

QX Hawk and Vision HAWK

Lens Replacement Guide

The QX Hawk and Vision HAWK Lens Replacement Kit allows you to use the lens assembly that best fits the unique requirements of your application. This guide applies to the following four lens replacement kits:

- **12° Lens Replacement Kit (98-000147-04)**
- **15° Lens Replacement Kit (98-000147-01)**
- **30° Lens Replacement Kit (98-000147-02)**
- **45° Lens Replacement Kit (98-000147-03)**

Important: Refer to the *QX Hawk Industrial Imager User Manual* or *Vision HAWK Smart Camera Guide* for lens calibration instructions and for information about how to select and configure your new lens type.

Hardware Required

- **1 Replacement Lens Assembly (included)**
- **4 4-40x1/4" Phillips-head Screws (included)**
- **4 Split Lock Washers (included)**
- **1 Replacement Gasket, Front Cover (included)**
- **1 Phillips screwdriver (not included)**

Replace the Lens

1. Remove the four screws and washers from the front cover of the imager. Discard the screws and washers.
2. Remove the front cover and set it aside.

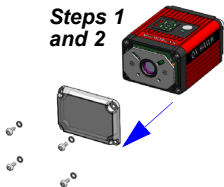
Note: If the gasket slips out of the optical chassis, replace it with the gasket provided in this kit (Step 8).

3. Remove the two screws from the illumination diffuser and set them aside.

Steps 3 and 4



Steps 1 and 2



4. Remove the illumination diffuser and set it aside.

Important: Be sure the LED illumination board remains in place.

5. Unscrew and remove the lens assembly.
6. Insert the new lens assembly and screw it down until it is fully seated.

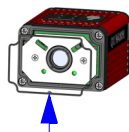
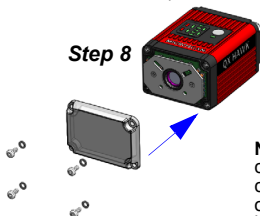
Important: Be sure no dust or debris enters when changing the lens assembly.



7. Replace the illumination diffuser and screw it down. Do not over-tighten the screws (2-3 in./lbs. maximum).



8. Replace the front cover and secure it with the washers and screws provided. Do not over-tighten the screws (5-6 in./lbs. maximum).



Note: When replacing the front cover, be sure that the gasket fits completely into its groove on the optical chassis. The triangle at the bottom of the gasket should fit into the key at the bottom of the groove

Set the Lens Type and Calibrate the Imager (QX Hawk)

1. Set the lens type.

Format: <K525,focal distance,distance units,lens type><Z>

| Focal Distance | Units | Lens Type |
|--------------------------|--------------------|--------------------------|
| 25 to 4,000 (mm) | 0 = mm | 1 = 15° |
| 100 to 4,000 (1/100 in.) | 1 = 1/100 in. | 2 = 30° |
| Default = 80 | Default = 0 | 3 = 45° (Default) |
| | | 4 = 12° |

2. Set focal distance limits.

Format: <K34UNLK,min. focal distance,max. focal distance><Zp>

| Min. Focal Distance | Max. Focal Distance |
|----------------------------|----------------------------|
| 100 to 4,000 (1/100 in.) | 100 to 4,000 (1/100 in.) |
| Default = 100 | Default = 4,000 |

Minimum Focal Distance

Sets the minimum focal distance to which the camera can be set – input is in inches only (no support for metric).

Maximum Focal Distance

Sets the maximum focal distance to which the camera can be set – input is in inches only (no support for metric).

The Focal Distance limits are determined by the lens model and are defined in the table below. Any value outside this range will be rejected.

| Lens Model | Inches | | Parameter Range |
|------------|---------------|---------------|-----------------|
| | Min. Distance | Max. Distance | |
| 15° | 1.5 | 9.0 | 150 to 900 |
| 30° | 1.0 | 40.0 | 100 to 4000 |
| 45° | 1.0 | 40.0 | 100 to 4000 |
| 12° | 3.0 | 13.5 | 300 to 1350 |

3. Run focus lens calibration.

Format: <@OPTIC>

Distances and line pair requirements are provided below.

Important: The line pairs should be centered in the image (X marks the spot) and pitched at a 15 degree angle.

| Sensor Type | Lens Configuration | | | | | | | |
|-------------|--------------------|----------|--------|----------|--------|----------|--------|----------|
| | 15 deg | | 30 deg | | 45 deg | | 12 deg | |
| | lp/mm | Distance | lp/mm | Distance | lp/mm | Distance | lp/mm | Distance |
| CCD | 6.66 | 1.5" | 6.66 | 1" | 4.16 | 1" | 6.66 | 3" |
| | 4.16 | 5" | 1.00 | 10" | 0.75 | 10" | 4.16 | 8" |
| | 2.02 | 10" | 0.50 | 20" | 0.25 | 20" | 2.02 | 14" |
| CMOS | 6.66 | 1.5" | 4.16 | 1" | 2.02 | 1" | 4.16 | 3" |
| | 2.02 | 5" | 0.75 | 10" | 0.50 | 10" | 2.02 | 8" |
| | 1.00 | 10" | 0.25 | 20" | 0.25 | 20" | 1.00 | 14" |

Set the Lens Type and Calibrate the Imager (Vision HAWK)

1. Set lens type.

SetCurrentLens(lens number)

1 = 15°

2 = 30°

3 = 45°

4 = 12°

This determines which lens the system is programmed for. This value must always match the lens that is currently being used for the camera to focus properly.

Output is as follows:

“Now Set to 1 = 15deg”

“Now Set to 2 = 30deg”

“Now Set to 3 = 45deg”

“Now Set to 4 = 12deg”

Return Values

int – True if successful

2. Set focus limits.

SetFocusLimits(min., max.)

Min. Focal Distance

100 to 4,000 (1/100 in.)

Default = 100

Max. Focal Distance

100 to 4,000 (1/100 in.)

Default = 4,000

Minimum Focal Distance

Sets the minimum focal distance to which the camera can be set – input is in inches only (no support for metric).

Maximum Focal Distance

Sets the maximum focal distance to which the camera can be set – input is in inches only (no support for metric).

| | Inches | | Parameter |
|------------|---------------|---------------|-------------|
| Lens Model | Min. Distance | Max. Distance | Range |
| 15° | 1.5 | 9.0 | 150 to 900 |
| 30° | 1.0 | 40.0 | 100 to 4000 |
| 45° | 1.0 | 40.0 | 100 to 4000 |
| 12° | 3.0 | 13.5 | 300 to 1350 |

3. Run focus lens calibration.

doFocusNormalize(lens type, focus units)

where

U32 lens type **1** = 15°; **2** = 30°; **3** = 45°; **4** = 12°

U32 focus units **0** = metric; **1** = inches

Distances and line pair requirements are provided below.

Important: The line pairs should be centered in the image (X marks the spot) and pitched at a 15 degree angle.

| | Lens Configuration | | | | | | | |
|-------------|--------------------|----------|--------|----------|--------|----------|--------|----------|
| | 15 deg | | 30 deg | | 45 deg | | 12 deg | |
| Sensor Type | lp/mm | Distance | lp/mm | Distance | lp/mm | Distance | lp/mm | Distance |
| CCD | 6.66 | 1.5" | 6.66 | 1" | 4.16 | 1" | 6.66 | 3" |
| | 4.16 | 5" | 1.00 | 10" | 0.75 | 10" | 4.16 | 8" |
| | 2.02 | 10" | 0.50 | 20" | 0.25 | 20" | 2.02 | 14" |
| | | | | | | | | |
| CMOS | 6.66 | 1.5" | 4.16 | 1" | 2.02 | 1" | 4.16 | 3" |
| | 2.02 | 5" | 0.75 | 10" | 0.50 | 10" | 2.02 | 8" |
| | 1.00 | 10" | 0.25 | 20" | 0.25 | 20" | 1.00 | 14" |

