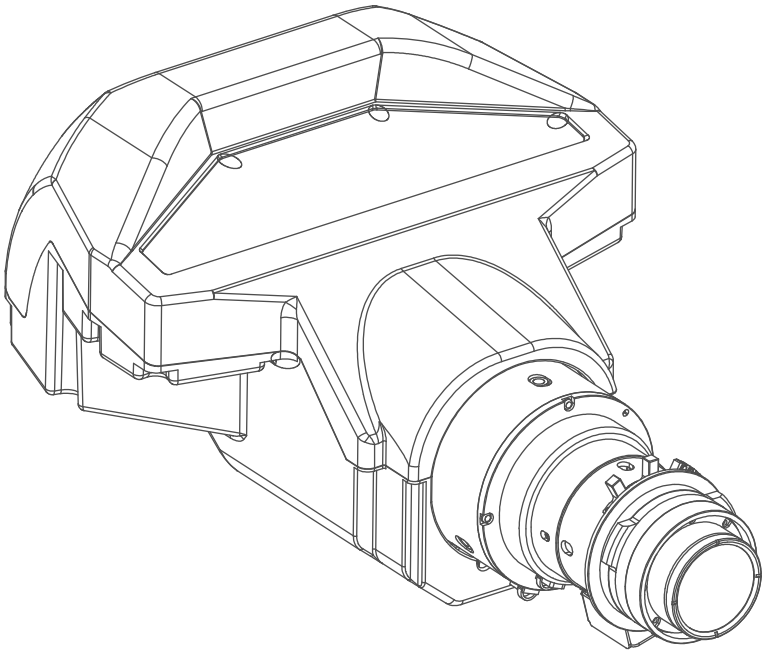
UST lens

For G60 W projector



Installation manual

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Introduction & preparation

1

About the manual

This user manual is designed to assist the installation of the R9801785 lens on the G60 W series projector.

Before attempting to mount the UST lens, please read through this document in full order to ensure all installation steps are clear.

Overview

- Specifications of the UST lens
- Safety precautions
- Required accessories and tools
- Necessary steps when installing the UST-lens on the G60

1.1 Specifications of the UST lens

Overview

Throw ratio	0.361 (120”)
Focal length	9.49-9.55
F number	2.4
Zoom ratio	No zoom
Throw distance	0.96-3.01m
Screen size	120” to 400”
Lens configuration	3 group 23 elements
Brightness ratio	70% (for reference)
Net weight	2.715 kg

Lens specification table

Screen diagonal (inch)	W (cm)	H (cm)	P (cm)[1]	A (cm)	B (cm)	C=PD (cm)	L (cm)	Height of feet (cm)
120	258,3	161,5	19,9	78,2	13,6	96,3	82,6	1,44
130	280,0	175,0	19,9	83,8	21,0	103,6	82,6	1,44
140	301,5	188,5	19,9	89,5	28,3	110,9	82,6	1,44
150	323,0	201,9	19,9	95,1	35,6	118,2	82,6	1,44
160	344,6	215,4	19,9	100,8	42,9	125,5	82,6	1,44
170	366,2	228,9	19,9	106,4	50,3	132,9	82,6	1,44
180	387,7	247,3	19,9	112,1	57,6	140,2	82,6	1,44
190	409,2	255,8	19,9	117,7	64,9	147,5	82,6	1,44
200	430,7	269,3	19,9	123,4	72,2	154,8	82,6	1,44
250	538,5	336,6	19,9	151,7	108,8	191,5	82,6	1,44
300	646,2	404,0	19,9	179,9	145,5	228,1	82,6	1,44
350	754,0	471,3	19,9	208,2	182,1	264,7	82,6	1,44
400	861,6	538,6	19,9	236,5	218,7	301,3	82,6	1,44

1: feet turned completely in

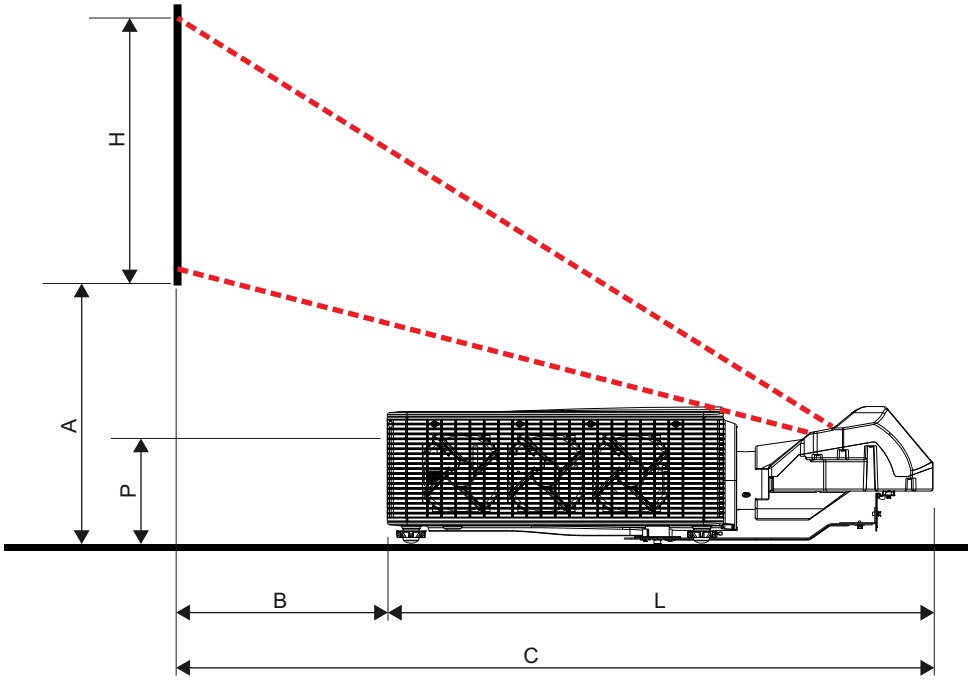


Image 1-1

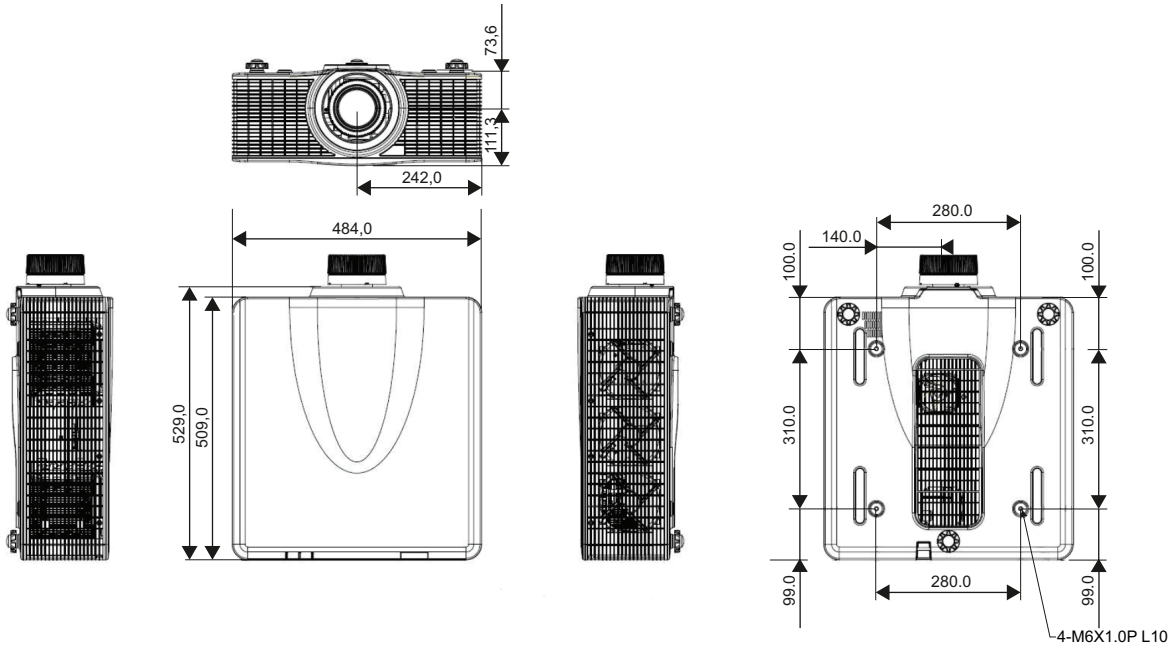


Image 1-2

1.2 Safety precautions

Overview

- Installation and adjustments should be performed by qualified technicians or authorized service dealers.
- Do not look into straight into the projector lens during the operation. The bright light may cause permanent eye injury.
- Make sure no personnel or object is in the light path of the projector during the operation.
- Do not place the projector on an unstable surface to prevent product damage and human injury.
- Failure to follow the control, adjustment or operation procedures may cause damage by the exposure.

1.3 Required accessories and tools

Overview

Check if all items in the table are included in the package.

	Image	Description	Quantity
A		UST lens	1
B		UST lens boresight module	1
C		Lens mount bracket	1
D		Bracket	1
E		Lens support	1
F		M3 x L8 screw	2
G		M3 x L8 hex screw	3
H		M6 x L22 hex screw	2
I		M3–3.7 x 0.8 x 18 washer	3
J		M6-6.7 x 1 x 16 washer	2
K		Boresight extender	3
L		L-shape tool	1

Required tools

The following tools are required for installing the UST lens:

- #2 Philip screwdriver with magnetic tip (long neck)

- L shape tool (provided in the lens package)
- 2.5 mm Allen wrench
- 5 mm Allen wrench

1.4 Necessary steps when installing the UST-lens on the G60

Handle as follow

1. Software preparation of the projector to receive the UST lens.
    1. First you need to put the lens holder in the position suited for the UST-lens and the brightness needs to be reduced during the setup process. This is initiated by pressing a series of keys on the local keypad or on the remote control unit. The software will do the rest automatically.
    2. After the setup and calibration is done, you need to let the projector know that the setup is done. After this command, the projector will switch off and it will know the setup is done. The lens shift is then fixed and the brightness is again put at maximum.
2. Mechanical preparation of the projector to receive the UST lens.

    In this part, a lot of steps need to be done to correctly install the UST-lens.
3. Adjust the lens optically.

    In this part, the UST lens is adjusted in sheimpflug and back focal distance by using the correct procedure.

2 Installation

Overview

- Software preparation of the projector to receive the UST lens
- Initially adjusting the boresight screws
- Replacing the lens boresight module
- Mounting the UST lens support system
- Installing the UST lens

2.1 Software preparation of the projector to receive the UST lens

About the software preparation

Set the start mode of the projector to get it ready for the UST lens installation. During the setup process, the projector reduces the image brightness and performs a lens calibration to bring the lens holder in the correct position for use with the UST-lens.

How to set

1. Connect the AC power cord and switch on the power button.
2. Turn on the projector.
3. Enable the UST Install mode. There are 2 possibilities:
   1. You have another projection lens available: use the on screen display (OSD) menu.
      a) Select *Menu → Settings/Service.*
      b) Enter the service password “1”, “5”, “9”, “0” on the remote control and press **OK**.
      c) Select *UST Install → Start.*
   2. You do not have another lens available: use the shotcut keys on the local keypad
      a) Enable the UST Install mode by pressing the following keys on the local keypad or on the remote control unit: ‘Exit / Input / Left / Right’.

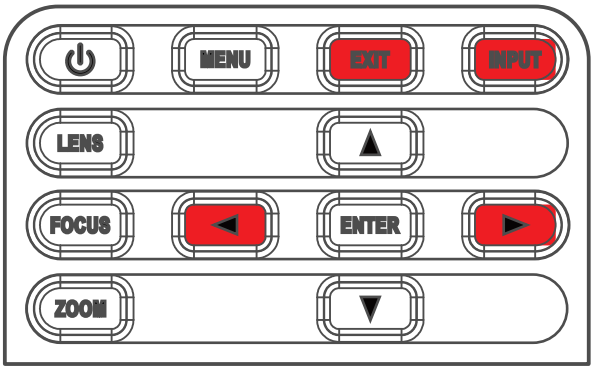


Image 2-1

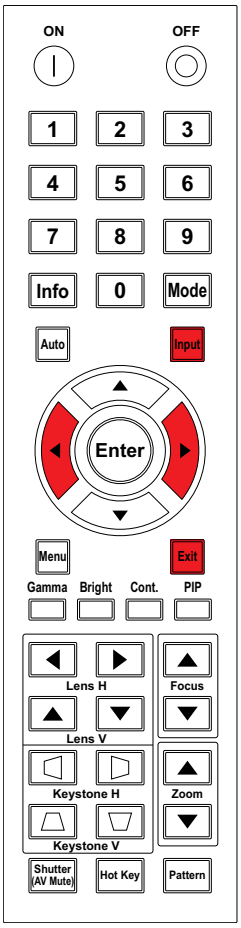


Image 2-2

4. A lens calibration is performed automatically.
5. After the calibration, the projector will automatically shut down. If not, press the “Exit” key on the remote control to power off the projector and making it ready for the install of the UST-lens.

6. Switch off the AC power button.

   The projector is now in the mode for an UST lens.

2.2 Initially adjusting the boresight screws

Preparations

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.

Required tools

- Boresight extenders
- L-shape tool

How to adjust

1. Take the lens boresight module B out of the UST-lens packaging.
2. To align the boresight gears, turn the small boresight gears counter-clockwise to the end position, where the marks on the two gears are roughly aligned.



Image 2-3

3. Turn the small boresight gears clockwise for the recommended ranges according to the installation orientation.

Adjustment ranges (in turns) for the boresight screws

Orientation	A	B	C
Table top	3, 1/4	7, 3/4	8, 3/4
Portrait (L)	6, 2/4	3, 3/4	8, 2/4
Portrait (R)	6,3/4	8, 3/4	4, 2/4
Ceiling mount	8, 2/4	5, 1/4	5, 3/4
Upright	8	7, 3/4	8

The optical adjustments of the UST lens need to be done in the actual position of the projector.

2.3 Replacing the lens boresight module

Required tools

Philips #2 screwdriver

How to replace

To replace the projector with an UST lens boresight module, complete the following steps:

1. Disconnect the lens cable from the lens holder.

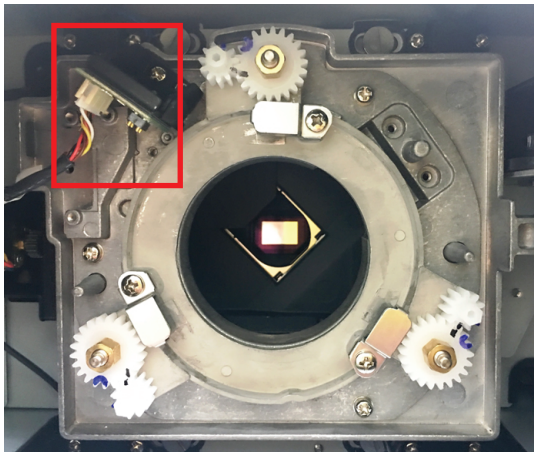


Image 2-4

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

2. Remove the 3 screws securing the non-UST lens boresight module with a Philips #2 screwdriver.

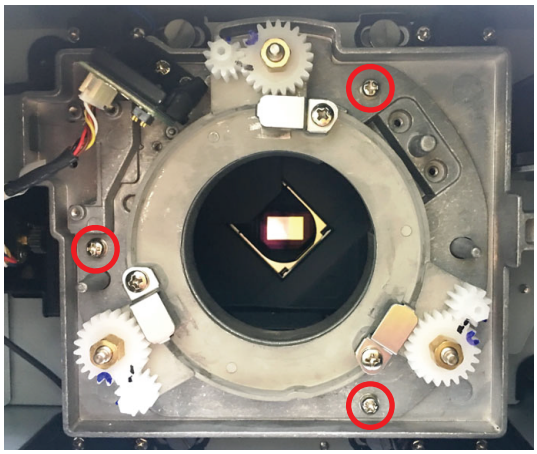


Image 2-5

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 module from the projector.

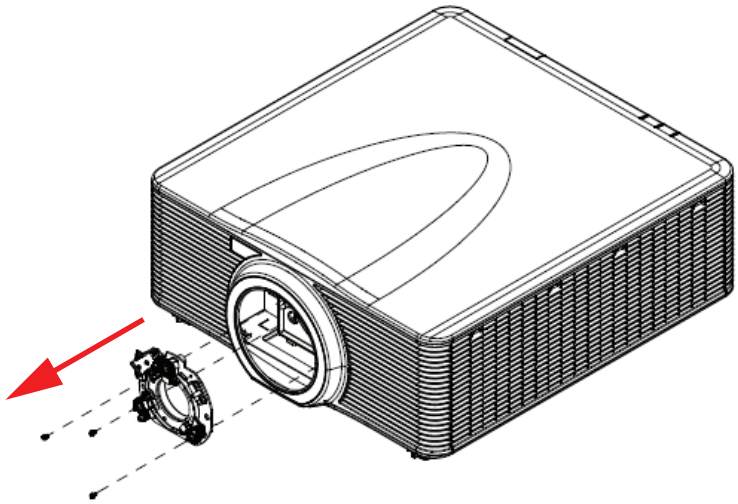


Image 2-6

4. Insert the UST lens boresight module to the projector.

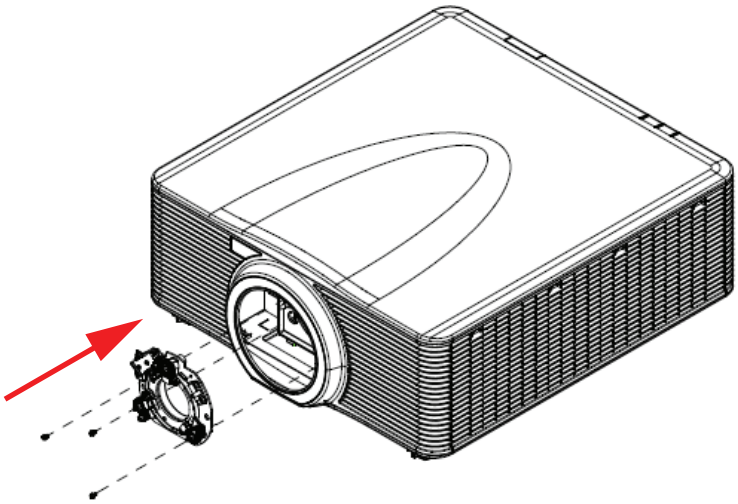


Image 2-7

5. On the UST lens boresight module, install and tighten the 3 screws with a Philips # 2 screwdriver.

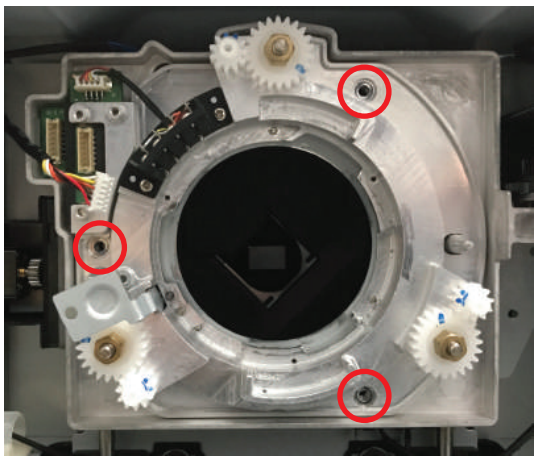


Image 2-8

6. Connect the lens cable to the lens holder.

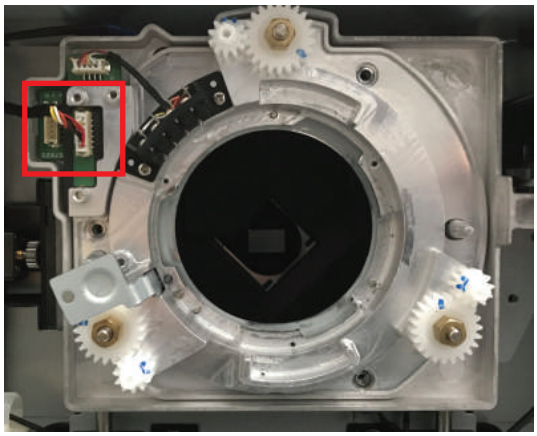


Image 2-9

2.4 Mounting the UST lens support system

Why lens support?

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

Required tools

- Allen wrench 5 mm
- Allen wrench 2.5 mm
- Philip #2 screwdriver
- Boresight extenders

How to mount

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 Philip #2 screwdriver.

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

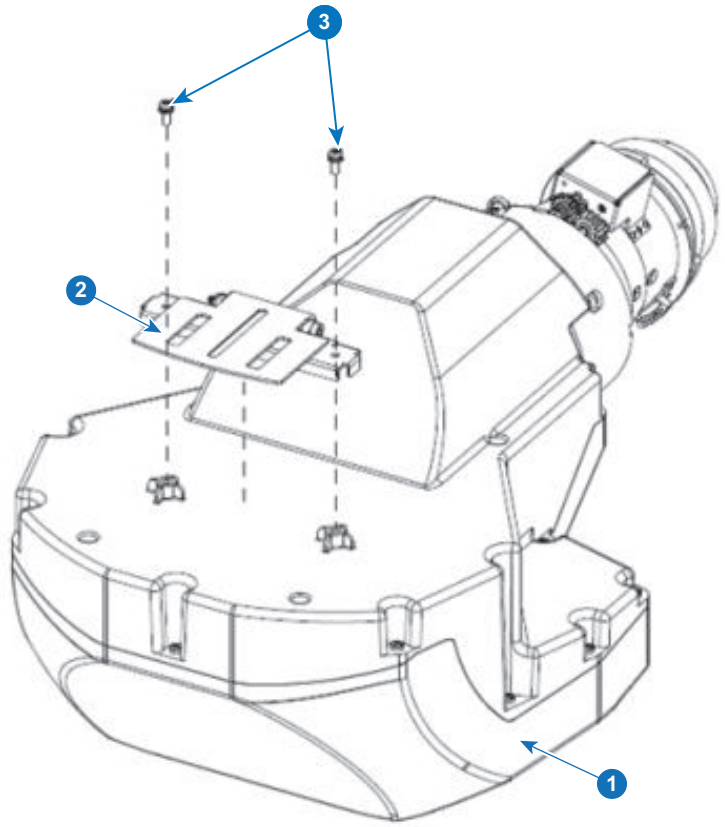


Image 2-10

1 UST lens
2 Lens bracket
3 M3xL8 screws

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.

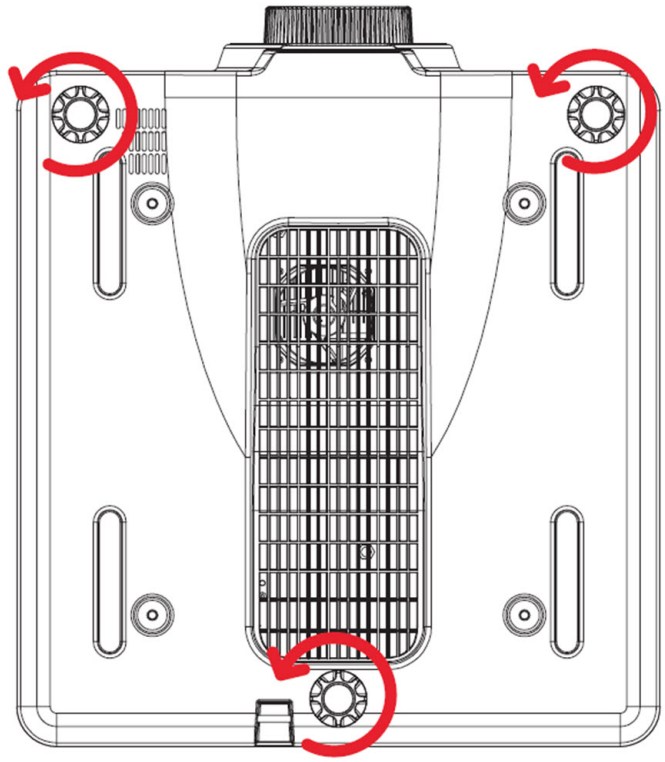


Image 2-11

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 wrench. Do not fully tighten the screw.

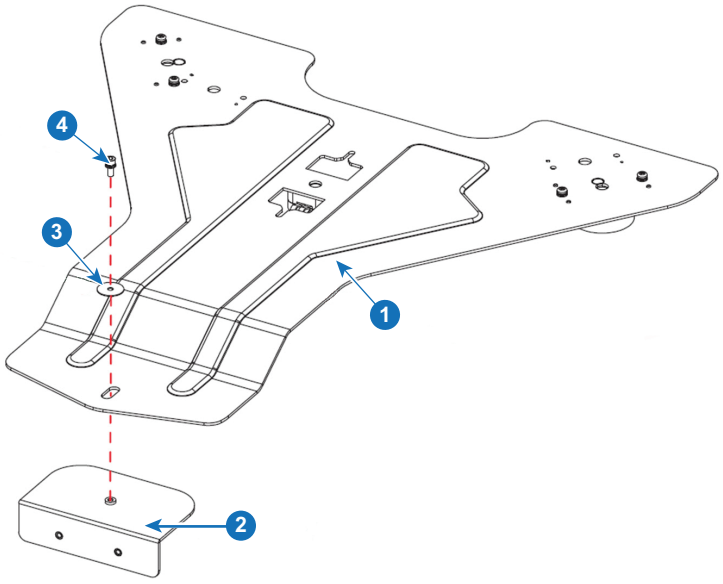


Image 2-12

1 Lens support
2 Angle bracket
3 M3-3.7 x 0.8 x18 washer
4 M3 x L8 hex 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 wrench.

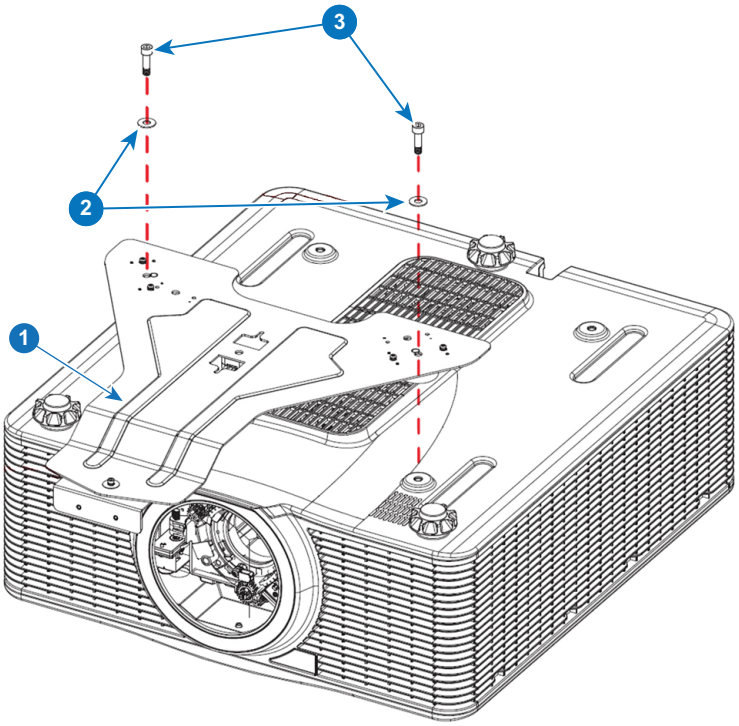


Image 2-13

1 Lens support
2 M6-6.7 x 1 x 16 washer
3 M6 x L22 hex screws

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.

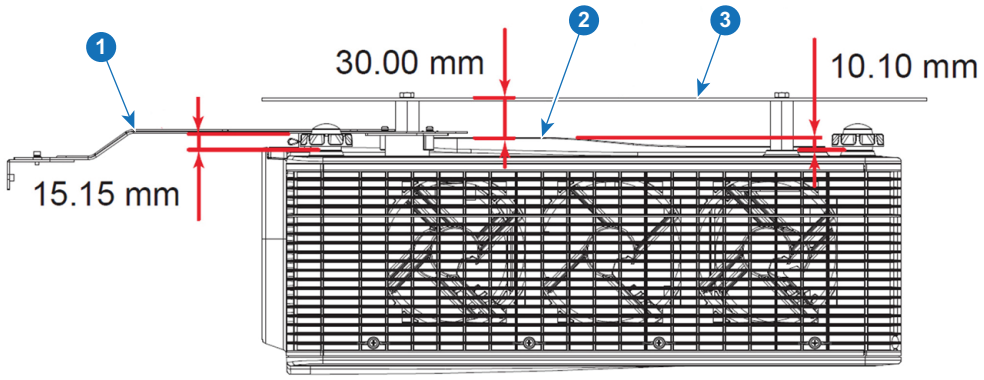


Image 2-14

1 Lens support
2 Bottom intake vents
3 Ceiling mount plate

8. Place the projector back to its original orientation.
9. Install the three boresight extenders.

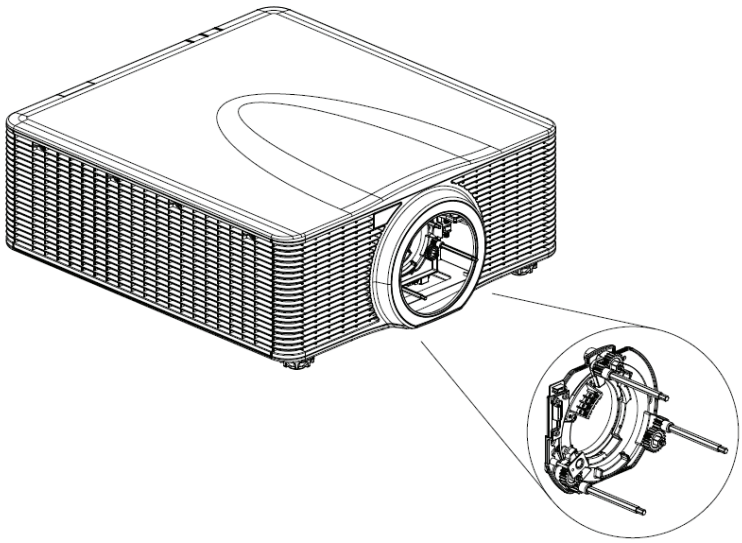


Image 2-15

2.5 Installing the UST lens

Required tools

Allen wrench 2.5 mm

How to install

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

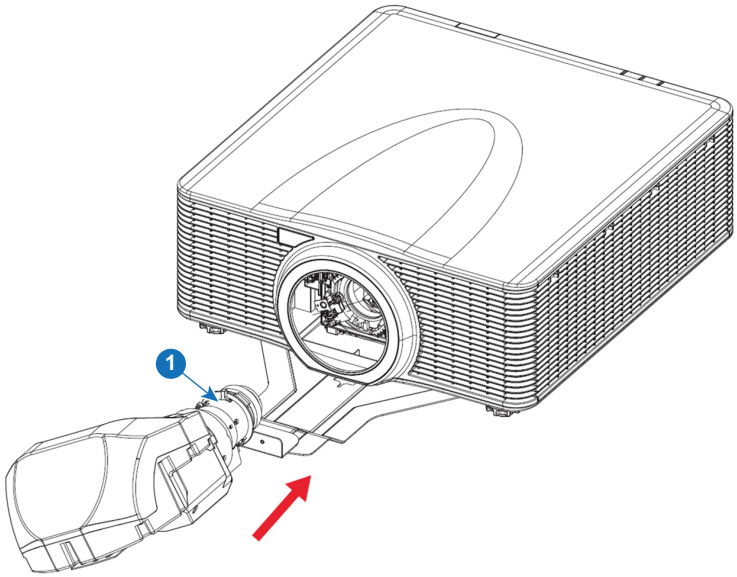


Image 2-16

1 Top

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

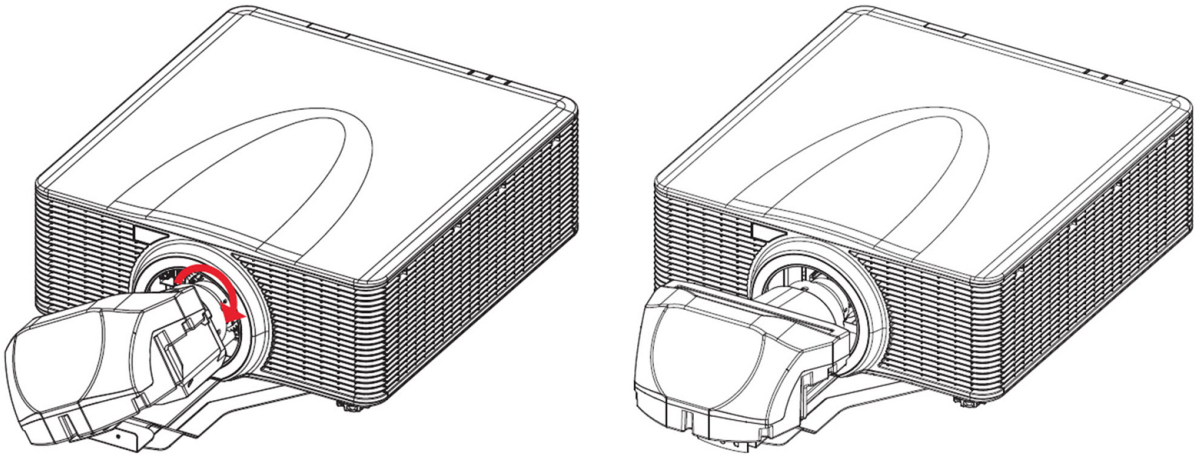


Image 2-17

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 wrench. Do not tighten the screws, as the lens still needs to be adjusted optically.

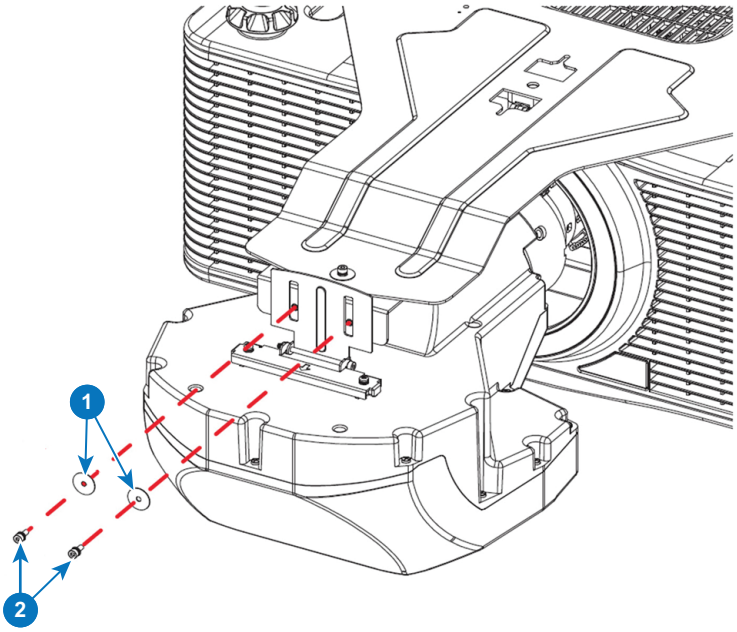


Image 2-18

1 M3 x L8 hex screw
2 M3-3.7 x 0.8 x 18 washer

4. Adjust the lens optically. See “Adjusting the UST lens”, page 21.

Adjusting the UST lens

3

Overview

- Adjusting the image position and focus
- Adjusting the boresight
- Finalizing the image adjustment

3.1 Adjusting the image position and focus

What must be done?

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

Required tools

- Allen wrench 2.5 mm
- Remote control

How to adjust

1. Place the projector as close as possible to the screen. Make sure the screen is flat and the projector is perpendicular 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.
5. If the obscured edge still exists after the lens shift, go to go to step 6. This obscuration will be gone after optical adjustment of the lens.
6. To adjust the image focus, press the **Zoom** keys on the remote control to adjust the back focus and the **Focus** keys on the remote control to adjust the focus.
   1. Press **Zoom** keys to adjust the back focus until the screen center (point 5) is clear and sharp.
   2. Press **Focus** keys to adjust the image focus untill the screen corners (point 1, 3, 7, and 9) are clear and sharp.
   3. Repeat step a and b to balance the image focus at the center and corners.

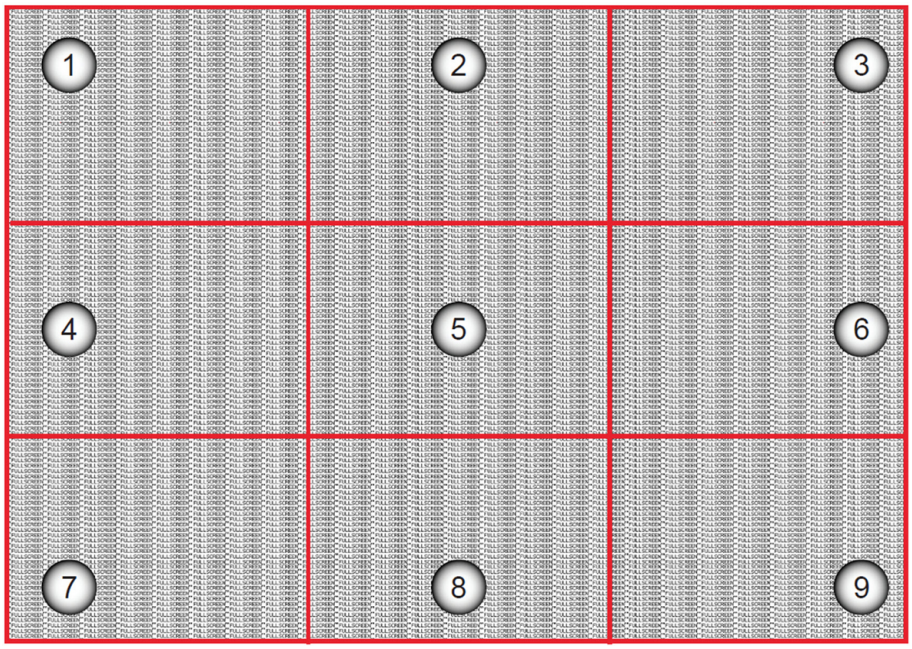


Image 3-1

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

3.2 Adjusting the boresight

Why boresight adjustment ?

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.

Required tools

- Boresight extenders
- L-shape tool
- Remote control

How to adjust

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.

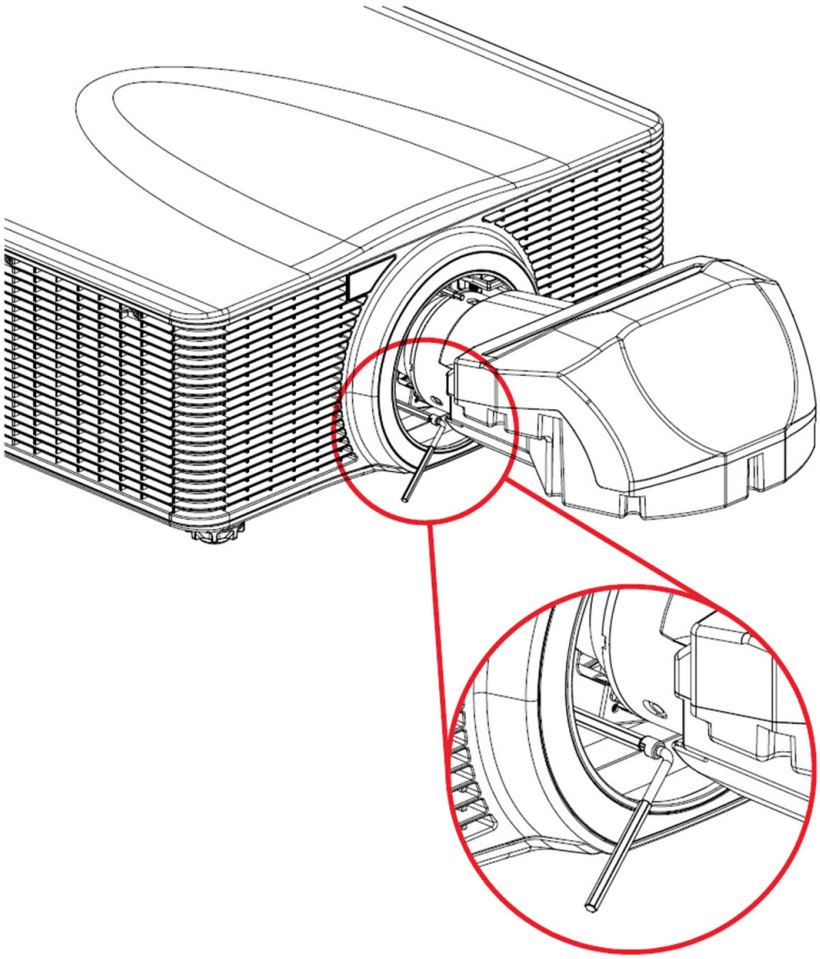


Image 3-2

2. Display a test pattern by pressing the **Pattern** key on the remote control.

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

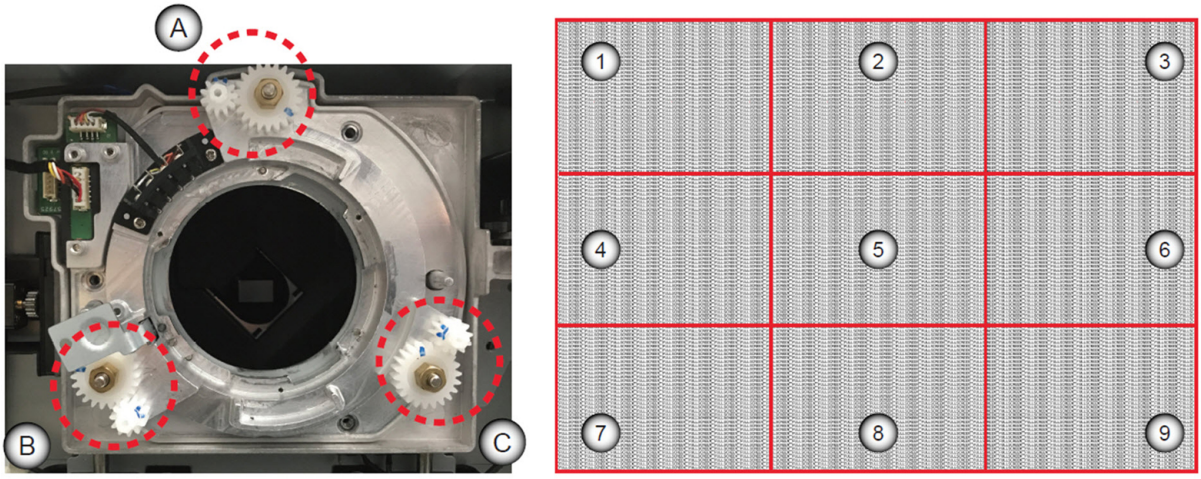


Image 3-3

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 on the remote control.
6. To focus the center bottom area of the screen (point 8), turn boresight screw A clockwise or counterclockwise.
7. Repeat from step 3 until the image is as sharp as possible in the center, left, right, top, and bottom of the screen.

3.3 Finalizing the image adjustment

What should be done?

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

Required tools

Allen wrench 2.5 mm

How to finalize

1. Tighten the three M3 screws securing the lens support system with a 2.5 mm Allen wrench.

   Note: To avoid affecting the projected image, do not use any force while fastening the screws. Start by fastening the screws by hand before using tools.

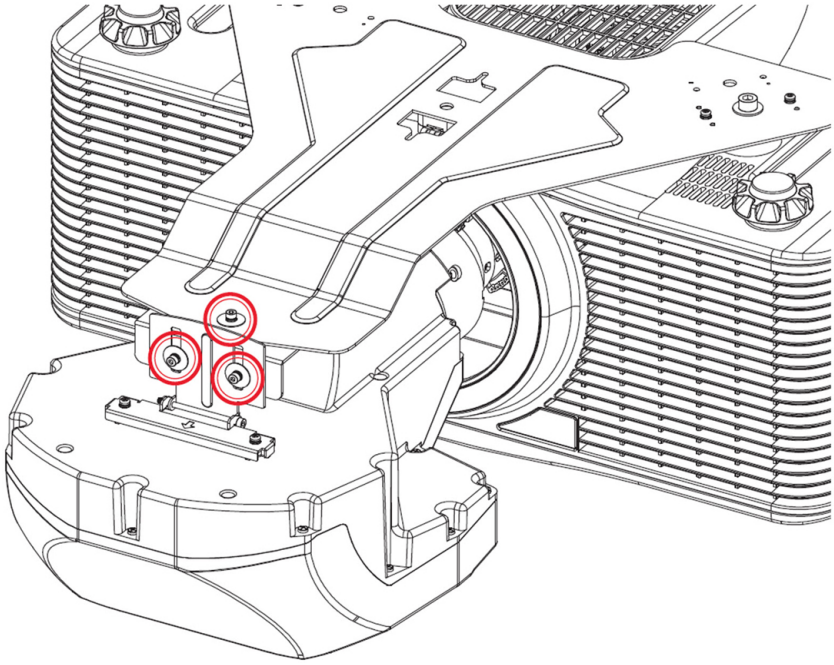


Image 3-4

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 on the remote control.
   The projector now can receive and display input sources.

UST lens removal and non UST lens installation

4

Overview

- Removing the UST lens
- Installing an non-UST lens.

4.1 Removing the UST lens

Required tools

Long neck screwdriver

How to remove

1. Turn off the projector.
2. Switch off the AC power button and remove the power cord.
3. Unscrew the three M3 screws that fix the lens to the bottom support plate.
4. Press the lens release button with a long neck screwdriver, or manually by pressing the lens release button.

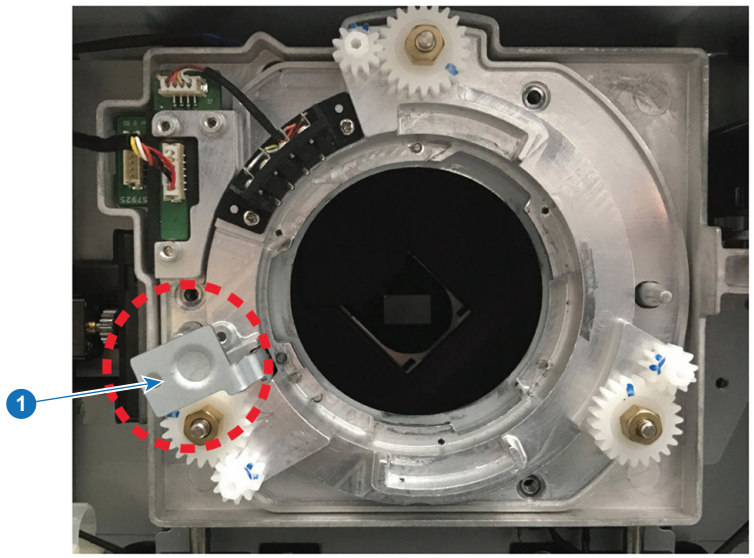


Image 4-1

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

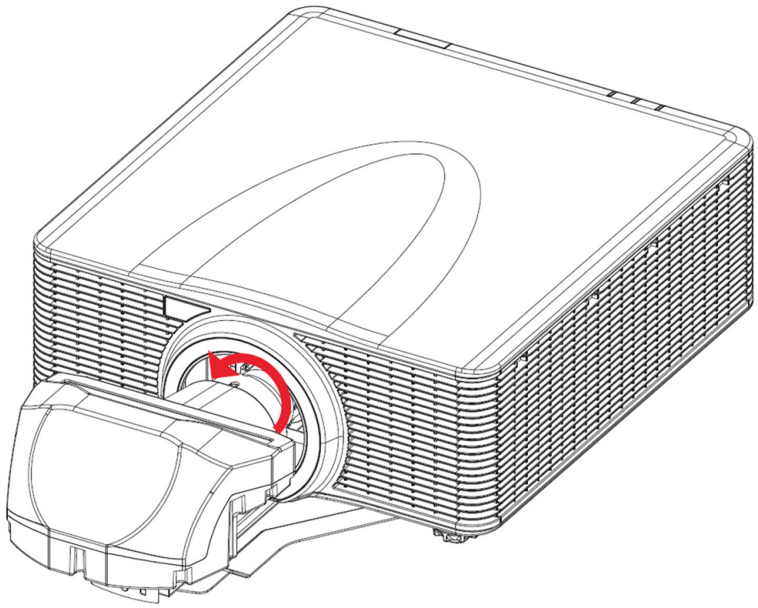


Image 4-2

4.2 Installing an non-UST lens.

How to install

1. Remove the UST lens boresight and install the original boresight for the non-UST lens. Repeat the steps in “Replacing the lens boresight module”, page 11.
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.
   1. Select *Menu → Settings / Service*
   2. Enter the service password “1”, “5”, “9”, “0” on the remote control and press **OK**.
   3. Select *UST Install → None*
6. Perform a lens calibration.
   1. Press **Lens** on the local keypad.
   2. Press **Enter** on the local keypad or the remote control.
   3. Select *Yes*.

   The projector is now again in the mode for a non-UST lens.

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