



FlexiFit Housings

Operating Instructions

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HAMILTON 

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Liability

The liability of Hamilton Bonaduz AG is detailed in the *General Terms and Conditions of Sale* (GTS) document. Hamilton is expressly *not* liable for direct or indirect losses arising from the use of the sensors. It must in particular be insured in this conjunction that malfunctions can occur on account of the inherently limited useful life of sensors contingent upon their relevant applications.

The user is responsible for the calibration, maintenance, and regular replacement of the sensors. Hamilton recommends regular calibration of the sensor. In the case of critical sensor applications, Hamilton recommends using backup measuring points to avoid consequential damages. The user is responsible for taking suitable precautions in the event of a sensor failure.

Hamilton Warranty

To download the latest version of the GTS, visit the Hamilton Process Analytics website: <https://www.hamiltoncompany.com/general-terms-and-conditions#purchase>

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Document History

Manual revision No.	Date of issue	Change summary
00	January 2018	The first release of the FlexiFit Housings Operating Instructions
05	November 2024	<ul style="list-style-type: none">• Migrated manual content to SCHEMA ST4 Component Content Management System (CCMS)• New layout design: Improved look and feel• Updated all chapters and sections• Contents restructured and revised to improve comprehension, consistency, and usability• New housings introduced: FlexiFit U TC50-15 Housings<ul style="list-style-type: none">– FlexiFit U TC50 Housing– FlexiFit U TC50 Housing• The specification for the Maximum Pressure of the FlexiFit Housings has been updated from 6 bar to 16 bar.

Preface

Conventions used in this manual

Safety messages are displayed as follows:

WARNING

Alerts the user to the risk of injury, death, or other severe adverse reactions associated with the correct or incorrect use of the device.

CAUTION

Alerts the user to the possibility of a problem with the device associated with its use or misuse, such as device malfunction, device failure, damage to the device, or damage to other property.

NOTICE

Emphasizes information of particular importance.

In tables and some descriptive text, safety messages are indicated as follows:

 WARNING!

 CAUTION!

 NOTICE!

Graphics or illustrations used in this manual

- The graphics or illustrations used in this manual are for illustrative purposes only.
- The colors used in the graphics or illustrations may not be an exact representation of the actual product.

In this manual:

- Some figures use callouts in a white circle with a blue border.
 - ①: These figures may have an associated legend table or may describe a single item legend in the title of the figure. Callouts may be numeric or alphabetic. Callouts are unrelated to any nearby procedures and refer only to the figures themselves and their associated legend.
- Some figures use small dark blue callouts.
 - A: These callouts show the sequence of steps. They are not directly related to the numbering of any associated procedure.

The latest version of the English manual, related documents, and translated manuals can be downloaded from the Hamilton Process Analytics website (<https://www.hamiltoncompany.com/process-analytics>).

1 Introduction

This chapter provides information about the intended use of the FlexiFit Housings and the operating instructions.

These operating instructions are intended for the following FlexiFit Housing models:

- FlexiFit Bio
- FlexiFit U Bio
- FlexiFit TC50-33
- FlexiFit U TC50
- FlexiFit U TC50-15°
- FlexiFit VV-0
- FlexiFit VV-15

Hamilton housings are quality products manufactured according to the latest scientific and technical standards. Follow the instructions given this manual to ensure maximum safety and durability.

These instructions must be read, understood and followed by the user of the device. Hamilton accepts no liability for damage or malfunctions caused by non-compliance with these instructions.

1.1 Intended use

The FlexiFit Housings are designed for specific operating conditions such as temperature, process connection and angled installation. For additional information about the FlexiFit Housings technical specifications, see Chapter 10).

The intended use also includes conforming with the conditions specified by Hamilton for assembly, disassembly, initial operation, operation, and maintenance. Any other use is considered as inappropriate.

NOTICE

- Hamilton is not liable for damage caused by incorrect use.
- Hamilton accepts no responsibility for damage caused by incorrect installation work by third parties.

1.2 Initial operation

Check the housing for damage at the time of unpacking. A damaged housing must be returned to your Hamilton dealer in the original packaging.

You must follow the maintenance procedures by paying particular attention to cleaning and decontamination if you work with hazardous liquids. You must decontaminate the housing if it becomes contaminated with biohazardous, radioactive, or chemical substance.

1.3 General precautions

CAUTION

- *Only authorized/trained service personnel can install, clean, or maintain the housing or do other service-related tasks.*
- *Only qualified personnel can set up the electrical connections for the housings.*
- *It is important that you observe necessary safety precautions and wear the appropriate Personal Protective Equipment (PPE) when assembling/disassembling the housing from the process setup.*
- *Observe the work safety laws and regulations applicable in the country of operation and the site's safety precautions in the operator's country and at the site of use.*
- *Media leakage can cause burns or cauterizations depending on the characteristics of the process media.*

For safe and correct use of the FlexiFit Housings, it is important that both operating and service personnel follow standard safety procedures and observe the safety precautions and hazards described in Chapter 2.

2 Safety Precautions and Hazards

CAUTION

- *Carefully read and observe the following safety precautions and hazards before installing and setting up the housing.*
- *Failure to observe and follow through with the maintenance procedures can impair the reliability and correct function of the system.*
- *Failure to observe the safety precautions and hazards described in this manual, improper use of the housing, and unauthorized interference with the housing by external devices will void all warranties provided by the manufacturer.*

This chapter provides safety information and technical-related information about the FlexiFit Housings.

If you have questions about any of the information in this manual, contact your Hamilton Process Analytics representative or technical service personnel.

2.1 Dangers associated with the housings

WARNING

- The process pressure of **16 bar** and the process temperature of 140 °C must *not* be exceeded under any circumstances.
- The use of the housing in potentially explosive atmospheres imposes additional restrictions on temperature and pressure, depending on the Category Classification and the sensor used.

WARNING

Housing Modification Risk

Do not modify the housing. Modification to the housing will void its approval for potentially explosive atmospheres.

The housing and its parts are constructed using current technology standards, ensuring safe operation. However, incorrect and inappropriate operation can pose a risk to life and limb. The housing must only be used:

- For the intended purpose
- In optimum safety and operating condition

Everyone involved in the operation and maintenance of this housing must carefully read and follow these operating instructions.

2.2 Use in potentially explosive atmospheres

Explosion risk

 **DANGER****Explosion Risk**

Make sure that there is no potentially explosive atmosphere present when you install/remove the housing or do maintenance/service-related work on the housing.

The operator of equipment in potentially explosive atmospheres is responsible for ensuring that all system components are certified for the designated area classification and are compatible with each other. Therefore, the sensor fitted to the housing must also be approved for the specified area.

 **WARNING**

- The permitted process temperature depends on the type of housing and sensor combination. While other combinations may be technically feasible, they are not permitted for Category 1 application.
- The housing must not be coupled with a sensor with an "a-length" of more than 120 mm in Category 1. When coupling with sensors that are not manufactured by Hamilton, the suitability of the explosion protection must be determined in each individual case.
- Incorrect assembly or disassembly of the housing or the sensor/electrode can in the unintended release of a potentially explosive substance into the atmosphere.

The FlexiFit Housing is approved for use in potentially explosive atmospheres of Category 1 to 3 (Zone 0 to 2) as described in the Ex Certificates (see Table 2-2).

You must comply with the conditions stated in the Ex Certificates (see Tables 2-1 and 2-2). For the housing specification details and certificate, visit the Hamilton Process Analytics website (<https://www.hamiltoncompany.com/process-analytics>).

ATEX / UKEX / IECEx / EAC Ex Markings and Certificates

Table 2-1. Ex Markings



Atmosphere	Ex Markings
Gas	CE 0035 / UKCA 2571 / EAC Ex  II 1/2 G Ex ia IIC T4/T5/T6 Ga/Gb
Dust	CE 0035 / UKCA 2571 / EAC Ex  II 1/2 D Ex ia IIIC T x °C Da/Db
Manufacturer: Hamilton Bonaduz AG, 7402 Bonaduz, Switzerland	

Table 2-2. Ex Examination Certificates and Ex Certificate of Conformity

Ex Examination Certificates / Ex Certificate of Conformity	
EU-Type Examination Certificate:	TÜV 03 ATEX 7005 X
UK Type Examination Certificate:	TÜV 21 UKEX 7047 X
IECEx Certificate of Conformity:	IECEx TUR 14.0001 X
EAC Ex Certificate of Conformity:	TOO «Т-СтаНДарт» EA3C KZ KZ 7500525.01.01.01846
Manufacturer: Hamilton Bonaduz AG, 7402 Bonaduz, Switzerland	

NOTICE

- Only use sensors with an "a-length" of 120 mm for equipment group IIC. For additional information about the corresponding Type Examination and Certificate of Conformity, see Tables 2-1 and 2-2.
- For all other uses, the glass/plastic area contact with the media must not exceed:
 - ▶ 4 cm² for equipment group IIC
 - ▶ 25 cm² for equipment group IIB
 - ▶ 50 cm² for equipment group IIA

Compliance with additional regulations

In addition to the Ex compliance, you must also comply with other regulatory directives/regulations where applicable.

- European Explosion Safety Directive
- Regulations regarding safety/health protection in preparing materials and their use in the workplace
- Machine directive
- Accident prevention regulations
- Other relevant DIN and VDE directives
- Other national regulations

2.2.1 Coupling situation

The housing serves as an interface between Ex Category 1 and 2. Note that only the immersed part of the housing is certified for Ex Category 1. The entire remaining portion of the housing is in Category 2. You must replace the O-rings that come in contact with media every time the sensor or the housing is disassembled.

2.2.2 Maximum process temperature permitted

The maximum permissible process temperature is not limited by the housing itself, but by the sensor that is installed in the housing. You must check the Ex Certificates of the sensor to identify the maximum permissible process temperature defined for the respective Ex Category (see Table 2-1).

2.3 Other associated risks

Even if all the necessary safety measures have been observed, there is a further risk in the form of leaks or mechanical damage to the housing. In areas with seals or screws, gases or liquids could potentially leak out undetected.

2.4 Basic safety information

Follow these safety precautions during installation, initial operation, cleaning, maintenance, and troubleshooting:

- Make sure the scheduled maintenance and inspection tasks are done at the designated intervals.
- Inform the operator before you start maintenance and service-related activities.
- Protect all attachments and media used with the housing to prevent unauthorized use.
- Always make sure that the system is depressurized (at zero pressure), cold, and free from any potential accidental spillage of the process medium before you remove the housing from the system.
- Defective parts must be replaced immediately. Only use original spare parts. There is no guarantee that parts from other manufacturers will fulfil the operating and safety requirements of the FlexiFit Housings.
- Verify that no screws are loose.
- Make sure that all the safety devices are in place after you have completed the maintenance work.

3 Transportation and Storage

The package should be checked for completeness on receipt. Any damage in transit and/or missing parts should be notified in writing without delay.

You must send the housing to Hamilton of your Hamilton dealer in its original packaging for inspection if parts are missing or damaged. Make sure you decontaminate the housing before you send it Hamilton or Hamilton dealer.

During storage, the housing should be protected from cold, moisture, direct heat sources (sun or heater), dirt and mechanical influences.

4 Product Description

The FlexiFit Housings are intended for professional use in process measurements technology, as adapters for sensors with shaft diameter of 12 mm, on weld-in sockets with a diameter of 25 mm, or other connections (Varivent Tuchenhausen or Triclamp). Table 4-1 provides an overview of the different types of the FlexiFit Housings.

Overview of the FlexiFit Housings family

Table 4-1. Different types of the FlexiFit Housings

Housing type	Process connection	Angle of the sensor	Protective Pins	REF
FlexiFit Bio	G 1¼	0°	Yes	237331-OP*
FlexiFit U Bio	G 1¼	0°	No	237380-OP
FlexiFit TC50-33	TC 1.5"	0°	Yes	237341
FlexiFit U TC50	TC 1.5"	0°	No	242335-IL*
FlexiFit U TC50-15°	TC 1.5"	15°	No	242325-IL
FlexiFit VV-0	Varivent®	0°	No	237344
FlexiFit VV-15	Varivent®	15°	No	237345

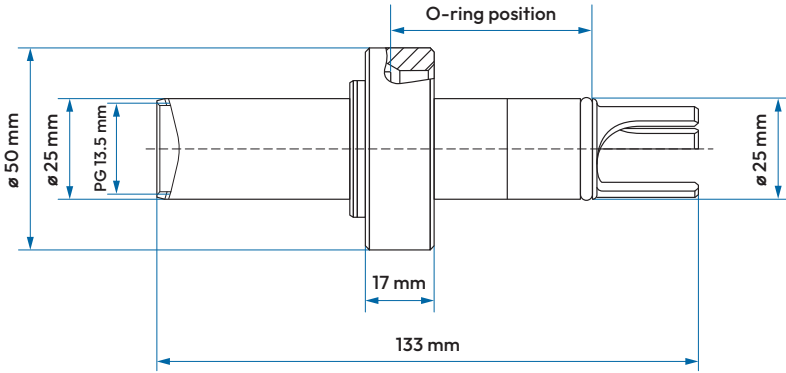
Where:

* OP: O-ring Position (see Figure 4-1)

* IL: Insertion Length (see Figure 4-2)

FlexiFit Housing O-ring position

Figure 4-1. Overview of the FlexiFit Bio dimensions



FlexiFit Housing insertion length

Figure 4-2. Overview of the FlexiFit U TC50 Housing dimensions

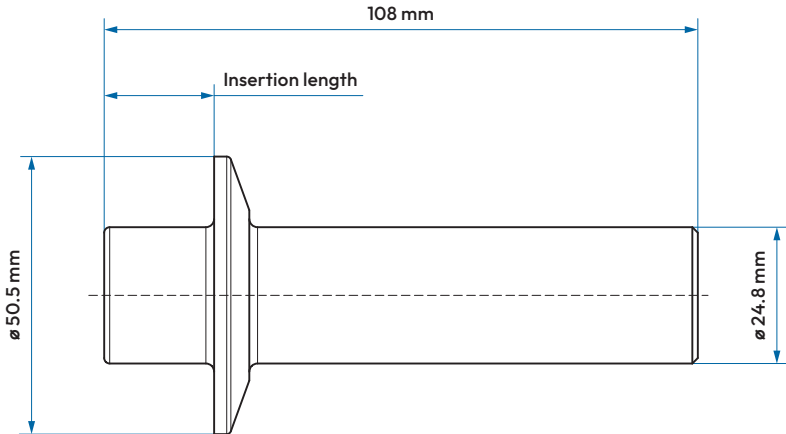
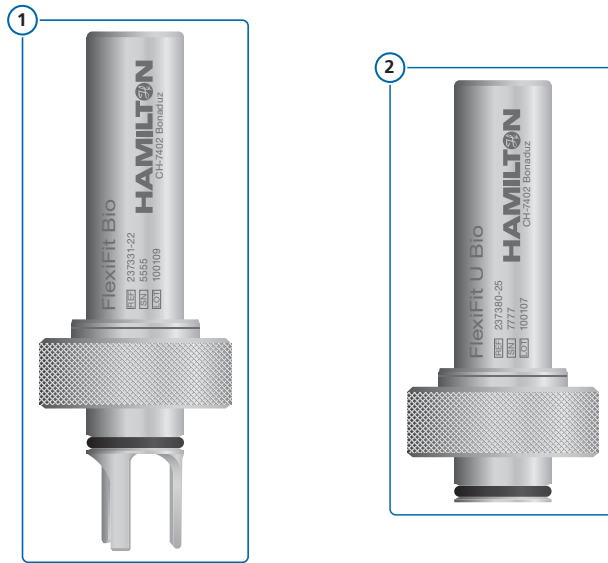


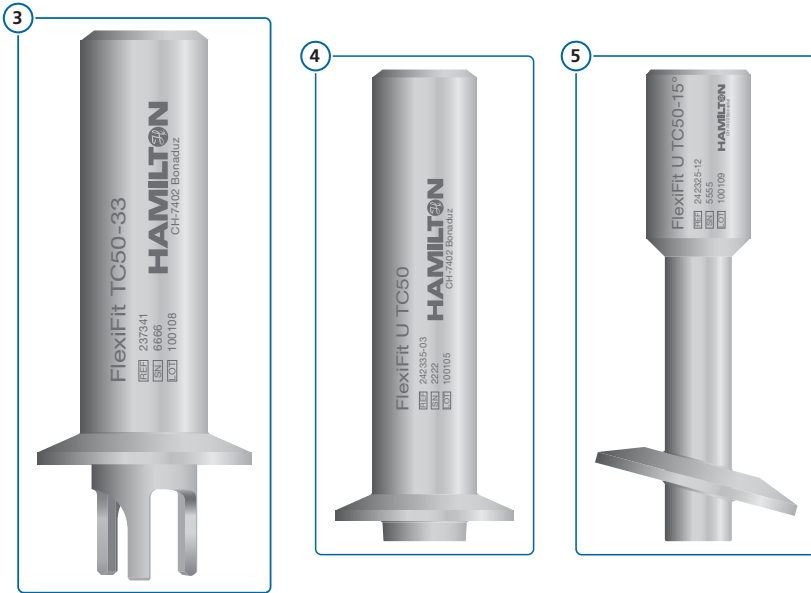
Figure 4-3. Overview of the FlexiFit Bio Housings [1/3]



1 FlexiFit Bio Housing

2 FlexiFit U Bio Housing

Figure 4-4. Overview of the FlexiFit TC / UTC Housing [2/3]

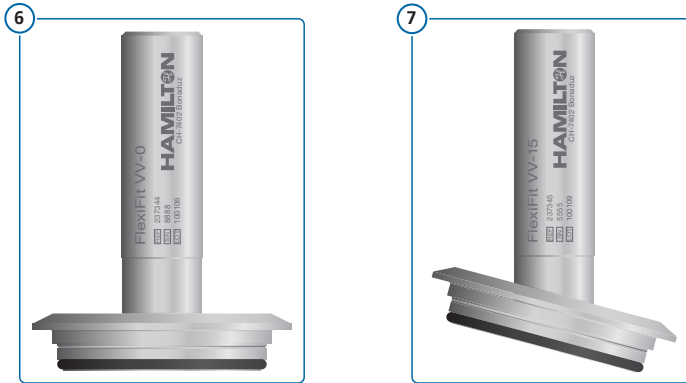


3 FlexiFit TC50-33 Housing

5 FlexiFit U TC50-15 Housing

4 FlexiFit U TC50 Housing

Figure 4-5. Overview of the FlexiFit VV Housing [3/3]



6 FlexiFit VV-0 Housing

7 FlexiFit VV-15 housing

5 Installation

This chapter provides information and instructions on how to install and set up the FlexiFit Housing.

5.1 Installing the sensor

Make sure that the sensor or the housing are not damaged. Check that all O-rings are seated correctly in the corresponding grooves and are not damaged.

To prevent mechanical damage to the O-rings during assembly, apply a light coat of grease. After the installation, thoroughly clean the sensor to remove any remaining residue of grease.

5.2 Installing the housing

1. Verify that the process connection is adequately clean before the installation.
2. Install the FlexiFit Housing and make sure that it is firmly in place.

5.3 Removing the sensor from the housing

CAUTION

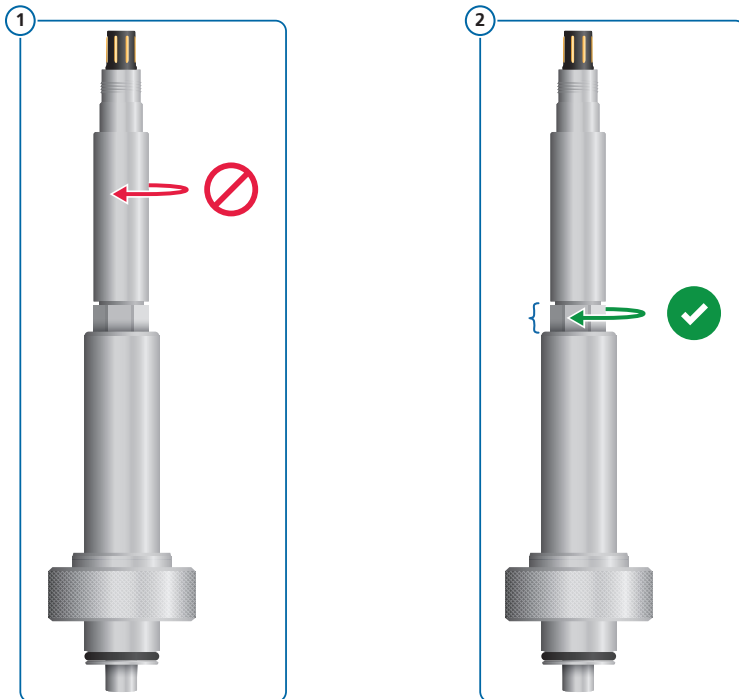
- *Do not turn the sensor head to remove the sensor from the housing. Turning the sensor head can cause damage to the O-ring below the PG 13.5 thread.*
- *Turning the sensor head to remove the sensor from the housing can also cause damage the sensor cap. For example, the DO Sensor cap get stuck inside the housing.*
- *Always use the PG 13.5 nut below the sensor head to unscrew the sensor from the housing.*

Figure 5-1 shows the incorrect and the correct procedure for removing the sensor from the housing.

How to remove the sensor from the housing

To remove the sensor from the housing, unscrew the PG 13.5 nut below the sensor head.

Figure 5-1. Incorrect (1) and correct (2) procedure for removing the sensor from the housing



- 1 Incorrect procedure for removing the sensor from the housing

⚠ CAUTION! Do not turn the sensor head to remove the sensor from the housing.

- 2 Correct procedure for removing the sensor from the housing

ⓘ NOTICE! Always use the PG 13.5 nut below the sensor head to unscrew the sensor from the housing.

6 Operation

CAUTION

Observe the following precautionary measures when using the FlexiFit Housing:

- *The metal parts can corrode if the housing comes into contact with salty solutions or concentrated acids. In such cases, clean the housing thoroughly.*
 - *Apply the following cleaning parameters:*
 - ▶ *Maximum process temperature: 140 °C*
 - ▶ *Maximum process pressure: 16 bar*
-

In EU countries, the enclosure can only be put into operation once its conformity with the requirements of the EC Machinery Directive, harmonized standards, European standards or corresponding national standards has been confirmed.

Make sure you test the seal for tightness and all parts are in working order before the initial operation of the housing. Do these tests on the seals and parts under the following circumstances:

- After breakdown
- When the device has been out of use for an extended period
- After repairs or maintenance

7 Cleaning and Maintenance

The general safety instructions listed in these operating instructions must be observed for all maintenance, cleaning and service-related work. The operational safety of the housing and service life depends, among other things, on appropriate maintenance and servicing.

Clean the FlexiFit Housings with standard cleaning agents. Do not use scouring or abrasive agents that contain hard particles to clean the housing. Periodically check the O-rings to make sure that it is correctly seated in place.

Make sure that you do not damage the O-ring nut or the O-ring when you install a new O-ring. Otherwise the seal or tightness of the O-ring is no longer guaranteed.

Routine maintenance checklist:

- Make sure the nut and PG 13.5 thread are screwed tight.
- Inspect the housing for damage or corrosion.
- Check the housing for leaks.
- Make sure that the electrical connections are tight. This check applies to the sensor.
- Check the electrical wires for strain and damage.
- Check the O-rings and replace them if necessary. Replace the O-rings at least once every 12 months.

8 Request for Technical Support

If a problem persists after you have attempted to correct it, contact Hamilton Technical Support via email (contact.pa.ch@hamilton.ch) or phone (+41-58-610-10-10).

9 Returning the Housing for Service

WARNING

- Make sure you decontaminate the housings and remove health hazards such as radiation, hazardous chemicals, or infectious agents before returning the housing to Hamilton.
 - Provide a complete description of any hazardous materials that have been in contact with the sensor and housing.
-

NOTICE

- Do not return housing to Hamilton without an Return Material Authorization (RMA) number. The RMA number ensures that your housing can be tracked, so your request can be handled by the correct department.
 - Housings that are returned without an RMA number will be sent back to the customer without being repaired.
-

Before returning a Hamilton product to Hamilton for repair, contact our Technical Support and request an RMA number (see Chapter 8).

10 Technical Specifications

FlexiFit Bio (REF 237331-OP)

Parameter	Specification
Material	Stainless steel 1.4435
Surface finish (wetted parts)	Ra < 0.4 µm (N5 electropolished)
Operating temperature range	-10 to 140 °C
Max. pressure	16 bar
OP = O-ring position	22 to 55 mm
O-ring material	EPDM (FDA approved, USP Class VI)
Sensor thread	PG 13.5
Sensor a-length	120 mm
Process connection	G 1¼ inch (Ingold)

FlexiFit U Bio (REF 237380-OP)

Parameter	Specification
Material	Stainless steel 1.4435
Surface finish (wetted parts)	Ra < 0.4 µm (N5 electropolished)
Operating temperature range	-10 to 140 °C
Max. pressure	16 bar
OP = O-ring Position	22 to 55 mm
O-ring material	EPDM (FDA approved, USP Class VI)
Sensor thread	PG 13.5
Sensor a-length	120 mm
Process connection	G 1¼ inch (Ingold)

FlexiFit VV-0 (REF 237344)

Parameter	Specification
Material	Stainless steel 1.4435
Surface finish (wetted parts)	Ra < 0.4 µm (N5 electropolished)
Operating temperature range	-10 to 140 °C
Max. pressure	16 bar
O-ring material	EPDM (FDA approved, USP Class VI)
Sensor thread	PG 13.5
Sensor a-length	120 mm
Process connection	Tuchenhagen Varivent® DN50/40

FlexiFit VV-15 (REF 237345)

Parameter	Specification
Material	Stainless steel 1.4435
Surface finish (wetted parts)	Ra < 0.4 µm (N5 electropolished)
Operating temperature range	-10 to 140 °C
Max. pressure	16 bar
O-ring material	EPDM (FDA approved, USP Class VI)
Sensor thread	PG 13.5
Sensor a-length	120 mm
Process connection	Tuchenhagen Varivent® DN50/40

FlexiFit TC50-33 (REF 237341)

Parameter	Specification
Material	Stainless steel 1.4435
Surface finish (wetted parts)	Ra < 0.4 µm (N5 electropolished)
Operating temperature range	-10 to 140 °C
Max. pressure	16 bar
O-ring material	EPDM (FDA approved, USP Class VI)
Insertion length (TC)	33 mm
Sensor thread	PG 13.5
Sensor a-length	120 mm
Process connection	Triclamp 1.5°

FlexiFit U TC50 (REF 242335-IL)

Parameter	Specification
Material	Stainless steel 1.4435
Surface finish (wetted parts)	Ra < 0.4 µm (N5 electropolished)
Operating temperature range	-10 to 140 °C
Max. pressure	16 bar
O-ring material	EPDM (FDA approved, USP Class VI)
Insertion length (TC)	3 to 75 mm
Sensor thread	PG 13.5
Sensor a-length	120 mm
Process connection	Triclamp 1.5°

FlexiFit U TC50-15° (REF 242325-IL)

Parameter	Specification
Material	Stainless steel 1.4435
Surface finish (wetted parts)	Ra < 0.4 µm (N5 electropolished)
Weld seam material	Stainless steel 1.4519
Operating temperature range	-10 to 140 °C
Max. pressure	16 bar
O-ring material	EPDM (FDA approved, USP Class VI)
Insertion length (TC)	3 to 75 mm
Sensor thread	PG 13.5
Sensor a-length	120 mm
Process connection	Triclamp 1.5° (15° angled)

11 Ordering Information

This chapter provides an overview of the different types of service parts and kits available to order (see Tables 11-1, 11-2, and 11-3).

NOTICE

Hamilton accepts no responsibility for damage caused by the use of non-original spare parts and any warranty is void.

Service kits

Table 11-1. FlexiFit service kits

REF	Product description
237366	Service Kit FlexiFit Bio EPDM
237219	Service Kit FlexiFit Bio FKM
237319	Service Kit FlexiFit Bio FFKM
237419	Service Kit FlexiFit TC EPDM (Only inner O-ring)
237519	Service Kit FlexiFit VV EPDM

Sockets

Table 11-2. FlexiFit safety sockets

REF	Product description
242580	Safety Socket 1.4435-0-50
242581	Safety Socket 1.4435-0-55
242576	Safety Socket 1.4435-15-25
242577	Safety Socket 1.4435-15-50
242578	Safety Socket 1.4435-15-55

Plugs

Table 11-3. FlexiFit blind plugs

REF	Product description
242560	Blind Plug 1.4435-25
242562	Blind Plug 1.4435-50
242564	Blind Plug 1.4435-55
242565	Blind Plug 1.4435-25
242567	Blind Plug 1.4435-50
242569	Blind Plug 1.4435-55



More information and free software simulation:

www.hamiltoncompany.com/process-analytics



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