

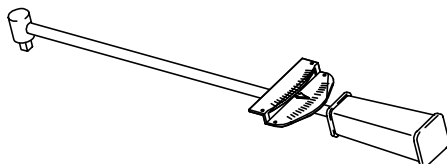
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Tool Requirements

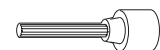
Torque wrench

Capable of applying up to 100 in.·lb (11.3 N·m)
(115 cm·kg) of torque



Hex head extension bits

5/32 and 3/16 in. hexes

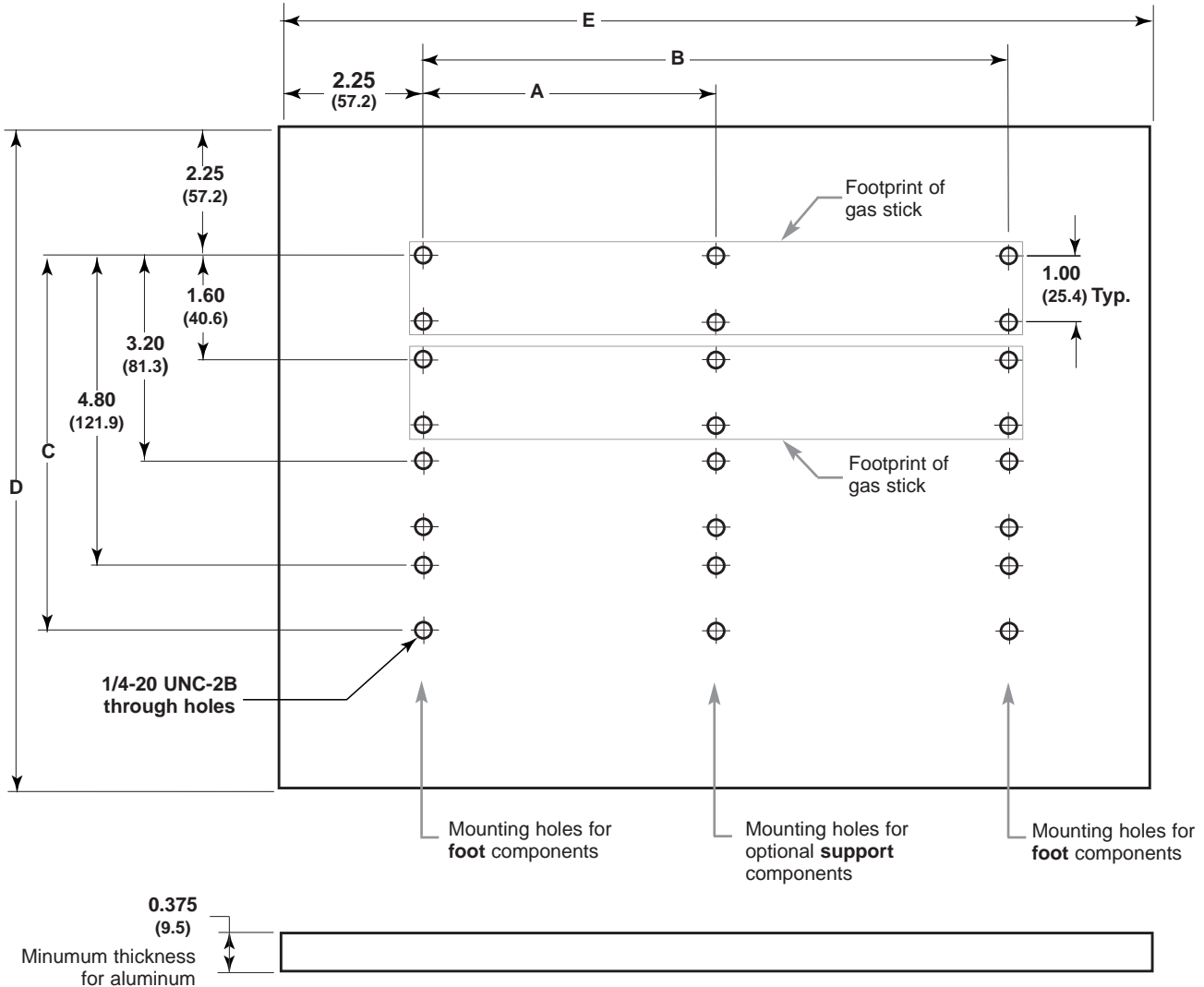


Torx® head extension bit

T27



Base Plate Requirements



Sample Base Plate (customer supplied)

The base plate requirements shown above are designed for a gas distribution panel consisting of **four** gas sticks with **five** positions on each stick.

Customized Base Plate

The following formulas can be used to determine the base plate dimensions and mounting hole locations for a gas panel with up to 10 gas sticks and 14 positions on each stick.

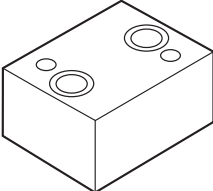
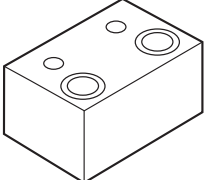
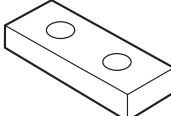
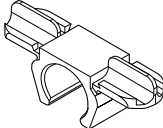
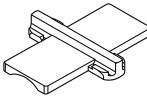


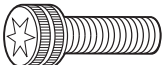
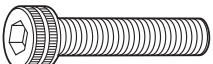
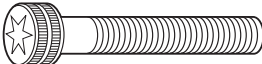
- A** = $1.53 \times$ (position number from the end of the base plate).
- B** = $1.53 \times$ (total number of positions on the gas stick + 1).
- C** = $1 + [(total\ number\ of\ gas\ sticks - 1) \times 1.6]$.
- D** = $C + 4.5$.
- E** = $B + 4.5$.

Notes:

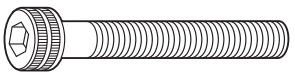
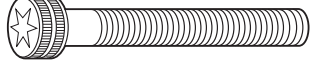
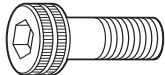
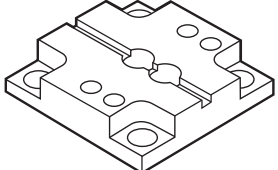

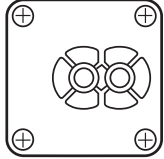
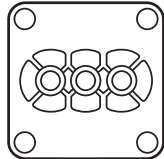
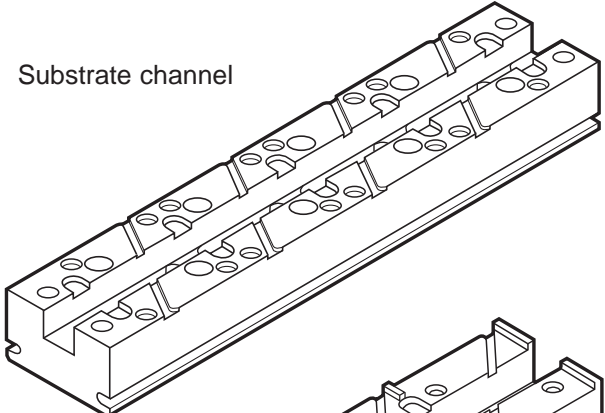
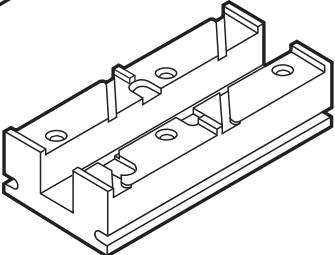
1. **Support** components are recommended for use with gas sticks with over **four** positions to provide mid-line support.

Components and Hardware

Item Description

<p>(A) Support</p>	
<p>(B) Foot</p>	
<p>(C) Lock-down plate</p>	
<p>(D) Substrate clip</p>	
<p>(E) Manifold clip #1</p>	
<p>(F) C-ring gasket assembly</p>	
<p>(G) 10-32 × 0.50 in. hex socket cap screw</p>	
<p>(H) 10-32 × 0.75 in. Torx head cap screw^①</p>	
<p>(J) 10-32 × 1.00 in. hex socket cap screw</p>	
<p>(K) 10-32 × 1.25 in. Torx head cap screw</p>	

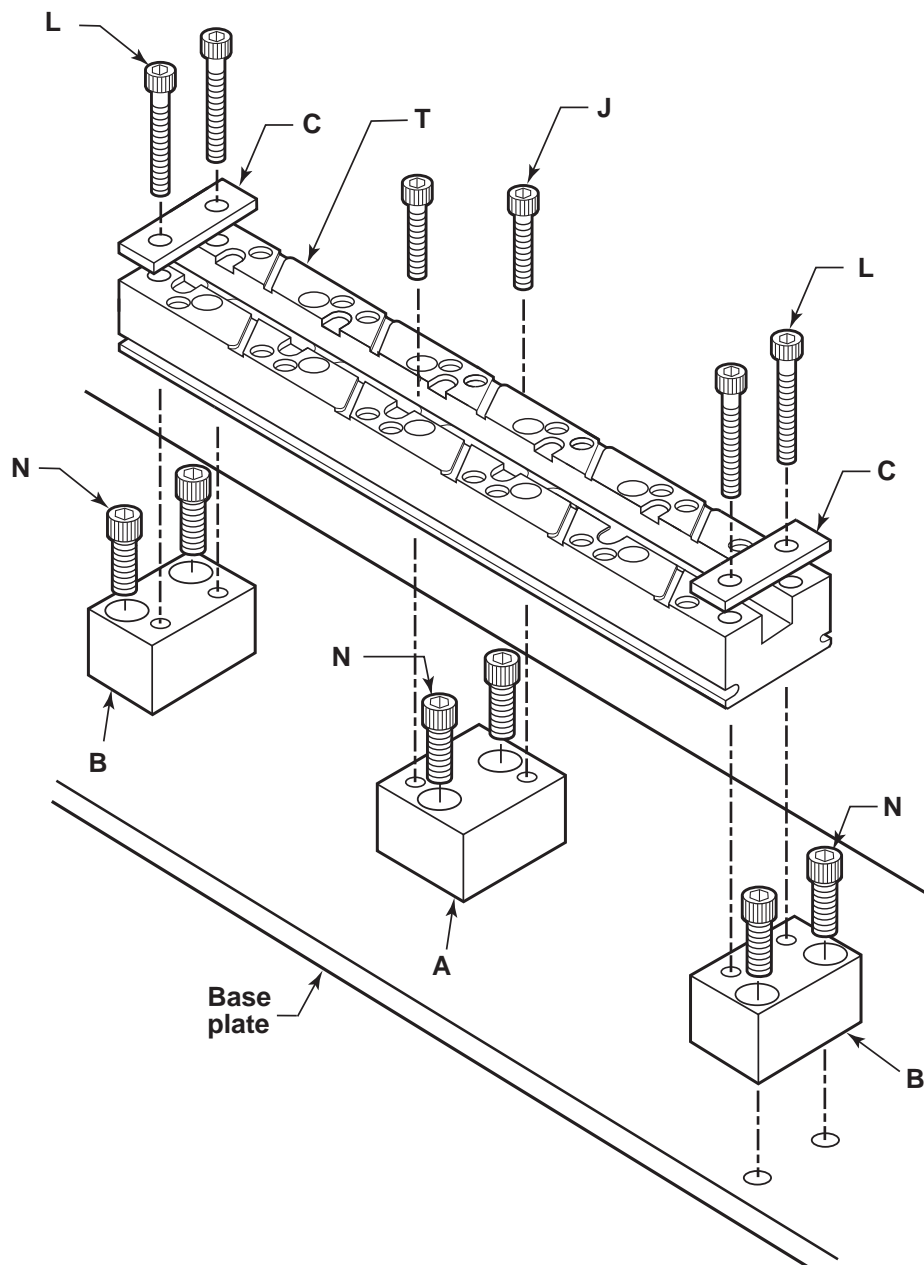
Item Description

<p>(L) 10-32 × 1.375 in. Hex socket cap screw</p>	
<p>(M) 10-32 × 1.50 in. Torx head cap screw</p>	
<p>(N) 1/4-20 × 0.75 in. hex socket cap screw</p>	
<p>(P) MFC conversion plate</p>	
<p>(Q) MFC c-ring gasket</p>	
<p>(R) Two-port c-ring gasket</p>	
<p>(S) Three-port c-ring gasket</p>	
<p>(T) Substrate channel</p>	
<p>(U) Manifold channel</p>	

^① Use with SEMI-PR3.1 compliant surface mounts with 0.312 in. (7.9 mm) base thickness.

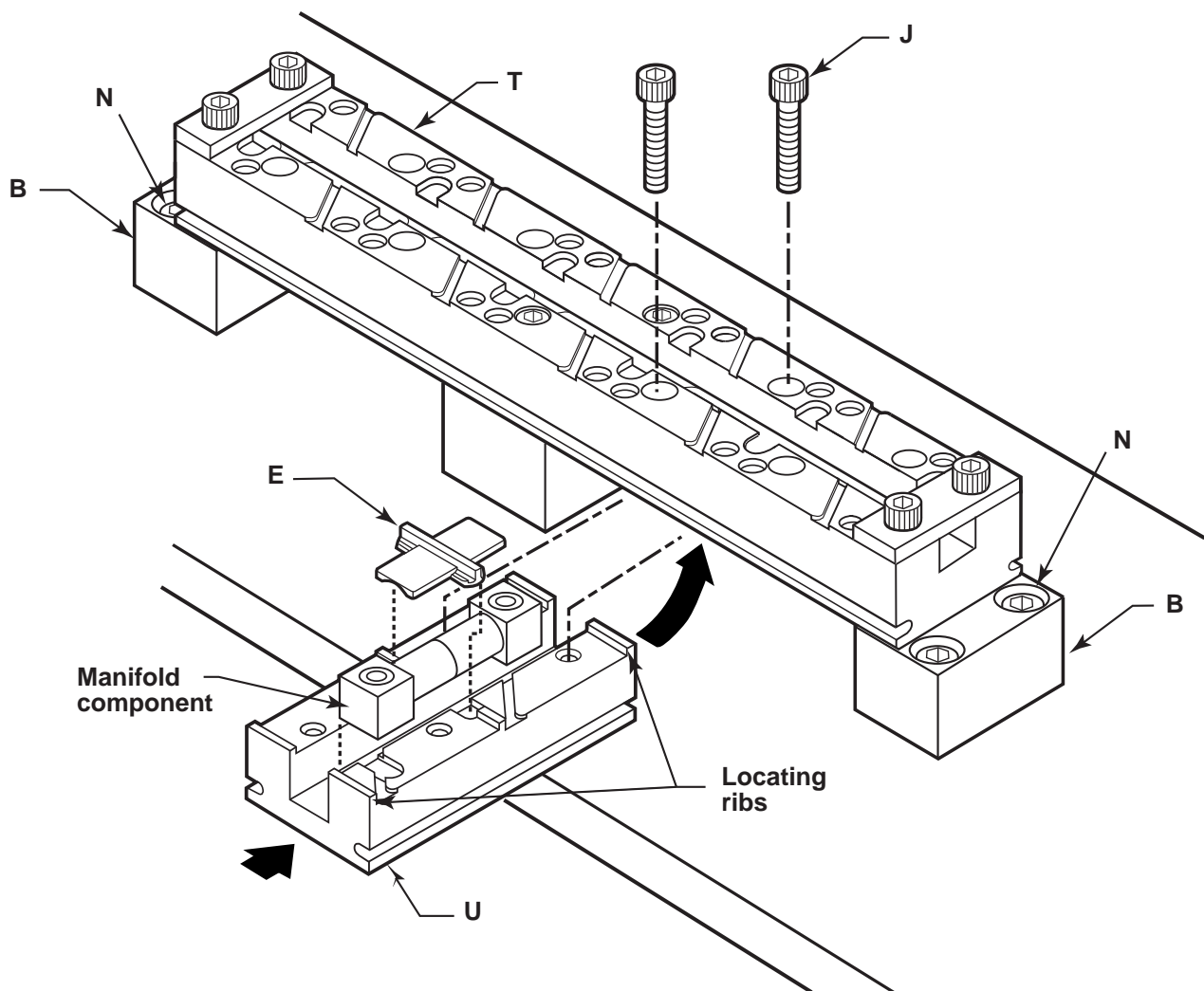
Foot and Support Assembly

1. Following the design specifications (or the 2-D assembly diagram from the IGC II System Configurator), place the **foot (B)** components on the **base plate** (customer supplied). Face the side of the **foot (B)** with the counterbored holes away from the center of the gas stick. Loosely attach each **foot (B)** to the **base plate** with two **1/4-20 × 0.75 in. hex socket cap screws (N)**.
2. Attach the **support (A)** component(s) to the **base plate** with two **1/4-20 × 0.75 in. hex socket cap screws (N)**, as specified by the system design. Tighten the cap screw to **60 in.·lb (6.8 N·m) (69 cm·kg)**.
3. Align the **substrate channel (T)** over the appropriate **foot (B)** and **support (A)** components, as specified by the system design.
4. Place a **lock-down plate (C)** on each end of the **substrate channel (T)**. Loosely attach each **plate (C)** to the channel and foot with two **10-32 × 1.375 in. hex socket cap screws (L)**.
5. Loosely attach the **substrate channel (T)** to the **support (A)** with two **10-32 × 1 in. hex socket cap screws (J)**.



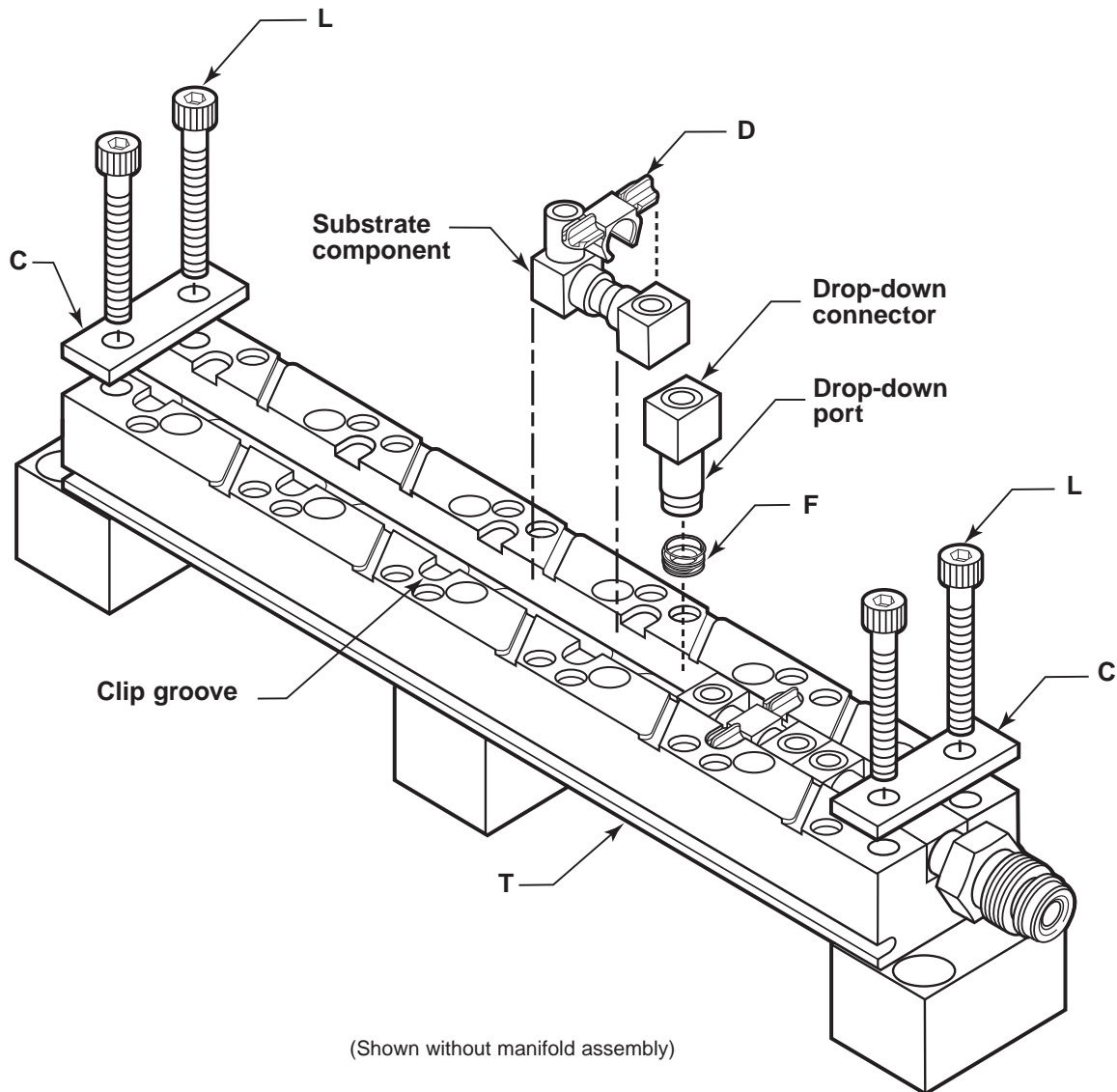
Manifold Assembly

1. Place the appropriate **manifold component(s)** into the **manifold channel (U)**, as specified by the system design (or the 2-D assembly diagram from the IGC II System Configurator).
2. Snap a **manifold clip #1 (E)** onto each **manifold component** to hold it in place. Use a **manifold clip #2** near the fitting end of any manifold component with a VCR® or butt weld fitting.
3. Position the **manifold channel (U)** under the **substrate channel (T)**, as specified by the system design. Align the **locating ribs** of the manifold channel on either side of substrate channel(s) (T)
4. Attach the **manifold channel (U)** to the **substrate channel (T)** with two **#10-32 × 1 in. hex socket cap screws (J)**. Tighten to **60 in.·lb (6.8 N·m) (69 cm·kg)**.
5. Tighten the **hex socket cap screws (N)** that hold each **foot (B)** to the base plate to **60 in.·lb (6.8 N·m) (69 cm·kg)**.



Substrate Assembly

1. Place a **C-ring gasket assembly (F)** on each **substrate component** and **drop down connector** that has a **drop-down port** to the manifold.
2. Remove the **lock-down plate (C)** and place all of the **substrate components** into the **substrate channel (T)**, as specified by the system design (or the 2-D assembly diagram from the IGC II System Configurator).
3. Snap a **substrate clip (D)** onto each **substrate component** located at a **clip groove**.
4. Loosely attach the **lock-down plates (C)** to the substrate channel with two **10-32 × 1.375 in. hex socket cap screws (L)**.



Mass Flow Controller (MFC) Assembly

1. If the system has an MFC component, place two **MFC conversion plates (P)** on the **substrate channel (T)** in the location specified by the system design (or the 2-D assembly diagram from the IGC II System Configurator). Align the mounting holes in each **MFC conversion plate (P)** with the threaded holes in the **substrate channel (T)**.
2. Attach each **MFC conversion plate (P)** to the **substrate channel (T)** with four **10-32 × 1/2 in. hex socket cap screws (G)**. Tighten to **60 in.·lb (6.8 N·m) (69 cm·kg)**.

3. Place an **MFC C-ring gasket (Q)** on each **MFC conversion plate (P)**. Align the port in the **gasket (Q)** over the port on the **conversion plate (P)** that has the substrate flow component showing in the port opening. Align the mounting holes in the **gasket (Q)** with the threaded holes in the **conversion plate (P)**.
4. Place the **MFC component** on the **MFC C-ring gaskets (Q)**. Align the ports in the MFC component with the ports in the **gaskets (Q)**, and align the mounting holes in the MFC component with the threaded holes in the **conversion plates (P)**.
5. Loosely attach each **MFC component** to the **MFC conversion plates (P)** with four **10-32 × 1.25 in. Torx head cap screws (K)** or four **10-32 × 1.50 in. Torx head cap screws (M)**.

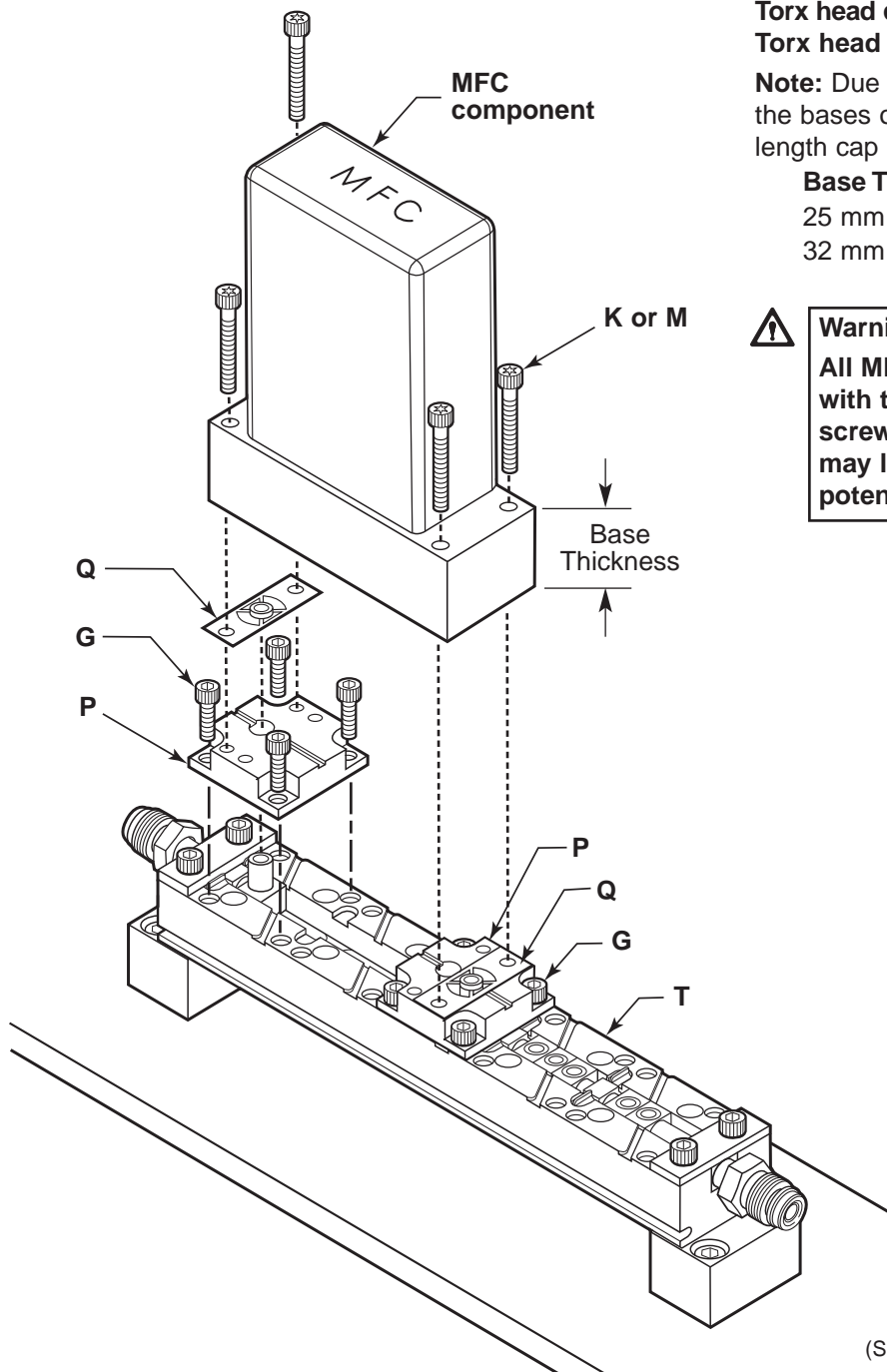
Note: Due to the differences in the thickness of the bases of the MFC components, a different length cap screw may be required.

Base Thickness	Cap Screw Length
25 mm or 26 mm	1.25 in. (K)
32 mm	1.50 in. (M)



Warning

All MFC components must be assembled with the designated Torx head cap screws. Use of an improper cap screw may lead to cap screw failure and potential injury.



(Shown without manifold assembly and support)

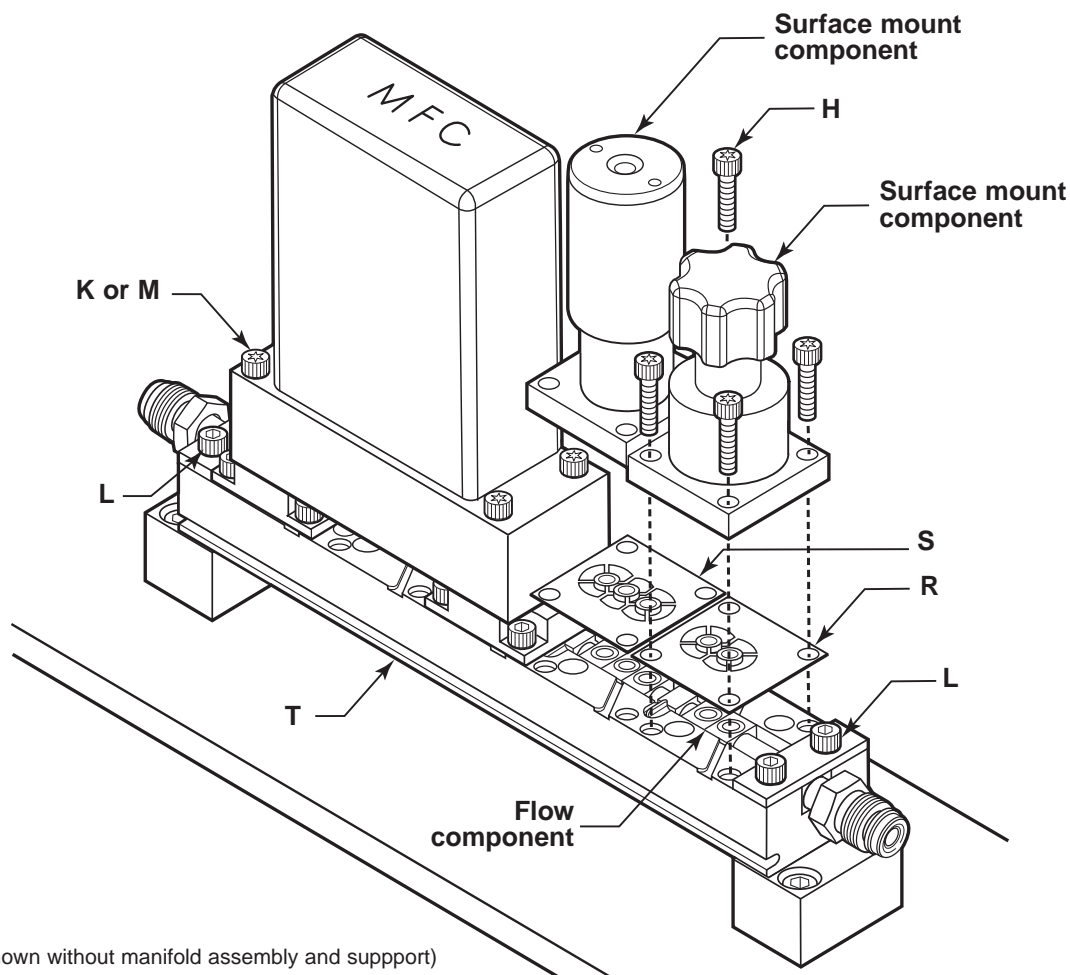
Surface Mount Assembly

1. Place a **two-port C-ring gasket (R)** on the **flow component(s)** that have two adjacent ports. Align the ports of the **gasket (R)** with the ports on the **flow components**, and align mounting holes on the **gasket (R)** with the threaded holes in the **substrate channel (T)**.
2. Place a **three-port C-ring gasket (S)** on the **flow component(s)** that have three adjacent ports. Align the ports in the **gasket (S)** with the ports on the **flow components**, and align the mounting holes on the **gasket (S)** with the threaded holes in the **substrate channel (T)**.
3. Place the designated **surface mount component(s)** over the **C-ring gaskets (R)** and **(S)**, as specified by the system design (or the 2-D assembly diagram from the IGC II System Configurator). Align the ports in each **surface mount component** with the ports in the **gaskets (R) and (S)**, and align the mounting holes in each **surface mount component** with the threaded holes in the **substrate channel (T)**.
4. Loosely attach each **surface mount component** to the substrate channel with four **10-32 × 0.75 in. Torx head cap screws (H)**.
5. Tighten the **Torx head cap screws (H)** to each **surface mount component** to **30 in.·lb (3.4 N·m) (35 cm·kg)** using a crisscross tightening pattern.
6. Tighten the **Torx head cap screws (K or M)** to the **MFC components** to **30 in.·lb (3.4 N·m) (35 cm·kg)** using a crisscross tightening pattern.
7. Retighten all the **Torx head cap screws (H)** and **(K or M)** to **60 in.·lb (6.8 N·m) (69 cm·kg)** using a crisscross tightening pattern. Recheck all **Torx head cap screws (H)** and **(K or M)** to verify the proper torque rating of **60 in.·lb (6.8 N·m) (69 cm·kg)**.
8. Tighten the **hex head cap screws (L)** to each **lock-down plate (C)** to **60 in.·lb (6.8 N·m) (69 cm·kg)**.



Warning

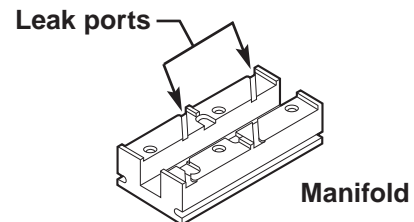
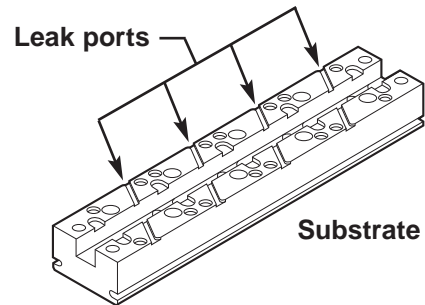
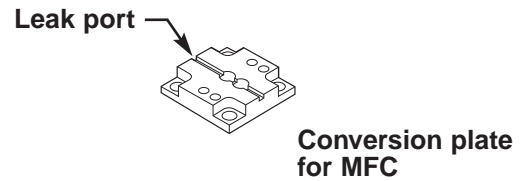
All surface mount components must be assembled with the designated Torx head cap screws. Use of an improper cap screw may lead to cap screw failure and potential injury.



(Shown without manifold assembly and support)

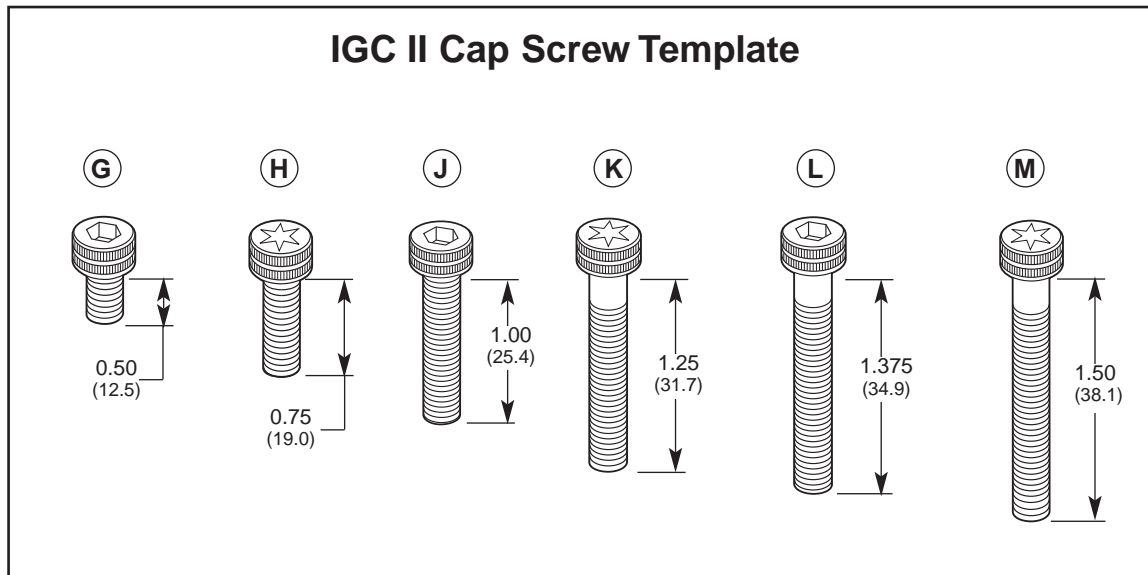
Gas Panel Testing

1. One by one, connect each gas stick of the assembled gas panel to a helium leak tester capable of detecting leaks less than 1×10^{-9} std cm³/s.
2. Plug all other connections and close all valves.
3. Plan a testing path to open valves in a “zone” pattern that will minimize volume. A “zone” is defined as the area on the gas stick between any two shut-off valves.
4. Starting with the valve closest to the connection fitting, and test the first “zone” using steps A through G.
 - A. Put the leak detector in test mode and wait until the reading is stabilized.
 - B. Adjust the helium flow rate to flow just fast enough to feel the gas on your skin.
 - C. Spray the helium in each **leak port**, starting with the **substrate** layer, which includes the **conversion plates**, and then moving to any **manifold** layer.
 - D. If the helium leak detector shows an unacceptable leak rate, determine which port is leaking by following steps E through G.
 - E. Spray helium into the atmosphere away from the gas stick.
 - F. Without spraying, place the tip of the helium nozzle at any suspected leak port. The residual helium inside of the tube will be pulled into that leak port.
 - G. If no leak is found, repeat steps E through F for each suspected leak port.
5. Open the next valve in the sequence and test the area in the next zone using steps A through G until the complete panel is tested.



Cap Screw Template

Use this template during gas stick assembly as a quick guide to verify the appropriate cap screw style and length.



Dimensions shown in inches (millimeters).

Maintenance Notes

To ensure a leaktight seal between components:

1. Always use a new **c-ring gasket** when replacing or moving a surface mount component. Do not reuse any c-ring gasket component.
2. Always use a new **c-ring gasket assembly** on the **drop down component**, 6LVV-IG2-WC-DD, when moving or replacing the surface mount component above it.
3. Always use a new **c-ring gasket assembly** on the **plug component**, 6LVV-IG2-WC-DP, when moving or replacing the surface mount component above it.