



# Procedure, Lower Lidar Protection Cage Installation for Minuteman

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# Revision History

Revision	Date	Brief Description	ECO No.	Initials
01	8/2/2019	Initial release	ECO-000482	GP

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# Document Scope

This document explains in detail how to install the lower lidar protection cage onto Minuteman machines.

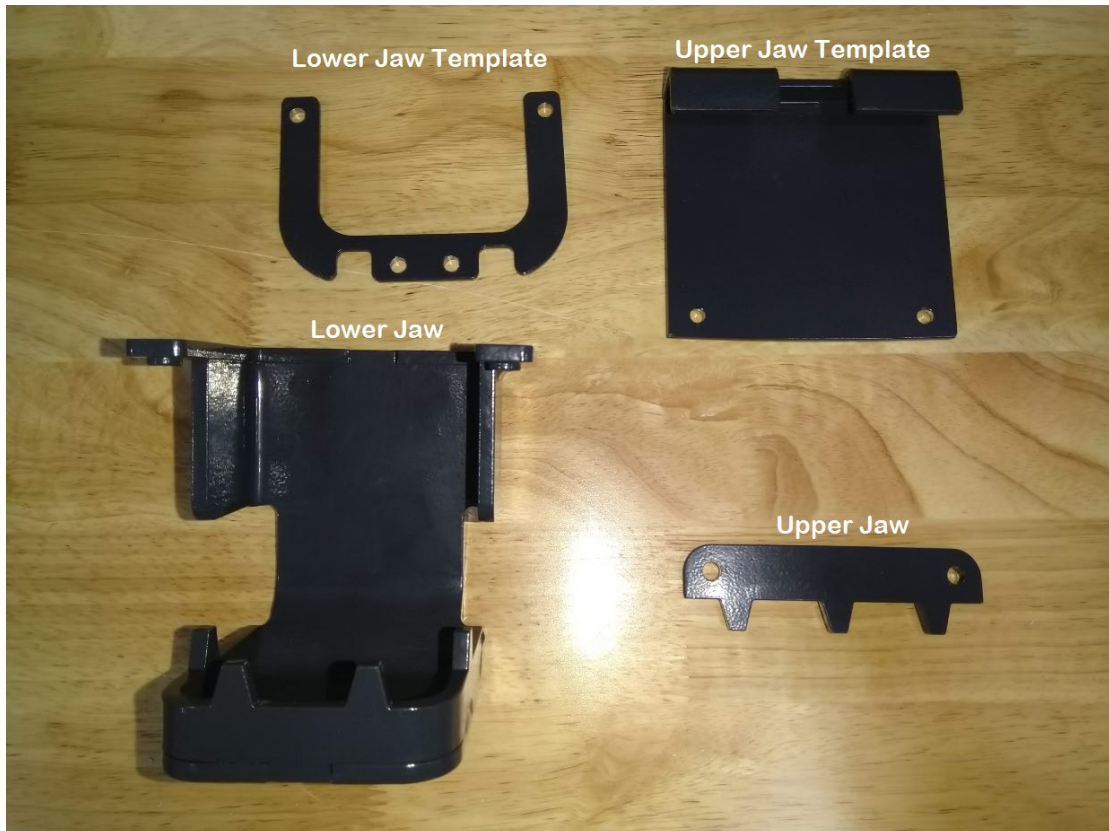
# Content

**Note:** The cage needs to be installed before mounting the lower lidar and the BCM. If installing on an existing machine, both items will need to be removed.

**Safety:** This process involves drilling through metal. Use eye protection and glove at all time when operating the drill.

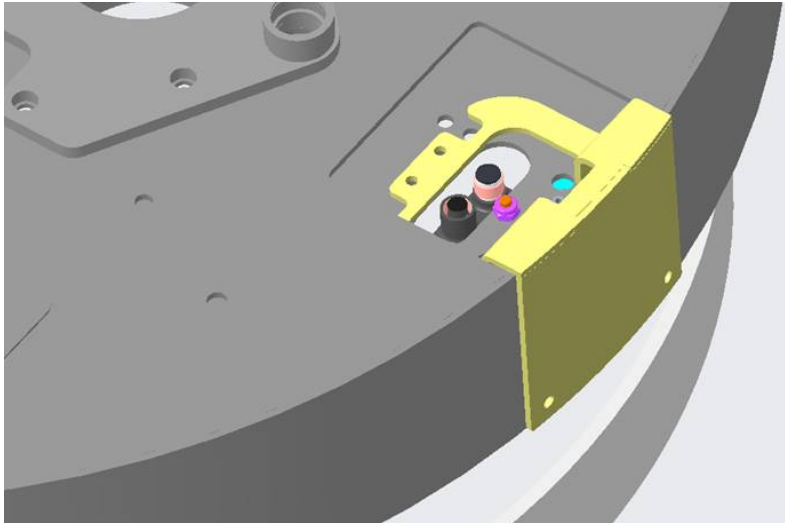
The cage consists of the following parts:

- Upper Jaw: 411-00257-01
- Lower Jaw: 411-00258-01
- Upper Jaw Template
- Lower Jaw Template



## Upper Jaw:

1) Place the provided template on the front of the machine:



2) While holding the template steady, use a #3 bit ( $\varnothing 0.213$ ) to drill through the two holes. Make sure to drill perpendicular to the face to ensure a tight fit.

3) Using a #60 sandpaper or equivalent, deburr the back of the frame.

4) Install the upper jaw using the following hardware:

- 2x #10-24, 5/8" long button head screws with Threadlocker (446-00256-01)
- 2x #10-24 Nylock nuts (444-00143-01)

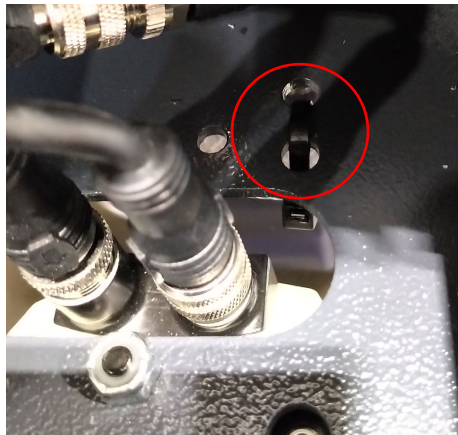
5) Torque both screws to 25 in-lbs.



## Lower Jaw:

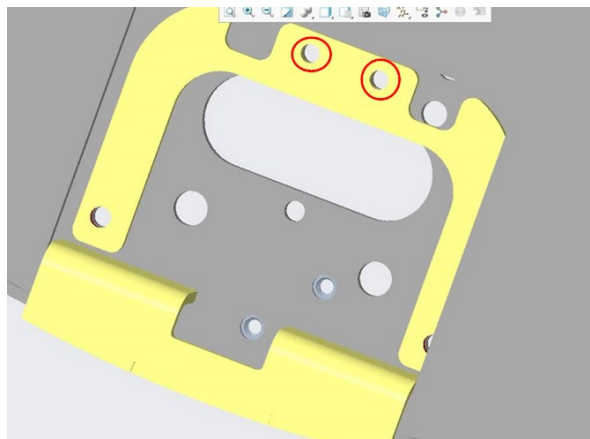
The upper jaw template uses two already existing holes to attach to the frame.

1) Cut the zip tie securing the hose. Note: picture for reference only.



2) Use the following hardware to secure the template.

- 2x #10-24, 1/2" long button head screws - any available
- 2x #10-24 nuts – any available



3) Using a #1 bit ( $\varnothing 0.228$ ), drill through two holes of the template.

4) Using a #60 sandpaper or equivalent, deburr the back of the plate.

5) Remove the hardware and the template.

6) Clean the area of all metal shards.

7) Install the lower lidar with blue film protecting the lens.

8) Place the cage underneath the plate and secure it using four #10-24 1/2" long button head screws (any available).



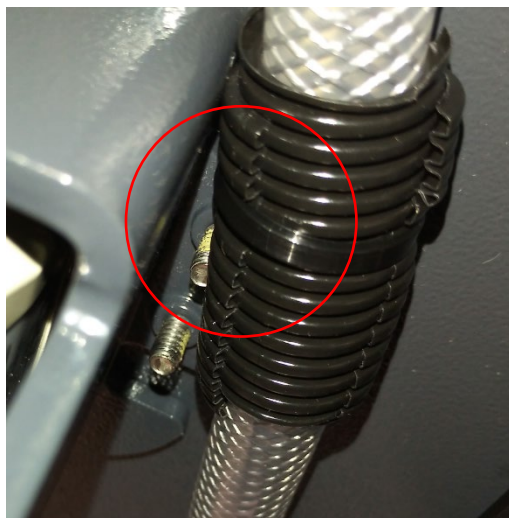
9) Torque all four screws to 25 in-lbs.

10) Re-secure the hose as per following:

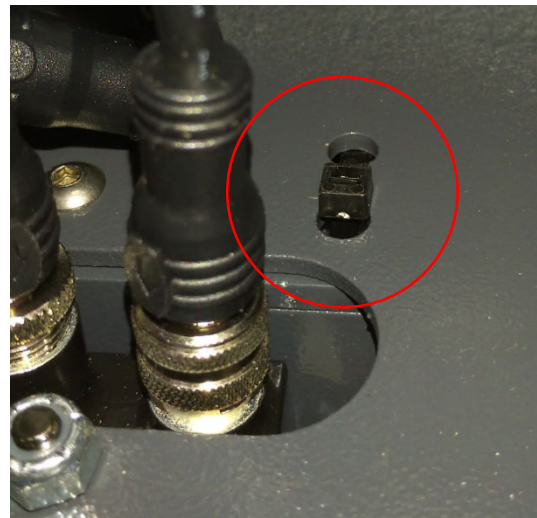
10a) Place 2" slit-corrugated sleeving (460-00139-01) over the clean hose where the jaw screw touches the hose, approximately where show. Ensure the sleeving completely wraps the hose diameter.

10b) Zip tie firmly the sleeving such that it will not slide over the hose.

Bottom view:



Top view:



11) Optional: Reinstall BCM and any zip ties (if previously removed).

12) Run calibration and End Of Line after Fit Check step.

## Fit Check:

After both parts are installed, the height between the “teeth” should be  $17 \pm 1$  mm and the height between the “gums” should be  $37 \pm 1$  mm.

