

Installation Guide

BX-CTA16 Ultra Short Throw Lens

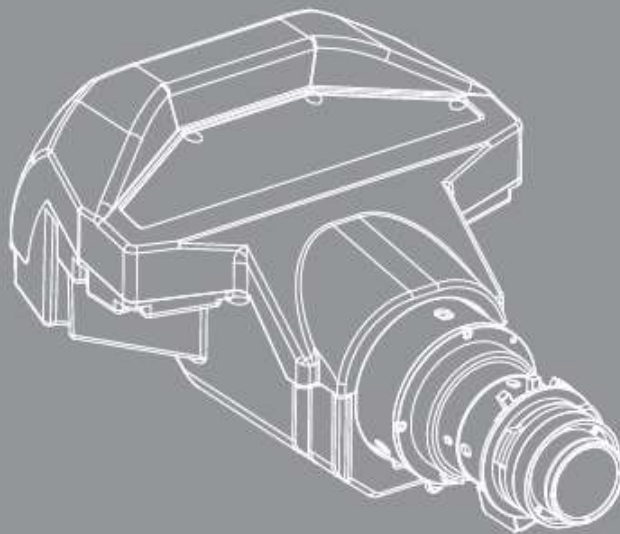


TABLE OF CONTENTS

Safety precautions.....	3
Identifying product versions.....	4
List of components	5
Required tools.....	6
Setting the projector start mode	6
Removing the non-UST boresight plate	8
Installing the UST lens boresight plate (LSM 1)	9
Installing the UST lens pogo pin adapter (LSM 2 ONLY)	10
Mounting the UST lens support system.....	12
Initially adjusting the boresight screws.....	16
Installing the UST lens	17
Adjusting the image position and focus	19
Adjusting the boresight.....	21
Finalizing the image adjustment.....	22
Removing the UST lens.....	23
Installing an non-UST lens	24
UST Lens specifications	25

Ultra short throw (UST) lens installation

The ultra short throw (UST) lens enables large screen projection from a short distance, which significantly increases the flexibility of projector installation. This installation guide provides detailed steps on mounting the UST lens to your projector. Before the installation, please read through this guide in full to ensure the installation steps are made correctly.

Safety precautions

- Installation and adjustments should be performed by qualified Technicians or authorized service dealers.
- Make sure the projector is turned off when installing and removing the UST lens.
- Do not look into straight into the projector lens when the projector is operating. The bright light may cause permanent eye injury.
- Make sure no personnel or object is in the light path of the projector when It is running.
- Do not place the projector on an unstable surface to prevent product damage and personal injury.
- Failure to follow the control, adjustment or operation procedures may cause damage by the exposure of laser radiation.

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Identifying product versions

The UST lens kit is designed with two types of installation accessories in order to fit the different lens shift modules (LSM) on the projectors. These instructions contain installation steps for both types. Please check the projector's boresight to identify the version of the lens shift module.

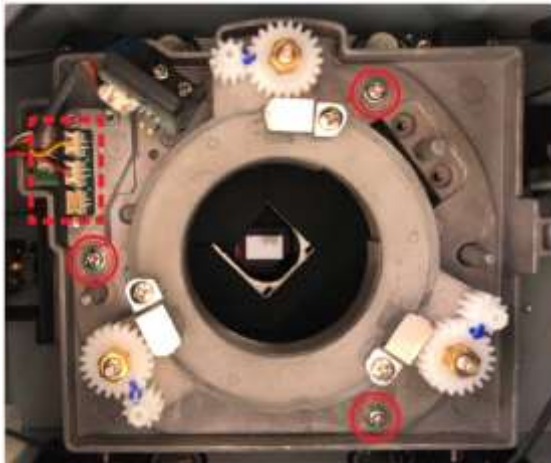
Note: Make sure the projector is turned off before checking the boresight.

- **Type 1 Lens Shift Module (LSM 1)**

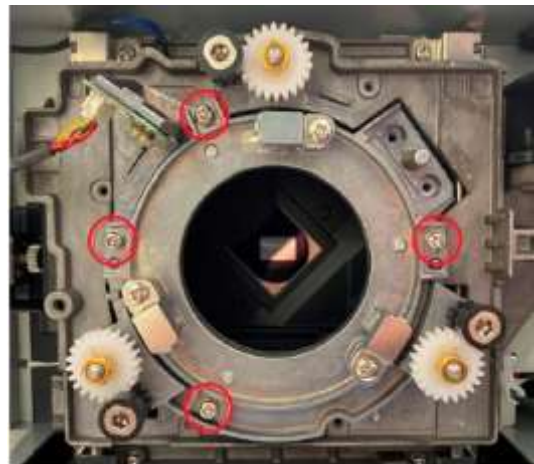
- On LSM 1, the boresight plate is secured with three screws.
- Compared to LSM 2, LSM 1 has a lens cable plugged to the circuit board on the top left corner.

- **Type 2 Lens Shift Module (LSM 2)**

- On LSM 2, the boresight plate is secured with four screws.



LSM1



LSM2

List of components

Check to make sure the following items are included in the UST lens package. Both LSM 1 and LSM 2 accessories are included in the lens package. Contact your dealer if anything is missing.

- **UST Lens**
- **Supporting system components**

Supporting system components	Quantity
Lens bracket	1
Angle bracket	1
Lens supporter	1
M3 x L8 screws	2
M3 x L8 hex screws	3
M6 x L22 hex screws	2
M3-3.7 x 0.8 x 18 washer	3
M6-6.7 x 1 x 16 washer	2

- **LSM 1 components**

Supporting system components	Quantity
UST lens boresight plate	1
Boresight extender (with socket head)	3
L shape socket tool (silver)	1



UST Lens boresight plate



**Boresight extender
(with socket head)**



L shape socket tool(silver)

- **LSM 2 components**

Supporting system components	Quantity
UST lens pogo pin adapter	1
Boresight extender (with red rubber ring)	3
L shape socket tool (black)	1



**UST Lens
pogo pin adapter**



**Boresight extender
(with red rubber ring)**



L shape socket tool(black)

Required tools

The following tools are required for installing the UST lens.

- #2 Philips screwdriver with magnetic tip (long neck)
- L shape socket tool (provided in the lens package)
- 2.5 mm Allen key
- 5 mm Allen key

Setting the projector start mode (excluding ZU860)

Set the start mode of the projector to get it ready for UST lens installation. During the setup process, the projector reduces the image brightness and performs a lens calibration to center the lens position.

1. Remove the lens cap.
2. Install a non ultra-short throw (non-UST) lens on to the projector.
3. Turn on the projector.
4. Enable the UST Install mode though the on-screen display (OSD) menu.
 - a. Select Menu > Service
 - b. Enter the service password (which is 1590 or LEFT, DOWN, RIGHT, UP) and click **OK**.
 - c. Select **UST Install > Start**.

5. A lens calibration is performed.
6. To turn off the projector, press the “Exit” key on the remote control.
7. Switch off the AC power button.
8. Remove the power cord.

Or if you do NOT have a non-UST lens for this projector, or are using a ZU860, please use one of the following steps.

Option 1:

- a. Turn the projector on
- b. Send RS232 command which is ~XX361 1 **or for the ZU860 use ~XX525 3**
- c. Projector will perform a lens calibration.
- d. If command is successful, Projector will power down to standby.

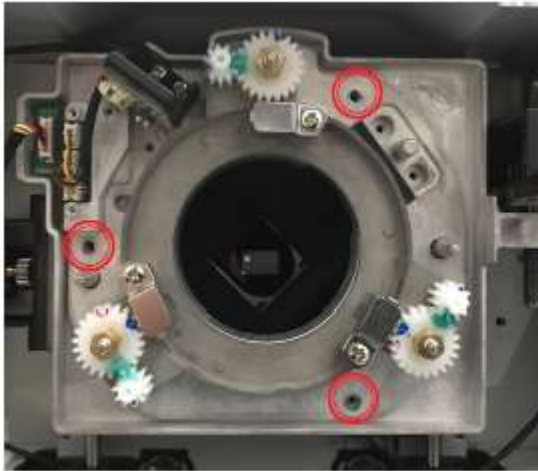
Option 2:

- a. Turn the projector on
- b. Using buttons on the rear of the projector press in sequence EXIT, INPUT, LEFT, RIGHT **(same for all models)**
- c. Projector will perform a lens calibration.
- d. If successful, Projector will power down to standby.

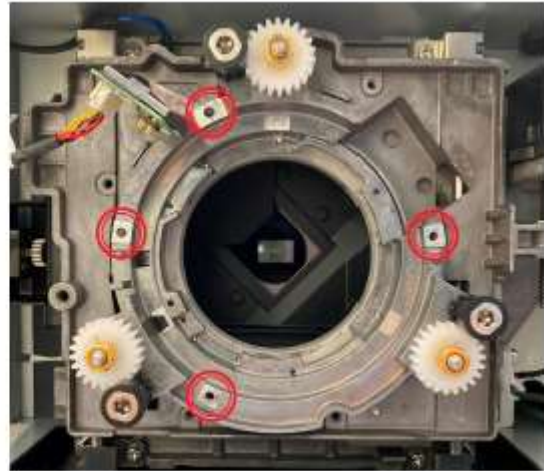
Removing the non-UST boresight plate

To replace the projector with a UST lens boresight plate, complete the following steps.

1. Remove the non ultra-short throw (non-UST) lens.
2. Remove the screws securing the non-UST lens boresight plate with a Philips #2 screwdriver.



LSM 1: three screws

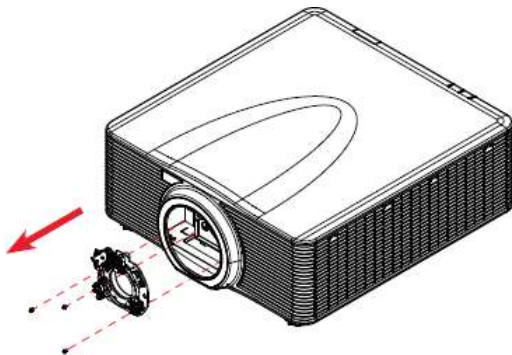


LSM 2: four screws

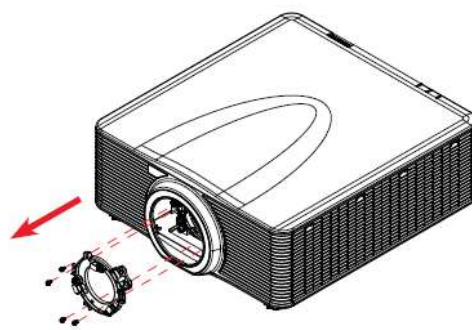
Note:

To have better visibility for the lens holder, you can stand the projector with the lens opening facing up.

3. Remove the non-UST lens boresight plate from the projector.



LSM 1: three screws

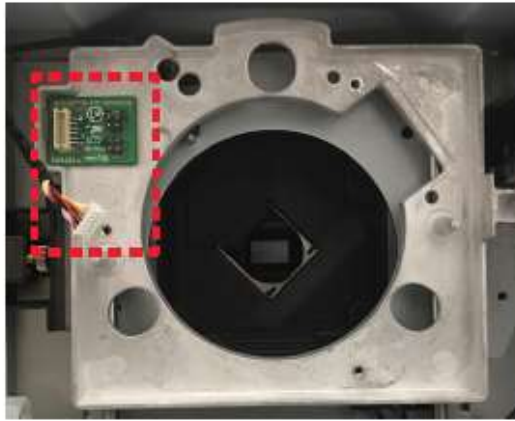


LSM 2: four screws

Installing the UST lens boresight plate (LSM 1)

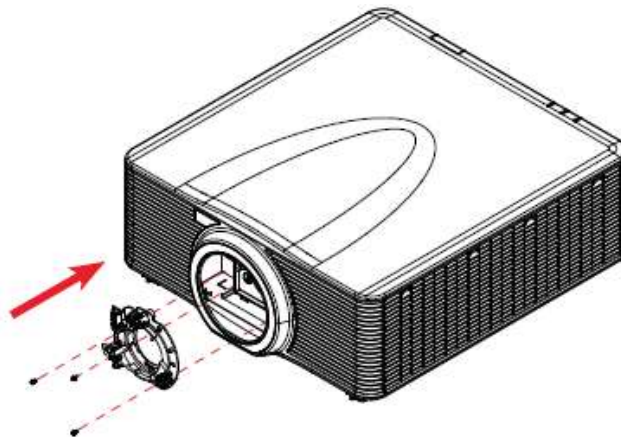
For type 1 lens shift module (LSM 1), you need to install a UST lens boresight plate in order to attach the UST lens to the projector.

1. Disconnect the lens cable from the small circuit board on the lens shift module.

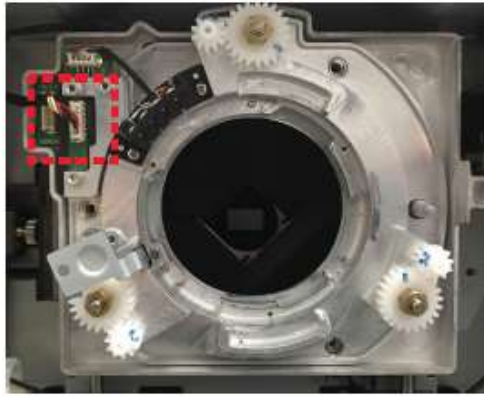


Note: Ensure the cable is not wrapped or pinched when replacing the lens boresight plate.

2. Insert the UST lens boresight plate in to the projector.



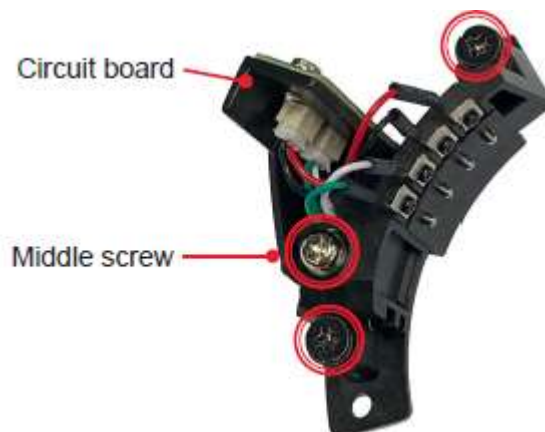
3. On the UST lens boresight plate, install and tighten the 3 screws with a Philips # 2 screwdriver.
4. Connect the lens cable to the boresight plate.



Installing the UST lens pogo pin adapter (LSM 2 ONLY)

For type 2 lens shift module (LSM 2), you need to install an UST lens pogo pin adapter in order to attach the UST lens to the projector.

1. Loosen the three screws on the UST lens pogo pin adapter with a Philips #2 screwdriver.



The middle screw controls the lateral position of the circuit board on the adapter:

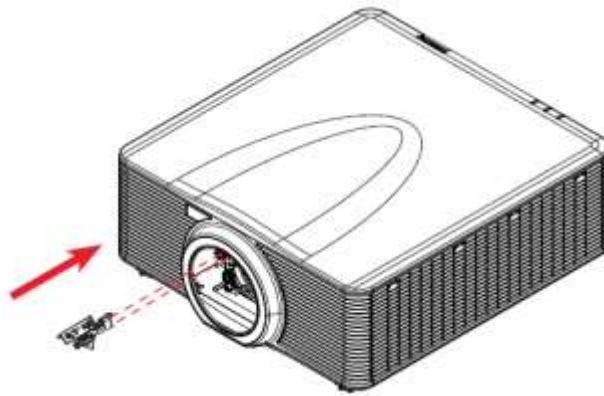
- Turning the screw counter-clockwise moves the circuit board towards the screw.
- Turning the screw clockwise moves the circuit board away from the screw.

To install the pogo pin adapter correctly, turn the middle screw counter-clockwise for at least 3 turns before the installation.

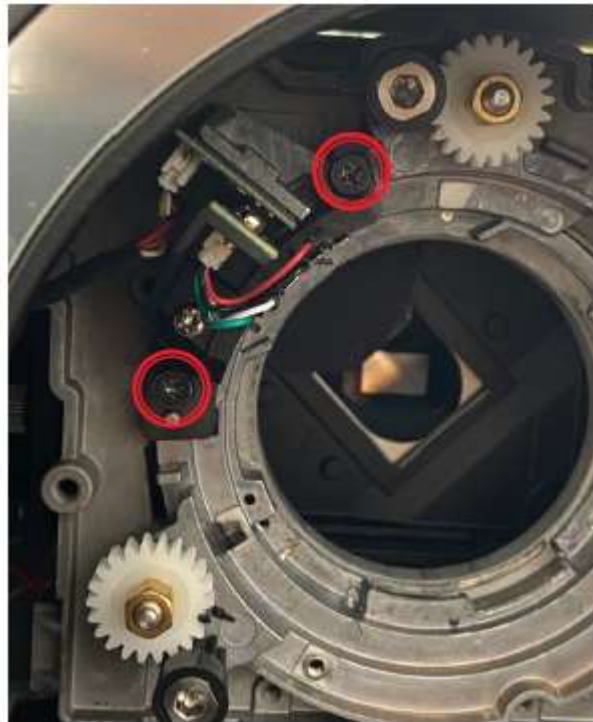
2. Insert the UST lens pogo pin adapter in to the projector.

Note: Before installing the pogo pin adapter, make sure the middle screw on the adapter is turned

counter-clockwise for at least 3 turns.



3. Tighten the side screws on the pogo pin adapter.



4. Tighten the middle screw on the pogo pin adapter.

Note: Please tighten the side screws before tightening the middle screw.

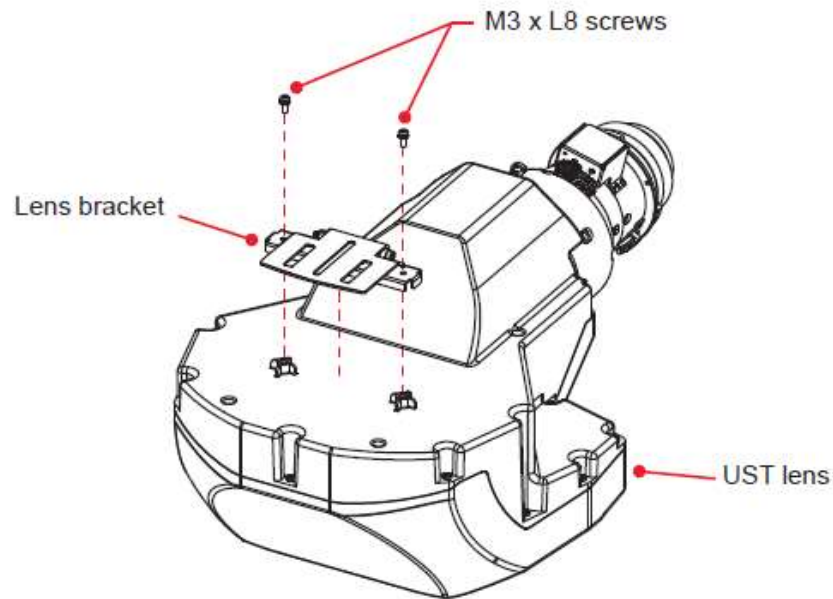


Mounting the UST lens support system

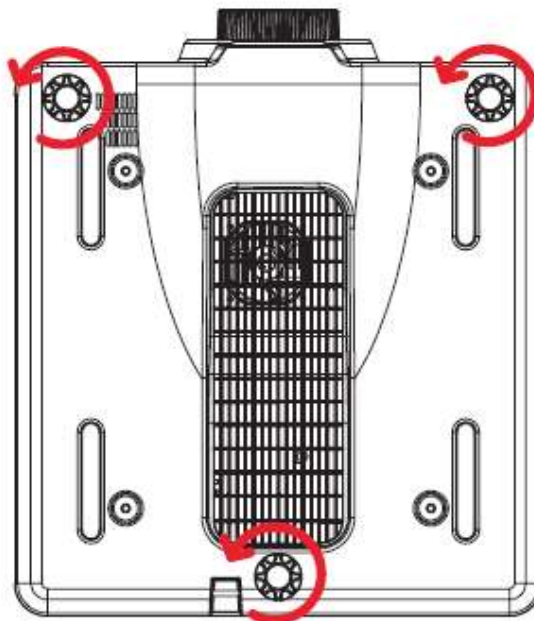
A support system is designed to go with the UST lens to provide additional support.

1. Place the lens on a cushioned surface to avoid damage.
2. To secure the lens bracket to the UST lens, install and tighten two M3 x L8 screws with a Philips #2 screwdriver.

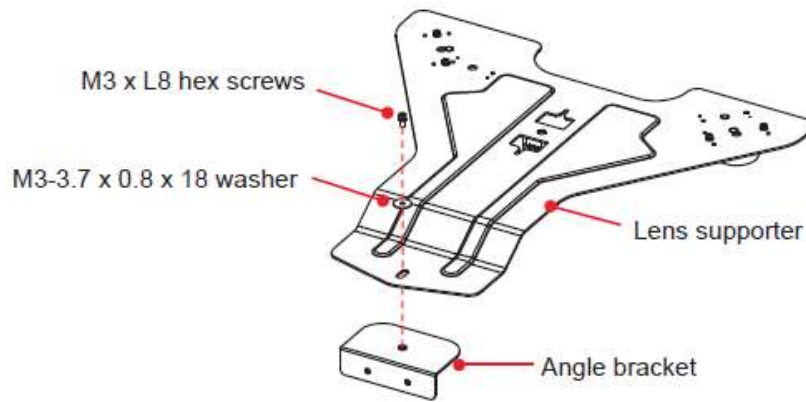
Note: Ensure the arrow on lens mount bracket is facing out from the lens mount.



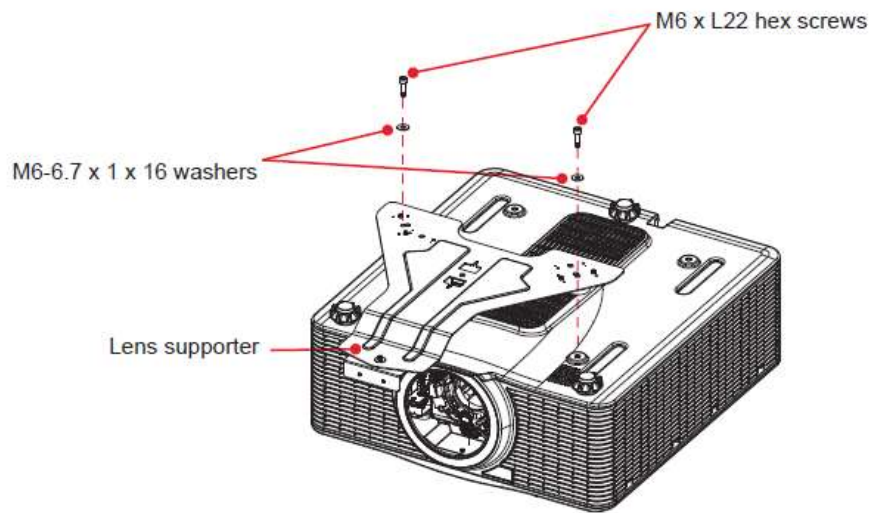
3. Place the projector upside down on a flat and clean surface.
4. To avoid the lens supporter touching the surface, rotate the adjustment feet counter-clockwise at least five turns.



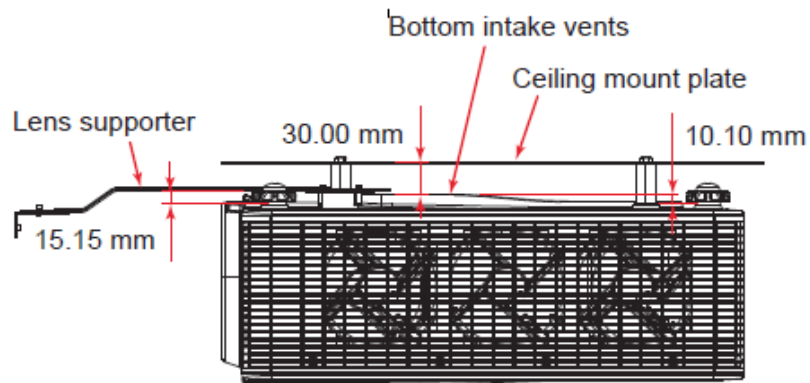
5. To secure the angle bracket to the lens supporter, install one M3 x L8 hex screw and one M3 washer with a 2.5 mm allen key. Do not fully tighten the screw.



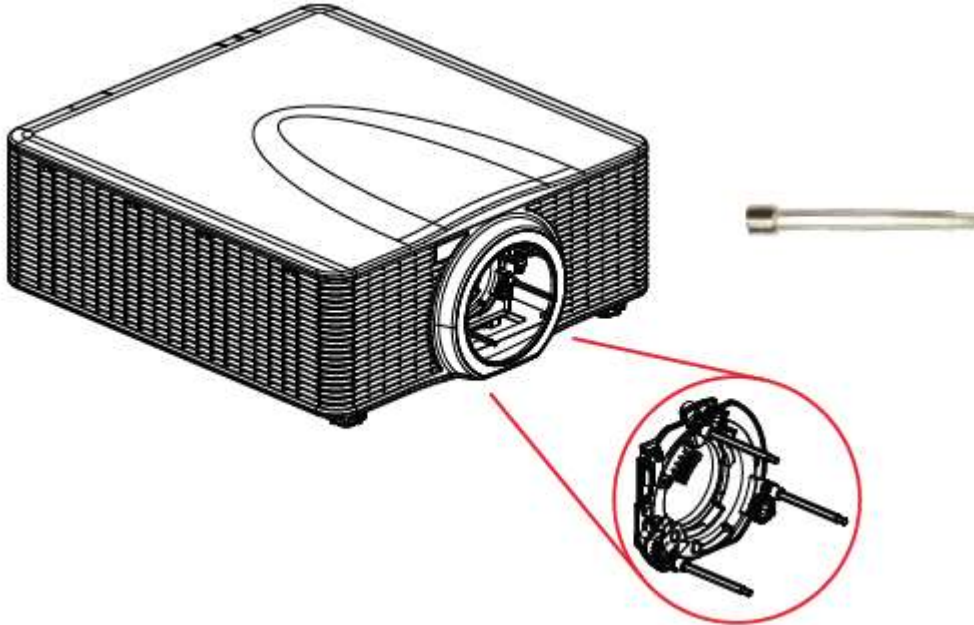
6. To mount the lens supporter to the bottom of the projector, install and tighten two M6 x L22 hex screws and two M6 washers with a 5 mm allen key.



7. If using the lens supporter with a ceiling mount, make sure to leave at least 30 mm clearance space above the projector's bottom intake vents.

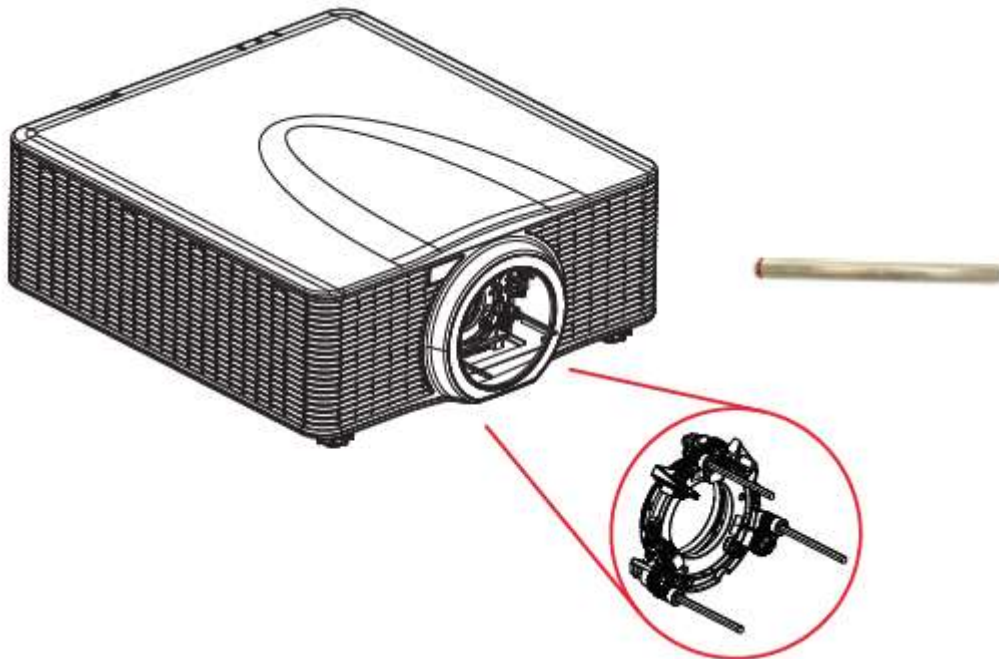


8. Place the projector back to its original orientation.
 9. Install the three boresight extenders. For LSM 1, face the socket heads of the extenders towards the projector.
- For **LSM 1 ONLY**, face the socket heads of the extenders towards the projector.



LSM 1: boresight extenders

- For **LSM 2 ONLY**, face the red rubber rings on the extenders toward the projector.



LSM 2: boresight extenders

Initially adjusting the boresight screws

Before installing the UST lens, adjust the boresight screws by turning the boresight extenders clockwise or counter-clockwise. Once a lens is installed, the adjustment ranges for the boresight screws are limited.

1. Turn the boresight gears counter-clockwise to the end position with the boresight extenders.
 - **For LSM 1 ONLY**, adjust the boresight gear until the marks on the two gears are roughly aligned.
 - **For LSM 2 ONLY**, adjust the boresight gear until the mark on the gear is roughly aligned with the marker on the lens shift module.

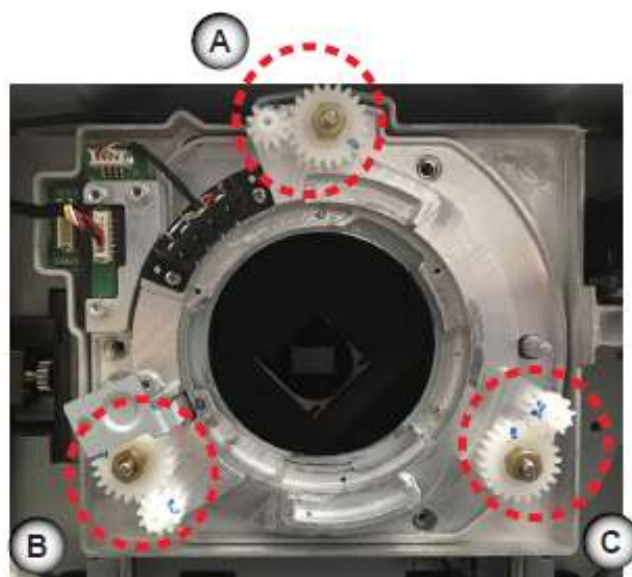


LSM 1



LSM 2

2. Turn the boresight gears clockwise for the recommended ranges detailed in the following tables.



- **Adjustment ranges for LSM 1 ONLY**

Key Note: 1 revolution = 1 complete rotation of the tool used (or the small gear you are turning)

Adjustment ranges (in turns) for the boresight screws (LSM 1)			
Orientation	A	B	C
Table Top	$3 + \frac{1}{4}$	$7 + \frac{3}{4}$	$8 + \frac{3}{4}$
Portrait(L)	$6 + \frac{1}{2}$	$3 + \frac{3}{4}$	$8 + \frac{1}{2}$
Portrait (R)	$6 + \frac{3}{4}$	$8 + \frac{3}{4}$	$4 + \frac{1}{2}$
CM	$8 + \frac{1}{2}$	$5 + \frac{1}{4}$	$5 + \frac{3}{4}$
Upright	8	$7 + \frac{3}{4}$	8

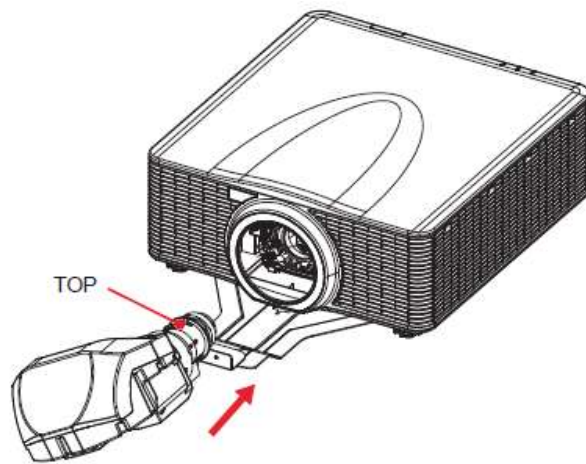
- **Adjustment ranges for LSM 2 ONLY**

- Key Note: 1 revolution = 1 complete rotation of the tool used (or the small black gear you are turning)

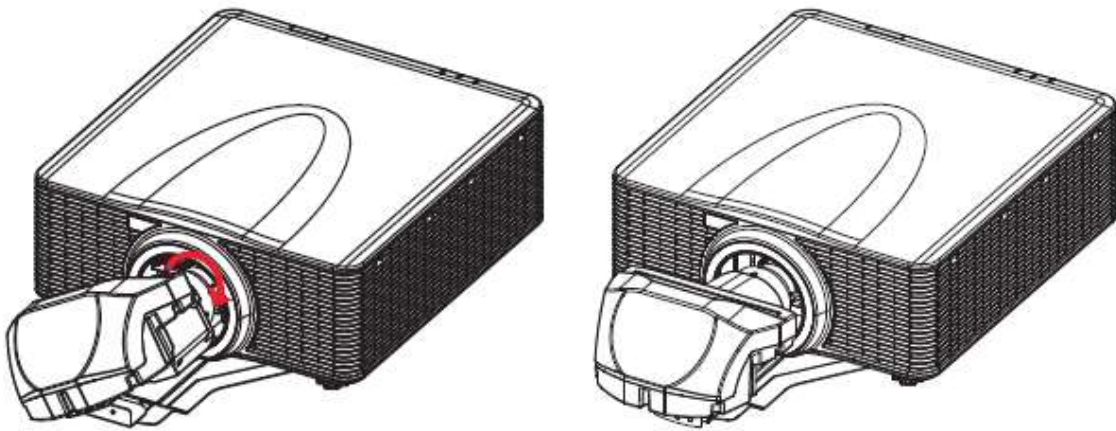
Adjustment ranges (in turns) for the boresight screws (LSM 2)			
Orientation	A	B	C
Table Top	7	7	7
Portrait(L)	$8 + \frac{1}{2}$	$8 + \frac{1}{2}$	$5 + \frac{1}{4}$
Portrait (R)	$8 + \frac{1}{2}$	$5 + \frac{1}{2}$	$8 + \frac{1}{2}$
CM	11	$5 + \frac{1}{2}$	$6 + \frac{1}{2}$
Upright	$9 + \frac{1}{2}$	7	7

Installing the UST lens

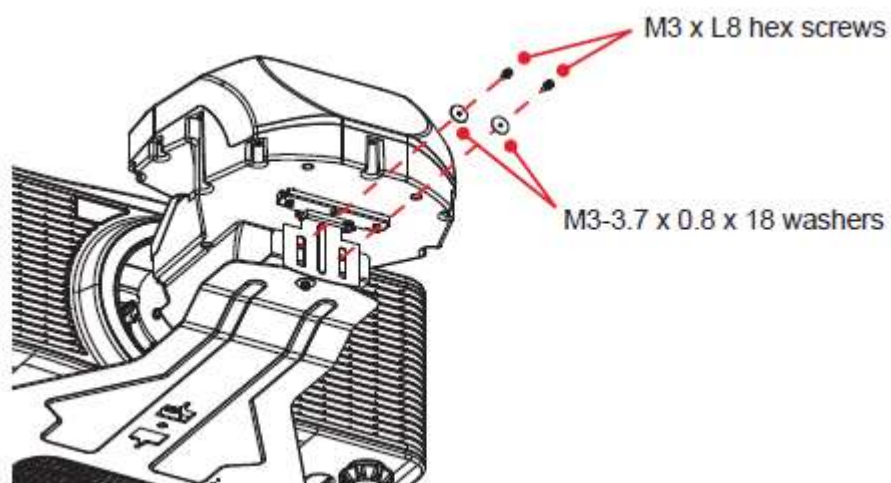
1. Insert the UST lens in to the projector with the TOP mark aligning to the top of the projector.



2. Rotate the UST lens clockwise to lock the lens.



3. To connect the lens bracket and the lens support assembly, install two M3 x L8 hex screws and two M3 washers with a 2.5 mm allen key. Do not fully tighten the screws.



Adjusting the image position and focus

After the UST lens is installed, turn on the projector and adjust the image position.

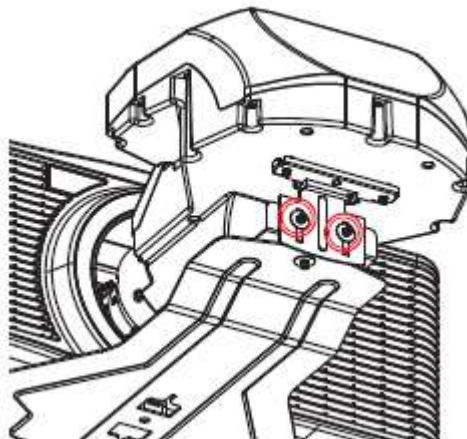
1. Place the projector as close as possible to the screen.
2. Turn on the projector.
3. To display a test pattern, press the "Pattern" key on the remote control.

The test image could be out of focus and the bottom edge may appear obscured or in dark.

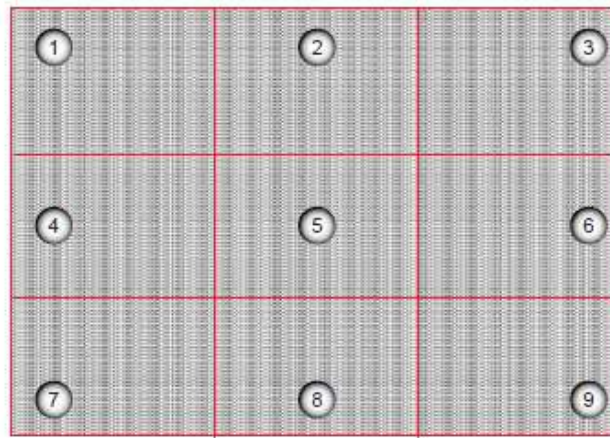
4. To remove the obscured bottom edge, adjust the image position by pressing the "Lens V" keys to shift the image up or down.

Note: To prevent product damage, avoid over adjusting the lens position as the UST lens boresight plate allows limited lens shift range.

5. If the obscured edge still exists after the lens shift, adjust the vertical position of the two M3 x L8 hex screws connecting the lens bracket and the lens support assembly, which mechanically moves the image up or down. Use a 2.5 mm allen key to adjust the M3 hex screws.



6. To adjust the image focus, press the "Zoom" keys to adjust the back focus and the "Focus" keys to adjust the focus.



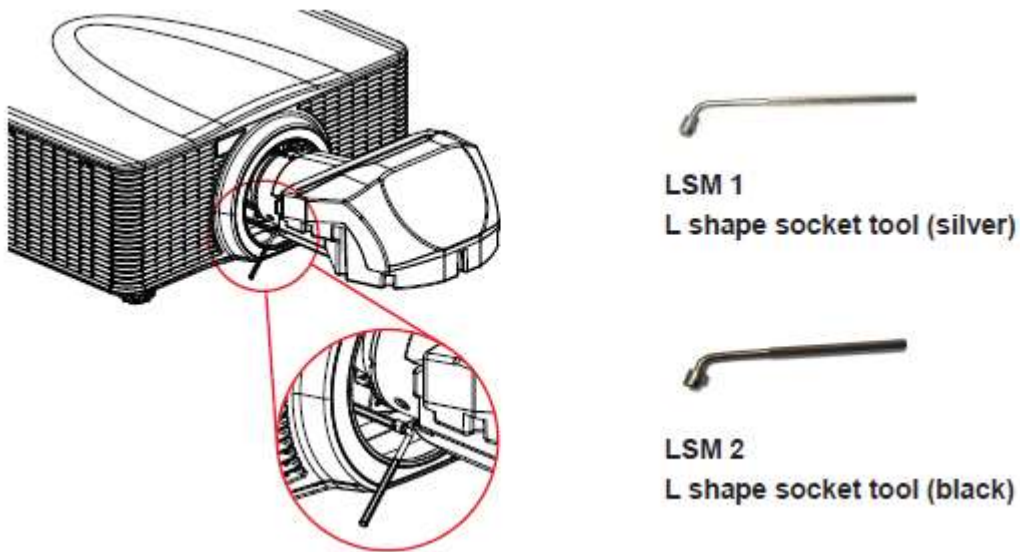
- a. Press “Zoom” keys to adjust the back focus until the screen center (point 5) is clear and sharp.
- b. Press “Focus” keys to adjust the image focus until the screen corners (point 1, 3, 7, and 9) are clear and sharp.
- c. Repeat step a and b to balance the image focus at the center and corners.

Note: The image focus should be tuned finely as the balance between the back focus and focus is very subtle. One press on the “Zoom” or “Focus” keys can make a big difference on the screen.

Adjusting the boresight

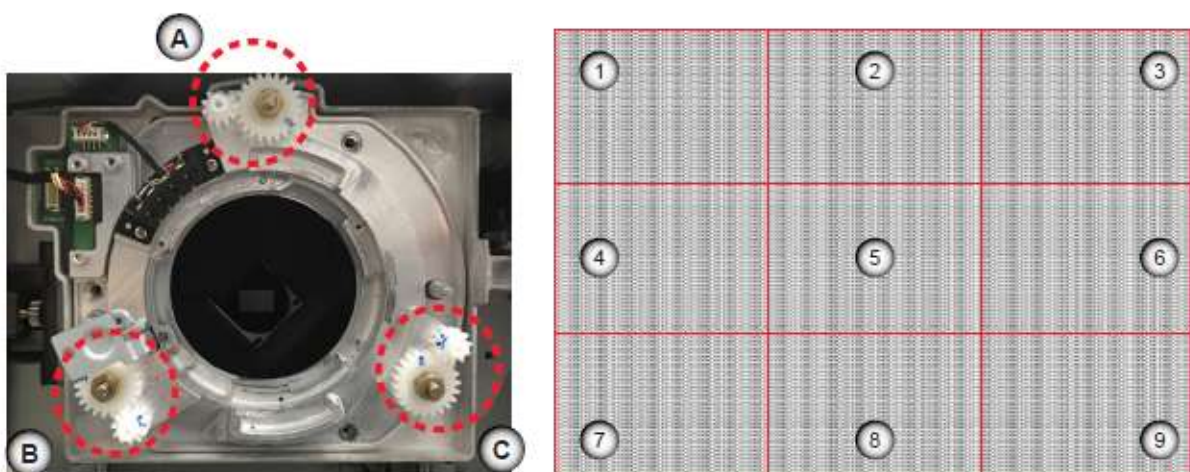
Boresight adjustment is needed if the image is still unsharp after the focus adjustment. The boresight adjustment tilts the lens holder to parallel the lens plane and the DMD plane to fully focus the image on the screen.

1. To perform the boresight adjustment, turn the boresight screws clockwise or counter-clockwise using the L shaped socket tool and the three boresight extenders.



2. Display a test pattern by pressing the "Pattern" key.

Note: The projector cannot display the input sources during the boresight adjustment.

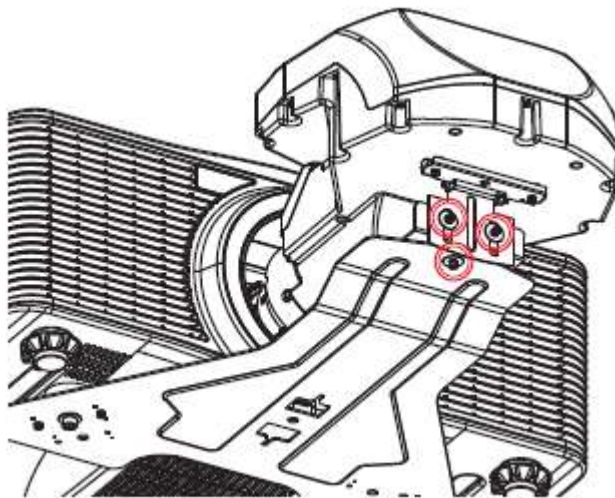


3. To focus the left bottom area of the screen (point 4 and 7), turn boresight screw B clockwise or counter-clockwise.
4. To focus the right bottom area of the screen (point 6 and 9), turn boresight screw C clockwise or counter-clockwise.
5. To focus the top corners of the screen (point 1 and 3), adjust the image back focus and focus by pressing the "Zoom" and "Focus" keys.
6. To focus the center bottom area of the screen (point 8), turn boresight screw A clockwise or counter-clockwise.
7. Repeat from step 3 until the image is as sharp as possible in the center, left, right, top, and bottom of the screen.

Finalizing the image adjustment

After the boresight adjustment is complete, fix the lens support system and fine tune the image focus.

1. Tighten the three M3 screws securing the lens support system with a 2.5 mm allen key.



2. Fine tune the image focus as bolting the support system changes the lens position slightly.
3. To restore the image brightness, press the "Exit" key twice.

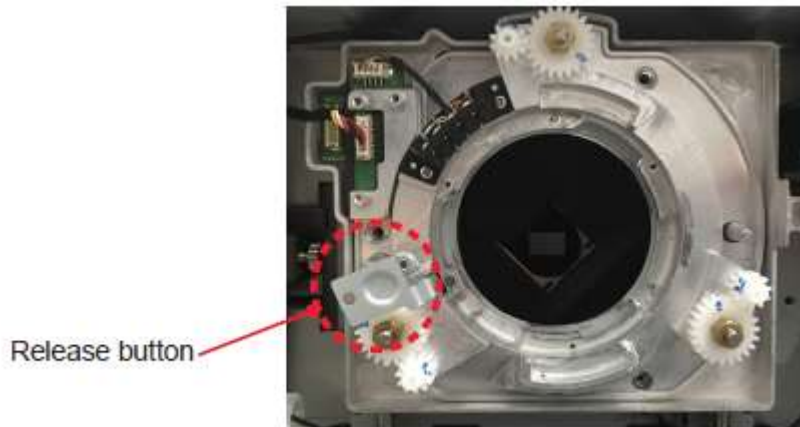
The projector can now receive and display input sources.

Removing the UST lens

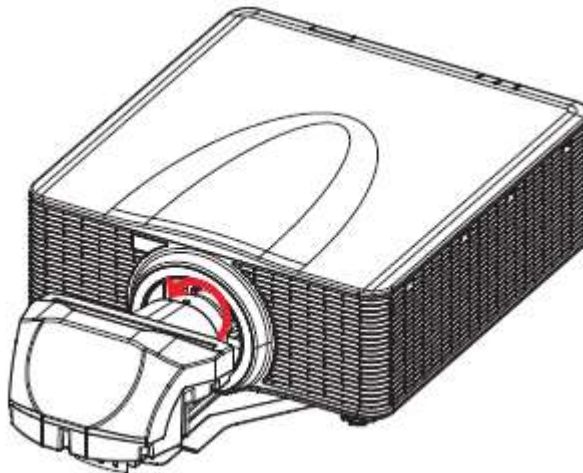
Complete the following steps to remove the UST lens.

1. Turn off the projector.
2. Switch off the AC power button and remove the power cord.
3. For LSM 1, press the lens release button with a long neck screwdriver.

For LSM 2, go to step 4



4. Rotate the lens counter-clockwise by a quarter and remove the UST lens.



Installing a non-UST lens

To install a non-UST lens to the projector, complete following steps.

1. Remove the UST lens accessory installed on the projector and install the original boresight for the non-UST lens.

Note: Refer to the images in the steps on page 5 to 8.

- **For LSM 1**, remove the UST lens boresight and install the non-UST lens boresight.
 - a. Unplug the lens cable from the circuit board on the projector lens module.
 - b. Remove the three screws that securing the UST lens boresight plate to the projector.
 - c. Remove the UST lens boresight plate from the projector.
 - d. Install the non-UST lens boresight plate to the projector, and secure it with the three screws.
 - e. Plug the lens cable to the circuit board on the lens module.
- **For LSM 2**, remove the UST lens pogo pin adapter and install the non-UST lens boresight.
 - a. Loosen the middle screw on the UST lens pogo pin adapter. Make sure the middle screw is turned clockwise for at least 3 turns.
 - b. Remove the side screws on the pogo pin adapter.
 - c. Remove the UST lens pogo pin adapter from the projector.
 - d. Install the non-UST lens boresight plate to the projector, and secure it with the four screws.

2. Install the non-UST lens.
3. Connect the AC power cord and switch on the power button.
4. Turn on the projector.
5. Disable the UST Install mode through the on screen display (OSD) menu.
 - a. Select **Menu > Service**
 - b. Enter the service password and press **OK**
 - c. Select **UST Install > None**.
6. To perform a lens calibration for the UST lens, from the OSD menu, select **Menu > Options > Lens function > Lens Calibration**.

UST Lens specifications

Specifications of the UST lens	
Throw ratio	0.361 (120")
Focal length	9.49-9.55
F number	2.4
Zoom ratio	No zoom
Throw distance	0.93-3.11 m
Screen size	120" to 400"
Lens configuration	3 group 23 elements
Brightness ratio	70% (for reference)
Net weight	2.715 kg

