Agilent 5100/5110 and 5800/5900 ICP-OES

Easy-fit Fully Demountable Torch User Guide

Introduction

The ICP-OES torch is a crucial component of the sample introduction system for the ICP-OES spectrometers. It plays an important role in determining the sensitivity, precision and stability achieved during analyses.

Figure 1: Fully demountable torch assembly

This document outlines the recommended procedures for assembly and disassembly, installation, cleaning and maintenance of the fully demountable torch.

The fully demountable torch is composed of five main parts:

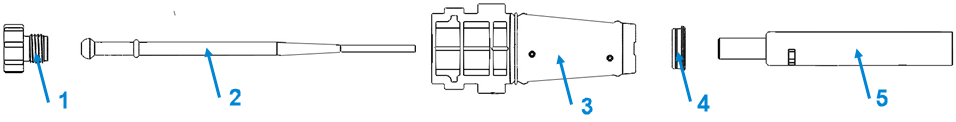


Figure 2 Exploded view

1. Locking nut
2. Injector (quartz or inert alumina)
3. Torch base
4. Top seal
5. Quartz outer tube-set

The fully demountable torch kit is supplied with all the components required for torch assembly. Some kits include a spare quartz outer tube-set. The torch can be used in either RV or DV mode, when fitted with the appropriate quartz outer tube-set.

The torch design allows either the injector and/or the quartz outer tube-set to be removed from the torch base for easy cleaning or replacement.

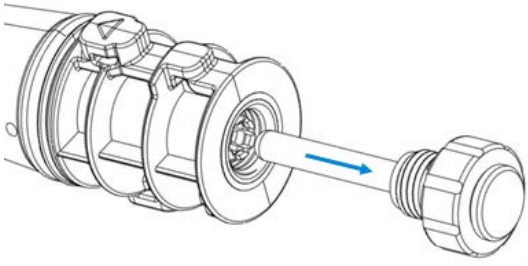
A range of injector types with different internal diameters are available, including an inert alumina injector recommended for use with hydrofluoric (HF) acid digests. This enables the torch to be configured for different applications. Additional or replacement components can be ordered separately.

Before first use

The torch is shipped without the injector installed. Before installing the torch in your instrument, follow the steps below to install the injector.

Initial injector setup

1 Unscrew the locking nut on the torch base to draw the shipping plug out of the torch base. Push the shipping plug out of the locking nut.



2 Fully insert the injector through the torch body until the bulge contacts the retaining clamp and "clicks" into position.

3 Replace the locking nut and tighten to secure the injector. Hand tighten only.

CAUTION **Overtightening can damage the injector and torch body.**

Disassembly of the fully demountable torch

WARNING

Hot Surfaces

The torch and torch compartment become extremely hot during instrument operation and remain hot for some time after the plasma has been switched off. Allow the torch and torch compartment to cool for at least five minutes before attempting to remove the torch.

Using a muffle furnace or portable handheld propane torch for carbon removal will heat the injector to very high temperatures. Always wear appropriate safety equipment when handling heated torch components.

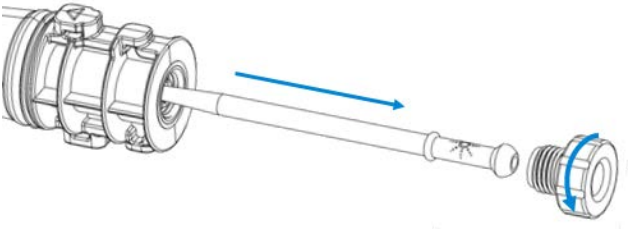
WARNING

Corrosive Liquids

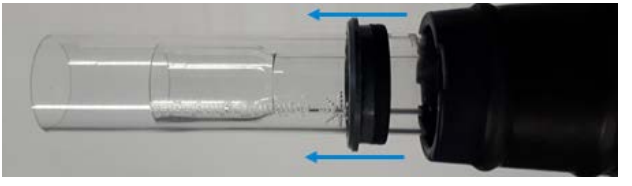
Acids, corrosive substances or other hazardous chemical residues may be present on the torch components and can cause severe burns when they come into contact with the skin. The cleaning procedure involves the use of other hazardous or corrosive chemicals. Appropriate protective clothing must be worn at all times when handling the torch components and the cleaning chemicals. If acids or the cleaning chemicals contact the skin, wash off with copious amounts of water and seek medical attention immediately.

1 Open the torch loader and remove the torch from the instrument.

2 Unscrew the locking nut on the base of the torch and remove the injector by gently pulling on the ball joint.



3 Remove the quartz outer tube-set from the top of the torch base. If the top seal is dislodged with the quartz outer tube-set, slide the seal away from the Torch base to remove



Reassembly of the fully demountable torch

1 Place the top seal back on the top of the torch base and ensure this is properly seated by pressing firmly on the top edges.

2 Insert the quartz outer tube-set into the torch body and position it so that the groove on the torch body aligns with the "T" alignment mark on the tube-set.

3 Press the outer tube-set fully into the torch body.

4 Fully insert the injector through the base of the torch body until the bulge contacts the retaining clamp and "clicks" into position.

5 Replace the locking nut and tighten to secure the injector. Hand tighten only.

CAUTION **Overtightening can damage the injector and torch body.**

6 The fully demountable torch is now ready for use. Install the torch by following the installation instructions in the ICP Expert Help and Learning Center.

Maintenance of the fully demountable torch

All ICP-OES torches require regular preventative maintenance. To ensure optimum performance throughout its service life, inspect the torch components and clean regularly. Look for damage such as loose fitting of the quartz outer tube-sets in the base, holes or significant cracks. If any damage is found, replace the damaged component.

CAUTION **Do not soak the removable top seal of the torch, or the torch base in any cleaning solution. If required, wipe these components with a clean tissue. Use dry, clean air to blow any particles out of the injector channel.**

Outer tube-set

To clean inorganic residues from the injector or the outer tube-set, soak them in a 50% Aqua Regia solution (1 part deionized water to 1 part Aqua Regia (1:3 concentrated nitric acid: hydrochloric acid)) for at least 1 hour. Rinse thoroughly and dry completely before refitting to the torch base.

Injector

If there is excessive carbon build-up on the outer tube-set or the tip of the injector, remove both parts and place them inside a muffle furnace. Ramp the temperature to 550ºC, holding the temperature at <550ºC for a maximum of 20 minutes. Then allow the furnace to ramp down slowly and cool.

To remove any remaining residue from the tip of the injector, soak the tip in a 50% Aqua Regia solution for at least 1 hour. Rinse thoroughly and dry completely before refitting to the torch base.

If a muffle furnace is not available, a handheld propane torch can be used to remove the carbon build-up. Refer to the procedures outlined in the ICP Expert Help and Learning Center or the Agilent 5100/5110 and 5800/5900 ICP-OES Easy-fit Torch Maintenance and Cleaning guide (Agilent publication # G8010-90015).

General

Replace the outer tube-set or the quartz injector when the outer surface of the quartz is rough to the touch (which indicates signs of wear), or if there are any cracks visible.

For more details, refer to the procedures outlined in the ICP Expert Help and Learning Center or the Agilent 5100/5110 and 5800/5900 ICP-OES Easy-fit Torch Maintenance and Cleaning guide (Agilent publication # G8010-90015).

Parts list

For spare parts and consumables ordering information, refer to the Agilent Technologies website: www.agilent.com

The items listed below can be ordered online from the Agilent website or through your local sales representative**.**

Replacement Injectors for fully demountable torch used with 5100/5110 and 5800/5900 ICP-OES	
0.8mm ID quartz injector, recommended for volatile organic solvents	G8020-60805
1.4mm ID quartz injector, recommended for semi-volatile organic solvents and acidic solutions with RV torch type	G8020-60806
1.8mm ID quartz injector, recommended for acidic solutions with DV torch type	G8020-60807
2.4mm ID quartz injector, recommended for high TDS samples	G8020-60808
1.8mm ID alumina injector (inert), recommended for HF digests	G8020-60809
Replacement outer tube-sets for torches used with 5100/5110 and 5800/5900 ICP-OES	
Quartz outer tube-set, for use with organic solvents, RV type	G8016-60000
Quartz outer tube-set, for use with organic solvents, DV type	G8014-60022
Quartz outer tube-set, for use with aqueous & acidic solutions, RV type	G8010-60264
Quartz outer tube-set, for use with aqueous & acidic solutions, DV type	G8010-60263
Other 5100/5110 and 5800/5900 ICP-OES torch supplies	
Top seal for fully and semi-demountable torches, pack/3	G8014-60023
Injector locking nut for fully demountable torch	G8020-60810

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