

## VBX-160 Vise Sensors

**\*Applies to all VBX-160 systems with VersaBuilt supplied Vise sensors**

### Summary:

Vise sensors are used during operation to detect part or jaw fumbles. For example, empty jaws loaded into the vise, jaws loaded with a part by not properly clamped. Sensors are also used for robot recovery, and general system readiness. There are 2 vise sensors.

- 1) Vise Open
- 2) Vise Closed

Vise sensors are either mounted direct to the Vise for a direct mount or a static vise, or to a bracket for a Vise mounted on a rotary or dynamic mount (e.g., 4<sup>th</sup> and/or 5<sup>th</sup> axis systems).

The two sensors on each vise detect fully open and fully closed (when holding soft jaws). The functionality of the sensors is as follows:

- 1) Detecting missing soft jaws:
  - a. For ID Jaw operation, an empty vise will allow the vise to fully open, rather than ID clamp the part at a middle stroke position. The Vise Open Sensor will be active.
  - b. For OD Jaw operation, an empty vise will allow the vise to fully close, rather than OD clamp the part at a middle stroke position. The Vise Closed Sensor will be active.
- 2) Detecting Empty OD Jaws
  - a. The Vise Closed sensor should be set to give a signal (light is illuminated) when empty OD Soft Jaws are fully closed without a part.
  - b. When this sensor is hit, the system interprets either empty OD jaws, or part fumble with an OD clamped part
- 3) Detecting Empty ID Jaws
  - a. The Vise Open sensor should be set to give a signal (light is illuminated) when empty ID Soft Jaws are fully open without a part.
  - b. When this sensor is hit, the system interprets either empty ID jaws, or part fumble with an ID clamped part
- 4) Detecting Clamped Part
  - a. The system should not have any sensor signals when the holding soft jaws and clamping on a part, with the Vise in a position in-between the Open and Closed positions.

# V E R S A **B U I L T**

## Parts and Tools required for setting or adjusting sensors:

### 1) Tools for

- a. 2.5mm Allen Key to adjust sensors attached directly to vise
- b. 13mm Hex Wrench to adjust sensors on bracket

### 2) Parts:

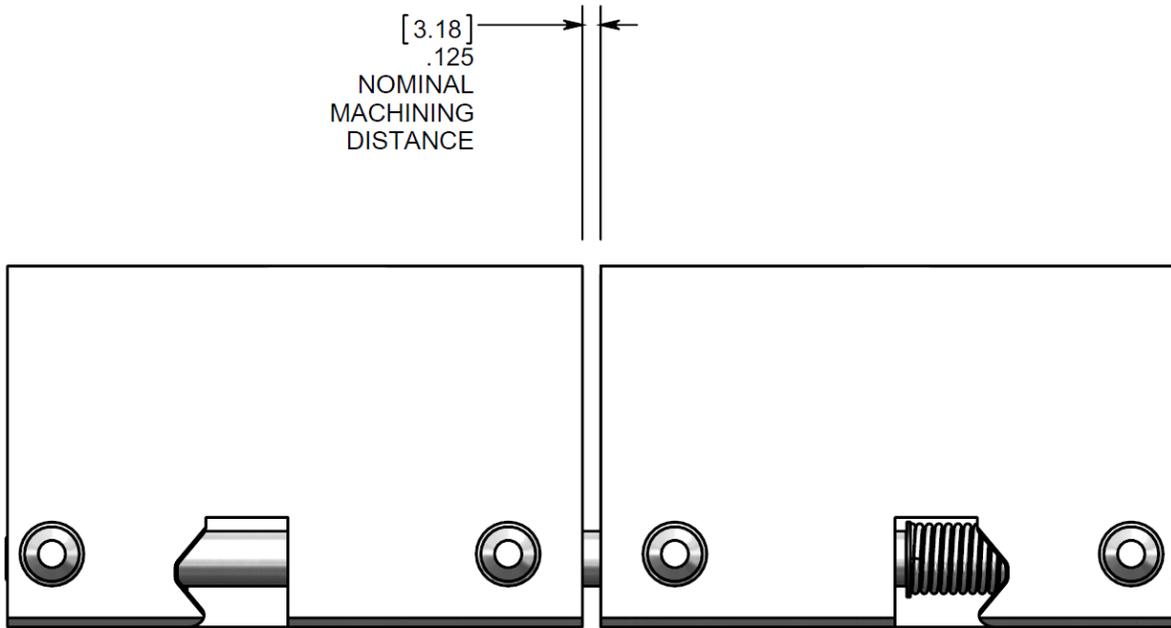
- a. Inductive Sensor (M8) to detect "Gripper Open"
- b. Inductive Sensor (M8) to detect "Gripper Closed"

**\*QTY: 3 IFM P/N: IEC201 \*OR EQUIVALENT**

INDUCTIVE SENSOR, METAL THREAD M8x1, QUICK DISCONNECT, 2mm SENSING RANGE, DC VOLTAGE PNP, 10-36 VDC, REVERSE POLARITY PROTECTION, NORMALLY OPEN, NON-LATCHING, OVERLOAD PROTECTION, OPERATING DISTANCE = 0-1.6mm; SWITCHING FREQUENCY 100 Hz; IP67 PROTECTION; YELLOW OUTPUT STATUS INDICATION LED; M8 CONNECTION; 13mm WRENCH FLATS ON NUTS

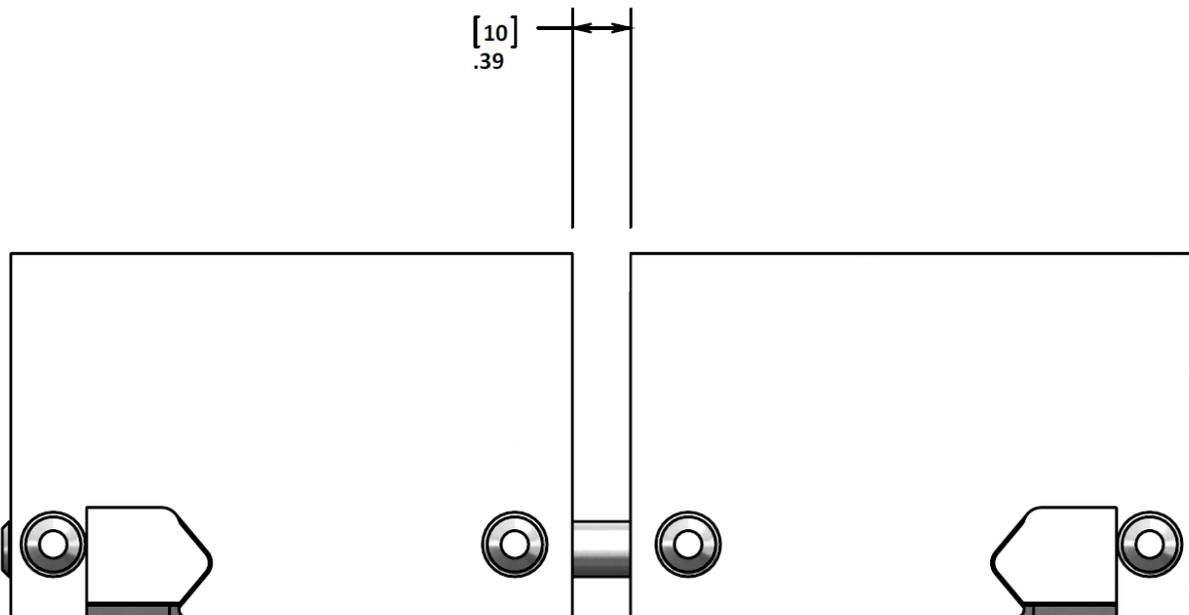
## OD Jaws

- $0.125 \pm 0.01$  inch (3.18mm) gap between jaws when part is clamped



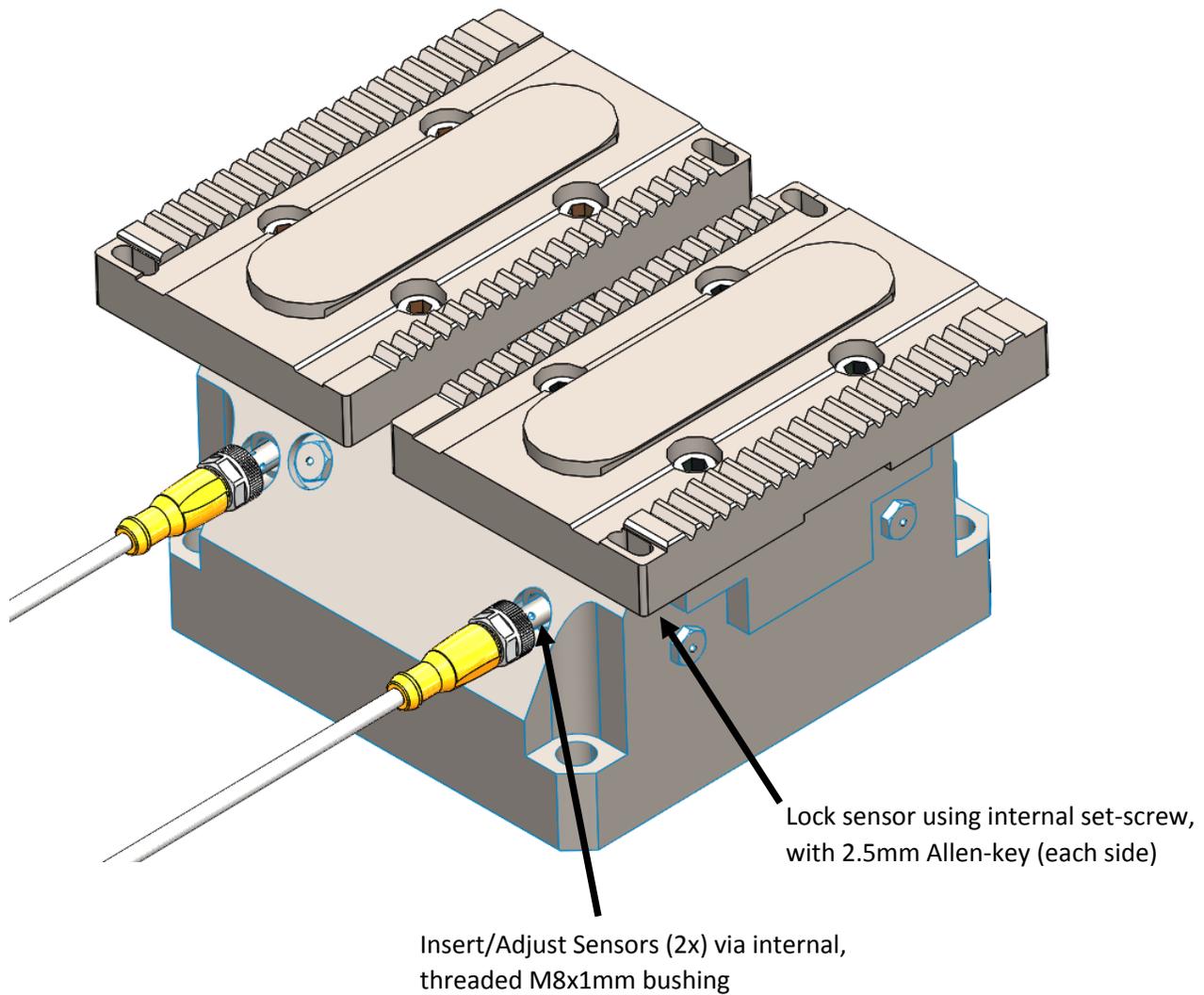
## ID Jaws

- $0.39 \pm 0.01$  inch (10mm) gap between jaws when part is clamped



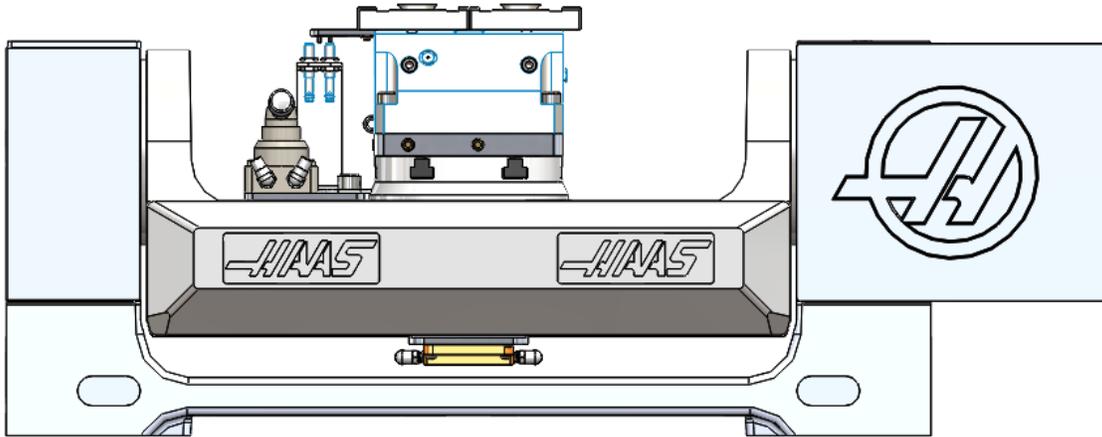
# V E R S A **B U I L T**

## Static Vise:



# V E R S A B U I L T

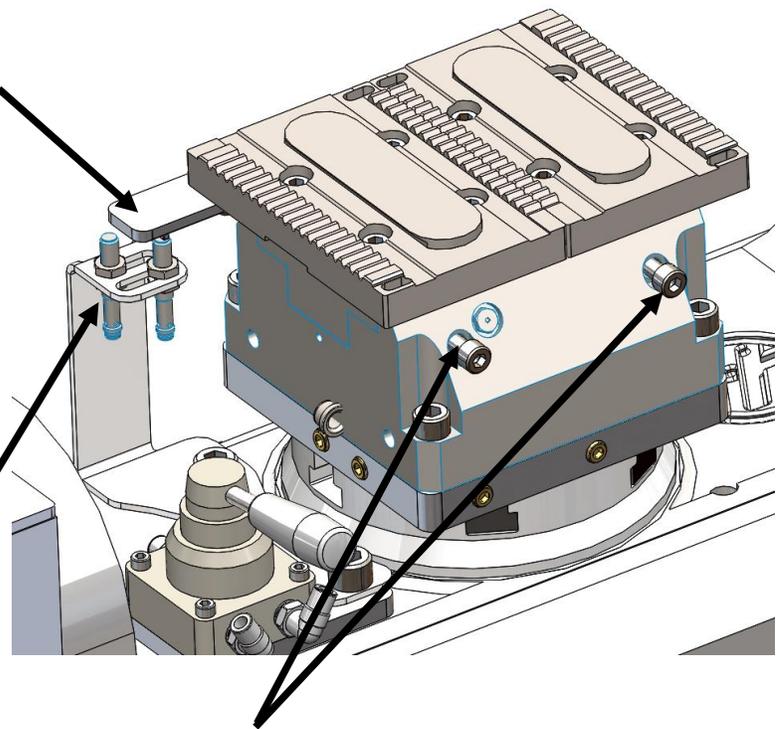
## Rotating or Dynamic Vise:



Sensors detect 2x flags on underside of bracket attaching to Vise

Adjust and lock with 13mm Hex wrench

Plug un-used sensor holes (M8 Bolts), when not in use



**Setting or Adjusting Vise Sensors:****1) Actuating the Vises via the VBXC (VBX-160 screen):**

- a. Connect the robot to the CNC via DNC Sync
- b. In the Recovery Screen, open and close the vises using the open/close buttons:
  - i. Open



- ii. Close



**Note:** the green light indicates the sensor for the open or close operation has been triggered (Open light – vise is fully open, Close light – vise is fully closed)

**2) Actuating the Vises via the manual valve:**

- a. Connect the robot to the CNC via DNC Sync
- b. On VBXC Screen, set Vise to “Float”



- c. Open/Close Vises using Manual valves

**\*Note, when returning to Automatic operation, return the Manual vises to the “Center” position**

3) **Setting the sensors** \*via VBXC or manual valve

- a. Adjust or set the Vise sensors \*Start with an empty vise\*
  - i. For Open Sensor, open the empty vise then adjust the sensor until the sensor light is illuminated
  - ii. For Close Sensor, close the empty vise then adjust the sensor until the sensor light is illuminated
- b. Verify you have the correct position of the “Vise Open Sensor” by checking the VBXC Screen for the green light next to the “Vise Open” icon. If the green light illuminates on Vise Close, you may have the sensors backwards.



- c. Verify you have the correct position of the “Vise Closed Sensor” by checking the VBXC Screen for the green light next to the “Vise Open” icon. If the green light illuminates on Vise Open, you may have the sensors backwards.



- d. Verify the correct position of the sensor by placing ID and OD jaws into the Vise
  - i. First, test without a part
    1. Open the Vise and verify the Vise Open sensor light is illuminated and the VBXC screen Vise Open green light is illuminated
    2. Close the Vise and verify the Vise Close sensor light is illuminated and the VBXC screen Vise Close green light is illuminated
  - ii. Second, test with a part
    1. With ID Jaws, open the Vise and verify the Vise Open sensor light is **NOT** illuminated and the VBXC screen Vise Open green light is **NOT** illuminated
    2. With OD Jaws, close the Vise and verify the Vise Close sensor light is **NOT** illuminated and the VBXC screen Vise Close green light is **NOT** illuminated

## Troubleshooting:

- 1) Vise Fumble Errors can be caused by:
  - a. Mispicks or dropped parts resulting in loading empty Soft Jaws
    - i. Part missing from slot on shelf
    - ii. Part pick height needs to be adjusted
  - b. Mispicks resulting in partially clamped parts, then over-stroke of the Vise
    - i. Table load position has changed or moved
    - ii. Location of Vise relative to location of robot has changed (requires re-calibration)
    - iii. Part pick height needs to be adjusted
  - c. Sensor Malfunction due metal debris on the head of the Inductive Sensor **(see #3 below)**
  - d. Sensor Malfunction due to Electrical issue, loose wire, blown fuse or other **(see #4 below)**
  
- 2) If the sensor lights are not illuminating properly or are illuminating when clamping a part:
  - a. First, try resetting the sensor positions and test again
  - b. Second, restart the VBXC, then check sensors
  - c. Third, power cycle VBX system at main disconnect, then check sensors
  - d. Forth, call VersaBuilt technical support or troubleshoot the following:
    - i. Electrical issue caused by a short, blown fuse, tripped breaker, loose wires or other
    - ii. Software/Hardware issue requiring system restart or part replacement
  
- 3) If one or more sensors are illuminating at all times, there could be metal debris stuck inside the sensor area or stuck on the sensor head:
  - a. For the Static Vise, remove the sensor from the body of the Vise:
    - i. Clean the sensor head
    - ii. Use air nozzle to blow-out the inside of the Vise
    - iii. Clean the inside of the Vise with a cotton swab (Q Tip) or equivalent until free of chips
  - b. For Dynamic or Rotating Visers, clean sensor head with air nozzle, cloth or other means
  
- 4) If the sensor light is illuminated, but the VBXC green light is not illuminated
  - a. First, restart the VBXC, then check sensors
  - b. Second, power cycle VBX system at main disconnect, then check sensors
  - c. Third, call VersaBuilt technical support or troubleshoot the following:
    - i. Electrical issue caused by a short, blown fuse, tripped breaker, loose wires or other
    - ii. Software/Hardware issue requiring system restart or part replacement