

49iQPS - External Loop Kit 121558-01

Installation Instructions

49iQPS - Ozone Primary Standard

A field upgrade of Thermo Scientific 49iQPS has been created to allow for easier connection of external Ozone (O₃) gas sample to calibrate the 49iQPS without the need to disassemble the standard interior plumbing.

A. Introduction

The Thermo Scientific 49iQPS has an Ozone Photometer to measure Ozone and an Ozonator to generate Ozone for calibration of other Ozone monitoring instruments. The 49iQPS is plumbed in such a way that it can only sample internally generated Ozone unless some of the internal plumbing is disconnected and replumbed to allow external reference Ozone to enter the instrument for calibration.

To facilitate a switch between internal and external Ozone sampling, an additional plumbing modification to the standard plumbing configuration will be made to allow the introduction of Ozone into the instrument without disassembling the internal plumbing. This modification is also being implemented into all new 49iQPS units and can be upgraded in the field with minimal parts.

It is advised that a verification check of challenging an ozone monitor before and after the install yield the same results to check installation was completed successfully. Changing these parts will not affect the calibration, however re-verification with your regional Standard Reference Photometer (SRP) should occur after install of the external loop kit, 121558-00, for use as a transfer standard.


Bill of Materials for Kit Part number 121558-00

Quantity	Part Number	Description
2	116774-00	FTG, BULKHEAD, 1/4T, 1/8 BARB SS
2	117128-00	CLAMP, HOSE, DIA .228-.256
2	116953-00	WASHER, FLAT, 7/16, ALUM, MIL SPEC
1	121564-00	LABEL, EXT. LOOP, 49iQPS
9"	B0164KB	TBG, TYGON, W/FEP TFL LINER
8"	5512	TUBING, TEFLON (1/4 OD)
1	121558-01	49iQPS Ext. Loop Kit Technical Bulletin

B. Required Tools and Equipment

1. Flat Screwdriver or equivalent
2. Sharp Cutting Tool
3. 9/16" Wrench
4. 5/8" Wrench

C. Installation Procedure

Procedure				Reference Diagram for Procedure
FIND	PART NO.	DESCRIPTION	QTY	
1	121564-00	Label, External Loop	1	
<ol style="list-style-type: none"> 1. Remove the top cover of the instrument and set aside. 2. Use a flat screwdriver or similar tool to pry the stainless steel covers off the lower two unmarked and unused port holes on the Rear Panel of the instrument (circled in red) and avoid scratching the paint. 3. Place the label on the back of the instrument as shown in "1". 				

Procedure				Reference Diagram for Procedure
FIND	PART NO.	DESCRIPTION	QTY	
1	116774-00	FTG, Bulkhead, 1/8" Barb	2	
2	116953-00	Washer, 7/16 flat	2	
3	5512	Tubing, Teflon (1/4 OD)	8"	
<p>4. Install the two 116774-00 1/8" barbed bulkhead fittings from the inside of the instrument into the "Photo Out" and "Photo In" holes with the barb facing the inside of the instrument in both locations using the 5/8" wrench.</p> <p>5. Place the bulkhead fitting 7/16" flat washer on the outside of the instrument Rear Panel over the bulkhead fittings.</p> <p>6. Place the bulkhead fitting nut over the fitting and washer and secure the bulkhead fitting to the Rear Panel with the bulkhead nut using a 9/16" wrench.</p> <p>7. Using the 5512 8" 1/4 OD tubing, ferrules and nuts from the new bulkhead fittings, connect the "Photo Out" and "Photo In" ports as shown in "1", "2", and "3".</p>				

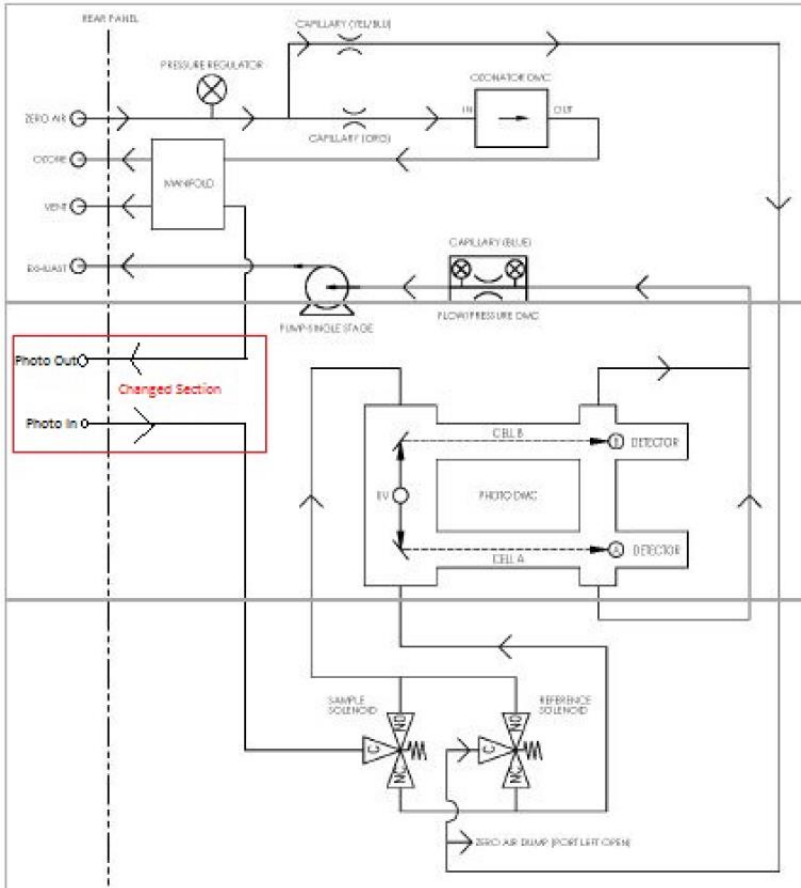
Procedure				Reference Diagram for Procedure	
FIND	PART NO.	DESCRIPTION	QTY		
1	117128-00	Hose Clamp, 0.228-0.256	2		
<p>8. With the top cover removed, locate the gray plastic 117087-00 Zero Span 49iQ (1) Manifold (Location B) with a plastic barbed fitting that has a length of Teflon-lined Tygon tubing that connects to the common port of the blue Sample Solenoid (Location A).</p> <p>8.1 Leave the end of the tubing connected to the 117087-00 Zero Span 49iQ (1) Manifold plastic barbed fitting (Location B) throughout this procedure.</p>					
<p>9. Remove the hose clamp at the other end of the tubing that is connected to blue Sample Solenoid valve common port (Location A) and save this clamp for later use in the procedure.</p>				<p>12. Connect the tubing, that was removed and cut, from the blue Sample Solenoid common port (and still connected to the Manifold) to the newly installed bulkhead barbed port "PHOTO OUT" fitting to the back of the unit (Location C).</p>	
<p>10. Remove the Teflon-lined Tygon tubing from the blue Sample Solenoid valve common port barbed fitting (Location A).</p>				<p>12.1 Ensure that the liner of the Tygon tubing stays intact over the barbed fitting.</p>	
<p>11. Cut the removed tubing back ~ 1/2" to acquire a shortened section of tubing.</p> <p>11.1 Use a sharp tool and ensure that the Teflon liner does not separate from the Tygon tubing.</p>				<p>12.2 Use the previously removed hose clamp to secure the tubing to the barbed fitting (Location C).</p> <p>12.3 The fitting labeled "PHOTO OUT" should now be connected to the gray Manifold front fitting.</p>	

Procedure				Reference Diagram for Procedure
FIND	PART NO.	DESCRIPTION	QTY	
1	B0164KB	Teflon Lined Tygon	9"	
2	117128-00	Hose Clamp, 0.228-0.256	2	

13. Connect the B0164KB 9" Tygon/Teflon kit tubing from the vacant plastic barbed fitting on the blue Sample Solenoid common barbed port (**Location A**) to the newly installed "PHOTO IN" barbed fitting that was just installed on the back of the instrument (**Location D**).

13.1 Secure both ends of the tubing (**Locations A & D**) with the provided 117128-00 hose clamps.

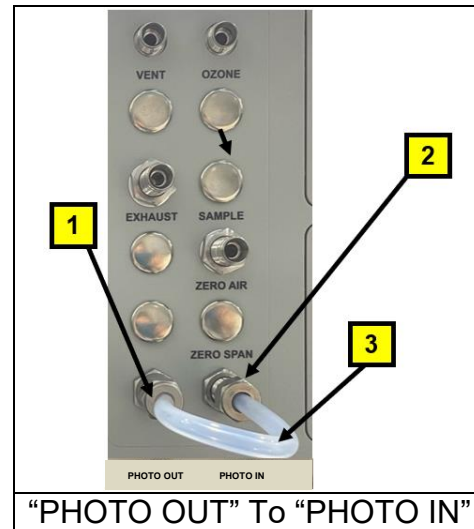
13.2 Validate that the Teflon liner does not separate from the Tygon.

Procedure	Reference Diagram for Procedure
<p>14. The successfully completed upgrade should look like the red rectangle highlighted in the flow diagram.</p>	 <p>The diagram illustrates the internal flow path of the 49iQPS unit. Key components include a pressure regulator, a pump (PUMP SINGLE STAGE), a flow pressure DMC, a photo DMC with two detectors (CELL A and CELL B), and two solenoids (SAMPLE and REFERENCE). The flow starts from the rear panel through various capillary tubes and solenoids, passes through the photo DMC, and is then directed to the detectors. A red rectangle highlights the 'Changed Section' between the 'Photo Out' and 'Photo In' ports, indicating the location of the upgrade.</p>
<p>15. After installing the new loop plumbing, condition/run the 49iQPS unit at 800ppb for at least 12 hours.</p>	

D. Operation

To use the 49iQPS calibrator with the new plumbing kit 121558-00, there are two options:

1. To sample internal/self-generated ozone, connect the short jumper tubing made of 1/4" OD Teflon tubing - long enough to connect the "PHOTO OUT" to the "PHOTO IN" port on the external back side of the analyzer. Use Stainless Steel nuts/ferrules to match the material on the bulkhead fittings. You are now completing the originally shipped analyzer flow path.



- To sample external ozone (generated by a device other than the 49iQPS), remove (and save) your short jumper hose. Install a 1/4" Stainless plug/cap on the "PHOTO OUT" port. Connect your external ozone to the "PHOTO IN" port.

Notes:

- The "PHOTO OUT" port is essentially a 2nd vent for the Ozone (O₃) output, and it is important to understand how to properly vent the system.
- At no time when zero-air is connected to the system, should you ever have the VENT, PHOTO OUT, and OZONE ports all capped.**
- This will cause a build-up of air pressure inside the 49iQPS and could cause tubing to rupture or become disconnected.
- When providing Ozone (O₃) to another ozone monitor, there should only be one system vent, either at the 49iQPS or at another point in the system.

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