

Njord



User Manual

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

Federal Communications Commission (FCC Statement)

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

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

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Patent protection

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

EMC notices

EN55032/CISPR32 Class A MME (MultiMedia Equipment)

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

GB/T 9254 Class A ITE (Information Technology Equipment)

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

BSMI Taiwan Class A statement:

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

Table of contents

1	Safety	7
1.1	General Considerations	8
1.2	Important safety instructions	9
1.3	Projector Hazard Distances	13
1.4	Product safety labels	14
1.5	Radio equipment (optional)	14
2	Getting Started	17
2.1	Getting to know the projector	18
2.2	Power on the projector	20
2.3	Start image projection	21
2.4	Switching to standby	23
2.5	Power off projector	23
3	Pulse Remote Control Unit	25
3.1	Remote control, battery installation	26
3.2	Remote control, protocol setup	27
3.3	Remote control, on/off button	27
3.4	Using the RCU	28
3.5	Functionality overview	29
3.6	Functions of the “button pressed indicator”	29
3.7	Function of the RGB filter button	29
3.8	Displaying and Programming addresses into the RCU	30
3.9	Using the XLR connector of the RCU	30
3.10	Using the mini-jack connector of the RCU	31
3.11	Silicone protection sleeve for the RCU (optional)	31
4	Input & Communication	33
4.1	Introduction	34
4.2	Local Keypad and LCD panel	34
4.3	LCD touch panel	35
4.4	Communication connections	36
4.5	LED and Button indication chart	38
4.6	Pulse Quad Combo input Mk II	39
4.7	Pulse Quad Combo input Mk I	40
4.8	Pulse Quad DP 1.2 input	41

4.9	Pulse SFP input	42
5	GUI – Introduction	43
5.1	Overview	44
5.2	Navigation	45
6	GUI – Image	47
6.1	Setting image levels manually	48
6.2	Adjusting the sharpness	49
6.3	Adjusting the gamma correction	50
6.4	Setting the desired Gamma type	51
6.5	Displaying HDR content	52
7	GUI – Status menu	55
7.1	Status menu overview	56
8	Product maintenance	59
8.1	Cleaning the lens	60
8.2	Cleaning the exterior of the projector	60
9	Risk group 3 Safety	61
9.1	General considerations	62
9.2	Safety training to be provided by the installer	62
9.3	High Brightness precautions: Hazard Distance	63
9.4	HD for fully enclosed projection systems	64
9.5	HD in function of modifying optics	66
	Index	67

Safety

1

About this document

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

Clarification of the term “NJORD” used in this document

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

- NJORD

Defining the Njord platform

The Njord series products in general, are all products within the Barco UDM platform

1.1 General Considerations



WARNING: Be aware of suspended loads.



WARNING: Wear a hard hat to reduce the risk of personal injury.



WARNING: Be careful while working with heavy loads.



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



WARNING: Mind your fingers while working with heavy loads.

General safety instructions

- This product contains no user serviceable parts. Attempts to modify/replace mechanics or electronics inside the housing or compartments will violate any warranties and may be hazardous.
- Do not stare into beam when the projector is on. The bright light may result in permanent eye damage.
- Before operating this equipment please read this manual thoroughly and retain it for future reference.
- Installation and preliminary adjustments must be performed by qualified Barco personnel or by authorized Barco service dealers.
- All warnings on the projector and in the documentation manuals must be adhered to.
- All instructions for operating and use of this equipment must be followed precisely.
- All local installation codes should be adhered to.

Notice on safety

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

Notice on optical radiation

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

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



When installing an interchangeable lens with a throw ratio that make the projector become an RG3 unit, (See the chapter "Approved Lenses" in the installation manual), refer to chapter "HD in function of modifying optics", page 66 regarding precautions.



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

Notice on laser radiation

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

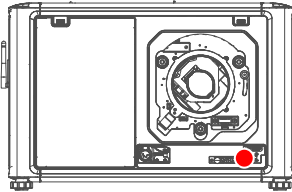


Image 1-1



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

Users definition

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

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

1.2 Important safety instructions

To prevent risk of electrical shock

- This product should be operated from a mono phase AC power source. Ensure that the mains voltage and capacity matches the projector electrical ratings: 120-180V/200-240V (+/-10%), 16A-12A, 50-60Hz. If you are unable to install the AC requirements, contact your electrician. Do not defeat the purpose of the grounding.
- This apparatus must be grounded (earthed) via the supplied 3 conductor AC power cable.
- If none of the supplied power cables are the correct one, consult your dealer.
- If you are unable to insert the plug into the outlet, contact your electrician to replace your obsolete outlet. Do not defeat the purpose of the grounding-type plug.
- Never use 2- wire power cords, as this is dangerous and could lead to electrical shock. Always use a power connector with a ground terminal.
- Do not allow anything to rest on the power cord. Do not locate this product where persons will walk on the cord. To disconnect the cord, pull it out by the plug. Never pull the cord itself.
- Use only the power cord supplied with your device. While appearing to be similar, other power cords have not been safety tested at the factory and may not be used to power the device. For a replacement power cord, contact your dealer.
- If you are unable to insert the plug into the outlet, contact your electrician to replace your obsolete outlet. Do not defeat the purpose of the grounding-type plug.
- Do not operate the projector with a damaged cord. Replace the cord.
- Do not operate the projector if the projector has been dropped or damaged - until it has been examined and approved for operation by qualified service personnel.
- Position the cord so that it will not be tripped over, pulled, or contact hot surfaces.

- If an extension cord is necessary, a cord with a current rating at least equal to that of the projector should be used. A cord rated for less amperage than the projector may overheat.
- Never push objects of any kind into this product through cabinet slots as they may touch dangerous voltage points or short out parts that could result in a risk of fire or electrical shock.
- Make sure that no objects enter into the vents and openings of the set.
- Do not expose this projector to rain or moisture.
- The projector is designed for indoor use only. Never operate the unit outdoors.
- Do not immerse or expose this projector in water or other liquids.
- Do not spill liquid of any kind on this projector.
- Should any liquid or solid object fall into the cabinet, unplug the set and have it checked by qualified service personnel before resuming operations.
- Do not disassemble this projector, always take it to qualified service personnel when service or repair work is required.
- Do not use an accessory attachment which is not recommended by the manufacturer.
- Lightning - For added protection for this video product during a lightning storm, or when it is left unattended and unused for long periods of time, unplug it from the wall outlet. This will prevent damage to the device due to lightning and AC power-line surges.

To prevent personal injury

- To prevent injury and physical damage, always read this manual and all labels on the system before powering the projector or adjusting the projector.
- To prevent injury, take note of the weight of the projector. The weight of a basic projector is about ± 48 kg (± 105 lb) without lens.
- To prevent injury, ensure that the lens and all covers are correctly installed. See installation procedures.
- **Warning:** high intensity light beam. NEVER look into the lens ! High luminance could result in damage to the eye.
- **Warning: extremely high brightness projector:** This projector embeds extremely high brightness (radiance) lasers; this laser light is processed through the projectors optical path. Native laser light is not accessible by the end user in any use case. The light exiting the projection lens has been diffused within the optical path, representing a larger source and lower radiance value than native laser light. Nevertheless the projected light represents a significant risk for the human eye when exposed directly within the beam. This risk is not specific related to the characteristics of laser light but solely to the high thermal induced energy of the light source; which is comparable with lamp based systems. Thermal retinal eye injury is possible when exposed within the Hazard Distance. The Hazard Distance (HD) is defined from the projection lens surface towards the position of the projected beam where the irradiance equals the maximum permissible exposure as described in the chapter "High Brightness precautions: Hazard Distance", page 63.
- High Brightness Warning: The projector light source may not be switched on or the shutter must be closed when no projection lens is installed.
- Based on international requirements, no person is allowed to enter the projected beam within the zone between the projection lens and the related Hazard Distance (HD). This shall be physically impossible by creating sufficient separation height or by placing optional barriers. Within the restricted area operator training is considered sufficient. The applicable separation heights are discussed in "High Brightness precautions: Hazard Distance", page 63.
- **Warning:** Laser radiation when optional laser distance meter is installed. Do not stare into laser ranging beam. Class 2 laser beam could result in damage to the eye.
- Don't put your hand in front of the beam.
- This product contains no user serviceable parts. Attempts to modify/replace mechanics or electronics inside the housing or compartments will violate any warranties and may be hazardous. This kind of operations shall only be performed by Barco authorized service personnel.
- Before attempting to remove any of the projector's covers, you must turn off the projector and disconnect from the wall outlet.
- When required to switch off the projector, to access parts inside, always disconnect the power cord from the power net.
- **The power input at the projector side is considered as the disconnect device. When required to switch off the projector, to access parts inside, always disconnect the power cord at the projector side. In case the power input at the projector side is not accessible (e.g. ceiling mount), the socket outlet supplying the projector shall be installed nearby the projector and be easily accessible, or a readily accessible general disconnect device shall be incorporated in the fixed wiring.**
- Do not stack or hang projectors without using the stacking frame.

- Max units in stacked configuration, 3 units.
- Max units in hanging configuration, 2 units.
- When hanging projectors on a truss with the Barco stacking frame, always secure the stack with safety cables between the projectors and the truss.
- When using the projector in a hanging configuration, always mount 2 safety cables. See installation manual for the correct use of these cables.
- Do not place this equipment on an unstable cart, stand, or table. The product may fall, causing serious damage to it and possible injury to the user.
- Only place the projector on a stable surface, or mount it securely using an approved ceiling mount rig.
- It is hazardous to operate without lens or shield. Always switch the output light off when replacing a lens.
- Lenses or shields shall be changed if they have become visibly damaged to such an extent that their effectiveness is impaired. For example by cracks or deep scratches.
- **Cooling liquid circuit.** The projector contains a cooling circuit filled with Mono-ethylene glycol (1,2-ethane diol) and inhibitors in aqueous solution (34% active). If the unlikely event that the cooling circuits have a leak, switch off the device and contact qualified service personnel. The liquid is not for household use. Keep out of reach of children. Harmful by oral intake. Avoid exposure to pregnant women. Avoid contact with eyes, skin and clothing. Avoid inhale of the noxious fumes.
- Never point or allow light to be directed on people or reflective objects within the HD zone.
- All operators shall have received adequate training and be aware of the potential hazards.
- In case of using an external cooling system position the hoses of the cooling system so that they will not be tripped over, pulled, or contact hot surfaces.

To prevent fire hazard

- Do not place flammable or combustible materials near the projector!
- Barco large screen projection products are designed and manufactured to meet the most stringent safety regulations. This projector radiates heat on its external surfaces and from ventilation ducts during normal operation, which is both normal and safe. Exposing flammable or combustible materials into close proximity of this projector could result in the spontaneous ignition of that material, resulting in a fire. For this reason, it is absolutely necessary to leave an “exclusion zone” around all external surfaces of the projector whereby no flammable or combustible materials are present. The exclusion zone must be not less than 40 cm (16”) for this projector.
- Do not place any object in the projection light path at close distance to the projection lens output. The concentrated light at the projection lens output may result in damage, fire or burn injuries.
- Ensure that the projector is solidly mounted so that the projection light path cannot be changed by accident.
- Do not cover the projector or the lens with any material while the projector is in operation. . Mount the projector in a well ventilated area away from sources of ignition and out of direct sun light. Never expose the projector to rain or moisture. In the event of fire, use sand, CO₂ or dry powder fire extinguishers. Never use water on an electrical fire. Always have service performed on this projector by authorized Barco service personnel. Always insist on genuine Barco replacement parts. Never use non-Barco replacement parts as they may degrade the safety of this projector.
- Slots and openings in this equipment are provided for ventilation. To ensure reliable operation of the projector and to protect it from overheating, these openings must not be blocked or covered. The openings should never be blocked by placing the projector too close to walls, or other similar surface. This projector should never be placed near or over a radiator or heat register. This projector should not be placed in a built-in installation or enclosure unless proper ventilation is provided.
- Projection rooms must be well ventilated or cooled in order to avoid build up of heat. It is necessary to vent hot exhaust air from projector and cooling system to the outside of the building.
- Let the projector cool completely before storing. Remove cord from the projector when storing.

To prevent battery explosion

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

To prevent projector damage

- The air filters of the projector must be cleaned or replaced on a regular basis. Cleaning the booth area would be monthly-minimum. Neglecting this could result in disrupting the air flow inside the projector, causing overheating. Overheating may lead to the projector shutting down during operation.
- The projector must always be installed in a manner which ensures free flow of air into its air inlets.
- If more than one projector is installed in a common projection booth, the exhaust air flow requirements are valid for EACH individual projector system. Note that inadequate air extraction or cooling will result in decreased life expectancy of the projector as a whole as well as causing premature failure of the lasers.
- In order to ensure that correct airflow is maintained, and that the projector complies with Electromagnetic Compatibility (EMC) and safety requirements, it should always be operated with all of its covers in place.
- Slots and openings in the cabinet are provided for ventilation. To ensure reliable operation of the product and to protect it from overheating, these openings must not be blocked or covered. The openings should never be blocked by placing the product on a bed, sofa, rug, or other similar surface. This product should never be placed near or over a radiator or heat register. The device should not be placed in a built-in installation or enclosure unless proper ventilation is provided.
- Ensure that nothing can be spilled on, or dropped inside the projector. If this does happen, switch off and remove all power from the projector. Do not operate the projector again until it has been checked by qualified service personnel.
- Do not block the projector cooling fans or free air movement around the projector.
- Do not use this equipment near water.
- **Special care for Laser Beams:** Special care should be used when DLP projectors are used in the same room as high power laser equipment. Direct or indirect hitting of a laser beam on to the lens can severely damage the Digital Mirror Devices™ in which case there is a loss of warranty.
- Never place the projector in direct sunlight. Sunlight on the lens can severely damage the Digital Mirror Devices™ in which case there is a loss of warranty.
- Save the original shipping carton and packing material. They will come in handy if you ever have to ship your equipment. For maximum protection, repack your set as it was originally packed at the factory.
- Unplug this product from the wall outlet before cleaning. Do not use liquid cleaners or aerosol cleaners. Use a damp cloth for cleaning. Never use strong solvents, such as thinner or benzine, or abrasive cleaners, since these will damage the cabinet. Stubborn stains may be removed with a cloth lightly dampened with mild detergent solution.
- To ensure the highest optical performance and resolution, the projection lenses are specially treated with an anti-reflective coating, therefore, avoid touching the lens. To remove dust on the lens, use a soft dry cloth. For lens cleaning follow the instructions precisely as stipulated in the projector manual.
- Only use **zoom** lenses of the Barco TLD+ series on the 4K models of the projector. Using other lenses will damage the internal optics. For suitable fixed TLD+ lenses contact Barco or see Barco website.
- Allowed ambient temperature range depends on altitude:
 - between 0 and 1000 meter altitude: ambient temperature range = 0°C (32°F) to 40°C (104°F)
 - between 1000 and 3000 meter altitude: ambient temperature range = 0°C (32°F) to 30°C (86°F)
- Rated humidity = 0% RH to 80% RH Non-condensed.

On servicing

- Do not attempt to service this product yourself, as opening or removing covers may expose you to dangerous voltage potentials and risk of electric shock.
- Refer all servicing to qualified service personnel.
- Attempts to alter the factory-set internal controls or to change other control settings not specially discussed in this manual can lead to permanent damage to the projector and cancellation of the warranty.
- Remove all power from the projector and refer servicing to Barco authorized service personnel under the following conditions:
 - When the power cord or plug is damaged or frayed.
 - If liquid has been spilled into the equipment.
 - If the product has been exposed to rain or water.
 - If the product does not operate normally when the operating instructions are followed. Adjust only those controls that are covered by the operating instructions since improper adjustment of the other controls may result in damage and will often require extensive work by a qualified technician to restore the product to normal operation.
 - If the product has been dropped or the cabinet has been damaged.
 - If the product exhibits a distinct change in performance, indicating a need for service.

- Replacement parts: When replacement parts are required, be sure the service technician has used original Barco replacement parts or authorized replacement parts which have the same characteristics as the Barco original part. Unauthorized substitutions may result in degraded performance and reliability, fire, electric shock or other hazards. Unauthorized substitutions may void warranty.
- Safety check: Upon completion of any service or repairs to this projector, ask the service technician to perform safety checks to determine that the product is in proper operating condition.

Stacking and transporting

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

Safety Data Sheets for Hazardous Chemicals

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

1.3 Projector Hazard Distances

WARNING. This may be a RG3 laser Product, dependent on which lens used.

This projector may become Risk Group 3 (RG3) when an interchangeable lens with throw ratio greater than 2.3 is installed.

Refer to the installation manual Chapter 3 for the lens list and throw ratio before operation.

Do not look directly in to the beam from the projector lens.


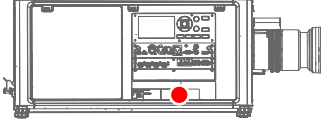

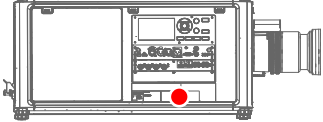

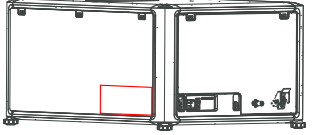

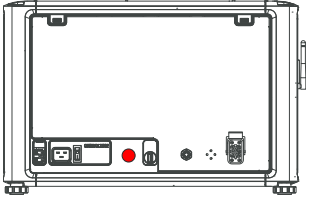

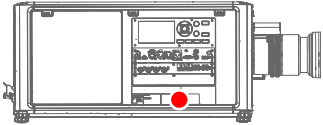
No direct eye exposure to the beam is permitted.

Operators shall control access to the beam within the hazard distance or install the product at a height that will prevent eye exposure within the hazard distance.

See table below for a definition of hazardous distances versus the throw ratio of the lens.

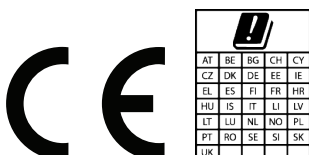
1.4 Product safety labels

Light beam related safety labels

Label image	Label description	Label location
	Hazard RG3: optical radiation warning symbol	
	Hazard class 2: laser radiation warning symbol. 0.95 mW - 638 nm.	
	This projector may become RG3 when no lens, or an interchangeable lens with throw ratio greater than 2.3 is installed. Refer to the manual for the lens list and hazard distance before operation. Such combinations of projector and lens are intended for professional use only, and are not intended for consumer use.	
	CAUTION. Do not stare into beam. RG2 product.	
	LASER RADIATION - DO NOT STARE INTO LASER RANGING BEAM CLASS 2 IEC EN 60825-1:2014 THIS PRODUCT IS IN CONFORMITY WITH PERFORMANCE STANDARDS FOR LASER PRODUCTS UNDER 21 CFR 1040, EXCEPT WITH RESPECT TO THOSE CHARACTERISTICS AUTHORIZED BY VARIANCE NUMBER 2016-V-0144 EFFECTIVE ON DECEMBER 12, 2019. 激光辐射— 请勿直视激光束 第2类 IEC EN 60825-1:2014 雷射辐射— 请勿凝视雷射光束 第2类 IEC EN 60825-1:2014 RADIATION LASER - NE PAS REGARDER LE FAISCEAU LASER CLASS 2 IEC EN 60825-1:2014	

1.5 Radio equipment (optional)

CE Conformity



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

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

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

WiFi & GSM module

For WLAN:

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

For UMTS:

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

For GSM:

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

Getting Started

2

2.1	Getting to know the projector	18
2.2	Power on the projector	20
2.3	Start image projection	21
2.4	Switching to standby	23
2.5	Power off projector.....	23

About this chapter

This chapter and by extension this whole document, the user manual, is intended for the user who want's to operate the projector. It does not contain installation instructions because the installation has to be done by trained and qualified service technicians. Refer to the projector installation manual for detailed installation instructions.

2.1 Getting to know the projector

Orientation convention

This manual refers to the left side of the projector as the side at your left hand when standing behind the projector and looking at the projection screen in front of the projector.

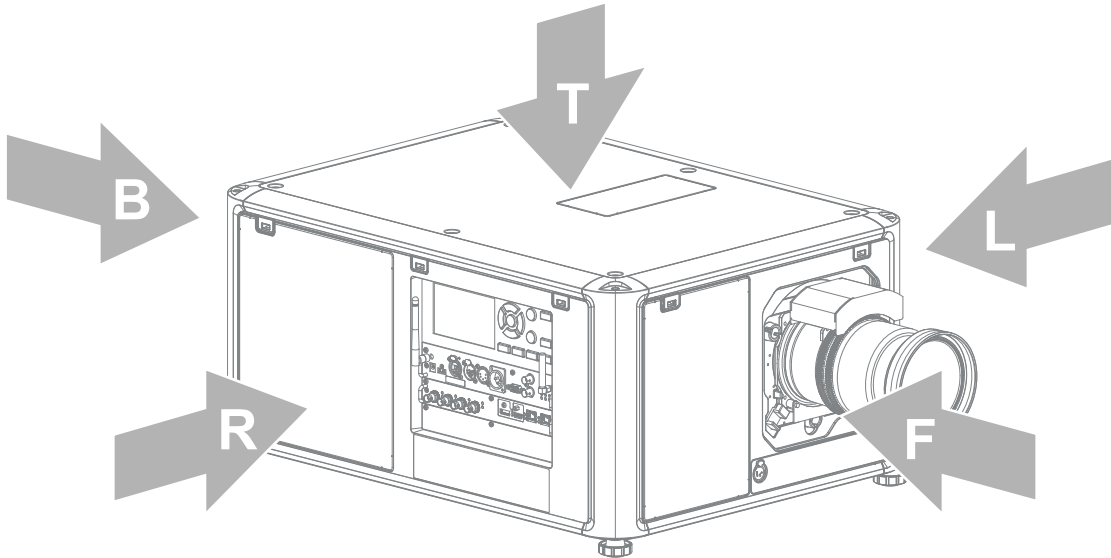


Image 2-1

- | | |
|----------------|----------------|
| T Top | R Right |
| L Left | B Back |
| F Front | |

Projector component location

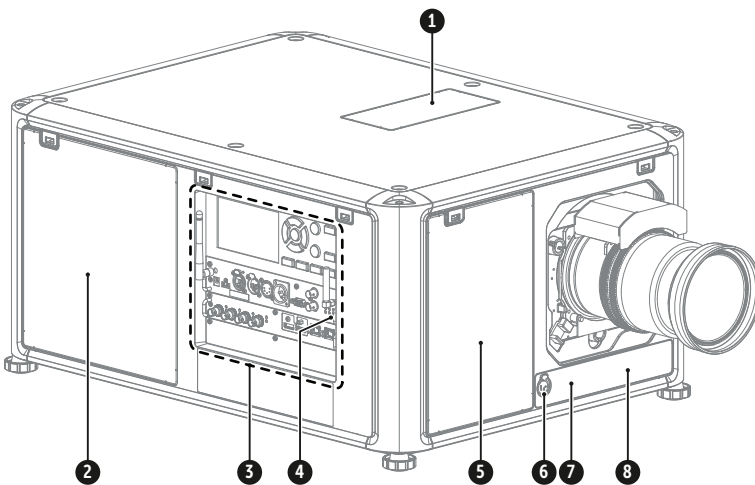


Image 2-2

- | | |
|---|---|
| 1 Dust filter top air inlet | 5 Dust filter front air inlet |
| 2 Dust filter side air inlet | 6 Auxiliary connector (for external shutter, DMX, ...) |
| 3 Input & Communication module | 7 IR receiver projector front side |
| 4 IR receiver projector right side | 8 Distance meter (optional) |

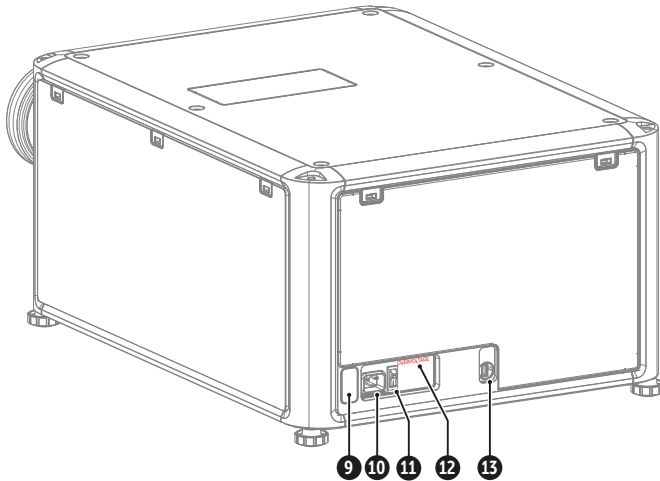


Image 2-3

- | | |
|---|---|
| 9 IR receiver projector rear side | 12 Overvoltage status light |
| 10 Mains power input socket (for C19 plug) | 13 USB port (to control motorized rigging frame) |
| 11 Power ON/OFF switch | |

For detailed info about the Input & Communication module see chapter “Input & Communication”, page 33.

Projector airflow

The projector has three air inlets: one at the top, one at the front and one at the right side of the projector. Each air inlet is equipped with a dust filter. For cleaning/replacement instructions see chapter “Product maintenance”, page 59.

There is only one air outlet which is located at the rear of the projector.

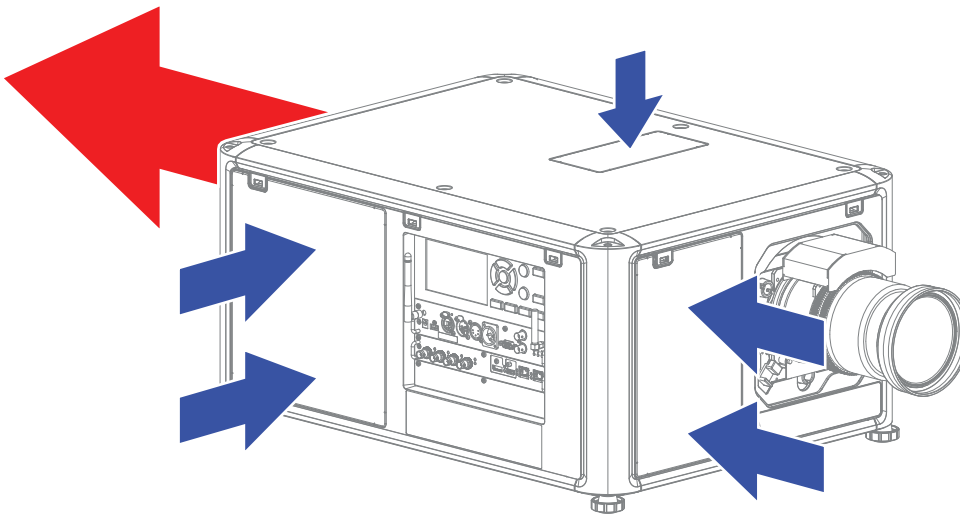


Image 2-4



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

Projector Infra Red receivers and Remote Control Unit

The projector has three Infra Red receivers: one at the rear (next to the power input), one at the front (below the lens holder) and one at the right side (integrated in the Input & Communication module).

Point the Remote Control Unit (RCU) directly to the Infra Red (IR) receiver. Make sure you are within the effective operating distance (30 m, 100 ft in a straight line)

The RCU will not function properly if strong light strikes the IR sensor window or if there are obstacles between the RCU and the IR sensor.

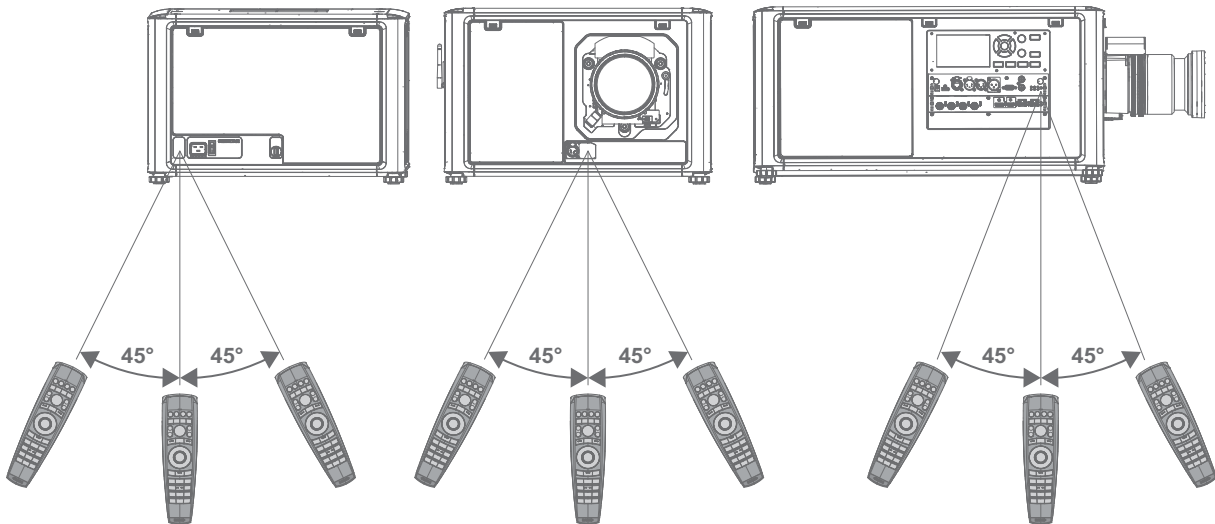


Image 2-5

For detailed info about the RCU see chapter “Pulse Remote Control Unit”, page 25.

2.2 Power on the projector

How to power on

1. Does the **OVERVOLTAGE** status light (reference 1) lit up?
 - ▶ If **yes**, pull out the power cord immediately. Contact a qualified technician to check the power net.
 - ⚠ **Warning:** Never switch on the projector if the **OVERVOLTAGE** status light lit up. Neglecting will cause irreversible damage to the projector.
 - ▶ If **no**, proceed with the next step.
2. Press the mains switch (reference 2) to switch on this projector.

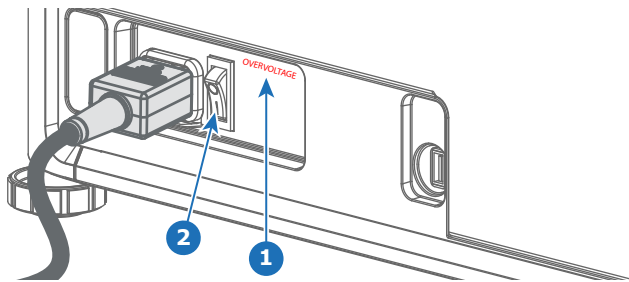


Image 2-6

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

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



Image 2-7

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

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

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



Image 2-8



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

2.3 Start image projection

Connect the source

1. Connect the source cable with the appropriate input port on the Input & Communication module.



Tip: See chapter “Input & Communication”, page 33, for more info about supported input formats.

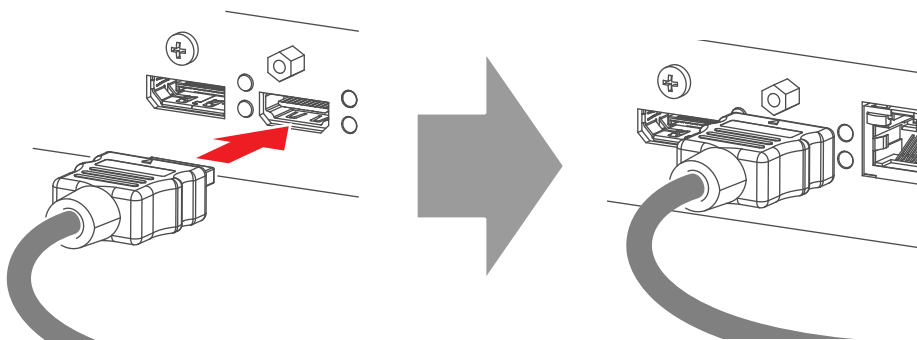


Image 2-9 Example of connecting an HDMI source.

2. Check if the **SYNC** LED lit up ORANGE (reference 1). This indicates that the sync is detected on the input signal.

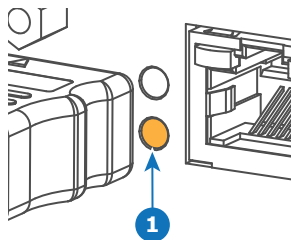


Image 2-10

Select the source

1. Press the **Input** button (reference I) on the remote control or local keypad.

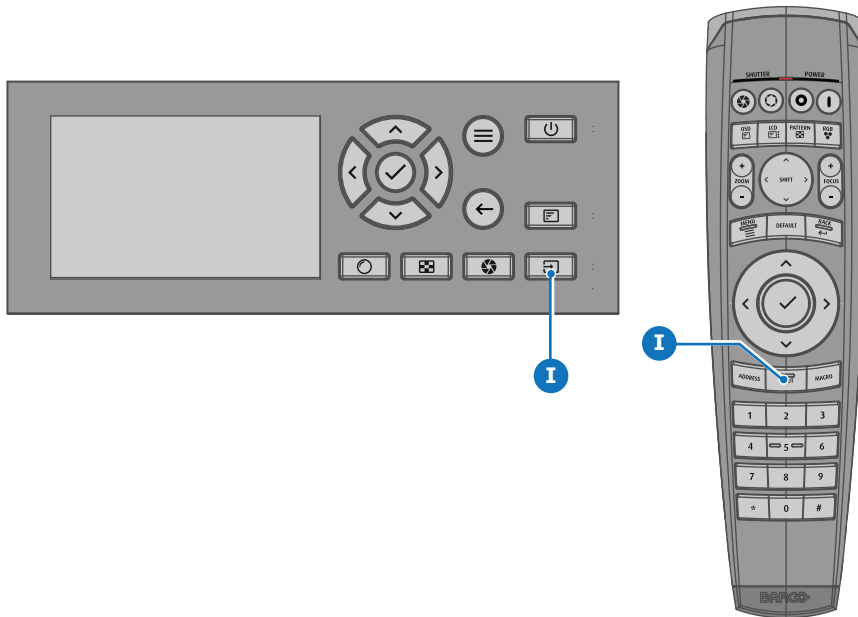


Image 2-11

The *Source selection* menu opens on the LCD display.

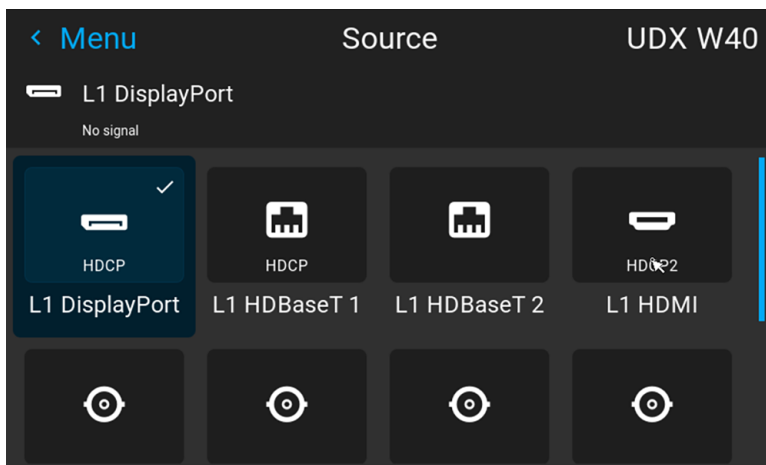


Image 2-12 Example of the input selection menu

2. Use the arrow keys to select the desired source.
 - the **SEL** LED (reference 2) of the selected source lit up GREEN, and
 - the image of the selected source is projected.

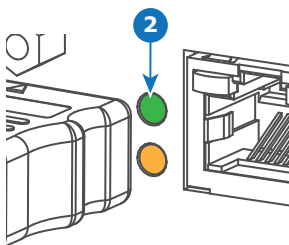


Image 2-13

Quick test pattern selection

1. Press the Test pattern button (references P) on the remote control or local keypad.

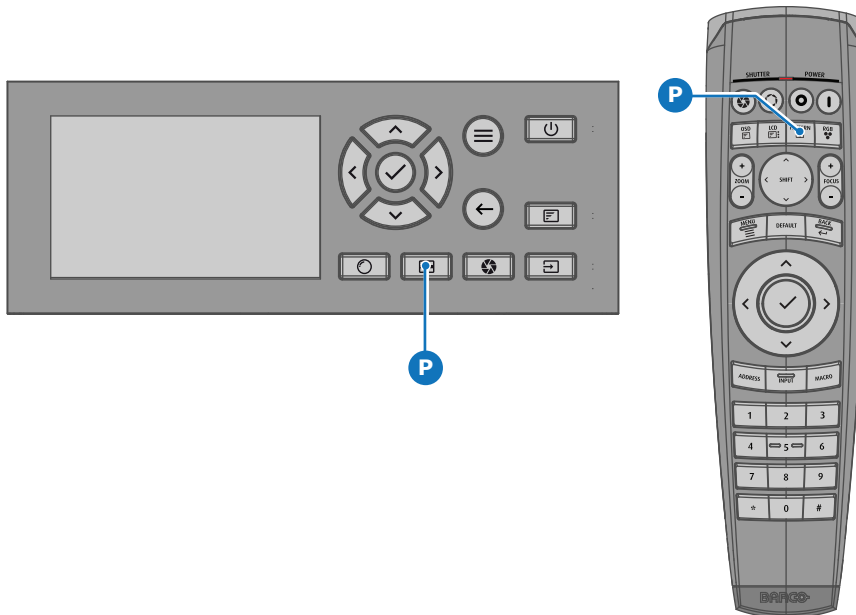


Image 2-14

The *Test pattern* menu opens on the LCD display.

2. Use the arrow keys to select the desired test pattern.

2.4 Switching to standby

How to switch to standby

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

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

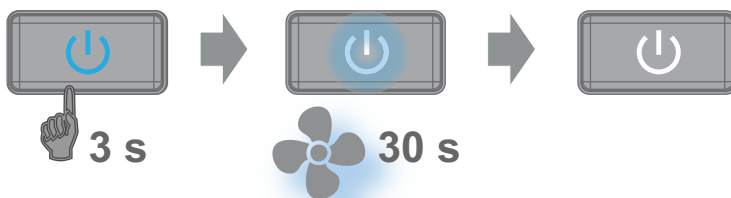


Image 2-15

2.5 Power off projector



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

How to power off

1. Switch off the projector with the mains switch. '0' must be pressed.
2. Unplug the power cord from the projector.

Pulse Remote Control Unit

3

3.1	Remote control, battery installation	26
3.2	Remote control, protocol setup	27
3.3	Remote control, on/off button.....	27
3.4	Using the RCU	28
3.5	Functionality overview.....	29
3.6	Functions of the “button pressed indicator”	29
3.7	Function of the RGB filter button	29
3.8	Displaying and Programming addresses into the RCU.....	30
3.9	Using the XLR connector of the RCU	30
3.10	Using the mini-jack connector of the RCU.....	31
3.11	Silicone protection sleeve for the RCU (optional).....	31

3.1 Remote control, battery installation

Where to find the batteries for the remote control ?

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

How to install

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

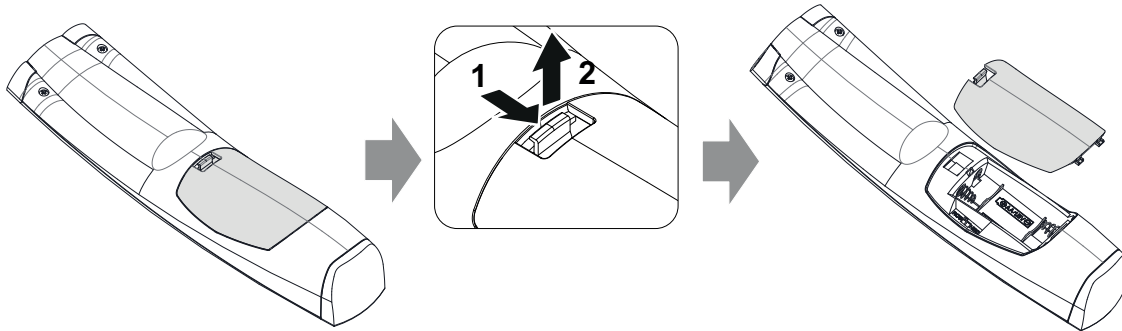


Image 3-1

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



Tip: Use alkaline batteries for optimum range and life time.

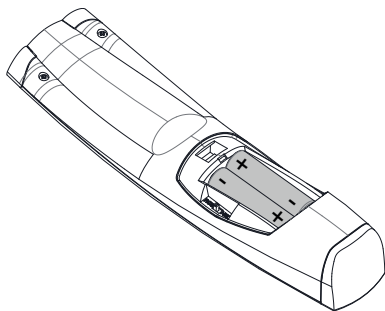


Image 3-2

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

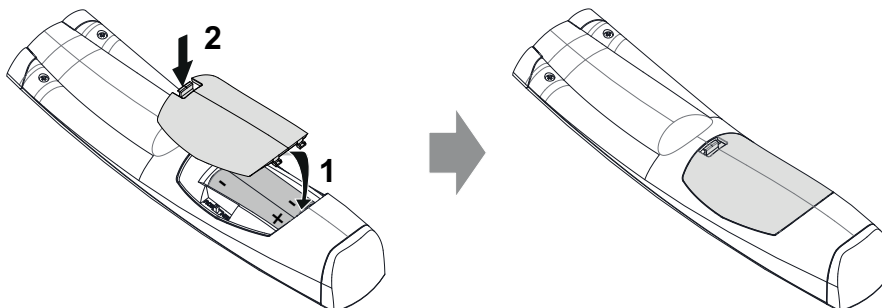


Image 3-3



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



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



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

3.2 Remote control, protocol setup

About the used protocol

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

Which protocol to use

- The **NEC** protocol has to be used for Barco projectors based on the Pulse platform: F70, F80, F90, HDX 4K, UDX, UDM, XDL, etc.
- The **RC5** protocol has to be used all legacy Barco projectors: HDQ 2k40, HDF, HDX W, etc.

How to set

1. Remove the cover. For more info on how to remove, see “Remote control, battery installation”, page 26.
2. Place the switch in the desired position.

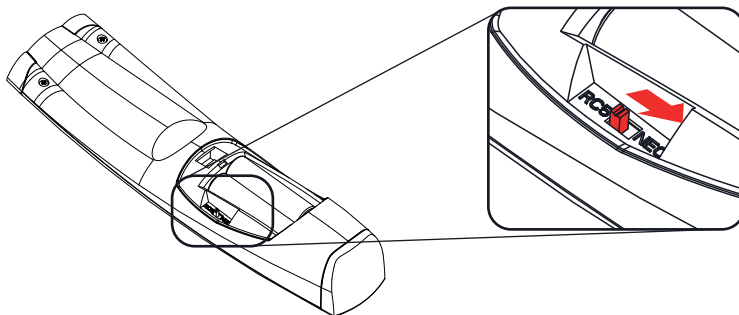


Image 3-4

Remarks when using the RC5 protocol

Due to new or updated functionality not all buttons of the Pulse RCU are one-to-one compatible with the legacy Barco RCU and projectors. Take the following limitations into account:

- Buttons **Shutter open** and **Shutter close** emit the same code when in RC5 mode. This because the legacy RCU's only had 1 button for Shutter functionality.
- Buttons **Power on** and **Power off** emit the same code when in RC5 mode. This because the legacy RCU's only had 1 button for Power functionality.
- The **RGB filter** button is not supported.
- The **Input selection** button is not supported.
- The **Default value** button is not supported.
- The **Macro** button is not supported.

3.3 Remote control, on/off button

Purpose of the remote control on/off button

The Pulse remote control unit has at the front side an on/off switch (reference 1 Image 3-5). Switching off the remote control prevents that unwanted commands are send due to an accidental key press. Furthermore, switching the RCU off will extend the battery life time of the remote control.

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

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

Default when (re)placing batteries, is “ON”.

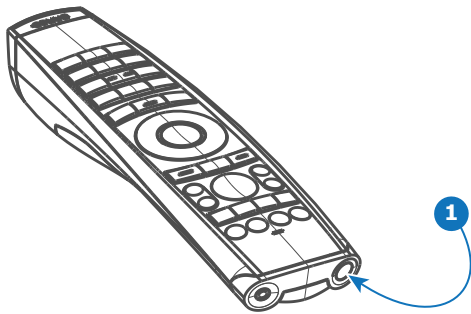


Image 3-5

3.4 Using the RCU

Pointing to the reflective screen or IR sensors

Switch on the RCU and point the front of the RCU to the reflective screen surface or point directly to one of the projector IR sensors. Make sure you are within the effective operating distance (30 m, 100 ft in a straight line). The RCU will not function properly if strong light strikes the IR sensor window or if there are obstacles between the RCU and the IR receiver.

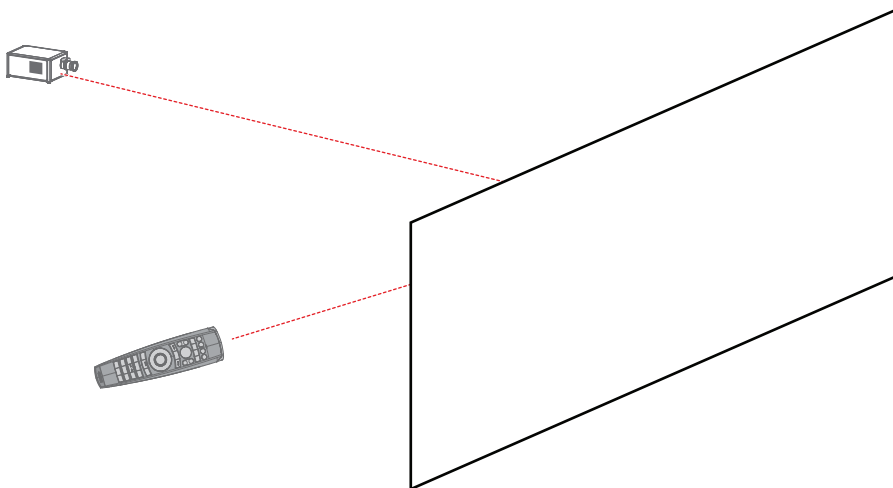


Image 3-6

The RCU can also hard-wired been used. See chapter “Using the XLR connector of the RCU”, page 30.

Using the RCU in combination with a 3D emitter

When using a 3D emitter that radiates IR beams (e.g. the optional 3D emitter that Barco provides), the IR beams of the 3D emitter may interfere with the IR communication between projector and the RCU.

If such interference occurs, connect the RCU to the projector using the remote cable with XLR connector. It is also be advised to turn the IR receivers of the projector off to avoid the 3D emitter interference. The IR receivers can be turned off in the GUI: *System Settings > Communication > IR Control* .

3.5 Functionality overview

Remote Control Unit buttons

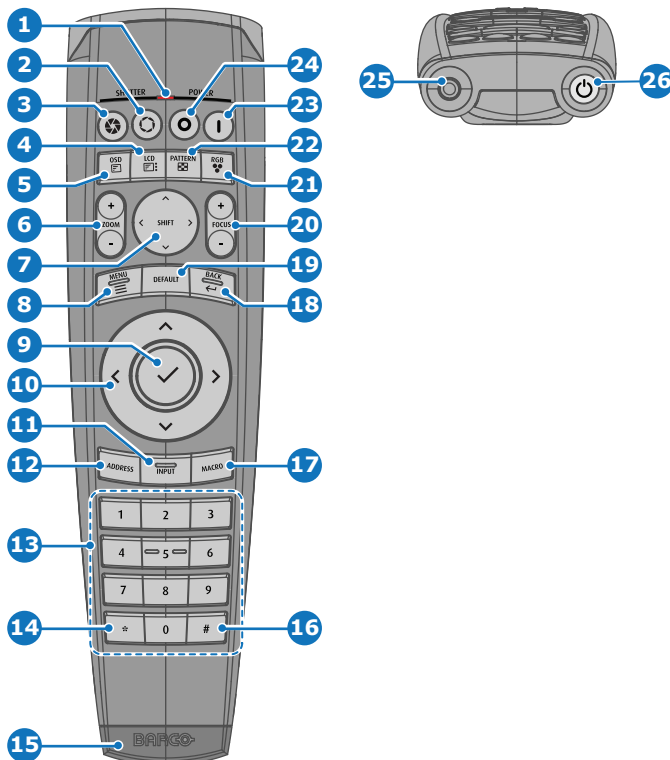


Image 3-7

- | | | | |
|----|---------------------------|----|--------------------------------------|
| 1 | Button pressed indicator | 14 | Backspace (while entering values) |
| 2 | Shutter open | 15 | XLR connector |
| 3 | Shutter close | 16 | Decimal mark (while entering values) |
| 4 | LCD panel on / off | 17 | Macro button |
| 5 | Project OSD on / off | 18 | Menu back |
| 6 | Lens zoom | 19 | Default value button |
| 7 | Lens shift | 20 | Lens focus |
| 8 | Menu open / close | 21 | RGB filter |
| 9 | Menu selection, OK button | 22 | Test patterns |
| 10 | Menu navigation | 23 | Power on |
| 11 | Input selection | 24 | Power off |
| 12 | Address button | 25 | 3.5 mm jack |
| 13 | Numeric buttons | 26 | RCU on / off |

3.6 Functions of the “button pressed indicator”

Functions button pressed indicator

- Rapidly flashes when commands are sent, this is the normal “button pressed” indication.
- 1 Short flash when remote control is switched ON by means of the on/off button.
- Continuously lit (up to 5 seconds) when address digits are expected after pressing the ADDR button.
- Slowly flashes (2 times a second) when the battery level is becoming low; typically when more than 85% of the useful life is past.

3.7 Function of the RGB filter button

Filtering the color of the projected image

By pressing the RGB filter button on the RCU you can place a color filter on the output of the projector. This feature can be useful during the installation and configuration of a multi-projector or multi-channel setup. By

having one projector project a red image and another project a green image, it is easier to spot and adjust the overlap section.

By pressing this button multiple times, you will have different active filters, in the following cycle:

- Red + Green + Blue (default)
- Red only
- Green only
- Blue only
- Red + Green
- Green + Blue
- Red + Blue
- Red + Green + Blue
- etc



After powering up, the colors will always revert back to full RGB.

3.8 Displaying and Programming addresses into the RCU

Displaying the Projector Address on the Screen.

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

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

How to Program an Address into the RCU?

1. Press the **Address** button until the *Button pressed indicator* lights up continuously (proximately 5 seconds).
2. Enter the address with the digit buttons within the time the indicator lights up (also proximately 5 seconds).



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

Tip: A few examples:



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

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

3.9 Using the XLR connector of the RCU



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

How to use the XLR connector

1. Remove the XLR cover by pulling it backwards.

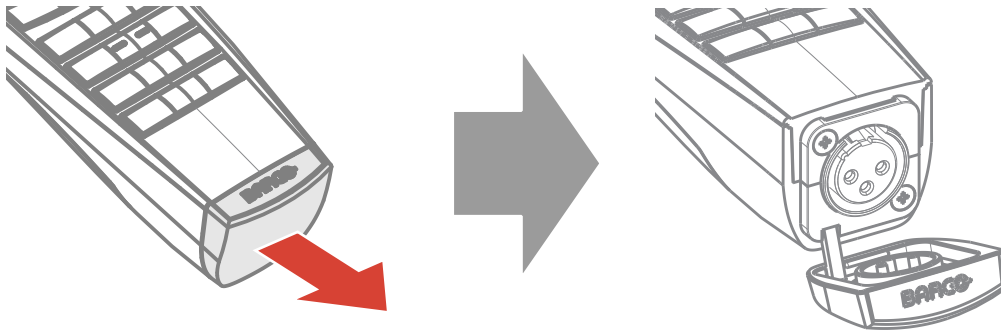



Image 3-8

2. Connect a cable with XLR plug into the XLR connector of the RCU.
 3. Connect the other end of the cable with the XLR input of the projector.
-  *Note:* While the XLR cable is connected, the IR beam of the RCU is switched off.

3.10 Using the mini-jack connector of the RCU



Connecting a cable with the mini-jack connector will reset the broadcast address of the RCU to its default value '0'.

How to use the mini-jack connector

1. Connect a cable with the mini-jack connector (reference 2 Image 3-9) of the RCU.
2. Connect the other end of the cable with the mini-jack input of the projector.

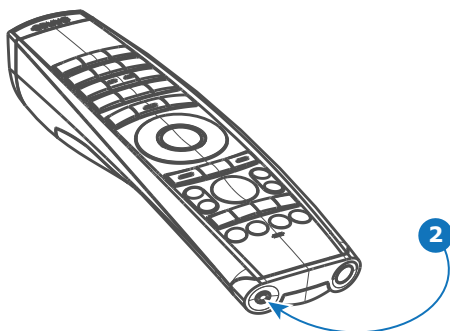


Image 3-9



Note: While the mini-jack cable is connected, the IR beam of the RCU is switched off.

3.11 Silicone protection sleeve for the RCU (optional)

Introduction

Barco offers a silicone form fitting protection sleeve for the Pulse RCU. The silicone material keeps it comfortably, non slip and soft touch. All buttons and holes remain accessible. The sleeve is quick and easy installed. For ordering information see Barco website.

How to install

1. Pull off the rubber XLR-lid from the RCU.



Image 3-10

2. Place back side (XLR side) of the RCU into the sleeve and pull the other side of the sleeve over the front side of the RCU.

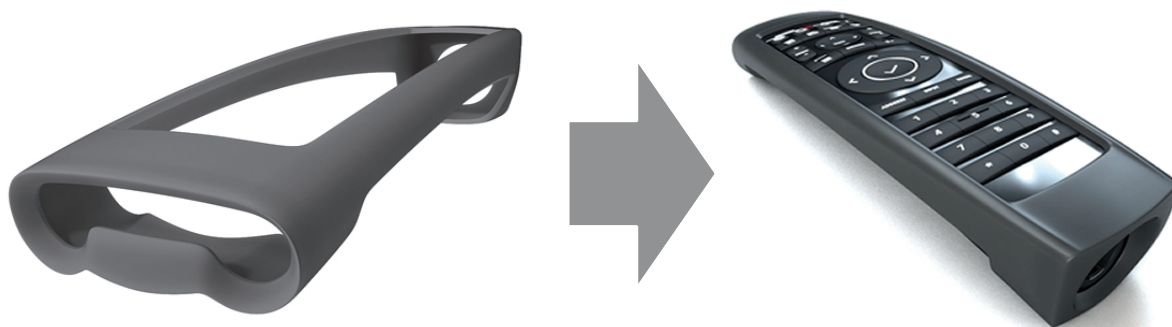


Image 3-11

Input & Communication

4

4.1	Introduction	34
4.2	Local Keypad and LCD panel	34
4.3	LCD touch panel.....	35
4.4	Communication connections.....	36
4.5	LED and Button indication chart.....	38
4.6	Pulse Quad Combo input Mk II	39
4.7	Pulse Quad Combo input Mk I	40
4.8	Pulse Quad DP 1.2 input	41
4.9	Pulse SFP input.....	42

4.1 Introduction

General

The Input & Communication module consists of a local keypad with LCD panel (1), a communication panel (4) and a Quad Combo input board (5). The free input slot can be used for optional modules (e.g. the Quad DP 1.2 input board).

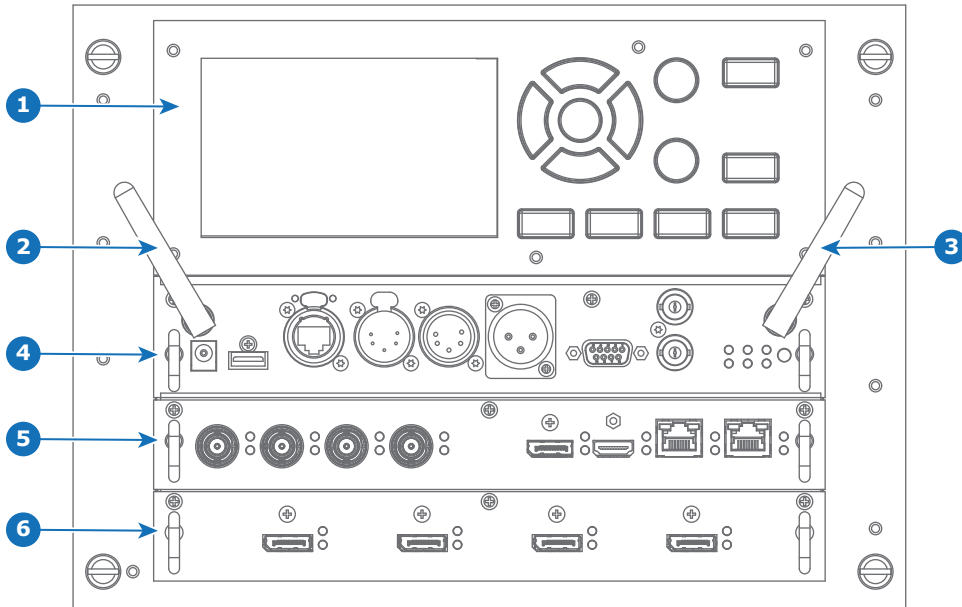


Image 4-1

- | | | | |
|---|--------------------------------------|---|--|
| 1 | Local Keypad and LCD panel | 4 | Communication Panel |
| 2 | Optional antenna for WiFi connection | 5 | Quad Combo Input board |
| 3 | Optional antenna for GSM | 6 | Free input slot (here filled with the Quad DP 1.2 Input board) |

4.2 Local Keypad and LCD panel

Overview

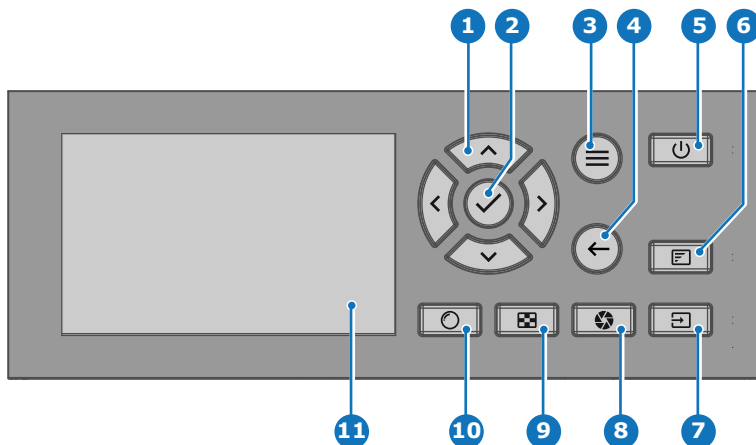


Image 4-2

- | | | | |
|---|------------------------------|----|----------------------|
| 1 | Menu navigation | 7 | Input selection |
| 2 | Menu confirmation, OK button | 8 | Shutter open / close |
| 3 | Menu open / close | 9 | Test patterns |
| 4 | Menu back | 10 | Lens adjustment |
| 5 | Power on / off | 11 | LCD panel |
| 6 | Project OSD on / off | | |

Local Keypad

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

The keypad has a backlight that can be switched on and off manually. By default the light turns off after 5 minutes.

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

LCD panel

The LCD panel has two main functions:

1. Showing the menus, the adjustment information and also a mirror of the OSD, (On Screen Display) described in *User Interface* when this is enabled.
2. Information regarding the status of the projector showing this data:
 - Projector status
 - Network address
 - Active source
 - Current firmware version
 - Operation Data
 - Active functions (Enabled Functions).

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

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

4.3 LCD touch panel

LCD touch panel functionality

In addition to the remote control and the keypad, it is also possible to navigate in the menus with the touch functionality in the LCD panel.

Press the icons to select the functions.

Select switches to toggle.

Select and drag sliders to adjust slider value.

When using the touch screen, some menu pictures will be present different compared to using the remote control or keypad. This applies in those cases where there is a numerical value to be set. The illustrations below shows how to scroll and confirm a numeric value. In this case, setting the screen size.

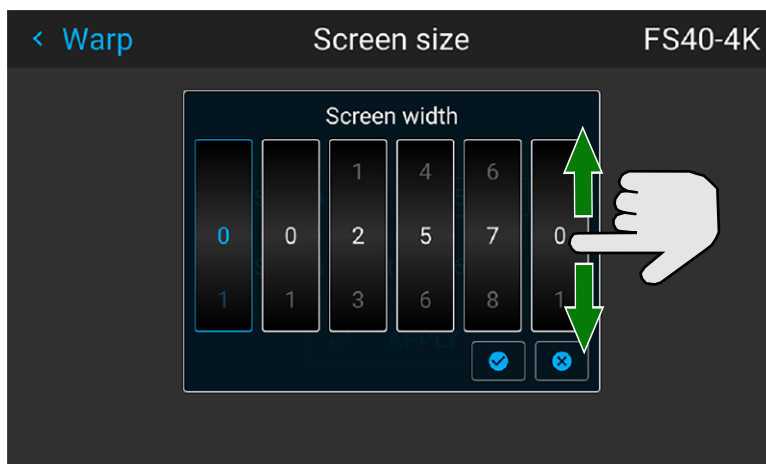


Image 4-3

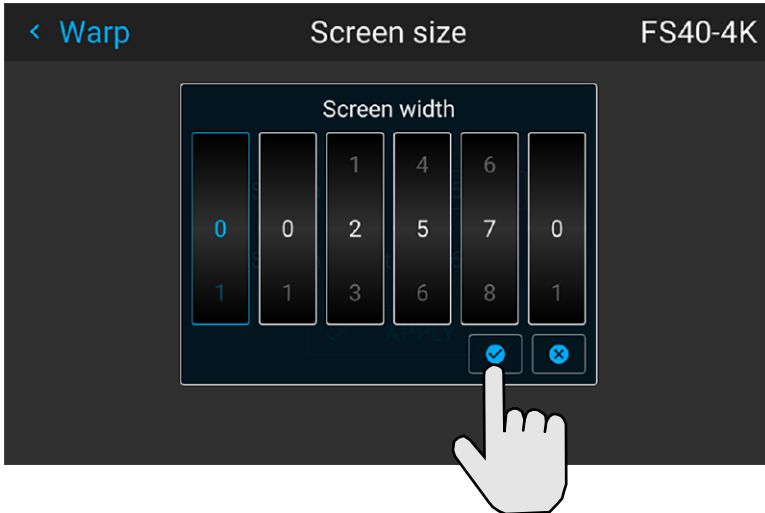


Image 4-4

4.4 Communication connections

Communication Panel

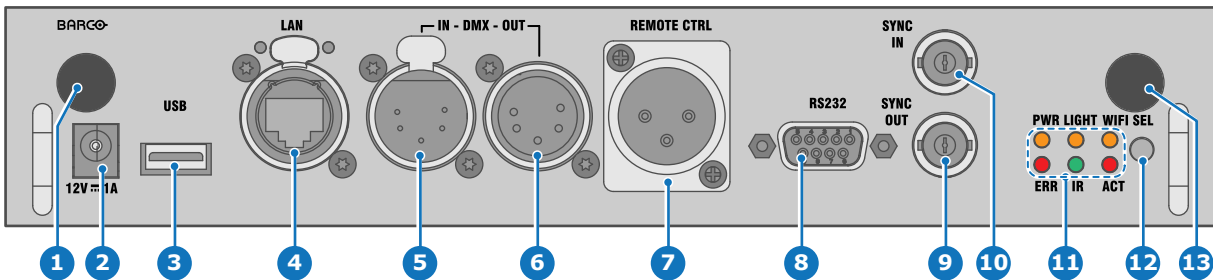


Image 4-5

- | | |
|--|---|
| <ul style="list-style-type: none"> 1 WIFI antenna for wireless IP (optional) 2 12V 1A output 3 Firmware update / USB download log files 4 10/100 base-T for external control over IP and Art-Net 5 DMX interface input 6 DMX interface output 7 XLR input for wired projector control | <ul style="list-style-type: none"> 8 RS232 for serial communication 9 Sync Out 3D 10 Sync In 3D 11 Status lights 12 IR receive sensor 13 GSM antenna input (optional) |
|--|---|

CAUTION: Ethernet should only be connected to either the 10/100 base-T port (on the communication panel) or the HDBaseT input (on the Quad Combo Input Mk II). Using both at the same time will lead to undefined behavior.

12 V output

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

DMX interface

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

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

DMX

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

**DMX**

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

RS232/RS422 input

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

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

Advantages of using RS232/RS422 serial communication:

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

RS232/422 input (Sub-D) port

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

**RS232**

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

RS422



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

USB port

The communication interface is equipped with a master USB port, type “A” connector. This USB port will simplify the service procedures for firmware updates or for downloading the log files without a network connection.

If the only file on the USB device is the firmware file (a “*.fw” file), the projector will automatically start one of the following processes.

- **cornet<version nr>.fw**: The projector will upgrade or downgrade, depending on the version number.
- **LogExtractor.fw**: The log files will be downloaded.



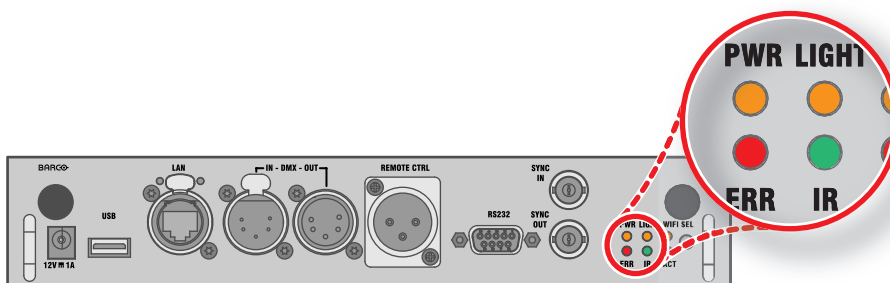
Make sure that any used USB-stick is FAT32 compatible and contains no other files or folders.

4.5 LED and Button indication chart

Button Backlight Status

Button	Color status	Description
	Blinking WHITE (slow)	Projector starts up (booting)
	Blinking WHITE (fast)	Firmware upgrade
	Solid WHITE	Projector is in Standby mode
	Blinking BLUE	Projector goes to ON mode
	Solid BLUE	Projector is ON
	Blinking RED	Error condition
	Off (no color)	Projector is OFF, starts up, or is in Standby mode.
	Solid WHITE	Projector is ON, shutter is open
	Solid RED	Projector is ON, shutter is closed

LED Status



LED	Color status	Description
PWR (power LED)	Off	Projector powers up
	RED	Projector is in Standby
	ORANGE	Projector is Ready

LED	Color status	Description
LIGHT (Illumination LED)	GREEN	Projector is on
	Off	Light source is off
	RED	No light source detected
	ORANGE	Light source is on in ECO mode
	GREEN	Light source is on in normal mode
	GREEN-ORANGE	Light source is on in CLO mode
ERR (error LED)	Off	No error
	RED toggles on/off	Error
	ORANGE toggles on/off	Warning
IR	RED	IR signal received
	GREEN	IR signal acknowledged

4.6 Pulse Quad Combo input Mk II

Overview Quad Combo Input Mk II

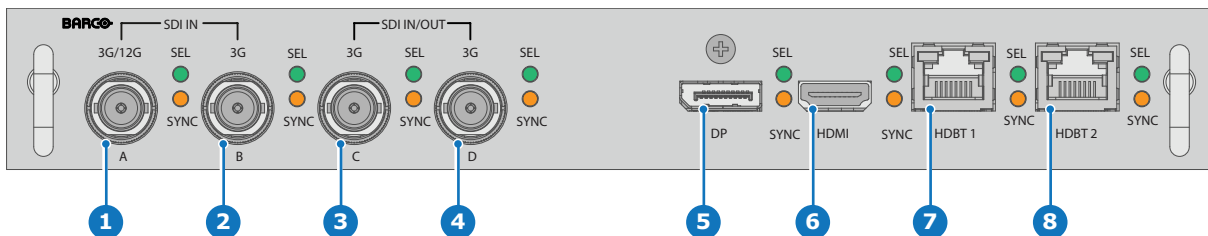


Image 4-6

- | | |
|---|----------------------------|
| 1 Quad SDI channel A: 3G/12G input | 5 DisplayPort Input |
| 2 Quad SDI channel B: 3G input | 6 HDMI input |
| 3 Quad SDI channel C: 3G SDI input + 3G/12G output | 7 HDBaseT input 1 |
| 4 Quad SDI channel D: 3G SDI input / output | 8 HDBaseT input 2 |

Functionality of the Quad Combo input Mk II

The Quad Combo Input Mk II support 12G input and throughput on the SDI connectors.

Compared with the Mk I the Mk II includes the following:

- **SDI input A** supports **12G** input signals.
- **SDI input C** functions as a **loop-through output** for any signal placed on **input A**.
- **SDI input D** functions as a **loop-through output** for any signal placed on **input B**.
- **HDBaseT input 1** supports **network connectivity**.



CAUTION: Ethernet should only be connected to either the 10/100 base-T port (on the communication panel) or the HDBaseT input (on the Quad Combo Input Mk II). Using both at the same time will lead to undefined behavior.

SDI input & output – How does it work?

When connecting an SDI source to the projector and the signal is HD or 3G, you can choose any of the four input connectors.

When connecting multiple projectors with the same signal, you can connect the signal as follows:

- Connect the source signal to Input A or B of the first projector.
- If the source signal is connected to **input A**, connect **input/output C** to the Input of the following projector.
- If the source signal is connected to **input B**, connect **input/output D** to the Input of the following projector.
- Continue in the same fashion until all projectors are connected.

When connecting a 12G SDI source to the projector, you can only connect that source to input A.



Only Input A accepts 12G SDI signals . While it is technically possible to connect a 12G SDI source to Input B and connect that source to another projector in line (using Input/Output D), this first projector itself will not be able to process the 12G signal.

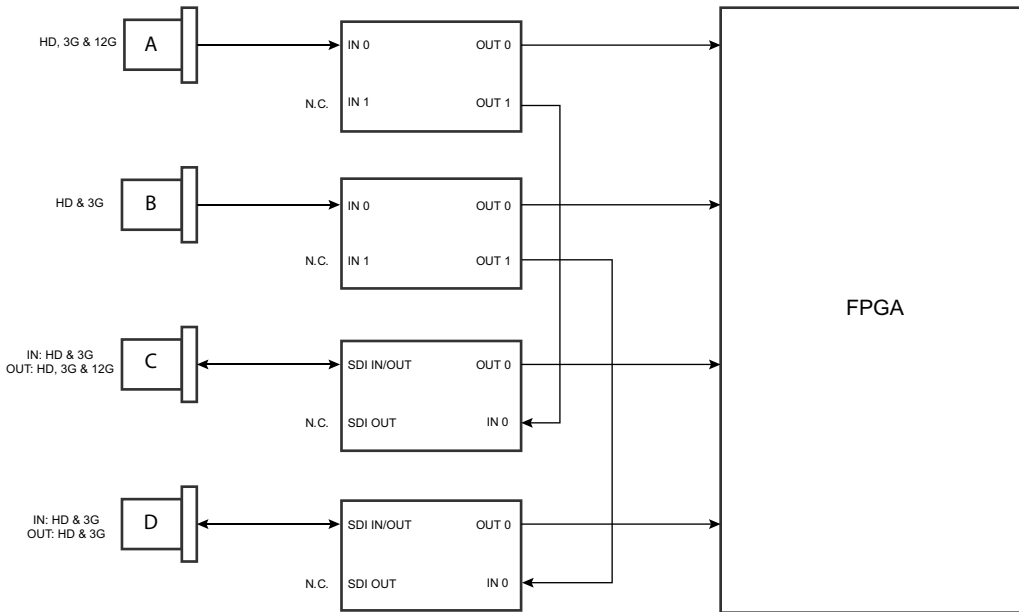


Image 4-7

LED behavior

- The SYNC LED lit up ORANGE when valid input sync is detected.
- The SEL LED lit up GREEN when the input is selected.
- The SEL LED blinks GREEN when the input/output is selected and configured as output.



For specifications about the supported inputs for SDI, HDMI, HDBaseT and DisplayPort 1.2 see chapter “”, .

4.7 Pulse Quad Combo input Mk I

Overview Quad Combo input Mk I

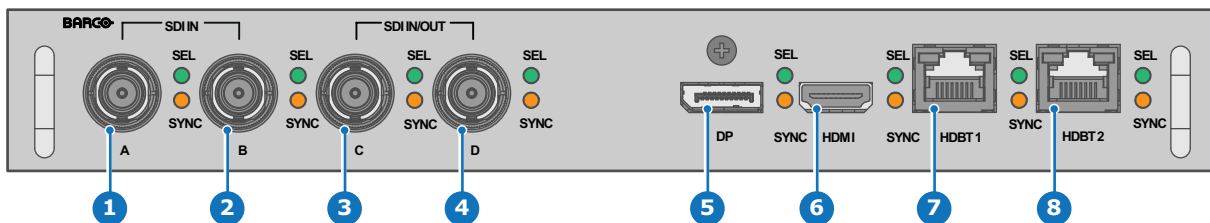


Image 4-8

- | | |
|--|---|
| <ul style="list-style-type: none"> 1 Quad SDI channel A: 3G input 2 Quad SDI channel B: 3G input 3 Quad SDI channel C: 3G input 4 Quad SDI channel D: 3G input | <ul style="list-style-type: none"> 5 DisplayPort Input 6 HDMI input 7 HDBaseT input 1 8 HDBaseT input 2 |
|--|---|

LED behavior

- The SYNC LED lit up ORANGE when valid input sync is detected.
- The SEL LED lit up GREEN when the input is selected.



For specifications about the supported inputs for SDI, HDMI, HDBaseT and DisplayPort 1.2 see chapter “”, .

Remark concerning the Mk I and Mk II inputs boards

The Mk I input board miss functionality that has been implemented on the Mk II input board. These missing features include:

- **Loop-through** functionality
- **12G SDI** support
- Network connectivity on HDBaseT inputs

The projector is now standard equipped with the Mk I input board. For details and specifications see chapter “Pulse Quad Combo input Mk II”, page 39.

Visual difference between the Mk I and Mk II input boards

There is one real visual aid to tell the two variants apart. There are visual markings added on the Mk II input board, marking which connector supports 12G and which only supports 3G.

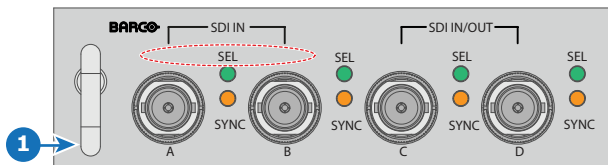


Image 4–9 Quad Combo Input Mk I board, without markings above the SDI inputs

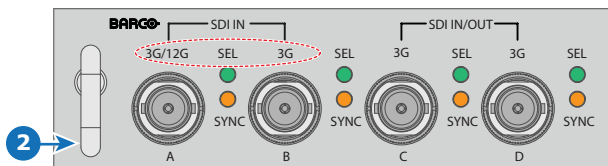


Image 4–10 Quad Combo Input Mk II board, with 3G/12G markings above the SDI inputs/outputs.

4.8 Pulse Quad DP 1.2 input

Quad DP 1.2 input

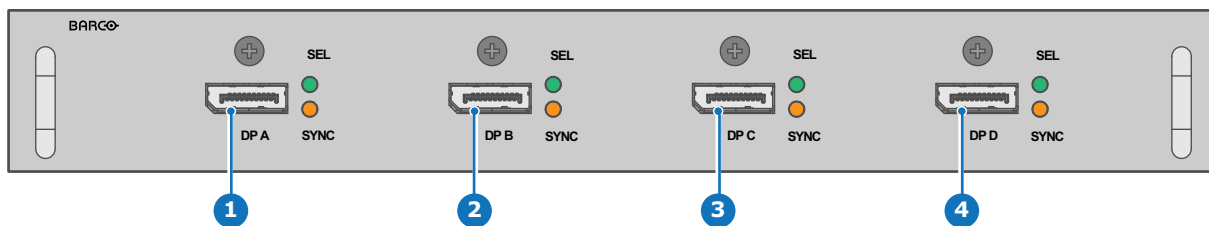


Image 4–11

- 1 Quad DisplayPort channel A input
- 2 Quad DisplayPort channel B input
- 3 Quad DisplayPort channel C input
- 4 Quad DisplayPort channel D input

LED behavior

- The SYNC LED lit up ORANGE when valid input sync is detected.
- The SEL LED lit up GREEN when the input is selected.



For specifications about the supported inputs for DisplayPort 1.2 see chapter “”, .

4.9 Pulse SFP input



The Barco SFP Input Board has been designed and tested to work alongside the Barco SFP Output Board.

However, it is possible that the SFP Input board can also work with other third-party devices that support 12G over fiber. Due to the many third-party options available on the market, the input board could not be tested for every option available.

Overview SFP input

To connect 12G SDI over fiber.

The SFP input is delivered without any connector. It is up to the customer to buy the necessary connectors, transceivers and cables. These parts can be mounted on the indicated places on the front panel of the board.

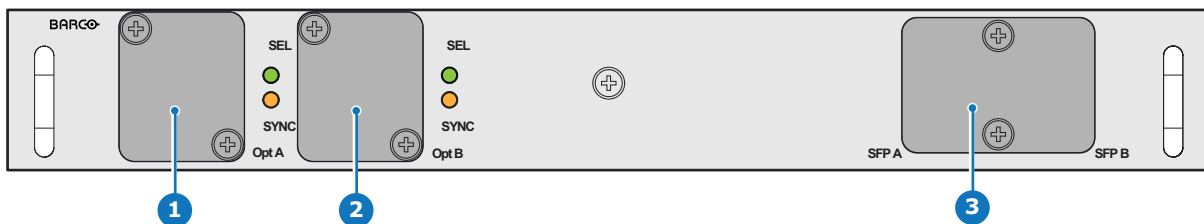


Image 4-12

- 1 Neutrik Duo optical connector or Neutrik Quad optical connector
- 2 Neutrik Duo optical connector or Neutrik Quad optical connector
- 3 2x12G SDI/10GE transceiver



For specifications about the supported inputs for SFP see chapter “”, .

LED behavior

- The SYNC LED lit up ORANGE when valid input sync is detected.
- The SEL LED lit up GREEN when the input is selected.

Use cases

The SFP can be configured as follows:

1. SFP+ transceiver + Fiber connection (integrated or separated)
2. Neutrik OpticalCon Duo + SFP+ transceiver + internal fiber
3. Neutrik OpticalCon Quad + SFP+ transceiver + internal fiber
4. Loop-through mode



See projector installation manual for detailed instructions on how to install/configure the SFP input.



WARNING: Only by Barco trained and qualified technicians are allowed to install the SFP input.

GUI – Introduction

5

5.1	Overview	44
5.2	Navigation.....	45

About this chapter

This chapter gives an general overview of the Graphic User Interface.

5.1 Overview

Disclaimer on GUI images used in this manual

The GUI images in this manual are example illustrations and should be treated as such. While the name of the projector displayed in the illustrations may be different from the projector model you are currently using, the menu lay-out and functionality is identical.

GUI – First start of the software

When you start the projector for the first time, you will be requested to choose the system language. You can choose between the following languages:

- German (DE)
- English (EN-US)
- Spanish (ES)
- French (FR)
- Japanese (JA)
- Korean (KO)
- Portuguese (PT-BR)
- Chinese (ZH)



Image 5-1 Example of the welcome screen

Once you confirmed your choice, you will be prompted with the **Pulse product-specific End User License Agreement (EULA)**. You will only be able to access the projector software once you have fully read and approved the EULA.

GUI – Status Screens

While the projector menu is not active, or the projector is Ready or Standby mode, the Status screens remain visible. These screens give an overview of the state of the projector and can be navigated through using the left and right arrow keys, or by swiping the screen left or right. The status screens are the following:

- **Dashboard:** The main overview. This screen displays all the chosen options on the projector (chosen source, blending/masking, display mode, etc).
- **About:** General info about the projector. This includes serial number, software version, mounted lens and light source runtime.
- **Notifications:** The error and/or warning messages that are currently active. If no messages are active, this list will be empty.
- **Preview:** A preview pane of the projected image. If no image is being projected, a test image is displayed instead.

GUI – Main Menu overview

The projector on-screen display (OSD) is the primary user interface (UI). From here, you can review and adjust all projector and display settings.

The OSD interface uses buttons to display the main menu. Each main menu contains submenus. The OSD can be disabled by pressing the OSD on/off button.

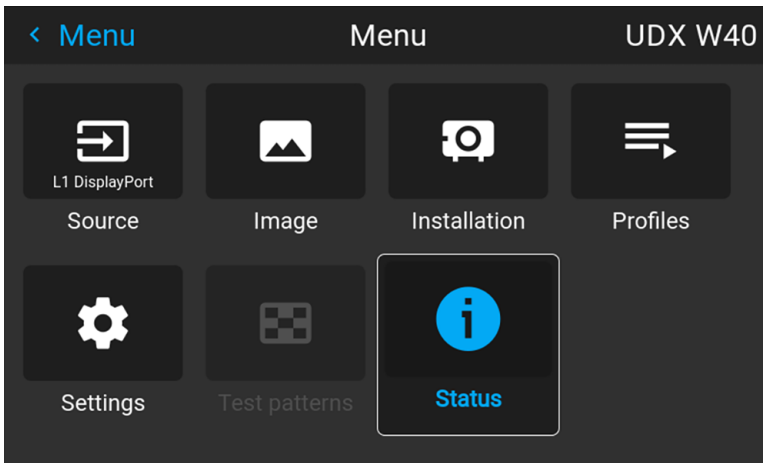


Image 5–2 Example of the home menu

The projector software platform uses access levels what each user can do. A standard user has access to the standard projector functionality. A certified service technician has also access to the advanced settings menu. This menu is password protected. This password can only be obtained by following the service partner training.

5.2 Navigation

Navigation via the RCU or local keypad

Navigating the OSD can be done using the remote control or the local keypad.

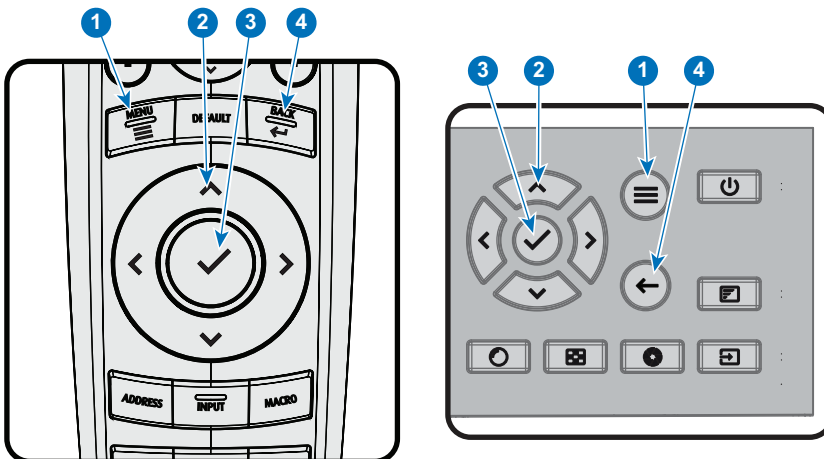


Image 5–3

To start up the menu structure, press **MENU** (1).

Use the arrow keys (**Menu Navigation** buttons) to navigate to the desired menu item (2). The background color changes to light blue.

Press the **Menu Selection** button (center key of the arrow keys), also called **OK** button, to activate that item and to jump one level deeper (3).

Use the numeral keys to enter values, or use the arrow keys to move the bar scale up or down.

Press the **Back** button to go up one level (4).

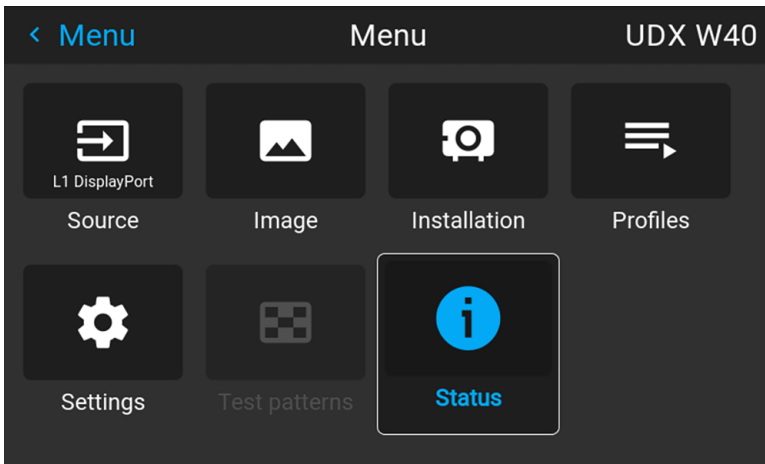


Image 5–4 Example of the home menu

Remark: a blue slider bar on the right side of the window means that there are more items to show than those currently displayed.

Define values

Menu settings are displayed using check boxes, bar scale sliders, and drop-down lists.

To set a value:

- Press **OK** to select or deselect a checkbox (turn a function ON or OFF).
- Use the arrow keys to move the bar scale slider up or down on the value line. For a bar scale 0-9, each step will equal 10% of the total value.
- To enter the value as a direct number, press **OK**, input the digit(s), and then press **OK** again to execute and exit cursor mode e.g. OK 79 OK.
Within an input field, use the * button as backspace button to remove an entered digit. Use the # button to enter a dot (.).

Changes to values are implemented dynamically.

To enter values with the local keyboard, use the arrow keys to select the first digit, press **OK**. Select the second digit and press **OK**. Continue until all digits are entered. Close the action by selecting the **enter** (↵) button and press **OK**. Select the **backspace** button and press **OK** to remove the last entered digit.

Using the LCD touch display

From Pulse software 2.0 onward, the touch display functionality of the LCD panel has been activated and can be used.

Instead of using the remote control buttons or keypad keys or button, you can now:

- Touch menu icons to enter the respective menu.
- Swipe a menu up and down if not all information is not immediately visible (e.g. more than 8 (sub)menu icons being visible)
- Return to a higher menu level, by touching the blue name in the top left corner of the display.
- Use touch functionality to use menu items (check boxes, sliders, digital keyboard or keypads, etc).
- Swipe menu panes left or right when multiple panes are available (e.g. the Status menu)

Menu memory

The OSD menu remembers the last selected sub-item as long as the projector is running. The menu memory is reset when restarting the projector from standby.

GUI – Image

6

6.1	Setting image levels manually.....	48
6.2	Adjusting the sharpness	49
6.3	Adjusting the gamma correction.....	50
6.4	Setting the desired Gamma type	51
6.5	Displaying HDR content	52

6.1 Setting image levels manually

Purpose

Contrast: Change the contrast of the complete output signal (main and PiP window together) of the projected image.

Brightness: Change the brightness of the complete output signal (main and PiP window together) of the projected image.

Saturation: Change the saturation of the complete output signal (main and PiP window together) of the projected image.

How to set up Contrast

1. In the main menu, select *Image* → *Contrast*.

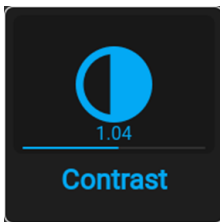


Image 6-1 Image menu — Contrast

2. Use the ◀ or ▶ key to change the contrast enhancement until the desired value is reached (adjustable between 0 and 2).

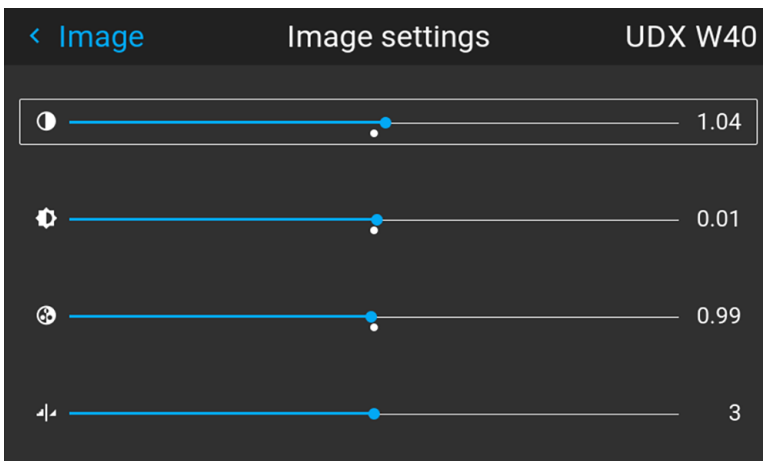


Image 6-2 Example of the image sliders, contrast is the first slider

3. If necessary, use the ▲ or ▼ key to select the other image adjustment options.

How to set up Brightness Level

1. In the main menu, select *Image* → *Brightness*.

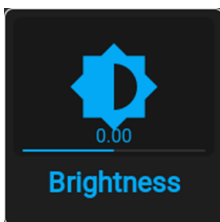


Image 6-3 Image menu — Brightness

2. Use the ◀ or ▶ key to change the brightness until the desired value is reached (adjustable between –1 and 1).

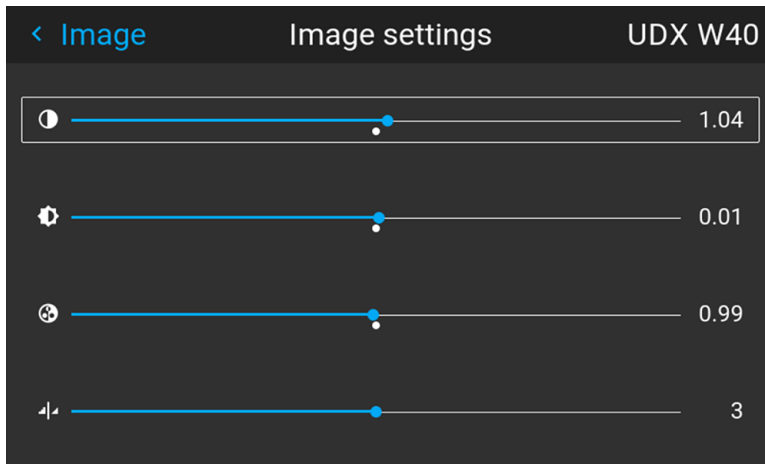


Image 6–4 Example of the image sliders, brightness is the second slider

3. If necessary, use the ▲ or ▼ key to select the other image adjustment options.

How to set up Saturation Level

1. In the main menu, select *Image* → *Saturation*.

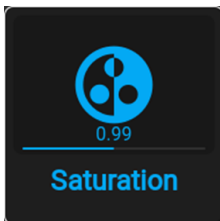


Image 6–5 Image menu — Saturation

2. Use the ◀ or ▶ key to change the saturation until the desired value is reached (adjustable between 0 and 2).

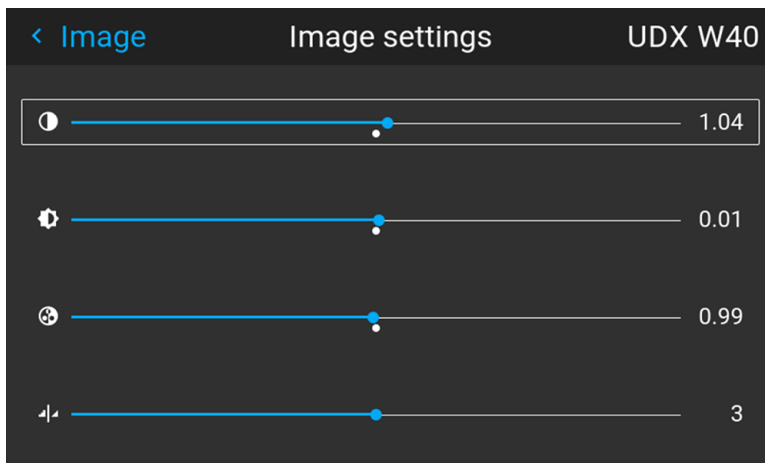


Image 6–6 Example of the image sliders, Saturation is the third slider

3. If necessary, use the ▲ or ▼ key to select the other image adjustment options.

6.2 Adjusting the sharpness

About adjusting the sharpness

The sharpness adjustment amplifies the high frequency components in the picture. This means that by increase the sharpness, the picture will be perceived as sharper, and if decreased, the picture will be perceived as more blurry.

Increasing the sharpness will have the best effect in high contrast images, eg a table with text and borders. In a natural picture, high sharpness can be perceived as noise, as all details in the picture will be amplified. Available range: -2 to 8. Default value: 0

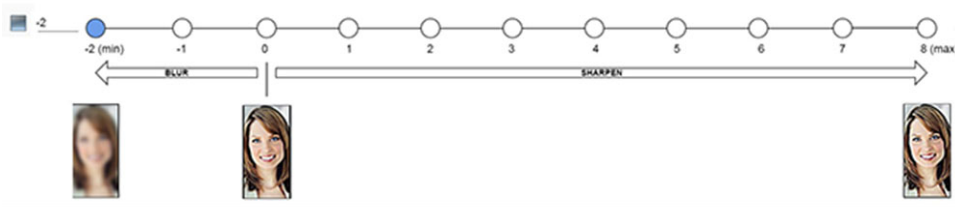


Image 6-7 Effect of sharpness adjust

How to adjust

1. In the main menu, select *Image* → *Sharpness*.

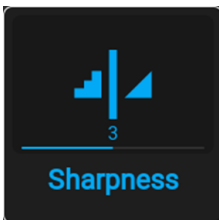


Image 6-8 Image menu – Sharpness

2. Use the ◀ or ▶ key to change the sharpness until the desired value is reached.

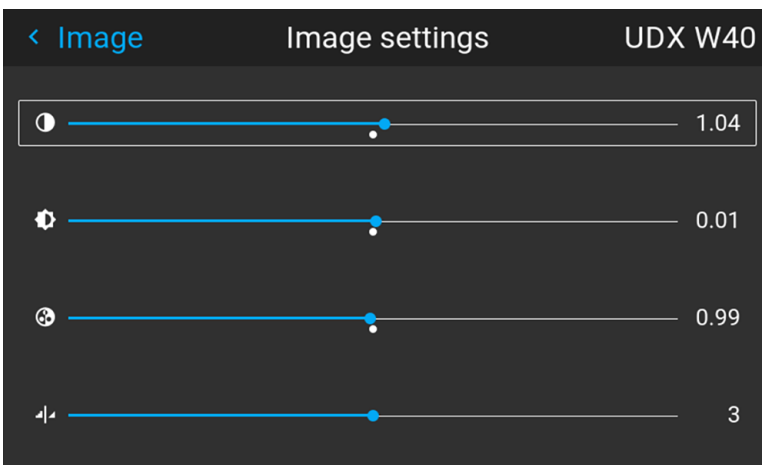


Image 6-9 Example of the image sliders, Sharpness is the bottommost slider

3. If necessary, use the ▲ or ▼ key to select the other image adjustment options.

6.3 Adjusting the gamma correction

About gamma correction

Gamma correction is an image quality enhancement function that offers a richer image by brightening the already darker portions of the image without altering the brightness of the brighter portions (contrast feeling enhanced).


How to adjust

1. In the main menu, select *Image* → *Gamma*.



Image 6–10 Image menu – Gamma

2. Use the ▼ key to select the slider.
3. Use the ◀ or ▶ key to change the gamma value between 1.0 and 2.8 . The default value is 2,2.

 *Tip:* The slider can be adjusted with a precision of 0.1.

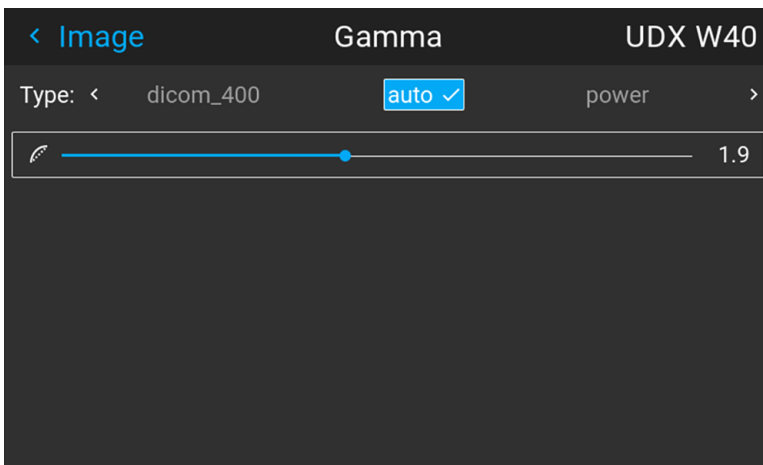


Image 6–11 Example of the gamma menu

6.4 Setting the desired Gamma type

Exception when using an HDR source

The only alternate color gamma that can not be selected in this menu is PQ/HDR. Because the color output of HDR is dependant on extra factors such as screen luminance, a separate menu has been made available for this (PQ).

If the source signal is HDR encoded an HDR icon will be visible next to the source signal. This is visible both in the Source selection menu, as well as the status menu.

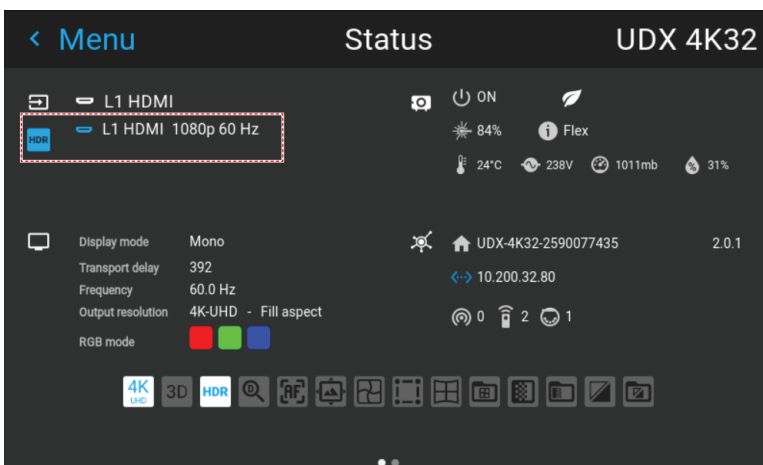


Image 6–12 Example of the HDR icon on the status menu

For more info on PQ and HDR, refer to “Displaying HDR content”, page 52.

How to adjust the gamma type?

1. In the main menu, select *Image* → *Gamma type*.



Image 6–13 Image menu – Gamma

The Gamma type menu is displayed

2. Use the ◀ or ▶ key to select the desired gamma type and confirm.

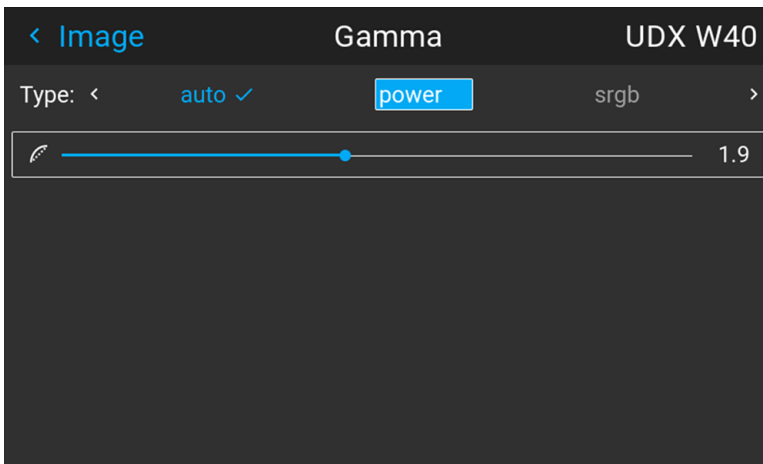


Image 6–14 Example of selecting a gamma type

Tip: If not sure what gamma type to select, keep the default value **auto** selected. This automatic mode will determine the used gamma type based on the incoming signal.



However: keep in mind when using the automatic mode, your media player needs to be configured correctly as well. While most mainstream media player devices will be configured correctly by default, we cannot guarantee this is the case for every device available on the market. If you notice the projected image seems “off”, it may be necessary to check the configuration of your media player. For more info, check the user guide of your media player device.

6.5 Displaying HDR content

About HDR and PQ

Perceptual Quantizer (PQ) is a non-linear electro-optical transfer function (EOTF) that allows for the display of High Dynamic Range (HDR) content with a luminance level of up to 10 000 cd/m² and can be used with the Rec. 2020 color space.

When do I know my content is HDR encoded?

If the source signal is HDR encoded, an HDR icon will be visible next to the source signal. This is visible both in the Source selection menu, as well as the status menu.

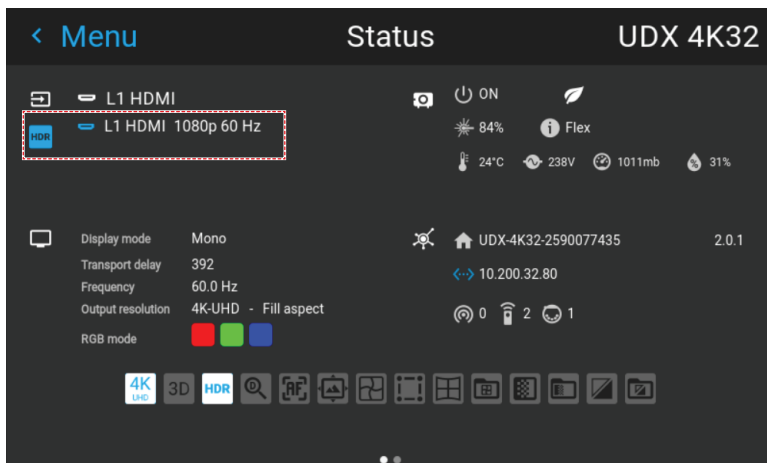


Image 6–15 Example of the HDR icon on the status menu

How to properly display HDR content?

If your provided HDR content has been mastered with PQ (e.g. HDR10 and Dolby Vision), a few changes can be made in order to project the intended mastering on screen. These changes are necessary because HDR content has been mastered specifically for HDR capable displays that are watched in living rooms. These conditions are different from a non-HDR projector and darker cinema-like environments.

The projected HDR content depends on the following factors:

- **Mastering luminance:** This is content-specific and cannot be changed.
- **Screen luminance:** Every projection screen has a specific luminance (measured in nits or foot-Lambert). Entering this luminance in the projector will adapt the content towards the intended HDR result.
- **HDR Boost:** A variable “booster” that may amplify or downplay the HDR output.

How to set the HDR-related parameters?

1. Make sure the chosen Gamma Type is set to *AUTO*. For more info, refer to “Setting the desired Gamma type”, page 51.
2. In the main menu, select *Image* → *Advanced* → *HDR*.

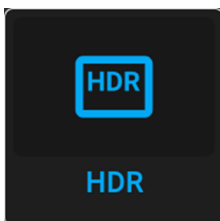


Image 6–16 Advanced settings menu, HDR

The HDR menu is displayed.

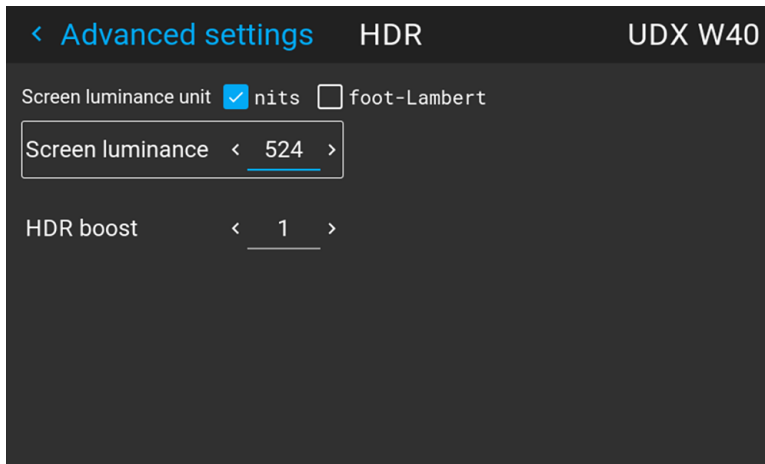


Image 6–17 Example of the HDR menu

3. Select the desired *Screen luminance unit* (nits or foot-Lambert).
4. Enter the *Screen luminance* (which is measured in nits or foot-Lambert).
5. Alter the *HDR boost* if necessary. You can modify this value to somewhere between 0.8 and 1.2.

GUI – Status menu

7

7.1	Status menu overview.....	56
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No settings can be modified in the status menu. Its only for consulting.

7.1 Status menu overview

How to access the status menu

While in the main menu, press Status.

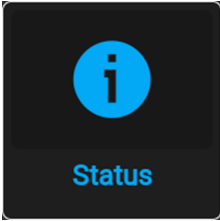


Image 7-1 Main menu, status

The status menu is displayed.



Image 7-2 Example of a status menu

Swipe the screen to switch between the Status and About page.

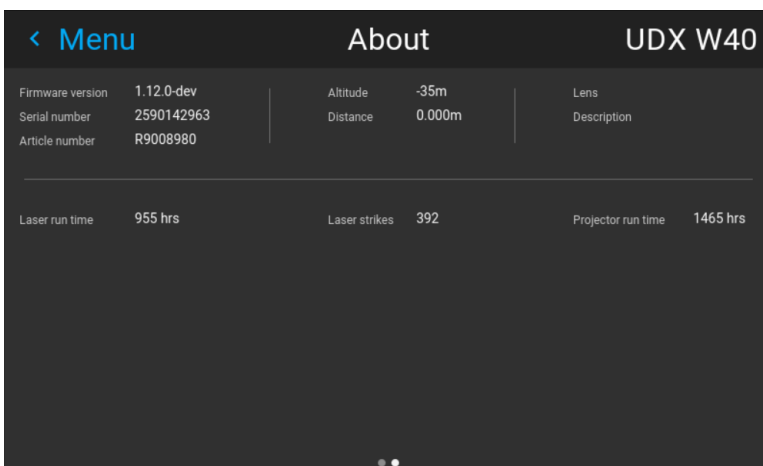


Image 7-3 Example of the About page in the Status menu

What can be seen on the Status page?

- Connected source and signal details
- Display settings (e.g. Display mode, transport delay, output resolution, etc)
- Projector power and environmental details (e.g. power, temperature, pressure, etc)
- Network status (e.g. host name, IP address, software version)
- Active function icons (e.g. warp, blend, files, etc).

What can be seen on the About page?

- Projector information, e.g. firmware version, serial number and projector article number
- Mounted lens: Type and description
- Basic statistics, e.g. light source run time, projector runtime

Product maintenance

8

8.1 Cleaning the lens




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

Required tools

- Compressed air
- Clean micro fiber lens cleaning cloth (e.g. Toraysee® cloth(s))
- Clean cotton cloth
- Lens cleaner (e.g. ZEISS lens cleaner, Purosol™ or other water based lens cleaner products)

How to clean the lens?

1. Blow off dust with clean compressed air (or pressurized air cans¹).
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.

8.2 Cleaning the exterior of the projector

How to clean the exterior of the projector ?

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

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

Risk group 3 Safety

9

9.1 General considerations

Notice on optical radiation from NJORD Projector when it becomes Risk Group 3.

- For RG3, no direct exposure to the beam shall be permitted.
For RG3, operators shall control access to the beam within the hazard distance or install the product at a height that will prevent eye exposure within the hazard distance.
- This projector has five (5) built-in Class 4 laser clusters. Disassembly or modification is very dangerous and should never be attempted.
- Any operation or adjustment not specifically instructed by the user's guide creates the risk of hazardous laser radiation exposure.
- Do not open or disassemble the projector as this may cause damage by the exposure of laser radiation.

FOR PROFESSIONAL USE ONLY means installation can only be carried out by Barco AUTHORIZED PERSONNEL familiar with potential hazards associated with high intensity light beams.

9.2 Safety training to be provided by the installer



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



Refer to document "Declaration of user safety training" (Document number 601-0462) for training tick off and signing. Document can be found on the Barco website if not included in the box.

Users definition

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

The skilled person must instruct the user about:

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

Restricted access location

To protect untrained persons and children, the projector must be installed in a **restricted access location**. The definition of a **restricted access location** is a location for equipment where both of the following paragraphs apply:

- Access can only be gained by skilled persons (installer or service personnel) or persons who have been instructed and trained by a skilled person. The persons must have been instructed about the reasons for the restriction applied to the location and about the precautions that shall be taken.
- Access is only possible through the use of the tool or lock and key, or other means of security, and is controlled by the authority responsible for the location.

Why a restricted access location: This is a RG3 product. Based on international requirements, no person is allowed to enter the projected beam within the zone between the projection lens and the related Hazard Distance (HD). This shall be physically impossible by creating sufficient separation height or by placing optional barriers. Within the restricted area operator training is considered sufficient. The applicable separation heights are discussed in "High Brightness precautions: Hazard Distance", page 63.

Exclusion zone

The projector radiates heat on its external surfaces and from ventilation ducts during normal operation. Exposing flammable or combustible materials into close proximity of this projector could result in the

spontaneous ignition of that material, resulting in a fire. For this reason, it is absolutely necessary to leave an exclusion zone around all external surfaces of the projector whereby no flammable or combustible materials are present:

- The exclusion zone must not be less than 40 cm (16 in).

Restriction zone

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

9.3 High Brightness precautions: Hazard Distance



HD

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

Restriction Zone (RZ) based on the HD

The HD depends on the amount of lumens produced by the projector and the type of lens installed. See chapter “HD in function of modifying optics”, page 66.

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

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

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

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

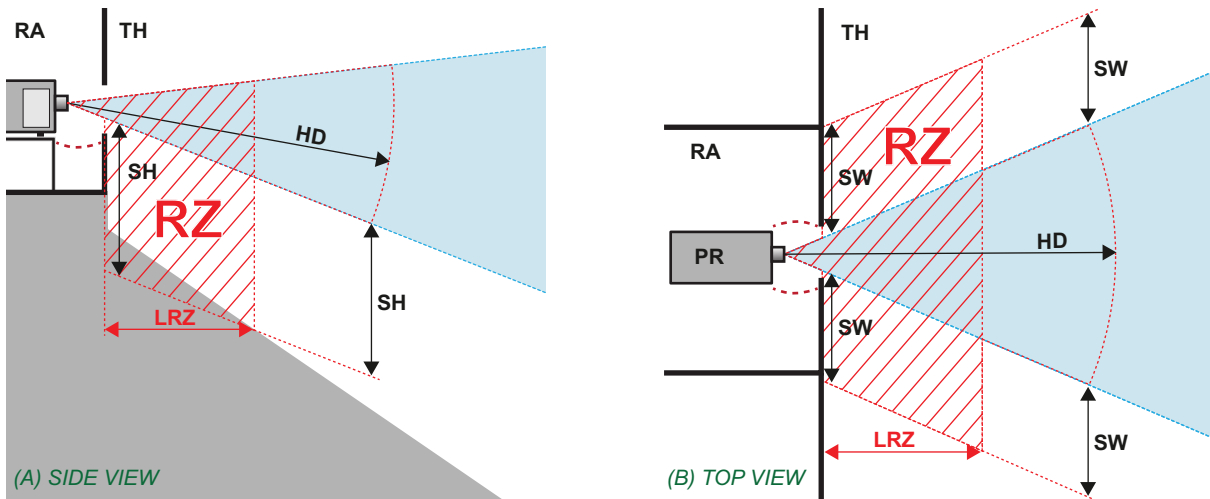


Image 9-1

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

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

On Image 9-2 a typical setup is displayed. It must be verified if these minimum requirements are met. If required a restricted zone (RZ) in the theater must be established. This can be done by using physical barrier, like a red rope as illustrated in Image 9-2.

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

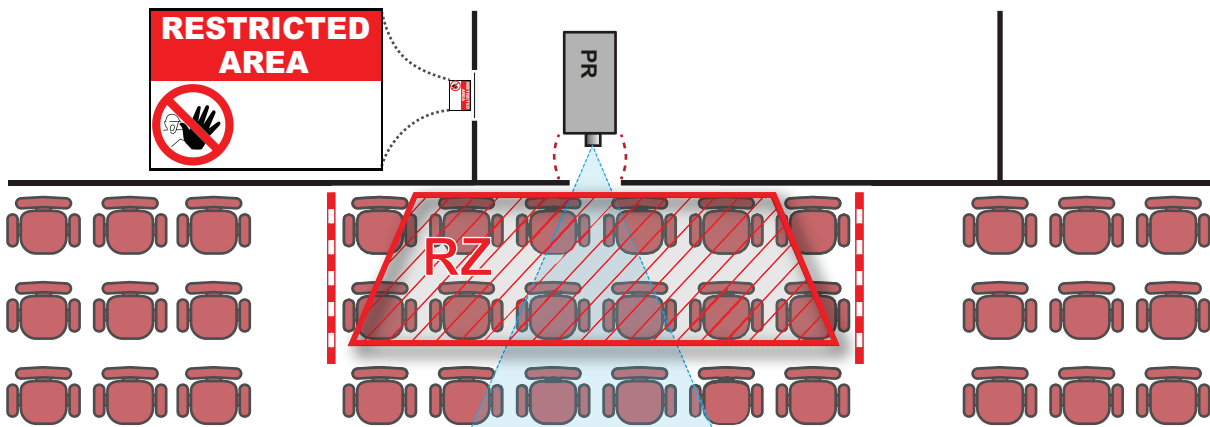


Image 9-2

9.4 HD for fully enclosed projection systems



HD

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

Restriction Zone (RZ) based on the HD

The projector is also suitable for rear projection applications; projecting a beam onto a diffuse coated projection screen. As displayed in Image 9–3 two areas should be considered: the restricted enclosed projection area (RA) and the observation area (TH).

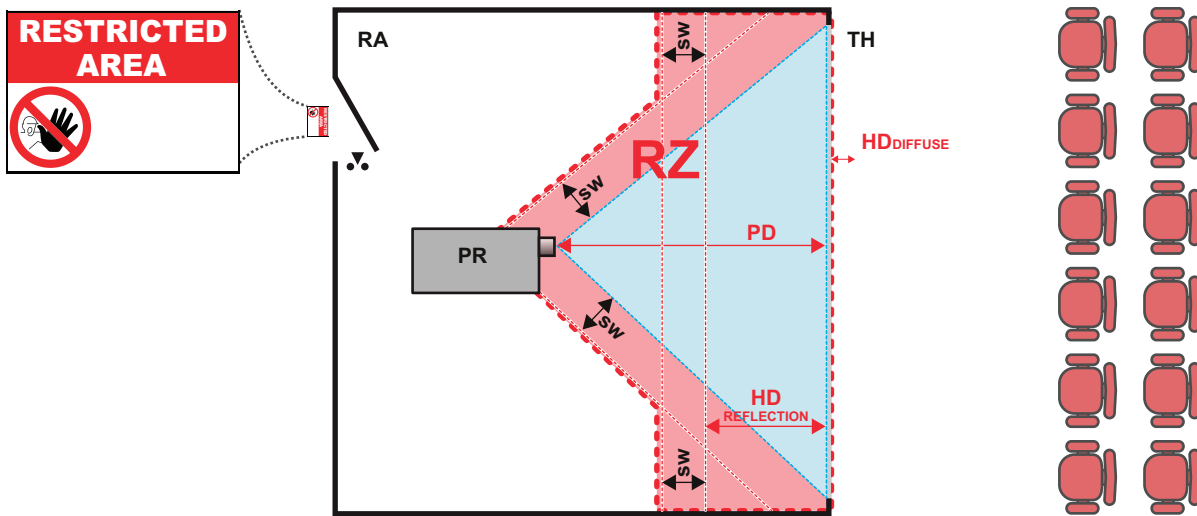


Image 9–3

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

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

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

- HD as discussed in “High Brightness precautions: Hazard Distance”, page 63, relevant for intrabeam exposure.
- $HD_{\text{reflection}}$: the distance that has to be kept restrictive related to the reflected light from the rear projection screen.
- HD_{diffuse} : the relevant distance to be considered while observing the diffuse surface of the rear projection screen.

As described in “High Brightness precautions: Hazard Distance”, page 63, it is mandatory to create a restricted zone within the beam areas closer than any HD. In the enclosed projection area the combination of two restricted zones are relevant: The restricted zone of the projected beam toward the screen; taking into account 1 meter Separation Width (SW) from the beam onward. Combined with the restricted zone related to the rear reflection from the screen ($HD_{\text{reflection}}$); also taking into account a 1 meter lateral separation.

The $HD_{\text{reflection}}$ distance equals 25% of the difference between the determined HD distance and the projection distance to the rear projection screen. To determine the HD distance for the used lens and projector model see chapter “HD in function of modifying optics”, page 66.

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

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

9.5 HD in function of modifying optics

Hazard distance

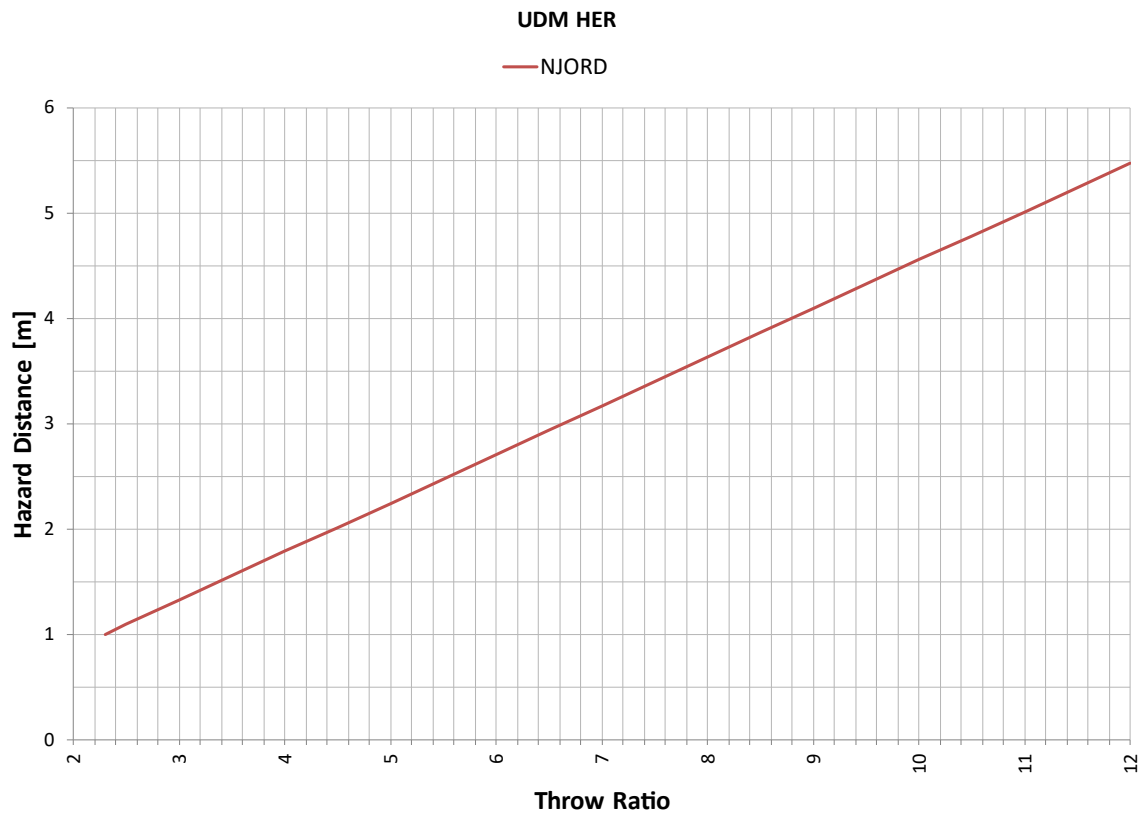


Image 9-4

HD Hazard Distance
TR Throw Ratio

The graph shows Hazard distance in meters versus Throw ratio of the lens.

Index

A

Address
 Program
 RCU 30

B

Brightness 48

C

CE Certification 14
Cleaning
 Exterior 60
 Lens 60
Communication 33
 DMX 36
 Introduction 34
 RS232 37
 RS422 37
 USB port 38
Communication panel 36
Connect
 Source 21
Contrast 48
Cooling liquid circuit warning 11

D

DMX input 36
DMX interface 36
DMX out 36

E

Enclosed projection 64
Exterior
 Cleaning 60

F

Fiber
 Input 42
 SFP 42
Function
 Button pressed indicator 29
 RGB button 29
 RGB filter 29

G

Gamma correction 50
Gamma type
 DICOM 51
 sRGB 51
General considerations 62
General Considerations 8
Getting started 17
Graphic User Interface
 Overview 44
Graphics User Interface 43
GUI
 Image 47
 Introduction 43
 Navigation 45
 Overview 44

H

Hazard distance 66
Hazard Distance 63–64
Hazard distances 13
Hazardous Chemicals 13
High Brightness precautions 63

I

Image
 Gamma 50–51
 HDR 52

- Perceptual Quantizer 52
- PQ 52
- Sharpness 49
- Image projection 21
- Input 33
 - Fiber 42
 - Introduction 34
 - Quad Combo Mk I 40
 - Quad Combo Mk II 39
 - Quad DP 1.2 41
 - SFP 42
 - Small Form-factor Pluggable 42
- Input & Communication
 - Terminology overview 34
- Introduction
 - GUI 43

L

- Laser radiation 9
- LED behavior
 - Quad Combo Mk I 40
 - Quad Combo Mk II 39
 - Quad DP 1.2 41
 - SFP 42
- Lens
 - Cleaning 60
- Local keypad
 - Functionality overview 34

M

- Maintenance 59
- mini-jack
 - RCU 31

N

- Notice on optical radiation
 - Optical radiation 8

O

- Orientation
 - Projector 18

P

- Power off 23
- Power on 20
- Prevent
 - Damage 12
 - Electrical shock 9
 - Fire hazard 11
 - Personal injury 10
- Product safety labels 14
- Projector
 - Components 18
 - Orientation 18
- Pulse
 - RCU 25

- Remote Control Unit 25

Q

- Quad Combo Mk I
 - Introduction 40
 - LED behavior 40
- Quad Combo Mk II
 - Introduction 39
 - LED behavior 39
- Quad DP 1.2
 - Introduction 41
 - LED behavior 41

R

- RCU
 - Address 30
 - battery
 - installation 26
 - Functionality overview 29
 - mini-jack 31
 - Protocol setup 27
 - Sleeve 31
 - Use 28
 - XLR 30
 - RCU on/off 27
 - Rear projection 64
 - Risk group 3 61
 - RS232 37
 - RS422 37

S

- Safety 7
 - Battery explosion 11
 - Cooling liquid circuit 11
 - Hazard Distance 63–64
 - Hazardous Chemicals 13
 - Important instructions 9
 - Safety Data Sheet (SDS) 13
 - Servicing 12
 - Stacking 13
- Safety Data Sheet (SDS) 13
- Safety instructions 8
- Safety Notice 8
- Safety training 62
- Saturation 48
- Serial communication 37
- SFP
 - Introduction 42
 - LED behavior 42
- Sleeve
 - RCU 31
- Source
 - Connect 21
 - Fiber 42
 - SFP 42
 - Small Form-factor Pluggable 42
- Standby
 - Switch to 23
- Start

- Image projection 21
- Status Light 38
- Status menu 55
 - Overview 56
- Switching off 23
- Switching on 20
- Switching to standby 23

T

- Touch panel 35

U

- USB port 38
- User definition 9, 62

W

- Warnings
 - Cooling liquid circuit 11

X

- XLR
 - RCU 30

