Agilent 4890, 5890, 6890
Gas Chromatograph
Rotary Valves

Installation Guide
Notices

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Safety Notices

CAUTION

A CAUTION notice denotes a hazard. It calls attention to an operating procedure, practice, or the like that, if not correctly performed or adhered to, could result in damage to the product or loss of important data. Do not proceed beyond a CAUTION notice until the indicated conditions are fully understood and met.

WARNING

A WARNING notice denotes a hazard. It calls attention to an operating procedure, practice, or the like that, if not correctly performed or adhered to, could result in personal injury or death. Do not proceed beyond a WARNING notice until the indicated conditions are fully understood and met.
**Installing Rotary Valves**

These instructions describe how to use the hardware kits to install a new valve in your Agilent Technologies' 4890, 5890, or 6890 series Gas Chromatograph (GC).

### Table 1  Parts supplied

<table>
<thead>
<tr>
<th>Description</th>
<th>Kit G2739A (Liquid sample)</th>
<th>Kit G2740A (Gas sample)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metering valve 1/16-inch</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Screw, M3 x 8 mm</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Screw, M3 x 30 mm, chrome-plated</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Label</td>
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<td></td>
</tr>
<tr>
<td>Screw, thread-cutting</td>
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<td></td>
</tr>
<tr>
<td>Screw, M4 x 12 mm, Torx™ T-20</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Fitting, column bulkhead</td>
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<td>4</td>
</tr>
<tr>
<td>Nut, 5/16-inch</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>Restrictor bracket</td>
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<td></td>
</tr>
<tr>
<td>1/16-inch SS tube, 102 mm long</td>
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<td>1</td>
</tr>
<tr>
<td>1/16-inch SS tube, 203 mm long</td>
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<td></td>
</tr>
<tr>
<td>1/16-inch SS tube, 360 mm long</td>
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<td>2</td>
</tr>
<tr>
<td>1/16-inch SS tube, 400 mm long</td>
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<td>1</td>
</tr>
<tr>
<td>1/16-inch SS tube, 560 mm long</td>
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<td>5</td>
</tr>
<tr>
<td>1/8-inch nut and ferrule set</td>
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</tr>
<tr>
<td>Filter union, reducing</td>
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<td></td>
</tr>
<tr>
<td>Reducer/restrictor, SS</td>
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<td></td>
</tr>
<tr>
<td>Actuator limiter, 36 degrees</td>
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<td>1</td>
</tr>
<tr>
<td>Installation sheet (this document)</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>
Installing Rotary Valves

Part Identification

Figure 1  Kit G2739A, Liquid Sample Valve

Figure 2  Kit G2740A, Gas Sample Valve
If you purchased a heated valve box (19238A/B, G1580A, or G1581A), or a side mount kit (G2748A or G2749A), install it before installing your valve.

To install a valve in a heated valve box, see page 3.
To install a valve on a side mount bracket, see page 8.

**Tools needed**

- Torx T-10 and T-20 drivers
- Flat blade screwdriver
- Needle-nose pliers
- 3 mm hex key wrench

**Installing a valve in a heated valve box**

**WARNING**

Do not install a liquid sampling valve (LSV) in the valve box if you plan to heat the box above 75°C. Heating an LSV over 75°C can cause a leak and subsequent explosion. Liquid sampling valves should be mounted in the side location to avoid potential explosions.

The oven, inlet, detector, and valve box may be very hot. Before proceeding, turn off the oven and all other heated zones and let them cool down.

Harmful gases may be present. Hydrogen (if used) can present an explosion hazard. Before proceeding, turn off all supply gases at their sources.

Shock hazard. Before proceeding, turn off the GC and disconnect the power cord.

1. If the detector top cover is installed, remove it.
2. Remove the upper valve box. Remove the two mounting screws using a T–20 Torx screwdriver and lift off the upper valve box. Set it aside.
Installing Rotary Valves

3 Remove the heater block mounting screw in the lower valve box.

4 Place the valve in the desired position in the valve box. The valve rotor index pin of a 6-port valve points toward the...
back of the GC if installed correctly. This is the \textit{ON} position. 
Tighten the two screws with a Torx T-10 screwdriver. If this is the last valve to be installed in the heated zone, make sure the screws that secure the heater block to the lower valve box are tight.

\textbf{Figure 5} Installing the valve

\begin{enumerate}
\item Use needle-nosed pliers to move the valve rotor index pin of the valve counterclockwise until the pin touches the valve stop (\textit{OFF} position).
\end{enumerate}

\textbf{Figure 6} Index pin and stops
6 Use the tubing and fittings in the hardware installation kit to plumb the valves. See “Common valve configurations” on page 11.

**Reinstall the upper valve box**

1 Verify that all valve rotors are in the full counterclockwise position.

2 For each actuator, loosen the link arm lock screw in the barrel of the shaft that links the valve and actuator about 1/4 turn. You may have to apply significant pressure.

![Loosening the lock screw](image1)

**Figure 7** Loosening the lock screw

3 For each actuator, use a flat blade screwdriver to turn the actuator coupling/shaft assembly counterclockwise until snug.

![Setting the coupling shaft](image2)

**Figure 8** Setting the coupling shaft
4 Locate the two half-moon cutouts at the bottom back of the upper valve box. Place the upper box on top of the lower valve assembly, routing the heater/sensor wires through the cutouts. Secure with two T-20 Torx screws.

5 For each actuator, push the coupling/shaft assembly downward with a flat blade screwdriver until the slot on the coupling engages the valve rotor index pin.

If the coupling and valve do not engage, check that both are fully counterclockwise and try again. If necessary, turn the shaft slightly to engage the coupling.

6 Continue to turn the shaft counterclockwise until snug, to ensure that the valve and actuator are both in the OFF position.

7 Tighten the link arm lockscrew firmly.

Figure 9  Turning the valve OFF
Installing Rotary Valves

Installing a valve on a side mount bracket

**WARNING** The oven, inlet, and detector may be very hot. Before proceeding, turn off the oven and all other heated zones and let them cool down.

Harmful gases may be present. Hydrogen (if used) can present an explosion hazard. Before proceeding, turn off all supply gases at their sources.

Shock hazard. Before proceeding, turn off the GC and disconnect the power cord.

1. Secure the clamp ring to the side mount bracket with two Torx T-20 screws.

![Diagram of mounting components](image)

**Figure 10** Attaching the clamp ring
2. With a flat blade screwdriver, turn the actuator coupling/shaft assembly counterclockwise until snug.

![Figure 11 Setting the coupling shaft](image1)

3. Use needle-nosed pliers to move the valve rotor index pin of the valve counterclockwise until the pin touches the valve stop (Off position).

![Figure 12 Index pin and stops](image2)

4. Use the tubing and fittings in the hardware installation kit to plumb the valves. See “Common valve configurations” on page 11.

5. Loosen the clamp ring set screw and insert the valve through the clamp ring and the bracket. Orient the valve so that the valve rotor index pin mates with the actuator. Tighten the clamp ring set screw.
Installing Rotary Valves

Restoring the GC to operating condition

1. If the electronics side or top cover was removed to install an actuator and solenoid, reinstall it now.

2. Plug in the power cord and turn on the GC.

3. Configure the valves. See your GC Operating Manual if you need help.

4. Connect the solenoid air line to a source of clean, dry air at 55 psi.
   
   If your detector also uses air, pulses in a shared air line may affect it. The solenoid air supply should be separate from the detector air supply.

5. Turn on the air supply to the solenoid valves.

6. Use a flat blade screwdriver to turn each installed valve ON and OFF. Ensure that each valve is physically in the OFF position as described on page 5.

7. Use the 3 mm hex key wrench to tighten the link arm lockscrew by rotating it clockwise until very tight.

   ![Hex key wrench](Image)

   **Figure 13** Tightening the link arm lockscrew

8. If it was removed, reinstall the detector cover.
Common valve configurations

1 The next several pages show some commonly used valve configurations.

Arrows indicate the direction of flow.

Adjustable Restrictor valves are used to adjust the pressure drop (e.g., to balance flow)

Loops have a specified volume

Fixed (non-adjustable) restrictors

Jumper volume is not specified.

Union

Fitting

Column

Figure 14 Legend
Installing Rotary Valves

Valve plumbing tips

- Use bulkhead fittings with attached tubing for column connections. Mount the fitting, pointing down, on the left or right nut plate and secure with a retaining nut. Connect the free end of the tubing to the valve.
- The best way to cut narrow tubing is with a tubing cutter designed for this task. If some other cutter is used, check:
  - The tubing bore is not restricted at the cut end
  - The cut is at right angles to the tubing
  - There are no burrs that might interfere with connections.
- Avoid kinks in the tubing.

![Diagram of gas sampling valve and carrier/second valve flow paths](image_url)
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*Temperature limited to 235 °C by micrometering needle valves

Two stream selection (requires gas sampling)
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Backflush to detector

Backflush a precolumn to vent
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From flow controller, Inj. Port or GSV

Column selection (unused column isolated)

Sequence reverse
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Sequence reverse with backflush of column 1
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Gas sampling with backflush of precolumn to vent
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Gas sampling with backflush to detector

Gas sampling of alternate streams
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Gas sampling with sequence reverse

Gas sampling with sequence reverse and backflush of column 1
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Column selection with backflush to vent

Liquid sampling
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Gas sample and column isolation

Gas sample/backflush and column isolation

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