GLASS EXPANSION
Quality By Design

User Guide

E-Torch

For Thermo® PRO DUO ICP-OES

P/N 30-808-4388



INS-0698

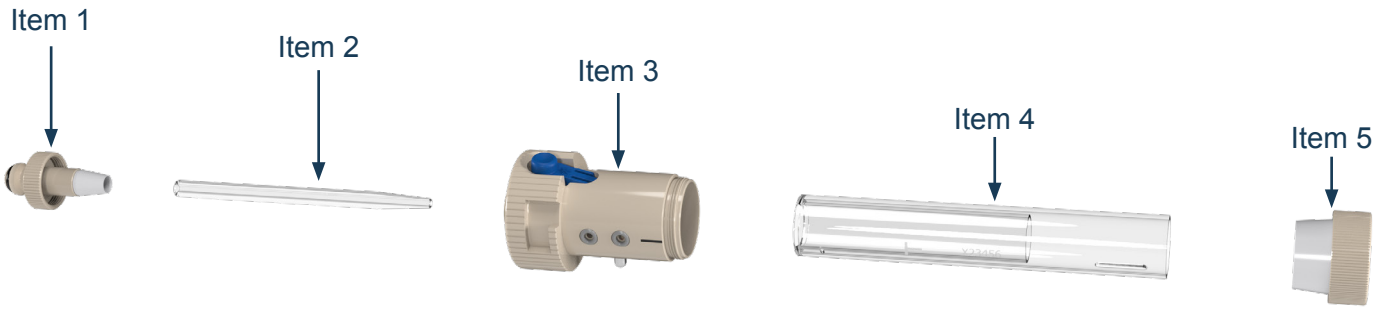
Disclaimer: Glass Expansion supplies products to customers with the assumption that only qualified individuals who are properly trained in the appropriate procedures will use our products. It is our customer's entire responsibility to safely store, handle and use the products ordered from Glass Expansion. We assume the installer/operator to be experienced, competent, safety conscious professionals. Glass Expansion assumes no liability for any damage or injuries - physical, emotional or mental, arising out of persons incorrectly or inappropriately using or handling our products. We also assume no liability for any damage to an instrument or product from incorrect installation, handling or use of the product by the user.

Before you Start

Thank you for purchasing E-Torch P/N 30-808-4388.

As supplied, the E-Torch is fully assembled. The table below lists the E-Torch parts that can be ordered separately.

Item no.	Part Number	Description	Qty
1	31-808-4582	S13 Injector Retainer 6.5mm	1
2	31-808-2836	Quartz Injector 2.0mm ID	1
3	31-808-4425	E-Torch Body	1
4	31-808-4390	Quartz Plasma Tube	1
5	31-808-4498	Plasma Tube Retainer 22mm	1



Scope

The following pages of this document will explain:

1. Precautions for personal safety and E-Torch preservation
2. Removal and Installation of the E-Torch injector
3. Removal of E-Torch Plasma Tube
4. Install E-Torch Plasma Tube
5. Removal/Replacement of o-rings
6. Care and Maintenance

Instructions

1. Precautions for personal safety and E-Torch preservation.

- Always wear safety gloves and safety glasses when handling ICP torches.
- It is recommended you read and understand this procedure before starting.
- The person performing this work must be competent in making basic ICP connections.
- The ICP torch is made from high grade engineered materials – Handle with extreme care.

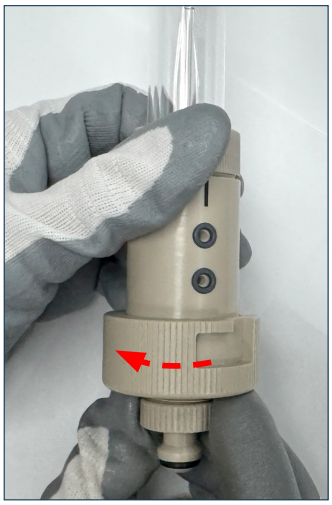
2. Remove the E-Torch Injector

Note: Removal of the E-Torch Injector must be done before removal of the quartz plasma tube to ensure injector does not get damaged.

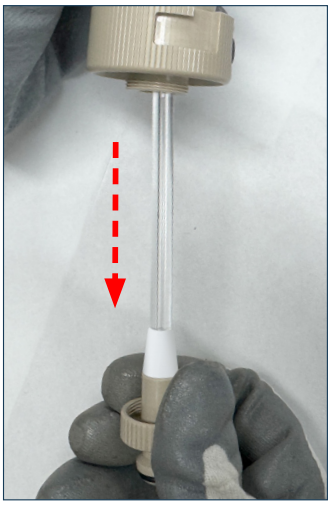
How to remove the injector:

2.1 Unscrew the injector retainer from rear of E-Torch then carefully remove the retainer (with injector) from E-Torch.

Note: Removal of the injector should be done by holding the E-Torch vertically.



Step 2.1a



Step 2.1b

2.2 Slide the injector out from the injector retainer. Check condition of the ferrule. Replace E-Torch injector retainer and ferrule if the ferrule is damaged or deteriorated.



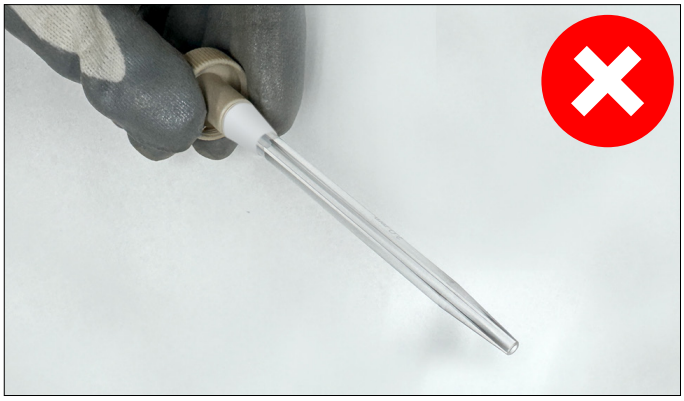
Step 2.2a



Step 2.2b

Critical Notes:

- Do **NOT** point downwards as the injector may fall out.



Do not point the injector and retainer downwards.

To reinstall the injector with the E-Torch:

Repeat steps 2.1 and 2.2 in reverse order.

Note: End of injector must butt-up against inside of retainer. Check how far the injector is recessed from the inner tube - approximately 4mm.

3. Removal of the E-Torch Plasma Tube

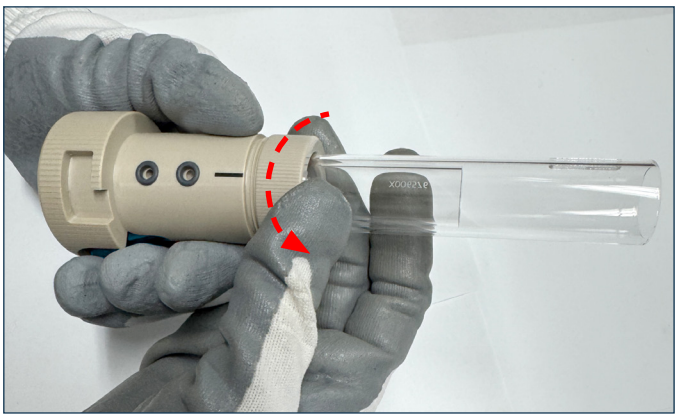
The E-Torch's plasma tube is accurately located in the E-Torch body with a plasma tube retainer.

The plasma tube can be removed by completing the following steps:

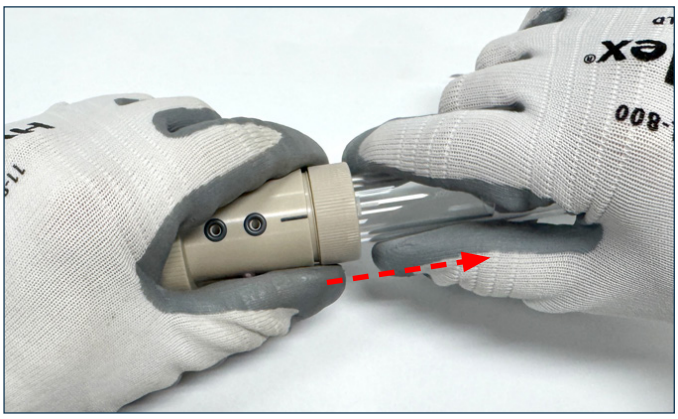
3.1 Remove injector retainer and injector (see step 2 above).

3.2 Loosen the plasma tube retainer one full turn by turning it counterclockwise.

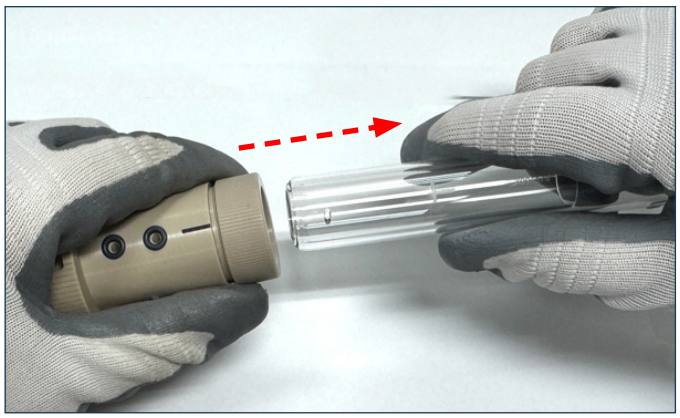
3.3 Hold the E-Torch body and plasma tube, then gently pull away the plasma tube from the E-Torch body.



Step 3.2



Step 3.3a



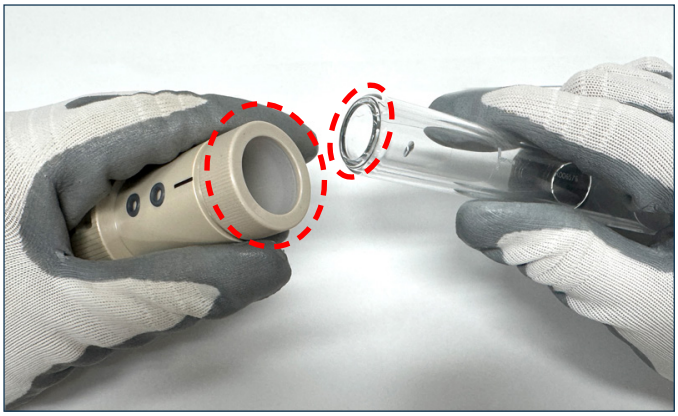
Step 3.3b

4. Install E-Torch Plasma Tube

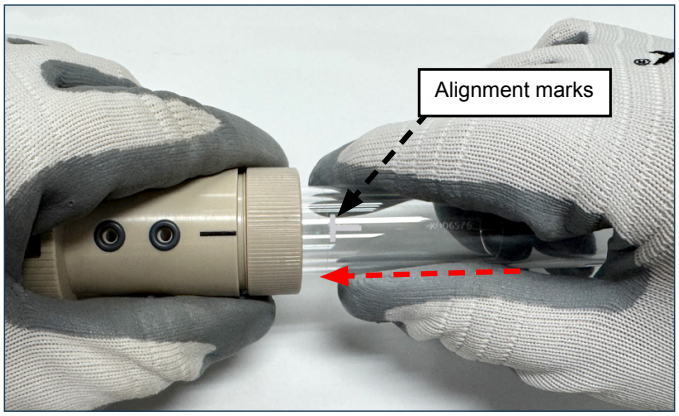
4.1 Check that both locating surfaces (quartz plasma tube and torch body) are clean and free from damage. Inspect the internal O-ring and replace if damaged.

4.2 Carefully slide the quartz plasma tube into the E-Torch body until it comes to a positive stop past the O-ring.

Note: You must align the alignment mark on the E-Torch body and the alignment mark on the quartz plasma tube before tightening the plasma tube retainer.



Step 4.1

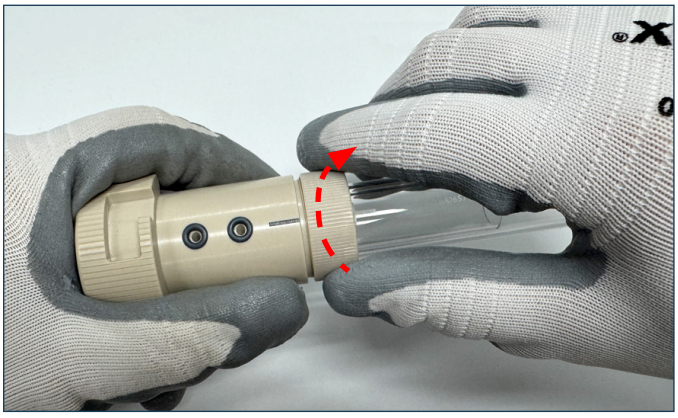


Step 4.2

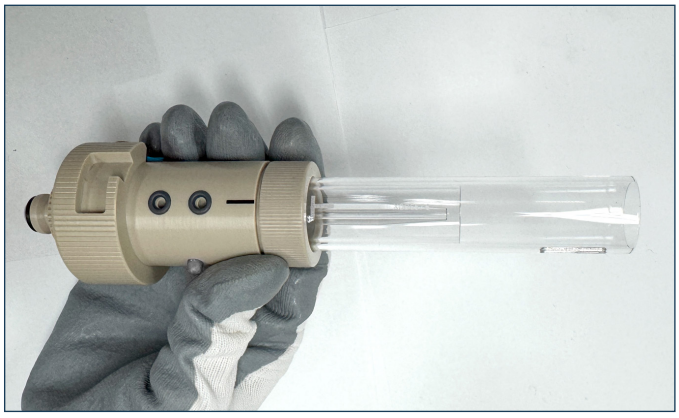
4.3 Tighten the plasma tube retainer to fix the quartz plasma tube in place (moderate pressure by hand is adequate – Do not over tighten.)

4.4 Reinstall the injector with the E-Torch (see step 2 above).

4.5 You can now return the E-Torch to your ICP as normal (not shown).



Step 4.3



Finished

5. Removal/Replacement of O-Rings

It is recommended to use the O-ring removal tool (P/N 50-100-1636) for safe removal and replacement of O-rings.

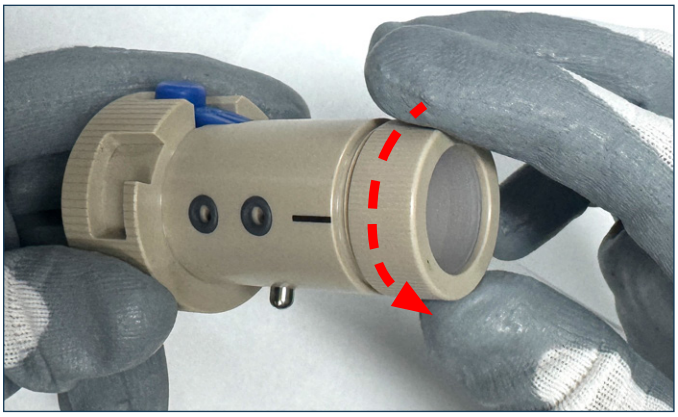
To remove the O-rings, follow the steps below:

5.1 Unscrew and remove the plasma tube retainer.

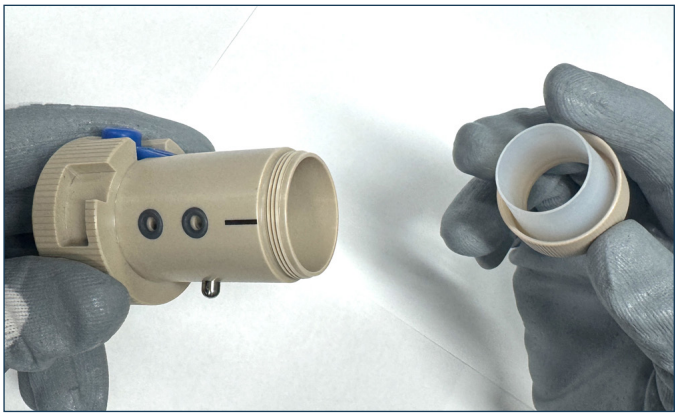
5.2 Locate the groove on the torch body. Insert the O-ring removal tool into the groove and gently lift the O-ring upward and out of the torch.

5.3 Repeat the same process to remove the additional o-rings.

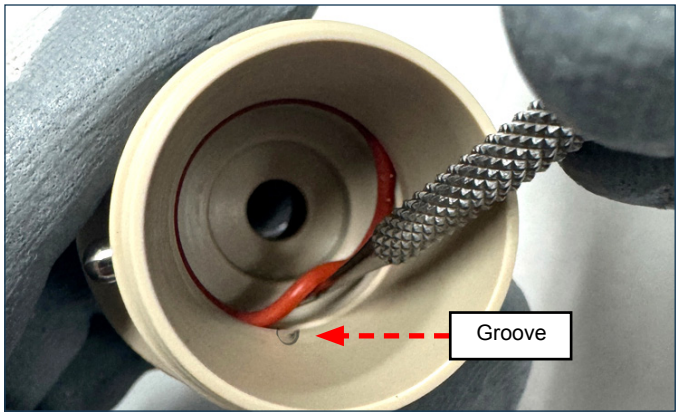
Note: To install new O-rings, follow the steps above in reverse order.



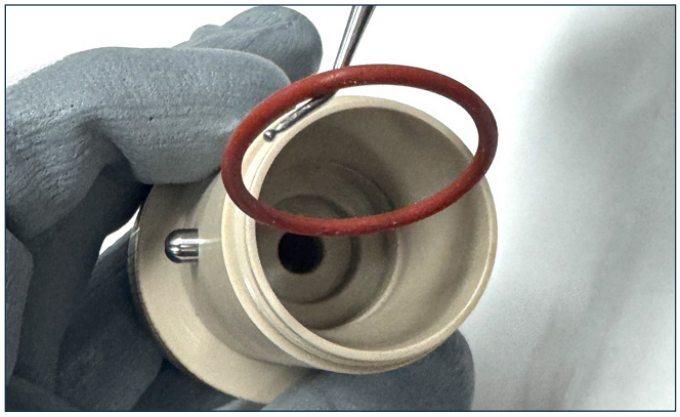
Step 5.1a



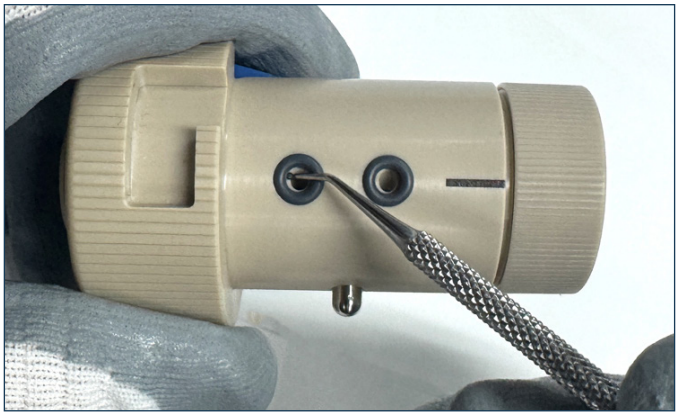
Step 5.1b



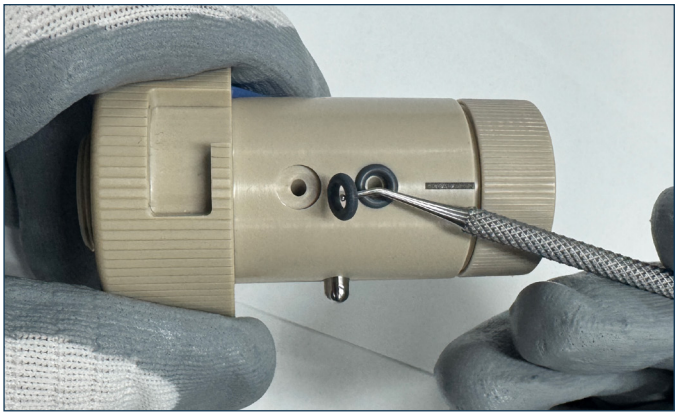
Step 5.2a



Step 5.2b



Step 5.3a



Step 5.3b

6. Care and Maintenance

- **Do NOT place plasma tube in ultrasonic bath.**
- Inspect O-rings, injector, and plasma tube regularly for wear, contamination, or damage. Clean or replace components as required to maintain proper sealing, alignment, and torch performance.
- The ceramic materials used in the E-Torch generally require less cleaning than quartz components. Most deposits can be removed using a damp cloth or non-abrasive scourer. More stubborn deposits may require the cleaning methods described below.

Organics

Carbon deposits resulting from organic samples can be removed by baking the plasma tube in a muffle furnace at approximately 500°C.

Salt

Salt deposits are best removed by soaking the plasma tube in a 25% solution (4x dilution) of Fluka RBS-25 (manufactured by Sigma-Aldrich, and is available from most suppliers of laboratory chemicals). Do not wash the plasma tube in an ultrasonic bath as this will damage the plasma tube.

Metals

Metallurgical samples with high metal content may result in a metallic film being deposited on the plasma tube. This conductive film may interfere with the RF field and should not be allowed to build up. Metallic films are best removed by soaking the plasma tube in acid. The best acid to use is usually the one that was used to prepare the samples.

Consumables list for 30-808-4388:

Part Number	Description
31-808-4390	Quartz Plasma Tube for Thermo PRO E-Torch
31-808-4425	E-Torch Body Assembly for Thermo PRO
31-808-4498	Plasma Tube Retainer 22mm
31-808-4582	S13 Injector Retainer 6.5mm
70-V-011	Viton O-rings for FDT/SDT S13 ball joints (PKT 10)
31-808-2836	Capillary Quartz Injector 2.0mm
31-808-4381	FKM O-Rings (PKT 10)
70-803-6475	Silicone O-rings 22X1.8S70 (PKT 10)
50-100-1636	O-ring Removal Tool

Note: E-Torch is compatible with S13 Spray Chambers. For S19 Spray Chambers, P/n 31-808-5181 - S19 Injector Retainer 6.5mm is required and sold separately.

Options:

Part Number	Description
31-808-3279	Alumina Injector 1.0mm
31-808-2835	Capillary Alumina Injector 2.0mm
31-808-3510	Capillary Quartz Injector 1.0mm
31-808-3246	Capillary Quartz Injector 2.5mm
31-808-3247	Capillary Quartz Injector 3.0mm
31-808-3511	Tapered Quartz Injector 0.75mm
31-808-2833	Tapered Quartz Injector 1.0mm
31-808-2834	Tapered Quartz Injector 1.5mm
31-808-2977	Sapphire Injector 2.0mm
31-808-4502	Ceramic Plasma Tube for Thermo PRO E-Torch DUO
31-808-5181	S19 Injector Retainer 6.5mm
JC-13	Metal Ball Joint Clip S13
JC-19	Metal Ball Joint Clip S19

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