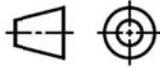


# Installation, Operation and Maintenance Manual for Sampling System

					<h1 style="margin: 0;">FITOK</h1>
Rev.	DATE	DRAWN	CHECKED	<i>UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS ARE IN MILLIMETER</i>	<h2 style="margin: 0;">Sampling System</h2>
		NAME	DATE		
DESIGN					REV. 1
CHECKED					
APPROVED				DO NOT SCALE DRAWING	Page 1/16

## Contents

<b>1. Overview</b> .....	3
<b>2. Cautions</b> .....	3
<b>3. Transportation</b> .....	3
<b>4. Storage</b> .....	3
<b>5. Installation</b> .....	4
<b>6. Connection</b> .....	4
<b>7. Maintenance</b> .....	5
<b>8. Troubleshooting</b> .....	6
<b>9. Warning to Prevent Personal Injury and Equipment Damage</b> .....	7
<b>10. Trial Run/Testing</b> .....	7
Appendix I: Installation Instructions for Tube Fittings .....	8
Appendix II: Installation Instructions for Pipe taped male fitting .....	13

## 1. Overview

This manual describes the requirements and precautions for the installation, operation and maintenance of FITOK sampling systems to ensure proper use of the product by operators.

## 2. Cautions

- ♦ Before using FITOK integrated system, please read the cautions carefully and follow the relevant regulations.
- ♦ The user must have professional qualification, wear work clothes according to relevant requirements, and use the product correctly in the specified site.
- ♦ Do not disassemble and assemble the integrated system or modify the relevant operating instructions.
- ♦ Check and maintain the Sampling system on a regular basis, refer to the maintenance instructions or contact your local FITOK distributors if you need to replace the valve, seat or seal.

## 3. Transportation

Properly transport the system to jobsite and ensure the intactness of the whole system until it is ready to be installed.

## 4. Storage

After cleaning, protection or packaging, the system shall be stored as follows:

4.1 The equipment shall be placed in the packaging at the time of initial delivery, with all protective parts, and shall be stored on the clean and dry indoor floor. Unless acceptance inspection is conducted, the packaged or maintained equipment shall be kept in the original state until the end of the storage period. After inspection, the packaging or protection of the equipment shall be restored immediately. The outermost packaging of the equipment shall be equipped with labels or marks. The packaging shall not be opened before unpacking acceptance inspection.

4.2 During the storage period, if the package is found to be damaged or the equipment may be affected, the purchaser shall be notified in time.

4.3 During handling and storage, stainless steel parts shall not contact carbon steel or pollutants.

4.4 Electrical equipment shall be kept stationary in the box or silica gel protection shall be provided at appropriate positions to prevent equipment from moisture and oxidation.

4.5 During storage, check regularly and form documents to ensure the completeness of

items and their packing boxes. Defects found should be corrected in time.

4.6 Pay attention to check the identification and marking, protective cover and protective layer, physical damage and cleanliness of items.

## **5. Installation**

5.1 Sampling system should be installed in dry, ventilated and vibration-free place, away from direct sunlight.

5.2 Before installation, please check to make sure that the FITOK System with the material, pressure, temperature marked is suitable for your sampling and processing conditions. Special attention should be paid to the working pressure and temperature to ensure that they shall not exceed the design pressure/ temperature limitations marked on the system.

5.3 There might be some particles (sand, weld slag, chemical clean residue, etc.) in the piping system. If they enter the sampling system, they might block the system and damage the valve. Therefore, the piping system should be flushed cleaned thoroughly before installation.

5.4 When installing the sampling system to the piping system, make sure that it is convenient to operate mechanism and to read metering instruments.

5.5 Check the sampling system to make sure that it is in the same condition as it was received, with no damage occurred.

5.6 Check the probe length if the sampling system is equipped with a probe.

5.7 Before installation, the system should be depressurized, drained and vented.

## **6. Connection**

6.1 For threaded connections, check whether the thread form of the sampling system and the connected elements is consistent, and check the flatness and cleanliness of the thread surface. For tapered threaded connections, use PTFE tape or sealant to avoid wear and enhance sealing; For parallel threaded connections, additional seals or gaskets are required; refer to the relevant FITOK product catalogs for details.

6.2 For flanged connection, the flange sealing surface and gasket should be intact and clean. The pipe mating flanges should be aligned allowing the bolts to be easily inserted through the flange holes. Tighten the bolts in diagonal pattern after placing the gasket.

6.3 Refer to appendix I and II for how to connection the system. And refer to appendix I for how to install tubing and fittings.

6.4 The piping connecting to the sampling system should be firmly supported to prevent outside forces and vibrations being transferred to the sampling system to cause damage.

6.5 Connect the corresponding pipeline according to the connection port position indicated on the sampling system.

Noted: The installed system should be leak tested as part of the customers test procedures. Each connection should be checked for leaks before the system is released for operation.

## **7. Maintenance**

### 7.1 Routine maintenance

Operators and maintenance personnel must carry out itinerant inspection of pipelines in their charge according to regulations.

1) Whether the piping connected to the system has over-temperature, overpressure, undercooling and leakage.

2) Whether the pipeline has abnormal vibration and collision sound inside the pipeline.

3) Whether the flanges, fittings and welds of pipelines leak.

4) Pressure gauges, thermometers and flow meters observe Windows for stains.

5) Are all valves in the closed position after each sampling.

6) Do not twist or fold the metal hose.

7) During installation, make sure that the sample cylinders are in vertical position, and the cylinder mounting seats are firmly installed.

8) For those sampling systems with purging function, they may be equipped with pressure regulator. The outlet pressure of the regulator should be set much higher than the outlet pressure of the system.

### 7.2 Periodic maintenance

The system shall be inspected at least once every six months, so as to ensure that the equipment is kept in normal operation. Visual inspection can be adopted for inspection.

1) Check the good condition of fastening bolts regularly to ensure that they are complete, without corrosion, complete and reliable connection.

2) Pressure gauges used in the system should be checked and calibrated regularly.

3) Periodical inspections to the sleeve and needle assembly are necessary to check the sharpness of the needles and the blockage of the vent holes. The bolt in the neck of the sleeve can be loosened to take the sleeve off to perform the inspections.

4) The FITOK Sample Cylinders are transportable pressure vessels. According to the requirements of EU 99/36/EC, transportable pressure vessels should be checked before utilization whether they are carved with correct identification markings. Periodical inspections are required as well.

5) For sample bottles made from glass, collisions should be prevented; for sample cylinders, violent shaking after sampling is prohibited. To ensure sealing performance, the septum should be replaced every three to five times puncturing.

### 7.3 Repairs

The general requirements for disassembly and maintenance of systems and equipment are as follows:

- 1) Operators shall take safety protection measures to ensure the safety.
- 2) Stop the system, close all medium inlets and outlets of the system, vent the gas in the whole system and purge with suitable inert gas before disassembly and maintenance.
- 3) Auxiliary tools and spare parts shall be fully prepared, including special tools, lubricant, spare sealing gasket, fasteners, etc.
- 4) Before connecting, clean the interface surface to avoid leaving dirt on the surface.
- 5) Clean the system after each maintenance operation.

## 8. Troubleshooting

System failure phenomenon and handling method:

No.	Failure phenomenon	Possible causes of failure	Troubleshooting steps	Remark
1	The downstream flow suddenly decreases	Filter clogged	Clean the component or replace the filter element	
		Large variation of inlet pressure	Check the pressure gauge and adjust the outlet pressure of the regulator	
2	Joint leakage	Loose thread seal	Fasten threaded connections	
		Sealing surface damaged	Replace the connector or seal element. (e.g., gasket, O-ring etc. )	
3	After closing the valve, there is still gas downstream	Internal leakage of valve	Replace valve.	
4	The pressure gauge pointer does not return to zero or the reading is abnormal.	Excessive pressure difference between inside and outside the gauge	After mounting, set the compensating valve (if available) from CLOSE to OPEN	
		Movement damaged	Replace pressure gauge	
		Fatigue damaged	Replace pressure gauge	
5	Check valve backflow	Check valve is installed reversely	Install after adjusting the correct direction	
		Sealing ring damaged	Replace check valve	
6	Sampling bottle cannot be sampled properly.	Sample needle is blocked	Replace needle assembly	
		The inlet pressure is too low to flow the sample	Increase inlet pressure	

## **9. Warning to Prevent Personal Injury and Equipment Damage**

### 1) System startup

Before putting into operation, the equipment shall be in working state, and confirm that the instruments and valves work normally.

### 2) System operation

After the normal operation of the system, all instruments and gauges are in normal working state to monitor the operation of the system.

### 3) Normal shutdown of system

When the system is temporarily stopped, all valves and equipment shall be restored to the original state.

### 4) Long-term shutdown of system

If the system needs to be out of service for a long time (more than half a month), restore all valves and equipment to the initial state.

### 5) System maintenance

When the system is shut down for maintenance, disconnect the pipeline from the system, vent the gas in the system and purge with an inert gas. The maintenance work can be carried out only after completion.

## **10. Trial Run/Testing**

Each set of the FITOK closed-loop sampling system has passed stringent hydraulic test and air tightness test before dispatching from the factory. The test reports are available upon request. After installation, please first test-run the sampling system with non-hazardous medium to double confirm that there is no leak and the system is functioning soundly as designed.

## Appendix I: Installation Instructions for Tube Fittings

### Installation Instructions for Tube Fittings

#### 1 Scope

1.1 This standard specifies the installation method and cautions of tube fittings.

1.2 This standard applies only to the installation of the FITOK tube fittings.

#### 2 Installation Tools



Wrench Manual



Presetting Tool

Figure 1

#### 3 Name of Each Part

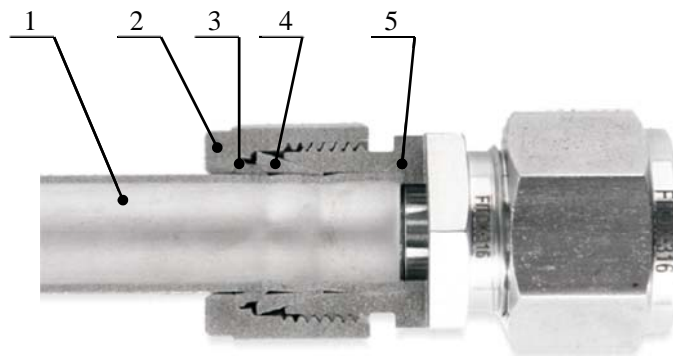


Figure 2 Tube fittings

1. Tube 2. Nut 3. Rear ferrule 4. Front ferrule 5. Body

#### 4 Assembly Procedure

##### 4.1 Initial Installation

4.1.1 Insert the tube into the tube fitting. Make sure the tubing rests firmly on the shoulder of the fitting body. Finger tight the nut as shown in Figure 3.

**For High-Pressure Applications and High Safety-Factor Systems:** Further tighten the nut with a wrench until the tubing could not be turned by hand or moved axially in the fitting, then install as per steps 4.1.2, 4.1.3.



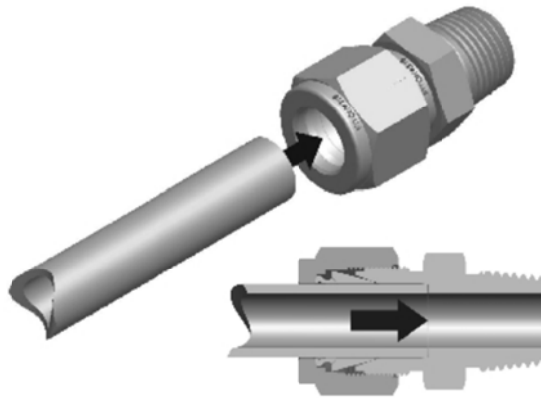


Figure 3

4.1.2 Mark the nut at the 6 o' clock position, as shown in Figure 4.

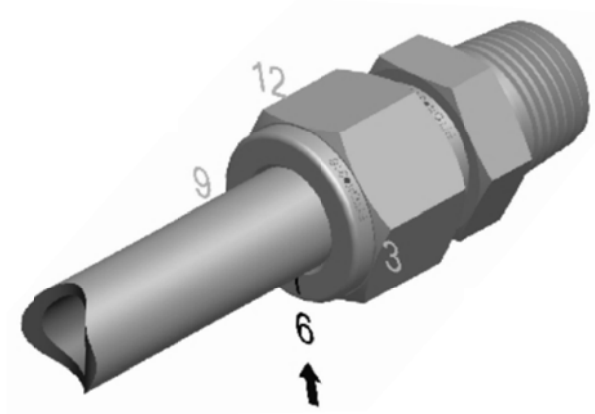


Figure 4

4.1.3 Firmly fix the fitting body and turn the nut 1 1/4 turn with a wrench to the 9 o' clock position, as shown in Figure 5.

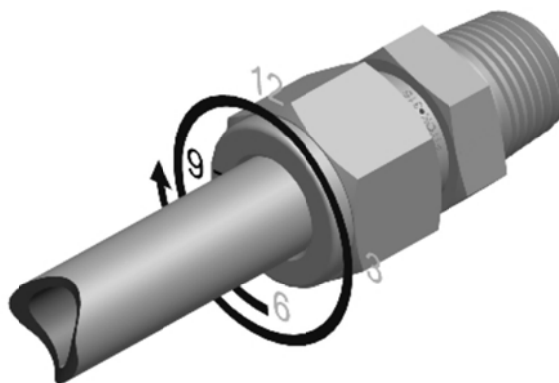


Figure 5

## 4.2 Reassembly

### 4.2.1 Reassembly to the originally installed fitting body

4.2.1.1 Mark the tubing along the back of the nut before removing the fitting. Draw a line on the surface to ensure that the nut is rotated to the previously tightened position during reassembly, as

shown in Figure 6 (above).

4.2.1.2 Insert the ferrule and tube assembly into the body until the front ferrule seats, as shown in Figure 6 (below).

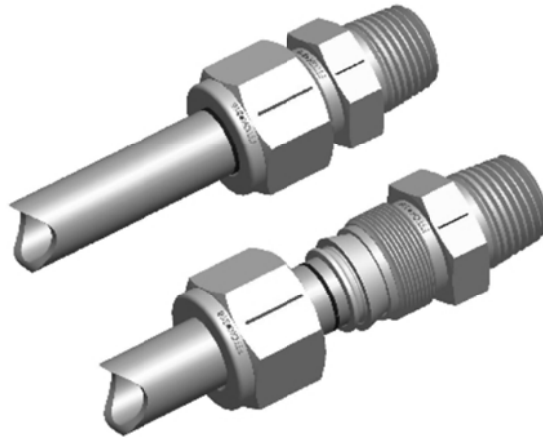


Figure 6

4.2.1.3 While holding the fitting body steady, rotate the nut with a wrench back to the original position as indicated by the marks on the tubing and the fitting body. At this point, there shall be a significant increase in resistance, as shown in Figure 7.



Figure 7

4.2.1.4 Tighten the nut slightly.

#### **4.2.2 Reassembly to other bodies not initially installed**

4.2.2.1 Insert tubing with the preset ferrules into the fitting body until the front ferrule seats.

4.2.2.2 Firmly fix the fitting body, tighten the nut with a wrench until a sudden increase in torque is felt, and gently tighten the nut.

#### **4.3 Install with presetting tools**

4.3.1 Install the nut and ferrules onto the presetting tool.

4.3.2 Insert tubing into the presetting tool, make sure the tube rests firmly on the shoulder of the presetting tool, then rotate the nut finger-tight.

4.3.3 Assemble the fitting as per 4.1.2 and 4.1.3 in the initial installation procedure, as shown in Figure 8.

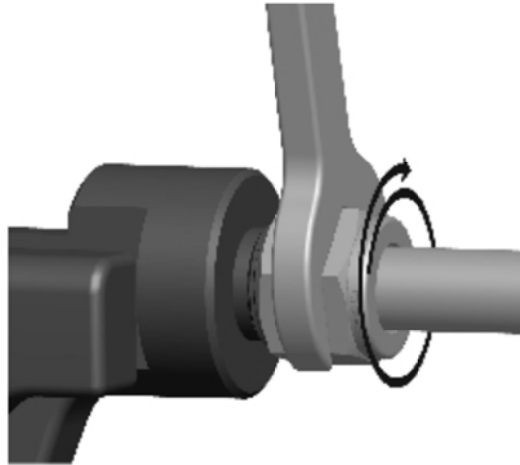


Figure 8

4.3.4 Loosen the nut and insert the tubing with preset ferrules into the fitting body until the front ferrule seats.

4.3.5 Install the tubing with preset ferrules into the fitting body according to the steps in 4.2.2 (reassembly to other bodies not initially installed), as shown in Figure 9.

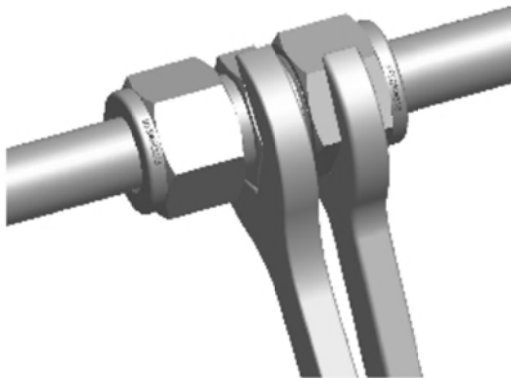


Figure 9

## 5 Cautions

5.1 Before installation, confirm that there is no reverse installation of front and rear ferrules.

5.2 Before tightening the nut, make sure that the tubing rests firmly on the shoulder of the fitting body.

5.3 Do not rotate the fitting body, fix the fitting body to rotate the nut.

5.4 Do not install or tighten the fittings when there is pressure in the system.

5.5 Do not discharge the system by loosening the fitting nut or the cap.

5.6 During installation, screw the nut at a uniform speed.

5.7 The material of the metal tubing shall be softer than that of the fittings. For example: brass fittings cannot be applied to stainless steel tubing.

5.8 Reserve enough length at the elbow for installing tube fittings.

5.9 For extremely soft or pliable tubing, inserts must always be used.

5.10 Do not forcibly insert oval tubing that are difficult to pass through the nut, ferrule and body part into the fitting.

5.11 All parts shall be clean.

5.12 In case of any abnormal phenomenon, timely record and contact the supplier.

Appendix II: Installation Instructions for Pipe taped male fitting

**Installation Instructions for Pipe taped male fitting**

**1 Scope**

- 1.1 This standard specifies the installation method and cautions of Pipe taped male fitting.
- 1.2 This standard applies only to the installation of Pipe taped male fitting.

**2 Installation Tools**



Torque wrench

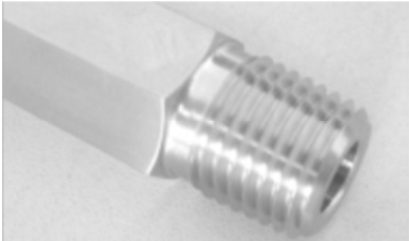


Teflon tape

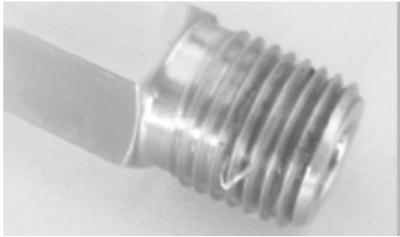
**4 Assembly Procedure**

Pipe taped male fitting always need to use PTFE or thread sealant, and follow the torque to install, the steps by following:

- 4.1 Clean the inner and outer thread, to make sure clean the dirt or small piece of tape.



Right



Wrong

- 4.2 From the first round, PTFE should follow the thread direction.



(Please following the form on rounding number)

4.3 Make sure the seal PTFE tape is not over the first round, to avoid the broken PTFE into the fluid system.



Right



Wrong

4.4 Cut the extra PTFE tape, and tight the free side with the thread.



4.5 Use hand the assemble the thread at first, then use torque wrench to tight, keep the right direction, to avoid damage the thread (following the torque form below).

Table 1 Recommended number of turns for the PTFE tape

Tapered Threads Size	Sealing-tape turning times
1/16, 1/8	4-5
1/4, 3/8	5-6
1/2, 3/4	7-8
1	10-12
Bigger	12 or more

**Notes:**  
 Holding the female component (or body) stationary and tighten the male component when the female component is not easy to tighten with a wrench, but remember to use a proper tightening strength as over tightening could result in damage to the female component, increasing the rate of sticking of the matching threads.

Table 2 Installation torque for CS and SS tapered pipe thread

Tapered Threads Size	Installation strength (N • m)	Max. Installation strength (N • m)
1/8	8-10	17
1/4	14-16	28
3/8	20-25	51
1/2	35-40	90
3/4	40-45	113
1	50-55	137
1-1/4	60-65	164
1-1/2	65-70	175
2	70-75	186

**Notes:**

Above data is based on the 0.1mm PTFE tape, adding the turns of tape to make sure the total thickness of PTFE tape if the PTFE tape is less than 0.1mm; When measured pressure leakage happened, more turns of tape is needed as well.

**FITOK Group**

**FITOK GmbH (Headquarter)**

**Sprendlinger Landstr. 115, 63069 Offenbach, Germany**

**Tel.: +49 69 8900 4498 Fax: +49 69 8900 4495**

**FITOK, Inc.**

**13843 North Promenade, Suite 750, Stafford, Texas 77477, USA**

**Tel.: +1 281 888 0077 Fax: +1 281 888 0033**

**FITOK Middle East Oil Equipment Trading LLC**

**208-209, Makateb Tower, Airport Road, P.O.Box 185412,**

**Deira, DUBAI, United Arab Emirates**

**Tel.: +971 4 2959 853 Fax: +971 4 2959 854**

**FITOK Incorporated**

**No.164 Xinqu Village, Tiantou Community, Shijing Street, Pingshan District,**

**Shenzhen 518118, China**

**Tel.: +86 755 2803 2500 Fax: +86 755 2803 2619**

**FITOK (Wuhan) Incorporated**

**Zhongbai Yangluo Industrial Park, Hanshi Road, Xinzhou District, Wuhan,**

**Hubei Province, 430415, China**

**TEL: +86 27 8983 8988 FAX: +86 27 8983 8980**

**info@fitokgroup.com**

**www.fitokgroup.com**

