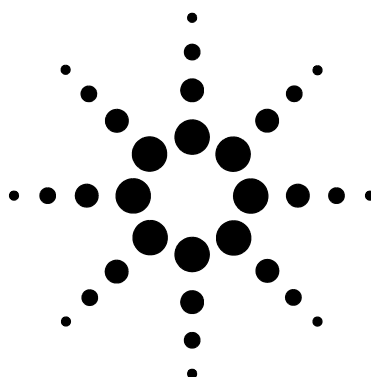




Agilent 18599T and G2918A Cool On-Column Conversion Kits

Installation and Operation



Agilent Technologies

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.

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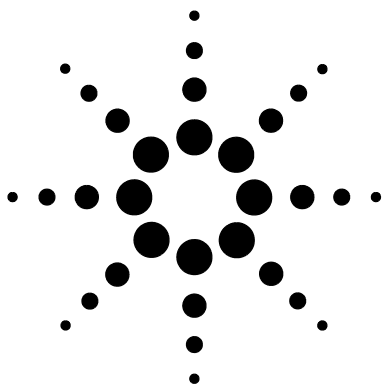
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The consumables and hardware in these kits allow you to use Agilent automatic injectors to inject onto 250-mm and 320-mm columns.

This chapter contains general information that applies to all injectors. Specific information is in the remaining chapters.



1 General Information

18599T Kit

The 18599T kit provides the parts needed for on-column injection into 250- μ m and 320- μ m columns on Agilent 5890, 6850, and 6890 GCs with a cool on-column inlet and one of the following injectors/autosamplers:

- 18593B (7673B)
- G1513A (7673C)
- G2613A (7683A)
- G2880A (6850 autosampler)

Injector model numbers appear on the serial number label.

Injection to 530- μ m columns does not require this kit.

Important note

The cool on-column inlet (COC) was developed after the 5890A gas chromatograph was introduced. Owners of the 5890 Plus, the 5890 Series II, and later GCs will find information about the COC in their GC, inlet accessory, and automatic sampler documentation, but owners of early 5890A GCs may not. "18599T Kit Installation and Operation" on page 15 supplies that information.

Owners of 6850 and 6890 GCs will find COC information in their User Information.

G2918A Kit

The G2918A kit provides the parts needed for on-column injection into 250- μm and 320- μm columns on Agilent GCs with a cool on-column inlet and the Agilent G2913A (7683B) injector. Injection to 530- μm columns does not require this kit.

When performing cool on-column injections, the injector:

- Slows the carriage speed so the overall injection time increases to 500 milliseconds.
- Lowers the tip of the syringe needle an additional 19 mm into the column.

"G2918A Kit Installation" on page 33 describes conversion of the injector for 250- μm and 320- μm columns. For operating information, see your GC and Automatic Liquid Sampler documents.

1 General Information

Installing a Fused Silica Capillary Column in the Inlet

You must cut the column correctly to ensure good performance. The method shown here produces the recommended square cut.

WARNING

Flying particles can cause eye injuries. Always wear safety glasses when cutting fused silica columns.

- 1 Slide a column nut and ferrule onto the end of the column.
- 2 Cut off the column end with a square cut (Figure 1).

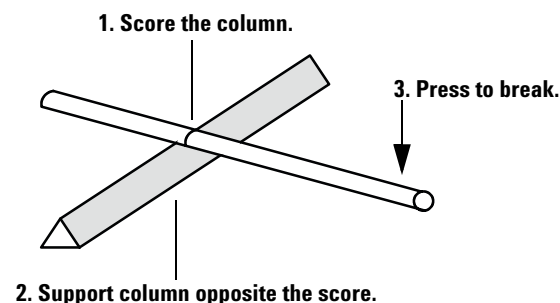


Figure 1 Cutting the column

- 3 Wipe the column end with methanol to remove oil and dust.
- 4 Insert the column into the inlet until it stops against the insert.
- 5 Finger-tighten the column nut.

NOTE

Make sure the column remains against the insert while you tighten the nut.

- 6 Use a wrench to tighten the column nut an additional quarter turn.
- 7 Verify the column installation by manually pushing the syringe you plan to use into the inlet. There should be a gap of 12 mm or less between the

septum nut and the syringe barrel (Figure 2). If the gap is greater than 12 mm, your needle is not reaching the column and you cannot perform on-column injections. If this is the case, reinstall the insert and the column.

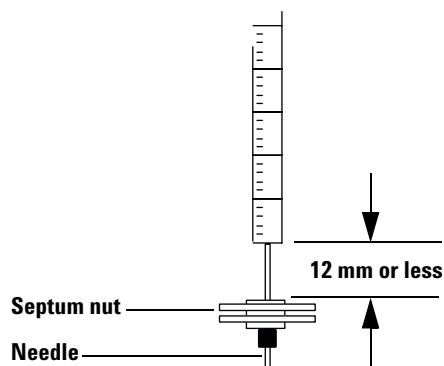


Figure 2 Checking the installation

- 8 Mount the injector module back onto the GC. For more details, see the Automatic Liquid Sampler Operating Manual.

Using Retention Gaps and Other Precolumns

Precolumns are columns connected in front of the analytical column. They are commonly used to protect the analytical column from contamination.

A retention gap is a deactivated, uncoated (or thinly coated) precolumn. It is used to increase sample resolution and decrease peak splitting. Retention gaps have the effect of reforming broad injection bands at the head of the column.

When you inject a sample, it first exists as both gas vapor and microdroplets. Without a retention gap, the gas vapor begins partitioning immediately at the stationary phase. The microdroplets, however, are carried farther into the column by carrier gas and cause loss of resolution and peak splitting.

The addition of a retention gap in front of the column prevents this premature partitioning until all the microdroplets are vaporized.

In general, the length of the retention gap required and type of deactivation depend on injected volume and solvent polarity. A working rule of thumb is to use 1 meter of retention gap per microliter injected. For a 3- μ L sample, use a 3-meter retention gap. The retention gap should be wetted by the solvent, which means it should be deactivated with material of similar polarity. Fused silica tubing is commercially available in a range of diameters and deactivations.

For more information, refer to the Agilent Web site at www.agilent.com.

Press-Fit connectors

Press-Fit connectors are easy-to-use, general-purpose connectors for coupling capillary columns of the same or different diameters.

Advantages They are inexpensive, have low dead volume, fit most fused silica columns, have low mass (no thermal lag), and are transparent. In most cases, simply pressing the column ends into the connector is the only installation task; heat from the oven completes the seal.

Disadvantages Because they are made of glass, these connectors may be too reactive for some compounds. In these cases, deactivated connectors should be used. In addition, press-fit connectors may need separate heating for a

reliable seal, and they expose a small amount of polyimide to the sample. If simply pressing the column ends into the connector does not give a good seal, try the following procedure:

- 1** Cut clean, square ends on the columns, and wipe them with methanol to remove fingerprints and dust.
- 2** Grasp one end of the connector with a folded tissue to avoid burned fingers. Heat the other end with a hot-air gun (clamped in a ring stand so hands are free) for about 30 seconds. Remove the connector from the heat, and insert the column immediately. Hold for about 1 minute while the fitting cools and shrinks around the column. Repeat with the other connection.
- 3** Finish forming the seal in the GC oven, above 200 °C, with low carrier pressure. You should now be able to see the polyimide seal.

Butt connectors

Butt connectors are also popular for connecting precolumns to columns, particularly for high-temperature use. Different-size ferrules are used depending on the size of the columns. Because column ends are in contact with each other inside the ferrule during tightening, exposure to ferrule material is minimized.

Purged connectors

Purged connectors are commercially available for column connection. The most complex of connector types, they purge the connection area and, thus, minimize contamination.

1 General Information

Replacing the Needle Guide in the Needle Support Foot

Check the needle guide for wear when you change the inlet septum.

Removing the needle guide

- 1 Use the 2-mm Allen wrench from the needle support kit to remove the screw from the needle support foot (Figure 3).
- 2 Remove the small metal plate from the foot.
- 3 Remove the needle guide.

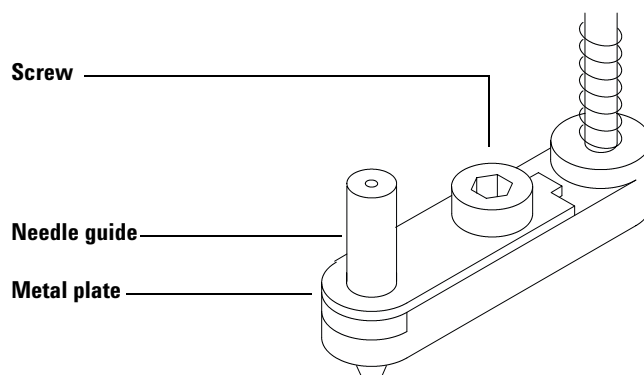


Figure 3 Removing the needle guide

Installing a new needle guide

Select the correct needle guide using Table 1.

Table 1 Needle guide selection

Kit number	Needle support kit	Needle guide color
18599T	07673-61340	Gray
G2918A	G2913-61340	White

- 1 Install the needle guide into the foot (Figure 4).
- 2 Replace the metal plate.
- 3 Replace and finger-tighten the screw.
- 4 Finish tightening the screw with the 2-mm Allen wrench.

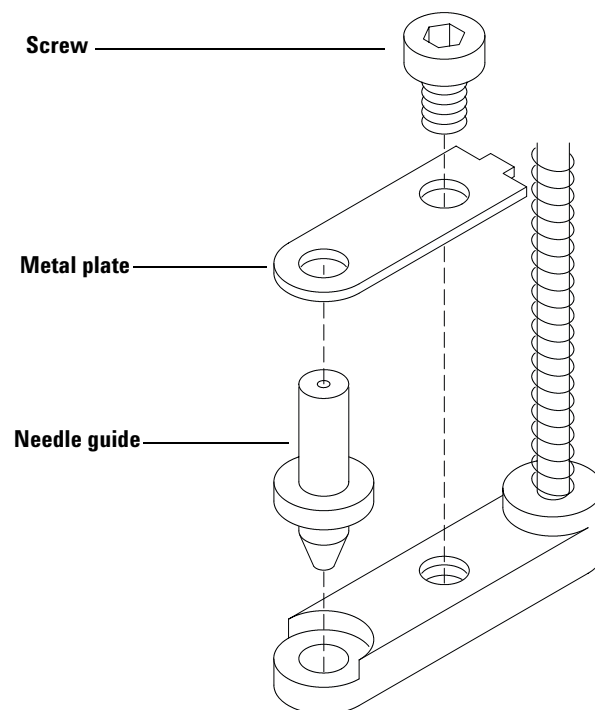
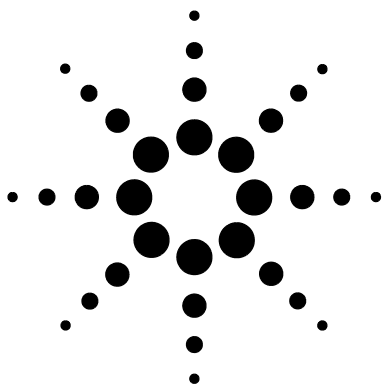


Figure 4 Installing the needle guide

1 General Information



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The **18599T** kit supports the Agilent 18593B, G1513A, G2613A injectors, and the G2880A autosampler.

For the G2913A injector, see the **G2918A** kit on page 33 in this document.



2 18599T Kit Installation and Operation

Parts Supplied

The parts in the 18599T kit are listed in Table 2.

Table 2 18599T parts supplied

Part number	Description	Quantity
07673-60978	Needle support assembly, 250/320, B (for 18593B injector)	1
G1513-60978	Needle support assembly, 250/320, C (for G1513A, G2613A, and G2880A injectors)	1
19245-20515	COC insert, 250- μ m column, 6 identification rings	1
19245-20525	COC insert, 320- μ m column, 5 identification rings	1
19245-60760	COC insert spring	2
19245-80521	COC septum nut base assembly	1
5182-0831	Needle, 320- μ m on-column, pkg of 3	1
5182-0833	Needle, 250- μ m on-column, pkg of 3	1
5182-0836	Syringe, 5- μ L on-column, removable needle, barrel only	1
07673-61340	Needle support kit. Contains:	
	Needle guide, gray	1
	Metal plate	1
	Screw	1
	2-mm Allen wrench	1

Overview

Preparing the injector

To prepare the injector, perform the following steps:

- Remove the standard needle support assembly.
- Install the appropriate 250/320 needle support assembly.
- Install the syringe into the needle support assembly.
- Verify the installation of the needle support assembly.

When changing to 250-mm or 320-mm columns, the standard needle support assembly must be replaced. This assembly is a spring-loaded rod with a needle support foot at its base that supports and guides the needle.

The 18599T kit contains two 250/320 needle support assemblies, one for the 18593B injector and one for the G1513A, G2613A, and G2880A injectors (see Figure 5).

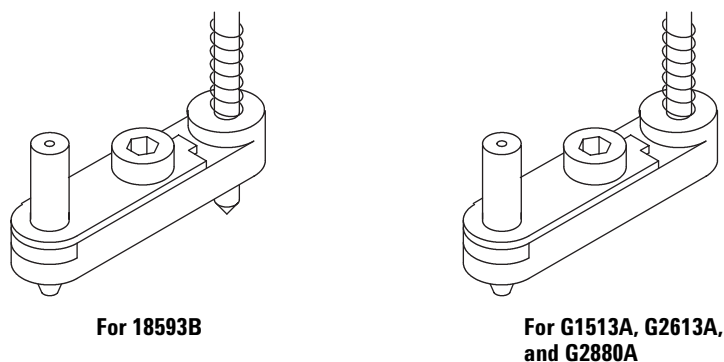


Figure 5 Needle support assemblies

The assembly for the G1513A/G2613A/G2880A is shown in the rest of this chapter.

Preparing the inlet

The inlet contains a glass insert that guides the needle into the end of the column. The correct insert for the actual (not nominal) column diameter must be installed in the inlet.

Replacing the Needle Support Assembly

Removing the standard assembly

- 1 Lay the injector module on its back on a flat surface.
- 2 Open the injector door (Figure 6).
- 3 Swing the syringe latch counterclockwise to unlock the syringe.

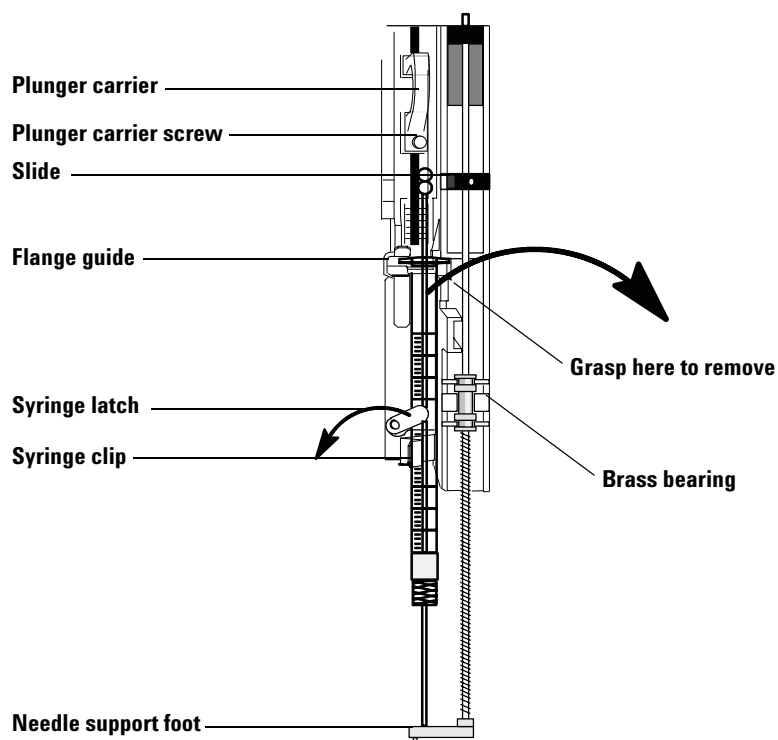


Figure 6 Removing the needle support assembly

CAUTION

Do not operate the injector without a syringe in place because the syringe latch may interfere with the motor if it swings freely.

- 4 Loosen the plunger carrier screw.

- 5 Slide the plunger carrier up as far as it will go.
- 6 With your finger under the upper portion of the syringe barrel (just above the syringe latch), pull the syringe up and remove it gently
- 7 With your finger under the brass bearing of the needle support assembly, pull up gently to release the brass bearing from the syringe carriage.
- 8 Carefully use the brass bearing to pull the rod down until you can lift the assembly out of the syringe carriage.

CAUTION

Be careful not to pull the assembly by its metal shaft. The shaft is bent easily.

Installing the 250/320 needle support assembly

- 1** Hold the new needle support assembly in your right hand (Figure 7).

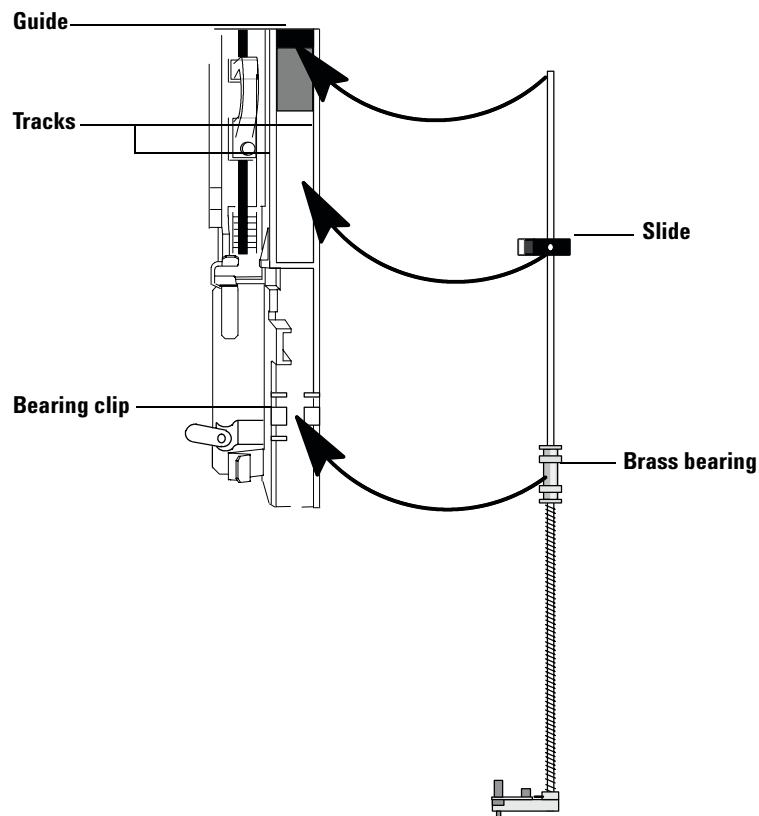


Figure 7 Installing the needle support

- 2** Insert the upper end of the rod into the plastic guide to the right of the plunger carrier.
- 3** Align the brass bearing on the needle support assembly with the plastic bearing clip to the right of the syringe.

- 4 Push the assembly down into place. Make sure the slide lies flat on the tracks of the syringe carriage so that it glides up and down (Figure 8).

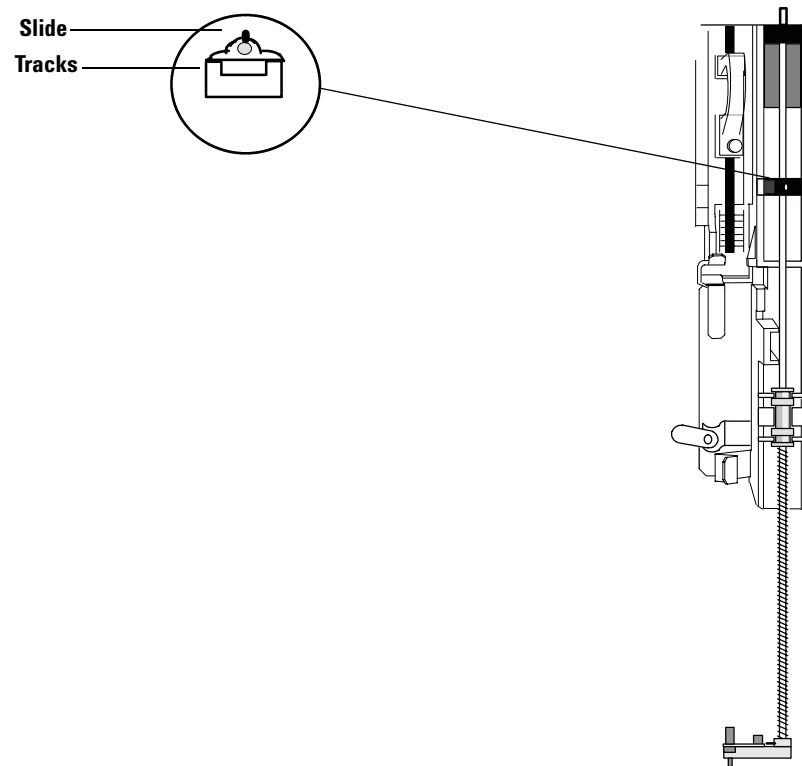


Figure 8 Aligning the slide

Installing a Syringe in the Needle Support Assembly

Before you can install a syringe into the needle support assembly, you must install the needle into the syringe barrel.

Installing a needle on the syringe barrel

- 1 Unscrew the syringe barrel cap and remove the spring (Figure 9).
- 2 Make sure the needle has a PTFE disk as shown in the picture. If the syringe barrel does not have the PTFE disk, use the instructions in the syringe box to wrap the needle yourself.
- 3 Slide the spring and the cap down over the needle.
- 4 Insert the needle into the syringe barrel.
- 5 Screw the cap back on the syringe barrel.

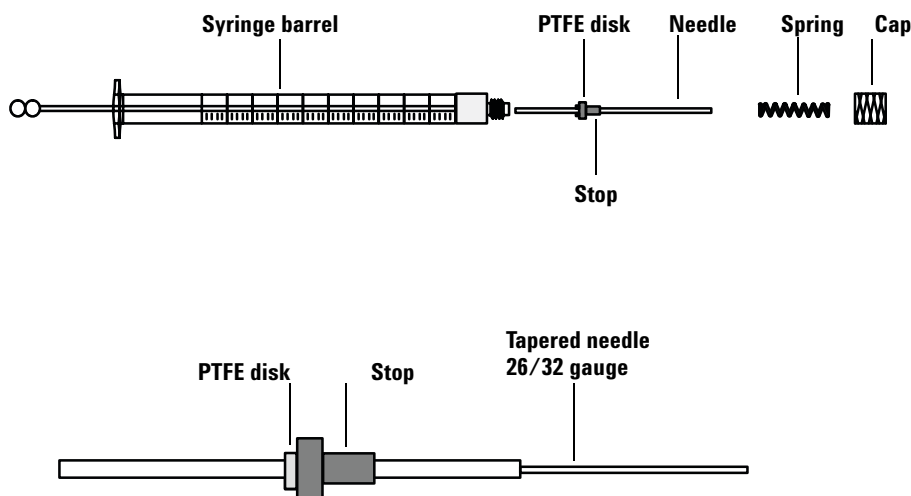


Figure 9 Installing a needle

Installing the syringe in the injector

Use the following steps to install the syringe in the needle support assembly.

- 1 Place the injector on the GC oven or on a parking post if you have one.
- 2 Open the injector door.

- 3 Rotate the syringe latch (Figure 6 on page 18) out of the way.
- 4 Pass the syringe needle through the hole of the small needle guide in the needle support foot (Figure 10).

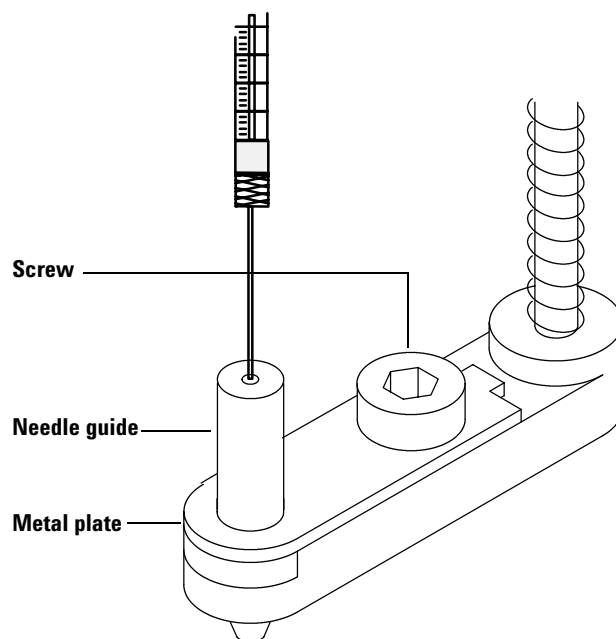


Figure 10 The needle guide

CAUTION

Failure to use the on-column syringe when injecting into an on-column inlet could damage the injector, syringe and column.

- 5 Align the syringe flange with the flange guide and syringe clip. Gently press the syringe into place, keeping the needle in the hole of the needle guide. Be careful not to bend the needle during this step (Figure 11).
- 6 Close the syringe latch by swinging it clockwise.

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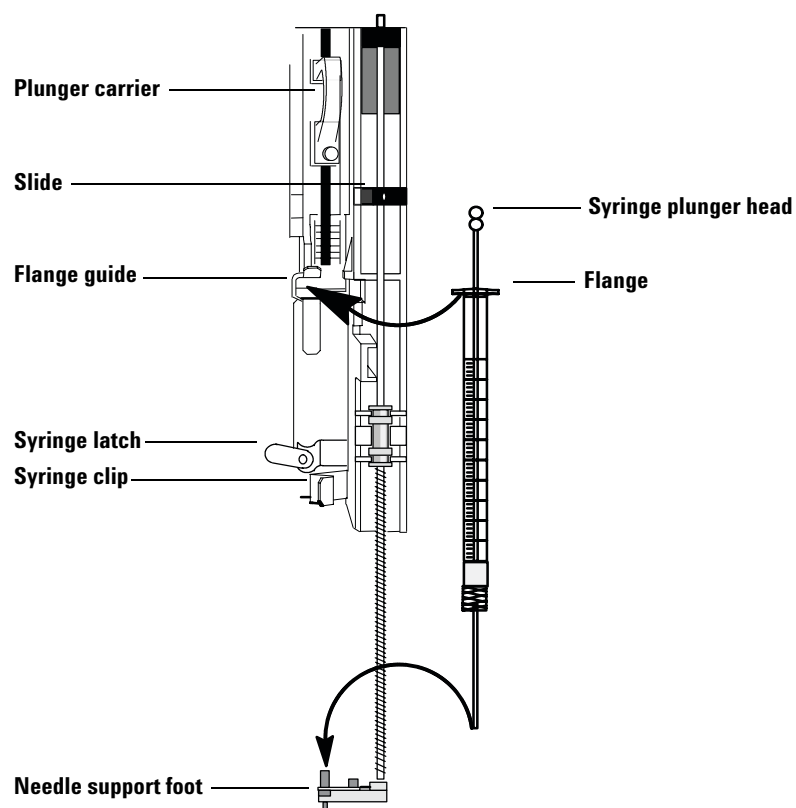


Figure 11 Installing the syringe

CAUTION

Do not operate the injector without a syringe in place because the syringe latch may interfere with the motor if it is allowed swing freely.

- 7** Move the plunger carrier loop down over the top of the syringe plunger head and tighten the plunger carrier screw.

Verifying the Installation

- Move the plunger carrier up and down (Figure 12). If the syringe plunger does not move with the carrier, loosen the plunger screw, move the carrier onto the plunger head and retighten the screw. Be sure the plunger carrier screw is tight.
- Check that the needle is aligned with the needle guide in the foot by moving the slide up and down. The needle should slide smoothly in the needle guide.

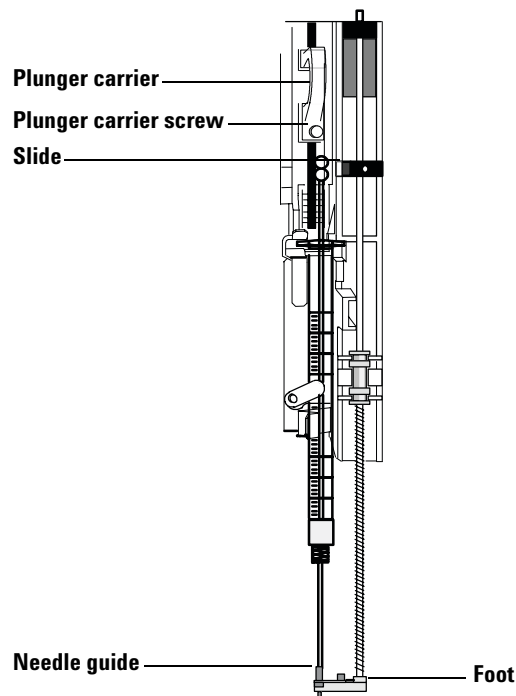


Figure 12 Verifying installation

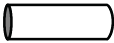
Checking the Needle-to-Column Size

You need to check the needle-to-column size because some manufacturers provide columns with internal diameters that are too small. You will bend the syringe if you try to inject into a column that is smaller than the needle.

You use the insert that is the same size as the syringe needle you will use in the analysis to verify that the column you plan to use is the correct size.

1 Identify the correct insert by the number of rings on it using Table 3.

Table 3 Columns, inserts and needles

Column id	Insert	Syringe needles*
250 µm	 19245-20515 Six identification rings	5182-0833
320 µm	 19245-20525 Five identification rings	5182-0831
530 µm	 19245-20780 Four identification rings Aluminum-coated  19245-20580 No identification rings Polyimide-coated	5181-1267 5181-1273 5181-3321 5182-0835 5182-0832 5181-3319

* This is a partial list of the needles available. See the Agilent supplies catalog for more.

- 2 Insert the column into one end of the insert (Figure 13).

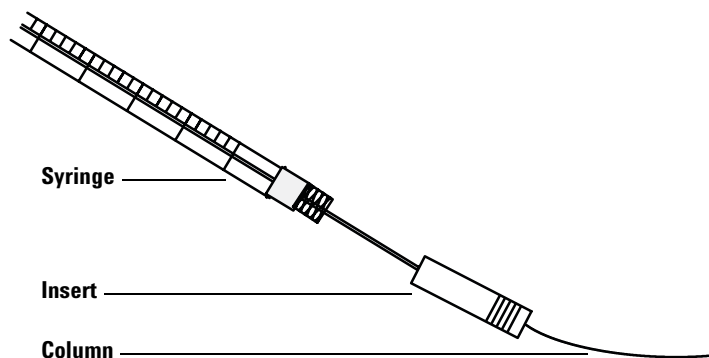


Figure 13 Testing column size

- 3 Insert the syringe needle through the other end of the insert and into the column. If the needle cannot pass easily into the column, reverse the insert to try the needle and column in the other ends.

If the needle still cannot pass into the column, you may have a column with an incorrect internal diameter. Check the column to make sure it is labeled correctly and try a new column.

Setting the Injector Parameters

Whether or not an injection parameter must be set for on-column use depends on the type of GC, the type of injector/autosampler installed, and the type of control used, as described in Table 4.

Table 4 Setting the on-column injection parameter

GC, injector, and control:	Set parameter:
5890 GC with 18593B/G1513A (7673B/C) injector and integrator or Agilent data system (Agilent ChemStation or Cerity NDS for Chemical QA/QC) control	Set the on-column injection parameter at the integrator or data system.
5890 GC with G2613A/G2913A (7683A/B) injector and G2911AA ALS Controller Software	Select the On-column Inlet Injection Mode in the G2911A software utility.
5890 or 6890 GC with 18593B/G1513A (7673B/C) injector using standalone control	Change the on-column switch to “yes” on the injector tower.
6890 GC with 18593B/G1513A (7673B/C) injector using Agilent data system (Agilent ChemStation or Cerity NDS for Chemical QA/QC) control	No setting needed. The data system automatically sets needed parameters.
6890 GC with G2613A/G2913A (7683A/B) injector using any control	No setting needed. The needed parameters are set automatically.
6850 GC with any injector/autosampler using any control	No setting needed. The GC automatically sets needed parameters.

The on-column setting reduces the syringe carriage speed so that the needle moves more slowly into and out of the inlet and spends more time in the inlet. It also lowers the tip of the needle an additional 19 mm (3/4 inch) into the column.

For any GC and any injector, you can also set the slow injection/plunger parameter. This slows the plunger speed to about 1/18 of the normal speed.

Preparing the Inlet

If the inlet was set up for automated injection onto 530- μ m columns, the following steps are needed in preparation for automated injection onto 320- μ m and 250- μ m columns, which require a different septum nut and insert.

Changing the insert

The insert that you used to check the column size is installed in the inlet of the GC to guide the syringe needle into the column. The insert must correspond to the size of the column and syringe needle you will use. (See the previous section on checking the needle-to-column size to identify the correct insert.)

Use the following steps to remove an existing insert and to install a new one:

- 1 Lower the temperature of the GC oven. After the oven is cool, turn the oven off and set the inlet pressure to 0.
- 2 Remove the column, the column nut and the ferrule (Figure 14).

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- 3 On top of the oven, unscrew and remove the inlet septum nut. Set the septum nut aside.

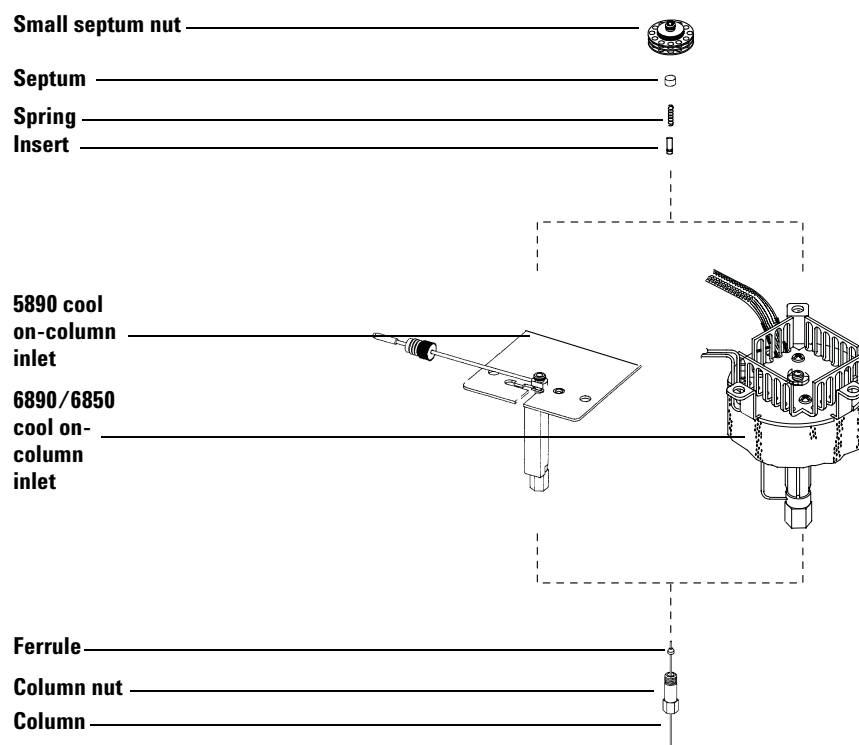


Figure 14 Changing the insert

- 4 Remove the spring from the inlet and set it aside. Be careful not to lose or damage it because you will use the spring with the new insert.
- 5 Remove the existing insert from the inlet by pushing it out from below with a piece of column. Save the insert for possible later use.
- 6 Drop the new insert straight into the inlet from the top. The end of the insert in which you inserted the needle should be up; the end of the insert in which you inserted the column should be down (see the previous section on checking the needle-to-column size). Use the identification rings to help you remember which way to install the insert.
- 7 Replace the spring on top of the insert.

Changing the septum nut

The septum nut to be used for automated on-column injections depends on the GC and the column size. See Figure 15.

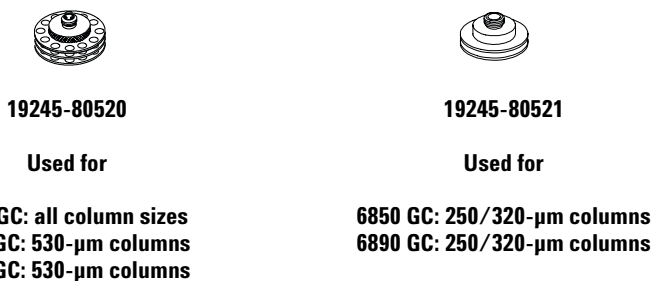


Figure 15 On-column septum nuts

Exchange the septum nut, if necessary, and install a new septum in the cavity. Tighten the septum nut firmly. If the septum nut is loose, the system may leak. Store the standard septum nut for future use.

The following section describes an alignment procedure for installing the septum nut with a through-hole septum.

Aligning the septum nut with the through-hole septum

For 250- μ m and 320- μ m on-column injections, the septum nut is smaller than the standard septum nut.

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- 1 To ensure proper alignment, thread the septum and septum nut onto a 26-gauge needle or a piece of wire with a diameter smaller than 0.47 mm (Figure 16). The septum should rest in the cavity in the nut.

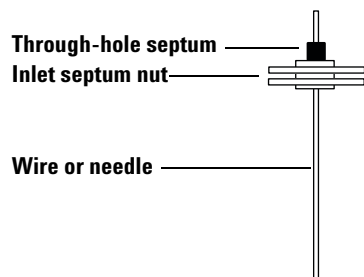
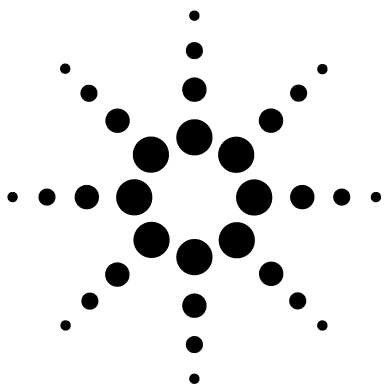


Figure 16 Aligning the septum nut

- 2 Turn the wire or needle over and insert the wire or needle, the inlet septum nut and the through-hole septum into the inlet.
- 3 Tighten the septum nut firmly. If the septum nut is loose, the system may leak.
- 4 Remove the needle from the inlet.



Agilent 18599T and G2918A Cool On-Column Conversion Kits Installation and Operation

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The consumables and hardware in these kits allow you to use Agilent automatic injectors to inject onto 250-mm and 320-mm columns.

The **G2918A** kit supports the G2913A injector.

The **18599T** kit supports the Agilent 18593B, G1513A, G2613A, and G2880A injectors. See page 15 for further information.



3 G2918A Kit Installation

Scope

The G2918A kit provides the parts needed for on-column injection into 250- μm and 320- μm columns on Agilent 6850 and 6890 GCs with a cool on-column inlet. Injection to 530- μm columns does not require this kit.

When performing cool on-column injections, the injector:

- Slows the carriage speed so the overall injection time increases to 500 milliseconds.
- Lowers the tip of the syringe needle an additional 19 mm into the column.

Parts Supplied

The parts contained in the G2918A kit are listed in Table 5.

Table 5 G2918A parts supplied

Part number	Description	Quantity
G2913-60978	Needle support assembly, 250/320	1
19245-80521	COC septum nut	1
19245-20515	COC insert, 250- μ m column, 6 identification rings	1
19245-20525	COC insert, 320- μ m column, 5 identification rings	1
19245-60760	COC insert spring	2
5182-0831	Needle, 320- μ m on-column, pkg of 3	1
5182-0833	Needle, 250- μ m on-column, pkg of 3	1
5182-0836	Syringe, 5- μ L on-column, removable needle, barrel only	1
G2913-61340	Needle support kit, 250/320. Contains:	
	Needle guide, white	1
	Metal plate	1
	Screw	1
	2-mm Allen wrench	

Adapting the G2913A Injector for Cool On-Column Injection

To adapt the injector and GC for cool on-column use, follow these steps:

- 1 Select the on-column syringe needed for the column size. See your Agilent catalog for consumables and supplies, your GC operating documentation, and the Agilent web site (www.agilent.com/chem) for a list of parts.
- 2 Prepare the GC inlet. (See the GC operating documentation for instructions).
 - Check the needle to column size.
 - Verify that the insert matches the needle size.
 - If necessary, replace the septum.

Verify that the correct needle support assembly (Figure 17) is installed in the injector. Replace if necessary.

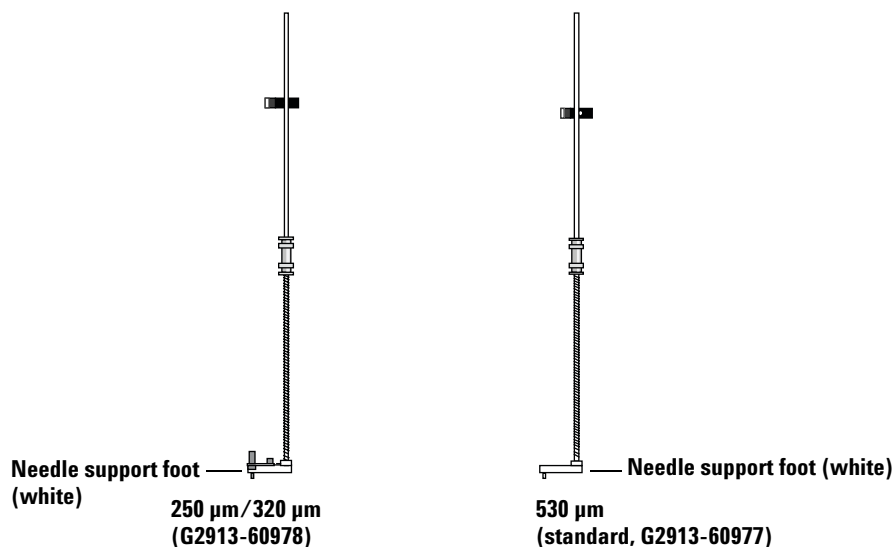


Figure 17 Needle support assemblies

CAUTION

The G2913A injector is not compatible with G2613A needle support assemblies. A G2913A needle support has a white foot. The G2613A needle support assembly has a gray foot.

Replacing the Needle Support Assembly

Use the standard needle support assembly for all injections except cool on-column injections with a 250- μ m or 320- μ m column. For these injections, you must change the needle support assembly to the one included in this kit.

- 1 Remove all vials and bottles from the turret and disconnect the injector cable from the GC.
- 2 Open the injector door.
- 3 Remove the syringe (Figure 18).

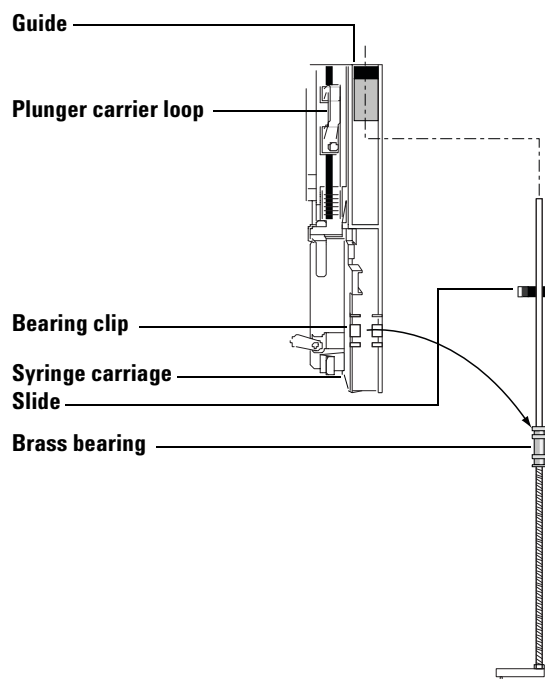


Figure 18 Removing the needle support assembly

- 4 With your finger under the shaft near the brass bearing on the needle support assembly, pull gently to release the bearing from the bearing clip in the syringe carriage.

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- 5 Carefully use the **brass bearing** to pull the rod down until you can lift the assembly out of the syringe carriage.

CAUTION

Be careful not to pull the assembly by its metal shaft. The shaft is easily bent.

- 6 To install the 250- μ m/320- μ m needle support assembly, hold it in your right hand and insert the upper end of the rod into the plastic guide to the right of the plunger carrier loop.
- 7 Turn the needle support assembly so that the flat surface of the slide glides up and down the syringe carriage tracks (Figure 19).

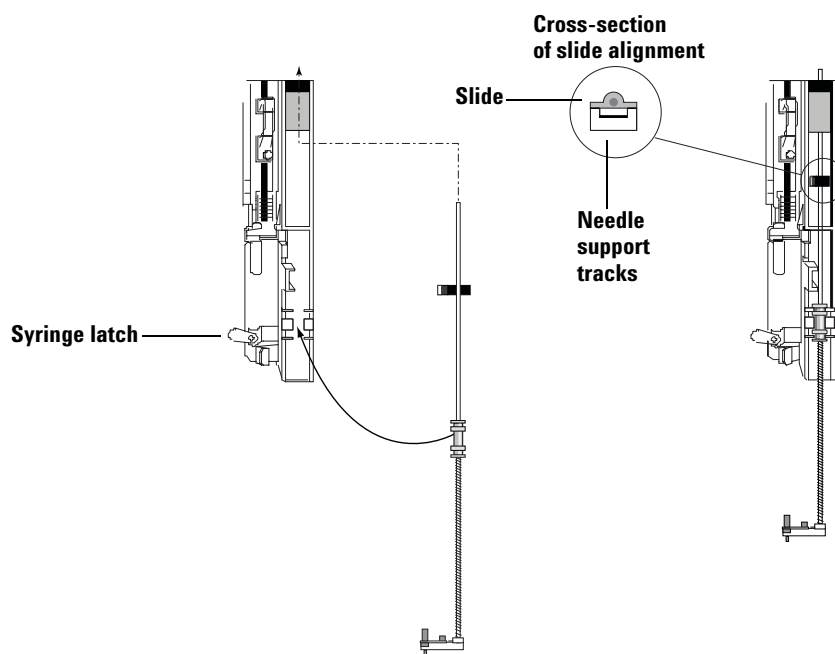


Figure 19 Installing the needle support assembly

- 8 Align the brass bearing on the needle support assembly with the plastic bearing clip to the right of the syringe latch and push gently on the bearing until the assembly snaps into place.

- 9 Place the injector back on the GC.

CAUTION

Be careful not to bend the needle during installation.

CAUTION

Do not operate the injector without a syringe or align probe in place because the free swinging syringe latch may interfere with the motor and jam the syringe carriage.

- 10 Install the syringe.
- 11 Move the slide up and down to make sure the needle is aligned with the needle guide in the support foot. The needle should slide smoothly in the needle guide.

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