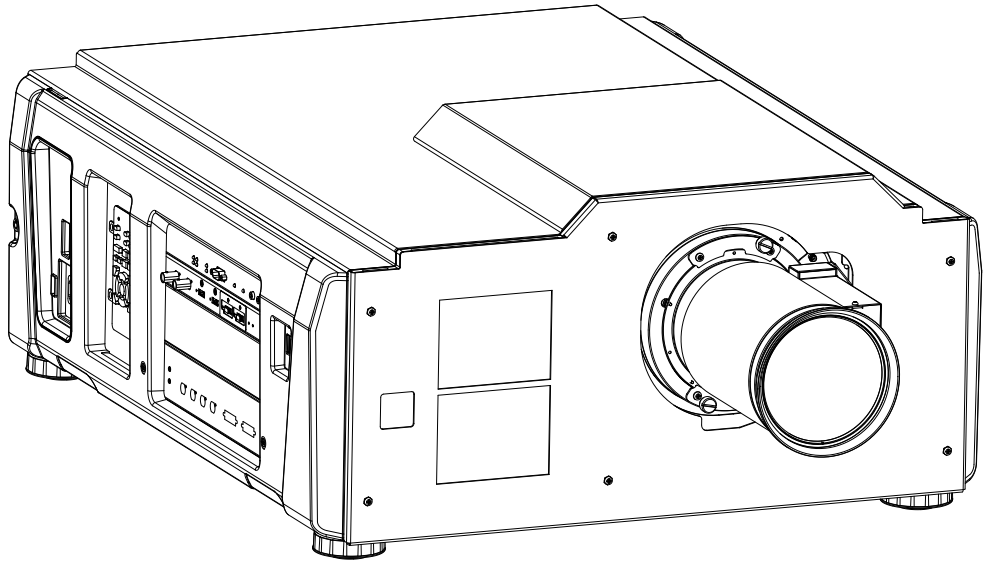
DIGITAL PROJECTION

INSIGHT 4K Dual LED Series
INSIGHT 4K Quad Series

High Brightness Digital Video Projector

- INSTALLATION AND QUICK-START GUIDE
- CONNECTION GUIDE
- OPERATING GUIDE
- REFERENCE GUIDE



Rev B June 2016
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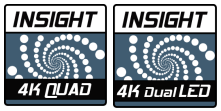
About This Document

Follow the instructions in this manual carefully to ensure safe and long-lasting use of the projector.

Products covered in this manual

This document covers the following INSIGHT 4K projectors: ***INSIGHT 4K Quad*** and ***INSIGHT 4K Dual LED***.

Information that is only relevant to one of the above models is marked with the product's badge:



If none of the above symbols is present on the page, the information within is relevant to both models.

Symbols used in this manual

Many pages in this document have a dedicated area for notes. The information in that area is accompanied by the following symbols:

WARNING: this symbol indicates that there is a danger of physical injury to yourself and/or damage to the equipment unless the instructions are closely followed.

ELECTRICAL WARNING: this symbol indicates that there is a danger of electrical shock unless the instructions are closely followed.

NOTE: this symbol indicates that there is some important information that you should read.

Product revision

Because we at Digital Projection continually strive to improve our products, we may change specifications and designs, and add new features without prior notice.

Legal notice

Notes

Introduction

Congratulations on your purchase of this Digital Projection product.

Your projector has the following key features:

- Full 4096 x 2160 resolution up to 60 fps via single DisplayPort input.
- Full 4096 x 2160 3D display capability.
- Scaling of HDMI 1.4 formats to 4K resolution.
- Control via LAN and RS232.
- Motorised lens mount.
- Very wide color gamut (covers 87% of the Rec. 2020 gamut).
- Redundant light source.
- Exceeds the Rec. 709 color gamut.

A serial number is located on the product label. Record it here:

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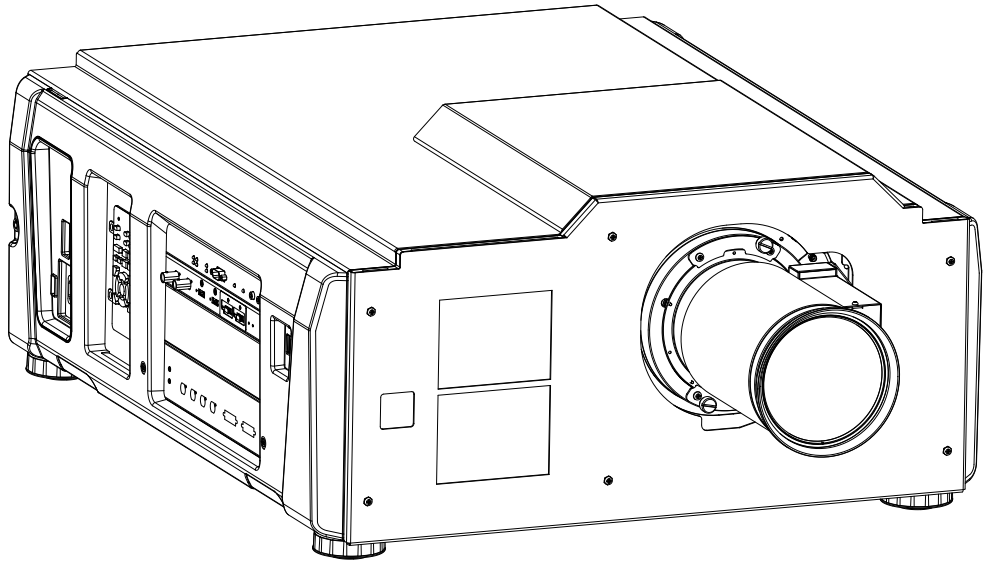
DIGITAL PROJECTION

INSIGHT 4K Dual LED Series
INSIGHT 4K Quad Series

High Brightness Digital Video Projector

INSTALLATION AND QUICK-START GUIDE



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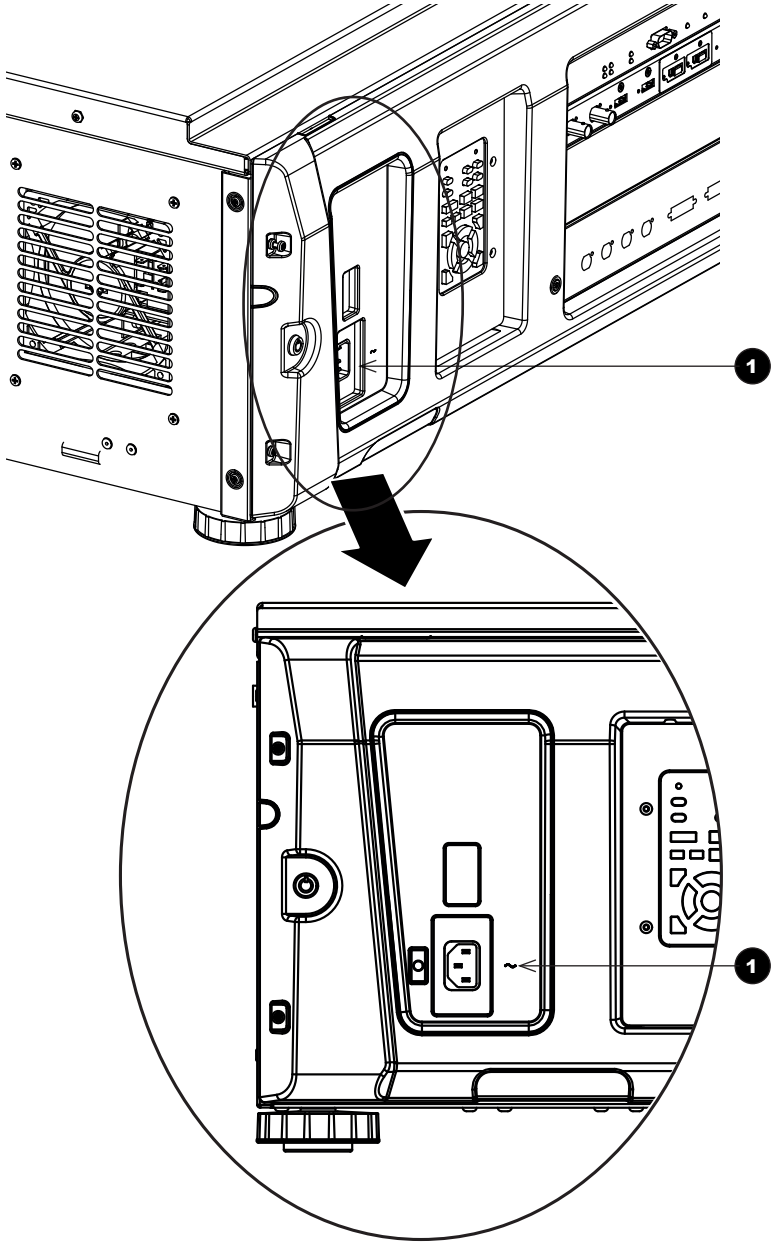
Connecting The Power Supply

When the projector is viewed from the back, the ***AC mains inlet*** 1 is located on the right hand side, toward the rear.

Push the mains connector in firmly.



Notes

Use only the power cable provided.

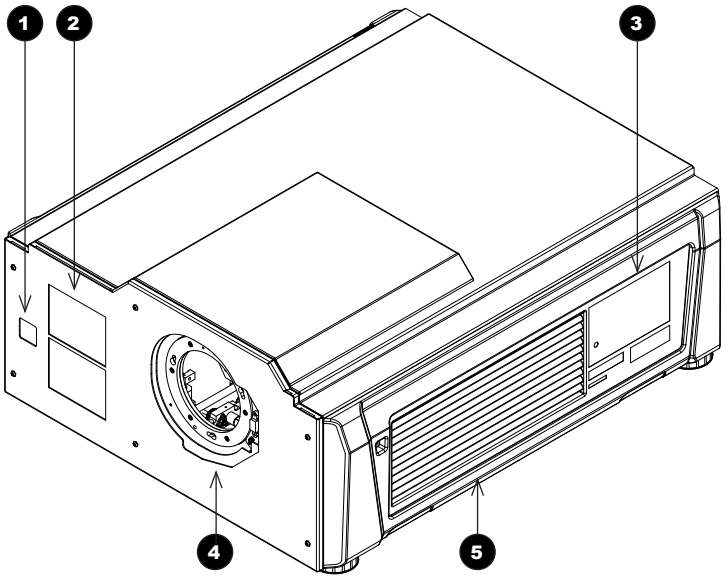
Ensure that the power outlet includes a ground connection as this equipment MUST be earthed.

Handle the power cable carefully and avoid sharp bends. Do not use a damaged power cable.

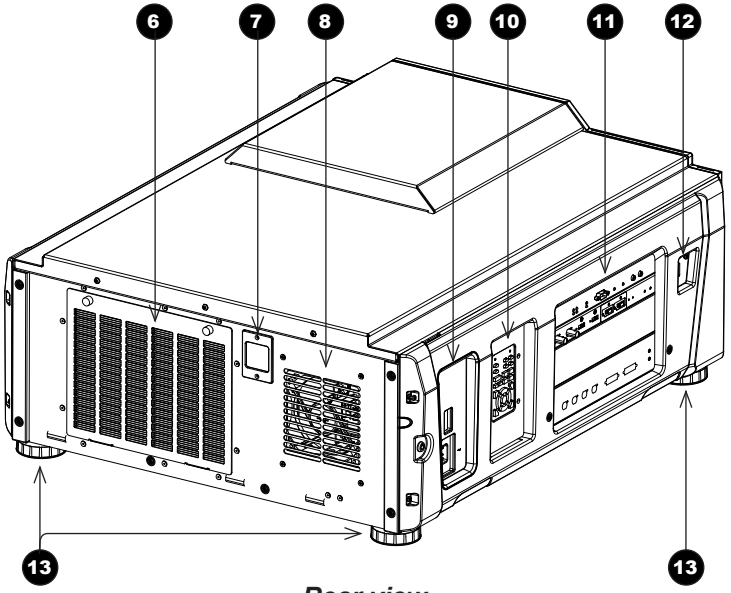
Projector Overview

Front and rear views, INSIGHT 4K Dual LED

1. Front infrared window
2. Air inlet and filter
3. Product label
4. Lens aperture
5. Air outlet
6. Air inlet and filter
7. Rear infrared window
8. Air outlet
9. Power connection
10. Keypad
11. Connections
12. LAN socket
13. Adjustable feet



Front view

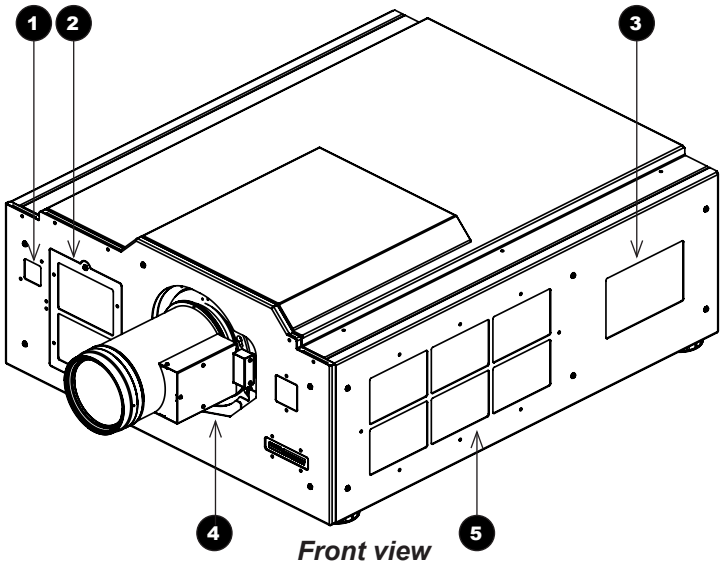


Rear view

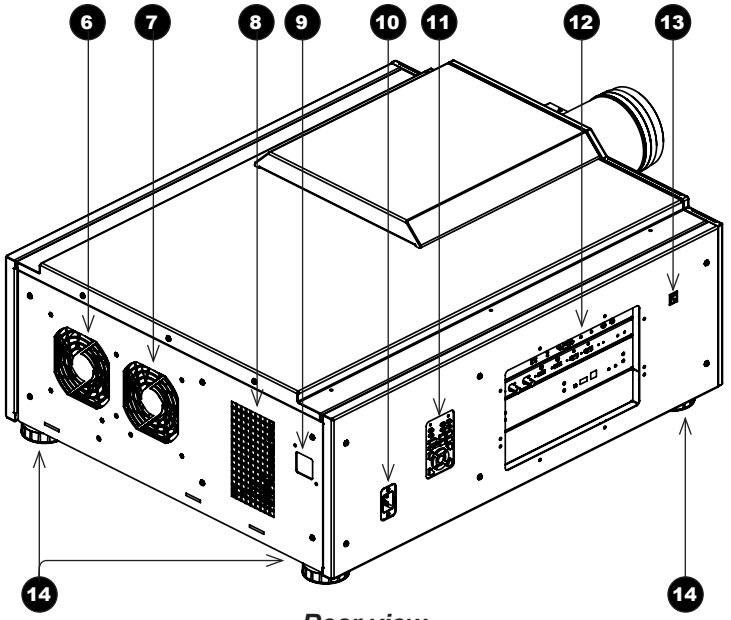
Notes

Front and rear views, INSIGHT 4K Quad

1. Front infrared window
2. Air inlet and filter
3. Product label
4. Lens aperture
5. Air inlet and filter
6. Air outlet
7. Air outlet
8. Air outlet
9. Rear infrared window
10. Power connection
11. Keypad
12. Connections
13. LAN socket
14. Adjustable feet



Front view

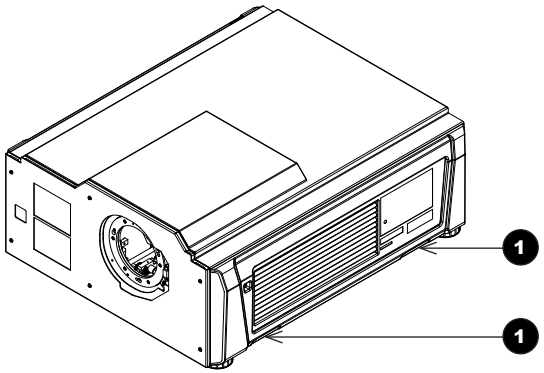


Rear view

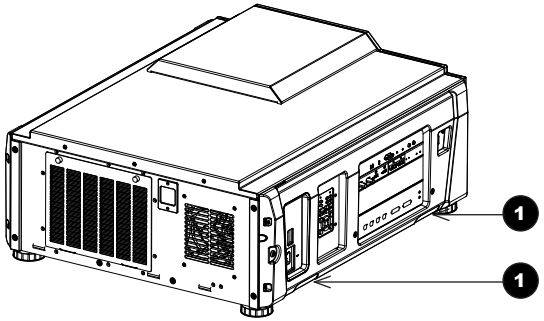
Notes

Handles for safe carriage

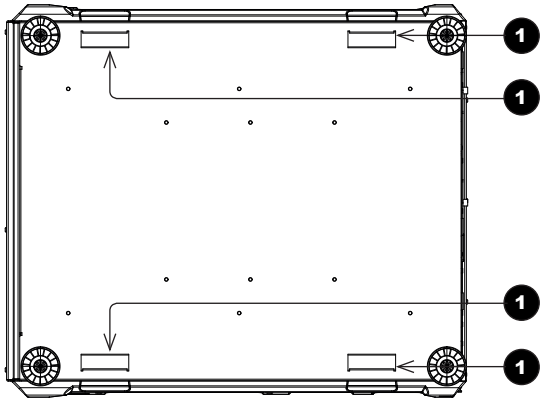
For safe carriage, use the ***four handles*** (1) positioned at the bottom of the projector, near the corners.



Front view



Rear view



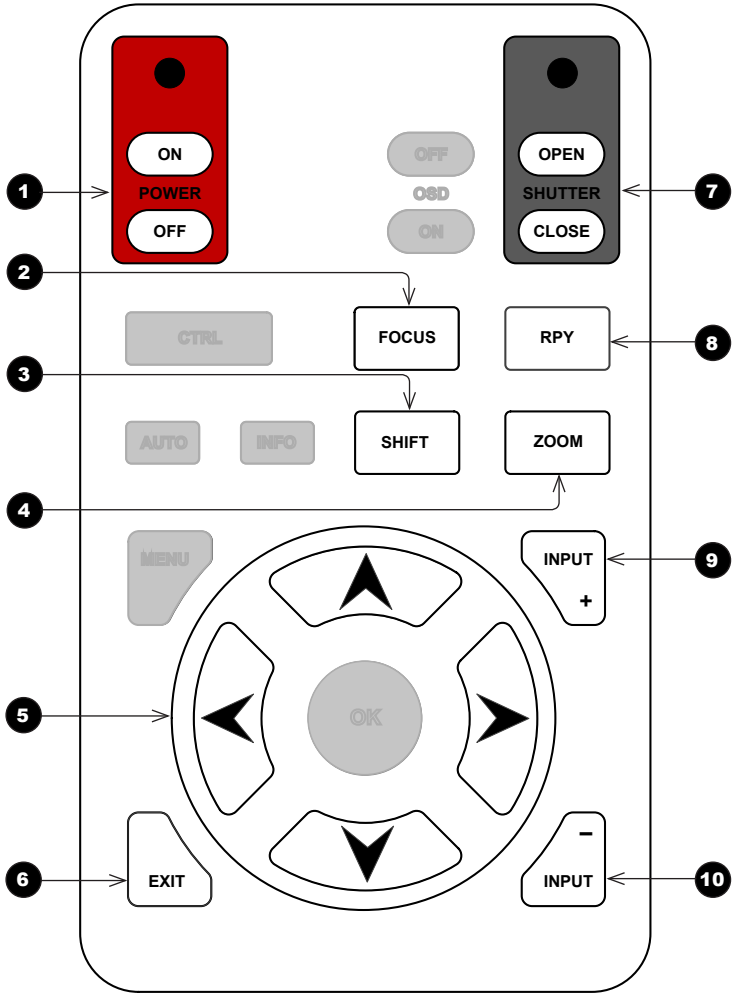
Bottom view

Notes

The handles should be used for transit only. Do not use the handles for inverted carrying or mounting.

Keypad

1. **POWER ON/OFF (with indicator)**
2. **FOCUS**
   Use with the arrow keys to adjust focus.
   Press to enter FOCUS ADJUSTMENT mode, then press an arrow key to focus the image.
   To exit FOCUS ADJUSTMENT mode, press **EXIT** or wait 10 seconds.
3. **SHIFT**
   Use with the arrow keys to move the projected image.
   Press to enter SHIFT ADJUSTMENT mode, then press an arrow key to move the image.
   To exit SHIFT ADJUSTMENT mode, press **EXIT** or wait 10 seconds.
4. **ZOOM**
   Use with the arrow keys to zoom the image in or out.
   Press to enter ZOOM ADJUSTMENT mode, then press an arrow key to zoom the image.
   To exit ZOOM ADJUSTMENT mode, press **EXIT** or wait 10 seconds.
5. **Arrow keys**
   Use with **FOCUS**, **SHIFT** and **ZOOM** to make adjustments.
6. **EXIT**
   Use to exit lens adjustment modes.
7. **SHUTTER OPEN/CLOSE (with indicator)**
8. **RPY**
   Press, then press **RIGHT** to calibrate zoom.
   Press, then press **LEFT** to calibrate focus.
9. **INPUT +**
   Switches to the next available input source. Cycle through the inputs in the following order:
   ...HDMI A, HDMI B, DisplayPort A, DisplayPort B...
10. **INPUT –**
    Switches to the previous available input source. Cycle through the inputs in the following order:
    ...DisplayPort B, DisplayPort A, HDMI B, HDMI A...



Notes

Keys that are not used in this configuration are grayed out.

When adjusting focus or zoom, UP and LEFT will focus/zoom in, while DOWN and RIGHT will zoom out.

When adjusting shift, each arrow key moves the image in the corresponding direction on the screen.

When a new lens is fitted, a calibration procedure must be carried out. For more information, see ***Calibrating zoom and focus*** *further in this guide.*

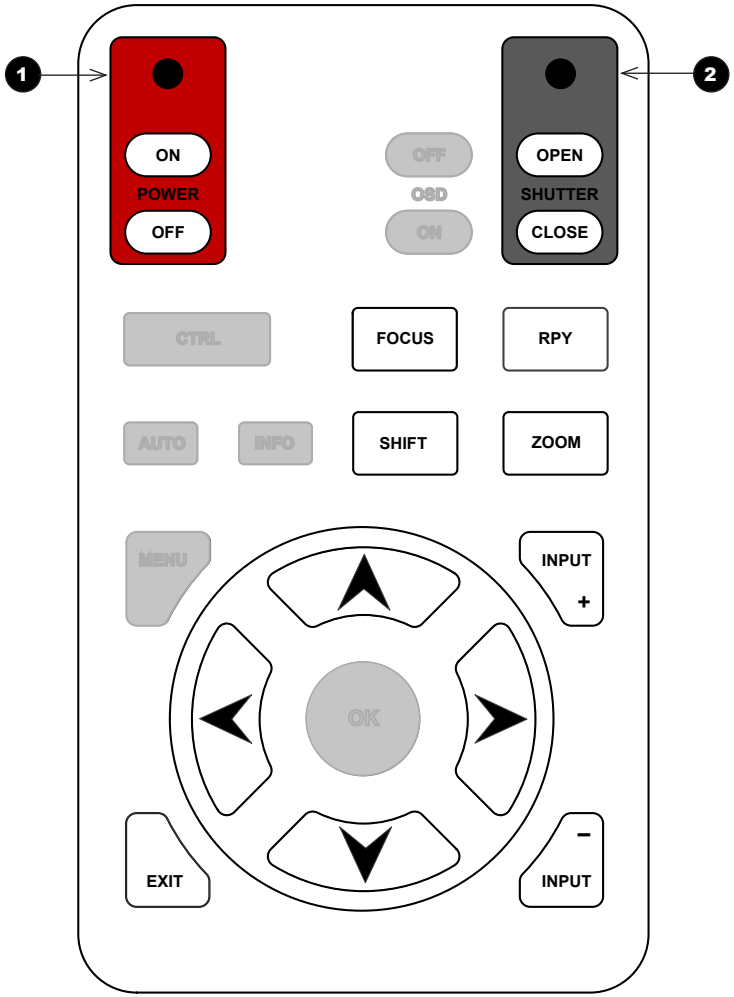
Keypad indicators

1 **Power indicator**

Behavior		Meaning
Off	●	The projector is switched off.
On (amber)	●	The projector is in Standby mode.
On (green)	●	The projector is switched on (Normal mode).

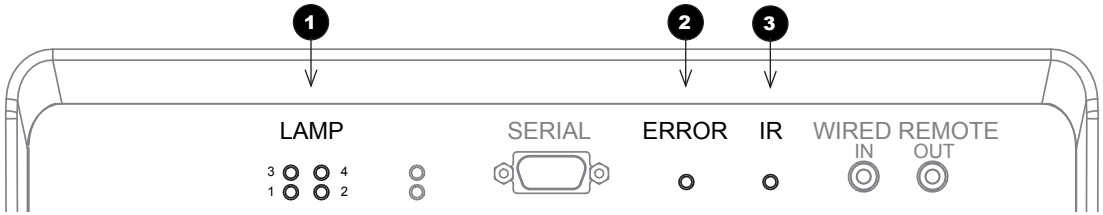
2 **Shutter indicator**

Behavior		Meaning
On (amber)	●	The shutter is closed.
On (green)	●	The shutter is open.



Notes

Connections panel indicators



1 **Lamp 1, 2, 3 and 4 indicators**

Lamp 1 indicator

Behavior	Meaning
Off	The lamp / light source is switched off.
On (green)	The lamp / light source is switched on (100%).
On (amber)	The lamp / light source is switched on (85-99%).
Flashing (green)	The lamp / light source is warming up.
Flashing (amber)	The lamp / light source is cooling down.
Flashing (red)	Lamp Error

2 **Error indicator**

Behavior	Meaning
On (red)	Voltage Error
Flashing	Temperature Error

3 **Infrared indicator**

Behavior	Meaning
Flashing (blue)	The projector is receiving input from the remote control.

Notes

*For information about other indicators found on the connections panel, see **Indicators on the connections panel** in the **Connection Guide**.*

Remote control

The remote control is shipped with no battery fitted. Remove the back cover and insert the supplied cells while observing the correct cell polarity.

1 **Transmit indicator**
Flashes when the remote control sends a signal to the projector.
Lights solidly when the projector is in FOCUS, ZOOM or SHIFT ADJUSTMENT mode.

2 **Power ON / OFF**

3 **Shutter OPEN / CLOSE**

4 **Input selection**
Select input source. Press:
1 for HDMI A
2 for HDMI B
3 for DisplayPort A
4 for DisplayPort B

5 **Remote control backlight ON / OFF**
Make the remote control keys glow in the dark, or switch this feature off.

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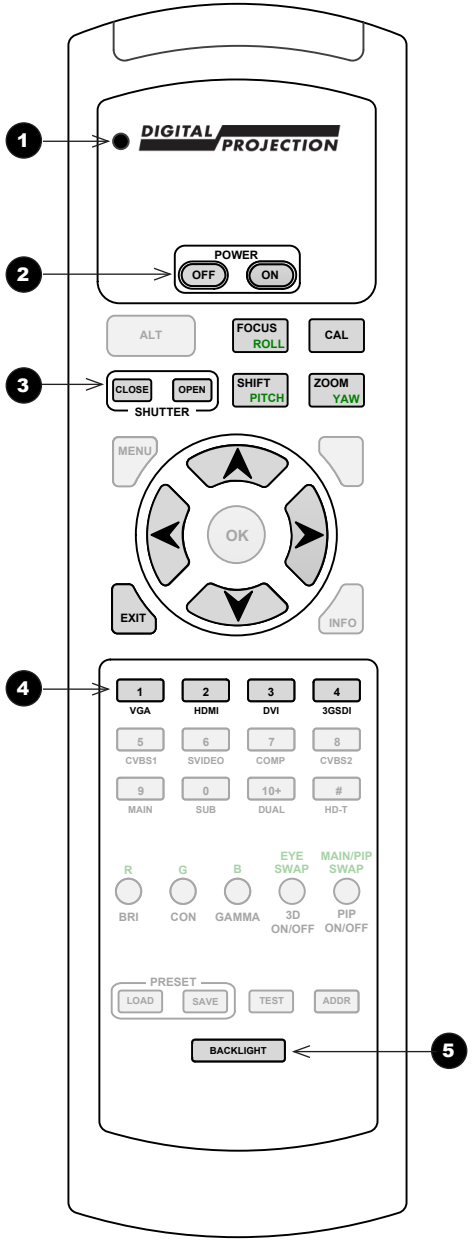


Notes

Not all remote control keys are used on this projector. The unused keys are grayed out.

You can use the remote control as a wireless IR device or connect it to the projector using a standard TRS cable. For further information, see ***Control Connections*** *in the* ***Connection Guide****.*

Remote control - continued

6 **FOCUS**
Press to enter FOCUS ADJUSTMENT mode, then use the arrow keys to make the adjustment.

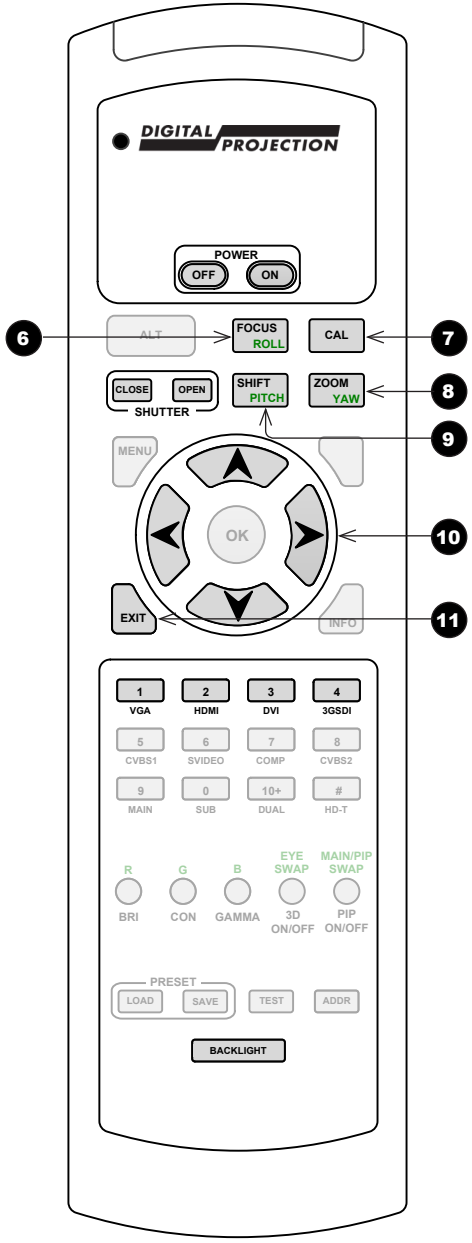
7 **CAL**
Press and hold this key, then press **FOCUS** or **ZOOM** to calibrate focus or zoom respectively.

8 **ZOOM**
Press to enter ZOOM ADJUSTMENT mode, then use the arrow keys to make the adjustment.

9 **SHIFT**
Press to enter SHIFT ADJUSTMENT mode, then use the arrow keys to make the adjustment.

10 **Arrow keys**
Use these keys to adjust lens focus, zoom and position.

11 **EXIT**
Exit lens adjustment modes.



Notes

Not all remote control keys are used on this projector. The unused keys are grayed out.

You can use the remote control wirelessly or connect it to the projector using a standard TRS cable. For further information, see ***Control Connections*** *in the* ***Connection Guide****.*

When a new lens is fitted, a calibration procedure must be carried out. For more information, see ***Calibrating zoom and focus*** *further in this guide.*

When adjusting focus or zoom, UP and LEFT will focus/zoom in, while DOWN and RIGHT will zoom out.

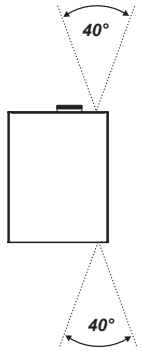
When adjusting shift, each arrow key moves the image in the corresponding direction on the screen.

When you enter FOCUS, ZOOM or SHIFT ADJUSTMENT mode, all other remote control functions become unavailable. To cancel an adjustment mode, either press **EXIT** *or wait ten seconds.*

Infrared reception

The projector has infrared sensors at the front and back.

The angle of acceptance is 40°. Make sure that the remote control is within the angle of acceptance when trying to control the projector.



Infrared reception

Notes

Infrared reception is confirmed by the blue Infrared indicator flashing on the Connections panel.

The infrared receivers are disabled when a remote control is connected via a cable. For more information, see ***Control Connections*** *in the* ***Connection Guide****.*

Remote control troubleshooting

The remote control is shipped with no battery fitted. Remove the back cover and insert the supplied cells while observing the correct cell polarity.

If the projector fails to respond to keypress on the remote control, consider the following checks.

Does the Transmit indicator flash when a key is pressed?

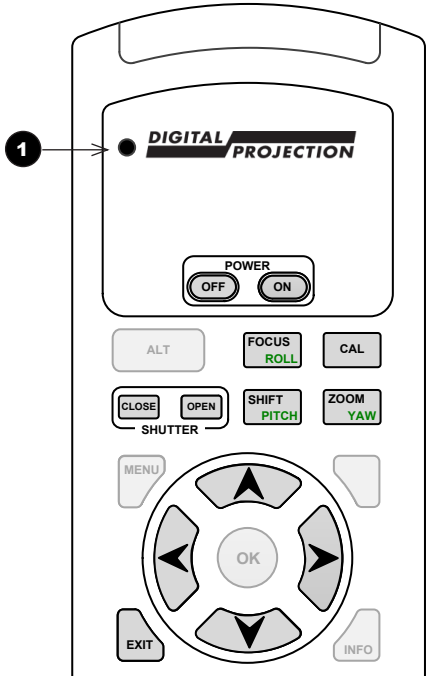
The blue ***Transmit Indicator*** 1 should be dark when the remote control is not being used and flash when a key is being pressed.

- If it emits a solid light when a key is not being pressed, the remote control is in LENS ADJUSTMENT mode. Press **EXIT** or wait up to ten seconds to exit LENS ADJUSTMENT mode.
- If the Transmit indicator fails to flash when a key is pressed, it might be time to replace the battery. Use only Alkaline AAA (LR03) cells for best results.

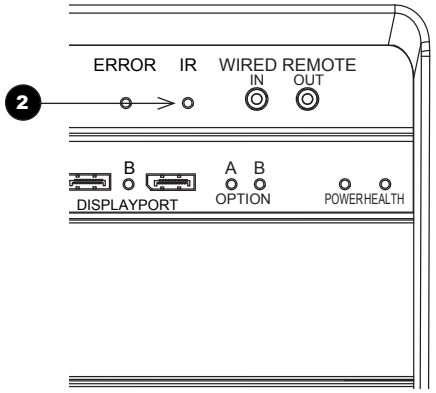
Does the indicator on the projector respond when a remote control key is pressed?

When a key is pressed on the remote control, the ***infrared indicator*** 2 on the connection panel should flash blue. If this does not happen:

- Check that the angle of acceptance is met.
- Check that the projector address matches the remote control address.
- If none of the above fixes the problem, it might be time to replace the battery. Use only Alkaline AAA (LR03) cells for best results.



Transmit indicator on the remote control



Infrared indicator on the Connections panel

Notes

The infrared receivers are disabled when a remote control is connected via a cable. For more information, see ***Control Connections*** *in the* ***Connection Guide****.*

For information about the angle of acceptance, see ***Infrared reception*** *earlier in this guide.*

Positioning The Screen And Projector

Installation should be carried out by authorised personnel only.

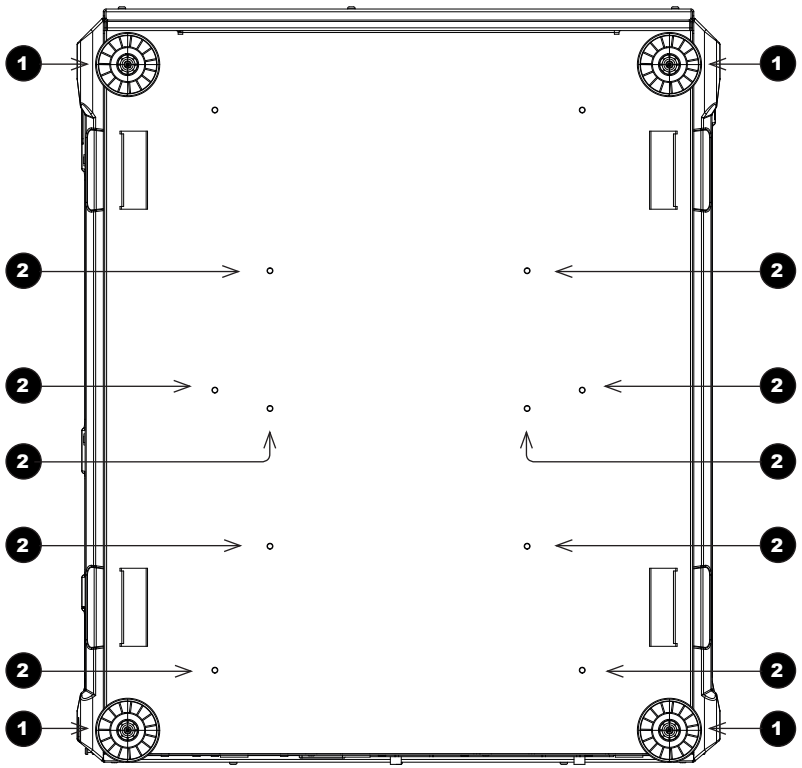
1. Install the screen, ensuring that it is in the best position for viewing by your audience.
2. Mount the projector, ensuring that it is at a suitable distance from the screen for the image to fill the screen.
   If table mounting, set the adjustable feet so that the projector is level, and perpendicular to the screen.
   If ceiling mounting, refer to the rigging frame documentation for further instructions.

Fixing holes for ceiling mounting

The drawing below shows the positions of the feet for table mounting, as well as the fixing holes needed for ceiling mounting.

1 **Four adjustable feet**

2 **M6 holes for ceiling mounting**
Ten out of twelve M6 holes found on the bottom of the projector are used for ceiling mounting - the pair closest to the front of the projector are not used.
The screws should not penetrate more than 15 mm into the body of the projector.



Notes

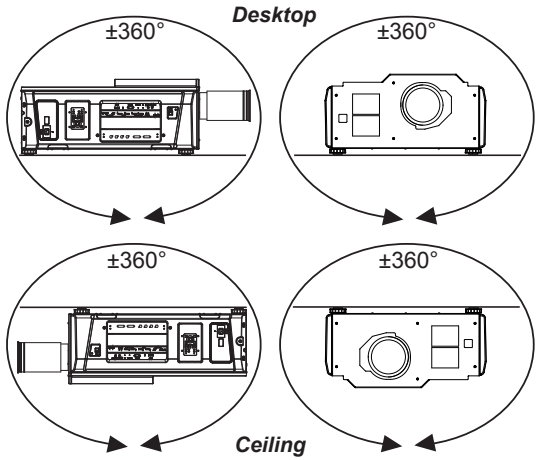
Always allow the projector to cool for 5 minutes before disconnecting the power or moving the projector.

Ensure that there is at least 30 cm (12 in) of space between the ventilation outlets and any wall, and 10 cm (4 in) on all other sides.

Projectors are not designed to be stacked on top of each other unless a rigging frame is used.

Orientation and tilting

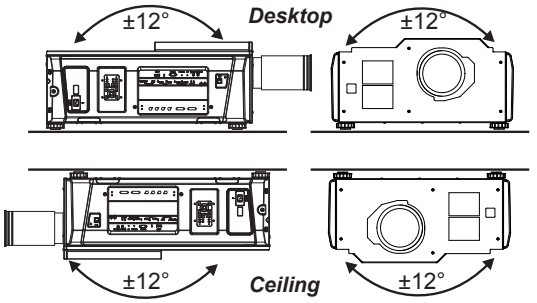
INSIGHT 4K Dual LED can be positioned at any angle, as shown in the illustration.



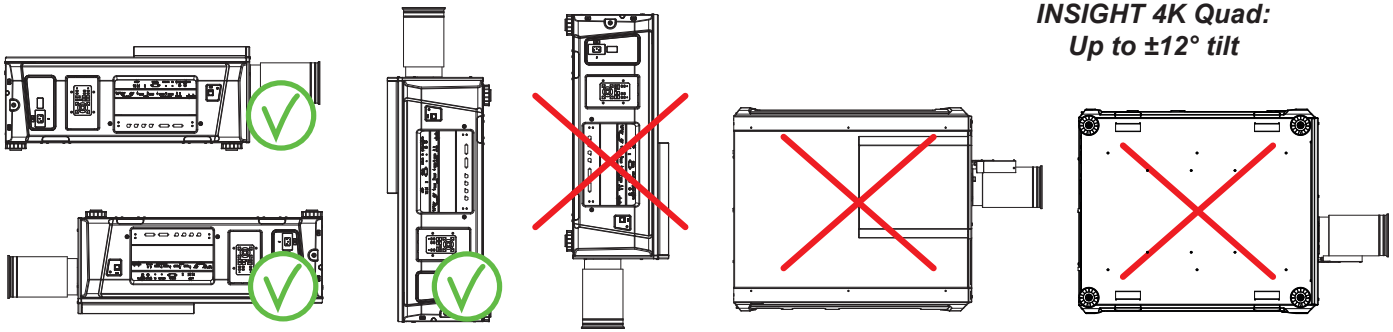
INSIGHT 4K Dual LED: any angle is possible

The following restrictions apply to INSIGHT 4K Quad:

- Do not position the projector in portrait mode or with the lens pointing down.
- Vertical positioning with the lens pointing up is possible but with implications on lamp life.
- When positioned in desktop or ceiling mode, do not tilt the projector more than ±12° along the pitch or roll axis.



INSIGHT 4K Quad: Up to ±12° tilt



INSIGHT 4K Quad: no portrait mode or lens pointing down

Notes

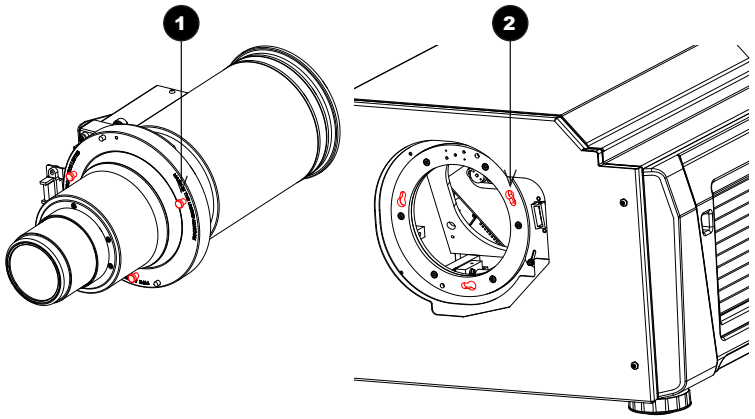
Always allow the projector to cool for 5 minutes before disconnecting the power or moving the projector.

Ensure that there is at least 30 cm (12 in) of space between the ventilation outlets and any wall, and 10 cm (4 in) on all other sides.

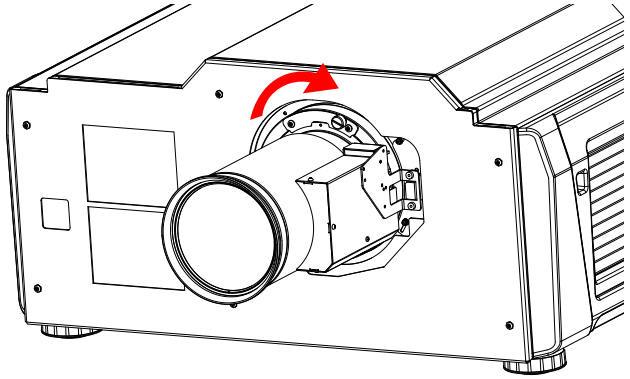
Projectors are not designed to be stacked on top of each other unless a rigging frame is used.

Fitting The Lens

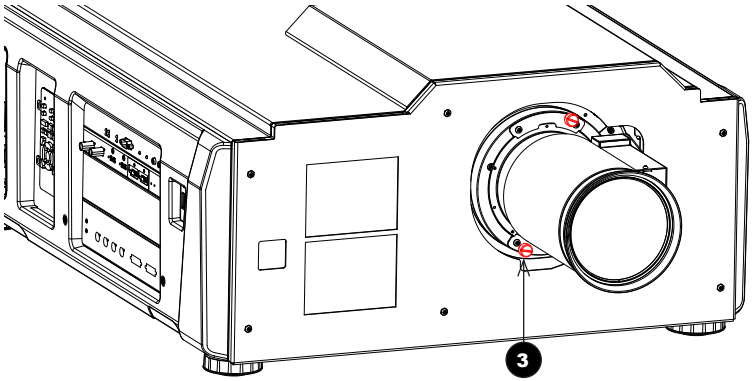
1. Insert the lens into the mount.
   Engage the three ***locating studs*** (1) into the corresponding ***slots*** (2) on the mount.



2. Rotate the lens clockwise until the studs slide all the way into the slots.



3. Tighten the two ***fixing screws*** (3) on the lens collar.



Notes

Before changing the lens, always make sure the projector is switched off and fully disconnected from its power supply.

When changing the lens, avoid using excessive force as this may damage the equipment.

Take care to preserve the original lens packaging and protective caps for future use.

The projector will not power on without the lens fitted.

Before turning on the projector, please ensure the protective caps are removed from the front and rear of the lens.

The two fixing screws must be tightened to at least a torque of 0.5 N-m using a screwdriver. Loose screws might lead to the lens falling off.

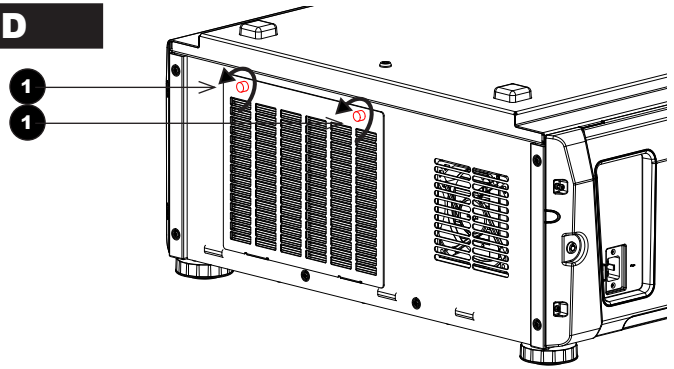
When a new lens is fitted, a calibration procedure must be carried out. For more information, see ***Calibrating zoom and focus*** *further in this guide.*

Cleaning And Replacing The Filters, Dual LED

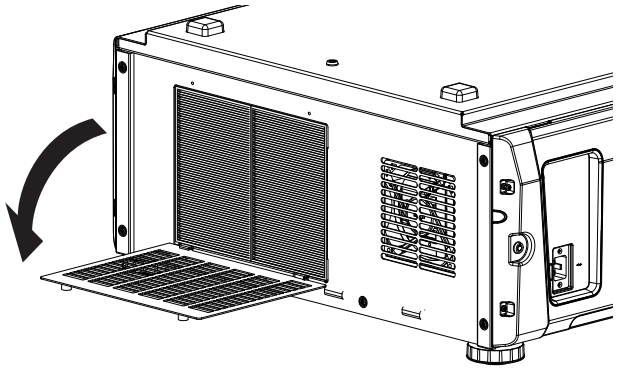
The information in this chapter refers to **INSIGHT 4K Dual LED**.

Rear filters

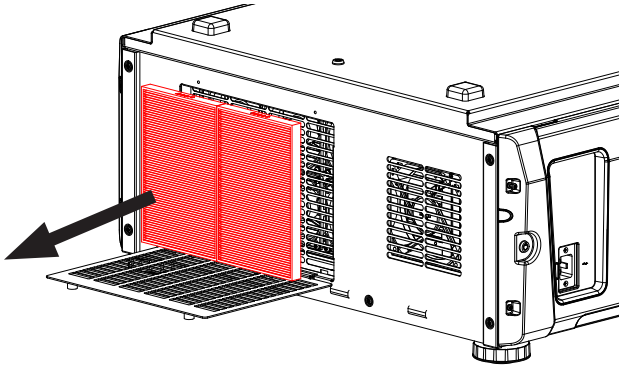
1. Loosen the two ***knobs*** (1) holding the filter cover by turning them counterclockwise.
   Use a Phillips screwdriver if necessary.



2. Tilt the filter cover to open it.



3. Remove the filters. Grasp the top and bottom or left and right ends of each air filter and remove it by pulling toward you.



Notes

The knobs are captive on the removable cover.

Before changing the filters, always make sure the projector is switched off and fully disconnected from its power supply.

When changing the filters, avoid using excessive force as this may damage the equipment.

Filters should be replaced as necessary upon visual inspection and in accordance with operating environment.

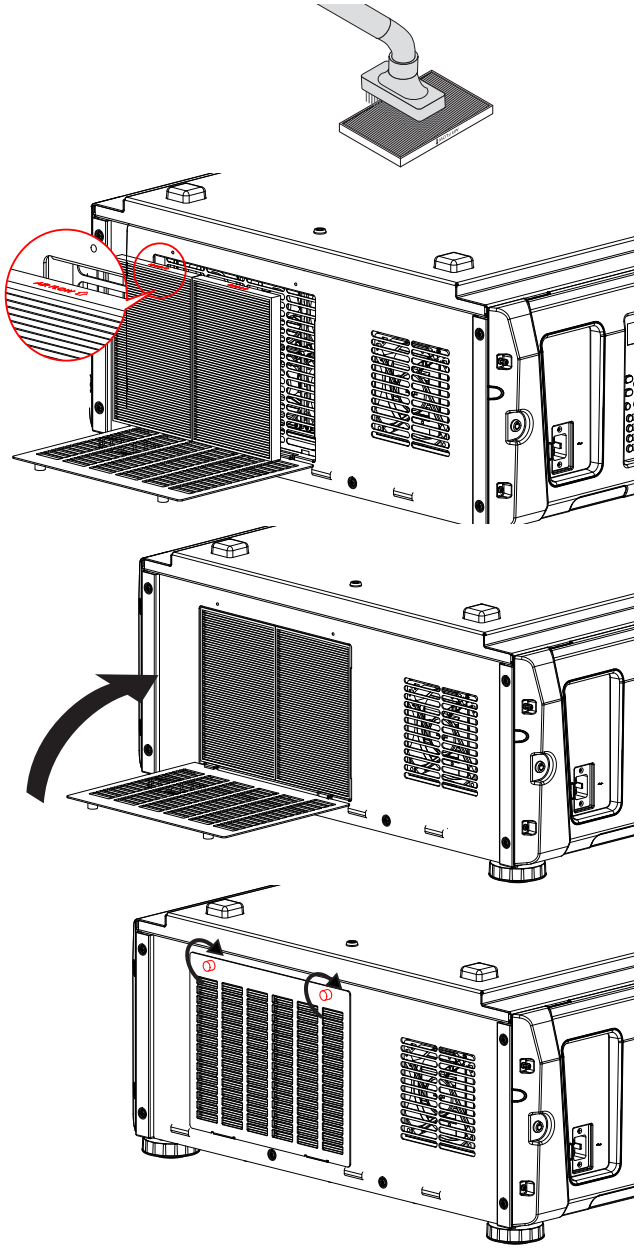
4. If you are replacing the filters, skip this step.

   To clean the filters, use a vacuum cleaner brush attachment to vacuum away dust from the air filters. Avoid making direct contact without an attachment or using a nozzle attachment.

5. Mount the air filters to the projector. Look for an arrow (AIR FLOW↑) indicating the installation direction on the side of the air filter. Point the arrow towards the projector.

6. Close the filter cover.

7. Tighten the knobs clockwise to secure the cover.



Notes

*The information on this page refers to **INSIGHT 4K Dual LED**.*

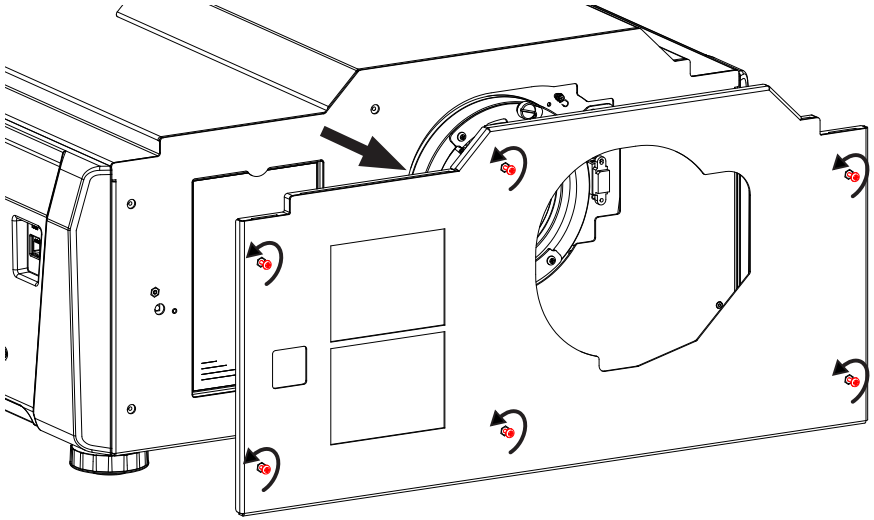
Before changing the filters, always make sure the projector is switched off and fully disconnected from its power supply.

When changing the filters, avoid using excessive force as this may damage the equipment.

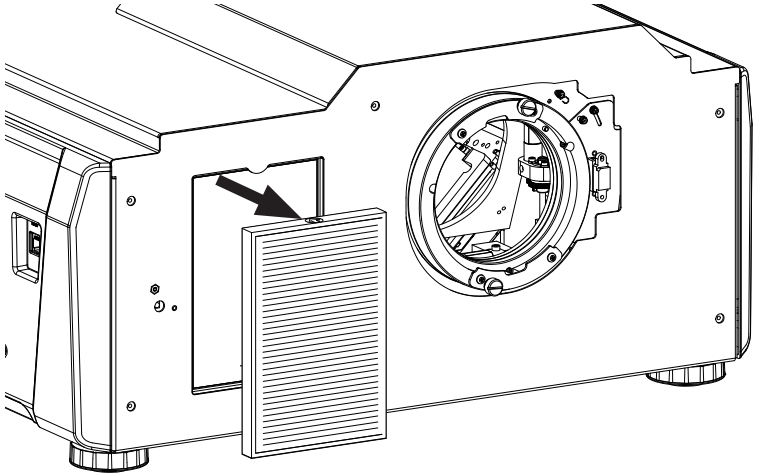
Filters should be replaced as necessary upon visual inspection and in accordance with operating environment.

Front filter

1. Remove the lens, if fitted. Loosen the six captive screws on the front cover of the projector, then remove the cover.

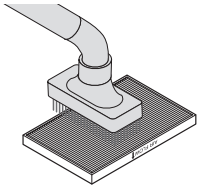


2. Remove the air filter.



3. If you are replacing the filter, skip this step.

   To clean the filter, use a vacuum cleaner brush attachment to vacuum away dust from the air filter. Avoid making direct contact without an attachment or using a nozzle attachment.



Notes

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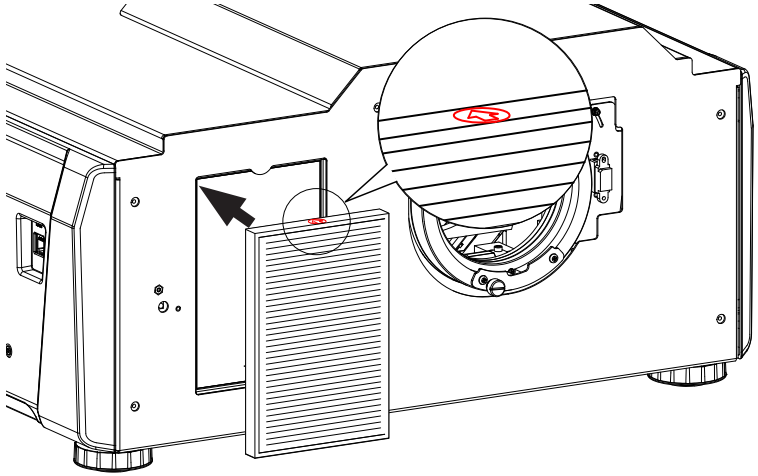
Before changing the filters, always make sure the projector is switched off and fully disconnected from its power supply.

When changing the filters, avoid using excessive force as this may damage the equipment.

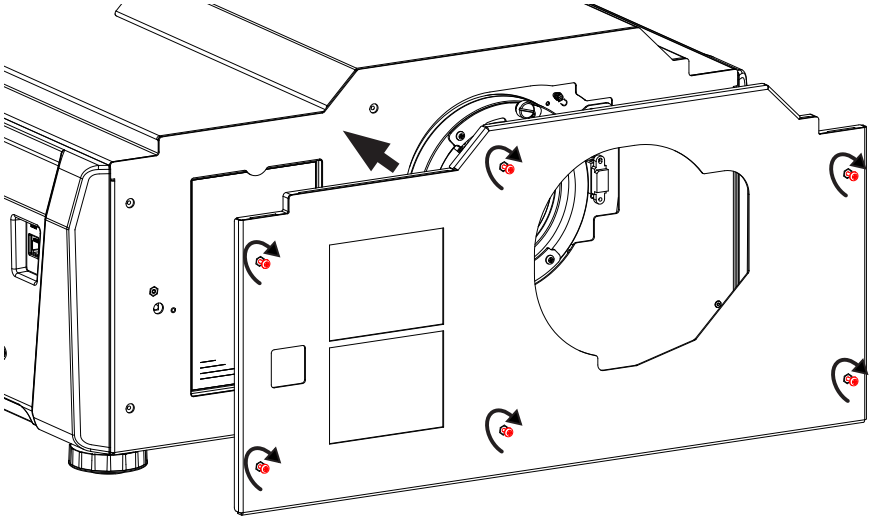
Filters should be replaced as necessary upon visual inspection and in accordance with operating environment.

4. Mount the air filter to the projector.

   Look for an arrow indicating the installation direction on the side of the air filter. Point the arrow towards the projector.



5. Mount the front cover to the projector. Tighten the two captive screws to secure the cover.



Notes

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The arrow may appear different from the illustration.

Before changing the filters, always make sure the projector is switched off and fully disconnected from its power supply.

When changing the filters, avoid using excessive force as this may damage the equipment.

Filters should be replaced as necessary upon visual inspection and in accordance with operating environment.

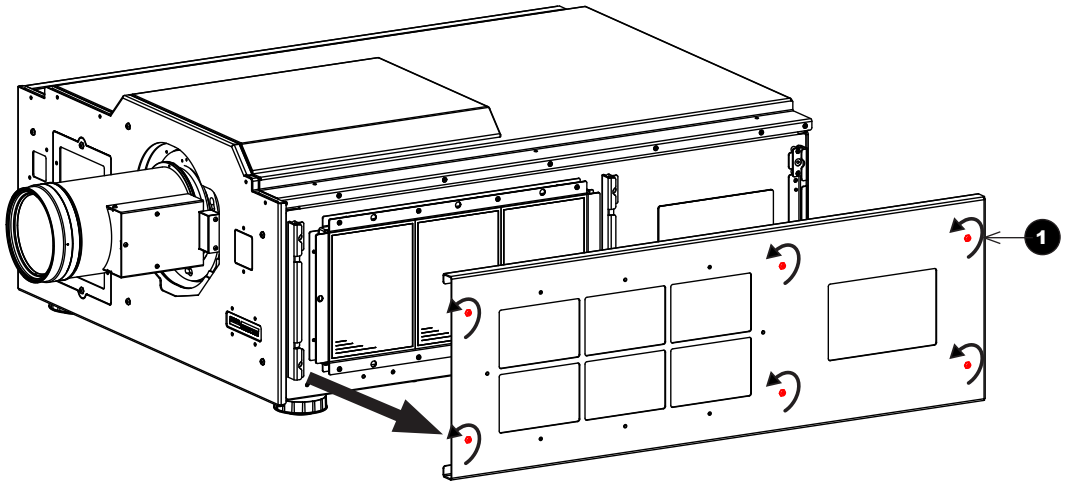
Cleaning And Replacing The Filters, Quad

The information in this chapter refers to **INSIGHT 4K Quad**.

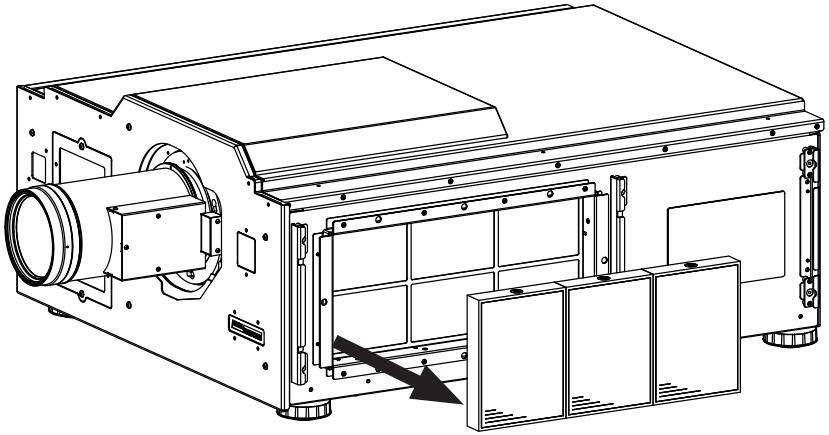
Side filters

1. Loosen the six ***captive screws*** (1) holding the side panel by turning them counterclockwise
   Use a Phillips screwdriver if necessary.

   When the captive screws are loose, pull the side panel out.



2. Remove the filters. Grasp the top and bottom or left and right ends of each air filter and remove it by pulling toward you.



Notes

The knobs are captive on the removable cover.

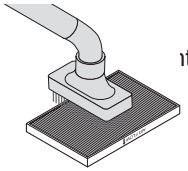
Before changing the filters, always make sure the projector is switched off and fully disconnected from its power supply.

When changing the filters, avoid using excessive force as this may damage the equipment.

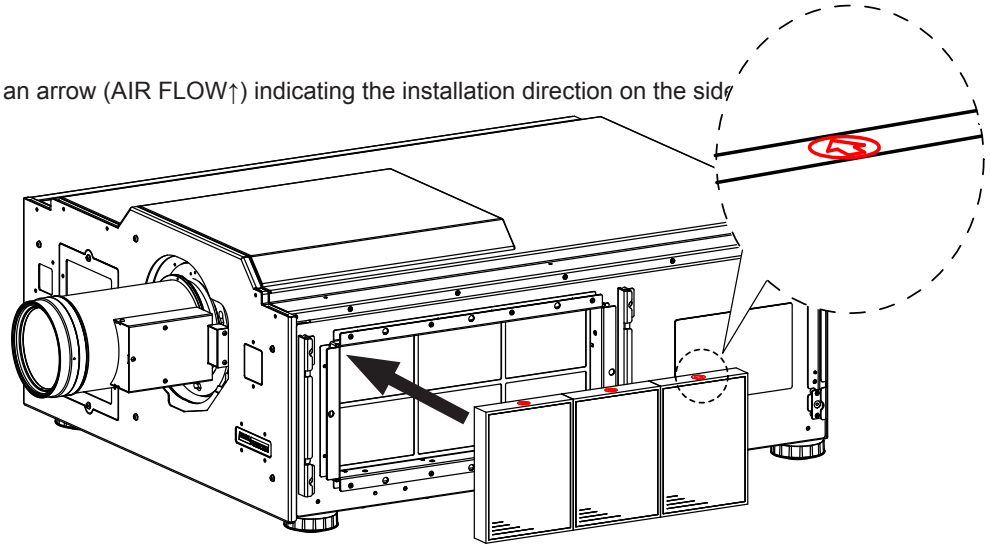
Filters should be replaced when new lamps are fitted, or as necessary upon visual inspection and in accordance with operating environment.

3. If you are replacing the filters, skip this step.

   To clean the filters, use a vacuum cleaner brush attachment to vacuum away dust from the air filters. Avc ıtact without an attachment or using a nozzle attachment.



4. Mount the air filters to the projector. Look for an arrow (AIR FLOW↑) indicating the installation direction on the sid the arrow towards the projector.



5. Close the filter cover.

6. Tighten the knobs clockwise to secure the cover.

Notes

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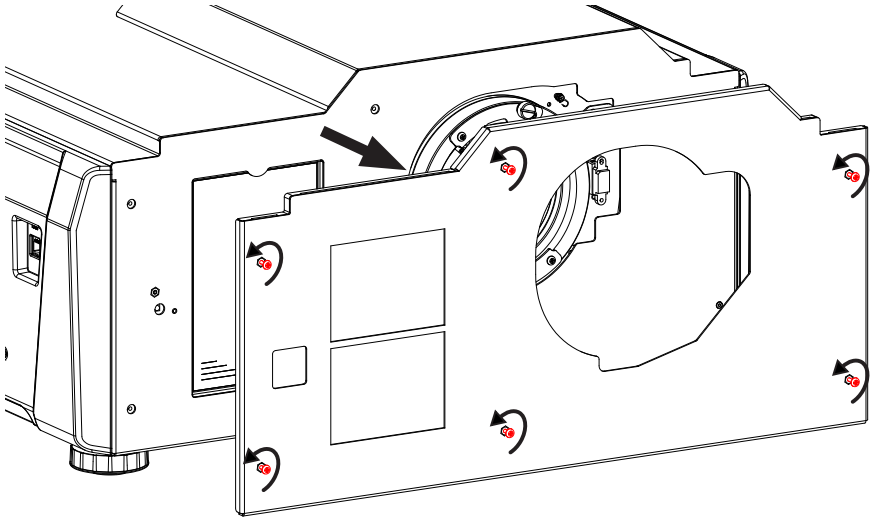
Before changing the filters, always make sure the projector is switched off and fully disconnected from its power supply.

When changing the filters, avoid using excessive force as this may damage the equipment.

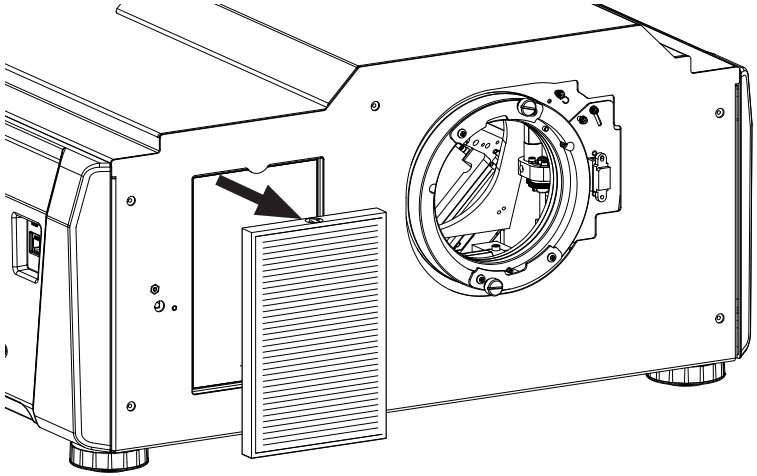
Filters should be replaced when new lamps are fitted, or as necessary upon visual inspection and in accordance with operating environment.

Front filter

1. Remove the lens, if fitted. Loosen the six captive screws on the front cover of the projector, then remove the cover.

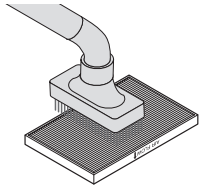


2. Remove the air filter.



3. If you are replacing the filter, skip this step.

   To clean the filter, use a vacuum cleaner brush attachment to vacuum away dust from the air filter. Avoid making direct contact without an attachment or using a nozzle attachment.



Notes

*The information on this page refers to I**NSIGHT 4K Quad**.*

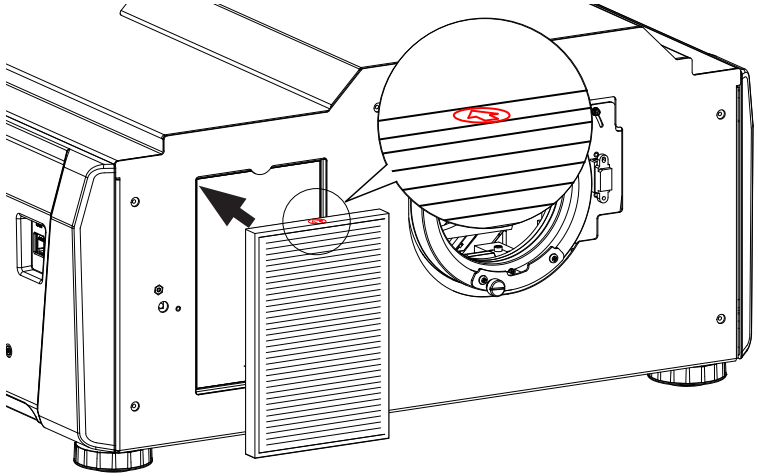
Before changing the filters, always make sure the projector is switched off and fully disconnected from its power supply.

When changing the filters, avoid using excessive force as this may damage the equipment.

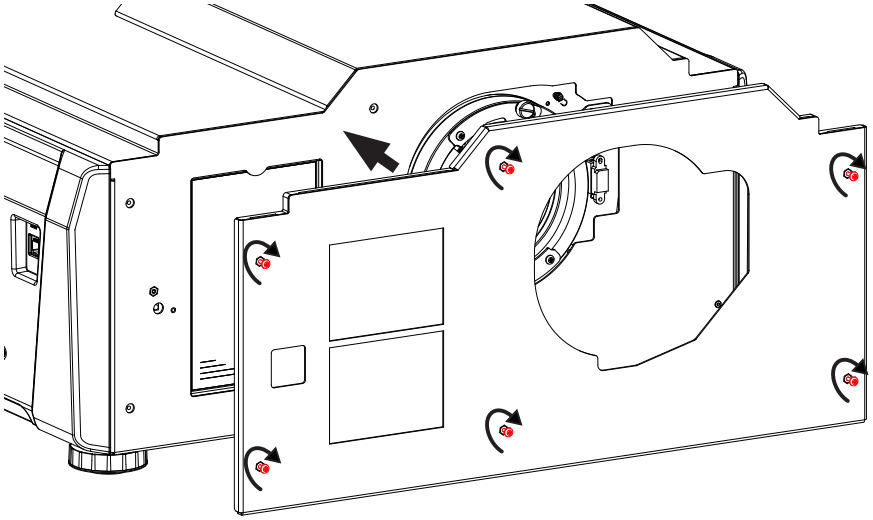
Filters should be replaced when new lamps are fitted, or as necessary upon visual inspection and in accordance with operating environment.

4. Mount the air filter to the projector.

   Look for an arrow indicating the installation direction on the side of the air filter. Point the arrow towards the projector.



5. Mount the front cover to the projector. Tighten the two captive screws to secure the cover.



Notes

*The information on this page refers to **INSIGHT 4K Quad**.*

The arrow may appear different from the illustration.

Before changing the filters, always make sure the projector is switched off and fully disconnected from its power supply.

When changing the filters, avoid using excessive force as this may damage the equipment.

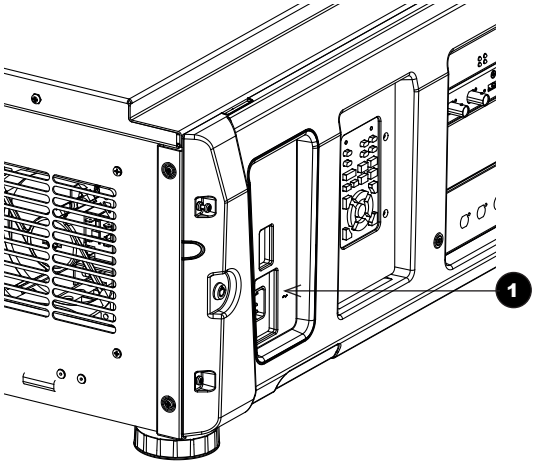
Filters should be replaced when new lamps are fitted, or as necessary upon visual inspection and in accordance with operating environment.

Operating The Projector

Switching the projector on

1. Connect the power cable between the mains supply and ***the mains socket*** (1) on the side of the projector.

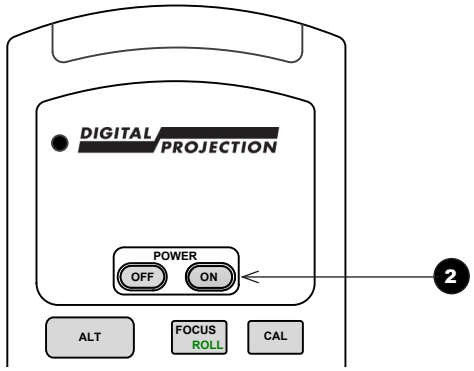
   The **SYSTEM** status indicator lights a steady amber to show that the projector is now in STANDBY mode.



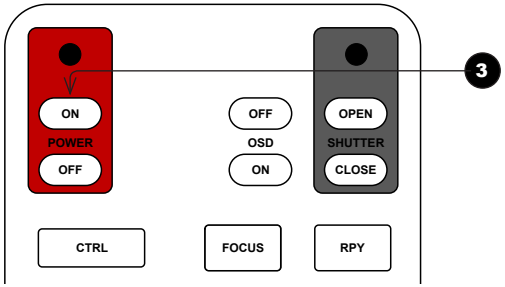
Location of mains socket

2. To switch from STANDBY to ON, press and hold the **ON** key on either ***the remote control*** (2) or ***the keypad*** (3) for at least three seconds.

   During the startup process, the **SYSTEM** status indicator flashes green. When the projector is fully switched on, the **SYSTEM** status indicator lights a steady green.



ON key - remote



ON key - keypad

Notes

*See also **Connecting The Power Supply** earlier in this guide.*

Do not disconnect the power cable while the projector is working or cooling down.

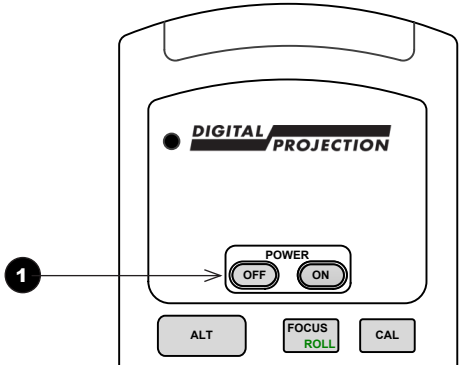
Use only the power cable provided.

Ensure that the power outlet includes a ground connection as this equipment MUST be earthed.

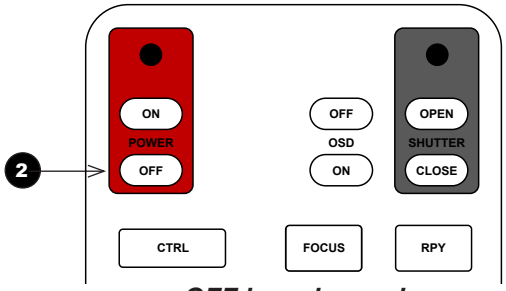
Handle the power cable carefully and avoid sharp bends. Do not use a damaged power cable.

Switching the projector off

1. Press *the* **OFF** *key* (1) for at least three seconds.
2. To switch the projector off completely, disconnect it from the mains.



OFF key - remote



OFF key - keypad

Notes

Do not turn off the projector from the power switch or disconnect the power cord while the projector is working or cooling down.

Use only the power cable provided.

Ensure that the power outlet includes a ground connection as this equipment MUST be earthed.

Handle the power cable carefully and avoid sharp bends. Do not use a damaged power cable.

Selecting an input

Using the keypad

The list of inputs on the main connection panel is as follows:

- ***HDMI A***
- ***HDMI B***
- ***DisplayPort A***
- ***DisplayPort B***

Press **INPUT +** to switch to the next input on the list.

Press I**NPUT -** to switch to the previous input on the list.

Using the remote control

Press:

- **1** to switch to ***HDMI A***
- **2** to switch to ***HDMI B***
- **3** to switch to ***DisplayPort A***
- **4** to switch to ***DisplayPort B***

Selecting a test pattern

You can access a variety of test patterns to choose from using the ***Projector Controller*** software, which is available for download from the Digital Projection website, free of charge.

Please refer to the ***Projector Controller*** user manual for details about installing and using the software.

Notes

Calibrating zoom and focus

Each time a new lens is fitted into the projector, a calibration procedure must be carried out as follows:

Calibrate zoom and focus using the keypad:

- Press **RPY** followed by the **RIGHT** arrow key to calibrate the lens zoom mechanism.
- Press **RPY** followed by the **LEFT** arrow key to calibrate the lens focus mechanism.

Calibrate zoom and focus using the remote control:

- Press and hold **CAL**, then press **ZOOM** or **FOCUS** to calibrate zoom or focus respectively.

When calibrating, select one command first, then allow at least 60 seconds for the calibration to take place before selecting the other command.

Adjusting the lens

On either the remote control or keypad:

- **Focus**
  Press to enter FOCUS ADJUSTMENT mode, then use the arrow keys to make the adjustment.
- **Zoom**
  Press to enter ZOOM ADJUSTMENT mode, then use the arrow keys to make the adjustment.
- **Shift**
  Press to enter SHIFT ADJUSTMENT mode, then use the arrow keys to make the adjustment.

Adjusting brightness, contrast and other settings

You can access a variety of settings to adjust using the ***Projector Controller*** software, which is available for download from the Digital Projection website, free of charge.

Please refer to the ***Projector Controller*** user manual for details about installing and using the software.

Notes

When adjusting focus or zoom, UP and LEFT will focus/zoom in, while DOWN and RIGHT will zoom out.

When adjusting shift, each arrow key moves the image in the corresponding direction on the screen.

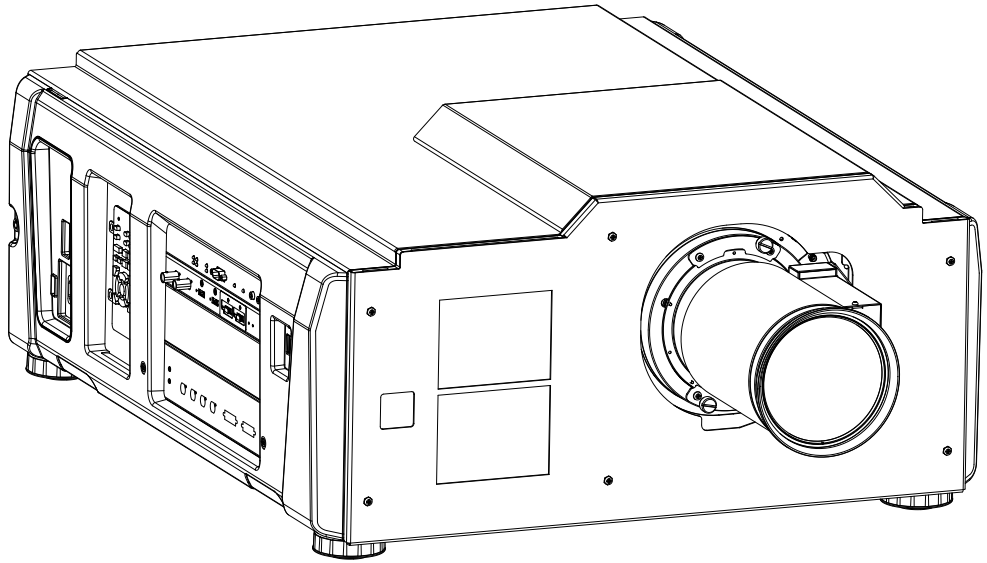
When you enter FOCUS, ZOOM or SHIFT ADJUSTMENT mode, all other remote control functions become unavailable. To cancel an adjustment mode, either press **EXIT** *or wait ten seconds.*

DIGITAL PROJECTION

INSIGHT 4K Dual LED Series
INSIGHT 4K Quad Series

High Brightness Digital Video Projector

CONNECTION GUIDE



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3D Sync **32**
Indicators on the connections panel **33**
EDID on the DisplayPort and HDMI inputs **34**
Using HDMI/DisplayPort switchers with the projector **34**

Control Connections **35**

Signal Inputs

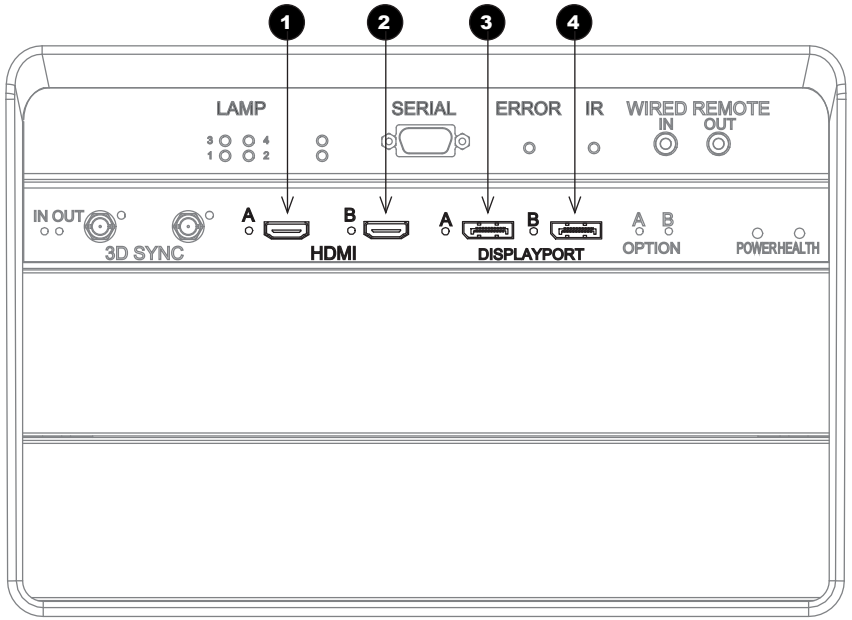
The following inputs are available on the main connections panel:

1 **HDMI A**
HDMI 1.4b

2 **HDMI B**
HDMI 1.4b

3 **DisplayPort A**
DisplayPort 2.0

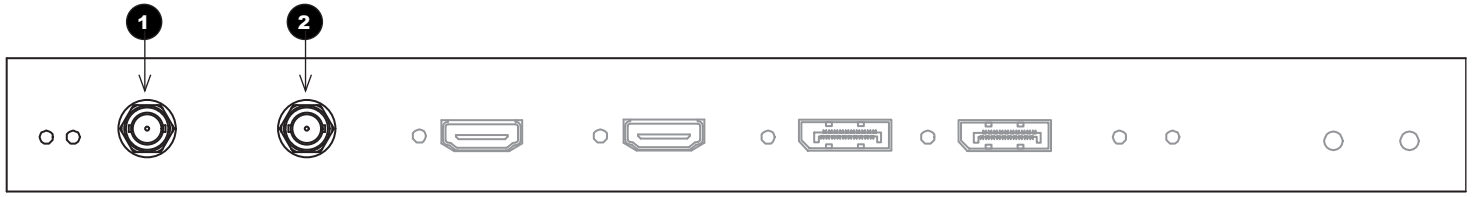
4 **DisplayPort B**
DisplayPort 2.0



Notes

It might be possible to add more inputs by installing an option card. Contact your dealer for information about option cards.

3D Sync



1 **3D Sync In**

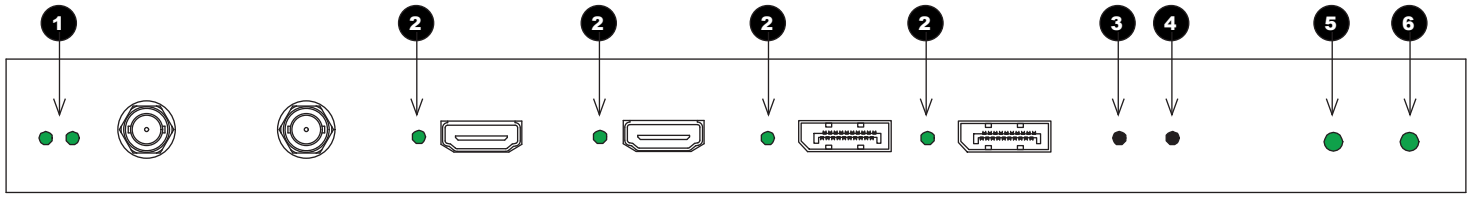
Sync input signal
Connect the 3D sync from your graphics card or server.

2 **3D Sync Out**

Sync output signal
Connect this to your IR emitter or ZScreen.

Notes

Indicators on the connections panel



1 3D Sync In / Out

On (green)	●	3D sync is present.

2 HDMI A / HDMI B / DisplayPort A / DisplayPort B

On (green)	●	Input selected. Signal detected and in range.
Flashing (green)	☼	Input selected, but signal is not detected or out of range.

3 Option A

(This indicator is not used unless an option card is fitted in slot A.)

On (green)	●	Input selected. Signal detected and in range.
Flashing (green)	☼	Input selected, but signal is not detected or out of range.

4 Option B

(This indicator is not used unless an option card is fitted in slot A.)

On (green)	●	Input selected. Signal detected and in range.
Flashing (green)	☼	Input selected, but signal is not detected or out of range.

5 Power

On (green)	●	Projector is switched on.

6 Health

Flashing (amber)	☼	The lamp is beginning to boot up.
Flashing (green)	☼	The lamp is booting up.
On (green)	●	Projector is switched on and fully functional.
On (red)	●	There is an error

Notes

*For information about other indicators found on the connections panel, see **Connections panel indicators** in the **Installation and Quick-Start Guide**.*

EDID on the DisplayPort and HDMI inputs

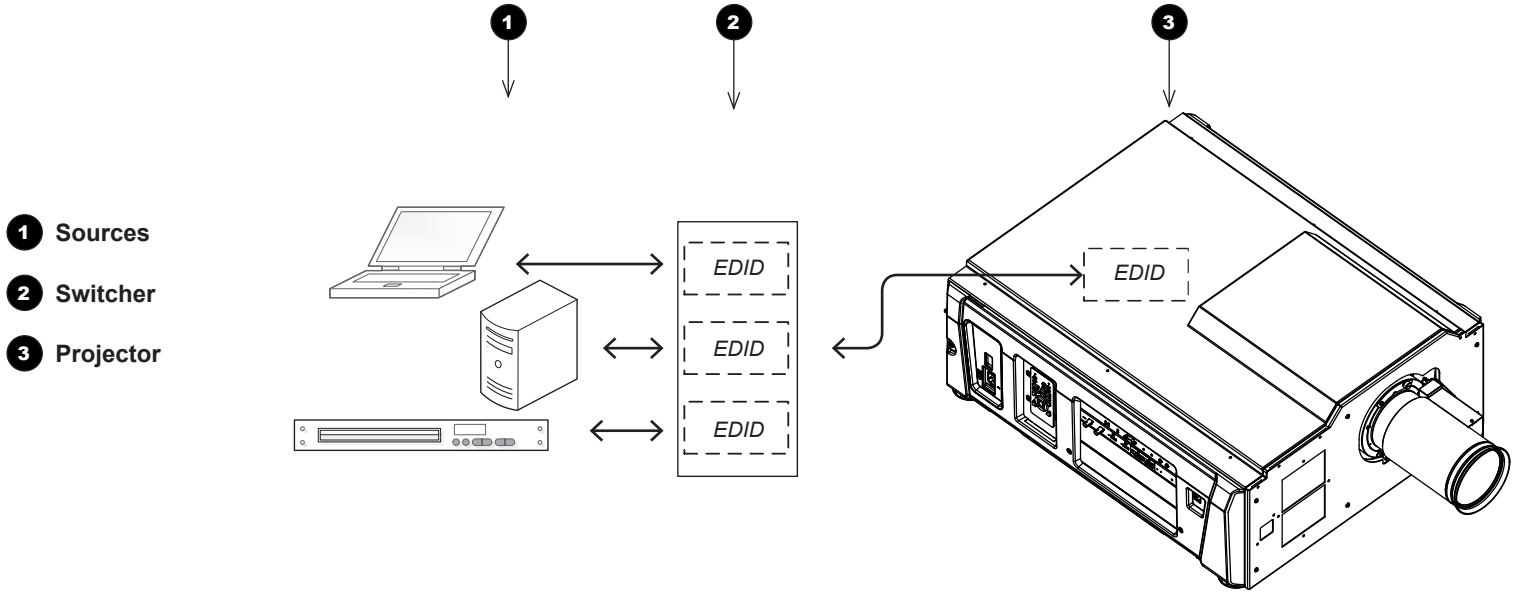
If you are using a computer graphics card or another source that obeys the EDID protocol, the source will automatically configure itself to suit the projector.

Otherwise please refer to the documentation supplied with the source to manually set the resolution to the native resolution of the projector or the nearest suitable setting. Switch off the source, connect to the projector, then switch the source back on again.

Using HDMI/DisplayPort switchers with the projector

When using an HDMI/DisplayPort source switcher with the projector, it is important to set the switcher so that it passes the projector EDID through to the source devices. If this is not done, the projector may not be able to lock to the source or display the source correctly as its video output timings may not be compatible with those of the projector. Sometimes this is called transparent, pass-through or clone mode. See your switcher's manual for information on how to set this mode.

Additionally, sources which use HDCP encryption may not display properly when connected to the projector via a switcher. Refer to the switcher's manual for more information.



1 Sources

2 Switcher

3 Projector

The EDIDs in the switcher should be the same as the one in the projector.

Notes

The HDMI and DisplayPort inputs are HDMI 1.4 compliant. Some content may not display unless the source is also compliant.

Control Connections

1 **PC control terminal (RS-232)**

Use this terminal when controlling the projector in serial connection from a PC.

2 **Wired remote control IN**

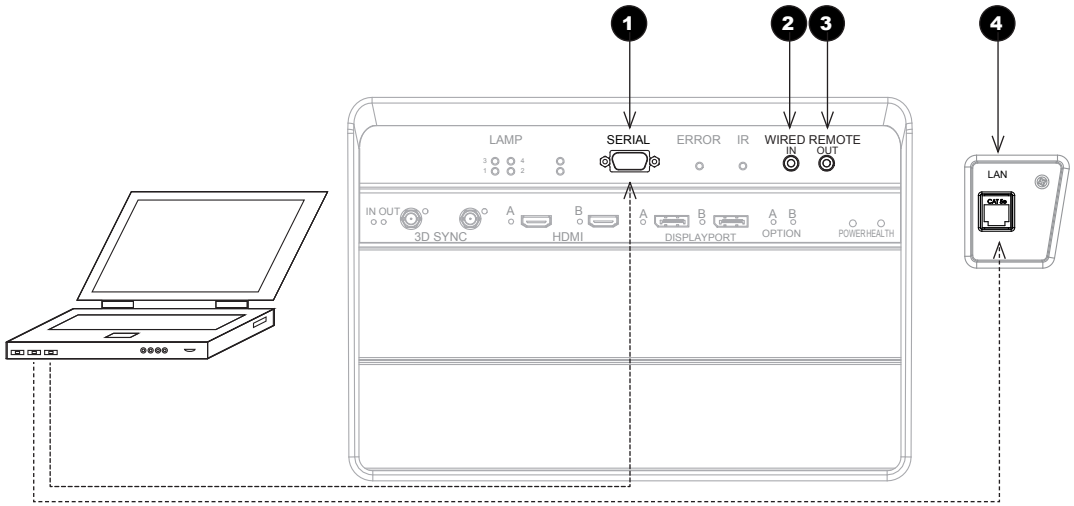
If infrared signals from the remote control cannot reach the projector due to excessive distance or obstructions such as walls or cabinet doors, you can connect a remote control handset directly to this input, or you can connect an external IR repeater to the remote control input, and position its IR sensor within range of the operator.

3 **Wired remote control OUT**

To synchronize the control of multiple projectors, connect the wired remote output of one projector to the wired remote input of another.

4 **LAN port (LAN)**

Use this port when controlling the projector in LAN connection from a PC.



Notes

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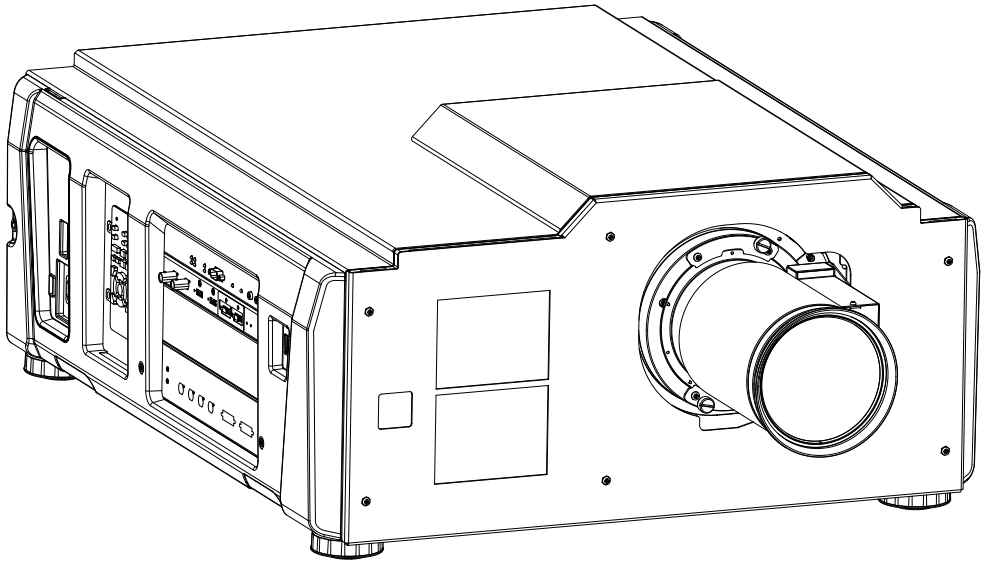
DIGITAL PROJECTION

INSIGHT 4K Dual LED Series
INSIGHT 4K Quad Series

High Brightness Digital Video Projector

OPERATING GUIDE



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Adjusting Projector Settings 40

Keypad And Remote Control

The keypad and remote control allow immediate access to some basic functions:

Use either device to:

- Turn the projector on and off:
  Press and hold the **ON** or **OFF** key respectively for at least three seconds.
- Open and close the shutter:
  Press the **OPEN** or **CLOSE** key respectively.
- Adjust the lens:
  - **Focus**
    Press **FOCUS** to enter FOCUS ADJUSTMENT mode, then use the arrow keys to focus.
  - **Zoom**
    Press **ZOOM** to enter ZOOM ADJUSTMENT mode, then use the arrow keys to zoom in or out.
  - **Shift**
    Press **SHIFT** to enter SHIFT ADJUSTMENT mode, then use the arrow keys to adjust the position of the image on the screen.

Change the input using the keypad

The list of inputs on the main connection panel is as follows:

- ***HDMI A***
- ***HDMI B***
- ***DisplayPort A***
- ***DisplayPort B***

Press **INPUT +** to switch to the next input, or I**NPUT -** to switch to the previous input on the list.

Change the input using the remote control

Press:

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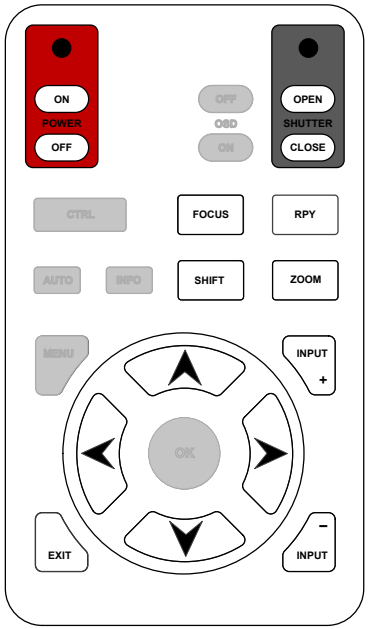
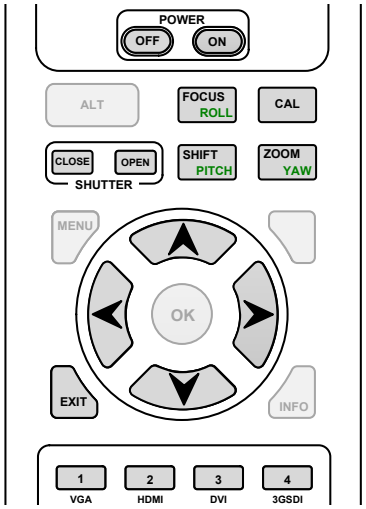


Keypad



Remote control

Notes

When adjusting focus or zoom, UP and LEFT will focus/zoom in, while DOWN and RIGHT will zoom out.

When adjusting shift, each arrow key moves the image in the corresponding direction on the screen.

When you enter FOCUS, ZOOM or SHIFT ADJUSTMENT mode, all other remote control functions become unavailable. To cancel an adjustment mode, either press **EXIT** *or wait ten seconds.*

When a new lens is fitted, a calibration procedure must be carried out, using the keypad or remote control. For more information, see ***Calibrating zoom and focus*** *in the* ***Installation and Quick-Start Guide****.*

Adjusting Projector Settings

Various adjustments can be made using the ***Projector Controller*** software, which is available for download from the Digital Projection website, free of charge.

Please refer to the ***Projector Controller*** user manual for details about installing and using the software.

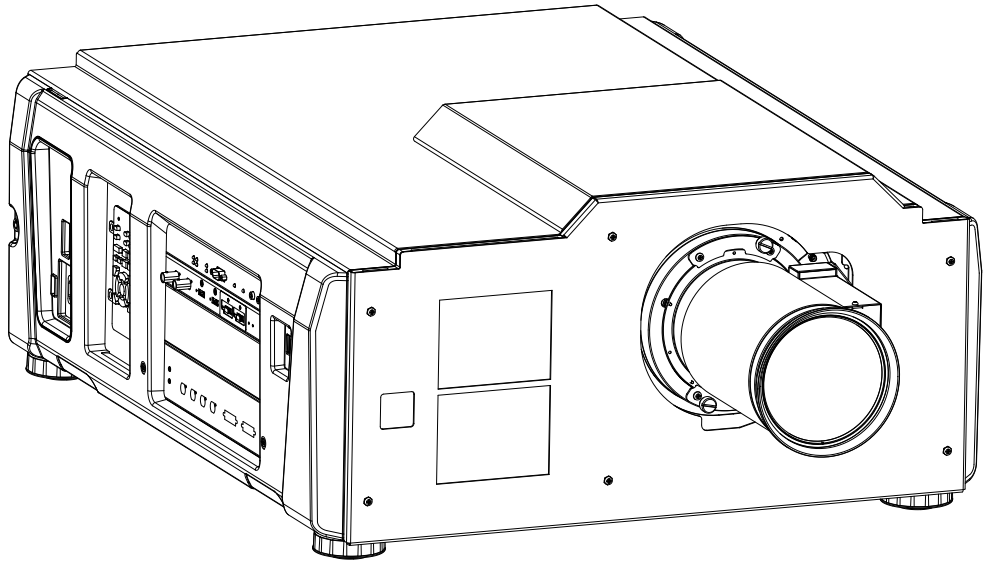
Notes

DIGITAL PROJECTION

INSIGHT 4K Dual LED Series
INSIGHT 4K Quad Series

High Brightness Digital Video Projector

REFERENCE GUIDE



Rev B June 2016

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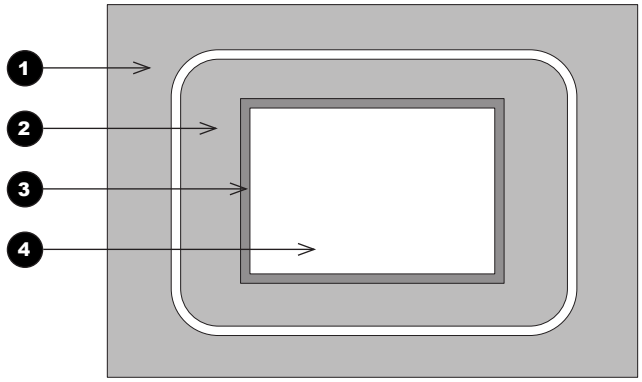
The DMD™

A DMD™ (Digital Micromirror Device™) is a true digital light modulator which utilises an array of approximately 8.8 million moving aluminium mirrors, with each one representing a pixel in the final projected image. The outermost micromirrors in the array remain inactive (***pond of mirrors***) and are not used in constructing the image.

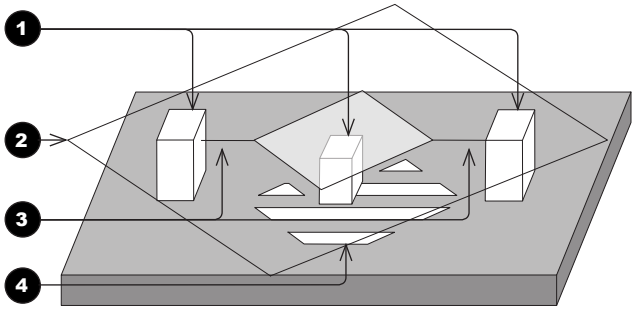
1. **Casing**
2. **Light shield**
3. **Pond of mirrors**
4. **Array**



DMD™

Each mirror element is suspended over address electrodes by a torsion hinge between two posts.

1. **Support posts**
2. **Mirror element**
3. **Torsion hinges**
4. **Offset address electrode**

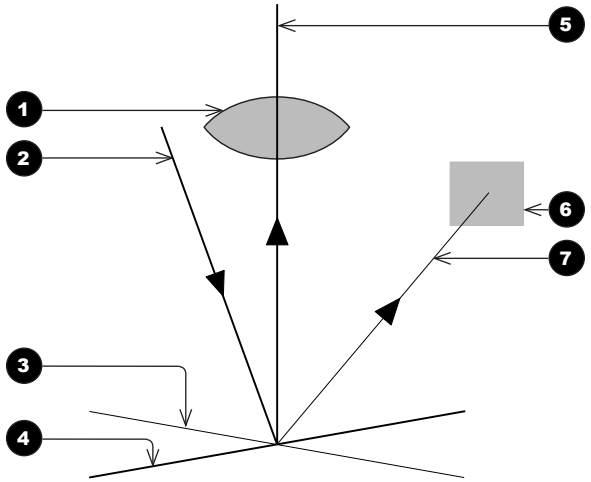


Mirror element with tilt mechanism

Notes

Depending on the voltage polarity applied, each mirror will either tilt to the left to produce a bright pixel or to the right for a dark pixel. When light is applied to the complete DMD™, only the light redirected from a mirror tilting to the left is projected.

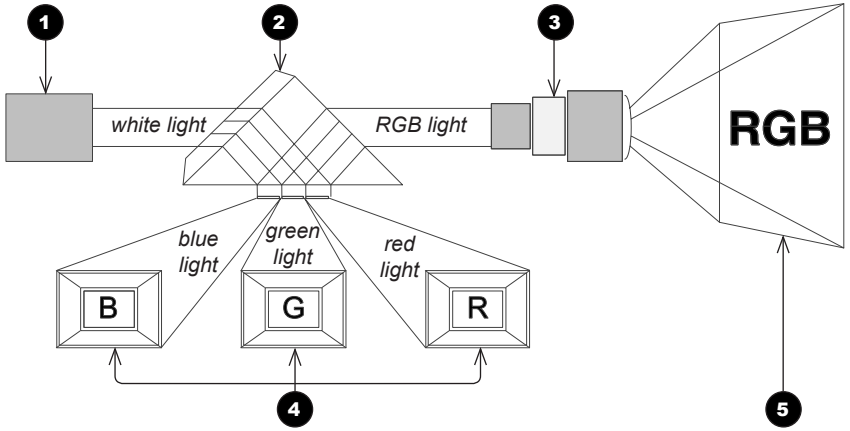
1. **Projection lens**
2. **Incoming light from the illumination module**
3. **Mirror element tilted to the right**
4. **Mirror element tilted to the left**
5. **Reflected light, left tilt**
6. **Light dump**
7. **Reflected light, right tilt**



Light flow

The projector optically filters white light from the illumination module into its constituent red, green and blue. Each color illuminates a separate DMD™ whose modulated output is then recombined with the other two to form the projected full color image.

1. **Illumination module**
2. **Optical filtering of light into red, green and blue**
3. **Projection lens**
4. **DMD™ devices**
5. **Full color image displayed on screen**



Filtering process

Notes

Choosing A Lens

A number of lenses are available. Which lens you choose depends on the screen size, image aspect ratio, throw distance and light output.

The following table shows all available lenses in order of their ***throw ratios***:

Throw ratios	Lens extension (±2%)	Throw distance range
0.93 : 1 fixed lens	272 mm (10.7 in)	0.5 m - 40 m (1.6 ft - 130 ft)
1.13 - 1.72 : 1 zoom lens	240 mm (9.4 in)	2.5 m - 40+ m (8.2 ft - 130+ ft) at 1.13:1 0.5 m - 40+ m (1.6 ft - 130+ ft) at 1.72:1
1.65 - 2.60 : 1 zoom lens	210 mm (8.3 in)	3.5 m - 40+ m (11.5 ft - 130+ ft) at 1.65:1 1.0 m - 40+ m (3.3 ft - 130+ ft) at 2.60:1
2.53 - 4.98 : 1 zoom lens	210 mm (8.3 in)	1.5 m - 40+ m (4.9 ft - 130+ ft) at 2.53:1 4.5 m - 40+ m (14.8 ft - 130+ ft) at 4.98:1

To choose a lens, either calculate the ***throw ratio*** required, or use the ***lens charts*** provided at the end of this guide.

Notes

INSIGHT 4K zoom lenses are capable of covering throw distances greater than forty metres.

The minimum throw of the zoom lenses changes depending on the throw ratio used.

Throw distance is measured from the front of the lens. Lens extension values give the distance from the front of the lens to the front cover of the projector. Lens extension is measured when the lens is focused at infinity, and fully extended.

*For information about individual lens part numbers, see **Appendix A** at the end of this document.*

*To choose a lens using lens charts, go to **Appendix B: Lens Charts** at the end of this guide.*

Calculation

Identify the required lens by calculating the ***throw ratio***.

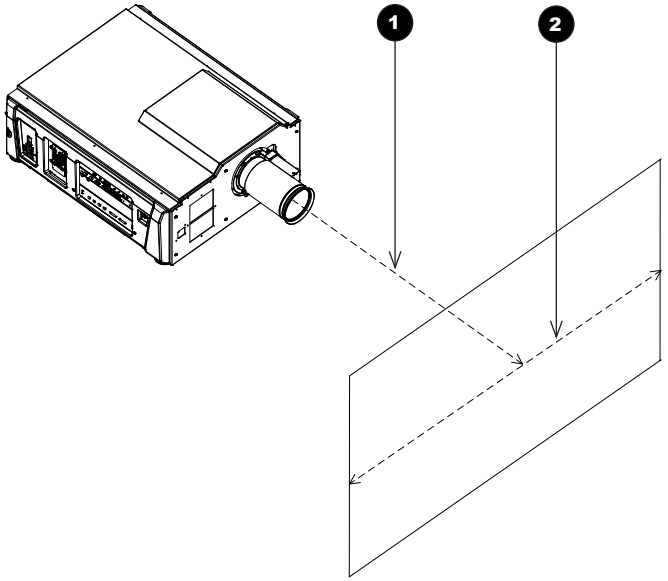
A ***throw ratio*** is the ratio of the ***throw distance*** (1) to the ***screen width*** (2):

$$\textit{Throw ratio} = \frac{\textit{Throw distance}}{\textit{Screen width}}$$

1. Use the formula above to obtain the required throw ratio.
2. Match the throw ratio with a lens from the table below:

Throw ratios	Throw distance range
0.93 : 1 fixed lens	0.5 m - 40 m (1.6 ft - 130 ft)
1.13 - 1.72 : 1 zoom lens	2.5 m - 40+ m (8.2 ft - 130+ ft) at 1.13:1 0.5 m - 40+ m (1.6 ft - 130+ ft) at 1.72:1
1.65 - 2.60 : 1 zoom lens	3.5 m - 40+ m (11.5 ft - 130+ ft) at 1.65:1 1.0 m - 40+ m (3.3 ft - 130+ ft) at 2.60:1
2.53 - 4.98 : 1 zoom lens	1.5 m - 40+ m (4.9 ft - 130+ ft) at 2.53:1 4.5 m - 40+ m (14.8 ft - 130+ ft) at 4.98:1

3. Ensure the required throw distance is within the range covered by the lens.



Notes

When calculating the throw ratio, be sure to use identical measurement units for both the throw distance and the screen width.

*You can also use the information in **Appendix B: Lens Charts** to choose a lens.*

*For information about individual lens part numbers, see **Appendix A: Lens Part Numbers** at the end of this document.*

Calculation example

1. **Calculate the throw ratio using the formula.**

   Your screen is ***4.5 m*** wide and you wish to place your projector approximately ***11 m*** from the screen. The throw ratio will then be

   $$\frac{11}{4.5} = \mathbf{2.44}$$

2. **Match the result with the lens table.**

   The lens matching a throw ratio of 2.44 is:

   - ***the 1.65 - 2.60 : 1 zoom lens***

3. **Check whether the lens covers the required throw distance.**

   11 m is comfortably within the throw range of the 1.65-2.60:1 lens.

INFORMATION YOU NEED FOR THIS CALCULATION

- The throw ratio formula:

$$\textit{Throw ratio} = \frac{\textit{Throw distance}}{\textit{Screen width}}$$

- The lens table:

Throw ratios	Throw distance range
0.93 : 1 fixed lens	0.5 m - 40 m (1.6 ft - 130 ft)
1.13 - 1.72 : 1 zoom lens	2.5 m - 40+ m (8.2 ft - 130+ ft) at 1.13:1 0.5 m - 40+ m (1.6 ft - 130+ ft) at 1.72:1
1.65 - 2.60 : 1 zoom lens	3.5 m - 40+ m (11.5 ft - 130+ ft) at 1.65:1 1.0 m - 40+ m (3.3 ft - 130+ ft) at 2.60:1
2.53 - 4.98 : 1 zoom lens	1.5 m - 40+ m (4.9 ft - 130+ ft) at 2.53:1 4.5 m - 40+ m (14.8 ft - 130+ ft) at 4.98:1

Notes

*You can also use the information in **Appendix B: Lens Charts** to choose a lens.*

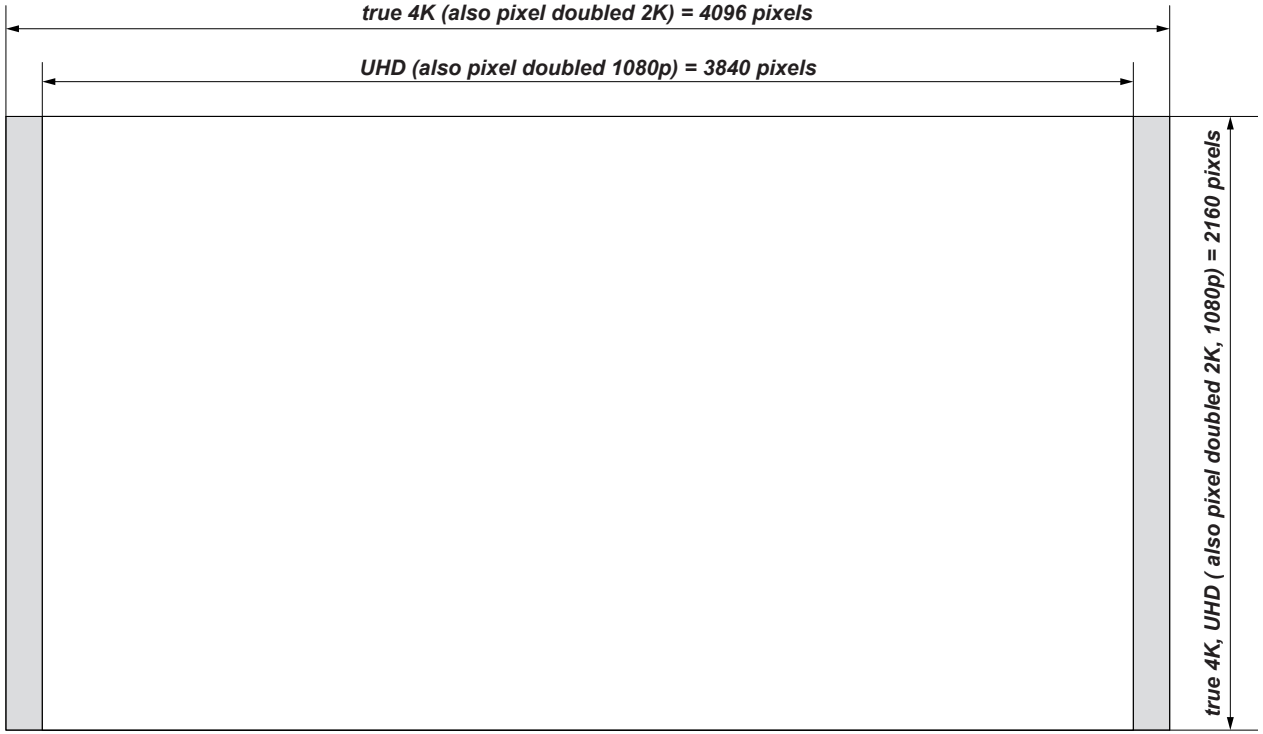
*For information about individual lens part numbers, see **Appendix A: Lens Part Numbers** at the end of this document.*

Screen Requirements

Fitting the image to the DMD™

The projector supports 4K and Ultra HD formats and is able to achieve 2K and 1080p via frame doubling.

2K and frame doubled 1080p will not utilize the full width of the DMD™, resulting in pillarboxing, as shown in the illustration.



Notes

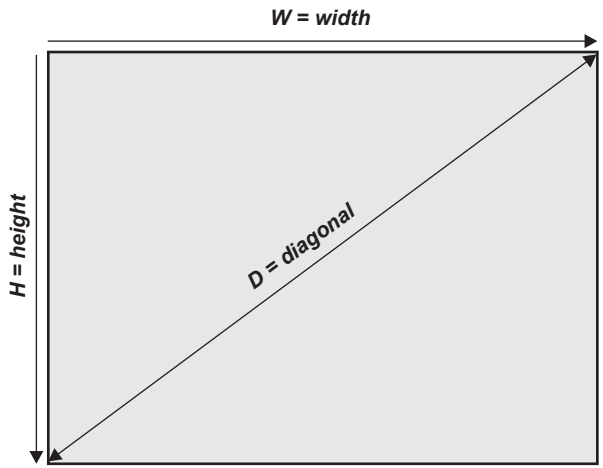
Diagonal screen sizes

Screen sizes are sometimes specified by their diagonal size (D). When dealing with large screens and projection distances at different aspect ratios, it is more convenient to measure screen width (W) and height (H).

The example calculations below show how to convert diagonal sizes into width and height, at various aspect ratios.

TRUE 4K (approximately 1.9 : 1)
W = D x 0.88 ***H*** = D x 0.47

UHD (approximately 1.78 : 1)
W = D x 0.87 ***H*** = D x 0.49



Notes

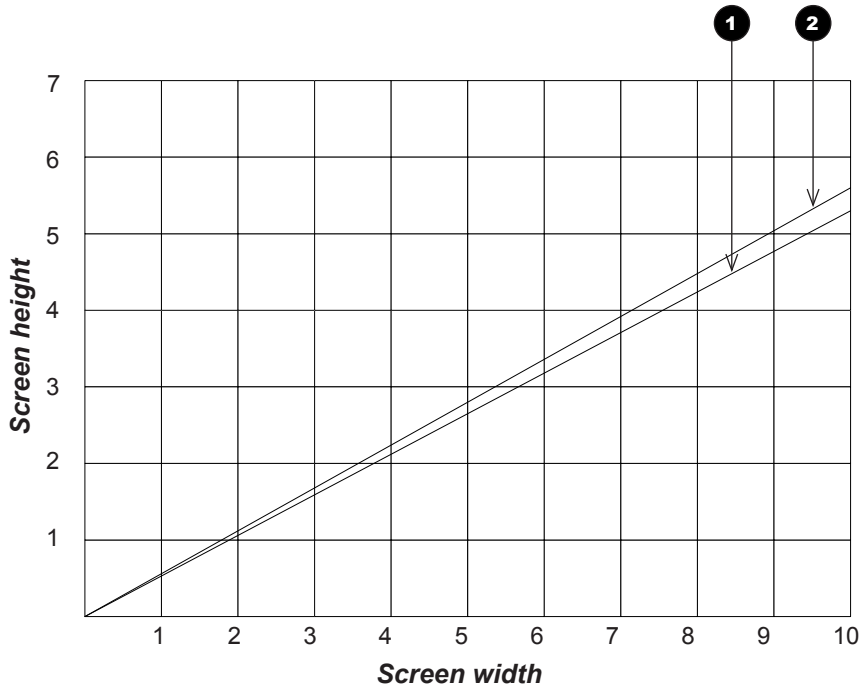
Fitting the image to the screen

It is important that your screen is of sufficient height and width to display images at all the aspect ratios you are planning to use.

Use the conversion chart to check that you are able to display the full image on your screen. If you have insufficient height or width, you will have to reduce the overall image size in order to display the full image on your screen.

1 **4K / 2K (1.9:1)**
W = H x 1.9, H = W x 0.53

2 **UHD / 1080p (16:9 = 1.78:1)**
W = H x 1.78, H = W x 0.56

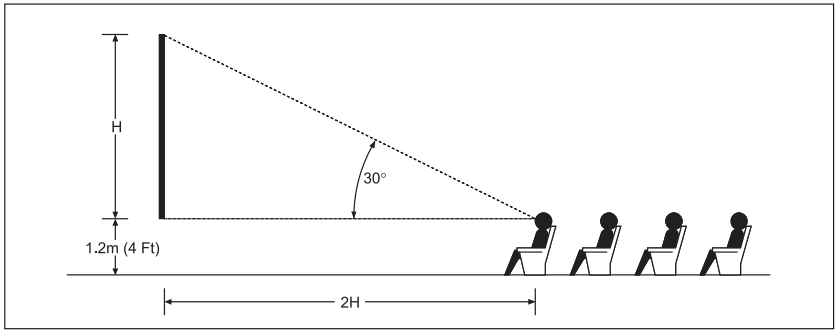


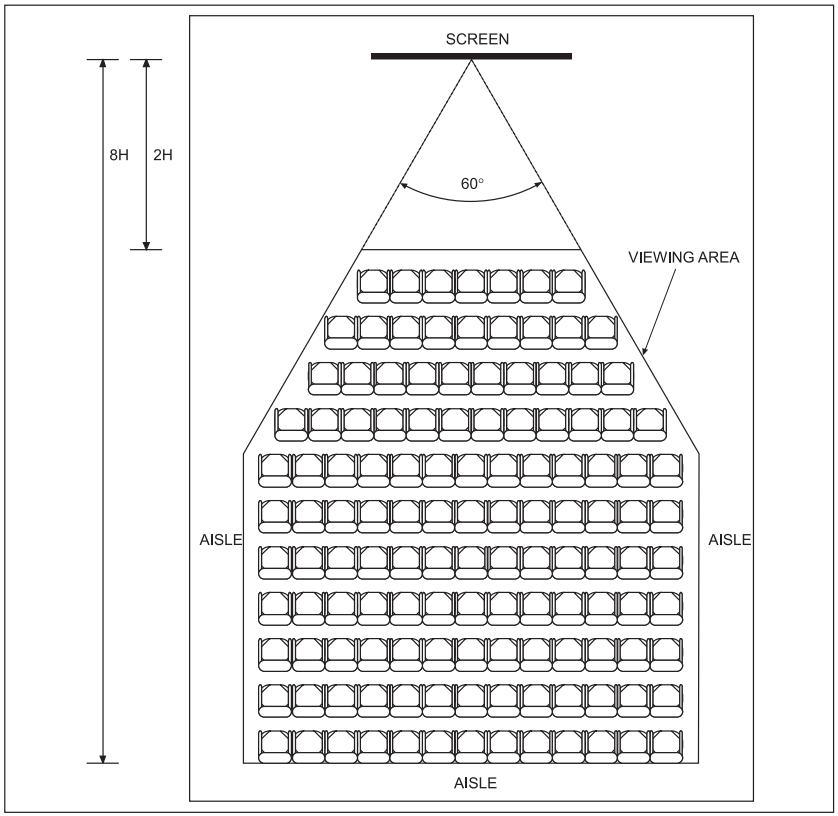
Notes

Positioning the screen and projector

For optimum viewing, the screen should be a flat surface perpendicular to the floor. The bottom of the screen should be 1.2 m (4 feet) above the floor and the front row of the audience should not have to look up more than 30° to see the top of the screen.

The distance between the front row of the audience and the screen should be at least twice the screen height and the distance between the back row and the screen should be a maximum of 8 times the screen height. The screen viewing area should be within a 60° range from the face of the screen.





Notes

The projector should be installed as close to the power outlet as possible.

The power connection should be easily accessible, so that it can be disconnected in an emergency.

Ensure that there is at least 30 cm (12 in) of space between the ventilation outlets and any wall, and 10 cm (4 in) on all other sides.

Do not install the projector close to anything that might be affected by its operational heat, for instance, polystyrene ceiling tiles, curtains etc.

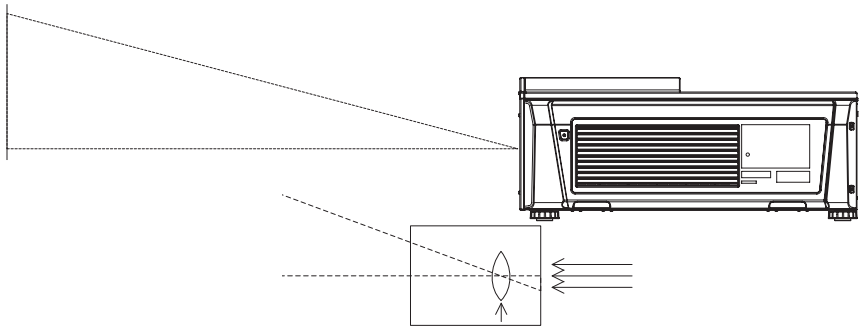
The image can be flipped for rear projection and displayed without the need for extra mirrors or equipment.

However, you must ensure that there is sufficient distance behind the screen for the projector to be correctly located.

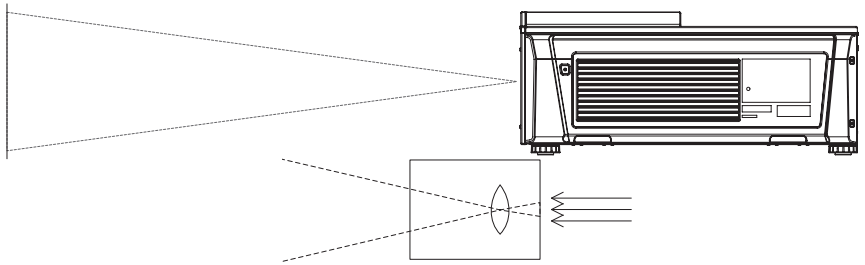
Rear installation is generally more complicated and advice should be sought from your local dealer before attempting it.

Positioning The Image

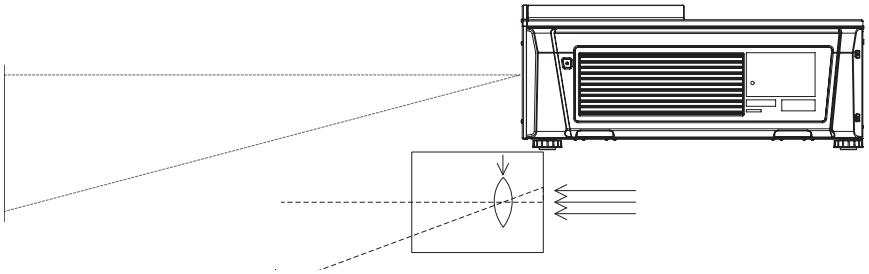
The normal position for the projector is at the centre of the screen. However, you can set the projector above or below the centre, or to one side, and adjust the image using the **Lens shift** feature (known as ***rising and falling front***) to maintain a geometrically correct image.



Shifting the lens up (rising front)



Centered lens



Shifting the lens down (falling front)

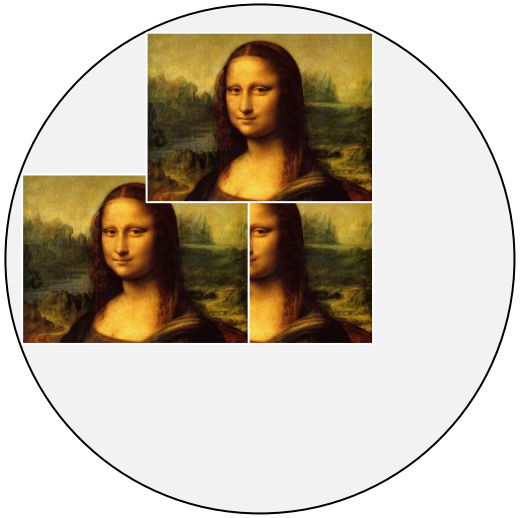
Notes

*For more information on shifting the lens, see **Keypad And Remote Control** in the **Operating Guide**.*

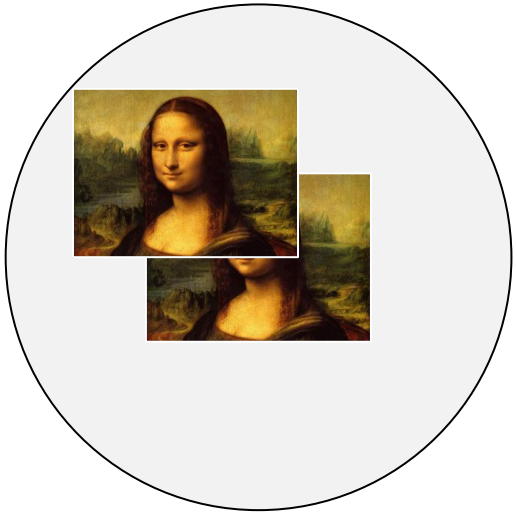
Whenever possible, position the projector so that the lens is centered for the highest quality image.

Any single adjustment outside the ranges specified on the following page may result in an unacceptable level of distortion, particularly at the corners of the image, due to the image passing through the periphery of the lens optics.

If the lens is to be shifted in two directions combined, the maximum range without distortion will be somewhat less, as can be seen in the illustrations below.



Full horizontal or vertical shift



Combined shift is reduced

Notes

*For more information on shifting the lens, see **Keypad And Remote Control** in the **Operating Guide**.*

Maximum offset range

The maximum offset range available with no distortion or vignetting is dependent on which lens is used. Shifting the lens beyond its undistorted limits may be physically possible, however you may experience some vignetting or distortion.

		vertical (frame)	horizontal (frame)
0.93 : 1 fixed		±0.210	±0.080
1.13 - 1.72 : 1 zoom	*at 1.13:1*	0.340 U 0.190 D	0.085 L 0.100 R
	at 1.72:1	0.500 U 0.190 D	0.150 L 0.180 R
1.65 - 2.60 : 1 zoom	*at 1.65:1*	0.400 U 0.210 D	0.130 L 0.130 R
	at 2.60:1	0.500 U 0.200 D	0.150 L 0.190 R
2.53-4.98 :1 zoom	*at 2.53:1*	0.375 U 0.200 D	0.130 L 0.130 R
	at 4.98:1	0.500 U 0.195 D	0.165 L 0.165 R

Notes

*For more information on shifting the lens, see **Keypad And Remote Control** in the **Operating Guide**.*

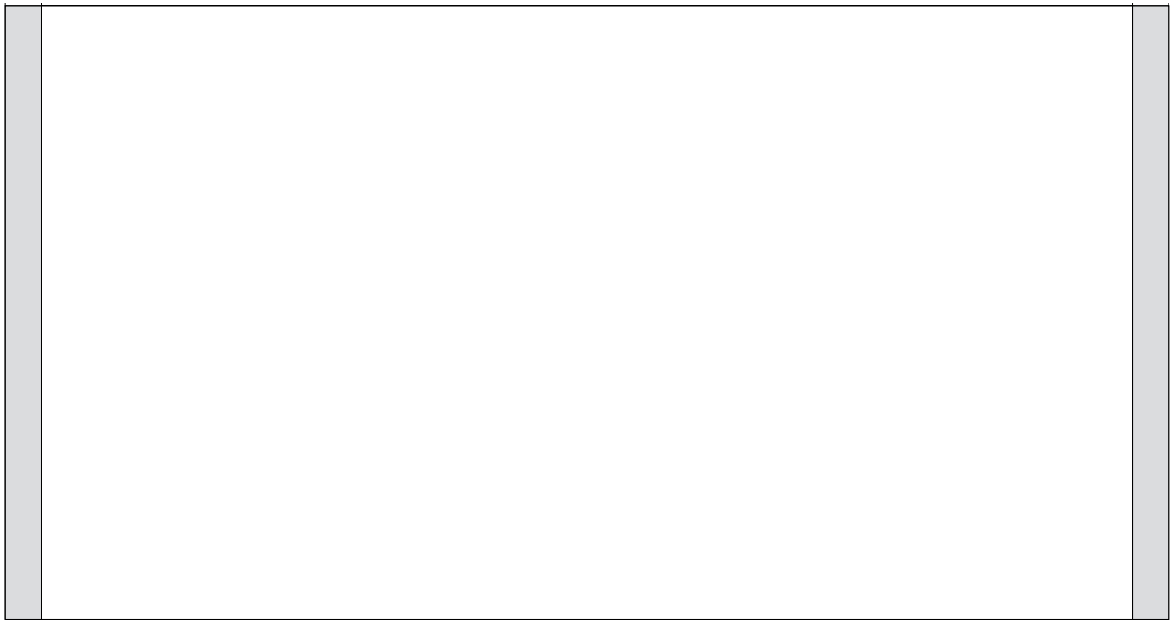
Aspect Ratios Explained

The appearance of a projected image on the screen depends on:

- the DMD™ resolution, which is **4K** with a 4096 x 2160 resolution, corresponding to an aspect ratio of 256:135, or approximately 1.9:1.
- the aspect ratio of the input signal, which is **1.9:1** for 4K and 2K images, or **1.78:1** for UHD or 1080p images.

2K and 1080p are automatically scaled by the projector to fill the height of the DMD™.

The 4K and 2K resolutions have a slightly wider aspect ratio. UHD and scaled 1080p do not fill the width of the DMD™, so they appear centered, with pillarboxing at the sides, as shown in the illustration.



Pillarboxing on UHD and 1080p images

Notes

Appendix A: Lens Part Numbers

Lens	Part No.	Focus Range	Lens Shift	Lens extension
0.93:1 fixed	117-310	0.5 m - 40+ m	Vert: 0.210 (U) 0.210 (D) frame, Hor: 0.08 (L) 0.08 (R)	272 mm
1.13 - 1.72:1 zoom	115-627	*At 1.13:1 zoom:* 2.5 m - 100+ m	*At 1.13:1 zoom:* Vert: 0.340 (U) 0.190 (D) frame, Hor: 0.09 (L) 0.09 (R) frame	240 mm
		At 1.72:1 zoom: 0.5 m - 100+ m	*At 1.72:1 zoom:* Vert: 0.500 (U) 0.190 (D) frame, Hor: 0.16 (L) 0.16 (R) frame	
1.65 - 2.60:1 zoom	115-630	*At 1.65:1 zoom:* 3.5 m - 100+ m	*At 1.65:1 zoom:* Vert: 0.400 (U) 0.200 (D) frame, Hor: 0.13 (L) 0.13 (R) frame	210 mm
		At 2.60:1 zoom: 1.0 m - 100+ m	*At 2.60:1 zoom:* Vert: 0.500 (U) 0.200 (D) frame, Hor: 0.17 (L) 0.17 (R) frame	
2.53 - 4.98:1 zoom	115-632	*At 2.53:1 zoom:* 1.5 m - 100+ m	*At 2.53:1 zoom:* Vert: 0.375 (U) 0.200 (D) frame, Hor: 0.13 (L) 0.13 (R) frame	210 mm
		At 4.98:1 zoom: 4.5 m - 100+ m	*At 4.98:1 zoom:* Vert: 0.500 (U) 0.195 (D) frame, Hor: 0.16 (L) 0.16 (R) frame	

Notes

Appendix B: Lens Charts

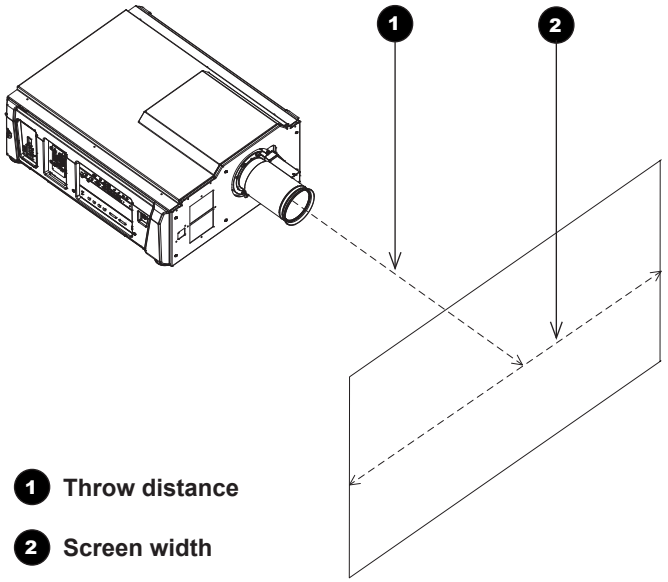
How to use the lens charts

The lens charts on the following pages provide a quick guide to the type of lens needed for a particular projector.

To use the lens charts, you need the following information:

- The distance between the projector and the screen (throw distance)
- The maximum width of your screen

In the chart, find the point where the throw distance corresponds to the screen width, as shown in the example below.

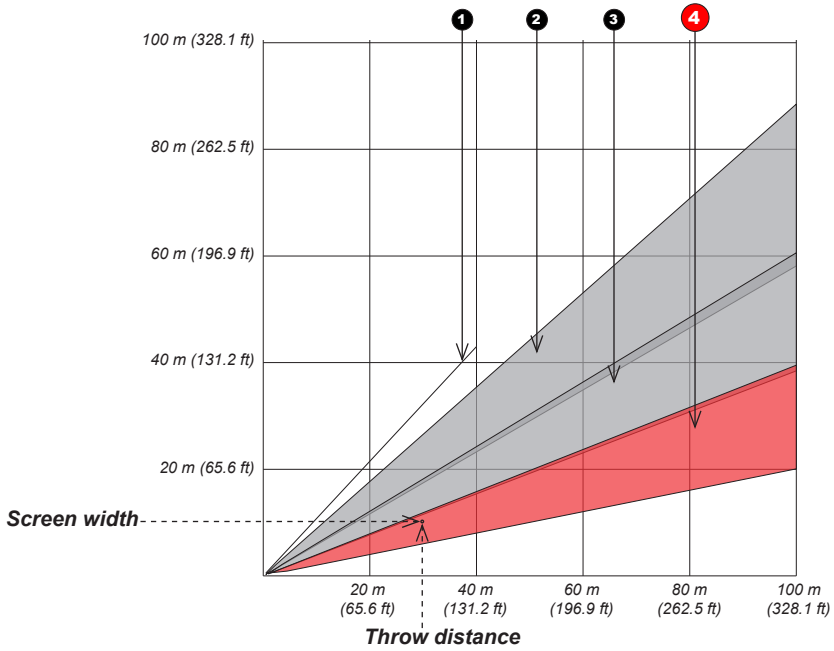


Example

For a projector with

- throw distance 30 m, and
- screen width 9 m,

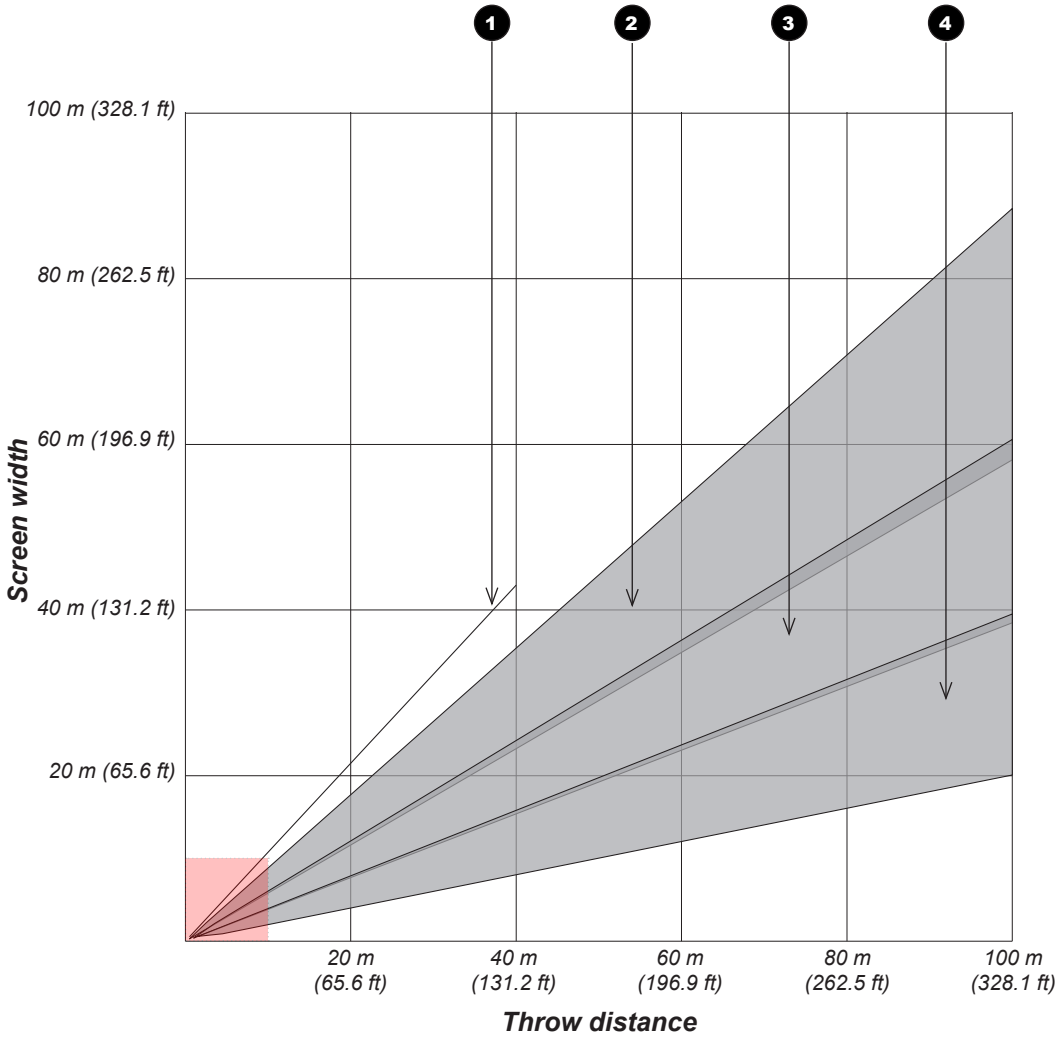
the correct lens would be ***number*** 4 in the chart.



Notes

Lens chart, up to 100 m throw

1. **0.93 : 1 fixed lens**
2. **1.13-1.72 : 1 zoom lens**
3. **1.65-2.60 : 1 zoom lens**
4. **2.53-4.98 : 1 zoom lens**

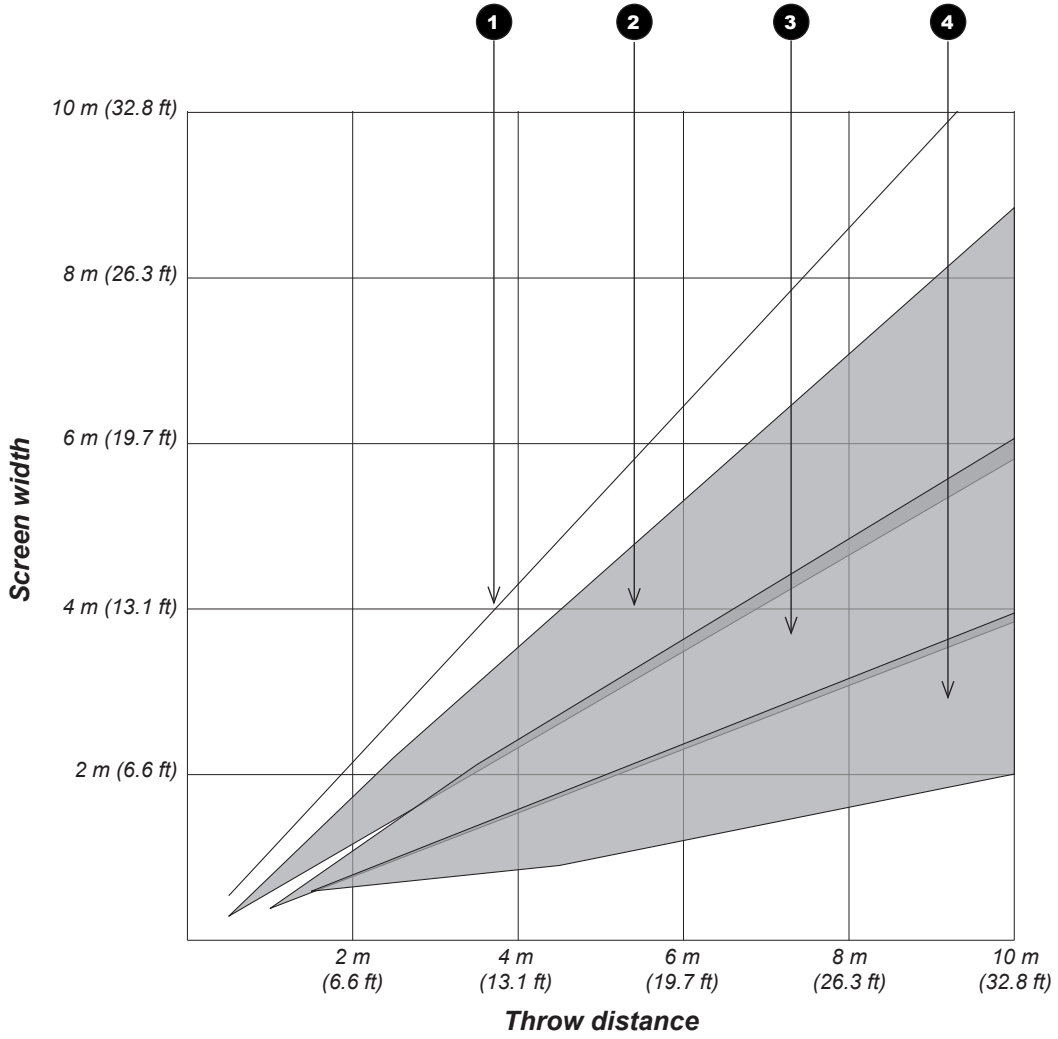


Notes

The semi-transparent red segment at the bottom left corner of the chart is shown on the next page in more detail.

Lens chart, 10 m throw in detail

1. **0.93 : 1 fixed lens**
2. **1.13-1.72 : 1 zoom lens**
3. **1.65-2.60 : 1 zoom lens**
4. **2.53-4.98 : 1 zoom lens**



Notes

Appendix C: Supported Signal Input Modes

	Resolution	Color Model (YCrCb 4:2:0)	Color Model (YCrCb 4:2:2)	Color Model (RGB 4:4:4)	Max allowable Frame Rate Multiplier	Dual-pipe East-West	Dual-pipe Left-Right	3D Capability
HDMI 1.4	720p @ 24 Hz	✓	✓	✓	x 3	—	—	FrameSequential only
	1080p @ 24 Hz	✓	✓	✓	x 3	—	—	
	3840 x 2160 @ 24 Hz	—	✓	✓	x 3	—	—	
	4096 x 2160 @ 24 Hz	—	✓	✓	x 3	—	—	
	720p @ 30 Hz	✓	✓	✓	x 3	—	—	
	1080p @ 30 Hz	✓	✓	✓	x 3	—	—	
	3840 x 2160 @ 30 Hz	—	✓	✓	x 3	—	—	
	720p @ 60 Hz	✓	✓	✓	x 2	—	—	
	1080p @ 50/60 Hz	✓	✓	✓	x 2	—	—	
	1080p @ 120 Hz	—	—	✓	x 1	—	—	
DisplayPort 1.2	720p @ 24 Hz	—	✓	✓	x 3	—	—	
	1080p @ 24 Hz	—	✓	✓	x 3	—	—	
	3840 x 2160 @ 24 Hz	—	✓	✓	x 3	—	—	
	4096 x 2160 @ 24 Hz	—	✓	✓	x 3	—	—	
	720p @ 30 Hz	—	✓	✓	x 3	—	—	
	1080p @ 30 Hz	—	✓	✓	x 3	—	—	
	3840 x 2160 @ 30 Hz	—	✓	✓	x 3	—	—	
	4096 x 2160 @ 30 Hz	—	✓	✓	x 3	—	—	
	720p @ 60 Hz	—	✓	✓	x 2	—	—	
	1080p @ 50/60 Hz	—	✓	✓	x 2	—	—	
	3840 x 2160 @ 50/60 Hz	—	✓	✓	x 2	—	—	
	4096 x 2160 @ 50/60 Hz	—	✓	✓	x 2	—	—	

Notes

HDMI formats up to 2K are automatically detected and converted to RGB, therefore the projector should be set to RGB. Formats over 2K are passed through to the video processing FPGA in their original color space: please select RGB or YCrCb as appropriate.

DisplayPort and HDMI receivers accept deep color and higher depth sources inline with DisplayPort 1.2 and HDMI standards. INSIGHT processing works at up to 12 bits per color (RGB in gamma space) and maps to a displayed palette of 16 bits per color (linear space).

Rev B ICP60 is qualified with n-Vidia graphics cards and not guaranteed to work with spread spectrum enabled cards, such as AMD.

Rev C ICP60 onwards has been qualified with both n-Vidia and AMD graphics cards.

DisplayPort formats up to 2048x1080 at up to 120 Hz can be accepted. These can be scaled 2:1 to best fit the DMD.

Formats over 2048x1080 can have a maximum input rate of 60 fps and multiplied in the formatter for 3D.

24, 30 and 60 Hz are nominal: the projector also accepts at least 23.98, 25, 48 and 59.94 Hz.

10-bit color is not supported at 60 Hz.

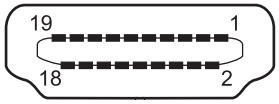
Appendix D: Wiring Details

Signal inputs - main connections panel

HDMI

19 way type A connector

1	TMDS Data 2+
2	TMDS Data 2 Shield
3	TMDS Data 2-
4	TMDS Data 1+
5	TMDS Data 1 Shield
6	TMDS Data 1-
7	TMDS Data 0+
8	TMDS Data 0 Shield
9	TMDS Data 0-
10	TMDS Clock+
11	TMDS Clock Shield
12	TMDS Clock-
13	CEC
14	not connected
15	SCL (DDC Clock)
16	SCA (DDC Data)
17	DDC/CEC Ground
18	+5 V Power
19	Hot Plug Detect



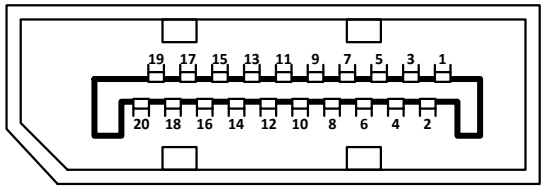
HDMI: pin view of panel connector

Notes

DisplayPort

DisplayPort 1.2

Pin 1	ML_Lane 0 (p)	Lane 0 (positive)
Pin 2	GND	Ground
Pin 3	ML_Lane 0 (n)	Lane 0 (negative)
Pin 4	ML_Lane 1 (p)	Lane 1 (positive)
Pin 5	GND	Ground
Pin 6	ML_Lane 1 (n)	Lane 1 (negative)
Pin 7	ML_Lane 2 (p)	Lane 2 (positive)
Pin 8	GND	Ground
Pin 9	ML_Lane 2 (n)	Lane 2 (negative)
Pin 10	ML_Lane 3 (p)	Lane 3 (positive)
Pin 11	GND	Ground
Pin 12	ML_Lane 3 (n)	Lane 3 (negative)
Pin 13	CONFIG1	connected to Ground1)
Pin 14	CONFIG2	connected to Ground1)
Pin 15	AUX CH (p)	Auxiliary Channel (positive)
Pin 16	GND	Ground
Pin 17	AUX CH (n)	Auxiliary Channel (negative)
Pin 18	Hot Plug	Hot Plug Detect
Pin 19	Return	Return for Power
Pin 20	DP_PWR	Power for connector (3.3 V 500 mA)



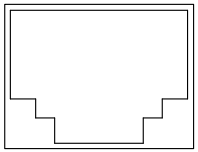
DisplayPort: pin view of panel connector

Notes

Control connections

LAN

RJ45 socket

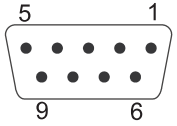


Update port

RS232

9 way D-type connector

Pin No.	RS-232C Signal Name	Functions as RS-232C	Projector Connector Operation
1	Not connected.		
2	RXD	Reception data	Data transmission to an external device
3	TXD	Transmission data	Data reception from an external device
4	Not connected.		
5	GND	Signal GND	Signal GND
6	Not connected.		
7	Not connected.		
8	Not connected.		
9	Not connected.		



RS232:
pin view of female connector

3D Sync IN and 3D Sync OUT

75 ohm BNC

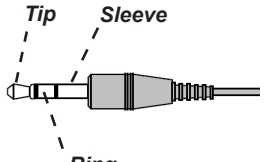
5V DC

pin view of female connector

Wired remote control

3.5mm mini jack

Tip	Power
Ring	Signal
Sleeve	Ground



pin view of female connector

Notes

Only one remote connection (RS232 or LAN) should be used at any one time.

Plugging in the remote control cable will disable the infra-red.

Appendix E: Glossary Of Terms

Notes

1080p

An ***HDTV resolution*** which corresponds to 1920 x 1080 ***pixels*** (a widescreen ***aspect ratio*** of 16:9). 1080p has half the horizontal and vertical resolution of ***UHD***.

2K

A ***resolution*** which corresponds to 2048 x 1080 ***pixels*** (approximately a 1.9:1 ***aspect ratio***). 2K has half the horizontal and vertical resolution of ***4K***, therefore a 4K projector can display 2K images by pixel and line doubling, without distorting the geometry of the image.

3D active glasses

Wireless battery-powered glasses with LCD shutters. Synchronization information is communicated to the glasses by means of an infrared (IR) or radio frequency (RF) emitter which is connected to the Sync Out terminal on the projector. IR or RF pulses are transmitted by the emitter to signal when the left eye and right eye images are being displayed. The glasses incorporate a sensor which detects the emitter's signal and synchronises the left and right eye shutters with the projected image.

3D passive glasses

Passive glasses do not require a power source to work. Light with left-hand polarisation can pass through the left lens and light with right-hand polarisation can pass through the right-hand lens. These glasses are used in conjunction with another device which polarizes the image, such as a ***ZScreen***.

4K

A ***resolution*** which corresponds to 4096 x 2160 ***pixels*** (approximately a 1.9:1 ***aspect ratio***). 4K has twice the horizontal and vertical resolution of ***2K***.

Adjust lines

A pattern applied to the image where its edge is to be blended with another image. Adjust lines are used to position the projectors in the array during the ***edge blend*** process.

Anamorphic lens

A special lens which, when used with the ***TheaterScope*** ***aspect ratio***, allows watching 2.35:1 content packed in a 16:9 source.

Aperture

The opening of the lens that determines the angle through which light travels to come into focus.

Aspect ratio

The proportional relationship between the width and the height of the projected image. It is represented by two numbers separated by a colon, indicating the ratio of image width and height respectively: for example, 16:9 or 2.35:1.

Not to be confused with ***resolution***.

Blanking (projection)

The ability to intentionally turn off, that is, set to black, areas around the edges of the projected image. It is sometimes referred to as “curtains” since it can be used to blank an area of image that literally falls on the curtains at the side of the screen in a movie theater. Usually no image resizing or geometric correction takes place and the “blanked” part of the image is lost.

Not to be confused with horizontal and vertical ***blanking (video signal)***.

Blanking (video signal)

The section of the video signal where there is no active video data.

Not to be confused with ***blanking (projection)***.

Blend region

The area of the image that is to overlap with another image in an ***edge blend*** setup. Sometimes called *overlapping region*.

Brightness (electronic control)

A control which adds a fixed intensity value to every ***pixel*** in the display, moving the entire range of displayed intensities up or down, and is used to set the black point in the image (see ***Contrast***).

Notes

Brightness (optical)

Describes how 'bright' an image that is projected onto a screen appears to an observer.

Color difference

In ***Component Video*** signals, the difference between specified colors and the ***luminance*** component. Color difference is zero for monochrome images.

Color gamut

The spectrum of color available to be displayed.

Color temperature

The position along the black body curve on the chromaticity diagram, normally quoted in Kelvin. It takes into account the preset values for color balance in the service set-up to take up the variations in the prism. The projector allows you to adjust this temperature (i.e. adjust the picture color temperature).

Contrast (electronic control)

The adjustment of the white point of the image without affecting the black point. This increases the intensity range of the displayed image.

Contrast (optical)

The intensity difference between the darkest and lightest areas of the screen.

Crop

Remove part of the projected image.

Alternatively, fit an image into a frame with a different ***aspect ratio*** by removing part of the image. The image is resized so that either its length or its width equals the length or width of the frame, while the other dimension has moved outside the frame; the excess area is then cut out.

Dark time

The time inserted between ***frames*** when using ***3D active glasses***, to avoid ***ghosting*** caused by switching time between left and right eye.

Notes

DDC (Display Data Channel)

A communications link between the source and projector. DDC is used on the HDMI inputs. The link is used by the source to read the ***EDID*** stored in the projector.

Deinterlacing

The process of converting ***interlaced*** video signals into ***progressive*** ones.

DHCP (Dynamic Host Configuration Protocol)

A network protocol that is used to configure network devices so that they can communicate on an IP network, for example by allocating an IP address.

DMD™ (Digital Micromirror Device™)

The optical tool that transforms the electronic signal from the input source into an optical image projected on the screen. The DMD™ of a projector has a fixed ***resolution***, which affects the ***aspect ratio*** of the projected image.

A Digital Micromirror Device™ (DMD™) consists of moving microscopic mirrors. Each mirror, which acts as a ***pixel***, is suspended between two posts by a thin torsion hinge. It can be tilted to produce either a bright or dark pixel.

Edge blend

A method of creating a combined image by blending the adjoining edges of two or more individual images.

Edge tear

An artifact observed in ***interlaced video*** where the screen appears to be split horizontally. Edge tears appear when the video feed is out of sync with the refresh rate of the display device.

EDID (Extended Display Identification Data)

Information stored in the projector that can be read by the source.

EDID is used on the DisplayPort and HDMI inputs, allowing the source to automatically configure to the optimum display settings.

Notes

EDTV (Enhanced Definition Television)

A ***progressive*** digital television system with a lower resolution than ***HDTV***.

Field

In ***interlaced video***, a part of the image ***frame*** that is scanned separately. A field is a collection of either all the odd lines or all the even lines within the frame.

Frame

One of the many still images displayed in a sequence to create a moving picture. A frame is made of horizontal lines of ***pixels***. For example, a 1920x1080 frame consists of 1080 lines, each containing 1920 pixels. In analog video frames are scanned one at a time (***progressive scanning***) or split into ***fields*** for each field to be scanned separately (***interlaced video***).

Frame rate

The number of ***frames*** shown per second (fps). In TV and video, a frame rate is the rate at which the display device scans the screen to "draw" the frame.

Frame rate multiplication

To stop low ***frame rate*** 3D images from flickering, frame rate multiplication can be used, which increases the displayed frame rate by two or three times.

Gamma

A nonlinear operation used to code and decode ***luminance***. It originates from the Cathode Ray Tube technology used in legacy television sets.

Ghosting

An artifact in 3D image viewing. Ghosting occurs when an image intended for one eye is partially seen by the other eye.

Ghosting can be removed by optimizing the ***dark time*** and sync delay.

Notes

HDCP (High-bandwidth Digital Content Protection)

An encryption scheme used to protect video content.

HDTV (High Definition Television)

A television system with a higher ***resolution*** than ***SDTV*** and ***EDTV***. It can be transmitted in various formats, notably ***1080p*** and 720p.

Hertz (Hz)

Cycles per second.

Horizontal Scan Rate

The rate at which the lines of the incoming signal are refreshed. The rate is set by the horizontal ***synchronization*** from the source and measured in ***Hertz***.

Hs + Vs

Horizontal and vertical ***synchronization***.

Interlacing

A method of updating the image. The screen is divided in two ***fields***, one containing every odd horizontal line, the other one containing the even lines. The fields are then alternately updated. In analog TV interlacing was commonly used as a way of doubling the refresh rate without consuming extra bandwidth.

Interleaving

The alternation between left and right eye images when displaying 3D.

LED (Light Emitting Diode)

An electronic component that emits light.

Notes

Lens extension

The distance between the front of the projector and the front of the mounted lens. When a long lens is intended to cover a relatively short ***throw distance***, lens extensions should be taken into account when calculating the ***throw ratio*** as the error margin for such calculations should not exceed 5%.

Letterboxing

Black margins at the top and bottom of the image. Letterboxing appears when a wider image is packed into a narrower ***frame*** without changing the original ***aspect ratio***.

Lumen

A photometric unit of radiant power. For projectors, it is normally used to specify the total amount of emitted visible light.

Noise

Electrical interference displayed on the screen.

Overlapping region

See ***blend region***.

Pillarboxing

Black margins at the left and right of the image. Pillarboxing appears when a narrower image is packed into a wider ***frame*** without changing the ***aspect ratio***.

Pixel

Short for *Picture Element*. The most basic unit of an image. Pixels are arranged in lines and columns. Each pixel corresponds to a micromirror within the ***DMD™***; resolutions reflect the number of pixels per line by the number of lines. For example, a ***1080p*** projector contains 1080 lines, each consisting of 1920 pixels.

Pond of mirrors

Area around the periphery of the ***DMD™*** containing inactive mirrors. The pond of mirrors may cause artifacts, for example during the ***edge blending*** process.

Notes

Primary colors

Three colors any two of which cannot be mixed to produce the third. In additive color television systems the primary colors are red, green and blue.

Progressive scanning

A method of updating the image in which the lines of each ***frame*** are drawn in a sequence, without ***interlacing***.

Pulldown

The process of converting a 24 fps film footage to a video ***frame rate*** (25 fps for ***PAL/SECAM***, 30 fps for ***NTSC***) by adding extra ***frames***. DP projectors automatically carry out reverse pulldown whenever possible.

Resolution

The number of ***pixels*** in an image, usually represented by the number of pixels per line and the number of lines (for example, 1920 x 1200).

Scope

An ***aspect ratio*** of 2.35:1.

Synchronization

A timing signal used to coordinate an action.

Test pattern

A still image specially prepared for testing a projection system. It may contain various combinations of colors, lines and geometric shapes.

Throw distance

The distance between the screen and the projector.

Throw ratio

The ratio of the ***throw distance*** to the screen width.

Notes

UHD

A ***resolution*** corresponding to 3840 x 2160 ***pixels*** (a widescreen ***aspect ratio*** of 16:9). UHD has twice the horizontal and vertical resolution of ***1080p***.

Vertical Scan Rate

The rate at which the ***frames*** of the incoming signal are refreshed. The rate is set by the vertical ***synchronization*** from the source and measured in ***Hertz***.

Vignetting

Optical cropping of the image caused by the components in the projection lens. This can happen if too much offset is applied when positioning the image using the lens mount.

ZScreen

A special kind of light modulator which polarizes the projected image for 3D viewing. It normally requires that images are projected onto a silver screen. The ZScreen is placed between the projector lens and screen. It changes the polarization of the projected light and switches between left- and right-handed circularly polarized light at the field rate.

Notes

Technical Specifications

Digital Projection reserves the right to change product specifications without prior notice.

Models

The specifications on these pages refer to the following projectors:

Series name	Part number	Brightness	Contrast ratio
INSIGHT 4K Dual LED	116-695	3,000 ANSI Lumens (+/- 10%)	2,500:1
INSIGHT 4K Quad	115-900	25,000 ANSI Lumens (+/- 10%)	2,000:1

Color system: 3-chip DLP®

Display type: 3 x 1.38” DarkChip™ DMD™

DMD™ specification (native): 4096 x 2160 pixels, +/- 12° tilt angle

Fast transit pixels for smooth grayscale and improved contrast.

Aspect ratio: 1.90:1

Fill factor: 87%

Notes

Inputs and outputs

Type	Connector	Qty
Video & Computer		
DisplayPort 1.2	DisplayPort	2
HDMI 1.4	HDMI	2

Type	Connector	Qty
Communication & Control		
3D Sync Out	BNC	1
3D Sync In	BNC	1
LAN	RJ45	1
RS232	9-pin D-Sub	1
Wired Remote In	3.5 mm Stereo Jack	1
Infra-Red	IR Receivers (front and rear)	2

Bandwidth

N/A

Remote control and keypad

- Wired remote control
- Infra-red remote control
- On-board keypad

Automation control

- RS232
- LAN

Color temperature

- User selectable from 3300 to 10000K

Notes

Lenses

Detailed information about available lenses can be found in ***Appendix A: Lens Part Numbers***.

Further information about lens offsets can be found in ***Positioning The Image > Maximum offset range***.

Lens mount

- Motorised shift, zoom and focus. Intelligent Lens Memory with user-definable preset positions.

Mechanical mounting

- Front/Rear Table
- Front/Rear Ceiling
- Adjustable Front/Rear Feet
- Optional RapidRig™ frame with integrated pitch, roll and yaw adjustments.

Orientation

- **Table Top or Inverted:** ✓
- **Pointing Up:** ✓
- **Pointing Down:** No
- **Roll (Portrait):** No

Notes

Information on lenses in this guide:

- ***Appendix A: Lens Part Numbers*** *- detailed descriptions of available lenses.*
- ***Maximum offset range*** *- lens offsets.*

See also the lens calculator on the Digital Projector website.

Electrical and physical specifications

	INSIGHT 4K Dual LED	INSIGHT 4K QUAD
• **Power requirements**	100-240 VAC, 50-60 Hz (single phase)	200-240 VAC, 50-60 Hz (single phase)
• **Power Consumption**	900 W	2100 W
• **Thermal Dissipation**	3070 BTU/hr	7165 BTU/Hour
• **Fan Noise**	40 dBA	48 dBA
• **Operating Temperature**	0°C to 40°C (32 to 104F)	0°C to 40°C (32 to 104F)
• **Storage Temperature**	-10°C to 50°C (14 to 122F)	-10°C to 50°C (14 to 122F)
• **Operating Humidity**	20% to 80% non-condensing	20% to 80% non-condensing
• **Weight**	approximately 67 kg (148 lb) without lens and handling frame	approximately 66.3 kg (146.2 lb) without lens and handling frame
• **Dimensions**	H: 35.3 cm W: 68.8 cm L: 82.0 cm H: 13.9 in W: 27.1 in L: 32.3 in	H: 35.3 cm W: 68.8 cm L: 82.0 cm H: 13.9 in W: 27.1 in L: 32.3 in

Safety & EMC regulations

- CE, FCC Class A

Notes

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