Prometheus III

Installation manual

BARCO

Changes

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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。

Federal Communications Commission (FCC Statement)

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

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

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

Product Security Incident Response

As a global technology leader, Barco is committed to deliver secure solutions and services to our customers, while protecting Barco's intellectual property. When product security concerns are received, the product security incident response process will be triggered immediately. To address specific security concerns or to report security issues with Barco products, please inform us via contact details mentioned on *https://www.barco.com/psirt*. To protect our customers, Barco does not publically disclose or confirm security vulnerabilities until Barco has conducted an analysis of the product and issued fixes and/or mitigations.

Patent protection

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

Guarantee and Compensation

Barco provides a guarantee relating to perfect manufacturing as part of the legally stipulated terms of guarantee. On receipt, the purchaser must immediately inspect all delivered goods for damage incurred during transport, as well as for material and manufacturing faults Barco must be informed immediately in writing of any complaints.

The period of guarantee begins on the date of transfer of risks, in the case of special systems and software on the date of commissioning, at latest 30 days after the transfer of risks. In the event of justified notice of complaint, Barco can repair the fault or provide a replacement at its own discretion within an appropriate period. If this measure proves to be impossible or unsuccessful, the purchaser can demand a reduction in the purchase price or cancellation of the contract. All other claims, in particular those relating to compensation for direct or indirect damage, and also damage attributed to the operation of software as well as to other services provided by Barco, being a component of the system or independent service, will be deemed invalid provided the damage is not proven to be attributed to the absence of properties guaranteed in writing or due to the intent or gross negligence or part of Barco.

If the purchaser or a third party carries out modifications or repairs on goods delivered by Barco, or if the goods are handled incorrectly, in particular if the systems are operated incorrectly or if, after the transfer of risks, the goods are subject to influences not agreed upon in the contract, all guarantee claims of the purchaser will be rendered invalid. Not included in the guarantee coverage are system failures which are attributed to programs or special electronic circuitry provided by the purchaser, e.g. interfaces. Normal wear as well as normal maintenance are not subject to the guarantee provided by Barco either.

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

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Safety

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About this chapter

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

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

• PROMETHEUS III

Model certification name

• DP4K-13BLPHC

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

Overview

• General considerations
• Safety training to be provided by the installer
• Important safety instructions
• Product safety labels
• High Brightness precautions: Hazard Distance (HD)
• HD for fully enclosed projection systems
• HD in function of modifying optics

1.1 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 international safety standards IEC60950-1, EN60950-1, UL60950-1 and CAN/CSA C22.2 No.60950-1, which are the safety standards of information technology equipment including electrical business equipment. These safety standards impose important requirements on the use of safety critical components, materials and insulation, in order to protect the user or operator against risk of electric shock and energy hazard and having access to live parts. Safety standards also impose limits to the internal and external temperature rises, radiation levels, mechanical stability and strength, enclosure construction and protection against the risk of fire. Simulated single fault condition testing ensures the safety of the equipment to the user even when the equipment's normal operation fails.

Notice on optical radiation

This projector embeds extremely high brightness (radiance) lasers; this laser light is processed through the projector's optical path. Native laser light is not accessible by the end user in any use case. The light exiting the projection lens has been diffused within the optical path, representing a larger source and lower radiance value than native laser light. Nevertheless the projected light represents a significant risk for the human eye and skin when exposed directly within the beam. This risk is not specifically related to the characteristics of laser light but solely to the high thermal induced energy of the light source; which is equivalent with lamp based systems.

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

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

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

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 in allowed to enter the projected beam within the zone between the projection lens and the related Hazard Distance (HD). This shall be physically impossible by creating sufficient separation height or by placing optional barriers. Within the restricted area operator training is considered sufficient. The applicable separation heights are discussed in "High Brightness precautions: Hazard Distance (HD)", page 16.

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 generated by lasers. Only qualified SERVICE PERSONNEL and TRAINED PROJECTIONISTS, knowledgeable of such risks, are allowed to perform service functions inside the product enclosure.

1.2 Safety training to be provided by the installer

> ⚡ **WARNING:** The installer is responsible that the user is instructed. The user will sign a document to confirm that the instructions have been received and understood.

Users definition

The Prometheus III is intended for persons who have been instructed and trained by a skilled person (installer or service personnel) to identify energy sources that may cause injury and to take precautions to avoid unintentional contact with or exposure to those energy sources.

The skilled person must instruct the user about:
- High intensity light beam. The user must respect the exclusion zone, based on the light beam Hazard Distance (HD).
- Dangerous energy sources inside the projector. The user is not allowed to remove any cover from the projector.
- The installation, maintenance or service is for skilled persons only.
- The requirements for a **restricted access location**, an **exclusion zone** and a **restriction zone**.

Restricted access location

To protect untrained persons and children, the projector must be installed in a **restricted access location**. The definition of a **restricted access location** is a location for equipment where both of the following paragraphs apply:
- Access can only be gained by skilled persons (installer or service personnel) or persons who have been instructed and trained by a skilled person. The persons must have been instructed about the reasons for the restriction applied to the location and about the precautions that shall be taken.
- Access is only possible 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 in allowed to enter the projected beam within the zone between the projection lens and the related Hazard Distance (HD). This shall be physically impossible by creating sufficient separation height or by placing optional barriers. Within the restricted area operator training is considered sufficient. The applicable separation heights are discussed in "High Brightness precautions: Hazard Distance (HD)", page 16.

Exclusion zone

The projector radiates heat on its external surfaces and from ventilation ducts during normal operation. 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 not be less than 40 cm (16 in).

Restriction zone

To protect untrained users and children against high intensity light beams, the light beam Hazard Distance (HD) shall be taken into account.

1.3 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 barrier strip for the connection of a power line. The configuration is 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 4mm^2 (10 AWG).
- The electronics of the projector must be powered either from a suitable UPS unit or from the power outlet socket (UPS OUTLET) provided on the projector. For that reason an adapted short power cord (2-pole 3-wire grounding) is added to the projector accessories to loop through the power.
- The cross-sectional area of the UPS inlet cord shall be not less than 0.75 mm² or AWG 18.
- The provided power output socket (UPS OUTLET) on the projector may only be used to provide power to the projector electronics. Never connect other devices to this power output socket.
- The circuit breaker(s) that must be provided in the power circuit(s) of the projector is considered as general disconnect switch(es) to switch off the complete installation.
- Disconnect the power to the projector mains terminals and unplug the power cord at UPS INLET for removal of all power from the projector.
- 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 an authorized trained service person when service or repair work is required.
- Do not use an accessory attachment which is not recommended by the manufacturer.
- Lightning - For added protection for this video product during a lightning storm, or when it is left unattended and unused for long periods of time, unplug it from the wall outlet and disconnect media and communication cables. This will prevent damage to the projector due to lightning and AC power-line surges.

To prevent personal injury

- To prevent injury and physical damage, always read this manual and all labels on the system before powering the projector or adjusting the projector.
- Do not underestimate the weight of the projector. The projector by itself weighs ±147 kg (±324 lbs). To prevent personal injury a hoisting tool should be used to lift the projector.
- To prevent injury, ensure that the lens, cooling 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 (radiance) lasers; this laser light is processed through the projectors optical path. Native laser light is not accessible by the end user in any use case. The light exiting the projection lens has been defused within the optical path, representing a larger source and lower radiance value than native laser light. Nevertheless the projected light represents a significant risk for the human eye when exposed directly within the beam. This risk is not specific related to the characteristics of laser light but solely to the high thermal induced energy of the light source; which is equivalent with lamp based systems.
  Thermal retinal eye injury is possible when exposed within the Hazard Distance. The Hazard Distance (HD) is defined from the projection lens surface towards the position of the projected beam where the irradiance equals the maximum permissible exposure as described in the chapter "High Brightness precautions: Hazard Distance (HD)", page 16.
- Based on international requirements, no person in allowed to enter the projected beam within the zone between the projection lens and the related Hazard Distance (HD). This shall be physically impossible by creating sufficient separation height or by placing optional barriers. Within the restricted area operator training is considered sufficient. The applicable separation heights are discussed in "High Brightness precautions: Hazard Distance (HD)", page 16.
- The projector shall be installed in a restricted access room equipped with a key or security lock preventing untrained persons entering the Risk Group 3 use zone.
- Switch off the projector before attempting to remove any of the projector's covers.
- When required to remove all power from the projector (eg during service), always disconnect the power from the projector mains terminals and UPS INLET connector. Use the disconnect device in the building installation to disconnect the power to the projector mains terminals, and unplug the power cord at the UPS INLET connector if the UPS INLET is separately powered.
- 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.
- Lenses, shields or 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.
- The associated Safety responsible of the unit must evaluate the setup before the unit may be started.
- Never point or allow light to be directed on people or reflective objects within the HD zone.
- All operators shall have received adequate training and be aware of the potential hazards.
- Strictly minimize the number of people who have access to the unit. The unit may never be operated without permission of the responsible for safety.
- Do not put your hand or any body part in front of the beam.
  Do not clean the port window when the projector is switched on.
- For a stand alone cooler, position the tubes so that they will not be tripped over, pulled, or contact hot surfaces.

To prevent fire hazard

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

should never be placed near or over a radiator or heat register. This projector should not be placed in a built-in installation or enclosure unless proper ventilation is provided.

- Projection rooms must be well ventilated or cooled in order to avoid build up of heat. It is necessary to vent hot exhaust air from projector and cooling system to the outside of the building.
- Let the projector cool completely before storing. Remove cord from the projector when storing.

To prevent battery explosion

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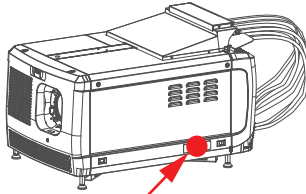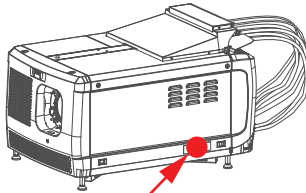
To prevent projector damage

- The air filters of the projector must be cleaned or replaced on a regular basis. Cleaning the booth area would be monthly-minimum. Neglecting this could result in disrupting the air flow inside the projector, causing overheating. Overheating may lead to the projector shutting down during operation.
- The projector must always be installed in a manner which ensures free flow of air into its air inlets.
- If more than one projector is installed in a common projection booth, the exhaust air flow requirements are valid for EACH individual projector system. Note that inadequate air extraction or cooling will result in decreased life expectancy of the projector as a whole as well as causing premature failure of the lasers.
- In order to ensure that correct airflow is maintained, and that the projector complies with Electromagnetic Compatibility (EMC) and safety requirements, it should always be operated with all of it's covers in place.
- Slots and openings in the cabinet are provided for ventilation. To ensure reliable operation of the product and to protect it from overheating, these openings must not be blocked or covered. The openings should never be blocked by placing the product on a bed, sofa, rug, or other similar surface. This product should never be placed near or over a radiator or heat register. The device should not be placed in a built-in installation or enclosure unless proper ventilation is provided.
- Ensure that nothing can be spilled on, or dropped inside the projector. If this does happen, switch off and remove all power from the projector. Do not operate the projector again until it has been checked by qualified service personnel.
- Do not block the projector cooling fans or free air movement around the projector.
- 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.
- Remove all power from 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 abrasive cleaners, since these will damage the cabinet. Stubborn stains may be removed with a cloth lightly dampened with mild detergent solution.
- To ensure the highest optical performance and resolution, the projection lenses are specially treated with an anti-reflective coating, therefore, avoid touching the lens. To remove dust on the lens, use a soft dry cloth. For lens cleaning follow the instructions precisely as stipulated in the projector manual.
- Rated maximum ambient temperature, t_a= 35°C (95°F).
- Rated humidity = 5% ... 85% RH Non-condensed.
- An external frame must be used to stack projectors.
- For functionality and reliability, the Prometheus III requires accurate temperature control and cooling. Therefore a liquid cooling system is provided consisting of liquid circuits inside the Prometheus III which are connected via hoses to external coolers. Only cooler models and hoses exclusively developed for this application and approved by Barco are allowed to be used.
- When using the projector with a stand alone cooler, do not stand on the cooling tubes or do not place any object on the tubes so that free liquid flow can be guaranteed. Position the tubes so that there is no contact with hot surfaces.

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.

1.4 Product safety labels

Light beam related safety labels

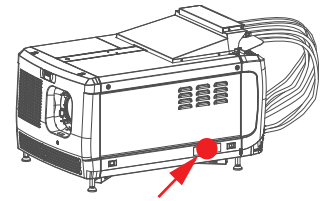| Label image	Label description	Label location
	Hazard RG3: optical radiation warning symbol	
	WARNING! DO NOT LOOK INTO THE LIGHT BEAM NO DIRECT EYE EXPOSURE TO THE BEAM IS PERMITTED. RG3 IEC EN 62471–5:2015 CLASS 1 IEC EN 60825–1:2014 HAZARD DISTANCE: CONSULT SAFETY MANUAL COMPLIES WITH 21 CFR 1040 EXCEPT WITH RESPECT TO THOSE CHARACTERISTICS AUTHORIZED BY VARIANCE NUMBER 2014-V-0285 DATED APRIL 14, 2016 RISK GROUP 3 LIP IEC 62471:2006	

| Label image	Label description	Label location
	警告！ 勿观看光束 眼睛勿直接接触可允许暴露的光束 (RG3 IEC EN 62471-5:2015 CLASS 1 IEC EN 60825-1:2014) 危害距离：请参考 安全手册 DANGER ! NE PAS REGARDER LE FAISCEAU EVITER TOUTE EXPOSITION DIRECTE DES YEUX AU FAISCEAU. RG3 IEC EN 62471-5:2015 CLASS 1 IEC EN 60825-1:2014 DISTANCE DE SECURITE : CONSULTER LE MANUEL DE SECURITE	
	Hazard RG3: not for household use symbol	
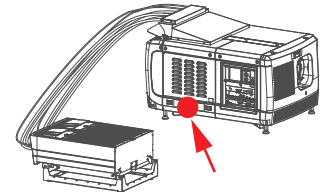
1.5 High Brightness precautions: Hazard Distance (HD)

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

Restriction Zone (RZ) based on the HD

The HD depends on the amount of lumens produced by the projector and the type of lens installed. See next chapter"HD in function of modifying optics", page 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.
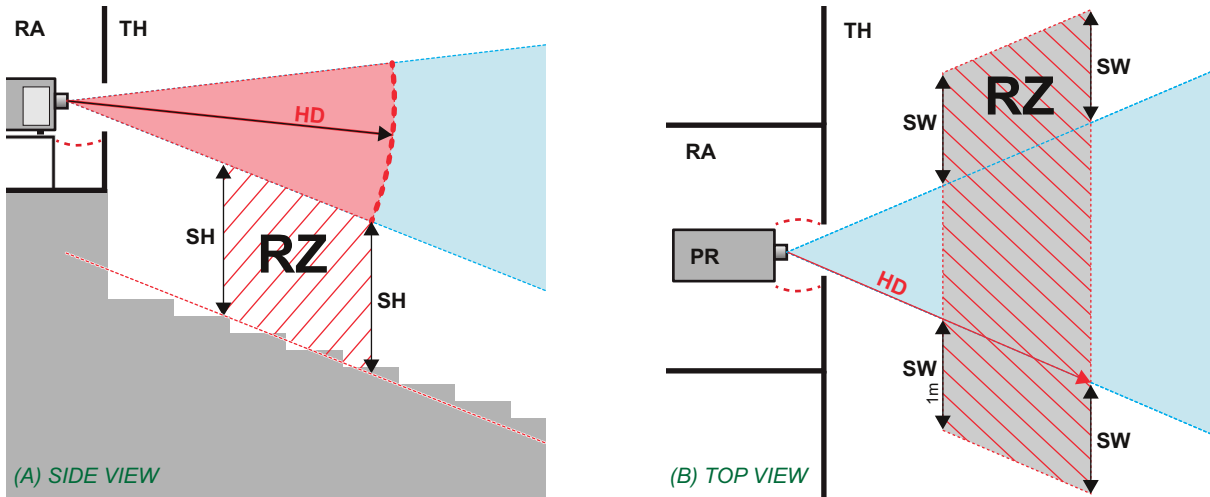
Image 1-1

A Side view.
B Top view.
RA Restricted Access location (boot area of projector).
PR Projector.

TH Theater.
RZ Restriction Zone in the theater.
SH Separation Height.
SW Separation Width.

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

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

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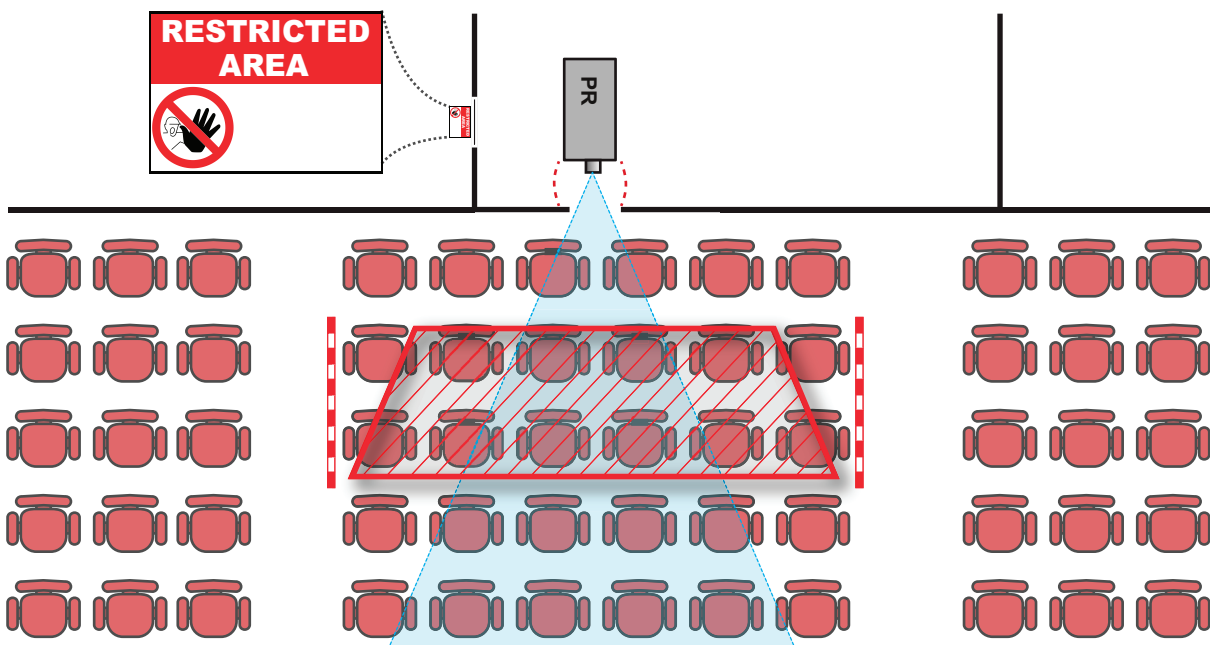
Image 1-2

USA market

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

LIPs for installation in restrained environment (cinema theaters) shall be installed at height vertically above the floor such that the bottom plane of the hazard distance zone shall be no lower than 2.5 meters above the floor. Horizontal clearance to the hazard distance zone shall be not less than 1 meter.

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

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

- This product can only be installed by Barco or sold or leased only to valid laser light show variance holders. In other words our installers are required to have an approved laser light show variance. Such installers may currently hold a valid variance for production of Class IIIb and IV laser light shows and/or for incorporation of the RG3 LIPs into their shows. Dealers and distributors are also required to obtain a valid laser light show variance.
- This product shall be located in such a way that all propagating beam paths within the Restriction Zone, and the audience can be directly observed at all times.
- Effects other than front or rear screen projections shall not be performed.
- Communication shall be maintained with other personnel assisting in surveillance of the LIP projection.
- In the event of any unsafe condition, immediately terminates (or designate the termination) of LIP projection light.

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

Laser light shows can be requested via the FDA online eSubmitter portal or via FDA Form FDA Form 3147 referencing to Barco's variance approval 2014-V-0285.

The installation checklist for laser illuminated RG3 projectors must be fully completed after the installation and sent to pvg@barco.com. This checklist can be downloaded from the Barco website. Only when the installer is a valid laser light show variance holder the checklist should not be sent to Barco.

1.6 HD for fully enclosed projection systems

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

Restriction Zone (RZ) based on the HD

The projector is also suitable for rear projection applications; projecting a beam onto a defuse coated projection screen. As displayed in Image 1-3 two areas should be considered: the restricted enclosed projection area (RA) and the observation area (TH).
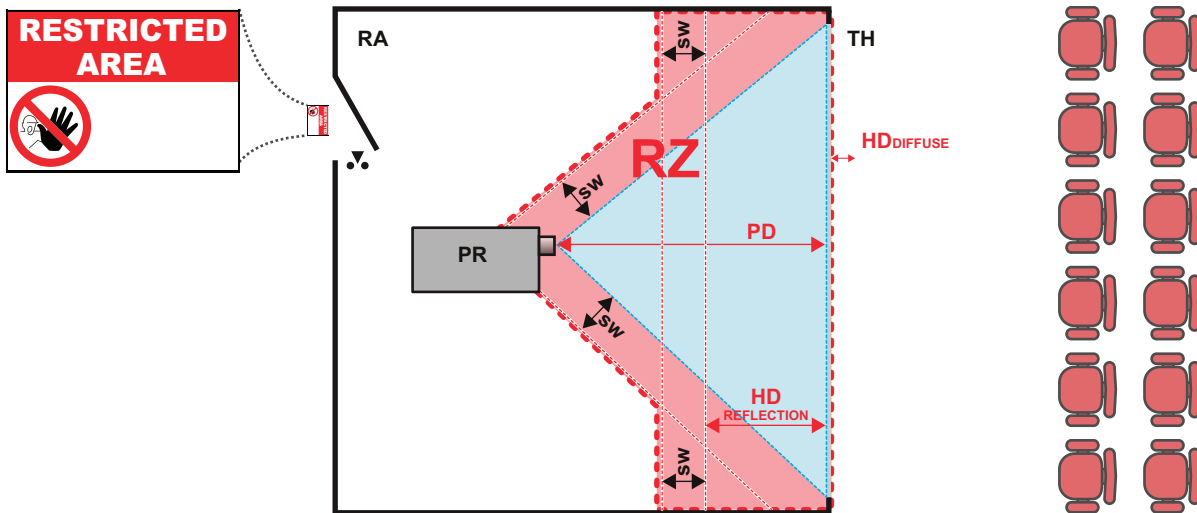
Image 1-3

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

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

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

- HD as discussed in "High Brightness precautions: Hazard Distance (HD)", page 16, relevant for intrabeam exposure.
- $HD_{reflection}$: the distance that has to be kept restrictive related to the reflected light from the rear projection screen.
- $HD_{diffuse}$: the relevant distance to be considered while observing the diffuse surface of the rear projection screen.

As described in "High Brightness precautions: Hazard Distance (HD)", page 16, it is mandatory to create a restricted zone within the beam areas closer than any HD. In the enclosed projection area the combination of two restricted zones are relevant: The restricted zone of the projected beam toward the screen; taking into account 1 meter Separation Width (SW) from the beam onward. Combined with the restricted zone related to the rear reflection from the screen ($HD_{reflection}$); also taking into account a 1 meter lateral separation.

The $HD_{reflection}$ distance equals 25% of the difference between the determined HD distance and the projection distance to the rear projection screen. To determine the HD distance for the used lens and projector model see graphs in 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.

1.7 HD in function of modifying optics

Hazard Distance
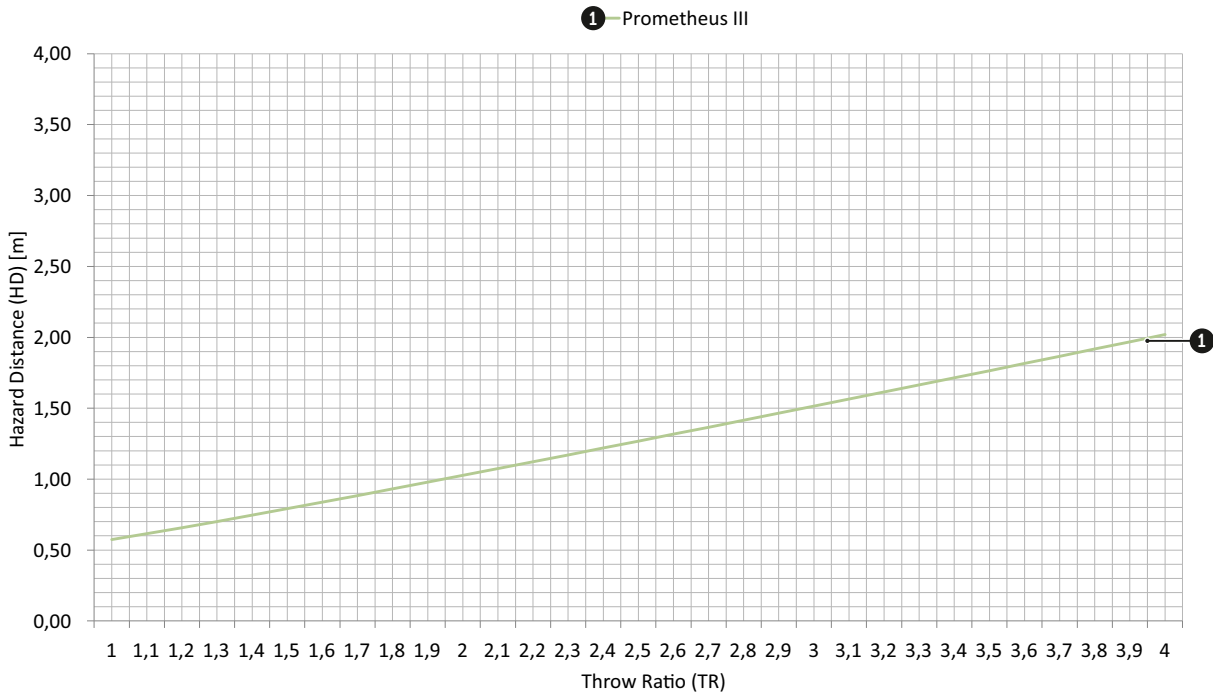
Image 1-4

HD Hazard Distance in meter
TR Throw Ratio

General

2

About this chapter

Read this chapter before installing your Prometheus III. It contains important information concerning installation requirements for the Prometheus III, 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.

About Prometheus IIIs

- PROMETHEUS III

> 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.

> After unpacking let the projector acclimatizes to a room temperature higher then 10°C (50°F) and lower then 35°C (95°F). It is suggests only using it after having stored it for 16 hours in final location. Neglecting this may result in a start up failure of the Light Processor Unit.

Overview

- Installation requirements
- About the delivered packages
- Unpacking the projector
- Initial inspection

2.1 Installation requirements

Environmental conditions

The table below summarizes the physical environment in which the Prometheus III 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)	-60 (-197Ft) to 10000m (32810Ft)

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

Use in high altitude conditions

When 3000 m environmental condition is combined with the highest permissible temperature (35°C ambient), the projector may be expected to go into warning status. Hence, for high altitude conditions, we advise max 30°C ambient condition (25°C is preferred).

Furthermore, to avoid temperature warnings on laser banks, we advise in high altitude to set cooler fans to 100%.

Cooling requirements

For functionality and reliability, the Prometheus III requires accurate temperature control and cooling. Therefore a liquid cooling system is provided consisting of liquid circuits inside the Prometheus III which are connected via hoses to external coolers. Only coolers and hoses exclusively developed for this application and approved by Barco are allowed to be used.

Main Power requirements

The Prometheus III operates from a nominal single phase power net with a separate earth ground PE.

Projector	Power requirements
Prometheus III	200-240 VAC, 50-60Hz, 20A 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 4 mm² or 10 AWG, minimum 300V.

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.

The building installation must be provided with a circuit breaker of max. 40A to protect the complete unit.

Exhaust outlet for external fan

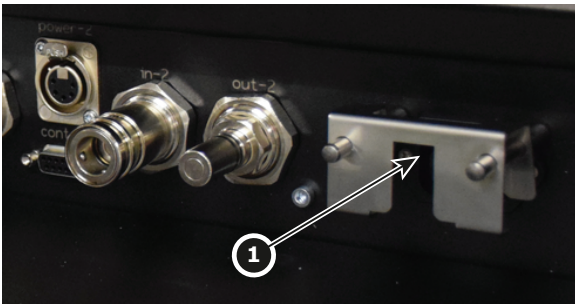The exhaust outlet has an output voltage of 200–240V at 50–60 Hz; switched and maximum 3 amperes is allowed.

Image 2-1

1   Outlet

The connection between the exhaust outlet and the external blower must be done with a certified AC power supply cord of minimum 0,75 mm² or 18 AWG and minimum 300V.

Projector weight

Do not underestimate the weight of the Barco Prometheus III.

The projector weights are without lens and without cooler. Be sure that the pedestal on which the projector has to be installed is capable of handling the complete load of the system.

Projector	Weight
Prometheus III	±147 kg (±324 lb)

The cooler weights ±32 kg (±70.6 lb).

> Barco offers a pedestal for the Prometheus III. This universal pedestal allows a solid and easy setup of the projector. The universal pedestal has a separate compartment to install the UPS unit for the Prometheus III. Futhermore, the universal pedestal contains a standard 19" rack to build in the projector peripherals such as alternative content switchers.

2.2 About the delivered packages

General

The complete projection system is delivered in 2 packages:
* Projector
* Stand alone pack accessories

The stand alone accessories contain the following content:
* 2 cooling units, each 1000W
* Cooling unit base plate
* Cooling unit housing
* 2 Cooling unit air filters
* Stand alone frame
* Stand alone hoses (4x) and cables (4x) with a length of 5 m
* Protection grid for cooling units

Overview
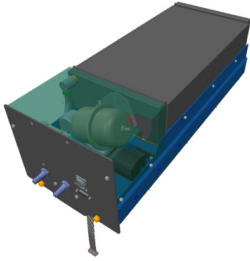
Image 2-2: Cooling unit
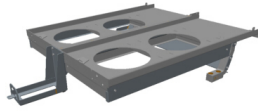
Image 2-3: Base plate (non-contractual photo, the fastening system may vary depending on the type of projector)

Image 2-4: Cooling housing
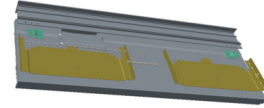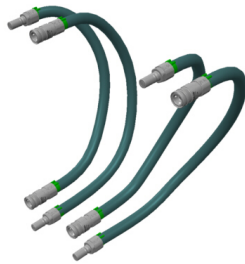

Image 2-5: Hoses (non-contractual photo, the length of the hoses may vary depending on the selected kit.)
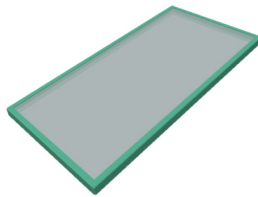
Image 2-6: Cooling filter
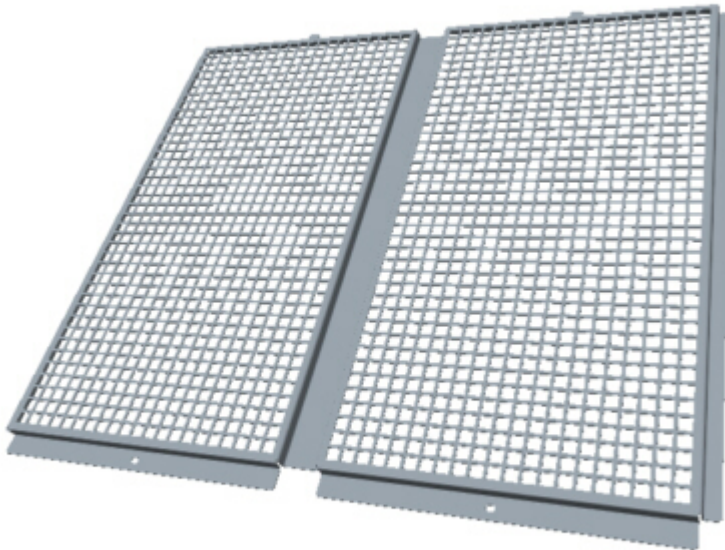
Image 2-7: Cooler protection grid (option for Stand alone cooler)

Option

The following optional accessories are available:

- A metal grid can be use to protect the radiators from damage due to direct blows or falling objects and such.
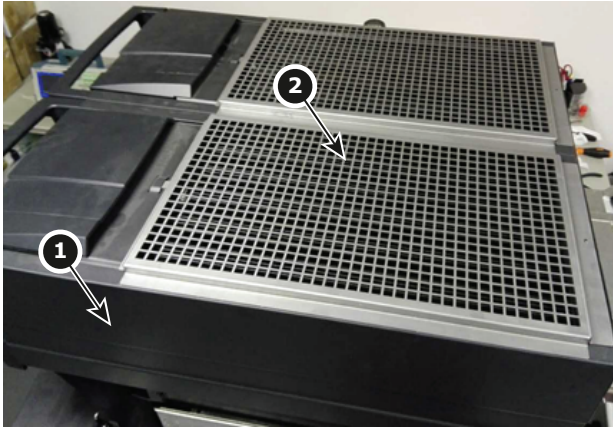
Image 2-8

1   Cooler
2   Metal grid

> 📄   This optional grid is delivered only in the Stand alone pack accessories. For further details, please see section dedicated to the physical installation of the stand alone cooler.

2.3 Unpacking the projector

What has to be done ?

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

> 📄   After unpacking let the projector acclimatizes to a room temperature higher then 10°C (50°F) and lower then 35°C (95°F). It is suggests only using it after having stored it for 16 hours in final location. Neglecting this may result in a start up failure of the Light Processor Unit.

Required tools

*   8 mm Allen wrench.
*   13 mm open end wrench.
*   17 mm open end wrench.

How to unpack

1. Loosen the banding by pulling the free end of the banding loop in the clip.

    Take off the box cover.
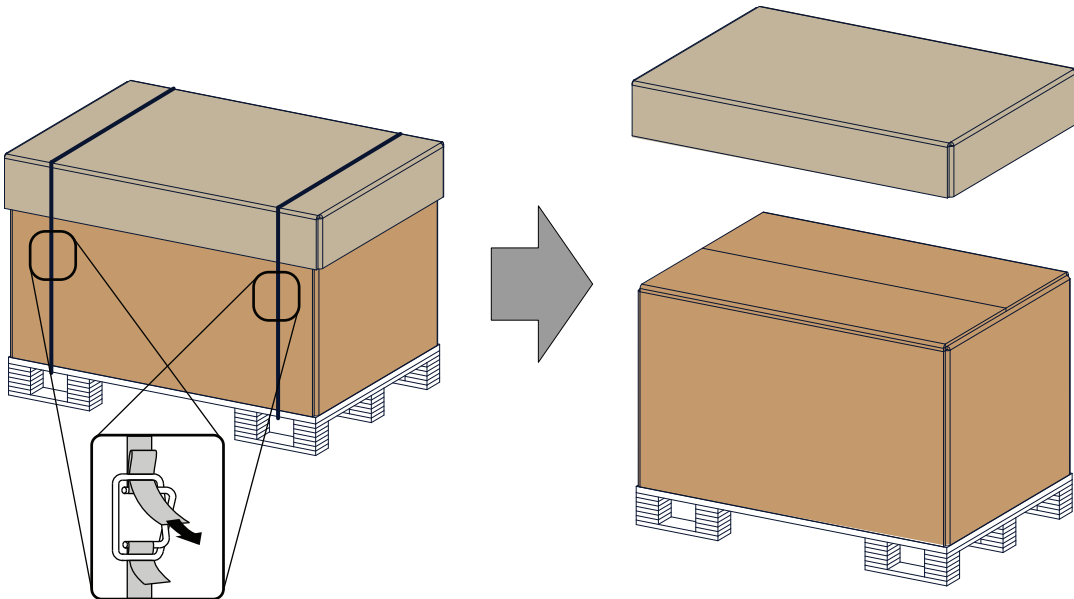
Image 2-9: Open banding

2. Open the box.

   Take out the small box between the outer and inner box containing the manuals.

   Remove the outer carton box
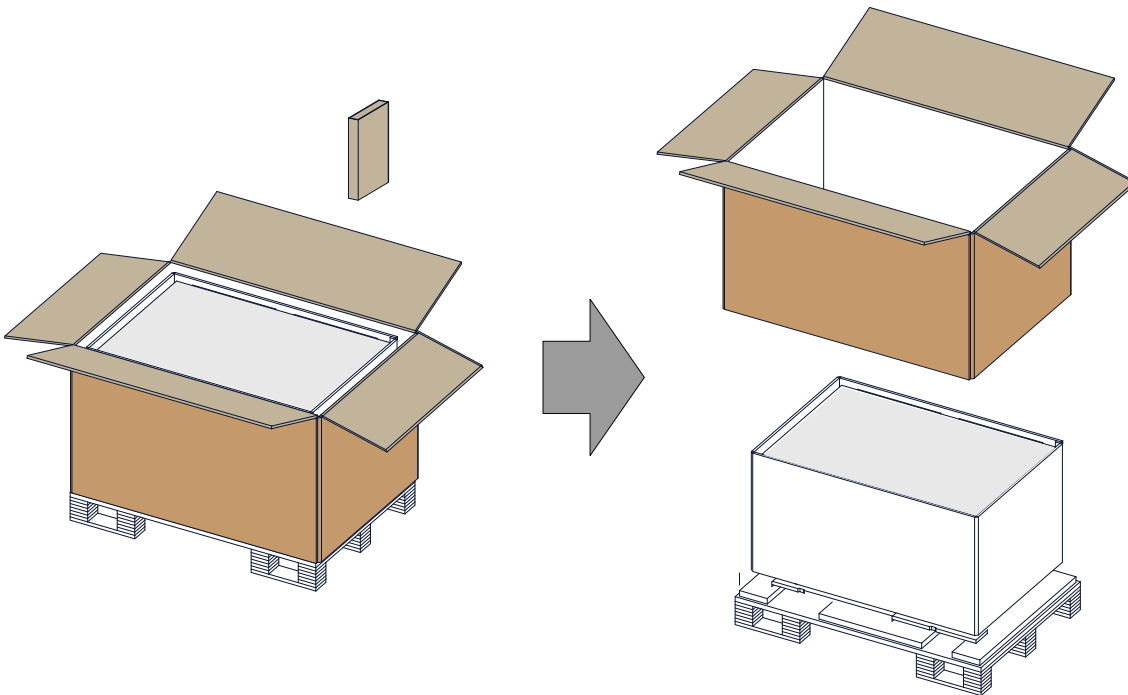
Image 2-10

3. Remove the inner carton box.
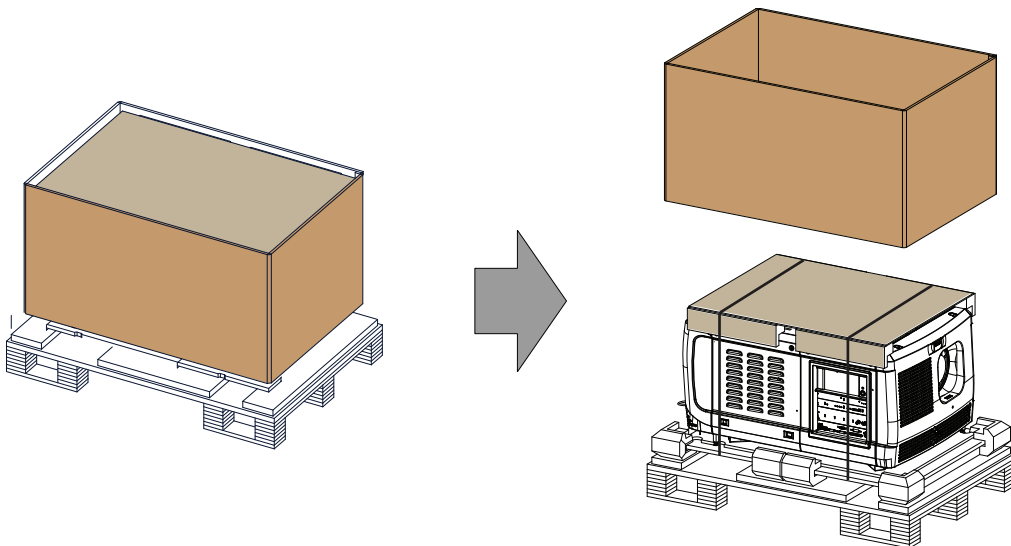
Image 2-11

4. Loosen the banding by pulling the free end of the banding loop in the clip.

Take off the upper carton plate (1)

Remove from the wooden pallet (2)
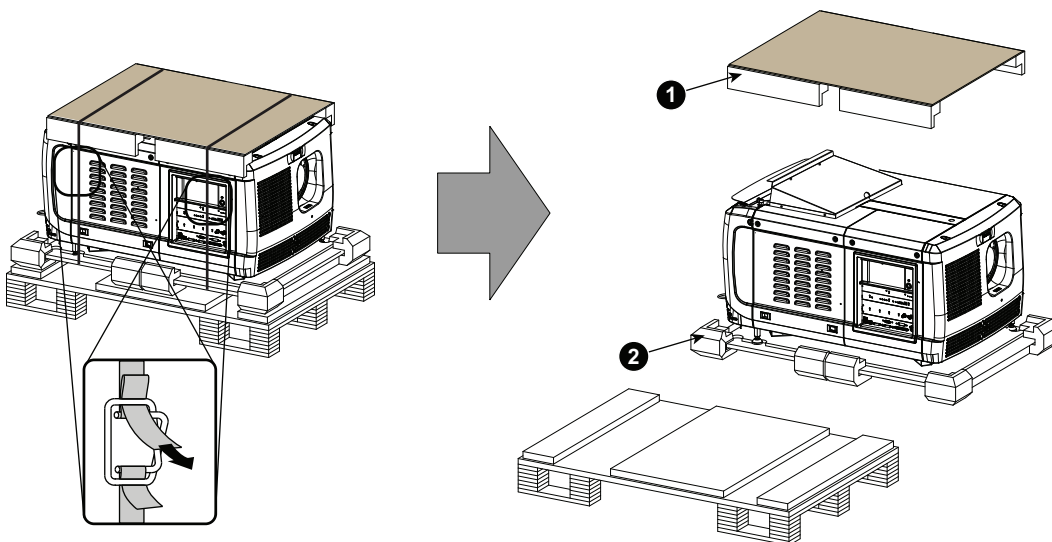
Image 2-12

5. Take the projector from the wooden board by gripping the bottom of the projector and place the projector on the pedestal.
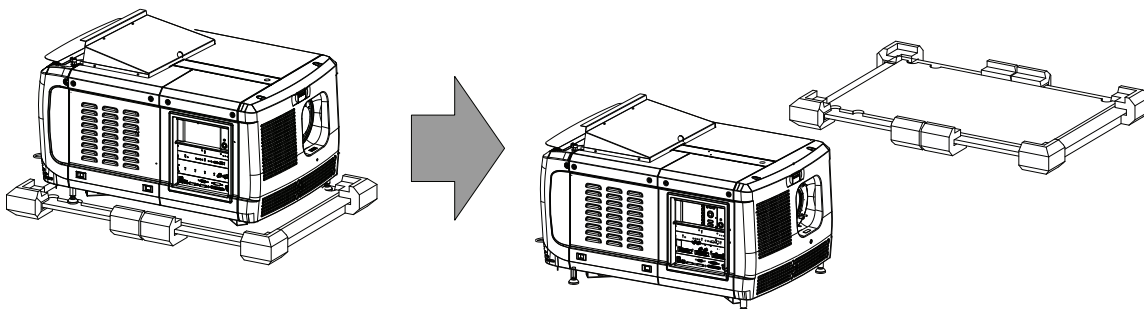
Image 2-13

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

> 📄 The projector is delivered with a plastic cover inside the Lens Holder. This to prevent intrusion of dust and foreign particles.

> 📄 The lens is delivered in a separate box. For lens installation, see section "Lens & lens holder".

2.4 Initial inspection

General

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

Projector Box content

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

* One short power link cable (mono phase) (in case no UPS is used) - Installed on projector.
* A short information notice to inform the user that installation manual (this manual) is available online on the Barco website.
* Safety manual

> 📄 The projector lens are 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. See "Removal of the input cover", page 138.

Installation process

3

About the installation process

The installation of the complete system is split up in two parts, installation of the projector and the installation of the cooler unit as top pack or stand alone pack.

Overview

- Installation process projector
- Installation process stand alone cooler
- Software upgrade
- Starting up and adjusting the system

3.1 Installation process projector

Installation process from A to Z

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

2. **Physical installation of the projector** upon its pedestal.

3. **Electrical connection with the power net**. See chapter "Connecting the Prometheus III 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 "Lenses & lens holder", page 63.

   ⚠️ *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, IMB, IMS or HDSDI input module**. (only in case no ICMP, 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", page 125. Make sure that all HDDs in the ICMP HDD set have the same storage capacity. See label on top of the HDD to know the storage capacity.

7. **Installation of the Cooler.** See "Installation process stand alone cooler", page 30.

8. (Option) **Installation** of the optional Communicator touch panel on the projector. In both stand alone and top pack solutions, it is possible to install a Barco communicator touch panel. Note: If the customer chose the top pack solution it is recommended to install the top cooler first, then the touch panel.

9. Upgrade all software to the latest available version. See "Software upgrade", page 30.

10. Start up your projector and adjust the system. See "Starting up and adjusting the system", page 31.

3.2 Installation process stand alone cooler

Installation process from A to Z

1. **Assembling** of the cooling **box housing**. The housing is delivered as a flat pack and should be assemble during the installation process.

2. **Mounting of the cooler housing** on its support.

3. **Mounting the empty cooler assembly** on the stand alone frame.

4. **Insert the cooler units** and filters.

5. Establish the **hose connections** (4x) between the cooler and the projector. Connect also the four **cables**.

3.3 Software upgrade

How to upgrade the software

1. 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.

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

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

3. Download the latest firmware from Barco's website in the same way as for Communicator.

4. Start Communicator and make a connection with the projector. For more information, consult the Communicator user guide.

5. Login as service technician and click on tab **Maintenance** and select **Software update**.

6. Click on **Launch DC update companion**.

7. Click **Next**, accept the license agreement and continue following the wizard.

3.4 Starting up and adjusting the system

Adjustment steps

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

2. **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 "Lens shift, zoom & focus", page 69.
      See chapter "Local keypad of the Prometheus III ", page 82, for detailed description of the Local Keypad buttons.

3. **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 75, and "Convergence", page 163.

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

5. Perform **Color calibration**. See chapter "Color calibration", page 171.

6. Create **light sensor calibration (LSC)** files. See user guide of the Communicator.

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

8. **Registration of the projector**. The Prometheus III is DCI compliant and should be registered.

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

10. In case the projector is equipped with an ICMP, download the ICMP 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", page 99, and user guide of the Communicator and/or (Web) Commander.

11. 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 133. Use the Communicator (Touch Panel) to configure the applied source. See the user guide of the Communicator (Touch Panel) for more detailed information.

12. 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 projector

4

About this chapter

This chapter describes how the set up of the projector has to be done.

Overview

- Positioning the Prometheus III at port window
- Access to the power connection
- Connecting the Prometheus III with the power net
- Power loop through to the projector electronics
- Connecting a UPS to the projector electronics

4.1 Positioning the Prometheus III at port window

⚠️ **WARNING:** The installation of the Prometheus III requires at least 4 persons.

General guide lines

- Use a solid pedestal to put the Prometheus III on. Ensure that the pedestal can handle 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 that the projector front cover is at a minimum distance of 20 centimeters from the port window.
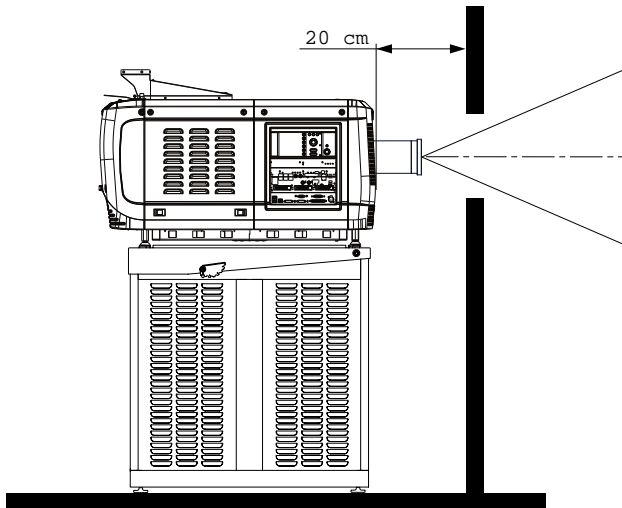
Image 4-1: Positioning at port window

☞ Barco offers a pedestal for the Prometheus III. This universal pedestal allows a solid and easy setup of the projector. The universal pedestal has a separate compartment to install the UPS unit (if available) for the Prometheus III. Futhermore, the universal pedestal contains a standard 19" rack to build in the projector peripherals like alternative content switchers.

Required tools

- 14 mm wrench
- 17 mm wrench

Projector centering

1. If the projector is standalone in front of the port window, center the projector with the theatre screen (see ref A Image 4-2).

2. If a film projector is already present (projector will be off-center), try to optimize aim (see ref B Image 4-2).

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

The off-center position slightly increases side keystone, but will minimize horizontal lens offset required.
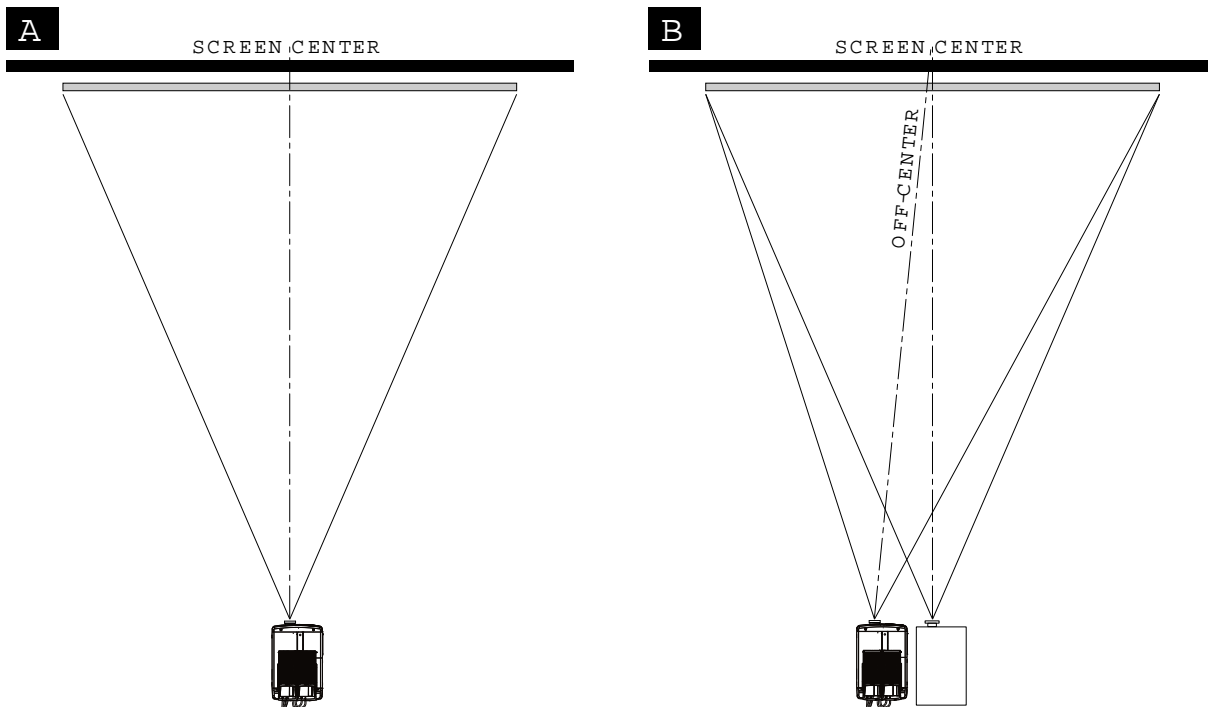
Image 4-2: Projector centering

3. Proceed to level the projector by adjusting the feet of the projector as follows:

  • Loosen the nuts (A), using a wrench of 24 mm, on the threaded rod.
  • Adjust the height of the 4 legs (B) to level the projector, using a 17 mm wrench.
  • Secure the leg height by tightening the nuts (A).

  📄 *Note:* There must be at least 5 cm between the bottom side of the projector and the pedestal.
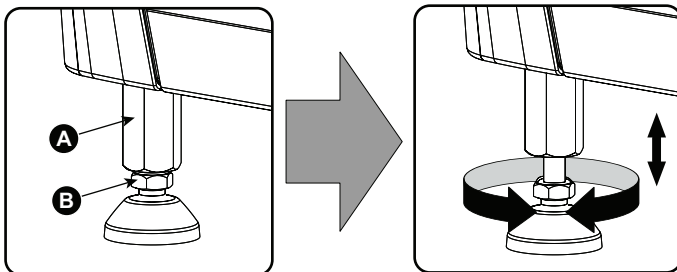
Image 4-3: Projector leveling

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

Projector tilting

In an ideal installation, the Prometheus III lens surface is **centered with** and **parallel to** the screen. This orientation helps to ensure optimized lens performances 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**.

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

2. Check with theatre personnel for 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 nuts (A), using a wrench of 24 mm, on the threaded rod.

- Adjust the height of the legs until the projected image matches the projection port window and the screen tilt.
- Secure the leg height by tightening the nuts (A).
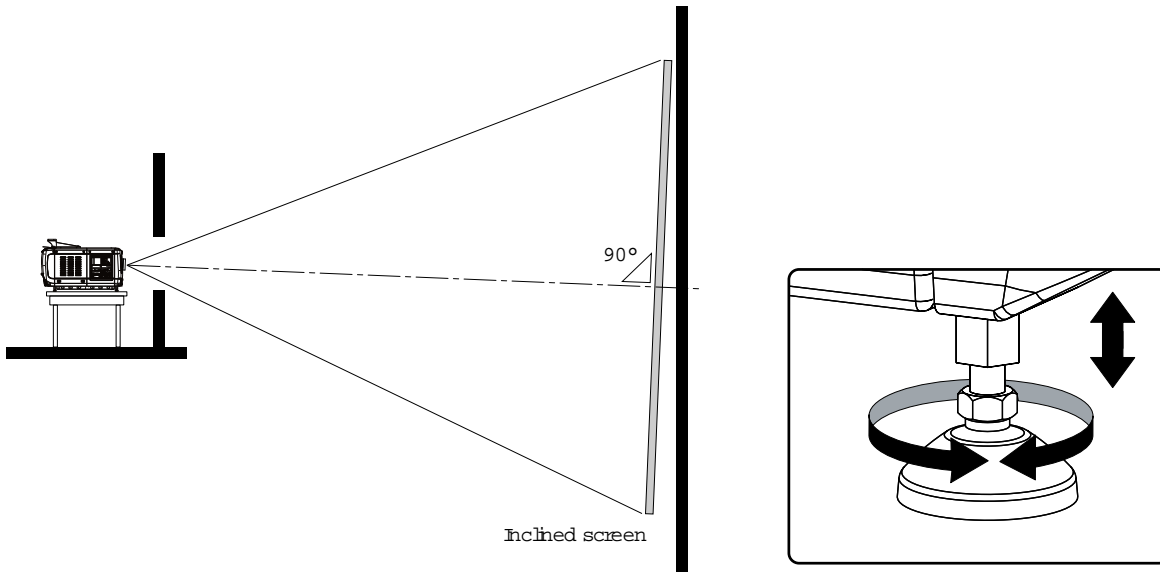
Image 4-4

> ⚠ **CAUTION:** The projector may tilt maximum 15° forward and maximum 15° backwards. This includes the tilt created by the projector feet and the tilt created by the pedestal.

> ☞ Barco offers a pedestal for the Prometheus III projector. This universal pedestal allows you to easily tilt the projector forward up to 6°.

4.2 Access to the power connection

Required tools

Flat screw driver 6 mm

How to access

1. Remove the back cover.

2. Loosen both captive screws (1).
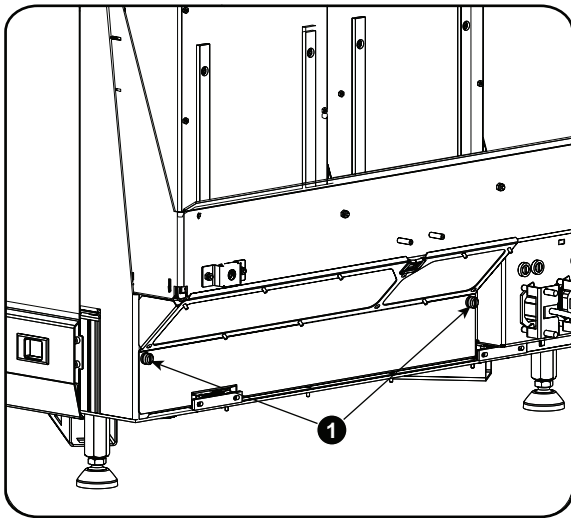
Image 4-5: Power connection cover, captive screws
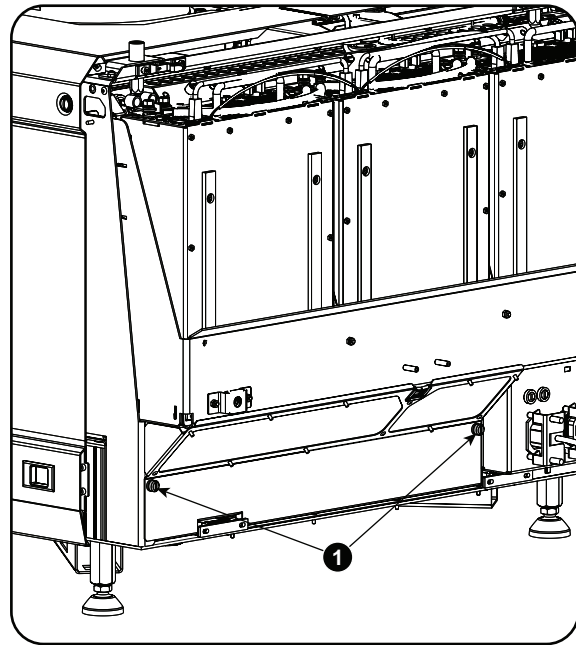
Image 4-6: Power connection cover, captive screws

3.   Slide off the power connection cover.
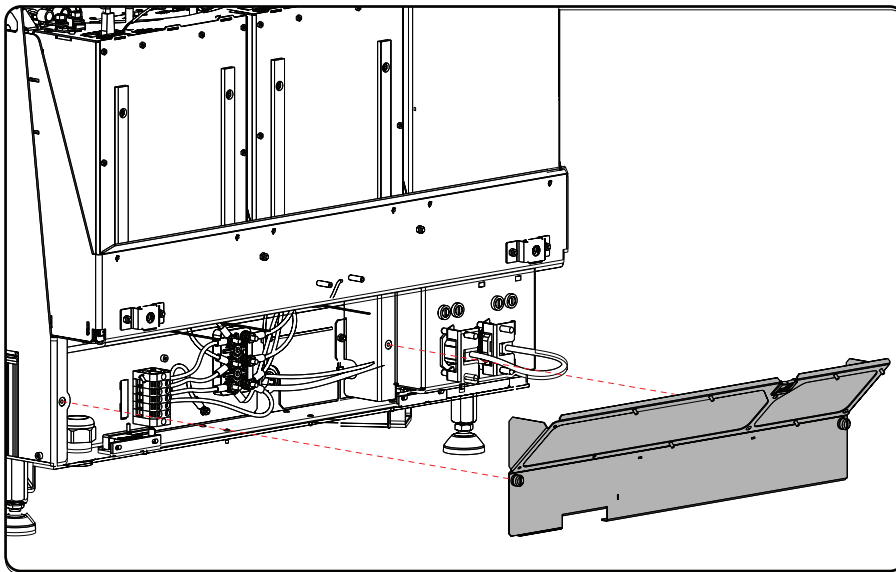
Image 4-7: Terminal strip accessible

The terminal strip and connection plate is accessible.

4.3 Connecting the Prometheus III 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.

> ⚡ **WARNING:** Make sure that the voltage range of projector matches with the voltage of the local power net.

> ⚠️ **CAUTION:** The cross-sectional area of the conductors in the Power Supply Cord shall be not less than 4 mm² or AWG 10

Required tools

- Flat torque screw driver
- Adjustable wrench

Required parts

- Certified power supply cord 4.0 mm², 10AWG, min. 300V, diameter between 11 mm and 21 mm
- Circuit breaker maximum 40A

How to connect

1. Remove the back cover.

2. Remove the power input cover.

3. Loosen the cable gland fixation ring (1).

   > 📄 *Note:* The cable gland (1) is specified for cables with a diameter between 11mm and 21mm.
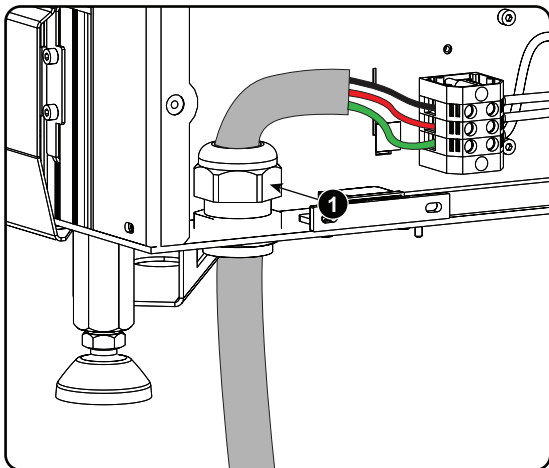
Image 4-8: Power cable connection

4. Push the stripped power supply cable through the cable gland. When using a flexible power cord, make sure that each conductor end is provided with an end sleeve.

   Fix the cable in the cable gland by securing ring 1 with an adjustable wrench.

5. Connect the power cord with the terminal barrier strip. Use a flat torque screw driver set to **2 Nm**.

   Always connect the ground wire (PE) with the connector indicated with *PE* on the terminal barrier strip.

   > ⚡ *Warning:* Always connect first the PE wire.

6. Reinstall the power connection cover and the back cover.

4.4 Power loop through to the projector electronics

> 📄 This procedure explains how to provide the projector electronics with power in case no UPS unit is used. Note that the projector is by default configured for use without UPS. So, the short power link cable is already installed.

Required tools

No tools required.

Required parts

Short power link cable with plug type C13/C14

How to loop through the power

1. Plug in the short power cable (1) which was delivered with the projector.

   ⚡ *Warning:* Always use the Barco short power cable which is delivered with the projector.
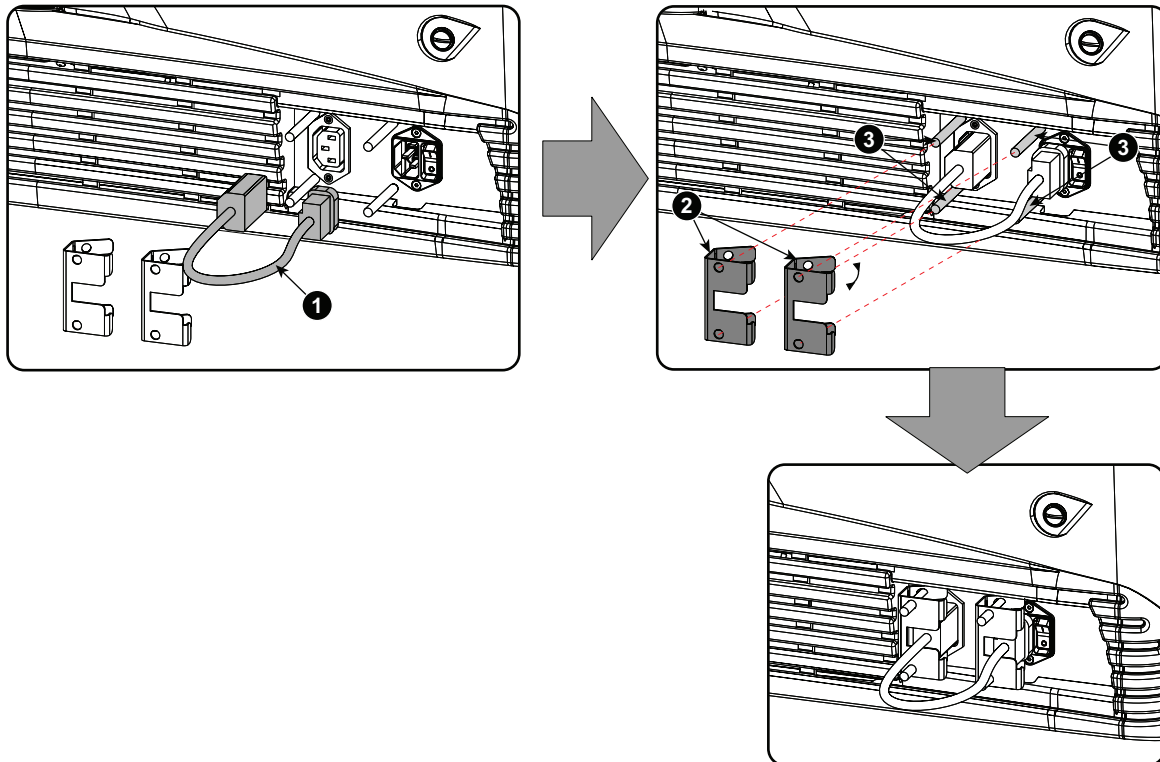
Image 4-9: Power loop through connection

2. Secure both plugs of the short cable with a fixation spring (2). Handle as follow:
   - Squeeze the fixation spring together.
   - Slide the fixation spring on the fixation pins (3) while squeezing together and push it against the power plug.
   - Release the fixation spring.

4.5 Connecting a UPS to the projector electronics

⚠️ **WARNING:** Only use UPS units which are suitable for the Prometheus III. See chapter "General", "Installation requirements" for more information about the requirements of the UPS.

How to connect the UPS

1. Install the UPS according to the instructions of the manufacturer and the local regulations.

2. Connect the power output cord from the UPS unit to the UPS inlet socket of the projector (right socket).

   Connect directly (A) or drag the cable behind the front cover so that the front cover can be removed without removing the UPS INLET cable (B).
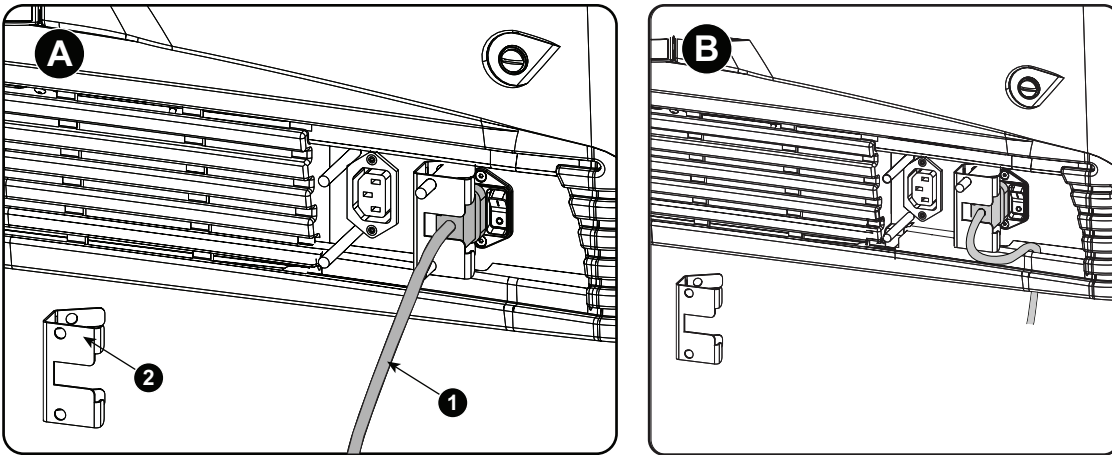
Image 4-10: UPS connection

3. Secure the UPS inlet socket with a fixation spring. Handle as follow:
   - Squeeze the fixation spring together.
   - Slide the fixation spring on the fixation pins while squeezing together and push it against the power plug.
   - Release the fixation spring.

4. Install on the power outlet the second fixation spring to prevent losing it (2).

⚠	**CAUTION:** The electrical connection with the UPS INLET socket of the projector must be done with a certified AC power supply cord (minimum 0,75 mm² or 18 AWG and minimum 300V)

⚠	**CAUTION:** Do not use the power OUTLET socket of the projector to provide power to other equipment!

Physical installation stand alone cooler

5

> ⚡ **WARNING:** When using the projector with a stand alone cooler, do not stand on the cooling tubes or do not place any object on the tubes so that free liquid flow can be guaranteed. Position the tubes so that there is no contact with hot surfaces.

> 📄 The tubes are pre-filled with liquid. It is not possible to refill the coolers or tubes on site. Hence take care to protect the tubes and quick connectors

Overview

- Supported mounting position
- Assembling the housing
- Mounting the housing on the frame
- Preparing the stand alone frame
- Installing the brackets on the cooler housing
- Mounting the cooler housing on the frame
- Insert the cooler units
- Mount the filters
- Cabling and tubing
- Mount protection grid for the LCM cooler modules (option)

5.1 Supported mounting position

General

The Standalone cooler can be positioned flat on a solid surface (Floor Mounting) or fixed onto the wall in portrait or landscape modes (Wall mounting).
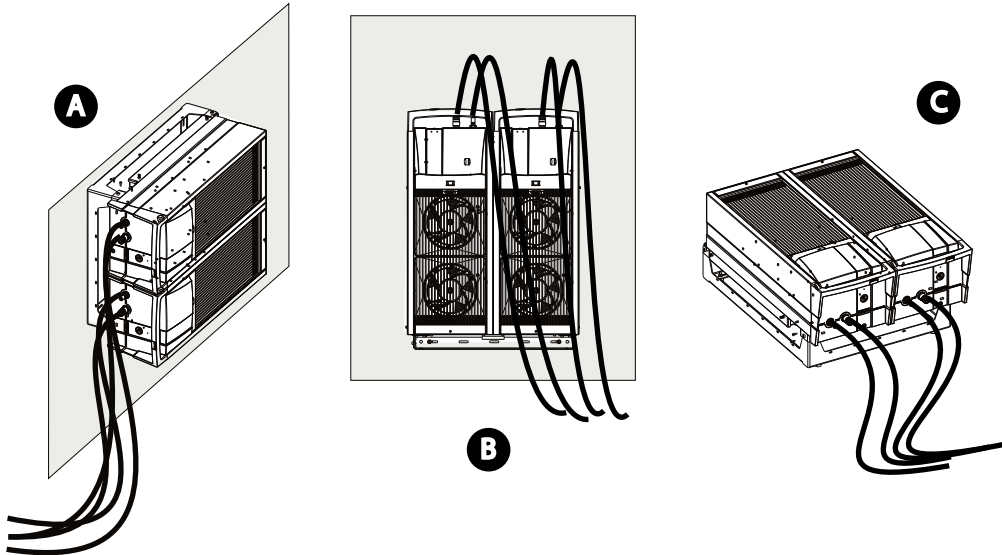
Image 5-1

A Wall Mounting (Landscape).
B Wall Mounting (Portrait).
C Floor Mounting.

Details and limitations

Depending the mounting option chosen, some limitations must be considered:

• **Floor mounting**: When this option is chosen, the cooler is installed on a flat and stable surface, in horizontal position. Four feet correctly distributed (2 on each side) allow stabilize the device. The cooler could be tilted forward or backward, but for security reasons it is strongly recommended to let the unit in horizontal position, the best way to avoid the potential hazards of falls and slips.
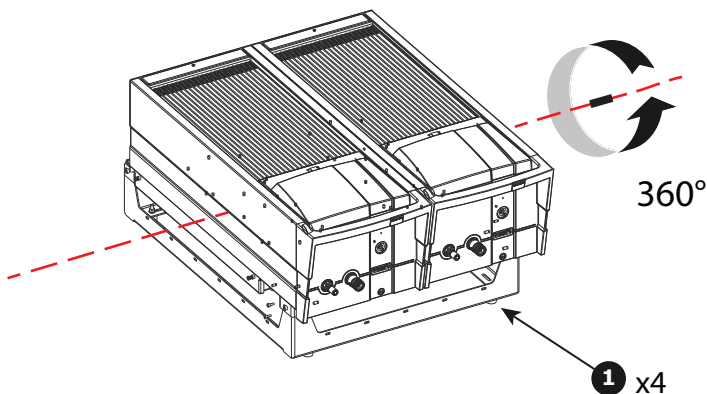
Image 5-2

1 Four feet allow stabilize the unit.

Stacking Standalone coolers: It is NOT allowed to stack multiple cooler modules on top of each other. The air intake of the upper cooler would take in the "hot" air of the lower cooler, even at a distance of 1m apart.
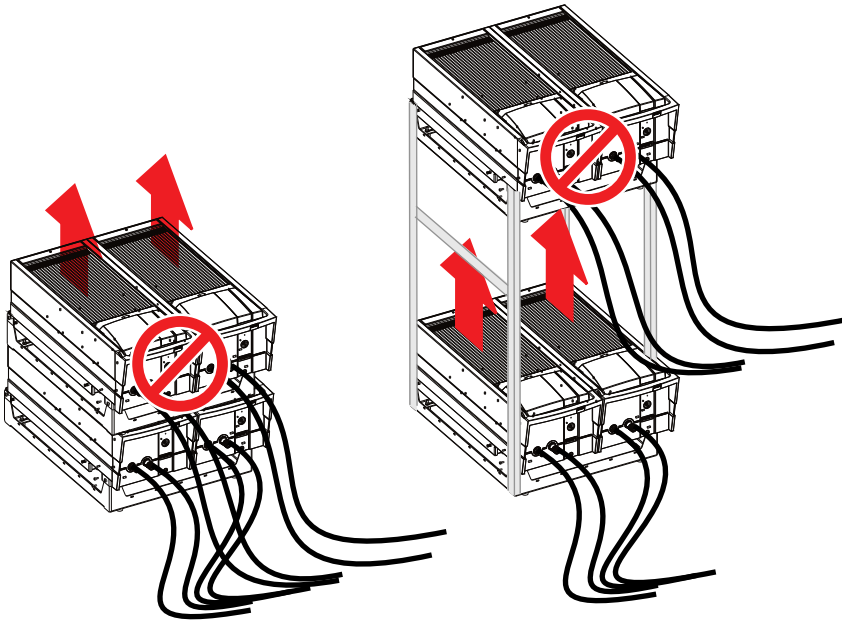
Image 5-3

A Stack of cooler positioned on their sides may be considered, but in this case, the direction of the entire coolers need to be the same, in order to forcing air flow in the same direction.
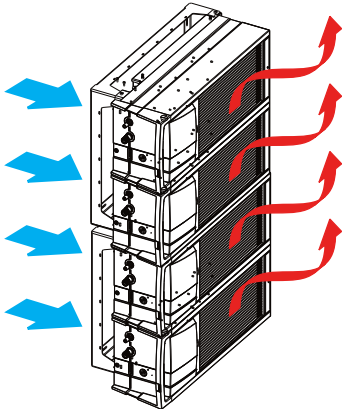
Image 5-4

Note: This positioning must be secularized with an adapted structure.

- **Wall mounting**: When this option is chosen, the cooler must be fixed on the wall in portrait mode or in landscape mode.
  In portrait mode, the cooler must be mounted with the cooling tubes up. The other position (cooling tubes down) is not authorized because coolers are heavy (more or less 15kg) and if the safety clic fails and the cooler screw is not fixed, the cooler will simply fall to the ground! In this orientation it is also less practical to remove a cooler for service.
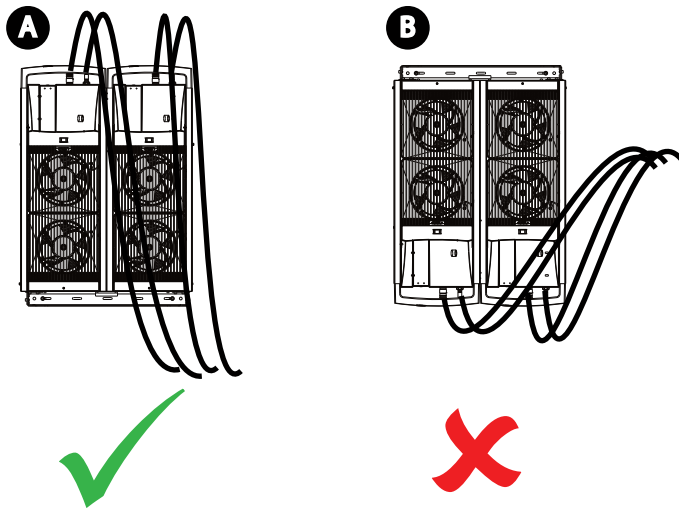
Image 5-5

A Portrait Mode with cooling tubes to the top.
B Portrait Mode with cooling tubes down (not authorized)

In landscape mode the cooler must be mounted with the cooling tubes to the left. The other position (cooling tubes to the right) is not authorized due to technical constraints. Functioning and lifetime of internal pump could be impacted if the unit is installed in this position.
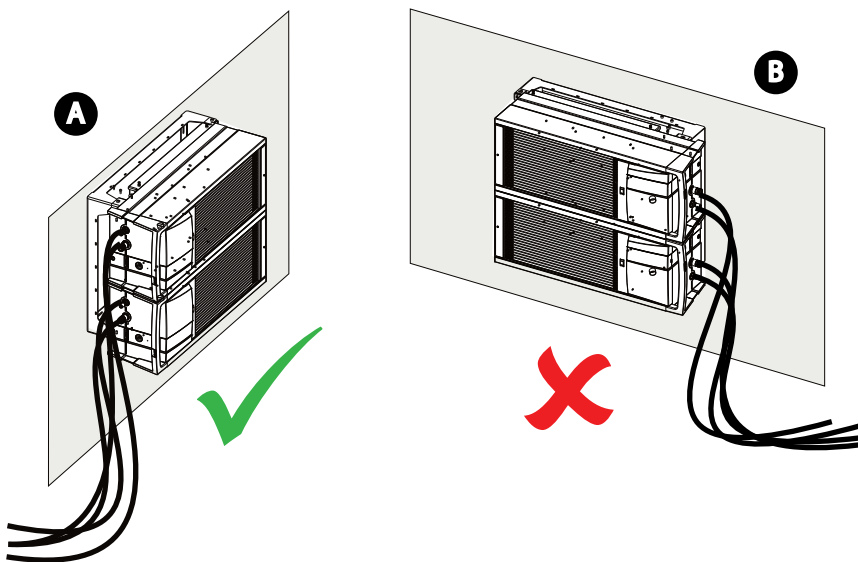
Image 5-6

A Landscape Mode with cooling tubes to the left (only one authorized position).
B Landscape Mode with cooling tubes to the right (not authorized).

5.2 Assembling the housing

Housing parts

The housing parts are delivered as a flat pack and should be mounted together at the customers side.
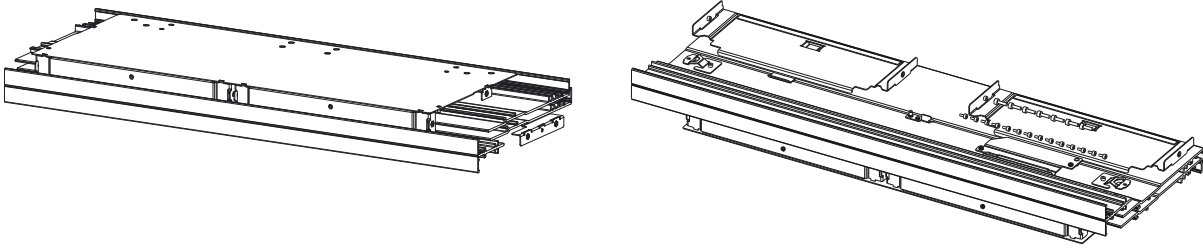
Image 5-7
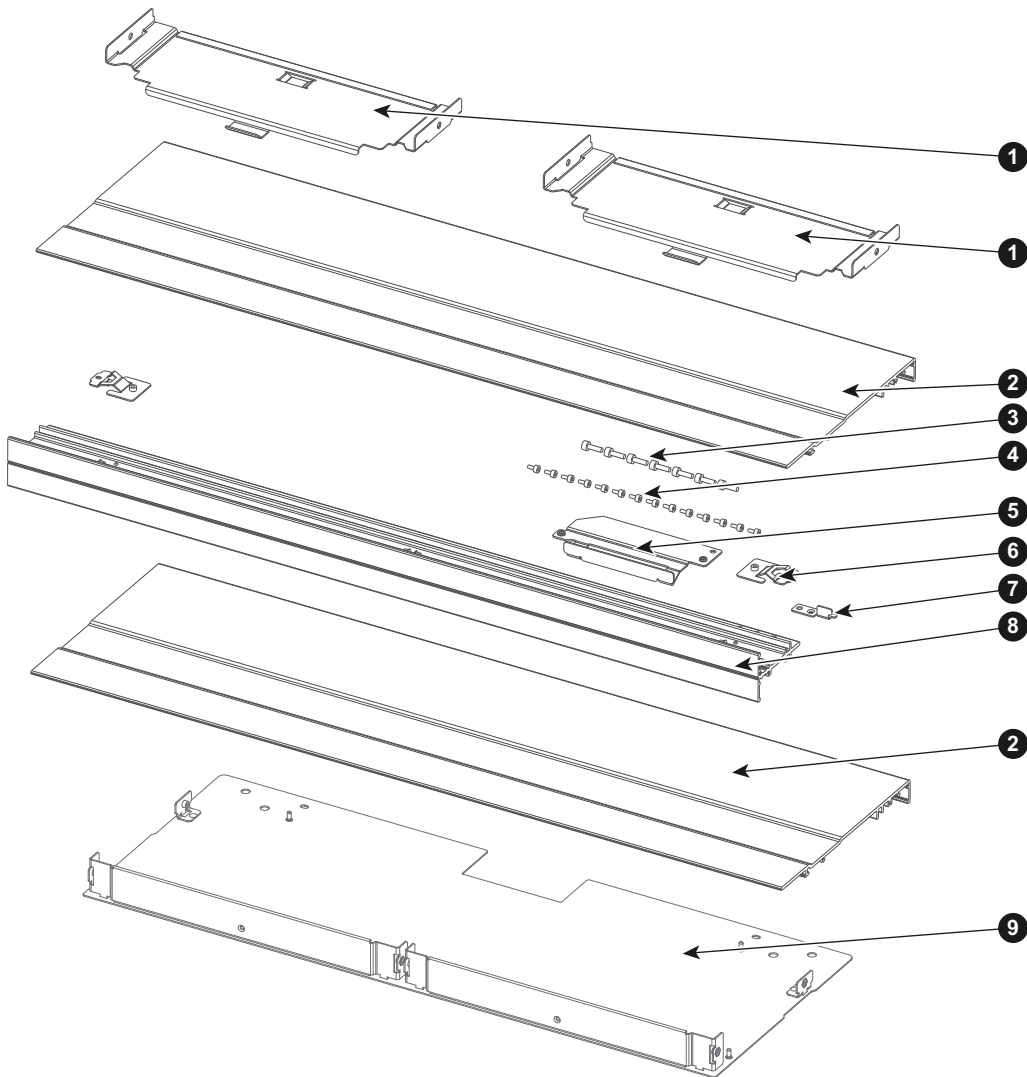
Image 5-8

This flat pack contains the following parts:

1   Top plate

2   Side covers

3   M4 Hex Screws

4   M3 Hex Screws

5   Support for middle bracket

6   Side fixation

7   Position plate

8   Middle bracket

9   Front plate

overview:
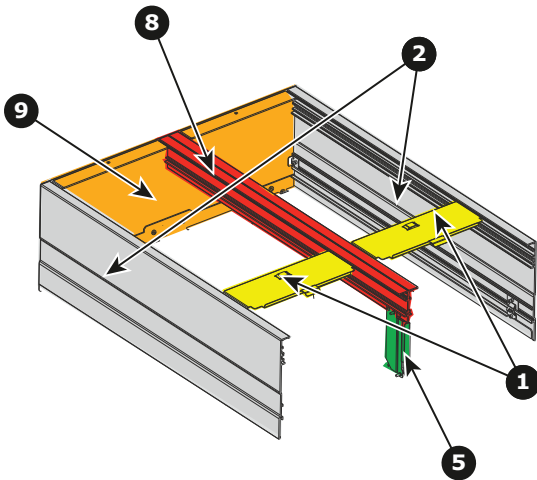
Image 5-9

Required tools

- Allen wrench 2.5 mm
- Allen wrench 3 mm

☞   First, turn all the screws in the inserts before starting to assemble.

☞   Into the drawings used in this procedure, orientation of the unit is indicative. Don't hesitate to change the unit orientation to facilitate the mounting of parts. By example, it could be more easy to lay flat the front plate upon the table when you installing the both side covers.

How to assemble

1.   Insert the side fixation on both side covers. Slide it in for about 4 cm.

Make sure you insert the side fixation for the left side cover on the opposite side.

Turn in a set screws (M3) on each side but do not fasten it yet.
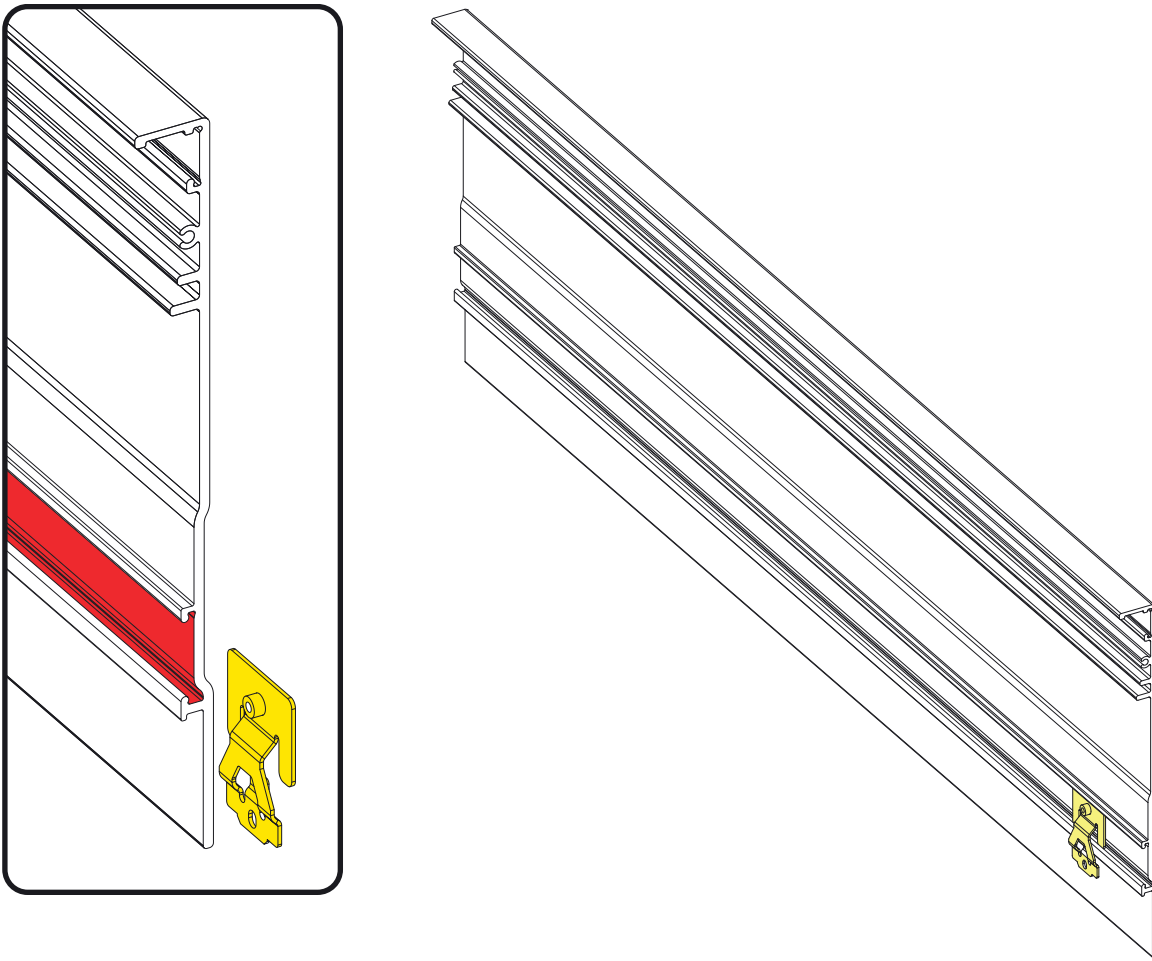
Image 5-10

2. Slide the front plate with both fixation brackets fully on both side covers.

    Turn in the 4 set screws (M3) and tighten them fully until the brackets are pushed strongly against the ribs in the cover.

    Note: There may be paint job markings left on the internal side of the side covers (e.g. in the grooves for the positioning pin). These markings are no thread nor should they be mistaken for such.
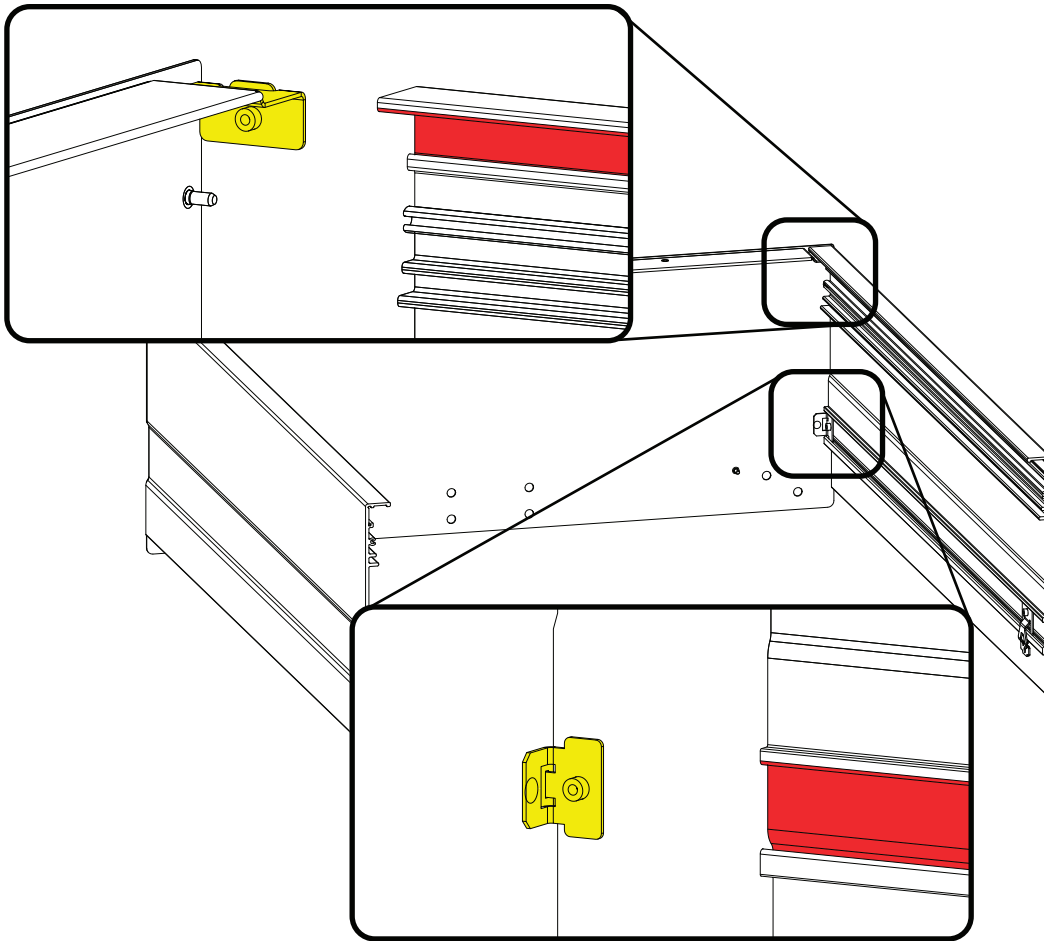
Image 5-11

3. Install the position plate onto the middle bracket as illustrated. Tighten the plate with an M4 hex screw.
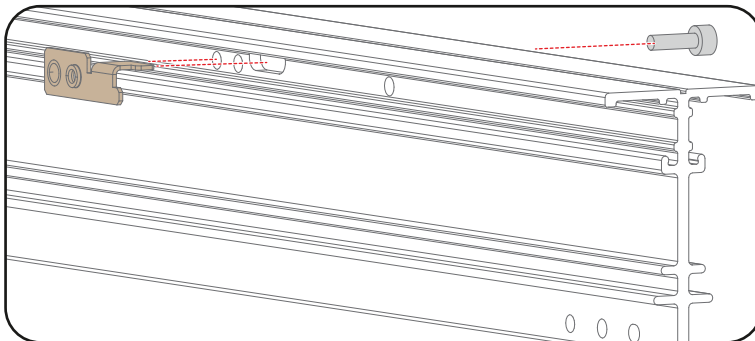
Image 5-12

4. Slide the middle bracket into the grooves of the front plate. Pay careful to orient the middle bracket like indicated in the drawing below (the three holes at the below of the bracket must be placed at the opposite to the front plate). Turn in a set screw (M3) as indicated in reference 1.

    ☞ *Tip:* Put in place the screws, without tightening them, before slide the middle bracket. It is more easy to positioning the screws when the middle bracket is not in place.
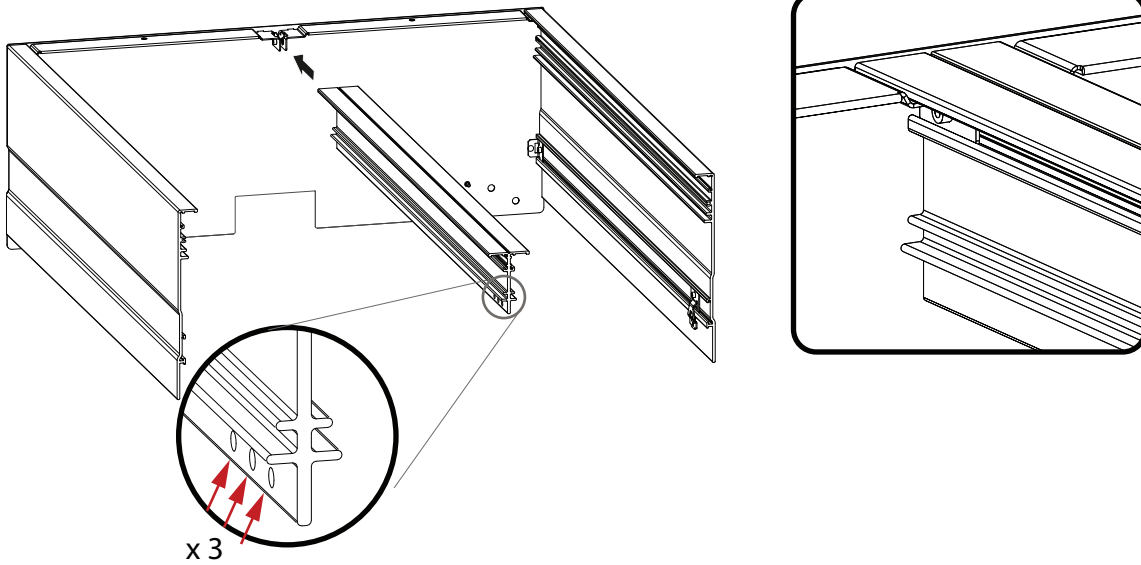
Image 5-13

5. Slide both top plates as indicated into the grooves. Slide until you reach the position plate and the hole matches the hole in the brackets. Use one screw (M3) on each side of the top plates and tighten them fully until the brackets are pushed strongly against the ribs in the cover and middle bracket.

> *Tip:* Put in place the screws, without tightening them, before slide the top plates. It is more easy to positioning the screws when the top plates are not in place.
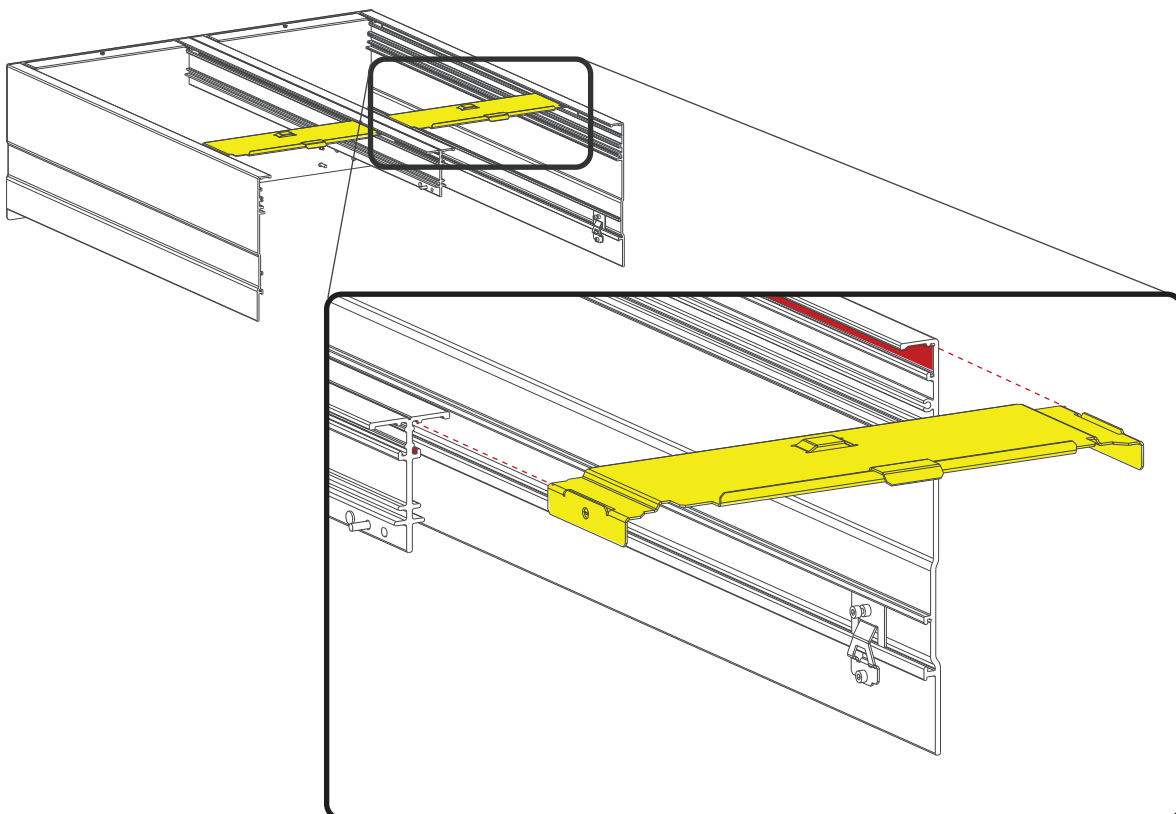
Image 5-14

6. Hook the middle bracket support into the middle bracket.

Turn in the fixation screw (M4).
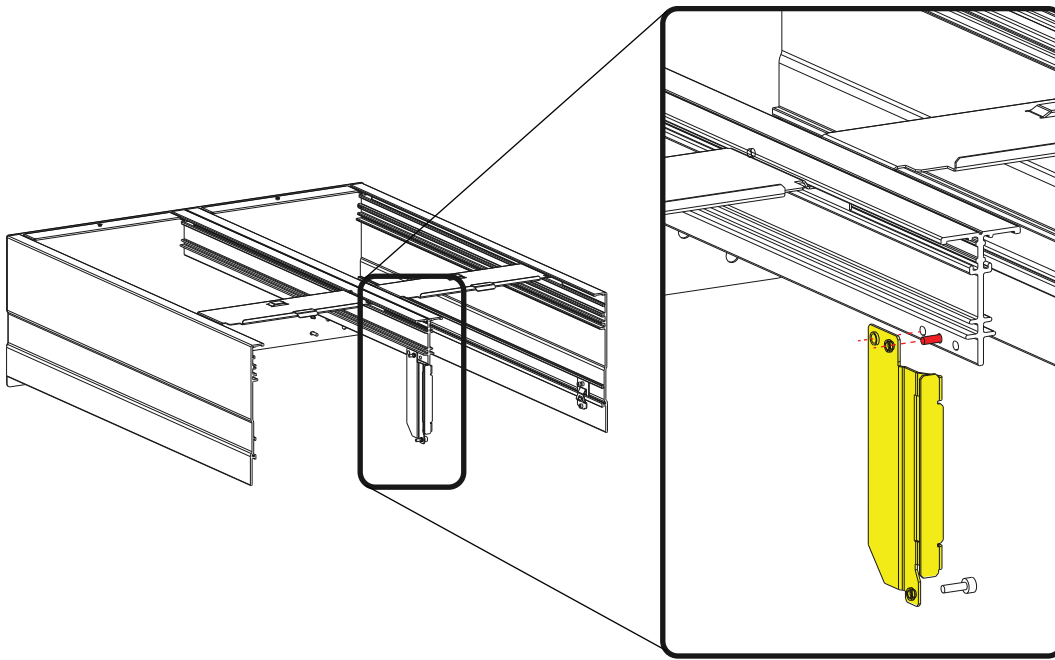
Image 5-15

The housing is ready to be mounted on the frame.

5.3 Mounting the housing on the frame

Required tools

Allen key 3 mm

How to mount

1. Place the housing on the cooler frame so that both positioning pins (1) on the housing match the notches in the frame.
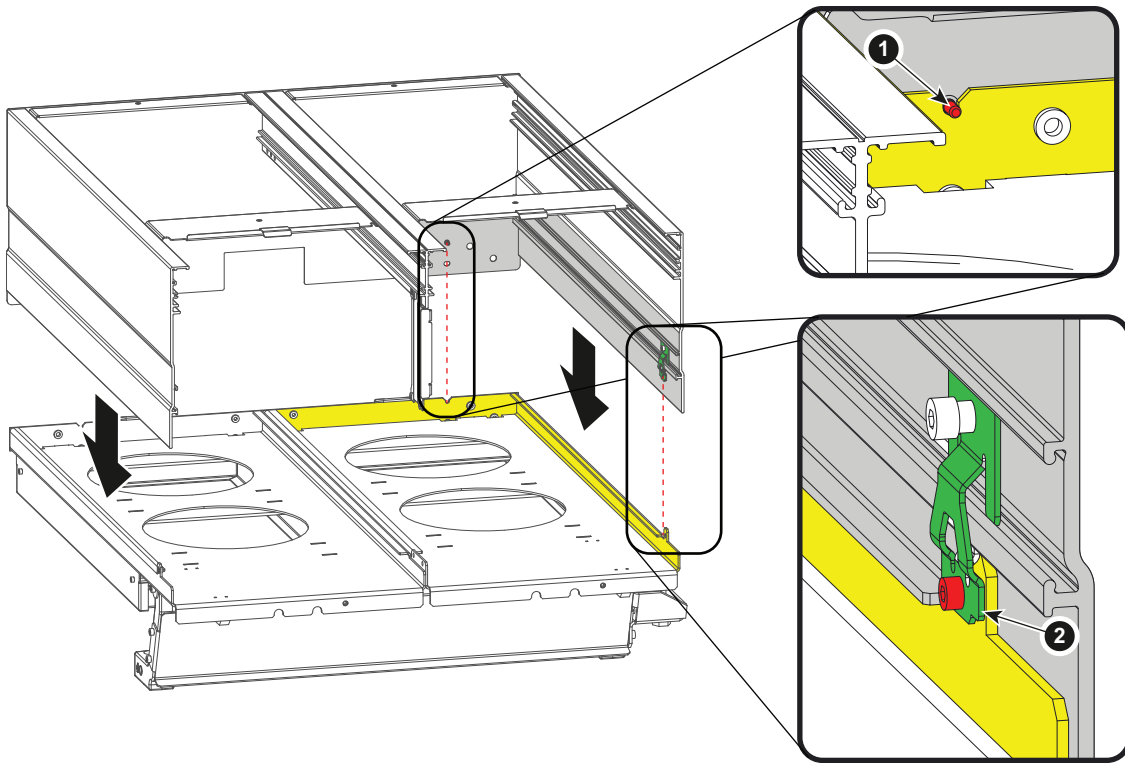
Image 5-16

2. Also make sure that the frame fits behind the clamp (2). If necessary, slide the clamp a little bit in the housing. Fixate the clamp fully so that it fits behind the rib on the housing.

   Drive in a screw (M3) to connect the clamp to the frame.

   Repeat for the other side.

3. Place the support for the middle bracket on the frame as indicated.

   Drive in the fixation screw (M4).
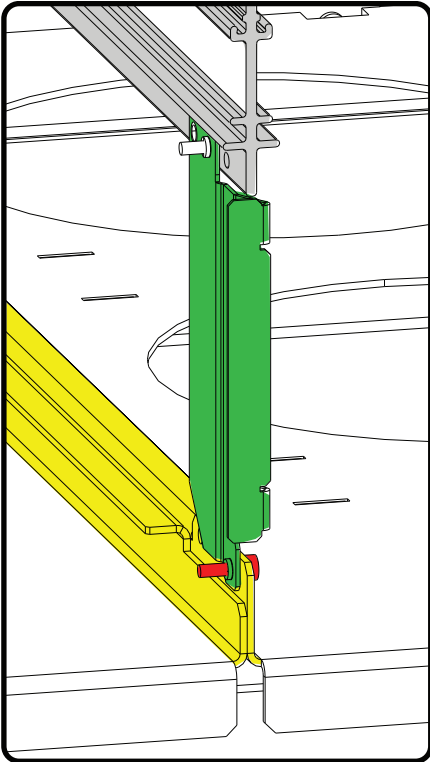
Image 5-17

4. On the front side, drive in the 2 screws (M4), one at the left and one at right.
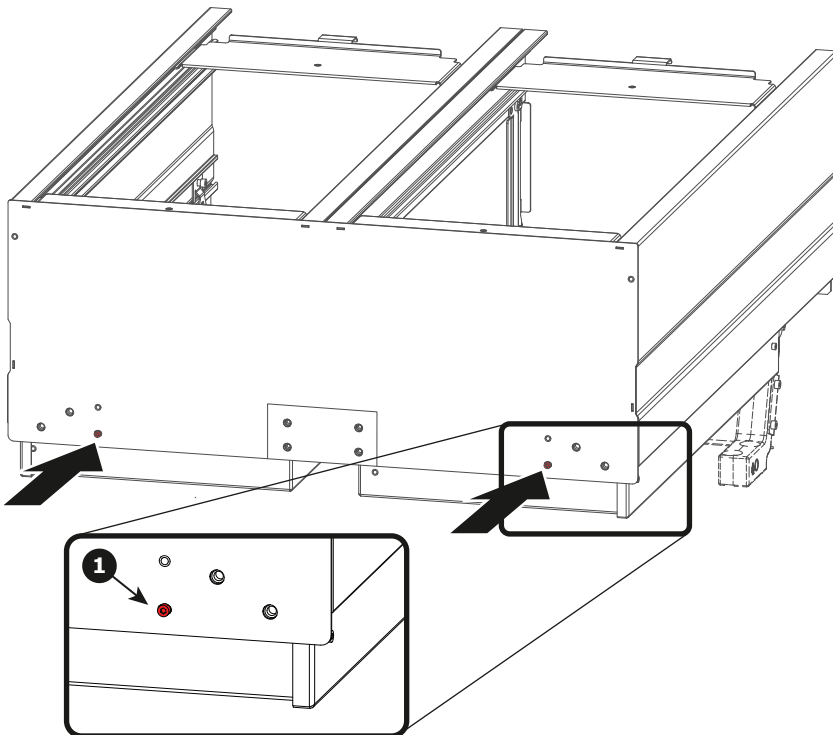
Image 5-18

Note: Only the hole referenced 1 must be used. The other holes around are not used at this step of the procedure.

5.4 Preparing the stand alone frame

Required tools

• Allen key 3 mm
• Nut driver

Required parts

• Stand alone frame
• 4 feet (floor mounting option)

Floor mounting

To install the standalone cooler in floor mounting mode follow this procedure:

1. Mount the 4 feet in such a way that the frame can stand stable. E.g. 2 on each short side or 2 on each long side.
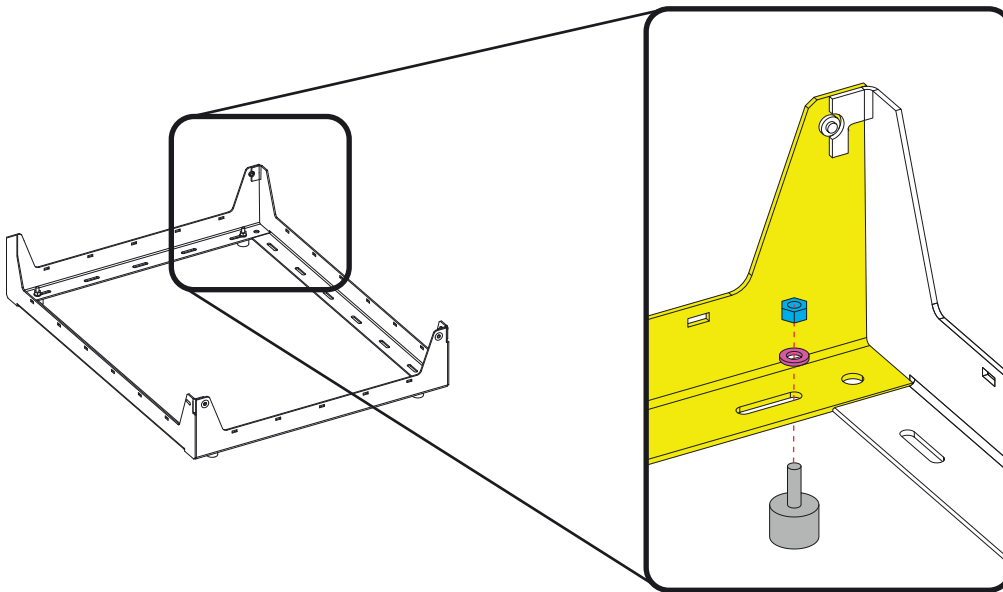
Image 5-19

2. Push the threat axle through one of the holes and secure with a washer and a nut.

Continue with "Installing the brackets on the cooler housing", page 54.

Wall mounting

To install the standalone cooler in wall mounting mode follow this procedure:

1. Place the stand alone frame against the wall (side indicated with 1) and mark the drilling hole. Any hole in the frame can be used as fixation point but make sure to divide the fixation point over the complete frame.

It can be mounted in portrait mode (A) or in landscape mode (B).

Note: In portrait mode the coolers must be mounted with the cooling tubes up. In landscape mode the cooler must be mounted with the cooling tubes to the left.
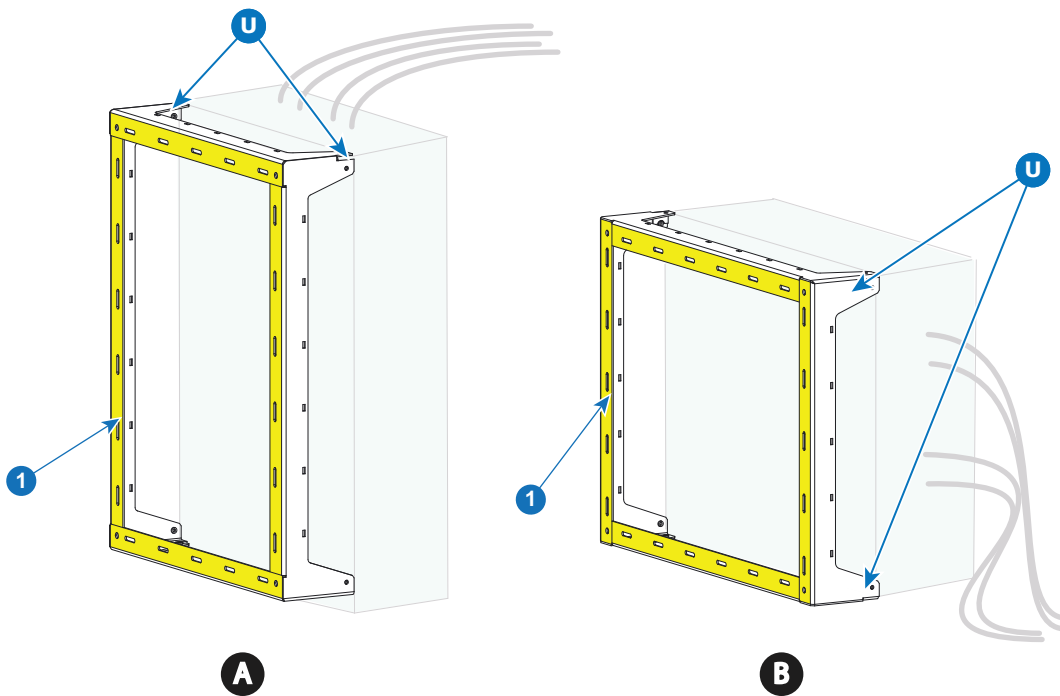
Image 5-20

1 Wall side
U U brackets location
A Portrait mode
B Landscape mode

When mounting the cooler assembly, the U brackets which will be mounted on the housing must be fixed to the indicated position (U) on the frame.

• For portrait mode the U brackets must be mounted on top (cooling tubes will be facing upwards) .
• For landscape mode the U brackets are mounted on the left side (cooling tubes will be facing to the left).

Continue with "Installing the brackets on the cooler housing", page 54.

5.5 Installing the brackets on the cooler housing

Required parts

• 2 front brackets (U-brackets)
• 2 equal rear brackets
• 4 Hex Screws M5x8
• 4 Hex Screws M5x12

How to install the brackets

1. Fixate the U-bracket (on both sides) to the side of the cooler housing with 2 screws (M5x12).
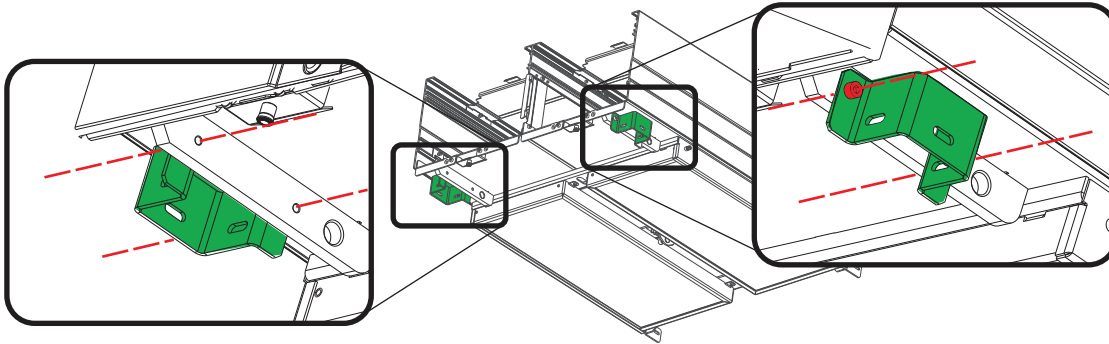
Image 5-21

2. Fixate the rear brackets to the backside of the cooler housing with 2 screws (M5x8) each.
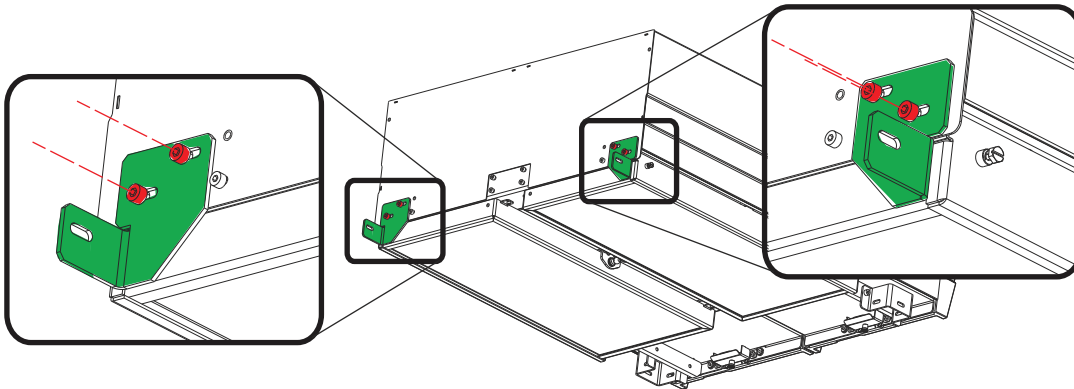
Image 5-22

5.6 Mounting the cooler housing on the frame

Required parts

*   Cooler housing already assembled
*   Frame
*   5 Hex Screws M5x8

> 📄 At this step of the procedure, the frame is considered as being in its final position, and already fixed, if the wall mounting option has been chosen. See chapter dedicated to the standalone frame preparation.

How to mount

1. Place the housing on the frame.
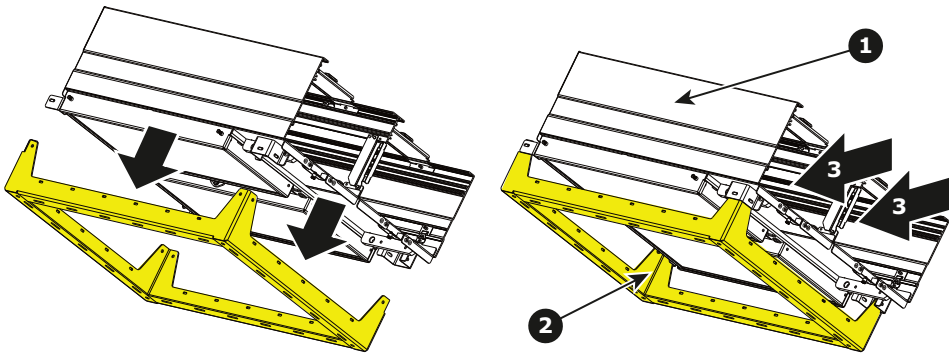
Image 5-23

1 cooler housing
2 Frame
3 cooler inputs

2. Fixate the first U-bracket to the frame with 2 screws (M5x8) as shown in the following drawing.

   Note: The two U-Brackets are not fixed in same manner. Here, the concerned U-bracket, is situated in the lower left corner of the housing when you look at the device on the side of the cooler inputs.
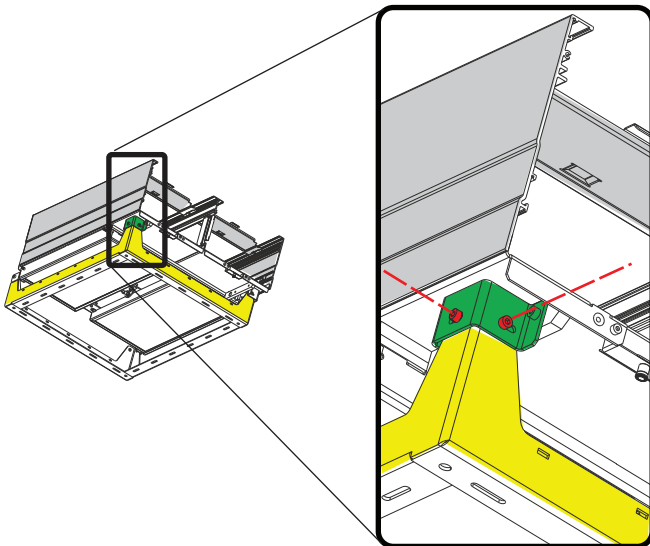
Image 5-24

3. Fixate the second U-bracket to the frame with only one screws (M5x8) as shown in the following drawing. There is a space of more or less 2 centimeters between the frame side and the bracket.

   Note: The two U-Brackets are not fixed in same manner. Here, the concerned U-bracket, is situated in the lower right corner of the housing when you look at the device on the side of the cooler inputs.
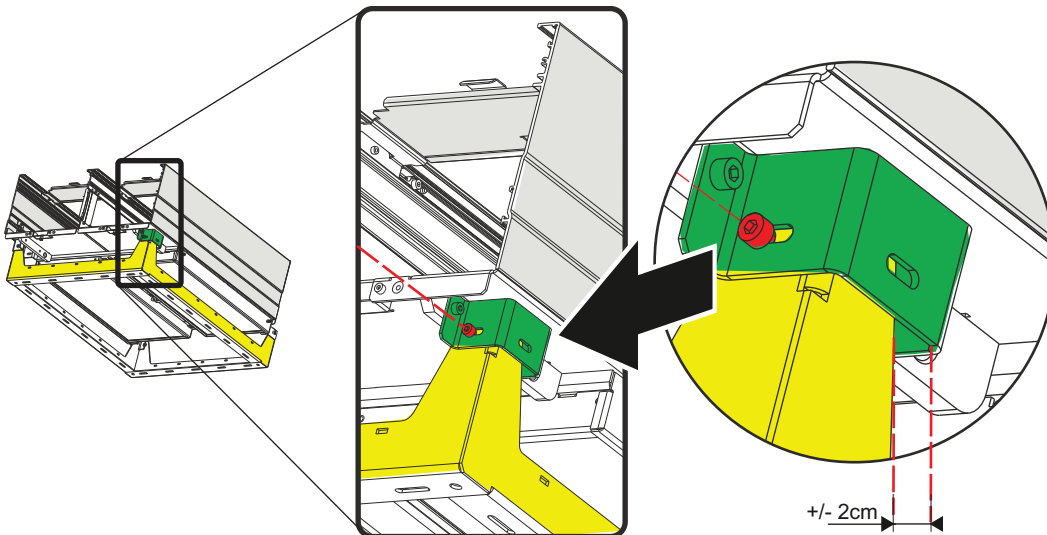
Image 5-25

4. Fixate the bracket situated to the backside of the cooler housing with only one screws (M5x8) each.
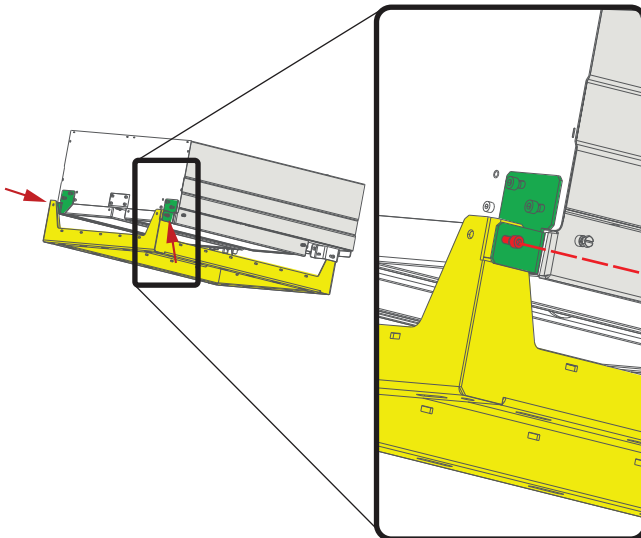
Image 5-26

5.7 Insert the cooler units

Required tools

Flat screwdriver

Before you start

Check if the two indicated screws (reference 1) are present. If it is the case, remove this screws.

The use of these screws may become necessary to fixate the cooler in the cooler assembly when the captive screws (reference 2) does not work.
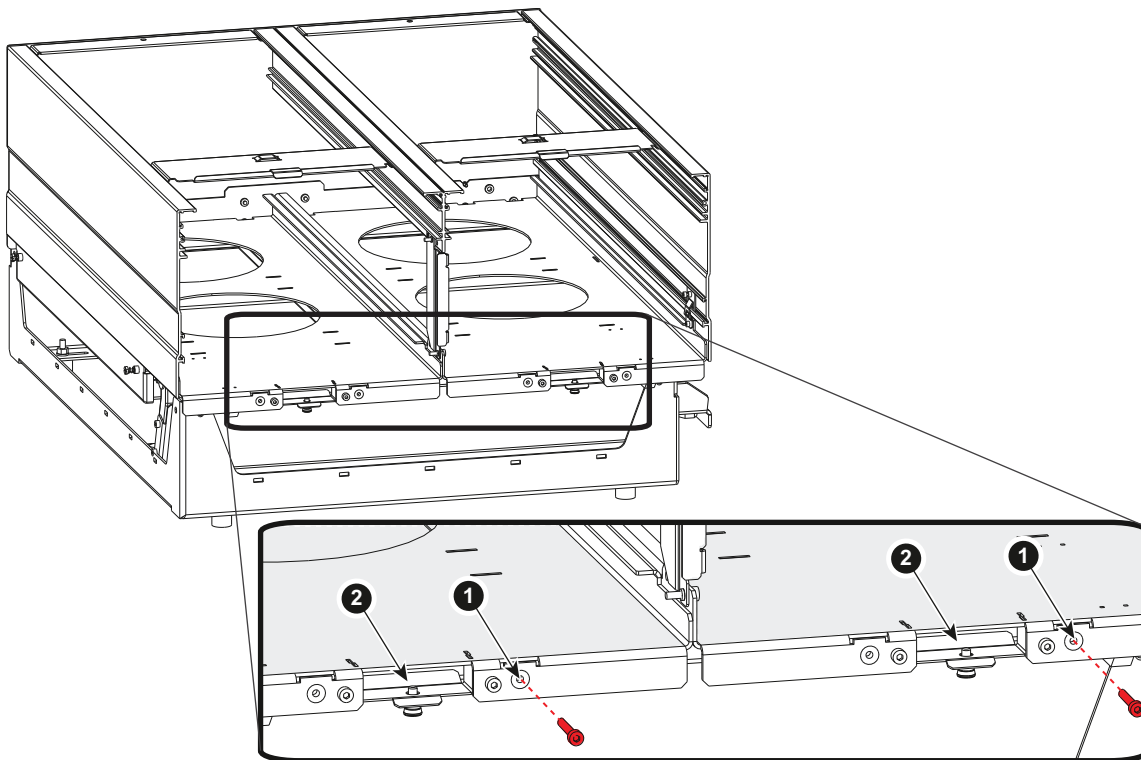
Image 5-27

How to mount

1. Slide the first cooler unit in the cooler housing.
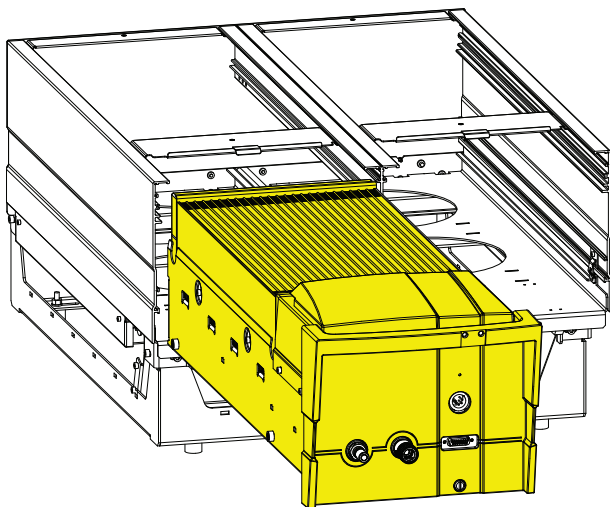
Image 5-28

2. Slide the second cooler unit in the cooler housing.

3. Fixate both units by closing the both captive screws.

5.8 Mount the filters

Required tools

Flat screw driver (if screws are too difficult to loosen by hand)

Required parts

2 x filters

How to insert

1. Turn out both screws and remove the cover plate.
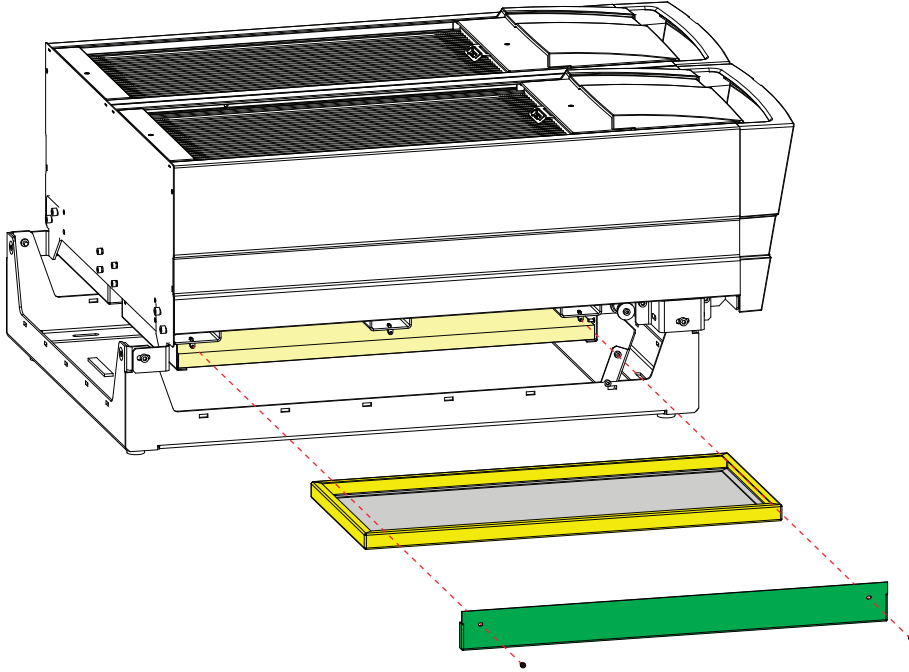
Image 5-29

2. Slide in a filter.

   Look to the airflow sticker for the correct orientation. Airflow is up.
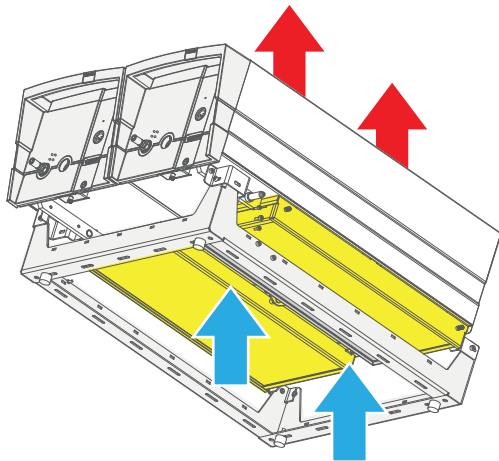
Image 5-30

3. Place the cover plate back on its location and drive in both fixation screws by hand.

   📄 *Note:* Please, don't use any tool! Only hand tighten these screws.

5.9 Cabling and tubing

📄 Always connect the right cooler with right group of connectors at the backside of the projector. Connect the left cooler with the left group of connectors at the backside of the projector.

Tubing

	From projector connector plate	**To cooler**
Tube 1	1f	1m
Tube 2	1m	1f
Tube 3	2f	2m
Tube 4	2m	2f
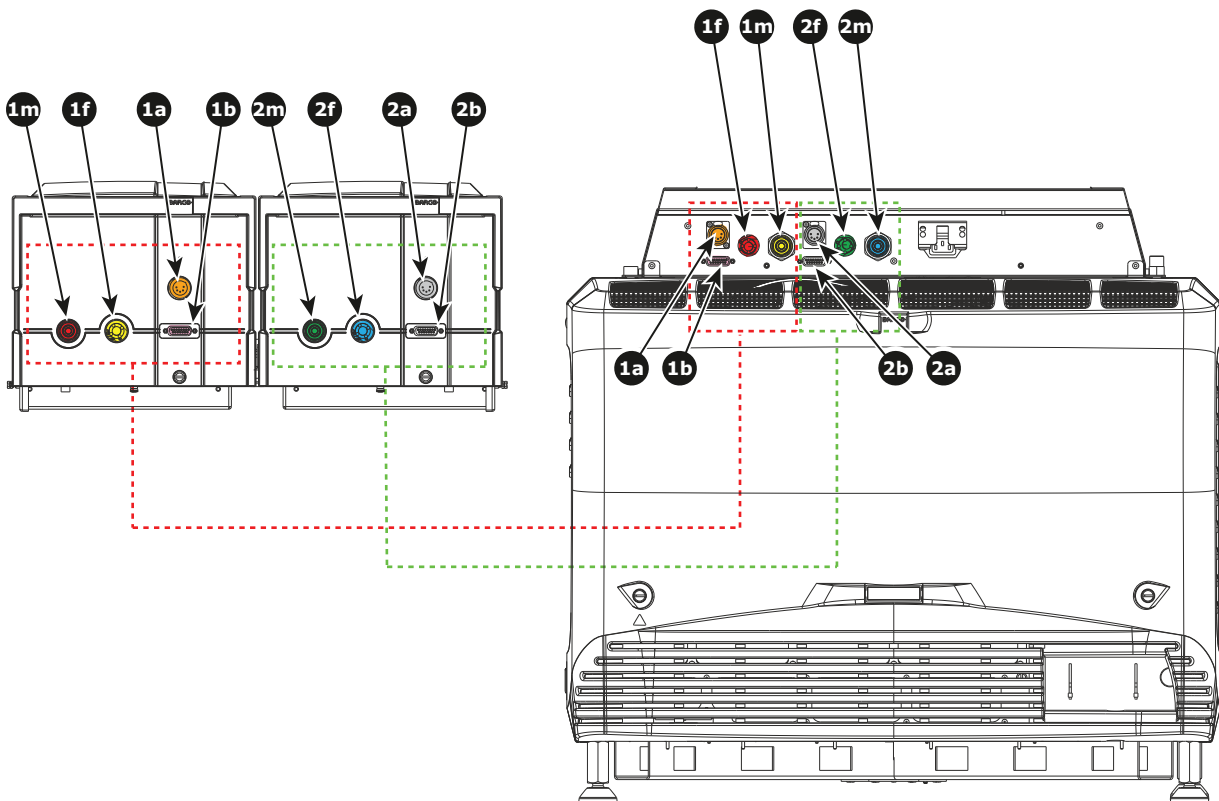
Image 5-31: Cabling & tubing

Cabling

	From projector connector plate	**To cooler**
XLR cable 1	1a	1a
Control cable 1	1b	1b
XLR cable 1	2f	2m
Control cable 2	2b	2b

5.10 Mount protection grid for the LCM cooler modules (option)

General

An metal grid (with two fixing screws) is provided in the delivery package. This optional grid can be use to protect the radiators from damage due to direct blows or falling objects and such.
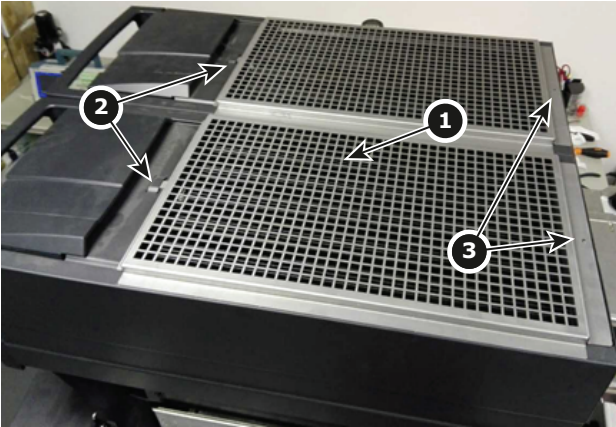
Image 5-32

1 Metal grille
2 Fixation tabs
3 Screws

> 📄 Addition of the metal grid will have a very slight impact to the cooling performance and hence the lifetime of the laser light source. .

Required tools

Flat screwdriver

How to mount

1. Slide the grid (reference 1 Image 5-32) in the fixation tabs (reference 2 Image 5-32).

2. Fix the grid with the two fixation screws (reference 3 Image 5-32).

Lenses & lens holder

6

About this chapter

This chapter gives an overview of available lenses for the Prometheus III and explains how you can select the best suited lens for your specific situation using the lens calculator. Also, it is explained how to install and remove a lens from the projector lens holder and how you can shift, zoom and focus the lens. Furthermore, it is described how you can perform the Scheimpflug adjustment.

> ⚠ **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.

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

Overview

- Available lenses
- Lens selection
- Lens installation
- Lens removal
- Lens shift, zoom & focus
- Back Focal Length adjustment
- Scheimpflug adjustment
- Fixation of the Lens Holder front plate

6.1 Available lenses

Which lenses are available for my projector?

> The table below is subject to changes and was last updated on 22/12/2017. Consult Barco's web site for the most recent information about available lenses.

Order No	Type	Throw Range		Projector series		
		2K	4K	DP2K-B DP4K-B DP2K-BLP DP4K-BLP DP4K-L	DP4K-P Prometheus I Prometheus II	DP4K-LHC DP4K-BLPHC Thor Prometheus III
R9856504	HB	1.25-1.90	1.13-1.72	X		
R9856506	HB	1.25-1.91	1.13-1.72	X		
R9856294	HB	1.49-2.05	1.35-1.86	X		
R9856297	HB	1.61-2.31	1.46-2.10	X		
R9856300	HB	1.82-2.86	1.65-2.60	X		
R9856303	HB	2.21-3.70	2.00-3.35	X		
R9855947	HB	2.8-5.5	2.53-4.98	X		
R98565042	HC		1.13-1.72	X	X	
R98562942	HC		1.35-1.86	X	X	
R98562972	HC		1.46-2.10	X	X	
R98563002	HC		1.65-2.60	X	X	
R98563032	HC		2.00-3.35	X	X	
R98565043	VHC		1.13-1.72			X
R98562943	VHC		1.35-1.86			X
R98562973	VHC		1.46-2.10			X
R98563003	VHC		1.65-2.60			X
R98563033	VHC		2.00-3.35			X

6.2 Lens selection

Which lens do I need?

1. Go to Barco's website on *www.barco.com* and click on myBarco

2. Login on.

   If you are not yet registered create a login and password. With the created login and password, it is possible to enter myBarco.

   When your login is correct, the start page is displayed.

3. Click the **Support** tab, then **Digital cinema calculator** (on the left of the screen) and select the appropriate lens calculator.

   The lens calculator (see screenshot, Image 6-1) 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.
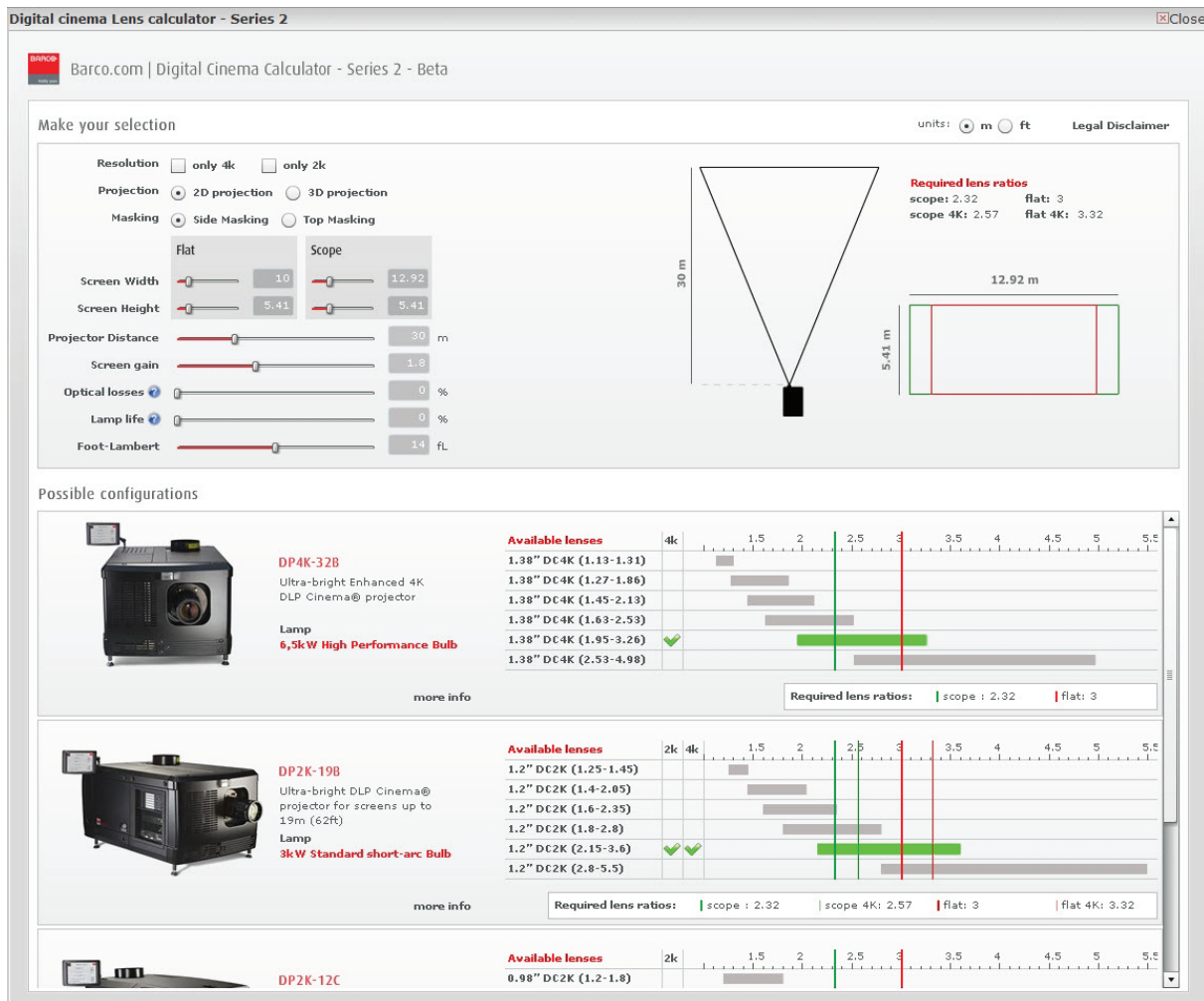
Image 6-1: Digital cinema lens calculator

> 📄 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?

1. Remove the plastic lens holder cover.
   1. Put the lock (1) into the unlock position.
   2. Take out the plastic cover.
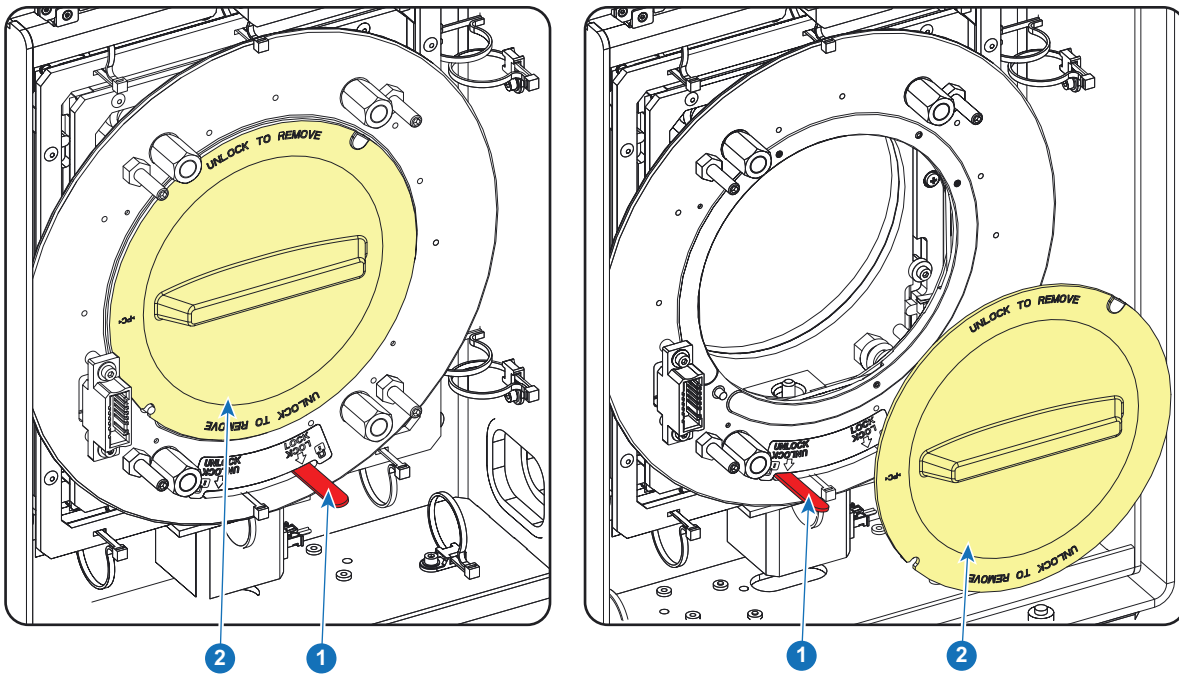
Image 6-2

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

3.   Place the lens holder in the "unlocked" position by moving the lens lock handle (1) towards the lens power supply socket (2).
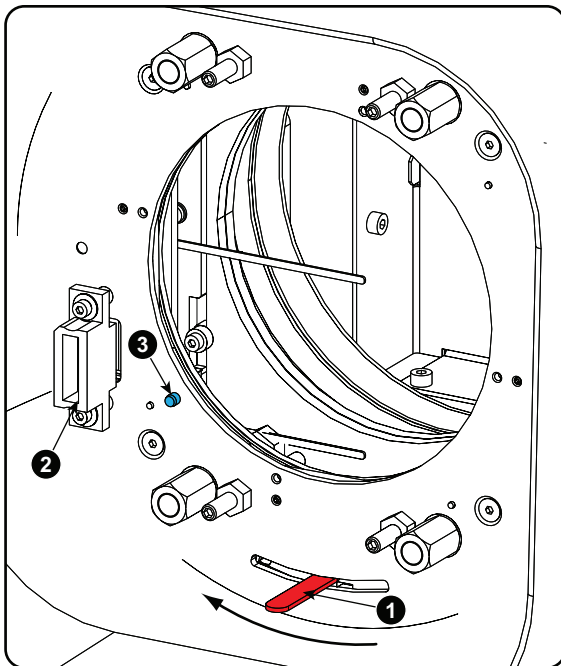
Image 6-3: Unlock lens holder

4.   Ensure that the lens holder stands in the On-Axis position (horizontal and vertical mid position).

     📄   *Note:* The lens holder is placed default in the On-Axis position at factory.

5.   Gently insert the lens in such a way that the lens connector matches the socket.
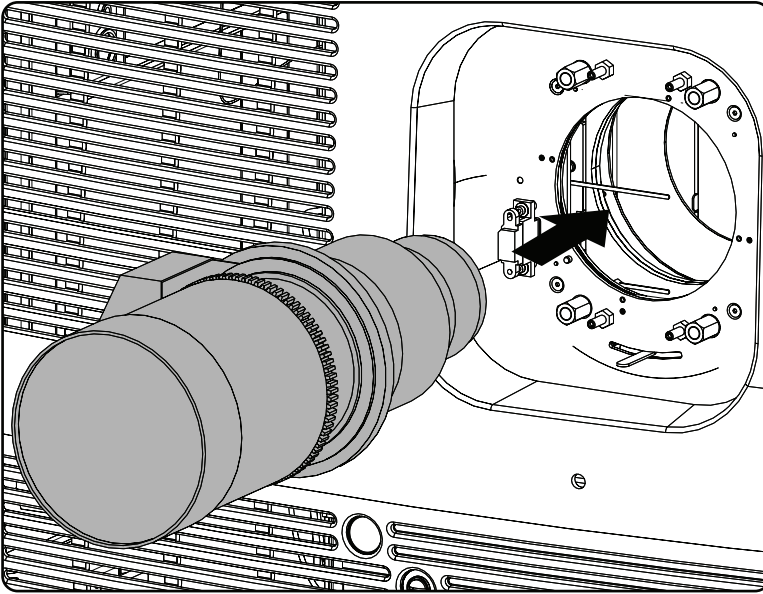
Image 6-4: Mount lens

6. Insert the lens until the connector seats into the socket.

    • the pin (3) on the lens holder matches with the sleeve in the lens.
    • the connector seats into the socket (2)

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

7. Secure the lens in the lens holder by sliding the lens lock handle into the "locked" position, which is away from the lens power supply socket. Ensure the lens touches the front plate of the lens holder.
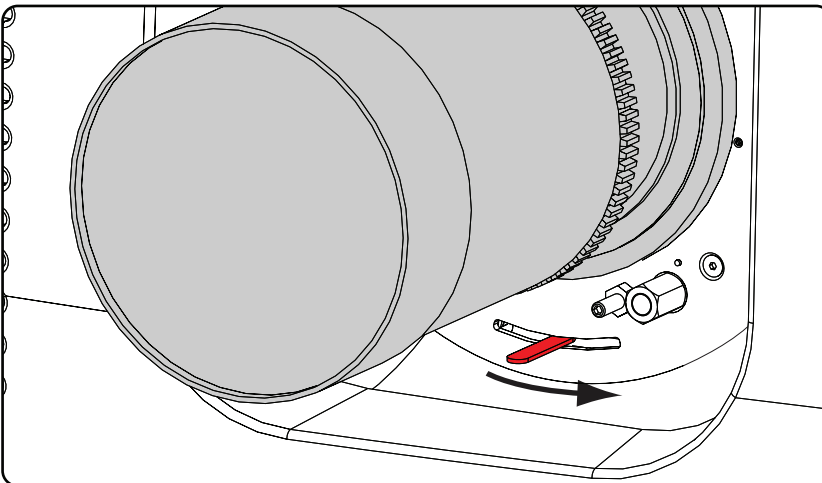
Image 6-5: Fix lens

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 6-6

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 of the installed lens.
> For the lenses with a focus adjustment mounted on the lens (4K lenses) , the lens holder goes to a normal (fixed) focus position. For these lenses, do not mechanically adjust the focus position of the lens holder, otherwise the normal position will be lost.

> 📄 A Spatial Color Calibration (SCC) has to be execute in case of a first install or in case a High Brightness lens is swapped with a High Contrast lens or vice versa. See user guide of the Communicator for detail SCC calibration instructions.

> ⚠ **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?

1. Support the lens with one hand while you unlock the lens holder by sliding the lock handle towards the "unlocked" position as illustrated.
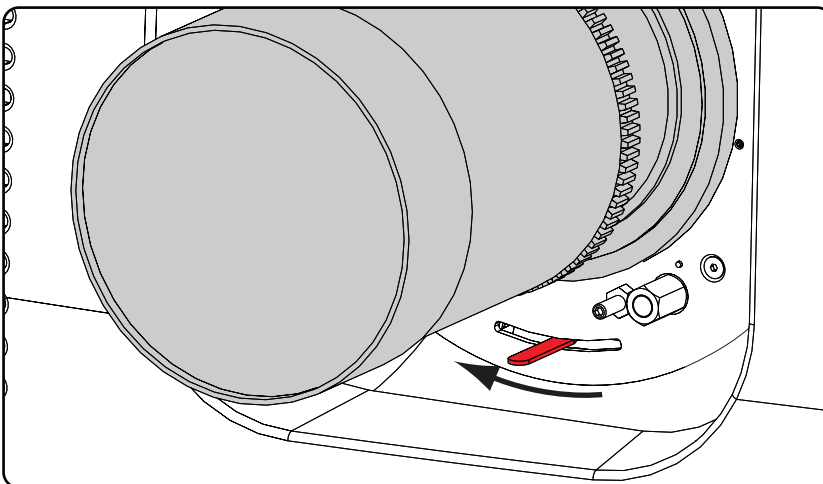
Image 6-7: Unlock lens

2. Gently pull the lens out of the lens holder.
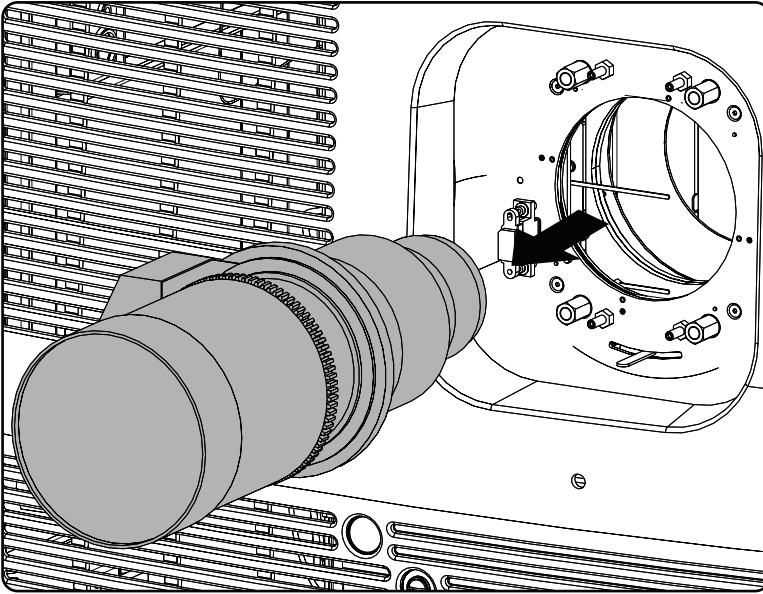
Image 6-8: Remove lens

> 👉 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 foam rubber of the original projector packaging, back into the Lens opening to prevent intrusion of dust. Note that this foam rubber is packed in a plastic bag to prevent the dust, emitted by the foam, from entering the projector.

6.5 Lens shift, zoom & focus

Motorized lens adjustment

The Prometheus III is equipped with a motorized lens shift functionality and a motorized 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.
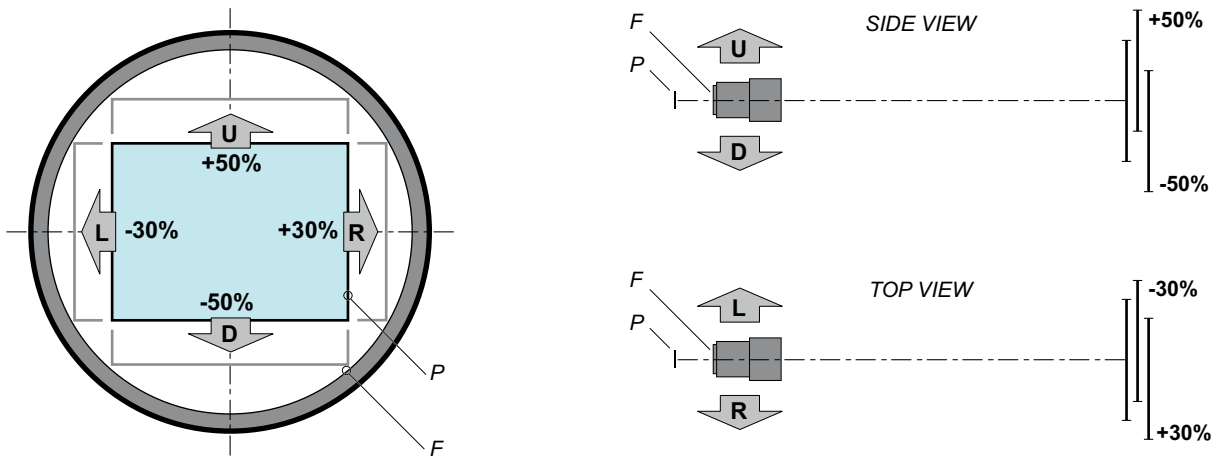
Image 6-9

P DMD.
F Field of view.

How to shift the lens of the Prometheus III?

1. Use the **up and down** arrow keys on the local keypad to shift the lens **vertically** and use the **left and right** arrow keys on the local keypad to shift the lens **horizontally**.
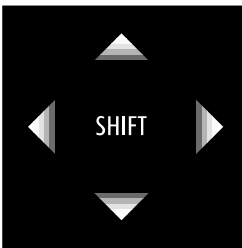
Image 6-10

How to zoom in or out?

1. Is the zoom lens equipped with a motorized zoom?
   ► If yes, use the "+" and "-" **zoom keys** on the local keypad to zoom in or out.

Image 6-11

   ► If no, use the **zoom barrel** on the lens to zoom in or out.

How to focus?

1. Use the "+" and "-" **focus keys** on the local keypad to focus the image on the screen.

Image 6-12

> 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.

6.6 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 Prometheus III 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.
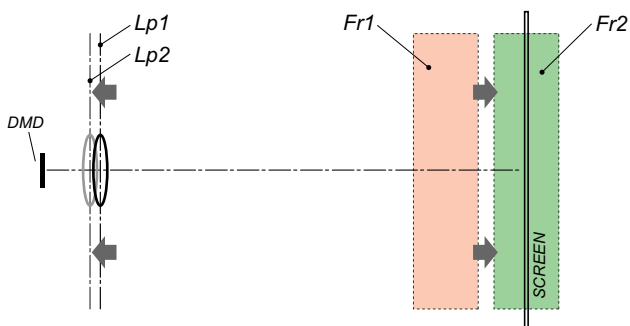
Image 6-13

> 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

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

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*)

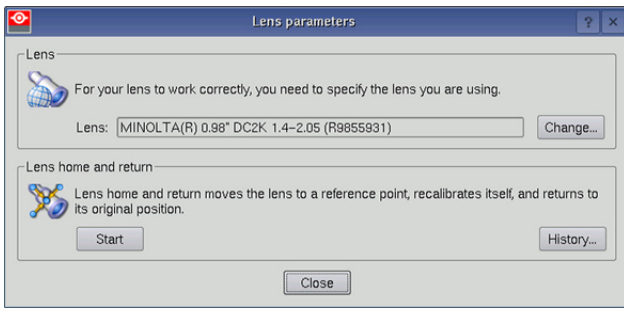   ⚠ *Caution:* Not using the correct lens parameters could result in lens damage.

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")
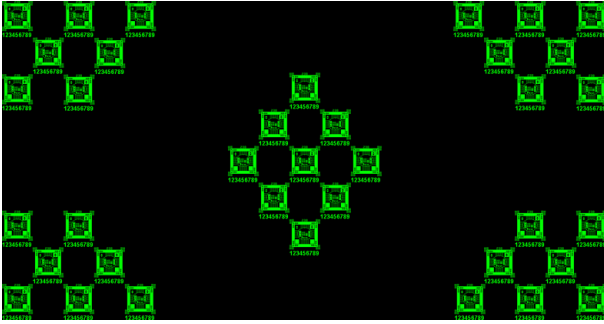
Image 6-14

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 6-15) of the Lens Holder by 1 centimeter. Use a 10mm nut driver for the lock nuts (reference 21 Image 6-15) and use a 3mm Allen wrench for the set screws.
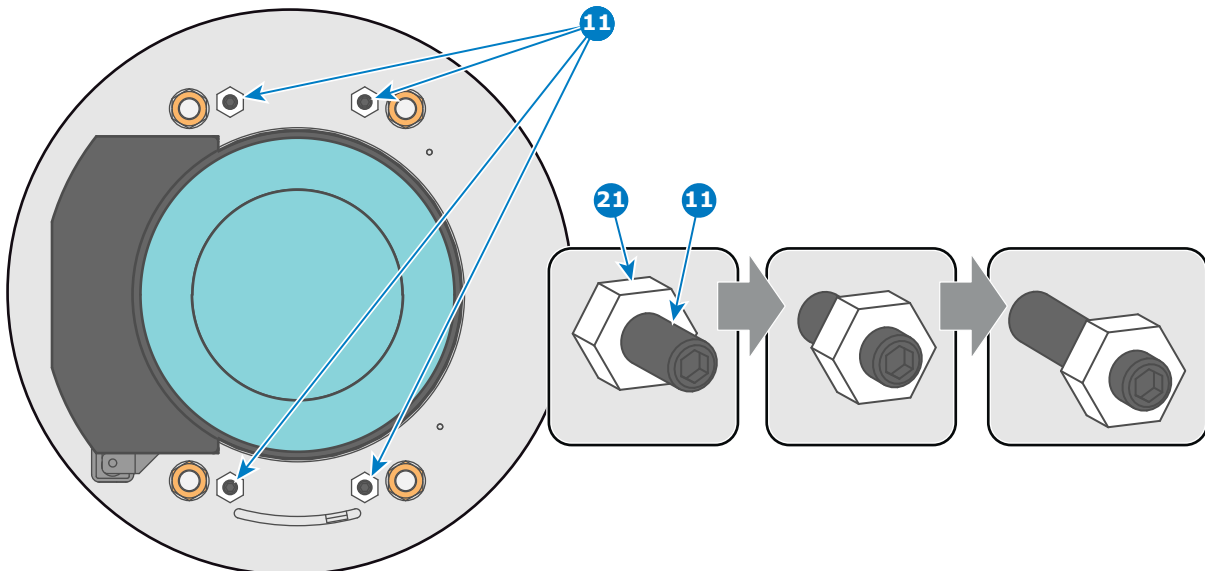
Image 6-15

2. Fully loosen the Scheimpflug nut at the lower left of the Lens Holder (reference 4 Image 6-16). Use a 13mm nut driver.
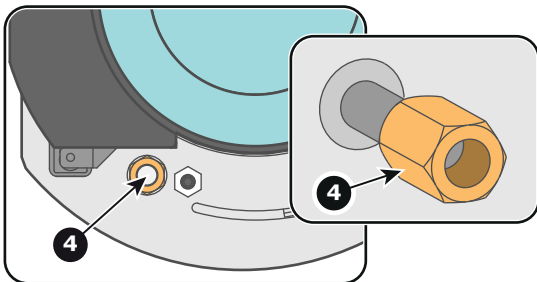
Image 6-16

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

📄 *Note:* This is the nominal position of the Lens Holder.

⚠️ *Caution:* Do not remove any of the Scheimpflug adjustment nuts completely from the threaded rod. Otherwise the lens holder front plate with lens will fall off.
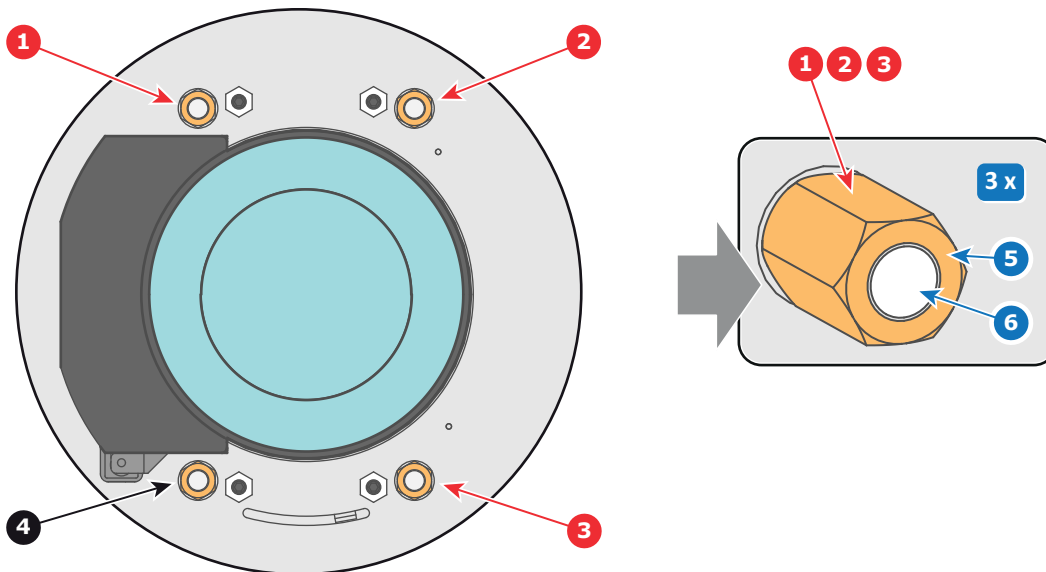
Image 6-17

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).
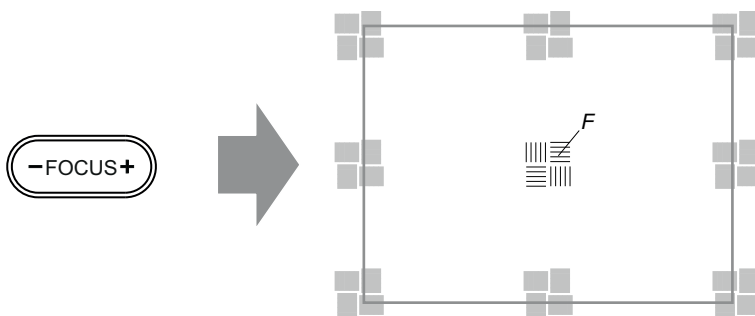
Image 6-18

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 6-19, 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.
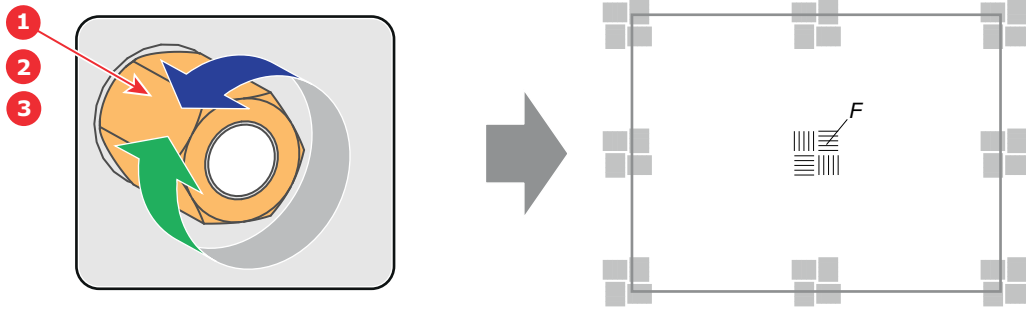
Image 6-19

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).
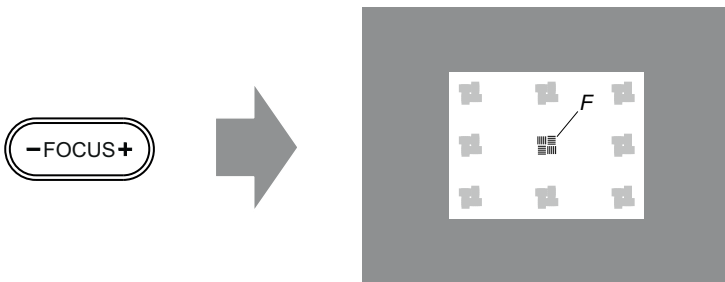
Image 6-20

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 6-21, equally in or out until the center of the projected image is sharp. **Note**: the same turning direction as in step 5 is applicable.
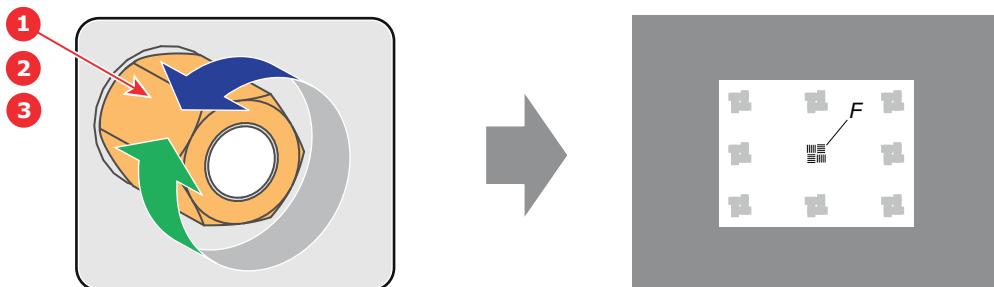
Image 6-21

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 78.
   ► If no, Scheimpflug adjustment is required. See procedure "Scheimpflug adjustment", page 75, 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!

6.7 Scheimpflug adjustment

What has to be done ?

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 sometimes happen 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 Sheimpflug's law. To solve this the lens plane must be placed parallel with the DMD plane. This can be achieved by turning the lens holder to remove the tilt (or swing) between lens plane and DMD plane (Lp3→Lp4).
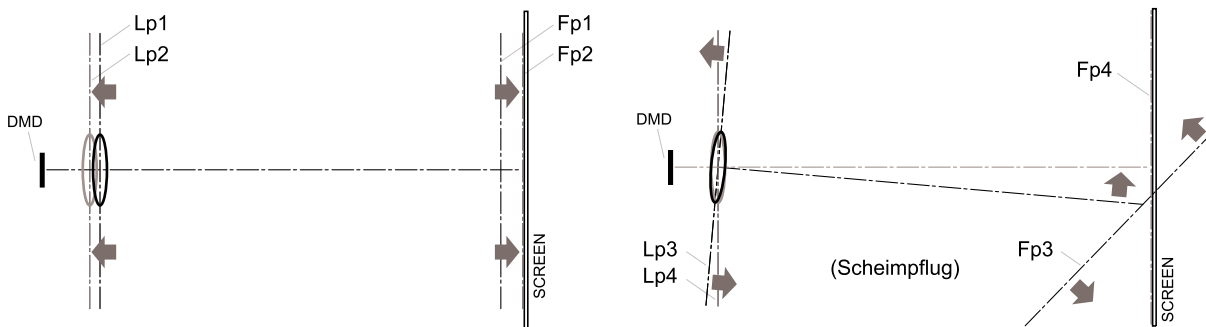
Image 6-22: Scheimpflug principle

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

Scheimpflug adjustment points
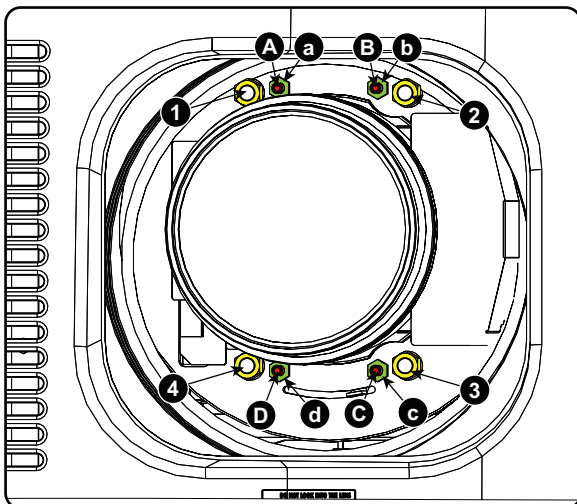
Image 6-23: Scheimpflug adjustments

Indication on drawing	Function
1, 2 and 3	Scheimpflug adjustment nuts
4	Locking nut
A, B, C and D	Set screws
a, b, c and d	lock nuts

1, 2 and 3 are adjustment points.

4 is a locking point and NOT used during Scheimpflug adjustment.

Required tools

- Allen key 3 mm
- Nut driver 13 mm
- Nut driver 10 mm

How to adjust

1. Project a green focus pattern. For a 4K projector, use the 4K test pattern. Otherwise, use the 2K test pattern.
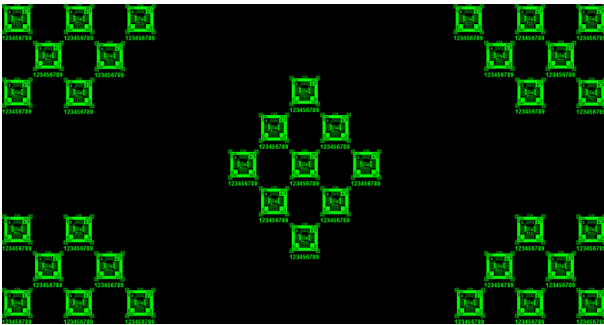
Image 6-24

2. Loosen the lock nuts (a, b, c and d). See Image 6-23.

3. Loosen the 4 set screws (A, B, C and D) by 1 cm. See Image 6-23.

4. Fully loosen lock nut 4. See Image 6-23.

5. Optimize the focus of the projected image as follows:

   1. Turn the Scheimpflug adjustment nuts 1, 2 and 3 until the front of the nut is equally aligned with the front of the threaded rod.
   2. Adjust the focus in the center of the screen (F) using the motorized focus control.
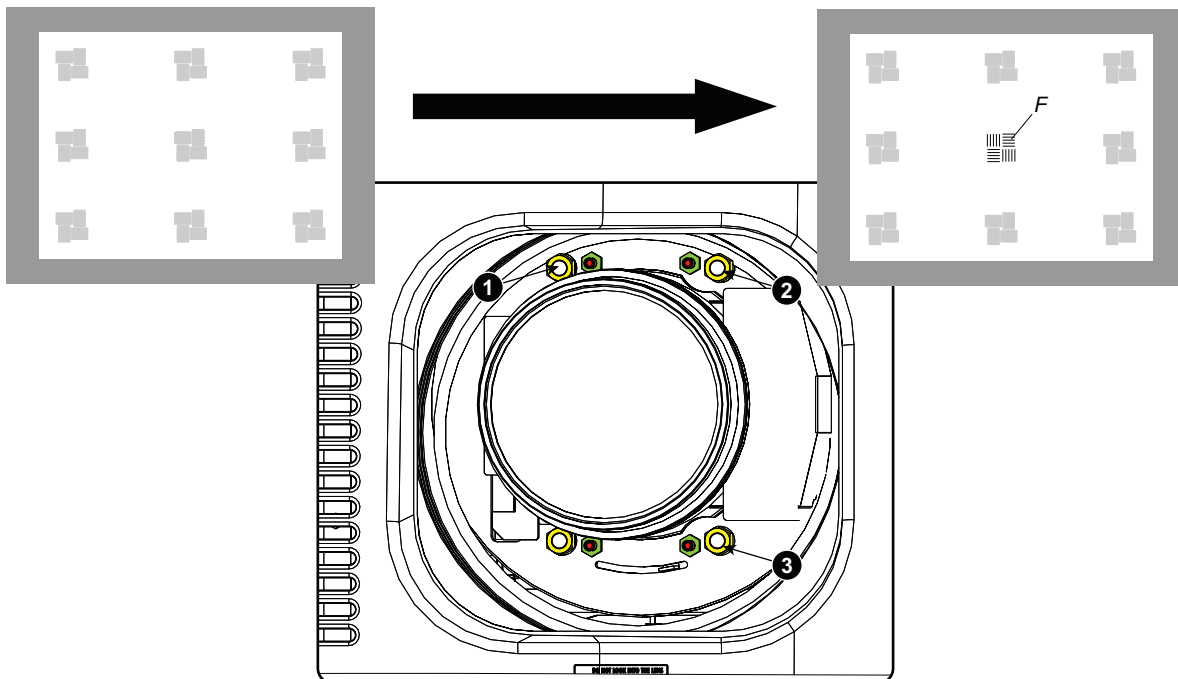
Image 6-25: Center focusing

6. Sharpen bottom left corner of the screen by adjusting nut 1.
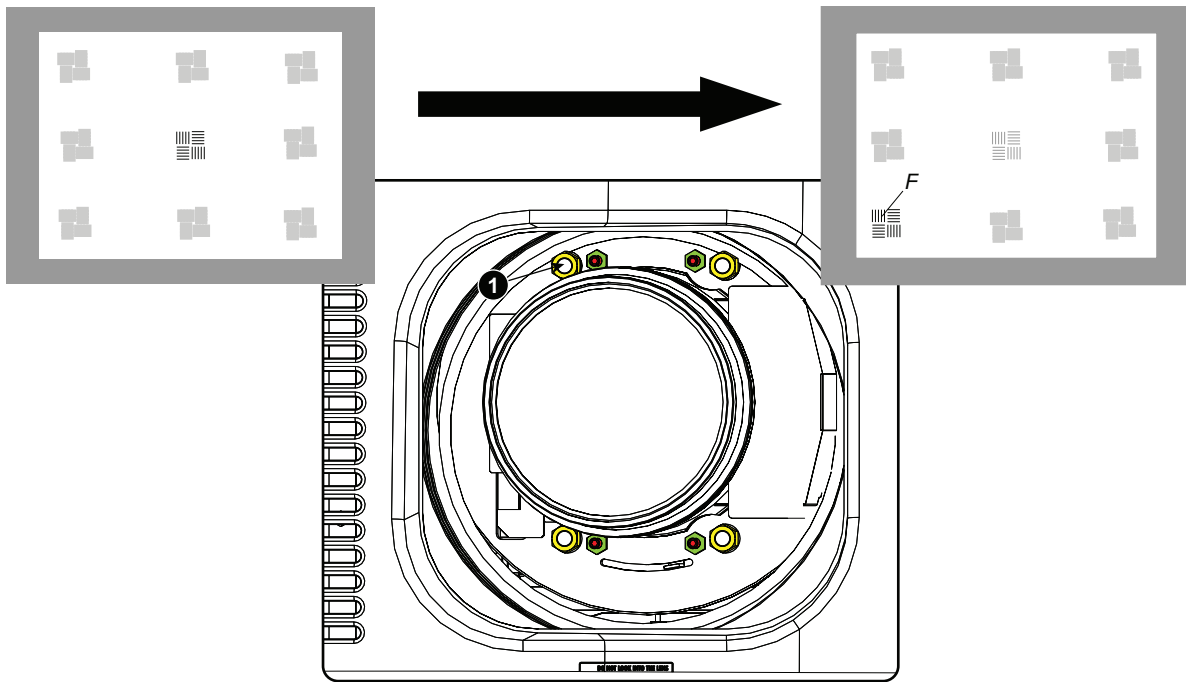
Image 6-26: Left bottom focusing

7. Sharpen bottom right corner of the screen by adjusting nut 2.
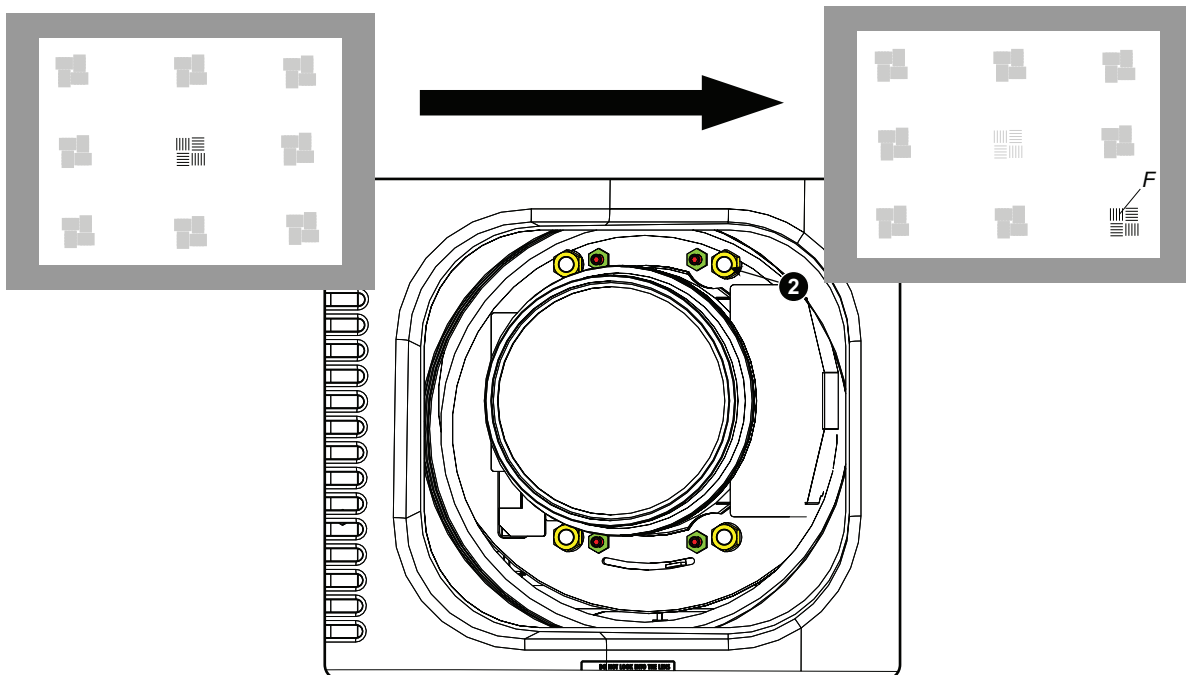
Image 6-27: Right bottom focusing

8. Sharpen top right corner of the screen by adjusting nut 3
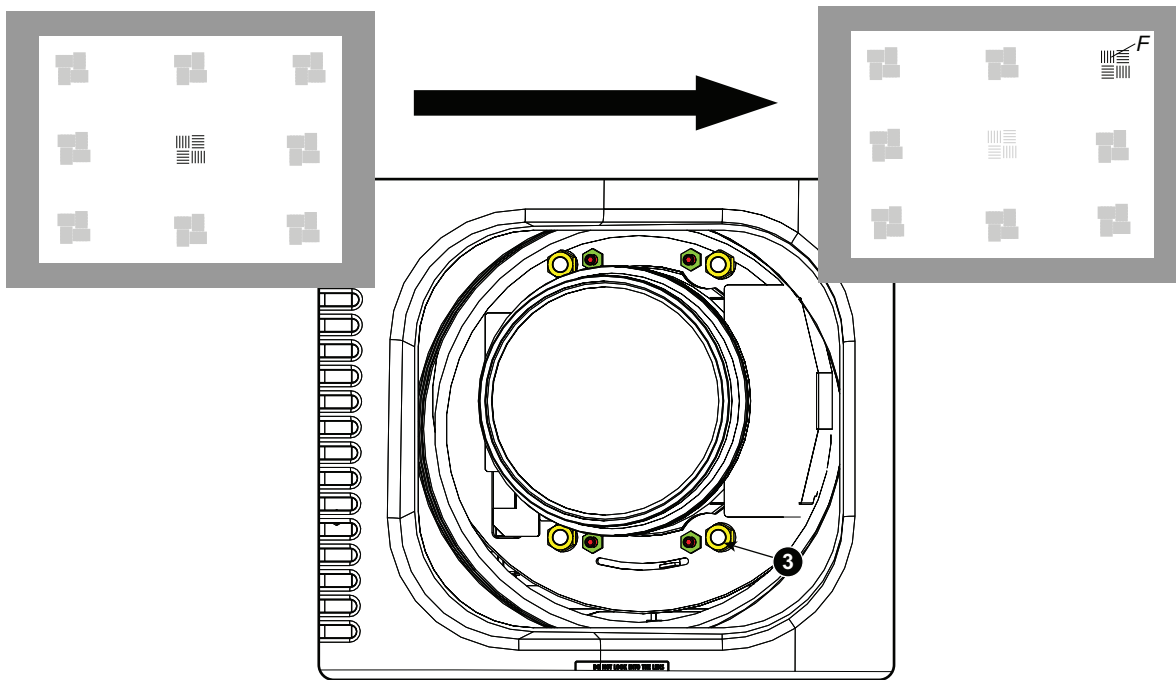
Image 6-28: Corner focusing

9. Repeat from go to step 6 until the projected focus pattern is as sharp as possible in the center, left, right, top and bottom of the screen.

10. Continue with the *Fixation of the lens holder front plate* procedure.

6.8 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.
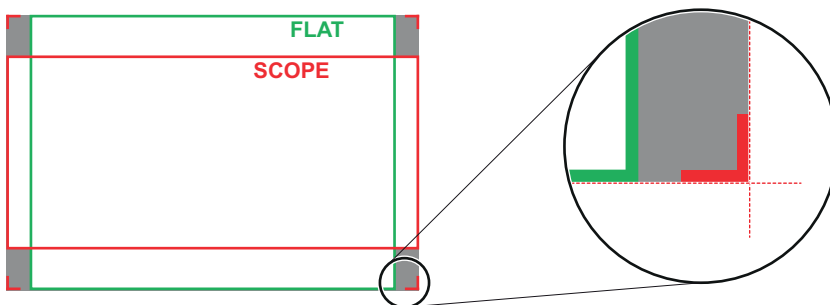
Image 6-29

3. Turn in the three set screws indicated with reference 11 Image 6-30 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 6-30) of the three set screws. Use a 10mm nut driver. Ensure the image doesn't move.
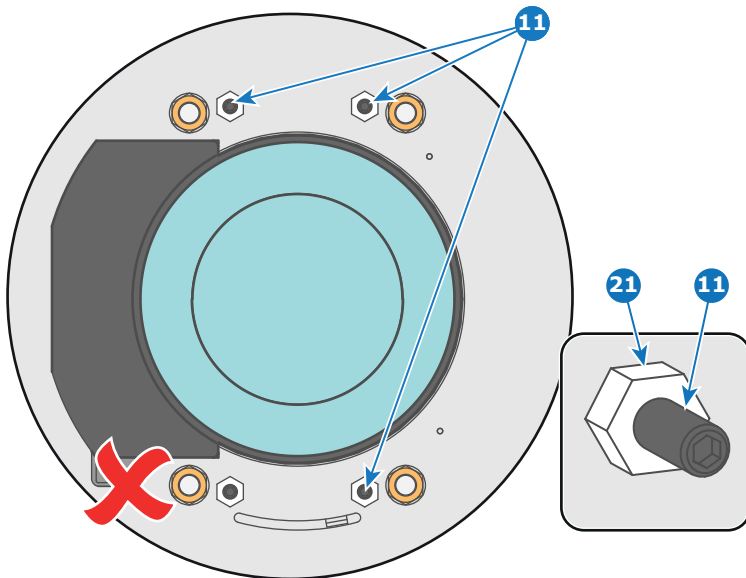
Image 6-30

5. Gently turn (by hand) the Scheimpflug adjustment nut at the lower left of the Lens Holder (reference 4 Image 6-31) 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 6-31) 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.
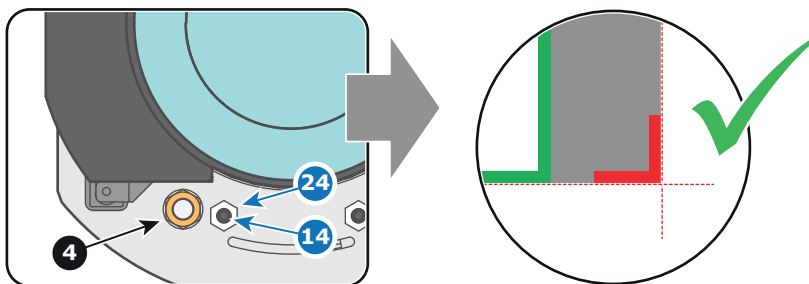
Image 6-31

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

Input & communication

7

Overview

- Introduction
- Local keypad of the Prometheus III
- Integrated Cinema Processor (ICP)
- HD-SDI Input Module (optional)
- Quad 3G-SDI Input Module (optional)
- Integrated Media Block/Server (optional)
- Cinema Controller of the Prometheus III

7.1 Introduction

General

The Input & Communication side of the Prometheus III consists of a Local Keypad and a card cage with four 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 or ICMP. See illustration below. In case an ICP is installed then an IMB, IMS, or HDSDI input module can be optionally inserted into the slot below the ICP. Note that all information about the ICMP is gathered into one separated chapter called ICMP.

Image 7-1

1	Fan Control Board (FCB).	**4**	Barco Cinema Controller.
2	Integrated Cinema Processor (ICP).	**5**	Barco ICMP (inserted in ICP slot and optional
3	Optional slot for either IMB, IMS or HD-SDI input module.		slot).

⚠ **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 of the Prometheus III

Identification of the keys
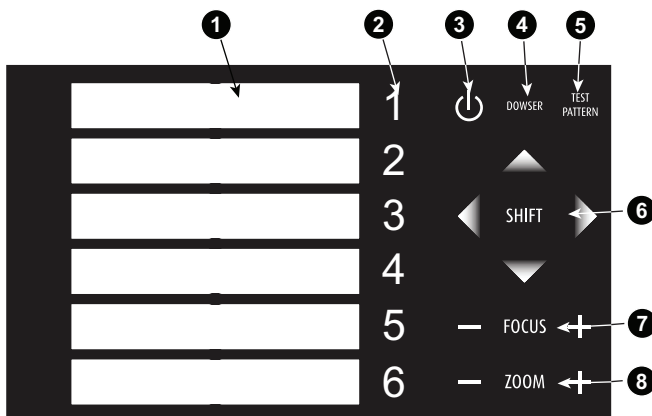
Image 7-2: Local keypad

1   Marker area for macro name

2   Numeric keyboard

3   Standby key

4   Dowser open/close switch

5   Test pattern toggle switch

6   Lens shift up/down, left/right

7   Lens focus

8   Lens zoom

Numeric keys

All the numeric keys (2) of the local keypad have a blue backlight during normal operation. When the authorization process is activated with the security key, the backlight color of the numeric keys 1 to 6 changes to orange. Each key can be linked to a macro which allows you to setup the projector to your requirements with one push of a button. Note that each numeric key has a marker area (1) where you can write down the name of the macro.

Standby key

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

Dowser key

The dowser key (4) opens or closes the dowser. The backlight color of the dowser key is green when the dowser is open and red when the dowser is closed.

Test pattern key

The test pattern key (5) gives you direct access to the internal test patterns of the projector.

Shift keys

The shift keys (6) allow you to shift the lens up/down or left/right.

Focus keys

The focus keys (7) allow you to focus the projected image on the screen.

Zoom keys

The zoom keys (8) allow you to zoom in or out the projected image on the screen.

7.3 Integrated Cinema Processor (ICP)

> In case the projector is equipped with a Barco ICMP no ICP board is inserted. All ICP functionality is integrated in the Barco ICMP.

LEDs and ports on the Integrated Cinema Processor

Image 7-3

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 Prometheus III projector. When using this board in a Prometheus III projector the software must be re-installed after installation of the board.

> 📄 When installing a new ICP board in a Prometheus III 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 !

7.4 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 or ICMP. In case an ICP is installed then an IMB, IMS, or HDSDI input module can be optionally inserted into the slot below the ICP. This is not the case if the ICMP is installed. For more information about the ICMP see chapter called ICMP.

Location of the source input ports

Image 7-4

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
						Dual (separate left / right eye)

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

Source: 2K-HFR						
	General settings			Advanced settings		
Port	**Port type**	**Mode**	**Scan type**	**Color space**	**Pixel mapping**	**Calibration**
			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)

7.5 Quad 3G-SDI Input Module (optional)

Location and source input ports
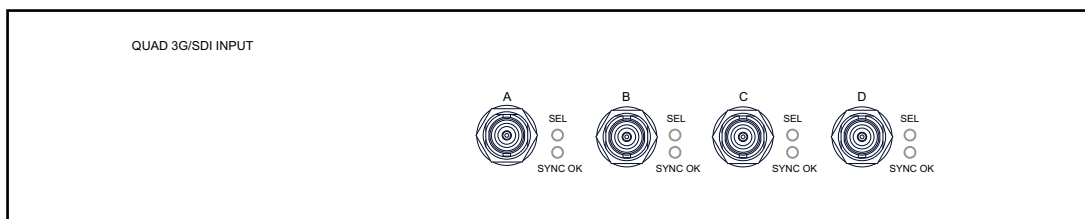
Image 7-5

The following input combinations are possible : A, B, A+B, A+B+C+D

When using all 4 four inputs to create the image connect the quadrants of the image to the inputs as indicated on the drawing.

Image 7-6: Quadrant connection

To configure the input, consult the Communicator manual

Source formats

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

		General settings			Advanced settings		
Source	Port	Port type	Mode	Scan type	Color space	Pixel mapping	Calibration
				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			
		HD-SDI Single Link A and B[1]	4:2:2 10 bits/color	Progressive	YCbCr	HD-SDI-Single link	Single
				Progressive - field bit normal			
				Progressive - field bit inverted			
				Progressive SF - 2nd field dominant			
				Progressive SF - 1st field dominant			
		3G-SDI link A and B[1]	4:2:2 12 bits/color	Progressive	XYZ/ RGB	3G-level A-Single link	
						3G-level B-Dual link	
			4:4:4 10 bits/color			3G-level A-Single link	
						3G-level B-Dual link	
			4:4:4 12 bits/color			3G-level A-Single link	
						3G-level B-Dual link	
2K-3D	A or B	3G-SDI link - 3D	4:2:2 10 bits/color	Progressive	YCbCr	3G - Level B - Dual stream	Single
							Dual (separate left / right eye)

1:    Only for Quad input board (this is a split screen setting, when selected, it turns on split-screen)

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

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

		General settings			Advanced settings		
Source	**Port**	**Port type**	**Mode**	**Scan type**	**Color space**	**Pixel mapping**	**Calibration**
4K	A+B	3G-SDI HS-4K	4:2:2 10 bits/color	Progressive	YCbCr	3G - Level A - Single Link	Single
				Progressive - field bit normal			
				Progressive - field bit inverted			
				Progressive SF - 2nd field dominant			
				Progressive SF - 1st field dominant			
	A + B + C + D	3G-SDI 4K	4:2:2 10 bits/color	Progressive	XYZ/ RGB	3G - Level A - Quad Link	Single
						3G - Level B - Quad Link	
				Progressive SF - 1st field dominant	YCbCr	3G - Level A - Quad Link	Single
						3G - Level B - Quad Link	
				Progressive SF - 2nd field dominant	YCbCr	3G - Level A - Quad Link	Single
						3G - Level B - Quad Link	
			4:4:4 10 bits/color	Progressive	RGB	3G - Level A - Quad Link	Single
						3G - Level B - Quad Link	
				Progressive SF - 1st field dominant	RGB	3G - Level A - Quad Link	Single
						3G - Level B - Quad Link	
				Progressive SF - 1st field dominant	RGB	3G - Level A - Quad Link	Single
						3G - Level B - Quad Link	
			4:4:4 12 bits/color	Progressive	XYZ/ RGB	3G - Level A - Quad Link	Single
						3G - Level B - Quad Link	
				Progressive SF - 1st field dominant	XYZ/ RGB	3G - Level A - Quad Link	Single
						3G - Level B - Quad Link	
				Progressive SF - 2nd field dominant	XYZ/ RGB	3G - Level A - Quad Link	Single
						3G - Level B - Quad Link	

General settings					Advanced settings		
Source	Port	Port type	Mode	Scan type	Color space	Pixel mapping	Calibration
		HD-SDI - 4K	4:2:2 10 bits/color	Progressive	YCbCr	HD-SDI - Quad Link	Single
				Progressive SF - 1st field dominant	YCbCr	HD-SDI - Quad Link	Single
				Progressive SF - 2nd field dominant	YCbCr	HD-SDI - Quad Link	Single

7.6 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 or ICMP. In case an ICP is installed then an IMB, IMS, or HDSDI input module can be optionally inserted into the slot below the ICP. This is not the case if the ICMP is installed. For more information about the ICMP see chapter called ICMP.

Integrated Media Block (IMB)

Image 7-7: Example of IMB powered by Doremi.

Integrated Media Server (IMS)

Image 7-8: Example of IMS powered by Doremi.

> 📄 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.

7.7 Cinema Controller of the Prometheus III

Location of the communication ports
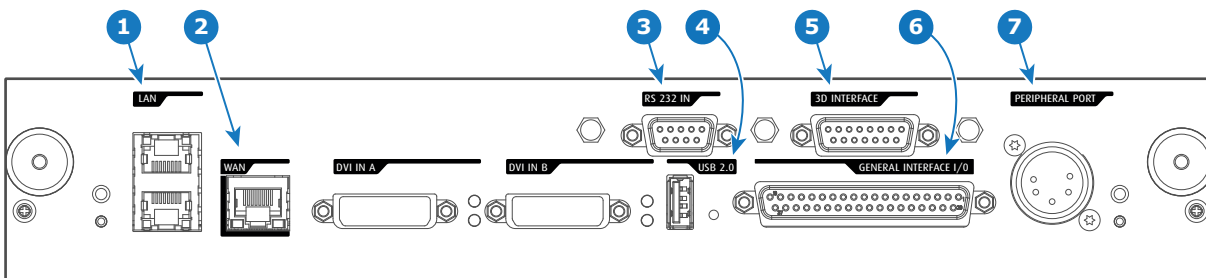
Image 7-9

Functionality

1 Local Area Network (LAN: 10/100/1000 base-T) port

Local Area Network (LAN: 10/100/1000 base-T) with built-in Ethernet switch (port 1 and port 2). 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. Furthermore, this Ethernet switch remains operational when the projector is in Standby mode.

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).

2 Wide Area Network (WAN) port

Wide Area Network (WAN: 10/100/1000 base-T). Use this Ethernet port (reference **2** Image 7-9) to connect the network which contains the DHCP server.

The Prometheus III can be connected to a WAN (Wide area network) (reference **2** Image 7-9). 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.

3 RS232 IN port

This female DB-9 connector allows you to use a standard serial cable up to 10 meter to connect the touch panel interface with the projector. Note that the RS232 protocol is used on this connection.

4 USB OUT port

The Cinema Controller is equipped with a USB port, type "A" connector, (reference **4** Image 7-9) which can be used to power handheld devices within USB spec (MAX 500mA/5V]. No other functionality supported (Future expansion). The USB OUT port remains operational in Standby mode.

5 3D INTERFACE port

3D interface port (reference **5** Image 7-9. Can be used to connect external 3D devices to the projector. All signals necessary for 3D projection can be provided via this connector. The 3D interface port is disabled if the projector is in Standby mode.

6 GENERAL PURPOSE INPUT/OUTPUT (GPIO) port

This 37 pin connector (reference **6** Image 7-9) 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. The GPIO remains operational when the projector is in Standby mode. So, 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.

Enter or leave Standby mode can also be done with GPIO via two predefined Macros (not editable).

7 PERIPHERAL port

For future use.

> **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.

Location of the source input ports (DVI)
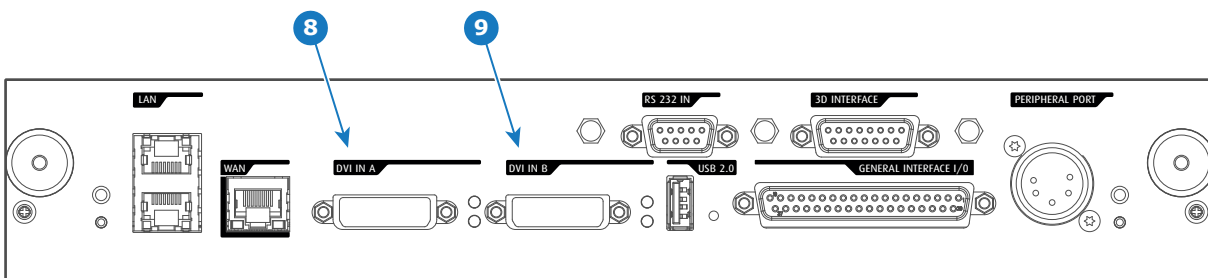
Image 7-10

Legende

8 DVI-D input, port A, Single link + HDCP

9 DVI-D input, port B, Single link + HDCP

> **DVI**
>
> Digital Visual Interface is a display interface developed in response to the proliferation of digital flat panel displays. The digital video connectivity standard that was developed by DDWG (Digital Display Work Group). This connection standard offers two different connectors: one with 24 pins that handles digital video signals only, and one with 29 pins that handles both digital and analog video. This standard uses TMDS (Transition Minimized Differential Signal) from Silicon Image and DDC (Display Data Channel) from VESA (Video Electronics Standards Association). DVI can be single or dual link.

DVI Input formats

Input	Source standard	Vertical rate	Scan type	Color space	Sampling	Color depth
Single DVI	VESA (640x480)	60	Progressive	RGB	4:4:4	8 bit
Single DVI	VESA (640x480)	72	Progressive	RGB	4:4:4	8 bit
Single DVI	VESA (800x600)	60	Progressive	RGB	4:4:4	8 bit

Input	Source standard	Vertical rate	Scan type	Color space	Sampling	Color depth
Single DVI	VESA (800x600)	72	Progressive	RGB	4:4:4	8 bit
Single DVI	VESA (1024x768)	60	Progressive	RGB	4:4:4	8 bit
Single DVI	VESA (1024x768)	70	Progressive	RGB	4:4:4	8 bit
Single DVI	VESA (1280x1024)	60	Progressive	RGB	4:4:4	8 bit
Single DVI	1280x720	60	Progressive	RGB	4:4:4	8 bit
Single DVI	1920x1080	60	Progressive	RGB	4:4:4	8 bit
Single DVI	2048x1080	50/60	Progressive	RGB	4:4:4	8 bit
Single DVI	1920x1080i	50/60	Interlaced	RGB	4:4:4	8 bit
Twin DVI	ACS (2048x1080)	50/59.94	Progressive	RGB	4:4:4	10 bit
Twin DVI	ACS (2048x1080)	50/59.94	Progressive	RGB	4:4:4	12 bit
DVI-3D	3D (2048x1080)	24/eye	Progressive	RGB	4:4:4	2x8 bit
DVI-3D	3D (2048x1080)	25/eye	Progressive	RGB	4:4:4	2x8 bit
DVI-3D	3D (2048x1080)	30/eye	Progressive	RGB	4:4:4	2x8 bit
DVI-3D	3D (2048x1080)	50/eye	Progressive	RGB	4:4:4	2x8 bit

About DVI-4K:

Two columns of 2048x2160 are needed, where DVI-A is left image and DVI-B is right image. Use Rec 709 for 4K as PFC file.

Image 7-11: DVI-4K

ICMP

<div style="text-align: right; font-size: 3em;">8</div>
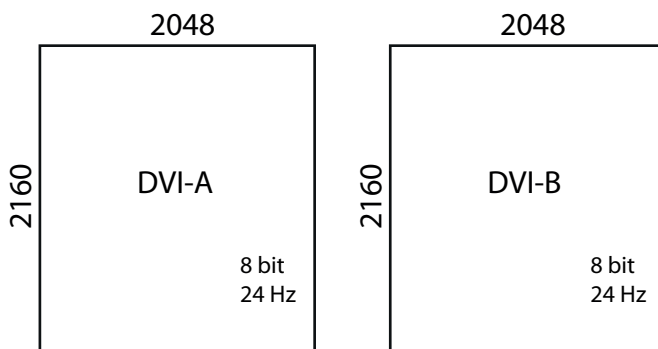
About this chapter

This chapter describes the ICMP 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.

Image 8-1

Overview

- ICMP introduction
- ICMP HDD
- ICMP communication ports
- ICMP source input ports
- ICMP DisplayPort specifications
- ICMP SDI specifications
- ICMP HDMI 2.0 specifications
- ICMP HDMI 1.4 specifications
- ICMP status LEDs
- ICMP HDD status LEDs
- ICMP device certificate
- ICMP configuration via Communicator
- ICMP reset
- Obtaining the Barco ICMP certificate
- Removing a HDD from the ICMP

ICMP

- Installing a HDD into the ICMP

8.1 ICMP introduction

About ICMP

The ICMP is a removable electronic assembly situated in the Card Cage of the projector. The ICMP 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 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. So, the ICMP replaces the ICP board as well.
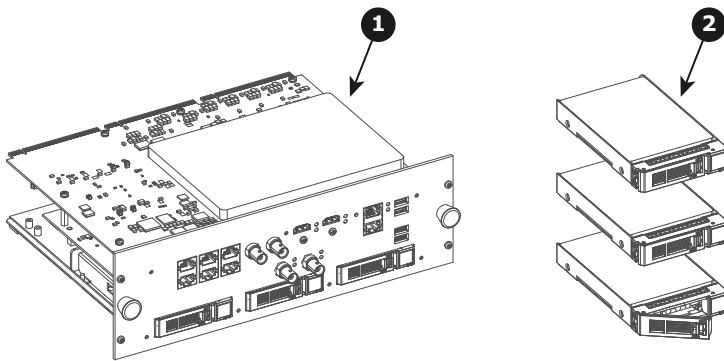
Image 8-2

1 ICMP
2 HDDs for ICMP

As an integrated component of the projector, installation and maintenance of the ICMP 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

The last produced model is equipped with two HDMI 2.0 as video source.
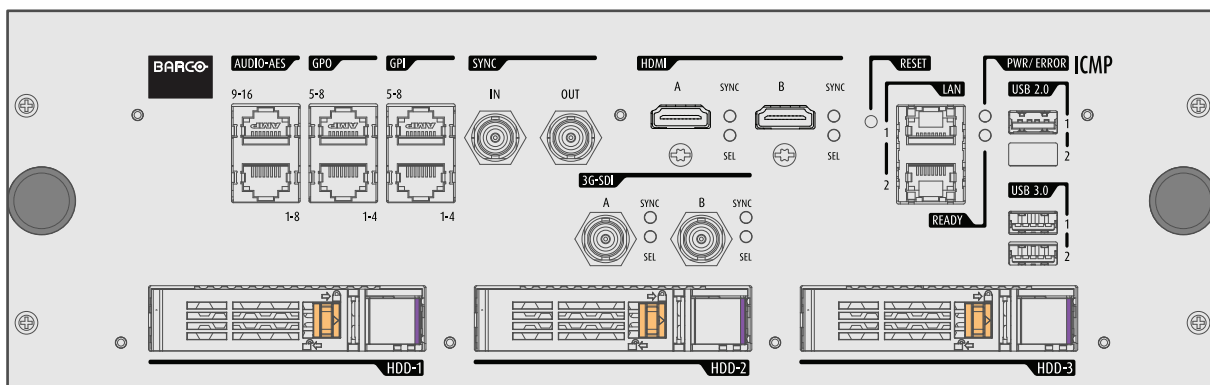
Image 8-3: Front face ICMP (with HDMI 2.0).

Some models with DisplayPorts and one HDMI 1.4 (mezzanine) are still present on the field.
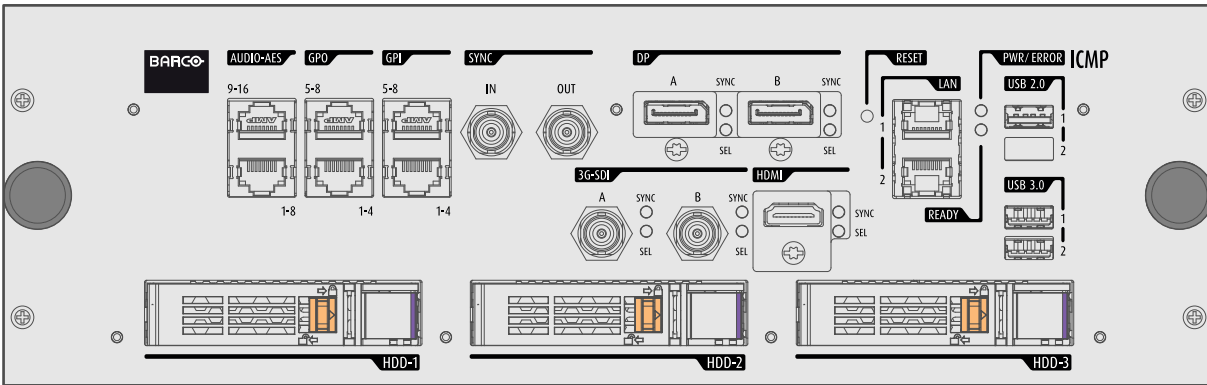
Image 8-4: Front face ICMP (with DisplayPort and HDMI 1.4).

Location in the Card Cage

The Card Cage can be different depending the projector type but it generally consists of a button module and several removable units. The ICMP (reference 1) is inserted into the former ICP slot and IMB slot next to the Barco Cinema Controller (reference 2).

ICMP location in the Card Cage of a DPxk B-series, C-series, BLP-series or CLP series projector.
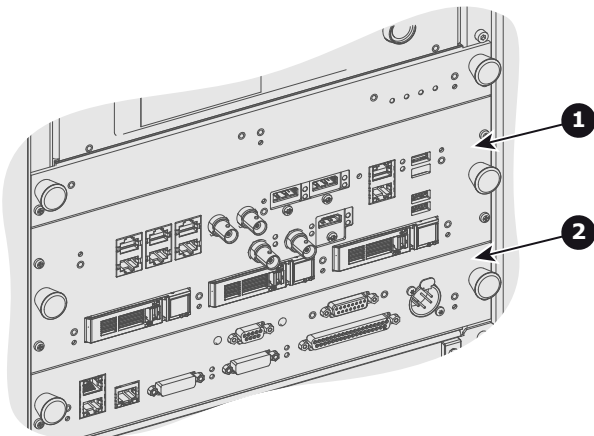
Image 8-5

8.2 ICMP HDD

About ICMP HDD

The three HDDs (local storage) in the ICMP, 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.
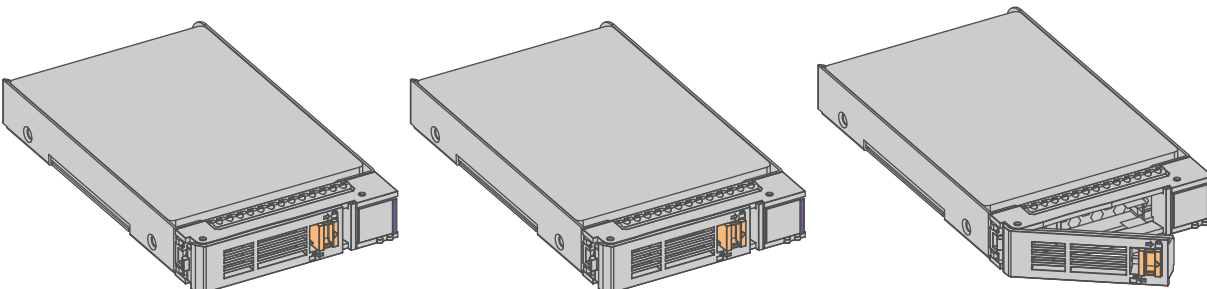
Image 8-6

> ⚠️ **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.

> ⚠️ **CAUTION:** The loss of one disk causes no serious consequences on the ICMP. 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. 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 it is necessary to retrieve from the content distributor the KDMs corresponding to the content and the new ICMP.

HDD storage capacity

Make sure that all HDDs in the ICMP 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. All deviations from this rule void warranty.

List of validated models:
- 1TB: HGST – Western Digital (order code: HCC541010A9E630)
- 2TB: Seagate (order code : ST2000NX0253)

8.3 ICMP communication ports

Location of the communication ports
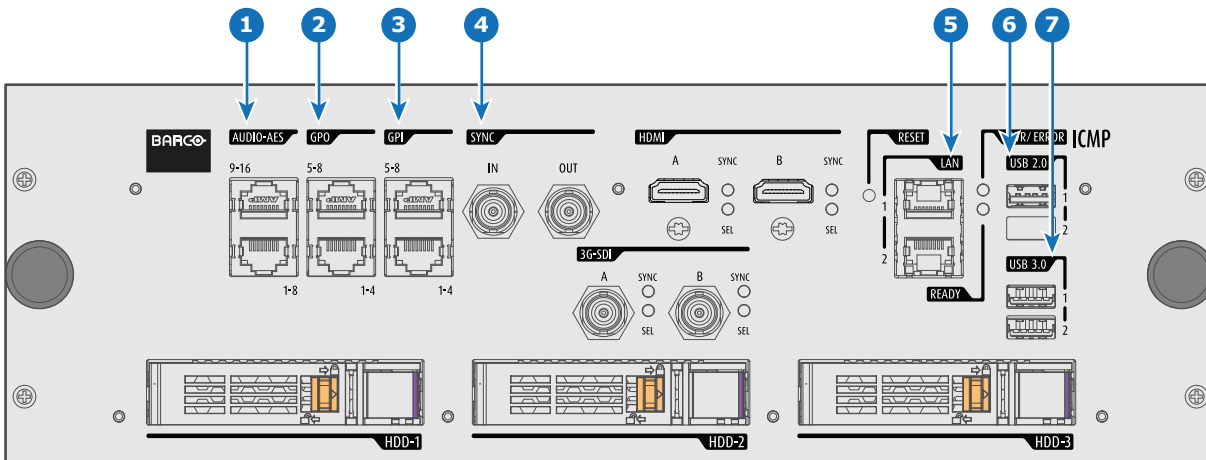
Image 8-7: ICMP (with HDMI 2.0).

Functionality

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

ICMP 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) is performed by configuring the ICMP 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 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 is done via the same IP address as the projector.

6 USB 2.0

The ICMP 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 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.

8.4 ICMP source input ports

Location of the source input ports

The last produced model is equipped with two HDMI 2.0 (Reference 8, Image 8-8) as video source.
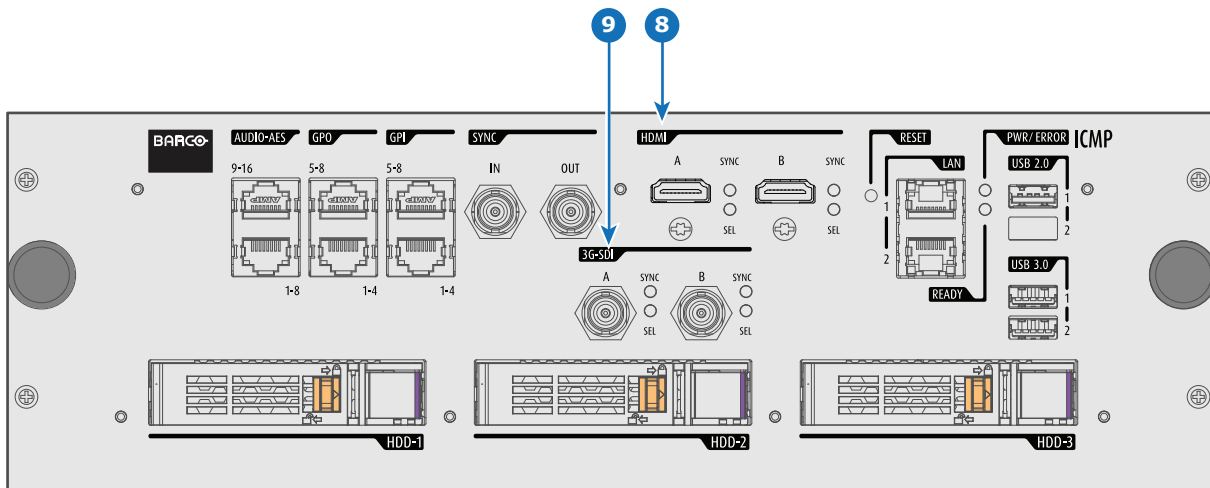
Image 8-8: ICMP (with HDMI 2.0).

Some models with DisplayPorts (Reference 11, Image 8-9) and HDMI 1.4 (Reference 10, Image 8-9) are still present on the field.
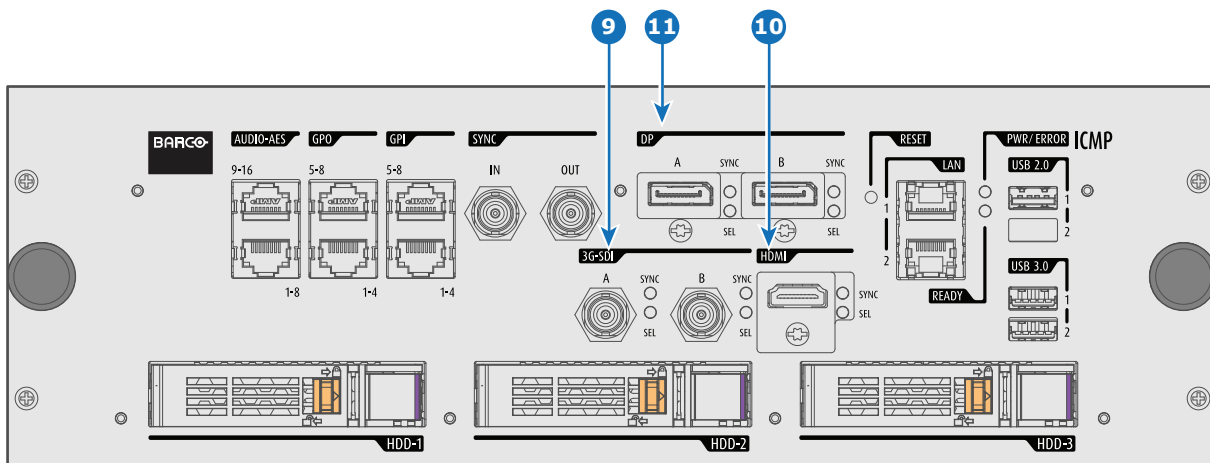
Image 8-9: ICMP (with DisplayPort and HDMI 1.4).

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.

8.5 ICMP DisplayPort specifications

ℹ | **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.

ℹ | **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

2D Formats / Single DP	Color depth	Port	Display Mode
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

8.6 ICMP SDI specifications

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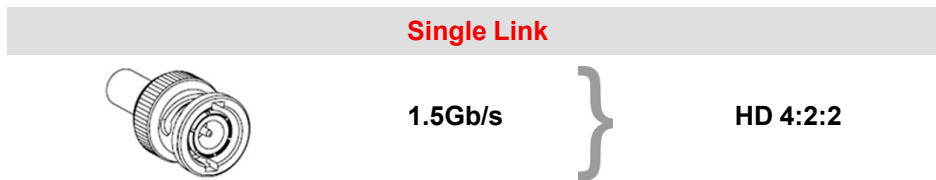
Standard HD-SDI allows for a single 4:2:2 image to be carried on one cable at 1.485 Gb/s. The image uses the Y Cb Cr colorspace and uses a bit depth of 10 bit per color component.

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

Dual-Link HD-SDI signal

Dual Link		
	1.5Gb/s 1.5Gb/s }	1080p 50/60[2] or 1080p 4:4:4
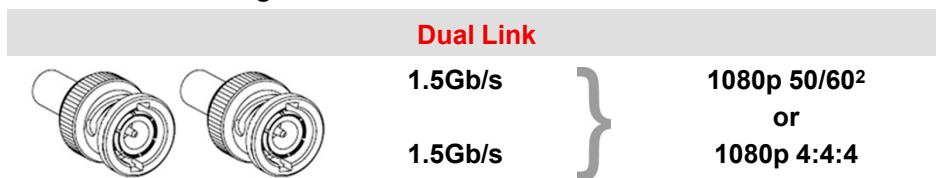
Dual-Link HD-SDI is mainly two standard HD-SDI signals carrying a single image stream split between the two cables. The main advantage is that color subsampling is no longer required, and the image can be transmitted in 4:4:4 quality, which then also allows the RGB (or XYZ) color space to be used.

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

3G		
	3Gb/s }	1080p 50/60 (Level A) or 1080p 4:4:4 (Level B)
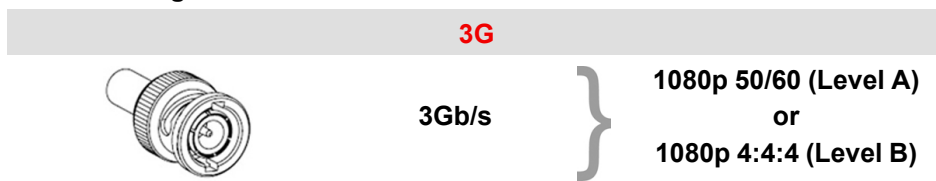
3G HD-SDI uses a higher data rate (2.97 Gb/s). This allows a single cable interface to achieve the same capabilities of a Dual-Link HD-SDI implementation.

2: 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

Dual Stream 3G		
	3Gb/s	} HD 4:2:2 Signal #1 and HD 4:2:2 Signal #2
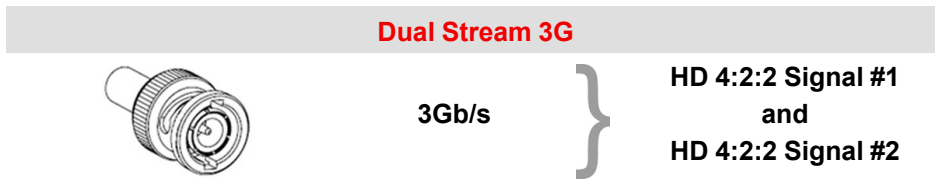
Dual Stream 3G is a specific variant of the 3G signal which combines two completely separate 4:2:2 image streams into a single 3G signal. This can be used to transmit stereoscopic streams by keeping the left and right eye signals together.

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[3]

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.

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

3G HD-SDI (SMPTE 425) formats

3:    mainly used to carry stereoscopic images.

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[4]	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

8.7 ICMP HDMI 2.0 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 2.0 specifications

HDMI

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.

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

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 30 50 59.94	RGB YCbCr 4:4:4 YCbCr 4:2:2	8 10 12

Format	Frame Rate	Color coding	Bit depth
	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

> In Dual (Twin) Link 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.

8.8 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

8.9 ICMP status LEDs

ICMP status LEDs and Reset button

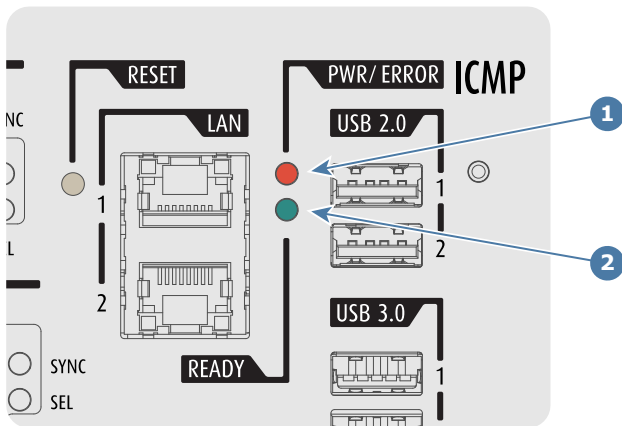LEDs on ICMP front panel give information on the status of the device.

Image 8-10

1 Power / Error LED
2 Ready LED

Status overview PWR/ERROR and READY LEDs:

PWR/ERROR	READY	ICMP 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

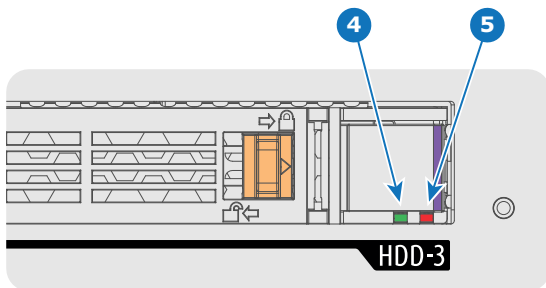# 8.10 ICMP HDD status LEDs

ICMP HDD status LEDs

Image 8-11

4 HDD I/O LED
5 RAID LED

Status overview HDD I/Oand RAID LEDs:

HDD I/O	RAID	ICMP HDD Status
Off	Off	HDD idle / Disk in RAID OK.
Blinking Green	Off	HDD I/O activity / Disk in RAID OK.
Blinking Green	Blinking Red	HDD I/O activity / RAID rebuilding.
Off	Red	HDD idle / Disk error. See troubleshooting table below 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", page 124, and "Installing a HDD into the ICMP", page 125. Ensure to insert the HDD firmly. 3. Switch on the power. **Result:** As soon the new HDD is detected by the ICMP 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", page 124, and "Installing a HDD into the ICMP", page 125. Ensure to insert the HDD firmly. 3. Switch on the power. **Result:** As soon the new HDD is detected by the ICMP the rebuild of the RAID is started (Blinking red LED).

| Situation	Solution
Multiple disks failed (multiple red LEDs) + **RAID 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", page 124, and "Installing a HDD into the ICMP", page 125. Ensure to insert the HDDs firmly. 3. Switch on the power. 4. Start "RAID Initialize". See user guide of the Communicator. **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", page 124, and "Installing a HDD into the ICMP", page 125. Ensure to insert the HDDs firmly. 3. If problem remains try "RAID Initialize". See user guide of the Communicator. Note that all content will be lost! 4. If problem remains contact Service for further instructions.

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

8.11 ICMP device certificate

Purpose of the Barco ICMP device certificate

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

The (WEB) Commander or Communicator can be used to retrieve the device certificate directly from the ICMP. To retrieve the device certificate from the website the QR (Quick Response) code can be used. See procedure "Obtaining the Barco ICMP certificate", page 123.
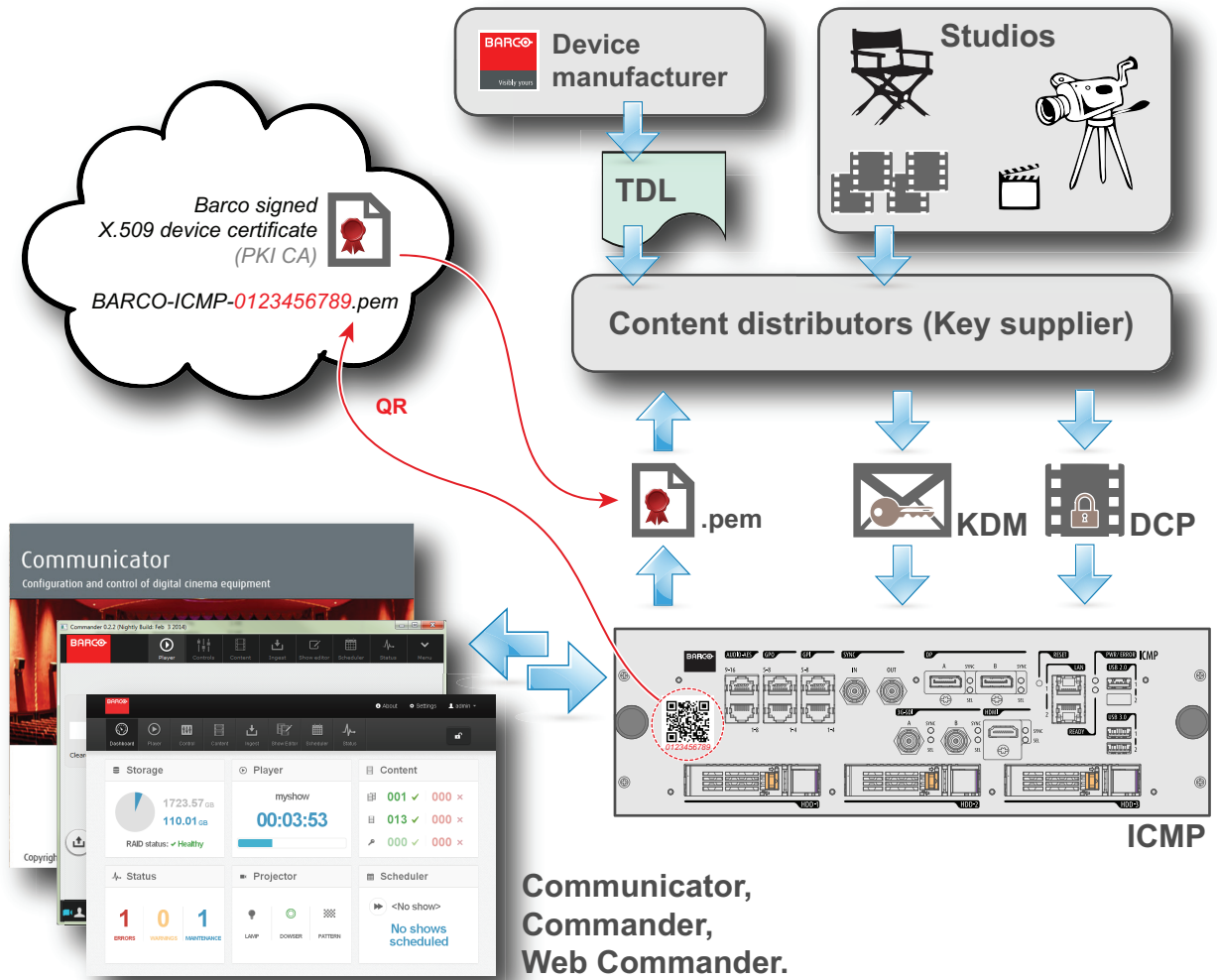
Image 8-12

	Trusted Device List (TDL)
ℹ	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.

	Public Key Infrastructure (PKI)
ℹ	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.

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

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*).

8.12 ICMP configuration via Communicator

About ICMP configuration

Following parameters are available to configure the ICMP:
- Global settings: allows defining name of the ICMP, 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.
- 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.

All installation and maintenance operations on the ICMP 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 and replaces them with the default values set at the factory. Please refer to the Communicator user guide for further information.

About the ICMP internal clock

The crystal on the ICMP 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 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.

8.13 ICMP reset

📄 This procedure requires that ICMP version 1.2.4 or later is installed.

ICMP reset possibilities

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

How to reset the ICMP?

1. Click on the ICMP **reset button** in the GUI of the **Web Commander**

   or
   Click on the ICMP **reset button** in the GUI of the **Commander**

   📄 *Note:* It can be that the Commander or WEB-Commander is not able to send the reset command.

   or
   click on the ICMP **reset button** 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 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 the lasers are switched on again.

   Once the READY LED lit continuous green the ICMP is up and running.

2. Did the reset of the ICMP 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 **hardware reset button** a few seconds (reference 3 Image 8-13) .

   ⚠ *Warning:* Resetting the ICMP 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.
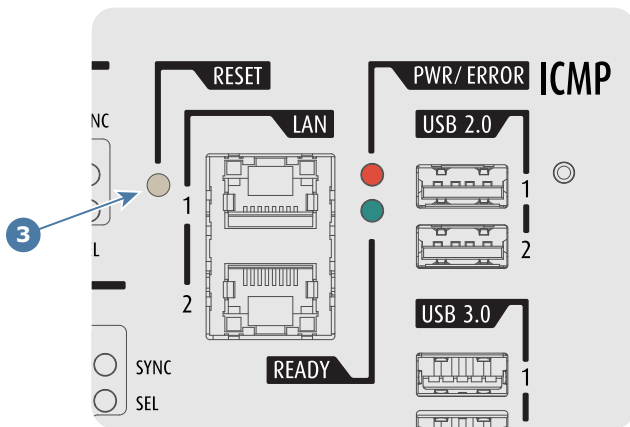

Image 8-13

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

8.14 Obtaining the Barco ICMP certificate

Required tools

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

Using the CertID label to download the ICMP certificate

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

   > 📄 *Note:* Instead of downloading the ICMP 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 certificate directly.
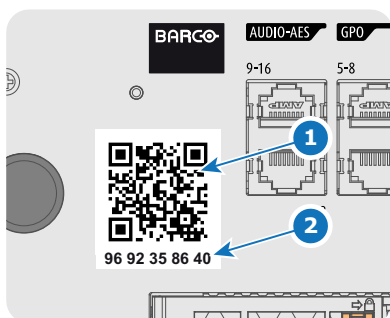
Image 8-14

Using control software to obtain the ICMP certificate

1. Use the **WEB Commander** to download the ICMP certificate from the ICMP main board. For detailed instructions see user guide of the WEB Commander.

   or
   use the **Commander** to download the ICMP certificate from the ICMP main board. For detailed instructions see user guide of the Commander.

   or

use the **Communicator** to download the ICMP certificate from the ICMP main board. For detailed instructions see user guide of the Communicator.

8.15 Removing a HDD from the ICMP

> 📄 In case the ICMP 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.

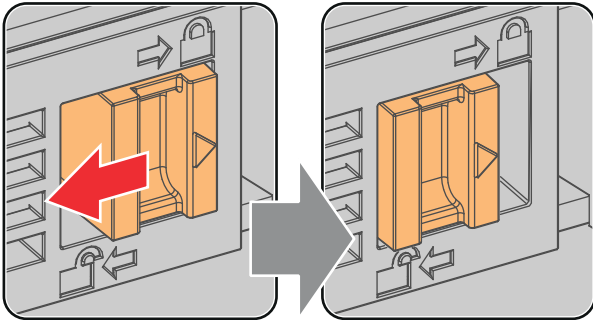2. Moving the latch towards the left.

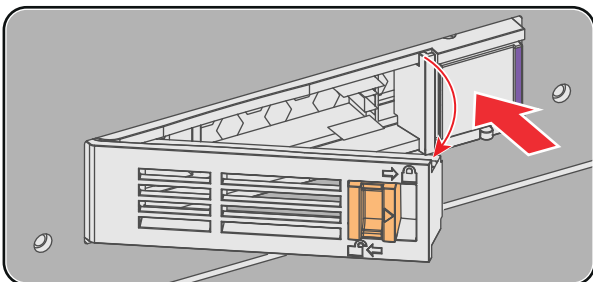

Image 8-15

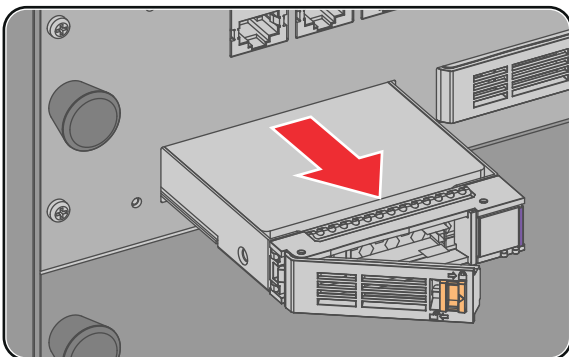3. Push the unlock button to open the handle.

Image 8-16

4. Pull the HDD out of its slot.

Image 8-17

> 📄 To install the HDD see procedure "Installing a HDD into the ICMP", page 125.

8.16 Installing a HDD into the ICMP

> 📄 This procedure assumes that the HDD slot of the ICMP is empty. If not, see procedure "Removing a HDD from the ICMP", page 124.

> ⚠️ **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 HDD set.

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

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.
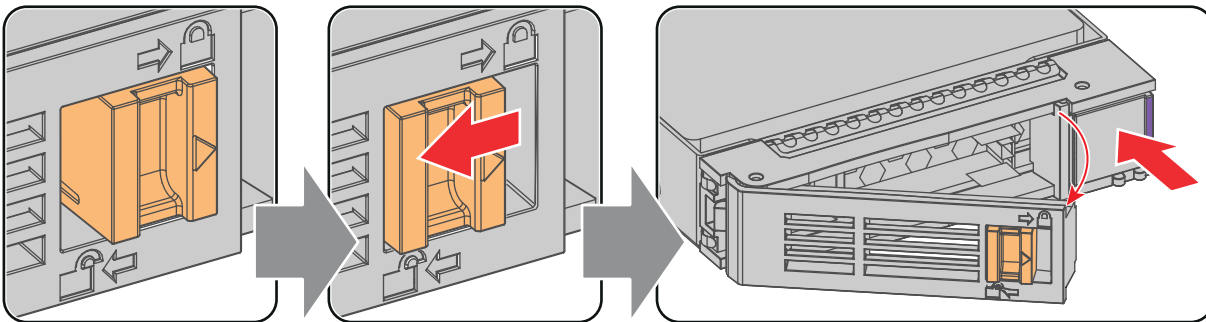
Image 8-18

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.
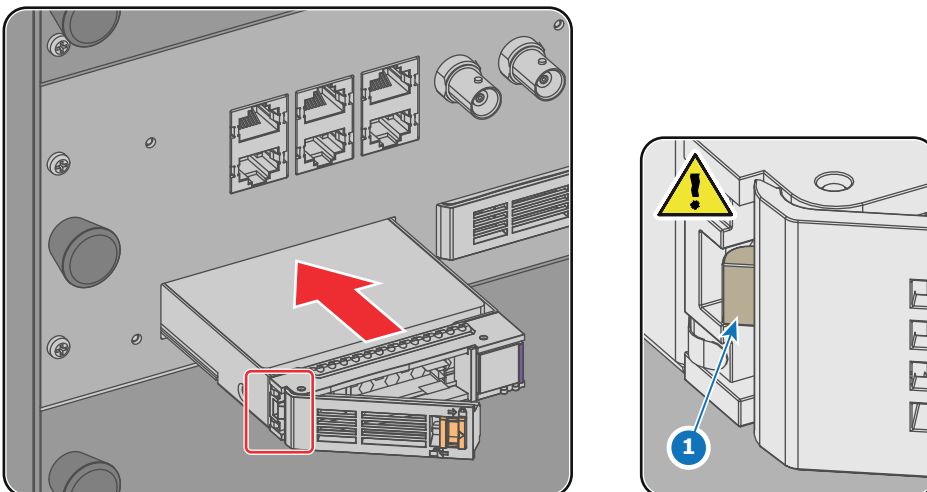

Image 8-19

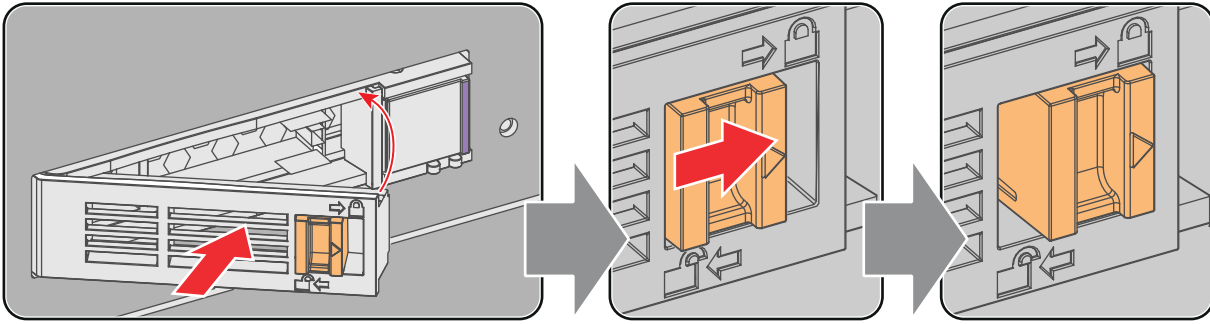4. Push the HDD completely and firmly inside its slot, close the handle, and move the latch towards the right.

Image 8-20

5. Switch on the projector.

📄 In case you replace one HDD (e.g. degraded mode) the ICMP 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.

Communicator Touch Panel

9

Overview

- Introduction
- Installation of the touch panel interface

9.1 Introduction

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 Prometheus III. One central locking mechanism of the swivel arm allows an instant fixation of the touch panel interface in any position.

The touch panel interface can also be installed further away from the Prometheus III. For that you can use a serial (RS232) cable up to 10 meter or an Ethernet cable up to 50 meter to allow a direct data communication between the Prometheus III and the Communicator Touch Panel.

The touch panel interface can also be connected with a Local Area Network (LAN) just like the Prometheus III. In this case both devices can communicate with each other as well.

The touch panel interface requires a +12 VDC voltage, 1,5 ampere. The use of a separate +12 VDC adaptor (1,5 ampere minimum) is required.
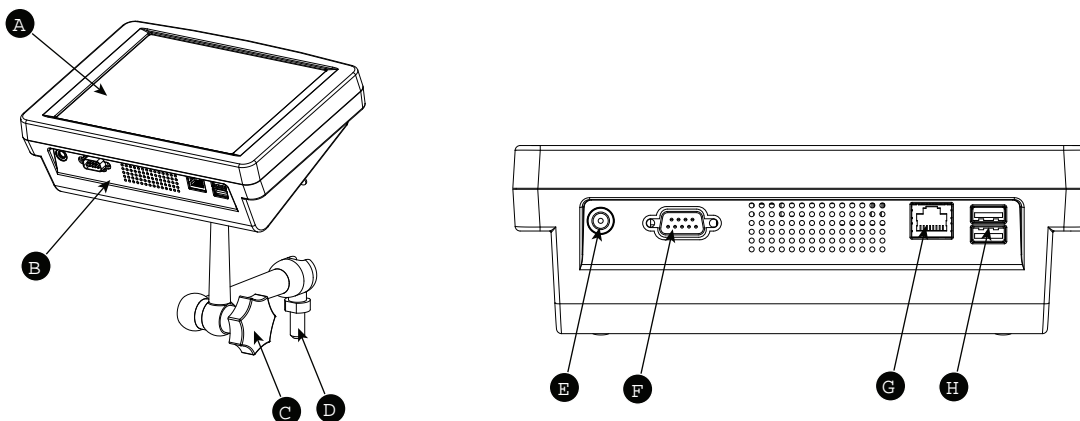
Parts location of the touch panel interface

Image 9-2: Communicator touch panel

A   Touch screen
B   Communication panel
C   Knob to operate central swivel clamp
D   Base of swivel arm

E   Power input 12 VDC, 1.5A

F   RS232 port (sub-D)

G   Ethernet port (RJ45)

> **CAUTION:** For more information about the use of the Communicator Touch Panel, consult its user guide.

9.2 Installation of the touch panel interface

Required tools

- 17 mm wrench
- 10 mm wrench

How to install the touch panel interface

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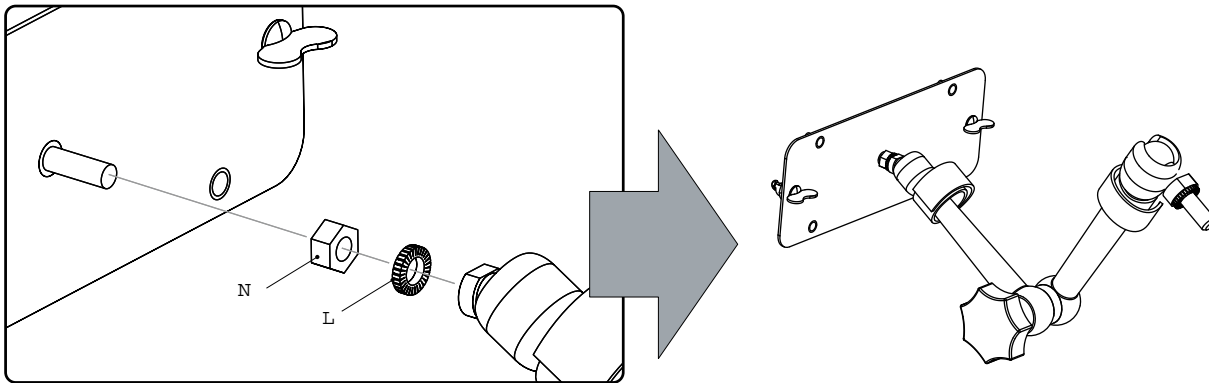

Image 9-3: Assemble swivel arm

2. Slide a washer (M) over the base of the swivel arm and Insert the base of the swivel arm into the mounting hole at the top of the Prometheus III as illustrated.
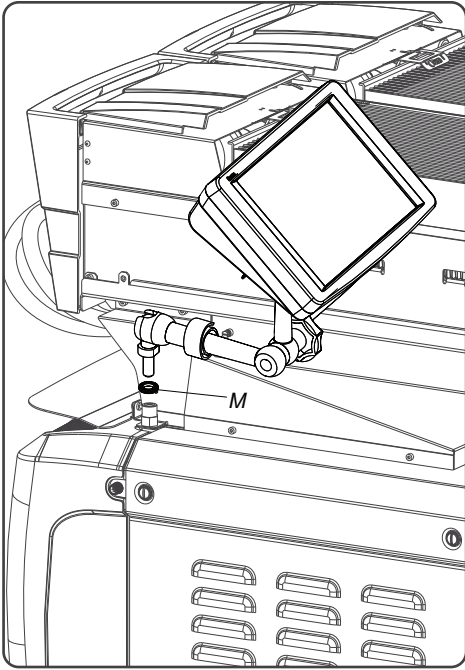
Image 9-4

3. Place the touch panel interface on the mounting plate of the swivel arm and fasten the two wing nuts (W) as illustrated.
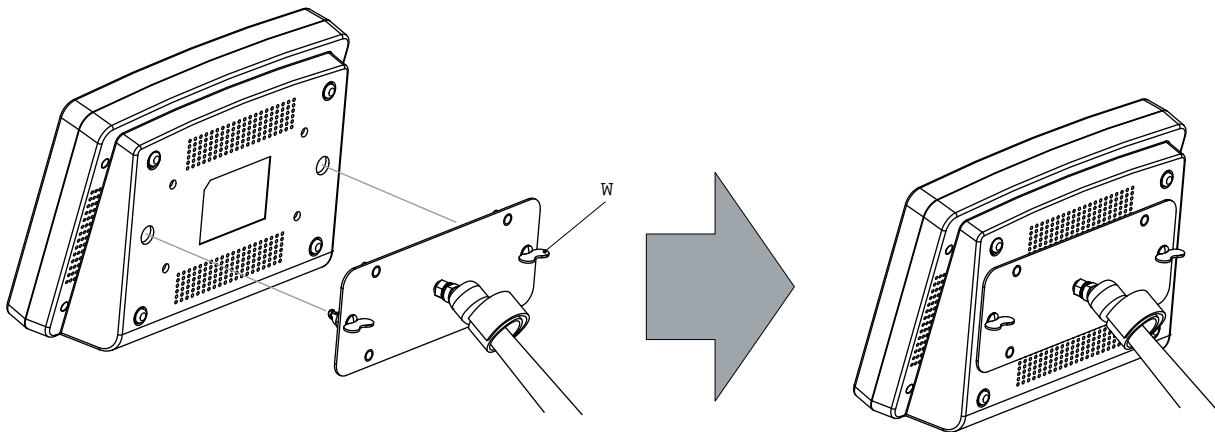

Image 9-5: Mount touch panel

4. Connect the circular plug of the multi cable with the circular socket at the rear side of the Prometheus III.
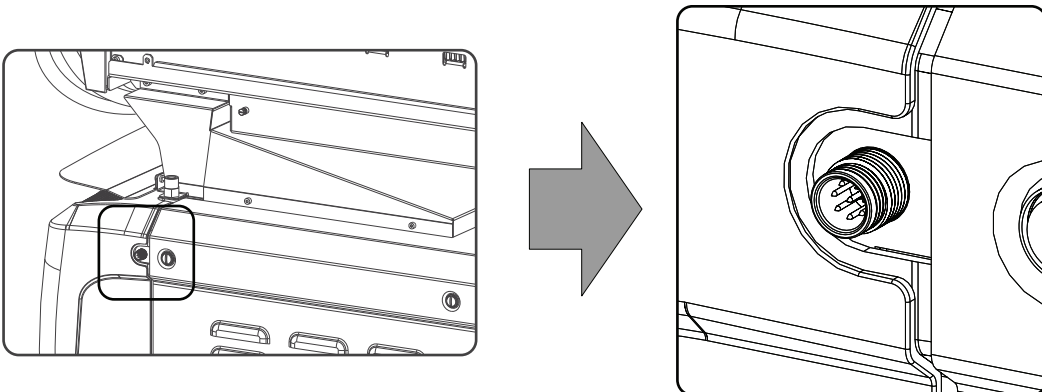

Image 9-6

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

6. Connect the DC plug, the RJ45 Ethernet plug and the D-SUB plug into their respective sockets on the touch panel interface.
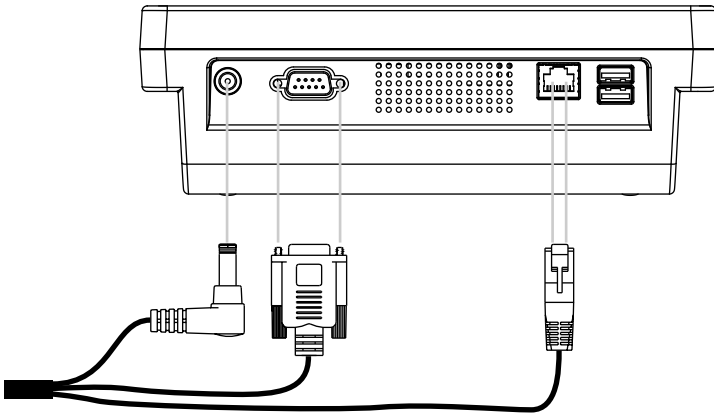

Image 9-7: Connections

Communicator Touch Panel

Starting up

10

About this chapter

This chapter contains the switch ON and switch OFF procedures of the Prometheus III. These procedures enumerate all the important points which have to be checked prior to switching ON the projector. This is to ensure a safe start up of the projector.

Overview

- Switching ON the Prometheus III
- Switching OFF the Prometheus III

10.1 Switching ON the Prometheus III

📄 This procedure is only done when projector was HARD switched-off.

How to switch on

1. Make sure that the Prometheus III is installed upon a stable pedestal. See chapter "Positioning the Prometheus III at port window", page 34.

2. Ensure the external cooler is correctly installed. Check the connections: Tubes and electrical connections must be secure and running from correct cooler to correct side. Ensure the tubes and electrical cables are well protected.

3. Make sure that the lens cap is removed and the correct lens is installed for your application. See chapter "Lens selection", page 64.

4. Make sure the projector is correctly connected to the power net. See chapter "Connecting the Prometheus III with the power net", page 37.

5. Check if a video source is connected with the projector. See chapter "Input & communication", page 81.

6. Check if the communicator touch panel is installed. See chapter "Communicator Touch Panel", page 127.

7. Press the power switch to switch ON the projector. As a result the projector starts up in standby.

   Power switch status:
   - When '0' is visible, the projector is switched OFF.
   - When '1' is visible, the projector is switched ON.

8. During this step some checking procedures are executed on the laser unit. The laser is OFF and the dowser closed. No internal pattern is selected.

9. After few moments, the communicator touch panel starts its initialization procedure, then the projector status led turns Green (fix). The projector is in standby mode.

10. Press the **STANDBY** button on the local keypad or use the Communicator Touch Panel to activate the laser.

11. Press the **DOWSER** button on the local keypad or use the Communicator Touch Panel to open the dowser. As a result the applied source will be displayed.

   👁 **CAUTION:** See user's guide of the Communicator Touch Panel to operate and control the Prometheus III.

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

10.2 Switching OFF the Prometheus III

How to switch OFF

1. Press the standby button on the local keypad or use the Communicator Touch Panel to switch the projector from operation to standby. As a result the lasers turn off but the fans remain turning and the cooling unit remains working to cool down the projector.

2. Let the projector cool down at least 5 minutes or until the speed of the fans decreases.

3. Switch OFF the projector with the power switch.

Removal and installation of the projector covers

11

> ⚠️ **WARNING:** All procedures in this chapter may only be performed by "qualified service technicians" .

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

Overview

- Removal of the light source cover
- Removal of the rear cover
- Removal of the input cover
- Removal of the front cover
- Removal of the side cover
- Installation of the front cover
- Installation of the input cover
- Installation of the light source cover
- Installation of the rear cover
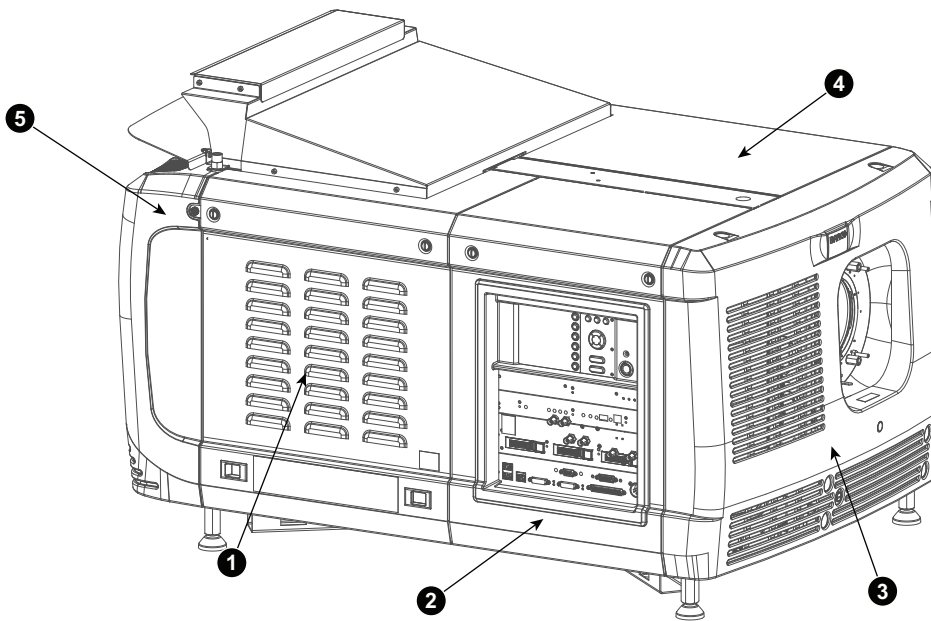- Installation of the side cover

Location of the covers

Image 11-1

1   Light source cover
2   Input cover
3   Front cover
4   Side cover
5   Rear cover

All cover can be individually removed.

11.1 Removal of the light source cover

Required tools

Flat screwdriver

How to remove

1. Release both captive screws on top of the lamp cover.
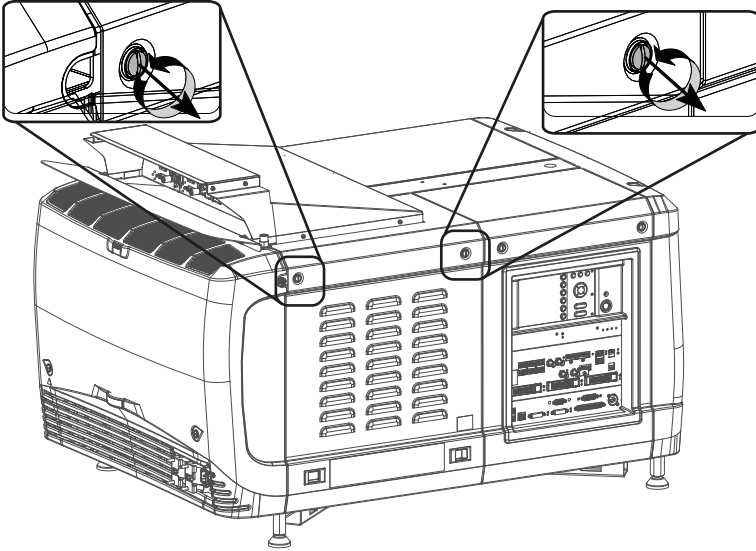

Image 11-2: Light Source cover, loosening screws

2. Push both lock to each other to release the locks and pull at the same time the bottom side of the cover away form the projector.
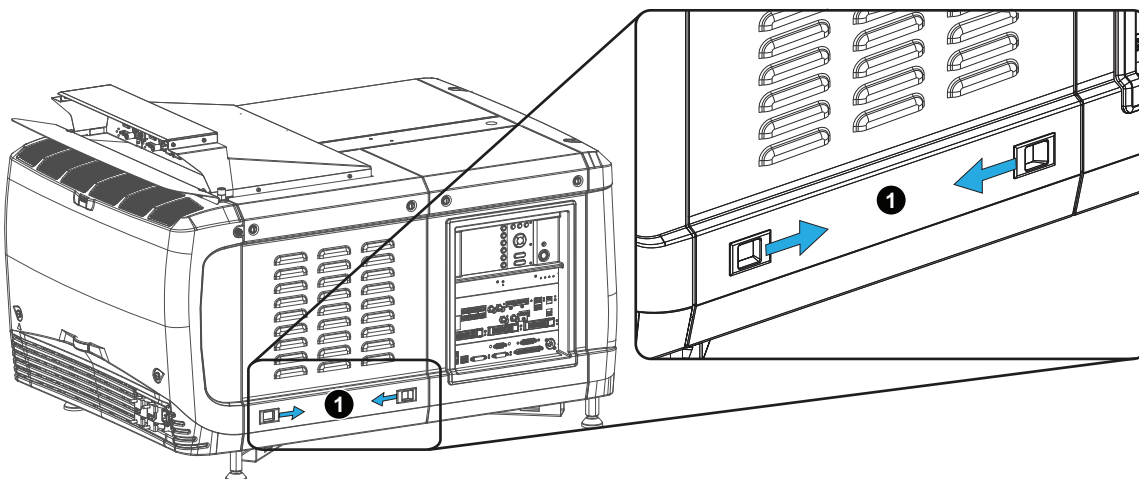

Image 11-3: Light Source cover, locks
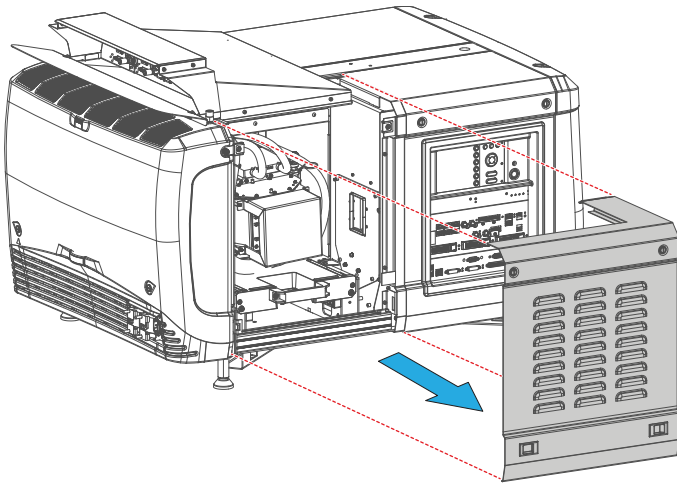
3. Remove the cover.

Image 11-4: Light Source cover, removal

11.2 Removal of the rear cover

Required tools

Flat screwdriver

How to remove

1. Release both captive screws almost at the bottom of the rear cover using a flat screw driver (1).
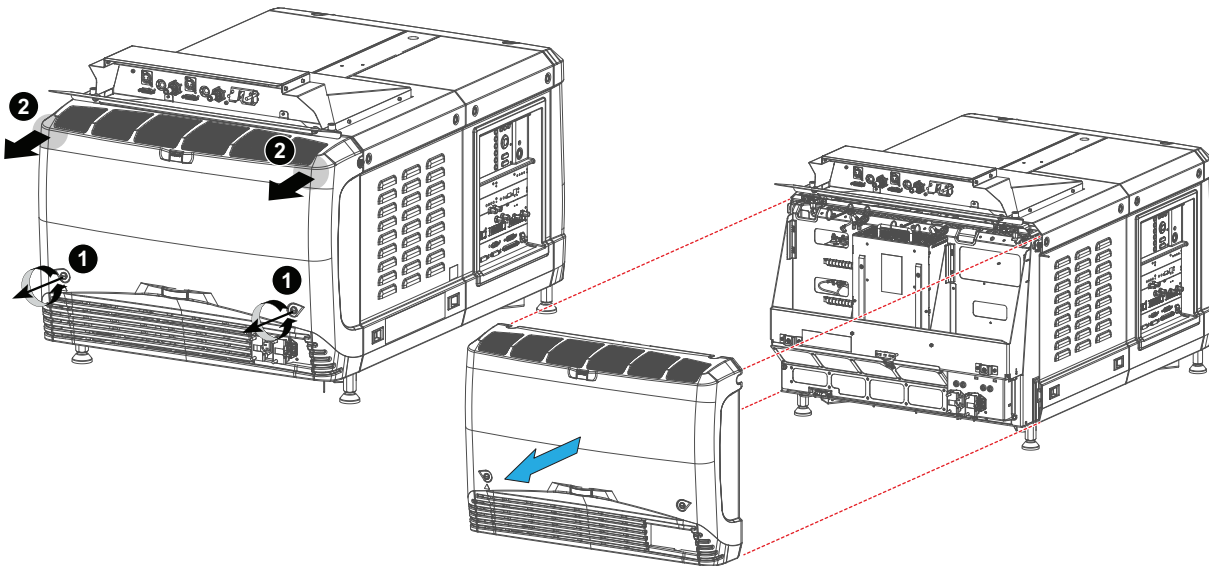

Image 11-5: Rear housing removal

2. Remove the rear cover of the projector doing the following:
   1. gently pull out the top covers of the rear cover (2).
   2. then move the rear cover away from the projector.

11.3 Removal of the input cover

Required tools

Flat screwdriver

How to remove

1. Release both captive screws at the top of the input cover using a flat screw driver.
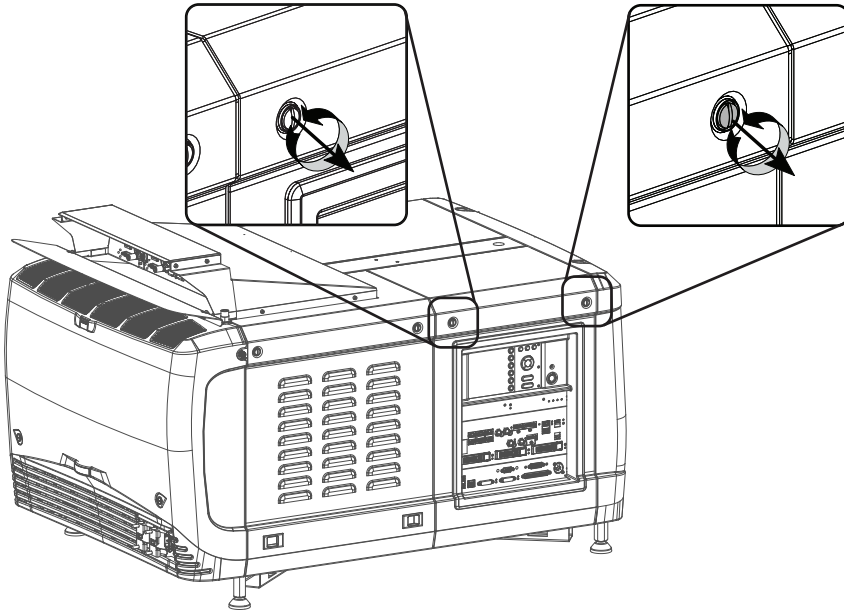

Image 11-6: Input cover, fixation

2. Remove the input cover as follow:
   1. Pull the bottom side of the cover to you until the cover is unlocked.
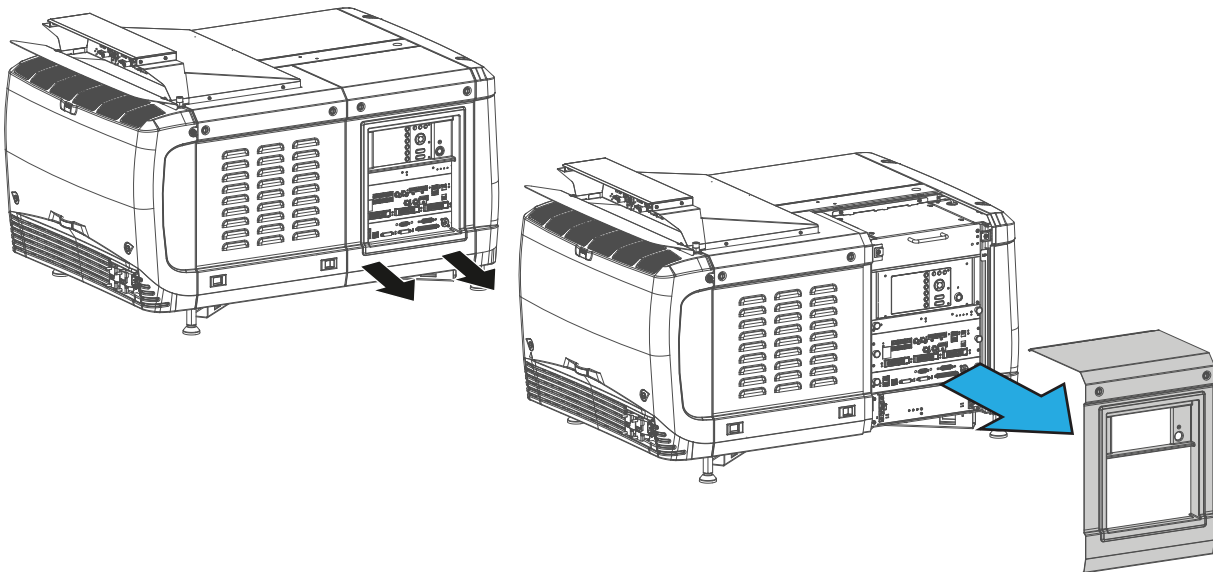   2. Slide the full cover away from the projector.

Image 11-7: Input cover removal

11.4 Removal of the front cover

Required tools

Flat screwdriver

How to remove

1. Check if the lens is removed.

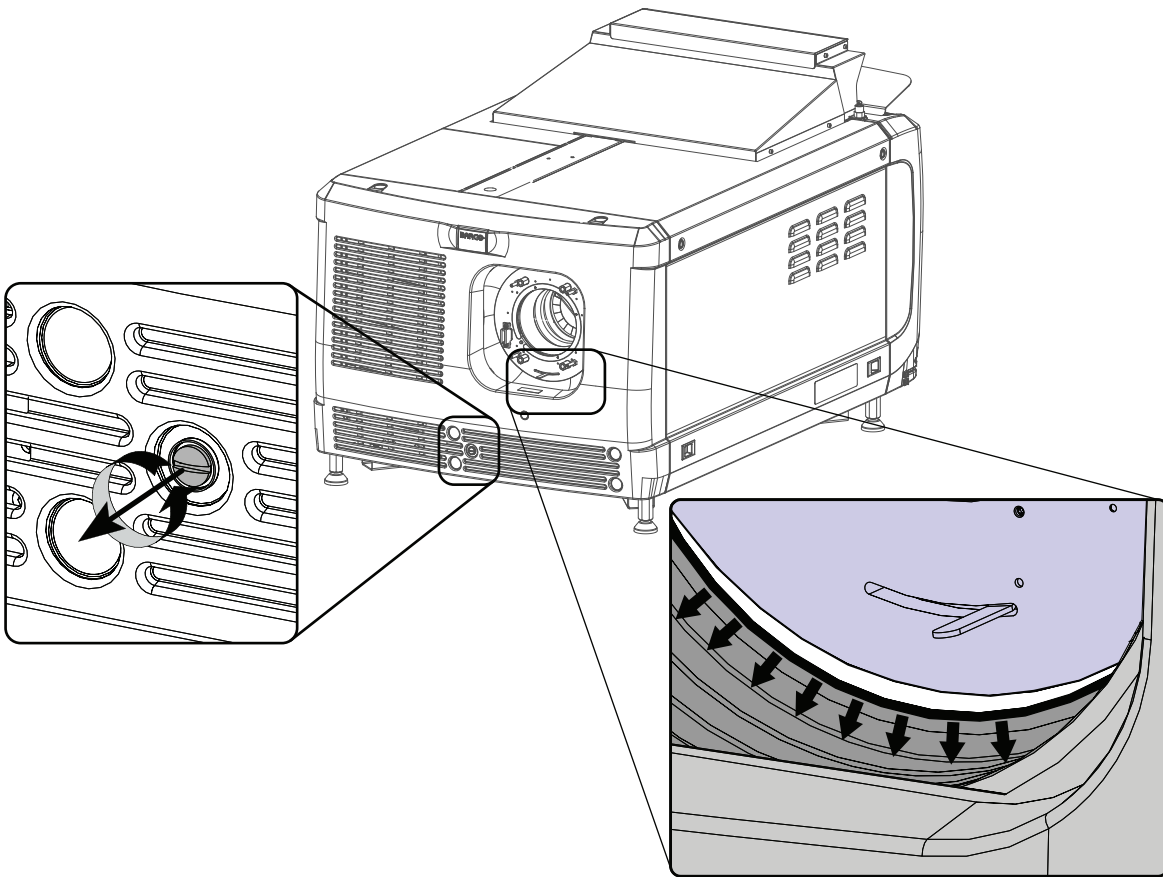2. Remove the rubber dust ring from the lens holder.

Image 11-8: Release cover removal

3. Release the captive screw at the middle bottom of the front cover.

4. Remove the front cover as follow:
   1. standing in front of the projector, pull the top side of the cover to you until it is unlocked.
   2. slide the cover away from the projector.

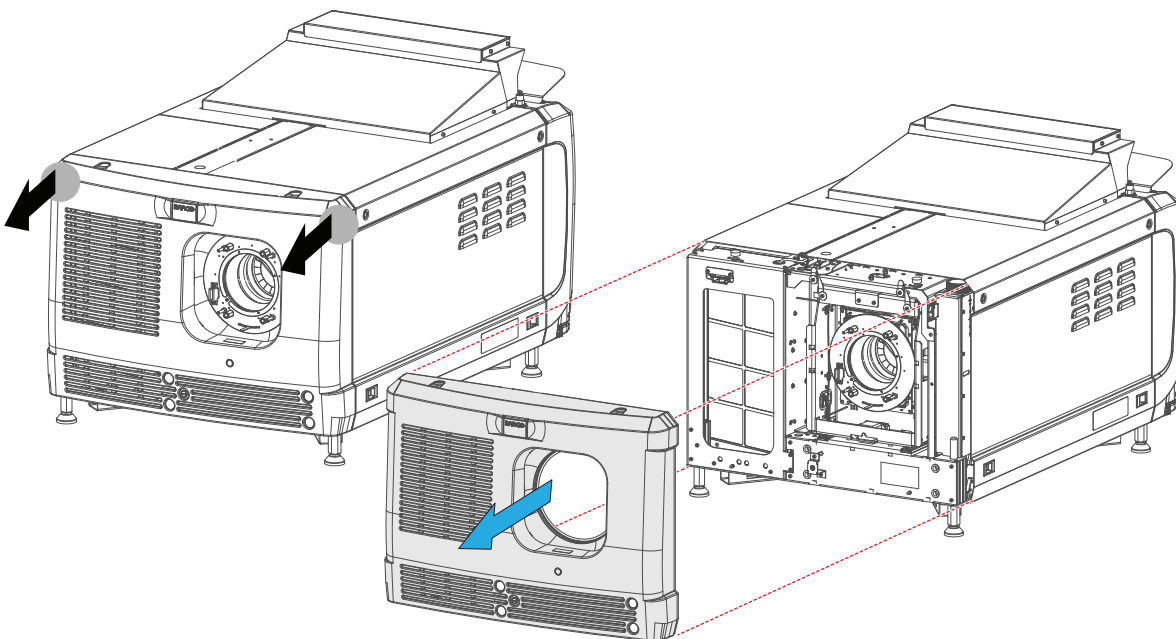Image 11-9: Remove front cover

11.5 Removal of the side cover

Required tools

Flat screwdriver

How to remove

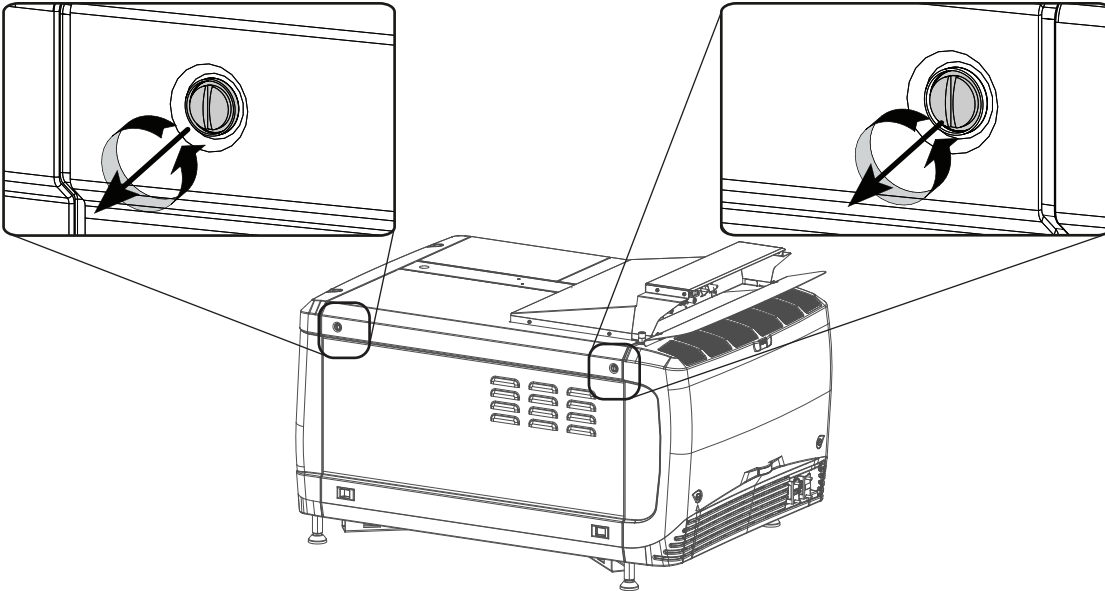1. Release both captive screws on top of the side cover.

Image 11-10: Captive screws

2. Push both lock to each other to release the locks and pull at the same time the bottom side of the cover away form the projector.
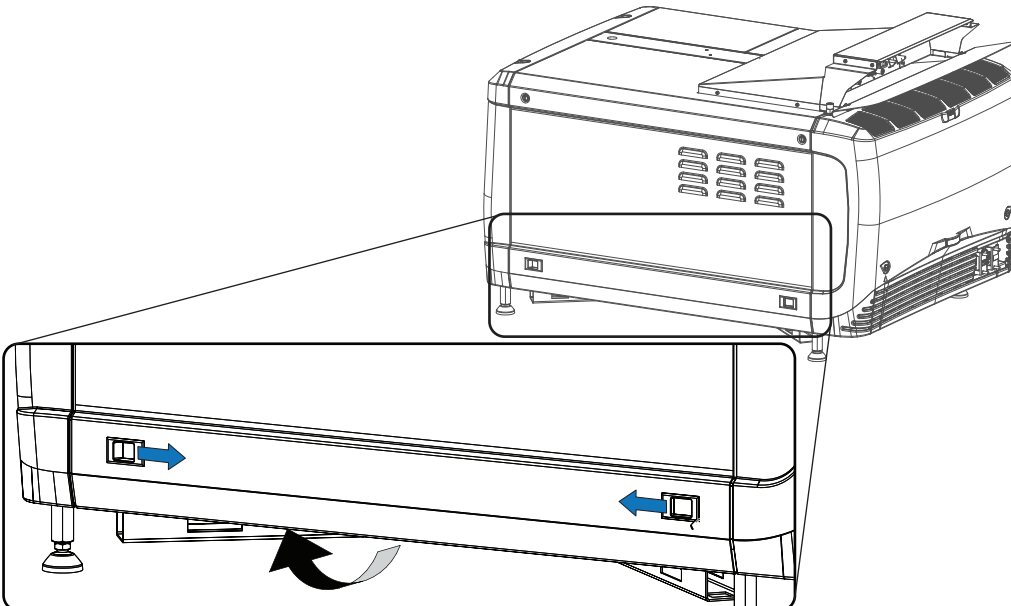
Image 11-11: Unlock side cover

3. Take off the cover.
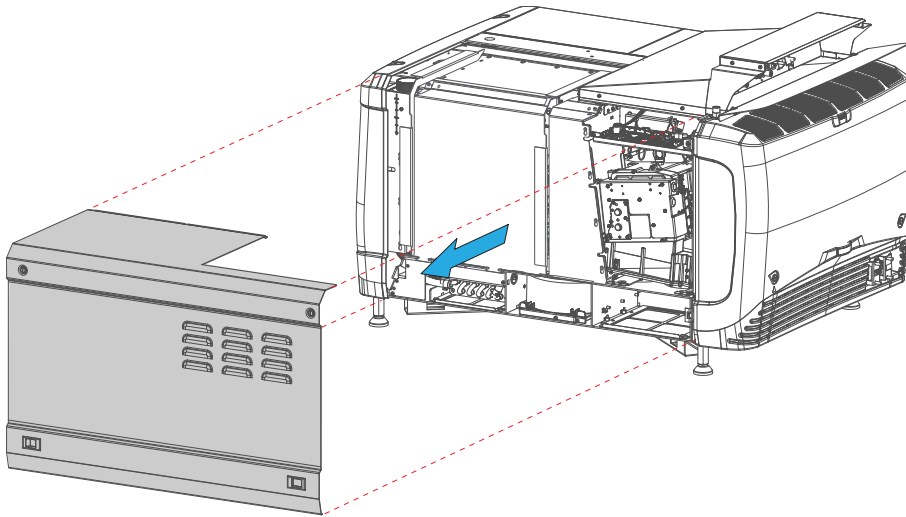
Image 11-12: Side cover

11.6 Installation of the front cover

Required tools

Flat screwdriver

How to install

1. Ensure that no lens is mounted.

2. Execute the next steps to install the front cover:

   1. Hook the bottom side of the cover to the projector.
   2. Gently push the top side of the cover into position.
   3. Ensure that the locking studs click into their receivers.
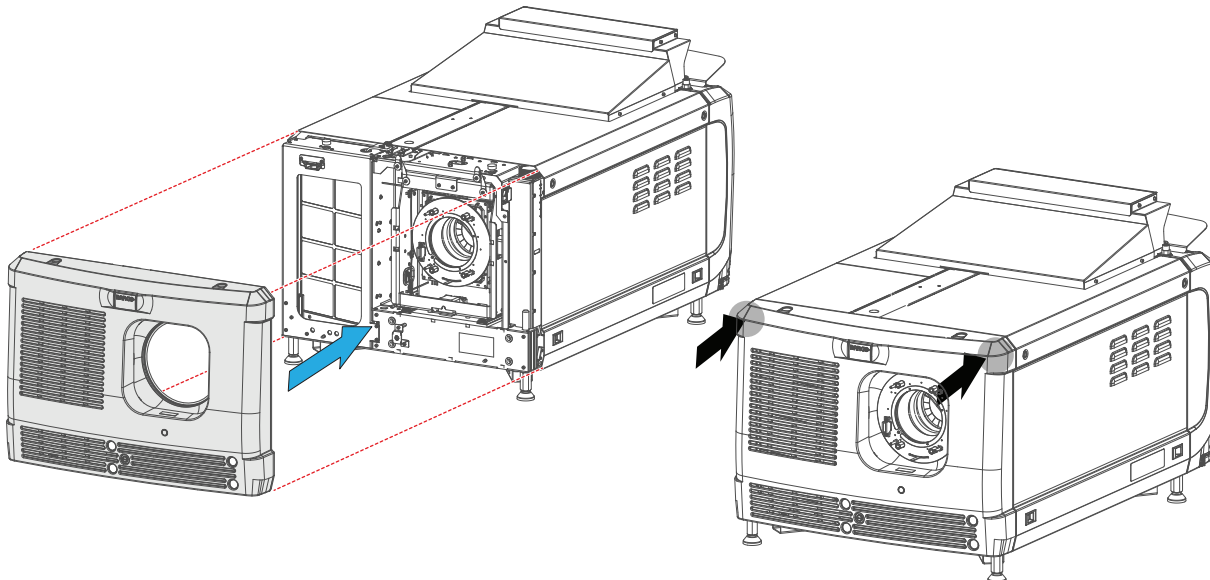
Image 11-13: Mount front cover

3. Secure the front cover by locking the captive screw in the middle at the bottom of the front cover.
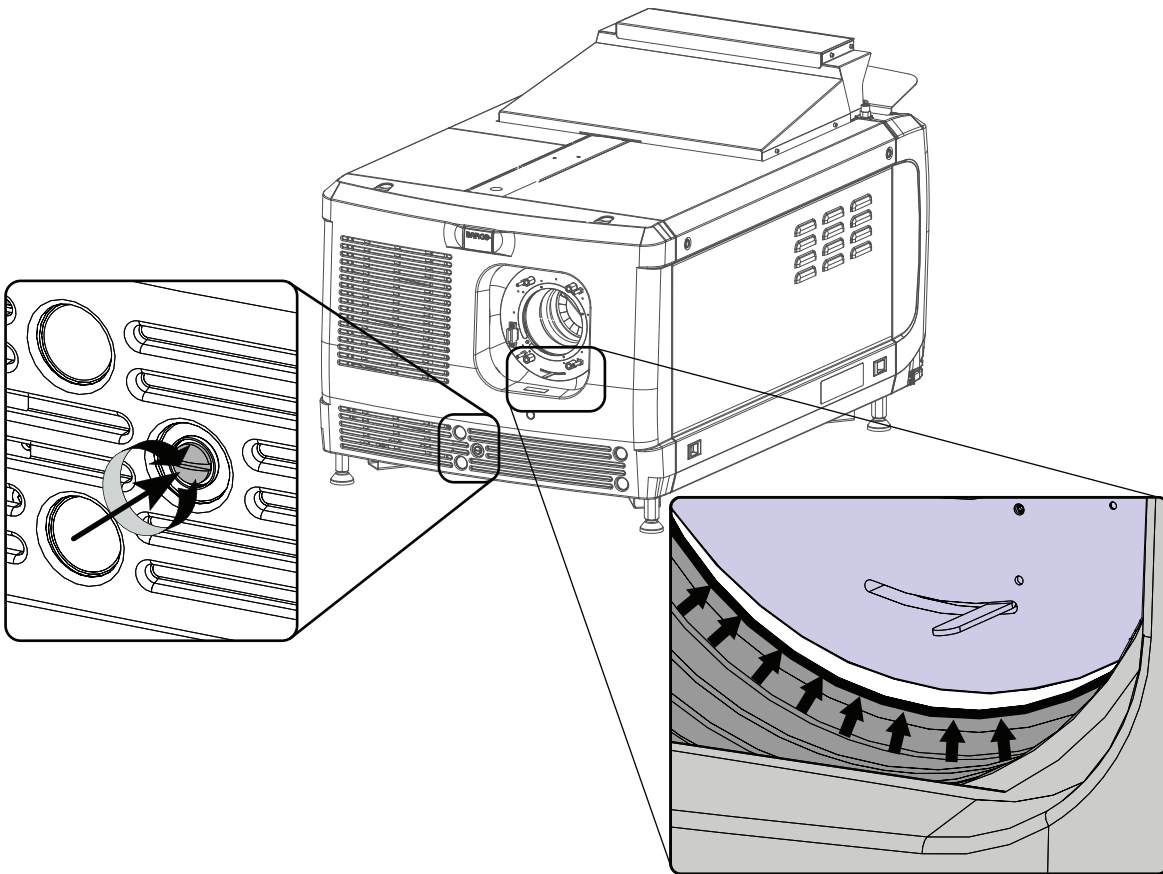
Image 11-14: Secure front cover

4. Reinstall the rubber dust ring around the lens holder.

11.7 Installation of the input cover

Required tools

Flat screwdriver

How to install

1. Place the top side of the cover on its place.
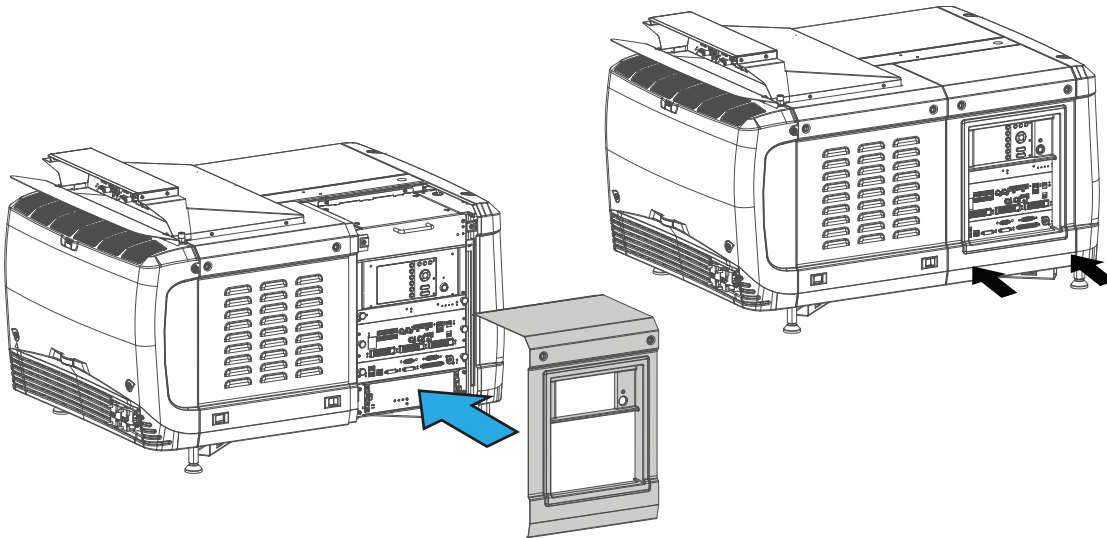
Image 11-15: Mount input cover

2. Gently move the bottom side of the cover towards the projector and push the bottom side until the locking studs click in the receivers.
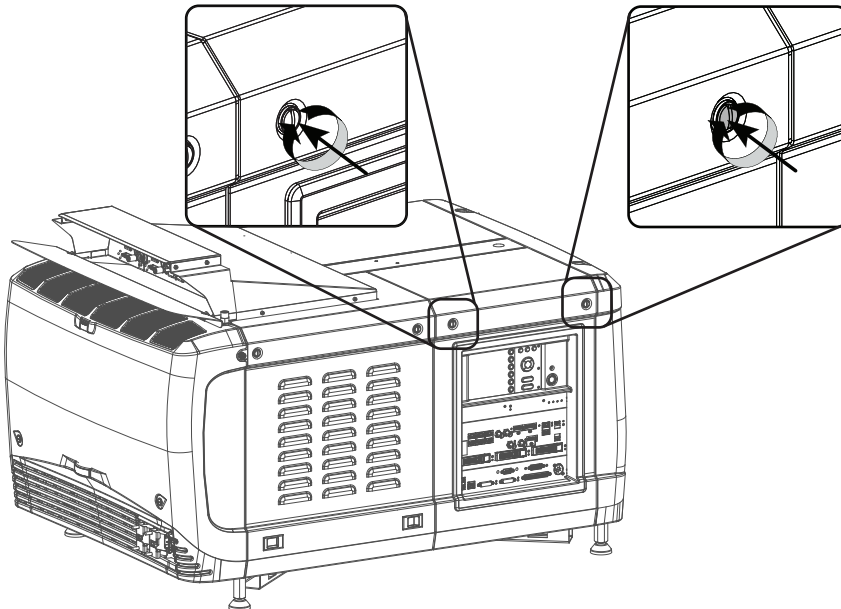
Image 11-16: Secure input cover

3. Secure the cover by fastening the captive screw.

11.8 Installation of the light source cover

Required tools

Flat screwdriver

How to install

1. Place the top side of the cover on its place.
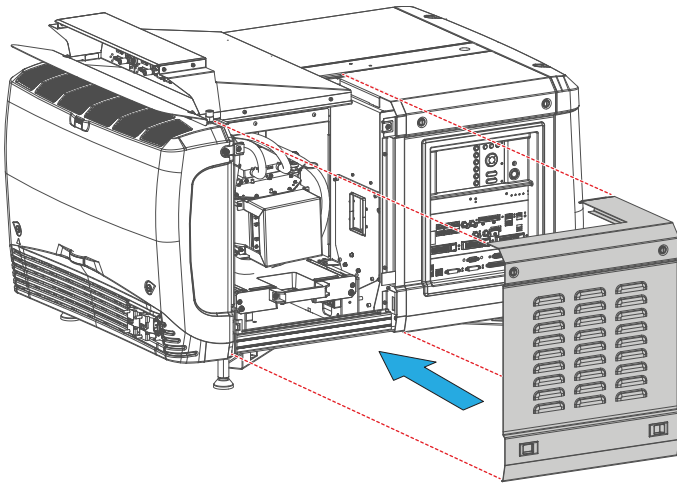
Image 11-17: Mount light source cover

Close the cover as follow:
1. Gently move the bottom side of the cover towards the projector
2. Push both lock to each other and push at the same time the cover against the projector frame.
3. Release both locks so that they lock in their receivers.

2. Secure the cover by fasting both captive screws.
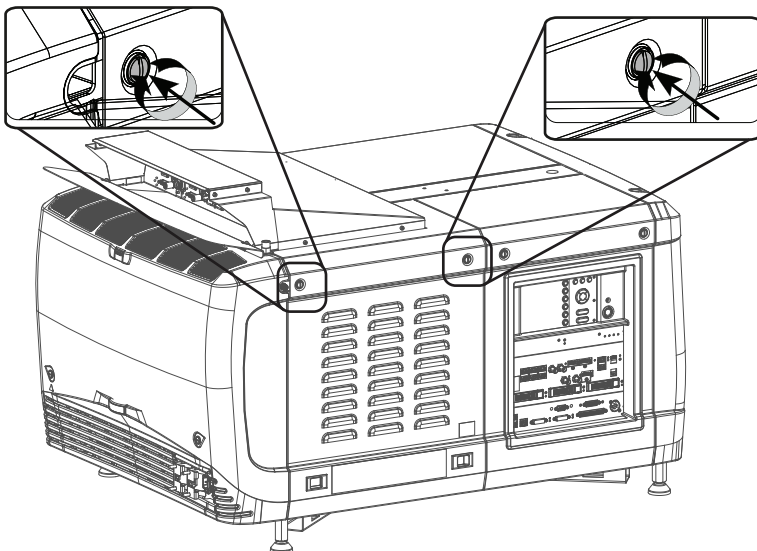
Image 11-18: Secure light source cover

11.9 Installation of the rear cover

Required tools

Flat screwdriver

How to install

1. Install the rear cover of the projector doing the following:
   1. Bring the rear cover towards its final position.
   2. Gently push the locking studs into the receivers (1).

   > *Note:* Gently install the back cover, ensure the UPS cable is not damaged by guiding it into the foreseen cavity in the cover.
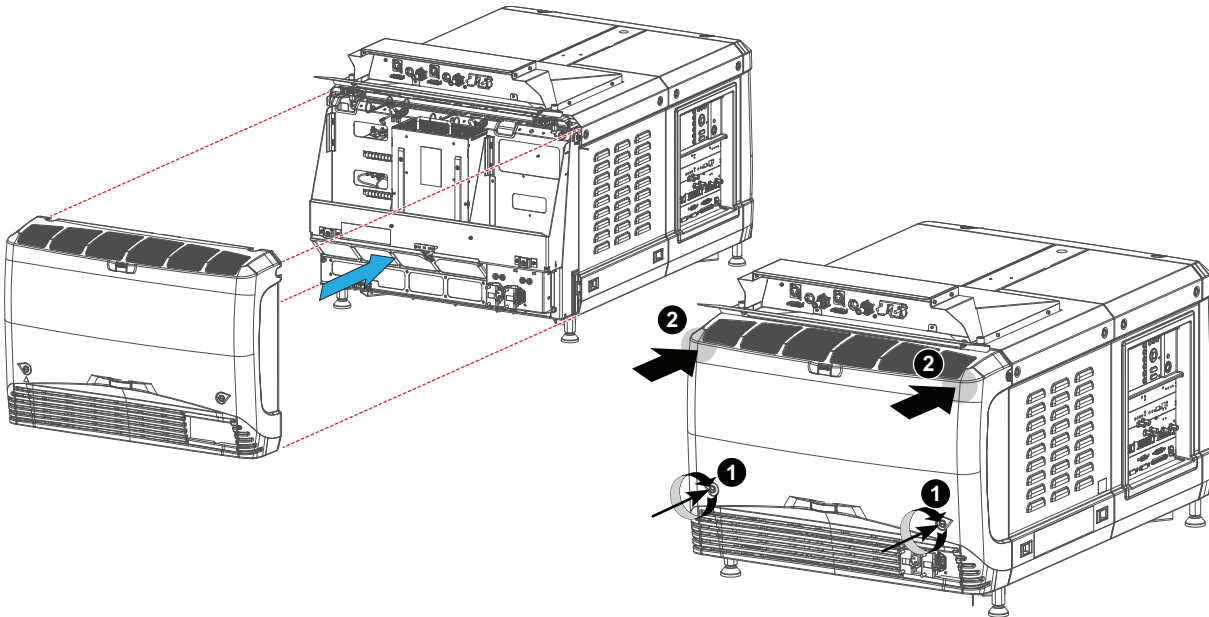
Image 11-19: Mount rear cover

2. Secure the cover by fastening the captive screw at the bottom of the rear cover (2).

11.10 Installation of the side cover

How to install

1. Place the top of the side cover on its place.
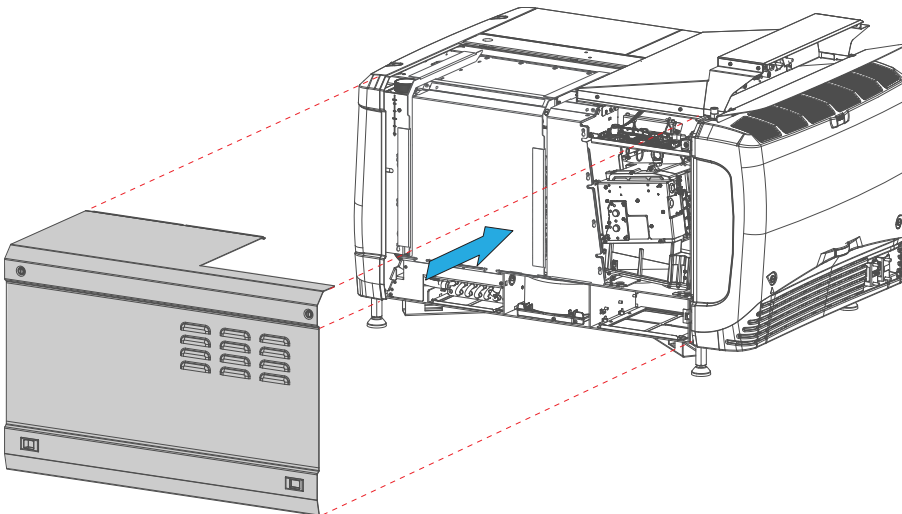
Image 11-20: Mounting the side cover

Close the cover as follow:

1. Gently move the bottom side of the cover towards the projector
2. Push both lock to each other and push at the same time the cover against the projector frame.
3. Release both locks so that they lock in their receivers.
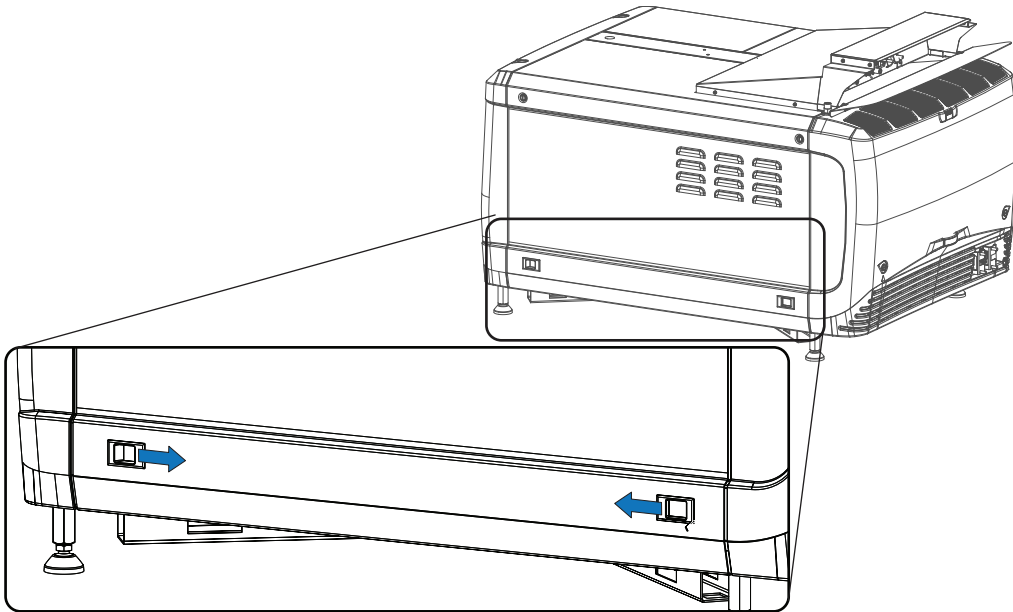
Image 11-21: Lock side cover

2. Secure the cover by fasting both captive screws.
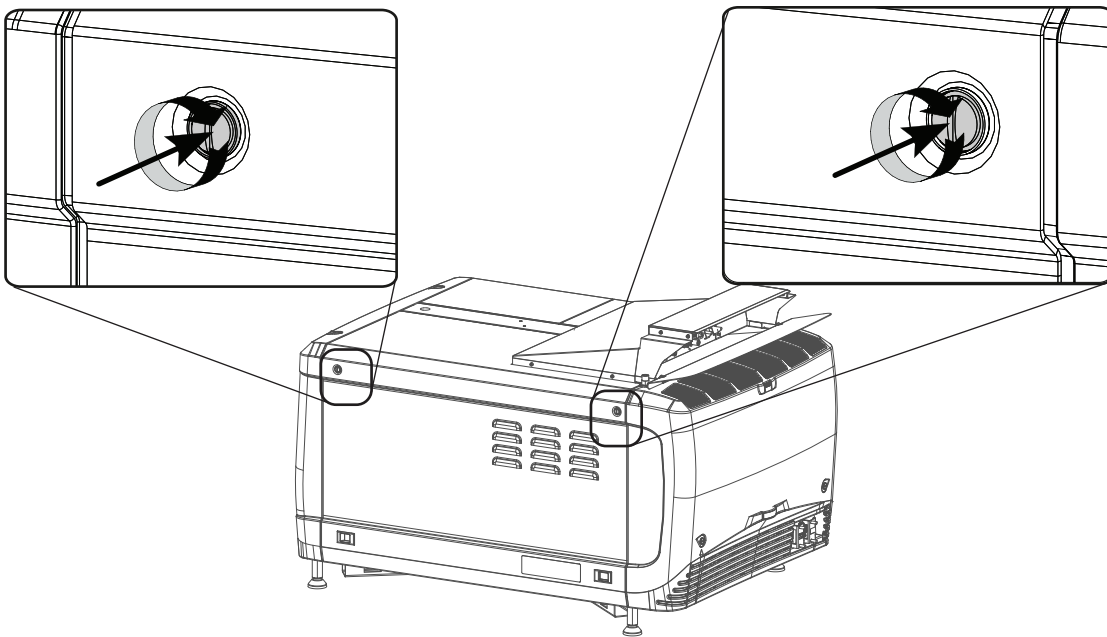
Image 11-22: Lock side cover

Removal and installation of the projector covers

Preventative maintenance actions

12

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.

Overview

- Monthly maintenance actions
- Three monthly maintenance actions

12.1 Monthly 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 "Remove and clean the front dust filter", page 154,"Remove and clean both bottom dust filters", page 155. 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.

12.2 Three monthly 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	**Check** dust **filters** of cooler 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 cooler dust filters", page 156. To speed-up drying, allow the filter(s) to dry at 50°C max in a well ventilated room.
2	Clean the back/side air inlet vents.	Use a vacuum cleaner.
3	Clean the housing of your projector.	Removal overall dust accumulation on projector covers. See cleaning instructions in this manual.
4	Clean the cooler housing	Remove all dust accumulation on the cooler housing and especially cleaning the area in proximity of the air inlets. Remove the dust from the fans below the filter inlets. Pay special attention to cleaning these fans if the cooler is installed above the projector because, due to the heat, this location has a greatest potential for dust accumulation.
5	Verify the internal clock of the ICMP with real time clock. Correct if needed.	ICMP version 1.2.1 is required at least. Communicator version 5.0 or higher is required. See user guide of Communicator for detailed instructions.

Maintenance

13

Overview

- Remove and clean the front dust filter
- Remove and clean both bottom dust filters
- Check the cooler dust filters
- Vacuum cleaning of the dust filters
- Washing and drying the dust filters
- Cleaning the lens
- Cleaning the exterior of the projector
- Check cooling liquid level
- Cooling liquid refill
- Authorization to clear security warning on the projector

13.1 Remove and clean the front dust filter

> ⚡ **WARNING:** Take care: the metal filters of the projector are fragile. Clean with care!

How to remove

1. Remove the input cover.
2. Slide out the filter frame.

Image 13-1: Front dust filter

Clean the dust filter

1. Remove most contamination gently with a vacuum cleaner in an other room or outside.
2. Blow remaining dust away with clean (without oil/lubricant) compressed air in an other room or outside. Do not hold compressor nozzle too close to the projector filters, as this may also cause damage.

> 📄 These dust filters are fragile. Clean them gently!

Mount the dust filter

1. Insert the dust filter with the "up" indication to the top of the projector.
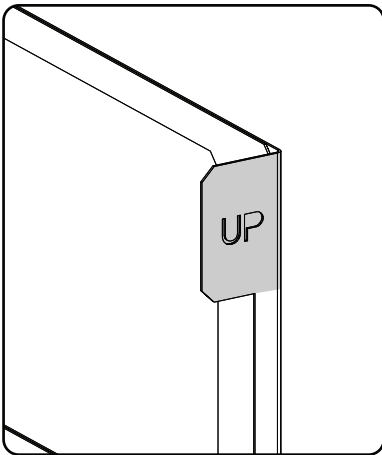
Image 13-2: Up indication

2. Push the filter completely in.

3. Reinstall the input cover.

13.2 Remove and clean both bottom dust filters

How to remove

1. Remove the side cover.

2. Slide out the bottom front dust filter.
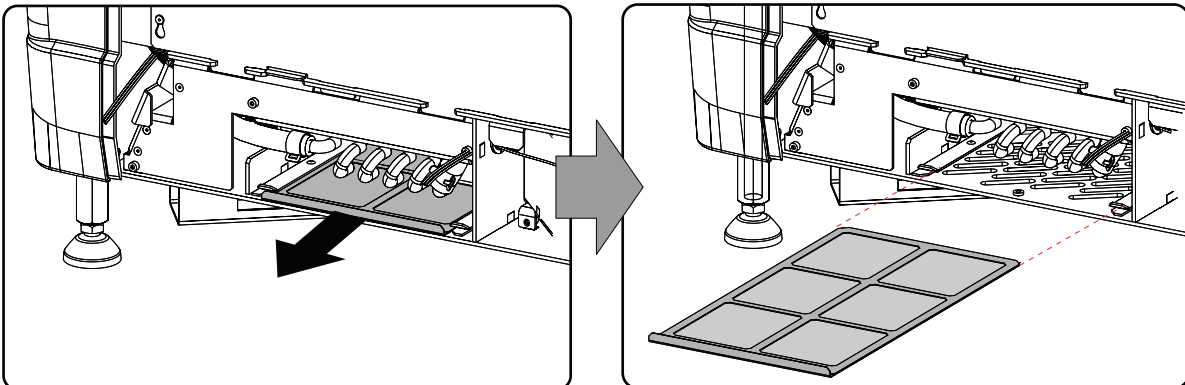
Image 13-3: Bottom front dust filter

3. Slide out the bottom back dust filter.
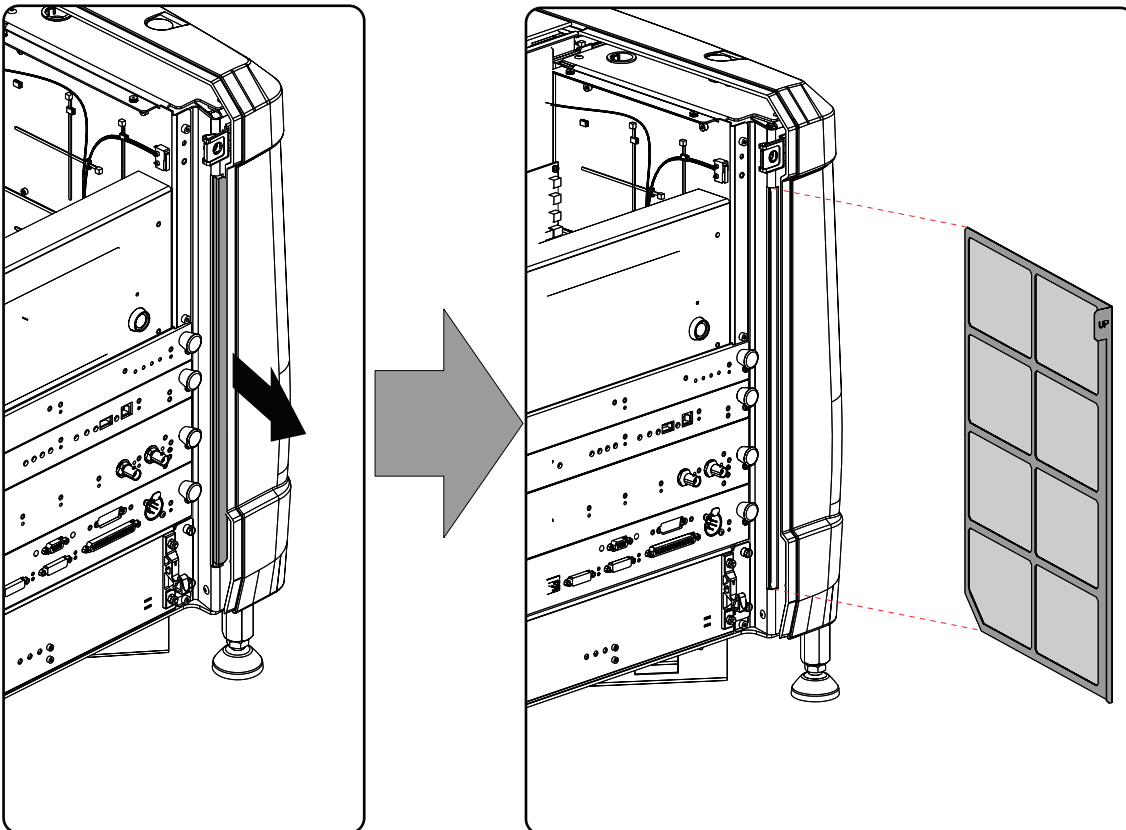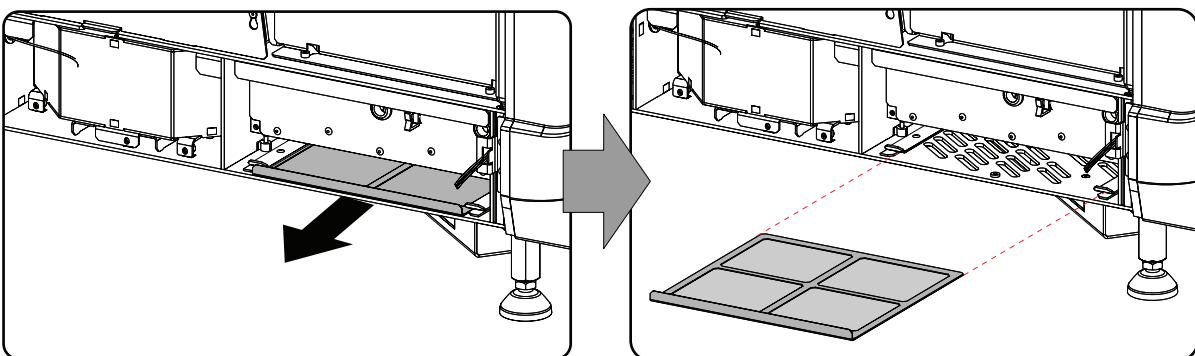

Image 13-4: Bottom back dust filter

Clean the dust filter

1. Remove most contamination with a vacuum cleaner in an other room or outside.

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

> 📄 These dust filters are fragile. Clean them gently!

Mount the dust filters

1. Insert the dust filter with the handle upwards. Small filter at the back, big filter at the front.

2. Push the filters completely in until they click into position.

3. Reinstall the side cover.

13.3 Check the cooler dust filters

How to check

1. Remove both fixation screws (captive screws) and take off the cover plate.
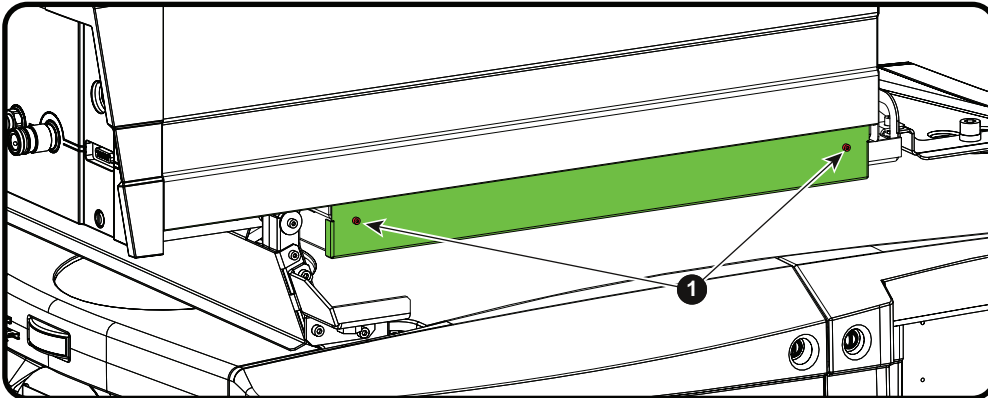
Image 13-5

2. Slide out the filter.
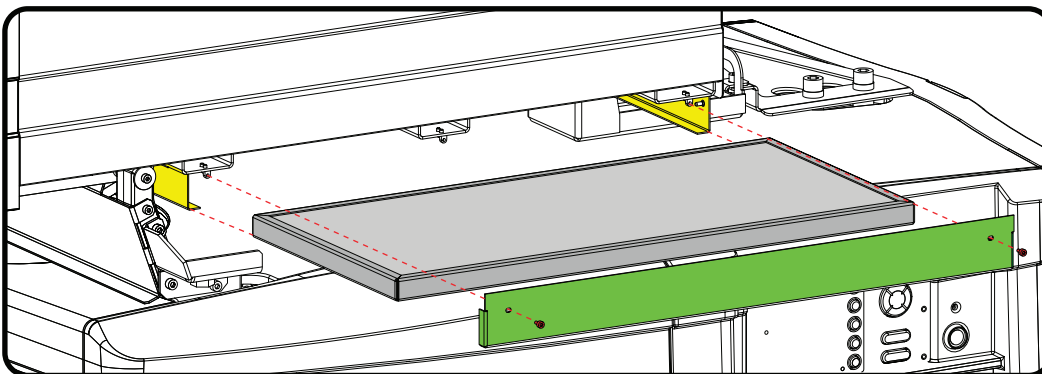
Image 13-6

3. **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 157.

   In case the filter contains dust but doesn't feel greasy then clean these filters with compressed air. These filters are not fragile and this method is more easier.

If an air compressor is not available, use vacuum to clean the dust filter. See procedure "Vacuum cleaning of the dust filters", page 157.

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.

4. While the filters are removed, pivot the cooling unit to check the fans for dust. Remove that dust if necessary.

Note: Do not neglect this step. Removing dust from the fans must be checked/cleaned regularly. Pay special attention to cleaning these fans if the cooler is installed above the projector because, due to the heat, this location has a greatest potential for dust accumulation.

5. Insert a clean dust filter and mount cover plate.

13.4 Vacuum cleaning of the dust filters

When vacuum 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 157.

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.

13.5 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 "Hazards", page 197.
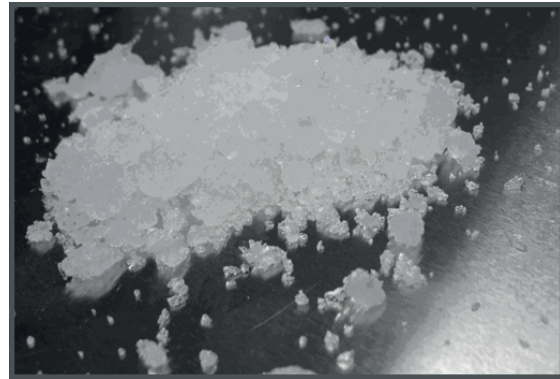
Image 13-7: Sodium carbonate crystals.

> 📄 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.

13.6 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 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 water-based lens cleaner)

How to clean the lens?

1. Blow off dust with clean compressed air (or pressurized air cans[5]) .

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.

13.7 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.

13.8 Check cooling liquid level

What should be done ?

The projector is liquid cooled. It is important that the liquid level is checked at regular intervals. We advise to check every 3 months. The liquid level must be between Min. and Max. Significant drop in liquid level indicates a major leakage and requires immediate attention.

How to check

1. Remove the left side cover (Light Processor side). "Removal of the side cover", page 141.

2. Check the liquid cooling level in the reservoir.

5: Pressurized air cans are not efficient if there is too much dust on the surface, the pressure is too low
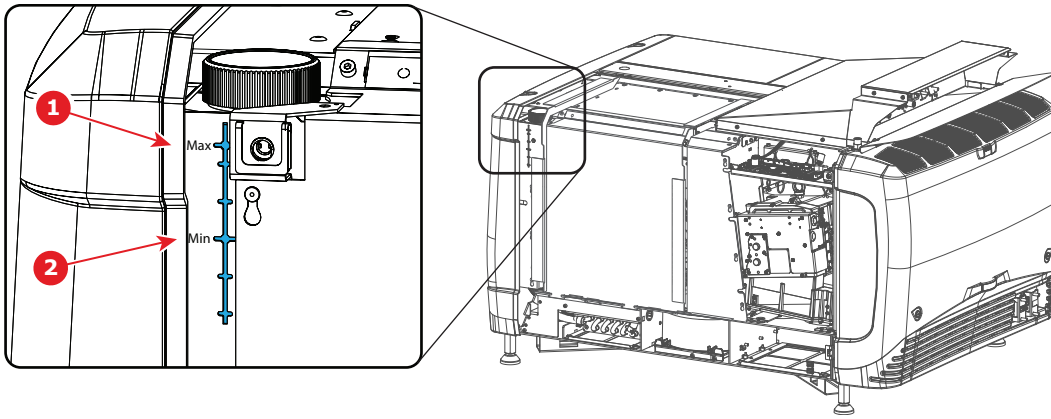
Image 13-8: Cooling liquid check

1 Max level
2 Min level

If the current liquid cooling level is somewhere between **Min** and **Max**, then no action should be taken.

If the current liquid cooling level is approaching the **Min** level point, than check for leakage in the cooling system prior starting the refill procedure.

> ☞ If you cannot see the level, open the filler cap and shine a torch into the reservoir

13.9 Cooling liquid refill

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

Order info cooling liquid

B1909086K : bottle of 1 liter cooling liquid.

Required parts

Cooling liquid

How to refill

1. Remove the side cover, "Removal of the side cover", page 141.

2. Open the filler cap by turning it anti clockwise.
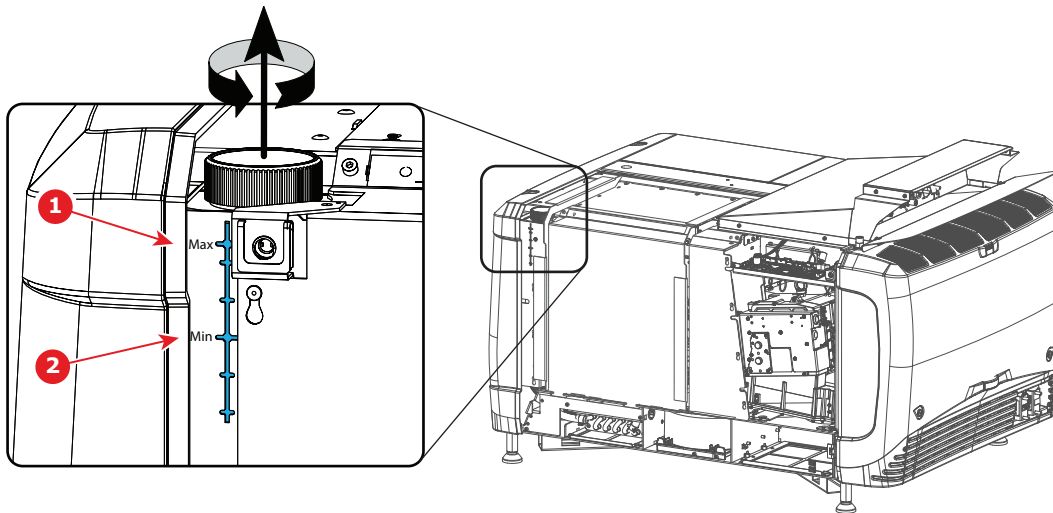
Image 13-9: Cooling liquid refill

1   Max level
2   Min level

3.   Fill the reservoir with cooling liquid until the level is equal with the **Max** indication on the reservoir.

4.   Close the reservoir again. Turn the filler cap clockwise to close the reservoir.

5.   Reinstall the side cover.

> ⚠️   **CAUTION:** Never fill above **Max** level mark !

13.10 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

•   Security key (Dallas iButton®).
•   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 holding the security key in the security socket D..
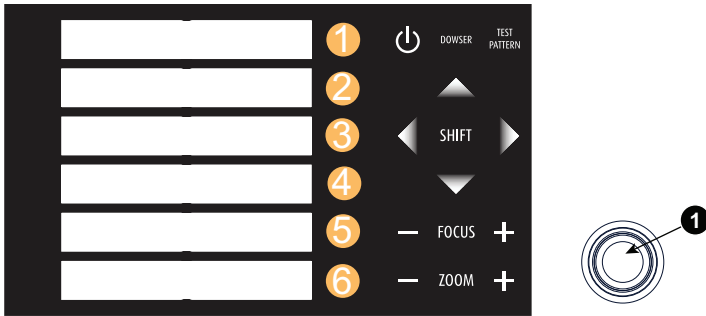
Image 13-10: Keypad

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 10 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.

Convergence 14

About this chapter

This chapter describes how to prepare the projector for convergence adjustment and how to adjust the convergence.

Overview

- Open the sealed compartment
- Close the sealed compartment
- Convergence controls
- Red on blue convergence
- Green on blue convergence

14.1 Open the sealed compartment

📄 This procedure assumes that the side cover of the projector is already removed.

⚠ **CAUTION:** This procedure may only be done by a qualified and trained service technician.

Required tools

3 mm Allen wrench

How to open the sealed compartment

1. Remove both hexagon head cap screws (1).
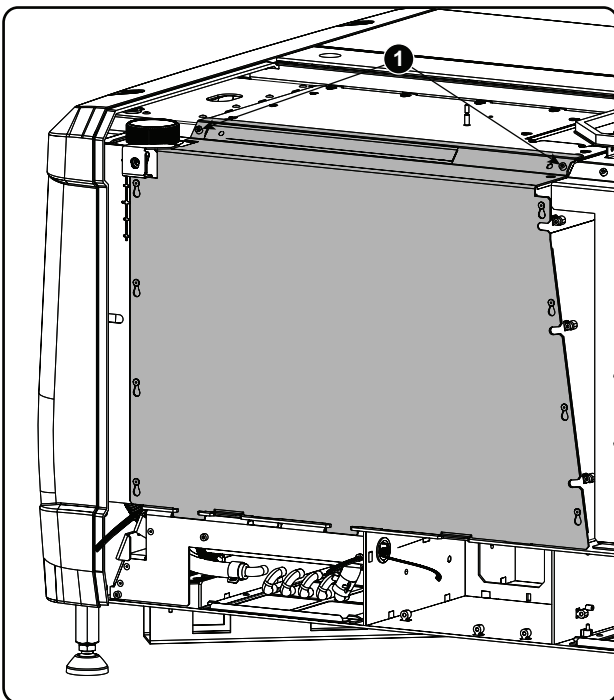
Image 14-1: Sealed cover fixation

2. Lift up the cover plate slightly using both lower lips (2) and then remove the cover by taking it away from the projector.
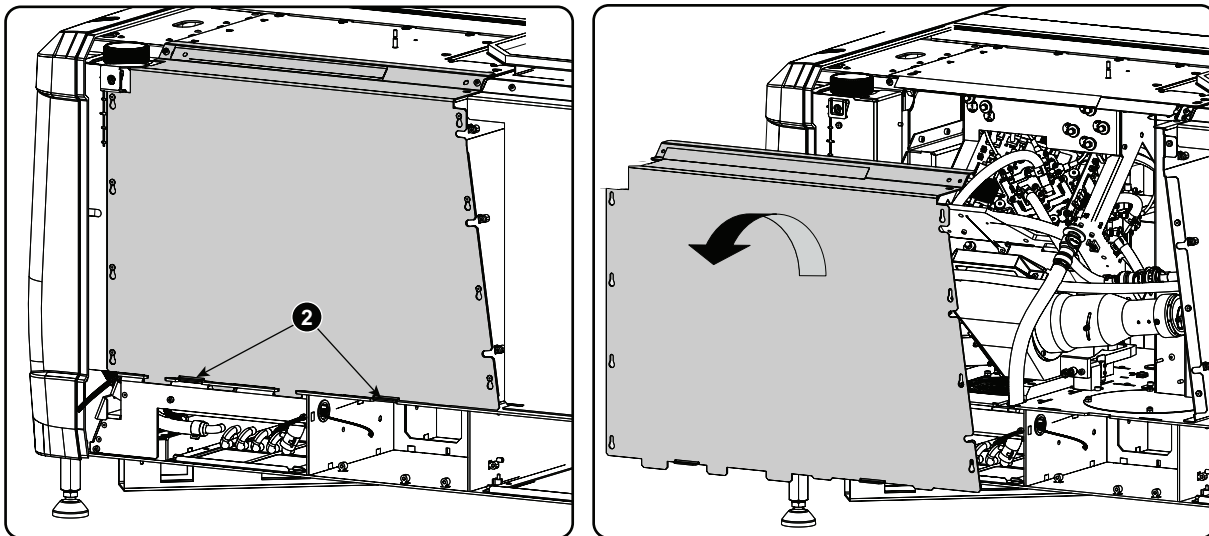
Image 14-2: Sealed cover, remove

> 📄 A security warning will be displayed on the projector. Execute the procedure "Authorization to clear security warning on the projector".

14.2 Close the sealed compartment

Required tools

3 mm Allen wrench

How to close the sealed compartment

1. Hook the cover plate on the studs.
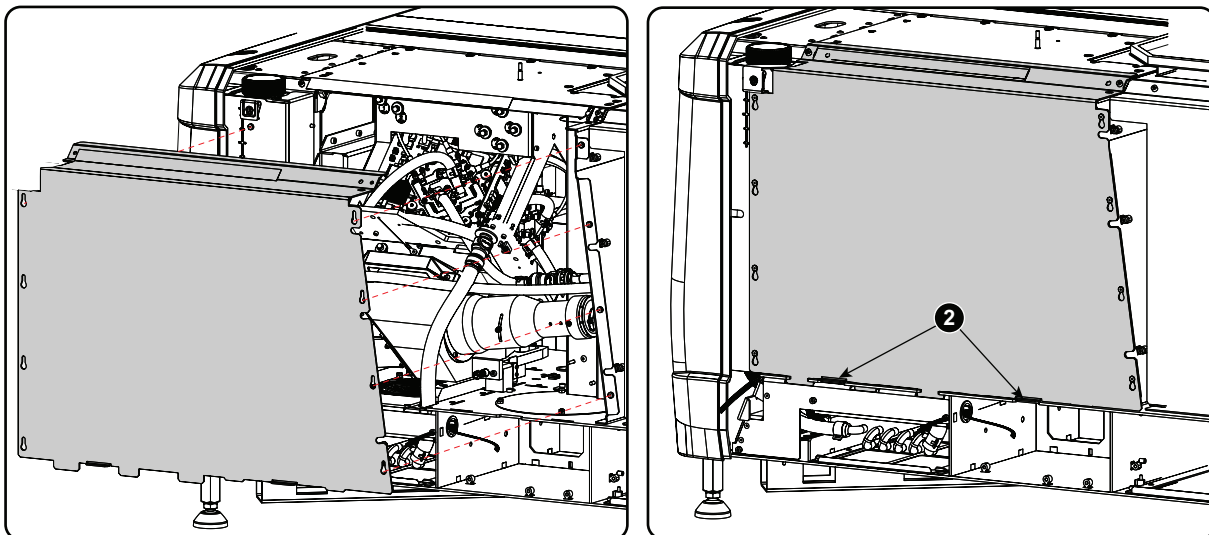
Image 14-3: Sealed cover, mount

2. Slide the cover downwards by pushing on both lips until it is in its correct position.

3. Drive in both fixation screws (1).
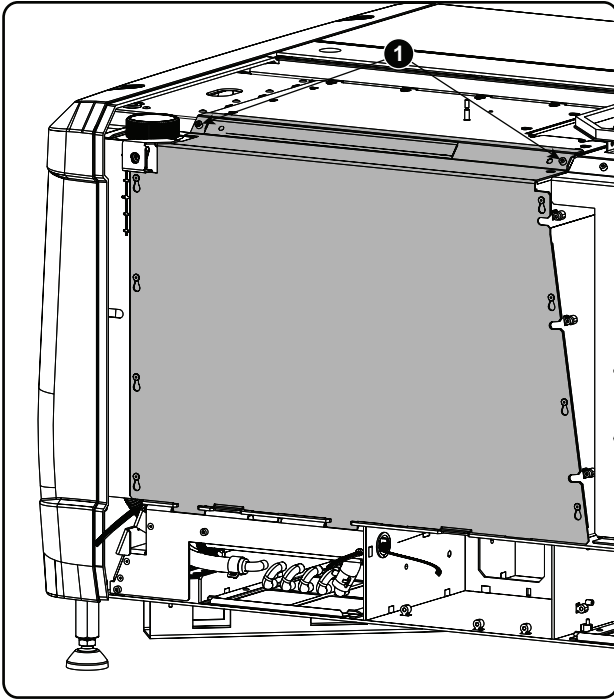
Image 14-4: Sealed cover, fixation

14.3 Convergence controls

Definitions-Abbreviations

- **X**: Horizontal direction on the screen, with origin in the centre of the screen and + to the right
- **Y**: Vertical direction on the screen, with origin in the centre of the screen and + to the top
- **Z** rotation: Tilting of the X and Y axes in their plane: + is clockwise rotation
- **[1]** ; **[2]** ; **[3]** ; **[4]** ; **[5]** ; **[6]** : these are the 6 adjustments available as they appear on the standard convergence adjustment screen.

Convergence controls, location
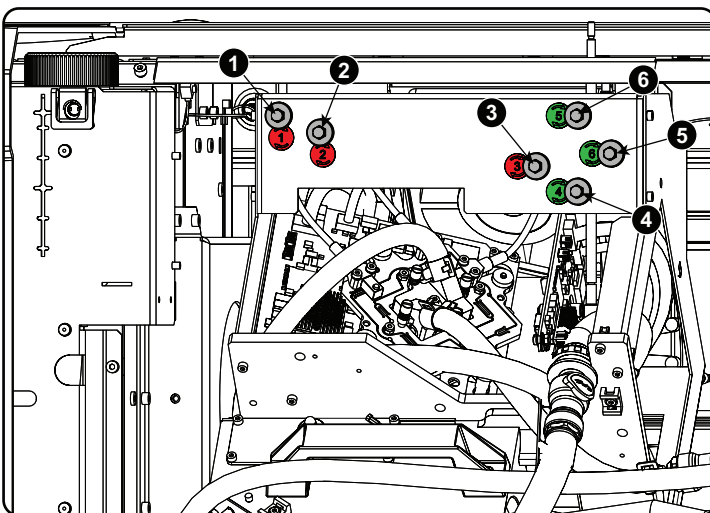
Image 14-5: Convergence knobs

1 Red channel, knob number 1 (position of knob can slightly differ)
2 Red channel, knob number 2
3 Red channel, knob number 3
4 Green channel, knob number 4
5 Green channel, knob number 5
6 Green channel, knob number 6

Convergence Test pattern

For the manual correction of the DMD convergence, a typical convergence test pattern is generated. For a 4K projector, use the 4K test pattern.
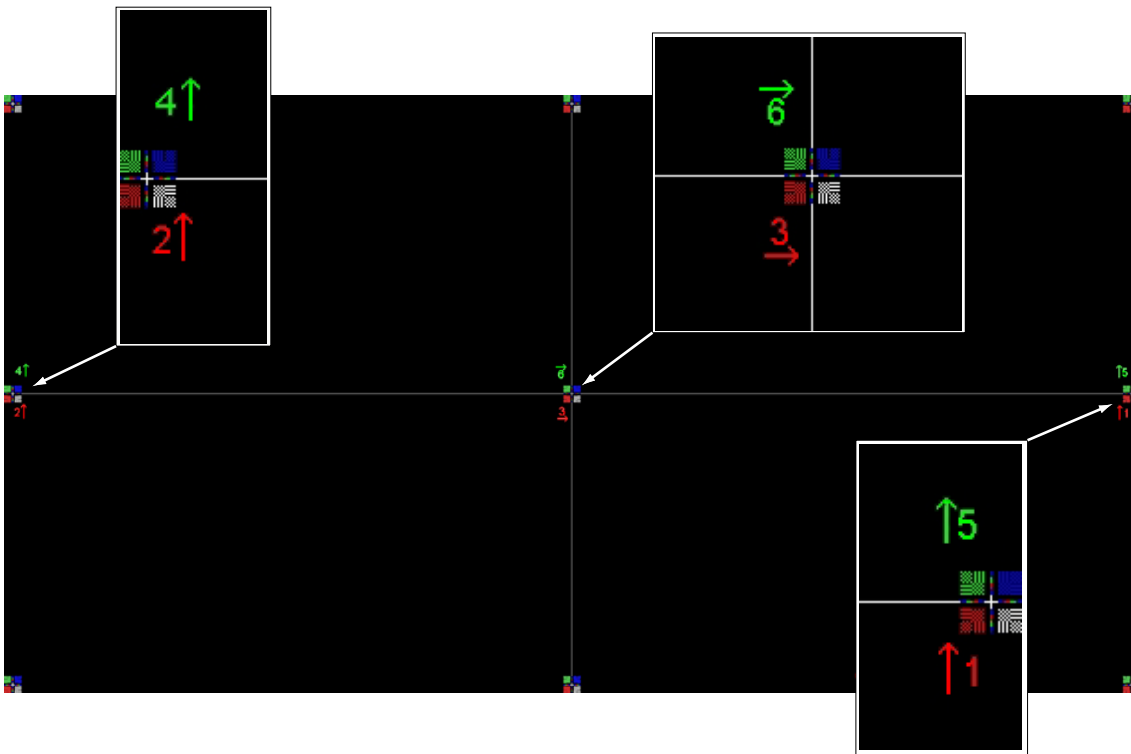
Image 14-6: Convergence test pattern

Work Instructions:

- GREEN and RED DMD's are to be adjusted with reference to the BLUE dmd.
- Each adjustment allows for approximately 10 pixels (for 2K projectors) or 20 pixels (for 4K projectors) maximum displacement to either side of the nominal BLUE position
- Rotation is limited to approximately +/- 5pixels on the left screen flank and +/- 5 pixels on the right screen flank
- One turn of an adjustment screw relates to an approx. 5-pixel displacement on the screen.
- Let the projector warming up for 30 minutes, while projecting the convergence test pattern, before starting to adjust the convergence.

Take Care:

- In rare cases it can happen that the nominal dmd position falls within a **dead zone**, where the mechanism changes from a pushing to a pulling function. This dead zone is due to inherent tolerances within the mechanism. Approximately 2 turns are required to get out of the dead zone. If it so happens that the nominal position of an adjustment falls within this dead zone, it is preferable to continue screwing through the dead zone for another 2 turns. Then return to the required nominal position. The dead zone should now be displaced away from the required end position. The DMD is now securely held in the nominal position.
- Each adjustment is limited to approximately 10 pixels (for 2K projectors) or 20 pixels (for 4K projectors) displacement. DO NOT try to force the adjustment beyond this point. The system has an end of travel in both directions, but with excessive force one could cause damage.

14.4 Red on blue convergence

Required tools

No tools required.

Converging the RED pattern onto the BLUE pattern

Start with aligning the RED DMD in the vertical directions [1] and [2] and then proceed with the horizontal direction [3]

1. To translate RED vertically in the Y + direction, turn both [1] and [2] clockwise. Turn screws in equal increments.

2. To translate RED vertically in the Y - direction, turn both [1] and [2] anti-clockwise. Turn screws in equal increments.

3. To translate RED horizontally in the X + direction, turn [3] clockwise.

4. To translate RED horizontally in the X - direction, turn [3] anti-clockwise.

5. For clockwise rotations of RED, turning [1] anti-clockwise would generally suffice. If much rotation is required, [2] may also be turned in the opposite direction. Slight corrections to Y may be required after rotation.

6. For anti-clockwise rotations of RED, turning [1] clockwise would generally suffice. If much rotation is required, [2] may also be turned in the opposite direction. Slight corrections to Y may be required after rotation.
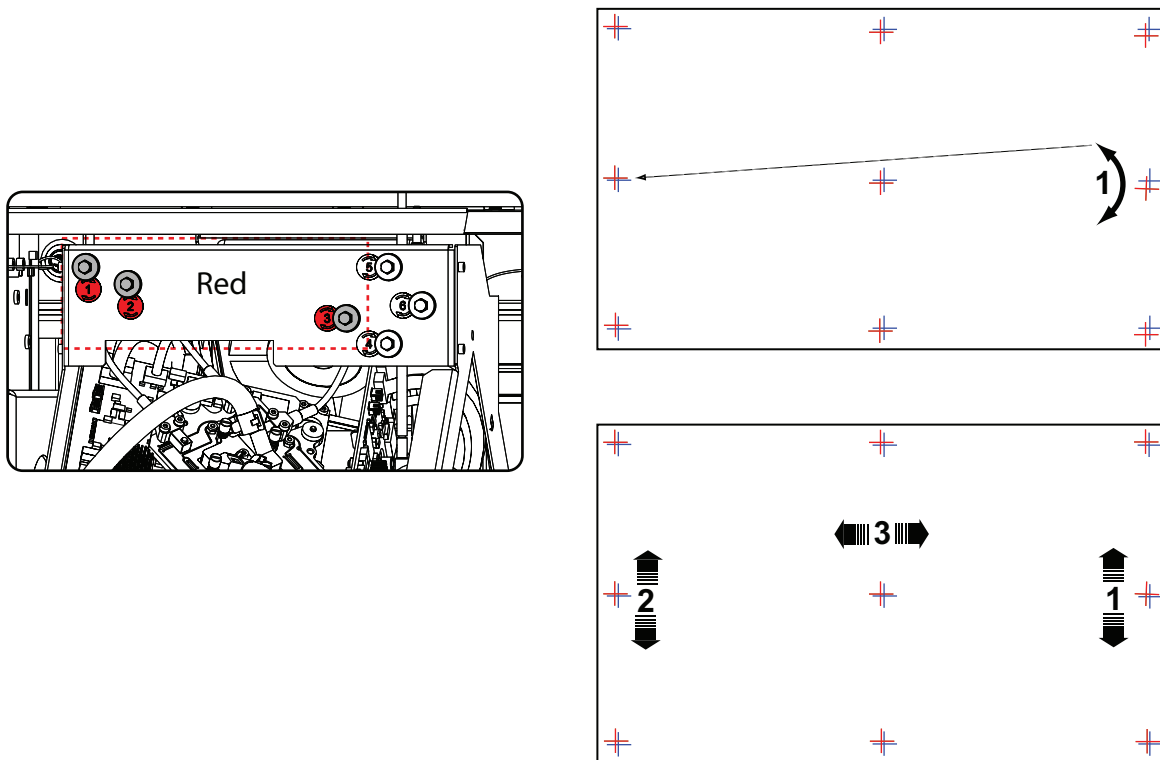
Image 14-7: Red on blue convergence

14.5 Green on blue convergence

Required tools

No tools required.

Converging the GREEN pattern onto the BLUE pattern

Next , align the GREEN DMD in the vertical directions [4] and [5] and then proceed with the horizontal direction [6].

1. To translate GREEN vertically in the Y + direction, turn both [4] and [5] clockwise. Turn screws in equal increments.

2. To translate GREEN vertically in the Y - direction, turn both [4] and [5] anti-clockwise. Turn screws in equal increments.

3. For clockwise rotations of GREEN, turning [5] anti-clockwise would generally suffice. If much rotation is required, [4] may also be turned in the opposite direction. Slight corrections to Y may be required after rotation.

4. For anti-clockwise rotations of GREEN, turning [5] clockwise would generally suffice. If much rotation is required, [4] may also be turned in the opposite direction. Slight corrections to Y may be required after rotation.

5. To translate GREEN horizontally in the X + direction, turn [6] clockwise.

6. To translate GREEN horizontally in the X - direction, turn [6] anti-clockwise.
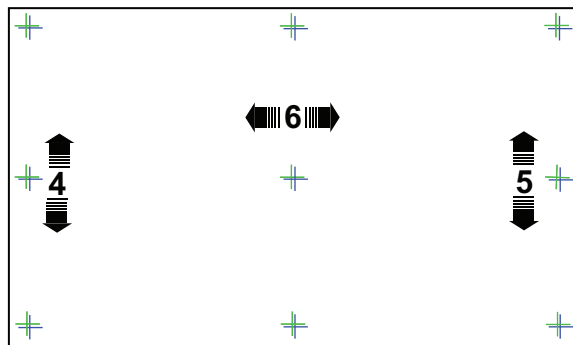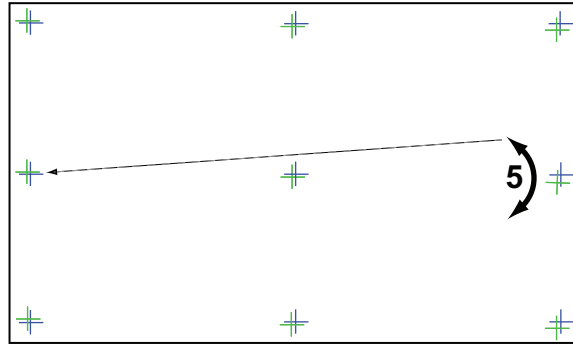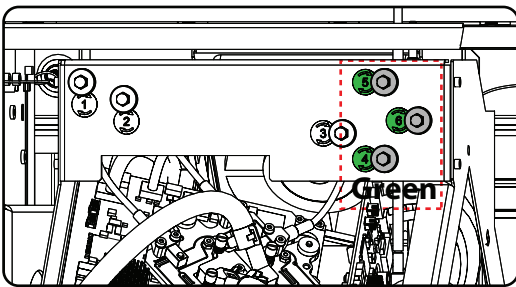
Image 14-8: Green on blue convergence

Color calibration 15

About this chapter

This chapter describes the luminance and color calibration process for the Prometheus III. Where applicable references are made to the user guide of the Communicator for detailed menu navigation instructions. The first chapter describes the complete calibration process in chronological order.

> 📄 Color calibration should be executed during the installation of the projector and also after some service actions as mentioned in the service manual.

Overview

- Calibration process
- White point calibration
- Color gamut calibration

15.1 Calibration process

Overview

1. Select the desired aspect ratio by activating the correct lens file.

    • **SCOPE** format
    • **FLAT** format

2. **Laser white point calibration**.

3. The Communicator contains a wizard for white point calibration. See user guide of the Communicator for detailed menu navigation instructions.

4. **Color gamut calibration**. (electronic P7 correction). Measured values are saved in the Measured Color Gamut Data (MCGD) file. Needs to be done per format and per projection mode.

    • 2D
    • External 3D

5. **Select target colors**. The target colors are stored in the Target Color Gamut Data (TCGD) file. Several TCGD files are already available in the file system of the projector.

6. For more info about color gamut calibration see "Color gamut calibration", page 173. The Communicator software contains a wizard for color gamut calibration. See user guide of the Communicator for detailed menu navigation instructions.

7. **Verify corrected colors**.

8. For detailed instructions on how to verify corrected colors see user guide of Communicator.

9. **Arrange calibration files in macro**. To apply correct color calibration it is important that the MCGD file(s) and matching TCGD file(s) are activated after that the INPUT file and PCF file are activated. For that it is recommended to create a macro where the files are loaded one by one in the right order:

    1. First activate the **INPUT** file.
    2. then activate the **PCF** file (PCF already contains plane 1 information),
    3. then activate the **MCGD** and **TCGD** files.

10. For detailed instructions on how to create a macro see Communicator's user guide.

15.2 White point calibration

About white point calibration

White point calibration should be executed to correct a color shift during dimming. The white point will be stabilized over the full dimming range.

Required tools

• Spectroradiometer.
• Communicator software.

Preparations

1. **Setup the ambient light conditions** as it should be during the play out of the movie. (e.g. only the stairs and emergency exit lighting is switched on).

    📄 *Note:* In an optimal setup less than 1% of light from any other source than the light from the projector should illuminate the screen.

2. Configure the desired aspect ratio: e.g. FLAT or SCOPE (use most common aspect ratio). Do this by activating the correct LENS file.

3. Position the spectrometer perpendicular to the screen and measure in the center of the screen.

4. Start up Communicator and follow the laser white point calibration wizard.

☞ After white point calibration proceed immediately with color gamut calibration.

15.3 Color gamut calibration

Color Gamut

Color Gamut is the entire range of reproducible colors by a particular device such as a projector. The entire range of reproducible colors are typically defined so that horizontal and vertical directions describe saturation and luminance changes, respectively. When a color is "out of gamut," it is not possible to reach that color by the device.
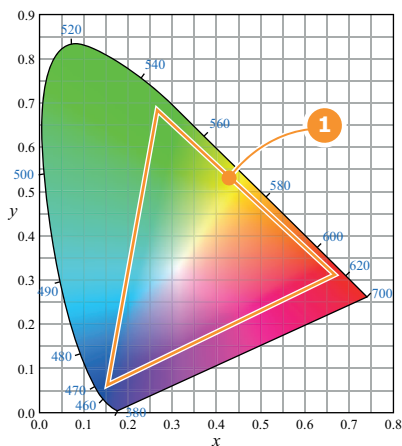
Image 15-1: Sample Chromaticity Diagram with Color Gamut of target device (1).

Why apply color correction?

During the post-production process of a film, a specific color space is applied. This color space is the Target Color Gamut Data (TCGD). All movie content operates under that gamut. To ensure that in the cinema theater the film is projected within the same color space as intended by the film industry, the color space of the projector has to be corrected accordingly.

What has to be done?

The color coordinates for the projected primary colors must be measured on the screen. The values can be different than those originally inside the projector due to reflection on the screen or due to the influence of the glass between the projection booth and the theatre and even the projected colors are different from setup to setup.

These measured color coordinates are references for the projector and will be entered so that the projector knows how its colors are projected on the screen. This reference measurement (MCGD), together with the delivered gamut file (TCGD) of the film will introduce a color correction so that the film will be projected with the desired color target.
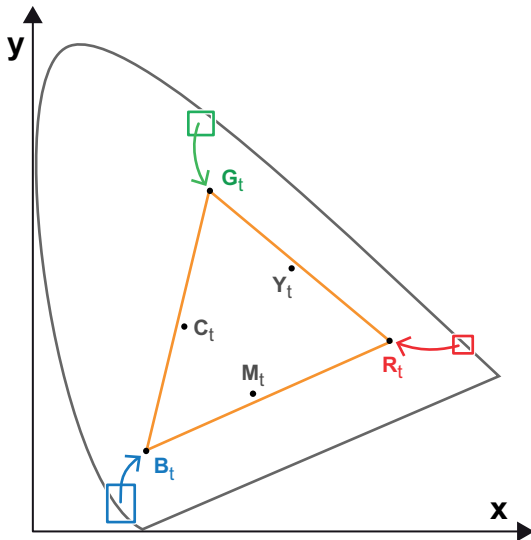
Image 15-2: Correction of native color gamut towards desired color gamut (electronic correction)

Electronic correction

The electronic correction adapts the native color gamut towards the desired (target) color gamut (e.g. DC28_ DCI_Xenon.TCGD). This correction is introduced by the DMD drivers and is also called 'P7 correction'. The electronic correction takes place once the MCGD file of the projector is mapped with the TCGD file of the film.

Influence of aspect ratio

The aspect ratio of the projected image could have a small influence upon the measured xy coordinates. Therefore, it's recommended to save the xy coordinates per aspect ratio in separate MCGD files.

> ⚠️ **CAUTION:** Prior to start with color gamut calibration ensure that the white point calibration is finalized successfully. See "White point calibration", page 172.

Color gamut calibration procedure

1. Check if the white point calibration is done. If not see "White point calibration", page 172.

2. **Setup the ambient light conditions** as it should be during the play out of the movie. (e.g. only the stairs and emergency exit lighting is switched on).

   > 📄 *Note:* In an optimal setup less than 1% of light from any other source than the light from the projector should illuminate the screen.

3. **Sequentially measure and enter the xy coordinates** of the three primary colors (red, green, blue) and full white. Use therefore the Communicator. Go to *Installation > Color calibration > Measure native colors*. For detailed instructions see user guide of the Communicator.

   > ⚠️ *Caution:* Ensure that the correct projection mode is selected: 2D or External 3D.

   > ⚠️ *Caution:* In case of 3D, measure the xy coordinates once through the left eye glass of the 3D goggles and once through the right eye glass.

   > 👉 *Tip:* When using the wizard for white point calibration you can immediately proceed with the electronic correction.

4. Once all xy coordinates are measured and entered proceed by saving all measured values into a MCGD file.

   > 👉 *Tip:* Put in the MCGD file name the type of projection mode (2D or External 3D) and the aspect ratio (FLAT, SCOPE).

5. Map the MCGD file with the TCGD file. Use for that the Communicator. Go to *Installation > Color calibration > Select target colors*. For detailed instructions see user guide of the Communicator.

6. In addition you can check if the corrected colors comply. Use therefore the Communicator. Go to *Installation > Color calibration > Verify corrected colors*. For detailed instructions see user guide of the Communicator.

Specifications

A

Overview

- Specifications of the Prometheus III
- Specifications of the ICMP
- Dimensions of the Prometheus III
- Dimensions of the universal pedestal
- Projector air inlets and outlets
- Technical Regulations

A.1 Specifications of the Prometheus III

Overview

Projector type	Three chip DLP
Technology	3 x 1.38" DMD™
Resolution	4,096 x 2,160 (4K)
Aspect ratio	1.89:1
Light source	Smart Laser
Light source lifetime	30,000 Hours (average usage conditions)
Light output	Up to 11,500 ANSI lumens
CLO (constant light output)	Yes
Contrast ratio	4,500:1 Sequential 600:1 ANSI
Brightness uniformity	80% at sides 75% at corners
Lens range	4K-VHC LNS (1.13 - 1.72:1) 4K-VHC LNS (1.35 - 1.86:1) 4K-VHC LNS (1.46 - 2.10:1) 4K-VHC LNS (1.65 - 2.60:1) 4K-VHC LNS (2.00 - 3.35:1)
Optical lens shift	Up to 25% vertical lens shift & up to 15% horizontal lens shift Motorized zoom, focus, shutter and lens shift
Optical dowser	Yes
Color correction	P7
Color gamut	Wider than DCI/P3
Image processing	Alchemy - Integrated Cinema Media Processor (ICMP)
WARP	N/A
Orientation	Pedestal / Table Top
Network connection	10/100 Ethernet via RJ45 connection
Software tools	Barco Communicator
Integrated web server	No
HDR	HDR10
3D	Active glasses systems supported Polarization systems on silver sceens Color separation systems (Dolby 3D and 6P) are not supported
Inputs	Barco Alchemy ICMP included in the projector: 2 x HDMI2.0a (up to 4K 2D 60fps) 2 x 3G-SDI inputs 16 x AES/EBU audio channels (2 x RJ45) 8 x GPI, 8 x GPO (4 x RJ45) 2 x Gbe for content connectivity & ingest 2 x front-accessible USB 3.0 for fast ingest

	2 x front-accessible USB 2.0 DCI 4K 2D up to 60fps* DCI 4K 3D (24 or 30fps per eye)* DCI High Frame Rates 2K 3D up to 120fps (60fps per eye) JPEG 2000 bit-rates up to 625 Mbps MPEG-2 (4:2:0 and 4:2:2 up to 60fps)
Input resolutions	VGA up to 4K (4,096 x 2,160) @ 120Hz
Integrated storage	3.9TB effective storage (RAID-5) via 3 x 2TB Hot-swappable 2.5" hard-drives
Control	RS232, TCP/IP, 8 x GPIO
Power requirements	Projector: Single phase 200 - 240V / 20A Cooler: Obtains power from the projector
Power consumption	Projector (incl. Cooler): 3.3 kW
Noise level (typical at 25°C/ 77°F)	dB(A) @ 1m: 67.6 dB(A) 62 dB(A) (half fan speed)
Operating temperature	10 to 35 °C Max. (sea Level)
Operational humidity	85% Max. (projector and cooler)
BTU per hour	10,796 BTU/h
Airflow requirements	Air Inlet (from Rear w/Feet Down): Front Exhaust (from Rear w/Feet Down): Top (Back Through Accessories)
Exhaust airflow	TDB
Dimensions (WxLxH)	Projector: 754 x 1,129 x 604 mm (excludes lens) 29.69 x 44.45 x 23.78 in. (excludes lens) Cooler: 562 x 739 x 348 mm 22.11 x 29.07 x 13.7 in.
Weight	Projector: 144 kg / 318 lbs (excludes lens) Cooler: 32 kg / 70.6 lbs
Shipping Dimensions	960 x 1,370 x 1,040 mm (excludes lens - packaged separately) 37.8 x 53.9 x 40.9 in. (excludes lens - packaged separately)
Shipping weight	203 kg / 448 lbs (excludes lens - packaged separately)
Storage temperature	TBC
Storage humidity	TBC
Standard accessories	TBC
Certifications	TBC
Warranty	Limited 2 years parts and labor Extendable up to 5 years

Safety requirements	Class 1, Risk Group 3
*	Firmware upgradable Please contact an authorized Barco representative for details

A.2 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 * 4K 24fps is standard. For 4K 60 fps / 4K 3D on ICMP upgrade modules a license is required. Newly-built 4K Barco Alchemy projectors have the license standard included.
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 4K 3D/4K 60p - Upgrade Kit
	ICMP License for HDMI2.0 HDR
	Licence for Dual Projector
TMS support	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

A.3 Dimensions of the Prometheus III
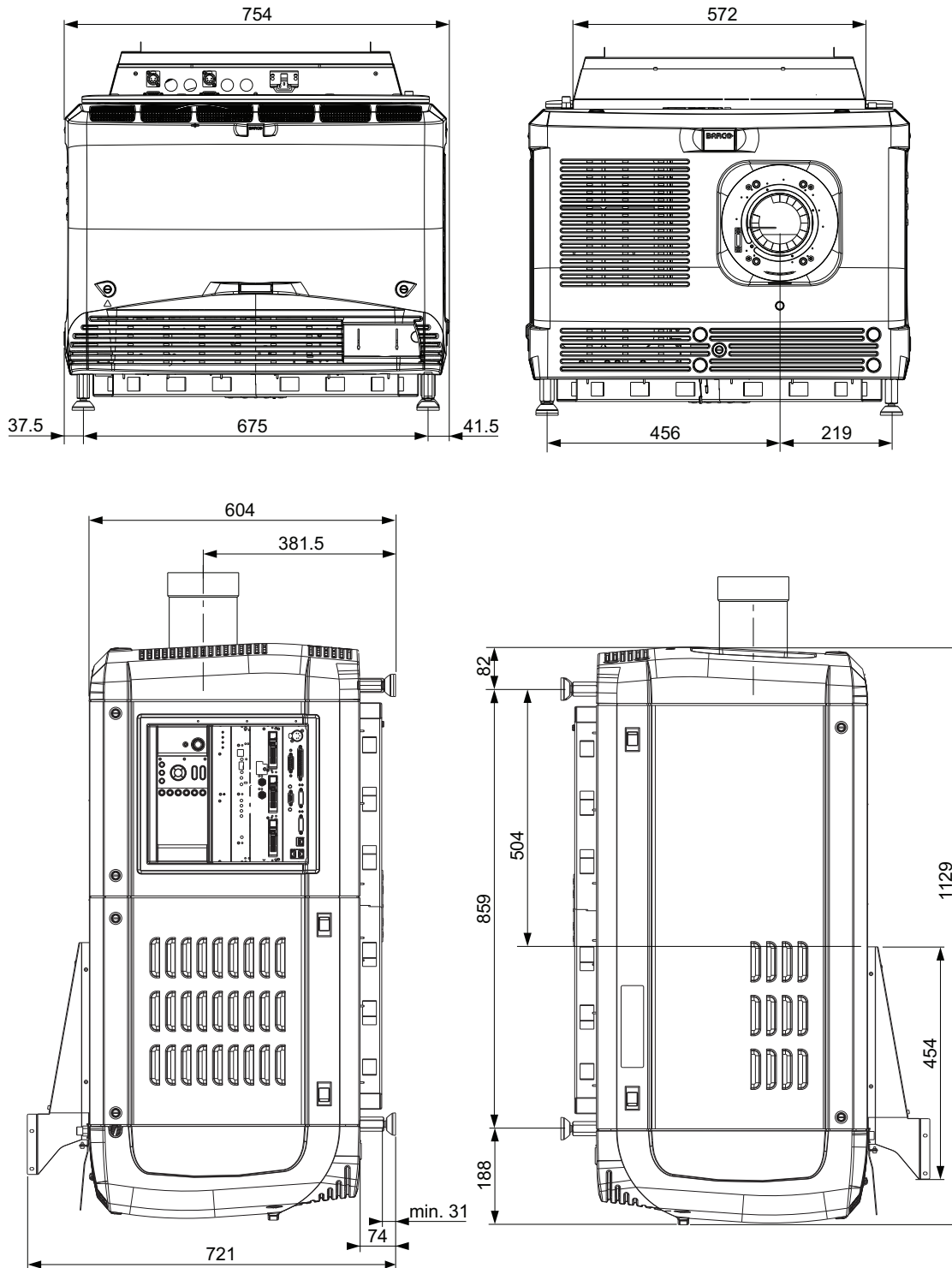
Dimensions

Image A-1: Dimensions given in millimeters.

A.4 Dimensions of the universal pedestal

Dimensions
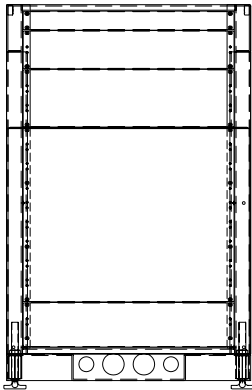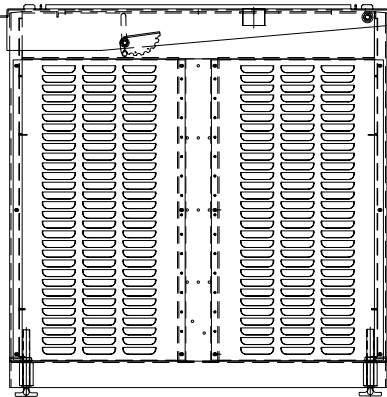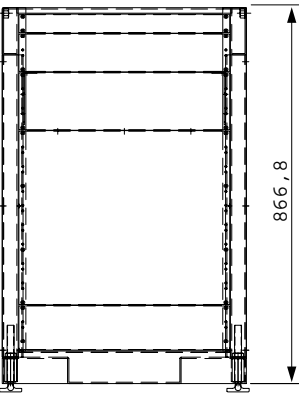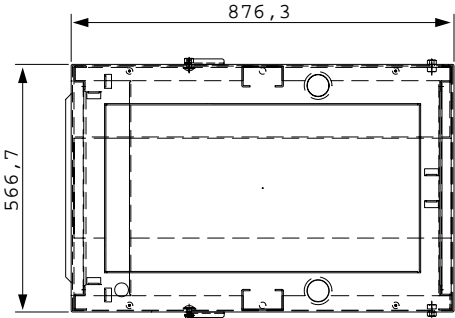
Image A-2: Dimensions given in millimeters.

A.5 Projector air inlets and outlets

Air inlets and outlets
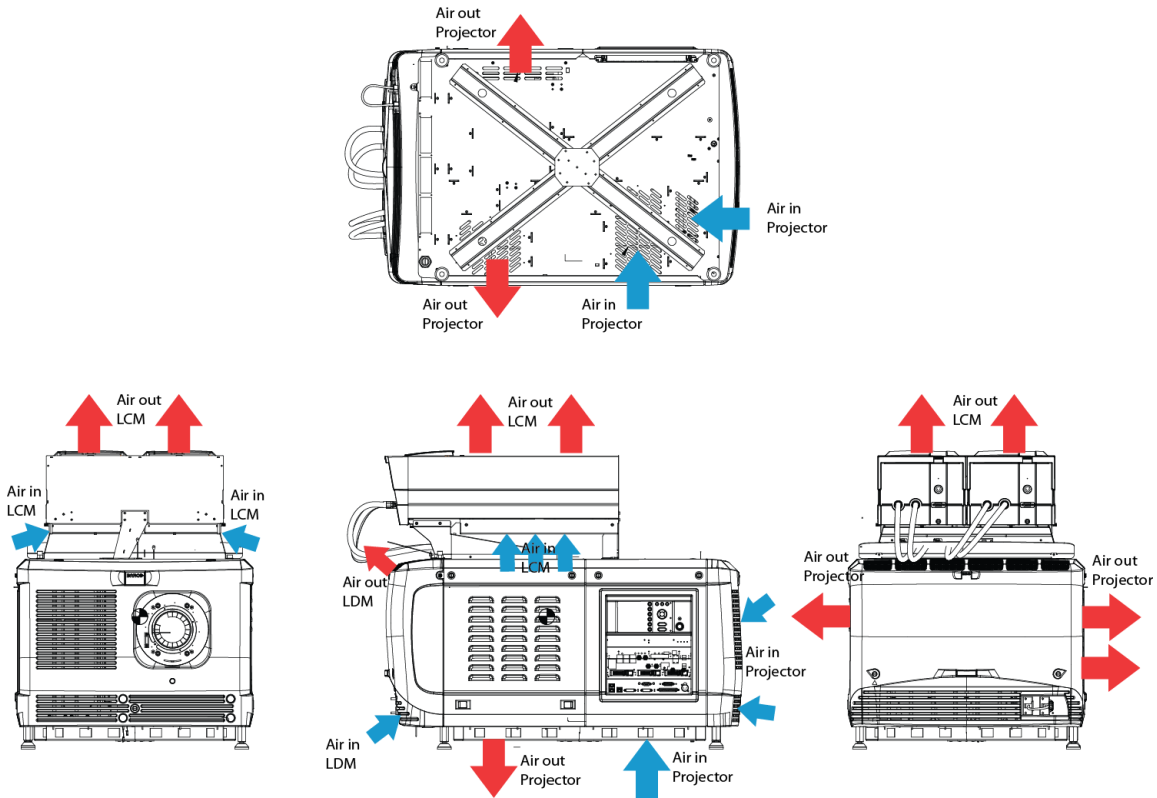
Image A-3

A.6 Technical Regulations

Certificates

Image A-4: EAC mark

Image A-5: Rohs

Image A-6: CE mark

Image A-7: ETL mark

Image A-8: CCC mark

Image A-9: CEBEC mark

Image A-10: RCM mark

Pin configurations

B

Overview

- About General Purpose Inputs & Outputs (GPIO)
- Pin configurations of the communication ports
- Pin configurations of the ICMP communication ports
- Pin configurations of the inputs

B.1 About General Purpose Inputs & Outputs (GPIO)

📄 The Barco Cinema Controller and the Barco ICMP 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 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.
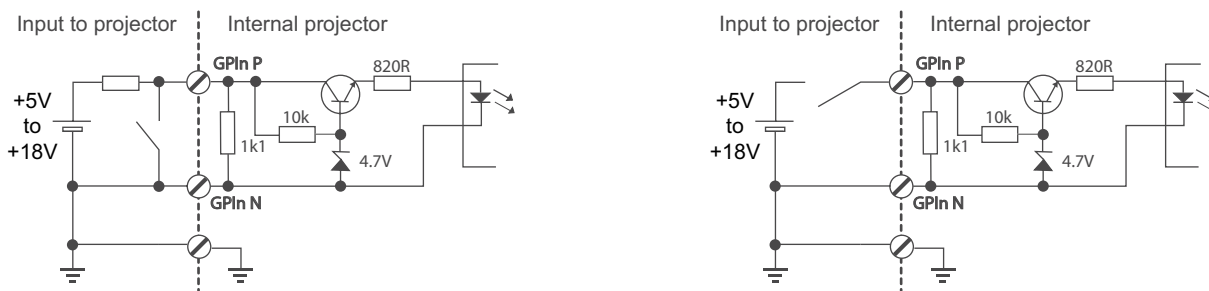
Image B-1

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 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
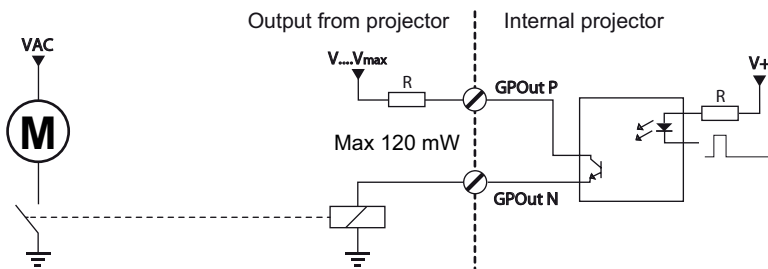
Image B-2

> 📄 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.

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 communication ports

RS232IN

RS232 IN			
1	-	6	-
2 RXE-	Receive Data (RD or RX or RXD)	7	-
3 TXE-	Transmitted Data (TD or TX or TXD)	8	-
4	-	9	-
5 GND	Signal Ground (GND)	-	-

General Purpose IN/OUT

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

Pin	Pair	Color	10/100 Base-T — RJ45 port Description	1000 Base-T — RJ45 port 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-

Peripheral Port

Pin	Name
1	+5V
2	SCL
3	SDA

Pin	Name
4	+24V
5	GND

3D connector

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 communication ports

RJ-45 pin configuration
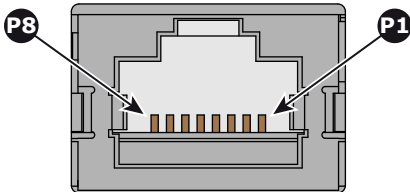
Image B-3

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
13, 14	7 +	4

AUDIO-AES 9-16		
Audio channel	**AES pair**	**RJ-45 pin**
	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
EXT_GPIN_3_P	5
EXT_GPIN_3_N	6

GPI 1-4	
Definition	**RJ-45 pin**
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.

B.4 Pin configurations of the inputs

DVI-D

DVI IN A & B							
1	RX2-	7	DDC Data	13	nc	19	RX0 Shield
2	RX2+	8	nc	14	+5V	20	nc
3	RX2 Shield	9	RX1-	15	GND	21	nc
4	nc	10	RX1+	16	Hot Plug Detect	22	TMDS Clock Shield
5	nc	11	RX1 Shield	17	RX0-	23	TMDS RXC+
6	DDC Clock	12	nc	18	RX0+	24	TMDS RXC-

Environmental Information

C

Overview

- Disposal information
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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.

WEEE Information

This product conforms to all requirements of the EU Directive on waste electrical and electronic equipment (WEEE). This product shall be recycled properly. It can be disassembled to facilitate proper recycling of it's individual parts.

Consult your dealer or relevant public authority regarding drop-off points for collection of WEEE. For details, please visit the Barco website at: *http://www.barco.com/en/aboutBarco/weee*.

C.2 China RoHS compliance

中国大陆 RoHS (Chinese Mainland RoHS)

根据中国大陆《电器电子产品有害物质限制使用管理办法》（也称为中国大陆RoHS），以下部分列出了Barco产品中可能包含的有毒和/或有害物质的名称和含量。中国大陆RoHS指令包含在中国信息产业部MCV标准："电子信息产品中有毒物质的限量要求"中。

According to the "Management Methods for the Restriction of the Use of Hazardous Substances in Electrical and Electronic Products" (Also called RoHS of Chinese Mainland), the table below lists the names and contents of toxic and/or hazardous substances that Barco's product may contain. The RoHS of Chinese Mainland is included in the MCV standard of the Ministry of Information Industry of China, in the section "Limit Requirements of toxic substances in Electronic Information Products".

零件项目(名称) Component Name	有毒有害物质或元素 Hazardous Substances or Elements					
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (Cr6+)	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
印制电路配件 Printed Circuit Assemblies	X	O	X	O	O	O
外接电(线)缆 External Cables	X	O	O	O	O	O

零件项目(名称) Component Name	有毒有害物质或元素 Hazardous Substances or Elements					
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (Cr6+)	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
內部线路 Internal wiring	X	O	O	O	O	O
镜头支架 Lens holder	X	O	O	O	O	O
光学镜头 Optical lenses	X	O	O	O	O	O
激光发生器 Laser	X	O	O	O	O	O
螺帽,螺钉(栓),螺旋(钉),垫圈, 紧固件 Nuts, bolts, screws, washers, fasteners	X	O	O	O	O	O
电源供应器 Power Supply Unit	X	O	O	O	O	O
风扇 Fan	X	O	O	O	O	O
泵 Pump	X	O	O	O	O	O
本表格依据SJ/T 11364的规定编制 This table is prepared in accordance with the provisions of SJ/T 11364. O: 表示该有毒有害物质在该部件所有均质材料中的含量均在 GB/T 26572 标准规定的限量要求以下. O: Indicates that this toxic or hazardous substance contained in all of the homogeneous materials for this part is below the limit requirement in GB/T 26572. X: 表示该有毒有害物质至少在该部件的某一均质材料中的含量超出 GB/T 26572 标准规定的限量要求. X: Indicates that this toxic or hazardous substance contained in at least one of the homogeneous materials used for this part is above the limit requirement in GB/T 26572.						

在中国大陆销售的相应电子信息产品（EIP）都必须遵照中国大陆《电子电气产品有害物质限制使用标识要求》标准贴上环保使用期限（EFUP）标签。Barco产品所采用的EFUP标签（请参阅实例，徽标内部的编号使用于指定产品）基于中国大陆的《电子信息产品环保使用期限通则》标准。

All Electronic Information Products (EIP) that are sold within Chinese Mainland must comply with the "Marking for the restriction of the use of hazardous substances in electrical and electronic product" of Chinese Mainland, marked with the Environmental Friendly Use Period (EFUP) logo. The number inside the EFUP logo that Barco uses (please refer to the photo) is based on the "General guidelines of environment-friendly use period of electronic information products" of Chinese Mainland.

C.3 Taiwan RoHS compliance

限用物質含有情況標示聲明書 (Declaration of the Presence Condition of the Restricted Substances Marking)

設備名稱: 數位電影投影機,　型號（型式）：　DP4K-13BLPHC Equipment name: Projector, Type designation: DP4K-13BLPHC						
	限用物質及其化學符號 Restricted substances and its chemical symbols					
單元 Unit	鉛 Lead (Pb)	汞 Mercu- ry (Hg)	鎘 Cadmi- um (Cd)	六價鉻 Hexavalent chromium (Cr6+)	多溴聯苯 Polybromi- nated biphenyls (PBB)	多溴二苯醚 Polybromi- nated diphenyl ethers (PBDE)
印製電路板配件 Printed Circuit Assemblies	—	O	—	O	O	O
外接電（線）纜 External Cables	—	O	O	O	O	O
內部線路 Internal wiring	—	O	O	O	O	O
鏡頭支架 Lens holder	—	O	O	O	O	O
光學鏡頭 Optical lenses	—	O	O	O	O	O
鐳射 Laser	—	O	O	O	O	O
螺帽, 螺釘（栓）, 螺旋（釘）, 墊圈, 緊固件 Nuts, bolts, screws, washers, fasteners	—	O	O	O	O	O
電源供應器 Power Supply Unit	—	O	O	O	O	O
風扇 Fan	—	O	O	O	O	O
泵 Pump	—	O	O	O	O	O
備考1.〝超出0.1 wt %〞及〝超出0.01 wt %〞係指限用物質之百分比含量超出百分比含量基準值。 Note 1："Exceeding 0.1 wt %" and "exceeding 0.01 wt %" indicate that the percentage content of the restricted substance exceeds the reference percentage value of presence condition. 備考2.〝○〞係指該項限用物質之百分比含量未超出百分比含量基準值。 Note 2："○" indicates that the percentage content of the restricted substance does not exceed the percentage of reference value of presence. 備考3.〝—〞係指該項限用物質為排除項目。 Note 3：The "—" indicates that the restricted substance corresponds to the exemption.						

C.4 Turkey RoHS compliance

Turkey RoHS compliance

Türkiye Cumhuriyeti: AEEE Yönetmeliğine Uygundur.

[Republic of Turkey: In conformity with the WEEE Regulation]

C.5 Hazards

Safety notice Sodium Carbonate (Na$_2$CO$_3$)

According to the Material Safety Data Sheet (MSDS), Sodium Carbonate could cause the following hazards:

- Potential Acute Health Effects: Hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion, of inhalation (lung irritant).
- Potential Chronic Health Effects: Slightly hazardous in case of skin contact (sensitizer). The substance may be toxic to upper respiratory tract, skin, eyes. Repeated or prolonged exposure to the substance can produce target organ damage.

C.6 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.7 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.8 Download Product Manual

Download Product Manual

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

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

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