



# Agilent 1200 Series Manual Injector



**User Manual**



**Agilent Technologies**

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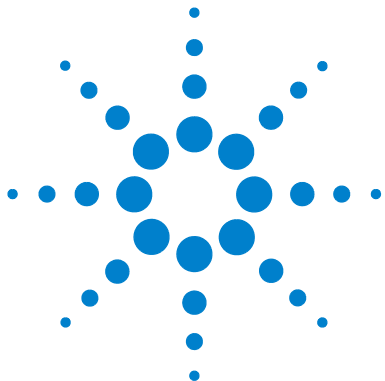
### WARNING

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.

# Contents

<b>1 Introduction</b>	<b>5</b>
Introduction to the Manual Injector	6
<b>2 Installing the Manual Injector</b>	<b>7</b>
Unpacking the Manual Injector	8
Installing the Manual Injector	9
Flow Connections	13
Leak Drainage	15
<b>3 Using the Manual Injector</b>	<b>17</b>
Solvent Information	18
Choice of Injection Seal	19
Needles	20
Injecting Sample	21
<b>4 Maintenance</b>	<b>23</b>
Overview of Maintenance	24
Flushing the Manual Injector	25
Cleaning the Manual Injector	26
Stator Face	27
Injection-Valve Seal	29
Position-Sensing Switch	32
<b>5 Parts and Materials for Maintenance</b>	<b>35</b>
Manual Injector	36
Injection-Valve Assembly	38
<b>6 Appendix</b>	<b>41</b>
Agilent Technologies on Internet	42

## Contents



# 1 Introduction

Introduction to the Manual Injector 6



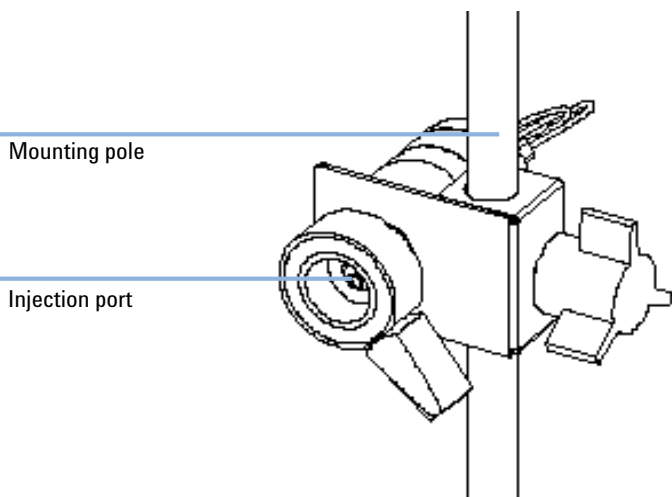
## Introduction to the Manual Injector

**NOTE**

See also the Rheodyne 7725i operating instructions supplied with the injection valve.

The Agilent 1200 Series manual injector uses a Rheodyne 7725i 7-port sample injection valve. Sample is loaded into the external 20- $\mu$ l sample loop through the injection port at the front of the valve. The valve has a ceramic stator and Vespel™ injection seal (for pH above 10, a Tefzel™ seal is available). A make-before-break passage in the stator ensures flow is not interrupted when the valve is switched between the INJECT and LOAD positions, and back again (see also “Needles” on page 20 and “Flow Connections” on page 13).

The valve is mounted on a steel mounting pole, and can be installed at the left- or right-hand side of the LC system.



**Figure 1** Rheodyne 7725i Injection Valve



## 2 Installing the Manual Injector

Unpacking the Manual Injector	8
Damaged Packaging	8
Delivery Checklist	8
Installing the Manual Injector	9
Flow Connections	13
Leak Drainage	15



## Unpacking the Manual Injector

### Damaged Packaging

Upon receipt of your manual injector, inspect the shipping containers for any signs of damage. If the containers or cushioning material are damaged, save them until the contents have been checked for completeness and the manual injector has been mechanically checked. If the shipping container or cushioning material is damaged, notify the carrier and save the shipping material for the carriers inspection.

### Delivery Checklist

Ensure all parts and materials have been delivered with the manual injector. The delivery checklist is shown in [Table 1](#) on page 8. To aid in parts identification, please see [“Parts and Materials for Maintenance”](#) on page 35. Please report missing or damaged parts to your local Agilent Technologies sales and service office.

**Table 1** Manual Injector Checklist

Description	Quantity	Part Number
Manual injection valve with start cable, <i>including</i> : operating instructions, needle port cleaner, vent tubes (×2) and fittings, 5/64 and 9/64-inch hex keys	1	5063-6502
Mounting pole	1	5001-3738
Connection capillary, 0.17 mm id, 500 mm	1	G1328-87600
Base plate	1	G1328-44111
Organizer plate	1	5042-8553
Catch tube cap	1	5042-8576
Valve syringe, fixed needle 50 µl	1	5182-9619
<i>User Manual</i>	1	G1328-90011



## Installing the Manual Injector

### CAUTION

"Defective on arrival" problems

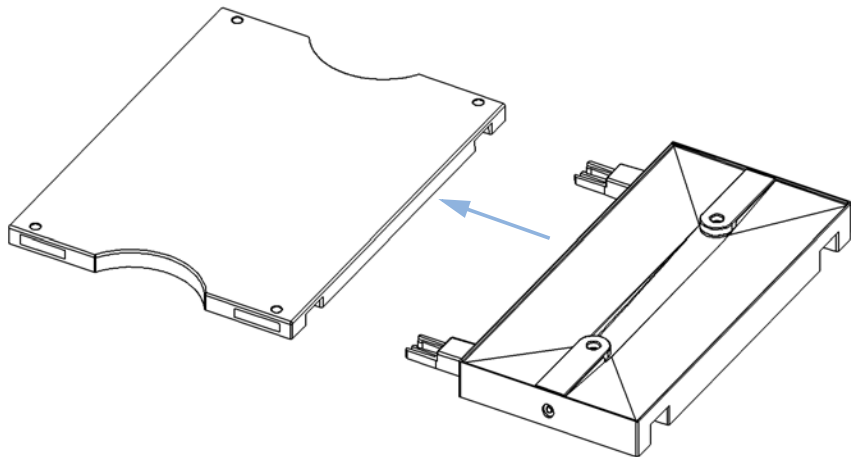
If there are signs of damage, please do not attempt to install the module. Inspection by Agilent is required to evaluate if the instrument is in good condition or damaged.

- Notify your Agilent sales and service office about the damage.
- An Agilent service representative will inspect the instrument at your site and initiate appropriate actions.

### NOTE

The manual injector can be installed at the left- or right-hand side of the instrument stack.

- 1 Place the baseplate on the bench.
- 2 Connect the two organizer plates to the base plate.



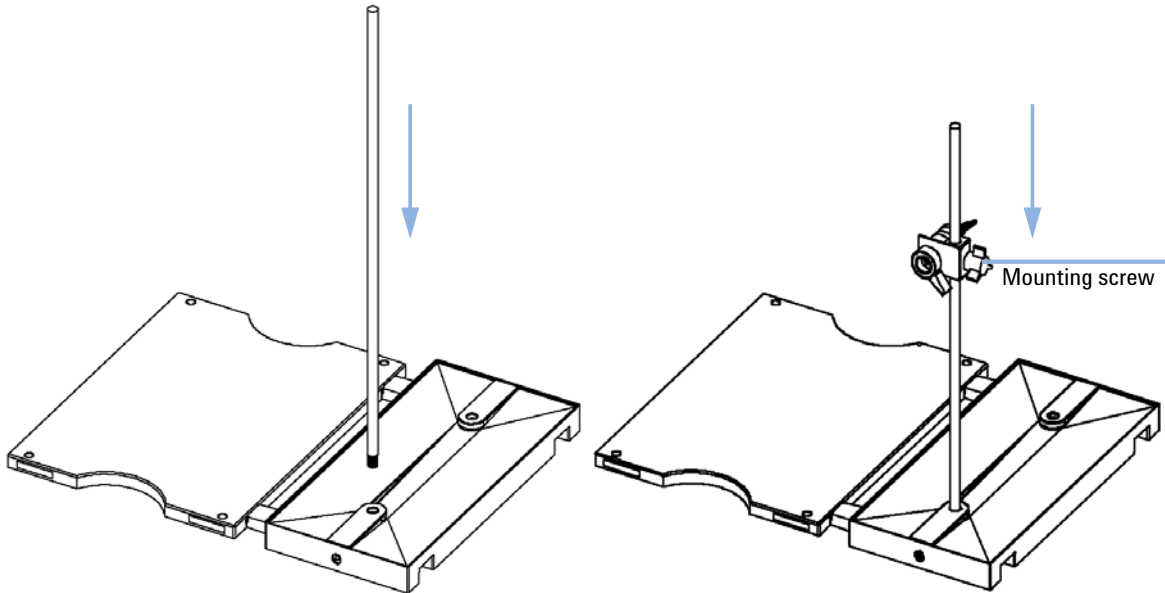
**Figure 2** Connecting the Organizer Plates

- 3 Screw the mounting pole into one of the two holes in the organizer plate.

## 2 Installing the Manual Injector

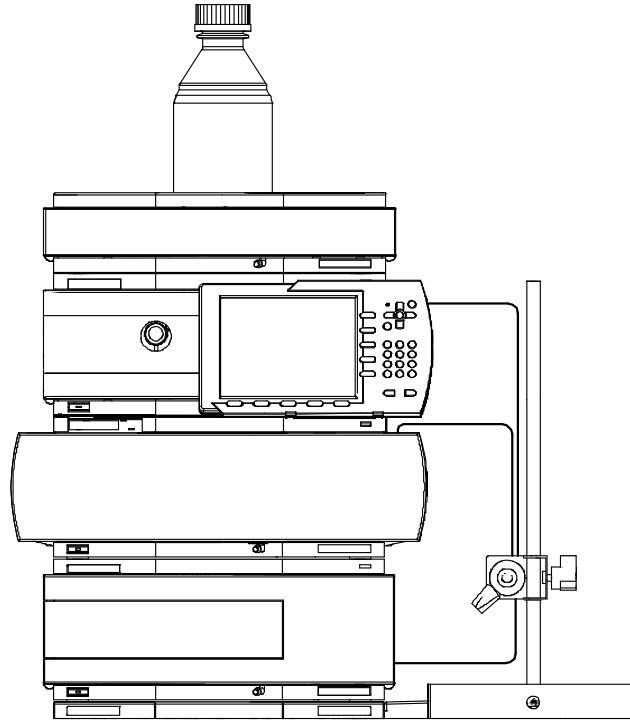
### Installing the Manual Injector

- Slide the manual injector onto the mounting pole (see [Figure 3](#) on page 10). Tighten the mounting screw.



**Figure 3** Installing the Mounting Pole and Manual Injector

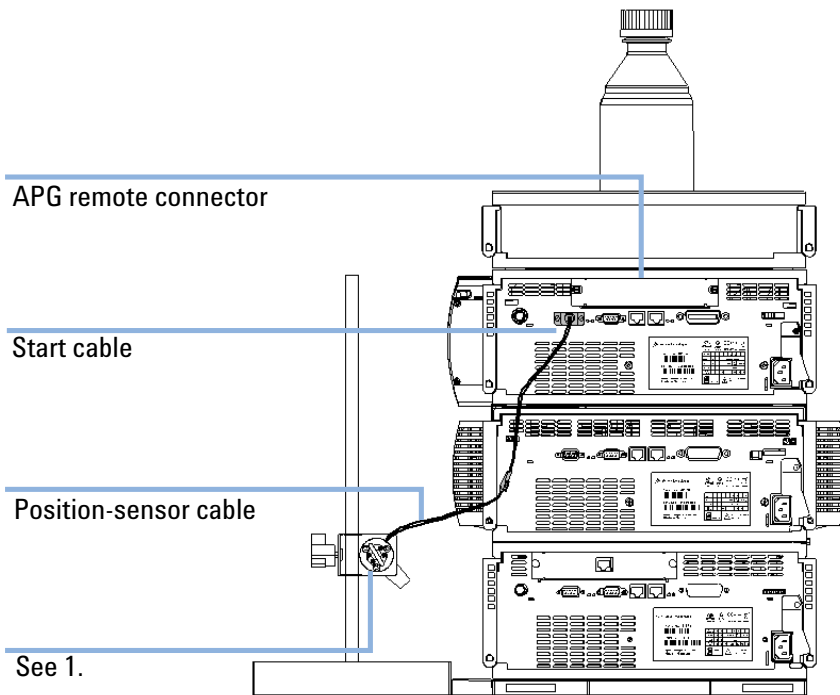
- 5 Install other system modules on top of the manual injector baseplate (see [Figure 4](#) on page 11).



**Figure 4** Installing the System

## 2 Installing the Manual Injector

### Installing the Manual Injector



**Figure 5** Installing the Start Cable

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1. See [Figure 6](#) on page 14

---

**6** Connect the capillaries to the manual injector (see “[Flow Connections](#)” on page 13).

## Flow Connections

### WARNING

#### *Toxic and hazardous solvents*

The handling of solvents and reagents can hold health risks.

- When opening capillary or tube fittings solvents may leak out.
  - Please observe appropriate safety procedures (for example, goggles, safety gloves and protective clothing) as described in the material handling and safety data sheet supplied by the solvent vendor, especially when toxic or hazardous solvents are used (see also “[Leak Drainage](#)” on page 15).
- 

### CAUTION

#### *Prevent siphoning*

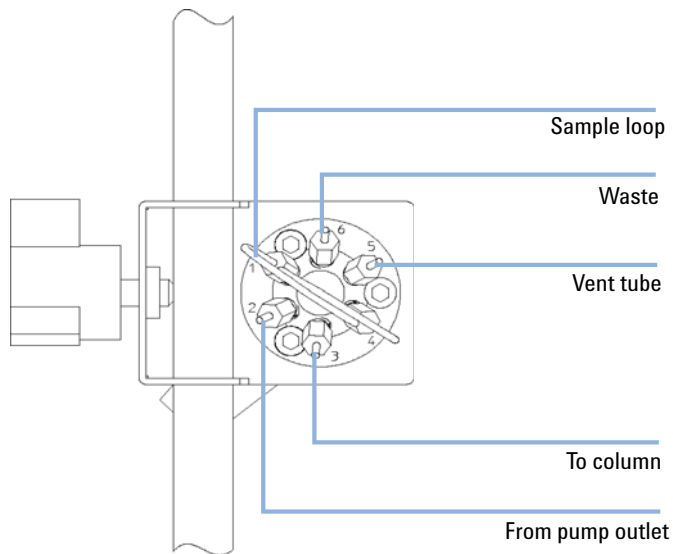
- The outlets of the two vent capillaries (ports 5 and 6) and the needle port must be at the same level to prevent siphoning (see [Figure 7](#) on page 14).
- 

- 1 Connect the pump outlet capillary to port 2.
- 2 Connect the column-compartment inlet capillary to port 3.
- 3 Connect the sample loop between ports 1 and 4.

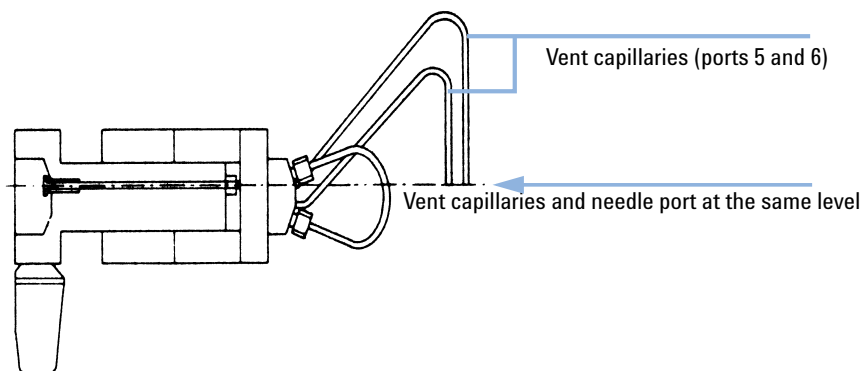
## 2 Installing the Manual Injector

### Flow Connections

- 4 Connect one vent capillary (supplied with valve) to port 5 and one to port 6.



**Figure 6** Flow Connections



**Figure 7** Vent Capillaries

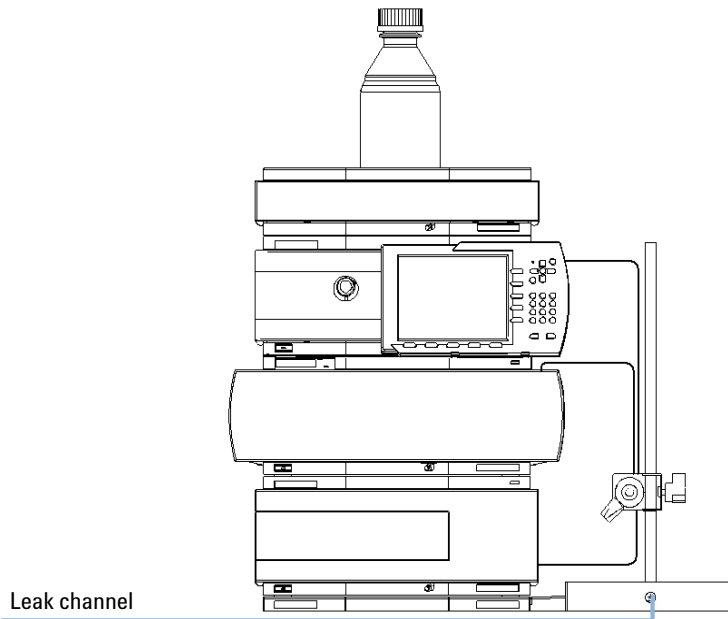
## Leak Drainage

**WARNING**

*Leaking injector fittings*

In the event of a leak, solvent will drop into the leak channel in the baseplate, from where it is channelled to the front and back of the baseplate.

→ Check the manual injector fittings periodically for signs of leakage.



**Figure 8** Leak Drainage

## **2** **Installing the Manual Injector** Leak Drainage





### 3 Using the Manual Injector

Solvent Information 18

Choice of Injection Seal 19

Needles 20

Injecting Sample 21



## Solvent Information

Observe the following recommendations on the use of solvents.

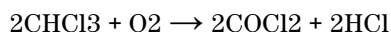
### Flow Cell

Long term operation at pH > 11 should be avoided. Never leave strongly alkaline solutions in the flow cell without flow.

### Solvents

Always filter solvents through 0.4 µm filters, small particles can permanently block filters, frits and capillaries. Avoid the use of the following steel-corrosive solvents:

- Solutions of alkali halides and their respective acids (for example, lithium iodide, potassium chloride, and so on).
- High concentrations of inorganic acids like sulfuric acid, especially at higher temperatures (replace, if your chromatography method allows, by phosphoric acid or phosphate buffer which are less corrosive against stainless steel).
- Halogenated solvents or mixtures which form radicals and/or acids, for example:



This reaction, in which stainless steel probably acts as a catalyst, occurs quickly with dried chloroform if the drying process removes the stabilizing alcohol.

- Chromatographic grade ethers, which can contain peroxides (for example, THF, dioxane, di-isopropylether). Such ethers should be filtered through dry aluminium oxide which adsorbs the peroxides.
- Solutions of organic acids (acetic acid, formic acid, and so on) in organic solvents. For example, a 1-% solution of acetic acid in methanol may attack steel.
- Mixtures of carbon tetrachloride with 2-propanol or THF. dissolve stainless steel.

## Choice of Injection Seal

The manual injector is supplied with a Vespel™ injection seal as standard. Vespel™ is sensitive to alkaline attack, so avoid mobile phases with a pH of 10 or more. Use the Tefzel™ injection seal (see [“Injection-Valve Assembly”](#) on page 38) for mobile phases with a pH above 10.

## Needles

**CAUTION**

Needle can damage valve

→ Always use the correct size needle.

---

The manual injector is not supplied with syringes or needles.

Use needles with 0.028-inch outer diameter (22 gauge) × 2-inch long needle, without electro-taper, and with 90° point style (square tip).

## Injecting Sample

### WARNING

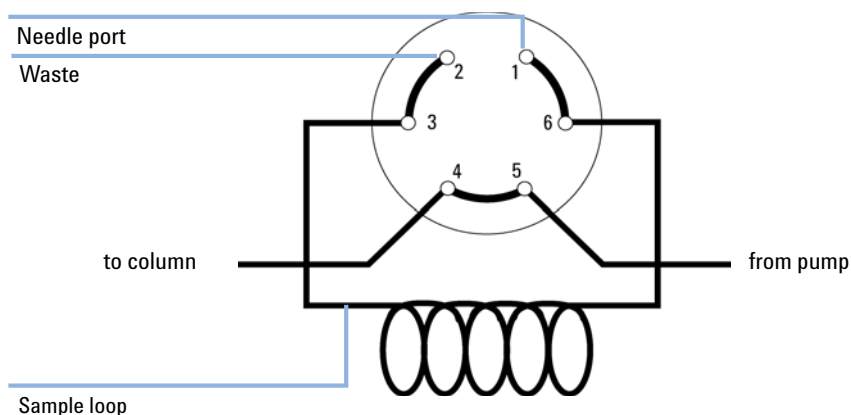
#### Ejection of mobile phase

When using sample loops larger than 100  $\mu\text{l}$ , mobile phase may be ejected from the needle port as the mobile phase in the sample loop decompresses.

- Please observe appropriate safety procedures (for example, goggles, safety gloves and protective clothing) as described in the material handling and safety data sheet supplied by the solvent vendor, especially when toxic or hazardous solvents are used.

### LOAD Position

In the LOAD position (see [Figure 9](#) on page 21), the pump is connected directly to the column (ports 2 and 3 connected), and the needle port is connected to the sample loop. At least 2 to 3 sample-loop volumes (more if better precision is required) of sample should be injected through the needle port to provide good precision. The sample fills the loop, and excess sample is expelled through the vent tube connected to port 6.



**Figure 9** LOAD Position





## 4 Maintenance

Overview of Maintenance	24
Flushing the Manual Injector	25
Cleaning the Manual Injector	26
Stator Face	27
Injection-Valve Seal	29
Position-Sensing Switch	32



## Overview of Maintenance

**Table 2** Overview of Repair Procedures

Procedure	Typical Frequency	Time Required	Notes
Flushing the injector	After using aqueous buffers or salt solutions	5 minutes	See <a href="#">“Flushing the Manual Injector”</a> on page 25
Exchanging the stator face	When visibly scratched, or when the valve performance shows indication of leakage or wear	10 minutes	See <a href="#">“Stator Face”</a> on page 27
Exchanging the injection-valve seal	After approximately 10000 to 20000 injections, or when the valve performance shows indication of leakage or wear	10 minutes	See <a href="#">“Injection-Valve Seal”</a> on page 29
Exchanging the position-sensing switch	When cable damaged or when no start signal is sent when switching to the inject position	10 minutes	See <a href="#">“Position-Sensing Switch”</a> on page 32



## Flushing the Manual Injector

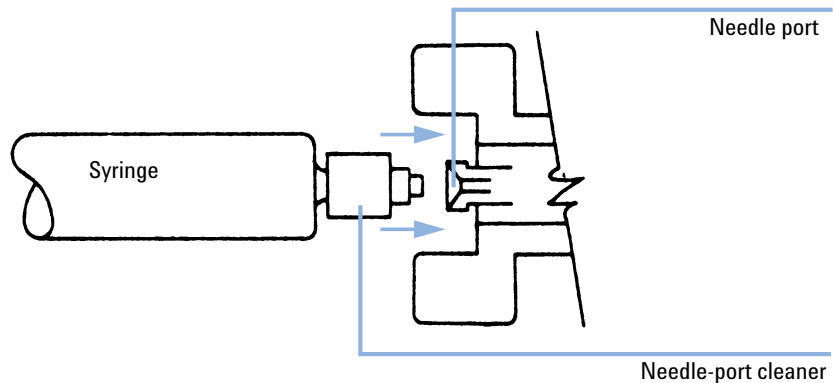
### CAUTION

#### *Damage through crystal formation*

The use of aqueous buffers or salt solutions can lead to crystal formation which may cause scratches on the injection seal.

→ Always rinse the valve with water after using aqueous buffers or salt solutions.

- 1 Switch the valve to the INJECT position.
- 2 Use the pump to flush the sample loop and seal grooves.
- 3 Use the needle-port cleaner (supplied with the valve) and syringe to flush the needle port and vent capillary.



**Figure 11** Needle-port Cleaner

## **Cleaning the Manual Injector**

The manual injector base should be kept clean. Cleaning should be done with a soft cloth slightly dampened with water or a solution of water and a mild detergent.

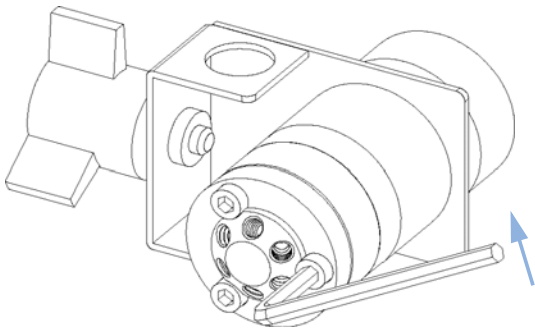
## Stator Face

- When**
- Poor injection-volume reproducibility
  - Leaking injection valve

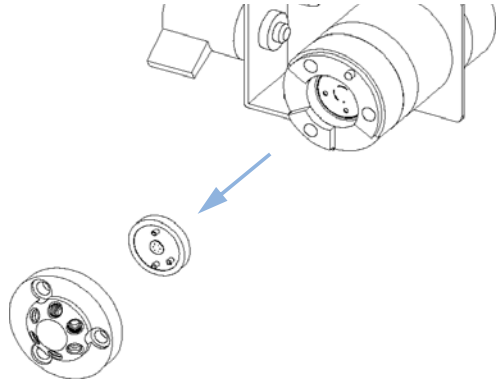
- Tools required**
- Hex key, 9/64 inch (supplied with valve)

<b>Parts required</b>	<b>#</b>	<b>Part number</b>	<b>Description</b>
	1	0100-1859	Stator face

**1** Loosen the three stator screws.



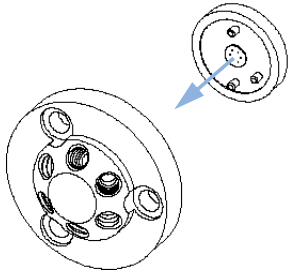
**2** Remove the stator head and stator face.



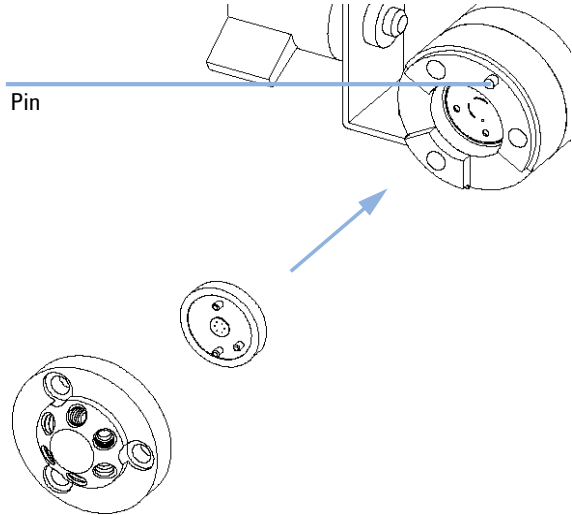
## 4 Maintenance

### Stator Face

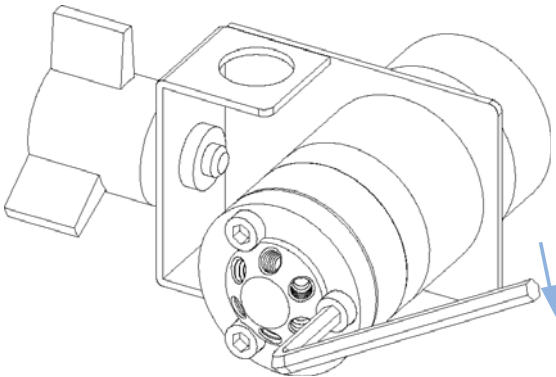
**3** Insert the new stator face onto the stator head.



**4** Install the stator head and stator face onto the valve. Ensure the pin in the stator ring is aligned with the hole in the stator head.



**5** Secure the stator face and stator head in place with the stator screws. Tighten each screw alternately  $\frac{1}{4}$ -turn until the stator head is secure.



## Injection-Valve Seal

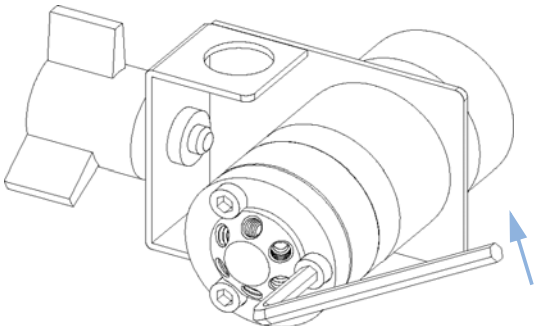
- When**
- Poor injection-volume reproducibility
  - Leaking injection valve

- Tools required**
- Hex key, 9/64 inch (supplied with valve)

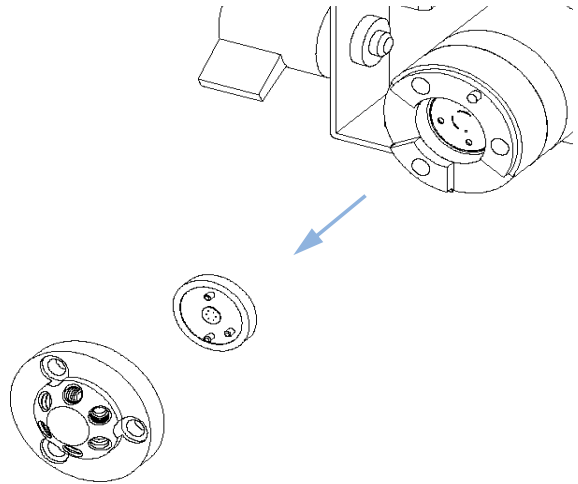
**Parts required**

#	Part number	Description
1	0100-0623 (VespeI™), 0100-0620(Tefz eI™)	Rotor seal

**1** Loosen the three stator screws.



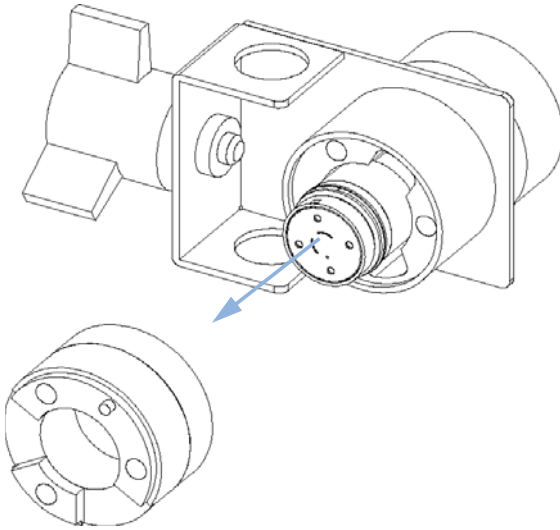
**2** Remove the stator head and stator face (see "Stator Face" on page 27).



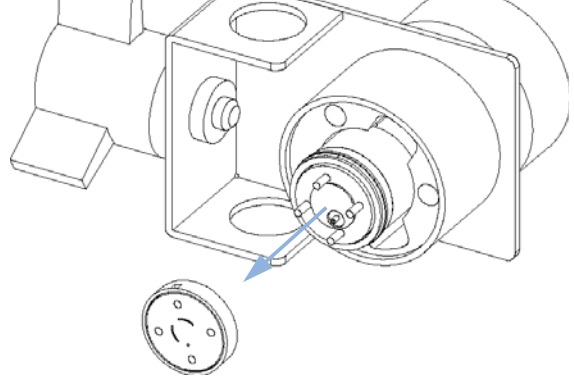
## 4 Maintenance

### Injection-Valve Seal

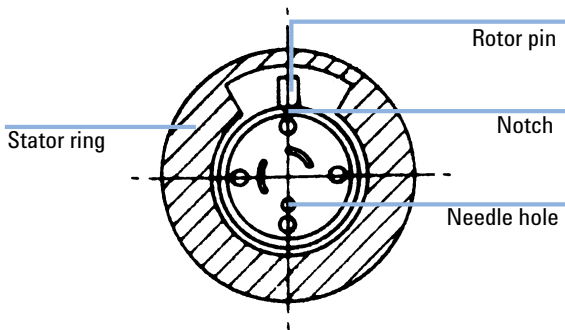
**3** Remove the stator ring.



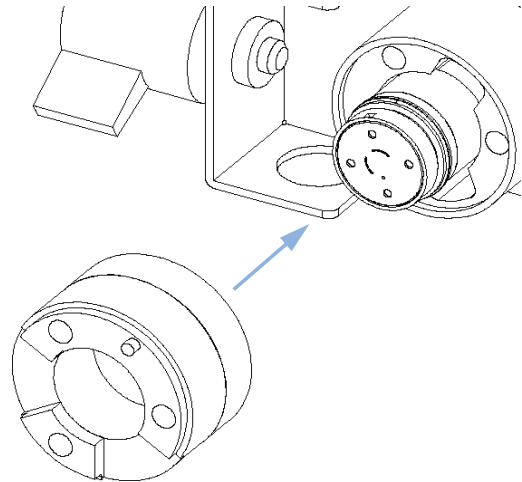
**4** Remove the seal.



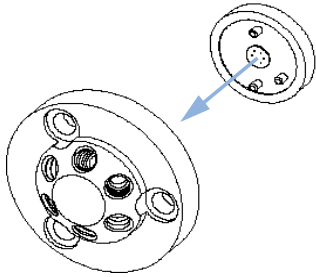
**5** Install the new seal. Ensure the seal is positioned as shown.



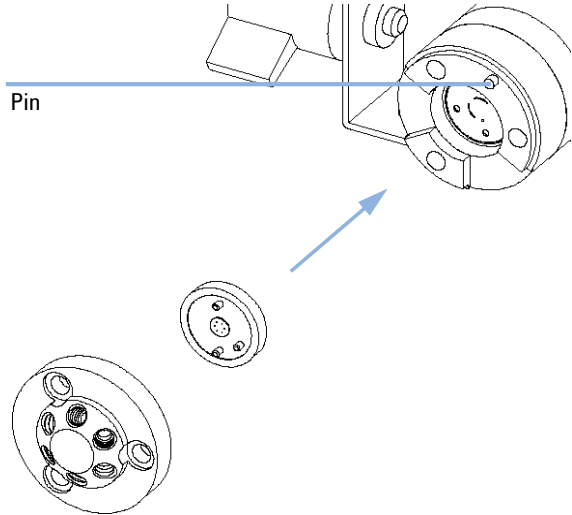
**6** Install the stator ring. Ensure the pin in the stator ring is aligned with the hole in the valve body.



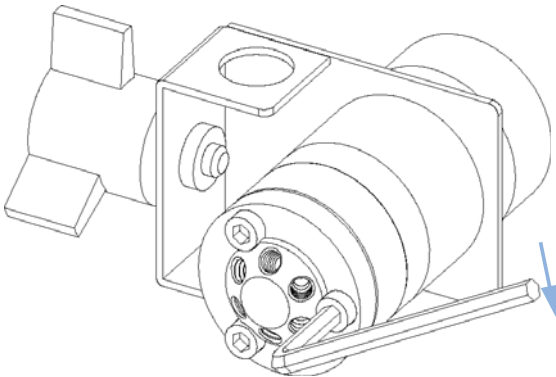
**7** Insert the stator face onto the stator head.



**8** Install the stator head and stator face onto the valve. Ensure the pin in the stator ring is aligned with the hole in the stator head.



**9** Secure the stator face and stator head in place with the stator screws. Tighten each screw alternately  $\frac{1}{4}$ -turn until the stator head is secure.



## 4 Maintenance

### Position-Sensing Switch

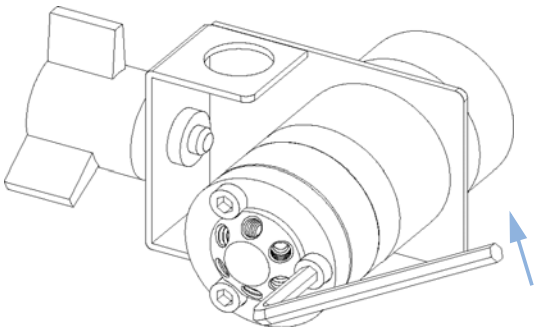
# Position-Sensing Switch

**When** • No start signal when switching to the inject position

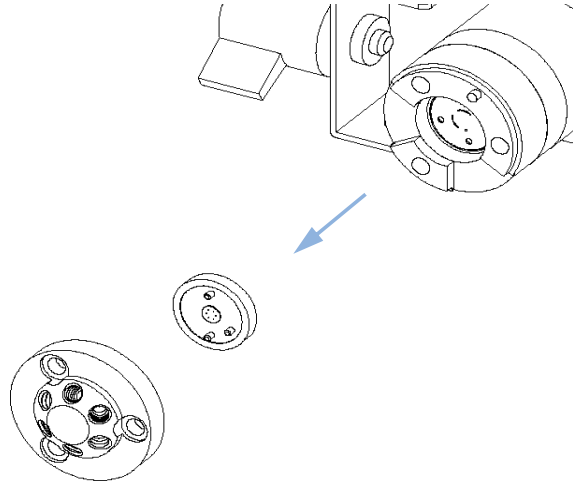
**Tools required** Hex key, 9/64 inch (supplied with valve)

Parts required	#	Part number	Description
	1	0490-1849	Position-sensing switch

**1** Loosen the three stator screws.

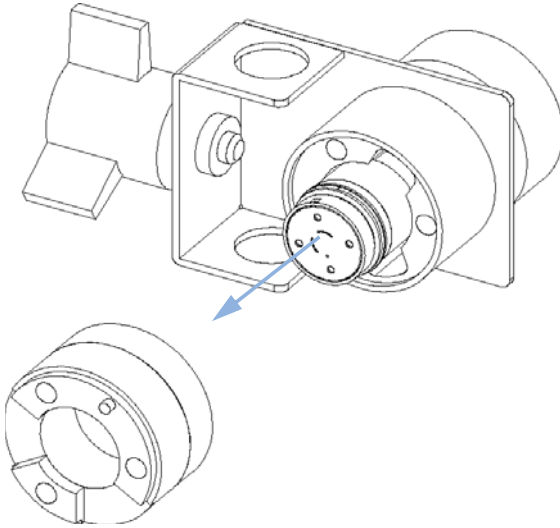


**2** Remove the stator head and stator face (see "Stator Face" on page 27).

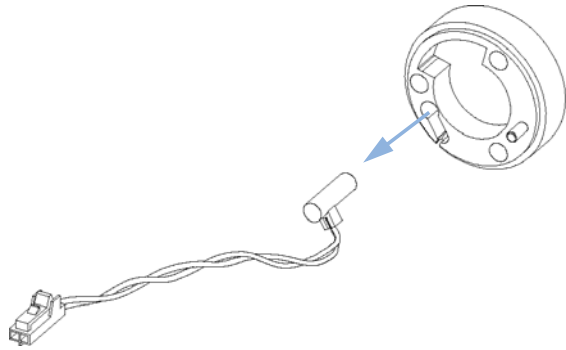




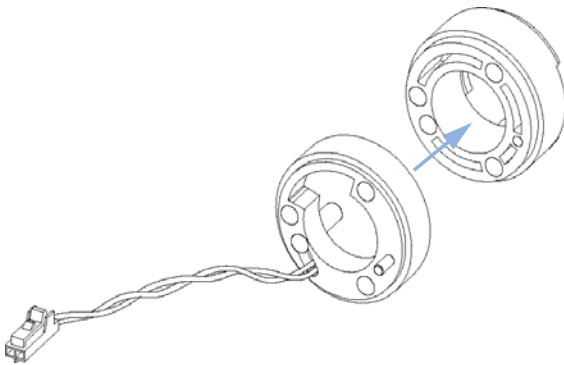
3 Remove the stator ring.



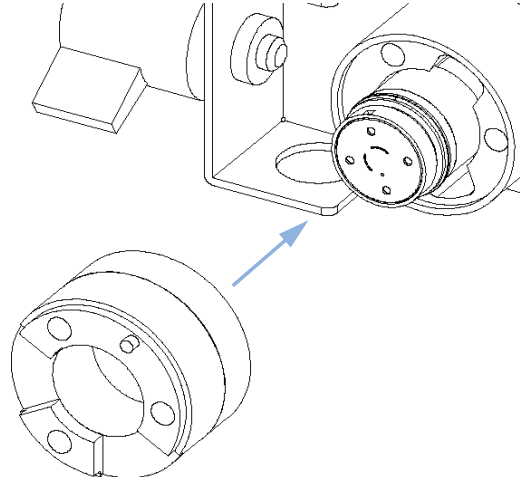
4 Disconnect the sensor cable from the start cable. Pull the sensing switch out of the stator ring.



5 Insert the new sensing switch into the stator ring.



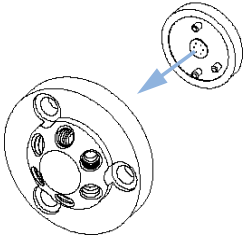
6 Install the stator ring. Ensure the pin in the stator ring is aligned with the hole in the valve body.



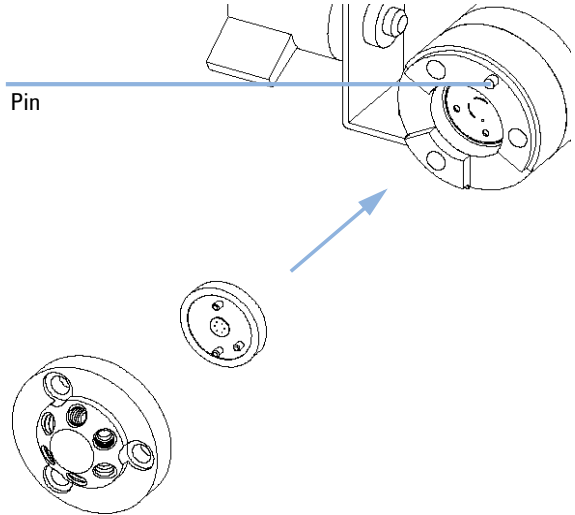
## 4 Maintenance

### Position-Sensing Switch

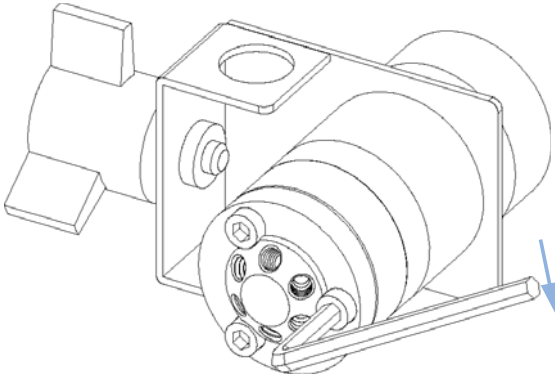
**7** Insert the stator face onto the stator head.



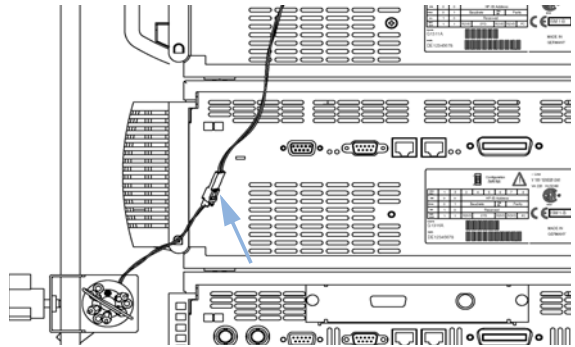
**8** Install the stator head and stator face onto the valve. Ensure the pin in the stator ring is aligned with the hole in the stator head.



**9** Secure the stator face and stator head in place with the stator screws. Tighten each screw alternately  $\frac{1}{4}$ -turn until the stator head is secure.



**10** Reconnect the sensor cable to the start cable.





## 5 Parts and Materials for Maintenance

Manual Injector 36

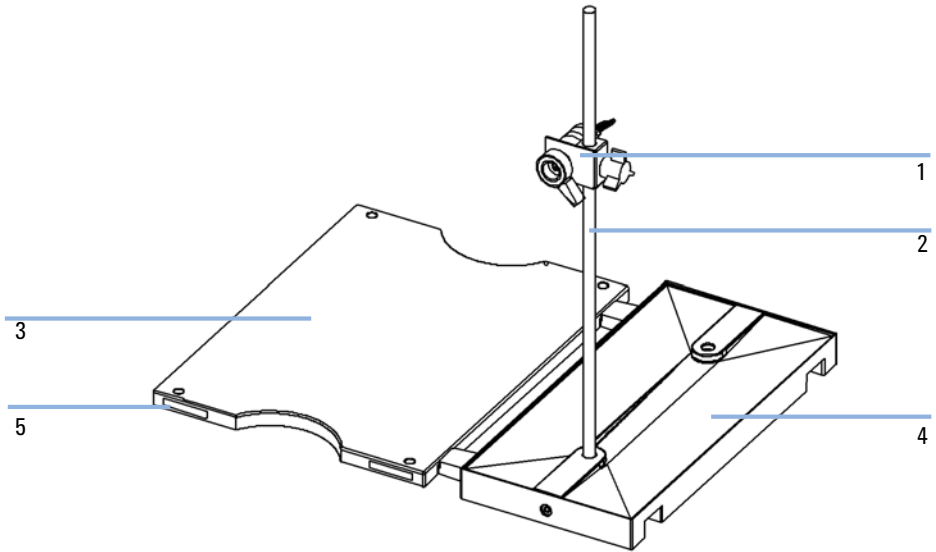
Injection-Valve Assembly 38



## Manual Injector

**Table 3** Manual Injector

<b>Item</b>	<b>Description</b>	<b>Part Number</b>
1	Manual injection valve (see <a href="#">“Injection-Valve Assembly”</a> on page 38)	<b>5063-6502</b>
2	Mounting pole	<b>5001-3738</b>
3	Base plate	<b>G1328-44111</b>
4	Organizer plate	<b>5042-8553</b>
	Catch tube cap	<b>5042-8576</b>
5	Name plate for Agilent 1200 Series	<b>5042-8901</b>
	Valve syringe, fixed needle 50 µl	<b>5182-9619</b>
	Connection capillary, 0.17 mm id, 500 mm (not shown)	<b>G1328-87600</b>
	Start cable (not shown)	<b>0100-1677</b>

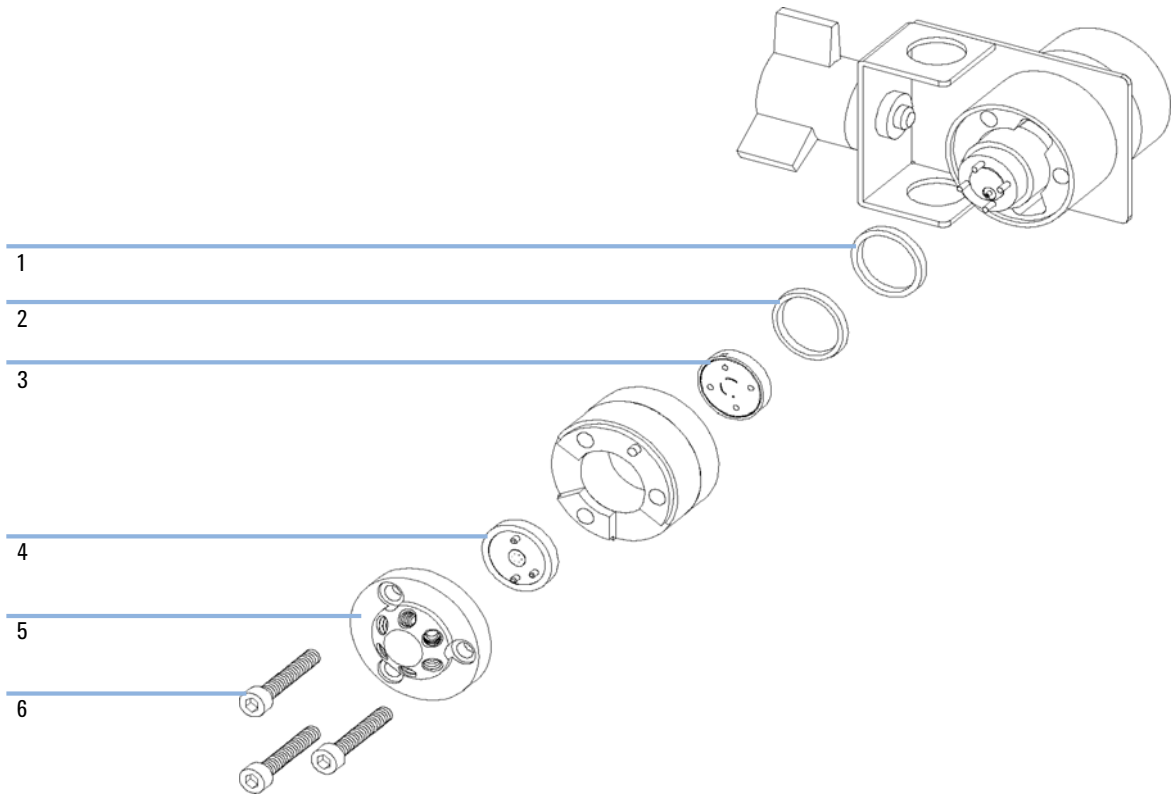


**Figure 12** Manual Injector

## Injection-Valve Assembly

**Table 4** Injection-Valve Assembly

<b>Item</b>	<b>Description</b>	<b>Part Number</b>
	Manual injection valve with starts cable (complete assembly), including operating instructions, needle port cleaner, vent tubes (×2) and fittings, 5/64 and 9/64-inch hex keys. Includes items 1 – 8	<b>5063-6502</b>
1	Bearing ring – order rebuild kit instead	<b>0101-1254</b>
2	Isolation seal	<b>0100-1857</b>
3	Rotor seal (VespeI™)	<b>0101-0623</b>
	Rotor seal (Tefzel™)	<b>0101-0620</b>
	Rotor Seal (PEEK™)	<b>0101-1255</b>
4	Stator face	<b>0100-1859</b>
5	Stator head	<b>0100-1860</b>
6	Stator screws	<b>1535-4857</b>
7	Hex key 9/64 inch (for stator screws — not shown)	<b>8710-2394</b>
8	Position sensing switch (not shown)	<b>0490-1849</b>



**Figure 13** Injection-Valve Assembly

Sample loops

Description	Stainless Steel loops	PEEK loops
Sample loop 5 $\mu$ l	0101-1248	0101-1241
Sample loop 10 $\mu$ l	0100-1923	0100-1240
Sample loop 20 $\mu$ l	0100-1922	0100-1239
Sample loop 50 $\mu$ l	0100-1924	0100-1238
Sample loop 100 $\mu$ l	0100-1921	0100-1242
Sample loop 200 $\mu$ l	0101-1247	0101-1327

## 5 Parts and Materials for Maintenance

### Injection-Valve Assembly

Description	Stainless Steel loops	PEEK loops
Sample loop 500 µl	0101-1246	0101-1236
Sample loop 1 ml	0101-1245	0101-1235
Sample loop 2 ml	0101-1244	0101-1234
Sample loop 5 ml	0101-1243	0101-1230





## 6 Appendix

Agilent Technologies on Internet 42



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# Index

## A

Agilent on internet 42  
APG-remote 12

## B

buffers 25

## C

capillary connections 13  
cleaning the manual injector 26

## D

damaged packaging 8  
delivery checklist 8  
description 6

## E

exchanging  
  injection seal 29  
  position-sensing switch 32  
  stator face 27

## F

flow cell  
  solvent information 18  
flow connections 13  
flushing the manual injector 25

## I

information  
  on internet 42  
INJECT 6, 22

injecting sample 6  
injection seal 29  
  tefel 19  
  vespel 19  
installation 9  
installing the manual injector 9  
internet 42, 42

## L

leak channel 15  
leak drainage 15  
leaks 13  
LOAD 6, 21

## M

make-before-break 6

## N

needle type 20  
needle-port cleaner 25  
needles 20

## P

position-sensing switch 32  
position-sensor cable 12  
precision 21

## R

repair procedures  
  injection seal 29  
  position-sensing switch 32  
  stator face 27  
Rheodyne 7725i 6

## S

salt solutions 25  
sample loops 6  
sample volume 21  
solvents  
  acids 18  
  buffers 25  
  ethers 18  
  rinsing 25  
  salt solutions 25  
  steel-corrosive 18  
start cable 12  
stator face 27

## U

unpacking  
  damaged packaging 8  
  delivery checklist 8

## W

worldwide web 42

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## In This Book

This manual contains user information about the Agilent 1200 Series manual injector. The manual describes the following:

- introduction to the manual injector,
- installing the manual injector,
- using the manual injector
- maintenance of the manual injector,
- parts and materials, and
- additional information.

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