DP2K-S

User and Installation manual

BARCO

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

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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

FCC responsible: Barco Inc.
                    3059 Premiere Parkway Suite 400
                    30097 Duluth GA, United States
                    Tel: +1 678 475 8000

EMC notices

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.

GB/T 9254 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.

BSMI Taiwan Class A statement:

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

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　　　但商品委託他人產製，並以在國內有住所或營業所之委託者名義，於國內銷售或輸出時，為委託者。
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GNU-GPL code

If you would like a copy of the GPL source code contained in this product shipped to you on CD, please contact Barco. The cost of preparing and mailing a CD will be charged.

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Welcome

1

Congratulations

May we congratulate you on your purchase of a Barco DP2K-S series projector! It is our sincere wish that this digital projector meets up to your every expectation and that you thereby take a little time to page through this important manual. Familiarizing yourself with it's features, important safety instructions and necessary maintenance actions, will ensure you enjoy many years of reliable, trouble-free high quality performance.

1.1 About this manual

How to use this manual?

We suggest that you read over this manual before you install and use your DP2K-S series projector. Inside it, you will find important information regarding safety, installation and maintenance. We urge even the experienced user to take the necessary time to page through this manual. We believe everyone will benefit from this manual. Not in the least our editors, who will sleep more comfortably knowing their efforts have had their effect.

What's expected from you?

For your safety and in the interest of reliable, trouble-free, high quality performance, we urge the user/operator/service technician, to follow all instructions precisely. Follow the maintenance recommendations and procedures in this manual step by step to keep your projector in excellent condition. Doing so will directly impact the lifetime of your DP2K-S series projector.

If, after having read over these instructions, you experience difficulties, please contact your Barco service partner! They will do their best to assist you and get you up and running as soon as possible.

"**Treat your DP2K-S series projector as your own and it will reward you with many trouble-free years of exquisite digital entertainment pleasure!**"

Safety

2

About this chapter

Read this chapter attentively. It contains important information to prevent personal injury while installing and using your DP2K-S series projector projector. Furthermore, it includes several cautions to prevent damage to your DP2K-S series projector projector. Ensure that you understand and follow all safety guidelines, safety instructions and warnings mentioned in this chapter before installing and using the DP2K-S series projector projector. After this chapter, additional "warnings" and "cautions" are given depending on the procedure. Read and follow these "warnings" and "cautions" as well.

Clarification of the term "DP2K-S series" used in this document

When referring in this document to the term "DP2K-S series" means that the content is applicable for following Barco products:

• DP2K-10S
• DP2K-10Sx
• DP2K-8S
• DP2K-8Sx

> 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.

2.1 General considerations

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

Notice on optical radiation

Thermal retinal eye injury is possible when exposed within the Hazard Distance (HD). The HD is defined from the projection lens surface towards the position of the projected beam where the irradiance equals the maximum permissible exposure as described in the chapter "Hazard Distance".

> ⚠️ **WARNING:** No direct exposure to the beam within the hazard distance shall be permitted, RG3 (Risk Group 3) IEC EN 62471-5:2015

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

Light beam related safety labels

WARNING! DO NOT LOOK INTO THE BEAM NO DIRECT EYE EXPOSURE TO THE BEAM IS PERMITTED RG3 IEC EN 62471-5:2015 HAZARD DISTANCE: CONSULT SAFETY MANUAL	ATTENTION! NE PAS REGARDER LE FAISCEAU EVITER TOUTE EXPOSITION DIRECTE DES YEUX AU FAISCEAU RG3 IEC EN 62471-5:2015 DISTANCE DE SECURITE: CONSULTER LE MANUEL DE SECURITE		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 危害距离：请参考安全手册	警告! 请勿注视光源。 禁止眼睛曝露在光源照射範圍 RG3 IEC EN 62471-5:2015 危害距離：請參考安全手冊。

Image 2–1

WARNING! DO NOT LOOK INTO THE BEAM NO DIRECT EYE EXPOSURE TO THE BEAM IS PERMITTED RG3 IEC EN 62471-5:2015 HAZARD DISTANCE: CONSULT SAFETY MANUAL

ATTENTION! NE PAS REGARDER LE FAISCEAU EVITER TOUTE EXPOSITION DIRECTE DES YEUX AU FAISCEAU RG3 IEC EN 62471-5:2015 DISTANCE DE SECURITE: CONSULTER LE MANUEL DE SECURITE

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 危害距离：请参考安全手册

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Hazard RG3: optical radiation warning symbol

Hazard RG3: not for household use symbol

Restricted access location

This product may only be installed in a restricted access location. The definition of a "restricted access location" is a location for equipment where both of following applies:

• Access can only be gained by SERVICE PERSONNEL or by OPERATORS who have been instructed about the reasons for the restriction applied to the location and about the precautions that shall be taken.
• Access is through the use of the tool or lock and key, or other means of security, and is controlled by the authority responsible for the location.

Why a restricted access location: This is a RG3 product. Based on international requirements, no person is allowed to enter the projected beam within the zone between the projection lens and the related Hazard Distance (HD). This shall be physically impossible by creating sufficient separation height or by placing optional barriers. Within the restricted area operator training is considered sufficient. The applicable separation heights are discussed in "High Brightness precautions: Hazard Distance", page 17.

Users definition

Throughout this manual, the terms SERVICE PERSONNEL and TRAINED PROJECTIONIST 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 or TRAINED PROJECTIONISTS, AUTHORIZED to operate professional projection systems.

The TRAINED PROJECTIONISTS may only perform the maintenance task described in the User & Installation manual. All other maintenance tasks and service tasks must be performed by qualified SERVICE PERSONNEL.

The DLP Cinema Systems are 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 and TRAINED PROJECTIONISTS, knowledgeable of such risks, are allowed to perform service functions inside the product enclosure.

Owner's record

The part number and serial number are printed on a label which is stuck on the respective part. Record these numbers in the spaces provided below. Refer to them whenever you call upon your Barco dealer regarding this product.

Product article number	
Product serial number	
Dealer	

2.2 Important safety instructions

To prevent the risk of electrical shock

• This projector should be operated from an AC power source. Ensure that the mains voltage and capacity matches the projector electrical ratings. If you are unable to install the AC requirements, contact your electrician. Do not defeat the purpose of the grounding.
• Installation according to the local electrical code and regulations by qualified technical personnel only.
• This product is equipped with a three-terminal barrier strip for the connection of a mono phase power line with a separate earth ground PE. If you are unable to install the AC Requirements, contact your electrician. Do not defeat the purpose of the grounding.
• The cross-sectional area of the conductors in the power supply cord shall be not less than **2.5mm² (12AWG)**, minimum 300V. Take into account that the cable gland of the projector allows a cable diameter from 8 to 13 millimeter.
• A readily accessible disconnect device must be incorporated externally to the equipment for removal of the power to the projector mains terminals.

- Warning: High leakage current. Earth connection essential before connecting supply.
- Do not allow anything to rest on the power cord. Do not locate this projector where persons will walk on the cord.
- Do not operate the projector with a damaged cord or if the projector has been dropped or damaged - until it has been examined and approved for operation by a qualified service technician.
- Position the cord so that it will not be tripped over, pulled, or contact hot surfaces.
- If an extension cord is necessary, a cord with a current rating at least equal to that of the projector should be used. A cord rated for less amperage than the projector may overheat.
- Never push objects of any kind into this projector through cabinet slots as they may touch dangerous voltage points or short circuit 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 a trained service person when service or repair work is required.
- Do not use an accessory attachment which is not recommended by the manufacturer.
- Lightning - For added protection for this video product during a lightning storm, or when it is left unattended and unused for long periods of time, remove all power from the projector. This will prevent damage to the projector due to lightning and AC power-line surges.

To prevent personal injury

- Isolate electrically before replacing the lamp or lamp house. Caution: Hot lamp (house).
- Caution: High pressure lamp may explode if improperly handled. Refer servicing to qualified service personnel.
- To prevent injury and physical damage, always read this manual and all labels on the system before inserting the lamp casing, powering the projector or adjusting the projector.
- To prevent injury, take note of the weight of the projector. Minimum 4 adult persons are needed to carry the projector.
- To prevent injury, ensure that the lens, exhausting system and all cover plates 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 lamps; this light is processed through the projectors optical path. The light exiting the projection lens has been defused within the optical path. Nevertheless the projected light represents a significant risk for the human eye when exposed directly within the beam.
- Before attempting to remove any of the projector's covers, disconnect the projector mains terminals for removal of all power from the projector.
- When required to remove all power from the projector, to access parts inside, always disconnect the projector mains terminals.
- 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.
- **Warning: Protection from ultraviolet radiation**: Do not look directly in the light beam. The lamp contained in this product is an intense source of light and heat. One component of the light emitted from this lamp is ultraviolet light. Potential eye and skin hazards are present when the lamp is energized due to ultraviolet radiation. Avoid unnecessary exposure. Protect yourself and your employees by making them aware of the hazards and how to protect themselves. Protecting the skin can be accomplished by wearing tightly woven garments and gloves. Protecting the eyes from UV can be accomplished by wearing safety glasses that are designed to provide UV protection. In addition to the UV, the visible light from the lamp is intense and should also be considered when choosing protective eye wear.
- **Exposure to UV radiation**: Some medications are known to make individuals extra sensitive to UV radiation. The American Conference of Governmental Industrial Hygienists (ACGIH) recommends occupational UV exposure for an-8 hour day to be less than 0,1 micro-watts per square centimeters of effective UV radiation. An evaluation of the workplace is advised to assure employees are not exposed to cumulative radiation levels exceeding these government guidelines.

- The exhaust output on top of the projector must be coupled to an external exhaust system. In case the projector is equipped with an exhaust output at the rear then there is no need for an external exhaust system.

> **WARNING:** Never look into the exhaust output on the top of the projector. High luminance and UV radiation could result in damage to the eye. The installation of an exhaust system on top of the projector is mandatory before operating the projector.

> **WARNING:** The exhaust output of the projector is very hot when the projector is on. To avoid burns, let the projector cool down for at least 15 minutes before touching the exhaust output.

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 all DLP Cinema projectors. The exclusion zone on the lens side must be at least 5 m. Do not cover the projector or the lens with any material while the projector is in operation. Keep flammable and combustible materials away from the projector at all times. Mount the projector in a well ventilated area away from sources of ignition and out of direct sun light. Never expose the projector to rain or moisture. In the event of fire, use sand, CO_2 or dry powder fire extinguishers. Never use water on an electrical fire. Always have service performed on this projector by 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 console to the outside of the building. The mandatory exhaust system must include a blower that maintain at least 4m³/min (140 CFM) when measured at the projector exhaust opening.
- Let the projector cool completely before storing. Remove cord from the projector when storing.
- Heat sensitive materials should not be placed in the path of the exhaust air or on the lamp house.

To prevent projector damage

- This projector has been designed for use with a specific lamp (house) type. See installation instructions for its correct type.
- The air filters of the projector must be cleaned or replaced on a regular basis (a "clean" booth 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 an exhaust system is installed onto the top of the projector it must be capable of removing minimum 4m³/min (140 CFM) measured at the projector's exhaust opening.
- If more than one projector is installed in a common projection booth, the exhaust air flow requirements are valid for EACH individual projector head exhaust stack. Note that inadequate air extraction will result in decreased life expectancy of the projector as a whole as well as causing premature xenon lamp failure.
- 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. Loose papers or other objects may not be nearer to the projector than 10 cm (4") on any side.
- Do not use this equipment near water.
- Proper operation of the projector can only be guaranteed in table mounting. It is not permitted to use the projector in another position. See installation procedure for correct installation.
- **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.
- Disconnect the power to the projectors mains terminals 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, patrol, 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. Do not use a damp cloth, detergent solution, or thinner.
- Rated maximum ambient temperature, t_a= 35°C (95°F).
- The lamp house shall be replaced if it has become damaged or thermally deformed.
- An external frame must be used to stack projectors.
- 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.
- Possible explosion hazard: Always keep in mind the caution below:

> **CAUTION:** Xenon compact arc lamps are highly pressurized. When ignited, the normal operating temperature of the bulb increases the pressure to a level at which the bulb may explode if not handled in strict accordance to the manufacturer's instructions. The bulb is stable at room temperature, but may still explode if dropped or otherwise mishandled. Whenever the lamp house, containing a xenon lamp, has to be dismantled or whenever the protective container or cloth has to be removed from the xenon lamp, authorized protective clothing MUST be worn!

Authorized protective clothing for xenon lamp handling

WARNING: Always wear face protection (full face shield) when handling xenon lamps.

WARNING: Always wear protective clothing (welder's jacket) when handling xenon lamps.

WARNING: Always wear clean leather gloves with wrist protectors when handling xenon lamps.

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.

Safety Data Sheets for Hazardous Chemicals

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

2.3 High Brightness precautions: Hazard Distance

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

Restriction Zone (RZ) based on the HD

The HD depends on the amount of lumens produced by the projector and the type of lens installed. See chapter "HD in function of modifying optics", page 20.

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

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

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

For example, projectors that have a HD greater than 1 m and emit light into an uncontrolled area where persons may be present should be positioned in accordance with "the fixed projector installation" parameters, resulting in a HD that does not extend into the audience area unless the beam is at least 2.0 meter above the floor level. In environments where unrestrained behavior is reasonably foreseeable, the minimum separation height should be greater than or equal to 3.0 meter to prevent potential exposure, for example by an individual sitting on another individual's shoulders, within the HD. Sufficiently large separation height may be achieved by mounting the image projector on the ceiling or through the use of physical barriers.
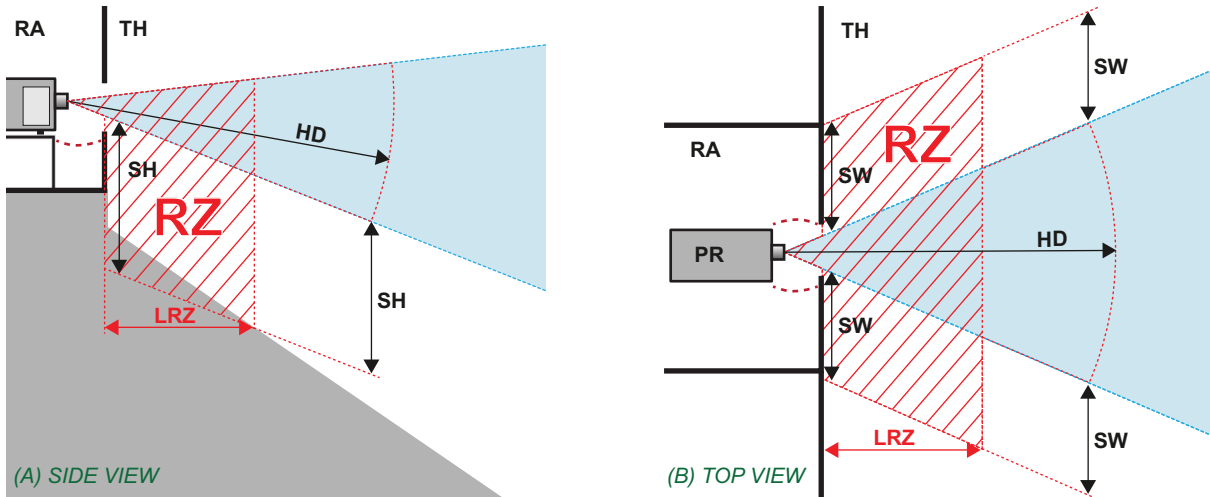
Image 2–2

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

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

On Image 2–3 a typical setup is displayed. It must be verified if these minimum requirements are met. If required a restricted zone (RZ) in the theater must be established. This can be done by using physical barrier, like a red rope as illustrated in Image 2–3.

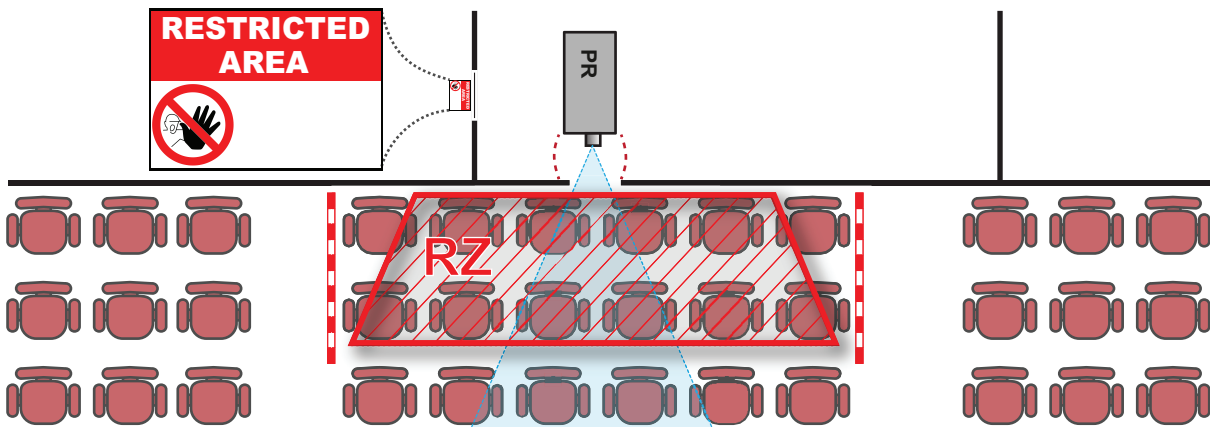The restricted area sticker can be replaced by a sticker with only the symbol.

Image 2–3

2.4 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 2– 4 two areas should be considered: the restricted enclosed projection area (RA) and the observation area (TH).
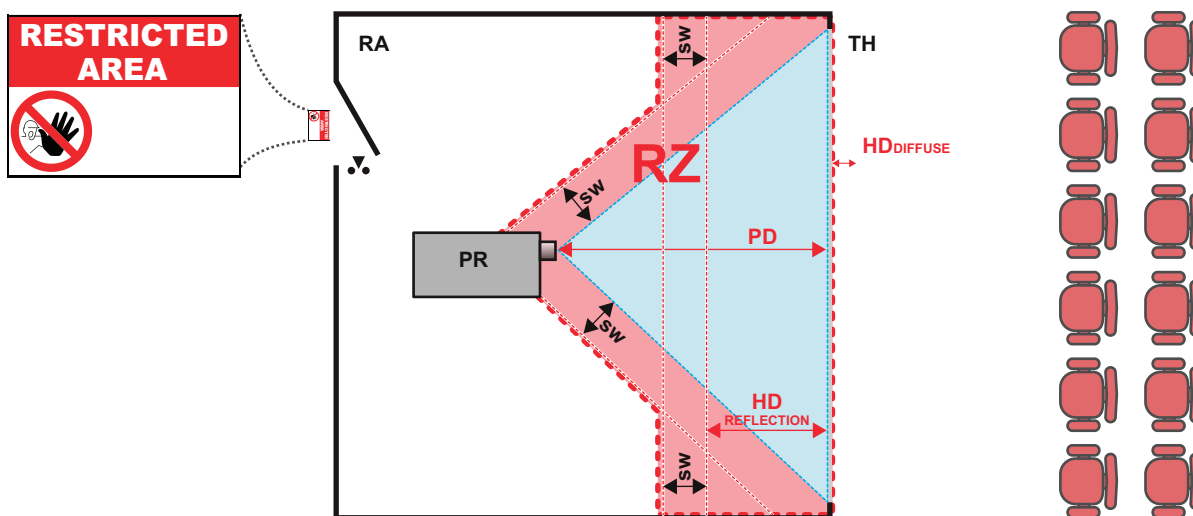

Image 2–4

RA Restricted Access location (enclosed projection area).
PR Projector.
TH Theater (observation area).

RZ Restriction Zone.
PD Projection Distance.
SW Separation Width. Must be minimum 1 meter.

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

- HD as discussed in "High Brightness precautions: Hazard Distance", page 17, relevant for intrabeam exposure.
- $HD_{reflection}$: the distance that has to be kept restrictive related to the reflected light from the rear projection screen.
- $HD_{diffuse}$: the relevant distance to be considered while observing the diffuse surface of the rear projection screen.

As described in "High Brightness precautions: Hazard Distance", page 17, it is mandatory to create a restricted zone within the beam areas closer than any HD. In the enclosed projection area the combination of two restricted zones are relevant: The restricted zone of the projected beam toward the screen; taking into account 1 meter Separation Width (SW) from the beam onward. Combined with the restricted zone related to the rear reflection from the screen ($HD_{reflection}$); also taking into account a 1 meter lateral separation.

The $HD_{reflection}$ distance equals 25% of the difference between the determined HD distance and the projection distance to the rear projection screen. To determine the HD distance for the used lens and projector model see chapter "HD in function of modifying optics", page 20.

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

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

2.5 HD in function of modifying optics
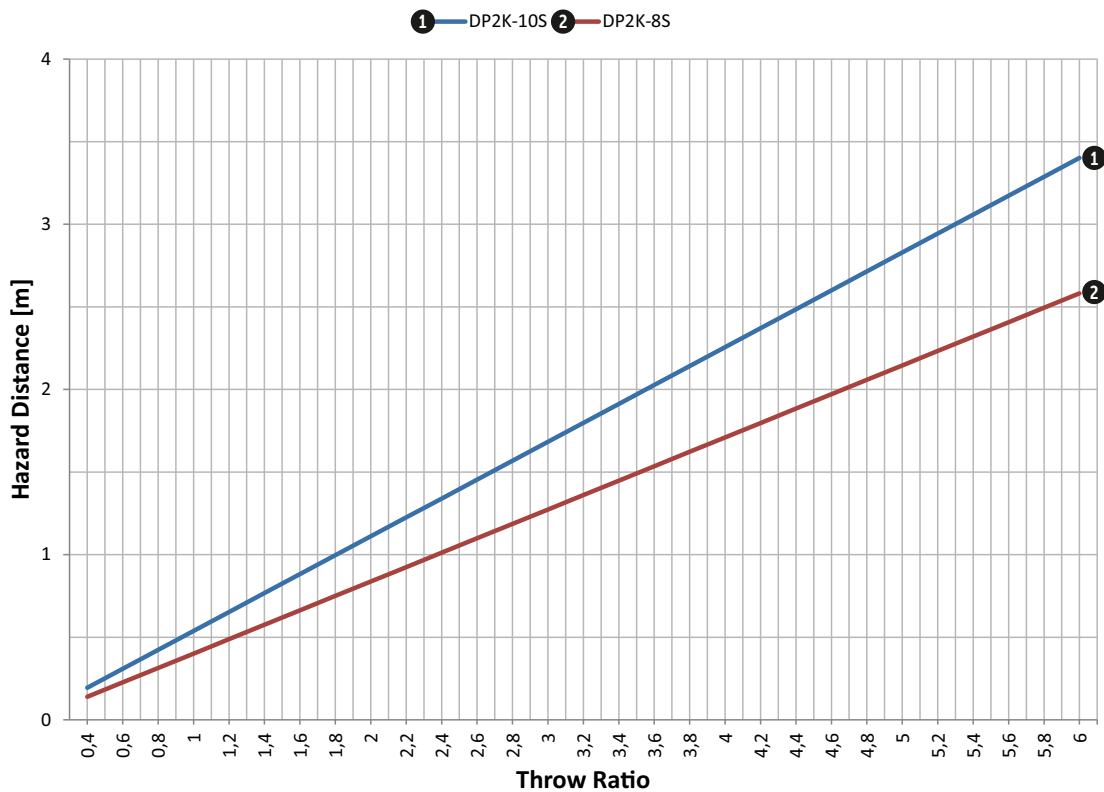
Hazard Distance

Image 2–5

HD Hazard Distance in meter
TR Throw Ratio

2.6 Safety precautions Hazardous Chemicals

Cooling liquid: Pale yellow antifreeze Antifrogen® N

Handling the cooling liquid:

• Not for household use.
• Keep out of reach of children.
• Harmful by oral intake.
• Avoid exposure to pregnant women.
• Avoid contact of the liquid with Eyes, Skin and Clothing.
• Avoid inhaling noxious fumes.
• Conserve the product in the original package and in a well ventilated room.

Personal protection rules:

• Handle the cooling liquid in a well ventilated room.
• Under no circumstances eat, drink and smoke while handling the liquid.
• Wear gloves (Butyl rubber, PVC....) and goggles.
• Wear suitable protection clothing.

Cleansing agent: sodium carbonate crystals (Na$_2$CO$_3$)

Handling the cleansing agent:

- Conserve the product in the original container in a cool, well ventilated place.
- Keep away from Incompatible materials: sources of ignition, direct sunlight.
- Keep container closed when not in use.
- After handling: Wash hands and other exposed areas with mild soap and water.

Personal protection rules:

- Handle the cleansing agent in a well ventilated area.
- Do not eat, drink or smoke during use.
- Wear gloves (Butyl rubber, PVC....) and goggles.
- Wear suitable protection clothing.

> **WARNING:** Before handling Hazardous Chemicals ensure that you have read and understood the safety instructions provided by the supplier of the chemical in the Safety Data Sheet.

Safety Data Sheets for Hazardous Chemicals

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

Getting started

3

About this chapter

Read this chapter before installing your DP2K-S series projector. It contains important information concerning installation requirements for the DP2K-S series 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.

3.1 Installation requirements

Environmental conditions

The table below summarizes the physical environment in which the DP2K-S series projector may be safely operated or stored.

Environment	Operating	Non-Operating
Ambient Temperature	10°C (50°F) to 35°C (95°F)	-15°C (5°F) to 60°C (140°F)
Air cleanliness	Clean office environment (equivalent with cleanroom standard ISO 14644-1 ISO Class 9)	n.a.
Humidity	5% to 85% RH Non-condensed	5% to 95% RH Non-Condensed
Altitude	-60 (-197Ft) to 3000m (9843Ft)[1]	-60 (-197Ft) to 10000m (32810Ft)

> 📄 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 head, minimum 20 cm (8 inch) to ensure sufficient air flow. It should be used in an area where the ambient temperature, as measured at the projector air inlet, does not exceed 35°C (95°F).

The projector is capable of autonomous, stand alone cooling. Two exhaust options are possible:

1. **REAR EXHAUST (Option):** Simply expel the hot air via the back housing into the room/booth/cabin.
   In this case an external exhaust system is not required.
2. **TOP EXHAUST (Standard):** Attach the standard exhaust stack [positioned towards the top/back of the projector and designed to fit a 201mm (7.91inch) diameter duct] to the air extraction system. This flow size must be used throughout the entire system and installed to eliminate any possibility of downdraft or rain dripping into the projector.
   In this case the installation of an **external exhaust system** is **MANDATORY** for safety reasons (possible direct eye contact with UV light of the xenon lamp). The installed exhaust blower must remove an air volume of minimum **4m³/min (140 CFM)** measured at the exhaust output of the projector. Although not obligatory, Barco also advises to limit the amount of extraction to a maximum of 5m³/min (180 CFM). Excessive air extraction can dramatically speed-up contamination of the projector air inlet filters, hence requiring more regular filter cleaning interventions.

- If the projector is installed into a "**sound box**" the following applies: minimum extraction requirement for the complete projector: 7m³/min (240CFM), maximum advised extraction requirement: 8m³/min (280 CFM).
- If dual stacking applies, ensure that the upper projector is thermally insulated from the bottom projector. Typically in dual stacking the bottom projector is installed with a "rear exhaust".
- An external frame must be used to stack projectors.
- Where the projectors are installed close to each other, ensure that the projectors do not thermally affect each other.

> ⚠ **CAUTION:** If more than one projector is installed in a common projection booth, the above exhaust air flow requirements are valid for EACH individual projector head exhaust stack. Note that inadequate air extraction will result in decreased life expectancy of the projector as a whole as well as causing premature lamp failure.

Air flow in/out

The projector must be installed with sufficient space around the projector head, minimum 20 cm (8 inch) to ensure sufficient air flow.

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1. For PRC (People's Republic of China) the certified altitude is specified on the product label.
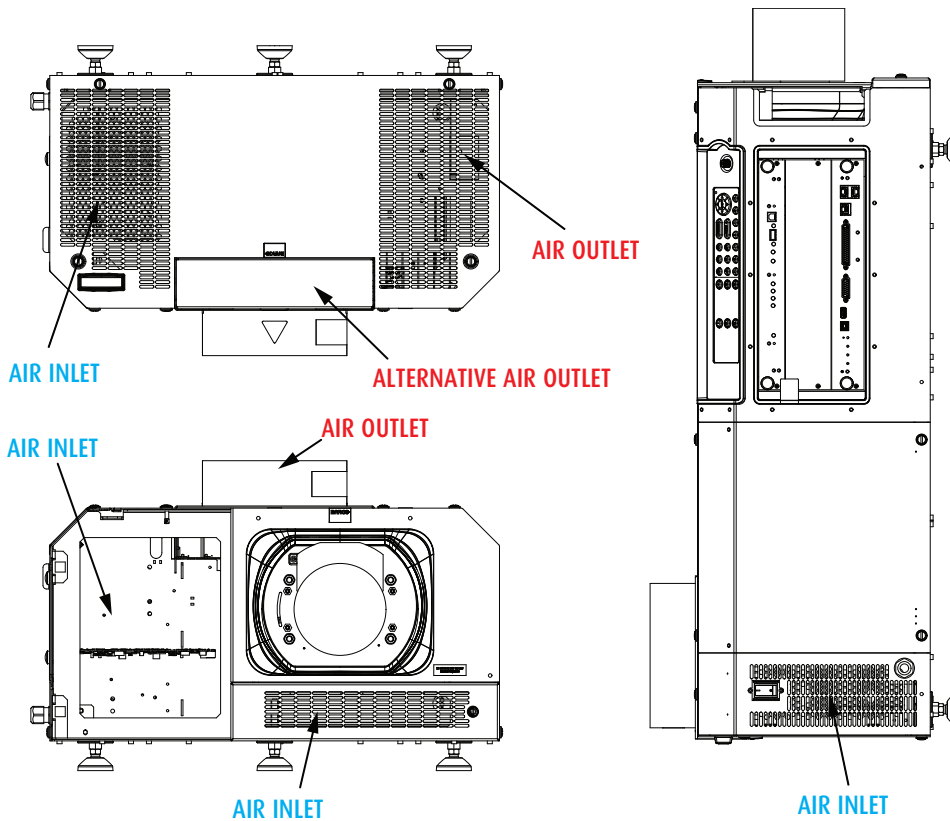
Image 3–1 Air flow

Main Power requirements

The DP2K-S series projector operates from a nominal mono phase power net with a separate earth ground PE.

Projector	Power requirements
DP2K-10S	200-240 VAC, 50-60Hz, 16A at 200 VAC
DP2K-10Sx	200-240 VAC, 50-60Hz, 16A at 200 VAC
DP2K-8S	200-240 VAC, 50-60Hz, 12A at 200 VAC
DP2K-8Sx	200-240 VAC, 50-60Hz, 12A at 200 VAC

The power cord required to connect the projector with the power net is not delivered with the projector. It is the responsibility of the customer to provide the correct type of power cord. The cross-sectional area of the conductors in the power supply cord shall not be less than **2.5mm² (12AWG)**, minimum 300V. Take into account that the cable gland allows a cable diameter from 8 to 13mm.

To protect operating personnel, the National Electrical Manufacturers Association (NEMA) recommends that the instrument panel and cabinet be grounded. In no event shall this projector be operated without an adequate cabinet ground connection.

The AC supply must be installed by a qualified electrician in conformance to local codes. Hardware, wire sizes and conduit types must comply with local codes.

A readily accessible disconnect device shall be incorporated externally to the equipment for removal of the power to the equipment mains terminals.

> ⚡ **WARNING:** Disconnect the power to the unit mains terminals for removal of all power from the unit.

> 📄 The DP2K-S series projector does not have a built in UPS unit.

Projector weight

Do not underestimate the weight of the DP2K-S series projector. The projector weight approximately 67 kg (147 lb.) without lens. Ensure that the pedestal on which the projector is installed is capable of supporting the complete load of the system. Minimum 4 adult persons are needed to carry the projector.

> Barco offers a pedestal for the DP2K-S series projector projector. This pedestal allows for a solid and easy setup of the projector. The pedestal support 19" rack systems. (projector peripherals such as alternative content switchers, ShowVault, etc.)

> **CAUTION:** An external frame must be used to stack projectors.

3.2 Unpacking the projector

What you need to do?

Upon delivery, your projector is packed into a carton box upon a wooden/plastic pallet and secured with banding and fastening clips. Furthermore, to provide protection during transportation, the projector is surrounded by foam. Once the projector has arrived at the installation site, it needs to be removed from its carton box and wooden/plastic pallet in a safe manner without damaging the projector.

How to unpack your projector?

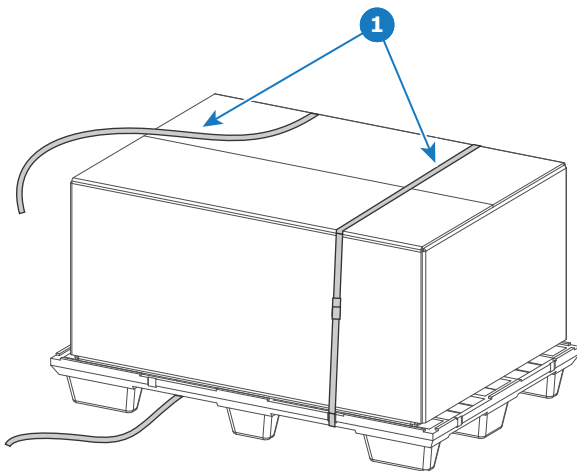**1.** Loosen the banding (reference 1 Image 3–2) by pulling the free end of the banding loop in the clip.

Image 3–2

2. Lift up the carton box (reference 2 Image 3–3) as a whole and remove it away from the projector package.

3. Take out the small box (reference 3 Image 3–3) between the polystyrene foam on top of the projector. This box contains the product documentation (manuals etc.).

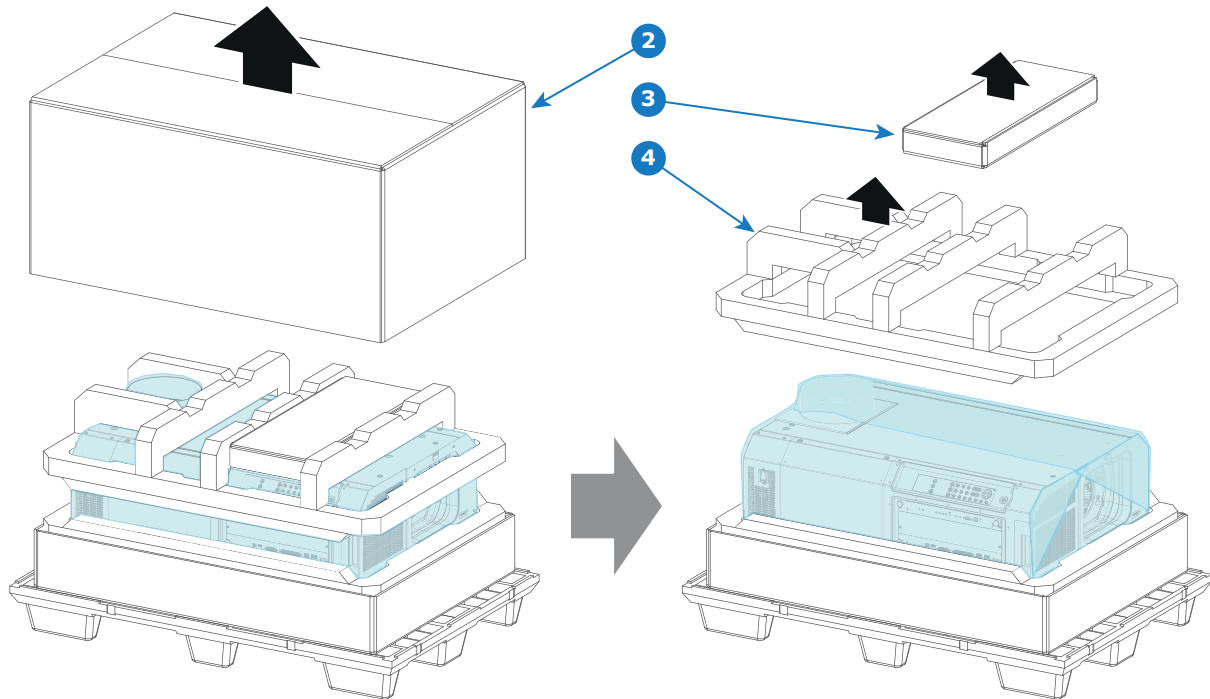**4.** Remove the polystyrene foam (reference 4 Image 3–3) from the top of the projector.

Image 3–3

5. Open the plastic bag and lift the projector out of its packaging, using the handles provided in the projector base.
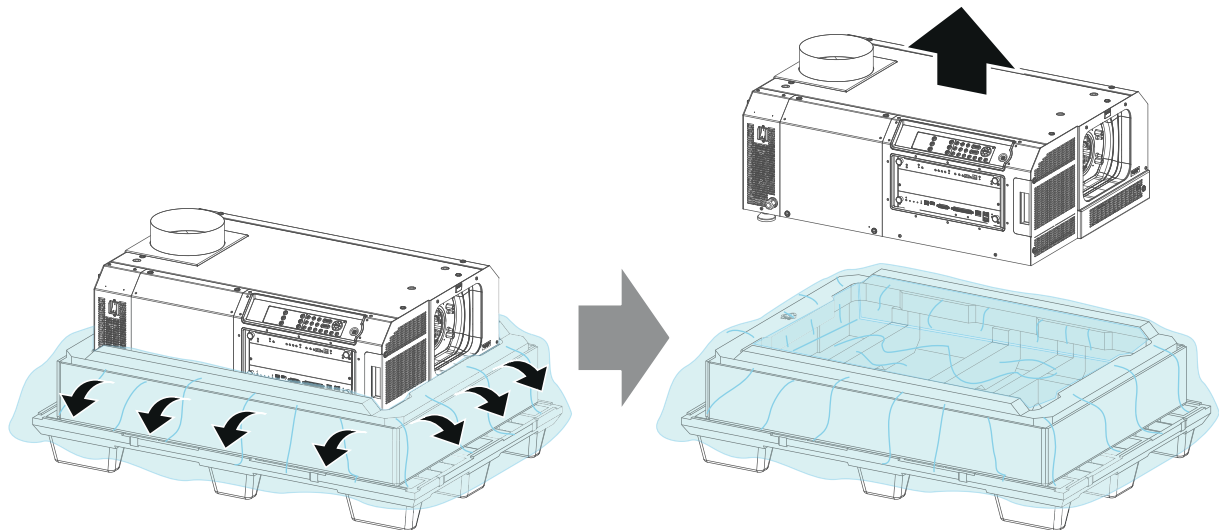

Image 3–4

6. Remove the protective foam from the Lens Holder opening.

> 📄 After unpacking, allow the projector to acclimatize to a room temperature ranging from 10°C (50°F) to 35°C (95°F) MAX. Neglecting this may result in a start up failure of the Light Processor Unit.

3.3 Initial inspection

General

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

> 📄 The packaging of the DP2K-S series projector is provided with a **shock-watch** label. If this shock-watch label was triggered (red colored at arrival) during transport may indicate rough handling by the transport company. In this case, the instructions mentioned on the label, should be followed, which are: adding a note on the "bill of lading" and informing the transport company and the Barco sales and service office as soon as possible.

Box content

• Projector.
• User and installation manual (this document).
• Safety manual.

> 📄 The projector lens is not included in the package of the projector.

Mechanical check

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

Tamper labels

During installation please inspect the tamper labels, if they are damaged please contact Barco tech support.

The tamper labels are required by DCI to provide easy visual indication if the equipment was tampered with. The projectors are tested and labeled for shipping to ensure that the system was not compromised before reaching the customers final destination.

These tamper labels can be found behind the input cover (partial visible), top cover and left side cover (orientation: looking at the screen). See chapter page 159, for instructions on how to remove the projector covers.

Image 3–5 Barco tamper label (required for DCI).

Installation process

4

About this chapter

After you have unpacked and checked the projector, you can start with the installation process of your DP2K-S series projector. This chapter gives an overview of all the different stages in the installation process which you have to be followed to set your DP2K-S series projector up and running. Each stage is briefly described and refers to more detailed step by step procedures in this manual.

Use this overview as a checklist to ensure that all stages have been followed in the setup process of the DP2K-S series projector.

> Let the projector acclimatize to ambient conditions after unpacking. Neglecting this may result in a startup failure of the light processor unit.

4.1 Installation process overview

> 📄 Normally the projector is delivered with the xenon lamp installed. So, this installation process assumes that the xenon lamp and Lamp House are already installed. If not, install the xenon lamp first prior to continue with this process. See chapter "Lamp replacement process", page 126.

Installation process from A to Z

1. **Check if all installation requirements are fulfilled** such as the environment conditions of the installation area, capacity of the exhaust system, electrical facilities, etc. Note that a solid pedestal is required to support the projector. For more info see topic **installation requirements**.

   Read also the information about hazard distance before starting the installation. For more info see topic "High Brightness precautions: Hazard Distance", page 17 and subsequent topics.

2. **Physical installation of the projector** upon its pedestal and connecting the air outlet of the projector with the exhaust system. Note that an external exhaust system is MANDATORY in case the exhaust output is on top of the projector. See chapters "Positioning the DP2K-S series projector projector at port window", page 34, and "Installation of the exhaust system", page 36.

3. **Electrical connection with the power net**. See chapter "Connecting the projector with the power net", page 37.

4. **Installation of the lens**. First select a lens with appropriate throw ratio covering the screen size and the projector - screen distance. Then install the lens in the lens holder of the projector. For more information about available lenses, lens selection and lens installation see chapter "Lens installation", page 43.

   > ⚠ *Caution:* The projector is delivered with a plastic cover inside the Lens Holder. Remove the cover prior to installing the lens.

5. **Installation of the ICMP(-X), IMB, IMS or HDSDI input module**. (only in case no ICMP(-X), or IMB or IMS or HDSDI is factory installed).

6. **Installation of the HDDs.** In case the HDDs of the ICMP are delivered separated from the projector remove the protection tape from the HDD input slots and install all three HDDs as described in the procedure "Installing a HDD into the ICMP(-X)", page 70. Make sure that all HDDs in the ICMP(-X) HDD set have the same storage capacity. See label on top of the HDD to know the storage capacity.

7. **Installation of the Communicator Touch Panel**. See chapter "Communicator Touch Panel", page 95.

8. **Switch on the projector.** The projector can now be switched on. Place the **ON/OFF** switch of the projector in the "I" position. As a result the projector starts to initialize. The status lights of the projector lights up GREEN once the projector is initialized. In case the status lights up RED may indicate a tamper event during transport. If so, contact Barco customer service.

9. **Select the corresponding lens parameters for the installed lens**. See user guide of the "*Communicator*" chapter *Installation > Advanced > Lens parameters*.

10. **Alignment of the projected image on the screen**. The image can be aligned with the screen size of the application. Follow the next steps to achieve that:
    1. Press the **STANDBY** button on the Local Keypad to activate the lamp.
    2. Press the **DOWSER** button on the Local Keypad to open the electronic dowser of the projector. The electronic dowser is open if the color of the DOWSER button is GREEN.
    3. Press the **TEST PATTERN** button on the Local Keypad to project one of the internal test patterns of the projector on the screen.
    4. Perform a "**Lens Homing**". See user guide of the Communicator.
    5. Use the lens **ZOOM**, **SHIFT** and **FOCUS** buttons on the Local Keypad to match the projected image with the screen. Tilt the projector in case you can not SHIFT the image completely upon the screen. See "Positioning the DP2K-S series projector projector at port window", page 34.
       See chapter "Local Keypad", page 48, for detailed description of the Local Keypad buttons.

11. **Realignment of the xenon lamp in its reflector**. For optimal performance of the xenon lamp realign the lamp. See "Realignment of the lamp in its reflector", page 143, for more information.

12. **Adjusting the light path**. Normally the lens holder and the convergence of the projector are perfectly adjusted at the factory. Nevertheless, some applications require a readjustment of the lens holder, convergence or both. See procedure "Scheimpflug adjustment", page 107, and "Convergence", page 115.

13. **Creating screen files, lens files, light sensor calibration (LSC) files, and macro files for FLAT and for SCOPE**. See user guide of the Communicator.

14. **Backup of all projector configuration files**. See user guide of the Communicator.

15. **Registration of the projector**. The DP2K-S series projector is DCI compliant and should be registered.

16. **Projection of a digital cinema movie**.

In case the projector is equipped with an ICMP(-X), download the ICMP(-X) device certificate, request KDM and DCP from your content supplier, ingest KDM and DCP, and play out the movie. for detailed instructions see chapter "ICMP(-X)", page 63, and user guide of the Communicator and/or (Web) Commander.

In case the projector is equipped with a HD-SDI input module apply a single or dual channel SMPTE (HD-SDI) source to the input ports of the HD-SDI input module and start up the projector. See chapter "Starting up", page 101. Use the Communicator (Touch Panel) to configure the applied source. See the user guide of the Communicator (Touch Panel) for more detailed information.

In case the projector is equipped with an Integrated Media Block (IMB) or Integrated Media Server (IMS) see user guide of the IMB or IMS for detailed instructions.

Physical installation

5

About this chapter

This chapter describes how the mechanical and electrical set up of your DP2K-S series projector has to be done.

5.1 Positioning the DP2K-S series projector projector at port window

> ⚠️ **WARNING:** The installation of the projector requires at least 4 adult persons persons.

General guidelines

- Use a solid pedestal to mount the DP2K-S series projector projector on to. Ensure that the pedestal can support the weight of the projector and that all feet of the projector are captured.
- The pedestal should be placed in front of the port window wall in a manner such that the projector lens is at a minimum distance of 20 centimeters from the port window.
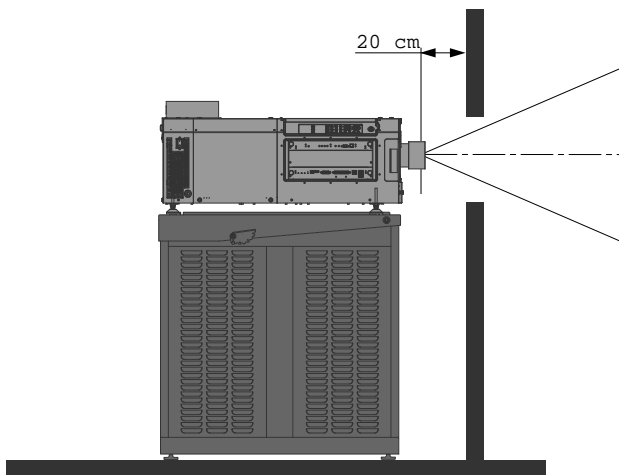
Image 5–1 Positioning at port window

> ☞ Barco offers a pedestal for the DP2K-S series projector projector. This pedestal allows for a solid and easy setup of the projector. The pedestal support 19" rack systems. (projector peripherals such as alternative content switchers, ShowVault, etc.)

Required tools

- 14mm open end wrench
- 17mm open end wrench

Projector centering

1. If the projector is standalone in front of the port window, center the projector with the theatre screen (see reference A Image 5–2).

2. If an analog film projector is already present (projector will be off-center), try to optimize aim (see reference B Image 5–2).

   > 📄 *Note:* Unlike analog film projectors, it is best to keep the projector lens surface as parallel as possible to the screen, even if it is significantly above the screen center.

   > ⚠️ *Caution:* The front foot has an adjustment range of maximum 70mm. The back feet maximum 150mm.

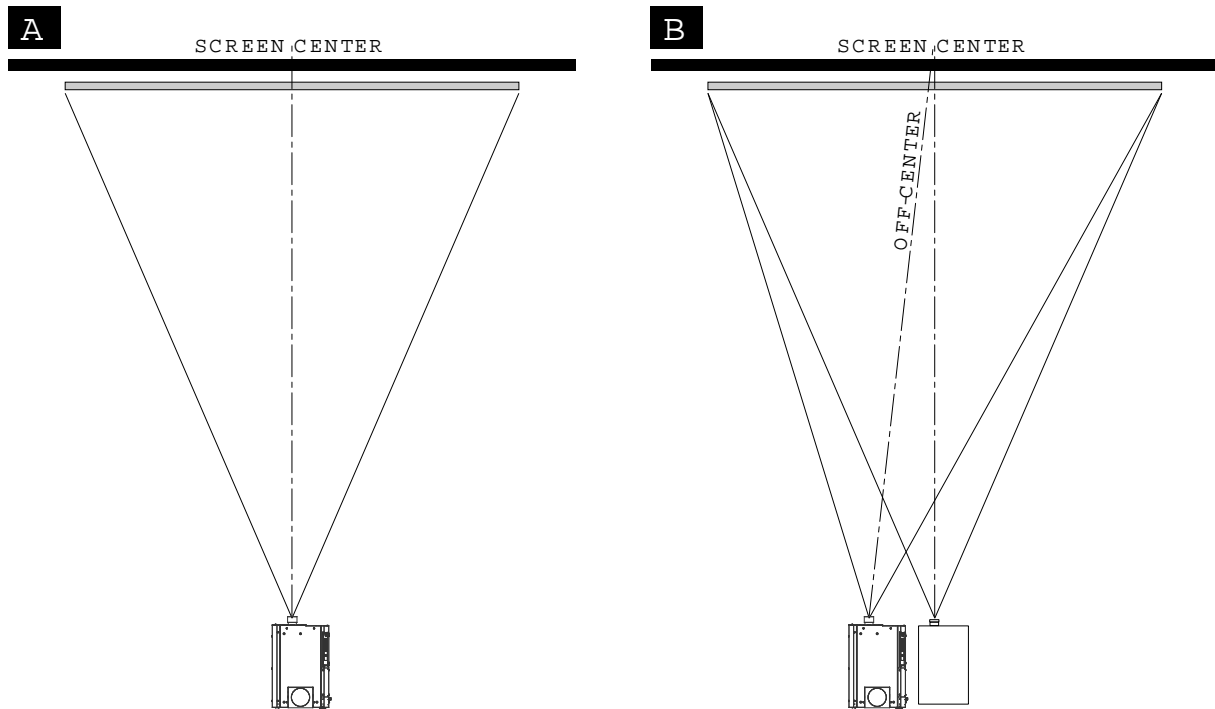The off-center position slightly increases side keystone, but will minimize horizontal lens offset required.

Image 5–2

3. Proceed to level the projector by adjusting the feet of the projector as follows:
   - Loosen the nut (reference 1 Image 5–3) on the threaded rod of the three projector feet. Use a 17mm open wrench.
   - Adjust the height of the 3 legs to level the projector. Use a 14 mm wrench to adjust the height as illustrated (reference 2 Image 5–3).
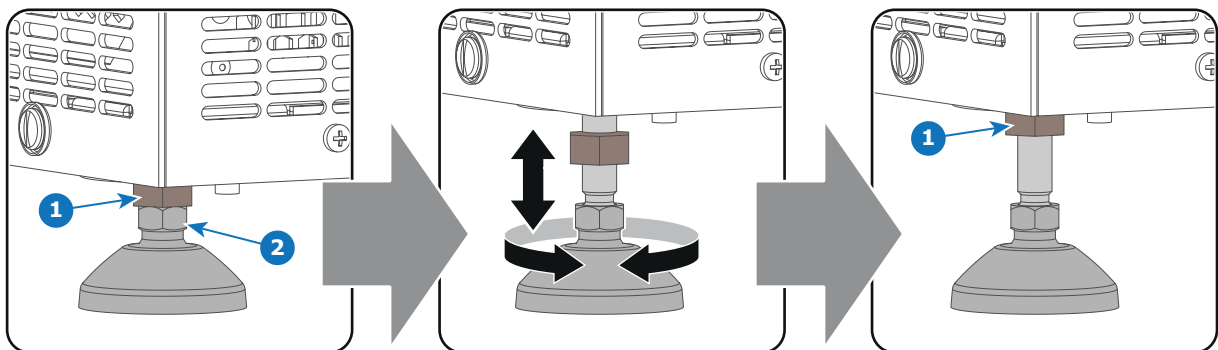   - Secure the leg height by tightening the nuts (reference 1 Image 5–3) of each projector foot.
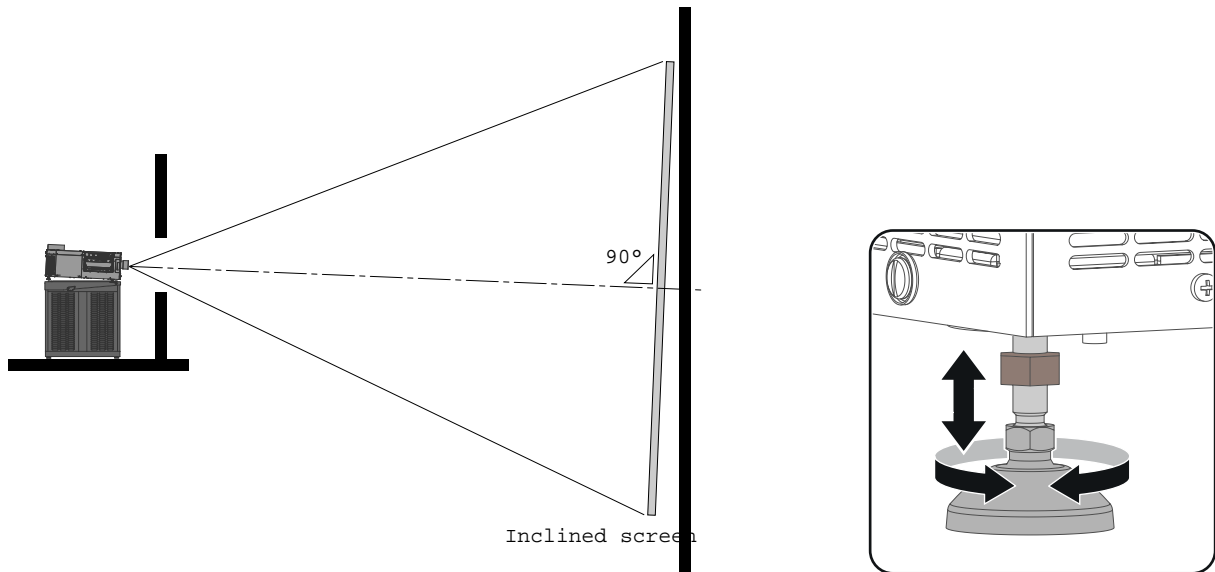

Image 5–3

4. Later, when the projector is up-and-running, adjust precise image geometry and placement.

Projector tilting

In an ideal installation, the DP2K-S series projector lens surface is **centered with** and **parallel to** the screen. This orientation helps to ensure optimized lens performance with minimal offset. If this position is not possible (such as when the projector is significantly higher than the center of the screen), it is better to rely on **offset** rather than extra **tilt**. In other words, use the SHIFT functionality of the Lens Holder prior to tilt the projector.

1. Before adjusting tilt, make sure the projector is as well-centered with the theatre screen as possible for the installation area.

2. Check the degree of screen tilt, or measure this incline with a protractor at the screen.

3. Tilt the projector to closely match this screen tilt angle as follows:
   - Loosen the nut (reference 1 Image 5–3) on the threaded rod of the three projector feet. Use a 17mm open wrench.

• Adjust the height of the 3 legs until the projected image matches the projection port window and the screen tilt. Use a 14mm open wrench to adjust the height as illustrated (reference 2 Image 5–3).
• Secure the leg height by tightening the nuts (reference 1 Image 5–3) of each projector foot.

90°

Inclined screen

Image 5–4

> ⚠ **CAUTION:** The DP2K-S series projector may tilt maximum 20° forward and maximum 5° backwards. No tilt is allowed sideways.

> 📄 The back feet of the projector can be turned out maximum 150mm. This correspond with a forward tilt of 7° if the front foot is completely turned in.

> 👉 Barco offers a pedestal for the projector. This pedestal allows you to easily tilt the projector forward up to 6°.

> 👉 Use the tilt of the projector feet and the pedestal to get sufficient tilt.

5.2 Installation of the exhaust system

About Exhaust

The exhaust stack at the top side of the projector is designed to fit a 201mm (7.91inch) diameter duct. This size must be used throughout the entire system and installed to eliminate any possibility of downdraft or rain dripping into the lamp house.

> ⚠ **CAUTION:** The exhaust system must be capable of removing minimum 4m^3/min (140 CFM), measured at the projector's exhaust opening. Although not obligatory, Barco also advises to limit the amount of extraction to a maximum of 5m^3/min (180 CFM). Excessive air extraction can dramatically speed-up contamination of the projector air inlet filters, hence requiring more regular filter cleaning interventions.

> ⚠ **CAUTION:** The connection between the projector duct and the exhaust system should be done with a flexible connection piece. This to prevent that vibrations of the external exhaust system disturbs the projected image.

> **WARNING:** The exhaust system must match the duct of the projector seamless. No gap may exist between the connection of the duct and the exhaust system. This to prevent personal injury due to the UV light that comes out of the duct of the projector.
> Never look into the exhaust output on the top of the projector. High luminance and UV radiation could result in damage to the eye. The installation of an exhaust system on top of the projector is mandatory before operating the projector.

> **CAUTION:** If more than one projector is installed in a common projection booth, the above exhaust air flow requirements are valid for EACH individual projector head exhaust stack. Note that inadequate air extraction will result in decreased life expectancy of the projector as a whole as well as causing premature lamp failure.

> **WARNING:** Temperature of exhaust air can approach 100°C.

How to install the Exhaust stack?

See illustration below:
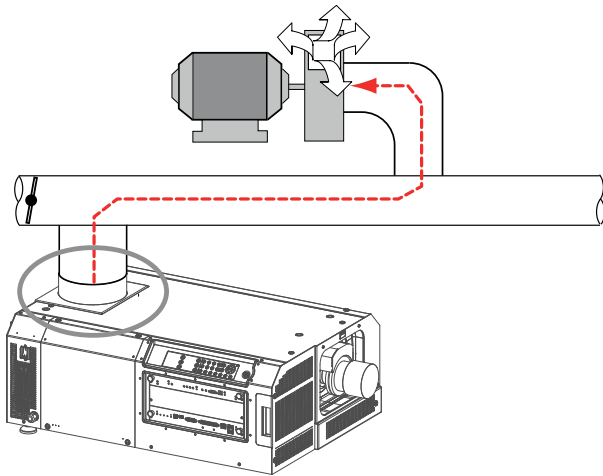
Image 5–5

> To ensure maximum lamp life, operate the lamp house blower and the exhaust system for at least ten minutes after extinguishing the lamp.

> Ensure good condition of the lamp house blower. Keep the blower inlet clean for unrestricted air flow.

5.3 Connecting the projector with the power net

> **WARNING:** The total electrical installation should be protected by an appropriate rated and readily accessible disconnect switch, circuit breakers and ground fault current interrupters. The installation shall be done according to the local electrical installation codes.

> **CAUTION:** ALL POWER CONNECTIONS to the DP2K-S series projector are made to the 3-slot terminal block located in a sealed compartment behind the rear cover of the projector.

> **CAUTION:** The cross-sectional area of the conductors in the Power Supply Cord shall be not less than 2.5mm^2 (12AWG).

Required tools

- Medium size flat screw driver (4mm x 100mm).
- Torque flat screw driver (medium size).
- Large size flat screw driver (8mm x 150mm).
- 24mm open end wrench.

Required parts

Certified AC power supply cord 2.5mm² (12AWG), min. 300V. Take into account that the cable gland of the projector allows a cable diameter from 8 to 13mm.

How to connect the main AC power with the DP2K-S series projector projector?

1. Remove the rear cover of the projector. See procedure "Removal of the rear cover", page 160.

2. Remove the cover of the main AC compartment by releasing the two captive thumb screws (reference 1 Image 5–6) .
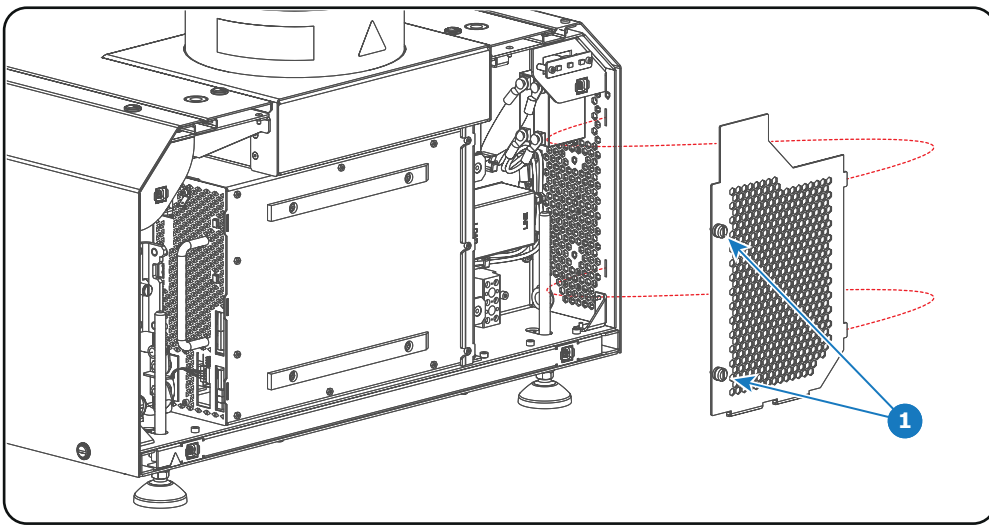
Image 5–6

3. Guide the AC power supply cord (reference 2 Image 5–7) through the cable gland (reference 3 Image 5–7) and connect the wires to the 3-terminal strip (reference 6 Image 5–7) as illustrated. Use a torque screw driver to fasten the screws of the 3-terminal strip with a torque of **1.7Nm** (1.25 lbf*ft).

> ⚡ *Warning:* Connect first the PE wire (reference 4 Image 5–7), then the other wires (reference 5 Image 5–7).

> ☞ *Tip:* Check for good fixation by pulling on each wire.
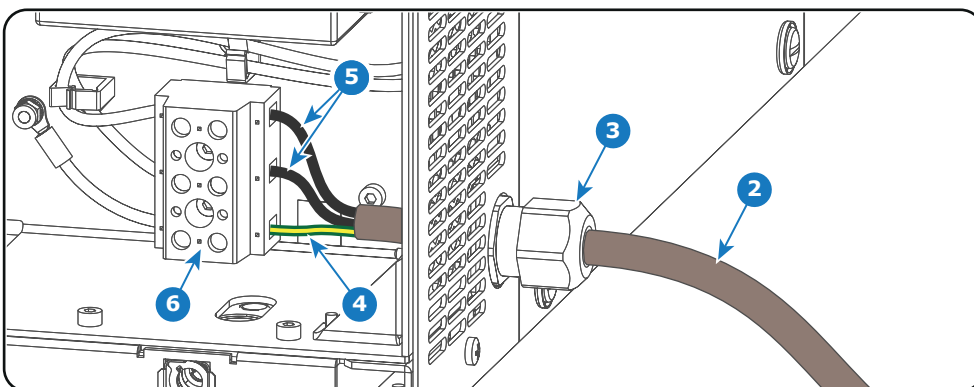
Image 5–7

4. Secure the AC power supply cord by fastening the cable gland (reference 3 Image 5–7). Use a 24mm open end wrench

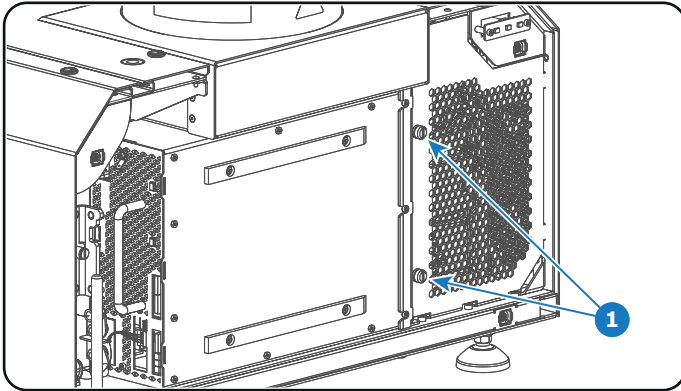**5.** Install the cover of the main AC compartment. Fasten the two captive thumb screws (reference 1 Image 5–8).

Image 5–8

6. Install the rear cover of the projector. See procedure "Installation of the rear cover", page 169.

Lenses & Lens selection

6

About this chapter

This chapter gives an overview of available lenses for your DP2K-S series projector and explains how to select the best suited lens for a specific situation using the lens calculator. Also, it is explained how to install and remove a lens from the projector Lens Holder and how to shift, zoom and focus the lens.

> ⚠ **CAUTION:** Never transport the projector with a lens mounted in the lens holder. Always remove the lens before transporting the projector. Neglecting this can damage the lens holder and prism.

> ⚠ **CAUTION:** Caution when removing or installing the lens! Fragile parts at the inner side of the lens holder.

> 📄 Each time a lens is manipulated (e.g. removed and installed in a projector), it needs to be homed and returned.

6.1 Available lenses

Which lenses are available?

For the DP2K-S series projector the **0.69**” **DC2K** lens family is used.

> 📄 The table below is subject to changes and was last updated on 09 January 2018. Consult *https://my.barco.com* for the most recent information about available lenses for the DP2K-S series projector.

0.69” DC2K zoom lenses			
Product Number	**2K zoom range**	**Image**	**Motor Block type**
R9856520	1.2 - 1.7	Image 6–1	M
R98565201	1.2 - 1.7		B
R9856521	1.34 - 1.9	Image 6–2	M
R9856522	1.5 - 2.15	Image 6–3	M
R9856523	1.7 - 2.55	Image 6–4	M
R9856524	2 - 3.9	Image 6–5	M
R98565241	2.09 - 3.9		F

Image 6–1 0.69" DC2K zoom lens 1.2 - 1.7 (**R9856520**)

Image 6–2 0.69" DC2K zoom lens 1.34 - 1.9 (**R9856521**)

Image 6–3 0.69" DC2K zoom lens 1.5 - 2.15 (**R9856522**)

Image 6–4 0.69" DC2K zoom lens 1.7 - 2.55 (**R9856523**)

Image 6–5 0.69" DC2K zoom lens 2 - 3.9 (**R9856524**)

6.2 Lens selection

Which lens do I need?

1. Browse to Barco's website on *www.Barco.com*.

2. Go to the product page of the desired product.

3. On the product page, go to the *Tools* section and click **Lens calculator**.

The lens calculator will be displayed.

The lens calculator allows you to have an overview of which lenses are suitable for your specific projector setup. Just make your selection of parameters and all possible configurations are displayed.
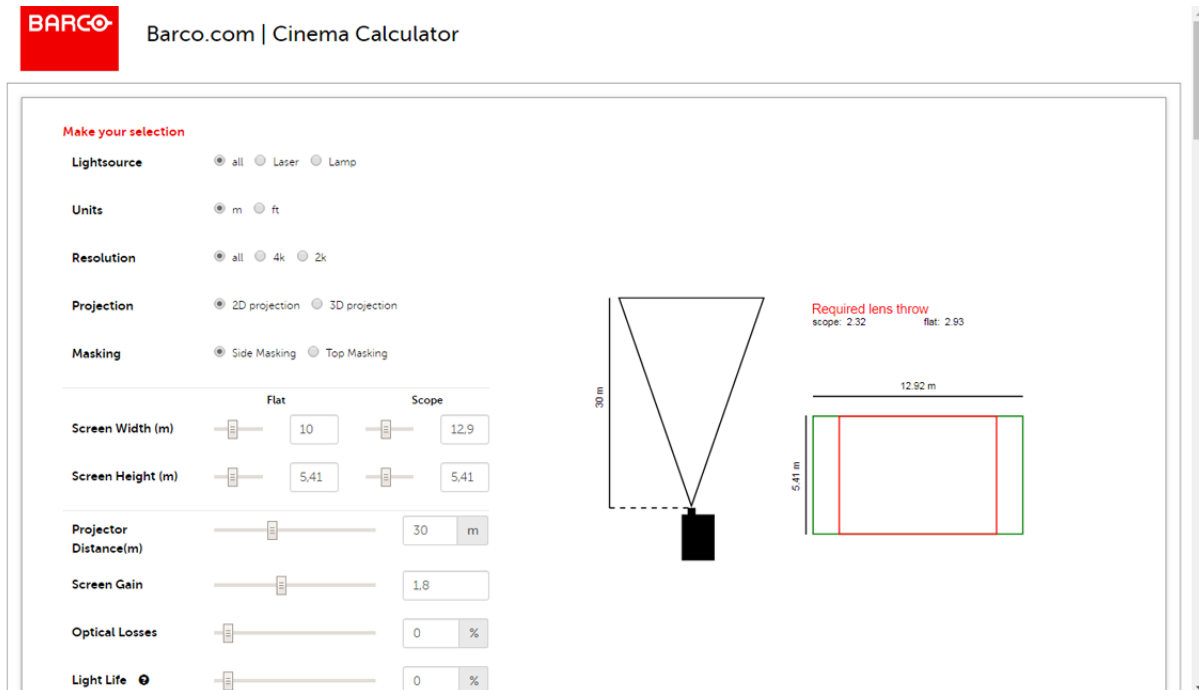

Image 6–6   Example of the Digital Cinema Lens calculator tool

> 📄 Take into account that when the projector is **tilted** the **Screen Width** you have to fill in should be **larger** than the physical screen width due to the keystone distortion of the projected image. How much larger depends on the amount of tilt.

> 📄 Due to production tolerances the real distances can differ by 2% from the calculated values.
> For critical situations (fixed installs that use the lens at one of its extreme zoom positions) this should be taken into account.

6.3 Lens installation

How to install a lens into the Lens Holder?

1. Remove the foam rubber in the opening of the Lens Holder if not removed yet.

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

   ⚠️ *Caution:* Do not touch the glass of the lens!

3. Ensure that the Lens Holder stands in the On-Axis position (horizontal and vertical mid position).

4. Place the Lens Holder in the "**locked**" position by moving the lens lock handle (reference 1 Image 6–7) downwards, away from the lens power supply socket (reference 2 Image 6–7).

5. Gently insert the lens in such a way that the lens connector matches the socket. To prevent collision of the lens with the critical electronics inside the projector, ensure you centre the lens and keep it on-axis while approaching.

   ⚠️ *Caution:* Do not accidentally bump with the lens against the electronic boards inside the Lens Holder.

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

6. **Push** the lens completely against the Lens Holder front plate. An **audible click** should be noticed. Once seated, there may be no airgap between lens flange and Lens Holder front plate.

⚠ *Caution:* Ensure that the lock handle remains in the "locked" position.
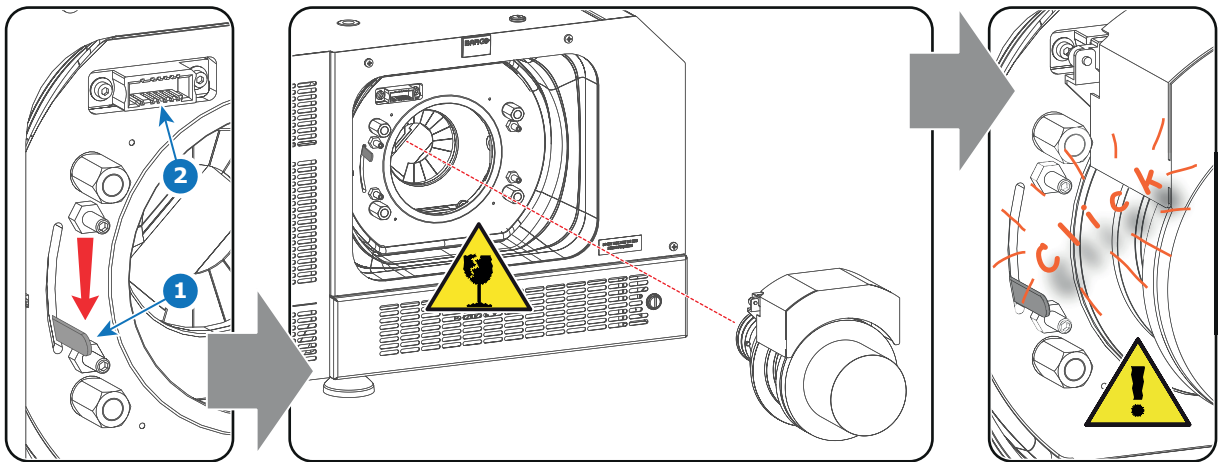

Image 6–7

📄 *Note:* For frequent installation and removal of the lens it is recommended to install the lens while the lock handle is in "open" position (upwards) and put the lock handle in "locked" position once the lens is inserted. Then check if the lens is properly installed by trying to pull the lens out of the Lens Holder. (this alternative procedure result in less wear of the Lens Holder)

7. Check if the lens is really secured by trying to pull the lens out of the Lens Holder.

8. Activate the corresponding lens parameters for the installed lens. (See user guide of the "*Communicator*" chapter *Installation > Advanced > Lens parameters*)

⚠ *Caution:* Not using the correct lens parameters could result in lens damage.
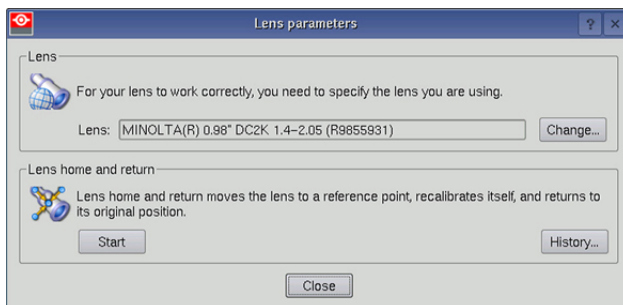
Image 6–8

9. Perform a lens **HOME & RETURN** operation. (See user guide of the "*Communicator*" chapter *Installation > Advanced > Lens parameters*)

📄 *Note:* The HOME & RETURN operation enables the projector to determine the reference positions of the motorized ZOOM and FOCUS barrels of the installed lens.

⚠ **CAUTION:** Never transport the projector with a lens mounted in the lens holder. Always remove the lens before transporting the projector. Neglecting this can damage the lens holder and prism.

6.4 Lens removal

How to remove a lens from the Lens Holder?

1. Support the lens with one hand while you unlock the lens holder by sliding the lock handle (reference 1 Image 6–9) towards the "unlocked" position as illustrated.

2. Gently pull the lens out of the lens holder, maintaining its coaxial direction.

> ⚠️ *Caution:* Do not accidentally bump with the lens against the electronic boards inside the Lens Holder.
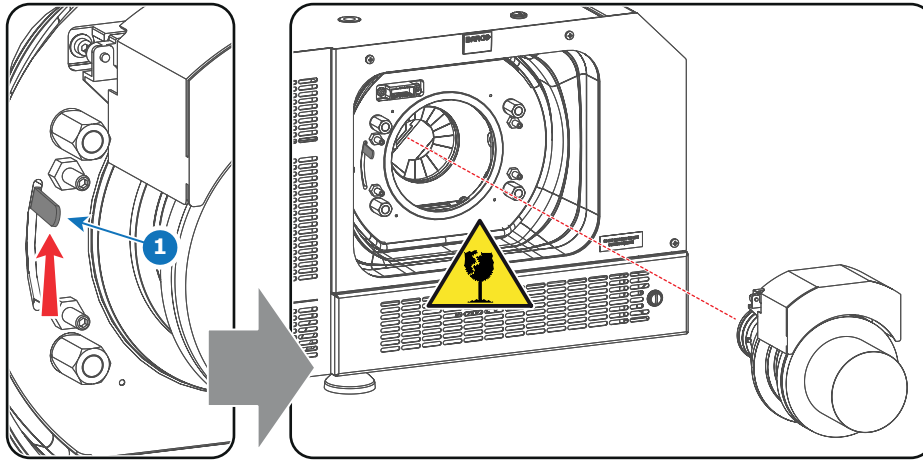

Image 6–9

> 👉 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 plastic lens holder cover of the original projector packaging, back into the Lens opening to prevent intrusion of dust.

6.5 Lens shift, zoom & focus

Motorized lens adjustment

The DP2K-S series projector is equipped with a motorized lens shift and zoom & focus functionality.

Maximum shift range

The lens can be shifted with respect to the internal optics of the projector (DMD) which results 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 the shift range is limited as well.

All lenses have a shift range of 50% up, 50% down, 30% left, and 30% right. This range is valid for all throw ratios. 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.
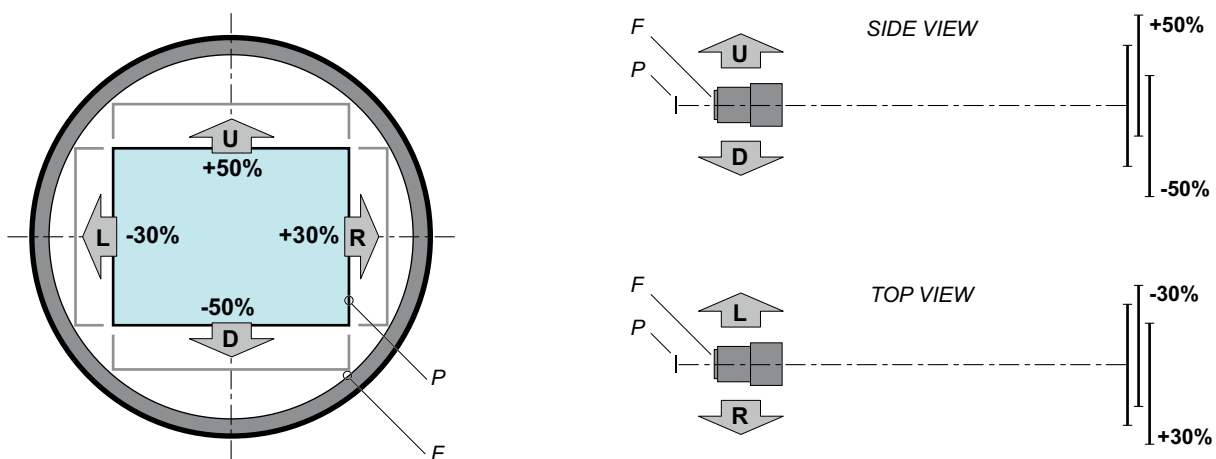
Image 6–10

P DMD.
F Field of view.

> It's mechanical possible to shift outside the recommended field of view (±90% UP/DOWN and ±50% LEFT/RIGHT), but this 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.

How to shift the lens of the DP2K-S series projector ?

1. Use the **up and down** arrow buttons on the Local Keypad to shift the lens **vertically** and use the **left and right** arrow buttons on the Local Keypad to shift the lens **horizontally**.
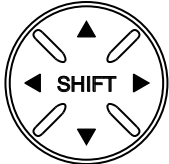
Image 6–11

How to zoom in or out?

1. Use the "+" and "-" **zoom buttons** on the Local Keypad to zoom in or out.

Image 6–12

How to focus?

1. Use the "+" and "-" **focus buttons** on the Local Keypad to focus the image on the screen.

Image 6–13

> Take into account that the lens focus may slightly drift while the lens is warming up from cold to operation temperature. This is a typical phenomenon for projection lenses used with high brightness projectors. The operation temperature of the lens is reached after approximately 30 minutes projection of average video.

Button backlight colors

- **BLUE** : The default backlight color of the Shift, Zoom and Focus buttons is blue which indicates that the button is enabled.
- **PURPLE** : When pushing the Shift, Zoom or Focus button the backlight color is purple of the part of the button that is pushed. This indicates that the requested action is ongoing.
- **RED** : The backlight color of the Shift, Zoom and Focus buttons is red in case of end of range.

Input & Communication

7

About this chapter

This chapter describes the functionality of the Local Keypad, the projector Status Light (tail light) and the different input and communication ports of your DP2K-S series projector.

Note that all information about the ICMP(-X) is gathered into one separated chapter: "ICMP(-X)", page 63.

7.1 Introduction

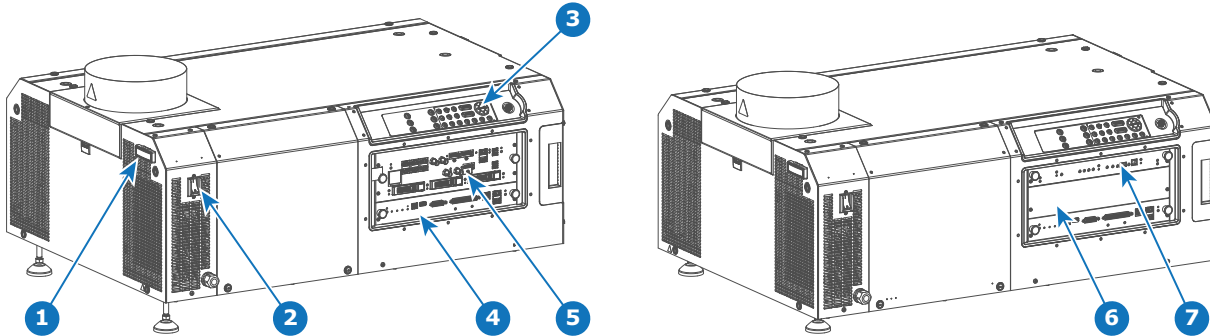## General

The Input & Communication side of the DP2K-S series projector consists of a Local Keypad integrated into the projector housing and a card cage with three slots. The rear side of the projector is equipped with a tail light which reflects the status of the projector.

Depending on the projector configuration the projector card cage is equipped with an ICP(-D) or ICMP(-X). See illustration below. In case an ICP(-D) is installed then an IMB, IMS, or HDSDI input module can be optionally inserted into the slot below the ICP(-D). Note that all information about the ICMP(-X) is gathered into one separated chapter: "ICMP(-X)", page 63.

Image 7–1

1	Projector status light.	**5**	ICMP(-X).
2	Power ON/OFF switch.	**6**	Input slot for IMB, IMS, or HD-SDI input module (in case no
3	Local keypad.		ICMP(-X) is installed.
4	Barco Cinema Controller.	**7**	ICP(-D) .

> ⚠️ **CAUTION:** A unit may only be removed from the card cage by qualified service personnel. Removing one of the boards (except for the Cinema Controller) will result in an authorization request upon starting.
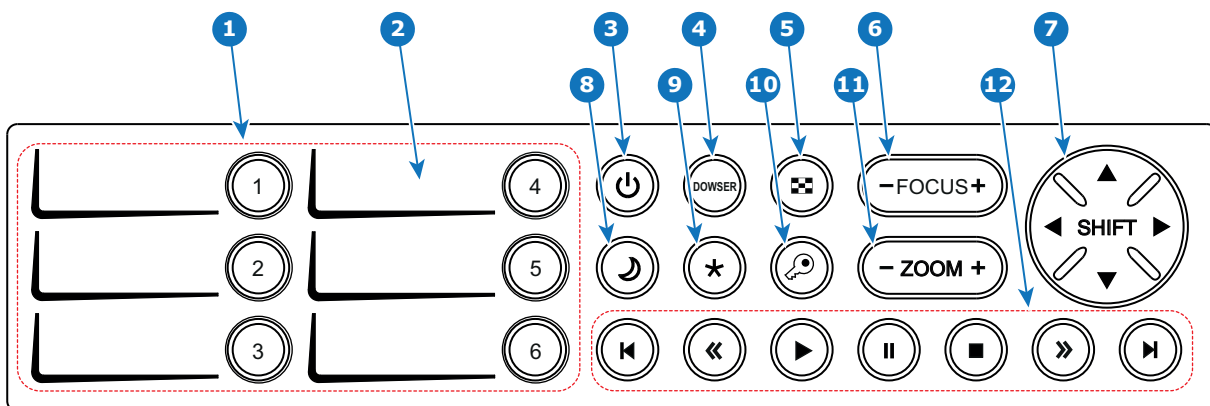
7.2 Local Keypad

Identification of the buttons

Image 7–2

Functionality of the buttons

1 **Numeric buttons (No.1 - 6)**

All the Numeric buttons (reference **1** Image 7–2) of the Local Keypad have a blue backlight during normal operation. When the authorization process is activated with the (security) Key button, the backlight color of the Numeric buttons changes to yellow. Each button can be linked to a macro which allows you to setup the projector to your requirements with one push of a button. The backlight color of the Numeric button is green if the macro associated with the Numeric key is activated. The backlight color of the Numeric button is red in case one of the actions of the macro failed.

2 **Marker area**

Each Numeric button has a marker area (reference **2** Image 7–2) where you can write down the name of the Macro.

3 **Standby button**

Standby button (reference **3** Image 7–2) switches the lamp and lamp electronics immediately ON or OFF. The lamp cooling fans remain active for about 5 minutes. The speed of the other fans is reduced. The backlight color of the Standby button remains red in standby mode and changes to green in operation mode.

4 **Dowser button**

The Dowser button (reference **4** Image 7–2) opens or closes the electronic dowser. The backlight color of the Dowser button is green when the dowser is open and red when the dowser is closed.

5 **Test Pattern button**

The Test Pattern button (reference **5** Image 7–2) gives direct access to a limited set of the internal test patterns of the projector. This is a toggle button. To exit the Test Pattern mode toggle through all test patterns. Note that the convergence test pattern is not included in this set. The backlight color of the Test Pattern button is red if one of the test patterns is activated and green if none is activated.

6 **Focus button**

The Focus button (reference **6** Image 7–2) allows you to focus the projected image on the screen. The backlight color of the Focus button is red in case the end of range is reached.

7 **Shift button**

The Shift button (reference **7** Image 7–2) allows you to shift the lens up/down or left/right. The backlight color of the Shift button is red in case the end of range is reached.

8 **Sleep button**

Pushing the Sleep button (reference **8** Image 7–2) for 3 seconds puts the projector in Sleep mode (energy saving). In case the projector is processing the after cooling cycle then the projector goes in Sleep mode after finishing the after cooling cycle. The backlight color of the Sleep button is purple during after cooling and red in Sleep mode.

Push the Sleep button for 3 seconds in Sleep mode to awake the projector (put in Standby). The backlight color of the Sleep button in Standby mode is green.

Enter or leave Sleep mode can also be done via a 2 dedicated projector command (USB/Ethernet), or via two predefined Macros (not editable) with GPIO, or via the Communicator.

The Sleep button is disabled if the lamp is on (no backlight).

9 **Star button**

Star button (reference **9** Image 7–2). Pressing the Star button a few seconds will activate the ICMP reset process.

10 **Key button**

The (security) Key button (reference **10** Image 7–2) is used for the authorization procedure to clear tamper errors etc. (service purposes). Pin codes can be added/changed with the Communicator.

11 **Zoom button**

The Zoom button (reference **11** Image 7–2) allows you to zoom in or out the projected image on the screen. The backlight color of the Zoom button is red in case the end of range is reached.

12 **Media control buttons**

Buttons (reference **12** Image 7–2) allowing you to navigate through the content on the integrated media server. The Media buttons are disabled (no backlight) if no IMS or IMB is installed.

Button backlight colors

- **BLUE** : The default backlight color of the buttons is blue which indicates that the button is enabled. The buttons of which the backlight doesn't light up are disabled (E.g. Media Control buttons are disabled in case no IMB or IMS is installed).
- **PURPLE** : The backlight color of a button (or part of) is purple when pushed. This indicates that the requested action is ongoing. The backlight color remains purple until the requested action is finished.
- **GREEN** : depending on the button the green backlight color can have a different meaning:
  - for the Standby button a green backlight color means that the lamp is switched ON.
  - for the Sleep button a green backlight color means that the projector is awake.
  - for the Dowser button a green backlight color means that the electronic dowser is open (applied source can be displayed).
  - for the Test Pattern button a green backlight color means that NO test pattern is activated and thus the applied source can be displayed.
  - for the Macro buttons a green backlight color means that the associated macro is successfully activated.
  - for the Key button a green backlight color means that the projector is secured (no tamper event).
- **RED** : depending on the button the red backlight color can have a different meaning:
  - for the Standby button a red backlight color indicates that the lamp is OFF (not activated).
  - for the Sleep button a red backlight color indicates that the projector is in Sleep mode.
  - for the Dowser button a red backlight color indicates that the electronic dowser is closed (applied source can not be displayed).
  - for the Test Pattern button a red backlight color indicates that a test pattern is selected (applied source can not be displayed).
  - for a Macro button a red backlight color indicates that projector could not execute all actions of the macro (error).
  - for the Shift, Zoom or Focus button a red backlight color indicates that the end of range is reached.
  - for the Key button a red backlight color means that the projector is not secured (tamper event).
- **YELLOW** : The backlight color of the Numeric buttons 1 to 6 of the Local Keypad changes from blue to yellow if the (security) Key button is pressed.

7.3 Projector Status

About the projector Status Light

The projector Status Light is located at the rear end of the projector (Tail Light). The projector Status Light is real time indicator of the projector condition.
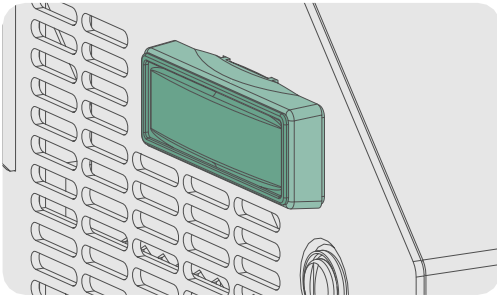
Image 7–3

Status overview

Depending on the condition of the projector the status light may have 4 colors: Green, Yellow, Red or Blue. Each color represent a different state:

Blinking Green	Projector is booting up. (Fully booted up when Test Pattern button is green as well)
Green	Projector is running normally.
Yellow	Projector is running with warnings. Event can go on but a technical intervention will be necessary in the near future to prevent a complete stop of the projector.
Red	Projector is in error state. Problem could prevent normal operation. Solve the problem before continuing with the projector.
Blue	Projector runs in notification state. Maintenance action required. Lamp run time is exceeded. New lamp must be installed.

Standby mode

In Standby mode the lamp of the projector is switched OFF but all the electronics of the projector remain fully operational. The projector is ready to ignite the lamp and project the image. The status light is not different between Standby mode and Lamp ON mode (fully operational).

Sleep mode

If the projector is in **Sleep** mode then the **status light flashes** every ten seconds. The color of the flash depends on the state of the projector. In other words, the color of the flash will be green in normal state (no warnings, no errors, no notifications).

In Sleep mode the total power consumption of the projector is less than 15W. No fans are turning and the Lamp Power Supply (LPS) is switched OFF completely. Only the following functionalities of the projector remains active:

• Cinema Controller
• Local Keypad
• Router and external switch fully functional
• USB IN port type "B" (Virtual comport RS232)
• USB OUT port type "A" (To power handheld devices [500mA MAX]. No other functionality supported)
• GPIO port on the Cinema Controller

Pressing the Sleep button in Standby mode for 3 seconds puts the projector in Sleep mode. In case the projector is processing the after cooling cycle then the projector goes in Sleep mode after finishing the after cooling cycle.

Pressing the Sleep button in Sleep mode for 3 seconds will awake the projector. The status light will blink for a few seconds (booting up all inactive boards) and then lights up continuously.

Enter or leave Sleep mode can also be done via 2 dedicated projector command (USB/Ethernet), or via two predefined Macros (not editable) with GPIO of the Cinema Controller (not the GPIO of the ICMP(-X)), or via the Communicator.

> 📄 The projector always boots up in the same mode (E.g. Standby or Sleep) as it was switched OFF. The Sleep button is disabled if the lamp is ignited.

7.4 Integrated Cinema Processor (ICP)

> 📄 In case the projector is equipped with an ICMP(-X) no ICP board is inserted. All ICP functionality is integrated in the ICMP(-X).

LEDs and ports on the Integrated Cinema Processor

Image 7–4

1 ICP is powered.
2 ICP software state, normal operation is green blinking.
3 ICP operating system state, normally full green .
4 ICP FMT configuration state, normally full green.
5 ICP MAIN configuration state, normally full green.

6 CINEMA port selected. When on, LED 7 will be out.
7 ALTERNATIVE port selection. When on, LED 6 will be out. (note that this function is disabled. Led never lights up)
8 USB, for future use.
9 USB, for future use.

LED diagnostic

State description	Normal operation	Error state
Software state (LED reference 2)	flashing green	red or orange
Operating System state (LED reference 3)	green	off, red or yellow
FMT FPGA state (LED reference 4)	green	red : unable to configure the FPGA yellow : FPGA is loaded with the Boot application
ICP FPGA state (LED reference 5)	green	red : unable to configure the FPGA yellow : FPGA is loaded with the Boot application

ICP functions:

- Stores all projector files. When board is replaced; clone package must be reloaded.
- Stores and generates test patterns.
- Scaling to native resolution, re-sizing, masking, line-insertion de-interlacing, subtitle overlay, color space conversion, de-gamma, color correction
- Source Selection between alternative content and cinema content.
- Stores a Certificate and Private Key needed for Playback validation
- Contains a real time clock, which must be synchronized with the GMT/UTC time stored in the link decryptor module or Integrated Media Block (see Communicator software)
- Handles unpacking of special video formats

> 📄 The ICP board spare part kit is not default programmed for a projector. When using this board in a projector the software must be re-installed after installation of the board.

📄 When installing a new ICP board in a projector the Spatial Color Calibration file must be reloaded and activated.

⚠️ **CAUTION:** Make sure not to short circuit the battery on the board. That will destroy the board completely !

7.5 Integrated Cinema Processor - Direct (ICP-D)

About ICP-D

The ICP-D (Integrated Cinema Processor - Direct) is a removable electronic assembly situated in the Card Cage of the projector. The ICP-D process and formats DCI cinema content played from a Media Block and delivers it to the projector (DMDs).

📄 In case the projector is equipped with a Barco ICMP(-X) no ICP-D board is inserted. All ICP-D functionality is integrated in the Barco ICMP(-X).

📄 Whatever the projector type, ICP-D is always located above IMB.

📄 A dedicated installation manual for ICP-D is available on the Barco's partner zone.

📄 An ICP-D can always replace an ICP in the field. Consult the dedicated installation manual for ICP-D available on Barco's partner zone.

ICP-D functions

- Stores a part of the projector files (screen files, MCGD files, ...).
- Stores the license files related to HDMI inputs.
  Note: the License file related to the use of ICP-D with a third party Integrated Media Block (IMB) is not stored here.
- Stores and generates test patterns.
- Scaling to native resolution, re-sizing, masking, line-insertion de-interlacing, color space conversion, de-gamma, color correction.
- Source Selection between alternative content and cinema content.
- Contains a real time clock, which must be synchronized with the GMT/UTC time stored in Integrated Media Block.
- Handles unpacking of special video formats.

ICP-D limitations

- CineCanvas subtitling support is not available on ICP-D.
- DVI inputs located on cinema controller are no longer functional.

Supported IMBs

Minimum ICP-D software version 1.2.1:

- Dolby ShowVault/IMB: From software version 2.8.25 onward
- Dolby IMS3000: From software version 3.3.26 onward
- Dolby IMS2000: From software version 2.8.25 onward
- GDC SX4000: From software version 10.00 (build 103) onward
- QSC CMS-5000: From software version 1.1.01818+ onward

📄 This list is subject to change. Please contact Barco service to obtain the updated list of supported IMB brands (models, minimum software version, etc).

ICP-D LEDs, communication and input ports
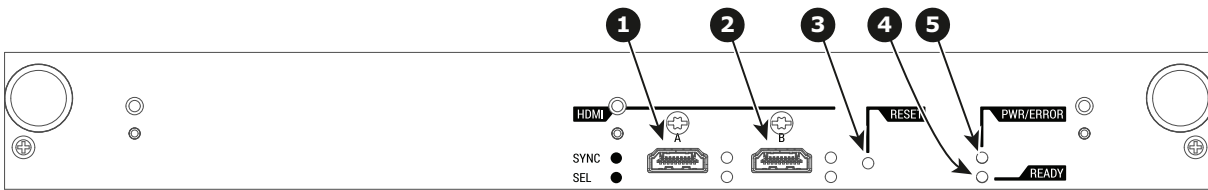
Image 7–5

1	HDMI Input A, HDMI 2.0 connector to connect a video source	**4**	Ready LED
2	HDMI Input B, HDMI 2.0 connector to connect a video source	**5**	Power & Error LED
3	Reset button		

ICP-D LEDs

Status overview PWR/ERROR and READY LEDs:

PWR/ERROR	READY	ICMP(-X) Status
Off	Off	Turned off
Red	Off	Board reset or security error
Blinking Green	Off	Boot loader
Blinking Green	Blinking Orange	Operating System start up
Blinking Green	Orange	Security Manager - Image Integrity tests
Blinking Green	Blinking Yellow	Security Manager - Self Test
Green	Blinking Green	Starting Applications
Green	Green	Applications started in normal mode
Green	Orange	Applications started in degraded mode
Blinking Red	Off	Security error
Green	Blinking Orange	Update ongoing
Orange	Orange	Update done

> 📄 When installing a new ICP(-D) board in a DP2K-S series projector projector the Spatial Color Calibration file must be reloaded and activated.

> ⚠ **CAUTION:** Make sure not to short circuit the battery on the board. That will destroy the board completely !

7.6 ICP-D HDMI 2.0 specifications

> 📄 Only video data will be processed. Audio component from HDMI standard is not supported by ICP-D.

HDMI 2.0 specifications

For the ICP-D HDMI 2.0 specifications, see "ICMP(-X) HDMI 2.0 specifications", page 87.

7.7 HD-SDI Input Module (optional)

> 📄 Not available for purchase at Barco for use in Taiwanese market.

> 📄 Depending on the projector configuration the projector card cage is either equipped with an ICP(-D) or ICMP(-X). In case an ICP(-D) is installed then an IMB, IMS, or HDSDI input module can be optionally inserted into the slot below the ICP(-D). This is not the case if the ICMP(-X) is installed. For more information about the ICMP(-X) see chapter called ICMP(-X).

Location of the source input ports

Image 7–6

1 SMPTE 292/424 input, port A (maximum cable length of 30 m allowed)
2 SMPTE 292/424 input, port B (maximum cable length of 30 m allowed)

> ℹ️ **SMPTE**
> Society of Motion Picture and Television Engineers - A global organization, based in the United States, that sets standards for baseband visual communications. This includes film as well as video standards.

HD-SDI settings

Source: 2K						
	General settings			**Advanced settings**		
Port	**Port type**	**Mode**	**Scan type**	**Color space**	**Pixel mapping**	**Calibration**
A or B	HDSDI Single link	4:2:2 10 bits/color	Progressive	YCbCr	HDSDI-Single link	Single
			Progressive - field bit normal			
			Progressive - field bit inverted			
			Progressive SF - 2nd field dominant			
			Progressive SF - 1st field dominant			
	3GSDI link	4:2:2 12 bits/color	Progressive	YCbCr	3G-level A-Single link	Single
					3G-level B-Dual link	
		4:4:4 10 bits/color	Progressive	RGB	3G-level A-Single link	

Source: 2K						
	General settings			Advanced settings		
Port	**Port type**	**Mode**	**Scan type**	**Color space**	**Pixel mapping**	**Calibration**
					3G-level B-Dual link	
		4:4:4 12 bits/color	Progressive	XYZ/ RGB	3G-level A-Single link	
					3G-level B-Dual link	
A+B	HDSDI Duallink AB	4:4:4 10 bits/color	Progressive	RGB	HDSDI-Dual link	Single
			Progressive - field bit normal			
			Progressive - field bit inverted			
			Progressive SF - 2nd field dominant			
			Progressive SF- 1st field dominant			
		4:4:4 12 bits/color	Progressive	XYZ/ RGB		
			Progressive - field bit normal			
			Progressive - field bit inverted			
			Progressive SF- 2nd field dominant			
			Progressive SF- 1st field dominant			

Source: 2K-3D						
	General settings			Advanced settings		
Port	**Port type**	**Mode**	**Scan type**	**Color space**	**Pixel mapping**	**Calibration**
A or B	3GSDI link - 3D	4:2:2 10 bits/color	Progressive	YCbCr	3G - Level B - Dual stream	Single
						Dual (separate left / right eye)
			Progressive SF- 1st field dominant	YCbCr	3G - Level B - Dual stream	Single
						Dual (separate left / right eye)
			Progressive SF - 2nd field dominant	YCbCr	3G - Level B - Dual stream	Single
						Dual (separate left / right eye)
A+B	HDSDI 3D	4:2:2 10 bits/color	Progressive	YCbCr	HDSDI - Interleaved	Single

Source: 2K-3D						
	General settings			Advanced settings		
Port	Port type	Mode	Scan type	Color space	Pixel mapping	Calibration
						Dual (separate left / right eye)
			Progressive SF- 1st field dominant	YCbCr	HDSDI - Interleaved	Single
						Dual (separate left / right eye)
			Progressive SF - 2nd field dominant	YCbCr	HDSDI - Interleaved	Single
						Dual (separate left / right eye)
	3GSDI 3D	4:2:2 12 bits/color	Progressive	YCbCr	3G - Level A - Interleaved	Single
						Dual (separate left / right eye)
					3G - Level B - Interleaved	Single
						Dual (separate left / right eye)
		4:4:4 10 bits/color	Progressive	RGB	3G - Level A - Interleaved	Single
						Dual (separate left / right eye)
					3G - Level B - Interleaved	Single
						Dual (separate left / right eye)
		4:4:4 12 bits/color	Progressive	XYR/ RGB	3G - Level A - Interleaved	Single
						Dual (separate left / right eye)
					3G - Level B - Interleaved	Single
						Dual (separate left / right eye)

Source: 2K-HFR						
	General settings			Advanced settings		
Port	Port type	Mode	Scan type	Color space	Pixel mapping	Calibration
A or B	3GSDI link - HFR	4:2:2 10 bits/color	Progressive	YCbCr	3G - Level B - Dual stream	Single
					3G - Level B - Single link	

Source: 2K-HFR						
General settings				**Advanced settings**		
Port	**Port type**	**Mode**	**Scan type**	**Color space**	**Pixel mapping**	**Calibration**
A+B	HDSDI HFR	4:2:2 10 bits/color	Progressive	YCbCr	HDSDI - Interleaved	Single
			Progressive SF- 1st field dominant			
			Progressive SF - 2nd field dominant			
	3GSDI HFR	4:2:2 12 bits/color	Progressive	YCbCr	3G - Level A - Interleaved	Single
					3G - Level B - Interleaved	
		4:4:4 10 bits/color	Progressive	RGB	3G - Level A - Interleaved	Single
					3G - Level B - Interleaved	
		4:4:4 12 bits/color	Progressive	XYZ/ RGB	3G - Level A - Interleaved	Single
					3G - Level B - Interleaved	

Source: 3D-HFR						
General settings				**Advanced settings**		
Port	**Port type**	**Mode**	**Scan type**	**Color space**	**Pixel mapping**	**Calibration**
A+B	3GSDI 3D HFR	4:2:2 10 bits/color	Progressive	YCbCr	3G - Level A - Interleaved	Single
						Dual (separate left / right eye)
			Progressive SF- 1st field dominant	YCbCr	3G - Level A - Interleaved	Single
						Dual (separate left / right eye)
			Progressive SF- 2nd field dominant	YCbCr	3G - Level A - Interleaved	Single
						Dual (separate left / right eye)

7.8 Integrated Media Block/Server (optional)

Not available for purchase at Barco for use in Taiwanese market.

Depending on the projector configuration the projector card cage is either equipped with an ICP(-D) or ICMP(-X). In case an ICP(-D) is installed then an IMB, IMS, or HDSDI input module can be optionally inserted into the slot below the ICP(-D). This is not the case if the ICMP(-X) is installed. For more information about the ICMP(-X) see chapter called ICMP(-X).

Integrated Media Block (IMB)

Image 7–7 Example of IMB powered by Dolby.

Integrated Media Server (IMS)

Image 7–8 Example of IMS powered by Dolby.

> 📄 Configuration and operation instructions for IMB and IMS are not included in this document. See manufacturers website of the installed IMB/IMS for technical documentation and support.

7.9 Cinema Controller

Location of the communication ports
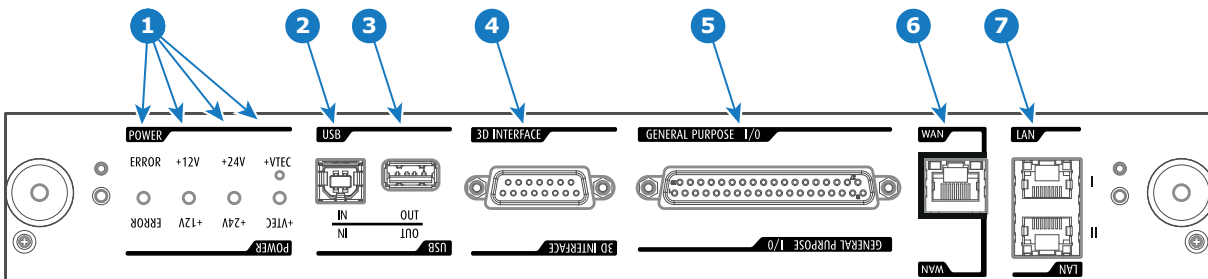
Image 7–9

Functionality

1 Diagnostic LEDs

The front plate of the Cinema Controller contains 4 diagnostic LEDs to display the status of the power supply:
- +VTEC supply (not used on DP2K-S series projector).
- +24V supply.
- +12V supply.
- general power supply (ERROR).

2 **USB IN port**

The Cinema Controller is equipped with a USB port, type "B" connector to connect upstream devices (E. g. PC). This USB port is used to communicate with the projector via RS232 commands (Virtual comport).

3 **USB OUT port**

The Cinema Controller is equipped with a USB port, type "A" connector which can be used to power handheld devices within USB spec (MAX 500mA/5V]. No other functionality supported (Future expansion).

4 **3D INTERFACE**

3D interface port can be used to connect external 3D devices to the projector. All signals necessary for 3D projection can be provided via this connector.

5 **GENERAL PURPOSE INPUT/OUTPUT (GPIO)**

This 37 pin connector can be used to send or receive trigger signals from other devices. These input/ output pins can be programmed by macros created with the Communicator software. See user's guide of the Communicator, section Macro editor, for more information about this functionality. Note that the General Purpose Inputs accept 24 volt maximum. If the factory predefined macro to wake up the projector is assigned to one of the free GPI input pins the projector can be awakened via GPIO.

6 **Wide Area Network (WAN)**

Wide Area Network (WAN: 10/100/1000 base-T). Use this Ethernet port (reference 6 image 7-8) to connect the network which contains the DHCP server.

Once connected to the WAN, users can access the projector from any location, inside or outside (if allowed) their company network using the Communicator software. This software locates the projector on the network if there is a DHCP server or the user can insert the correct IP-address to access the projector. Once accessed, it is possible to check and manipulate all the projector settings. Remote diagnostics, control and monitoring of the projector can then become a daily and very simple operation. The network connectivity allows detection of potential errors and consequently improves service time.

7 **Local Area Network (LAN: 10/100/1000 base-T)**

Local Area Network (LAN: 10/100/1000 base-T) with built-in Ethernet switch (port I and port II). Use for projector control and automation. E.g. Touch Panel, content server, ... (not for content streaming!)

As there is a need to daisy chain projectors when they are on an Ethernet network, an Ethernet switch is built in. the incoming network is hereby available for the internal PC and for the next device in the chain. In this way a 'star' network interconnection can be avoided. The switch used is a stand alone 10/100/ 1000Mbit Ethernet switch. This assures no influence on the network speed.

The connectors used for these Ethernet ports are of the type RJ45, which is compatible with standard RJ45 cable connector. Straight (most common) as well as cross linked network cables can be used. The 2 ports are functionally identical. Both ports are connected via the projector switch (Auto sensing enabled).

> 📄 The connectors used for all Ethernet ports are of the type RJ45, which is compatible with standard RJ45 cable connector. Straight (most common) as well as cross linked network cables can be used. The 2 ports are functionally identical. Both ports are connected via the projector switch (Auto sensing enabled).

Virtual comport (RS232 serial communication)

The USB-IN port of the communication interface supports RS232 serial communication. You can use the RS232 input port to connect a local PC to the projector. This way you can configure and control the projector from your local PC.

> 📄 Do not forget to set the projector's baud rate (default = 115200) to match that of the computer.

Advantages of using RS232 serial communication:

- easy adjustment of the projector via PC (or MAC).
- wide range of control possibilities.
- sending data to the projector (update).
- copying data from the projector (backup).

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.

ICMP(-X)

8

About this chapter

This chapter describes the ICMP (-X) in general, the HDDs, the input ports and the communication ports. Furthermore, the status LEDs are described and the importance of the device certificate is illustrated.

ICMP(-X)

Image 8–1

8.1 ICMP(-X) introduction

About ICMP(-X)

The ICMP(-X) is a removable electronic assembly situated in the Card Cage of the projector. The ICMP(-X) stores, decrypts and decodes DCI cinema content and delivers it to the projector in a usable format, all integrated into a single assembly placed directly in the projector. ICMP(-X) is a fully integrated assembly so expected by the operators to facilitate their daily business.

The standard Integrated Cinema Processor functionality from Texas Instruments® is fully integrated into the ICMP(-X). So, the ICMP(-X) replaces the ICP(-D) board as well.

The ICMP(-X) is located in the Card Cage of the projector.
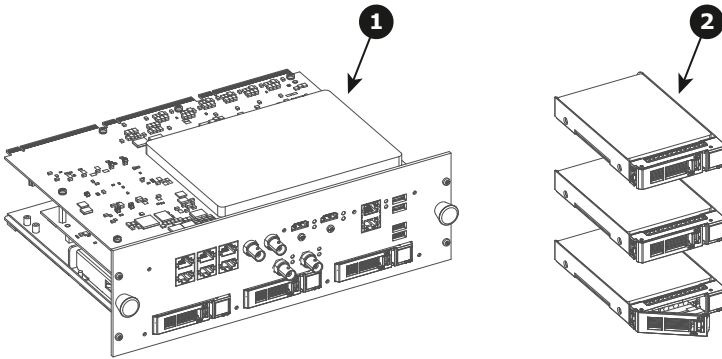
Image 8–2

1 ICMP(-X)
2 HDDs for ICMP(-X)

As an integrated component of the projector, installation and maintenance of the ICMP(-X) requires the same skills and the same precautions as an intervention on the projector itself.

For order info see *www.barco.com*.

Front face of the ICMP-X
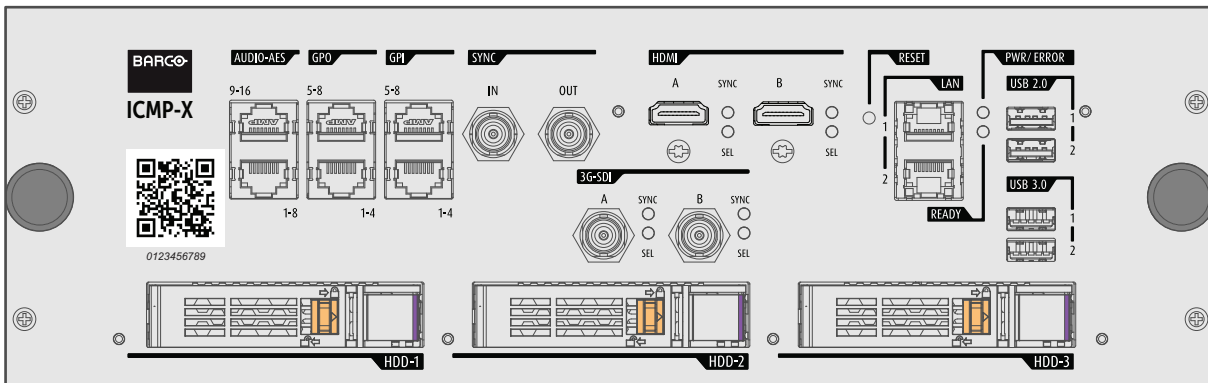
Image 8–3 Front face ICMP-X (standard with storage controller GEN 2)

Front face of the ICMP with HDMI 2.0
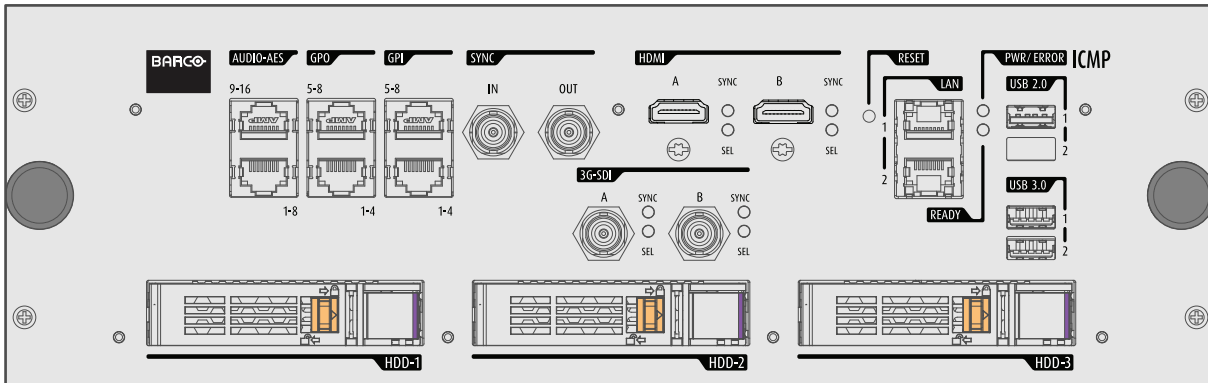
Image 8–4 The model is equipped with two HDMI 2.0 as video source. This ICMP model is no longer available.

Front face of the ICMP with DisplayPort and HDMI 1.4
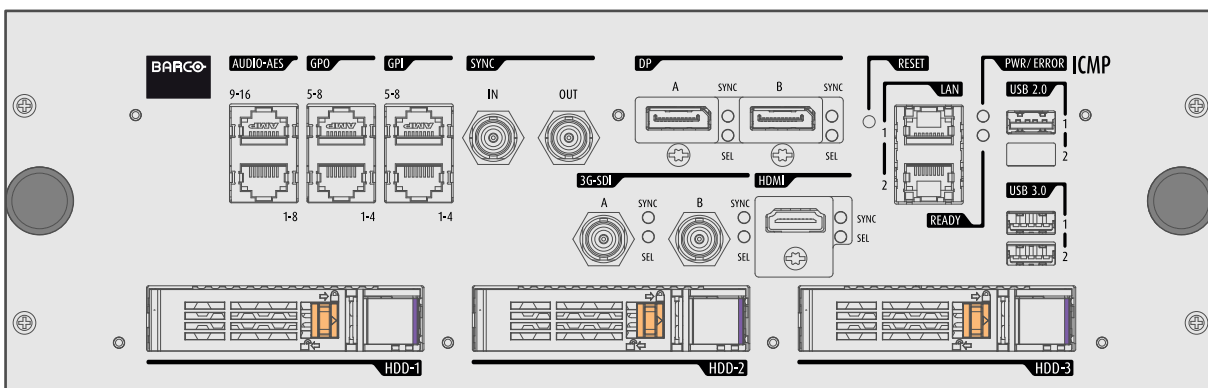
Image 8–5 Some models with DisplayPorts and one HDMI 1.4 (mezzanine) are still present on the field. This ICMP model is no longer available.

GEN1 and GEN2 storage controller

The ICMP-X is equipped with a GEN2 storage controller while the legacy ICMP has an GEN1 storage controller.

The GEN2 storage controller supports SSD and uses another disk initialization type. This implies that HDDs initialized for the legacy ICMP (with GEN1 storage controller) are not interchangeable with the ICMP-X without re-initialization. Note that a re-initialization process result in lost of content. See "What are the possible HDD swaps ", page 69.

It's possible to upgrade an ICMP with a GEN2 storage controller. For more info about the upgrade kit and instructions see Barco website.

How to recognize an ICMP-X or an upgraded ICMP with GEN2 storage controller

At the first glance ICMP-X is very similar to ICMP (the previous generation device) however both devices are not fully compatible and not interchangeable.

Unlike the previous versions the name of ICMP-X appears on the upper left side of the front face (under the Barco logo).
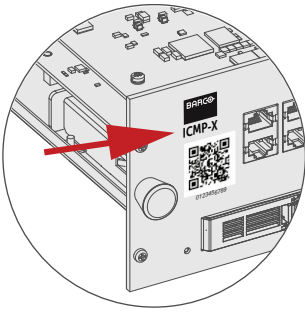
Image 8–6

An upgraded ICMP with GEN 2 storage controller has a label "SSD READY - RAID GEN2" applied under the Barco logo). This sticker comes with the upgrade kit; it will only be there when the "upgrader" applied it.
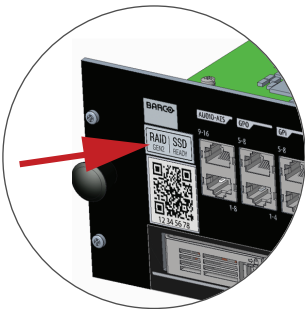
Image 8–7

> 📄 It's useful to recognize an ICMP from an ICMP-X or upgraded ICMP to know which HDDs can be used without re-initialization.

8.2 ICMP(-X) HDD

About ICMP(-X) HDD

The three HDDs (local storage) in the ICMP(-X), are set up in a RAID 5 configuration. This storage technique, that combines multiple HDD components into a logical unit, manages enough redundancy information to continue to operate properly after the loss of one HDD.
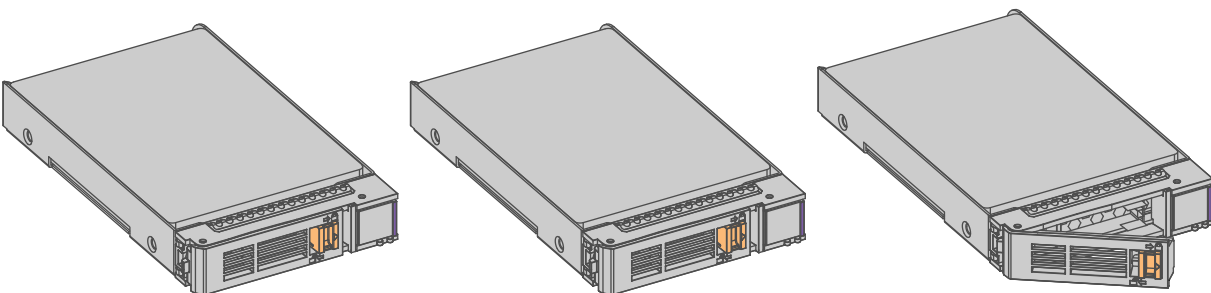
Image 8–8

> ⚠️ **CAUTION:** A RAID 5 configuration with three HDDs allows a maximum loss of one disk. With the simultaneous loss of more than one HDDs, data is lost and the RAID must be completely initialized again after replacement of the defect HDDs with new HDDs!

About degraded mode

When a RAID array experiences the failure of one disk, it enters in degraded mode. Content storage and playback remains available on the ICMP(-X).

> ⚠️ **CAUTION:** The loss of one disk causes no serious consequences on the ICMP(-X). But action must be taken quickly because the loss of a second disk will make the RAID system broken. The main cause of the total loss of RAID is due in most cases to the loss of the second disk while the first has not been rebuilt!

> ☞ A failed drive should be replaced as soon as possible.

About "RAID recovery" process

The restoration from degraded to normal condition of the RAID 5 system is done automatically. When the RAID controller detects a new HDD to replace the failed disk the recovery procedure starts automatically.

> ⚠️ **CAUTION:** The automatic process does not work if more than one disk is lost. In that case the RAID must be completely initialized again!

About RAID broken

When more than one HDD is out of order, the RAID is considered as 'broken' and the content is lost. The failed HDDs must be changed and a new RAID must be created.

Exchange or re-use of a disk set

It's possible to have several sets of disks with one ICMP or to reuse a complete set of disks coming from another projector with ICMP.

How to exchange:

- **Exchange of HDD set between two ICMP(-X)s with the same storage controller:**
  It is sufficient to insert the three HDDs, from a valid RAID array, and let the system explore the new RAID. The mounting order of the HDDs and the HDD slots do not matter. Of course, when using HDDs from another ICMP(-X) it is necessary to retrieve from the content distributor the KDMs corresponding to the content and the new ICMP(-X).
- **Exchange of HDD set between two ICMP(-X)s with a different storage controller:**
  After inserting the three HDDs it is necessary to perform a manual RAID initialization with (Web) Communicator, the Barco projectors configuration software. The *RAID initialization* command (e.g. in Web Communicator: *Maintenance > Raid Storage*) erases any data present on the HDDs and the old content will be lost. This will only take a short while and after this process, the projector will reboot. You can start immediately after booting with the ingest of your content.

> 📄 The problem of non-compatibility between the two generations of storage controllers is also encountered when installing a new set of hard drives on an ICMP-X. The HDD spare part kits provided by Barco are configured by default to work with a GEN1 storage controller and it is necessary to perform a manual RAID initialization when they are deployed on a GEN2 storage controller.

> ☞ Label the HDDs with the initialization type (GEN1 or GEN2) to make it visible for which type of storage controller the disks can be used without requiring a re-initialization and lost of content

HDD storage capacity

Make sure that all HDDs in the ICMP(-X) HDD set have the same storage capacity. See label on top of the HDD to know the storage capacity.

HDD storage

The maximum recommended storage period for the drive in a non-operational environment is 90 days. Drives should be stored in the original unopened shipping packaging whenever possible. Once the drive is removed from the original packaging the recommended maximum period between drive operation cycles is 30 days. During any storage period the drive non-operational temperature, humidity, wet bulb, atmospheric conditions, shock, vibration, magnetic and electrical field specifications should be followed.

HDD models validated by Barco

Only the original HDD spare parts provided by Barco or models validated by Barco (see list below) can be used in the ICMP(-X). All deviations from this rule void warranty.

HDD model	ICMP-X	ICMP
1TB: HGST – Western Digital (order code: HCC541010A9E630 or HCC541010B9E660)	Yes	Yes
1TB: Western Digital black drives (order code: WD10JQLX-22JFGT0)	Yes	Yes
1TB: Seagate (order code : ST1000NX0313)	Yes	Yes
2TB: Seagate (order code : ST2000NX0253)	Yes	Yes
4TB: Seagate SSD (order code: XA3840ME10063)	Yes	Yes, only if the GEN1 storage controller is replaced by a GEN2 storage controller. Software version 1.4.2 or higher is needed.

8.3 What are the possible HDD swaps

General

There are several possible scenarios for replacing (exchange) hard drives on the ICMP(-X). The situation is different depending on the device type (ICMP or ICMP-X) and whether to replace one or more disks.

Continuity of data present on the disks is also impacted depending on the type of exchange. Degraded operation or RAID initialization may be required.

List of available actions

The following table exposes all possible swaps available concerning HDDs on ICMP(-X):

> Replacing drives should always be done while the power is off.

Type of HDD swap	On ICMP	On ICMP-X
1 HDD replaced.	• Content is preserved. • ICMP automatically starts rebuild. • Process takes about 3-4 hours for 1TB HDD and could takes about 13-14 hours for 4TB HDD.	• Content is preserved. • ICMP-X automatically starts rebuild. • Process takes about 3-4 hours for 1TB HDD and could takes about 13-14 hours for 4TB HDD.
3 HDDs replaced separately (previous kit of one disk used three times).	• All content will be lost. • RAID initialization need to be perform with Communicator. • immediately usable after RAID initialization + restart (content can be ingested).	• All content will be lost. • RAID initialization need to be perform with Web Communicator. • immediately usable after RAID initialization + restart (content can be ingested).
Barco HDD replacement kit (Spare part kit provided by Barco with a set of 3 hard disks configured to GEN1 storage controller).	• RAID initialization does not need to be performed. • Content can be ingested immediately.	• RAID initialization needs to be perform with Web Communicator. • immediately usable after RAID initialization + restart (content can be ingested).

Type of HDD swap	On ICMP	On ICMP-X
Set of 3 HDDs with content reused from an ICMP with GEN1 storage controller.	On an ICMP with GEN1 storage controller: • Content is preserved but certificates (KDM) need to be re-ingested. On an ICMP with GEN2 storage controller: • All content will be lost. • Only usable after RAID initialization + restart (content can then be ingested immediately).	• All content will be lost. • Only usable after RAID initialization + restart (content can then be ingested immediately).

Set of 3 HDDs with content reused from an ICMP-X.	1. Unit is equipped with an GEN1 storage controller (default configuration):
	  - All content will be lost.
	  - RAID initialization needs to be perform with Communicator.
	2. Unit has been upgraded with a GEN2 storage controller (+ ICMP software 1.4.2 or higher is installed):
	  - Content is preserved but certificates (KDM) need to be re-ingested.
		• Content is preserved but certificates (KDM) need to be re-ingested.

8.4 Installing a HDD into the ICMP(-X)

📄 This procedure assumes that the HDD slot of the ICMP(-X) is empty. If not, see procedure "Removing a HDD from the ICMP(-X)", page 72.

⚠ **CAUTION:** Always use a new empty spare part HDD approved by Barco to replace a malfunction HDD. Do not use a HDD from another ICMP(-X) HDD set.

⚠ **CAUTION:** Always make sure that all HDDs in the ICMP(-X) HDD set have the same storage capacity. See label on top of the HDD to know the storage capacity.

Re-initialization or rebuild of RAID

Installing or exchange one or several HDDs into ICMP (-X) has an impact on data presents on the already inserted drives. RAID integrity depends on the type of HDD swap. Refer to the chapter "What are the possible HDD swaps ", page 69.

How to install a HDD ?

1. Ensure that the projector is switched off.

2. Prepare the HDD for insertion by moving the latch towards the left and push the unlock button to open the handle.
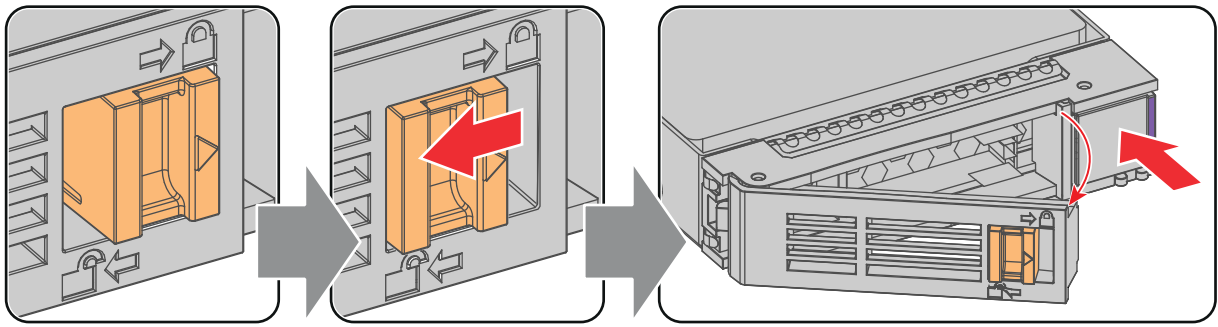
Image 8–9

3. Insert the HDD into the HDD slot. Ensure that the handle is sufficiently open so that the hook (reference 1) of the handle can pass the front plate of the ICMP(-X).
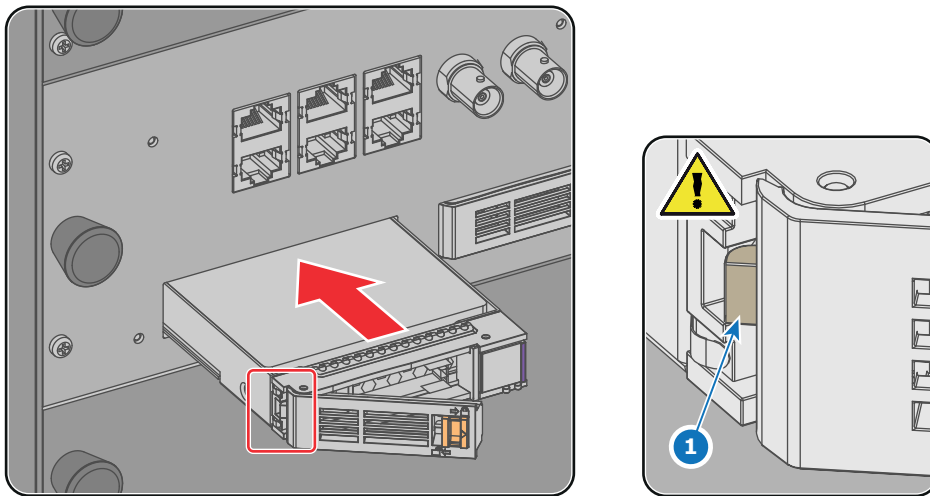
Image 8–10

4. Push the HDD completely and firmly inside its slot, close the handle, and move the latch towards the right.
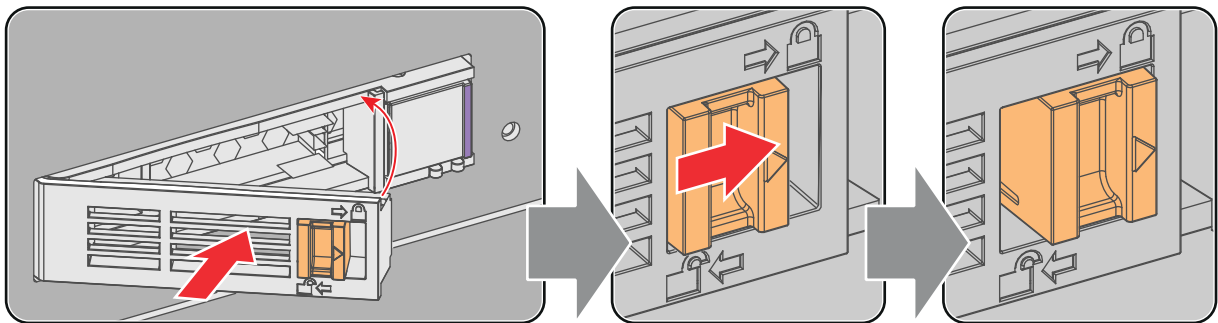
Image 8–11

5. Switch on the projector.

> 📄 In case you replace one HDD (e.g. degraded mode) the ICMP(-X) automatically starts with the RAID recovery process. The red LED of the HDD which has to be rebuilt is blinking. This process takes about 200 GB per hour. Once the RAID is completed the red LED turns off.

> ⚠️ **CAUTION:** It's strongly recommended to complete the RAID recovery process prior to starting a show. This to ensure that the content integrity is preserved and that the show is not interrupted.

8.5 Removing a HDD from the ICMP(-X)

📄 In case the ICMP(-X) has to be returned to factory (e.g. for repair) the non defective HDDs should be removed and kept.

How to remove a HDD ?

1. Switch off the projector.

2. Moving the latch towards the left.
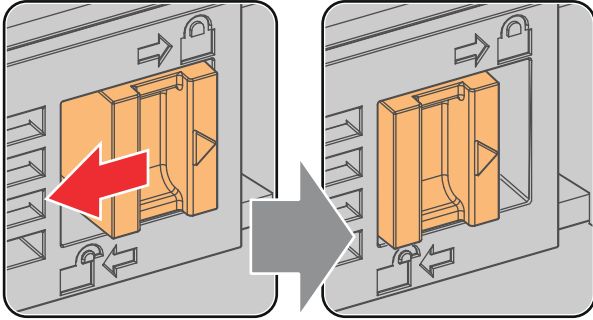
Image 8–12

3. Push the unlock button to open the handle.
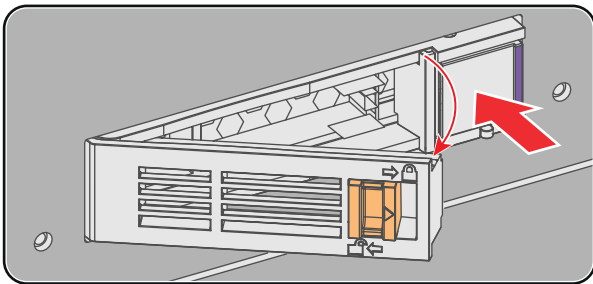
Image 8–13

4. Pull the HDD out of its slot.
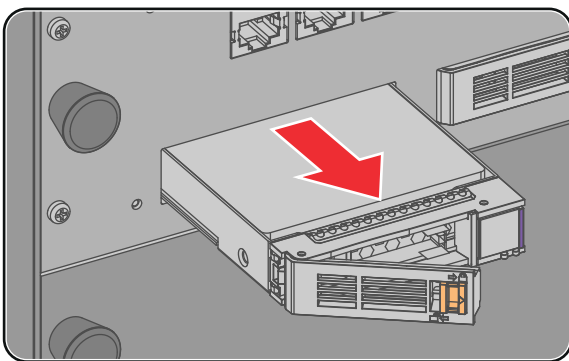
Image 8–14

📄 To install an HDD, see the following procedure: "Installing a HDD into the ICMP(-X)", page 70.

8.6 HDD status LEDs

HDD status LEDs
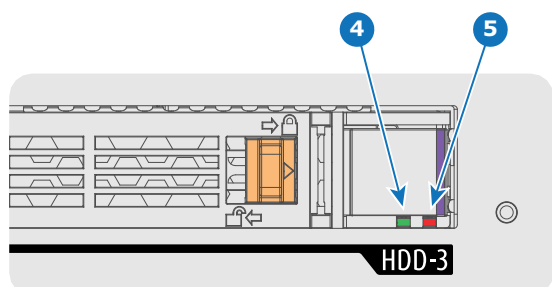
Image 8–15

4   HDD I/O LED
5   RAID LED

Status LEDs on ICMP(-X)

HDD I/O	RAID	HDD Status
Off	Off	HDD idle / disk in RAID OK.
Blinking green	Off	HDD I/O activity / disk in RAID OK.
Blinking green	Slow blinking red	HDD disks not (yet) initialized (not supported on ICMP with GEN1 storage controller).
Blinking green	Fast blinking red	HDD I/O activity / RAID rebuilding.
Off	Red	HDD idle / Disk error. Consult the following troubleshooting table for curative actions.

> When entering a new HDD in an ICMP(-X), the HDD RAID LED will be full red for a short time. This is not an error, the HDD has not yet been "recognized" by the projector and ICMP(-X).
>
> Once the HDD has been accepted by the ICMP(-X), the full red LED will start blinking in accordance with the previous status table.
>
> If the LED remains full red, an error has occurred. In this case, consult the following troubleshooting table for curative actions.

Troubleshooting

Situation	Solution
One disk failed (red LED) + **RAID degraded**. The ongoing event is not interrupted. **Note:** The disk status (RAID degraded) can be retrieved via the (Web) Commander. See user guide of the (Web) Commander.	1. Switch off the power. 2. Replace the defect HDD with approved model of the same storage capacity. See procedure "Removing a HDD from the ICMP(-X)", page 72, and "Installing a HDD into the ICMP(-X)", page 70. Ensure to insert the HDD firmly. 3. Switch on the power. **Result:** As soon the new HDD is detected by the ICMP(-X) the rebuild of the RAID is started (Blinking red LED).
One disk failed (red LED) + Error 10580 "**local storage not available**". **Note:** The disk status (Error code) can be retrieved via the (Web) Commander. See user guide of the (Web) Commander.	1. Switch off the power. 2. Replace the defect HDD with approved model of the same storage capacity. See procedure "Removing a HDD from the ICMP(-X)", page 72, and "Installing a HDD into the ICMP(-X)", page 70. Ensure to insert the HDD firmly.

Situation	Solution
	3. Switch on the power.
	Result: As soon the new HDD is detected by the ICMP(-X) the rebuild of the RAID is started (Blinking red LED).
Multiple disks failed (multiple red LEDs) + Error 10573 "**The RAID is broken**". **Note:** The disk status (RAID broken) can be retrieved via the (Web) Commander. See user guide of the (Web) Commander.	1. Switch off the power. 2. Replace all defect HDDs with approved models of the same storage capacity. See procedure "Removing a HDD from the ICMP(-X)", page 72, and "Installing a HDD into the ICMP(-X)", page 70. Ensure to insert the HDDs firmly. 3. Switch on the power. 4. Start "RAID Initialize". See user guide of the (Web) Communicator. **Result:** a new empty RAID is created.
A set of HDDs initialized for a GEN 2 storage controller is installed on a GEN 1 storage controller (All red LEDs remain off) + Combination of three errors (10580 "**local storage not available**", 10585 "**storage mount failed**", 10573 "**the RAID is broken**") **Note:** The disk status (Error code) can be retrieved via the (Web) Commander. See user guide of the (Web) Commander.	1. To avoid any misidentification, double check ICMP model and if HDD model is compatible with installed storage controller (see list of HDD models validated by Barco). 2. Start "RAID Initialize". See user guide of the (Web) Communicator. Note that all content will be lost! **Result:** a new empty RAID is created.
All HDD LEDs remain off + Error 10580 "**local storage not available**". **Note:** The disk status (Error code) can be retrieved via the (Web) Commander. See user guide of the (Web) Commander.	1. Switch off the power. 2. Reseat all HDDs. See procedure "Removing a HDD from the ICMP(-X)", page 72, and "Installing a HDD into the ICMP(-X)", page 70. Ensure to insert the HDDs firmly. 3. If problem remains try "RAID Initialize". See user guide of the (Web) Communicator. Note that all content will be lost! 4. If problem remains contact Service for further instructions.

In case the ICMP(-X) has to be returned to factory (e.g. for repair) the non defective HDDs should be removed and kept.

8.7 ICMP(-X) status LEDs

ICMP(-X) status LEDs and Reset button

LEDs on ICMP(-X) front panel give information on the status of the device.
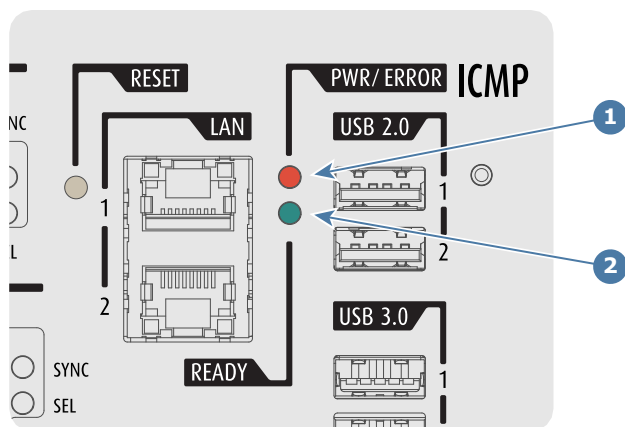
Image 8–16
1 Power / Error LED
2 Ready LED

Status overview PWR/ERROR and READY LEDs:

PWR/ERROR	READY	ICMP(-X) Status
Off	Off	Turned off
Red	Off	Board reset or FIPS error
Blinking Green	Off	Boot loader
Blinking Green	Blinking Orange	Operating System start up
Blinking Green	Orange	Security Manager - Image Integrity tests
Blinking Green	Blinking Yellow	Security Manager - Self Test
Blinking Green	Yellow	Security Manager - FPGA self-test
Green	Blinking Green	Starting Applications
Green	Green	Applications started in normal mode
Green	Orange	Applications started in degraded mode
Blinking Red	Off	FIPS error
Green	Blinking Orange	Update ongoing
Orange	Orange	Update done

8.8 ICMP(-X) device certificate

Purpose of the Barco ICMP(-X) device certificate

The device certificate (*.pem) of the Barco ICMP(-X) is a digital certificate signed by Barco which is required when ordering the KDM[2] to play a DCP that is ingested on the ICMP(-X). The device certificate is stored inside the ICMP(-X) and on a web server.

The (WEB) Commander or Communicator can be used to retrieve the device certificate directly from the ICMP (-X). To retrieve the device certificate from the website the QR (Quick Response) code can be used. See procedure "Obtaining the ICMP(-X) certificate", page 77.

---

2. For China mainland LDM is used next to KDM. LDM specifies also a maximum number of shows.

Image 8–17

ℹ️ **Trusted Device List (TDL)**

The Goal of the TDL is to maintain timely and accurate information on participating auditoriums so that participating subscribers can obtain information needed to issue KDMs. The TDL has several data sources: Device manufacturers, Exhibitors, Deployment Entities, Integrators, Service Providers (interacting with Exhibitors), regional authorities and Support.

ℹ️ **Public Key Infrastructure (PKI)**

PKI is a framework for creating a secure method for exchanging information based on public key cryptography. The foundation of a PKI is the certificate authority (**CA**), which issues digital certificates that authenticate the identity of organizations and individuals over a public system such as the Internet. The certificates are also used to sign messages, which ensures that messages have not been tampered with.

ℹ️ ***.pem**

Privacy-enhanced Electronic Mail. File format used to distribute digital signed certificates. Base64 encoded DER certificate, enclosed between "———BEGIN CERTIFICATE———" and "———END CERTIFICATE———"

ℹ️ **Key Delivery Message (KDM)**

The security key for each movie is delivered in a unique KDM for each digital cinema server. The security key is encrypted within the KDM, which means that the delivery of a KDM to the wrong server or wrong location will not work, and thus such errors cannot compromise the security of the movie. The KDM is a small file, and is typically emailed to the exhibitor. To create the correct set of KDMs for a site requires knowledge of the digital certificate in the projection system´s media block.

> **Digital Cinema Package (DCP)**
>
> A Digital Cinema Package (DCP) is a collection of digital files used to store and convey Digital Cinema (DC) audio, image, and data streams. The term has been defined by Digital Cinema Initiatives (DCI). General practice adopts a file structure that is organized into a number of usually multi-gigabyte size Material eXchange Format (MXF) files, which are separately used to store audio and video streams, and auxiliary index files in XML format. The MXF files contain streams that are compressed, encoded, and encrypted, in order to reduce the huge amount of required storage and to protect from unauthorized use. The image part is JPEG 2000 compressed, whereas the audio part is linear PCM. The adopted (optional) encryption standard is AES 128 bit in CBC mode. The newer SMPTE standards are used to conform the recommendations among different tool vendors and producers. Interop, the legacy DCP standard, is still required to be supported by DCP players.

> **Digital Cinema Initiatives (DCI)**
>
> DCI is a joint venture of Disney, Fox, Paramount, Sony Pictures Entertainment, Universal and Warner Bros. Studios. DCI's primary purpose is to establish and document voluntary specifications for an open architecture for digital cinema that ensures a uniform and high level of technical performance, reliability and quality control. Note that the DCI specification is not a standard. Standards for digital cinema are the domain of the Society of Motion Picture and Television Engineers (SMPTE). "DCI compliant" is a term used to describe products that conform to the DCI specification. Products that have been tested per the DCI Compliance Test Plan (CTP) are posted at the DCI compliance web site. Notably, DCI compliance does not require compliance to the full set of SMPTE DCP standards. A copy of the most recent DCI specification can be downloaded from the DCI website (*http://dcimovies.com*).

8.9 Obtaining the ICMP(-X) certificate

Required tools

Smartphone (with auto-focus) or control software (e.g. Communicator, Web Communicator, Commander or Web Commander)

Using the CertID label to download the ICMP(-X) certificate

1. Scan the QR code (reference 1) on the front face of the ICMP(-X) with a smartphone. It's recommended to use a smartphone with auto-focus. The QR reader will automatically redirect to the ICMP(-X) certificate download page on the web server.

   > *Note:* Instead of downloading the ICMP(-X) certificate you can use the CertID number (reference 2), located below the QR code, in communication with your KDM supplier. Certified KDM suppliers can use this CertID number to retrieve the ICMP(-X) certificate directly.
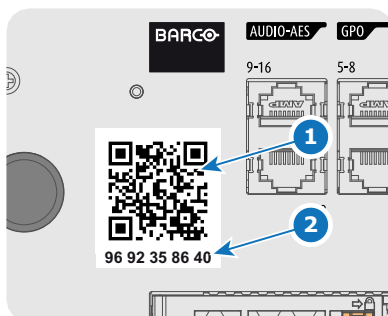
Image 8–18

Using control software to obtain the ICMP(-X) certificate

1. Use your control software to download the ICMP(-X) certificate from the ICMP(-X) main board. For detailed instructions, refer to the user guide of your control software, or the projector User Guide.

8.10 ICMP(-X) configuration via Communicator

About ICMP(-X) configuration

Following parameters are available to configure the ICMP(-X):

- Global settings: allows defining name of the ICMP(-X), host name (network identifier) and IP address which can be used for communication with external content devices.
- User settings: definition of all users allowed on the ICMP(-X).
- Server settings: definition of access to servers and storage libraries of content (movies, KDM, etc.).
- Player settings: Audio delay and audio output frequency.
- Audio channel: allows defining the mapping of audio channels (content) on each audio output (AES outputs of the ICMP).
- Scheduler setting: Enable/Disable scheduler at startup, delays allowed in scheduler mode and length of schedule history.
- Devices: allows defining communication ports settings, to access external devices controlled by the automation.
- Automation Cues: event cues that are triggered from different sources and to which can be assigned actions to be executed by the automation engine.
- Verify internal clock of the ICMP(-X).

> 📄 All installation and maintenance operations on the ICMP(-X) are performed via Communicator, the Barco configuration software. Please refer to the Communicator user guide for further information.

About Default settings

The restore of factory setting is a feature that allows removing all settings performed on the ICMP(-X) and replaces them with the default values set at the factory. Please refer to the Communicator user guide for further information.

About the ICMP(-X) internal clock

The crystal on the ICMP(-X) board that manages the clock shows a certain drift (all crystals do). With the Communicator the internal clock can be adjusted. This maintenance action should be repeated every 3 months. When neglected the system will locks up.

From ICMP(-X) software version 1.2.1 onwards it is possible to enable NTP (Network Time Protocol). You have to configure (at installation) an IP address where the ICMP can find a sync signal. From then on, and as long as the connection is active, the ICMP will automatically keep its clock correct. For detailed instructions see user guide of the Communicator.

About test patterns

Often, during ICMP(-X) settings, it could be necessary to resize displayed image. In most of the cases, to achieve this, test patterns are displayed on screen. However, some test patterns are provided on the fly by the projector and can not be resized.

List of test patterns that can be resized:

- 2K Barco Enabling Bright Outcomes
- BARCO_rgb_primarylogo_red_2K
- Convergence_pattern
- Convergence_pattern_green_on_blue
- Convergence_pattern_red_on_blue
- Convergence_pattern_xxB
- Convergence_pattern_xxC
- Convergence_pattern_xxS
- DualStack3D_Left
- DualStack3D_Right
- Focus
- FocusGreen
- FocusWhite

- Framing_uncorrected
- RGB-12bit-Color Bars
- RGB-12bit-Convergence Pattern
- RGB-12bit-Log Step Blue
- RGB-12bit-Log Step Cyan
- RGB-12bit-Log Step Green
- RGB-12bit-Log Step Magenta
- RGB-12bit-Log Step Red
- RGB-12bit-Log Step White
- RGB-12bit-Log Step Yellow
- RGB-12bit-MacBeth ColorChecker
- RGB-12bit-Shallow Horizontal Ramp
- RGB-12bit-Split Ramp
- RGB-12bit-Vertical Bars Plus Crosshairs
- SCC_13PNTS
- SCC_27PNTS

8.11 ICMP(-X) communication ports

Location of the communication ports
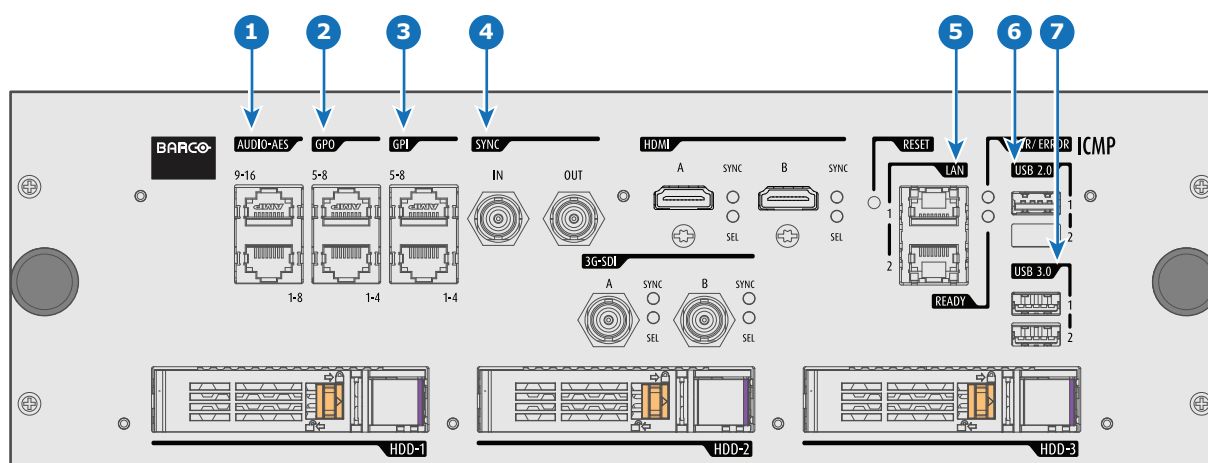
Image 8–19 ICMP(-X) (with HDMI 2.0).

Functionality

1 AUDIO-AES 1-8 (9-16)

ICMP(-X) outputs sixteen audio signals equitably distributed over these two RJ45 connectors, which can be configured independently. The mapping of audio channels (content) on each audio output (AES outputs of the ICMP(-X)) is performed by configuring the ICMP(-X) via the Communicator software. Please refer to the Communicator user guide for further information.

2 GPO 1-4 (5-8)

These RJ45 connectors can be used to send trigger signals to other devices. The mapping of user Cues (output Cues) on each General Purpose Output (GPO) is configured via the Communicator software. Please refer to the Communicator user guide for further information.

3 GPI 1-4 (5-8)

These RJ45 connectors can be used to receive trigger signals from other devices. The mapping of the General Purpose Input (GPI) on each input Cues is configured via the Communicator software. Please refer to the Communicator user guide for further information.

4 **SYNC IN / OUT**

Synchronization signal IN and OUT: Reserved for multiple-projector projection. Use a 50 Ohm coaxial cable to connect the sync signal from projector to projector.

5 **LAN 1 (2)**

The ICMP(-X) can be connected to a LAN (local area network) using one of the Ethernet ports. These LAN port are used for 'content' transfer.

NOTE: These ports are optionally used to connect to external content storage sources. Control of the ICMP(-X) is done via the same IP address as the projector.

6 **USB 2.0**

The ICMP(-X) can be connected to a USB 2.0 Media to load content. The USB port can be used to load content (DCP) or keys (KDM).

NOTE: It is recommended to use the USB 3.0 ports for faster ingest.

7 **USB 3.0**

The ICMP(-X) can be connected to a USB 3.0 Media to load content. The USB port can be used to load content (DCP), or keys (KDM), or software update.

NOTE: These ports are recommended for fast ingest when connected to an appropriate USB 3.0 source.

USB

Universal Serial Bus (USB) is an industry standard developed in the mid-1990s that defines the cables, connectors and communications protocols used in a bus for connection, communication, and power supply between computers and electronic devices. **USB 2.0** (also called "Hi-Speed"), adding higher maximum signaling rate of 480 Mbit/s (effective throughput up to 35 MB/s or 280 Mbit/s), in addition to the "USB 1.x Full Speed" signaling rate of 12 Mbit/s.[16] USB 2.0 connectors are usually colored black. **USB 3.0** defines a new SuperSpeed mode with a signaling speed of 5 Gbit/s and a usable data rate of up to 4 Gbit/s (500 MB/s). A USB 3.0 port is usually colored blue, and is backwards compatible with USB 2.0.

8.12 ICMP(-X) source input ports

Location of the source input ports

ICMP and ICMP-X equipped with two HDMI 2.0 (Reference 8, Image 8–20) as video source.
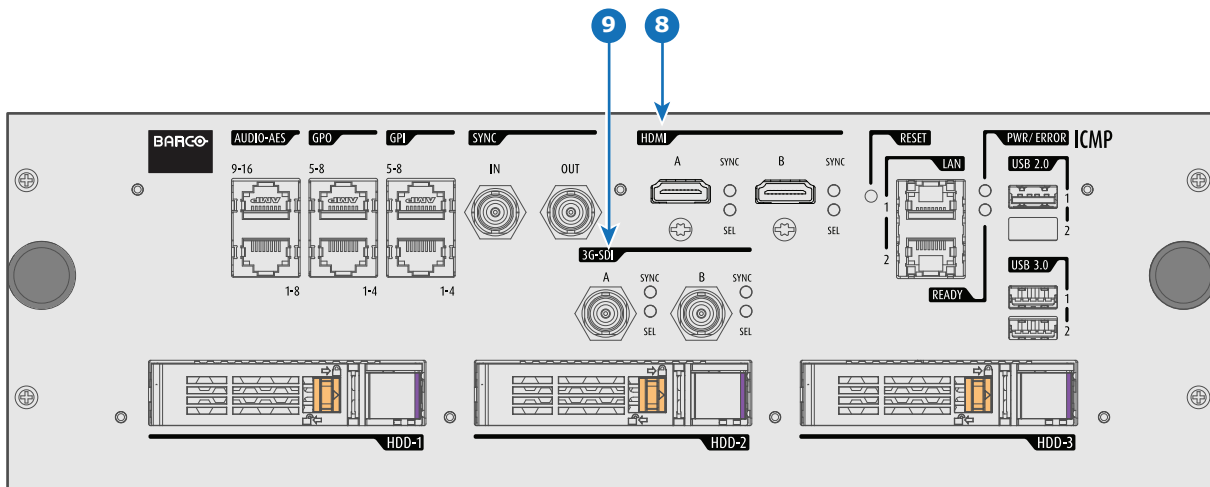
Image 8–20 ICMP(-X) (with HDMI 2.0).

ICMP with DisplayPorts (Reference 11, Image 8–21) and HDMI 1.4 (Reference 10, Image 8–21) are still present on the field.
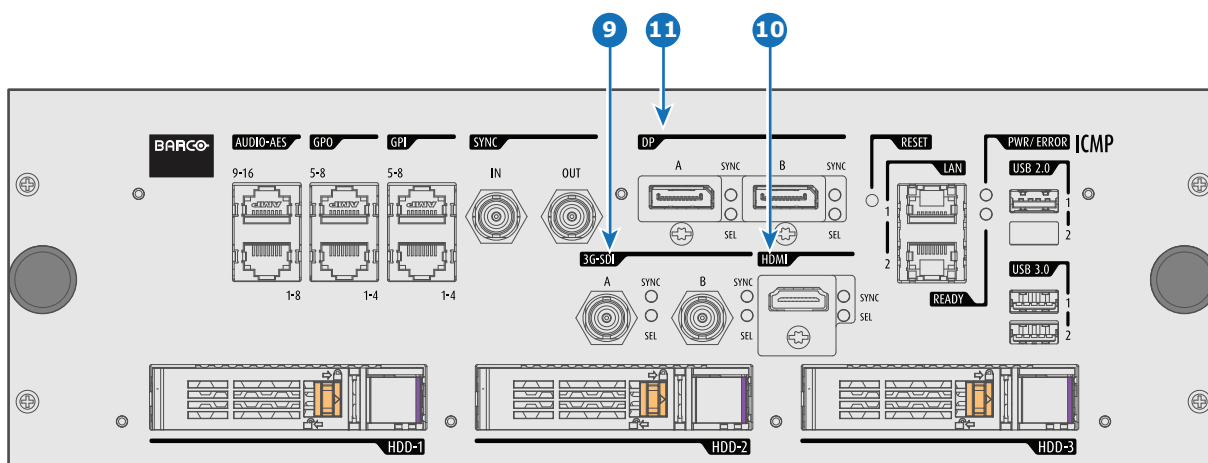
Image 8–21 ICMP (with DisplayPort and HDMI 1.4).

Functionality

8 HDMI A (B)

HDMI 2.0 connector to connect a video source.

NOTE: It is recommended to use the HDMI 2.0 ports for faster transfer of video and audio data.

9 3G-SDI A (B)

SDI connector to connect a video source.

10 HDMI

HDMI 1.4 connector to connect a video source.

11 DisplayPort A (B)

DisplayPort connector to connect a video source.

8.13 ICMP(-X) network streaming (Live IP) specifications

About network streaming

When equipped with a mezzanine, the ICMP (-X) can receive and play streaming content (multicast live streaming or http live streaming). Streaming content (audio/video/text files) is delivered in real time via one of LAN (local area network) connected to one of Ethernet ports of the ICMP (LAN1/LAN2) or Cinema Controller.

For more details concerning playout of Live IP streaming content please refer to the Web Commander user guide: in the chapter dedicated to the show editor a section explains how to manage alternative input clips (the clips dedicated to the alternative media inputs or Live IP streaming content).

Minimum requirements

To use Live IP function of ICMP(-X), the followings are needed:

- ICMP(-X) must be equipped with a video mezzanine board.
- a license need to be installed with (Web) Communicator to enable the functionality.
- a macro named *LIVE_IP* (used to set Live IP as the input of the video mezzanine board) need to be present on the projector. To do this both the following methods are available:
  - a new clone package that contain Icmp_Live_IP.INPUT file (and *LIVE_IP* macro) could be apply with (Web) Communicator.

ICMP(-X)

- new macro named *LIVE_IP* based on the file Icmp_Live_IP.INPUT could be created with (Web) Communicator. For more details concerning creation of *LIVE_IP* macro, please refer to the (Web) Communicator user guide.

It is not necessary to upgrade ICMP(-X) (or video mezzanine board) with new software version to use Live IP function.

Network Streaming

- UDP (multicast)
- HLS (http live streaming)
- from RJ45 network port of Cinema Controller or ICMP(-X) (LAN1/LAN2)

Stream containers

- Mpeg Transport Stream ISO13818-1 with 1 program
- HLS (http live streaming) with segmented MpegTS stream
- MP4 from file
- Webm from file

Video formats

- MPEG2/H.264 4:2:0 up to 1920x1080 (smaller resolutions are upscaled to full screen)
- Standard frame rates: 24/25/30/50/60p and 50/60i
- Fractional frame rates: 24/30/60 x (1000/1001) according to HDMI spec CEA-861-F
- High quality temporal de-interlacing with edge detection

Audio formats

- MP2, MP3, AAC, AC3
- Multichannel output (up to 5.1)

Subtitle formats

- MpegTS timed text support according to DVB spec ETSI EN 300 743

8.14 ICMP DisplayPort specifications

> **DisplayPort**
> Digital display interface developed by the Video Electronics Standards Association (VESA). This royalty-free interface is primarily used to connect a video source to a display device such as a computer monitor, though it can also be used to transmit audio, USB, and other forms of data. VESA designed it to replace VGA, DVI, and FPD-Link. Backward compatibility to VGA and DVI by using active adapter dongles enables users to use DisplayPort fitted video sources without replacing existing display devices.

> **HDCP**
> High-bandwidth Digital Content Protection is a form of digital copy protection developed by Intel Corporation to prevent copying of digital audio and video content as it travels across DisplayPort, Digital Visual Interface (DVI), High-Definition Multimedia Interface (HDMI), Gigabit Video Interface (GVIF), or Unified Display Interface (UDI) connections, even if such copying would be permitted by fair use laws. The specification is proprietary, and implementing HDCP requires a license.

DisplayPort specifications

Supported Modes:

- DP1.1a, 4-lanes RBR/HBR
- Audio : yes
- Content Protection : HDCP1.4
- Color Depth : 8 bit/component and 10 bit/component.

- 3D-stereo mode : frame sequential (embedded stereosync on DP required from the source)

DisplayPort A and DisplayPort B accept the following video-timings:

2D Formats / Single DP	Color depth	Port	Display Mode
640 x 480 @ 60 fps	8 bpc, 10 bpc	Single	2D
800 x 600 @ 60 fps	8 bpc, 10 bpc	Single	2D
1600 x 1200 @ 60 fps	8 bpc, 10 bpc	Single	2D
1280 x 800 @ 60 fps	8 bpc, 10 bpc	Single	2D
1280 x 720 @ 60 fps	8 bpc, 10 bpc	Single	2D
1680 x 1050 @ 60 fps	8 bpc, 10 bpc	Single	2D
1920 x 1080 @ 60 fps	8 bpc, 10 bpc	Single	2D
1920 x 1200 @ 60 fps	8 bpc, 10 bpc	Single	2D
2048 x 1080 @ 48, 60 fps	8 bpc, 10 bpc	Single	2D
2048 x 1536 @ 60 fps	8 bpc, 10 bpc	Single	2D
2048 x 2160 @ 30, 48, 50, 60 fps	8 bpc, 10 bpc	Single	2D
3840 x 2160 @ 24 fps	8 bpc, 10 bpc	Single	2D

3D Formats / Single DP	Color depth	Port	Display Mode
1920 x 1080 @ 60 fps	8 bpc, 10 bpc	Single	3D
2048 x 1080 @ 60 fps	8 bpc, 10 bpc	Single	3D

4K Horizontal SPAN 2D - Full	Color depth	Port	Display Mode
2048 x 2160 @ 30, 48, 50, 60 fps	8 bpc, 10 bpc	A+B span	2D

4K Horizontal SPAN 2D - Flat	Color depth	Port	Display Mode
1920 x 2160 @ 30, 48, 50, 60 fps	8 bpc, 10 bpc	A+B span	2D

4K Horizontal SPAN 3D	Color depth	Port	Display Mode
2048 x 2160 @ 60 fps	8 bpc, 10 bpc	A+B span	3D

Audio formats

- 2 channels / LPCM / 16 bits / 32 kHz, 44.1 kHz, 48 kHz, 88.2 kHz, 96 kHz
- 5.1 format / LPCM / 24 bits / 48 kHz
- 7.1 format / LPCM / 20 bits / 48 kHz

Notes:

- DisplayMode = Single : is applicable to both DisplayPort A, and DisplayPort B input, separately.
- DisplayMode = A+B : inputs DisplayPort A and DisplayPort B are combined to 1 larger image; in this case the 2 DisplayPort links need to be genlocked (= synchronous and in phase).
- In all cases :
  - Color Space - Color Sampling:
    - YCbCr - 4:4:4
    - YCbCr - 4:2:2
    - RGB - 4:4:4
  - Scan Type = progressive.
- Both Nvidia and AMD GPU's will not support color depths of 10 bits/color while in 3D-stereo mode.
- Some Graphical Cards may not permit 10 bits/color at all video timings, because of bandwidth restrictions.
- DisplayPort A and DisplayPort B automatically detect:
  - Active Pixels, and Active Lines
  - Vertical Refresh
  - 8 bits/color - 10 bits/color
  - Frame locked
- All input resolutions are scaled towards the desired resolution specified in the screen presentation file.

• Fractional frame rates = (Hz*1000)/1001

8.15 ICMP(-X) SDI specifications

> **3G-SDI**
> Serial Digital Interface (SDI) is a serial link standardized by ITU-R BT.656 and the Society of Motion Picture and Television Engineers (SMPTE). SDI transmits uncompressed digital video over 75-ohm coaxial cable within studios, and is seen on most professional video infrastructure equipment. The first revision of the standard, SMPTE 259M, was defined to carry digital representation of analog video such as NTSC and PAL over a serial interface and is more popularly known as standard-definition (SD) SDI. The data rate required to transmit SD SDI is 270 Mbps. With the advent of high-definition (HD) video standards such as 1080i and 720p, the interface was scaled to handle higher data rates of 1.485 Gbps. The 1.485-Gbps serial interface is commonly called the HD SDI interface and is defined by SMPTE 292M, using the same 75-ohm coaxial cable. Studios and other video production facilities have invested heavily on the hardware infrastructure for coaxial cable and have a vested interest in extending the life of their infrastructure. Fortunately, SMPTE recently ratified a new standard called SMPTE 424M that doubles the SDI data rates to 2.97 Gbps using the same 75-ohm coaxial cable. This new standard, also called 3-Gbps (3G)-SDI, enables higher resolution of picture quality required for 1080p and digital cinema.

SDI terminology

Standard HD-SDI signal (Single Link)
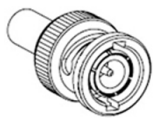
1.5Gb/s } HD 4:2:2

Standard HD-SDI allows for a single 4:2:2 image to be carried on one cable at 1.485 Gb/s. The image uses the Y Cb Cr colorspace and uses a bit depth of 10 bit per color component.

Due to the data rate limitations only 23.976, 24, 25, 29.970 and 30 fps streams are achievable.

Dual-Link HD-SDI signal
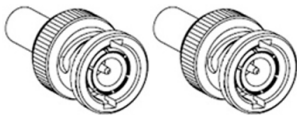
1.5Gb/s } 1080p 50/60[3]
1.5Gb/s   or
           1080p 4:4:4

Dual-Link HD-SDI is mainly two standard HD-SDI signals carrying a single image stream split between the two cables. The main advantage is that color subsampling is no longer required, and the image can be transmitted in 4:4:4 quality, which then also allows the RGB (or XYZ) color space to be used.

The main link will contain a standard HD-SDI signal, the second (enhancement) link contains the missing Cb and Cr samples.

Depending on the implementation the enhancement link could also contain extra information to increase the bit depth.

3G HD-SDI signal
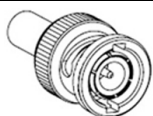
3Gb/s } 1080p 50/60 (Level A)
          or
          1080p 4:4:4 (Level B)

3G HD-SDI uses a higher data rate (2.97 Gb/s). This allows a single cable interface to achieve the same capabilities of a Dual-Link HD-SDI implementation.

---

3. Not supported in Alchemy

In direct mapping (level A) this is used to achieve higher frame rates. (50, 59.940 and 60 fps streams are supported).

Dual Stream 3G HD-SDI signal
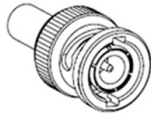
3Gb/s   } HD 4:2:2 Signal #1
         and
         HD 4:2:2 Signal #2

Dual Stream 3G is a specific variant of the 3G signal which combines two completely separate 4:2:2 image streams into a single 3G signal. This can be used to transmit stereoscopic streams by keeping the left and right eye signals together.

SMPTE 292M STANDARD 1.485 Gb/s HD-SDI SIGNALS

Standard HD-SDI (SMPTE 292M) formats

SMPTE Standard	Source Resolution	Frame Rate	Display Rate	Scan Type
SMPTE 296M	1280 x 720	23.976 24 25 29.970 30 50 59.940 60	23.976 24 25 29.970 30 50 59.940 60	Progressive Y Cb Cr 4:2:2 10-Bit
SMPTE 274M SMPTE 428-8	1920 x 1080 2048 x 1080	23.976 24 25 29.97 30	23.976 24 25 29.97 30	Progressive Y Cb Cr 4:2:2 10-Bit
SMPTE 274M SMPTE 428-9 (SMPTE RP211)	1920 x 1080 2048 x 1080	23.976 24 25 29.97 30	23.976 24 25 29.97 30	Segmented frame Y Cb Cr 4:2:2 10-Bit
SMPTE 274M	1920 x 1080	25 29.970 30	50 59.940 60	Interlaced Y Cb Cr 4:2:2 10-Bit

Dual-Link HD-SDI (SMPTE 372M) formats

SMPTE Standard	Source Resolution	Frame Rate	Display Rate	Scan Type
SMPTE 274M SMPTE 428-8	1920 x 1080 2048 x 1080	23.976 24 25 29.970 30	23.976 24 25 29.970 30	Progressive Y Cb Cr 4:2:2 12-Bit only Y Cb Cr 4:4:4 10 or 12-Bit RGB (XYZ) 4:4:4 10 or 12-Bit
SMPTE 274M SMPTE 428-9 (SMPTE RP211)	1920 x 1080 2048 x 1080	23.976 24 25 29.970 30	23.976 24 25 29.970 30	Segmented frame Y Cb Cr 4:2:2 12-Bit only Y Cb Cr 4:4:4 10 or 12-Bit RGB (XYZ) 4:4:4 10 or 12-Bit
SMPTE 274M	1920 x 1080	25 29.970 30	50 59.940 60	Interlaced Y Cb Cr 4:2:2 12-Bit only Y Cb Cr 4:4:4 10 or 12-Bit RGB (XYZ) 4:4:4 10 or 12-Bit

Standard HD-SDI (2 × SMPTE 292M) formats[4]

SMPTE Standard	Source Resolution	Frame Rate	Display Rate	Scan Type
SMPTE 292M SMPTE 428-8	1920 x 1080 2048 x 1080	23.976 24 25 29.97 30	47.952 48 50 59.940 60	Progressive Y Cb Cr 4:2:2 10-Bit
SMPTE 292M SMPTE 428-9 (SMPTE RP211)	1920 x 1080 2048 x 1080	23.976 24 25 29.97 30	47.952 48 50 59.940 60	Segmented frame Y Cb Cr 4:2:2 10-Bit

The standard HD-SDI interfaces support the Y Cb Cr colorspace (both legal and full range) using 4:2:2 color subsampling.

The Dual-Link HD-SDI interface can be used to carry a single 4:4:4 image, having a color depth of 10 or 12 bit per component. Both RGB (XYZ) and Y Cb Cr color spaces are supported.

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4.   mainly used to carry stereoscopic images.

SMPTE 424M 3G HD-SDI 2.970 Gb/s SIGNALS

3G HD-SDI (SMPTE 425) formats

SMPTE Standard	Source Resolution	Frame Rate	Display Rate	Scan Type
SMPTE 296M	1280 x 720	23.976 24 25 29.970 30 50 59.940 60	23.976 24 25 29.970 30 50 59.940 60	Progressive Y Cb Cr 4:4:4 10-Bit RGB (XYZ) 4:4:4 10-Bit
SMPTE 274M[5]	1920 x 1080	50 59.940 60	50 59.940 60	Progressive Y Cb Cr 4:2:2 10-Bit
SMPTE 274M	1920 x 1080	23.976 24 25 29.97 30	23.976 24 25 29.97 30	Progressive Y Cb Cr 4:2:2 12-Bit only Y Cb Cr 4:4:4 10 or 12-Bit RGB (XYZ) 4:4:4 10 or 12-Bit
SMPTE 274M	1920 x 1080	50 59.940 60	50 59.940 60	Interlaced Y Cb Cr 4:2:2 12-Bit only Y Cb Cr 4:4:4 10 or 12-Bit RGB (XYZ) 4:4:4 10 or 12-Bit
SMPTE 428-9	2048 x 1080	23.976 24	23.976 24	Progressive Y Cb Cr 4:4:4 12-Bit RGB (XYZ) 4:4:4 12-Bit

Dual Stream 3G HD-SDI (SMPTE 425) formats

SMPTE Standard	Source Resolution	Frame Rate	Display Rate	Scan Type
SMPTE 292M SMPTE 428-9	1920 x 1080 2048 x 1080	23.976 24 25 29.970 30	47.952 48 50 59.940 60	Progressive Y Cb Cr 4:2:2 10-Bit

8.16 ICMP(-X) HDMI 2.0 specifications

ℹ️ **HDMI**
HDMI (High-Definition Multimedia Interface) is a compact audio/video interface for transferring uncompressed video data and compressed/uncompressed digital audio data from a HDMI-compliant device ("the source device") to a compatible computer monitor, video projector, digital television, or digital audio device. HDMI is a digital replacement for existing analog video standards.

HDMI 2.0 specifications

HDMI

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5. only supported in 3G level A mapping, others formats are supported in both level A and level B mapping.

Both HDMI 2.0 inputs are fully compliant with the HDMI 1.4, 1.4a, 1.4b, 2.0 and 2.0a revisions of the HDMI specification.

Full Range and Limited Range Quantization are supported for all specified formats.

BT.709 and DCI-P3 are supported for all formats. For HDR content (UHD and 4K only) the BT.2020 color coding is supported.

All video streams should have a progressive scan order, with the exception of 1920x1080i 60 fps (interlaced scan).

HDCP

Both HDMI 2.0 inputs are HDCP 1.4 & HDCP 2.2 compliant.

HDR (SMPTE ST 2084)

HDR (High Dynamic Range) is supported on all UHD and 4K formats.

This includes SMPTE ST 2084 (static metadata) and BT.2020 color coding. Requires a license!

HDMI 2.0 Cable requirements

All HDMI cables should work with HDMI 2.0 receivers. There is no such thing as a "4K HDMI cable" even though this is sometimes sold this way. But of course there are quality differences. The "high-speed" cables would be preferred over the "standard-speed" cables. They usually work at higher cable lengths than the standard-speed ones.

The "Premium Certified HDMI" cables are tested to work with high bandwidth as is the case with 4K HDR content. These can be more expensive though. When using active and/or optical cables you should verify if the integrated receiver and sender are HDMI certified to guarantee to work compliant with the HDMI protocol. You can request the HDMI certificate to the manufacturer of the cable.

> The ICMP is not supporting Ethernet-over-HDMI and such specific cables are thus not required.

HDMI 2.0 Supported 2D Formats

Format	Frame Rate	Color coding	Bit depth
1280x720	23.976 24 25 29.97 30 50 59.94 60	RGB YCbCr 4:4:4 YCbCr 4:2:2	8 10 12
1280x720	100 119.88 120	RGB YCbCr 4:4:4 YCbCr 4:2:2	8
1920x1080 2048x1080	23.976 24 25 29.97	RGB YCbCr 4:4:4 YCbCr 4:2:2	8 10 12

Format	Frame Rate	Color coding	Bit depth
	30 50 59.94 60		
1920x1080 2048x1080	100 119.88 120	RGB YCbCr 4:4:4 YCbCr 4:2:2	8
3840x2160 4096x2160	23.976 24 25 29.97 30	RGB YCbCr 4:4:4 YCbCr 4:2:2	8 10 12
3840x2160 4096x2160	50 59.94 60	RGB YCbCr 4:4:4 YCbCr 4:2:2	8

HDMI 2.0 Supported 3D (Frame Packing) Formats

Format	Frame Rate	Color coding	Bit depth
1920x1080 2048x1080	23.976 24 25 29.97 30	RGB YCbCr 4:4:4 YCbCr 4:2:2	8 10 12
1920x1080 2048x1080	50 59.94 60	RGB YCbCr 4:4:4 YCbCr 4:2:2	8
3840x2160 4096x2160	23.976 24 25 29.97, 30	RGB YCbCr 4:4:4 YCbCr 4:2:2	8 10 12
3840x2160 4096x2160	50 59.94 60	RGB YCbCr 4:4:4 YCbCr 4:2:2	8

HDMI 2.0 Supported Audio Formats

Format	Sample Rate	Sample coding	Bit depth
2.0 2.1 5.1 7.1	32 44.1 48 88.2 96	L-PCM	16 20 24

HDMI 2.0 Supported Dual (Twin) Link Formats (2D formats only)

Format	Frame Rate	Color coding	Bit depth
1920x1080 2048x1080	23.976 24 25 29.97 30 50 59.94 60	RGB YCbCr 4:4:4 YCbCr 4:2:2	8
3840x2160 4096x2160	23.976 24 25 29.97 30 50 59.94 60	RGB YCbCr 4:4:4 YCbCr 4:2:2	8

> Both HDMI2 inputs (port A & port B) should have to same Format, Frame Rate and Color coding.

> Port A should contain the 8 most significant bits of the pixel data, where port B should contain the 8 least significant bits of the pixel data. The pixel data will be reconstructed using the all 8 bits of port A and using the 4 most significant bits of port B.

HDMI 2.0 Supported Passive 3D Formats (3D formats only)

Format	Frame Rate	Color coding	Bit depth
1920x1080 2048x1080	24 30	RGB YCbCr 4:4:4 YCbCr 4:2:2	8 10 12
1920x1080 2048x1080	60	RGB YCbCr 4:4:4 YCbCr 4:2:2	8
3840x2160 4096x2160	24 30	RGB YCbCr 4:4:4 YCbCr 4:2:2	8

> In Passive 3D HDMI2 input port A should contain the pixel data of Left Eye and HDMI2 input port B should contain the pixel data for Right Eye.

8.17 ICMP HDMI 1.4 specifications

> **HDMI**
> HDMI (High-Definition Multimedia Interface) is a compact audio/video interface for transferring uncompressed video data and compressed/uncompressed digital audio data from a HDMI-compliant device ("the source device") to a compatible computer monitor, video projector, digital television, or digital audio device. HDMI is a digital replacement for existing analog video standards.

HDMI 1.4 specifications

HDMI1.4a, including HDCP1.4

HDMI 1.4 Supported 2D Formats (progressive)

Format	Frame Rate	Color coding	Bit depth
720x480	60	RGB YCbCr 4:4:4 YCbCr 4:2:2	(8) 10 12
720x576	50	RGB YCbCr 4:4:4 YCbCr 4:2:2	(8) 10 12
1280x720	23.976 24 25 29.97 30 50 59.94 60 100 119.88 120	RGB YCbCr 4:4:4 YCbCr 4:2:2	8 10 12
1680x720	23.976 24 25 29.97 30 50 59.94 60 100 119.88 120	RGB YCbCr 4:4:4 YCbCr 4:2:2	8 10 12
1920x1080 2048x1080	23.976 24 25 29.97 30 50 59.94 60	RGB YCbCr 4:4:4 YCbCr 4:2:2	8 10 12
1920x1080 2048x1080	100 119.88 120	RGB YCbCr 4:4:4 YCbCr 4:2:2	8

Format	Frame Rate	Color coding	Bit depth
2560x1080	23.976 24 25 29.97 30 50 59.94 60	RGB YCbCr 4:4:4 YCbCr 4:2:2	8 10 12
3840x2160 4096x2160	23.976 24 25 29.97 30	RGB YCbCr 4:4:4 YCbCr 4:2:2	8 10 12

HDMI 1.4 Supported 2D (Interlaced) Formats

Format	Frame Rate	Color coding	Bit depth
720x576	25 50 100		
1920x1080	25 29.97 30 50 59.94 60		

HDMI 1.4 Supported 3D (Frame Packing) Formats

Format	Frame Rate	Color coding	Bit depth
1280x720	50 59.94 60		
1920x1080	23.98 24		

HDMI 1.4 Supported 3D (Top Bottom) Formats

Format	Frame Rate	Color coding	Bit depth
1280x720	50 59.94 60		
1920x1080	23.98 24		

HDMI 1.4 Supported Audio Formats

Format	Sample Rate	Sample coding	Bit depth
2 channels	32 44 48 88 96	L-PCM	16
5.1 channels	24	L-PCM	48
7.1 channels	20	L-PCM	48

8.18 ICMP(-X) reset

> 📄 This procedure requires that ICMP(-X) version 1.2.4 or later is installed.

ICMP(-X) reset possibilities

- The *Star* button on the local keypad (Not for C- and B-series)
- The ICMP(-X) reset button (labeled *Reboot ICMP*) in the GUI of the Communicator.
- The ICMP(-X) reset button (labeled *media server*) in the GUI of the Communicator.
- The ICMP(-X) reset button (labeled *Reboot media server*) in the GUI of the Commander.
- The ICMP(-X) reset button (labeled *Reboot media server*) in the GUI of the Web Commander.
- The ICMP(-X) hardware reset button located on the front panel of the ICMP(-X) (Not recommended, use only when all other reset possibilities are exhausted!)

How to reset the ICMP(-X)?

1. Click on the *Control/ICMP/Reboot media server* in the GUI of the Web Commander

or

Click on *Control/ICMP/Reboot media server* in the GUI of the Commander
> 📄 *Note:* The behavior could be different depending the projector type. Please, refer to the projector manual to obtain more details.

or

click on *Maintenance/Reboot action/media server* in the GUI of the Communicator (recommended)

or

click on *Contol/projector/power/Reboot ICMP* in the GUI of the Communicator (recommended)

or

press the *Star* button on the **local keypad** for a few seconds (Not for C- and B-series)

As a result the projector is safely prepared for the ICMP reboot. All ongoing events on the ICMP (e.g. ingest) are requested to end. After a few seconds the ICMP is requested to restart. The READY LED on the front panel of the ICMP starts to blink orange.

In case the ICMP(-X) is installed in DP4K-L series projector the lasers are switched off and the projector remains in the same mode (e.g. Conditioned). The Star button on the local keypad starts blinking green. After the reset of the ICMP(-X) the lasers are switched on again.

Once the READY LED lit continuous green the ICMP(-X) is up and running.

2. Did the reset of the ICMP(-X) fail?
  ► If yes, perform a hardware reset as follows:
  1. switch off the lasers of the projector or switch of the projector lamp.
  2. press the ICMP(-X) **hardware reset button** a few seconds (reference 3 Image 8–22) .

> ⚠ *Warning:* Resetting the ICMP(-X) with the hardware reset button may cause damage to the content on the HDDs. A re-configuration of the whole system may be required!

As a result the projector is safely prepared for the ICMP reboot. All ongoing events on the ICMP (e.g. ingest) are stopped immediately and the ICMP restarts.
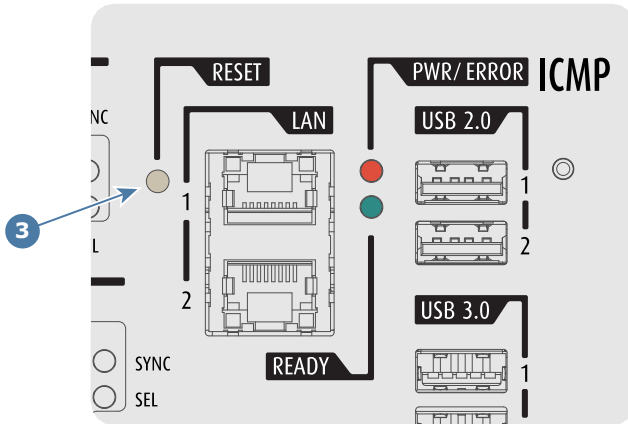
Image 8–22

> ⚠ **WARNING:** Resetting the ICMP(-X) with the hardware reset button may cause damage to the content on the HDDs. A re-configuration of the whole system may be required!

Communicator Touch Panel

9

About this chapter

This chapter gives a short introduction of the Communicator Touch Panel, describes how to install the Communicator Touch Panel interface onto the top of your DP2K-S series projector and how to connect the interface. For operation instructions refer to the user guide of the Communicator software. The latest software version and updated user guide for the Communicator can be downloaded from *https://www.barco.com*.

The Communicator Touch Panel is not included in the package of the projector. An alternative for the Communicator Touch Panel is the use of the Communicator for PC (Mac, Linux or Windows).

9.1 Communicator Touch Panel

Communicator Touch Panel for digital cinema projectors

The Communicator Touch Panel is designed for multi-user command and control. The Communicator enables users to learn quickly and operate efficiently - using an elegant and flexible Touch Panel interface. The interface's commonality means that operators can intuitively use any model in the product line, without restriction, and its user-friendly nature translates directly into a short and enjoyable learning curve.
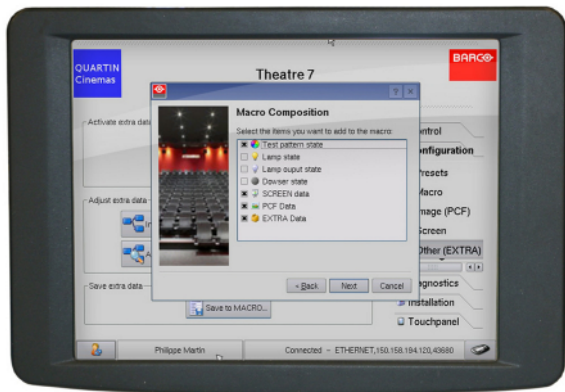
Image 9–1

Flexible Touch Panel interface

The Touch Panel interface can be mounted upon a swivel arm which easily fits on top of the DP2K-S series projector. One central locking mechanism of the swivel arm allows instant fixation of the Touch Panel interface in any position.

The Touch Panel interface can also be installed further away from the DP2K-S series projector. For this purpose an Ethernet cable up to 50 meter can be used to realize a direct data communication between the DP2K-S series projector and the Communicator Touch Panel.

The Touch Panel interface can also be connected via a Local Area Network (LAN) in the same way as the DP2K-S series projector. In this configuration both devices can communicate with each other as well.

The Touch Panel interface requires a voltage supply +12 VDC and 1,5 ampere. Note that the DP2K-S series projector has a 12 VDC output which can be used to power up the Touch Panel interface. Nevertheless, the use of a separate +12 VDC adaptor (1,5 ampere minimum) is required in case the Touch Panel interface is installed more then a few meters away from the DP2K-S series projector.

Parts location of the Touch Panel interface
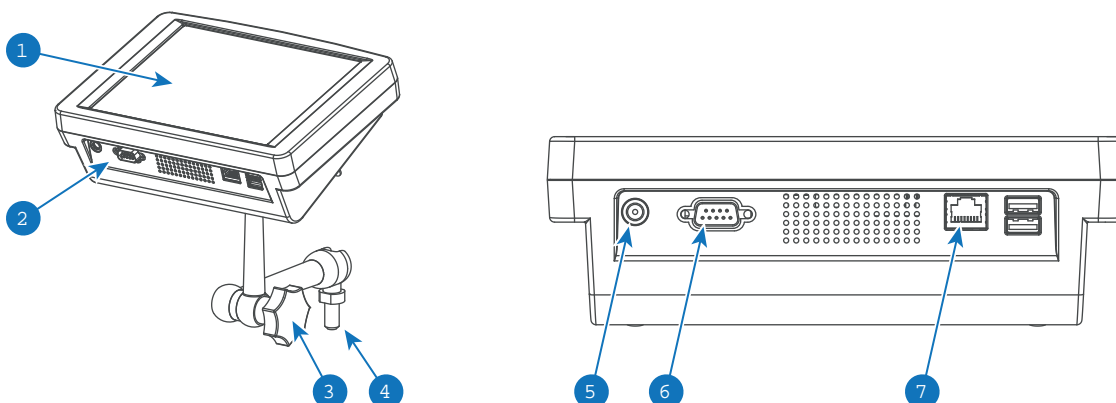
Image 9–2

1	Touch screen	**5**	Power input 12 VDC, 1.5A
2	Communication panel	**6**	RS232 port (sub-D)
3	Knob to operate central swivel clamp	**7**	Ethernet port (RJ45)
4	Base of swivel arm		

Touch Panel power/data customized cable

Image 9–3 Customized cable to connect Touch Panel interface with the Barco projector.

> 📄 The Communicator Touch Panel has its own user guide which latest version is available on the Barco website.

9.2 Installing the Touch Panel interface

Required tools

• open-end wrench 17 mm
• open-end wrench 10 mm

How to install the Touch Panel interface onto the top of the projector?

1. Assemble the mounting plate and the swivel arm together as illustrated. First place the nut (reference 1 Image 9–4) upon the rod of the mounting plate, then add the lock washer (reference 2 Image 9–4), then fasten the mounting plate and the swivel arm together. When the arm is mounted, turn the nut (reference 1 Image 9–4) against the arm to secure the position.
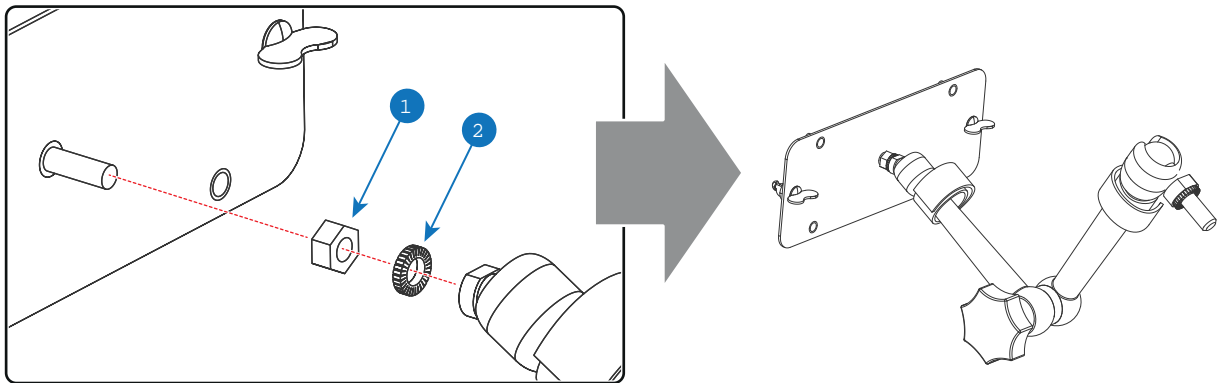
Image 9–4

2. Slide a washer (reference 4 Image 9–5) over the base of the swivel arm (reference 3 Image 9–5) and insert the base of the swivel arm into one of the four possible mounting holes (reference 1 & 2 Image 9–5) at the top of the projector.

   > 📄 *Note:* Which mounting hole to use depends on the operator preferences. In the illustration below the swivel arm is installed into the mounting hole nearest by the Local Keypad of the projector.

   > ⚠️ *Caution:* If you choose to use the back mounting holes (reference 1 Image 9–5) to mount your Touch Panel, ensure it is sufficiently removed from the hot top exhaust system, to avoid damage.
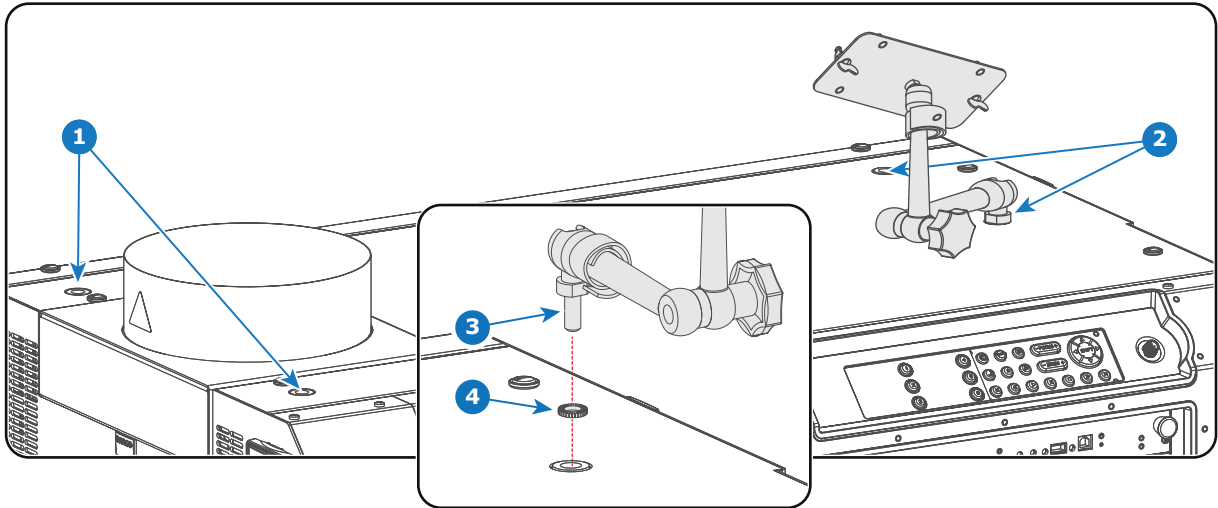
Image 9–5

3. Place the Touch Panel interface upon the mounting plate of the swivel arm and fasten the two wing nuts (reference 5 Image 9–6) as illustrated.
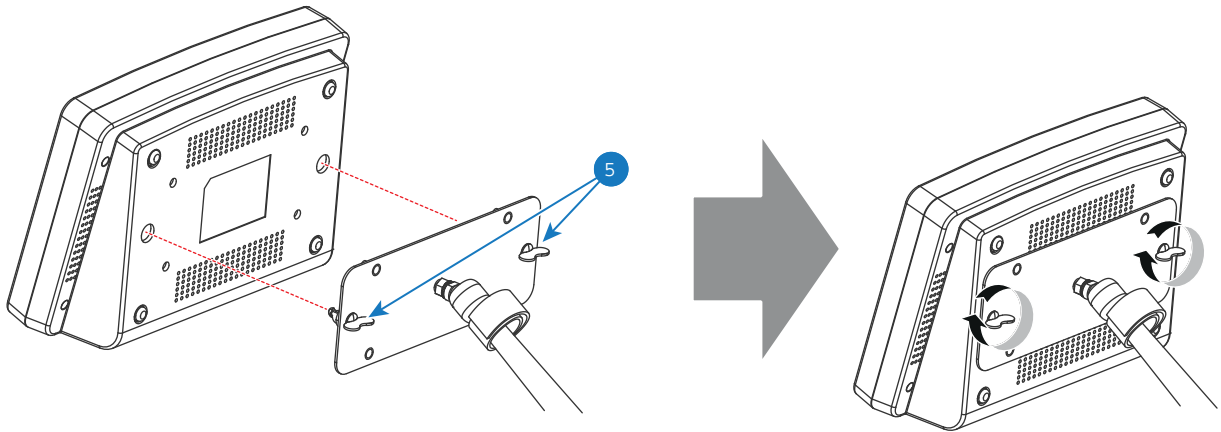
Image 9–6

4. Connect the DC plug, the RJ45 Ethernet plug and the D-SUB plug of the customized cable into their respective sockets on the Touch Panel interface.
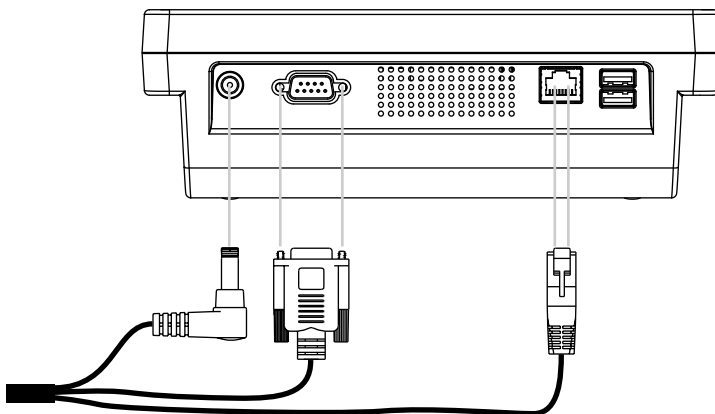
Image 9–7

5. Connect the circular plug of the customized cable with the circular socket (reference 6 Image 9–8) at the right side of the Local Keypad of the projector.

⚠ *Caution:* To avoid connector damage, align the pins before you connect the customized cable.

📄 *Note:* Ensure to tighten the locking nut on the connector.
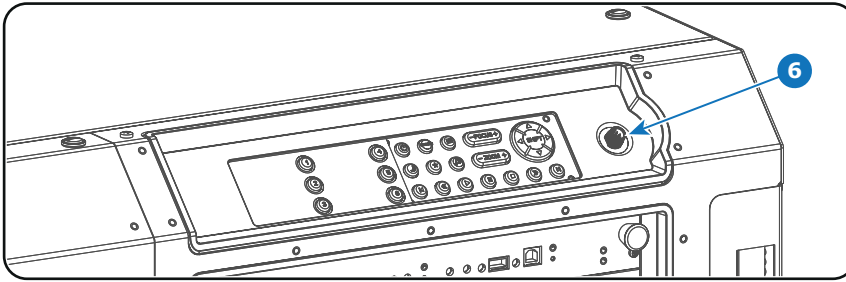
Image 9–8

6. Attach the multi cable to the swivel arm using the two Velcro strips.

7. Position the Touch Panel interface in the desired location. See "Repositioning the Touch Panel interface", page 99.

9.3 Repositioning the Touch Panel interface

How to reposition the Touch Panel interface?

1. Hold the Touch Panel interface with one hand.

2. Release the central swivel clamp by turning the knob (reference 7 Image 9–9) counterclockwise.
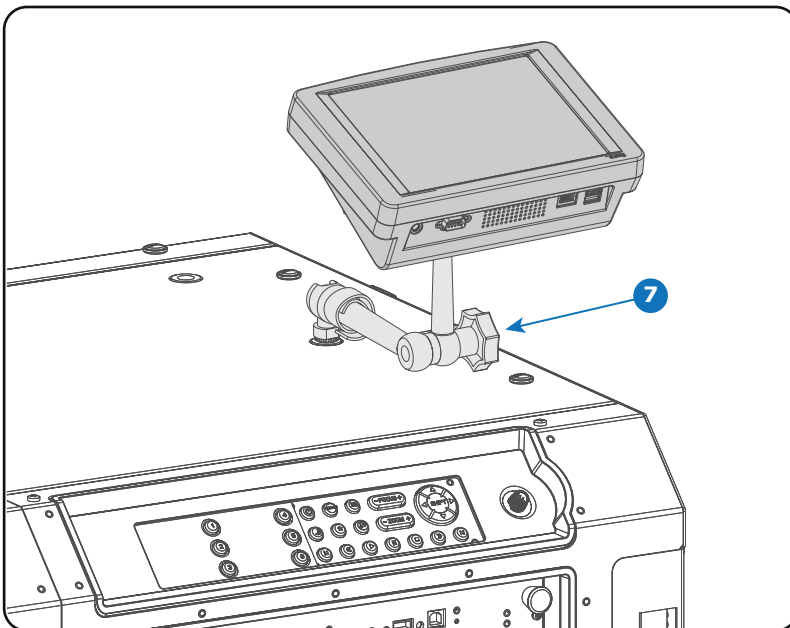
Image 9–9

3. Move the Touch Panel interface to the desired position.

4. Fasten the central swivel clamp by turning the knob clockwise.

> ⚠ **CAUTION:** Never release the central swivel lock without supporting the Touch Panel interface.

Communicator Touch Panel

Starting up

10

About this chapter

This chapter contains the switch ON and switch OFF procedures of your DP2K-S series projector. These procedures highlight all important points to be checked prior to switching the projector ON. This is to ensure a safe startup of the projector.

10.1 Switching the DP2K-S series projector ON

How to switch on?

1. Ensure that the DP2K-S series projector is installed onto a stable platform.

2. Ensure that the exhaust system is properly installed.

3. Ensure the projector is correctly connected to the mains power.

4. Ensure that the lamp and lamp house are correctly installed.

5. Ensure that the correct lens is installed for your application.

6. Check if a video source is connected to the projector.

7. Press the **Power Switch** to switch the projector **ON**. As a result the projector starts up and the communicator touch panel starts its initialization procedure.

   📄 *Note:* The projector always boots up in the same mode (E.g. Standby or Sleep) as it was switched off. This procedure assumes that the projector was switched off in standby mode (projector fully operational but lamp is off).

8. Wait until the status light of the projector lights up **GREEN** (not flashing).

9. Press the **STANDBY** button on the Local Keypad or use the Communicator to activate the lamp.

10. Press the **DOWSER** button on the Local Keypad or use the Communicator to open the dowser.
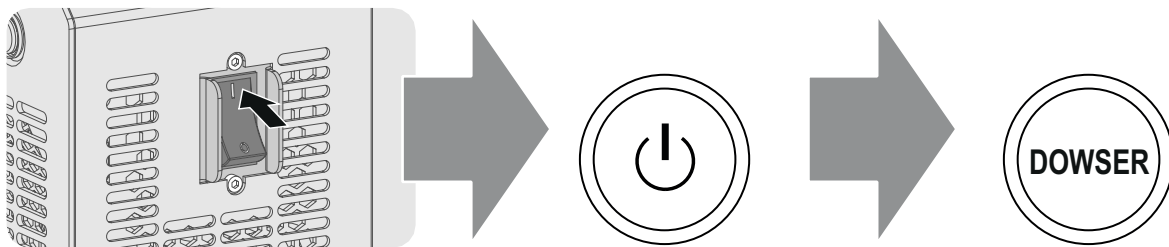
Image 10–1

How to awake the projector from Sleep mode?

1. Press the **SLEEP** button on the Local Keypad for three seconds or use the Communicator to put the projector in Standby mode.

   As a result the projector starts booting and initializing all electronics. During the booting and initializing phase the backlight color of the Sleep button is purple (transition phase). Once the projector is fully awake the backlight color of the Sleep button is green.

   📄 *Note:* When the projector is in Sleep mode only the backlight of the Sleep button lights up red. The backlight of all other buttons of the Local Keypad remains off.

👉 The backlight color of the Sleep button, Standby button, Dowser button and Test Pattern button must all light up green to project the image of the applied source.

👆 **CAUTION:** See user's guide of the Communicator Touch Panel to operate and control the DP2K-S series projector.

📄 When for any reason a restart of the projector is required, the content server should be restarted also.

10.2 Switching the DP2K-S series projector OFF

How to switch the DP2K-S series projector OFF?

1. Press the Standby button on the Local Keypad or use the Communicator Touch Panel to switch the projector from Lamp ON mode to Standby mode. As a result the lamp turns off while the fans keep turning to cool down the projector.

2. Allow the projector to cool down for 5 minutes minimum or until the speed of the fans decreases.

3. Switch the projector OFF with the power switch.

Tip: Make sure no lens motors are running while switching off the projector. Wait for lens positioning to complete.
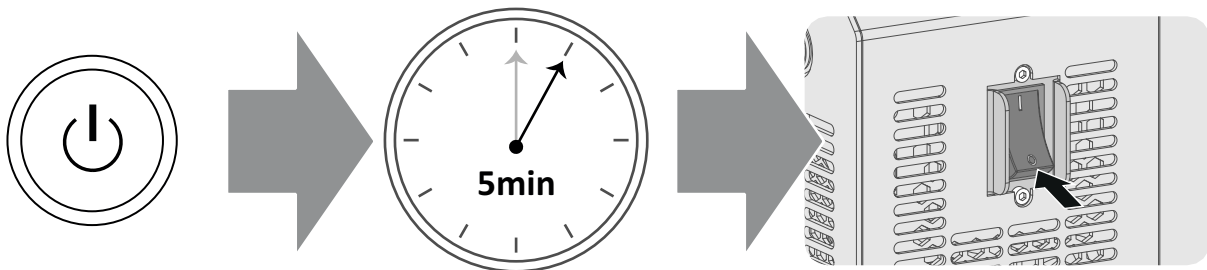
Image 10–2

How to put the projector into Sleep mode?

1. Check if the lamp is switched off. If not, press the Standby button on the Local Keypad or use the Communicator to switch the lamp off. The backlight color of the Standby button is red when the lamp is switched off.

Note: To put the projector into Sleep the projector must be in Standby mode (in other words the lamp must be off). If the lamp is ignited he Sleep button is disabled notwithstanding the backlight color of the Sleep button is green.

2. Press the **SLEEP** button on the Local Keypad for three seconds or use the Communicator to put the projector into Sleep mode.

As a result the projector immediately shuts down the electronics but when the lamp is still too hot the projector will finish the after cooling cycle and then finally go to sleep. The backlight color of the Sleep button is red in Sleep mode even when the projector is finishing the after cooling cycle.

Note: Pressing the Sleep button before the after cooling cycle has finished, will re-start the projector in a normal way.

Scheimpflug

11

About this chapter

This chapter explains the Scheimpflug principle and when to apply Scheimpflug correction upon your DP2K-S series projector. In addition to the procedure for Scheimpflug adjustment the procedure to adjust the Back Focal Length is also included in this chapter.

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.

11.1 Scheimpflug introduction

What is Scheimpflug?

The lens holder has to be adjusted so that the "sharp focus plane" of the projected image falls together with the plane of the screen (Fp1→Fp2). This is achieved by changing the distance between the DMD plane and the lens plane (Lp1→Lp2). The closer the lens plane comes to the DMD plane the further the sharp focus plane will be. It can occur that you won't be able to get a complete focused image on the screen due to a tilt (or swing) of the lens plane with respect to the DMD plane. This is also known as Scheimpflug's law. To solve this the lens plane must be placed parallel with the DMD plane. This can be achieved by turning the lens holder to remove the tilt (or swing) between lens plane and DMD plane (Lp3→Lp4).
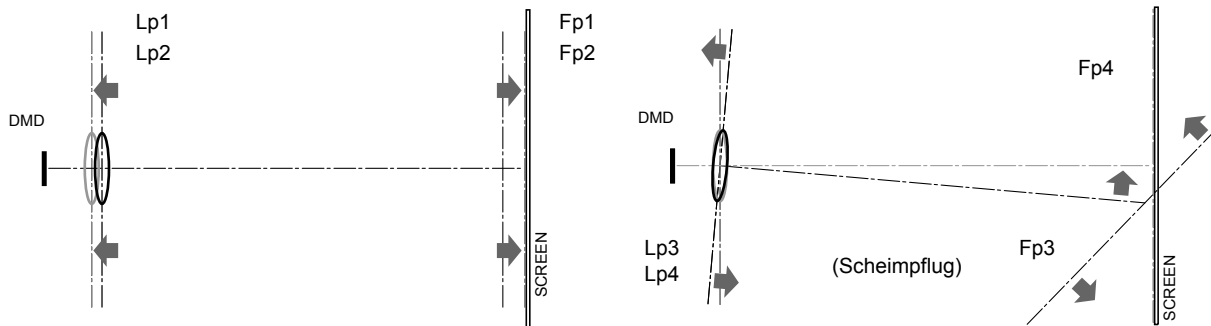
Image 11–1 Scheimpflug principle

> **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

The front plate of the Lens holder is equipped with four bronze (Scheimpflug) nuts and four set screws with lock nut. These screws and nuts are used for Scheimpflug adjustment.
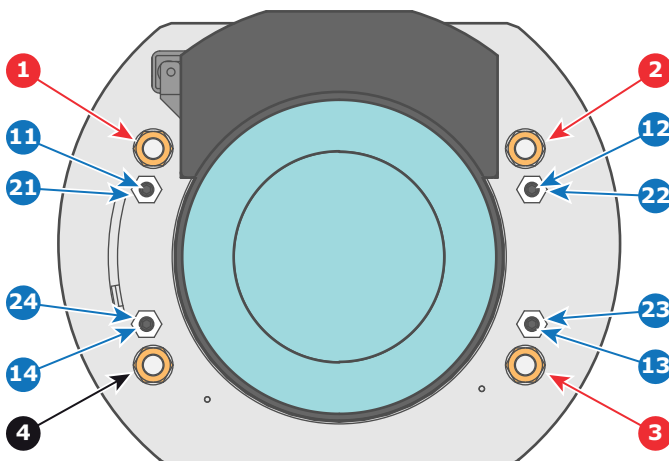
Image 11–2

1	Scheimpflug adjustment nuts No1: Influences the sharp focus plane in the lower left corner of the projected image.	**13**	Set screw for nut No3.
2	Scheimpflug adjustment nuts No2: Influences the sharp focus plane in the lower right corner of the projected image.	**14**	Set screw for nut No4.
		21	Lock nut.
3	Scheimpflug adjustment nuts No3: Influences the sharp focus plane in the upper right corner of the projected image.	**22**	Lock nut.
		23	Lock nut.
4	Scheimpflug nut No 4: without adjustment functionality.	**24**	Lock nut.
11	Set screw for nut No1.		
12	Set screw for nut No2.		

> Reference 1, 2 and 3 are adjustment points. Reference 4 is a locking point and NOT used during Scheimpflug adjustment.

When to apply Scheimpflug?

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

The disadvantage of Masking is loss of content. Therefore it is strongly **recommended** to place the projector **in parallel** with the projection screen and use the **SHIFT** functionality of the Lens Holder to match the projected image with the projection screen. In case the SHIFT range is not sufficient then the projector can be tilted and Scheimpflug can be applied.

11.2 Scheimpflug adjustment

Required tools

- 3mm Allen wrench.
- 13mm nut driver.
- 10mm nut driver.

Preparation steps:

1. Ensure that the throw ratio of the installed lens matches the requirements of the application (projection distance and screen size).

2. Ensure that the correct lens parameters are activated. (See user guide of the "*Communicator*" chapter *Installation > Advanced > Lens parameters*)

   > *Note:* Selecting the wrong lens parameters will result in an unexpected behavior of the lens when using macros for switching between FLAT and SCOPE (change in picture size and focus).

3. Perform a lens **HOME & RETURN** operation. (See user guide of the "*Communicator*" chapter *Installation > Advanced > Lens parameters*)

4. Project the green focus test pattern.
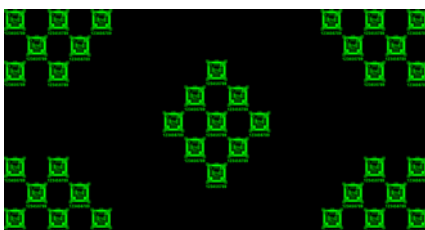
Image 11–3

5. Zoom the lens for maximum image on the screen (**WIDE**).

6. Is it possible to focus the center of the projected image?
   ▶ If yes, the Back Focal Length is OK. Proceed with the next step.
   ▶ If no, the Back Focal Length needs realignment. Proceed with the procedure "Back Focal Length adjustment", page 111.

7. Unlock and turn out the 4 set screws (reference 11 Image 11–4) of the Lens Holder by 1 centimeter. Use a 10mm nut driver for the lock nuts (reference 21 Image 11–4) and use a 3mm Allen wrench for the set screws.
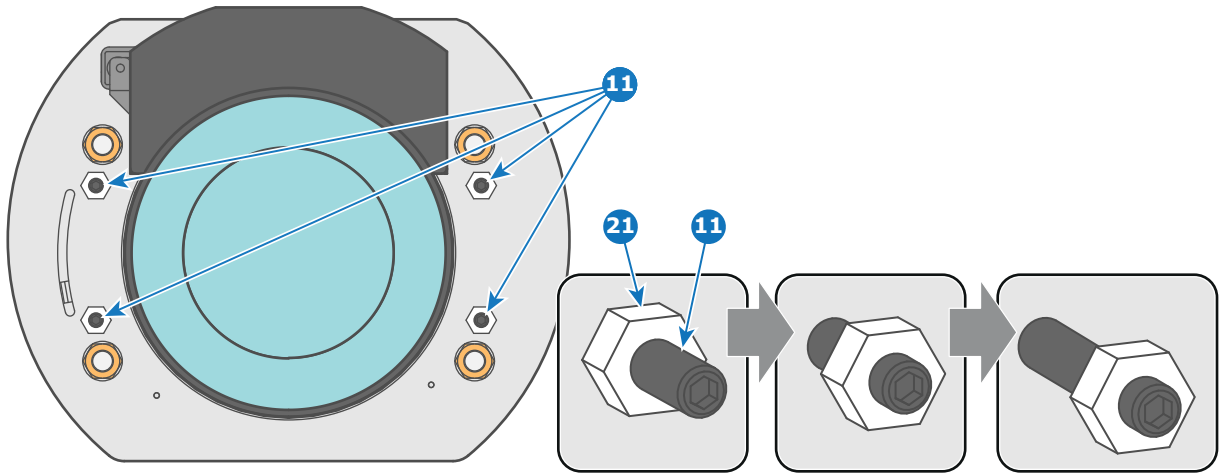
Image 11–4

8. Fully loosen the Scheimpflug nut at the lower left of the Lens Holder (reference 4 Image 11–5). Use a 13mm nut driver.
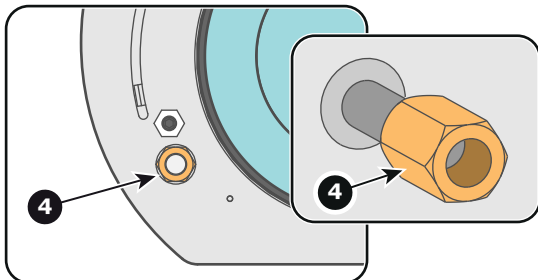
9. Optimize the focus of the projected image in the center of the screen (F) using the motorized focus control (Local Keypad).
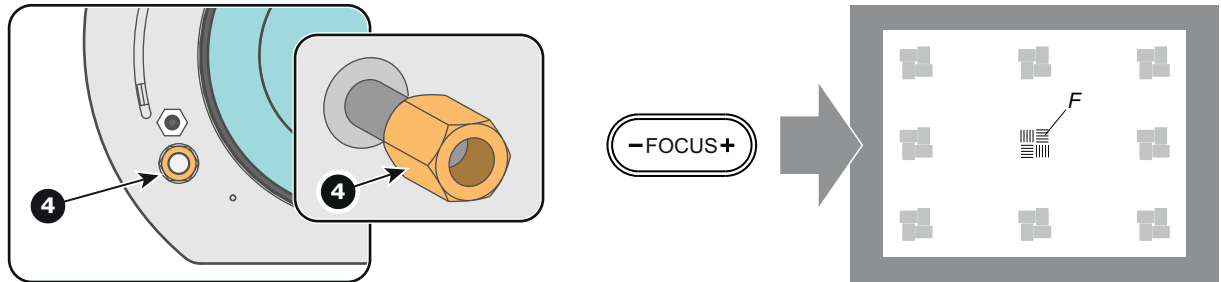
Image 11–5

Scheimpflug adjustment steps:

1. Sharpen the image at the bottom left corner of the screen by turning the upper left Scheimpflug adjustment nut (reference 1 Image 11–6). As a result the focus in the center will fade a bit but that's normal.
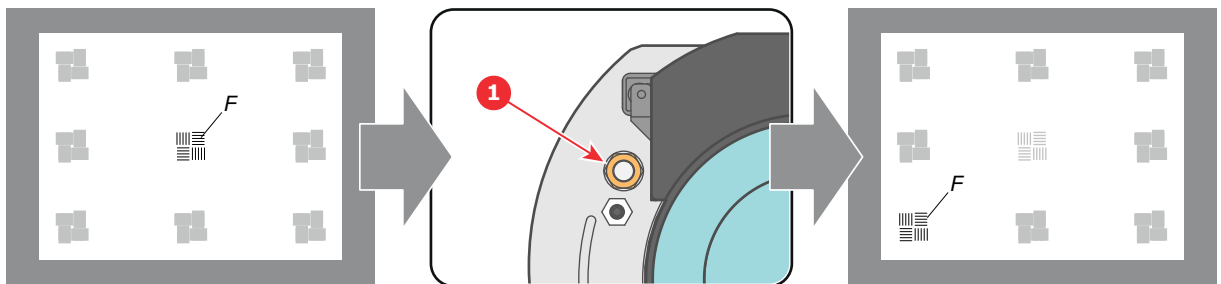
Image 11–6

2. Sharpen the image at the top right corner of the screen by turning the lower right Scheimpflug adjustment nut (reference 3 Image 11–7).
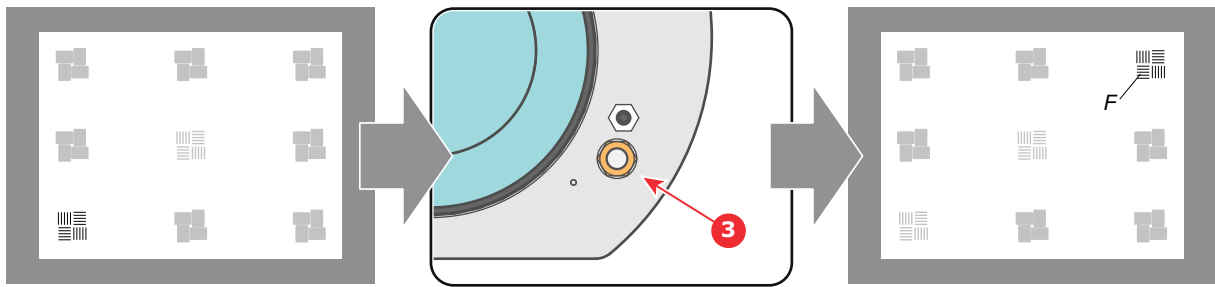
Image 11–7

3. Sharpen the image at the bottom right corner of the screen by turning the upper right Scheimpflug adjustment nut (reference 2 Image 11–7).
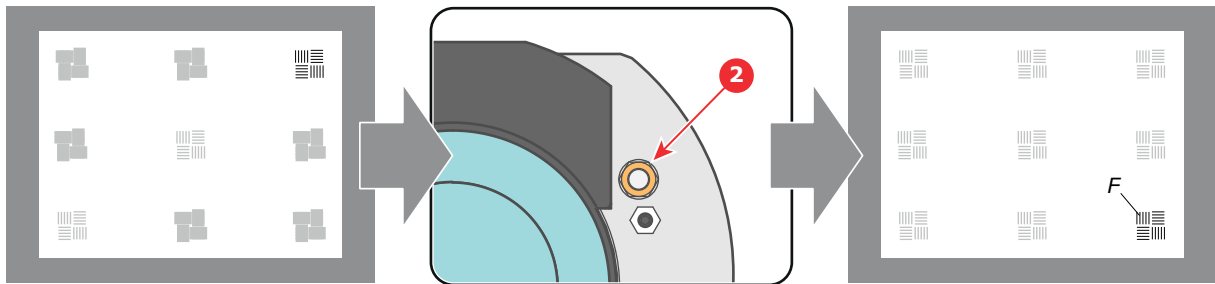
Image 11–8

4. Optimize the focus of the projected image in the center of the screen using the motorized focus control (Local Keypad).
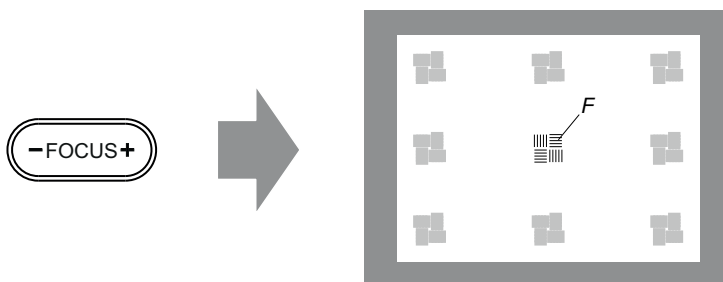
Image 11–9

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. Proceed with the procedure "Fixation of the Lens Holder front plate", page 109.

11.3 Fixation of the Lens Holder front plate

When fixing the Lens Holder front plate

After performing the procedure for Scheimpflug adjustment or Back Focal Length adjustment the Lens Holder front plate must be secured in such a way that it doesn't disturb the result of the adjustment.

Required tools

- 10mm nut driver.
- 3mm Allen wrench.
- 13mm nut driver.

How to fix the Lens Holder front plate?

Start the fixation as follows (steps must be followed strictly) :

1. Project the framing test pattern for FLAT & SCOPE.

2. Zoom the projected image until the edges of the projected test pattern matches with the edges of the projection screen.
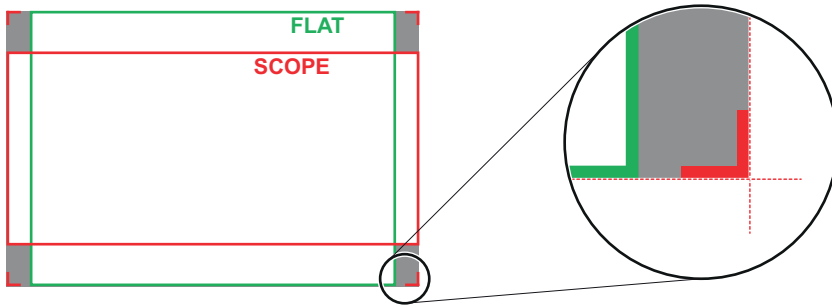
Image 11–10

3. Turn in the three set screws indicated with reference 11 Image 11–11 without disturbing the projected image. Tighten lightly . Do not turn in the set screw at the lower left of the Lens Holder!

   Note: Ensure that the edges of the projected test pattern remain in place on the screen. Any movement of the image will affect the Scheimpflug adjustment.

4. Fasten the lock nut (reference 21 Image 11–11) of the three set screws. Use a 10mm nut driver. Ensure the image doesn't move.
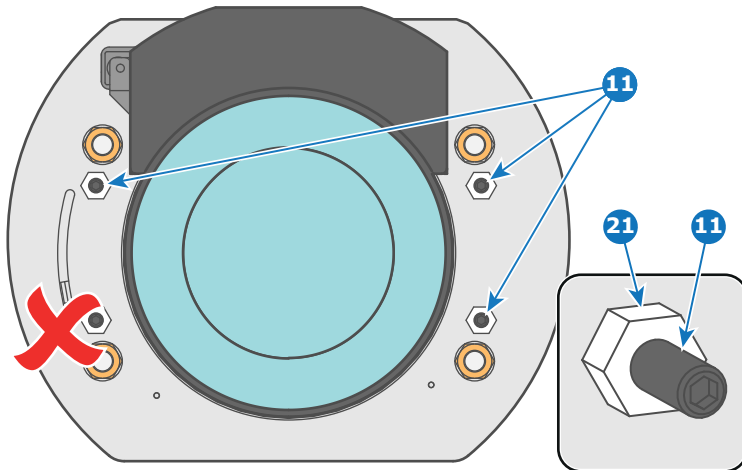
Image 11–11

5. Gently turn (by hand) the Scheimpflug adjustment nut at the lower left of the Lens Holder (reference 4 Image 11–12) against the Lens Holder front plate without disturbing the projected image.

6. Turn in the set screw at the lower left of the Lens Holder (reference 14 Image 11–12) without disturbing the projected image. Use a 3mm Allen wrench.

   Note: Ensure that the edges of the projected test pattern remain in place on the screen. Any movement of the image will affect the Scheimpflug adjustment.

   Tip: Fasten the set screw and the Scheimpflug nut alternately, without disturbing the projected image, until the Scheimpflug nut and set screw are completely tightened.
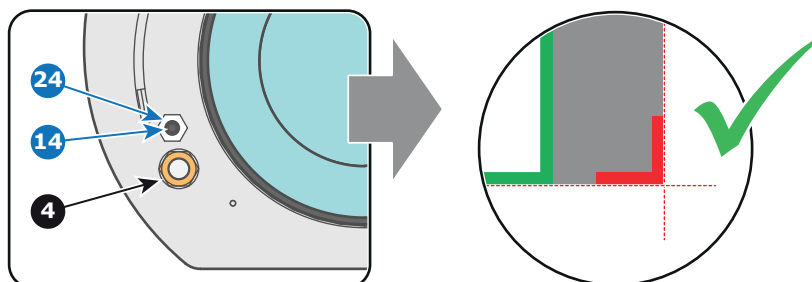
Image 11–12

7. Fasten the lock nut at the lower left of the Lens Holder. Use a 10mm nut driver.

11.4 Back Focal Length adjustment

When to adjust the Back Focal Length?

If a lens is used with a throw ratio suited for the application, (lens selection depends on projection distance and screen size) typically one would NEVER need to adjust the Back Focal Length of the projector.

A Back Focal Length adjustment is only required in case the Focus range of the installed lens does not capture the projection screen either for FLAT and/or for SCOPE. In other words, when it is impossible to focus the image on the screen for FLAT and/or for SCOPE. Note that the lenses for the DP2K-S series projector projector are varifocal. So, switching between FLAT and SCOPE (zoom action) requires a readjustment of the focus.

What is Back Focal Length adjustment?

Back Focal Length adjustment means moving the lens plane (Lp), thus the Lens Holder front plate, closer to or further from the DMD plane. The closer the lens plane to the DMD plane the further the focus range (Fr) of the lens will be.
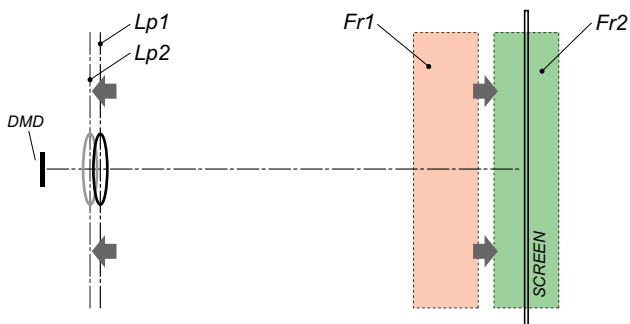
Image 11–13

> Do not abuse the Back Focal Length adjustment of the Lens Holder. Neglecting this will result in loss of image quality because of the lens design. Cases requiring Back Focal Length adjustment normally indicate incorrect lens choice (throw ratio).

Required tools

- 10mm nut driver.
- 3mm Allen wrench.
- 13mm nut driver.

How to check the Back Focal Length?

1. Ensure that the throw ratio of the installed lens matches with the requirements of the application (projection distance and screen size).

2. Ensure that the correct lens parameters are activated. (See user guide of the "*Communicator*" chapter *Installation > Advanced > Lens parameters*)

> ⚠ *Caution:* Not using the correct lens parameters could result in lens damage.

3. Perform a lens **HOME & RETURN** operation. (See user guide of the "*Communicator*" chapter *Installation > Advanced > Lens parameters*)

4. Project the green focus test pattern. (screen file "no masking" or "no "crop")
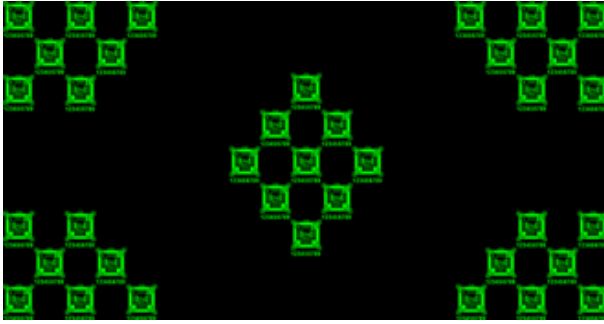
Image 11–14

5. Zoom the lens for maximum image on the screen (**WIDE**).

6. Is it possible to focus the center of the projected image?
   ▸ If yes, the Back Focal Length is OK.
   ▸ If no, the Back Focal Length needs realignment. Proceed with the next procedure.

How to adjust the Back Focal Length?

1. Unlock and loosen the 4 set screws (reference 11 Image 11–15) of the Lens Holder by 1 centimeter. Use a 10mm nut driver for the lock nuts (reference 21 Image 11–15) and use a 3mm Allen wrench for the set screws.
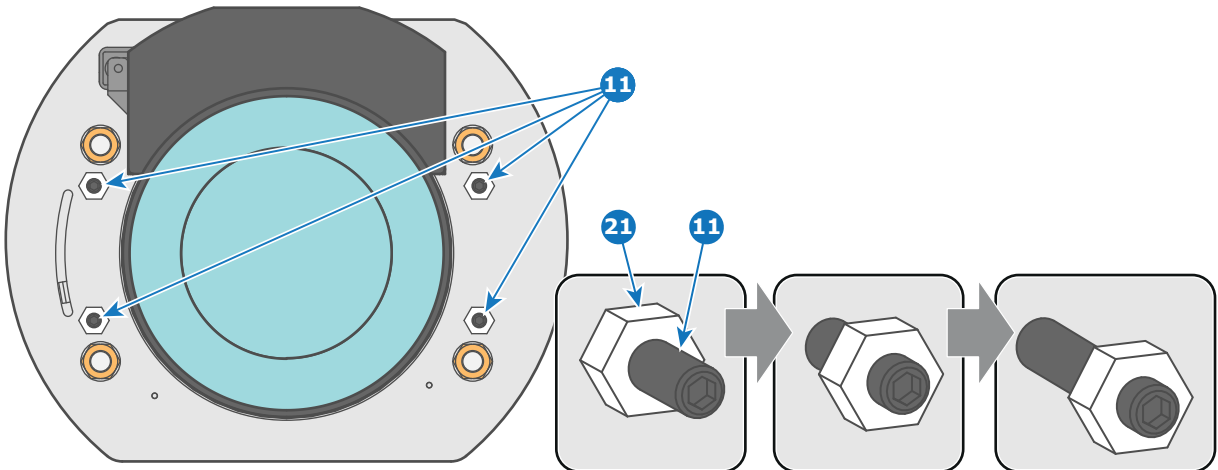
Image 11–15

2. Fully loosen the Scheimpflug nut at the lower left of the Lens Holder (reference 4 Image 11–16). Use a 13mm nut driver.

Image 11–16

3. Turn the three Scheimpflug adjustment nuts, reference 1, 2 and 3 Image 11–17, until the front of the nut (reference 5 Image 11–17) is equally aligned with the front of the threaded rod (reference 6 Image 11–17). Use a 13mm nut driver.

   📄 *Note:* This is the nominal position of the Lens Holder.
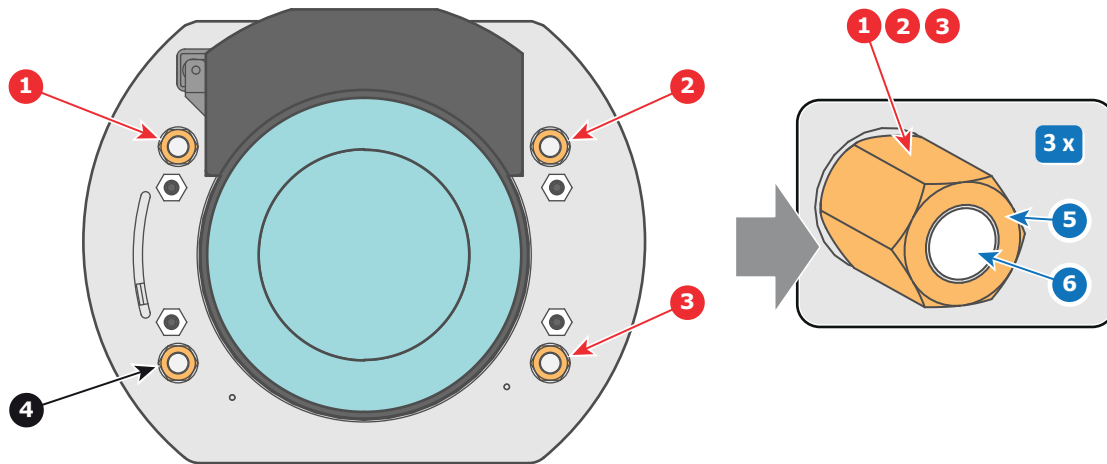
Image 11–17

4. Zoom the lens for maximum image on the screen (**WIDE**) and focus the center of the projected image using the motorized focus control (Local Keypad).
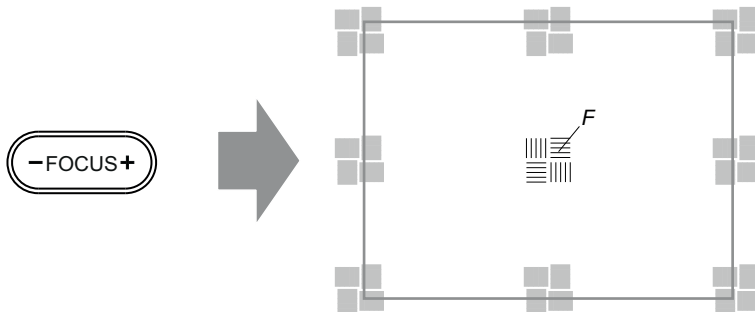
Image 11–18

5. Is it possible to focus the center of the projected image using the motorized focus control (Local Keypad) ? Ensure that the lens is zoomed for maximum image on the screen (**WIDE**).

► If yes, nominal position is good for sharp focus in the middle of the projected image. Proceed with step 6.

► If no, obtain the best possible focus in the center of the projected image using the motorized focus control and then turn the three Scheimpflug adjustment nuts, reference 1, 2 and 3 Image 11–19, equally in or out until the center of the projected image is sharp. **Attention:** Keep in mind the turning direction of the Scheimpflug adjustment nuts for further adjustment instructions in this procedure.
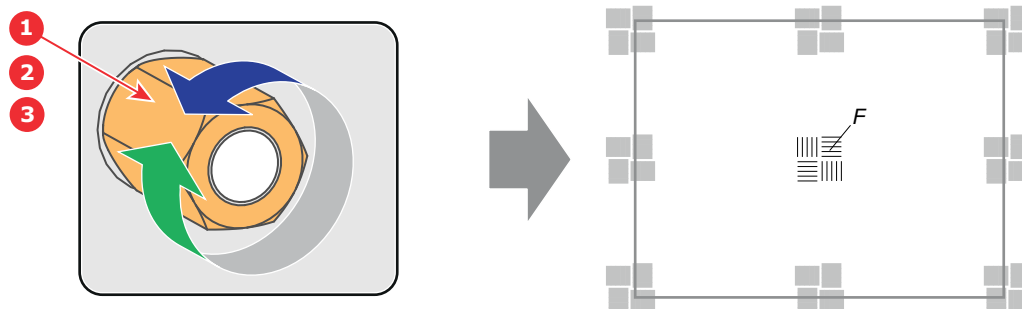
Image 11–19

6. Zoom the lens for minimum image on the screen (**TELE**) and focus the center of the projected image using the motorized focus control (Local Keypad).
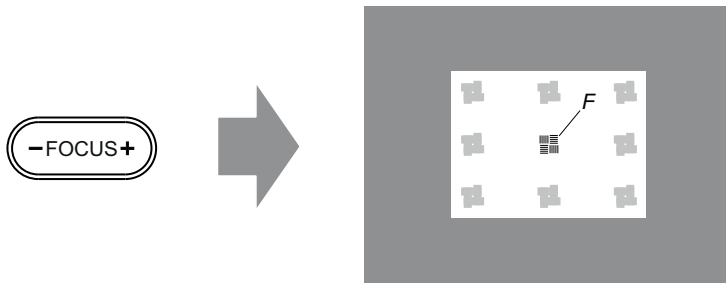
Image 11–20

7. Is it possible to focus the center of the projected image using the motorized focus control (Local Keypad) ? Ensure that the lens is zoomed for minimum image on the screen (**TELE**).

▶ If yes, no further adjustment actions required. Proceed with step 8.

▶ If no, obtain the best possible focus in the center of the projected image using the motorized focus control and then turn the three Scheimpflug adjustment nuts, reference 1, 2 and 3 Image 11–21, equally in or out until the center of the projected image is sharp. **Note**: the same turning direction as in step 4 is applicable.
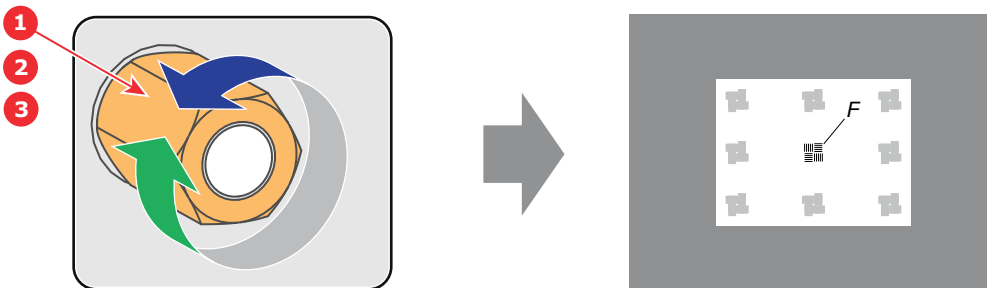
Image 11–21

8. Check if it is possible to focus the center of the projected image using the motorized focus control (Local Keypad) for **WIDE** and for **TELE**.

▶ If yes, the Back Focal Length is correctly adjusted.

▶ If no, repeat with step 4.

9. Is the projected image in the corners as sharp as in the middle?

▶ If yes, proceed with the procedure "Fixation of the Lens Holder front plate", page 109.

▶ If no, Scheimpflug adjustment is required. See procedure "Scheimpflug adjustment", page 107, prior to fixate the Lens Holder front plate. **CAUTION**: Skip the action, in the Scheimpflug adjustment procedure, to turn the three Scheimpflug adjustment nuts until the front of the nut is equally aligned with the front of the threaded rod!

Convergence 12

About this chapter

This chapter describes how to prepare your DP2K-S series projector for convergence adjustment and how to adjust the convergence.

12.1 Convergence controls

Extended control knobs

As the DMD of the red channel is not accessible in the projector, it remains fixed. Therefor the image of this DMD will be taken as reference. Blue and green may be aligned onto red when a small convergence drift is recognized. The blue and green channels have pivot plates equipped with three control knobs for convergence adjustment, two of which are extended (reference 2, 3, 5 and 6 of Image 12–1) . The adjustment knobs are numbered from 1 to 6 and have the same color as the channel which they affect.

To access the control knobs the top cover and left side cover of the projector and the top cover plate and side cover plate of the Light Processor compartment have to be removed. For easy access to control knobs No1 and No4, we advise locating the Light Processor top fan unit in it's upper position, hereby still providing the necessary cooling to the unit.
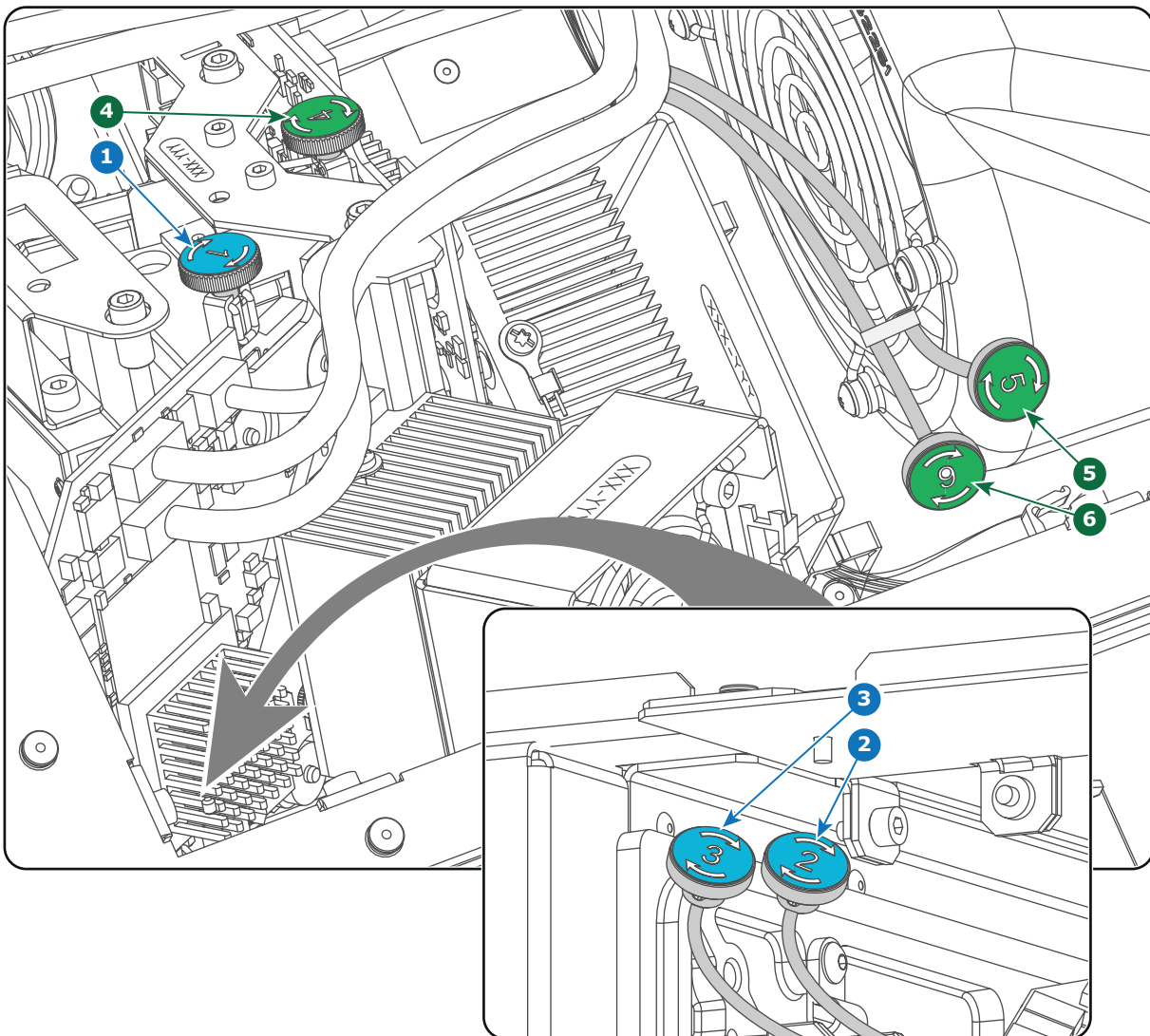
Image 12–1

1	Blue channel, knob number 1.	**4**	Green channel, knob number 4.
2	Blue channel, knob number 2.	**5**	Green channel, knob number 5.
3	Blue channel, knob number 3.	**6**	Green channel, knob number 6.

Convergence test pattern
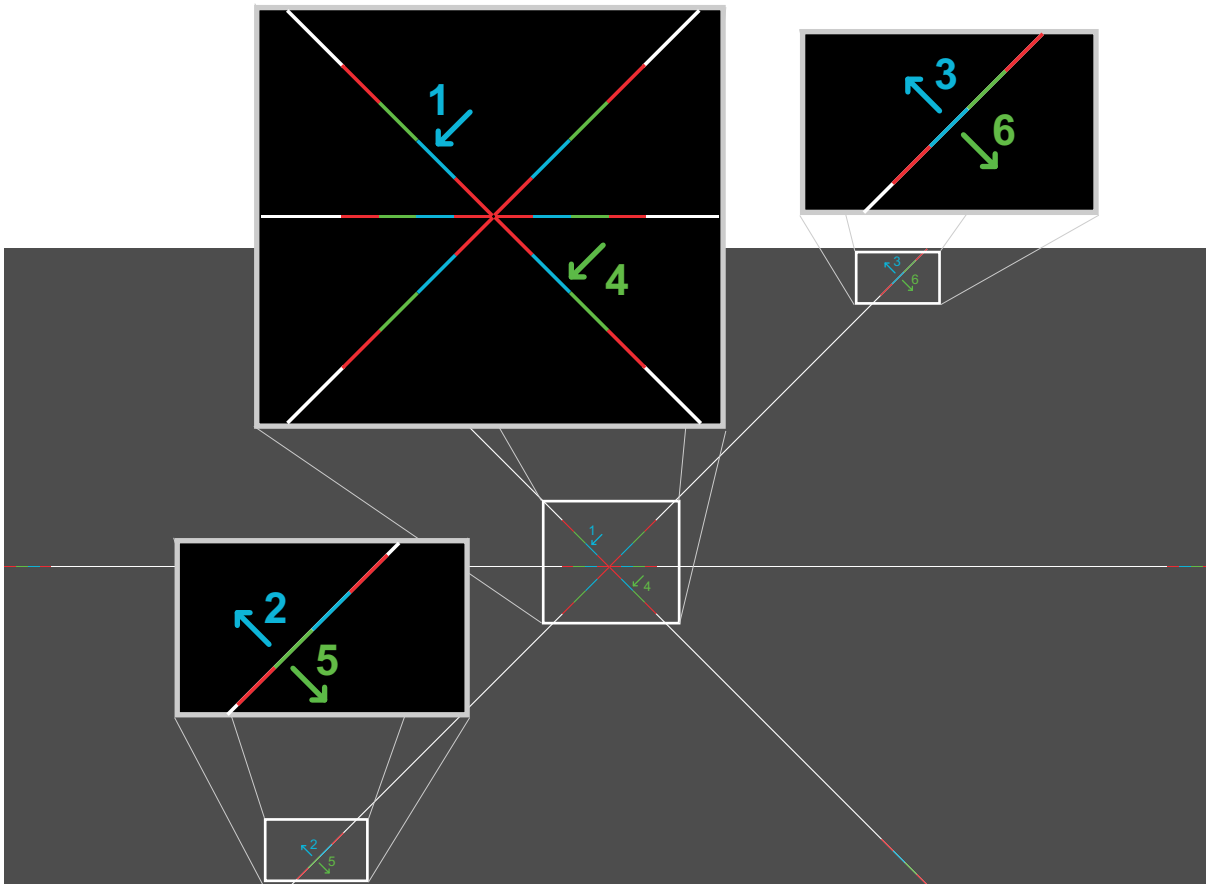
Image 12–2

The test pattern illustrated above is specifically designed for convergence purposes. The test pattern has three blue arrows numbered from 1 to 3 and three green arrows numbered from 4 to 6. These numbers and colors correspond to those of the control knobs. Each knob is marked with an arrow which corresponds to the direction indicated on the screen.

Adjustment Range

Prevent damage to the system by limiting the amount/number of adjustment (s) made. Typically the convergence adjustments serve to correct a convergence fault of a few pixels at the most. Any convergence fault beyond this is considered grossly abnormal and likely indicates abuse or rough handling. However, in extreme cases correction of up to 10 pixels is possible.

> ⚠️ **CAUTION:** The system does have an end of travel in either direction, but using excessive force may cause damage. Please handle gently.

Troubleshooting 'dead zone' of control knob

In the rare event that a knob is loose in the perfect convergence position, it is preferable to continue translating the image away for approximately 20 to 30 pixels (max 1 revolution of the knob(s)). Note that this is the only time we allow for extreme adjustment. Thereafter, return the image back immediately to the correct position. The knob should now have become tighter in the final position and therefore resists turning due to vibrations and such. Repeat the procedure if you feel the knob is still loose.

12.2 Preparing for convergence adjustment

Required tools

• 7mm flat screwdriver.

• 3mm Allen wrench.

How to set up the projector for convergence adjustment?

1. Remove the top cover from of the projector.

2. Remove the left side cover from of the projector.

3. Remove the top cover plate of the Light Processor compartment.

4. Remove the left cover plate of the Light Processor compartment.

5. Place the fan on top of the Light Processor in the upper position as illustrated. Do this by engaging the two lower slots (reference 2 Image 12–3) into the upper mounting pins as illustrated. The two upper slots (reference 3 Image 12–3) remain free.
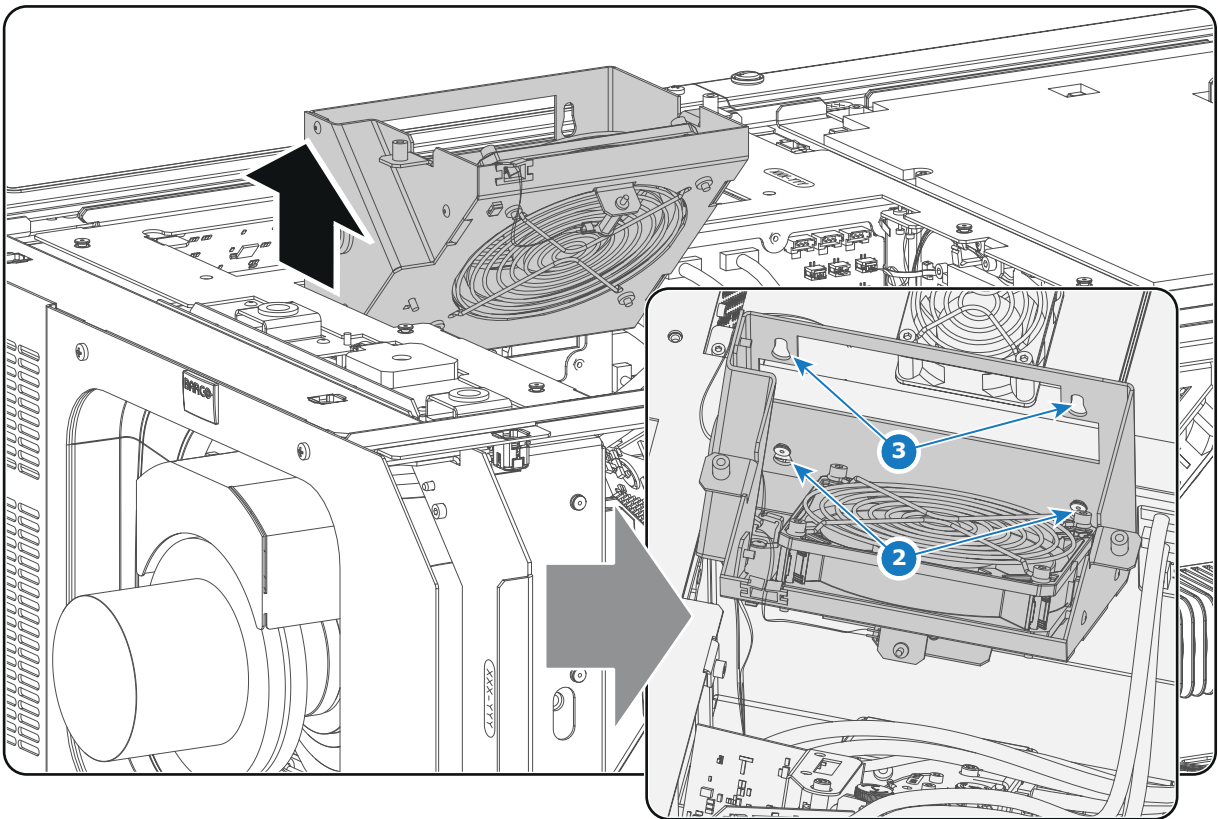
Image 12–3

6. Switch on the projector, activate the light source and open the dowser.

7. Select the convergence test pattern, which is illustrated below (Image 12–4). Use the communicator to activate the convergence test pattern.

> 📄 *Note:* The convergence test pattern can NOT be activated via the **PATTERN** button on the Local Keypad.
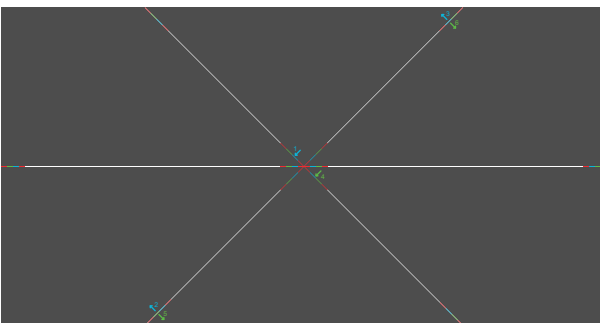
Image 12–4

12.3 Converging the blue pattern onto the red pattern

📄 This adjustment procedure assumes that the projector is prepared for convergence adjustment.

Required tools

No tools required.

How to converge the blue pattern onto the red pattern?

1. Slightly turn the blue colored control knob number 1 until the blue pattern in the **center** of the projected image converges with the red pattern. Note that a turn of a few degrees corresponds with one full pixel. The direction on the control knob corresponds to the direction of the arrow of the test pattern.
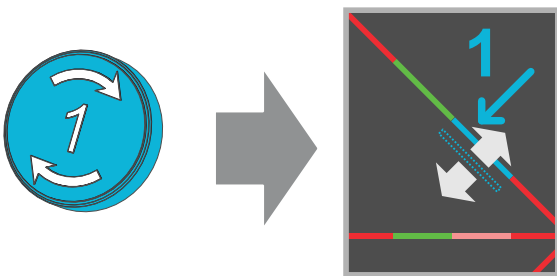
Image 12–5

2. Slightly turn the blue colored control knob number 2 until the blue pattern in the **lower left** of the projected image converges with the red pattern.
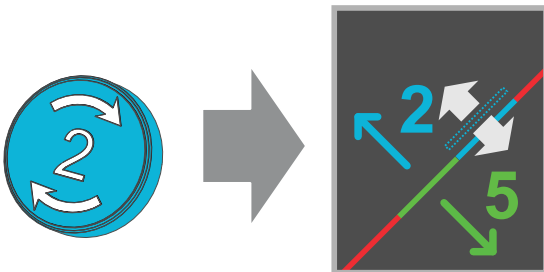
Image 12–6

3. Slightly turn the blue colored control knob number 3 until the blue pattern in the **upper right** of the projected image converges with the red pattern.
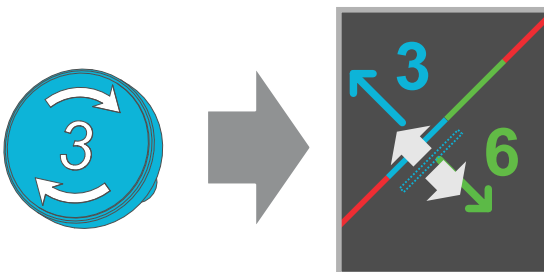
Image 12–7

4. Repeat step 2 and 3 until **coincidence** is obtained of the blue pattern in the **lower left** and **upper right** of the projected image.

5. Repeat from step 1 until **full coincidence** is obtained of the blue pattern in the **center**, **lower left** and **upper right** of the projected image.

6. Continue with the procedure: "Converging the green pattern onto the red pattern", page 120.

12.4 Converging the green pattern onto the red pattern

📄 This adjustment procedure assumes that the projector is prepared for convergence adjustment.

Required tools

No tools required.

How to converge the green pattern onto the red pattern?

1. Slightly turn the green colored control knob number 4 until the green pattern in the **center** of the projected image converges with the red pattern. Note that a turn of a few degrees corresponds with one full pixel. The direction on the control knob corresponds to the direction of the arrow of the test pattern.
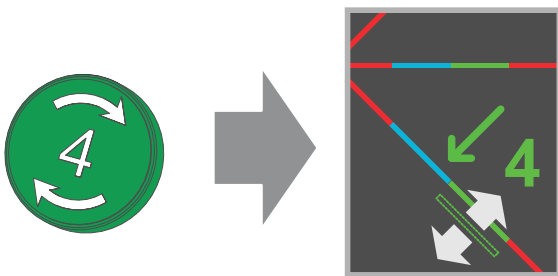
Image 12–8

2. Slightly turn the green colored control knob number 5 until the green pattern in the **lower left** of the projected image converges with the red pattern.
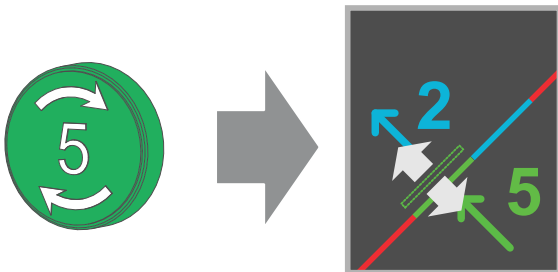
Image 12–9

3. Slightly turn the green colored control knob number 6 until the green pattern in the **upper right** of the projected image converges with the red pattern.
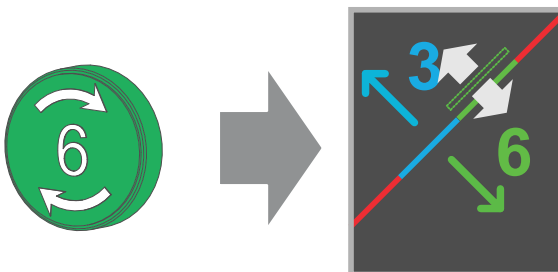
Image 12–10

4. Repeat step 2 and 3 until **coincidence** is obtained of the green pattern in the **lower left** and **upper right** of the projected image.

5. Repeat from step 1 until **full coincidence** is obtained of the green pattern in the **center**, **lower left** and **upper right** of the projected image.

6. Switch off the projector.

7. Continue with the procedure **Closing off the Light Processor compartment**.

12.5 Closing off the Light Processor compartment

Required tools

- 7mm flat screwdriver.
- 3mm Allen wrench.

How to close off the Light Processor compartment?

1. Place the fan on top of the Light Processor in the lower position . Ensure that the four mounting pins (reference 1 Image 12–11) of the fan assembly are engaged.

> ⚠ *Caution:* Take care of the wire.
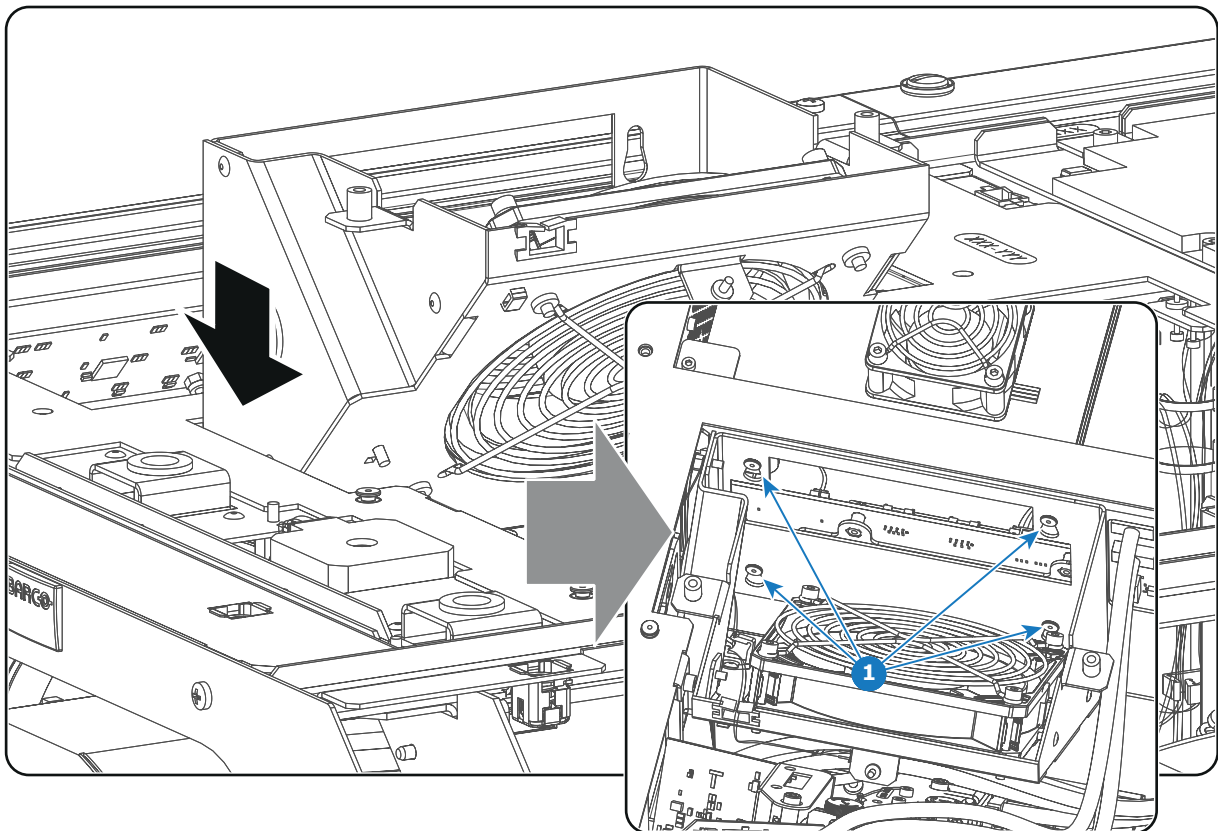
Image 12–11

2. Install the top cover plate of the Light Processor compartment.

3. Install the side cover plate of the Light Processor compartment.

4. Install the top cover of the projector.

5. Install the left side cover of the projector.

6. Switch on the projector.

7. Clear the security warning. See procedure page 157.

Lamp House & Lamp replacement

13

About this chapter

This chapter highlights all the supported xenon lamps for your DP2K-S series projector and how to replace the xenon lamp in the lamp house. Also included is the procedure to reset the lamp parameters, which is required after a xenon lamp replacement, and the procedure to realign the lamp in its reflector for optimal performance.

> **WARNING:** DO NOT PERMIT UNAUTHORIZED PERSONNEL TO PERFORM OR ATTEMPT ANY PHASE OF XENON LAMP HANDLING OR SERVICE. ONLY TRAINED AND QUALIFIED TECHNICAL SERVICE PERSONNEL ARE ALLOWED TO HANDLE THE XENON LAMP.

> **CAUTION:** Xenon compact arc lamps are highly pressurized. When ignited, the normal operating temperature of the bulb increases the pressure to a level at which the bulb may explode if not handled in strict accordance to the manufacturer's instructions. The bulb is stable at room temperature, but may still explode if dropped or otherwise mishandled. Whenever the lamp house, containing a xenon lamp, has to be dismantled or whenever the protective container or cloth has to be removed from the xenon lamp, authorized protective clothing MUST be worn!

> **WARNING:** Always wear face protection (full face shield) when handling xenon lamps.

> **WARNING:** Always wear protective clothing (welder's jacket) when handling xenon lamps.

> **WARNING:** Always wear clean leather gloves with wrist protectors when handling xenon lamps.

13.1 Introduction

Lamp and Lamp House

The DP2K-S series projector is delivered with a Lamp House with a xenon lamp installed. The xenon lamp is a consumable item of the projector. Exhausted xenon lamps must be replaced on site by a qualified service technician.

The xenon lamp is packed in a protective container or wrapped in a protective cloth. Never remove this protective container or protective cloth without wearing adequate protective clothing (face shield, clean leather gloves, welder's jacket).

Image 13–1 Left: Xenon lamp in protective container. Right: Xenon lamp wrapped in protective cloth.

> **CAUTION:** Xenon compact arc lamps are highly pressurized. When ignited, the normal operating temperature of the bulb increases the pressure to a level at which the bulb may explode if not handled in strict accordance to the manufacturer's instructions. The bulb is stable at room temperature, but may still explode if dropped or otherwise mishandled. Whenever the lamp house, containing a xenon lamp, has to be dismantled or whenever the protective container or cloth has to be removed from the xenon lamp, authorized protective clothing MUST be worn!

Lamp strike policy and lamp warning/error policy versus the lamp runtime

- The projector issues a lamp run time notification message (and have blue status LEDs) approximately 30 hours before the maximum lamp runtime occurs.
- The projector issues a lamp run time notification message (and have blue status LEDs) when the maximum lamp runtime occurs.
- The projector will always try to strike the lamp, independent of the lamp runtime.

Parts identification Lamp House

Image 13–2

1	Air inlet cathode cooling.	**9**	Removable front cover (with UV blocker).
2	Air inlet anode cooling.	**10**	Handle.
3	Positioning pin.	**11**	Adjustment screw vertical lamp alignment.
4	Air outlet.	**12**	Adjustment screw for lamp Z-alignment.
5	Removable side cover.	**13**	Lamp cathode fixation screw.
6	Anode connection with ignitor (SPG).	**14**	Adjustment screw horizontal lamp alignment.
7	UV blocker (with incorporated anode lamp support).	**15**	Lamp House fixation screws.
8	Cathode connection with ignitor (SPG).		

Parts identification xenon lamp
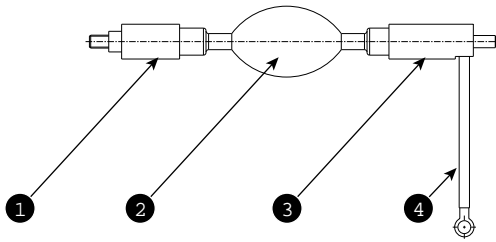
Image 13–3

1 Cathode of the xenon lamp.
2 Envelope (bulb) of the xenon lamp.
3 Anode of the xenon lamp.
4 Anode wire of the xenon lamp.

> ⚠️ **CAUTION: Expired xenon lamps**.
> Dispose of expired bulbs that are beyond warranty according the national regulations. See also related user manual of the lamp supplier for more guidance.

> 📄 When returning a xenon lamp for warranty adjustment, pack it in its original shipping container. Complete and return all required warranty information.

13.2 Supported xenon lamps

Cathode adaptor

A cathode adaptor is required to mount the xenon lamp in the Lamp House. The cathode adapter has to be mounted on the cathode side of the xenon lamp prior to mounting the lamp in to the Lamp House. The purpose of the cathode adapter is to position the arc of the xenon lamp in the middle of the reflector inside the Lamp House. Note that there is no anode adaptor for the Lamp House of the DP2K-S series projector.
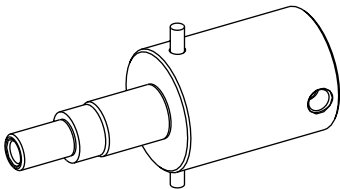
Image 13–4 Cathode adapter (**R858100K**)

> 📄 All lamps and adapters in the table below can be used in the Lamp House of the DP2K-S series projector. Note that the maximum lamp power the projector delivers depends on the type of projector and the installed lamp. Prior to install the lamp it's important to check with the Communicator software if the lamp is listed in the list of supported lamps for this projector.

Supported lamp types and cathode adapter:

Lamp type & Supplier	Cathode adapter	Barco Order No.	DP2K-8S	DP2K-10S
USHIO 1.2kW DXL12BAF	R858100K	**R9855961**	Yes	Yes
USHIO 1.6kW DXL16BAF	R858100K	**R9855972**	Yes	Yes
USHIO 2.0kW DXL20BAF	R858100K	**R9855955**	No	Yes
USHIO 2.0kW DXL20BAF2	R858100K	**R9855965**	No	Yes
USHIO 2.0kW DXL20BAF/L	R858100K	**R9801067**	No	Yes
USHIO 2.2kW DXL22BAF	R858100K	**R9855971**	No	Yes
OSRAM 1.2kW DHP	R858100K	**R9855959**	Yes	Yes

Lamp type & Supplier	Cathode adapter	Barco Order No.	DP2K-8S	DP2K-10S
OSRAM 2.0kW DHP	R858100K	**R9855956**	No	Yes
PHILIPS 2.0kW XDC2000B	R858100K	**R9801071**	No	Yes

> 📄 The table above is subject to changes and was last updated on 29 August 2013. Consult *https://my.barco.com* for the most recent information about supported lamps for the DP2K-S series projector.

> ⚠️ **WARNING:** Always use the correct Cathode adapter for the xenon lamp in the Lamp House. Neglecting this may result in poor performance of the lamp and damage to the xenon lamp and Lamp House. Some adapters looks the same, therefore check the engraved item number upon the adapter to ensure you use the right adapter.

13.3 Lamp replacement process

About this process

This process enumerates all procedures in a chronological order for replacement of the xenon lamp of the projector. The stages in this process refer to the detailed step by step procedures included in this document.

Lamp replacement process from A to Z

1. Put the projector in standby mode, wait 15 minutes to let the projector cool down (after cooling), and then switch off the projector.
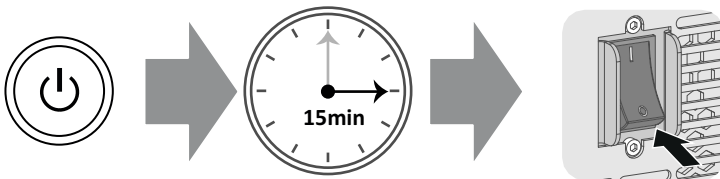
Image 13–5

2. Remove the cover of the Lamp House compartment. See page 160.
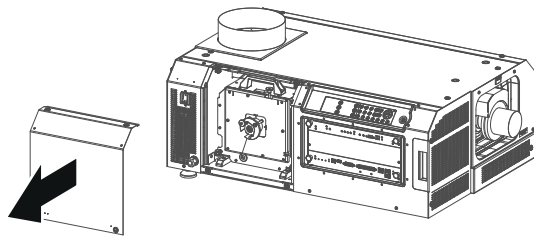
Image 13–6

3. Remove the Lamp House from the projector. See page 128.
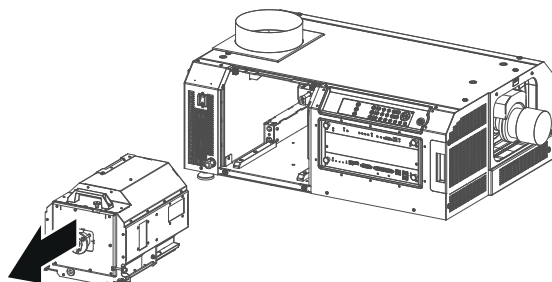
Image 13–7

4. Remove the exhausted xenon lamp from the Lamp House. See page 133.
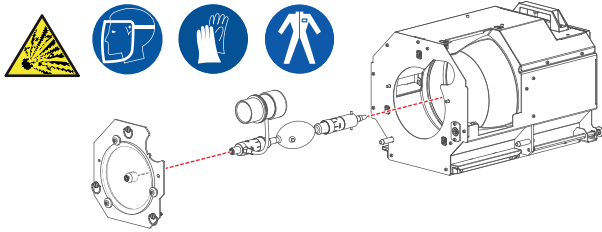
Image 13–8

5. Perform maintenance actions for lamp replacement. See page 147.

6. Install a new xenon lamp in the Lamp House. See page 133.

7. Install the Lamp House back into the projector. See page 138.
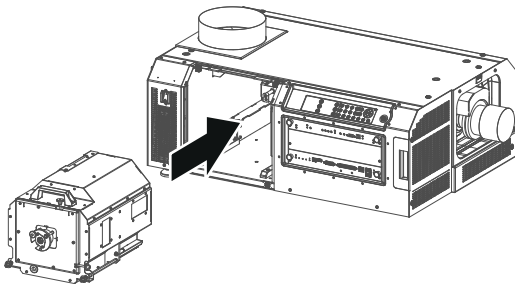
Image 13–9

8. Install the cover of the Lamp House compartment. See page 170.
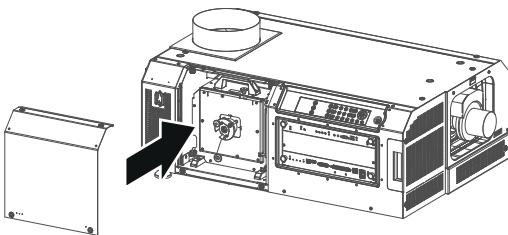
Image 13–10

9. Switch on the projector (into standby).
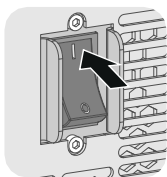
Image 13–11

10. Reset the lamp parameters. See page 140.
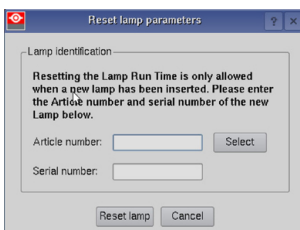
Image 13–12

11. Re-align the lamp in its reflector. See page 143.
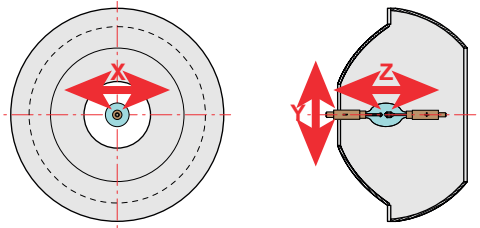
Image 13–13

12. Dispose of the exhausted lamp.

> *Caution:* **Expired xenon lamps**.
>
> Dispose of expired bulbs that are beyond warranty according the national regulations. See also related user manual of the lamp supplier for more guidance.

13.4 Removal of the Lamp House

> **WARNING:** This procedure may only be performed by qualified technical service personnel.

> **WARNING:** The Lamp House is very hot after operation. To avoid burns, let the projector cool down for at least 15 minutes before proceeding to remove the Lamp House.

> **CAUTION:** Due to its high internal pressure, the lamp may explode in either hot or cold states if improperly handled.

Required tools

8mm nut driver or flat screw driver.

How to remove the Lamp House from the projector?

1. Ensure the projector is switched off and cooled down.

2. If not already removed, remove the cover of the Lamp House compartment.

3. Release the two retaining screws (reference 1 Image 13–14) at the base of the Lamp House. Use a 8mm nut driver or a flat screw driver.

4. Remove the Lamp House as follows:
   1. Grip the Lamp House by the handle and slide it out half way of the lamp compartment
   2. Support the Lamp House at the bottom with the other hand and remove it from the lamp compartment.
   3. Place the Lamp House on a stable support.

   > *Caution:* Be aware of the weight of the lamp assembly (10kg). Take the necessary precautions to avoid personal injury.
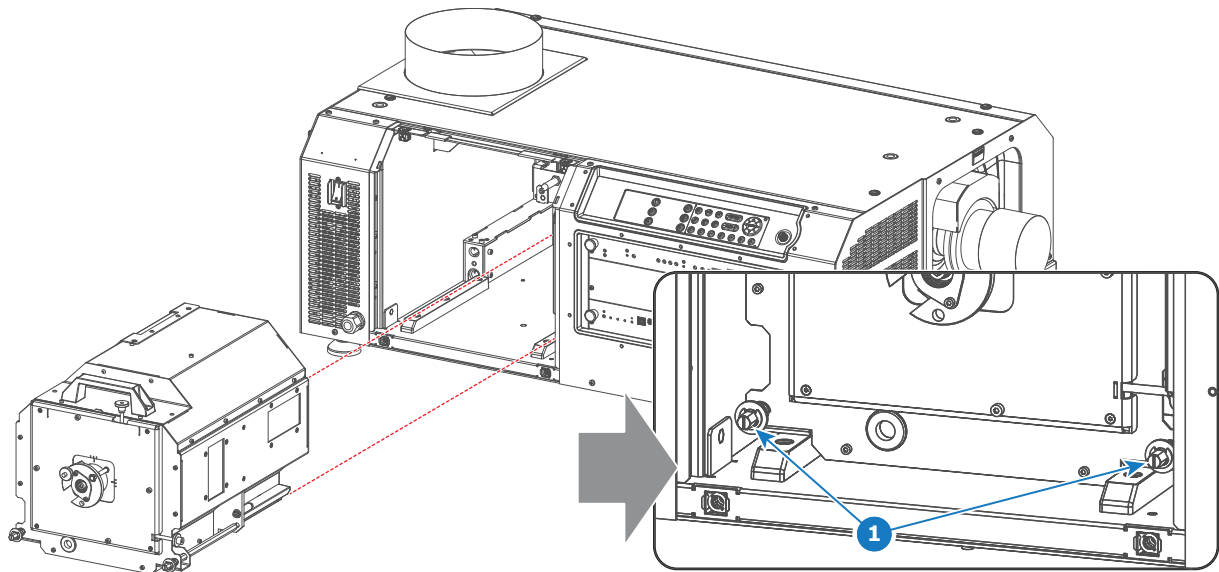
Image 13–14

13.5 Removal of the xenon lamp from the Lamp House

> ⚠️ **WARNING:** DO NOT PERMIT UNAUTHORIZED PERSONNEL TO PERFORM OR ATTEMPT ANY PHASE OF XENON LAMP HANDLING OR SERVICE. ONLY TRAINED AND QUALIFIED TECHNICAL SERVICE PERSONNEL ARE ALLOWED TO HANDLE THE XENON LAMP.

> ⚠️ **WARNING:** This procedure may only be performed by qualified technical service personnel.

> ⚠️ **CAUTION:** Xenon compact arc lamps are highly pressurized. When ignited, the normal operating temperature of the bulb increases the pressure to a level at which the bulb may explode if not handled in strict accordance to the manufacturer's instructions. The bulb is stable at room temperature, but may still explode if dropped or otherwise mishandled. Whenever the lamp house, containing a xenon lamp, has to be dismantled or whenever the protective container or cloth has to be removed from the xenon lamp, authorized protective clothing MUST be worn!

> ⚠️ **WARNING:** Always wear face protection (full face shield) when handling xenon lamps.

> ⚠️ **WARNING:** Always wear protective clothing (welder's jacket) when handling xenon lamps.

> ⚠️ **WARNING:** Always wear clean leather gloves with wrist protectors when handling xenon lamps.

Required tools

- 5mm Allen wrench.
- Lamp protective container or protective cloth with two binders.
- Flat blade screw driver.
- 2.5mm Allen wrench.
- 17mm open end wrench.
- 17mm nut driver.
- Welder's jacket (not included in the safety kit that Barco offers).
- Full face shield with neck protection.

•   Leather gloves with wrist protection.

How to remove the xenon lamp out of the Lamp House?

1. Remove the hexagon socket head cap screw (reference 1 Image 13–15) which fasten the cathode of the xenon lamp. Use a 5 mm Allen wrench. Do not release the cathode wire lug. The screw contains a spring washer and a plain washer (reference 2 & 3 Image 13–15).

> 📄 *Note:* The cathode wire remains in its position after the screw and two washers are removed.
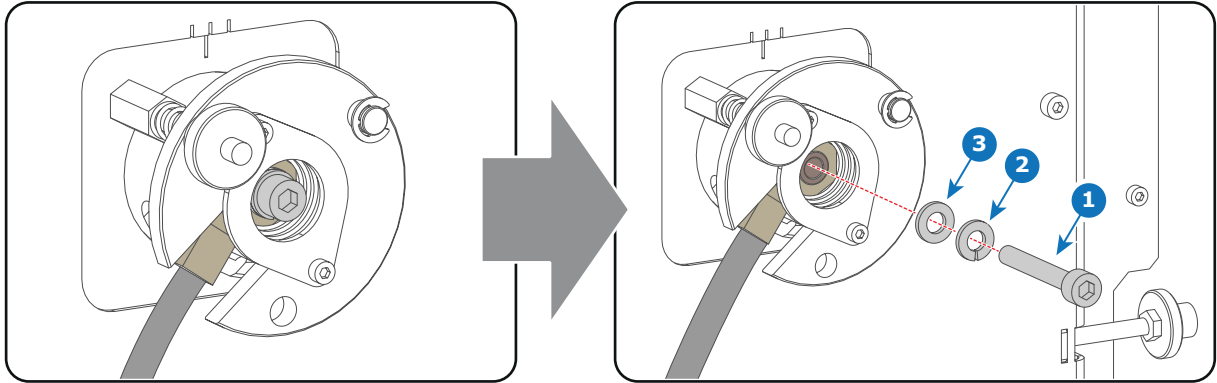
Image 13–15

2. Remove the side cover of the Lamp House by releasing the two quarter turn screws (reference 4 Image 13–16) of the side cover as illustrated.

> ⚠️ *Caution:* Ensure that you wear protective clothing, a full face shield and protective gloves.
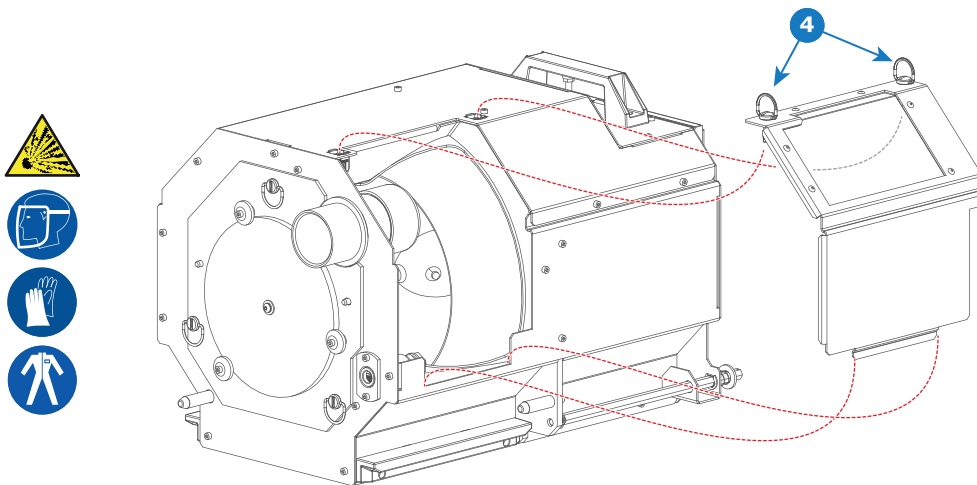
Image 13–16

3. Release the three quarter turn screws (reference 5 Image 13–17) of the UV blocker assembly as illustrated. Do not remove the UV blocker yet. Hold it in position!

> ⚠️ *Caution:* Ensure that the anode support remains in its position while releasing the screws as it serves to support the front end of the lamp.
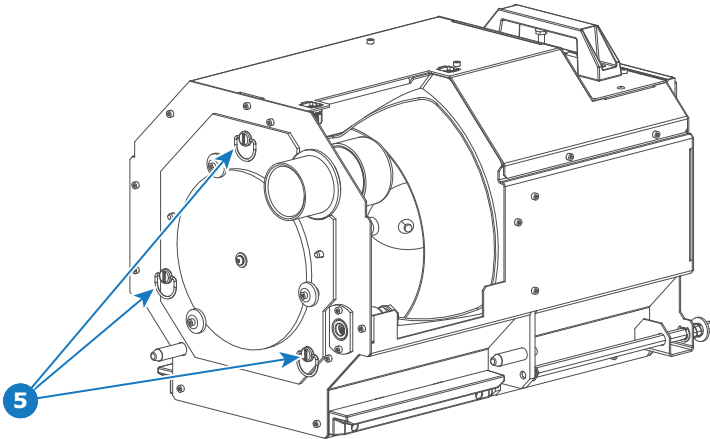
Image 13–17

4. Support the xenon lamp inside the Lamp House with one hand while removing the UV blocker assembly from the Lamp House. Take care not to damage the UV blocker.

⚠ *Warning:* Supporting the xenon lamp with one hand prevents the xenon lamp from dropping and colliding with the chassis of the Lamp House.
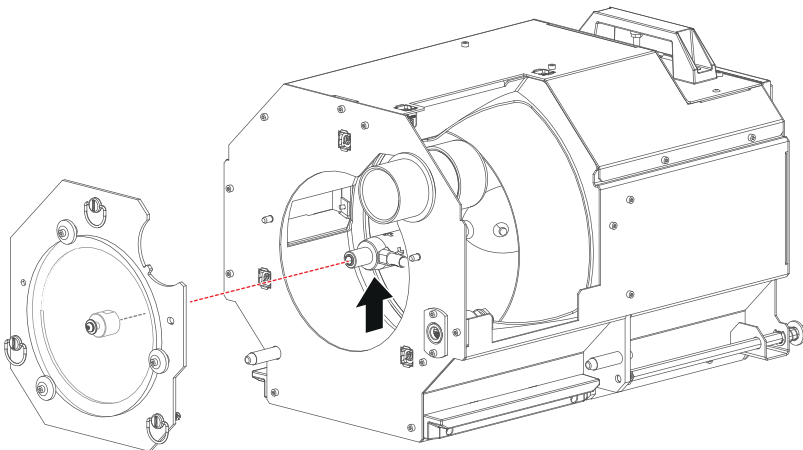
Image 13–18

5. Slide out the anode connector from the Lamp House. The anode connector remains attached with the lamp anode wire.
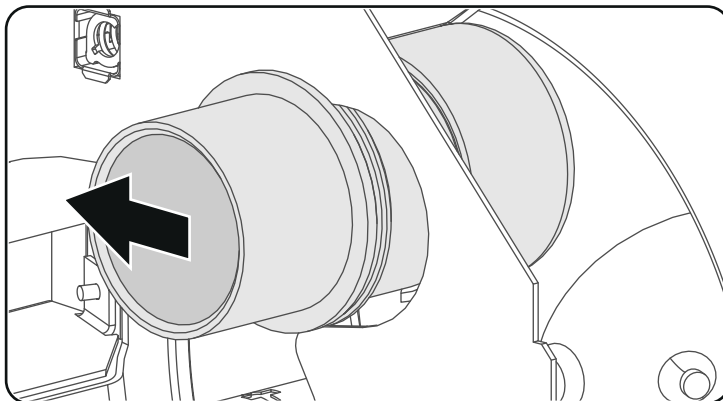
Image 13–19

6. Gently remove the xenon lamp together with the anode connector out of the Lamp House. Do not apply excessive force to the xenon lamp. The xenon lamp should easily slide out the cathode socket of the Lamp House.

⚠ *Warning:* Supporting the xenon lamp with one hand while pulling it out with other hand prevents it from bumping against the chassis of the Lamp House.
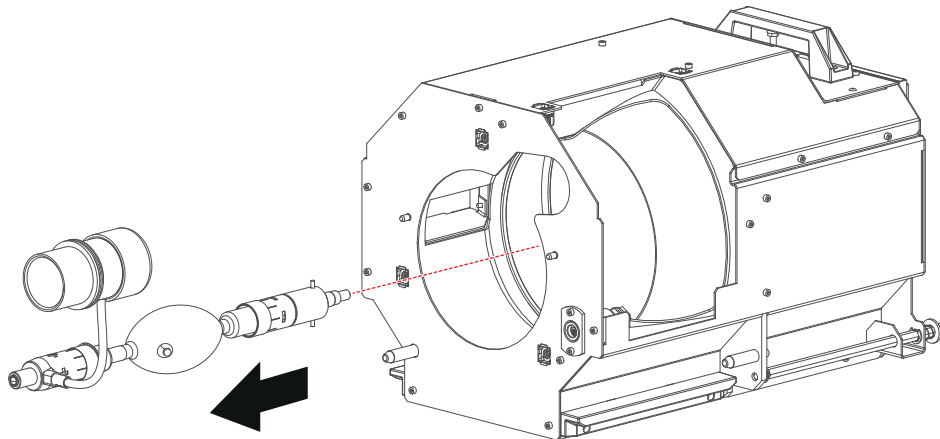
Image 13–20

7. Place the xenon lamp in its protective container or wrap the xenon lamp in a protective cloth and secure with two binders.
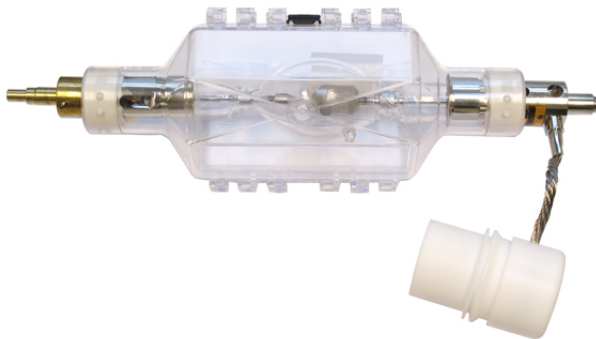
Image 13–21

8. Remove the protection cap from the anode connector.
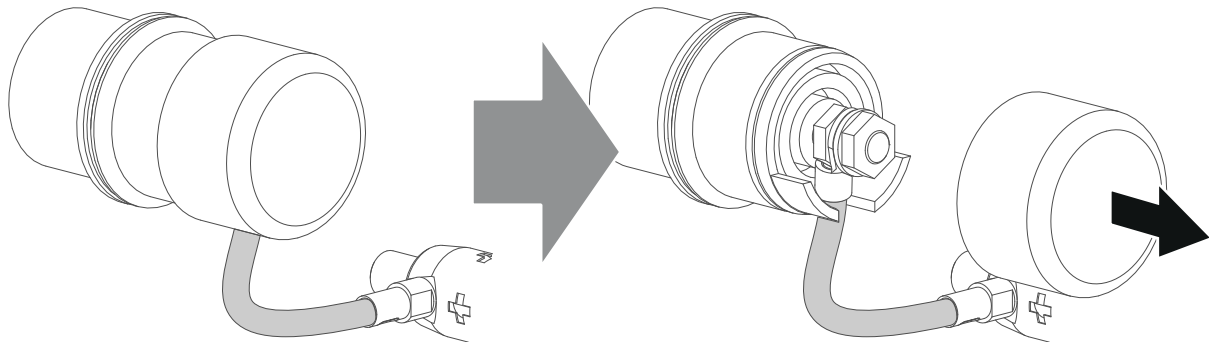
Image 13–22

9. Remove the anode wire lug from the anode connector. For this, use a 17mm open end wrench and a 17mm nut driver. Hold one nut (reference 6 Image 13–23) with the open end wrench while releasing the other nut (reference 9 Image 13–23) with the nut driver. Note that there is a plain washer (reference 8 Image 13–23) in front of the wire lug (reference 7 Image 13–23).

> *Tip:* To avoid losing the plain washer and bolt (reference 8 & 9 Image 13–23), place these back immediately after lug removal.
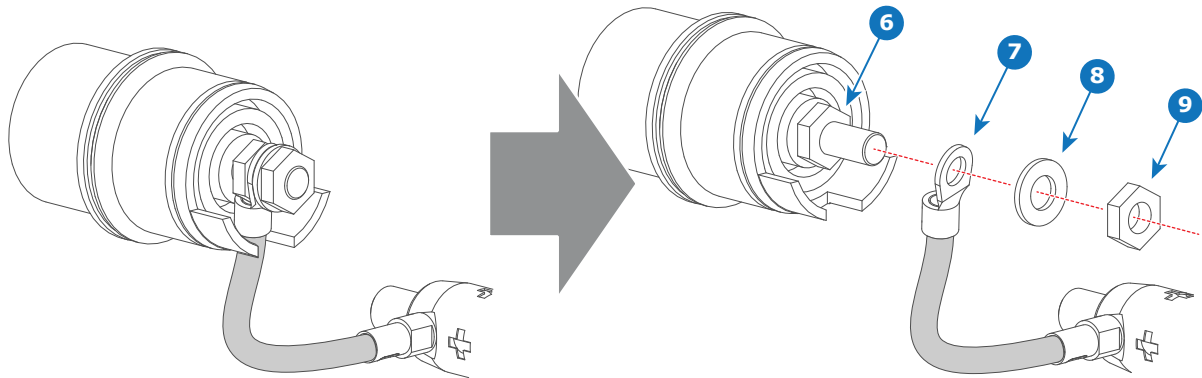
Image 13–23

10. Remove the cathode adapter from the xenon lamp by releasing the hexagon socket head cap screw (reference 10 Image 13–24) of the adapter as illustrated. Use a 5mm Allen wrench.

> 📄 *Note:* The xenon lamp has a cathode pin with screw thread (reference 11 Image 13–24).
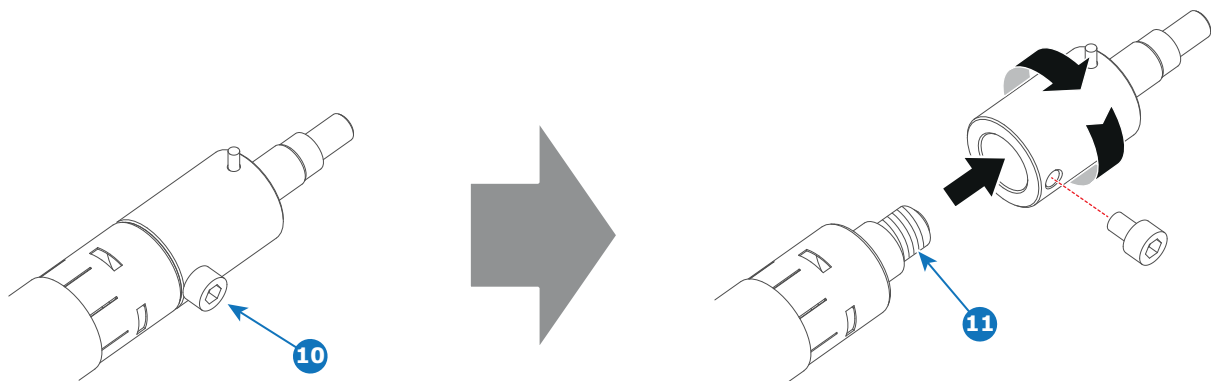
Image 13–24

> 📄 Reinstall the UV blocker assembly and the side cover in case you do not intend to install another xenon lamp immediately in the Lamp House.

> ⚠️ **CAUTION: Expired xenon lamps**.
> Dispose of expired bulbs that are beyond warranty according the national regulations. See also related user manual of the lamp supplier for more guidance.

> ☢️ **CAUTION:** Small amounts of radioactive material (< 1000 Bq per lamp) are deliberately added to Xenon lamps for functional reasons. These lamps are manufactured under regulatory control as consumer product according to IAEA basic safety standard BSS 115. Disposal according to national regulations is required e.g. in Europe covered by WEEE regulation. See also related user manual of the lamp supplier for more guidance.

> 📄 When returning a xenon lamp for warranty adjustment, pack it in its original shipping container. Complete and return all required warranty information.

13.6 Installation of the xenon lamp into the Lamp House

> ⚠️ **WARNING:** DO NOT PERMIT UNAUTHORIZED PERSONNEL TO PERFORM OR ATTEMPT ANY PHASE OF XENON LAMP HANDLING OR SERVICE. ONLY TRAINED AND QUALIFIED TECHNICAL SERVICE PERSONNEL ARE ALLOWED TO HANDLE THE XENON LAMP.

> ⚠ **WARNING:** This procedure may only be performed by qualified technical service personnel.

> ☢ **CAUTION:** Xenon compact arc lamps are highly pressurized. When ignited, the normal operating temperature of the bulb increases the pressure to a level at which the bulb may explode if not handled in strict accordance to the manufacturer's instructions. The bulb is stable at room temperature, but may still explode if dropped or otherwise mishandled. Whenever the lamp house, containing a xenon lamp, has to be dismantled or whenever the protective container or cloth has to be removed from the xenon lamp, authorized protective clothing MUST be worn!

> 🛡 **WARNING:** Always wear face protection (full face shield) when handling xenon lamps.

> 🛡 **WARNING:** Always wear protective clothing (welder's jacket) when handling xenon lamps.

> 🧤 **WARNING:** Always wear clean leather gloves with wrist protectors when handling xenon lamps.

> 📄 This procedure assumes that the UV blocker assembly and the side cover are already removed from the Lamp House due to the removal of the xenon lamp.

Required tools

- Torque Allen key.
- 17mm open-end wrench.
- Torque wrench with a 17mm hexagon socket.
- Torque wrench with a 5mm Allen socket.
- Welder's jacket (not included in the safety kit that Barco offers).
- Full face shield with neck protection.
- Leather gloves with wrist protection.

How to install the xenon lamp into the Lamp House?

1. Have you considered required maintenance actions?
   - ► If yes, proceed with this procedure.
   - ► If no, see chapter "Lamp change maintenance actions", page 147.

2. Install the lamp cathode adapter onto the cathode of the xenon lamp. Note that the xenon lamp has a threaded cathode pin (reference 11 Image 13–25). Tighten the adaptor by hand on the cathode pin. Make sure that there is full contact between the adapter flat surface and the lamp base (no air gap may be visible). Fasten the screw (reference 10Image 13–25) of the cathode adapter with a torque of **2.5Nm** (1.84 lbf*ft). Use a torque wrench with a 5mm Allen socket.

   > ⚠ *Caution:* Ensure that the adaptor is clean. Periodically clean the adapter. Remove oxide from adaptor with standard household metal polish (E.g. Brasso).

   > ⚠ *Warning:* Install the cathode adapter prior to removing the protective container or protective cloth from the xenon lamp.
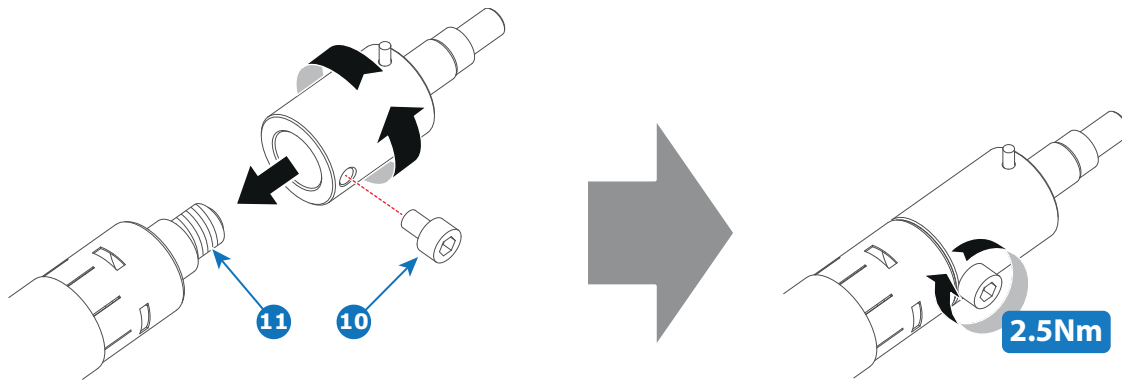
Image 13–25

3. Install the anode wire lug (reference 7 Image 13–26) onto the anode socket of the Lamp House as illustrated. Take care of wire orientation (must fit through slot of white Teflon part). Use an open-end wrench of 17 mm to hold the first nut (reference 6 Image 13–26) while fastening the second nut (reference 9 Image 13–26) with a torque of **9Nm** (6.64 lbf*ft) using a torque wrench. Ensure that there is a flat washer (reference 8 Image 13–26) between the second nut and f the wire lug (reference 7 Image 13–26).

⚠ *Warning:* A torque of **9Nm** (6.64 lbf*ft) must be applied to fasten the nuts. Make sure that there is no tension on the anode wire of the xenon lamp.

⚠ *Caution:* Do not tighten the first nut against the connector housing. There must be some play (1 mm maximum). This is important to insert the Lamp House smoothly into the projector

📄 *Note:* Alter tightening the two nuts, the connector should still be "floating".
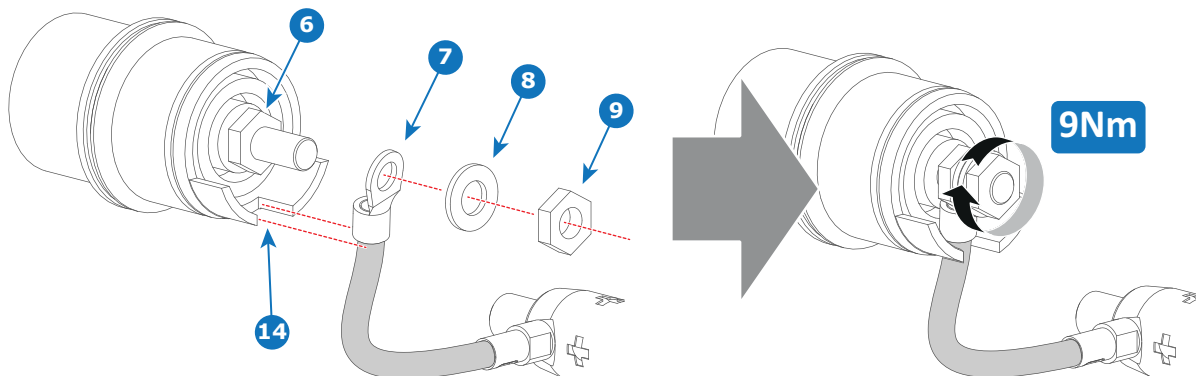
Image 13–26

☞ *Tip:* Write down the serial number of the xenon lamp. You will need this while updating the lamp parameters after installation of the xenon lamp. The serial number of the xenon lamp is engraved in the neck of the xenon lamp.

4. Click the protection cap onto the anode socket.

⚠ *Caution:* Ensure the cap is properly installed. It may not come loose from the socket.
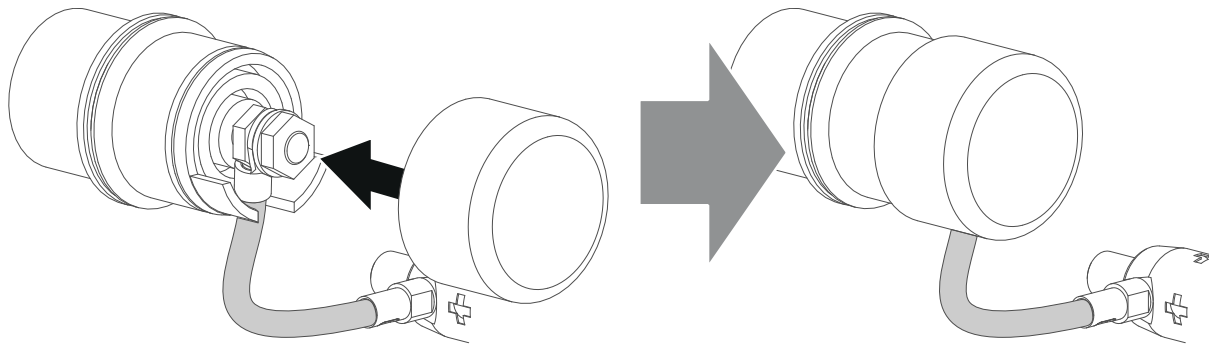
Image 13–27

5. Remove the protective packing from the xenon lamp and gently insert the xenon lamp (cathode first) into the Lamp House as illustrated. While inserting the lamp, rotate it slightly, **engaging the pins** (reference 11 Image 13–28) of the cathode adapter in the foreseen slots. This is to ensure the lamp cathode is completely inserted. Keep supporting the anode of the lamp with one hand once the xenon lamp is in position. It's important that the anode **cable is freely routed** as shown in the illustration.

> *Caution:* Ensure that you wear protective clothing, a full face shield and protective gloves.

> *Tip:* Retain the protective packaging for future use (you will need it when replacing the next lamp).
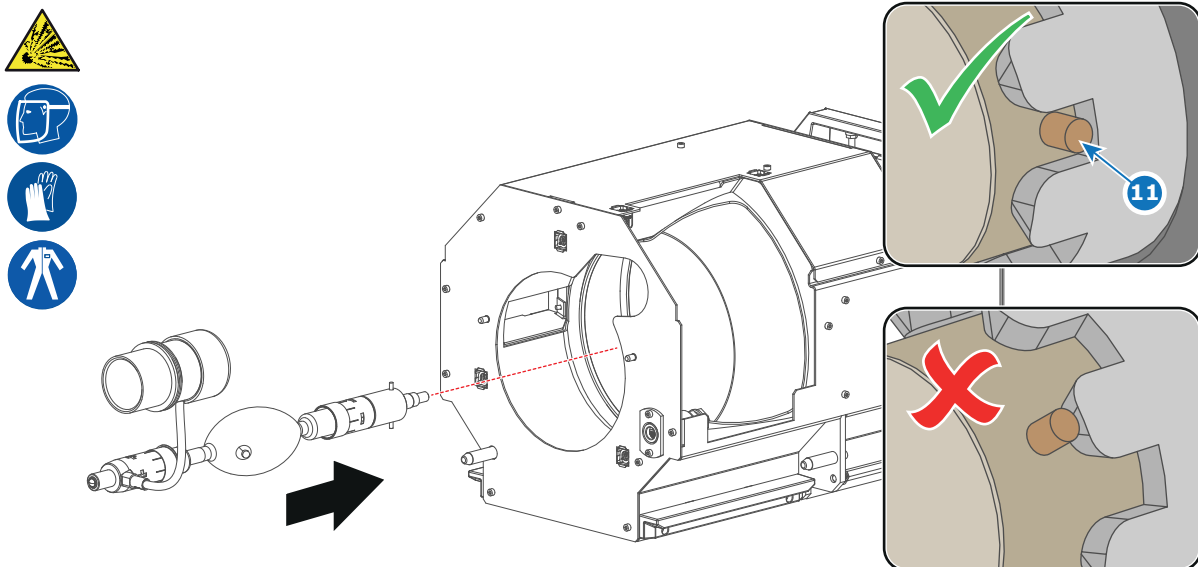
Image 13–28

6. Slide the anode connector into position on the Lamp House as illustrated.

> *Caution:* Avoid any tension on the anode wire, ensuring there is no mechanical stress on the lamp.
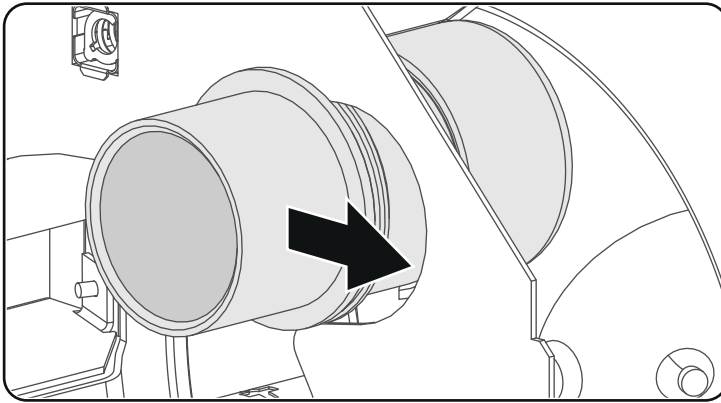
Image 13–29

7. Install the UV blocker assembly as illustrated. While supporting the lamp, via the Lamp House side opening, guide the UV blocker (with supporting mechanism) into position and engage it with the lamp.

Install the UV blocker assembly as illustrated. Use the opening at the side of the Lamp House to guide the anode pin of the xenon lamp into the anode supporting mechanism of the UV blocker.

📄 *Note:* Make sure that the notch (reference 12 of Image 13–30) of the UV blocker assembly matches with the gap (reference 12 of Image 13–30) of the anode connector.
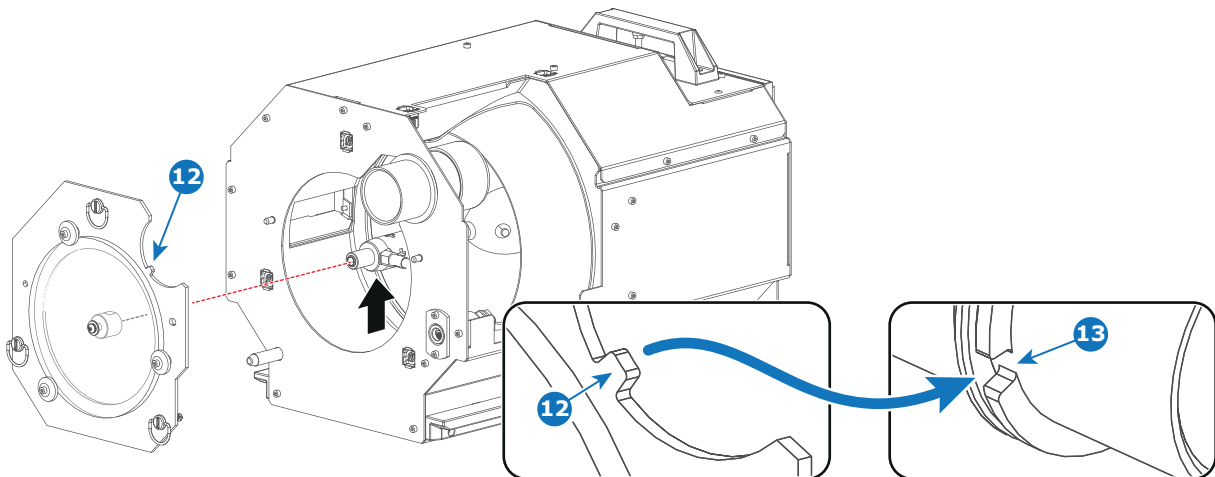
Image 13–30

8. Secure the UV blocker by fastening the three quarter turn screws (reference 5 Image 13–31) as illustrated.
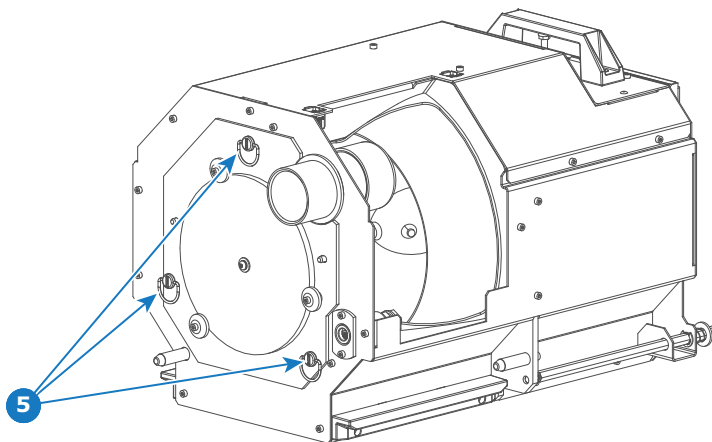
Image 13–31

9. Secure the xenon lamp cathode with the hexagon socket head cap screw (reference 1 Image 13–32), spring washer (reference 2 Image 13–32 and plain washer (reference 3 Image 13–32). Fasten the screw with a torque of **2.5Nm** (1.84 lbf*ft). Use a torque wrench with a 5 mm Allen socket.

⚠ *Caution:* Make sure that both pins (reference 11 Image 13–32) of the cathode adapter remain engaged in the foreseen slots.
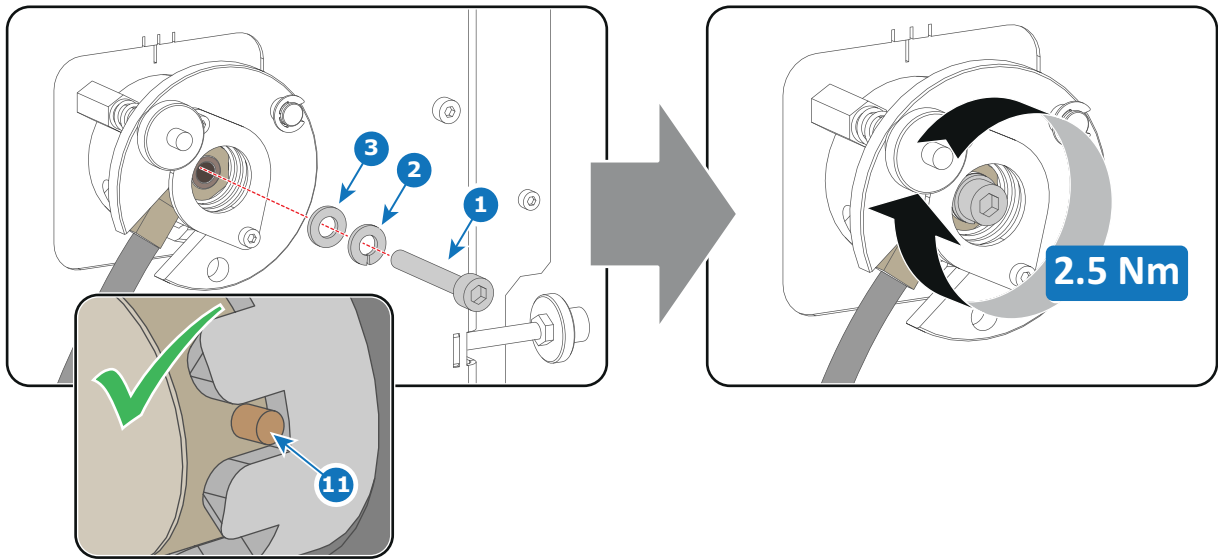
Image 13–32

10. Install the side cover of the Lamp House and fasten the two quarter turn screws (reference 4 Image 13–33) of the cover.

📄 *Note:* Ensure that the quarter turn screws turning wires are flush with the cover or interference will occur while inserting the Lamp House into the projector.
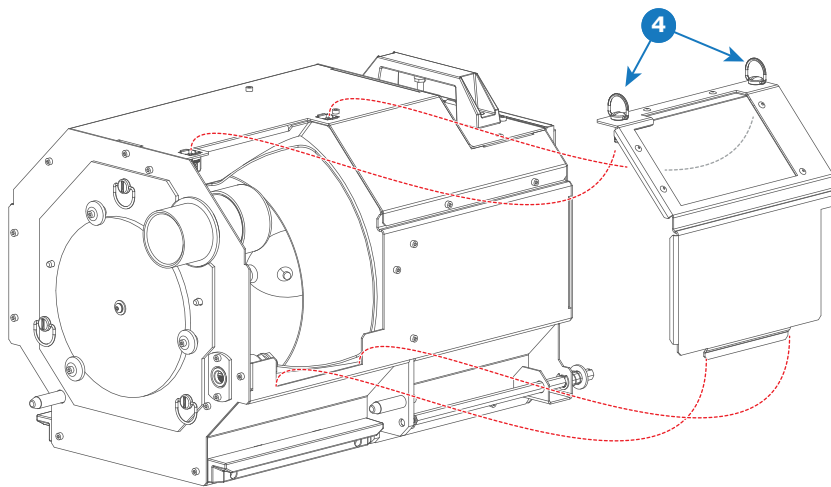
Image 13–33

⚠ **CAUTION:** The "LAMP INFO" parameters which are stored on the Cinema Controller board of the projector MUST be updated after each installation of an xenon lamp inside the Lamp House. Neglecting this update will result in poor performance and short life time of the xenon lamp.

📄 A realignment of the xenon lamp in its reflector is required after the installation of the xenon lamp in the Lamp House.

13.7 Installation of the Lamp House

⚠ **WARNING:** This procedure may only be performed by qualified technical service personnel.

> ⚠ **CAUTION:** Due to its high internal pressure, the lamp may explode in either hot or cold states if improperly handled.

Required tools

8mm nut driver or flat screw driver.

How to install the Lamp House in the projector?

1. Check if the five quarter turn screws turning wires (reference 1Image 13–34) are flush with the cover or interference will occur while inserting the Lamp House into the projector.
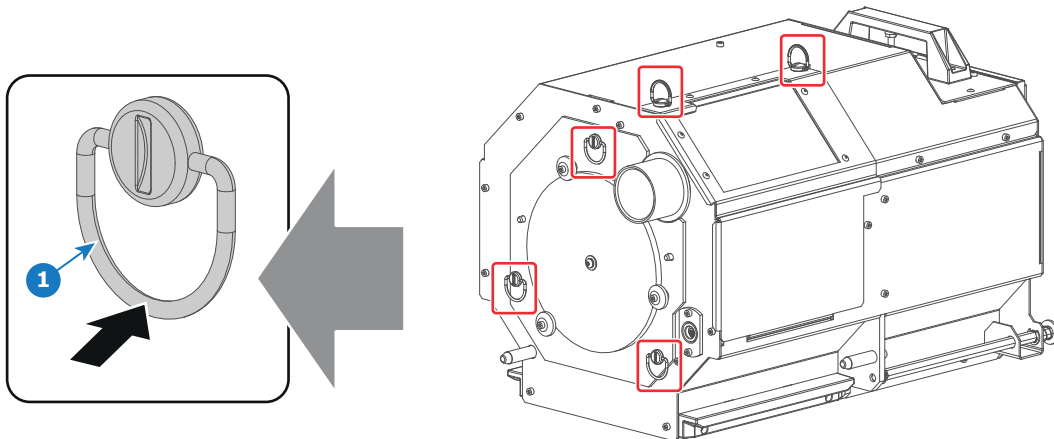
Image 13–34

2. Grip the Lamp House by the handle and place the front of the Lamp House onto the base plate guides inside the lamp compartment of the projector, lining up the pins of the Lamp House with the slots on the base.

3. Insert the Lamp House fully into the slots.

4. Secure the Lamp House by fastening the two retaining screws (reference 1 Image 13–35) at the base of the Lamp House. Use a 8mm nut driver or flat screw driver.

5. Reinstall the cover of the Lamp House compartment.
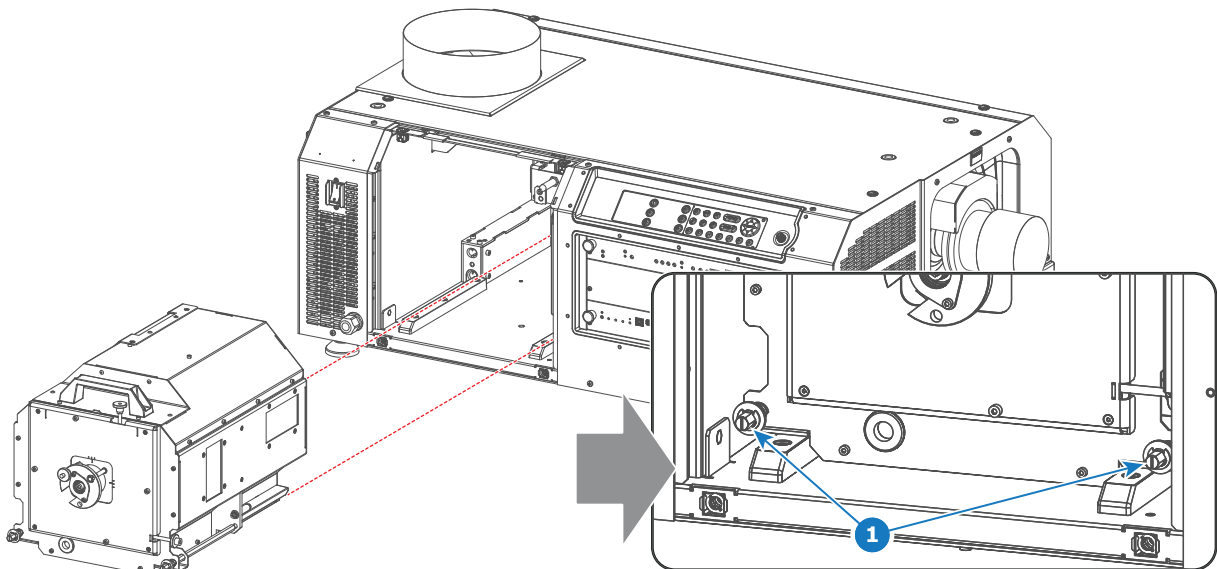
Image 13–35

13.8 Resetting the lamp parameters

⚠️ **CAUTION:** The "LAMP INFO" parameters MUST be updated after each installation of a xenon lamp inside the Lamp House. Neglecting this update will result in poor performance and short life time of the xenon lamp.

For a new lamp, how to reset the values

1. While the *Lamp information* window is displayed, click on **Change lamp** (1).
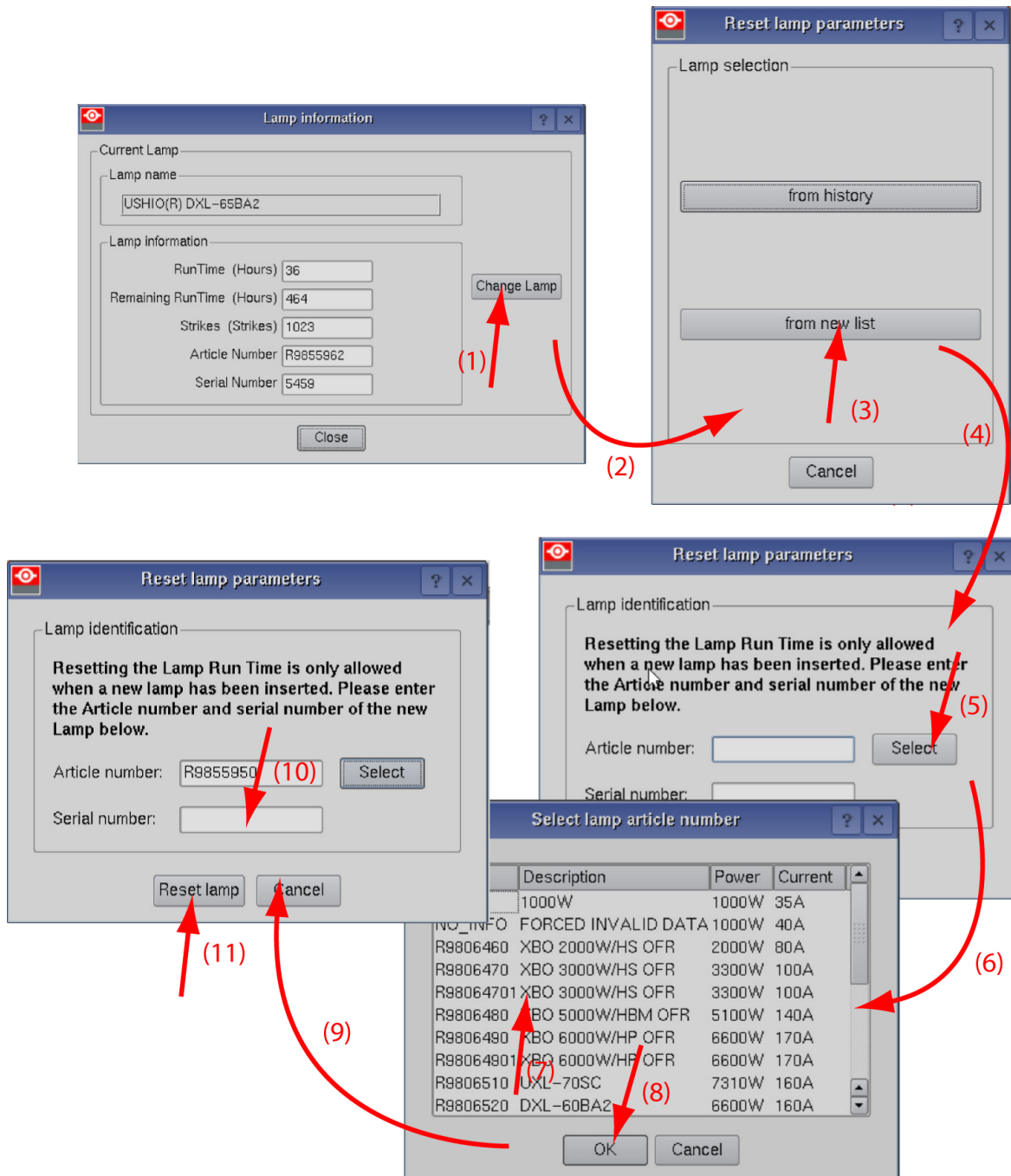
Image 13–36 Reset lamp info, new lamp

A Reset lamp parameters selection window opens (2).

2. To get new lamps, click on **From new list** (3).

The lamp article and serial number opens (4).

3. Fill out the article number of the new lamp (5a)

   or

   click on **Select** (5b) to display a list of possible article numbers (6). Select a article number (7) and click **OK** (8).

   The software will check if the entered article number is a valid number (9).

4. Fill out the serial number of the lamp (10).

5. Click **Reset lamp** (11).

For a used lamp, how to set back the original values

1. While the *Lamp information* window is displayed, click on **Change lamp** (1).
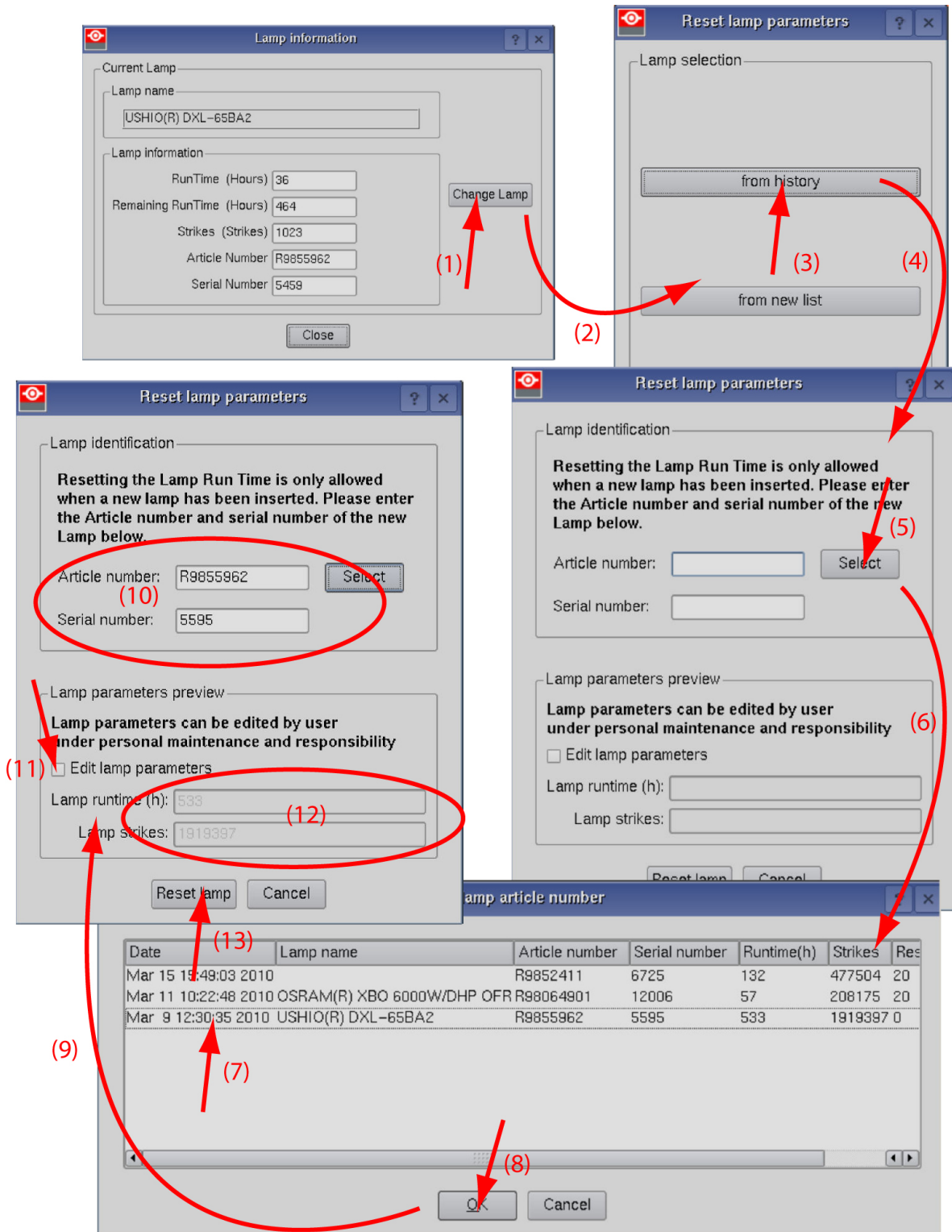
Image 13–37 Reset lamp info, used lamp

A *Reset lamp parameters* window opens (2).

2. To get history of the used lamps, click **from history** (3).

The Reset lamp history selection window opens (4).

3. Click on **Select** (5) to display a list of possible lamps (6).

4. Select the desired lamp (7) and click **OK** (8).

The article number and serial number of the selected lamp is added to the *Reset lamp parameters* window (10). The lamp run time and number of strikes of this lamp are added in *Lamp parameter preview* (12).

5. The lamp parameters can be edited by the user under personnel maintenance and responsibility. If you want to change these parameters, check the check box in front of *Edit lamp parameters* (11).

   The current parameter fields become active (12).

6. Click in an input field and change to the desired value.

7. Click **Reset lamp** (13).

13.9 Realignment of the lamp in its reflector

About lamp alignment

Due to ageing of the lamp, the light output will be reduced if no corrective actions are taken. To bring the light output again on its normal level, lamp alignment should be performed on a regular time. Also when the lamp is replaced physically the alignment procedure has to be done. Normal Z-axis alignment is enough to bring the light output again on its normal level. But sometimes, alignment of the other axes are also necessary to reach the maximum light output. These alignments are done manually on the Lamp House itself.

What is required?

The arc of the xenon lamp must be placed in the focal point of the Reflector for maximum light output.
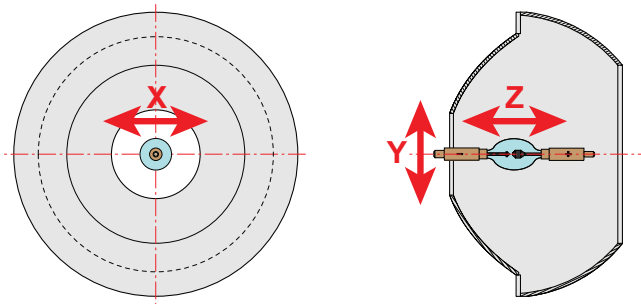
Image 13–38

> Each xenon lamp installation requires a realignment of the lamp in its reflector for optimal performance of the xenon lamp. Furthermore, it is recommended to realign the lamp after the first run time of 100 and 200 hours. Especially the Z-axis of the lamp.

> ⚠ **WARNING:** This procedure may only be performed by qualified technical service personnel.

Required tools

Communicator

How to realign the lamp in its reflector?

1. Remove the cover of the lamp compartment to gain access to the X-, Y-, and Z-axis adjustment thumbscrews of the lamp.

2. Switch on the projector and start up the lamp.

3. Via the Communicator go to the menu *Installation > Lamp > Light alignment*.

   Note: This window on the Communicator shows the measured value of the built-in light sensor of the projector. For purposes of finding the maximum light output, a non calibrated readout serves the purpose. For correct readout levels (fL) refer to the user guide of the Communicator to learn about system calibration.
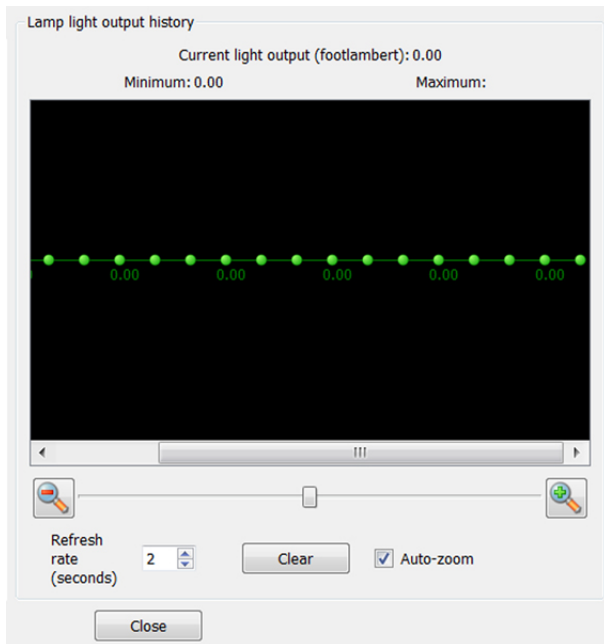
Image 13–39

4. Adjust the X-axis (ref X Image 13–40), the Y-axis (ref Y Image 13–40) and the Z-axis (ref Z Image 13–40) for maximum current light output (Footlambert Measured). Carefully turn the thumbscrew for maximum light output. Once over the maximum, turn slightly in opposite direction to reach the maximum light output again. Do this for each direction and repeat this adjustment cycle twice.
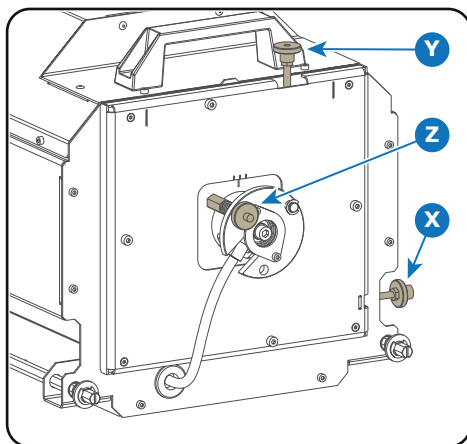
Image 13–40

5. Switch off the projector.

6. Reinstall the cover of the lamp compartment.

Preventative maintenance actions

14

Maintenance program

The maintenance program is subdivided in time frames. The maintenance actions described in this chapter can be done by a trained projectionist. Note that there are also annually and 4 yearly maintenance actions (not included in this manual) which must be done by certified service personnel who are familiar with potential hazards of the product and all product safety checks. Contact your service partner for more information about maintenance services.

14.1 1 month maintenance actions

MAINTENANCE TYPE A (perform every month)

> The 1 month maintenance actions, listed below, may be performed by a trained projectionist who is familiar with potential hazards associated with the product.

No.	Maintenance action	Remarks
1	**Check** both dust **filters** of the projector for **dust** and **grease**. Grease on the filter can build up after several months in an environment contaminated with greasy air. Note that areas where popcorn is consumed are subject to greasy air. • If the filters are contaminated with **dust** than cleaning the filters with a **vacuum cleaner** should be sufficient. • In case the filters feel **greasy** than the filters must be **washed**. Take into account that the time needed to dry the dust filters may be 24 hours or more. For that, it's recommended to have a second set of dust filters which can be used while cleaning the first set.	Replace damaged filters immediately. See procedures "Check the large dust filter", page 150, and "Check the small dust filter", page 151. To speed-up drying, allow the filter(s) to dry at 50°C max in a well ventilated room.
2	Check the surface of the lens output side for dust. (it is not needed to remove the lens from the projector). Only clean if necessary.	Clean the lens output side in case dust is clearly visible upon the surface. **Note:** if the lens was removed from the projector, a manual "Lens Home & Return" action must be executed to calibrate the position of the lens in relation to the Lens Holder. This way the references of the existing 'lens files' remain valid. See user guide of the Communicator software.
3	Check the porthole (both sides) for dust.	Clean the porthole in case dust is clearly visible upon the surface. Use an optical cloth.

14.2 3 month maintenance actions

MAINTENANCE TYPE B (perform every three months)

> The 3 month maintenance actions, listed below, may be performed by a trained projectionist who is familiar with potential hazards associated with the product.

No.	Maintenance action	Remarks
1	Clean the back/side air inlet vents of the Lamp Power Supply (LPS).	Use a vacuum cleaner.
2	Clean the housing of your projector.	Removal overall dust accumulation on projector covers. See cleaning instructions in this manual.
3	Verify the internal clock of the ICMP with real time clock. Correct if needed.	ICMP version 1.2.1 is required. Communicator version 5.0 is required. See user guide of Communicator for detailed instructions.

14.3 Lamp change maintenance actions

Maintenance actions at every lamp change

> The maintenance actions, listed below, which are required at every lamp change may be performed by a trained projectionist who is familiar with potential hazards associated with the xenon lamp.

No.	Maintenance action	Remarks
1	Check the UV blocker of the Lamp House for dust.	Only clean the UV blocker in case dust is clearly visible upon the surface of the UV blocker (both sides). Use an optical cloth.
2	Check the Reflector of the Lamp House for dust.	Only clean the Reflector in case dust is clearly visible upon the surface of the Reflector. Take the Lamp House to another room and use compressed air to blow away the dust. Use an optical cloth to remove the remaining dust.
3	Visual inspection of the lamp anode and cathode Igniter (SPG) connectors of the Lamp House.	Replace the Lamp House in case of degradation, damage, etc.
4	Visual inspection of the lamp anode and cathode cables of the Lamp House.	Replace the Lamp House in case of degradation, damage, etc.

Maintenance procedures

15

> ⚠ **WARNING:** All procedures described in this chapter may only be performed by TRAINED PROJECTIONISTS or qualified SERVICE PERSONNEL.

About this chapter

This chapter describes several maintenance procedures for your DP2K-S series projector.

15.1 Check the large dust filter

Required tools

7mm flat screwdriver.

How to check the large dust filter?

1. Loosen the two captive screws (reference 1 Image 15–1) of the large dust filter assembly using a 7mm flat screwdriver.

2. Remove the dust filter assembly from the projector by pivoting the assembly away from the projector as illustrated. Note that the other side of the assembly contains two mounting lips (reference 2 Image 15–1) which are engaged in the projector chassis.
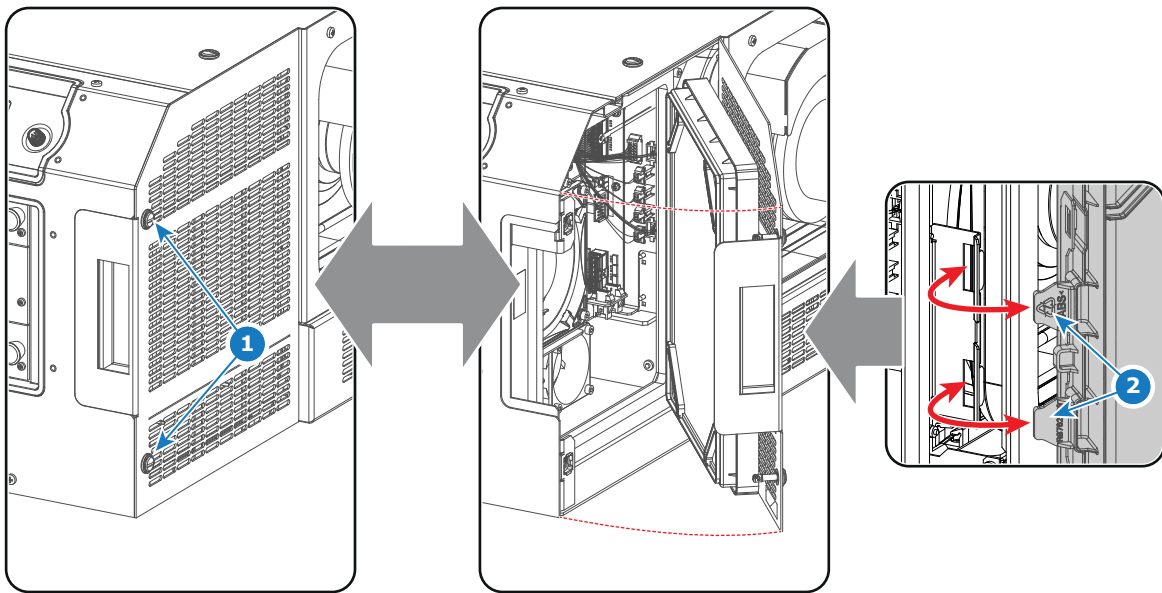
Image 15–1

3. Detach the dust filter from the cover plate. Do this by pushing the two latches (reference 3 Image 15–2) of the dust filter inwards.

4. **Check** the "air in" side of the dust filter for **dust** and/or **grease**.

   In case the filter is contaminated with grease wash and dry the dust filter. See cleaning procedure "Washing and drying the dust filters", page 154.

   In case the filter contains dust but doesn't feel greasy then vacuum clean the dust filter. See procedure "Vacuum cleaning of the dust filters", page 153.

   > *Note:* Grease on the filter can build up after several months in an environment contaminated with greasy air. Note that areas where popcorn is consumed are subject to greasy air.

   > *Tip:* Take into account that the time needed to dry the dust filters may be 24 hours or more. For that, it's recommended to have a second set of dust filters which can be used while cleaning the first set.

5. Attach a clean dust filter to the cover plate. Ensure that both latches and both mounting lips (reference 4 Image 15–2) of the dust filter are engaged.

   > *Caution:* UNDER NO CIRCUMSTANCES SHOULD WET FILTERS BE INSTALLED BACK INTO THE PROJECTOR. THIS CAN HAVE SERIOUS SAFETY CONSEQUENCES AS WELL AS JEOPARDIZE THE INTERNAL OPTICS OF THE SYSTEM.
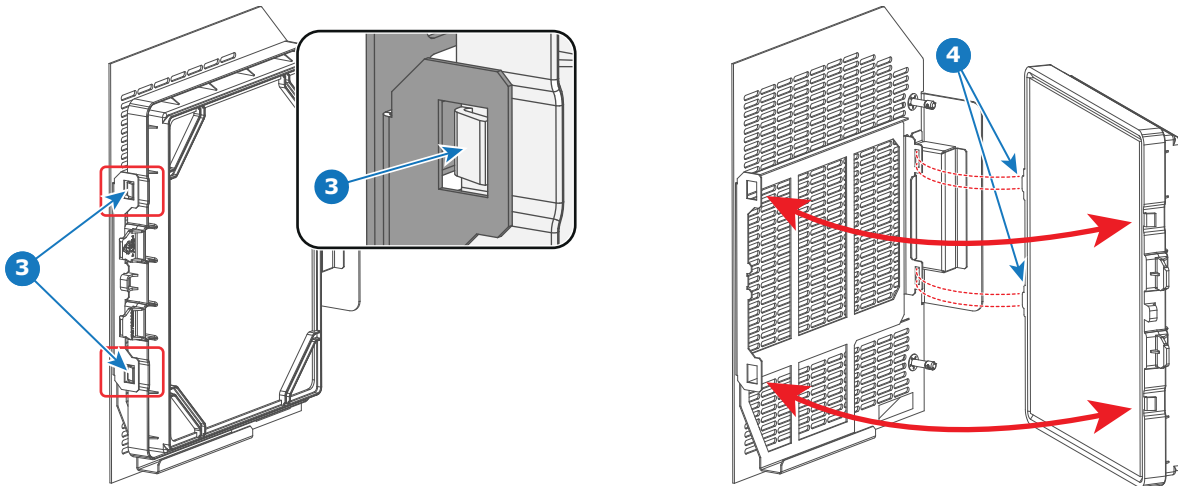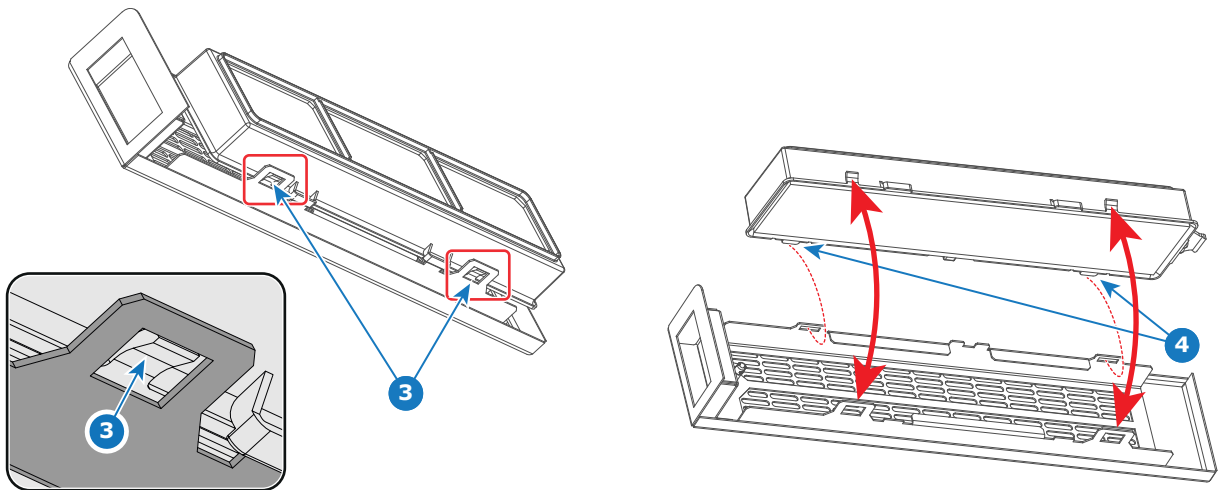
Image 15–2

6. Install the dust filter assembly back at the front side of the projector. Use a 7mm flat screwdriver to fasten the two captive screws. Ensure that the two mounting lips (reference 2 Image 15–1) of the assembly are engaged in the projector chassis.

> ☞ The dust filter is cleanable. See cleaning procedure for correct cleaning and drying instructions.

15.2 Check the small dust filter

Required tools

7mm flat screwdriver.

How to check the small dust filter?

1. Loosen the captive screw (reference 1 Image 15–3) of the small dust filter assembly using a 7mm flat screwdriver.

2. Remove the dust filter assembly from the projector by pivoting the assembly away from the projector as illustrated. Note that the other side of the assembly contains a mounting lip (reference 2 Image 15–3) which is engaged in the projector chassis.
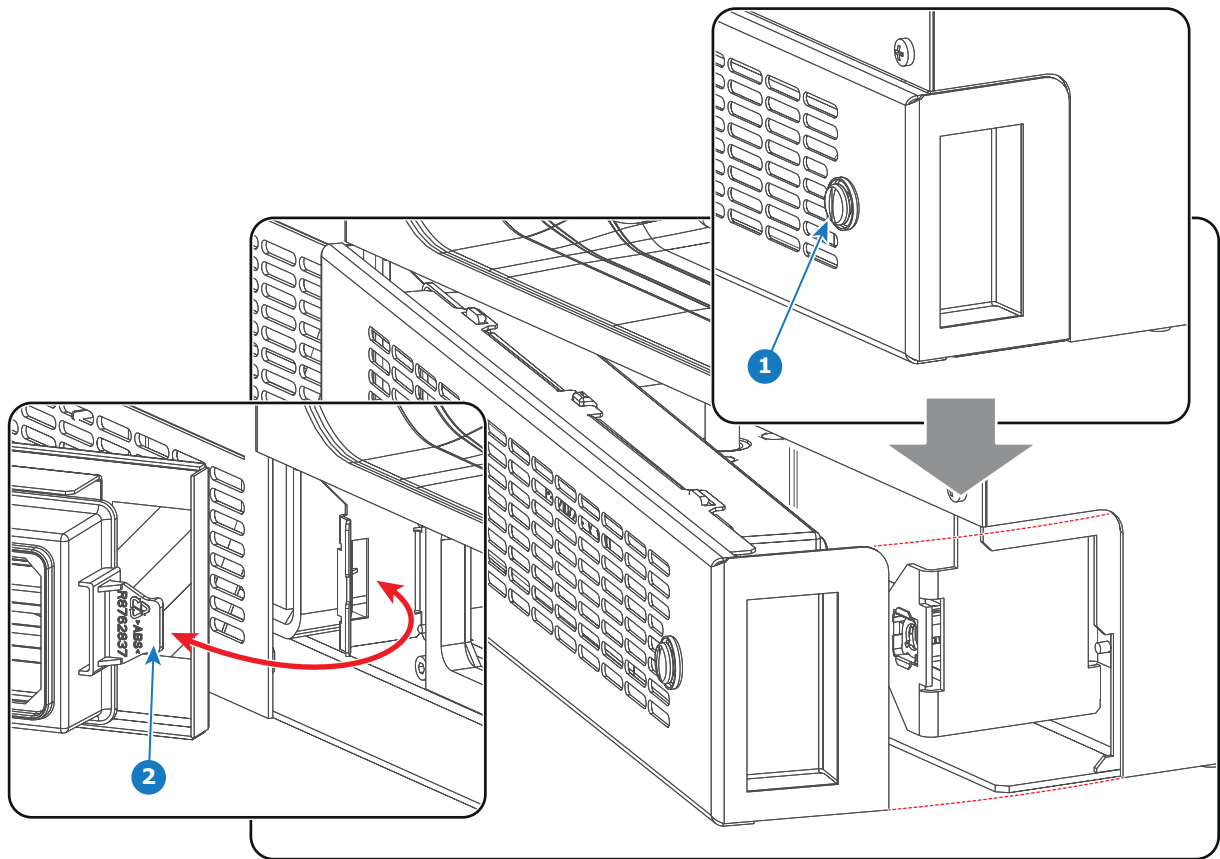
Image 15–3

3. Detach the dust filter from the cover plate. Do this by pushing the two latches (reference 3 Image 15–4) of the dust filter inwards.

4. **Check** the "air in" side of the dust filter for **dust** and/or **grease**.

In case the filter is contaminated with grease wash and dry the dust filter. See cleaning procedure "Washing and drying the dust filters", page 154.

In case the filter contains dust but doesn't feel greasy then vacuum clean the dust filter. See procedure "Vacuum cleaning of the dust filters", page 153.

> *Note:* Grease on the filter can build up after several months in an environment contaminated with greasy air. Note that areas where popcorn is consumed are subject to greasy air.

> *Tip:* Take into account that the time needed to dry the dust filters may be 24 hours or more. For that, it's recommended to have a second set of dust filters which can be used while cleaning the first set.

5. Attach a clean dust filter to the cover plate. Ensure that both latches (reference 4 Image 15–4) of the dust filter are engaged.

> *Caution:* UNDER NO CIRCUMSTANCES SHOULD WET FILTERS BE INSTALLED BACK INTO THE PROJECTOR. THIS CAN HAVE SERIOUS SAFETY CONSEQUENCES AS WELL AS JEOPARDIZE THE INTERNAL OPTICS OF THE SYSTEM.

Image 15–4

6. Install the dust filter assembly back at the front side of the projector. Use a 7mm flat screwdriver to fasten the captive screw.

> 👉 The dust filter is cleanable. See cleaning procedure for correct cleaning and drying instructions.

15.3 Vacuum cleaning of the dust filters

When to vacuum clean the dust filters?

The dust filters should be checked every month. If the filters are contaminated with dust then cleaning the filters with a vacuum cleaner should be sufficient. In case the filters feel greasy these must be washed. See cleaning procedure "Washing and drying the dust filters", page 154.

> 📄 Grease on the filter can build up after several months in an environment contaminated with greasy air. Note that areas where popcorn is consumed are subject to greasy air.

> 📄 This procedure assumes that the dust filters are removed from their slots.

Required tools

Vacuum cleaner with soft brush suction nuzzle.

How to vacuum-clean the dust filter?

1. Carefully vacuum the air inlet side of the dust filter. Use a vacuum cleaner with a soft brush suction nuzzle. The air inlet side of the dust filter is the side which is surrounded with a glue edge.

> 👉 *Tip:* Lightly tap the filter on its dusty side to expel heavy dust contamination.

> 👉 *Tip:* Compressed air is also permitted to clean the filters but take care not to damage them.

> ⚠️ *Caution:* Do not damage the dust filter. Replace damaged dust filters immediately.

15.4 Washing and drying the dust filters

About filter washing and drying

For environments where popcorn grease and such can contaminate the filters, Barco advises the client to purchase one extra set of filters to cover drying time, as well as taking following extra precautions and instructions pertaining to filter cleaning and drying.

Cleansing agent

To clean sticky, greasy dust filters we suggest usage of **Sodium carbonate** crystals (Na_2CO_3). Sodium carbonate (Often called **washing soda**, **soda crystals**, or **sal soda** in the detergent section of stores) is widely used to effectively remove oil, grease, alcohol stains … The product itself is relatively safe, sodium carbonate is used in toothpastes and as a food additive (E500). Potential Hazards are described in the section "Safety precautions Hazardous Chemicals", page 20.
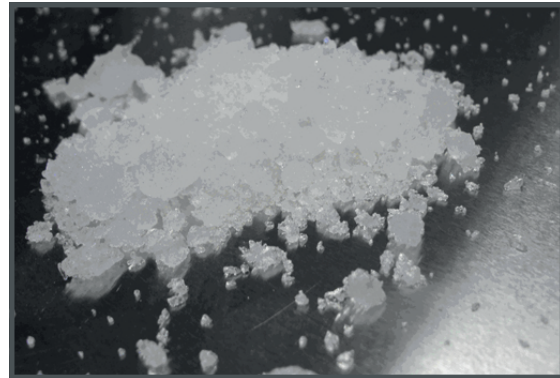
Image 15–5 Sodium carbonate crystals.

> This cleaning procedure assumes that the filters are already removed from their slots.

> Take into account that the time needed to dry the dust filters may be 24 hours or more. For that, it's recommended to have a second set of dust filters which can be used while cleaning the first set.

Required tools

• Bucket with hot water
• Sodium carbonate, 30 gram (handful) per liter hot water

How to wash and dry the dust filters?

1. Make a solution with a ratio of 30 gram (a handful) sodium carbonate to 1 liter **hot water**.

2. Soak the dust filters in the solution for **30 to 60 minutes**. The grease should be dissolved after 1 hour.

3. If the dust filter is still clogged repeat this procedure from step 1.

4. Rinse the dust filters with clean water to flush all grease residue away.

5. Shake out all excess liquid by repeatedly swinging the filter to-and-fro in a centrifugal action.

6. Then allow the filters to **dry thoroughly**.

   Note: Drying time of the dust filters can be up to 24h or more. Drying time can be shorter when being done in a well-ventilated area.

   Tip: To speed-up drying, allow the filter(s) to dry at 50°C max in a well ventilated room.

> ⚠️ **CAUTION:** UNDER NO CIRCUMSTANCES SHOULD WET FILTERS BE INSTALLED BACK INTO THE PROJECTOR. THIS CAN HAVE SERIOUS SAFETY CONSEQUENCES AS WELL AS JEOPARDIZE THE INTERNAL OPTICS OF THE SYSTEM.

> ⚠️ **CAUTION:** Do not install/use damaged dust filters. Replace damaged dust filters immediately with new dust filters of the same type. See *https://my.barco.com* for the correct replacement part.

15.5 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.

Required tools

- Compressed air
- Clean micro fiber lens cleaning cloth (e.g. Toraysee® cloth(s))
- Clean cotton cloth
- Lens cleaner (e.g. ZEISS lens cleaner, Purosol™ or other water based lens cleaner products)

How to clean the lens?

1. Blow off dust with clean compressed air (or pressurized air cans[6]) .

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.

15.6 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.

15.7 Cleaning the UV blocker of the Lamp House

When cleaning the UV blocker?

Clean UV blocker on regular basis to maintain light output level.

> 📄 This procedure requires that the UV blocker is removed from the Lamp House.

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

Required tools

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

Required parts

Lens cleaner (e.g. Carl Zeiss lens cleaner or Purasol® or any waterbased lens cleaner)

How to clean the UV blocker of the Lamp House?

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

2. Clean with lens cleaner together with a clean lens cleaning cloth to remove the dust and contamination. Use big wipes.

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.

> ⚠ **CAUTION:** Never reinstall a UV blocker which is cracked or has a damaged coating. Neglecting this will result in irreversible damage of optical parts in the projector.

15.8 Cleaning the Reflector of the Lamp House

When cleaning the Reflector?

Clean the Reflector on a regular basis to maintain light output level.

> 📄 This procedure requires that the lamp is removed from the Lamp House.

Required tools

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

Required parts

Lens cleaner (e.g. Carl Zeiss lens cleaner or Purasol® or any waterbased lens cleaner)

How to clean the Reflector of the Lamp House?

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

2. Clean with lens cleaner together with a clean lens cleaning cloth to remove the dust and contamination. Use big wipes.

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.

> ⚠ **CAUTION:** Never use a Lamp House with cracked or damaged Reflector. Neglecting this may result in irreversible damage of the projector.

15.9 Authorization to clear security warning on the projector

When is an authorization required to clear the security warning?

If a module has been removed or if the sealed compartment has been opened, an authorization will be required to clear the security warning.

Required tools

Authorization pin code.

Authorization procedure to clear security warning

1. Ensure that all modules are properly installed.

2. Start up the projector (Standby mode).

3. Initiate authorization by pushing the Key button on the Local Keypad:

   The color of the backlight of the Numeric keys 1 to 6 of the Local Keypad changes from blue to yellow.

4. Enter pin code within 5 seconds.
   - In case no keys are pressed, the color of the backlight of the Numeric keys 1 to 6 changes back to blue.
   - In case of an **incorrect code** entry, the color of the backlight of the Numeric keys changes to **red** for 1 second and then back to **blue**.
   - In case of a **correct code** entry, the color of the backlight of the Numeric keys 1 to 6 changes to **green** for 1 second and then back to **blue**.

   Each attempt to clear the security warning and its result (successfully or unsuccessfully) is logged inside the projector.

Removal and installation of the projector covers

16

About this chapter

Most installation, maintenance and service procedures demand removing one or more of the projector covers to gain access to the parts to maintain or to service. To avoid redundancy, all procedures about cover removing or installing are grouped together in this chapter. The maintenance and servicing procedures also refer to this chapter if required. The procedures in this chapter describe, with detailed step by step actions and illustrations, how to remove or install the projector covers. Note that the covers may only be removed by qualified service personnel.

> ⚠️ **WARNING:** All procedures described in this chapter may only be performed by TRAINED PROJECTIONISTS or qualified SERVICE PERSONNEL.

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

16.1 Removal of the Lamp House cover

> ⚡ **WARNING:** Switch off the projector prior to start with this procedure, unless otherwise specified in the procedure.

Required tools

7mm flat screwdriver.

How to remove the Lamp House cover?

1. Loosen the four captive screws (reference 1 Image 16–1) of the Lamp House cover using a 7mm flat screwdriver.

2. Remove the Lamp House cover from the projector.
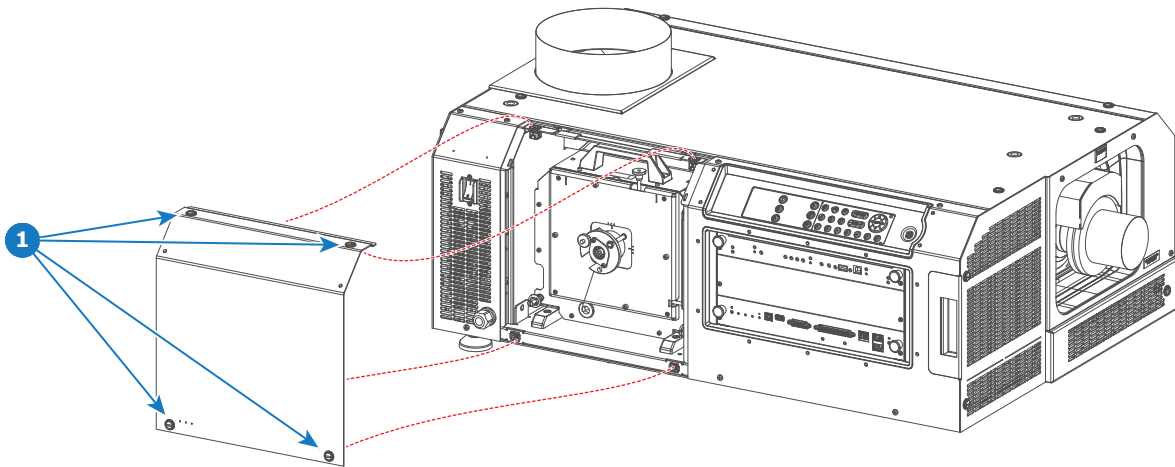
Image 16–1

16.2 Removal of the rear cover

> ⚡ **WARNING:** Switch off the projector prior to start with this procedure, unless otherwise specified in the procedure.

Required tools

7mm flat screwdriver.

How to remove the rear cover?

1. Loosen the four captive screws (reference 1 Image 16–2) of the rear cover using a 7mm flat screwdriver.

2. Remove the rear cover from the projector.
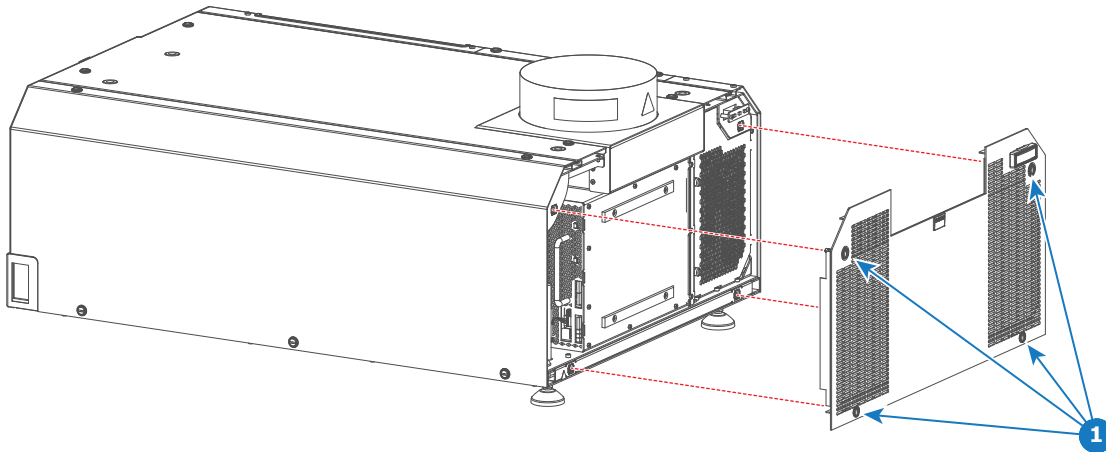
Image 16–2

16.3 Removal of the top cover

⚡ **WARNING:** Switch off the projector prior to start with this procedure, unless otherwise specified in the procedure.

📄 To remove the top cover from the projector the Communicator Touch Panel must be removed first if installed on top of the projector. This procedure assumes that the Communicator Touch Panel is not installed on top of the projector.

Required tools

7mm flat screwdriver.

How to remove the top cover?

1. Loosen the four captive screws (reference 1 Image 16–3) of the top cover using a 7mm flat screwdriver.

2. Remove the top cover from the projector.
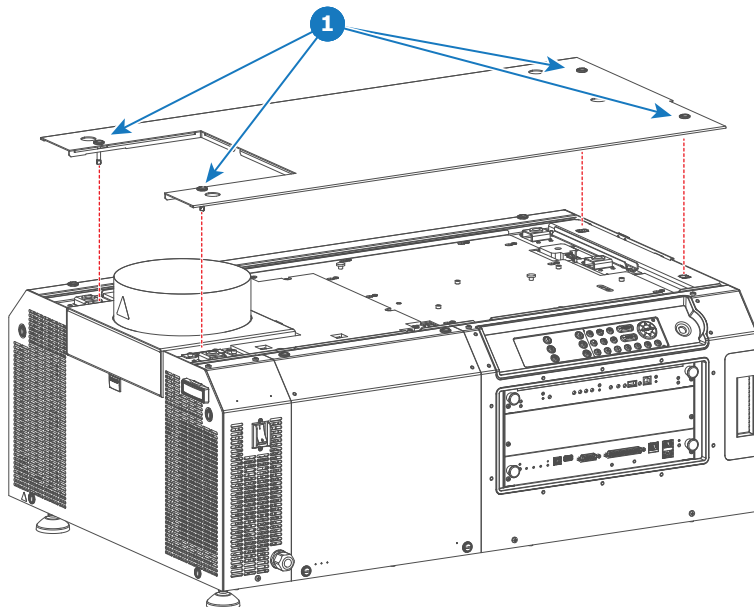
Image 16–3

16.4 Removal of the left side cover

> ⚡ **WARNING:** Switch off the projector prior to starting with this procedure, unless otherwise specified in the procedure.

Required tools

7mm flat screwdriver.

How to remove the left side cover?

1. Release the small dust filter assembly from the front side of the projector. Use 7mm flat screw driver to loosen the captive screw (reference 1 Image 16–4) of the small dust filter assembly.

   📄 *Note:* The left side cover is partial captured by the sheet metal of the small filter assembly. For that, this filter has to be (partially) removed first.
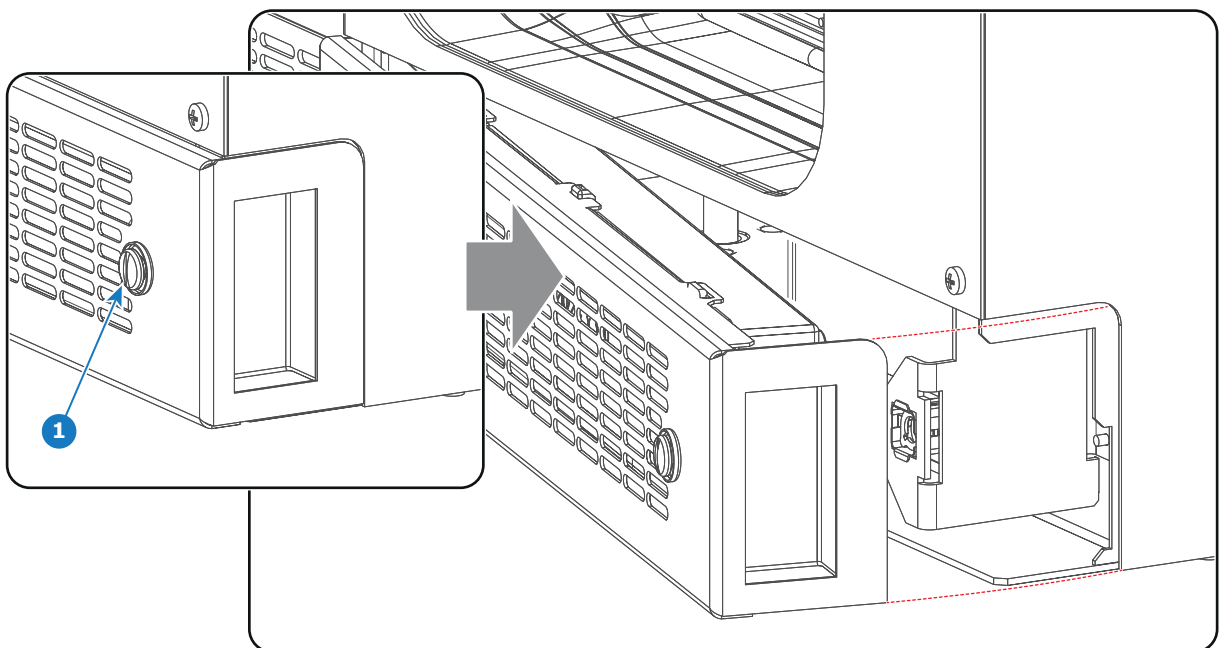
Image 16–4

2. Loosen the five captive screws (reference 2 Image 16–5) of the left side cover using a 7mm flat screwdriver.

3. Remove the left side cover from the projector.
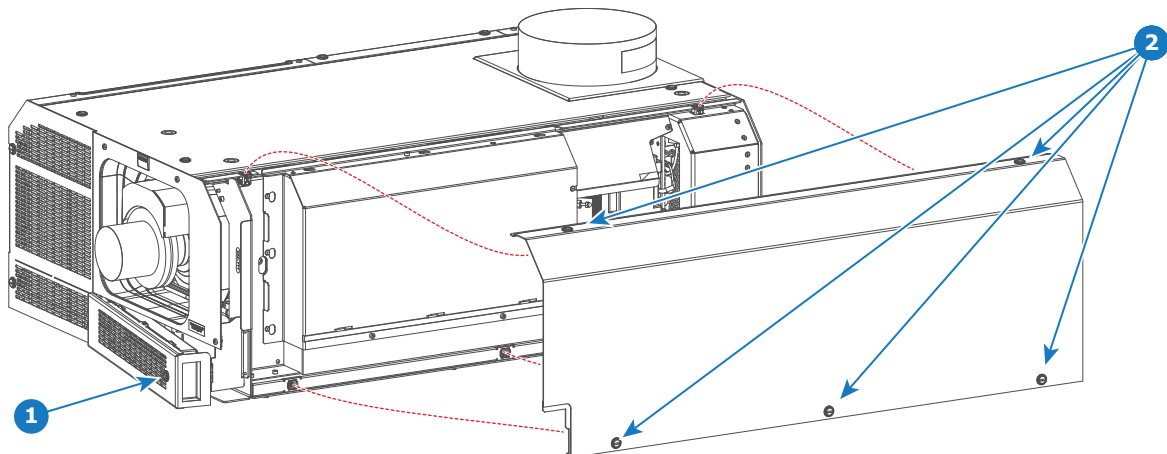
Image 16–5

16.5 Removal of the top cover plate of the Light Processor compartment

📄 To access the top cover plate of the Light Processor compartment the projector top cover has to be removed first. This procedure assumes that the projector top cover is already removed.

⚠️ **CAUTION:** Opening the Light Processor compartment by removing the top cover plate or side cover plate will result in a tamper event. An authorization to clear the security warning on the projector, after closing off the Light Processor compartment, will be needed!

Required tools

3mm Allen wrench.

How to remove the top cover plate from the Light Processor compartment?

1. Remove the four screws (reference 1 Image 16–6) at the top of the cover plate. Use a 3mm Allen wrench.
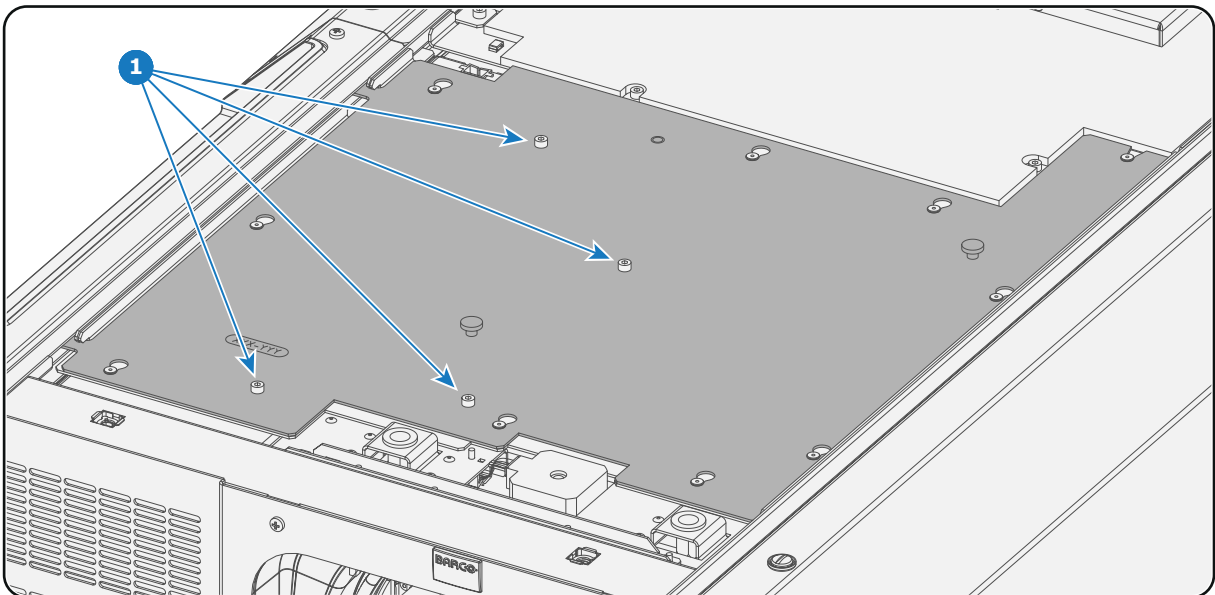
Image 16–6

2. Remove the top cover plate as follows:
1. Grib the top cover plate by the two handles (reference 2 Image 16–7) and slide it towards the front side (lens side) of the projector. All latches (reference 3 Image 16–7) must become free.
2. Tilt the top cover plate as illustrated.
3. Move the top cover plate away from the projector.
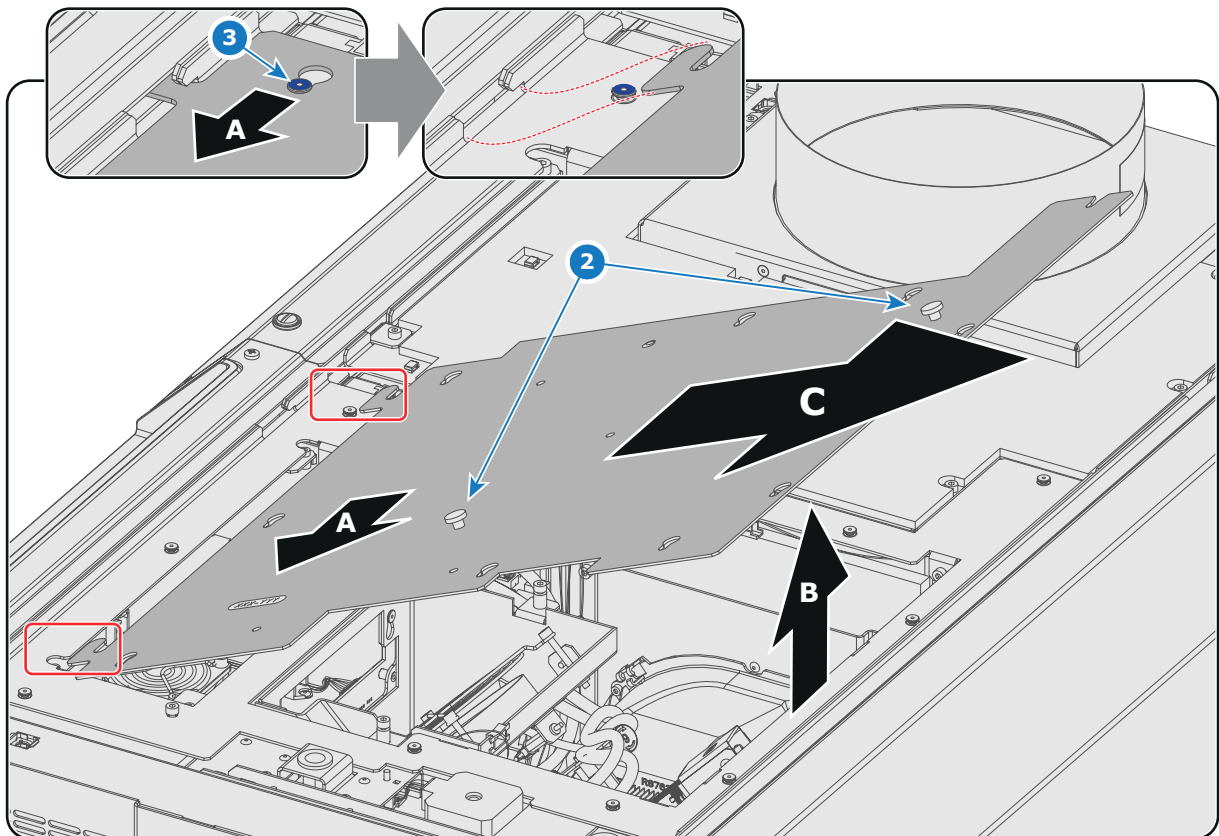
Image 16–7

16.6 Removal of the side cover plate of the Light Processor compartment

📄 To access the side cover plate of the Light Processor compartment, the projector left side cover has to be removed first. This procedure assumes that the projector left side cover is already removed.

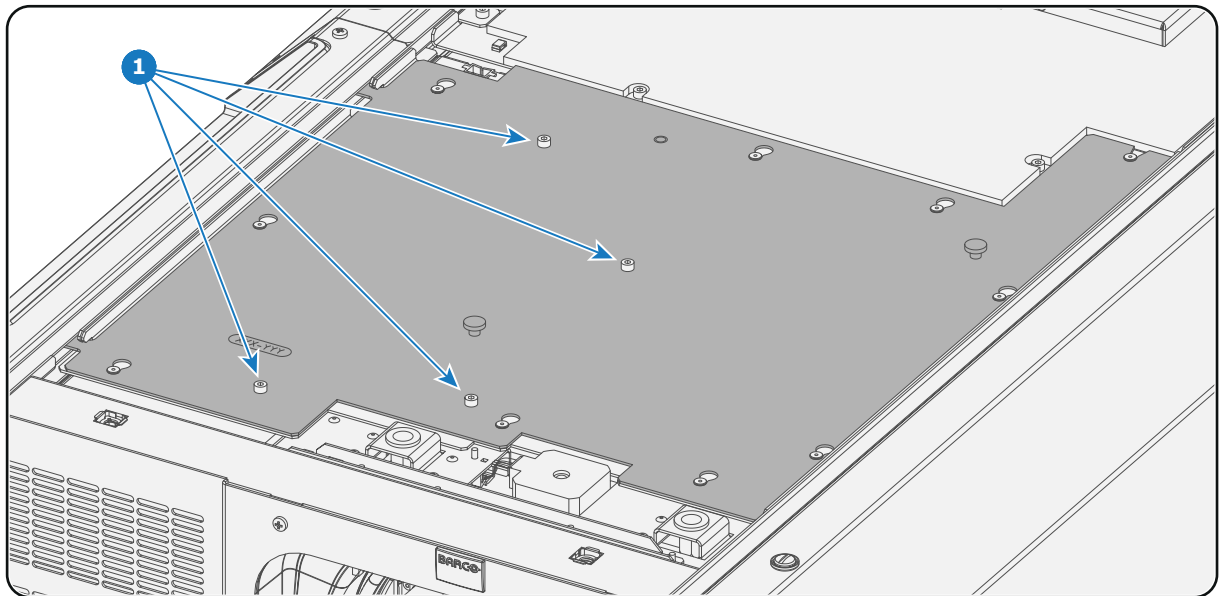⚠️ **CAUTION:** Opening the Light Processor compartment by removing the top cover plate or side cover plate will result in a tamper event. An authorization to clear the security warning on the projector, after closing off the Light Processor compartment, will be needed!

Required tools

3mm Allen wrench.

How to remove the side cover plate from the Light Processor compartment?

1. Remove the screw at the top of the cover plate (reference 1 Image 16–8) and the two screws at the bottom of the cover plate (reference 2 Image 16–8). Use a 3mm Allen wrench.

2. Remove the side cover plate left (A) then up (B) then away (C).
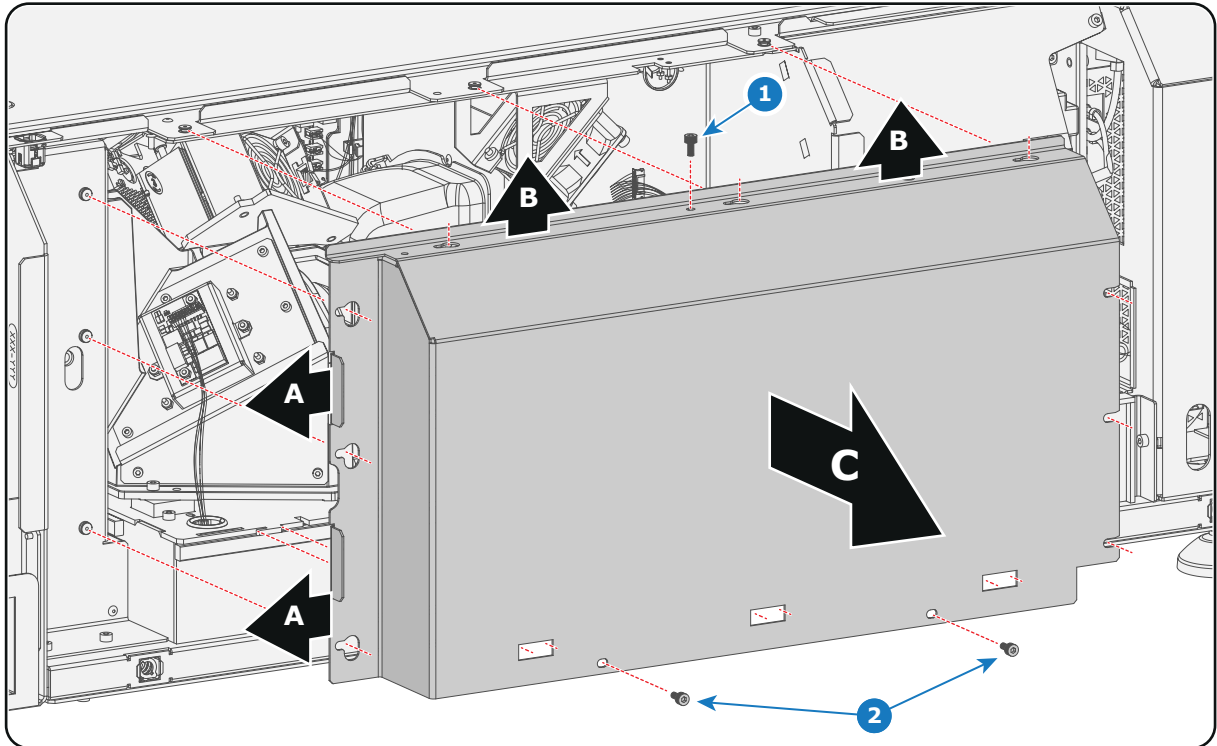
Image 16–8

16.7 Installation of the side cover plate of the Light Processor compartment

Required tools

3mm Allen wrench.

How to install the side cover plate from the Light Processor compartment?

1. Place the side cover plate into position as illustrated. Ensure that all 12 slots of the side cover plate are engaged (three at each side).
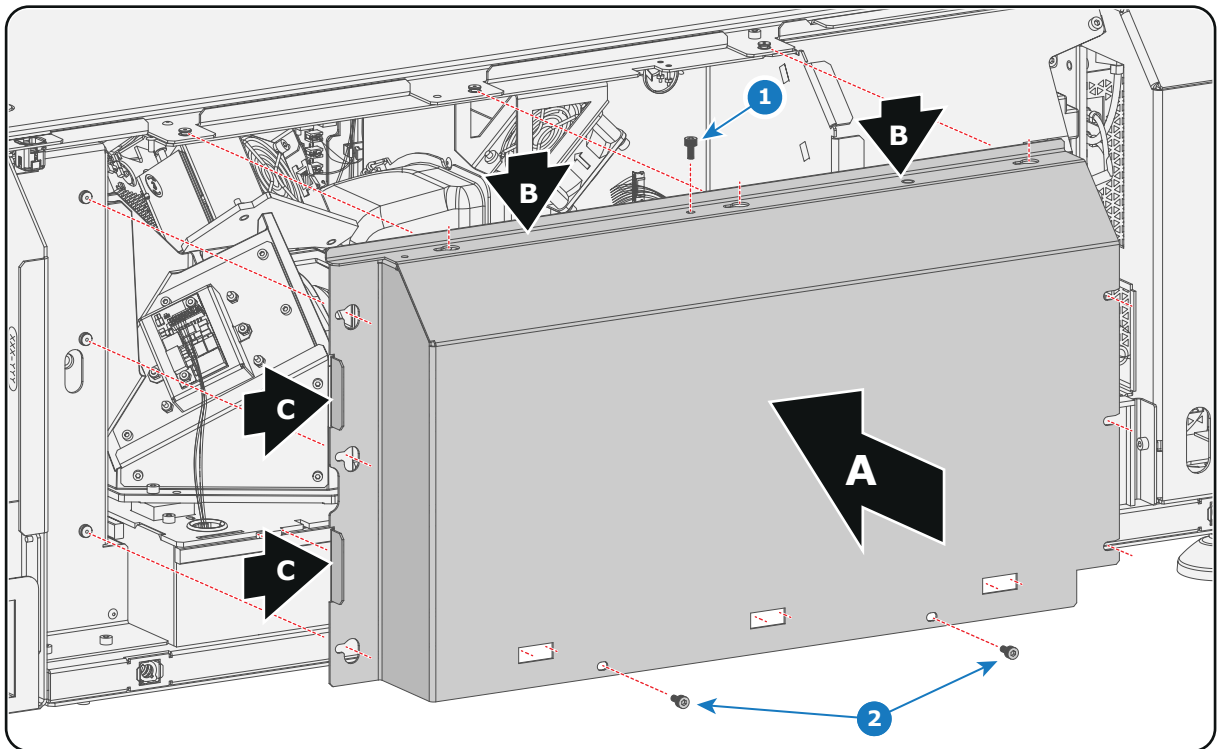
Image 16–9

2. Fasten the side cover plate with a screw at the top (reference 1 Image 16–9) and the two screws at the bottom (reference 2 Image 16–9). Use a 3mm Allen wrench.

> ⚠️ **CAUTION:** Opening the Light Processor compartment by removing the top cover plate or side cover plate will result in a tamper event. An authorization to clear the security warning on the projector, after closing off the Light Processor compartment, will be needed!

16.8 Installation of the top cover plate of the Light Processor compartment

Required tools

3mm Allen wrench.

How to install the top cover plate from the Light Processor compartment?

1. Install the top cover plate as follows:
    1. Approach the projector with the top cover plate tilted as illustrated and insert the two hooks of the top cover plate into the projector chassis (see detailed illustration Image 16–10).
    2. Lower the top cover plate completely.
    3. Grip the two knobs (reference 2 Image 16–10) , slide the top cover plate to the rear side of the projector and ensure that all slots (reference 1 Image 16–10) of the top cover plate are engaged.
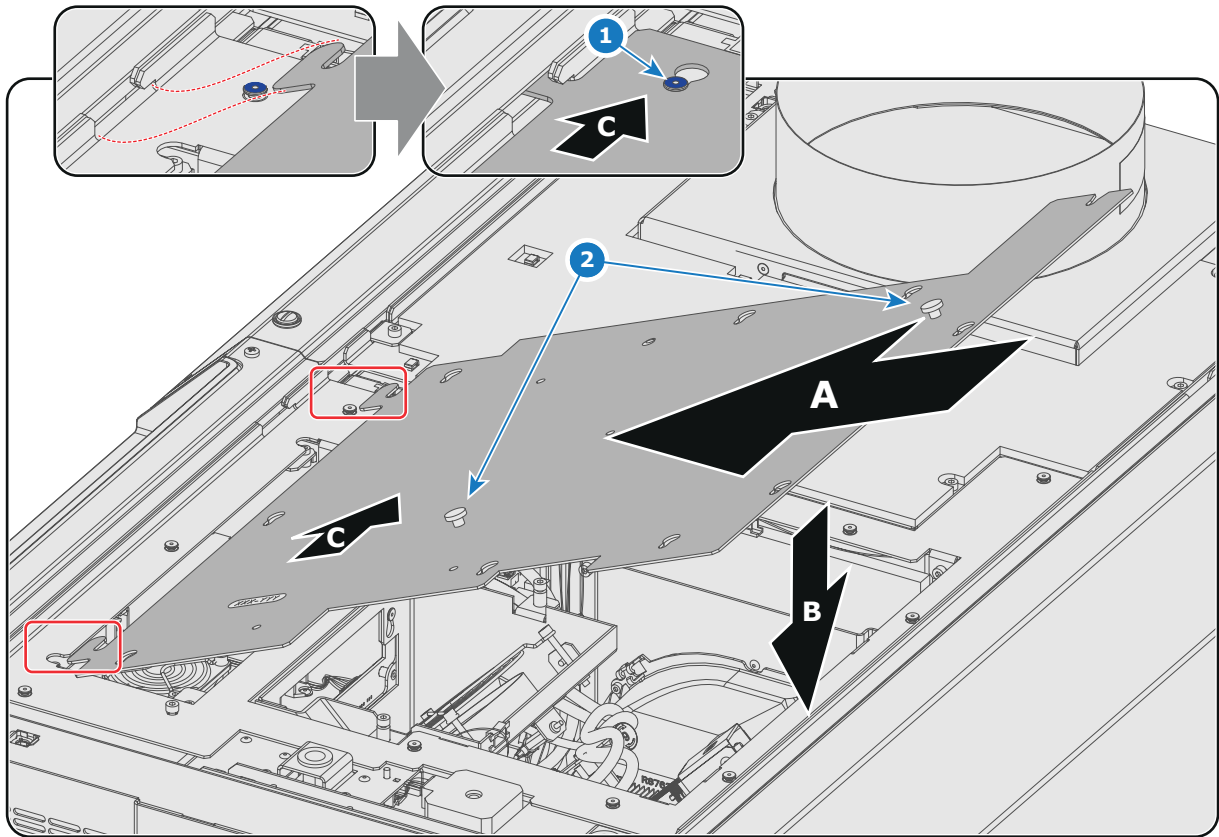
Image 16–10

2. Fasten the top cover plate with four screws (reference 1 Image 16–11). Use a 3mm Allen wrench.

Image 16–11

⚠ **CAUTION:** Opening the Light Processor compartment by removing the top cover plate or side cover plate will result in a tamper event. An authorization to clear the security warning on the projector, after closing off the Light Processor compartment, will be needed!

16.9 Installation of the left side cover

Required tools

7mm flat screwdriver.

How to install the left side cover?

1. Place the left side cover on the projector.

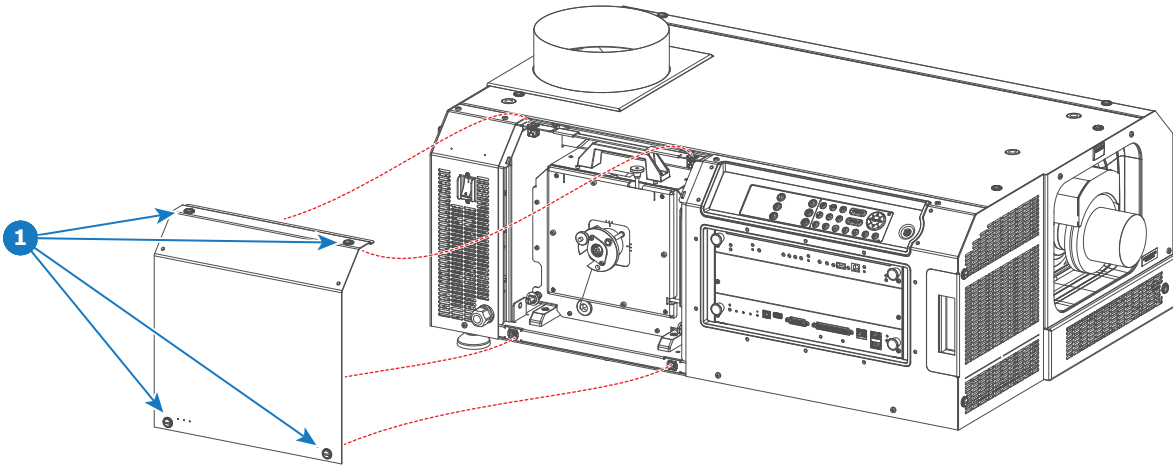2. Fasten the five captive screws (reference 2 Image 16–12) of the left side cover using a 7mm flat screwdriver.

   Note: The left side cover is partial captured by the sheet metal of the small filter assembly. For that, this filter is partially removed for the removal of the side cover.
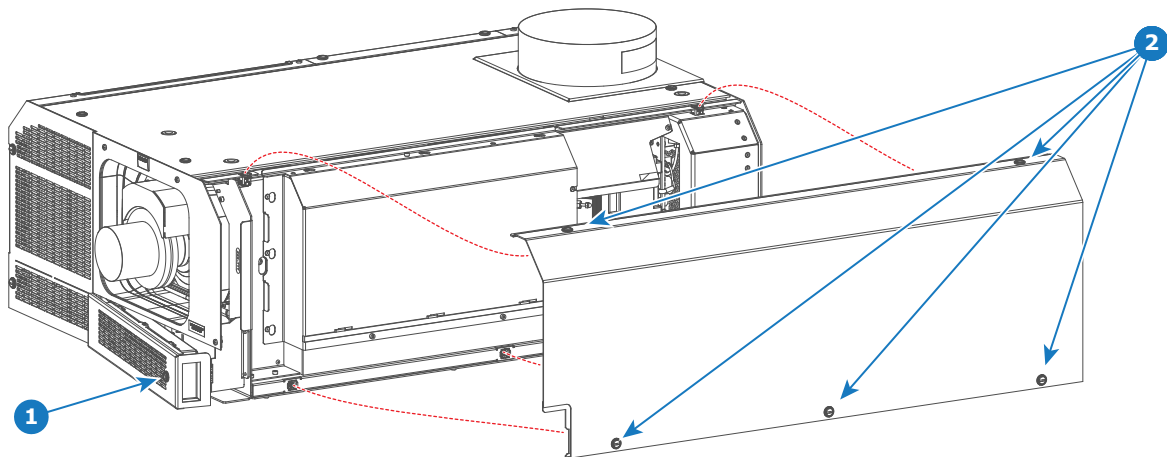
Image 16–12

3. Install the small dust filter at the front side of the projector. Use a 7mm flat screw driver to fasten the captive screw (reference 1 Image 16–13) of the small dust filter assembly.
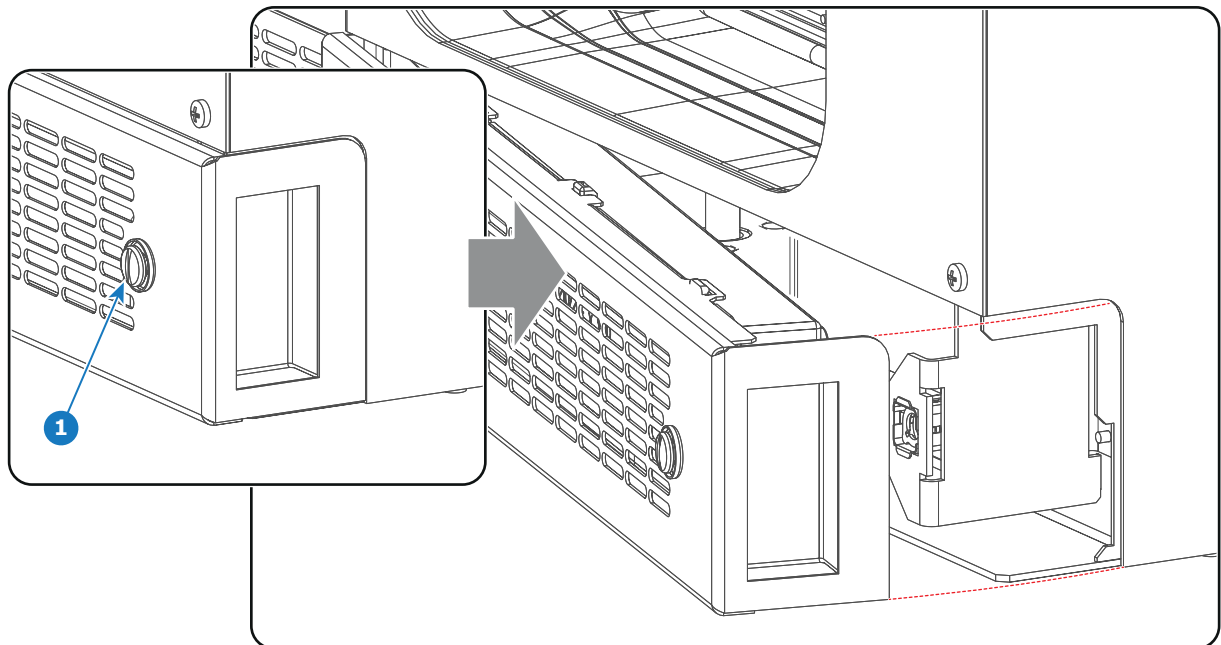
Image 16–13

16.10 Installation of the top cover

Required tools

7mm flat screwdriver.

How to install the top cover?

1. Install the top cover on the projector.

2. Fasten the four captive screws (reference 1 Image 16–14) of the top cover using a 7mm flat screwdriver.
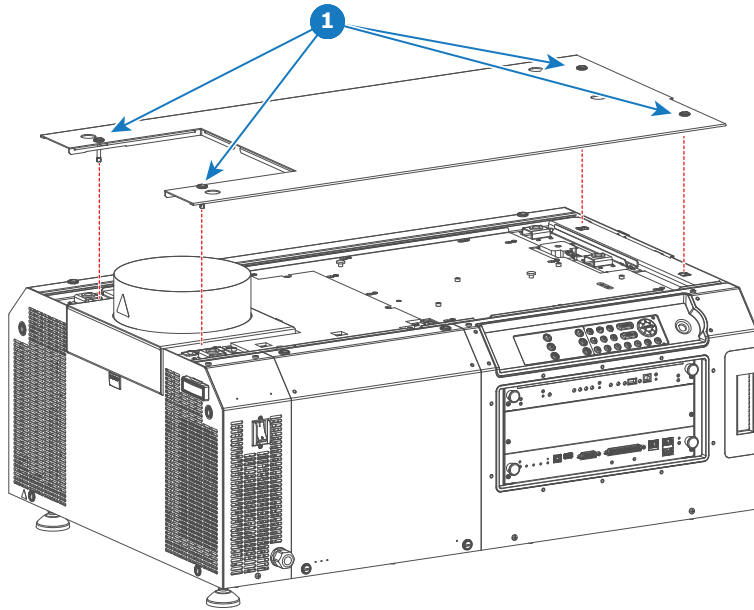
Image 16–14

16.11 Installation of the rear cover

Required tools

7mm flat screwdriver.

How to install the rear cover?

1. Install the rear cover on the projector.

2. Fasten the four captive screws (reference 1 Image 16–15) of the rear cover using a 7mm flat screwdriver.
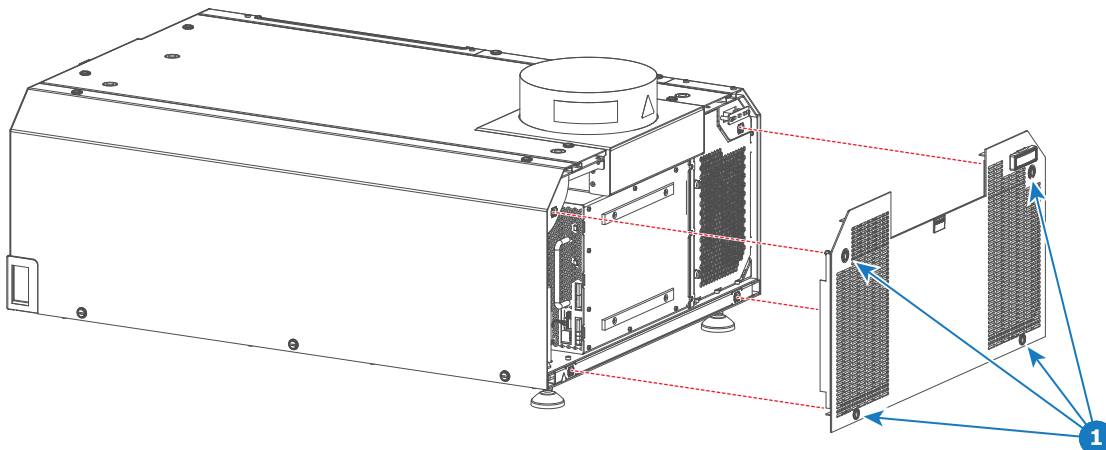
Image 16–15

16.12 Installation of the Lamp House cover

Required tools

7mm flat screwdriver.

How to install the Lamp House cover?

1. Install the Lamp House cover on the projector.

2. Fasten the four captive screws (reference 1 Image 16–16) of the Lamp House cover using a 7mm flat screwdriver.

Image 16–16

Specifications

A

About this chapter

This chapter gives an overview of the specification of your DP2K-S series projector as well as the dimensions, the center of gravity and the dimensions of the optional pedestal.

A.1 Specifications of the DP2K-8S series

Specifications

Housing	Hermetically sealed DMDs and optical assembly
Lamp	1.6kW, short-arc Xenon
Light output	6,000 lumens (1.6kW lamp)
Screen size	Up to 8m/26 ft wide (screen gain 1.0 @ 14ftl)
Contrast ratio	1,850:1
Digital MicroMirror Device™	3 x 0.69" DC2K dark metal devices
Native resolution	2,048 x 1,080 pixels
Prime lenses	Fully motorized 1.2 - 1.7 1.34 - 1.9 1.5 - 2.15 1.7 - 2.55 2.0 - 3.9
Control I/O	3x Ethernet (RJ 45) 8x GPIO (DB 25) 3D interface USB interface
Integrated Cinema Media Processor	DCI 4K 2D up to 60fps DCI 4K 3D (24 or 30 fps per eye) DCI High Frame Rates 2K 3D up to 120fps (60fps per eye) JPEG 2000 bit-rates up to 625Mbps Dual-channel color-correction MPEG-2 (4:2:0 and 4:2:2 up to 60fps) 2x HDMI2.0a (up to 4K 2D 60fps) 2x 3G-SDI inputs 16x AES/EBU audio channels (2x RJ45) 8x GPI, 8x GPO (4x RJ45) 2x Gbe for content connectivity & ingest 2x front-accessible USB 3.0 for fast ingest 2x front-accessible USB 2.0 Video watermarking: Civolution NexGuard Audio watermarking: Civolution Closed captioning devices: Support for SMPTE 430-10
Integrated storage	1.9TB effective storage (RAID-5) / 3x 1TB Hot-swappable 2.5" hard-drives 3.9TB effective storage (RAID-5) / 3x 2TB Hot-swappable 2.5" hard-drives
Barco Web Commander	Projector Dashboard Projector Control Board Show Player/Editor/Scheduler Automation, 3D, Ingest Dynamic DCP playlists & intermission TMS integration Smart Projector Status

	Via HTML5 web-browsers including iOS & Android tablets Dual projector 3D: passive and active Auro 11.1 decoding
Barco Communicator	Projector installation & configuration Projector update & maintenance
Power requirements	220 V
Projector dimensions (HxWxD)	325 x 625 x 910 mm 12.8 x 24.6 x 35.8 inch
Projector weight	Recessed handles for easy carrying 56.5 kg / 125 lbs for carrying (lamp-house removed) (66.5 kg / 147 lbs total weight)
Ambient temperature	35°C / 95°F Max.
Exhaust airflow	140 – 180 CFM (4 – 5 m³/min)
Options	Barco CineMate App (iOS & Android) - free 3D add-ons Touch screen monitor, inc. Barco Commander & Communicator Pedestal CineCare Web Auro 11.1 license Barco Escape license Live 3D*** *** Software roadmap

A.2 Specifications of the DP2K-10S series

Specifications

Digital MicroMirror Device™	3 x 0.69" DC2K dark metal devices
Native resolution	2,048 x 1,080 pixels
Housing	Hermetically sealed DMDs and optical assembly
Lamp	2.2kW, short-arc Xenon
Light output	9,000 lumens
Screen size	Up to 10m/33 ft wide (screen gain 1.2 @ 14ftl)
Contrast ratio	1,850:1
Prime lenses	Fully motorized 1.2 - 1.7 1.34 - 1.9 1.5 - 2.15 1.7 - 2.55 2.0 - 3.9
Control I/O	3x Ethernet (RJ 45) 8x GPIO (DB 25) 3D interface

	USB interface
Integrated Cinema Media Processor	DCI 4K 2D up to 60fps DCI 4K 3D (24 or 30 fps per eye) DCI High Frame Rates 2K 3D up to 120fps (60fps per eye) JPEG 2000 bit-rates up to 625Mbps Dual-channel color-correction MPEG-2 (4:2:0 and 4:2:2 up to 60fps) 2x HDMI2.0a (up to 4K 2D 60fps) 2x 3G-SDI inputs 16x AES/EBU audio channels (2x RJ45) 8x GPI, 8x GPO (4x RJ45) 2x Gbe for content connectivity & ingest 2x front-accessible USB 3.0 for fast ingest 2x front-accessible USB 2.0 Video watermarking: Civolution NexGuard Audio watermarking: Civolution Closed captioning devices: Support for SMPTE 430-10
Integrated storage	1.9TB effective storage (RAID-5) / 3x 1TB Hot-swappable 2.5" hard-drives 3.9TB effective storage (RAID-5) / 3x 2TB Hot-swappable 2.5" hard-drives
Barco Web Commander	Projector Dashboard Projector Control Board Show Player/Editor/Scheduler Automation, 3D, Ingest Dynamic DCP playlists & intermission TMS integration Smart Projector Status Via HTML5 web-browsers including iOS & Android tablets Dual projector 3D: passive and active Auro 11.1 decoding
Barco Communicator	Projector installation & configuration Projector update & maintenance
Power requirements	220 V
Projector dimensions (HxWxD)	325 x 626 x 925 mm 12.8 x 24.7 x 36.4 inch
Projector weight	Recessed handles for easy carrying 56.5 kg / 125 lbs for carrying (lamp-house removed) (66.5 kg / 147 lbs total weight)
Ambient temperature	35°C / 95°F Max.

Exhaust airflow	140 – 180 CFM (4 – 5 m³/min)
Options	Barco CineMate App (iOS & Android) - free 3D add-ons Touch screen monitor, inc. Barco Commander & Communicator Pedestal CineCare Web Auro 11.1 license Barco Escape license Live 3D*** *** Software roadmap

A.3 Specifications of the ICMP

Specifications

Integrated Cinema Media Processor	DCI 4K 2D up to 60fps DCI 4K 3D (24 or 30 fps per eye) DCI High Frame Rates 2K 3D up to 120fps (60fps per eye) JPEG 2000 bit-rates up to 625Mbps Dual-channel color-correction MPEG-2 (4:2:0 and 4:2:2 up to 60fps) 2x HDMI2.0a (up to 4K 2D 60fps) 2x 3G-SDI inputs 16x AES/EBU audio channels (2x RJ45) 8x GPI, 8x GPO (4x RJ45) 2x Gbe for content connectivity & ingest 2x front-accessible USB 3.0 for fast ingest 2x front-accessible USB 2.0 Video and audio watermarking: Civolution NexGuard Closed captioning devices: Support for SMPTE 430-10 Streaming of Live IP content
Barco Web Commander	Projector dashboard Projector control board Show player/editor/scheduler Automation, 3D, Ingest Smart projector status Via HTML5 web browsers including iOS & Android tablets Compatible with free Barco CineMate iOS & Android app
Barco Commander (for touch panel controller)	Projector control board Show Player/Editor/Scheduler Automation, 3D, ingest Dynamic DCP playlists & intermission Smart projector status
Barco Communicator	Projector installation & configuration Projector update & maintenance Barco CineMate App (iOS & Android) - free
Integrated storage	2TB effective storage (RAID-5) / 3x 1TB Hot-swappable 2.5" hard-drives 4TB effective storage (RAID-5) / 3x 2TB Hot-swappable 2.5" hard-drives

Options	ICMP License for HDMI2.0 HDR
	ICMP License for Live IP
Compatibility	Barco Alchemy is supported by the following Theater Management System (TMS) brands: AAM Screenwriter, Ymagis Melody, CFG-Barco, Unique RosettaBridge, ADDE, CinéDigital Manager, GDC, Proyecson, Real Image, Sony, Hollywoodsoftware/Comscore TCC, Kinoton
	Barco Alchemy is supported by 4DX Experience

A.4 Specifications of the ICMP-X

Specifications

Integrated Cinema Media Processor	DCI 4K 2D up to 60fps
	DCI 4K 3D (24 or 30 fps per eye)
	DCI High Frame Rates 2K 3D up to 120fps (60fps per eye)
	JPEG 2000 bit-rates up to 625Mbps
	Dual-channel color-correction
	MPEG-2 (4:2:0 and 4:2:2 up to 60fps)
	2x HDMI2.0a (up to 4K 2D 60fps)
	2x 3G-SDI inputs
	16x AES/EBU audio channels (2x RJ45)
	8x GPI, 8x GPO (4x RJ45)
	2x Gbe for content connectivity & ingest
	2x front-accessible USB 3.0 for fast ingest
	2x front-accessible USB 2.0
	Video and audio watermarking: Civolution NexGuard
	Closed captioning devices: Support for SMPTE 430-10
	Streaming of Live IP content
Barco Web Commander	Projector dashboard
	Projector control board
	Show player/editor/scheduler
	Automation, 3D, Ingest
	Smart projector status
	Via HTML5 web browsers including iOS & Android tablets
	Compatible with free Barco CineMate iOS & Android app
Barco Commander (for touch panel controller)	Projector control board
	Show Player/Editor/Scheduler
	Automation, 3D, ingest
	Dynamic DCP playlists & intermission
	Smart projector status
Barco (Web) Communicator	Projector installation & configuration
	Projector update & maintenance
	Barco CineMate App (iOS & Android) - free
Integrated storage	2TB effective storage (RAID-5) / 3x 1TB Hot-swappable 2.5" hard-drives
	4TB effective storage (RAID-5) / 3x 2TB Hot-swappable 2.5" hard-drives
	8TB effective storage (RAID-5) / 3x 4TB Hot-swappable 2.5" solid state drives

Options	ICMP License for HDMI2.0 HDR
	ICMP License for Live IP
Compatibility	Barco Alchemy is supported by the following Theater Management System (TMS) brands: AAM Screenwriter, Ymagis Melody, CFG-Barco, Unique RosettaBridge, ADDE, CinéDigital Manager, GDC, Proyecson, Real Image, Sony, Hollywoodsoftware/Comscore TCC, Kinoton
	Barco Alchemy is supported by 4DX Experience

A.5 Dimensions of the DP2K-S series projector

Dimensions
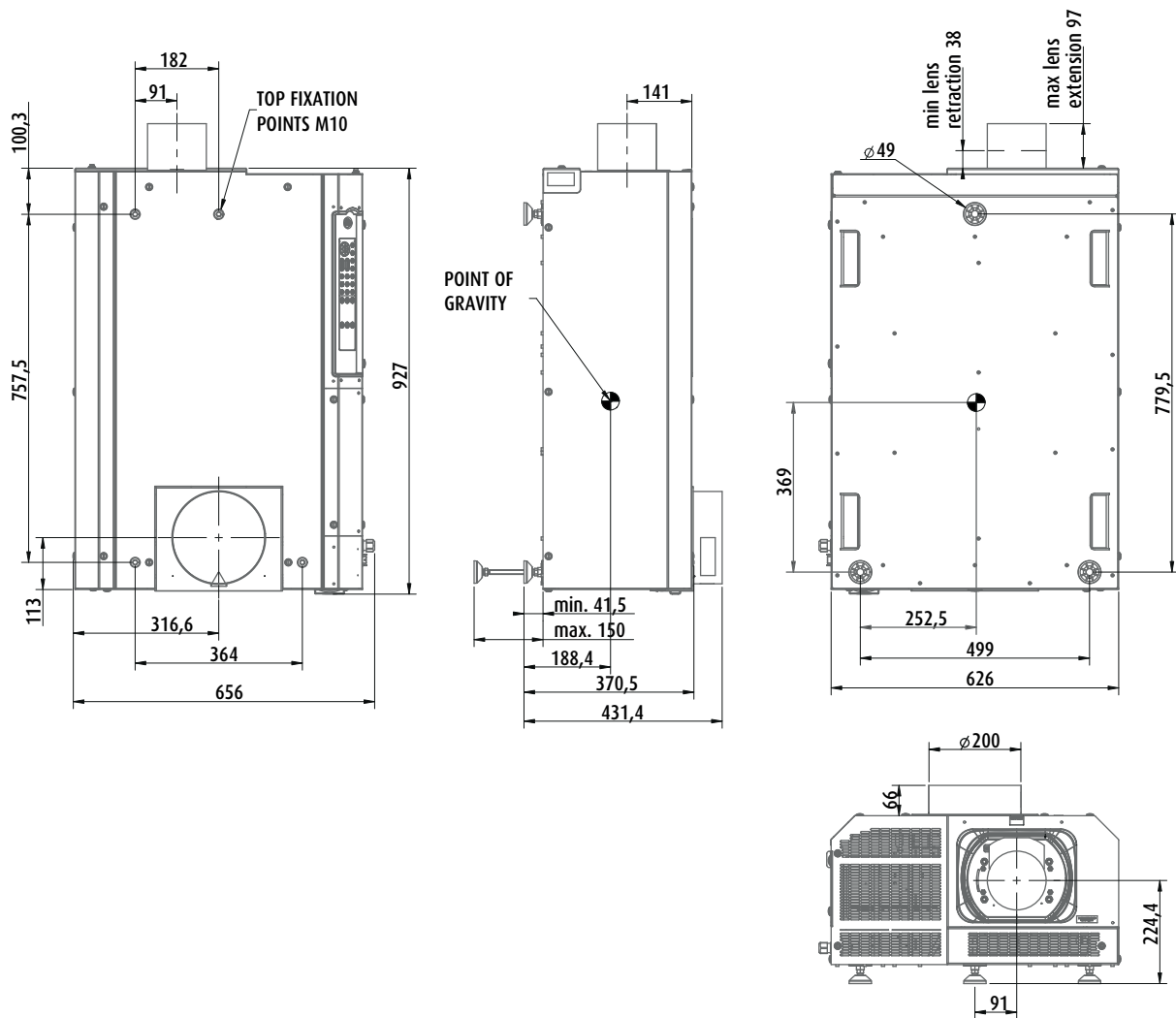
Image A–1 Dimensions given in millimeters.

A.6 Dimensions of the universal pedestal

Dimensions
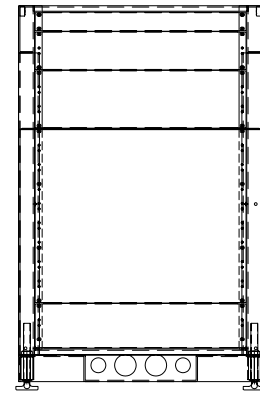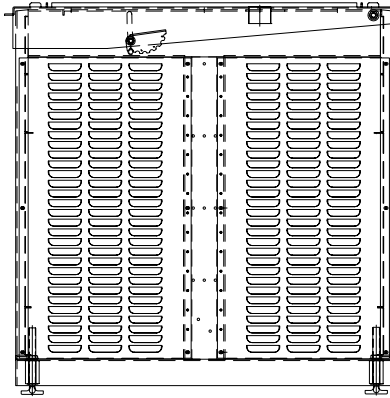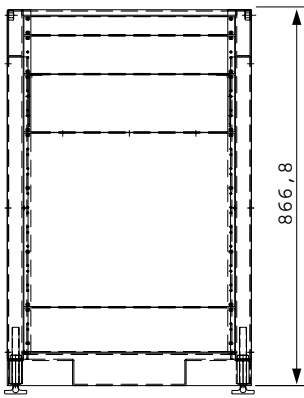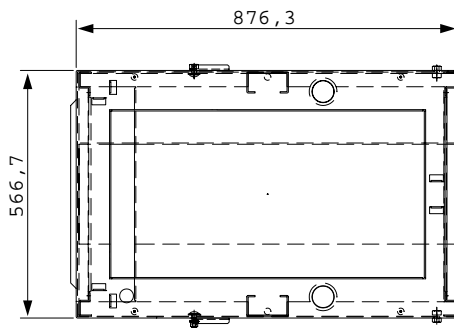
Image A–2 Dimensions given in millimeters.

A.7 Dimensions of the flat-packed pedestal

Dimensions
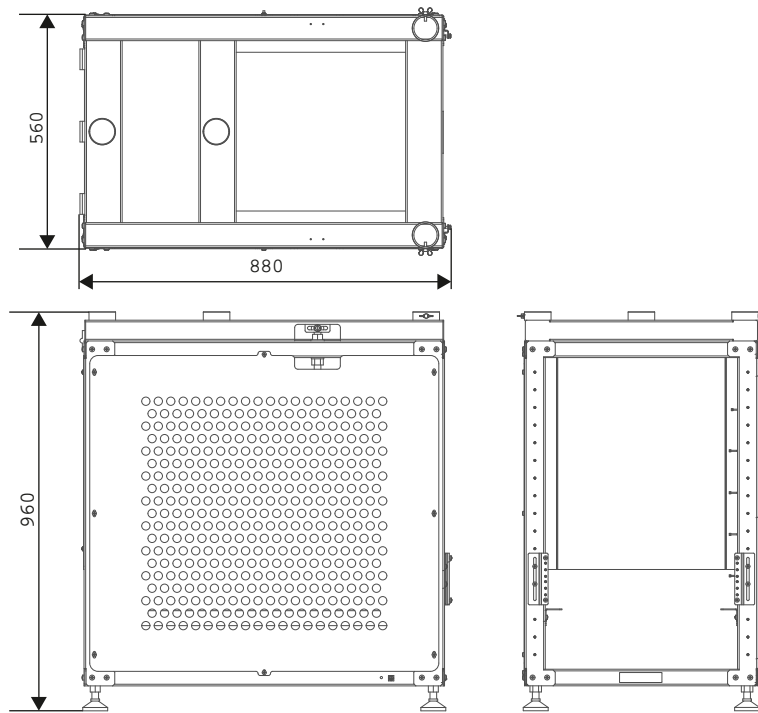
Image A–3 Dimensions given in millimeters

A.8 Technical Regulations

Certificates

Image A–4 EAC mark

Image A–5 CE mark

Image A–6 CCC mark

Image A–7 CEBEC mark

Image A–8 SGS mark

Pin configurations

B

B.1 About General Purpose Inputs & Outputs (GPIO)

> 📄 The Barco Cinema Controller and the Barco ICMP(-X) are equipped with GPIO ports. The electrical specifications described in this chapter are the same for both GPIO ports.

General Purpose inputs

The Barco Cinema Controller and the Barco ICMP (-X) have each eight (8) opto-isolated general purpose inputs available. These inputs are used to trigger the execution of macro files. For more explanation about the association of a macro to a GPI, consult the user guide of the Communicator.

Input voltage

The inputs can be directly driven from a TTL or CMOS output.

- The shape of the pulse must be rectangular.
- The duration of the pulse must be at least 50 milliseconds (shorter pulses are considered as a switch bounce)
- Minimum voltage : V_{min} = +5V
- Maximum voltage : V_{max} = +18V

External power supply

When interfacing with contact closure outputs, an external power supply needs to be provided. Depending upon the configuration a suitable pull-up resistor needs to be added as well.
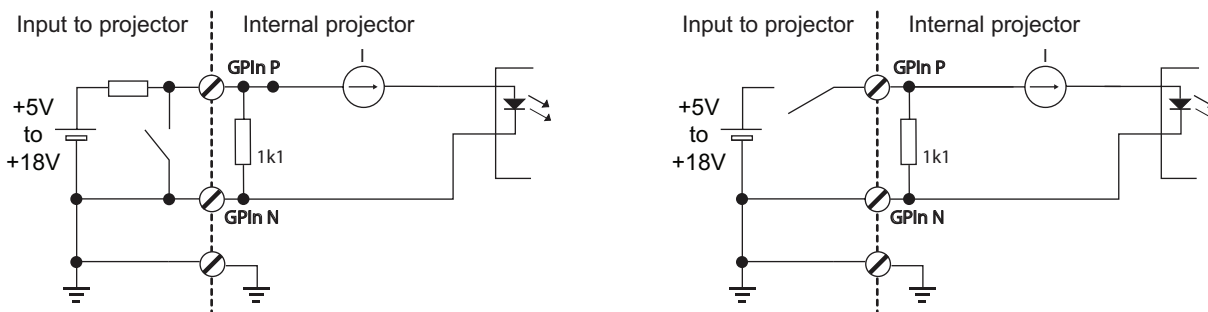
Image B–1

Cables

When long cable connections are required the use of shielded cables with twisted pairs is recommended. One twisted pair is to be assigned to each GP Input pair.

How to make the connection

When the power supply used to provide the DC voltage is isolated from ground (for example in the case of an AC adapter) it is recommended that the minus pole of that power supply is connected to ground (or to the projector chassis). This will avoid high common mode voltages at the projector GP Inputs. If that same power supply is used for other parts of the system, take care not to create ground loops. In any case when shielded cables are used that shield should be connected to the projector chassis.

General Purpose outputs

The Barco Cinema Controller and the Barco ICMP(-X) have each eight (8) opto-isolated outputs available. Four (4) of the outputs on the Cinema Controller are dedicated for TI. The other general purpose outputs can be controlled via software.

About an output

The output can generate a falling edge, rising edge, toggle or continuous toggle.

- **Generate Falling Edge** – generate a falling edge on the external GPO port if the present state of the output is high. If the present state of the external GPO is low, no edge will be generated.
- **Generate Rising Edge** – generate a rising edge on the external GPO port if the present state of the output is low. If the present state of the external GPO is high, no edge will be generated.
- **Generate Toggle** – generate a toggle on the external GPO port. If the present state of the output is low, a rising edge will be generated, followed by a falling edge. If the present state of the output is high, a falling edge will be generated, followed by a rising edge. Pulse width = 20 milliseconds.
- **Generate Continuous Toggle** - This command will generate a continuous toggle of the external GPO port. This toggle will continue until a *Generate Falling Edge*, *Generate Rising Edge*, or *Generate Toggle* command is received. The rate of toggle is 24Hz. .

Output transistor

- Maximum output driving voltage : V_{max} = 18 V
- Maximum current : I_{max} = 30 mA
- Maximum power dissipation : 120 mW
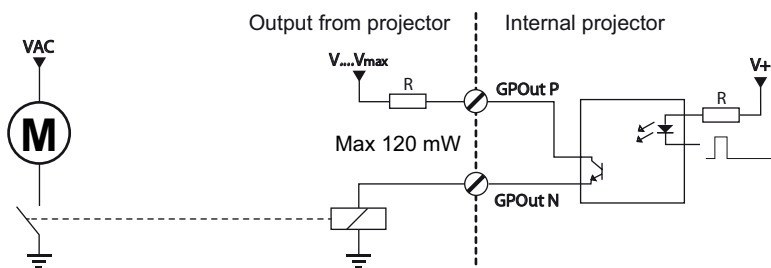
Image B–2

> When the GPO driver inside the projector becomes powerless the GPO state changes to the default state. The default GPO state depends on the external system connected with the GPO port (pull-up or pull-down circuitry).

GPIO and projector Sleep mode

In case the projector is equipped with a "Sleep" mode (e.g. DP2K S series): Enter or leave Sleep mode can be done with GPIO of the Cinema Controller via two predefined Macros (not editable). Not with the GPIO of the ICMP(-X).

The GPO signals of the ICMP will return to their default output level when the projector is switched to Sleep mode. This could generate unexpected "Falling Edge" triggers at the output pins. Also when awakening the projector (from Sleep mode to Standby mode) the GPO signals of the ICMP may generate unexpected "Rising Edge" events.

GPO and projector switching On or Off

The GPO signals of the Cinema Controller and ICMP will return to their default output level when the projector is switched to power-off. This could generate unexpected "Falling Edge" triggers at the output pins. Also during power-on the GPO signals may generate unexpected "Rising Edge" events.

B.2 Pin configurations of the Cinema Controller communication ports

General purpose input/output (GPIO) of the Cinema Controller

General Purpose In/Out			
1	3D Input Reference P	20	3D Input Reference N
2	3D Display Reference P	21	3D Display Reference N
3	GPIN 3 P (reserved)	22	GPIN 3 N (reserved)
4	GPIN 4 P (reserved)	23	GPIN 4 N (reserved)
5	GPIN 5 P	24	GPIN 5 N
6	GPIN 6 P	25	GPIN 6 N
7	GPIN 7 P	26	GPIN 7 N
8	GPIN 8 P	27	GPIN 8 N
9	3D Output Reference P	28	3D Output Reference N
10	GPOUT 2 P (reserved)	29	GPOUT 2 N (reserved)
11	GPOUT 3 P (reserved)	30	GPOUT 3 N (reserved)
12	GPOUT 4 P	31	GPOUT 4 N
13	GPOUT 5 P	32	GPOUT 5 N
14	GPOUT 6 P	33	GPOUT 6 N
15	GPOUT 7 P	34	GPOUT 7 N
16	GPOUT 8 P	35	GPOUT 8 N
17	reserved	36	reserved
18	reserved	37	reserved
19	reserved		

Ethernet port

			10/100 Base-T – RJ45 port	1000 Base-T – RJ45 port
Pin	Pair	Color	Description	Description
1	3	white/green	TXD+	TX0+
2	3	green	TXD-	TX0-
3	2	white/orange	RXD+	RX0+
4	1	blue	–	TX1+
5	1	white/blue	–	TX1-
6	2	orange	RXD-	RX0-
7	4	white/brown	–	Rx1+
8	4	brown	–	RX1-

3D interface

Pin	Name	Pin	Name
1	+12V	9	+12V
2	Grnd	10	3D Input Reference -
3	Grnd	11	3D Display Reference +
4	RS232 RX	12	3D Display Reference -
5	RS232 TX	13	CONN_3D MODE -
6	CONN_3D_MODE +	14	CONN_SYNC -
7	CONN_SYNC +	15	-
8	3D Input Reference +		

B.3 Pin configurations of the ICMP(-X) communication ports

RJ-45 pin configuration
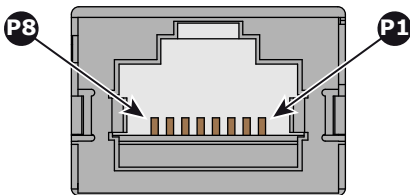
Image B–3

Audio Channels:

AUDIO-AES 1-8		
Audio channel	**AES pair**	**RJ-45 pin**
1, 2	1 +	1
	1 -	2
3, 4	2 +	3
	2 -	6
5, 6	3 +	4
	3 -	5
7, 8	4 +	7
	4 -	8

AUDIO-AES 9-16		
Audio channel	**AES pair**	**RJ-45 pin**
9, 10	5 +	1
	5 -	2
11, 12	6 +	3
	6 -	6

AUDIO-AES 9-16		
Audio channel	**AES pair**	**RJ-45 pin**
13, 14	7 +	4
	7 -	5
15, 16	8 +	7
	8 -	8

General Purpose Output:

GPO 1-4	
Definition	**RJ-45 pin**
EXT_GPOUT_1_P	1
EXT_GPOUT_1_N	2
EXT_GPOUT_2_P	3
EXT_GPOUT_2_N	4
EXT_GPOUT_3_P	5
EXT_GPOUT_3_N	6
EXT_GPOUT_4_P	7
EXT_GPOUT_4_N	8

GPO 5-8	
Definition	**RJ-45 pin**
EXT_GPOUT_5_P	1
EXT_GPOUT_5_N	2
EXT_GPOUT_6_P	3
EXT_GPOUT_6_N	4
EXT_GPOUT_7_P	5
EXT_GPOUT_7_N	6
EXT_GPOUT_8_P	7
EXT_GPOUT_8_N	8

General Purpose Input:

GPI 1-4	
Definition	**RJ-45 pin**
EXT_GPIN_1_P	1
EXT_GPIN_1_N	2
EXT_GPIN_2_P	3
EXT_GPIN_2_N	4

GPI 1-4	
Definition	**RJ-45 pin**
EXT_GPIN_3_P	5
EXT_GPIN_3_N	6
EXT_GPIN_4_P	7
EXT_GPIN_4_N	8

GPI 5-8	
Definition	**RJ-45 pin**
EXT_GPIN_5_P	1
EXT_GPIN_5_N	2
EXT_GPIN_6_P	3
EXT_GPIN_6_N	4
EXT_GPIN_7_P	5
EXT_GPIN_7_N	6
EXT_GPIN_8_P	7
EXT_GPIN_8_N	8

About 568A and 568B on an Ethernet connector RJ-45

TIA/EIA-568A and -568B are two standards for connecting Category 3 and Category 5 wire to connectors. Both are appropriate for high speed data, though 568B is somewhat more common for installed wiring and 568A is more common in jumpers. There is no performance advantage either way. The only real difference between the two is the order in which the pairs are used (orange and green).

Hold a cable as if to plug it into a wall jack, the locking tab down (contacts facing you). The contacts are numbered 1-8 from left to right. Here's what you will see:

RJ-45 Pin Number (Left >Right copper side)	568A		568B	AES -1-8
1	White/Green		White/Orange	AES 1&2 +plus
2	Green		Orange	AES 1&2 +minus
3	White/Orange		White/Green	AES 3&4 +plus
4	Blue		Blue	AES 5&6 +minus
5	White/Blue		White/Blue	AES 5&6 +plus
6	Orange		Green	AES 3&4 +minus
7	White/Brown		White/Brown	AES 7&8 +plus
8	Brown		Brown	AES 7&8 +minus

568A and 568B may be used interchangeably in a system SO LONG AS both ends of a given cable are terminated the same way.

568A + 568B wiring is a crossover cable.

568A + 568A wiring is a straight cable.

568B + 568B wiring is a straight cable.

The mapping of the channels is done according to the Ethernet wiring scheme and gives us 100 Ohm per pair.

Environmental information

C

C.1 Disposal information

Disposal Information

Waste Electrical and Electronic Equipment

This symbol on the product indicates that, under the European Directive 2012/19/EU governing waste from electrical and electronic equipment, this product must not be disposed of with other municipal waste. Please dispose of your waste equipment by handing it over to a designated collection point for the recycling of waste electrical and electronic equipment. To prevent possible harm to the environment or human health from uncontrolled waste disposal, please separate these items from other types of waste and recycle them responsibly to promote the sustainable reuse of material resources.

For more information about recycling of this product, please contact your local city office or your municipal waste disposal service.

For details, please visit the Barco website at: *http://www.barco.com/AboutBarco/weee*

Disposal of batteries in the product

This product contains batteries covered by the Directive 2006/66/EC which must be collected and disposed of separately from municipal waste.

If the battery contains more than the specified values of lead (Pb), mercury (Hg) or cadmium (Cd), these chemical symbols will appear below the crossed-out wheeled bin symbol.

By participating in separate collection of batteries, you will help to ensure proper disposal and to prevent potential negative effects on the environment and human health.

Disposal of lamp

Dispose of expired bulbs that are beyond warranty according the national regulations. See also related user manual of the lamp supplier for more guidance.

Small amounts of radioactive material (< 1000 Bq per lamp) are deliberately added to Xenon lamps for functional reasons. These lamps are manufactured under regulatory control as consumer product according to IAEA basic safety standard BSS 115. Disposal according to national regulations is required e. g. in Europe covered by WEEE regulation. See also related user manual of the lamp supplier for more guidance.

> ⚠ **CAUTION:** To avoid breaking the lamps, repack carefully when storing and transporting them.

> ⚠ **CAUTION:** Lamps may not be disposed as normal household trash.
> Contact your local waste disposal facility for information on the recycling program for HID (High Intensity Discharge) lamps in your area.

C.2 Turkey RoHS compliance

Turkey RoHS compliance

Türkiye Cumhuriyeti: AEEE Yönetmeliğine Uygundur.

[Republic of Turkey: In conformity with the WEEE Regulation]

C.3 Contact information

Barco contact information

Registered office address: President Kennedypark 35, 8500 Kortrijk, Belgium

Contact address: Beneluxpark 21, 8500 Kortrijk, Belgium

Importers contact information

To find your local importer, contact Barco directly or one of Barco's regional offices via the contact information given on Barco's web site, *www.barco.com*.

C.4 Production address

Factories

Barco NV (BELGIUM)
President Kennedypark 35, B-8500 Kortrijk

CFG Barco (Beijing) Electronics Co. Ltd.
中影巴可（北京）电子有限公司
3rd Floor, Barco Factory, No.16 Changsheng Road, Changping District, 102200, Beijing, P.R.C.
北京市昌平区中关村科技园区昌平园昌盛路16号巴可工厂第3层 邮政编码：102200

Barco Visual (Beijing) Electronics Co. Ltd.
巴可伟视（北京）电子有限公司
No.16 Changsheng Road, Changping District, 102200, Beijing, P.R.C
北京市昌平区中关村科技园区昌平园昌盛路16号 邮政编码：102200

Made in information

The made in country is indicated on the product ID label on the product itself.

Production date

The month and year of production is indicated on the product ID label on the product itself.

C.5 Download Product Manual

Download Product Manual

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

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

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

Environmental information

Glossary

3G-SDI

Serial Digital Interface (SDI) is a serial link standardized by ITU-R BT.656 and the Society of Motion Picture and Television Engineers (SMPTE). SDI transmits uncompressed digital video over 75-ohm coaxial cable within studios, and is seen on most professional video infrastructure equipment. The first revision of the standard, SMPTE 259M, was defined to carry digital representation of analog video such as NTSC and PAL over a serial interface and is more popularly known as standard-definition (SD) SDI. The data rate required to transmit SD SDI is 270 Mbps. With the advent of high-definition (HD) video standards such as 1080i and 720p, the interface was scaled to handle higher data rates of 1.485 Gbps. The 1.485-Gbps serial interface is commonly called the HD SDI interface and is defined by SMPTE 292M, using the same 75-ohm coaxial cable. Studios and other video production facilities have invested heavily on the hardware infrastructure for coaxial cable and have a vested interest in extending the life of their infrastructure. Fortunately, SMPTE recently ratified a new standard called SMPTE 424M that doubles the SDI data rates to 2.97 Gbps using the same 75-ohm coaxial cable. This new standard, also called 3-Gbps (3G)-SDI, enables higher resolution of picture quality required for 1080p and digital cinema.

Digital Cinema Initiatives (DCI)

DCI is a joint venture of Disney, Fox, Paramount, Sony Pictures Entertainment, Universal and Warner Bros. Studios. DCI's primary purpose is to establish and document voluntary specifications for an open architecture for digital cinema that ensures a uniform and high level of technical performance, reliability and quality control. Note that the DCI specification is not a standard. Standards for digital cinema are the domain of the Society of Motion Picture and Television Engineers (SMPTE). "DCI compliant" is a term used to describe products that conform to the DCI specification. Products that have been tested per the DCI Compliance Test Plan (CTP) are posted at the DCI compliance web site. Notably, DCI compliance does not require compliance to the full set of SMPTE DCP standards. A copy of the most recent DCI specification can be downloaded from the DCI website (*http://dcimovies.com*).

Digital Cinema Package (DCP)

A Digital Cinema Package (DCP) is a collection of digital files used to store and convey Digital Cinema (DC) audio, image, and data streams. The term has been defined by Digital Cinema Initiatives (DCI). General practice adopts a file structure that is organized into a number of usually multi-gigabyte size Material eXchange Format (MXF) files, which are separately used to store audio and video streams, and auxiliary index files in XML format. The MXF files contain streams that are compressed, encoded, and encrypted, in order to reduce the huge amount of required storage and to protect from unauthorized use. The image part is JPEG 2000 compressed, whereas the audio part is linear PCM. The adopted (optional) encryption standard is AES 128 bit in CBC mode. The newer SMPTE standards are used to conform the recommendations among different tool vendors and producers. Interop, the legacy DCP standard, is still required to be supported by DCP players.

DisplayPort

Digital display interface developed by the Video Electronics Standards Association (VESA). This royalty-free interface is primarily used to connect a video source to a display device such as a computer monitor, though it can also be used to transmit audio, USB, and other forms of data. VESA designed it to replace VGA, DVI, and FPD-Link. Backward compatibility to VGA and DVI by using active adapter dongles enables users to use DisplayPort fitted video sources without replacing existing display devices.

HDCP

High-bandwidth Digital Content Protection is a form of digital copy protection developed by Intel Corporation to prevent copying of digital audio and video content as it travels across DisplayPort, Digital Visual Interface (DVI), High-Definition Multimedia Interface (HDMI), Gigabit Video Interface (GVIF), or Unified Display Interface (UDI) connections, even if such copying would be permitted by fair use laws. The specification is proprietary, and implementing HDCP requires a license.

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.

HDMI

HDMI (High-Definition Multimedia Interface) is a compact audio/video interface for transferring uncompressed video data and compressed/uncompressed digital audio data from a HDMI-compliant device ("the source device") to a compatible computer monitor, video projector, digital television, or digital audio device. HDMI is a digital replacement for existing analog video standards.

Key Delivery Message (KDM)

The security key for each movie is delivered in a unique KDM for each digital cinema server. The security key is encrypted within the KDM, which means that the delivery of a KDM to the wrong server or wrong location will not work, and thus such errors cannot compromise the security of the movie. The KDM is a small file, and is typically emailed to the exhibitor. To create the correct set of KDMs for a site requires knowledge of the digital certificate in the projection system´s media block.

*.pem

Privacy-enhanced Electronic Mail. File format used to distribute digital signed certificates. Base64 encoded DER certificate, enclosed between "———BEGIN CERTIFICATE———" and "———END CERTIFICATE———"

Public Key Infrastructure (PKI)

PKI is a framework for creating a secure method for exchanging information based on public key cryptography. The foundation of a PKI is the certificate authority (**CA**), which issues digital certificates that authenticate the identity of organizations and individuals over a public system such as the Internet. The certificates are also used to sign messages, which ensures that messages have not been tampered with.

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.

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.

SMPTE

Society of Motion Picture and Television Engineers - A global organization, based in the United States, that sets standards for baseband visual communications. This includes film as well as video standards.

Trusted Device List (TDL)

The Goal of the TDL is to maintain timely and accurate information on participating auditoriums so that participating subscribers can obtain information needed to issue KDMs. The TDL has several data sources: Device manufacturers, Exhibitors, Deployment Entities, Integrators, Service Providers (interacting with Exhibitors), regional authorities and Support.

USB

Universal Serial Bus (USB) is an industry standard developed in the mid-1990s that defines the cables, connectors and communications protocols used in a bus for connection, communication, and power supply between computers and electronic devices. **USB 2.0** (also called "Hi-Speed"), adding higher maximum signaling rate of 480 Mbit/s (effective throughput up to 35 MB/s or 280 Mbit/s), in addition to the "USB 1.x Full Speed" signaling rate of 12 Mbit/s.[16] USB 2.0 connectors are usually colored black. **USB 3.0** defines a new SuperSpeed mode with a signaling speed of 5 Gbit/s and a usable data rate of up to 4 Gbit/s (500 MB/s). A USB 3.0 port is usually colored blue, and is backwards compatible with USB 2.0.

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