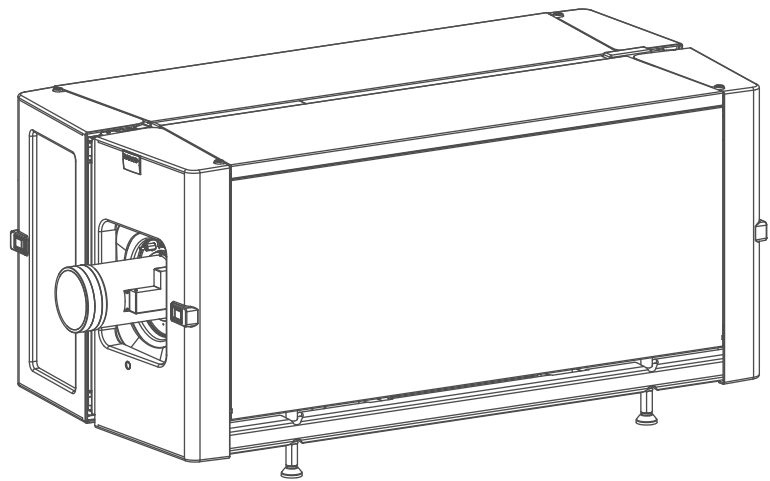


Thor series



Safety manual

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1 Safety & Environmental Information

1.1	General considerations	3
1.2	Safety training to be provided by the installer	4
1.3	Important safety instructions	4
1.4	Product safety labels	7
1.5	High Brightness precautions: Hazard Distance	8
1.6	HD for fully enclosed projection systems	10
1.7	HD in function of modifying optics	11
1.8	Disposal information	11
1.9	Turkey RoHS compliance.....	11
1.10	Regulatory.....	12
1.11	Hazards.....	12
1.12	Contact information	12
1.13	Production address.....	12
1.14	Download Product Manual	12

About this chapter

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

Clarification of the term “Thor series” used in this document

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

- Thor
- Thor+

Model certification name

- Thor : DP4K-20LHC
- Thor+: DP4K-40LHC



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

1.1 General considerations

General safety instructions

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

Notice on safety

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

Notice on optical radiation

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

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



WARNING: No direct exposure to the beam within the hazard distance shall be permitted, RG3 IEC 62471-5:2015



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

Owner's record

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

Product article number	
Product serial number	
Dealer	

1.2 Safety training to be provided by the installer



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



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.

Usage

The Thor series 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** 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 an 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 and width or by placing optional barriers. Within the restricted area operator training is considered sufficient. The applicable separation heights and widths are discussed in "[High Brightness precautions: Hazard Distance](#)", page 8.

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).

1.3 Important safety instructions

To prevent the risk of electrical shock

- This product is equipped with a five-terminal barrier strip for the connection of a 3W+N+PE or 3W+PE three phase power system.
- This projector should be operated from an AC power source. Ensure that mains voltage and capacity matches the projector electrical ratings.

- **Electrical ratings for Star system (3W+N+PE):**
 - The cross-sectional area of the conductors in the power supply cord shall be 4mm² to 6mm², 10AWG to 8AWG.
 - The electrical rating of the Thor+ projector is 200-240V/346-415V 3W+N+PE 16A 50-60Hz (Y connection) (Y connection).
 - The electrical rating of the Thor projector is 200-240V/346-415V 3W+N+PE 10A 50-60Hz (Y connection) (Y connection).
 - The building installation has to be provided with a circuit breaker of range 25A to 40A to protect the complete unit.
- **Electrical ratings for Delta system (3W+PE):**
 - The cross-sectional area of the conductors in the power supply cord shall be 6mm², 8AWG.
 - The electrical rating of the Thor+ projector is 200-240V 3W+PE 28A 50-60Hz (Δ connection) (Δ connection).
 - The electrical rating of the Thor projector is 200-240V 3W+PE 15A 50-60Hz (Δ connection) (Δ connection).
 - The building installation has to be provided with a circuit breaker of 40A to protect the complete unit.
- **REMARK for Thor+ projector:** In case of a Delta system (3W+PE) the circuit breakers rated lower than 40A can trip unwanted because of the internal laser power supply redundancy system. The projector remains working if one internal laser power supply module fails or is removed, but this results in a higher current in one mains power line. In case of very low line voltage (between 180V and 200V), and one failed or removed laser power supply, the line current can reach 35A.
- Installation according to the local electrical code and regulations by qualified technical personnel only. Do not defeat the purpose of the grounding.
- The cross-sectional area of the UPS inlet cord shall be not less than 0.75 mm² or AWG 18.
- The electronics of the projector (UPS INLET) must be powered either from a suitable UPS unit or from the power outlet socket (UPS OUTLET) provided on the projector. An adapted short power cord (2-pole 3-wire grounding) is added to the projector accessories to loop through the power from UPS OUTLET to UPS INLET.
- The provided power output socket (UPS OUTLET) on the projector may only be used to provide power to the projector electronics (UPS INLET). Never connect other devices to this power output socket.
- A readily accessible disconnect device must be incorporated externally to the equipment for removal of the power to the projector mains terminals.
- Disconnect the power to the projector mains terminals and unplug the power cord at UPS INLET for removal of all power from the projector.
- Warning: High leakage current. Earth connection essential before connecting supply.
- Do not allow anything to rest on the power cord. Do not locate this projector where persons will walk on the cord.
- Do not operate the projector with a damaged cord or if the projector has been dropped or damaged - until it has been examined and approved for operation by a qualified service technician.
- Position the cord so that it will not be tripped over, pulled, or contact hot surfaces.
- If an extension cord is necessary, a cord with a current rating at least equal to that of the projector should be used. A cord rated for less amperage than the projector may overheat.
- Never push objects of any kind into this projector through cabinet slots as they may touch dangerous voltage points or short circuit parts that could result in a risk of fire or electrical shock.
- Do not expose this projector to rain or moisture.
- Do not immerse or expose this projector in water or other liquids.
- Do not spill liquid of any kind on this projector.
- Should any liquid or solid object fall into the cabinet, unplug the set and have it checked by qualified service personnel before resuming operations.
- Do not disassemble this projector, always take it to a trained service person when service or repair work is required.
- Do not use an accessory attachment which is not recommended by the manufacturer.
- Lightning - For added protection for this video product during a lightning storm, or when it is left unattended and unused for long periods of time, remove all power from the projector. This will prevent damage to the projector due to lightning and AC power-line surges.

To prevent fire hazard

- Do not place flammable or combustible materials near the projector!
- Barco large screen projection products are designed and manufactured to meet the most stringent safety regulations. This projector radiates heat on its external surfaces and from ventilation ducts during normal operation, which is both normal and safe. Exposing flammable or combustible materials into close proximity of this projector could result in the spontaneous ignition of that material, resulting in a fire. For this reason, it is absolutely necessary to leave an "exclusion zone" around all external surfaces of the projector whereby no flammable or combustible materials are present. The exclusion zone must be not less than 40 cm (16") for all DLP Cinema projectors. The exclusion zone on the lens side must be at least 5 m. Do not cover the projector or the lens with any material while the projector is in operation. Keep flammable and combustible materials away from the projector at all times. Mount the projector in a well ventilated area away from sources of ignition and out of direct sun light. Never expose the projector to rain or moisture. In the event of fire, use sand, 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.
- Ensure no miss alignment can occur. Prolonged long time exposure of back wooden walls at close distance (< 20cm) can represent a fire risk. After alignment the projector shall be securely mounted to the pedestal.
- 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 (chiller units) 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 personal injury

- To prevent injury and physical damage, always read this manual and all labels on the system before powering the projector or adjusting the projector.
- Do not underestimate the weight of the projector. The projector weighs ± 240 kg (± 529 lbs). To prevent personal injury a hoisting tool should be used to lift the projector.
- To prevent injury, ensure that the lens, cooling system and all cover plates are correctly installed. See installation procedures.
- Warning: high intensity light beam. NEVER look into the lens ! High luminance could result in damage to the eye.
- **Warning: extremely high brightness projector:** This projector embeds extremely high brightness (radiance) lasers; this laser light is processed through the 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 defused within the optical path, representing a larger source and lower radiance value than native laser light. Nevertheless the projected light represents a significant risk for the human eye when exposed directly within the beam. This risk is not specific related to the characteristics of laser light but solely to the high thermal induced energy of the light source; which is 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 8.
- 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 8.
- The projector shall be installed in a restricted access room equipped with a key or security lock preventing untrained persons entering the Class 4 use zone.
- Before attempting to remove any of the projector's covers, disconnect the projector power cable from the mains electricity for removal of all power from the projector.
- When required to remove all power from the projector (e.g. during service), always disconnect the power from the projector mains terminals and UPS INLET connector. Use the disconnect device in the building installation to disconnect the power to the projector mains terminals, and unplug the power cord at the UPS INLET connector if the UPS INLET is separately powered.
- Do not place this equipment on an unstable cart, stand, or table. The product may fall, causing serious damage to it and possible injury to the user.
- Lenses, shields or screens shall be changed if they have become visibly damaged to such an extent that their effectiveness is impaired. For example by cracks or deep scratches.
- The associated Laser Safety responsible of the unit must evaluate the setup before the unit may be started.
- Never point or allow light to be directed on people or reflective objects within the HD zone.
- If the unit is shut down, remove the key control from the system; avoiding unauthorized startup.
- All operators shall have received adequate training and be aware of the potential hazards.
- Strictly minimize the number of people who have access to the unit. The unit may never be operated without permission of the responsible for laser safety.
- When the projected light causes a dangerous situation the operator must hit the beam stop button which is located close to the control panel. The beam stop removes all power from the laser power supplies.
- Don't put your hand in front of the beam.
- Do not clean the port window when the projector is switched on.
- Position the hoses of the cooling system so that they will not be tripped over, pulled, or contact hot surfaces.

On servicing

- Do not attempt to service this product yourself, as opening or removing covers may expose you to dangerous voltage potentials and risk of electric shock.
- Refer all servicing to qualified service personnel.
- Attempts to alter the factory-set internal controls or to change other control settings not specially discussed in this manual can lead to permanent damage to the projector and cancellation of the warranty.
- 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.

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.


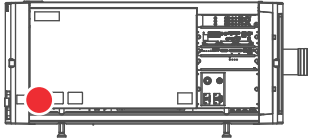

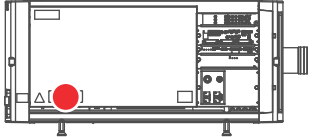

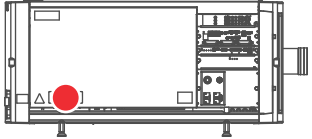


- Ensure that nothing can be spilled on, or dropped inside the projector. If this does happen, switch off and remove all power from the projector. Do not operate the projector again until it has been checked by qualified service personnel.
- Do not block the projector cooling fans or free air movement around the projector.
- Proper operation of the projector can only be guaranteed in table mounting. It is not permitted to use the projector in another position. See installation procedure for correct installation.
- **Special care for Laser Beams:** Special care should be used when DLP projectors are used in the same room as high power laser equipment. Direct or indirect hitting of a laser beam on to the lens can severely damage the Digital Mirror Devices™ in which case there is a loss of warranty.
- Never place the projector in direct sunlight. Sunlight on the lens can severely damage the Digital Mirror Devices™ in which case there is a loss of warranty.
- Save the original shipping carton and packing material. They will come in handy if you ever have to ship your equipment. For maximum protection, repack your set as it was originally packed at the factory.
- Disconnect the power to the projectors mains terminals before cleaning. Do not use liquid cleaners or aerosol cleaners. Use a damp cloth for cleaning. Never use strong solvents, such as thinner or benzine or abrasive cleaners, since these will damage the cabinet. Stubborn stains may be removed with a cloth lightly dampened with mild detergent solution.
- To ensure the highest optical performance and resolution, the projection lenses are specially treated with an anti-reflective coating, therefore, avoid touching the lens. To remove dust on the lens, use a soft dry cloth. For lens cleaning follow the instructions precisely as stipulated in the projector manual.
- Rated maximum ambient temperature, $t_a = 30^{\circ}\text{C}$ (86°F).
- Rated humidity = 0% RH to 80% RH Non-condensed.
- An external frame must be used to stack projectors.
- For functionality and reliability, the projector requires accurate temperature control and cooling below ambient. Therefore a liquid cooling system is provided consisting of liquid circuits inside the projector which are connected via hoses to external chillers. Only chiller models and hoses exclusively developed for this application and approved by Barco are allowed to be used. Barco approved chillers models are listed on the Barco website.
- An adequate draining system must be coupled with the drain pipes at the bottom of the projector to collect and lead away the condensed water from the built-in air-dryers. The capacity of the draining system must meet the humidity conditions wherein the projector operates. The water drain must arrive into an 'open' water container!

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 safetysdatasheets@barco.com.

1.4 Product safety labels

Light beam related safety labels

Label image	Label description	Label location
	Hazard RG3: optical radiation warning symbol	
	WARNING! DO NOT LOOK INTO THE LIGHT BEAM NO DIRECT EYE EXPOSURE TO THE BEAM IS PERMITTED. RG3 IEC EN 62471-5:2015 CLASS 1 IEC EN 60825-1:2014 HAZARD DISTANCE: CONSULT SAFETY MANUAL. COMPLIES WITH 21 CFR 1040 EXCEPT WITH RESPECT TO THOSE CHARACTERISTICS AUTHORIZED BY VARIANCE NUMBER 2014-V-0285 DATED APRIL 14, 2016 RISK GROUP 3 LIP IEC 62471:2006	
	警告！ 勿观看光束 眼睛勿直接接触允许暴露的光束 (RG3 IEC EN 62471-5:2015 CLASS 1 IEC EN 60825-1:2014) 危害距离：请参考 安全手册 DANGER ! NE PAS REGARDER LE FAISCEAU EVITER TOUTE EXPOSITION DIRECTE DES YEUX AU FAISCEAU RG3 IEC EN 62471-5:2015 CLASS 1 IEC EN 60825-1:2014 DISTANCE DE SECURITE : CONSULTER LE MANUEL DE SECURITE	
	Beam stop. Arrêt de faisceau. 光束衰减器	

Label image	Label description	Label location
	Enable key. Clé de active. 启动钥匙	
	Hazard RG3: not for household use symbol	

Electric related safety labels

Label image	Label description	Label location
	<p>Disconnect the power to the unit mains terminals and unplug power cord at UPS inlet for removal of all power from the unit. WARNING : HIGH LEAKAGE CURRENT EARTH CONNECTION ESSENTIAL BEFORE CONNECTING SUPPLY SEE INSTALLATION INSTRUCTIONS BEFORE CONNECTING TO THE SUPPLY.</p> <p>Déconnecter l'alimentation des bornes du réseau et déconnecter le câble de la prise UPS pour la coupure de toute l'alimentation de l'appareil. ATTENTION : COURANT DE FUITE ÉLEVÉ RACCORDEMENT À LA TERRE INDISPENSABLE AVANT LE RACCORDEMENT AU RÉSEAU VOIR LA NOTICE D'INSTALLATION AVANT DE RACCORDER AU RÉSEAU.</p> <p>断开放映机主电源端的电源并从UPS电源接入插座上拔下电源线。警告：大漏，电流在接通电源之前必须先接地。在与电源连接前请查看安装说明书。</p>	 (located behind cover)
	<p>UPS INLET: 200-240V 6A max. 50-60Hz UPS电源输入插座：200-240V 最大电流 6A 50-60Hz</p> <p>UPS OUTLET: ONLY FOR CONNECTION TO UPS INLET UPS输出插座：仅用于连接 UPS电源输入插座</p> <p>WARNING : Disconnect the power to the mains terminals and unplug power cord at UPS inlet for removal of all power from the unit. 警告 断开放映机主电源端的电源并从UPS电源接入插座上拔下电源线，切断放映机的所有电源。</p> <p>ATTENTION : Eteindre et déconnecter le câble dans la prise UPS pour la coupure de toute l'alimentation de l'appareil</p> <p>UPS电源输入插座：200-240V 最大电流 6A 50-60Hz UPS输出插座：仅用于连接 UPS电源输入插座 警告 断开放映机主电源端的电源并从UPS电源接入插座上拔下电源线，切断放映机的所有电源。</p>	

1.5 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 11.

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 a height that will prevent spectators' eyes from being in the hazard distance. Radiation levels in excess of the limits will not be permitted at any point less than 2.0 meter (SH) above any surface upon which persons other than operators, performers, or employees are permitted to stand or less than 1.0 meter (SW) lateral separation from any place where such persons are permitted to be. In environments where unrestrained behavior is reasonably foreseeable, the minimum separation height should be greater than or equal to 3.0 meter to prevent potential exposure, for example by an individual sitting on another individual's shoulders, within the HD.

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

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

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

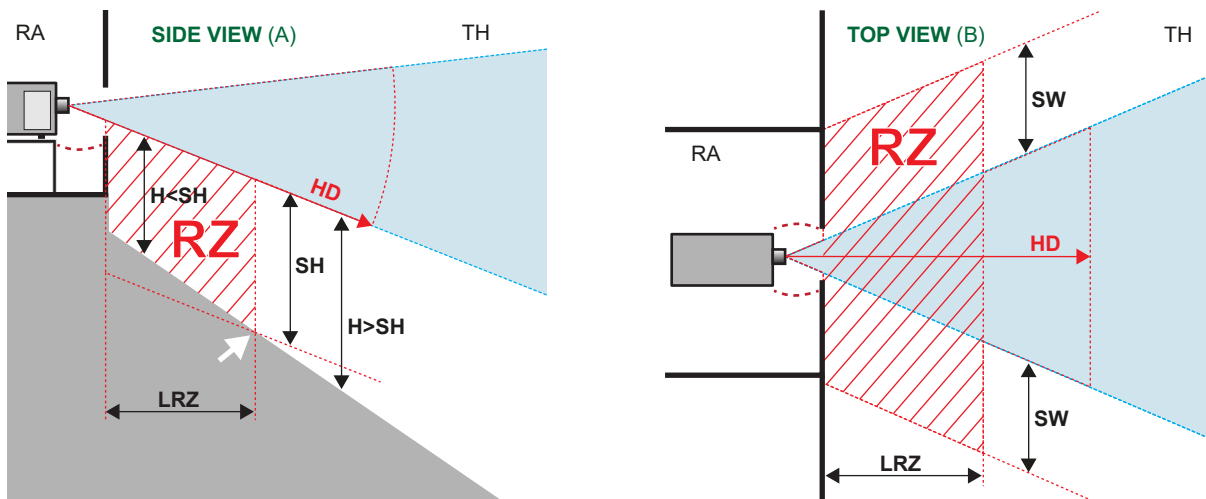


Image 1-1

- A** Side view
- B** Top view
- RA** Restricted Access location (boot area of projector).
- TH** Theater
- RZ** Restriction Zone in the theater

- HD** Hazard Distance
- LRZ** Length Restriction Zone in the theater
- H** Height between surface floor and the light beam
- SH** Separation Height
- SW** Separation Width

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

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

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

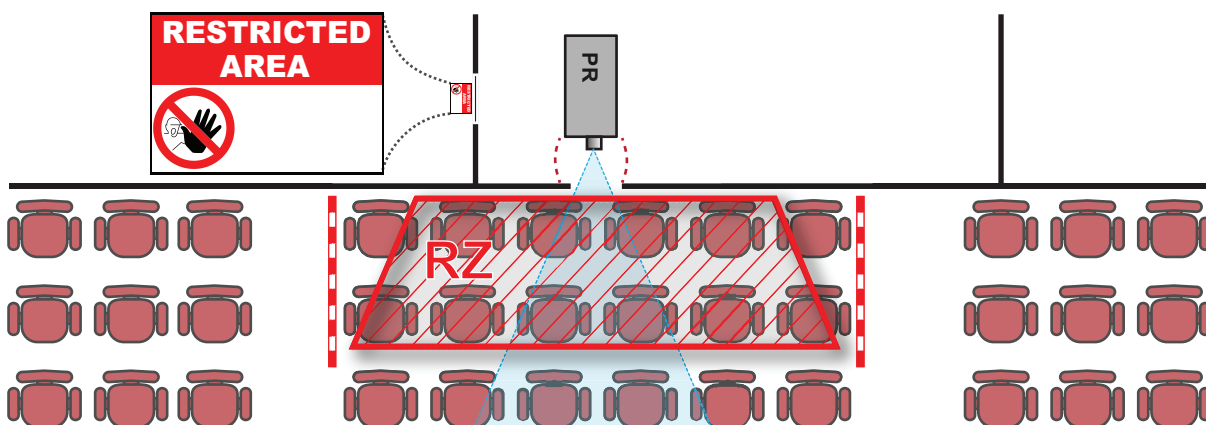


Image 1-2

USA market

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

LIPs for installation in restrained environment (cinema theaters, business rooms, class rooms, museums ...) shall be installed at height vertically above the floor such that the bottom plane of the hazard distance zone shall be no lower than 2.5 meters above the floor. Horizontal clearance to the hazard distance zone shall be not less than 1 meter. Alternatively, in case the height of the separation barrier for the horizontal clearance is at least 1 meter high then the horizontal clearance (SW) can be reduced to:

- 0 meter if the height of the hazard zone is minimum 2.5 meter.
- 0.1 meter if the height of the hazard zone is minimum 2.4 meter.

- 0.6 meter if the height of the hazard zone is minimum 2.2 meter.

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

The LIP shall be installed by Barco or by a trained and Barco-authorized installer or shall only be transferred to laser light show variance holders. This is applicable for dealers and distributors since they may need to install the LIP (demo install) and/or they transfer (sell, rent, lease) the LIP. Dealers and distributors shall preserve sales and installation records for a period of 5 years. Variance holders may currently hold a variance for production of Class IIIB and IV laser light shows and/or for incorporating RG3 LIPs. Laser light show variance for RG3 LIPs can be requested by mailing the application to RadHealthCustomerService@fda.hhs.gov.

The installation checklist for laser illuminated RG3 projectors must be fully completed after the installation. The installation checklist can be downloaded from the Barco website. The installer shall preserve the checklist for a period of 5 years.

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

1.6 HD for fully enclosed projection systems



HD

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

Restriction Zone (RZ) based on the HD

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

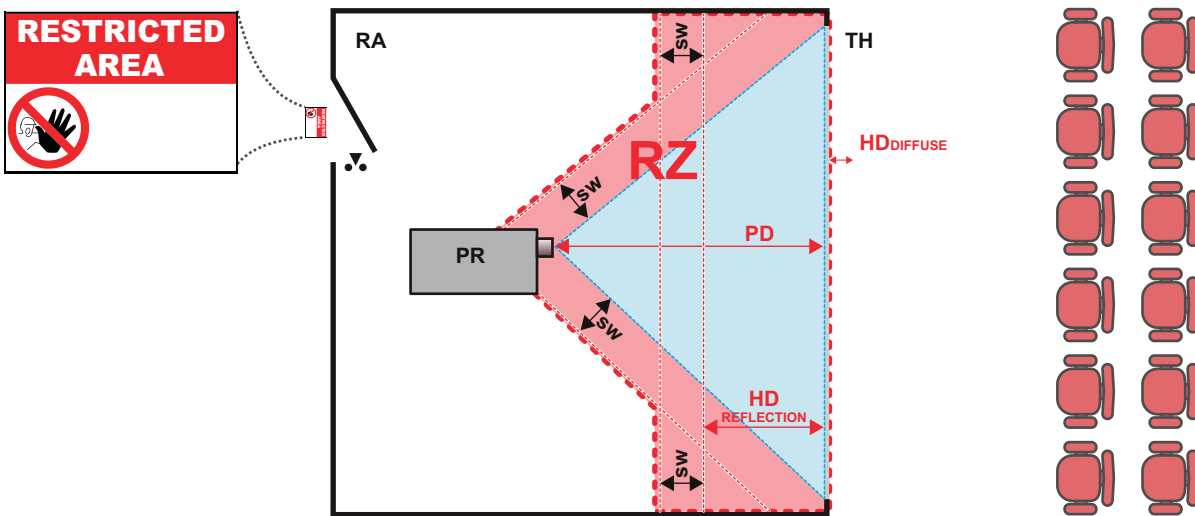


Image 1–3

- | | |
|--|--|
| RA Restricted Access location (enclosed projection area). | RZ Restriction Zone. |
| PR Projector. | PD Projection Distance. |
| TH Theater (observation area). | 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 8, 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 8, 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 11.

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

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.

1.7 HD in function of modifying optics

Hazard Distance

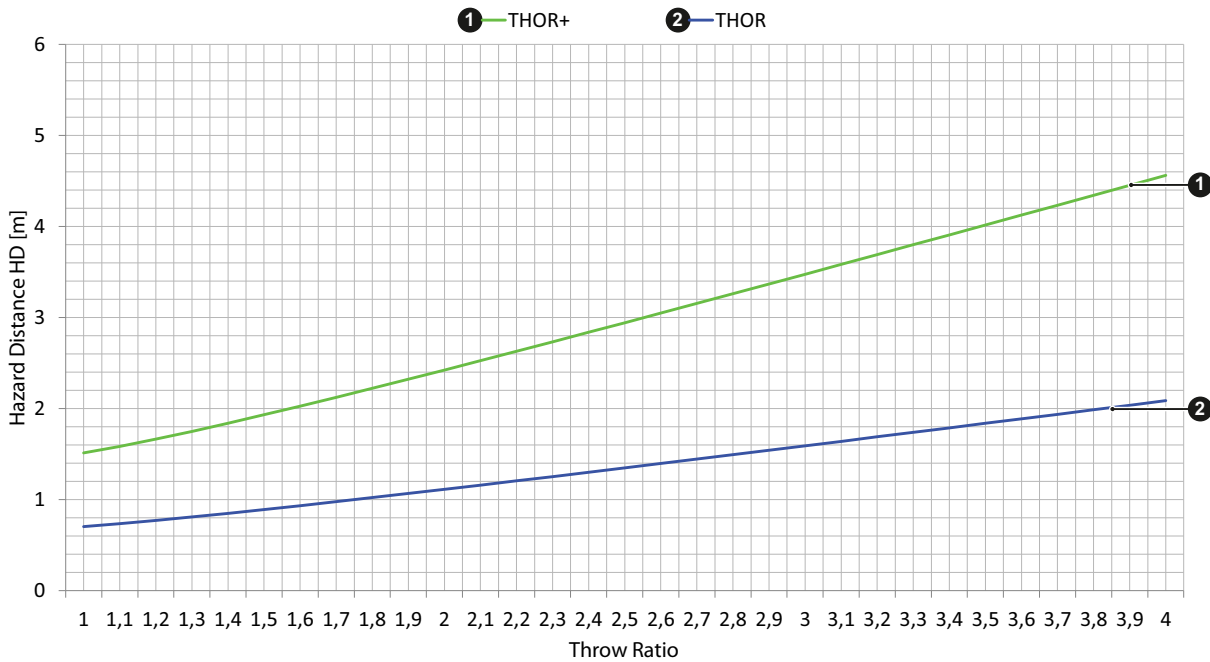


Image 1–4

1.8 Disposal information

Disposal Information



Waste Electrical and Electronic Equipment (WEEE)

This symbol on the product indicates that, under the European Directive 2012/19/EU governing waste from electrical and electronic equipment, this product must not be disposed of with other municipal waste. Please dispose of your waste equipment by handing it over to a designated collection point for the recycling of waste electrical and electronic equipment. To prevent possible harm to the environment or human health from uncontrolled waste disposal, please separate these items from other types of waste and recycle them responsibly to promote the sustainable reuse of material resources.

For more information about recycling of this product, please contact your local city office or your municipal waste disposal service. For details, please visit the Barco website at: <http://www.barco.com/AboutBarco/weee>

Disposal of batteries in the product



This product contains batteries covered by the Directive 2006/66/EC which must be collected and disposed of separately from municipal waste.

If the battery contains more than the specified values of lead (Pb), mercury (Hg) or cadmium (Cd), these chemical symbols will appear below the crossed-out wheeled bin symbol.

By participating in separate collection of batteries, you will help to ensure proper disposal and to prevent potential negative effects on the environment and human health.

1.9 Turkey RoHS compliance

Turkey RoHS compliance



Türkiye Cumhuriyeti: AEEE Yönetmeliğine Uygundur.

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

1.10 Regulatory

UK Compliance



This product is fit for use in the UK.

Authorised Representative: Barco UK Ltd

Address: Building 329, Doncastle Road
Bracknell RG12 8PE, Berkshire, United Kingdom

1.11 Hazards

Safety notice Sodium Carbonate (Na_2CO_3)

According to the Safety Data Sheet (SDS), Sodium Carbonate could cause serious eye irritation.

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 safetymdatasheets@barco.com.

1.12 Contact information

Barco contact information

Registered office address: President Kennedypark 35, 8500 Kortrijk, Belgium

Contact address: Beneluxpark 21, 8500 Kortrijk, Belgium

Importers contact information

To find your local importer, contact Barco directly or one of Barco's regional offices via the contact information given on Barco's web site, www.barco.com.

1.13 Production address

Factories

Barco NV (BELGIUM)

President Kennedypark 35, B-8500 Kortrijk

CFG Barco (Beijing) Electronics Co. Ltd.

中影巴可 (北京) 电子有限公司

3rd Floor, Barco Factory, No.16 Changsheng Road, Changping District, 102200, Beijing, P.R.C.

北京市昌平区中关村科技园区昌平园昌盛路16号巴可工厂第3层 邮政编码：102200

Barco Visual (Beijing) Electronics Co. Ltd.

巴可伟视 (北京) 电子有限公司

No.16 Changsheng Road, Changping District, 102200, Beijing, P.R.C.

北京市昌平区中关村科技园区昌平园昌盛路16号 邮政编码：102200

Made in information

The made in country is indicated on the product ID label on the product itself.

Production date

The month and year of production is indicated on the product ID label on the product itself.

1.14 Download Product Manual

Download Product Manual

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

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

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

