DP2K-E series

User and installation manual

R5906693/05
25/01/2018

BARCO

Visibly yours

Barco Visual (Beijing) Electronics Co., Ltd
地址：北京市 昌平区 中关村科技园 昌平园 昌盛路 16号
Phone: +86 10 8010 1166
Fax: +86 10 8970 2793
Support: www.barco.com/en/support
Visit us at the web: www.barco.com

Barco NV
President Kennedypark 35, 8500 Kortrijk, Belgium
Phone: +32 56.36.82.11
Fax: +32 56.36.883.86
Support: www.barco.com/en/support
Visit us at the web: www.barco.com

Printed in Belgium

Changes

Barco provides this manual 'as is' without warranty of any kind, either expressed or implied, including but not limited to the implied warranties or merchantability and fitness for a particular purpose. Barco may make improvements and/or changes to the product(s) and/or the program(s) described in this publication at any time without notice.

This publication could contain technical inaccuracies or typographical errors. Changes are periodically made to the information in this publication; these changes are incorporated in new editions of this publication.

The latest edition of Barco manuals can be downloaded from the Barco web site www.barco.com or from the secured Barco web site https://www.barco.com/en/signin.

Copyright ©

Federal Communications Commission (FCC Statement)

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

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

EMC statements

EN55032/CISPR32 Class A MME (MultiMedia Equipment)

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

Class A ITE (Information Technology Equipment)

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

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.

Software License Agreement

You should carefully read the following terms and conditions before using this software. Your use of this software indicates your acceptance of this license agreement and warranty.

Terms and Conditions:

1. No redistribution of the software is allowed.
2. Reverse-Engineering. You may not reverse engineer, decompile, disassemble or alter this software product.

Disclaimer of Warranty:

This software and the accompanying files are sold “as is” and without warranties as to performance or merchantability or any other warranties whether expressed or implied. In no event shall Barco be liable for damage of any kind, loss of data, loss of profits, business interruption or other pecuniary loss arising directly or indirectly. Any liability of the seller will be exclusively limited to replacement of the product or refund of purchase price.

GNU-GPL code

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

Trademarks

Brand and product names mentioned in this manual may be trademarks, registered trademarks or copyrights of their respective holders. All brand and product names mentioned in this manual serve as comments or examples and are not to be understood as advertising for the products or their manufacturers.

TABLE OF CONTENTS

1. WELCOME

Congratulations

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

Overview

- About this manual

1.1 About this manual

How to use this manual?

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

What's expected from you?

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

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

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

2. SAFETY

About this chapter

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

Clarification of the term “DP2K-E series” used in this document

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

- DP2K-6E

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
- Important safety instructions
- Product safety labels
- Light beam Hazard Distance (HD)
- HD in function of the lens Throw Ratio (TR)

2.1 General considerations

General safety instructions

- Before operating this equipment please read this manual thoroughly and retain it for future reference.
- Installation and preliminary adjustments should be performed by qualified Barco personnel or by authorized Barco service dealers.
- All warnings on the projector and in the documentation manuals should be adhered to.
- All instructions for operating and use of this equipment must be followed precisely.
- All local installation codes should be adhered to.

Notice on safety

This equipment is built in accordance with the requirements of the 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.

Users definition

Throughout this manual, the terms SERVICE PERSONNEL and TRAINED PROJECTIONIST refers to persons having appropriate technical training and experience necessary to be knowledgeable of potential hazards to which they are exposed (including, but not limited to HIGH VOLTAGE ELECTRIC and ELECTRONIC CIRCUITRY and HIGH BRIGHTNESS PROJECTORS) in performing a task, and of measures to minimize the potential risk to themselves or other persons. The term USER and OPERATOR refers to any person other than SERVICE PERSONNEL or TRAINED PROJECTIONISTS, AUTHORIZED to operate professional projection systems.

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

The DLP Cinema Systems are intended "FOR PROFESSIONAL USE ONLY" by AUTHORIZED PERSONNEL familiar with potential hazards associated with high voltage, high intensity light beams, ultraviolet exposure and high temperatures generated by the lamp and associated circuits. Only qualified SERVICE PERSONNEL and TRAINED PROJECTIONISTS, knowledgeable of such risks, are allowed to perform service functions inside the product enclosure.

Owner's record

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

Product article number	
Product serial number	
Dealer	

2.2 Important safety instructions

To prevent the risk of electrical shock

- This projector should be operated from an AC power source. Ensure that the mains voltage and capacity matches the projector electrical ratings. If you are unable to install the AC requirements, contact your electrician. Do not defeat the purpose of the grounding.
- Installation according to the local electrical code and regulations by qualified technical personnel only.
- A readily accessible disconnect device must be incorporated externally to the equipment for removal of the power to the projector cord.
- Warning: High leakage current. Earth connection essential before connecting supply.
- Do not allow anything to rest on the power cord. Do not locate this projector where persons will walk on the cord.
- Do not operate the projector with a damaged cord or if the projector has been dropped or damaged - until it has been examined and approved for operation by a qualified service technician.
- Position the cord so that it will not be tripped over, pulled, or contact hot surfaces.
- If an extension cord is necessary, a cord with a current rating at least equal to that of the projector should be used. A cord rated for less amperage than the projector may overheat.
- Never push objects of any kind into this projector through cabinet slots as they may touch dangerous voltage points or short circuit parts that could result in a risk of fire or electrical shock.
- Do not expose this projector to rain or moisture.
- Do not immerse or expose this projector in water or other liquids.
- Do not spill liquid of any kind on this projector.
- Should any liquid or solid object fall into the cabinet, unplug the set and have it checked by qualified service personnel before resuming operations.
- Do not disassemble this projector, always take it to a trained service person when service or repair work is required.
- Do not use an accessory attachment which is not recommended by the manufacturer.
- Lightning - For added protection for this video product during a lightning storm, or when it is left unattended and unused for long periods of time, remove all power from the projector. This will prevent damage to the projector due to lightning and AC power-line surges.

To prevent personal injury

- Isolate electrically before replacing the lamp or lamp house. Caution: Hot lamp (house).
- Caution: High pressure lamp may explode if improperly handled. Refer servicing to qualified service personnel.
- To prevent injury and physical damage, always read this manual and all labels on the system before inserting the lamp casing, powering the projector or adjusting the projector.
- To prevent injury, take note of the weight of the projector. Minimum 4 adult persons are needed to carry the projector.
- To prevent injury, ensure that the lens 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 lamps**: This projector uses extremely high brightness lamps. Never attempt to look directly into the lens or at the lamp. If the projection distance is less than 6 meter, any person needs to be at least 4 meters away from the projected image. Avoid close range reflection of the projected image on any reflecting surface (such as glass, metal, …) . When operating the projector, we strongly recommend wearing suitable safety glasses.
- Before attempting to remove any of the projector's covers, disconnect the projector power cord for removal of all power from the projector.
- When required to remove all power from the projector, to access parts inside, always disconnect the projector power cord for removal of all power from the projector.
- Do not place this equipment on an unstable cart, stand, or table. The product may fall, causing serious damage to it and possible injury to the user.

- It is hazardous to operate without lens or shield. Lenses, shields or ultra violet screens shall be changed if they have become visibly damaged to such an extent that their effectiveness is impaired. For example by cracks or deep scratches.
- **Warning: Protection from ultraviolet radiation**: Do not look directly in the light beam. The lamp contained in this product is an intense source of light and heat. One component of the light emitted from this lamp is ultraviolet light. Potential eye and skin hazards are present when the lamp is energized due to ultraviolet radiation. Avoid unnecessary exposure. Protect yourself and your employees by making them aware of the hazards and how to protect themselves. Protecting the skin can be accomplished by wearing tightly woven garments and gloves. Protecting the eyes from UV can be accomplished by wearing safety glasses that are designed to provide UV protection. In addition to the UV, the visible light from the lamp is intense and should also be considered when choosing protective eye wear.
- **Mercury Vapor Warnings**: Keep the following warnings in mind when using the projector. The lamp used in the projector contains mercury. In case of a lamp rupture, explosion there will be a mercury vapor emission. In order to minimize the potential risk of inhaling mercury vapors:
  - Ensure the projector is installed only in ventilated rooms.
  - Replace the lamp module before the end of its operational life.
  - Promptly ventilate the room after a lamp rupture, explosion has occurred, evacuate the room (particularly in case of a pregnant woman).
  - Seek medical attention if unusual health conditions occur after a lamp rupture, explosion, such as headache, fatigue, shortness of breath, chest-tightening coughing or nausea.
- **Exposure to UV radiation**: Some medications are known to make individuals extra sensitive to UV radiation. The American Conference of Governmental Industrial Hygienists (ACGIH) recommends occupational UV exposure for an-8 hour day to be less than 0,1 micro-watts per square centimeters of effective UV radiation. An evaluation of the workplace is advised to assure employees are not exposed to cumulative radiation levels exceeding these government guidelines.

To prevent fire hazard

- Do not place flammable or combustible materials near the projector!
- Barco large screen projection products are designed and manufactured to meet the most stringent safety regulations. This projector radiates heat on its external surfaces and from ventilation ducts during normal operation, which is both normal and safe. Exposing flammable or combustible materials into close proximity of this projector could result in the spontaneous ignition of that material, resulting in a fire. For this reason, it is absolutely necessary to leave an “exclusion zone” around all external surfaces of the projector whereby no flammable or combustible materials are present. The exclusion zone must be not less than 40 cm (16”) for all DLP Cinema projectors. The exclusion zone on the lens side must be at least 5 m. Do not cover the projector or the lens with any material while the projector is in operation. Keep flammable and combustible materials away from the projector at all times. Mount the projector in a well ventilated area away from sources of ignition and out of direct sun light. Never expose the projector to rain or moisture. In the event of fire, use sand, CO_2 or dry powder fire extinguishers. Never use water on an electrical fire. Always have service performed on this projector by authorized Barco service personnel. Always insist on genuine Barco replacement parts. Never use non-Barco replacement parts as they may degrade the safety of this projector.
- Slots and openings in this equipment are provided for ventilation. To ensure reliable operation of the projector and to protect it from overheating, these openings must not be blocked or covered. The openings should never be blocked by placing the projector too close to walls, or other similar surface. This projector should never be placed near or over a radiator or heat register. This projector should not be placed in a built-in installation or enclosure unless proper ventilation is provided.
- Projection rooms must be well ventilated or cooled in order to avoid build up of heat. It is necessary to vent hot exhaust air from console to the outside of the building.
- Let the projector cool completely before storing. Remove cord from the projector when storing.
- Heat sensitive materials should not be placed in the path of the exhaust air or on the lamp house.

To prevent projector damage

- This projector has been designed for use with a specific lamp (house) type. See installation instructions for its correct type.
- The air filters of the projector must be cleaned or replaced on a regular basis (a "clean" booth would be monthly-minimum). Neglecting this could result in disrupting the air flow inside the projector, causing overheating. Overheating may lead to the projector shutting down during operation.
- The projector must always be installed in a manner which ensures free flow of air into its air inlets.
- In order to ensure that correct airflow is maintained, and that the projector complies with Electromagnetic Compatibility (EMC) and safety requirements, it should always be operated with all of it’s covers in place.
- Slots and openings in the cabinet are provided for ventilation. To ensure reliable operation of the product and to protect it from overheating, these openings must not be blocked or covered. The openings should never be blocked by placing the product on a bed, sofa, rug, or other similar surface. This product should never be placed near or over a radiator or heat register. The device should not be placed in a built-in installation or enclosure unless proper ventilation is provided.
- Ensure that nothing can be spilled on, or dropped inside the projector. If this does happen, switch off and remove all power from the projector. Do not operate the projector again until it has been checked by qualified service personnel.
- Do not block the projector cooling fans or free air movement around the projector. Loose papers or other objects may not be nearer to the projector than 10 cm (4") on any side.
- Do not use this equipment near water.
- Proper operation of the projector can only be guaranteed in table mounting. It is not permitted to use the projector in another position. See installation procedure for correct installation. A ceiling mount will be supported in the future.

- **Special care for Laser Beams**: Special care should be used when DLP projectors are used in the same room as high power laser equipment. Direct or indirect hitting of a laser beam on to the lens can severely damage the Digital Mirror Devices™ in which case there is a loss of warranty.
- Never place the projector in direct sunlight. Sunlight on the lens can severely damage the Digital Mirror Devices™ in which case there is a loss of warranty.
- Save the original shipping carton and packing material. They will come in handy if you ever have to ship your equipment. For maximum protection, repack your set as it was originally packed at the factory.
- Disconnect the power to the projector before cleaning. Do not use liquid cleaners or aerosol cleaners. Use a damp cloth for cleaning. Never use strong solvents, such as thinner or benzine, or, patrol, or abrasive cleaners, since these will damage the cabinet. Stubborn stains may be removed with a cloth lightly dampened with mild detergent solution.
- To ensure the highest optical performance and resolution, the projection lenses are specially treated with an anti-reflective coating, therefore, avoid touching the lens. To remove dust on the lens, use a soft dry cloth. Do not use a damp cloth, detergent solution, or thinner.
- Rated maximum ambient temperature, t_a= 35°C (95°F).
- The lamp house shall be replaced if it has become damaged or thermally deformed.
- Do not stack DP2K-E series projectors.

On servicing

- Do not attempt to service this product yourself, as opening or removing covers may expose you to dangerous voltage potentials and risk of electric shock.
- Refer all servicing to qualified service personnel.
- Attempts to alter the factory-set internal controls or to change other control settings not specially discussed in this manual can lead to permanent damage to the projector and cancellation of the warranty.
- Remove all power from the projector and refer servicing to qualified service technicians under the following conditions:
  - When the power cord or plug is damaged or frayed.
  - If liquid has been spilled into the equipment.
  - If the product has been exposed to rain or water.
  - If the product does not operate normally when the operating instructions are followed. Adjust only those controls that are covered by the operating instructions since improper adjustment of the other controls may result in damage and will often require extensive work by a qualified technician to restore the product to normal operation.
  - If the product has been dropped or the cabinet has been damaged.
  - If the product exhibits a distinct change in performance, indicating a need for service.
- Replacement parts: When replacement parts are required, be sure the service technician has used original Barco replacement parts or authorized replacement parts which have the same characteristics as the Barco original part. Unauthorized substitutions may result in degraded performance and reliability, fire, electric shock or other hazards. Unauthorized substitutions may void warranty.
- Safety check: Upon completion of any service or repairs to this projector, ask the service technician to perform safety checks to determine that the product is in proper operating condition.
- Possible explosion hazard: Always keep in mind the caution below:

To prevent battery explosion

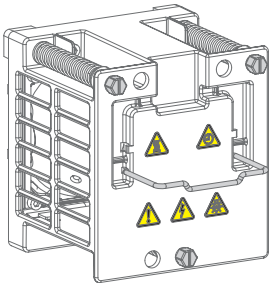
- Danger of explosion if battery is incorrectly installed.
- Replace only with the same or equivalent type recommended by the manufacturer.
- For disposal of used batteries, always consult federal, state, local and provincial hazardous waste disposal rules and regulations to ensure proper disposal.

Safety Data Sheets for Hazardous Chemicals

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

2.3 Product safety labels

Product safety labels

Label image	Label description	Label location
	The Lamp House is very hot after operation. To avoid burns, let the projector cool down for at least 15 minutes before proceeding to remove the Lamp House.	
	General Warning Hazard	
	Electric Voltage Hazard	
	Hot Surface Hazard	
	UV Hazard	
	Hazardous moving parts. Keep away from moving fan blades. Keep fingers and other body parts away.	On the fans inside the projector

2.4 Light beam Hazard Distance (HD)

HD

Light beam Hazard Distance (HD) is the distance from the source at which the intensity or the energy per surface unit becomes lower than the applicable safety limit. The light beam can thus be considered as dangerous if the operator is closer from the source than the HD.

Restriction Zone (RZ) based on the HD

The HD is defined from the projection lens surface towards the position of the lowest projected beam where the irradiance equals the applicable safety limit. 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 the lens Throw Ratio (TR)*.

To protect untrained users the installation shall comply with the following installation requirements: light output levels in excess of the limits shall not be permitted at any point less than 2.0 meters (SH image 2-1) above any surface upon which persons are assumed to stand or 1 meter (SW image 2-1) below or in lateral separation from any place where such persons are assumed to be. See image 2-1.

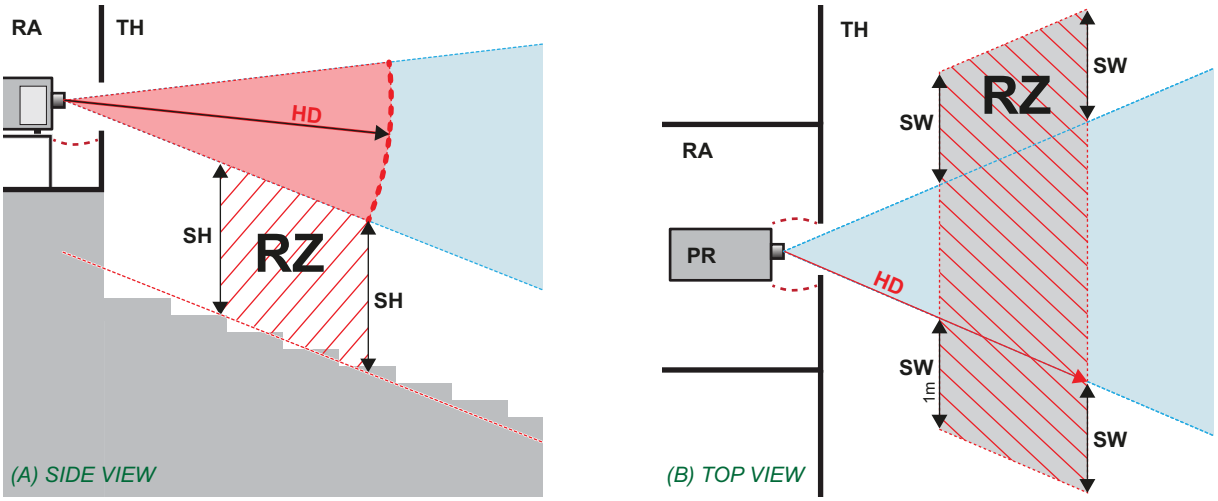


Image 2-1
A Side view.
B Top view.
RA Restricted Access location (booth area of projector).
PR Projector.
TH Theater.
RZ Restriction Zone in the theater.
SH Separation Height. Must be minimum 2 meter.
SW Separation Width. Must be minimum 1 meter.

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 are assumed to stand.

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

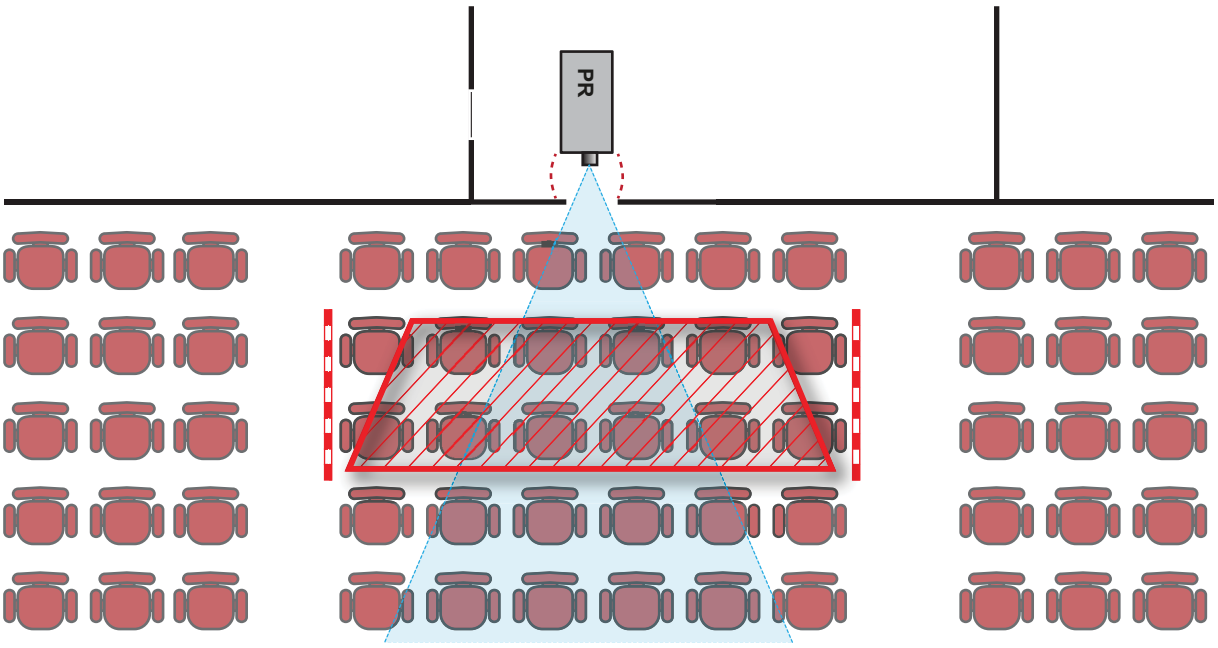


Image 2-2

2.5 HD in function of the lens Throw Ratio (TR)

TR (Throw Ratio)

The ratio of the distance to the screen (throw) to the screen width.

Hazard Distance

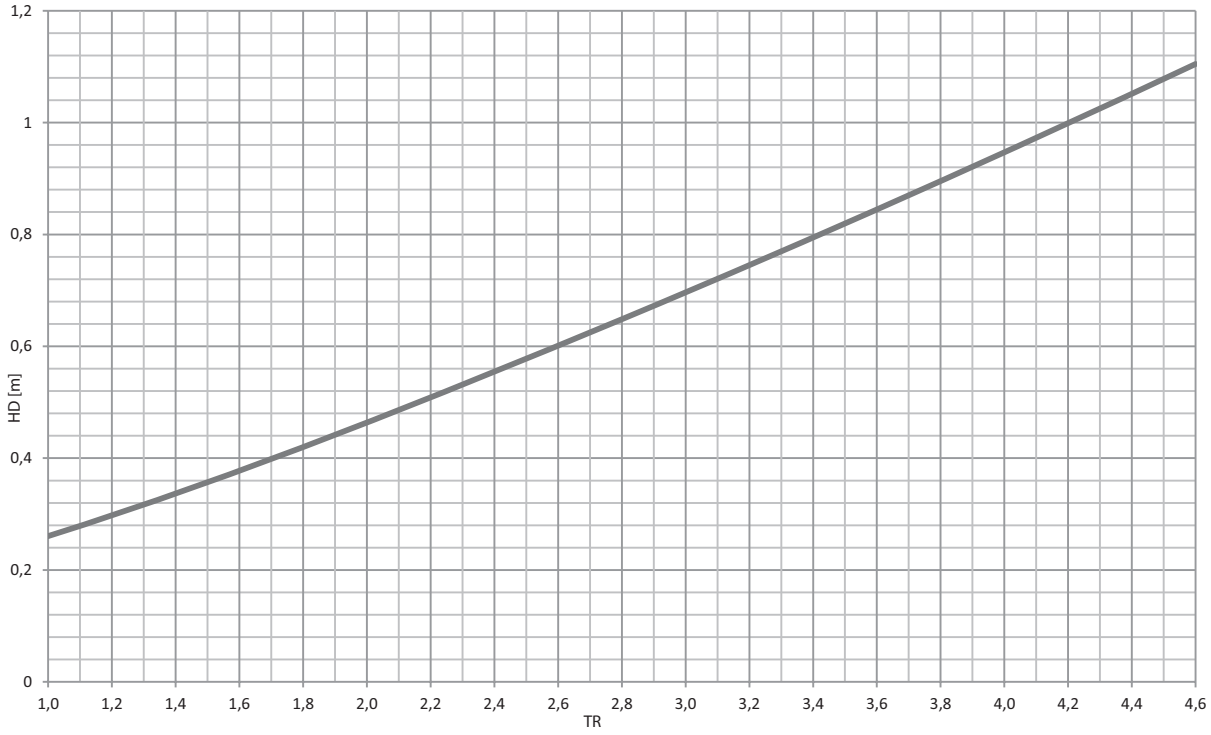


Image 2-3
HD (in meter) in function of the Throw Ratio (TR)

3. GETTING STARTED

About this chapter

Read this chapter before installing your DP2K-E series projector. It contains important information concerning installation requirements for the DP2K-E series projector, such as minimum and maximum allowed ambient temperature, humidity conditions, required safety area around the installed projector, required power net, etc.

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

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

Overview

- Installation requirements
- Unpacking the projector
- Initial inspection

3.1 Installation requirements

Environment conditions

Table below summarizes the physical environment in which the DP2K-E series projector may be safely operated or stored.

Environment	Operating	Non-Operating
Ambient Temperature	10°C (50°F) to 35°C (95°F)	-20°C (-4°F) to 60°C (140°F)
Air cleanliness	Clean office environment (equivalent with cleanroom standard ISO 14644-1 ISO Class 9)	n.a.
Humidity	0% to 85% RH Non-condensed	0% to 93% RH Non-Condensed
Altitude	-60 (-197Ft) to 3000m (9843Ft)[1]	-60 (-197Ft) to 10000m (32810Ft)

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

Measures to resolve radio interference

Operation of this equipment in a residential area may cause radio interference. Possible interference shall be solved by one of the following non limitative product installation measures:

- Create more separation distance between projector and interfered device.
- Change direction of the interfered device.
- Electromagnetic shielding of the projection booth.

No interference to radio communication in neighbor buildings possible if a separation distance of 30 m (32.8 yards) is provided.

Cooling requirements

The projector is fan cooled and must be installed with sufficient space around the projector head, minimum 20 cm (8 inch) to ensure sufficient air flow. It should be used in an area where the ambient temperature, as measured at the projector air inlet, does not exceed 35°C (95°F).

Main Power requirements

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

1. Due to China regulation the maximum altitude is limited to 2000 meter (6561 feet) for China mainland.

Projector	Power requirements
DP2K-E	200-240 VAC, 50-60Hz, 6,25A 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 **1mm² (16AWG)**, 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.

UPS requirements

The Uninterruptible Power Supply (UPS), also known as a Continuous Power Supply (CPS), must have an output voltage of 200-240V at 50-60Hz and must be capable of delivering an output power of 250W. This UPS provides only power for the electronics and lamp cooling, but not for the lamp.

The connection between the UPS unit and the UPS inlet of the projector must be done with a certified AC power supply cord of minimum 0,75 mm² or 18 AWG and minimum 300V.

WARNING: Disconnect the power cord for removal of all power from the unit.

The DP2K-E series projector does not have a built in UPS unit.

Projector weight

Do not underestimate the weight of the DP2K-E series projector. The projector weights approximately 53 kg (116.8 lb.) without lens. Ensure that the pedestal on which the projector is installed is capable of supporting the complete load of the system. Minimum 4 adult persons are needed to carry the projector.

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

3.2 Unpacking the projector

What you need to do?

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

How to unpack your projector?

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

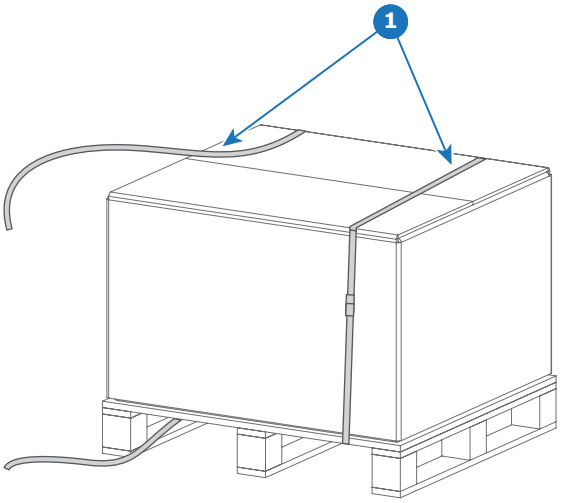


Image 3-1

2. Lift up the carton box (2) as a whole and remove it away from the projector package.
3. Take out the small box (3) between the polystyrene foam on top of the projector. This box contains the product documentation (manuals etc.).
4. Remove the polystyrene foam (4) from the top of the projector.

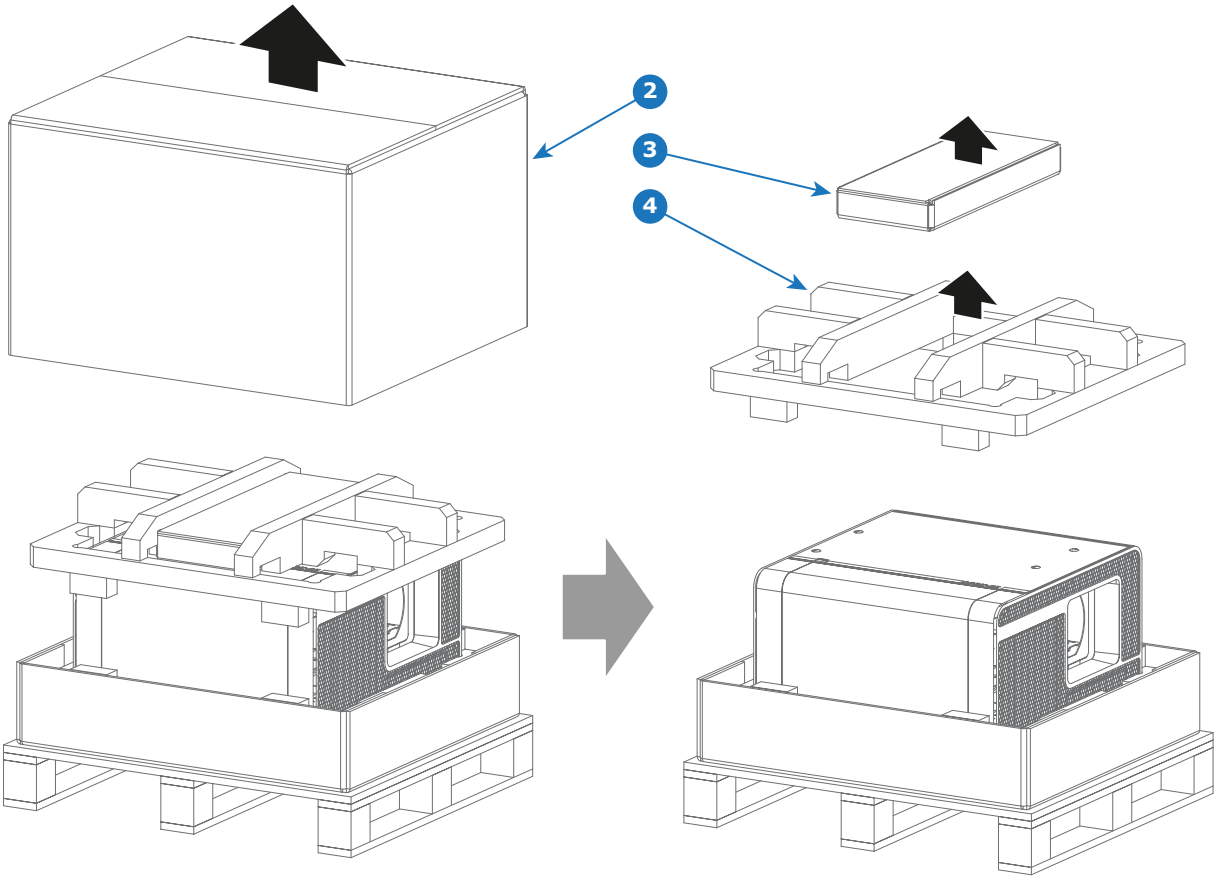


Image 3-2

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

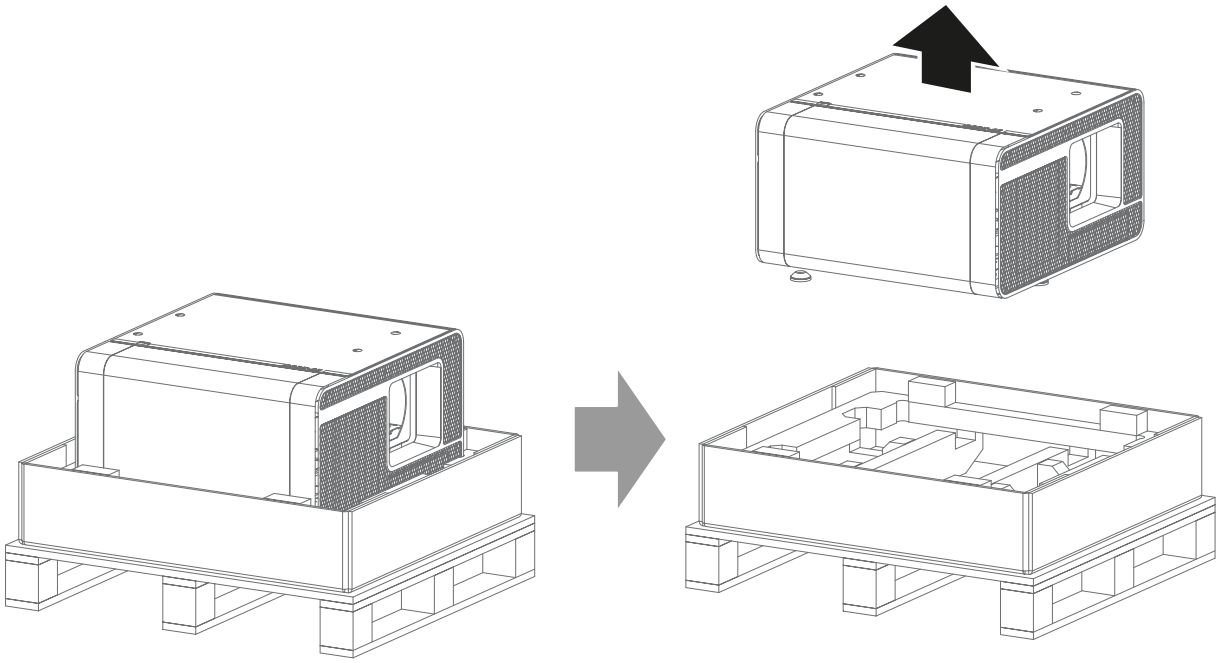


Image 3-3

6. Remove the plastic cover from the Lens Holder opening.

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

3.3 Initial inspection

General

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

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

Box content

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

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

Mechanical check

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

Tamper labels

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

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

These tamper labels can be found on the top cover plate from the Light Processor compartment, the side cover plate from the Light Processor compartment, on the internal cover of the card cage and on the ICMP.

See chapter "Removal and installation of the projector covers", page 111, for instructions on how to remove the projector covers.

Image 3-4
Barco tamper label (required for DCI).

4. INSTALLATION PROCESS

About this chapter

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

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

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

Overview

- Installation process overview

4.1 Installation process overview

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. See chapter "Positioning the DP2K-E series projector at port window", page 21.
3. **Electrical connection with the power net**. See chapter "Connecting the projector with the power net", page 23.
4. **Installation of a UPS to the projector electronics** (if applicable). See chapter "Connecting a UPS to the projector electronics", page 24.
5. **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 selection", page 27.
   Caution: *The projector is delivered with a plastic cover inside the Lens Holder. Remove the cover prior to installing the lens.*
6. **Installation of the ICMP, IMB, IMS or HDSDI input module**. (only in case no ICMP, or IMB or IMS or HDSDI is factory installed).
7. **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 69. 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.
8. **Installation of the Communicator Touch Panel**. See chapter "Installing the Touch Panel interface", page 72.
9. **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.
10. **Select the corresponding lens parameters for the installed lens**. See user guide of the *Communicator* chapter *Installation* > *Advanced* > *Lens parameters*.
11. **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:
    a) Press the **STANDBY** button on the Local Keypad to activate the lamp.
    b) 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.
    c) Press the **TEST PATTERN** button on the Local Keypad to project one of the internal test patterns of the projector on the screen.
    d) Perform a “**Lens Homing**”. See user guide of the Communicator.
    e) Use the lens **ZOOM**, **SHIFT** and **FOCUS** buttons on the Local Keypad to match the projected image with the screen. Tilt the projector in case you can not SHIFT the image completely upon the screen. See "Positioning the DP2K-E series projector at port window", page 21.
    See chapter "Local Keypad", page 36, for detailed description of the Local Keypad buttons.
12. **Adjusting the light path**. Normally the lens holder and the convergence of the projector are perfectly adjusted at the factory. Nevertheless, some applications require a readjustment of the lens holder, convergence or both. See procedure "Scheimpflug adjustment", page 80, and "Convergence", page 89.

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

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

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

16. **Projection of a digital cinema movie**.
    In case the projector is equipped with an ICMP, 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 47, and user guide of the Communicator and/or (Web) Commander. Use the Communicator (Touch Panel) to configure the applied source. See the user guide of the Communicator (Touch Panel) for more detailed information.
    In case the projector is equipped with 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. Use the Communicator (Touch Panel) to configure the applied source. See the user guide of the Communicator (Touch Panel) for more detailed information.
    In case the projector is equipped with an Integrated Media Block (IMB) or Integrated Media Server (IMS) see user guide of the IMB or IMS for detailed instructions.

5. PHYSICAL INSTALLATION

About this chapter

This chapter describes how the mechanical and electrical set up of your DP2K-E series projectorhas to be done.

Overview

- Positioning the DP2K-E series projector at port window
- Connecting the projector with the power net
- Connecting a UPS to the projector electronics

5.1 Positioning the DP2K-E series projector at port window

WARNING: The installation of the DP2K-E series requires at least 4 adult persons.

General guidelines

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

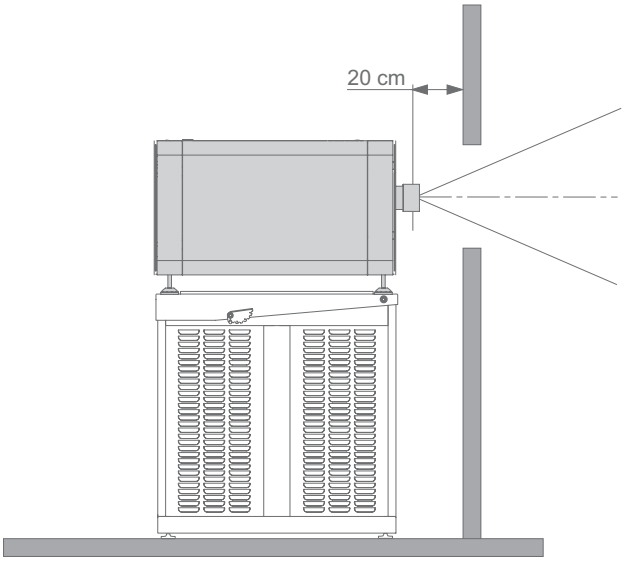


Image 5-1

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

Necessary tools

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

Projector centering

1. If the projector is standalone in front of the port window, center the projector with the theatre screen (A).
2. If an analog film projector is already present (projector will be off-center), try to optimize aim (B).
   Note: *Unlike analog film projectors, it is best to keep the projector lens surface as parallel as possible to the screen, even if it is significantly above the screen center.*

   Caution: *The front foot has an adjustment range of maximum 70mm. The back feet maximum 125mm.*

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

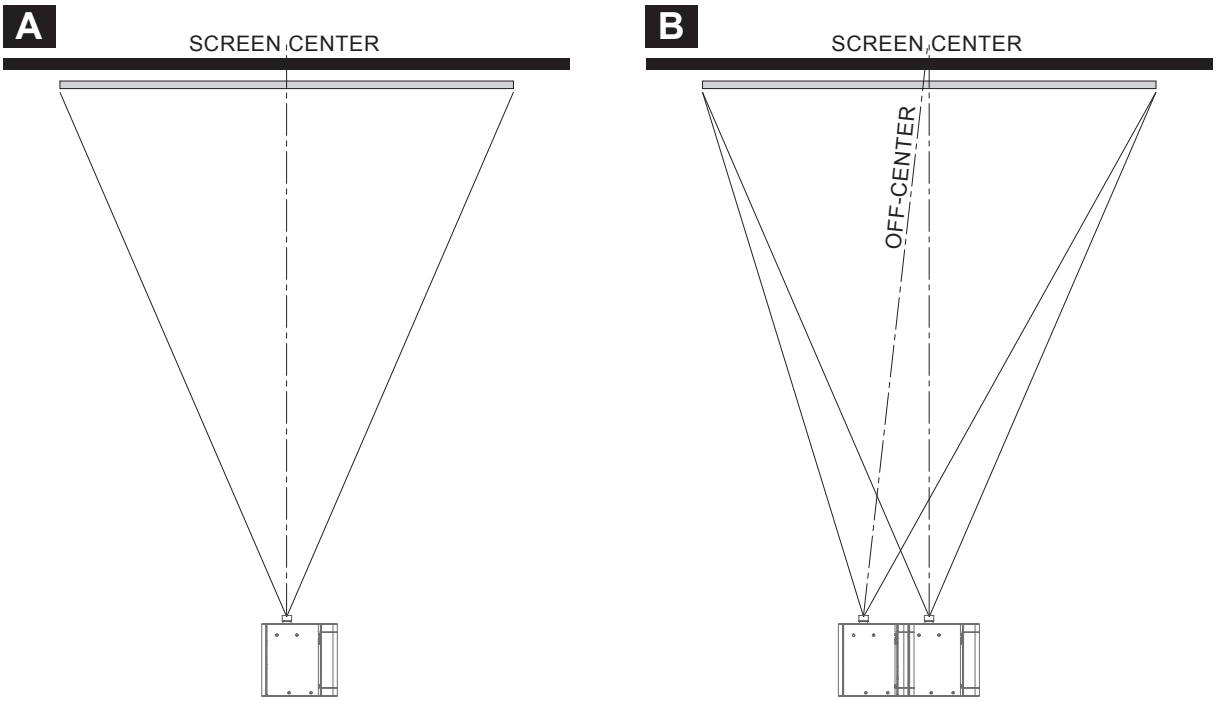


Image 5-2

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

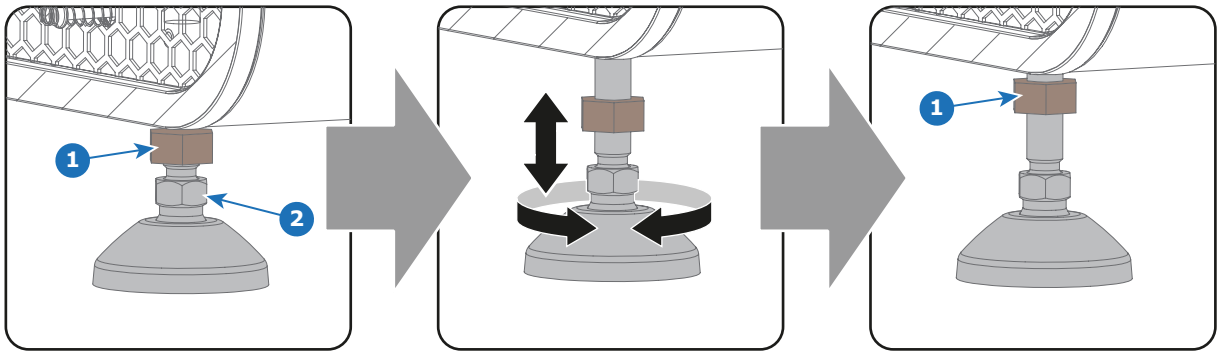


Image 5-3

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

Projector tilting

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

1. Before adjusting tilt, make sure the projector is as well-centered with the theatre screen as possible for the installation area.
2. Check the degree of screen tilt, or measure this incline with a protractor at the screen.
3. Tilt the projector to closely match this screen tilt angle as follows:
   - Loosen the nut (1) on the threaded rod of the three projector feet. Use a 17mm open wrench.
   - Adjust the height of the 3 legs until the projected image matches the projection port window and the screen tilt. Use a 14mm open wrench to adjust the height as illustrated (2).
   - Secure the leg height by tightening the nuts (1) of each projector foot.

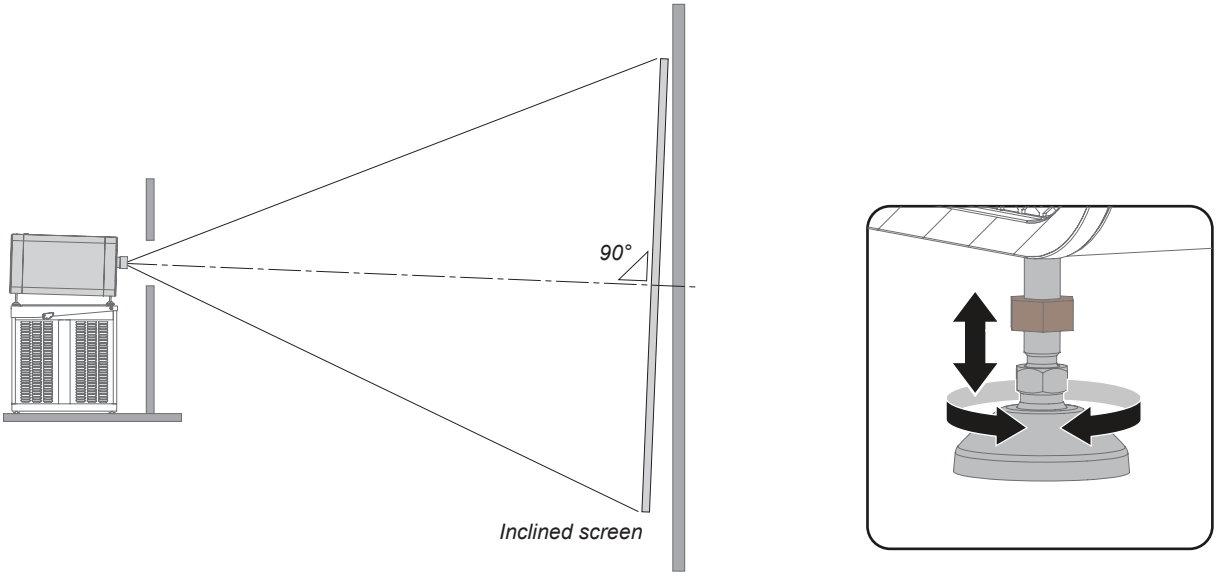


Image 5-4

CAUTION: The DP2K-E series may tilt maximum 15° forward and maximum 5° backwards. No tilt is allowed sideways.

The back feet of the projector can be turned out maximum 125mm. This correspond with a forward tilt of 12° if the front foot is completely turned in.

Barco offers a pedestal for the DP2K-E series projector. This universal pedestal allows you to easily tilt the projector forward up to 6°.

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

5.2 Connecting the projector with the power net

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

CAUTION: The cross-sectional area of the conductors in the Power Supply Cord shall be not less than 1mm² (16AWG).

Necessary tools

No tools.

Necessary parts

Power supply cord 1mm² (16AWG), min. 300V with IEC 60320 - C13 connector

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

1. Remove the right side cover of the projector. See procedure "Removal of the right side cover", page 115.

2. Make sure that the projector is switched off. Position the power switch in the '0' (OFF) position (1).
3. Connect the female side of the power cord with the power input socket of the projector (2).

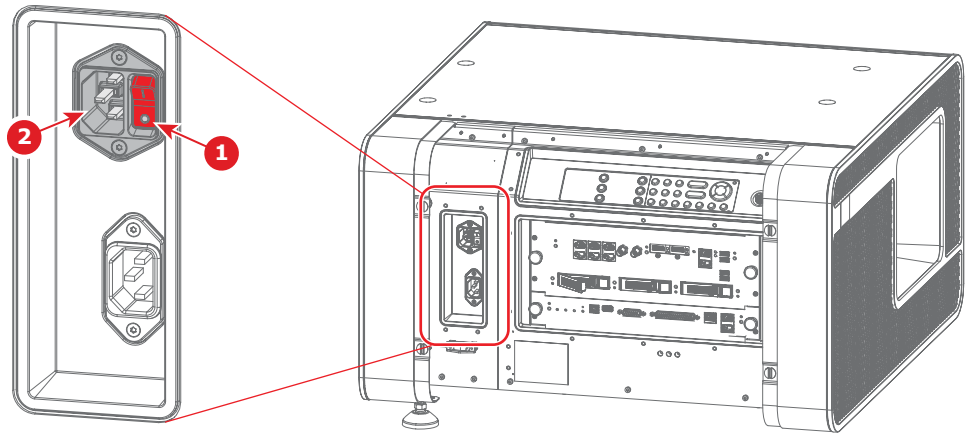


Image 5-5

4. Connect the male side of the power cord to the local power net.
5. Install the right side cover of the projector. See procedure "Installation of the right side cover", page 120.

5.3 Connecting a UPS to the projector electronics

WARNING: Only use UPS units which are suitable for the DP2K-E series series projector. See chapter "Installation requirements" for more information about the requirements of the UPS.

Necessary tools

3mm Allen wrench

How to connect the UPS

1. Remove the right side cover of the projector. See procedure "Removal of the right side cover", page 115.
2. Remove the rear cover. See "Removal of the rear cover", page 112.
3. Remove the 2 screws (1) of the SMPS cover (2) and remove the cover. Use a 3mm Allen wrench.

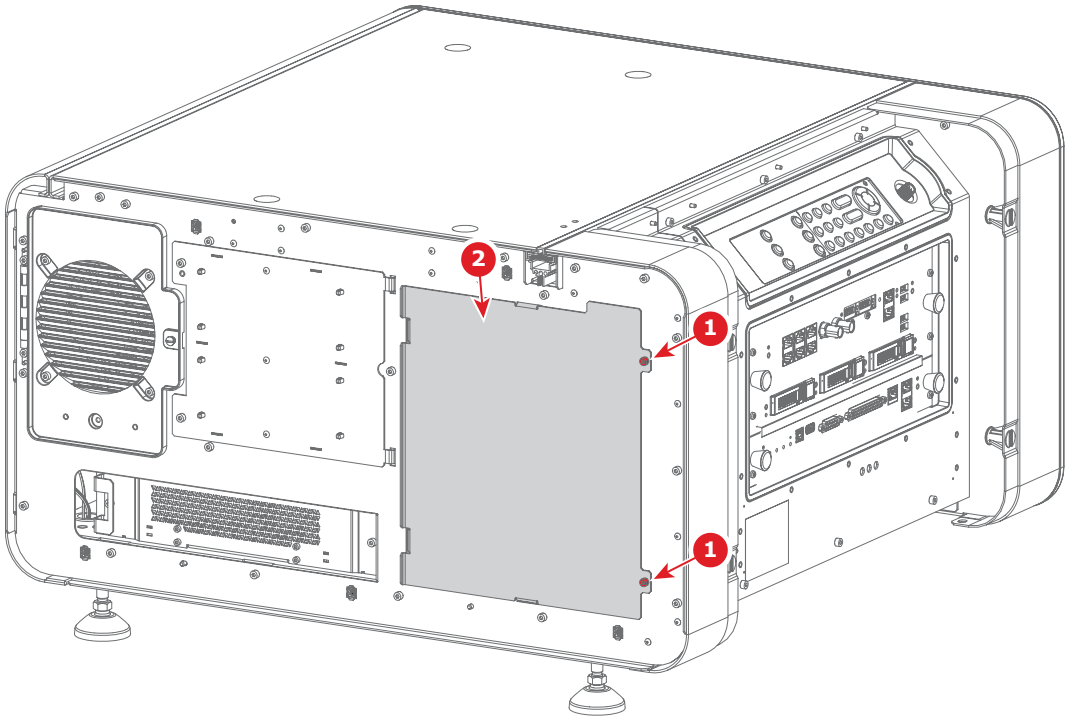


Image 5-6

4. Plug out the connector which is plugged into the AC socket (3). Plug the connector in the UPS socket (4).

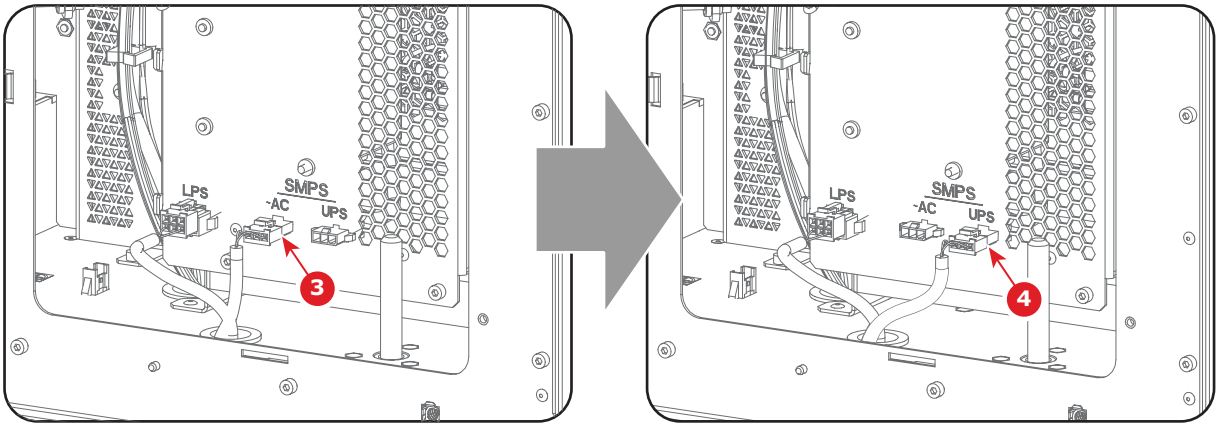


Image 5-7

5. Install the SMPS cover and install the 2 screws. Use a 3mm Allen wrench.
6. Install the rear cover. See "Installation of the rear cover", page 122.
7. Install the UPS according to the instructions of the manufacturer and the local regulations.
8. Connect the power output cord from the UPS unit to the UPS inlet socket (5) of the projector.

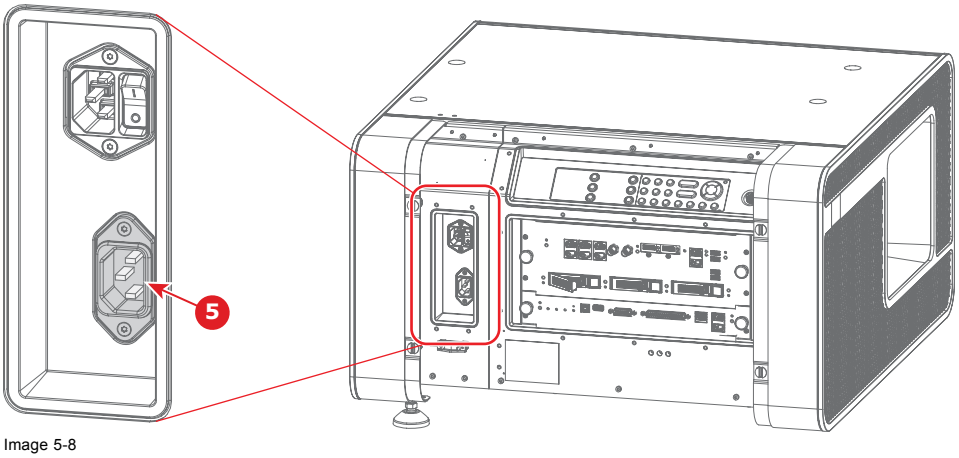


Image 5-8

9. Install the right side cover of the projector. See procedure "Installation of the right side cover", page 120.

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)

6. LENSES & LENS SELECTION

About this chapter

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

CAUTION: Never transport the projector with a Lens mounted in the Lens Holder. Always remove the Lens before transporting the projector. Neglecting this can damage the Lens Holder and Prism.

CAUTION: Caution when removing or installing the lens! Fragile parts at the inner side of the Lens Holder.

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

Overview

- Available lenses
- Lens selection
- Lens installation
- Mounting the lens safety cable
- Lens removal
- Lens shift, zoom & focus

6.1 Available lenses

Which lenses are available?

For the DP2K-E series the **0.69" DC2K** lens family is used.

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

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

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

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

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

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

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

6.2 Lens selection

Which lens do I need?

1. 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 6-6) will be displayed.

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

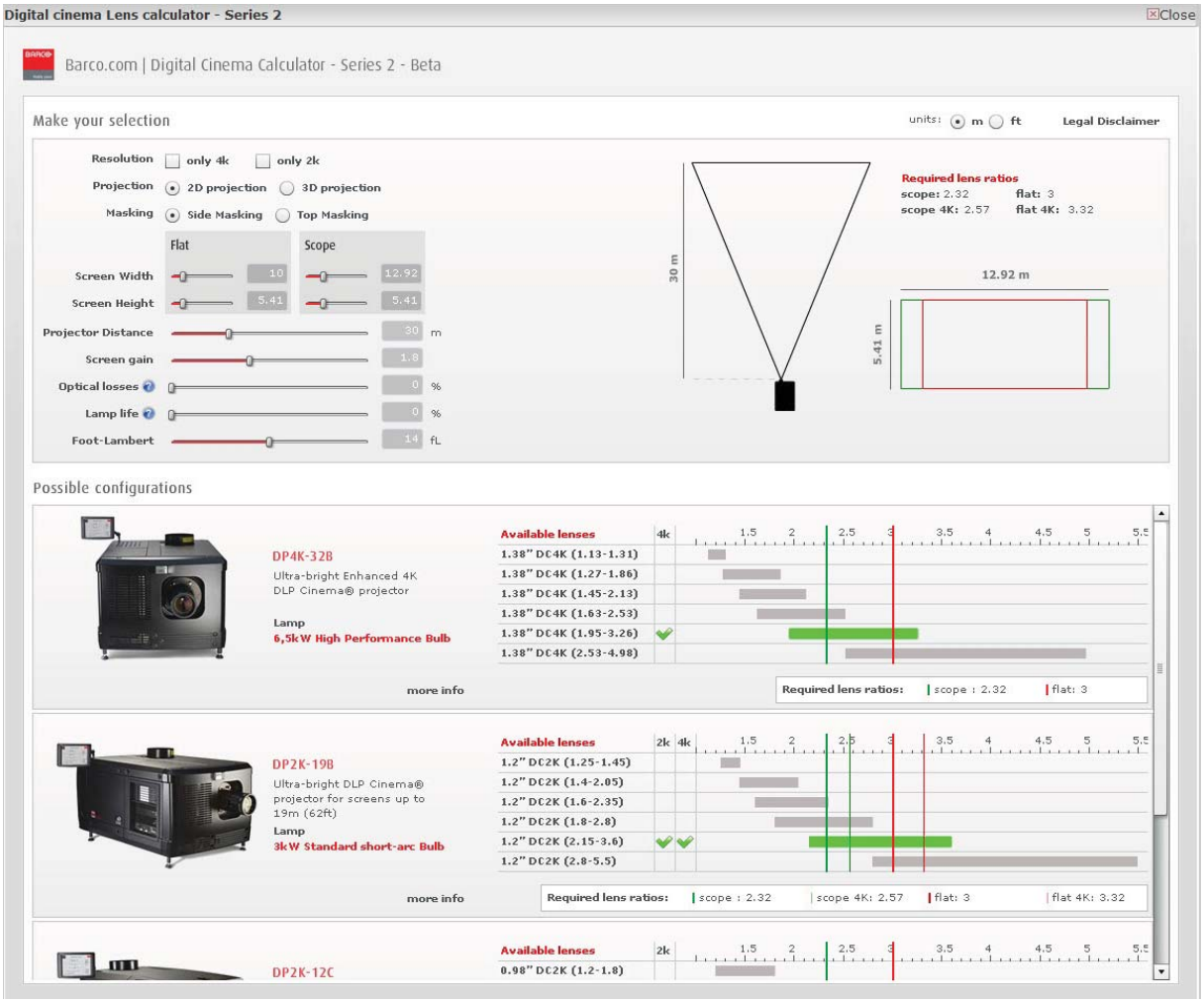


Image 6-6
Digital cinema lens calculator

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 into the Lens Holder?

1. Remove the foam rubber in the opening of the Lens Holder if not removed yet.
2. Take the lens assembly out of its packing material and remove the lens caps on both sides.
   Caution: *Do not touch the glass of the lens!*
3. Ensure that the Lens Holder stands in the On-Axis position (horizontal and vertical mid position).
4. Place the Lens Holder in the "**locked**" position by moving the lens lock handle (1) downwards, away from the lens power supply socket (2).
5. Gently insert the lens in such a way that the lens connector matches the socket. To prevent collision of the lens with the critical electronics inside the projector, ensure you centre the lens and keep it on-axis while approaching.
   Caution: *Do not accidentally bump with the lens against the electronic boards inside the Lens Holder.*

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

6. **Push** the lens completely against the Lens Holder front plate. An **audible click** should be noticed. Once seated, there may be no airgap between lens flange and Lens Holder front plate.
   Caution: *Ensure that the lock handle remains in the "locked" position.*

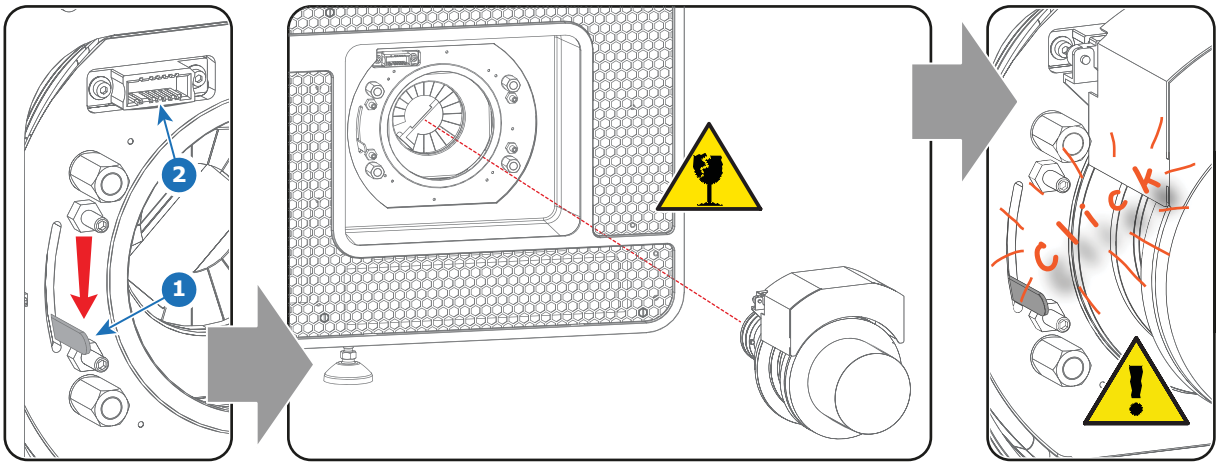


Image 6-7

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

7. Check if the lens is really secured by trying to pull the lens out of the Lens Holder.
8. Activate the corresponding lens parameters for the installed lens. (See user guide of the *Communicator* chapter *Installation* > *Advanced* > *Lens parameters*)
   Caution: *Not using the correct lens parameters could result in lens damage.*

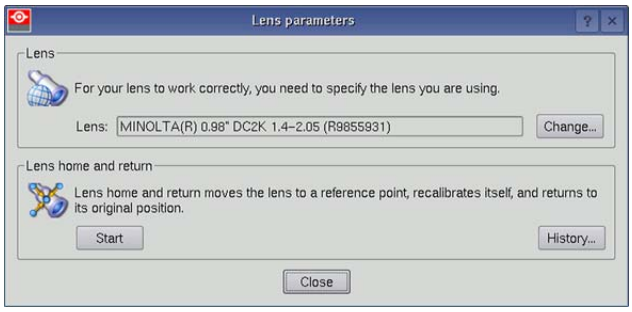


Image 6-8

9. Perform a lens **HOME & RETURN** operation. (See user guide of the *Communicator* chapter *Installation* > *Advanced* > *Lens parameters*)
   Note: *The HOME & RETURN operation enables the projector to determine the reference positions of the motorized ZOOM and FOCUS barrels of the installed lens.*

CAUTION: Never transport the projector with a Lens mounted in the Lens Holder. Always remove the Lens before transporting the projector. Neglecting this can damage the Lens Holder and Prism.

6.4 Mounting the lens safety cable

Necessary tools

Socket wrench 7mm

For lenses with a step at front

1. Place the lens with lens safety cable (1) in the lens holder.

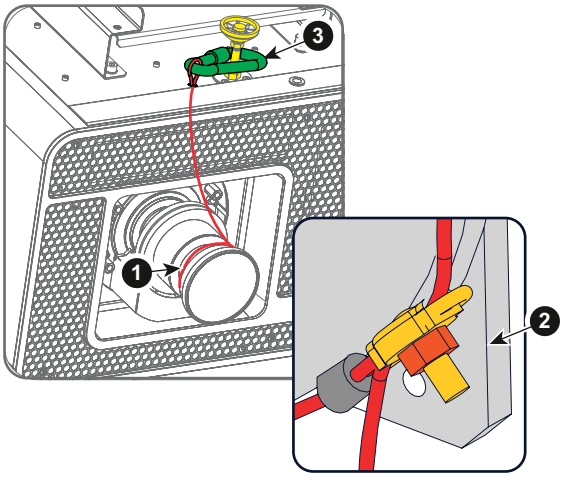


Image 6-9

Caution: *Always make sure the lens is really secured by trying to pull the lens out of the lens holder.*

2. Hook the shackle lock with cable around the feet of the projector (3).

For lenses with a flat barrel

1. Place the lens with lens safety cable (1) in the lens holder. Make sure the safety cable is properly mounted around the lens.
2. Strap the cable so that the gap between the lens and the cable is smaller then 0.4 mm.

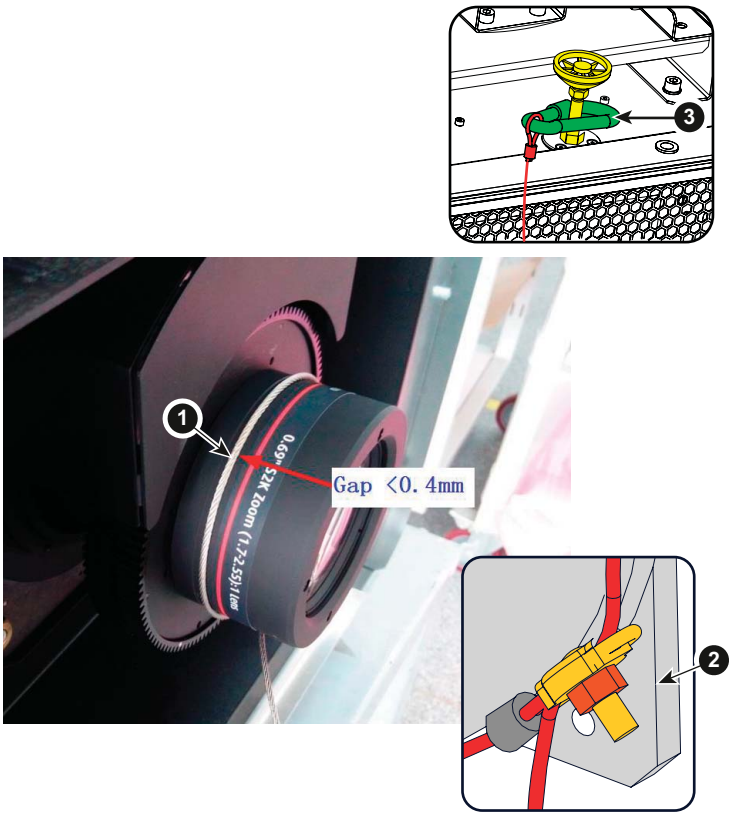


Image 6-10

3. Hook the shackle with cable around the feet of the projector (3).

6.5 Lens removal

How to remove a lens from the Lens Holder?

1. Support the lens with one hand while you unlock the lens holder by sliding the lock handle (1) towards the “unlocked” position as illustrated.

2. Gently pull the lens out of the lens holder, maintaining its coaxial direction.
   Caution: *Do not accidentally bump with the lens against the electronic boards inside the Lens Holder.*

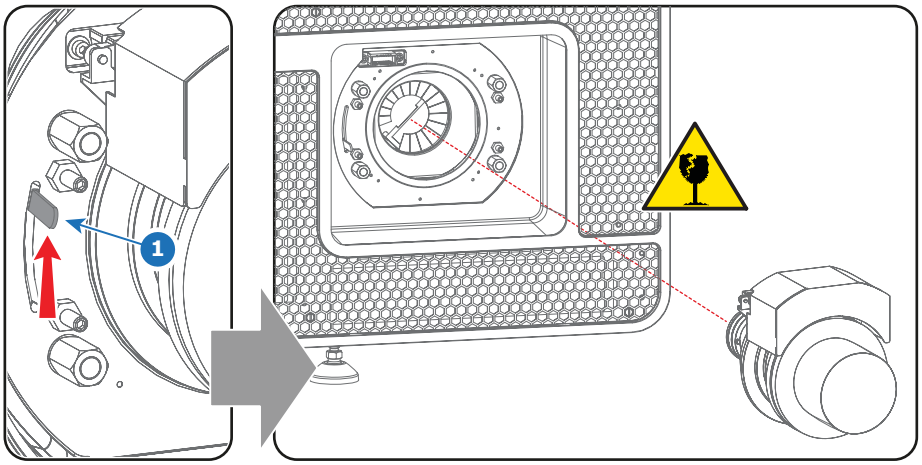


Image 6-11

It's recommended to place the Lens caps of the original Lens packaging, back on both sides of the removed Lens to protect the optics of the Lens.

It's recommended to place the plastic cover of the original projector packaging, back into the Lens opening to prevent intrusion of dust.

6.6 Lens shift, zoom & focus

Motorized lens adjustment

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

Maximum shift range

The lens can be shifted with respect to the internal optics of the projector (DMD) which results in a shifted image on the screen (Off-Axis). A 100% shift means that the centre point of the projected image is shifted by half the screen size. In other words, the centre point of the projected image falls together with the outline of the image in an On-Axis projection. Due to mechanical and optical limitations the shift range is limited as well.

All lenses have a shift range of 50% up, 50% down, 30% left, and 30% right. This range is valid for all throw ratios. Within these shift ranges the projector and lens perform excellently. Configuring the projector outside these shift ranges will result in a slight decline of image quality.

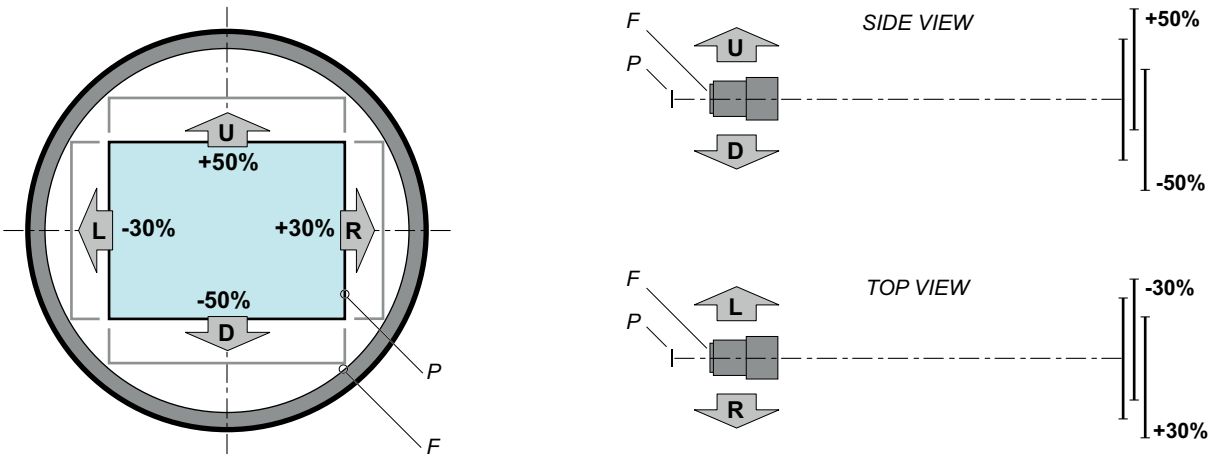


Image 6-12
P DMD.
F Field of view.

It's mechanical possible to shift outside the recommended field of view (±90% UP/DOWN and ±50% LEFT/RIGHT), but this will result in a decline of image quality depending on the used lens and the zoom position of the used lens. Furthermore, shifting too much in both directions will result in a blurred image corner.

How to shift the lens of the DP2K-E series ?

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

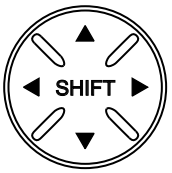


Image 6-13

How to zoom in or out?

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

Image 6-14

How to focus?

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

Image 6-15

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

Button backlight colors

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

7. INPUT & COMMUNICATION

About this chapter

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

Note that all information about the ICMP is gathered into one separated chapter: "ICMP", page 47.

Overview

- Introduction
- Local Keypad
- Projector Status
- Cinema Controller
- Integrated Cinema Processor (ICP)
- HD-SDI Input Module (optional)
- Integrated Media Block/Server (optional)

7.1 Introduction

General

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

The projector card cage is equipped with an ICMP. See illustration below. Note that all information about the ICMP is gathered into one separated chapter: "ICMP", page 47.

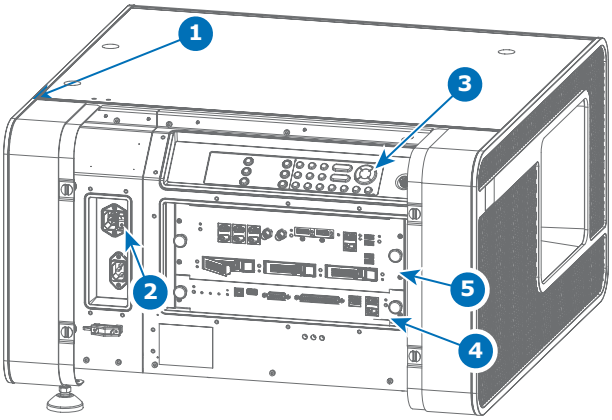


Image 7-1
1 Projector status light.
2 Power ON/OFF switch.
3 Local keypad.
4 Barco Cinema Controller.
5 ICMP.

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

7.2 Local Keypad

Identification of the buttons

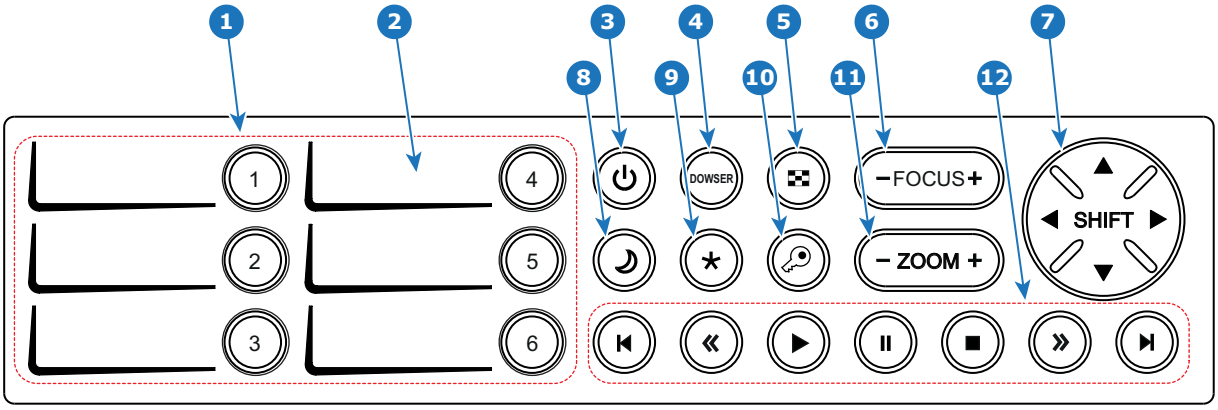


Image 7-2

Functionality of the buttons

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

All the Numeric buttons (reference **1** image 7-2) of the Local Keypad have a white backlight during normal operation. When the authorization process is activated with the (security) Key button, the backlight color of the Numeric buttons changes to yellow. Each button can be linked to a macro which allows you to setup the projector to your requirements with one push of a button.

2 **Marker area**

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

3 **Standby button**

Standby button (reference **3** image 7-2) switches the lamp and lamp electronics immediately ON or OFF. The lamp cooling fans remain active for about 5 minutes. The backlight color of the Standby button remains white in standby mode and changes to green in operation mode.

4 **Dowser button**

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

5 **Test Pattern button**

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

6 **Focus button**

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

7 **Shift button**

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

8 **Sleep button**

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

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

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

The Sleep button is disabled if the lamp is on.

9 **Star button**

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

10 **Key button**

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

11 **Zoom button**

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

12 **Media control buttons**

Buttons (reference **12** image 7-2) allowing you to navigate through the content on the integrated media server. If a test pattern is activated, the projector will not show the content on the integrated media server.

Button backlight colors

- **PURPLE** : The backlight color of a button (or part of) is purple when pushed. This indicates that the requested action is ongoing. The backlight color remains purple until the requested action is finished.
- **GREEN** : depending on the button the green backlight color can have a different meaning:
  - for the Standby button a green backlight color means that the lamp is switched ON.
  - for the Sleep button a green backlight color means that the projector is awake.
  - for the Dowser button a green backlight color means that the electronic dowser is open (applied source can be displayed).
  - for the Test Pattern button a green backlight color means that one test pattern is activated and thus the applied source can be displayed.
  - for the Key button a green backlight color means that the projector is secured (no tamper event).
- **RED** : depending on the button the red backlight color can have a different meaning:
  - for the Shift, Zoom or Focus button a red backlight color indicates that the end of range is reached.
- **YELLOW** : The backlight color of the Numeric buttons 1 to 6 of the Local Keypad changes from white to yellow if the (security) Key button is pressed.
- **WHITE**: depending on the button the white backlight color can have a different meaning:
  - for the Standby button a white backlight color indicates that the lamp is OFF (not activated).
  - for the Sleep button a white backlight color indicates that the projector is in Sleep mode.
  - for the Dowser button a white backlight color indicates that the electronic dowser is closed (applied source can not be displayed).
  - for the Test Pattern button a white backlight color indicates that no test pattern is selected (applied source can be displayed).
  - for the Key button a white backlight color means that the projector is not secured (tamper event).

7.3 Projector Status

About the projector Status Light

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

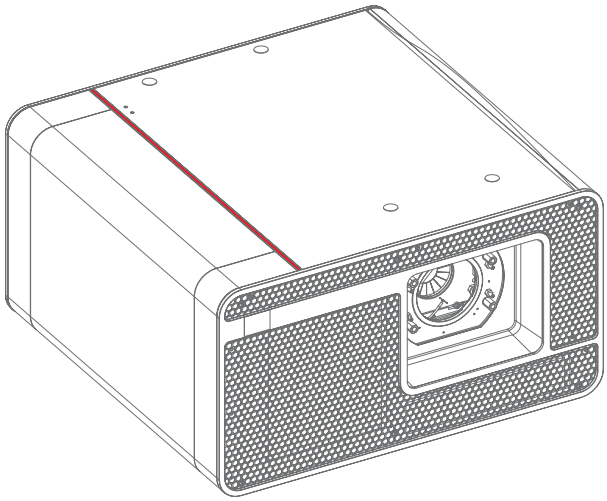


Image 7-3

Status overview

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

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

Standby mode

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

Sleep mode

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

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

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

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

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

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

The projector always boots up in the same mode (E.g. Standby or Sleep) as it was switched OFF.

The Sleep button is disabled if the lamp is ignited.

7.4 Cinema Controller

Location of the communication ports

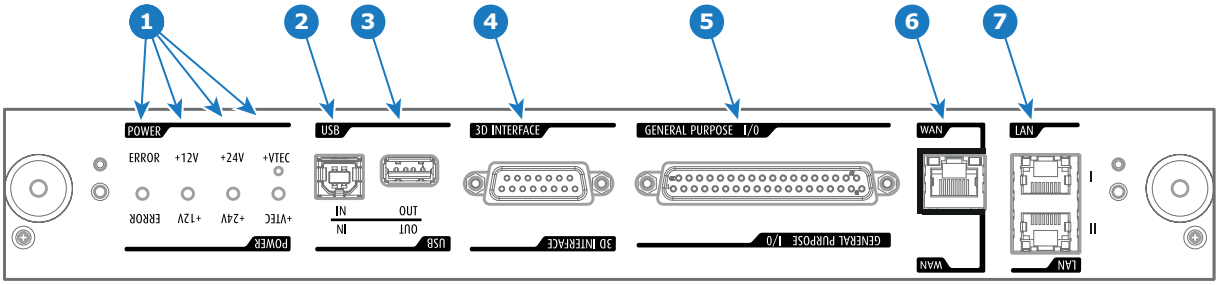


Image 7-4

Functionality

1 Diagnostic LEDs

The front plate of the Cinema Controller contains 4 diagnostic LEDs to display the status of the power supply (reference **6** image 7-4):

- +VTEC supply (not used on DP2K-E series).
- +24V supply.
- +12V supply.
- general power supply (ERROR).

2 USB IN port

The Cinema Controller is equipped with a USB port, type “B” connector, (reference **5** image 7-4) to connect upstream devices (E.g. PC). This USB port is used to communicate with the projector via RS232 commands (Virtual comport). The USB IN port remains operational in Sleep mode.

3 USB OUT port

The Cinema Controller is equipped with a USB port, type “A” connector, (reference **4** image 7-4) 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 Sleep mode.

4 3D INTERFACE

3D interface port (reference **3** image 7-4). 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 Sleep mode.

5 GENERAL PURPOSE INPUT/OUTPUT (GPIO)

This 37 pin connector (reference **2** image 7-4) 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 Sleep 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 Sleep mode can also be done with GPIO via two predefined Macros (not editable).

6 Wide Area Network (WAN)

Wide Area Network (WAN: 10/100/1000 base-T). Use this Ethernet port (reference **6** image 7-4) to connect the network which contains the DHCP server.

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

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

Local Area Network (LAN: 10/100/1000 base-T) with built-in Ethernet switch (port I and port II, reference **7** image 7-4). 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).

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

Cinema Controller functions:

- Ethernet Communication to ICP, Media block or Link decryptor.
- Virtual COM port (RS232) to BARCO Controller on the USB-IN port.
- Standardized 3D interface on board.
- GPIO controls
- Lensholder motors (stepper motors)
- Stores lens files and lens type / Controls lens
- Lens motor drivers (DC motors)
- Controls lamp power supply
- Stores SNMP key
- Stores Barco IP address and host name
- Handles reporting of errors, version info & Barco logs to Communicator
- Controls ICP board
- Controls Dolby 3D color wheel
- Controls and monitors keypad (Button module)
- Controls and monitors status lights
- Stores Macro files, Input files, Lens files, 3D files and Light Sensor Calibration file (LSC)

Virtual comport (RS232 serial communication)

The USB-IN port of the communication interface supports RS232 serial communication. You can use the RS232 input port to connect a local PC to your DP2K-E series projector. This way you can configure and control your DP2K-E series projector from your local PC.

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

Advantages of using RS232 serial communication:

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

RS232

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

7.5 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

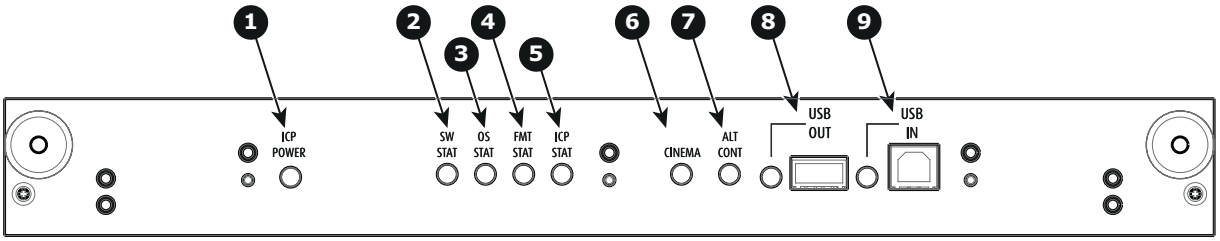


Image 7-5
1 ICP is powered.
2 ICP software state, normal operation is green blinking.
3 ICP operating system state, normally full green .
4 ICP FMT configuration state, normally full green.
5 ICP MAIN configuration state, normally full green.
6 CINEMA port selected. When on, LED 7 will be out.
7 ALTERNATIVE 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 DP2K-E series projector. When using this board in a DP2K-E series projector the software must be re-installed after installation of the board.

When installing a new ICP board in a DP2K-E series projector the Spatial Color Calibration file must be reloaded and activated.

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

7.6 HD-SDI Input Module (optional)

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

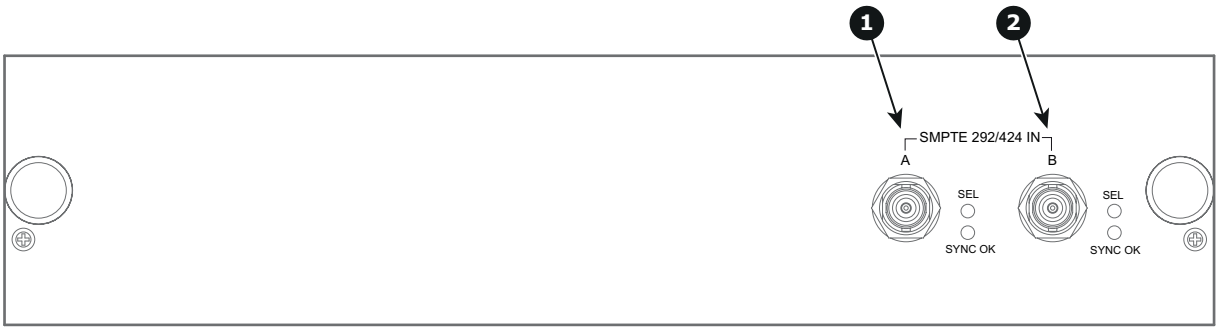


Image 7-6
1 SMPTE 292/424 input, port A (maximum cable length of 30 m allowed)
2 SMPTE 292/424 input, port B (maximum cable length of 30 m allowed)

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	
					3G-level B-Dual link	
		4:4:4 12 bits/color	Progressive	XYZ/RGB	3G-level A-Single link	
					3G-level B-Dual link	

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

Source: 2K-3D						
	General settings			Advanced settings		
Port	**Port type**	**Mode**	**Scan type**	**Color space**	**Pixel mapping**	**Calibration**
					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			
			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)

7.7 Integrated Media Block/Server (optional)

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.

8. ICMP

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
- 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.

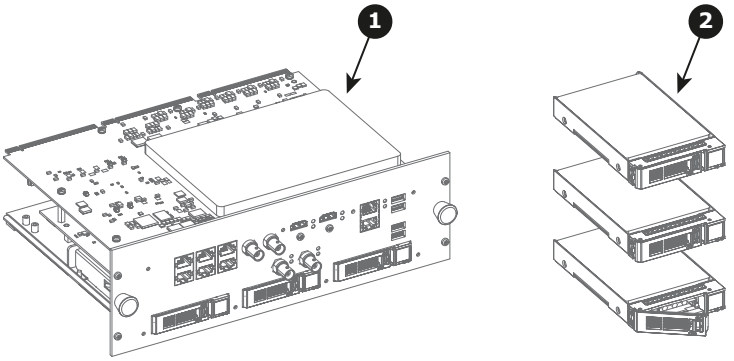


Image 8-2
1 ICMP
2 HDDs for ICMP

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.

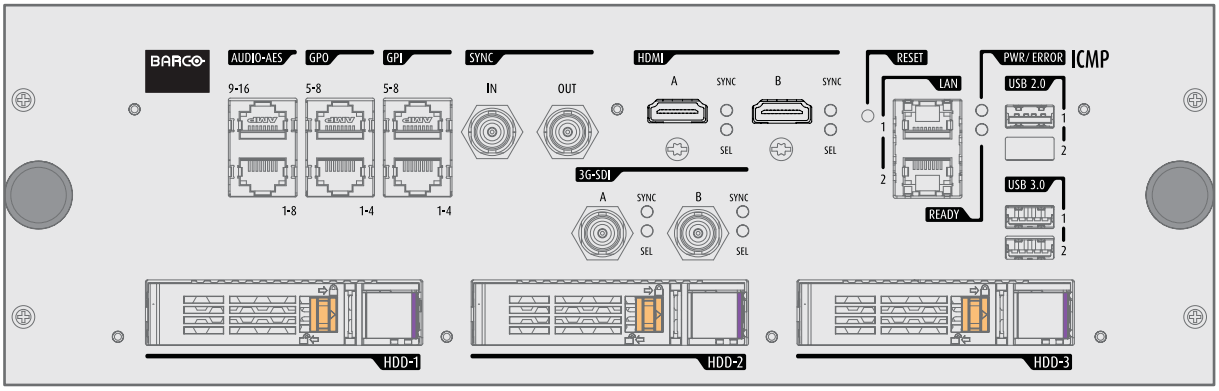


Image 8-3
Front face ICMP (with HDMI 2.0).

Some models with DisplayPorts and one HDMI 1.4 (mezzanine) are still present on the field.

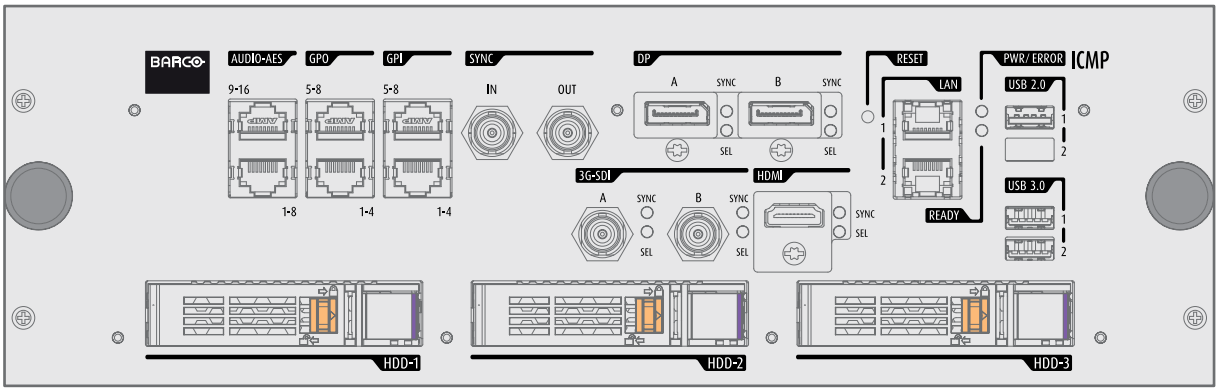


Image 8-4
Front face ICMP (with DisplayPort and HDMI 1.4).

Card Cage slot location

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

ICMP location in the Card Cage of a E-series projector.

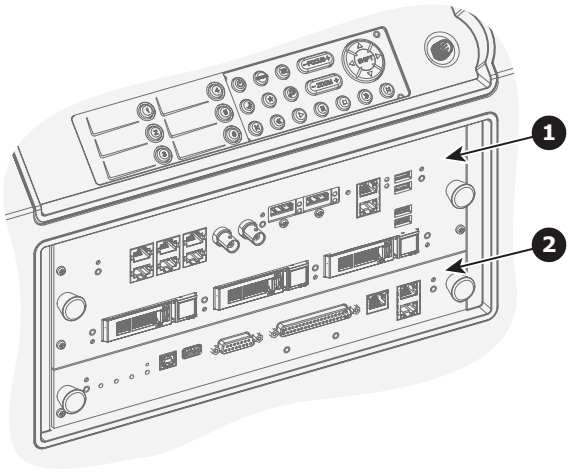


Image 8-5

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.

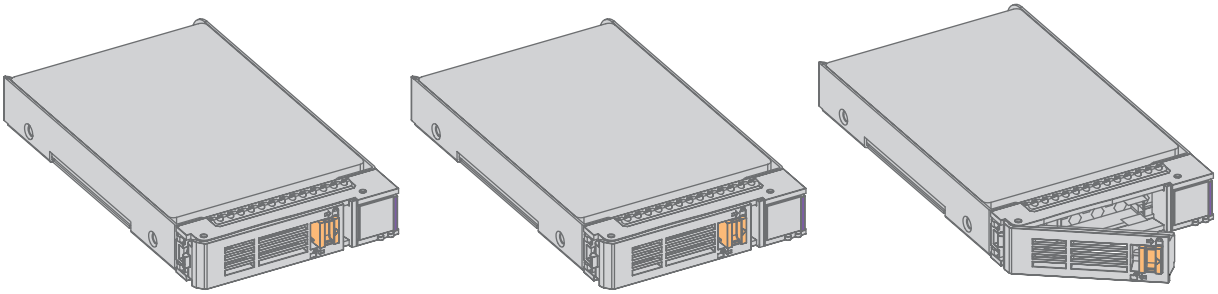


Image 8-6

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

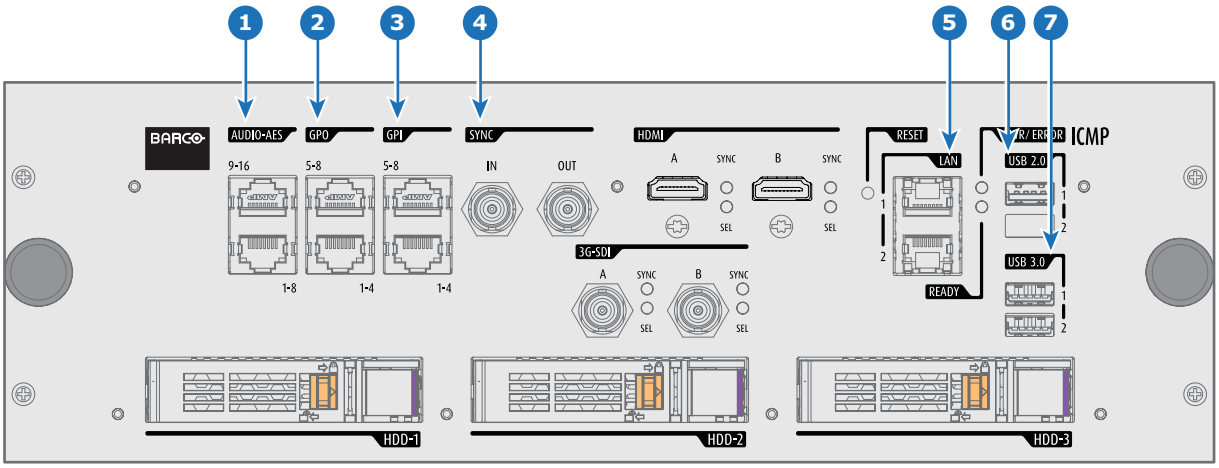


Image 8-7
ICMP (with HDMI 2.0).

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.

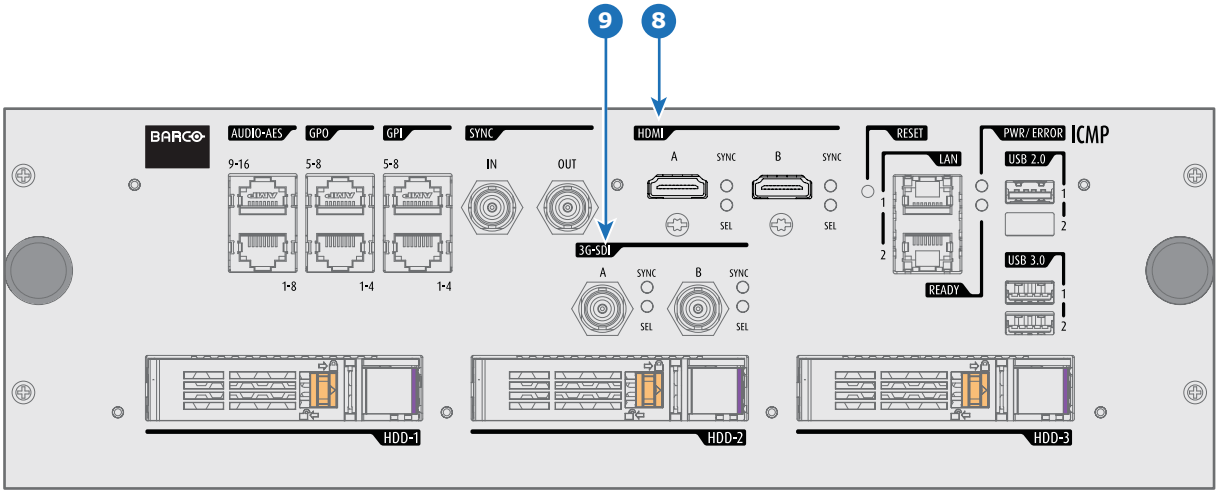


Image 8-8
ICMP (with HDMI 2.0).

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

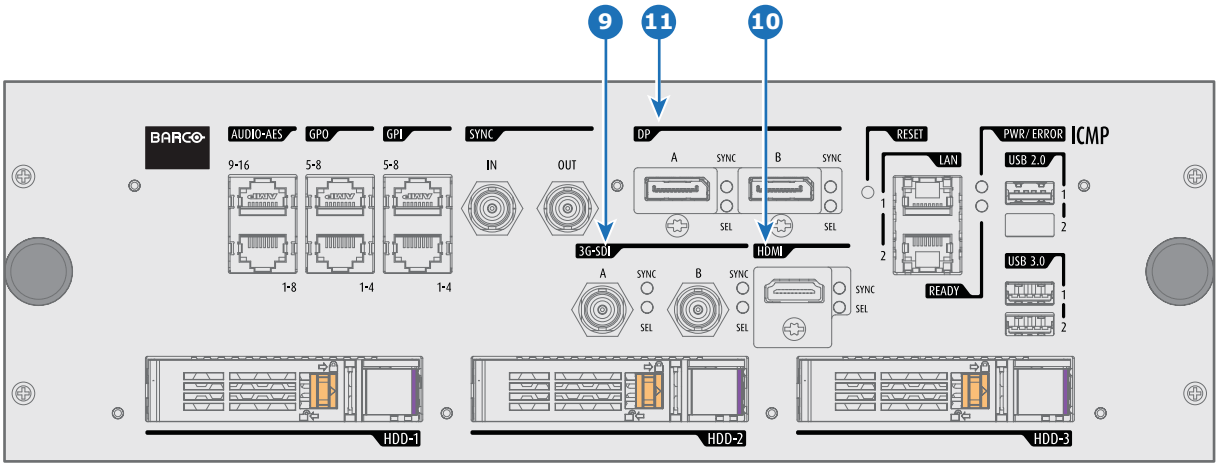


Image 8-9
ICMP (with DisplayPort and HDMI 1.4).

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

DisplayPort

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

HDCP

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

DisplayPort specifications

Supported Modes:

- DP1.1a, 4-lanes RBR/HBR
- Audio : yes
- Content Protection : HDCP1.4
- Color Depth : 8 bit/component and 10 bit/component.
- 3D-stereo mode : frame sequential (embedded stereosync on DP required from the source)

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

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

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

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

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

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

Audio formats

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

Notes:

- DisplayMode = Single : is applicable to both DisplayPort A, and DisplayPort B input, separately.
- DisplayMode = A+B : inputs DisplayPort A and DisplayPort B are combined to 1 larger image; in this case the 2 DisplayPort links need to be genlocked (= synchronous and in phase).
- In all cases :
  - Color Space - Color Sampling:
    - YCbCr - 4:4:4
    - YCbCr - 4:2:2
    - RGB - 4:4:4
  - Scan Type = progressive.
- Both Nvidia and AMD GPU's will not support color depths of 10 bits/color while in 3D-stereo mode.
- Some Graphical Cards may not permit 10 bits/color at all video timings, because of bandwidth restrictions.
- DisplayPort A and DisplayPort B automatically detect:
  - Active Pixels, and Active Lines
  - Vertical Refresh
  - 8 bits/color - 10 bits/color
  - Frame locked
- All input resolutions are scaled towards the desired resolution specified in the screen presentation file.
- Fractional frame rates = (Hz*1000)/1001

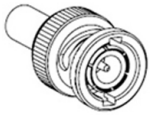
8.6 ICMP SDI specifications

3G-SDI

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

SDI terminology

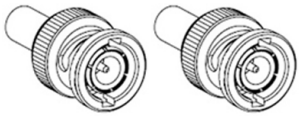
Standard HD-SDI signal

Single Link		
	**1.5Gb/s**	**HD 4:2:2**

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

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

Dual-Link HD-SDI signal

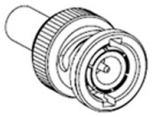
Dual Link		
	1.5Gb/s 1.5Gb/s	1080p 50/60[2] or 1080p 4:4:4

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.

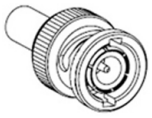
3G HD-SDI signal

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.

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

2. Not supported in Alchemy

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

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

SMPTE Standard	Source Resolution	Frame Rate	Display Rate	Scan Type
SMPTE 274M	1920 x 1080	23.976	23.976	Progressive
SMPTE 428-8	2048 x 1080	24	24	Y Cb Cr 4:2:2 12-Bit only
		25	25	Y Cb Cr 4:4:4 10 or 12-Bit
		29.970	29.970	RGB (XYZ) 4:4:4 10 or 12-Bit
		30	30	
SMPTE 274M	1920 x 1080	23.976	23.976	Segmented frame
SMPTE 428-9	2048 x 1080	24	24	Y Cb Cr 4:2:2 12-Bit only
(SMPTE RP211)		25	25	Y Cb Cr 4:4:4 10 or 12-Bit
		29.970	29.970	RGB (XYZ) 4:4:4 10 or 12-Bit
		30	30	
SMPTE 274M	1920 x 1080	25	50	Interlaced
		29.970	59.940	Y Cb Cr 4:2:2 12-Bit only
		30	60	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	1920 x 1080	23.976	47.952	Progressive
SMPTE 428-8	2048 x 1080	24	48	Y Cb Cr 4:2:2 10-Bit
		25	50	
		29.97	59.940	
		30	60	
SMPTE 292M	1920 x 1080	23.976	47.952	Segmented frame
SMPTE 428-9	2048 x 1080	24	48	Y Cb Cr 4:2:2 10-Bit
(SMPTE RP211)		25	50	
		29.97	59.940	
		30	60	

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.

3. mainly used to carry stereoscopic images.

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

3G HD-SDI (SMPTE 425) formats

SMPTE Standard	Source Resolution	Frame Rate	Display Rate	Scan Type
SMPTE 296M	1280 x 720	23.976 24 25 29.970 30 50 59.940 60	23.976 24 25 29.970 30 50 59.940 60	Progressive Y Cb Cr 4:4:4 10-Bit RGB (XYZ) 4:4:4 10-Bit
SMPTE 274M[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 60	RGB YCbCr 4:4:4 YCbCr 4:2:2	8 10 12

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

HDMI 2.0 Supported 3D (Frame Packing) Formats

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

HDMI 2.0 Supported Audio Formats

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

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

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

Format	Frame Rate	Color coding	Bit depth
4096x2160	25 29.97 30 50 59.94 60	YCbCr 4:2:2	

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

Format	Frame Rate	Color coding	Bit depth
720x576	50	RGB	(8)
		YCbCr 4:4:4	10
		YCbCr 4:2:2	12
1280x720	23.976	RGB	8
	24	YCbCr 4:4:4	10
	25	YCbCr 4:2:2	12
	29.97		
	30		
	50		
	59.94		
	60		
	100		
	119.88		
	120		
1680x720	23.976	RGB	8
	24	YCbCr 4:4:4	10
	25	YCbCr 4:2:2	12
	29.97		
	30		
	50		
	59.94		
	60		
	100		
	119.88		
	120		
1920x1080	23.976	RGB	8
2048x1080	24	YCbCr 4:4:4	10
	25	YCbCr 4:2:2	12
	29.97		
	30		
	50		
	59.94		
	60		
1920x1080	100	RGB	8
2048x1080	119.88	YCbCr 4:4:4	
	120	YCbCr 4:2:2	
2560x1080	23.976	RGB	8
	24	YCbCr 4:4:4	10
	25	YCbCr 4:2:2	12
	29.97		
	30		
	50		
	59.94		
	60		
3840x2160	23.976	RGB	8
4096x2160	24	YCbCr 4:4:4	10
	25		

Format	Frame Rate	Color coding	Bit depth
	29.97 30	YCbCr 4:2:2	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.

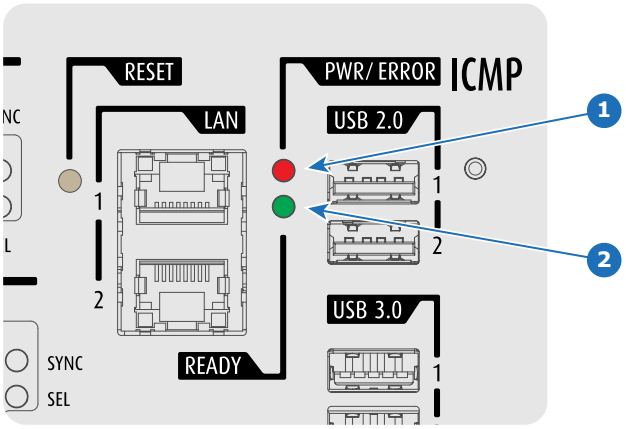


Image 8-10

Status overview PWR/ERROR and READY LEDs:

1 PWR/ERROR	2 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

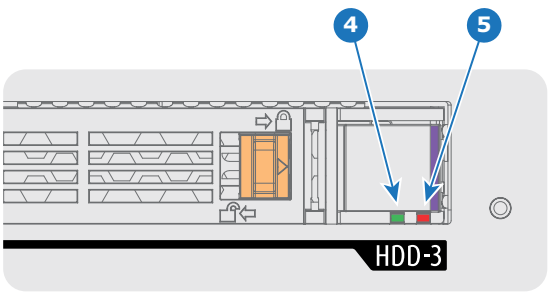


Image 8-11

Status overview PWR/ERROR and READY LEDs:

4 HDD I/O	5 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 68, and "Installing a HDD into the ICMP", page 69. 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 68, and "Installing a HDD into the ICMP", page 69. 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).
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 68, and "Installing a HDD into the ICMP", page 69. 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 68, and "Installing a HDD into the ICMP", page 69. 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 68.

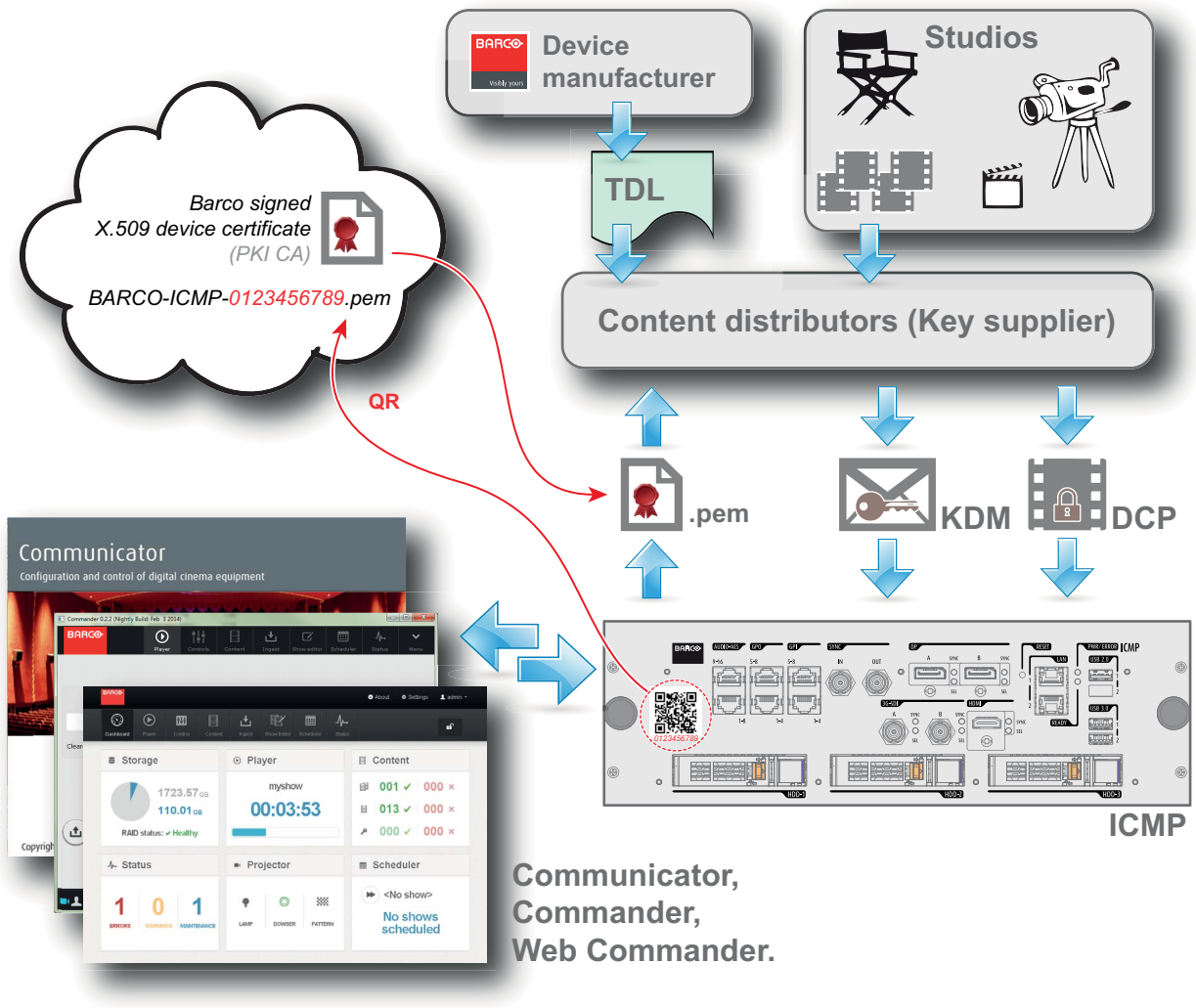


Image 8-12

Trusted Device List (TDL)

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

Public Key Infrastructure (PKI)

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

***.pem**

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:
   a) switch off the lasers of the projector or switch of the projector lamp.
   b) 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.

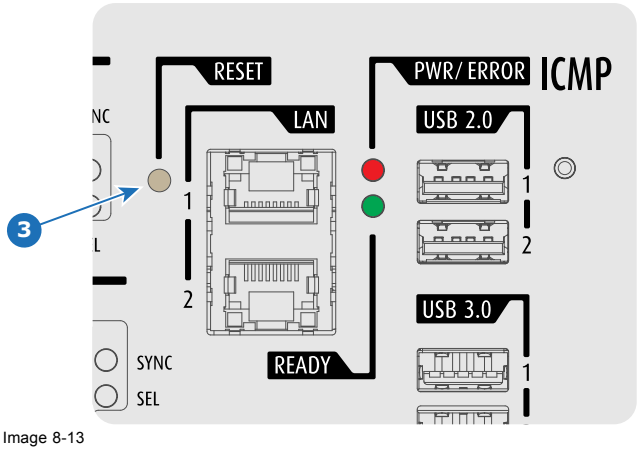


Image 8-13

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

Necessary 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.*

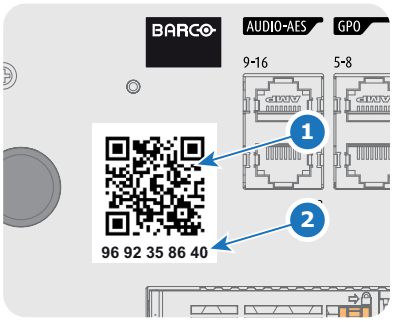


Image 8-14

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.

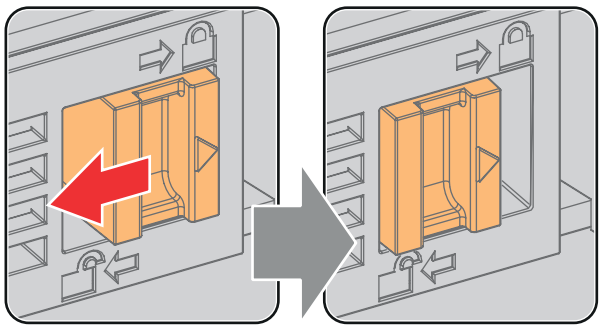


Image 8-15

3. Push the unlock button to open the handle.

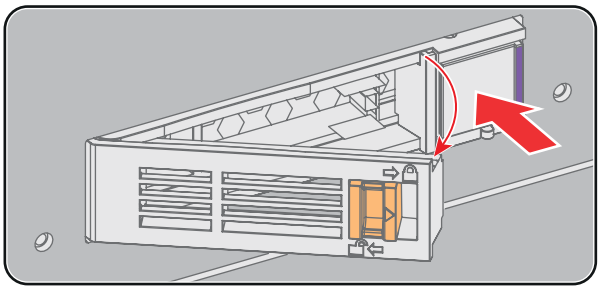


Image 8-16

4. Pull the HDD out of its slot.

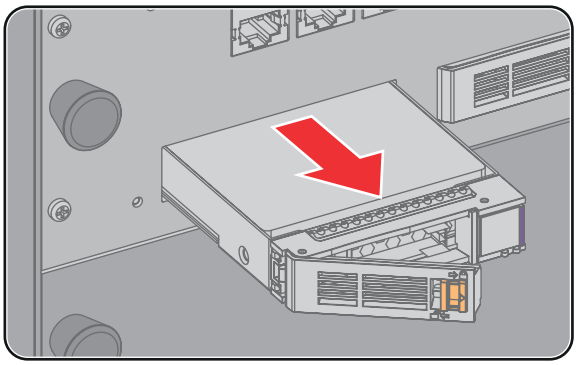


Image 8-17

To install the HDD see procedure "Installing a HDD into the ICMP", page 69.

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 68.

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.

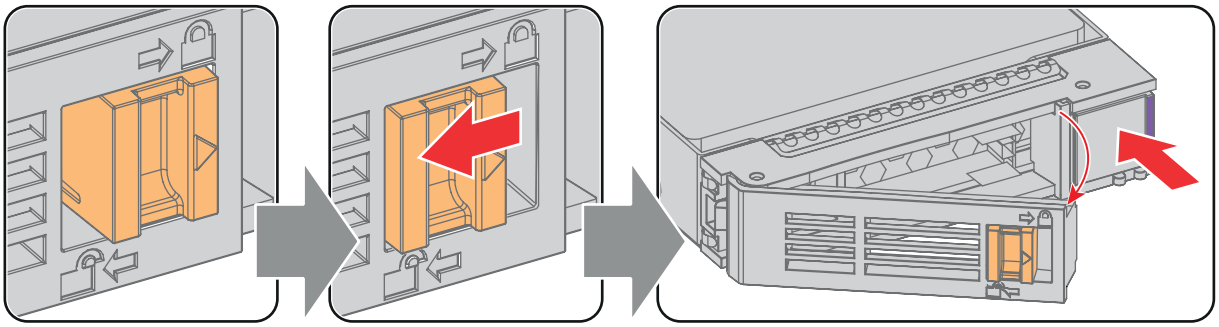


Image 8-18

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.

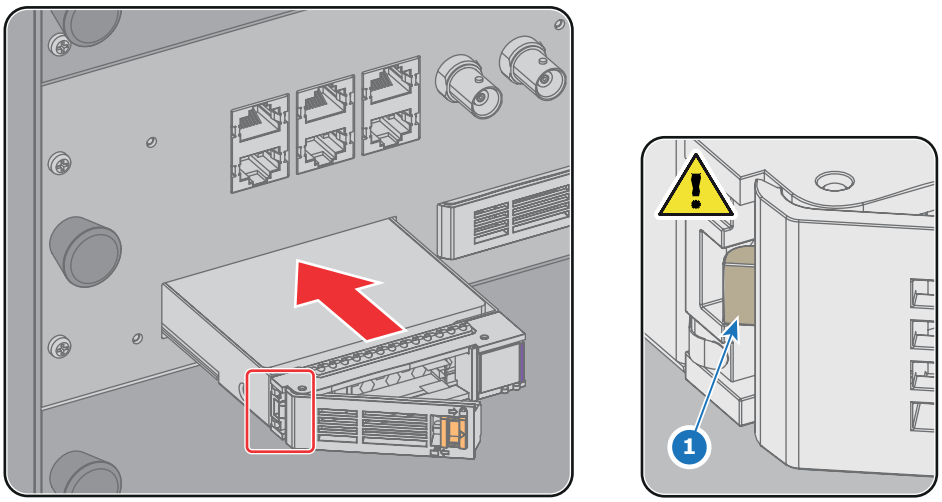


Image 8-19

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

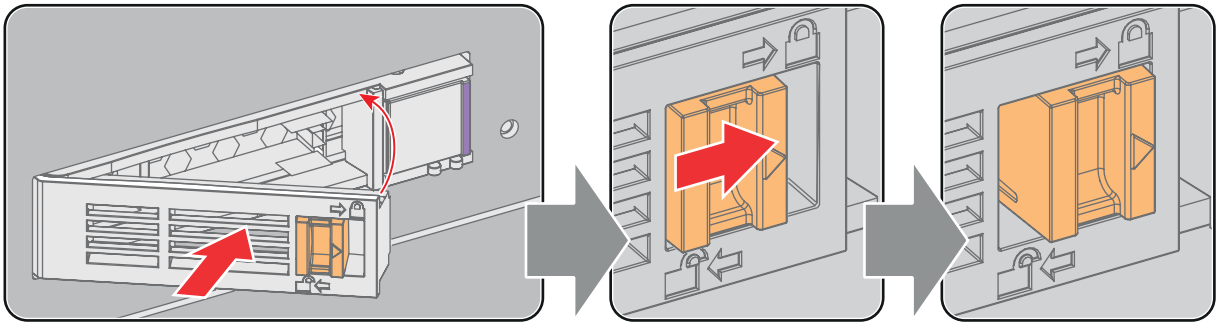


Image 8-20

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.

9. COMMUNICATOR TOUCH PANEL

About this chapter

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

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

Overview

- Communicator Touch Panel
- Installing the Touch Panel interface
- Repositioning the Touch Panel interface

9.1 Communicator Touch Panel

Communicator Touch Panel for digital cinema projectors

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

Image 9-1

Flexible Touch Panel interface

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

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

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

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

Parts location of the Touch Panel interface

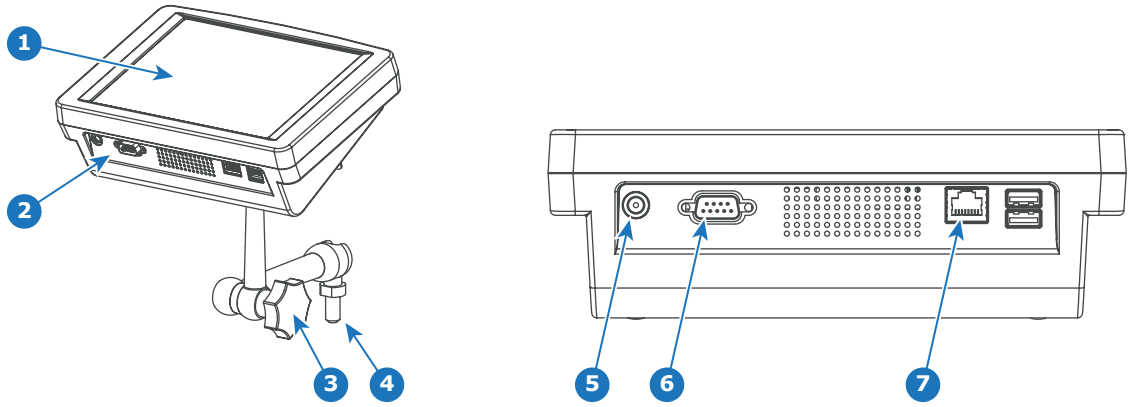


Image 9-2
1 Touch screen
2 Communication panel
3 Knob to operate central swivel clamp
4 Base of swivel arm
5 Power input 12 VDC, 1.5A
6 RS232 port (sub-D)
7 Ethernet port (RJ45)

Touch Panel power/data customized cable

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

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

9.2 Installing the Touch Panel interface

Necessary tools

- 17mm open wrench.
- 10mm open wrench.

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

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

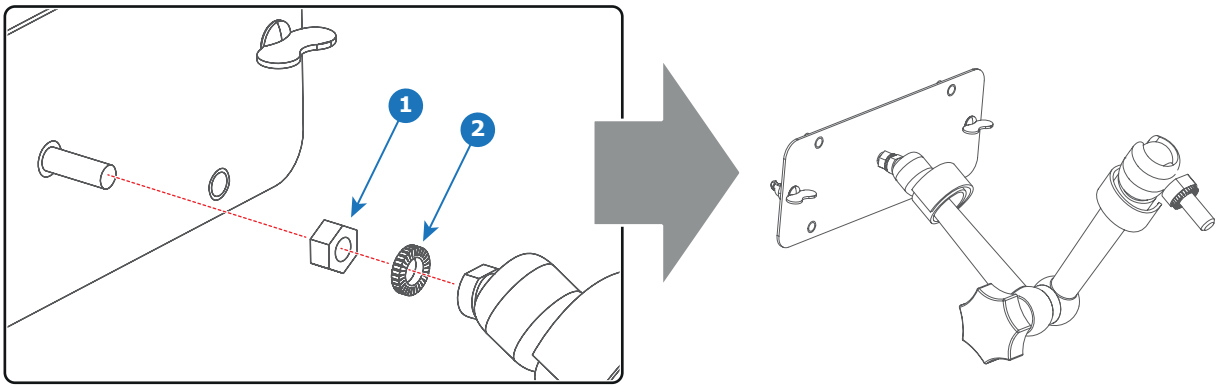


Image 9-4

2. Slide a washer (4) over the base of the swivel arm (3) and insert the base of the swivel arm into one of the four possible mounting holes (A & B) at the top of the projector.
   Note: *Which mounting hole to use depends on the operator preferences. In the illustration below the swivel arm is installed into the mounting hole nearest by the Local Keypad of the projector.*

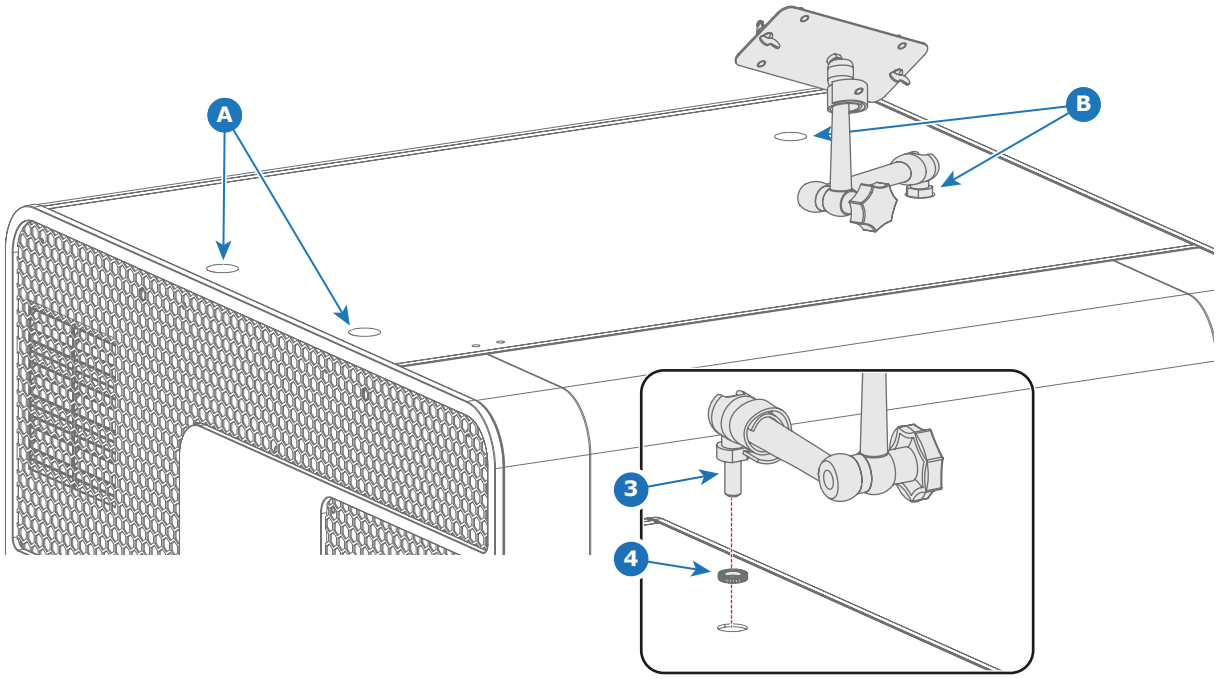


Image 9-5

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

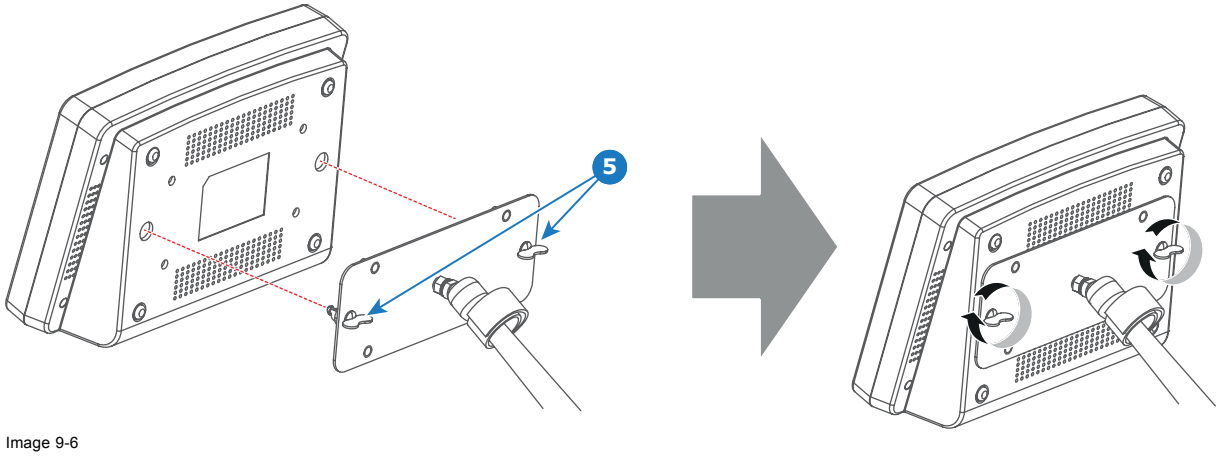


Image 9-6

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

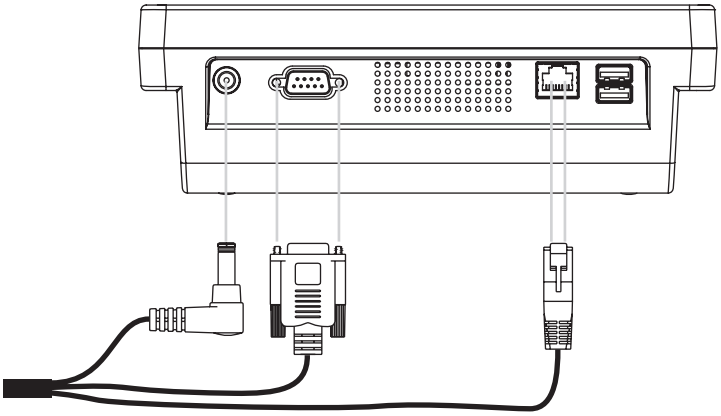


Image 9-7

5. Remove the right side cover."Removal of the right side cover", page 115.
6. Connect the circular plug of the customized cable with the circular socket (6) at the right side of the Local Keypad of the projector.
   Caution: *To avoid connector damage, align the pins before you connect the customized cable.*

   Note: *Ensure to tighten the locking nut on the connector.*

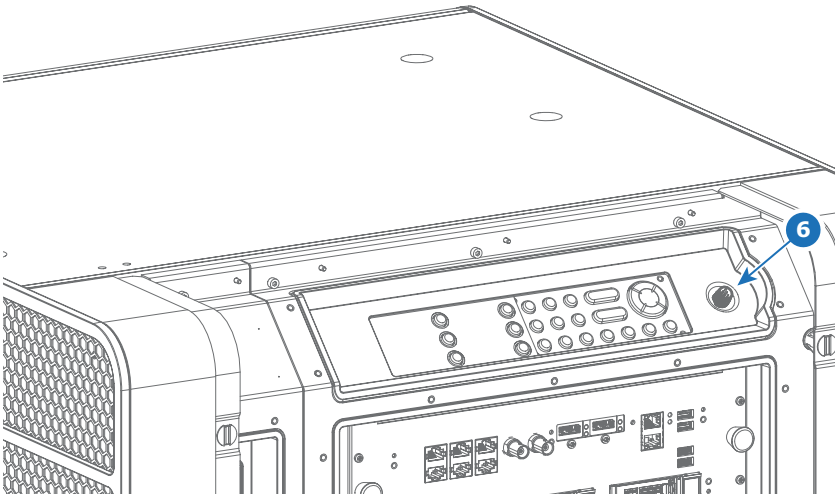


Image 9-8

7. Attach the multi cable to the swivel arm using the two Velcro strips.
8. Position the Touch Panel interface in the desired location. See "Repositioning the Touch Panel interface", page 74.

9.3 Repositioning the Touch Panel interface

How to reposition the Touch Panel interface?

1. Hold the Touch Panel interface with one hand.
2. Release the central swivel clamp by turning the knob (7) counterclockwise.

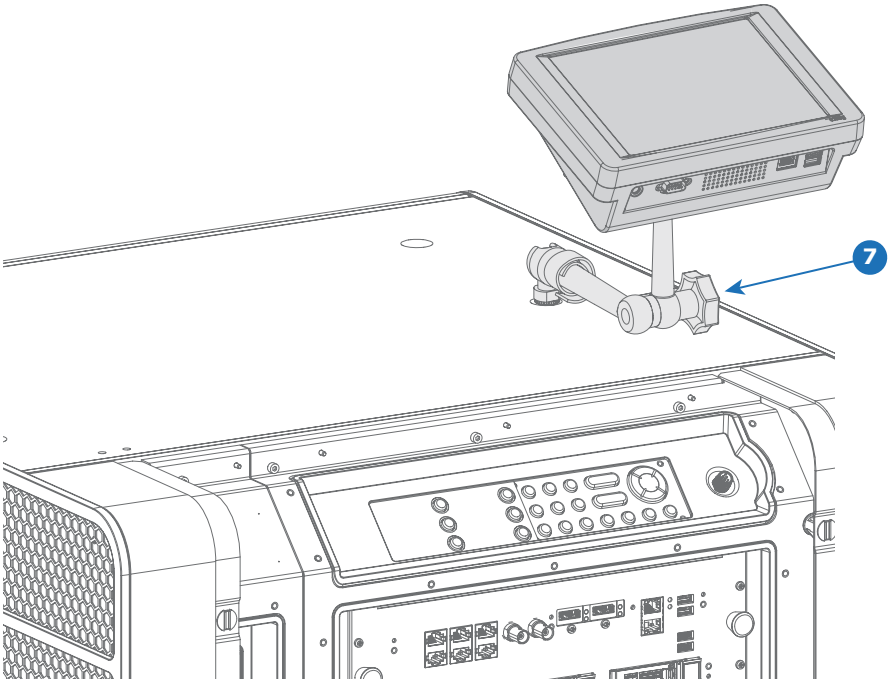


Image 9-9

3. Move the Touch Panel interface to the desired position.
4. Fasten the central swivel clamp by turning the knob clockwise.

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

10. STARTING UP

About this chapter

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

Overview

- Switching the DP2K-E series projector ON
- Switching the DP2K-E series projector OFF

10.1 Switching the DP2K-E series projector ON

How to switch on?

1. Ensure that the projector is installed onto a stable platform.
2. Ensure the projector is correctly connected to the mains power.
3. Ensure that the lamp and lamp house are correctly installed.
4. Ensure that the correct lens is installed for your application.
5. Check if a video source is connected to the projector.
6. Press the **Power Switch** to switch the projector **ON**. As a result the projector starts up and the communicator touch panel starts its initialization procedure.
   Note: *The projector always boots up in the same mode (E.g. Standby or Sleep) as it was switched off. This procedure assumes that the projector was switched off in standby mode (projector fully operational but lamp is off).*
7. Wait until the status light of the projector lights up **GREEN** (not flashing).
8. Press the **STANDBY** button on the Local Keypad or use the Communicator to activate the lamp.
9. Press the **DOWSER** button on the Local Keypad or use the Communicator to open the dowser.

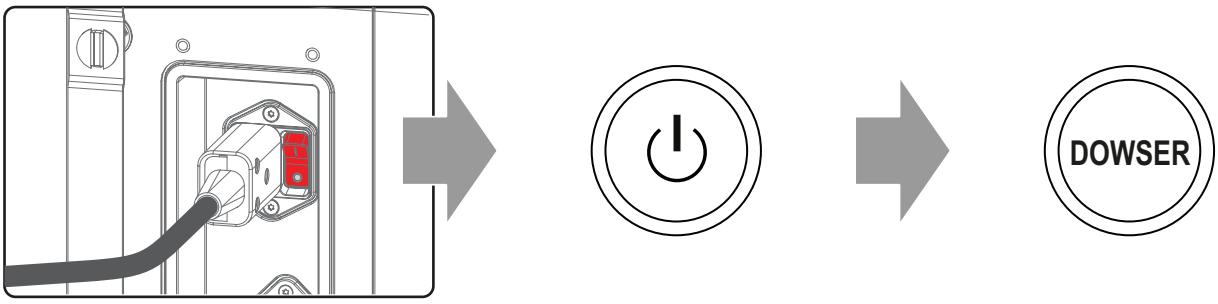


Image 10-1

How to awake the projector from Sleep mode?

1. Press the **SLEEP** button on the Local Keypad for three seconds or use the Communicator to put the projector in Standby mode. As a result the projector starts booting and initializing all electronics. During the booting and initializing phase the backlight color of the Sleep button is purple (transition phase). Once the projector is fully awake the backlight color of the Sleep button is green.
   Note: *When the projector is in Sleep mode only the backlight of the Sleep button lights up red. The backlight of all other buttons of the Local Keypad remains off.*

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

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

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

10.2 Switching the DP2K-E series projector OFF

How to switch the DP2K-E series projector OFF?

1. Press the Standby button on the Local Keypad or use the Communicator Touch Panel to switch the projector from Lamp ON mode to Standby mode. As a result the lamp turns off while the fans keep turning to cool down the projector.
2. Allow the projector to cool down for 5 minutes minimum or until the speed of the fans decreases.
3. Switch the projector OFF with the power switch.
   Tip: *Make sure no lens motors are running while switching off the projector. Wait for lens positioning to complete.*

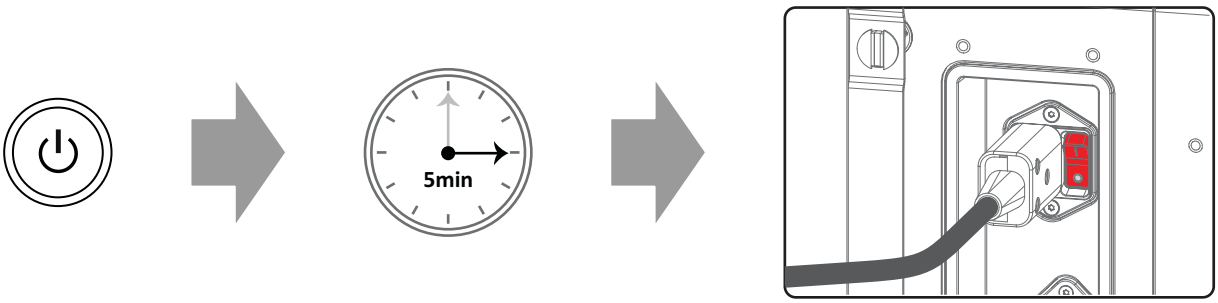


Image 10-2

How to put the projector into Sleep mode?

1. Check if the lamp is switched off. If not, press the Standby button on the Local Keypad or use the Communicator to switch the lamp off. The backlight color of the Standby button is red when the lamp is switched off.
   Note: *To put the projector into Sleep the projector must be in Standby mode (in other words the lamp must be off). If the lamp is ignited he Sleep button is disabled notwithstanding the backlight color of the Sleep button is green.*
2. Press the **SLEEP** button on the Local Keypad for three seconds or use the Communicator to put the projector into Sleep mode. As a result the projector immediately shuts down the electronics but when the lamp is still too hot the projector will finish the after cooling cycle and then finally go to sleep. The backlight color of the Sleep button is white in Sleep mode even when the projector is finishing the after cooling cycle.
   Note: *Pressing the Sleep button before the after cooling cycle has finished, will re-start the projector in a normal way.*

11. SCHEIMPFLUG

About this chapter

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

Scheimpflug principle

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

Overview

- Scheimpflug introduction
- Scheimpflug adjustment
- Fixation of the Lens Holder front plate
- Back Focal Length adjustment

11.1 Scheimpflug introduction

What is Scheimpflug?

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

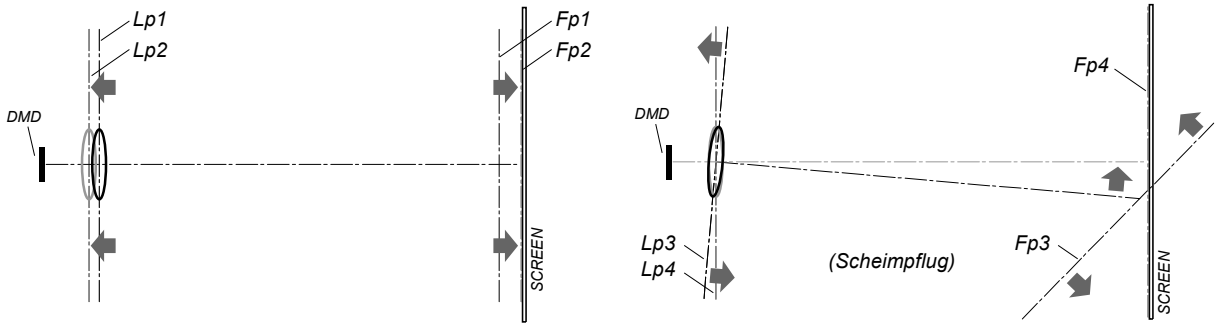


Image 11-1
Scheimpflug principle

Scheimpflug principle

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

Scheimpflug adjustment points

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

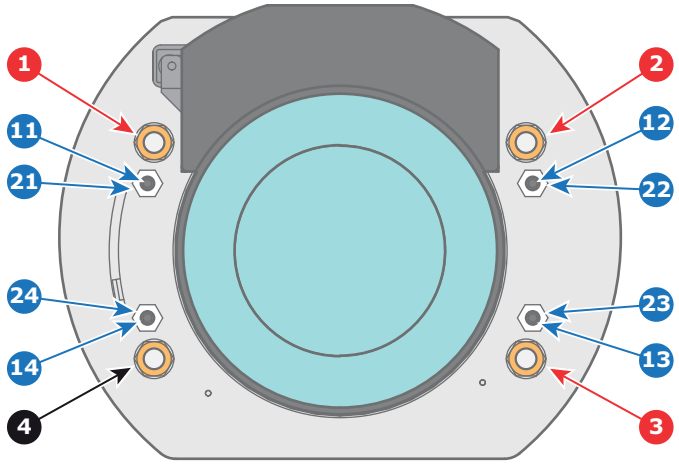


Image 11-2
1 Scheimpflug adjustment nuts No1: Influences the sharp focus plane in the lower left corner of the projected image.
2 Scheimpflug adjustment nuts No2: Influences the sharp focus plane in the lower right corner of the projected image.
3 Scheimpflug adjustment nuts No3: Influences the sharp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

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

When to apply Scheimpflug?

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

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

11.2 Scheimpflug adjustment

Necessary tools

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

Preparation steps:

1. Ensure that the throw ratio of the installed lens matches the requirements of the application (projection distance and screen size).
2. Ensure that the correct lens parameters are activated. (See user guide of the *Communicator* chapter *Installation* > *Advanced* > *Lens parameters*)
   Note: *Selecting the wrong lens parameters will result in an unexpected behavior of the lens when using macros for switching between FLAT and SCOPE (change in picture size and focus).*
3. Perform a lens **HOME & RETURN** operation. (See user guide of the *Communicator* chapter *Installation* > *Advanced* > *Lens parameters*)
4. Project the green focus test pattern.

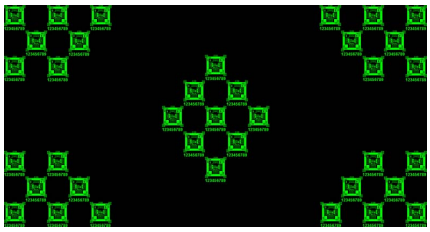


Image 11-3

5. Zoom the lens for maximum image on the screen (**WIDE**).
6. Is it possible to focus the center of the projected image?
   If yes, the Back Focal Length is OK. Proceed with the next step.
   If no, the Back Focal Length needs realignment. Proceed with the procedure "Back Focal Length adjustment", page 83.
7. Unlock and turn out the 4 set screws (reference 11 image 11-4) of the Lens Holder by 1 centimeter. Use a 10mm nut driver for the lock nuts (reference 21 image 11-4) and use a 3mm Allen wrench for the set screws.

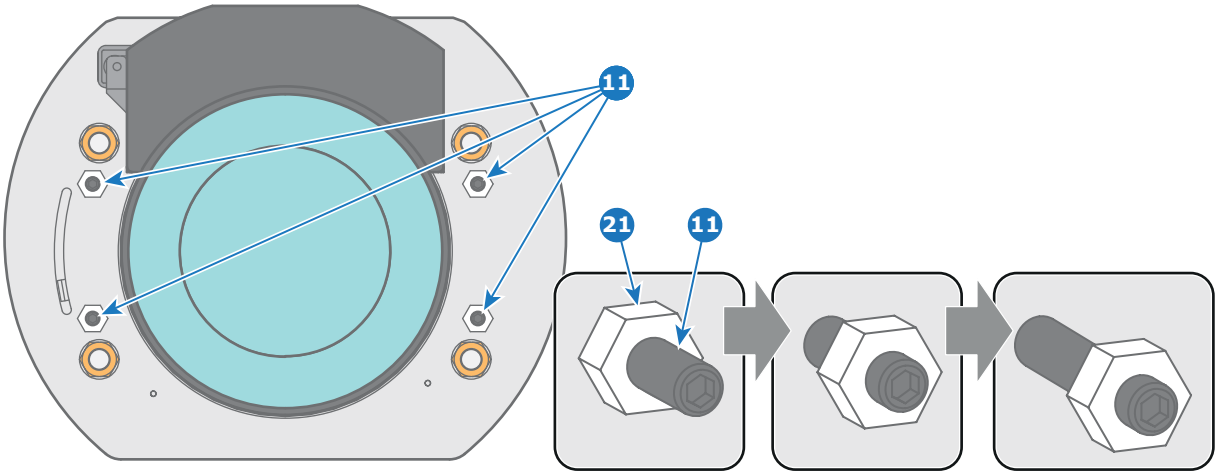


Image 11-4

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

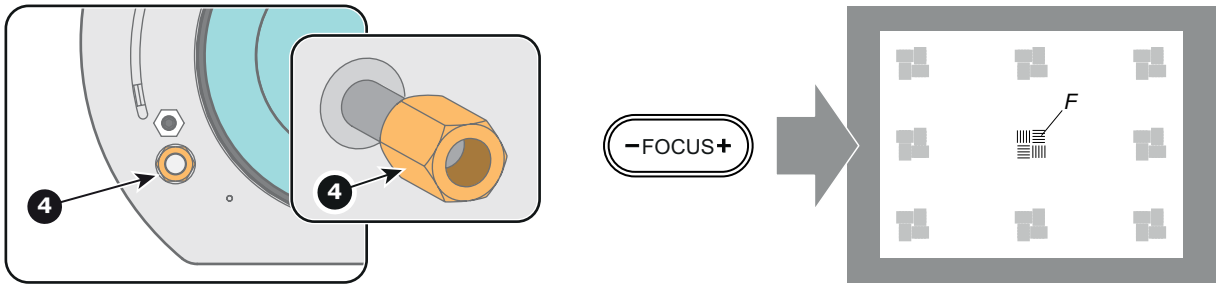


Image 11-5

Scheimpflug adjustment steps:

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

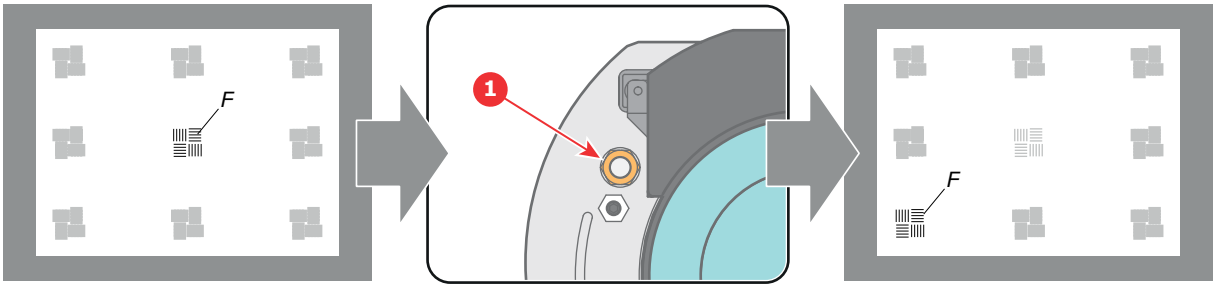


Image 11-6

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

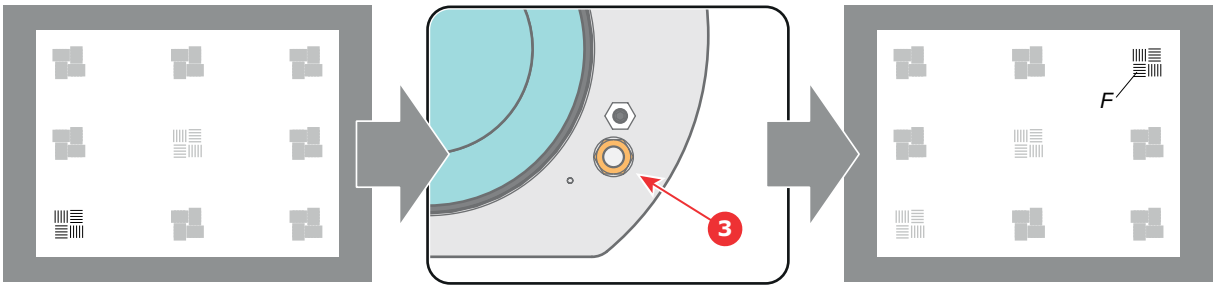


Image 11-7

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

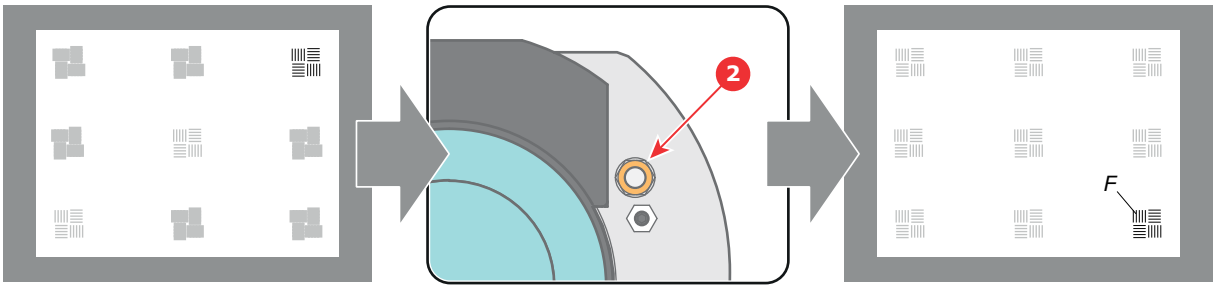


Image 11-8

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

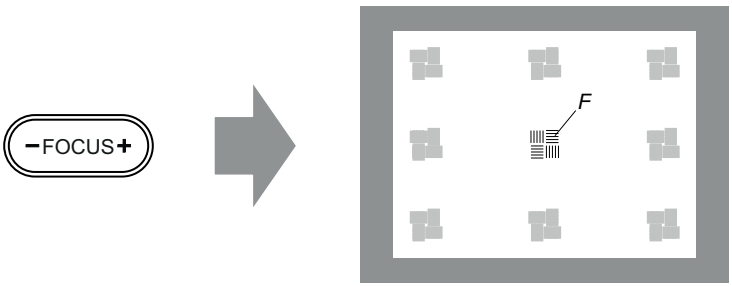


Image 11-9

5. Repeat from step 1 until the projected focus pattern is as sharp as possible in the center, left, right, top and bottom of the screen.
6. Proceed with the procedure "Fixation of the Lens Holder front plate", page 82.

11.3 Fixation of the Lens Holder front plate

When fixing the Lens Holder front plate

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

Necessary tools

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

How to fix the Lens Holder front plate?

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

1. Project the framing test pattern for FLAT & SCOPE.
2. Zoom the projected image until the edges of the projected test pattern matches with the edges of the projection screen.

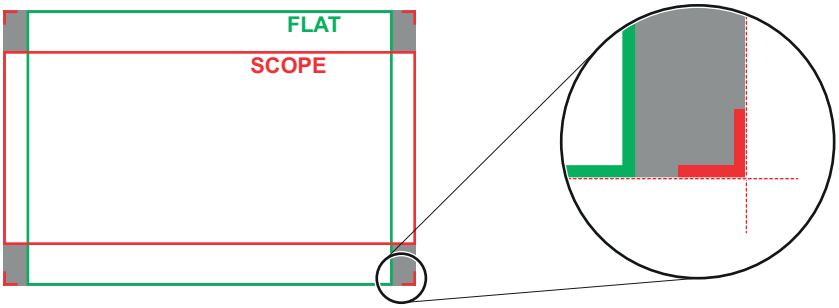


Image 11-10

3. Turn in the three set screws indicated with reference 11 image 11-11 without disturbing the projected image. Tighten lightly . Do not turn in the set screw at the lower left of the Lens Holder!
   Note: *Ensure that the edges of the projected test pattern remain in place on the screen. Any movement of the image will affect the Scheimpflug adjustment.*
4. Fasten the lock nut (reference 21 image 11-11) of the three set screws. Use a 10mm nut driver. Ensure the image doesn't move.

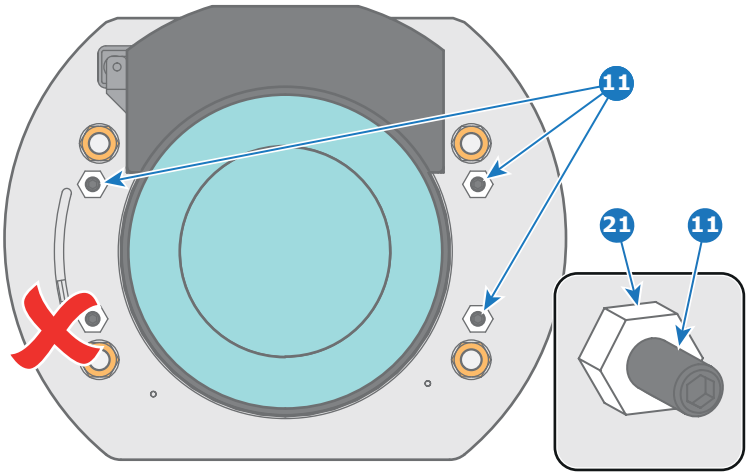


Image 11-11

5. Gently turn (by hand) the Scheimpflug adjustment nut at the lower left of the Lens Holder (reference 4 image 11-12) against the Lens Holder front plate without disturbing the projected image.
6. Turn in the set screw at the lower left of the Lens Holder (reference 14 image 11-12) without disturbing the projected image. Use a 3mm Allen wrench.
   Note: *Ensure that the edges of the projected test pattern remain in place on the screen. Any movement of the image will affect the Scheimpflug adjustment.*

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

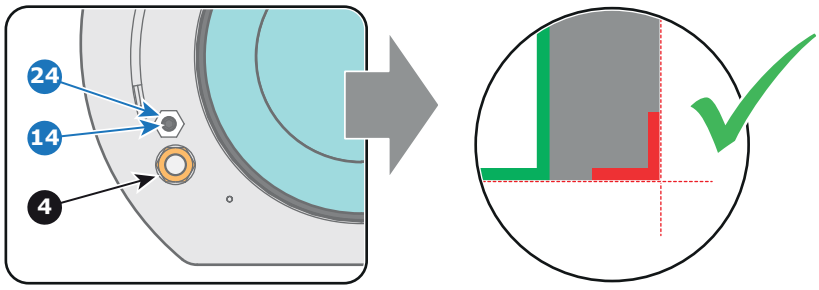


Image 11-12

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

11.4 Back Focal Length adjustment

When to adjust the Back Focal Length?

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

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

What is Back Focal Length adjustment?

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

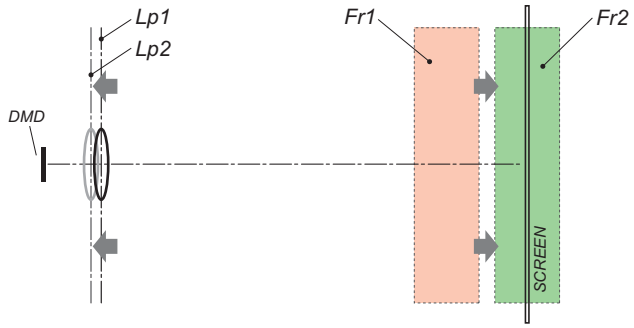


Image 11-13

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

Necessary tools

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

How to check the Back Focal Length?

1. Ensure that the throw ratio of the installed lens matches with the requirements of the application (projection distance and screen size).
2. Ensure that the correct lens parameters are activated. (See user guide of the *Communicator* chapter *Installation* > *Advanced* > *Lens parameters*)
   Caution: *Not using the correct lens parameters could result in lens damage.*
3. Perform a lens **HOME & RETURN** operation. (See user guide of the *Communicator* chapter *Installation* > *Advanced* > *Lens parameters*)
4. Project the green focus test pattern. (screen file “no masking” or “no “crop”)

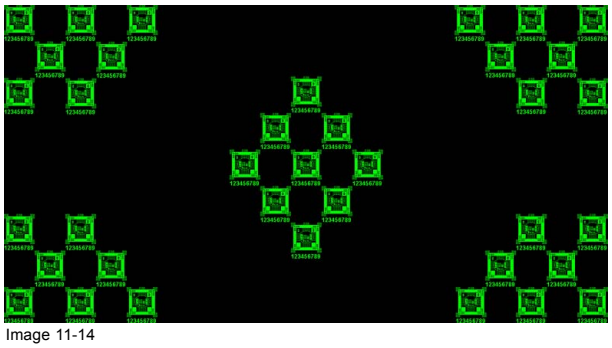


Image 11-14

5. Zoom the lens for maximum image on the screen (**WIDE**).
6. Is it possible to focus the center of the projected image?
   If yes, the Back Focal Length is OK.
   If no, the Back Focal Length needs realignment. Proceed with the next procedure.

How to adjust the Back Focal Length?

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

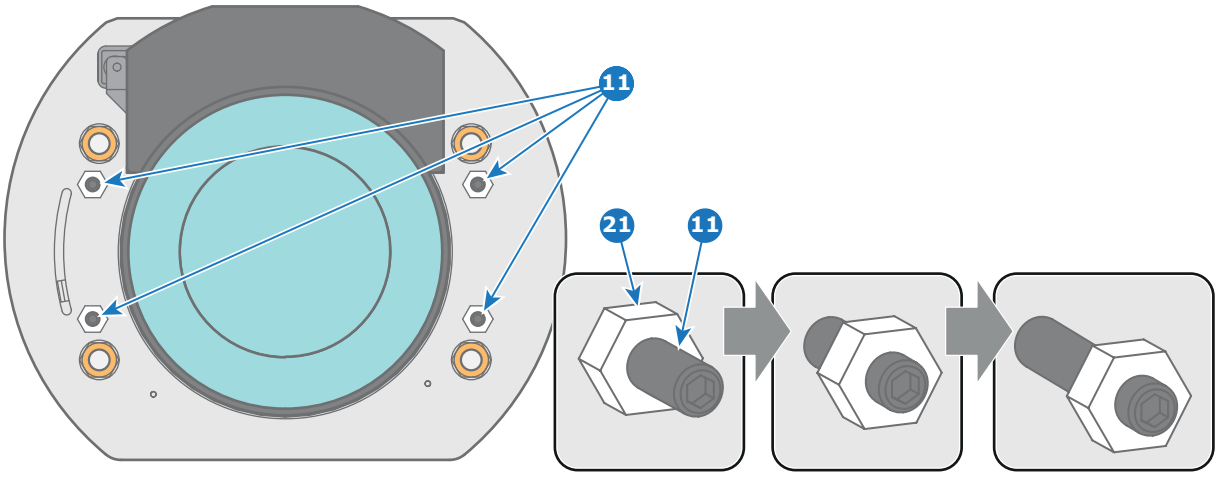


Image 11-15

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

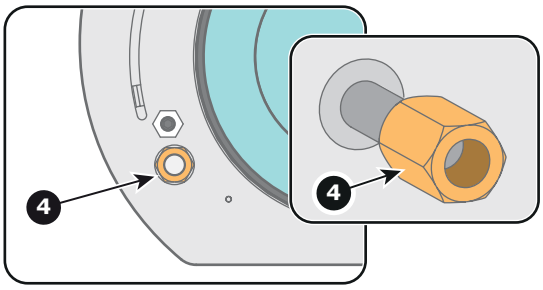


Image 11-16

3. Turn the three Scheimpflug adjustment nuts, reference 1, 2 and 3 image 11-17, until the front of the nut (reference 5 image 11-17) is equally aligned with the front of the threaded rod (reference 6 image 11-17). Use a 13mm nut driver.
   Note: *This is the nominal position of the Lens Holder.*

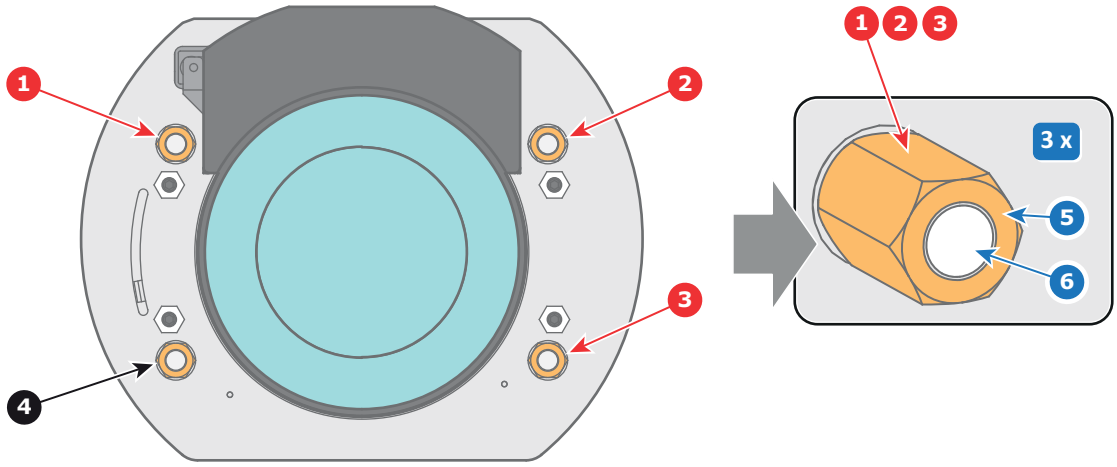


Image 11-17

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

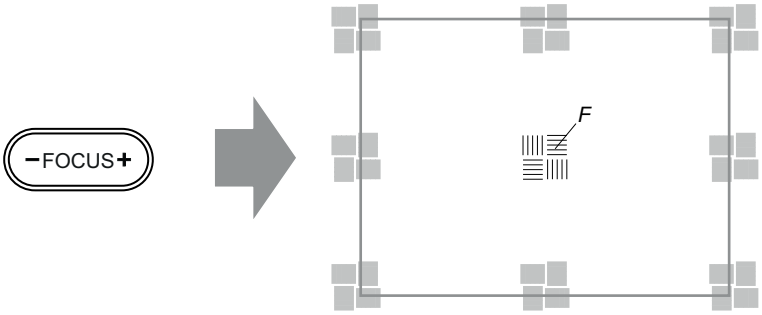


Image 11-18

5. Is it possible to focus the center of the projected image using the motorized focus control (Local Keypad) ? Ensure that the lens is zoomed for maximum image on the screen (**WIDE**).
   If yes, nominal position is good for sharp focus in the middle of the projected image. Proceed with step 6.
   If no, obtain the best possible focus in the center of the projected image using the motorized focus control and then turn the three Scheimpflug adjustment nuts, reference 1, 2 and 3 image 11-19, equally in or out until the center of the projected image is sharp. **Attention:** Keep in mind the turning direction of the Scheimpflug adjustment nuts for further adjustment instructions in this procedure.

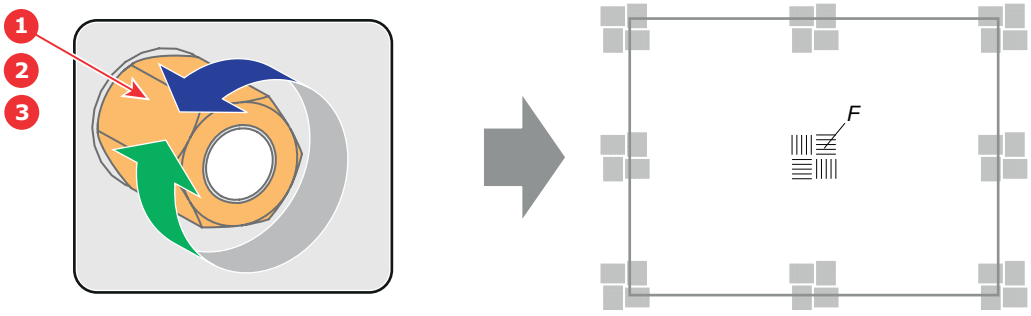


Image 11-19

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

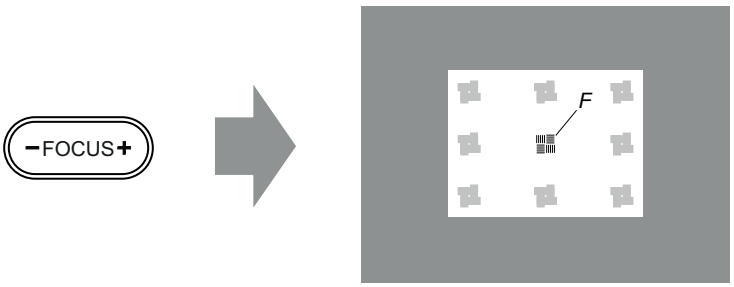


Image 11-20

7. Is it possible to focus the center of the projected image using the motorized focus control (Local Keypad) ? Ensure that the lens is zoomed for minimum image on the screen (**TELE**).
   If yes, no further adjustment actions required. Proceed with step 8.
   If no, obtain the best possible focus in the center of the projected image using the motorized focus control and then turn the three Scheimpflug adjustment nuts, reference 1, 2 and 3 image 11-21, equally in or out until the center of the projected image is sharp.
   Note: the same turning direction as in step 4 is applicable.

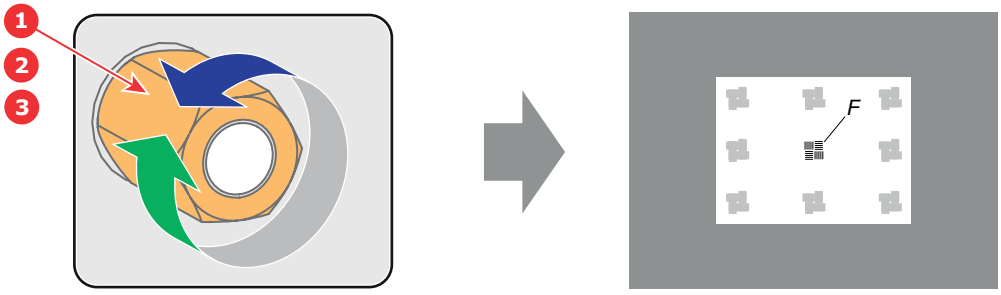


Image 11-21

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

If yes, the Back Focal Length is correctly adjusted.
If no, repeat with step 4.

9. Is the projected image in the corners as sharp as in the middle?
   If yes, proceed with the procedure "Fixation of the Lens Holder front plate", page 82.
   If no, Scheimpflug adjustment is required. See procedure "Scheimpflug adjustment", page 80, 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!

12. CONVERGENCE

About this chapter

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

Overview

- Convergence controls
- Preparing for convergence adjustment
- Converging the blue pattern onto the red pattern
- Converging the green pattern onto the red pattern
- Closing off the Light Processor compartment

12.1 Convergence controls

Extended control knobs

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

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

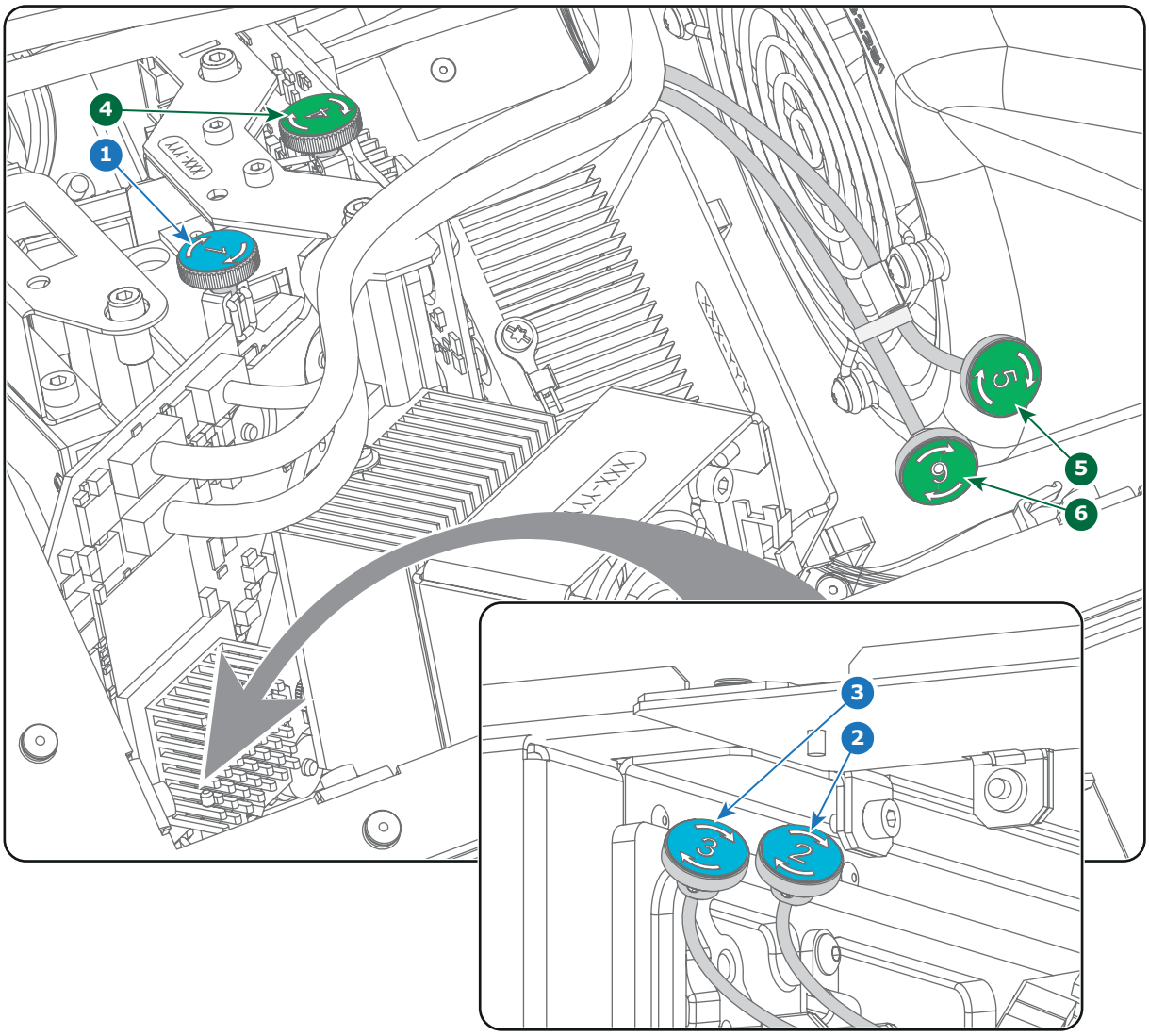


Image 12-1
1 Blue channel, knob number 1.
2 Blue channel, knob number 2.
3 Blue channel, knob number 3.
4 Green channel, knob number 4.
5 Green channel, knob number 5.
6 Green channel, knob number 6.

Convergence test pattern

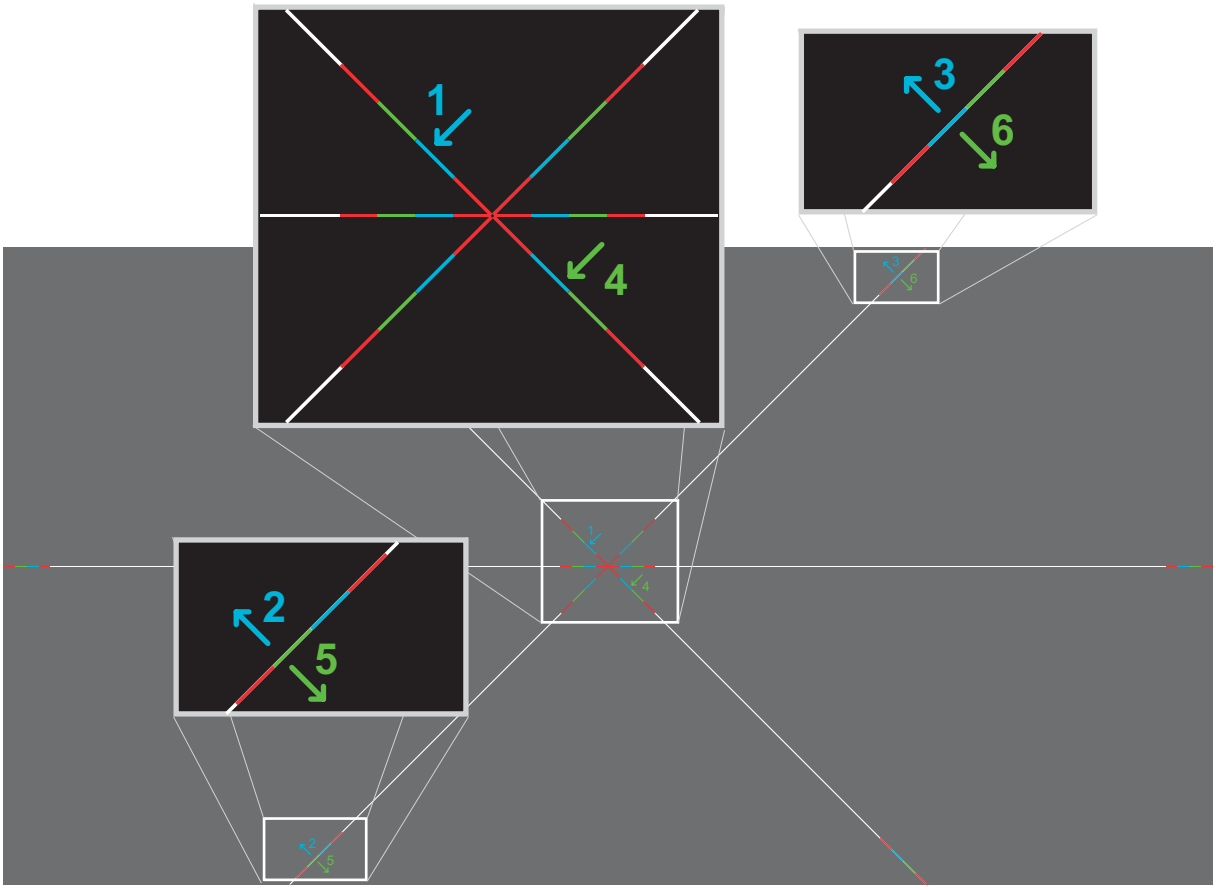


Image 12-2

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

Adjustment Range

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

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

Troubleshooting 'dead zone' of control knob

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

12.2 Preparing for convergence adjustment

Necessary tools

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

How to set up the projector for convergence adjustment?

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

3. Remove the left cover plate of the Light Processor compartment.
4. Place the fan on top of the Light Processor in the upper position as illustrated. Do this by engaging the two lower slots (2) into the upper mounting pins as illustrated. The two upper slots (3) remain free.

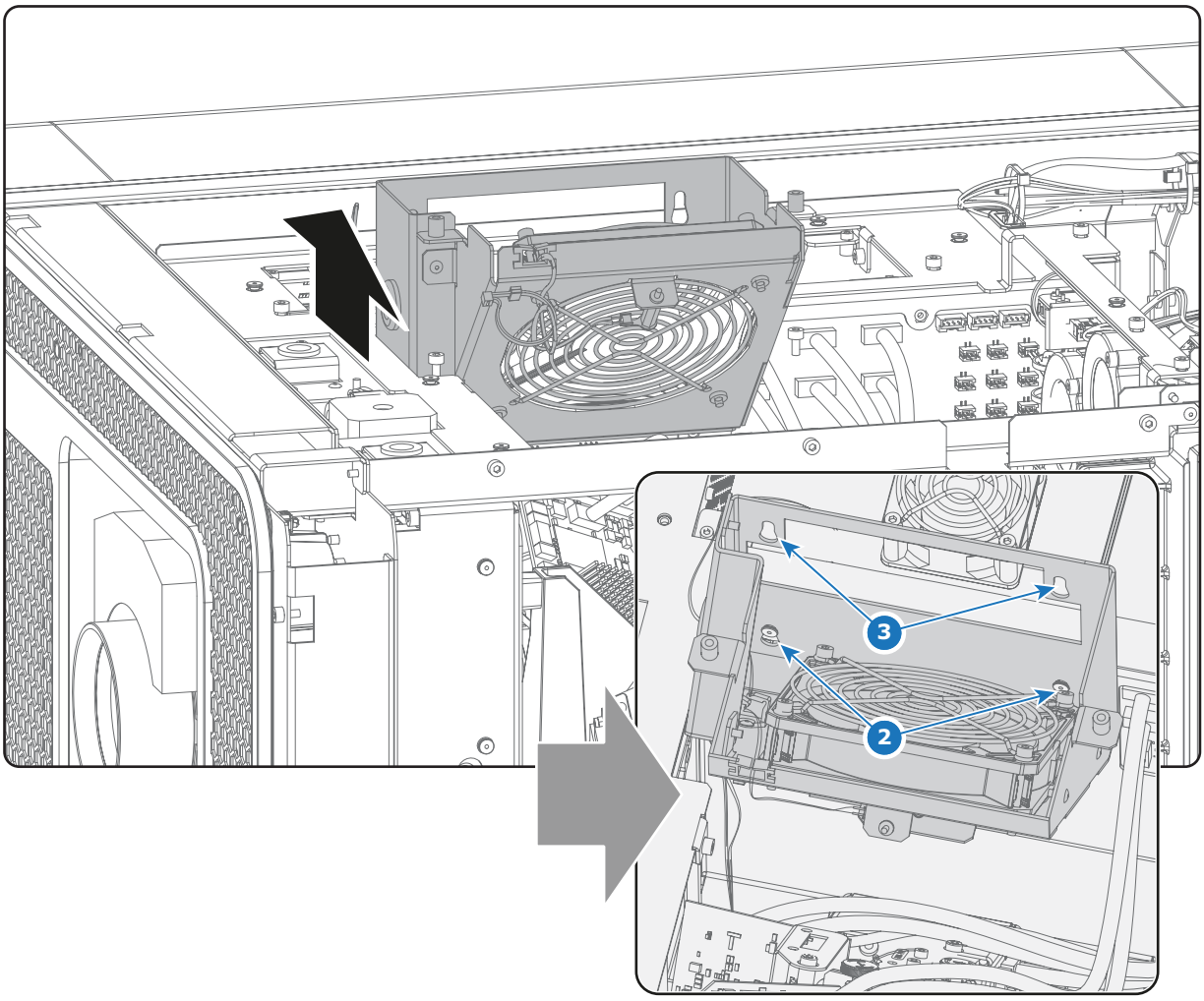


Image 12-3

5. Switch on the projector, ignite the lamp and open the dowser.
6. Select the convergence test pattern, which is illustrated below (image 12-4). Use the communicator to activate the convergence test pattern.
   Note: *The convergence test pattern can NOT be activated via the* ***PATTERN*** *button on the Local Keypad.*

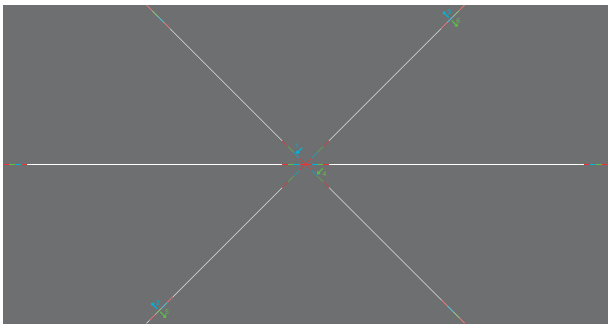


Image 12-4

12.3 Converging the blue pattern onto the red pattern

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

Necessary tools

No tools.

How to converge the blue pattern onto the red pattern?

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

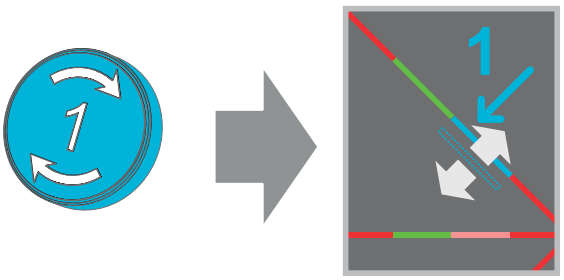


Image 12-5

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

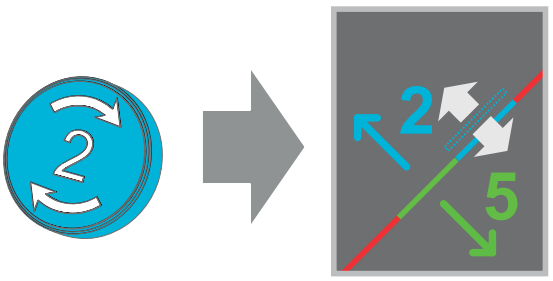


Image 12-6

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

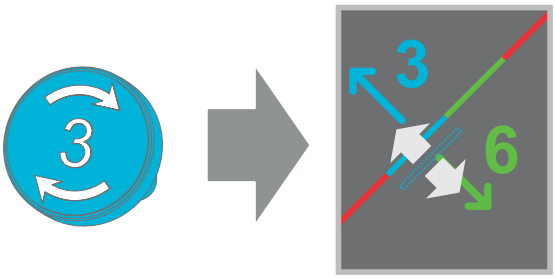


Image 12-7

4. Repeat step 2 and 3 until **coincidence** is obtained of the blue pattern in the **lower left** and **upper right** of the projected image.
5. Repeat from step 1 until **full coincidence** is obtained of the blue pattern in the **center**, **lower left** and **upper right** of the projected image.
6. Continue with the procedure: "Converging the green pattern onto the red pattern", page 94.

12.4 Converging the green pattern onto the red pattern

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

Necessary tools

No tools.

How to converge the green pattern onto the red pattern?

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

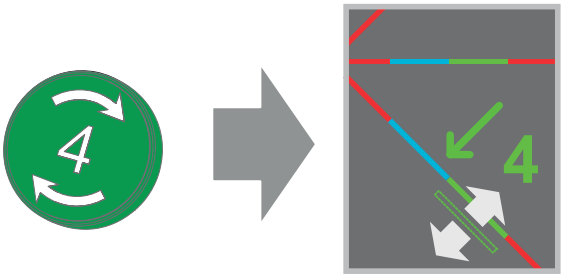


Image 12-8

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

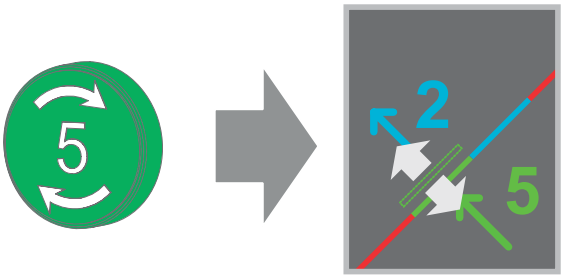


Image 12-9

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

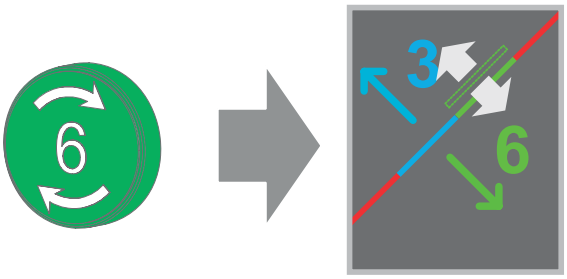


Image 12-10

4. Repeat step 2 and 3 until **coincidence** is obtained of the green pattern in the **lower left** and **upper right** of the projected image.
5. Repeat from step 1 until **full coincidence** is obtained of the green pattern in the **center**, **lower left** and **upper right** of the projected image.
6. Switch off the projector.
7. Continue with the procedure **Closing off the Light Processor compartment**.

12.5 Closing off the Light Processor compartment

Necessary tools

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

How to close off the Light Processor compartment?

1. Place the fan on top of the Light Processor in the lower position. Ensure that the four mounting pins (1) of the fan assembly are engaged.
   Caution: *Take care of the wire.*

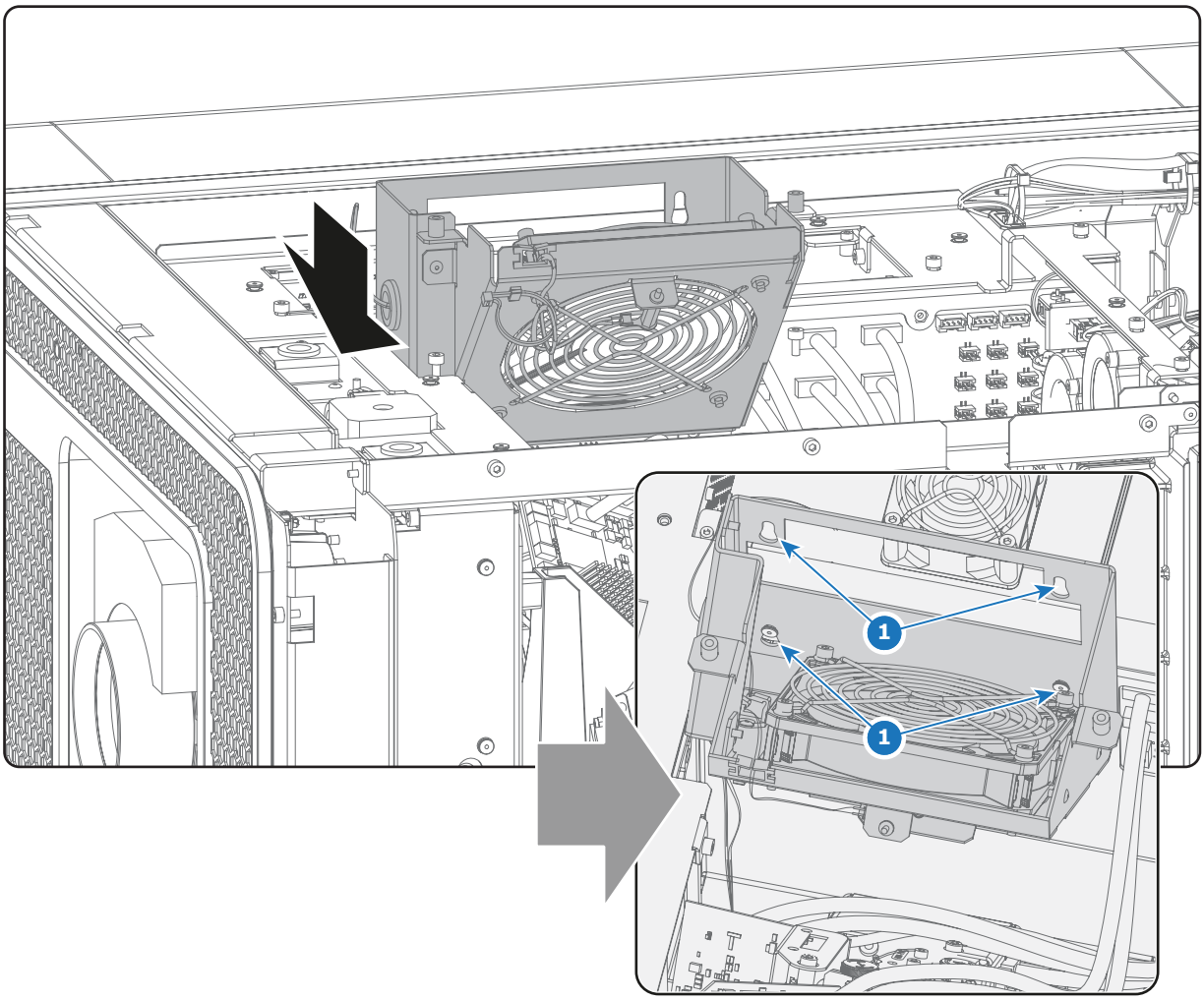


Image 12-11

2. Install the side cover plate of the Light Processor compartment.
3. Install the top cover of the projector.
4. Install the left side cover of the projector.
5. Switch on the projector.
6. Clear the security warning. See "Authorization to clear security warning on the projector", page 108.

13. LAMP HOUSE

About this chapter

This chapter explains how to replace the Lamp House. Also included is the procedure to reset the lamp parameters, which is required after a Lamp House replacement.

Overview

- Introduction
- Removal of the Lamp Module
- Installation of the Lamp House
- Resetting the lamp parameters

13.1 Introduction

Lamp House

The DP2K-E series is delivered with two Lamp Houses installed. The Lamp House is a consumable item of the projector.

For a better user experience, it is recommended to replace both Lamp Modules at the same time.

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

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

Parts identification Lamp House

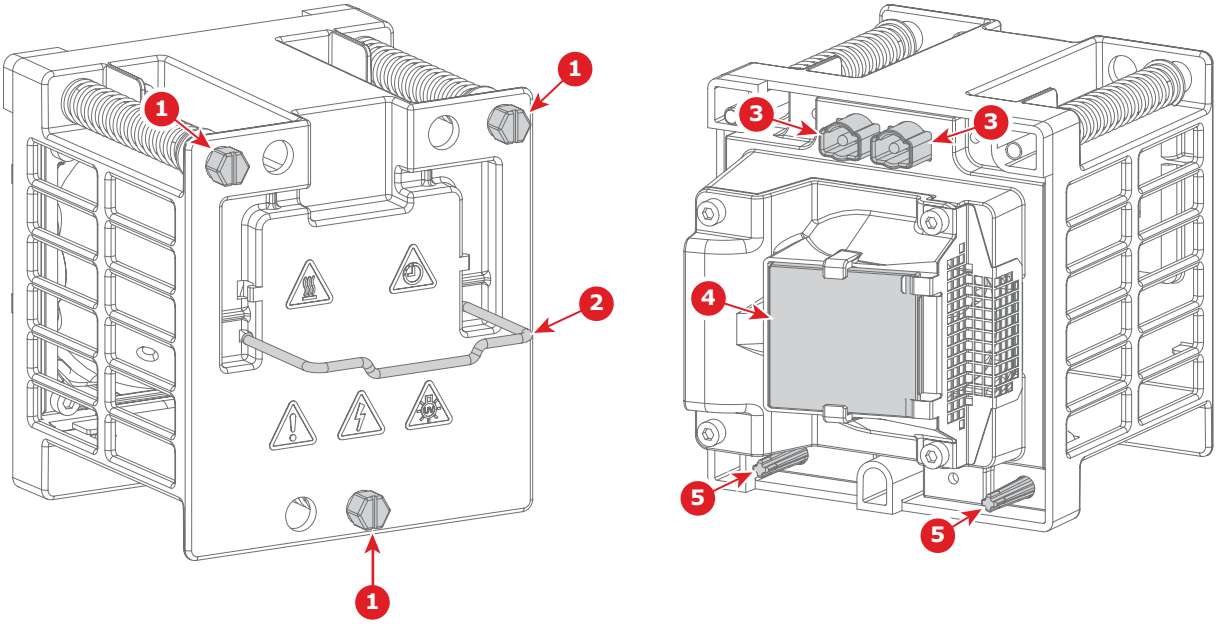


Image 13-1
1 Retaining screws for fixation of the Lamp House
2 Handle
3 Power cable connections
4 UV/IR blocker
5 Positioning pins

13.2 Removal of the Lamp Module

WARNING: The Lamp Module is extremely hot during and directly after operation. Let the projector cool down for at least 15 minutes before attempting to access or handle the Lamp Module.

WARNING: This procedure may only be carried out by trained projectionists or qualified technical service personnel.

CAUTION: Due to its high internal pressure, the lamp may explode in hot state if improperly handled.

Necessary tools

7mm nut driver or flat screw driver.

How to remove the Lamp Module from the projector?

1. Ensure the projector is switched off and cooled down.
2. Remove the rear cover of the projector. See "Removal of the rear cover", page 112.
3. Loosen the retaining screw (1) of the fan door and open the door (2).

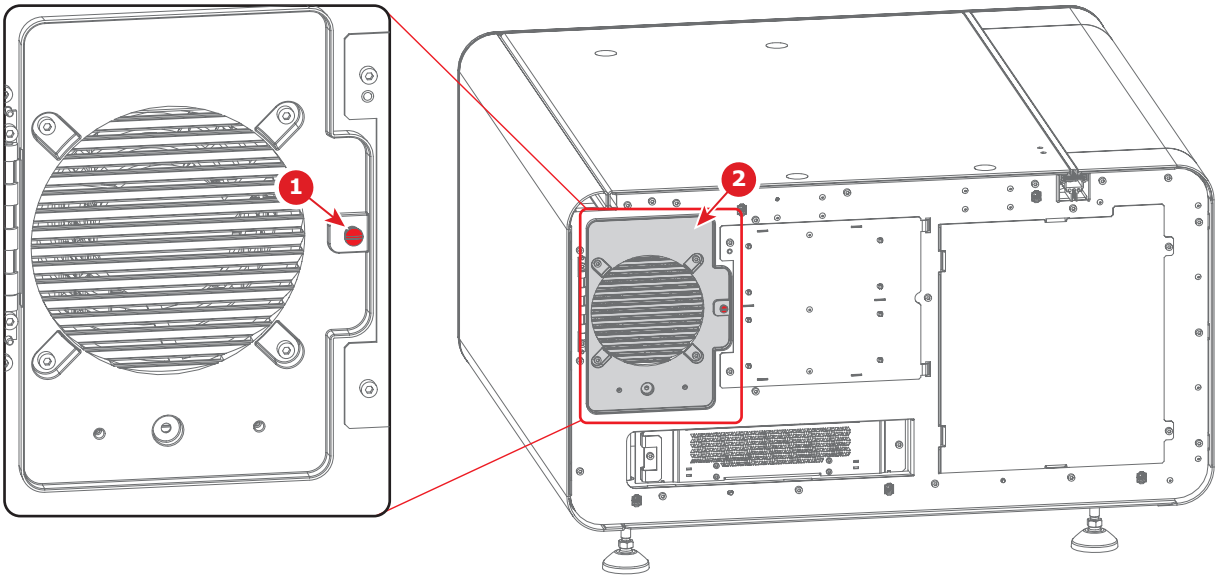


Image 13-2

4. Release the three retaining screws (3) of the Lamp Module. Use a 7mm nut driver or a flat screw driver.

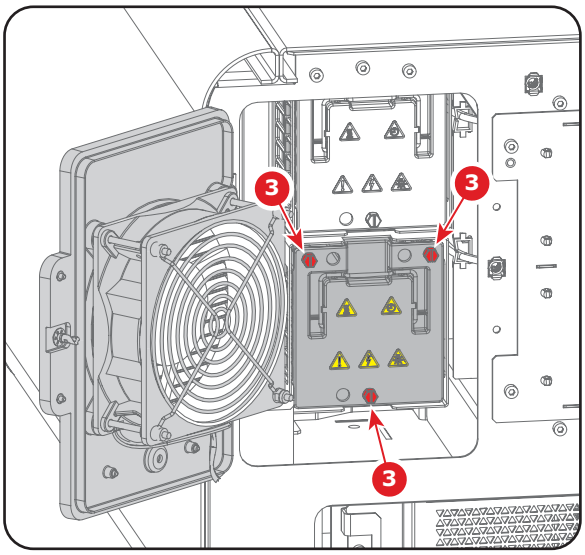


Image 13-3

5. Remove the Lamp Module as follows:
   a) Grip the Lamp Module by the handle (4) and slide it out half way of the lamp compartment.
   b) Support the Lamp Module at the bottom with the other hand and remove it from the lamp compartment.
   c) Place the Lamp Module on a stable support.

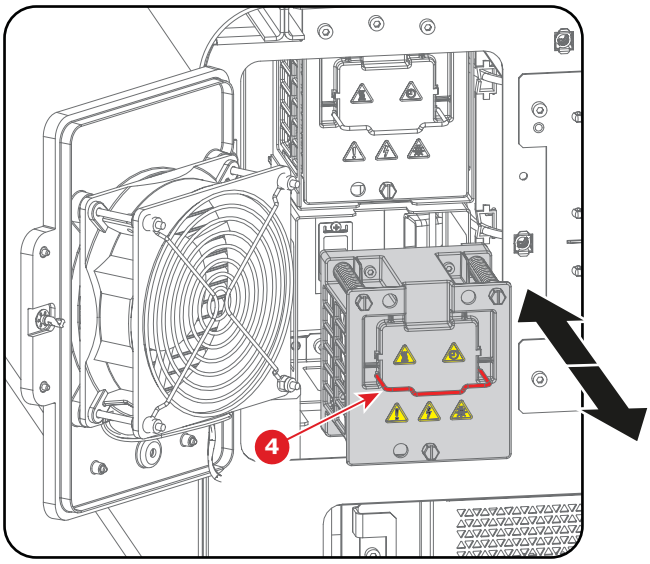


Image 13-4

13.3 Installation of the Lamp House

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

Necessary tools

7mm nut driver or flat screw driver.

How to install the Lamp House in the projector?

1. Insert the Lamp House as follows:
   a) Grip the Lamp House by the handle (4) and support it at the bottom with the other hand. Slide the Lamp House in the lamp compartment.
   b) Carefully insert the Lamp House into the projector. Make sure the positioning pins (reference 5, image 13-1) match the holes in the projector.

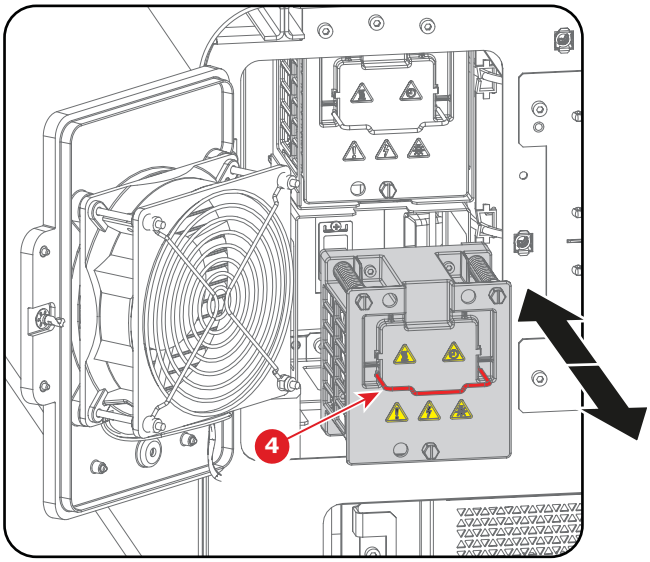


Image 13-5

2. Tighten the three retaining screws (3) of the Lamp House. Use a 7mm nut driver or a flat screw driver.

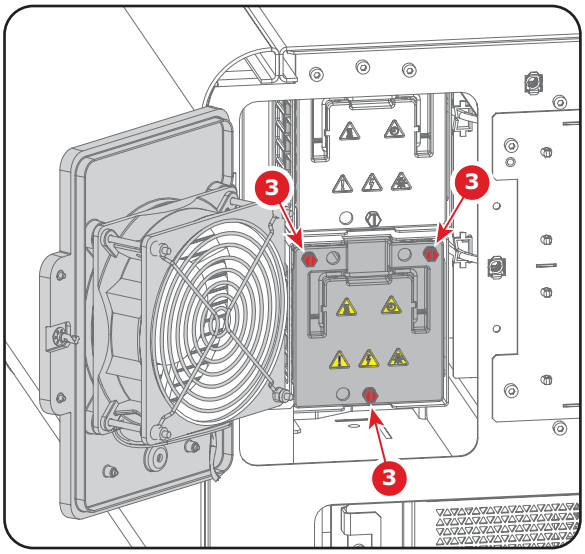


Image 13-6

3. Close the fan door (2) and tighten the retaining screw (1) of the fan door.

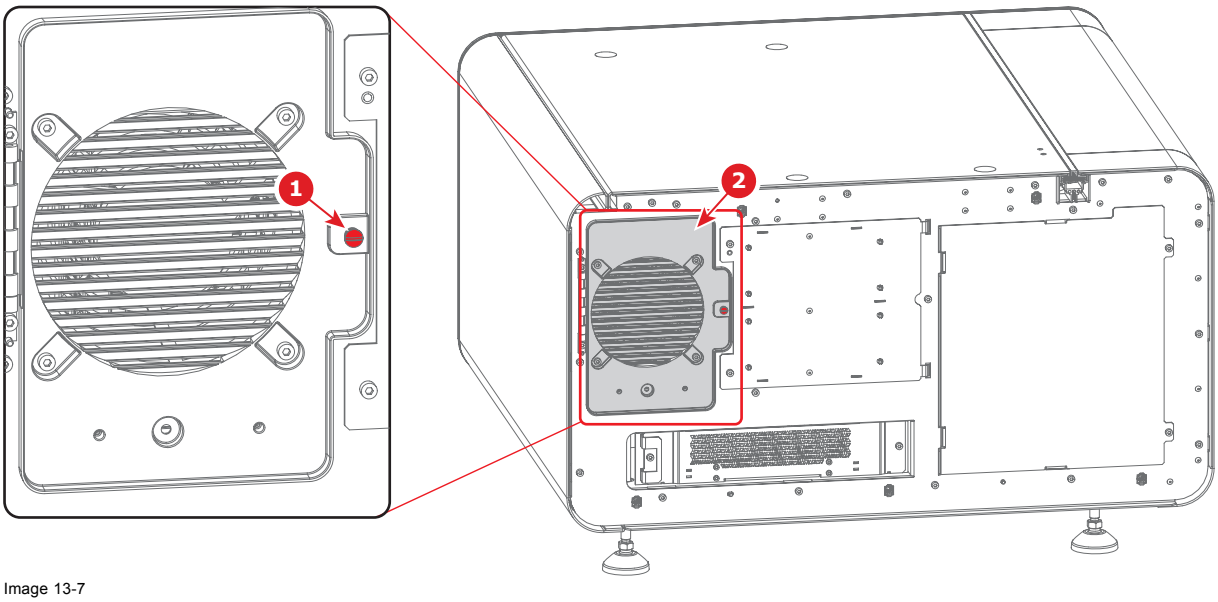


Image 13-7

4. Install the rear cover of the projector. See "Installation of the rear cover", page 122.

13.4 Resetting the lamp parameters

CAUTION: The LAMP INFO parameters must be updated any time a Lamp Module is replaced. Neglecting to do this will result in poor performance and a reduced lamp lifetime.

How to reset the lamp parameters?

1. In the Communicator software, click on **Installation** (1) and click on **Lamp** (2).

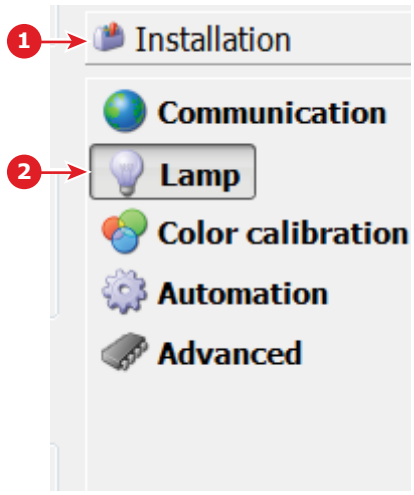


Image 13-8

2. Click on **Lamp information** (3).

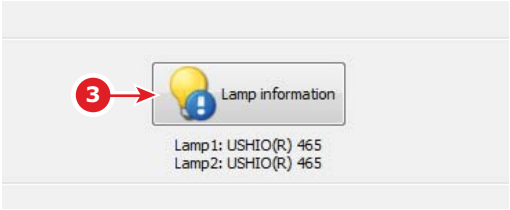


Image 13-9

The *Lamp information* window is displayed.

3. Click on **Get service code** (4) of the lamp you wish to replace.

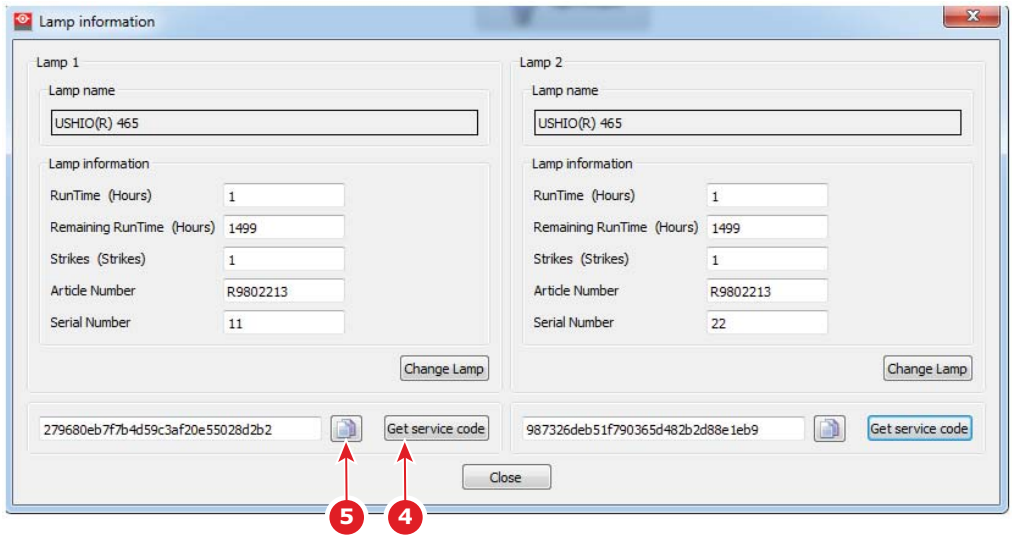


Image 13-10

The service code appears. Click the **copy** icon (5) to copy the service code to the clipboard. Paste the service code in a text editor and save the file. This service code will be required to claim a lamp which is failing within its warranty. A replacement lamp cannot be shipped if this code is not provided.

4. Click on **Change Lamp** (6).

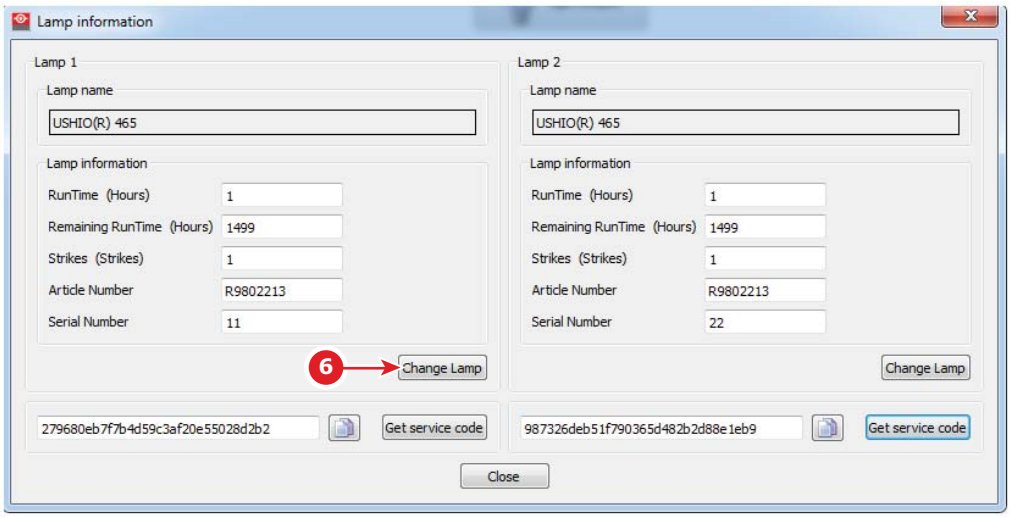


Image 13-11

The **Reset lamp** window appears.

5. Fill in the serial number of the new Lamp Module and click **OK** (7).

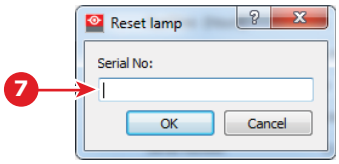


Image 13-12

6. A warning appears. Click **Yes** (8) to proceed.

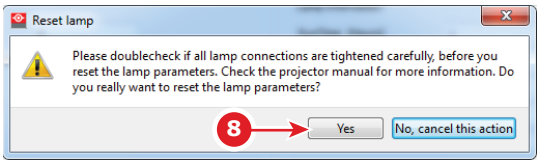


Image 13-13

14. PREVENTATIVE MAINTENANCE ACTIONS

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

- 1 month maintenance actions
- 3 month maintenance actions

14.1 1 month maintenance actions

MAINTENANCE TYPE A (perform every month)

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

No.	Maintenance action	Remarks
1	**Check** both **dust filters** and **foam filters** of the projector for **dust** and **grease**. Grease on the filter and foam 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 or foams are contaminated with **dust** then cleaning the them with a **vacuum cleaner** should be sufficient. • If the filters or foams feel **greasy** then they must be **washed**. Take into account that the time needed to dry the dust filters and foams may be **24 hours or more**. For that reason, it is recommended to have a second set of dust filters and foams which can be used while cleaning the first set.	Replace damaged filters and foams immediately. See procedures "Vacuum cleaning of the dust filters and filter foams", page 106, and "Washing and drying the dust filters", page 107. To speed up drying, allow the filters and foams to dry at 50°C max (122°F max) in a well ventilated room.
2	Check the surface of the lens output side for dust (it is not necessary to remove the lens from the projector to do this). Clean only if necessary.	Clean the equipment if dust is clearly visible upon the surface of the lens output side. **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 if dust is clearly visible upon the surface. Use a clean dry micro-fiber cloth suitable for cleaning optics.

14.2 3 month maintenance actions

MAINTENANCE TYPE B (perform every three months)

The 3 month maintenance actions, listed below, may be performed by a trained projectionist who is familiar with potential hazards associated with the product.

No.	Maintenance action	Remarks
1	Clean the back air outlet vents of the lamp modules and Lamp Power Supply (LPS).	Dust the vents using a vacuum cleaner with brush attachment.
2	Clean the housing of your projector.	Remove excess dust on and around the projector covers. See cleaning instructions in this manual.
3	Verify the internal clock of the ICMP with real time clock. Correct if needed.	ICMP version 1.2.1 is required. Communicator version 5.0 is required. See user guide of Communicator for detailed instructions.
4	Check the lamp module compartment and lamp fan for dust.	Clean if necessary. Use a vacuum cleaner with brush attachment to remove dust.

15. MAINTENANCE PROCEDURES

WARNING: All procedures described in this chapter may only be performed by TRAINED PROJECTIONISTS or qualified SERVICE PERSONNEL.

About this chapter

This chapter describes several maintenance procedures for your DP2K-E series projector.

Overview

- Check the dust filters and foams
- Vacuum cleaning of the dust filters and filter foams
- Washing and drying the dust filters
- Cleaning the lens
- Cleaning the exterior of the projector
- Authorization to clear security warning on the projector

15.1 Check the dust filters and foams

How to check the dust filters and foams?

1. Remove the front cover. See "Removal of the front cover", page 111.
2. Click away out the big (1) & small (2) dust filter assembly from the front cover.
3. Remove the big (3) and small (4) foam filters from between the dust filter and front cover.
4. **Check** the “air in” side of the dust filters for **dust** and/or **grease**. Then check the foam filters for **dust** and/or **grease**.
   In case one of the filters or foams contains dust but doesn’t feel greasy then vacuum clean it. See procedure "Vacuum cleaning of the dust filters and filter foams", page 106.
   In case one of the filters or foams is contaminated with grease, wash and dry it. See cleaning procedure "Washing and drying the dust filters", page 107.
   Note: *Grease on the filters and foams 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 and filter foams may be 24 hours or more. For that, it’s recommended to have a second set of dust filters and filter foams which can be used while cleaning the first set.*
5. Place the big (3) and small (4) dust foam onto the front cover.
6. Click the big (1) & small (2) dust filter assembly onto the front cover. Make sure you don’t crush the foam while doing so.
   Caution: *UNDER NO CIRCUMSTANCES SHOULD WET FILTERS BE INSTALLED BACK INTO THE PROJECTOR. THIS CAN HAVE SERIOUS SAFETY CONSEQUENCES AS WELL AS JEOPARDIZE THE INTERNAL OPTICS OF THE SYSTEM.*

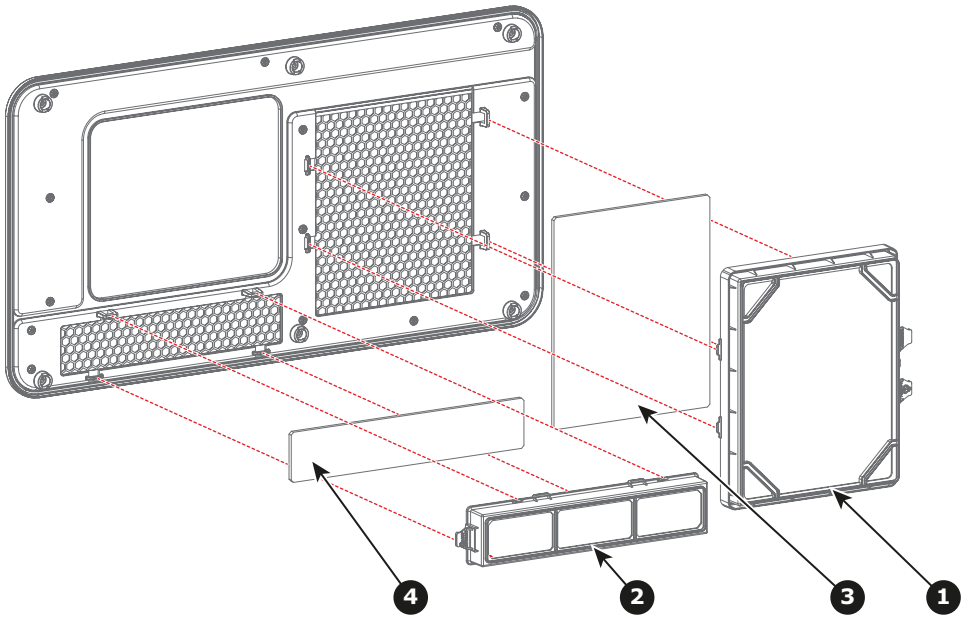


Image 15-1

7. Install the front cover. See "Removal of the front cover", page 111.

Both the dust filter and filter foam are cleanable. The cleaning methods for the filters and foams are identical. See the cleaning procedures for correct cleaning and drying instructions.

Even if only the filter or the foam needs to be cleaned, due to them being tied together to the front cover it's useful to clean both at the same time.

15.2 Vacuum cleaning of the dust filters and filter foams

When to vacuum the dust filters and foams?

The dust filters and foams of the projector should be checked every month. If any of the filters or foams are contaminated with dust then cleaning the filter and foam with a vacuum cleaner should be sufficient. In case the filter or foam feels greasy, they must be washed instead. See cleaning procedure "Washing and drying the dust filters", page 107.

Grease on the filters and foams 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 and foams are removed from the projector. For removal and installation of the filters and foams, see procedures "Check the dust filters and foams", page 105.

Necessary 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.*

How to vacuum-clean the filter foam?

1. Carefully vacuum the filter foam. Use a vacuum cleaner with a soft brush suction nuzzle.
   Caution: *Do not damage the filter foam. Replace damaged foams immediately.*

15.3 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 140.

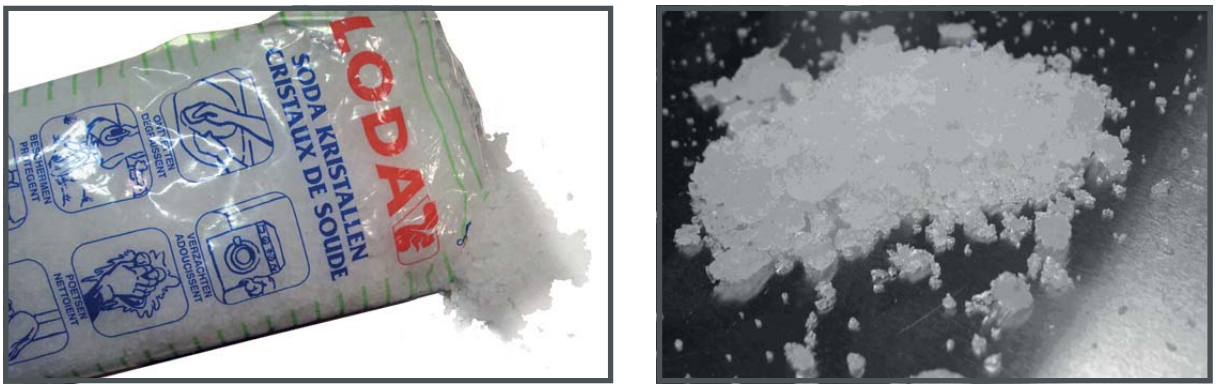


Image 15-2
Sodium carbonate crystals.

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.

Necessary tools

- Bucket with hot water.
- Sodium carbonate, 30 gram (handful) per liter hot water.

How to wash and dry the dust filters?

1. Make a solution with a ratio of 30 gram (a handful) sodium carbonate to 1 liter **hot water**.
2. Soak the dust filters in the solution for **30 to 60 minutes**. The grease should be dissolved after 1 hour.
3. If the dust filter is still clogged repeat this procedure from step 1.
4. Rinse the dust filters with clean water to flush all grease residue away.
5. Shake out all excess liquid by repeatedly swinging the filter to-and-fro in a centrifugal action.
6. Then allow the filters to **dry thoroughly**.
   Note: *Drying time of the dust filters can be up to 24h or more. Drying time can be shorter when being done in a well-ventilated area.*

   Tip: *To speed-up drying, allow the filter(s) to dry at 50°C max in a well ventilated room.*

CAUTION: UNDER NO CIRCUMSTANCES SHOULD WET FILTERS BE INSTALLED BACK INTO THE PROJECTOR. THIS CAN HAVE SERIOUS SAFETY CONSEQUENCES AS WELL AS JEOPARDIZE THE INTERNAL OPTICS OF THE SYSTEM.

CAUTION: Do not install/use damaged dust filters. Replace damaged dust filters immediately with new dust filters of the same type. See https://my.barco.com for the correct replacement part.

15.4 Cleaning the lens

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

Necessary tools

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

Necessary parts

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

How to clean the lens?

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

15.5 Cleaning the exterior of the projector

How to clean the exterior of the projector ?

1. Switch off the projector and unplug the projector from the mains power net.
2. Clean the housing of the projector with a damp cloth. Stubborn stains may be removed with a cloth lightly dampened with a mild detergent solution.

15.6 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.

Necessary tools

Authorization pin code.

Authorization procedure to clear security warning

1. Ensure that all modules are properly installed.
2. Start up the projector (Standby mode).
3. Initiate authorization by pushing the Key button on the Local Keypad:

   The color of the backlight of the Numeric keys 1 to 6 of the Local Keypad changes from white to yellow.
4. Enter pin code within 5 seconds.

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

- In case no keys are pressed, the color of the backlight of the Numeric keys 1 to 6 changes back to white.
- 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 **white**.
- In case of a **correct code** entry, the color of the backlight of the Numeric keys 1 to 6 changes to **green** for 1 second and then back to **white**.

Each attempt to clear the security warning and its result (successfully or unsuccessfully) is logged inside the projector.

16. REMOVAL AND INSTALLATION OF THE PROJECTOR COVERS

About this chapter

Most installation, maintenance and service procedures demand removing one or more of the projector covers to gain access to the parts to maintain or to service. To avoid redundancy, all procedures about cover removing or installing are grouped together in this chapter. The maintenance and servicing procedures also refer to this chapter if required. The procedures in this chapter describe, with detailed step by step actions and illustrations, how to remove or install the projector covers. Note that the covers may only be removed by qualified service personnel.

WARNING: All procedures described in this chapter may only be performed by TRAINED PROJECTIONISTS or qualified SERVICE PERSONNEL.

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

Overview

- Removal of the front cover
- Removal of the rear cover
- Removal of the top cover
- Removal of the left side cover
- Removal of the right side cover
- Removal of the top cover plate of the Light Processor compartment
- Removal of the side cover plate of the Light Processor compartment
- Installation of the side cover plate of the Light Processor compartment
- Installation of the top cover plate of the Light Processor compartment
- Installation of the right side cover
- Installation of the left side cover
- Installation of the top cover
- Installation of the rear cover
- Installation of the front cover

16.1 Removal of the front cover

Necessary tools

7 mm flat screwdriver

How to remove the front cover?

1. Unscrew the six captive screws (reference 1, image 16-1) from the front cover. Use a 7 mm flat screwdriver.

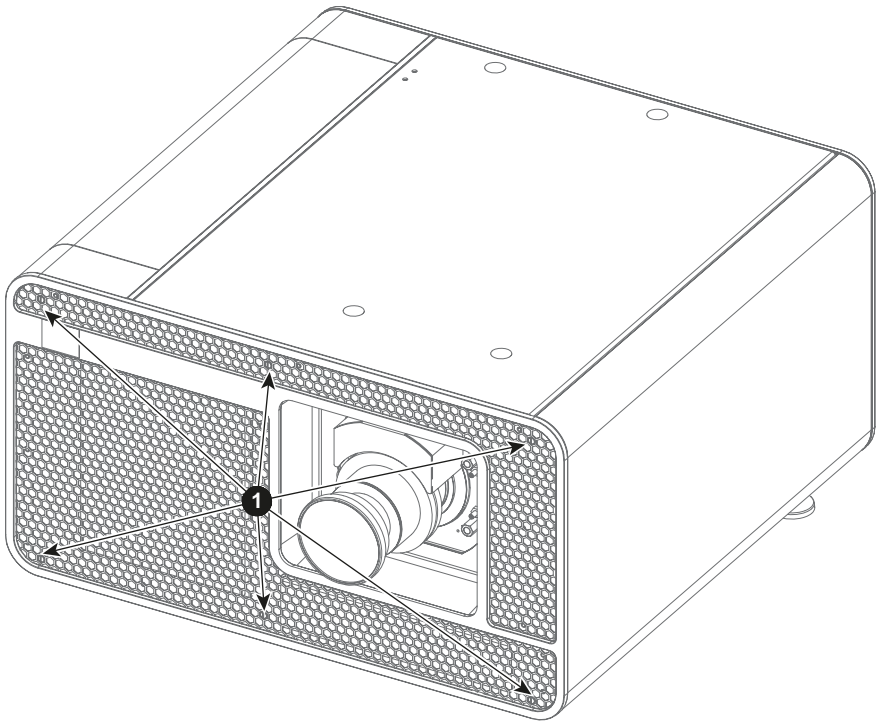


Image 16-1

2. Remove the front cover.

16.2 Removal of the rear cover

WARNING: Switch off the projector prior to start with this procedure, unless otherwise specified in the procedure.

Necessary tools

7 mm flat screwdriver.

How to remove the rear cover?

1. Loosen the five captive screws (reference 1image 16-2) of the rear cover using a 7 mm flat screwdriver.

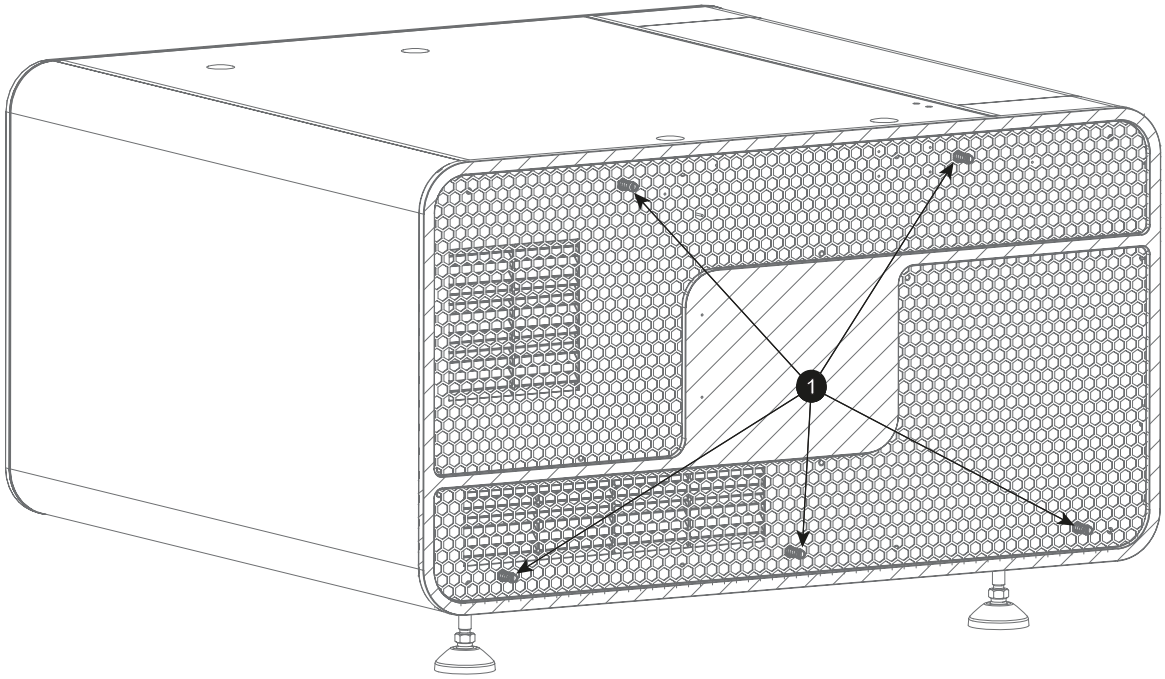


Image 16-2

2. Remove the rear cover from the projector.

16.3 Removal of the top cover

WARNING: Switch off the projector prior to start with this procedure, unless otherwise specified in the procedure.

To remove the top cover from the projector the front and back covers must be first removed. This procedure assumes that the front and back covers are already removed.

Necessary tools

3 mm Allen key.

How to remove the top cover?

1. Loosen the three screws at the front and the three screws at the back (reference 1, image 16-3) using a 3 mm Allen key.

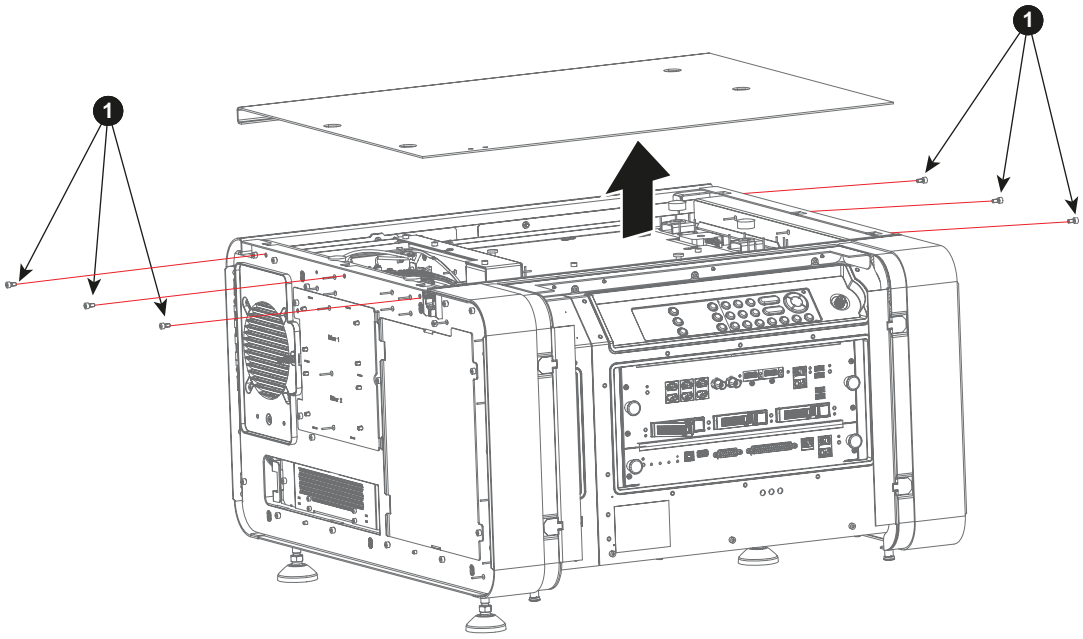


Image 16-3

2. Remove the top cover from the projector.

16.4 Removal of the left side cover

WARNING: Switch off the projector prior to starting with this procedure, unless otherwise specified in the procedure.

The back and front cover must be removed before the left side cover can be removed. This procedure assumes that the back and front cover are already removed.

Necessary tools

3 mm Allen Key (Hex key)

How to remove the left side cover?

1. Loosen and remove the three screws at front of the projector (reference 1, image 16-4) and the three screws at the back of the projector (reference 1, image 16-5). Use a 3 mm Allen Key.

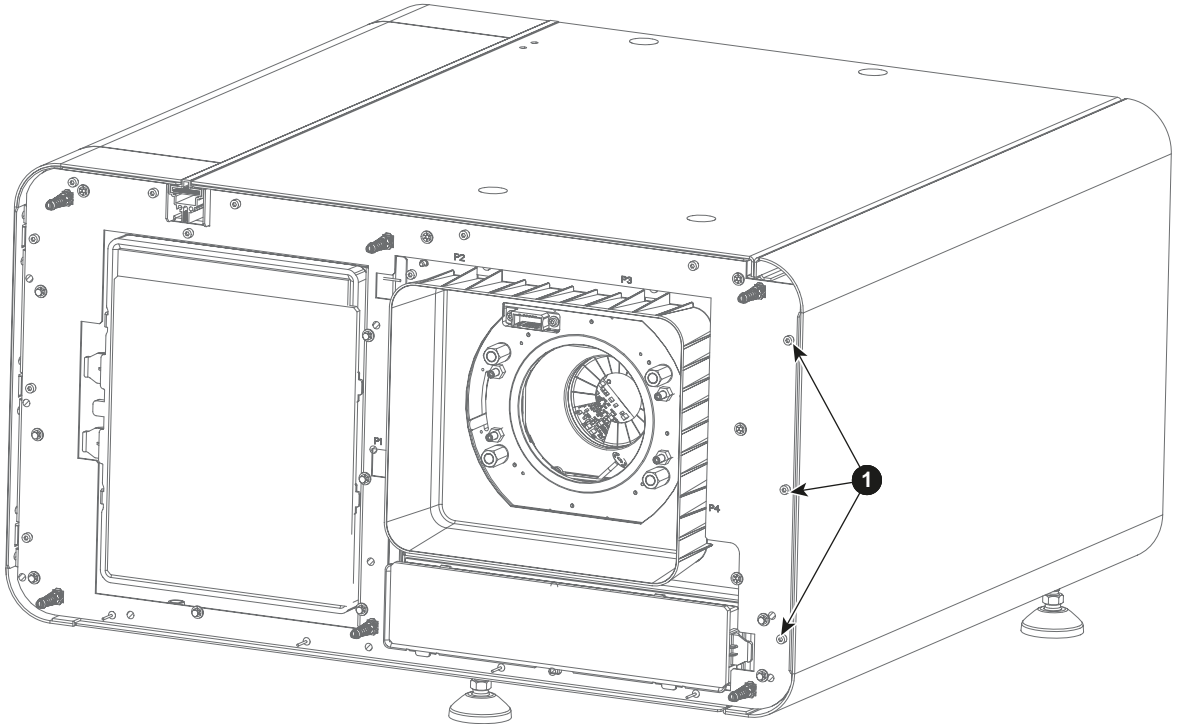


Image 16-4

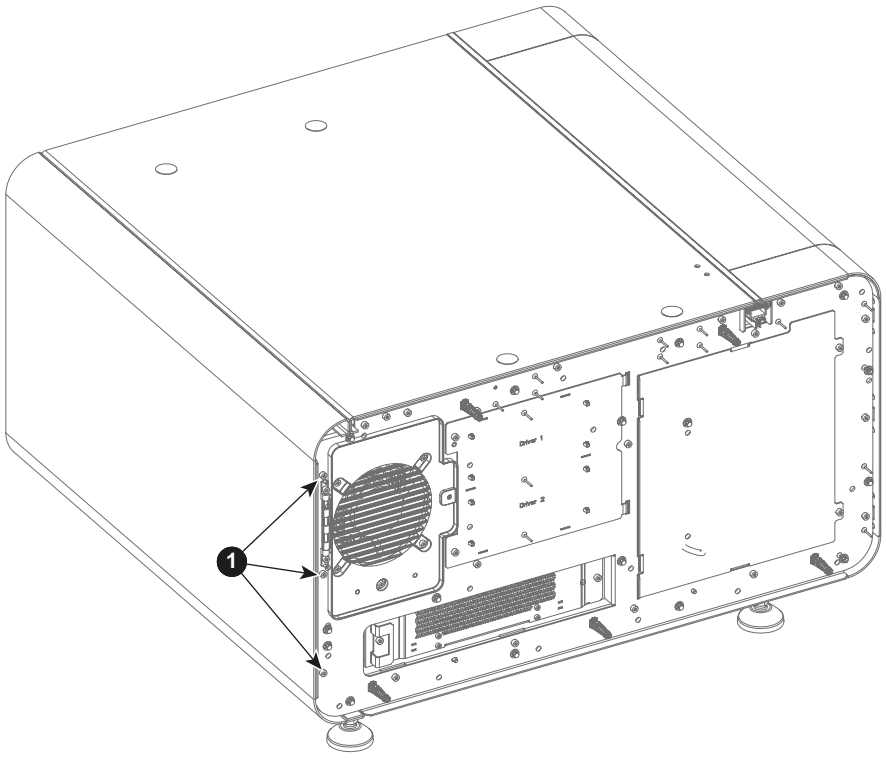


Image 16-5

2. Remove the left side cover.

16.5 Removal of the right side cover

How to remove the right side cover

1. Pull down and quarter clockwise turn the two push turn fasteners at the bottom of the right side cover (reference 1, image 16-6).

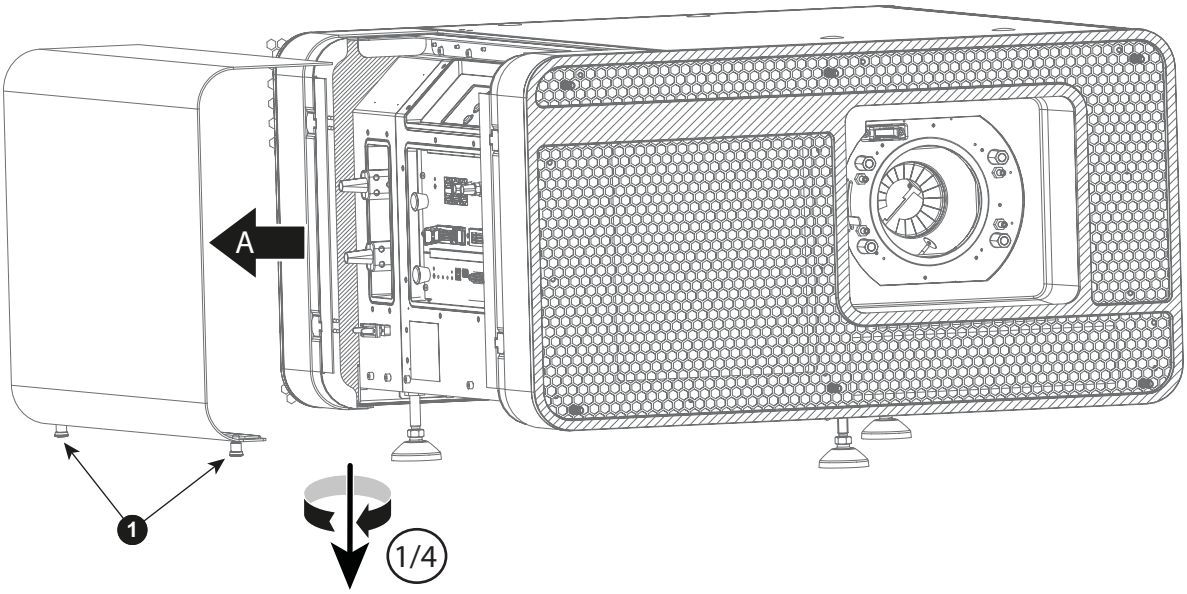


Image 16-6

2. Remove the cover by pulling it straight out. Do not lift or tilt the cover while removing it.

16.6 Removal of the top cover plate of the Light Processor compartment

To access the top cover plate of the Light Processor compartment the projector top cover has to be removed first. This procedure assumes that the projector top cover is already removed.

CAUTION: Opening the Light Processor compartment by removing the top cover plate or side cover plate will result in a tamper event. An authorization to clear the security warning on the projector, after closing off the Light Processor compartment, will be needed!

Necessary tools

3mm Allen wrench.

How to remove the top cover plate from the Light Processor compartment?

1. Remove the seven screws (reference 1, image 16-7) of the top cover plate. Use a 3 mm Allen key.

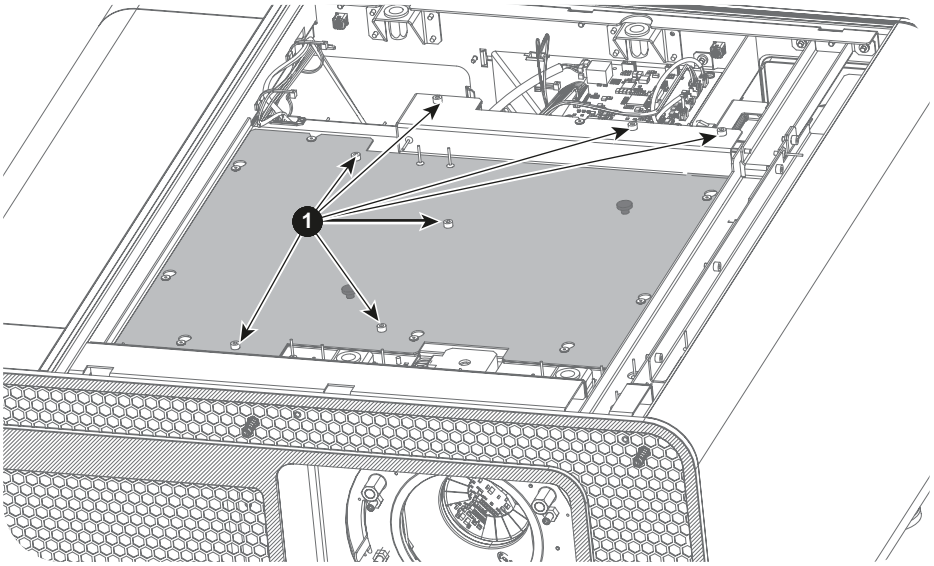


Image 16-7

2. Grip the 2 handles (reference 2, image 16-8) and slide the cover towards the front of the projector until the 8 cover latches (reference 3, image 16-8) are free.

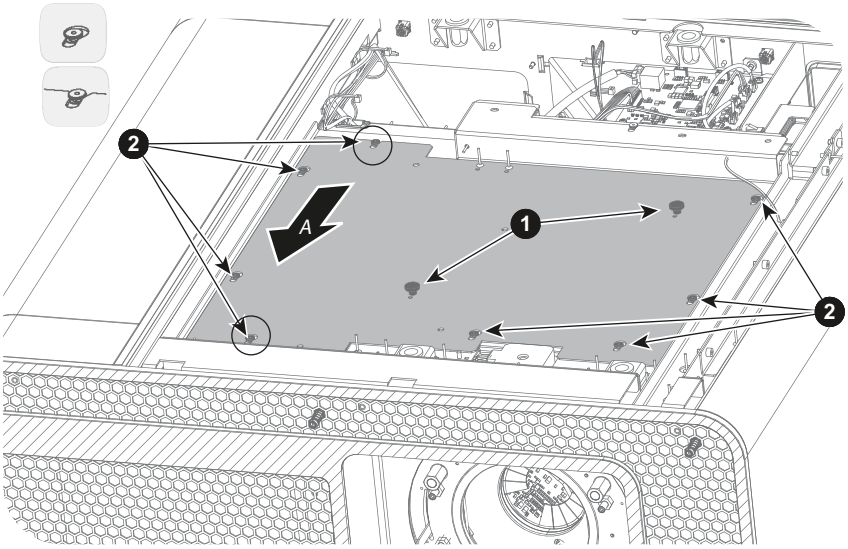


Image 16-8

3. Remove the top cover plate.

16.7 Removal of the side cover plate of the Light Processor compartment

To access the side cover plate of the Light Processor compartment, the projector left side cover must first be removed. This procedure assumes that the projector left side cover is already removed.

CAUTION: Opening the Light Processor compartment by removing the top cover plate or side cover plate will result in a tamper event. An authorization to clear the security warning on the projector, after closing off the Light Processor compartment, will be needed!

Necessary tools

3 mm Allen wrench.

How to remove the side cover plate from the Light Processor compartment?

1. Remove the four screws at the top of the cover plate and the two screws at the bottom of the cover plate (reference 1, image 16-9). Use a 3 mm Allen wrench.
2. Slide the side cover plate left to disengage the cover, and then remove it.

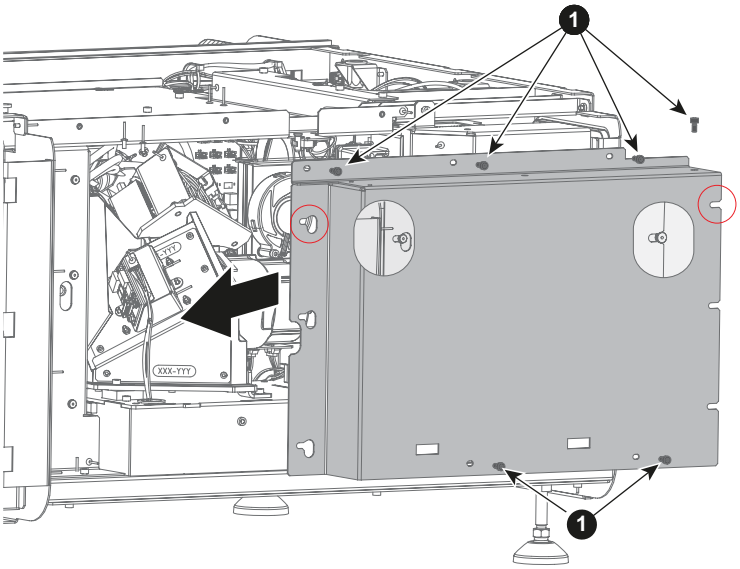


Image 16-9

16.8 Installation of the side cover plate of the Light Processor compartment

Necessary tools

3 mm Allen key.

How to install the side cover plate from the Light Processor compartment?

1. Place the side cover plate into position and slide to the right until all slots of the side cover plate are correctly engaged.

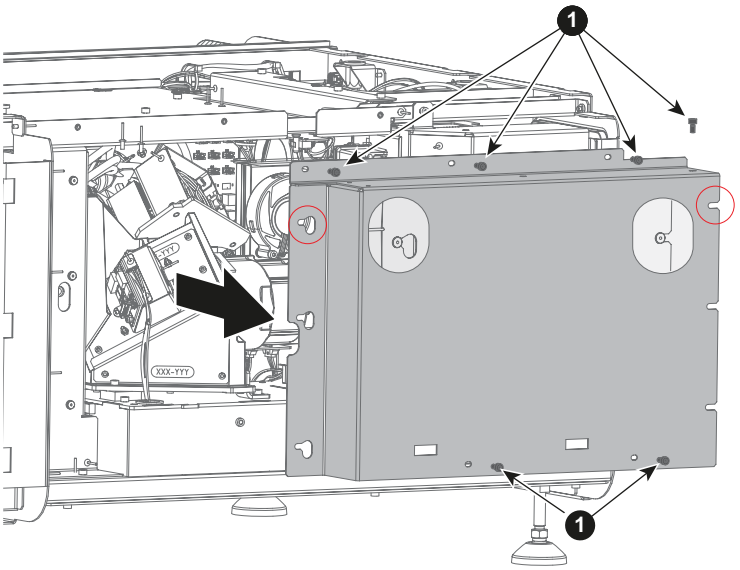


Image 16-10

2. Fasten the side cover plate into place with four screws at the top and two screws at the bottom (reference 1, image 16-10). Use a 3 mm Allen key.

CAUTION: Opening the Light Processor compartment by removing the top cover plate or side cover plate will result in a tamper event. An authorization to clear the security warning on the projector, after closing off the Light Processor compartment, will be needed!

16.9 Installation of the top cover plate of the Light Processor compartment

Necessary tools

3 mm Allen key

How to install the top cover plate from the Light Processor compartment?

1. Install the top cover plate as follows:
   a) Position yourself on the right side of the projector, and place the cover on an angle as shown.
   b) Lower the top cover plate completely.
   c) Slide the top cover plate towards the back of the projector until all slots of the top cover plate are properly engaged (reference image 16-11).

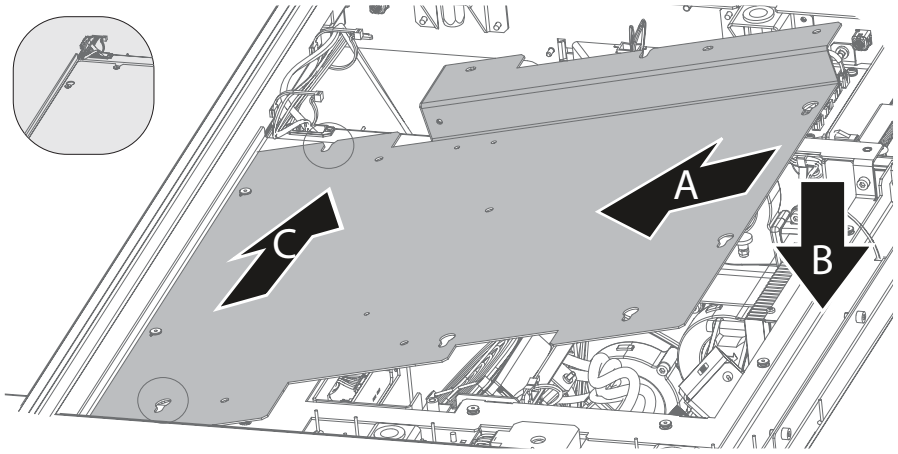


Image 16-11

2. Install the seven screws (reference 1, image 16-12). Use a 3 mm Allen Key.

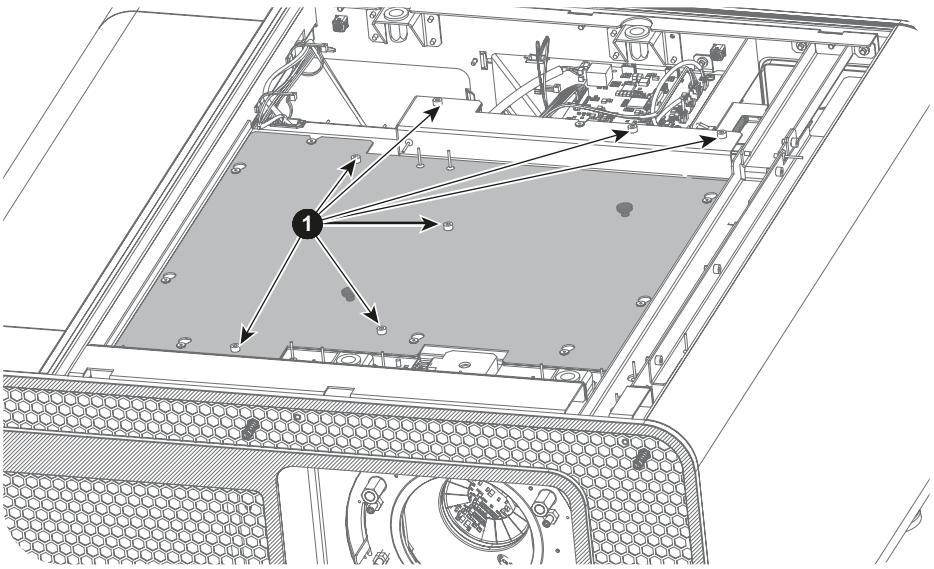


Image 16-12

CAUTION: Opening the Light Processor compartment by removing the top cover plate or side cover plate will result in a tamper event. An authorization to clear the security warning on the projector, after closing off the Light Processor compartment, will be needed!

16.10 Installation of the right side cover

Necessary tools

3 mm Allen key.

How to install the right side cover?

1. Position the right side cover on the projector on an angle as shown (reference A, image 16-13). The magnetic clips will snap into position.
   Tip: *Before positioning the cover into place, guide the cables (1) (power cables and data cables) underneath the projector. When the cables are guided well, they won't obstruct the cover when installing.*

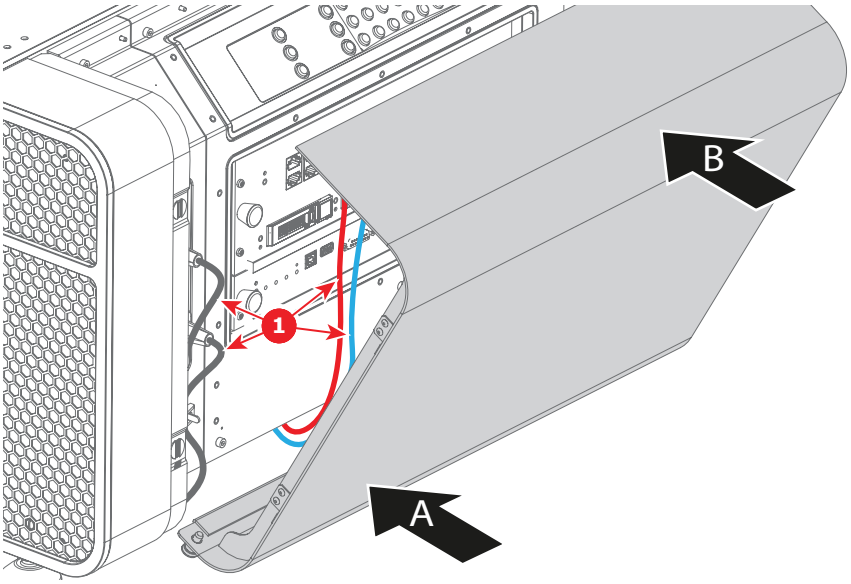


Image 16-13

2. Close the cover by pushing the top firmly into place.

16.11 Installation of the left side cover

The back and front cover must be removed before the left side cover can be installed. This procedure assumes that the back and front cover are already removed.

Necessary tools

3 mm Allen key.

How to install the left side cover?

1. Position the left side cover on the projector.
2. Fasten the 3 screws at the front left side of the projector (reference 1, image 16-14) and the 3 screws at the back left side of the projector (reference 1, image 16-15). Use a 3 mm Allen key.

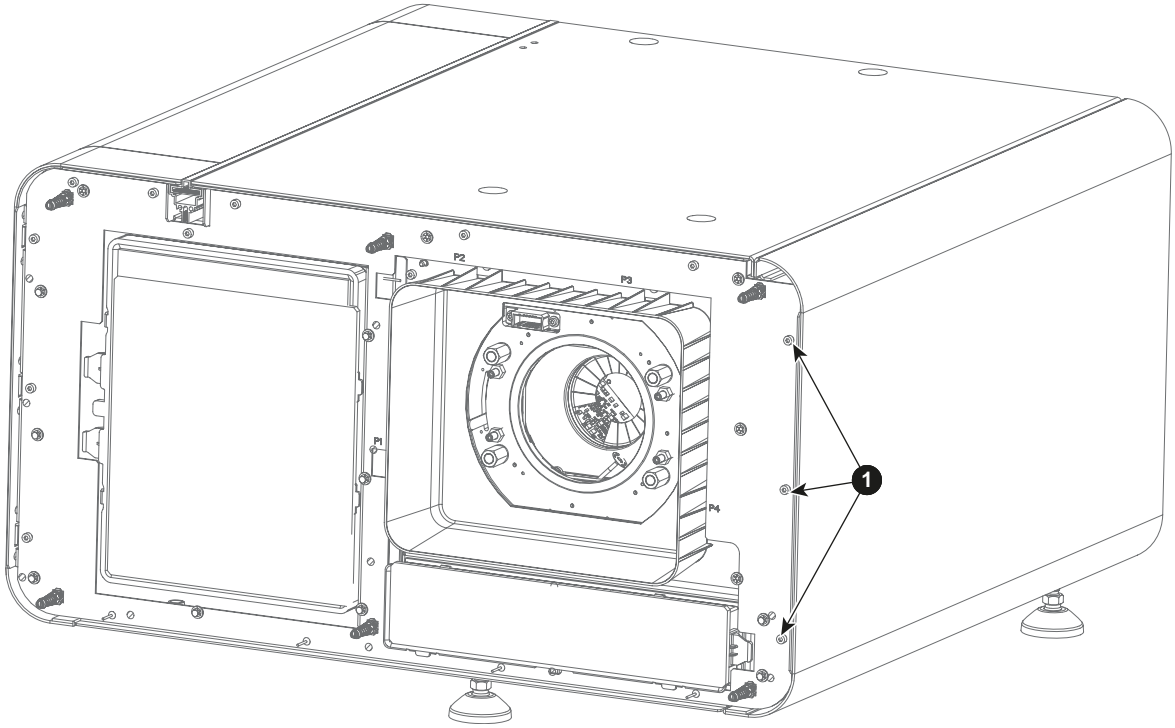


Image 16-14

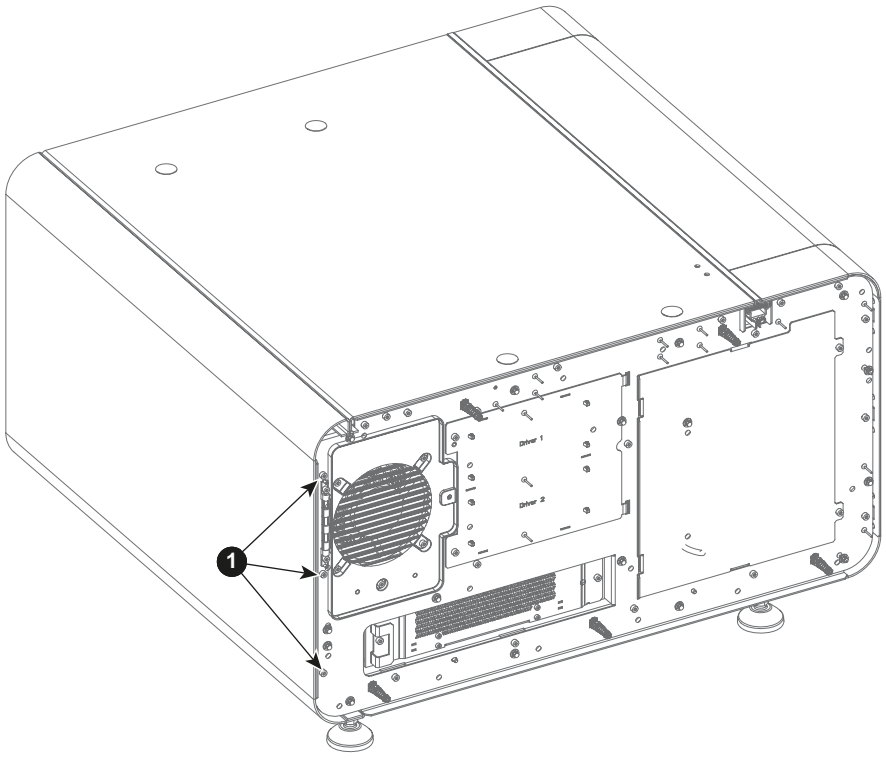


Image 16-15

16.12 Installation of the top cover

Necessary tools

3 mm Allen key.

To install the top cover, the front and back covers must be removed. This procedure assumes the front and back covers are already removed.

How to install the top cover?

1. Position the top cover on the projector.
2. Fasten the three screws at the front and the three screws at the back (reference 1, image 16-16). Use a 3 mm Allen key.

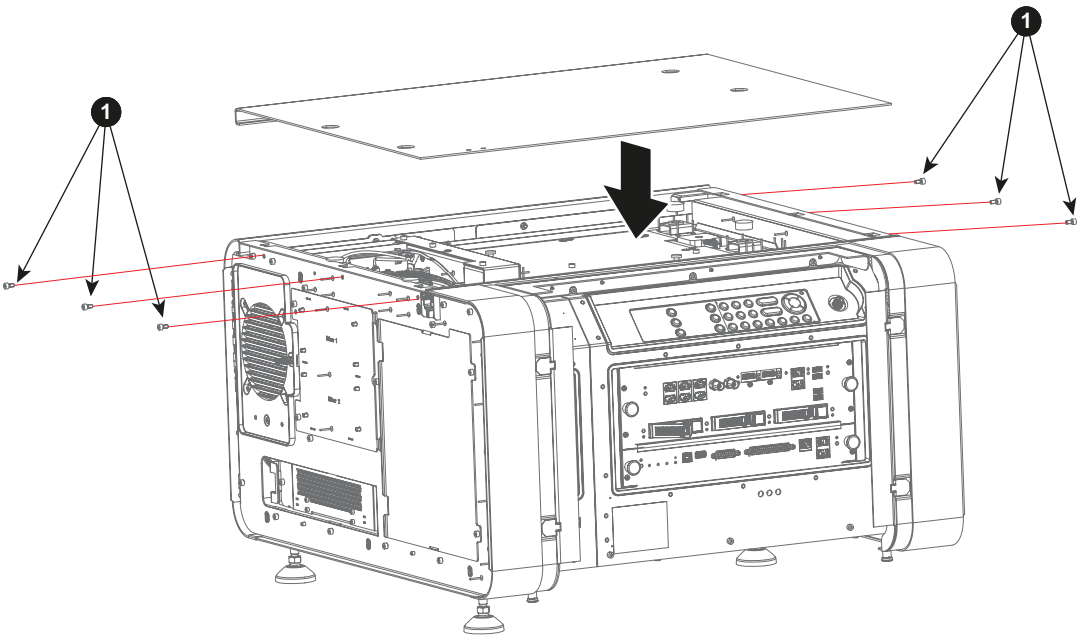


Image 16-16

16.13 Installation of the rear cover

Necessary tools

7 mm flat screwdriver.

How to install the rear cover?

1. Position the rear cover on the projector.
2. Fasten the five captive screws (reference 1, image 16-17) of the rear cover using a 7 mm flat screwdriver.

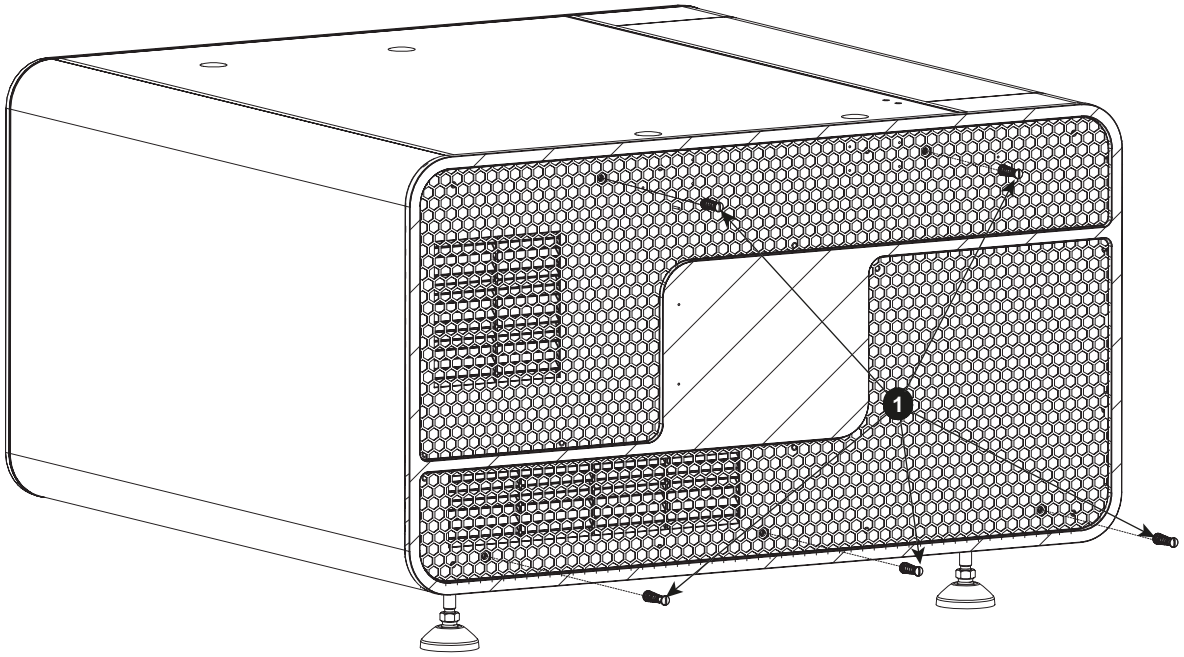


Image 16-17

16.14 Installation of the front cover

Necessary tools

7 mm flat screwdriver

How to install the front cover?

1. Position the front cover on the projector.
2. Install the six captive screws (reference 1, image 16-18).

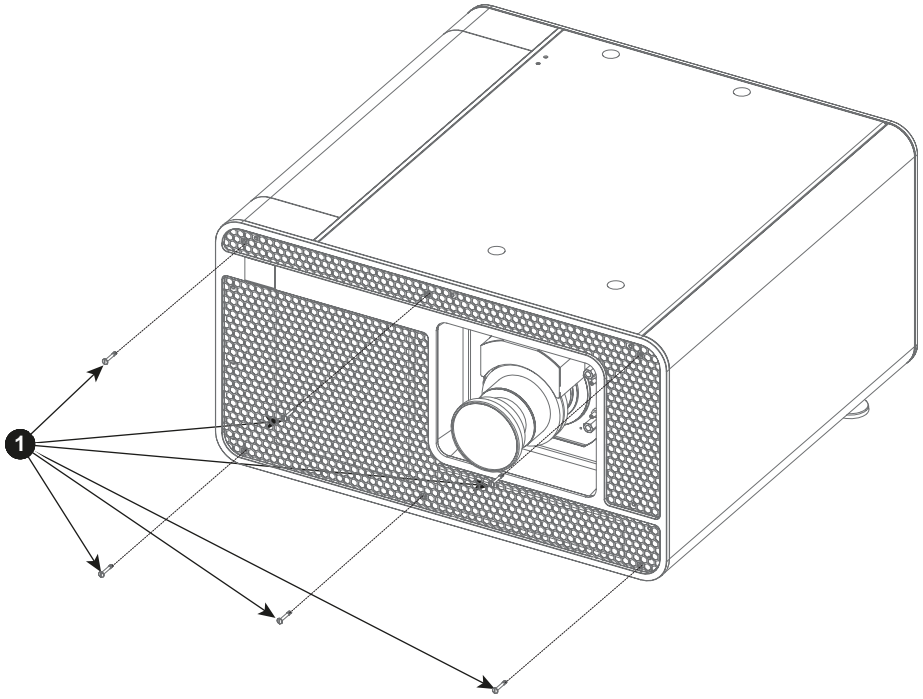


Image 16-18

A. SPECIFICATIONS

About this chapter

This chapter gives an overview of the specification of your DP2K-E series projector as well as the dimensions, the center of gravity and the dimensions of the optional pedestal.

Overview

- Specifications of the DP2K-E
- Specifications of the ICMP
- Dimensions of the DP2K-E series projector
- Dimensions of the universal pedestal
- Technical Regulations

A.1 Specifications of the DP2K-E

Specifications

Native resolution	2,048 x 1,080 pixels
Housing	Hermetically sealed DMDs and optical assembly
Light output	DCI colors: 4,800 lumens / Non-DCI: 7,200 lumens
Lamps	Dual 465W, UHP lamps
Screen size	Up to 7.5m/24.6 ft wide (screen gain 1.2 @ 14ftl)
Contrast ratio	1,600:1
Digital MicroMirror Device™	3 x 0.69” DC2K dark metal devices
Prime lenses	Fully motorized 1.2 - 1.7 1.34 - 1.9 1.5 - 2.15 1.7 - 2.55 2.0 - 3.9
Control I/O	3x Ethernet (RJ 45) 8x GPIO (DB 25) 3D interface USB interface
Integrated Cinema Media Processor	DCI 4K 2D up to 60fps* DCI 4K 3D (24 or 30 fps per eye)* DCI High Frame Rates 2K 3D up to 120fps (60fps per eye) JPEG 2000 bit-rates up to 625Mbps Dual-channel color-correction MPEG-2 (4:2:0 and 4:2:2 up to 60fps) 2x HDMI2.0a (up to 4K 2D 60fps) 2x 3G-SDI inputs 16x AES/EBU audio channels (2x RJ45) 8x GPI, 8x GPO (4x RJ45) 2x Gbe for content connectivity & ingest 2x front-accessible USB 3.0 for fast ingest 2x front-accessible USB 2.0 Video watermarking: Civolution NexGuard Audio watermarking: Civolution

	Closed captioning devices: Support for SMPTE 430-10 * 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.
Integrated storage	1.9TB effective storage (RAID-5) / 3x 1TB Hot-swappable 2.5" hard-drives 3.9TB effective storage (RAID-5) / 3x 2TB Hot-swappable 2.5" hard-drives
Barco Web Commander	Projector Dashboard Projector Control Board Show Player/Editor/Scheduler Automation, 3D, Ingest TMS integration Smart Projector Status Via HTML5 web-browsers including iOS & Android tablets
Barco Communicator	Projector installation & configuration Projector update & maintenance
Power requirements	200-240 VAC
Projector dimensions (HxWxD)	369 x 689 x 664 mm 14.5 x 27.1 x 26.1 inch
Projector weight	53.8 kg / 119 lbs (including recessed handles for easy carrying)
Ambient temperature	35°C / 95°F Max.
Options	Barco CineMate App (iOS & Android) - free 3D add-ons Touch screen monitor, inc. Barco Commander & Communicator Pedestal CineCare Web Auro 11.1 license Barco Escape license Live 3D*** Ceiling mount kit*** (*** roadmap)
Noise Level	48 dB(A)
Airflow requirements	43 CFM

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	1.9TB effective storage (RAID-5) / 3x 1TB Hot-swappable 2.5" hard-drives 3.9TB effective storage (RAID-5) / 3x 2TB Hot-swappable 2.5" hard-drives
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 DP2K-E series projector

Dimensions

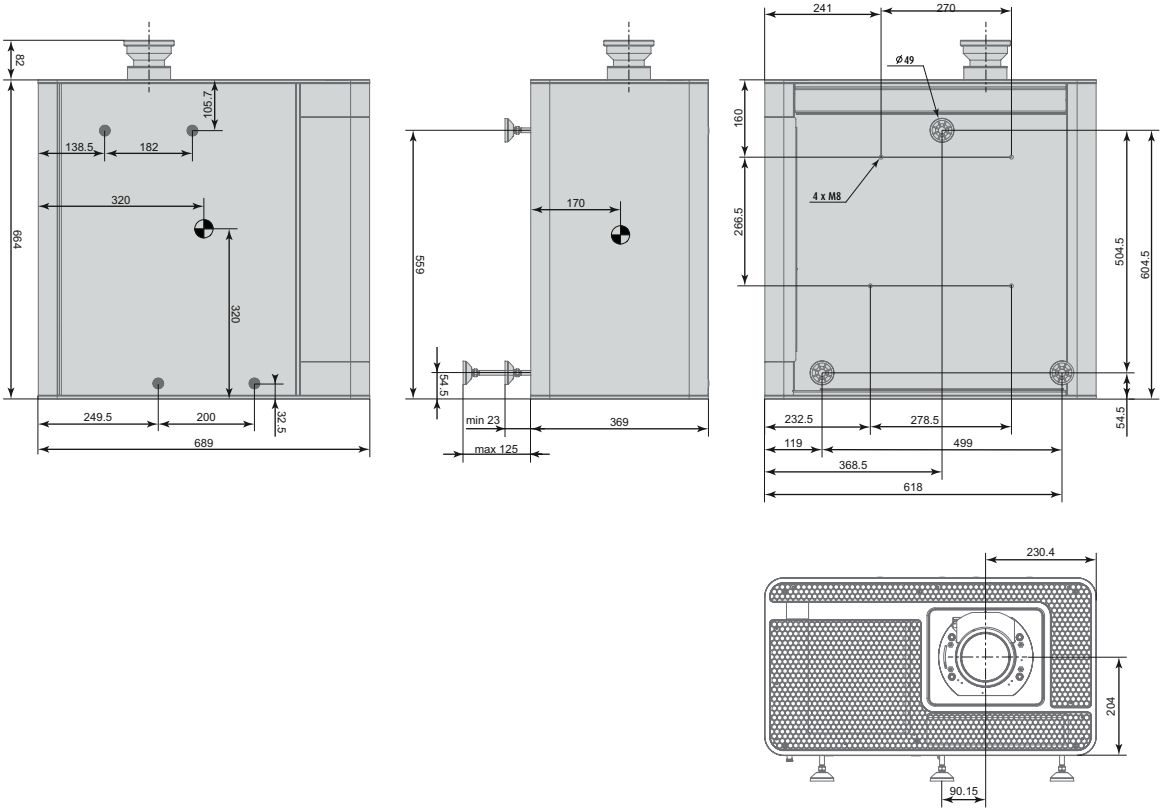


Image A-1
Dimensions given in millimeters.

A.4 Dimensions of the universal pedestal

Dimensions

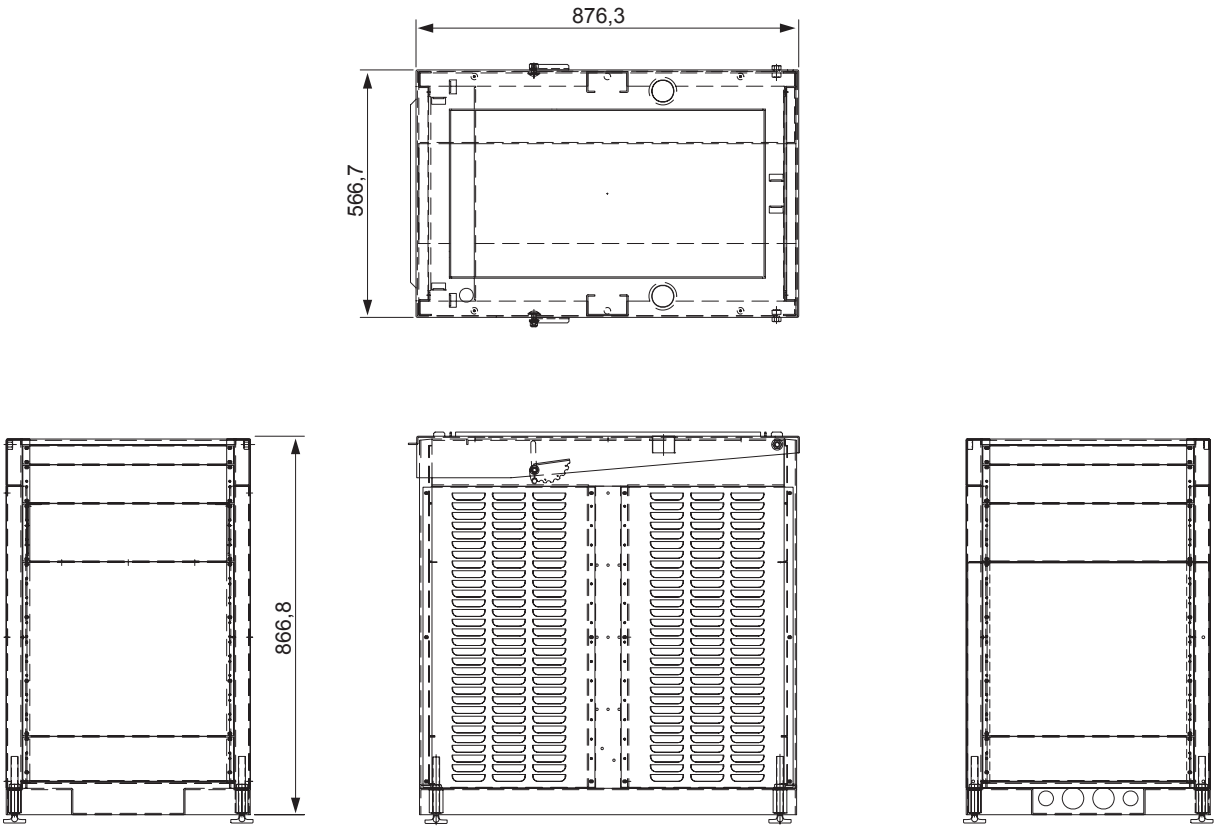


Image A-2
Dimensions given in millimeters.

A.5 Technical Regulations

Certificates

Image A-3
EAC mark

Image A-4
Rohs

Image A-5
CE mark

Image A-6
CCC mark

Image A-7
CEBEC mark

B. PIN CONFIGURATIONS

Overview

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

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.

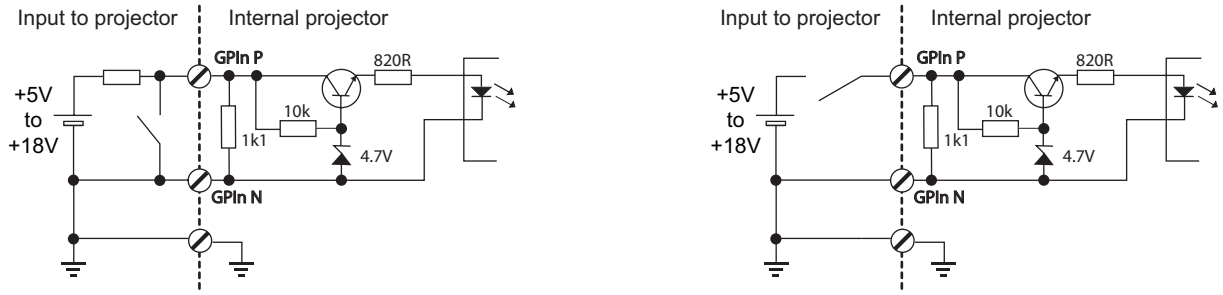


Image B-1

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

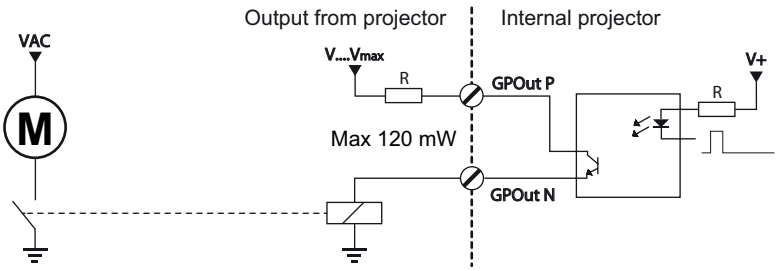


Image B-2

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 Cinema Controller communication ports

General purpose input/output (GPIO) of the Cinema Controller

General Purpose In/Out			
1	3D Input Reference P	20	3D Input Reference N
2	3D Display Reference P	21	3D Display Reference N
3	GPIN 3 P (reserved)	22	GPIN 3 N (reserved)
4	GPIN 4 P (reserved)	23	GPIN 4 N (reserved)
5	GPIN 5 P	24	GPIN 5 N
6	GPIN 6 P	25	GPIN 6 N
7	GPIN 7 P	26	GPIN 7 N
8	GPIN 8 P	27	GPIN 8 N
9	3D Output Reference P	28	3D Output Reference N

General Purpose In/Out			
10	GPOUT 2 P (reserved)	29	GPOUT 2 N (reserved)
11	GPOUT 3 P (reserved)	30	GPOUT 3 N (reserved)
12	GPOUT 4 P	31	GPOUT 4 N
13	GPOUT 5 P	32	GPOUT 5 N
14	GPOUT 6 P	33	GPOUT 6 N
15	GPOUT 7 P	34	GPOUT 7 N
16	GPOUT 8 P	35	GPOUT 8 N
17	reserved	36	reserved
18	reserved	37	reserved
19	reserved		

Ethernet port

			10/100 Base-T – RJ45 port	1000 Base-T – RJ45 port
Pin	**Pair**	**Color**	**Description**	**Description**
1	3	white/green	TXD+	TX0+
2	3	green	TXD-	TX0-
3	2	white/orange	RXD+	RX0+
4	1	blue	–	TX1+
5	1	white/blue	–	TX1-
6	2	orange	RXD-	RX0-
7	4	white/brown	–	Rx1+
8	4	brown	–	RX1-

3D interface

Pin	Name	Pin	Name
1	+12V	9	+12V
2	Grnd	10	3D Input Reference -
3	Grnd	11	3D Display Reference +
4	RS232 RX	12	3D Display Reference -
5	RS232 TX	13	CONN_3D MODE -
6	CONN_3D_MODE +	14	CONN_SYNC -
7	CONN_SYNC +	15	-
8	3D Input Reference +		

B.3 Pin configurations of the ICMP communication ports

RJ-45 pin configuration

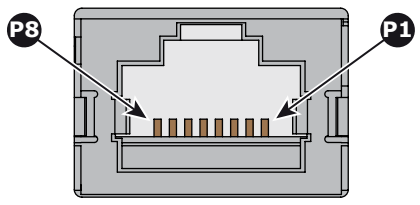


Image B-3

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
	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
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.

C. ENVIRONMENTAL INFORMATION

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/en/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.

Mercury Notice

LAMP CONTAINS MERCURY, DISPOSE ACCORDING TO STATE/LOCAL LAW.

This Barco product consists of materials that may contain mercury, which must be recycled or disposed of in accordance with local, state, or country laws. See www.lamprecycle.org for disposal information.

For more information on safe handling procedures, the measures to be taken in case of accidental breakage, and safe disposal options visit: http://www.ec.gc.ca/mercure-mercury.

Within this system, the lamp in the projector contains mercury.

The lamp and the projector are carefully designed to minimize the probability of lamp rupture, although the lamp may break while operating and small amounts of mercury vapor may be emitted from the projector. As a general precaution, secure good ventilation in the room when operating the projector. If lamp rupture occurs, evacuate the room and secure good ventilation.

CAUTION: Lamps may not be disposed as normal household trash.

Contact your local waste disposal facility for information on the recycling program for HID (High Intensity Discharge) lamps in your area.

Disposal of mercury-containing lamps

- Recycle through a municipal or solid waste district household hazardous waste collection program in accordance with local regulations.
- Direct shipment to lamp recycler.
- Shipment through a hazardous waste transporter.

WARNING: Do not break or crush lamps because this may pose health and environmental risks when mercury vapors are released.

CAUTION: To avoid breaking the lamps, repack carefully when storing and transporting them.

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
内部线路 Internal wiring	X	O	O	O	O	O
镜头支架 Lensholder	X	O	O	O	O	O
光学镜头 Optical lenses	X	O	O	O	O	O
燈泡 Lamp	O	X	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

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)
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： 投影儀， 型號(型式)： DP2K-6E Equipment name: Projector, Type designation: DP2K-6E						
	限用物質及其化學符號 Restricted substances and its chemical symbols					
單元 Unit	鉛 Lead (Pb)	汞 Mercury (Hg)	鎘 Cad-mium (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 Lensholder	—	O	O	O	O	O
光學鏡頭 Optical lenses	—	O	O	O	O	O
燈泡 Lamp	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

設備名稱：投影機，型號(型式)：DP2K-6E Equipment name: Projector, Type designation: DP2K-6E						
	限用物質及其化學符號 Restricted substances and its chemical symbols					
單元 Unit	鉛 Lead (Pb)	汞 Mercury (Hg)	鎘 Cad-mium (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)
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.〝O〞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：“O” 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_2CO_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.

GLOSSARY

***.pem**

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

3G-SDI

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

Digital Cinema Initiatives (DCI)

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

Digital Cinema Package (DCP)

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

DisplayPort

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

HD

Light beam Hazard Distance (HD) is the distance from the source at which the intensity or the energy per surface unit becomes lower than the applicable safety limit. The light beam can thus be considered as dangerous if the operator is closer from the source than the HD.

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.

HDMI

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

Key Delivery Message (KDM)

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

Public Key Infrastructure (PKI)

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

RS232

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

Scheimpflug principle

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

SMPTE

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

TR (Throw Ratio)

The ratio of the distance to the screen (throw) to the screen width.

Trusted Device List (TDL)

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

USB

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

INDEX

Numerics/Symbols

A

B

C

D

E

F

G

H

I

K

L

M

N

O

P

R

S

T

U

V

W

Z