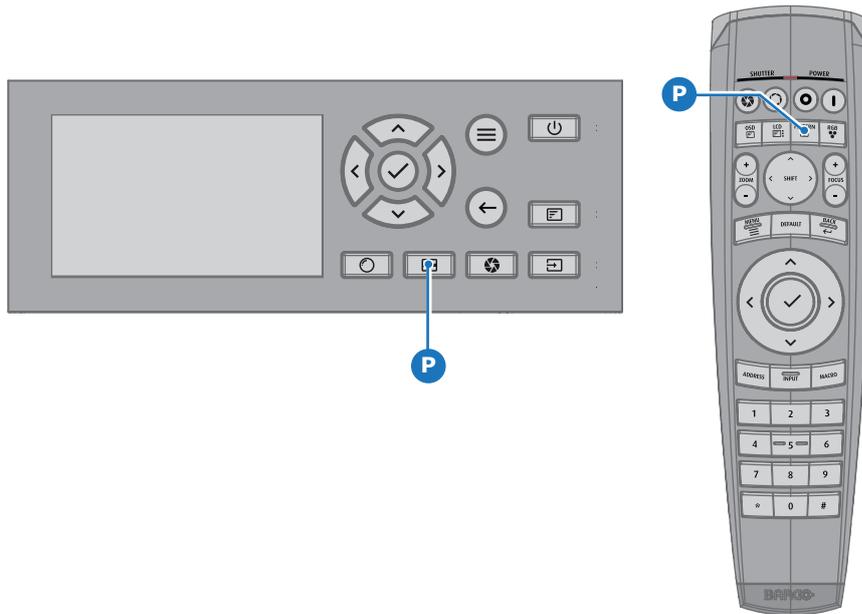
Image 6-10

A first test pattern will be displayed.

2. Press as may times on that button until the desired pattern is displayed

7. MAINTENANCE

About this chapter

This chapter contains general maintenance procedures.

Overview

- Cleaning the lens
- Cleaning the exterior of the projector
- Replacement of the metal dust filters
- Replacement of the synthetic air filter

7.1 Cleaning the lens

> **To minimize the possibility of damage to optical coatings, or scratches to lens surfaces follow the cleaning procedure as described here precisely.**

Necessary tools

- Compressed air.
- Clean Toraysee® cloth or any micro fiber lens cleaning cloth.
- Clean cotton cloth.

Necessary parts

Lens cleaner (e.g. Carl Zeiss lens cleaner or Purasol® or any water-based lens cleaner)

How to clean the lens?

1. Blow off dust with clean compressed air (or pressurized air cans[1]) .

2. Clean with lens cleaner together with a clean lens cleaning cloth to remove the dust and contamination. Use big wipes in one single direction.
   Warning: *Do not wipe back and forwards across the lens surface as this tends to grind dirt into the coating.*

3. Use a dry lens cleaning cloth to remove left liquid or stripes. Polish with small circles.

4. If there are still fingerprints on the surface, wipe them off with lens cleaner together with a clean lens cleaning cloth. Polish again with a dry one.

> **If smears occur when cleaning lenses, replace the cloth. Smears are the first indication of a dirty cloth.**

---

1. Pressurized air cans are not efficient if there is too much dust on the surface, the pressure is too low

7.2 Cleaning the exterior of the projector

How to clean the exterior of the projector ?

1. Switch off the projector and unplug the projector from the mains power net.

2. Clean the housing of the projector with a damp cloth. Stubborn stains may be removed with a cloth lightly dampened with a mild detergent solution.

7.3 Replacement of the metal dust filters

⚠️	**CAUTION:** The high density filter must be replaced on a regular basis, depending on the environment conditions of the projector.

⚡	**WARNING:** Switch off the projector and unplug the power cord before starting the procedure.

Necessary tools

• Vacuum cleaner
• Compressed air

Necessary parts

Metal air filters

How to replace the small air filter

1. Remove the light processor cover. See "Removal of the left cover", page 91.

2. Locate the metal filter on the inside of the cover.

3. Push both filter holders to the outside and flip the filter out of the holder as illustrated.
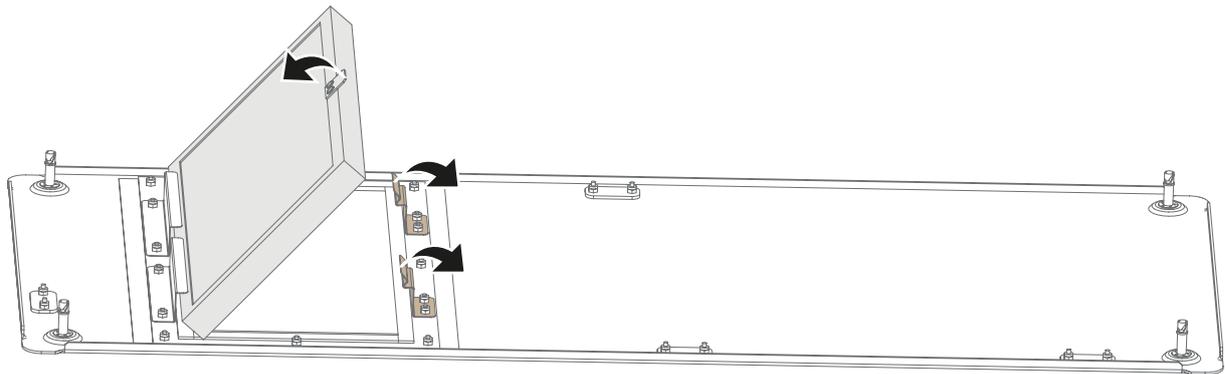
Image 7-1
Small metal filter replacement

4. Remove the filter and clean it.

5. Install either the cleaned filter or a new filter (if the old one is no longer usable).
   Caution: Take notice of the air flow direction of the filter (made visible by a label). Make sure the arrow points towards the inside of the projector.

6. Install the light processor cover again. See "Mounting the left cover", page 95.

How to replace the large air filter

1. Remove the small top cover. See "Removal of the small top cover", page 93.

2. Push both filter holders to the outside and flip the filter out of the holder as illustrated.
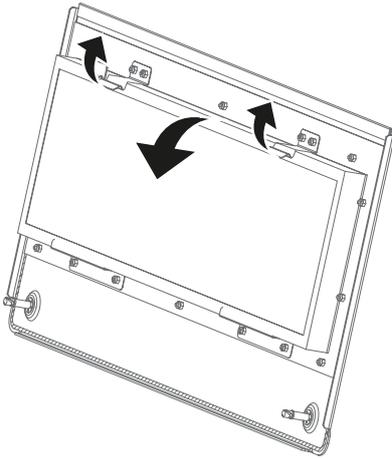
Image 7-2
Small top cover filter replacement

3. Remove the filter and clean it.

4. Install either the cleaned filter or a new filter (if the old one is no longer usable).
   Caution: *Take notice of the air flow direction of the filter (made visible by a label). Make sure the arrow points towards the inside of the projector.*

5. Install the small top cover again. See "Mounting the small top cover", page 97.

Clean the metal dust filters

1. Remove most contamination with a vacuum cleaner.

2. Blow remaining dust away with compressed air in an other room or outside.

If you cannot clean the filter anymore, insert a new one.

7.4 Replacement of the synthetic air filter

	WARNING: Switch off the projector and unplug the power cord before starting the procedure.

Necessary parts

New synthetic filter

How to remove

1. Remove the front cover. See "Removal of the front cover", page 90.

2. Push both filter holders to the outside and flip the filter out of the holder as illustrated.
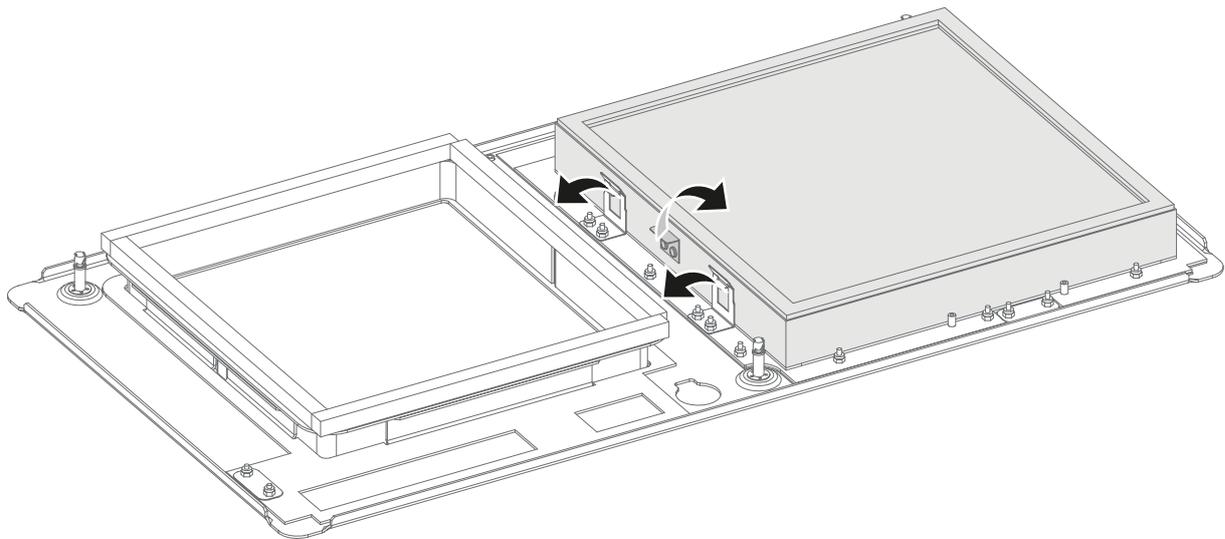
Image 7-3
Remove old filter

3. Remove the filter and insert a new one.
   Caution: *Take notice of the air flow direction of the filter (made visible by a label). Make sure the arrow points towards the inside of the projector.*

4. Install the front cover. See "Mounting the front cover", page 94

	CAUTION: Never clean the filter. Always replace with a new one.

	CAUTION: Never use the projector with removed filters !

8. REMOVAL AND INSTALLATION OF THE PROJECTOR COVERS

Overview

- •   Removal of the front cover
- •   Removal of the left cover
- •   Removal of the back cover
- •   Removal of the small top cover
- •   Mounting the front cover
- •   Mounting the left cover
- •   Mounting the back cover
- •   Mounting the small top cover

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: Always switch off the projector and unplug the power cord before removing one of the covers, unless otherwise stated.

8.1 Removal of the front cover

Necessary tools

7 mm flat screw driver

How to remove

1. Remove the lens. See "Lens removal", page 43.

2. Release the three captive screws (reference 1).
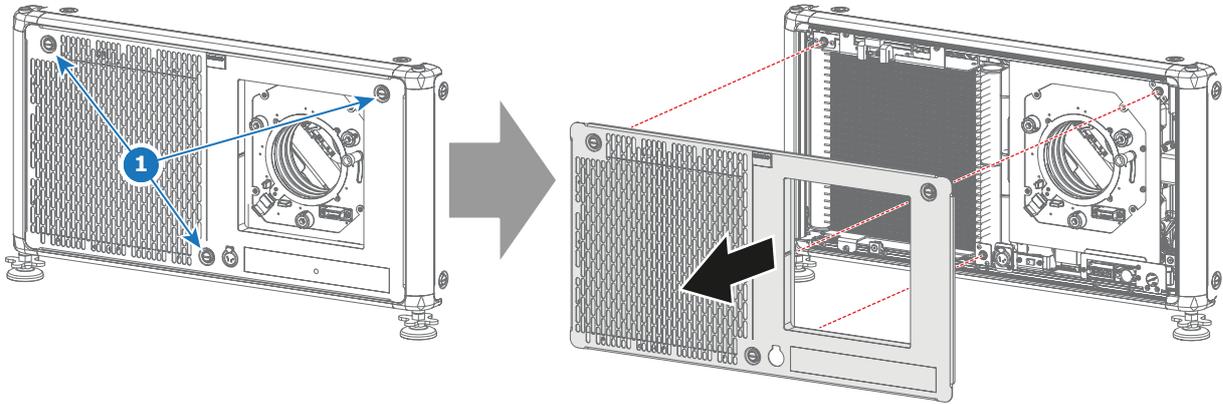
Image 8-1
Front cover removal

3. Remove the front cover.

8.2 Removal of the left cover

Necessary tools

7 mm flat screw driver

How to remove

1. Loosen the four captive screws (reference 1) of the light processor cover. Use a 7 mm flat screwdriver.

2. Remove the cover from the projector.
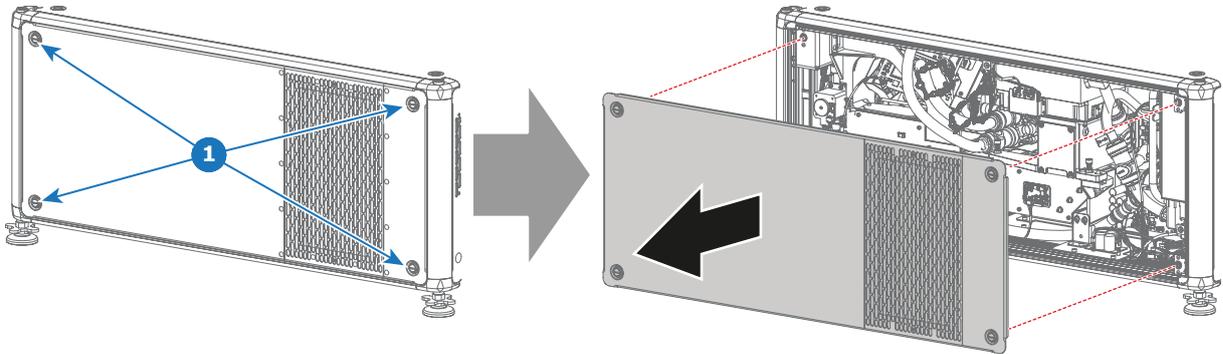
Image 8-2
Removal of the left cover (light processor side)

8.3 Removal of the back cover

Necessary tools

7 mm flat screw driver

How to remove

1. Loosen the captive three screws (reference 1) of the backside of the projector. Use a 7 mm flat screwdriver.

2. Remove the cover from the projector.
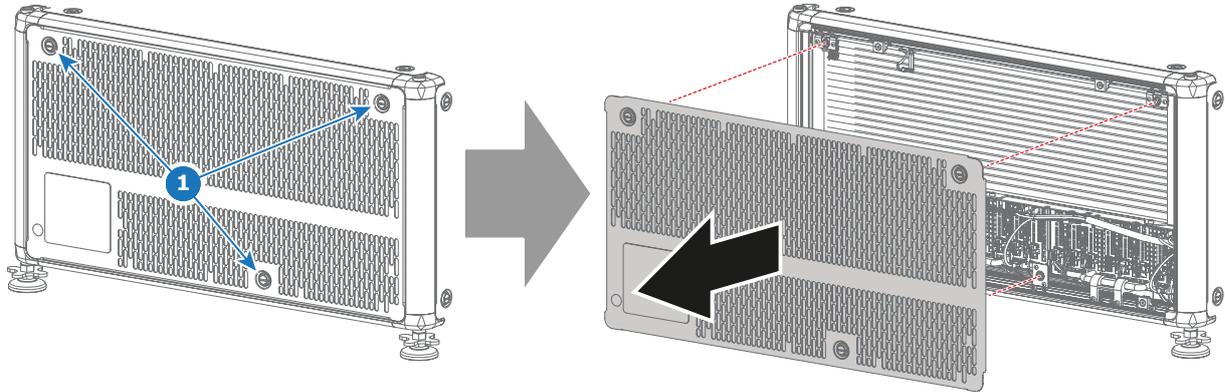
Image 8-3
Remove back cover

8.4 Removal of the small top cover

Necessary tools

7 mm flat screw driver

How to remove

1. Loosen the two captive screws (reference 1) of the small top cover at the back side of the projector.
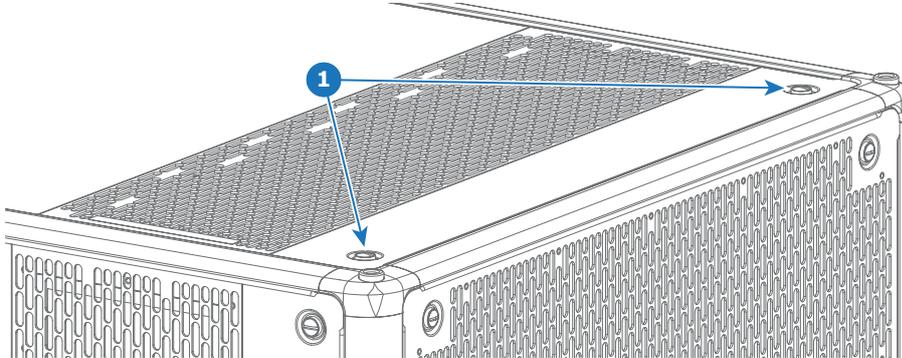
Image 8-4

> *Caution:* Only loosen the captive screws at the backside of the projector. It is not necessary to loosen the captive screws at the front side of the top cover.

2. Flip the small cover open and remove it carefully.
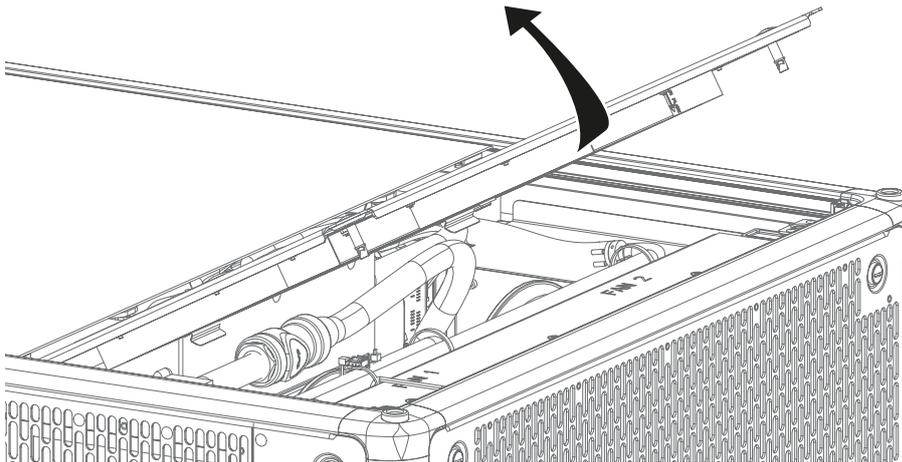
Image 8-5
Flip the small top cover

8.5 Mounting the front cover

Necessary tools

7 mm flat screw driver

How to mount

1. Place the front cover on its place, with the filter facing the projector.
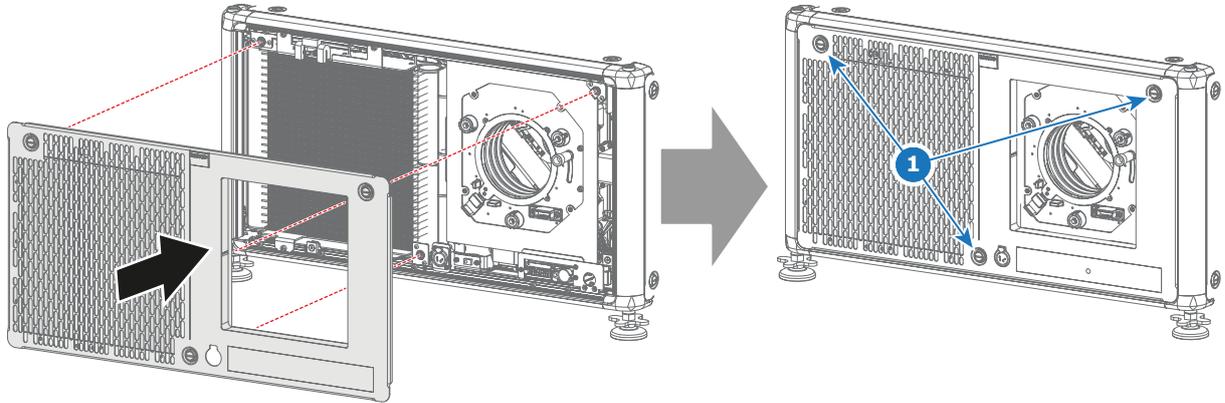
Image 8-6
Mount front cover

2. Fasten the three captive screws (reference 1).

3. Mount the lens again. See "Lens installation", page 41.

8.6 Mounting the left cover

Necessary tools

7 mm flat screw driver

How to mount

1. Place the cover on its place, with the filter facing the **back side** of the projector.
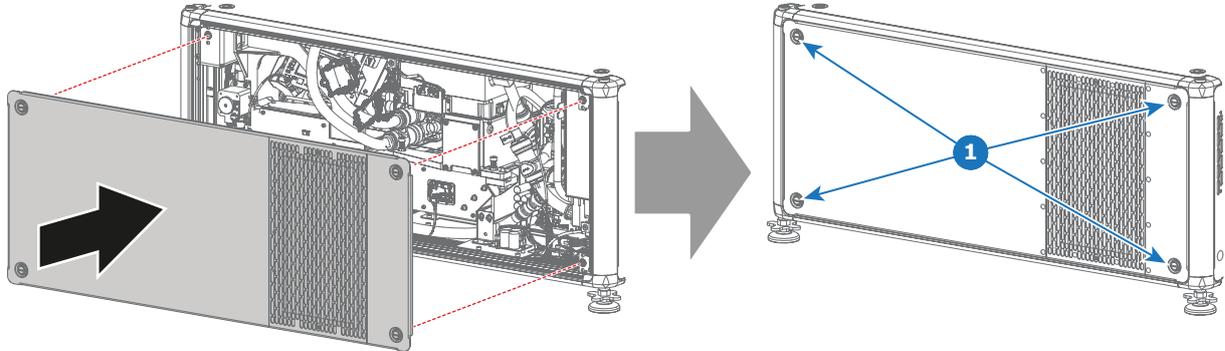
Image 8-7
Mount left cover (light processor side)

2. Fasten the four captive screws (reference 1).

8.7 Mounting the back cover

Necessary tools

7 mm flat screw driver

How to mount

1. Place the back cover on the backside of the projector.
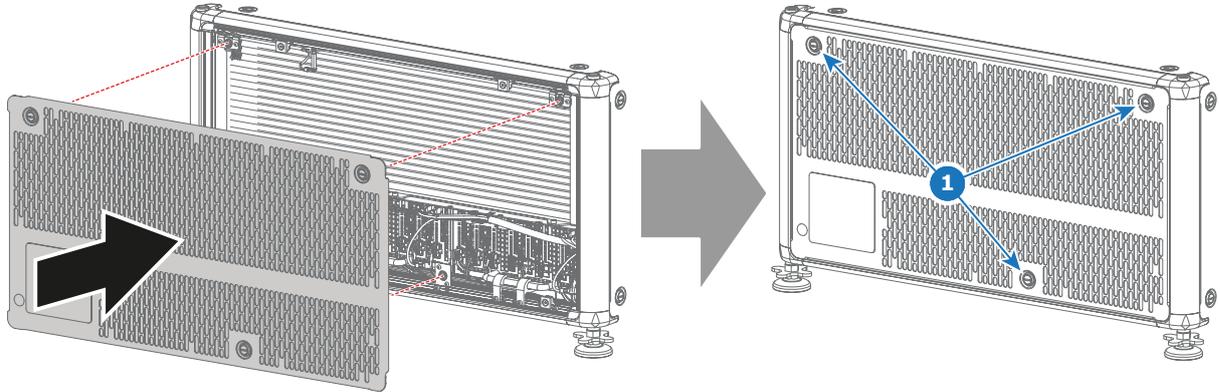
Image 8-8
Mount back cover

2. Fasten the three captive screws (reference 1).

8.8 Mounting the small top cover

Necessary tools

7 mm flat screw driver

How to mount

1. Slide the small top cover into the gapes of the large top cover (reference 1, image 8-9).
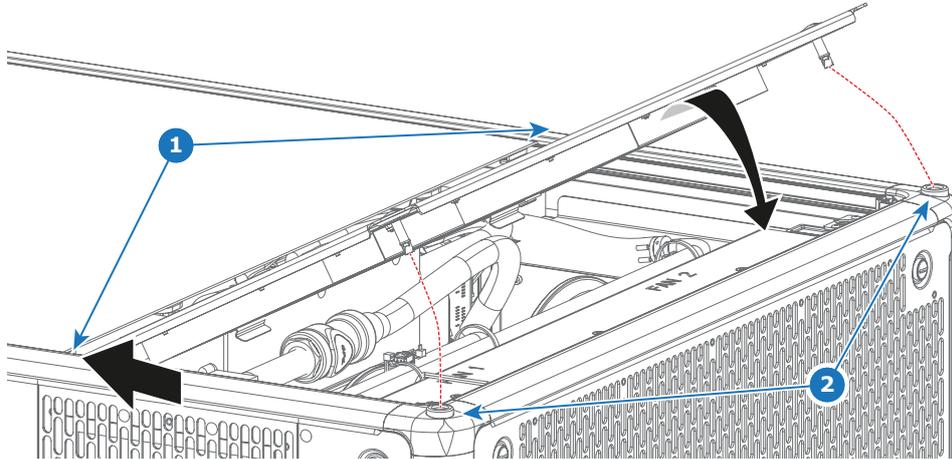
Image 8-9

2. Flip down the cover, so that the captive screws nicely fit the inserts (reference 2).

3. Fasten the two captive screws (reference 1, image 8-9).
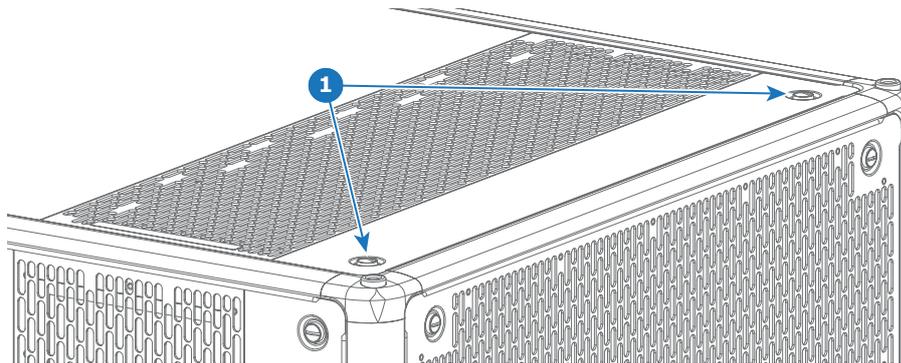
Image 8-10

A. SPECIFICATIONS

About this chapter

This chapter gives an overview of the specification of the UDX projector as well as the dimensions and the center of gravity.

Overview

- Specifications of the UDX 4K32
- Specifications of the UDX 4K22
- Specifications of the UDX W32
- Specifications of the UDX W22
- Specifications of the UDX U32
- Dimensions of a UDX
- Dimensions of the rigging frame
- Dimensions of the flight case
- Technical Regulations

A.1 Specifications of the UDX 4K32

Specifications

Projector type	4K UHD 3-chip DLP digital projector
Technology	0.9" DMD™ x3
Resolution	3,840 x 2,160 (4K UHD) / 2,560 x 1,600 (native)
Brightness	31,000 (WQ)/30,000 (4K UHD) center lumens*
Contrast ratio	2,000:1
Brightness uniformity	90%
Aspect ratio	16:10
ScenergiX	Horizontal and vertical edge blending
Lenses	TLD+ 0.8-1.16:1 ; 1.25-1.6:1 ; 1.5-2.0:1 ; 2.0-2.8:1 ; 2.8-4.5:1 ; 4.5-7.5:1 ; 7.5-11.5:1
Optical lens shift	V: -100% to +130% / H: +/- 40% on zoom lenses (memorized)
Color correction	P7
Light source	laser phosphor with inorganic phosphor wheel
Light source lifetime	+20,000 hrs
Optical dowser	Standard
Picture-in-picture	Two sources simultaneously
Orientation	360°
Sealed DLP™ core	standard
DMX 512	standard
WARP	Direct adjust OSD + toolset
Integrated web server	Yes
CLO (constant light output)	Standard
3D	Active eye wear (optional), passive circular (optional); 3 flash up to 200Hz
Inputs	Dual HDBt; HDMI 2.0 (HDCP 2.2); DP 1.2 (HDCP 1.3); Quad SDI/HDSDI/dual HDSDI/6G/BarcoLink
Optional Inputs	Quad DP1.2
Input resolutions	From NTSC up to 4K (4,096 x 2,160)
Max. pixel clock	600 MHz
Software tools	Projector Toolset + Android app + iOS app
Control	XLR wired + IR, RS232, Wifi, GSM (opt)
Network connection	10/100 base-T, RJ-45 connection, Wifi (optional)
Power requirements	120-160V / 200-240V (+/- 10%), 20A, 50-60Hz
Max. power consumption	2,900W nom/3,100W max / STBY less than 10W
Noise level (typical at 25°C/77°F)	52dB(A)
Operational ambient temperature	0-40°C / 32°-104°F
Operational humidity	0-80% (non condens)
Dissipation BTU	Max. 10,921 BTU/h
Dimensions (WxLxH)	660 x 830 x 350 mm / 25.98 x 32.67 x 13.77 inches
Shipping Dimensions	(LxWxH) 1,200 x 800 x 685 mm / 47.24 x 31.49 x 26.96 inches
Weight	92kg (202 lbs)/shipping weight from factory: 110kg (242 lbs)
Standard accessories	Power cord, wireless/XLR wired rugged remote control
Certifications	Compliant with UL60950-1 and EN60950-1 complies with FCC rules & regulations, part 15 Class A and CE EN55032 Class A, Rohs
Warranty	3 years
*	+/- 10%

A.2 Specifications of the UDX 4K22

Specifications

Projector type	4K UHD 3-chip DLP digital projector
Technology	0.9" DMD™ x3
Resolution	3,840 x 2,160 (4K UHD) / 2,560 x 1,600 (native)
Brightness	21,000 (WQ)/20,000 (4K UHD) center lumens*
Contrast ratio	2,000:1
Brightness uniformity	90%
Aspect ratio	16:10
ScenergiX	Horizontal and vertical edge blending
Lenses	TLD+ 0.8-1.16 ; 1.25-1.6:1 ; 1.5-2.0:1 ; 2.0-2.8:1 ; 2.8-4.5:1 ; 4.5-7.5:1 ; 7.5-11.5:1
Optical lens shift	Vert -100% to +130% / Hor +/-40% on zoom lenses memorized
Color correction	P7
Light source	laser phosphor with inorganic phosphor wheel
Light source lifetime	+20,000 hrs
Optical dowser	Standard
Picture-in-picture	Two sources simultaneously
Sealed DLP™ core	Standard
Orientation	360°
DMX 512	standard
WARP	Direct adjust OSD + toolset
Integrated web server	Yes
CLO (constant light output)	Standard
3D	Active eye wear (optional), passive circular (optional); 3 flash up to 200Hz
Inputs	Dual HDBt; HDMI 2.0 (HDCP 2.2); DP 1.2 (HDCP 1.3); Quad SDI/HDSDI/dual HDSDI/6G/BarcoLink
Optional Inputs	Quad DP1.2
Input resolutions	From NTSC up to 4K (4,096 x 2,560)
Max. pixel clock	600 Mhz
Software tools	Projector Toolset + Android app + iOS app
Control	XLR wired + IR, RS232, Wifi, GSM (opt)
Network connection	10/100 base-T, RJ-45 connection, Wifi (optional)
Power requirements	120-160 V / 200-240 V (+/- 10%), 20 A, 50-60 Hz (reduced power on 110 V)
Max. power consumption	1,900W @ 230 volts STBY<10W
Noise level (typical at 25°C/77°F)	TBD
Operational ambient temperature	0°-40°C/ 32°-104°F (45°C reduced power)
Operational humidity	0-80% (non condens)
Dissipation BTU	Max. 6,600 BTU/h
Dimensions (WxLxH)	660 x 830 x 350 mm (25.98 x 32.67 x 13.77")
Shipping Dimensions	(LxWxH)1,200 x 980 x 760 mm (47.24 x 38.58 x 29.92")
Weight	87.5 kg (193 lbs)/shipping weight from factory: 105kg (231lbs)
Standard accessories	Power cord, wireless/XLR wired rugged remote control
Certifications	Compliant with UL60950-1 and EN60950-1, complies with FCC rules & regulations, part 15 Class A and CE EN55032 Class A, Rohs
Warranty	3 years
*****	+/- 10%

A.3   Specifications of the UDX W32

Specifications

Projector type	WUXGA 3-chip DLP digital projector
Technology	0.96" DMD™ x3
Resolution	1,920 x 1,200
Brightness	32,000 center lumens*
Contrast ratio	2,000:1
Brightness uniformity	90%
Aspect ratio	16:10
ScenergiX	Horizontal and vertical edge blending
Lenses	TLD+ 0.73:1 ; 1.2:1 ; 0.8-1.16 ; 1.25 -1.6:1 ; 1.5-2.0:1 ; 2.0-2.8:1 ; 2.8-4.5:1 ; 4.5-7.5:1 ; 7.5-11.5:1
Optical lens shift	V: -100% to +130% / H: +/-40% on zoom lenses (memorized)
Color correction	P7
Light source	laser phosphor with inorganic phosphor wheel
Light source lifetime	+20,000 hrs
Optical dowser	Standard
Picture-in-picture	Two sources simultaneously
Sealed DLP™ core	standard
Orientation	360°
DMX 512	standard
WARP	Direct adjust OSD + toolset
Integrated web server	Yes
CLO (constant light output)	Standard
3D	Active eye wear (optional), passive circular (optional); 3 flash up to 200Hz
Inputs	Dual HDBt; HDMI 2.0 (HDCP 2.2); DP 1.2 (HDCP 1.3); Quad SDI/HDSDI/dual HDSDI/6G/BarcoLink
Optional Inputs	Quad DP1.2
Input resolutions	From NTSC up to 4K (4,096 x 2,160)
Max. pixel clock	600 MHz
Software tools	Projector Toolset + Android app + iOS app
Control	XLR wired + IR, RS232, Wifi, GSM (opt)
Network connection	10/100 base-T, RJ-45 connection, Wifi (optional)
Power requirements	120-160V / 200-240V (+/- 10%), 20A, 50-60Hz
Max. power consumption	2,900W nom/3,100W max. / STBY less than 10W
Noise level (typical at 25°C/77°F)	52dB(A)
Operational ambient temperature	0-40°C / 32°-104°F
Operational humidity	0-80% (non condens)
Dissipation BTU	Max. 10,921 BTU/h
Dimensions (WxLxH)	660 x 830 x 350 mm / 25.95 x 32.7 x 13.78 inches
Shipping Dimensions	(LxWxH) 1,200 x 800 x 685 mm / 47.24 x 31.49 x 26.96 inches
Weight	92kg (202 lbs)/shipping weight from factory: 110kg (242 lbs)
Standard accessories	Power cord, wireless/XLR wired rugged remote control
Certifications	Compliant with UL60950-1 and EN60950-1 complies with FCC rules & regulations, part 15 Class A and CE EN55032 Class A, Rohs
Warranty	3 years
*****	+/- 10%

A.4   Specifications of the UDX W22

Specifications

Projector type	WUXGA 3-chip DLP digital projector
Technology	0.96" DMD™ x3
Resolution	1,920 x 1,200
Brightness	22,000 center lumens*
Contrast ratio	2,000:1
Brightness uniformity	90%
Aspect ratio	16:10
ScenergiX	Horizontal and vertical edge blending
Lenses	TLD+ 0.73:1 ; 1.2:1 ; 1.25 -1.6:1 ; 1.5-2.0:1 ; 2.0-2.8:1 ; 2.8-4.5:1 ; 4.5-7.5:1 ; 7.5-11.5:1
Optical lens shift	Vert -100% to +130% / Hor +/-40% on zoom lenses memorized
Color correction	P7
Light source	laser phosphor with inorganic phosphor wheel
Light source lifetime	+20,000 hrs
Optical dowser	Standard
Picture-in-picture	Two sources simultaneously
Sealed DLP™ core	standard
Orientation	360°
DMX 512	standard
WARP	Direct adjust OSD + toolset
Integrated web server	Yes
CLO (constant light output)	Standard
3D	Active eye wear (optional), passive circular (optional); 3 flash up to 200Hz
Inputs	Dual HDBt; HDMI 2.0 (HDCP 2.2); DP 1.2 (HDCP 1.3); Quad SDI/HDSDI/dual HDSDI/6G/BarcoLink
Optional Inputs	Quad DP1.2
Input resolutions	From NTSC up to 4K (4,096 x 2,560)
Max. pixel clock	600 Mhz
Software tools	Projector Toolset + Android app + iOS app
Control	XLR wired + IR, RS232, Wifi, GSM (opt)
Network connection	10/100 base-T, RJ-45 connection, Wifi (optional)
Power requirements	120-160V / 200-240V (+/- 10%), 20A, 50-60Hz (reduced power on 110v)
Max. power consumption	1,900 W @ 230 volts/ STBY less than 10W
Noise level (typical at 25°C/77°F)	TBD
Operational ambient temperature	0°-40°C/ 32°-104°F (45°C reduced power)
Operational humidity	0-80% (non condens)
Dissipation BTU	Max. 6,600 BTU/h
Dimensions (WxLxH)	660 x 830 x 350 mm (25.98 x 32.67 x 13.77")
Shipping Dimensions	(LxWxH) 1200 x 800 x 685 mm / (47.24 x 31.49 x 26.96")
Weight	87.5kg (193 lbs)/shipping weight from factory: 105kg (231 lbs)
Standard accessories	Power cord, wireless/XLR wired rugged remote control
Certifications	Compliant with UL60950-1 and EN60950-1 complies with FCC rules & regulations, part 15 Class A and CE EN55032 Class A, Rohs
Warranty	3 years
*	+/- 10%

A.5 Specifications of the UDX U32

Specifications

|	
Projector type	UXGA 3-chip DLP digital projector
Technology	0.96" DMD™ x3
Resolution	1,600 x 1,200
Brightness	30,000 center lumens*
Contrast ratio	2,000:1
Brightness uniformity	90%
Aspect ratio	4:3
ScenergiX	Horizontal and vertical edge blending
Lenses	TLD+ 0.73:1 ; 1.2:1 ; 0.8-1.16 ; 1.25-1.6:1 ; 1.5-2.0:1 ; 2.0-2.8:1 ; 2.8-4.5:1 ; 4.5-7.5:1 ; 7.5-11.5:1
Optical lens shift	V: -100% to +130% / H: +/- 40% on zoom lenses (memorized)
Color correction	P7
Light source	laser phosphor with inorganic phosphor wheel
Light source lifetime	+20,000 hrs
Optical dowser	Standard
Picture-in-picture	Two sources simultaneously
Sealed DLP™ core	standard
Orientation	360°
DMX 512	standard
WARP	Direct adjust OSD + toolset
Integrated web server	Yes
CLO (constant light output)	Standard
3D	Active eye wear (optional), passive circular (optional); 3 flash up to 200Hz
Inputs	Dual HDBt; HDMI 2.0 (HDCP 2.2); DP 1.2 (HDCP 1.3); Quad SDI/HDSDI/dual HDSDI/6G/BarcoLink
Optional Inputs	Quad DP1.2
Input resolutions	From NTSC up to 4K (4,096 x 2,160)
Max. pixel clock	600 MHz
Software tools	Projector Toolset + Android app + iOS app
Control	XLR wired + IR, RS232, Wifi, GSM (opt)
Network connection	10/100 base-T, RJ-45 connection, Wifi (optional)
Power requirements	120-160V / 200-240V (+/- 10%), 20A, 50-60Hz
Max. power consumption	2,900W nom/3,100W max / STBY less than 10W
Noise level (typical at 25°C/77°F)	52dB(A)
Operational ambient temperature	0-40°C / 32°-104°F
Operational humidity	0-80% (non condens)
Dissipation BTU	Max. 10,921 BTU/h
Dimensions (WxLxH)	660 x 830 x 350 mm / 25.98 x 32.7 x 13.78 inches
Shipping Dimensions	(LxWxH) 1,200 x 800 x 685 mm / 47.24 x 31.49 x 26.96 inches
Weight	92kg (202 lbs)/shipping weight from factory: 110kg (242lbs)
Standard accessories	Power cord, wireless/XLR wired rugged remote control, bottom rigging kit/clamps
Certifications	Compliant with UL60950-1 and EN60950-1, complies with FCC rules & regulations, part 15 Class A and CE EN55032 Class A, Rohs
Warranty	3 years
*	+/- 10%

A.6   Dimensions of a UDX

Overview
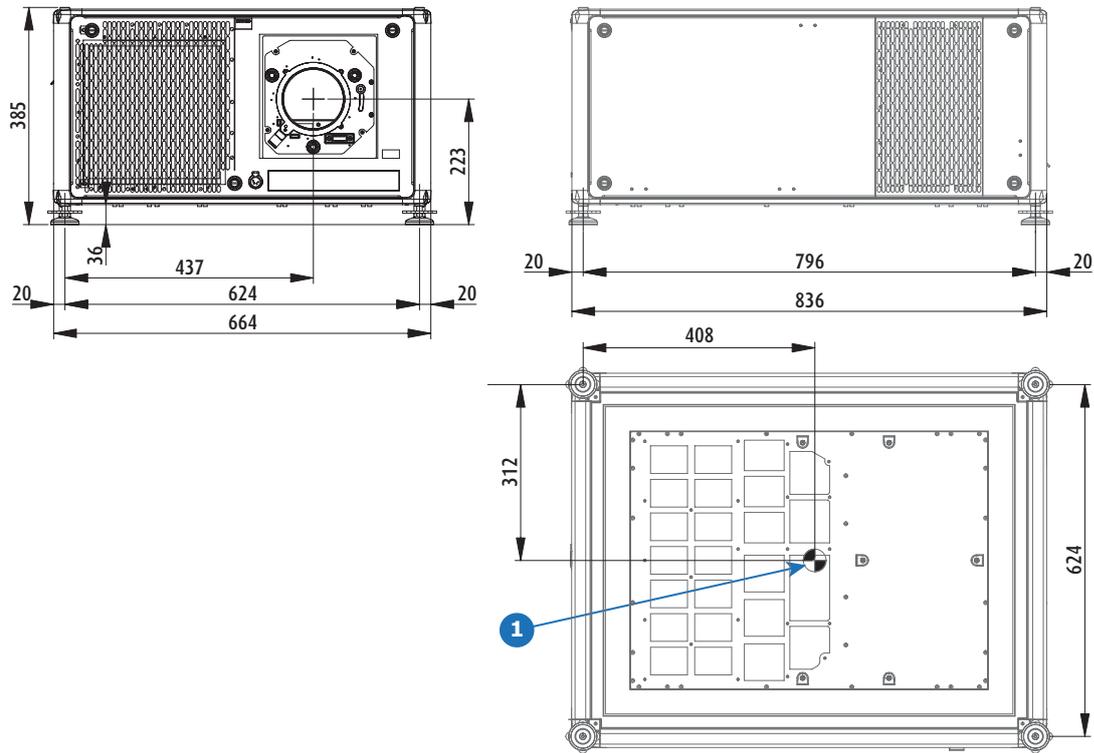
Image A-1
Dimensions, in mm

1   Geometrical centre

A.7   Dimensions of the rigging frame

Overview
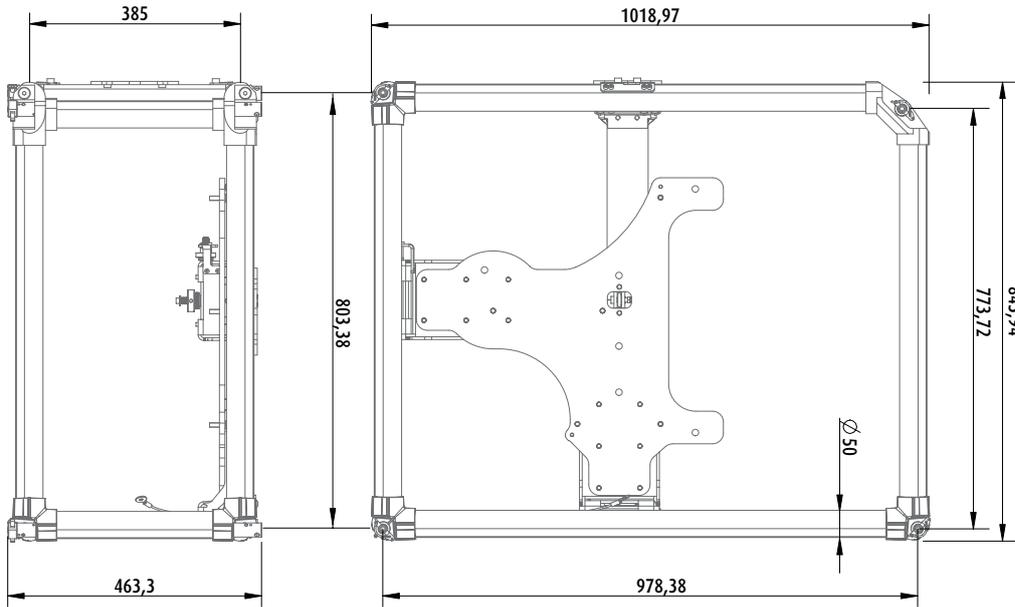
Image A-2
Dimensions, in mm

A.8 Dimensions of the flight case

Overview
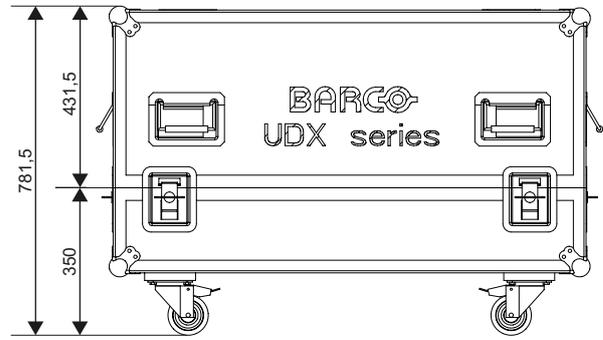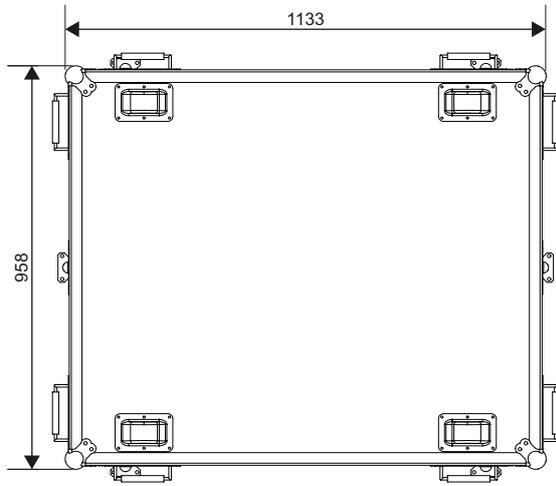
Image A-3
Dimensions, in mm

A.9 Technical Regulations

Certificates

Image A-4
EAC mark

Image A-5
Rohs

Image A-6
Rohs OK

Image A-7
CE mark

Image A-8
FCC label

Image A-9
RCM mark

Image A-10
SGS mark

B. STACKING UDX PROJECTORS

B.1 Stacking UDX projectors

WARNING: UDX projectors can be stacked up on top of each other on a flat surface, or suspended from a truss using the rigging frame. But keep the following in mind:

It is allowed to stack maximum three projectors

It is allowed to suspend maximum two projectors

How to stack

1. Make sure that each projector is installed in their respective rigging frame.

2. If pre-installed, remove all four locking pins (reference 1, image B-1) from each rigging frame, except the frame that will be installed on top of the stack.
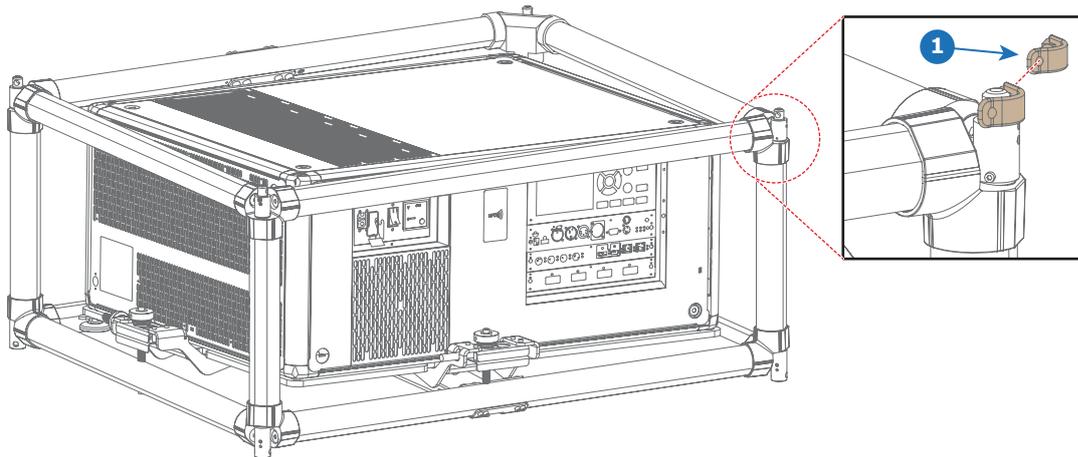
Image B-1
1   Locking pin

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

3. Stack the frames. Make sure the stacking pins of both frames are aligned.
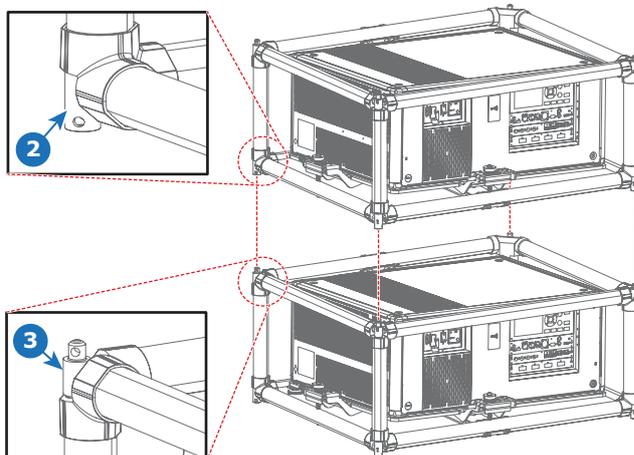
Image B-2
2   Lower stacking pins
3   Upper stacking pins

4. Install a locking pin (reference 1, image B-3) through the overlapping hole of both stacking pins.
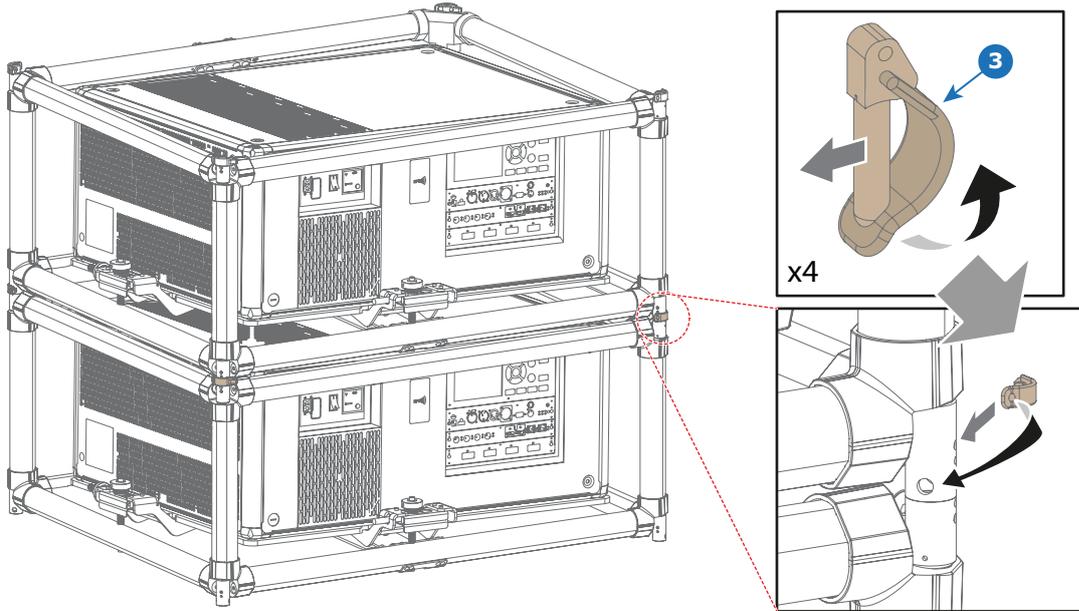
Image B-3

5. Repeat the previous step for each overlapping corner of all stacked rigging frames.

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

GLOSSARY

Broadcast address

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

DMX

DMX-512 Lighting protocol over RS-485 interface. Carries information of 512 channels from a lighting controller to lighting devices. Standardized by USITT.

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 unit

Heart of the projector, unit inside this projector which is responsible for the creation of the image to be projected on the screen. Also called 'engine'.

Projector address

Address installed in the projector to be individually controlled.

RS232

An Electronic Industries Association (EIA) serial digital interface standard specifying the characteristics of the communication path between two devices using either D-SUB 9 pins or D-SUB 25 pins connectors. This standard is used for relatively short-range communications and does not specify balanced control lines. RS-232 is a serial control standard with a set number of conductors, data rate, word length and type of connector to be used. The standard specifies component connection standards with regard to computer interface. It is also called RS-232-C, which is the third version of the RS-232 standard, and is functionally identical to the CCITT V.24 standard. Logical '0' is > + 3V, Logical '1' is < - 3V. The range between -3V and +3V is the transition zone.

RS422

An EIA serial digital interface standard that specifies the electrical characteristics of balanced (differential) voltage, digital interface circuits. This standard is usable over longer distances than RS-232. This signal governs the asynchronous transmission of computer data at speeds of up to 920,000 bits per second. It is also used as the serial port standard for Macintosh computers. When the difference between the 2 lines is < - 0.2V that equals with a logical '0'. When the difference is > +0.2V that equals to a logical '1'..

Scheimpflug principle

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

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