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MICROFLUIDICS

MILLILITER VOLUME MICRO REACTOR

User Manual - Version 1.0

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1 INTRODUCTION

This manual describes the use of the Micro Reactor Connection Frame 1507. The MR_FRAME_1507 is designed for all glass Micro reactor type MR_1507.4_xxx.xx. The frame has five 1/4-28 threaded fluidic connection positions. The fluidic connections can be made using the Micronit MR_TF_KIT, also described in this manual, to create an user friendly interface.

The MR_FRAME_1507 is designed with a large viewing window to allow full inspection of the Micro reactor. All fluidic connections are placed on one side of the Micro reactor.

The MR_FRAME_1507 has two O-rings which allows the user to clamp the microreactor inside the frame without the use of fluidic connections.

Key features of MR_FRAME_1507:

- Easy Micro reactor replacement
- Chemically inert holder (Hastelloy C4)
- Full optical inspection area for the glass reactor

Key features of MR_TF_KIT:

- User friendly, leak-free microfluidic connections
- Easy to assemble connection set
- Connections are protected against over tightening

2 ASSEMBLY AND ADJUSTMENTS

In this section, the assembly of the MR_FRAME_1507 will be explained step by step.

2.1 STEP 1: PARTS CHECK

Check if all the parts are included, see figure 2.1.

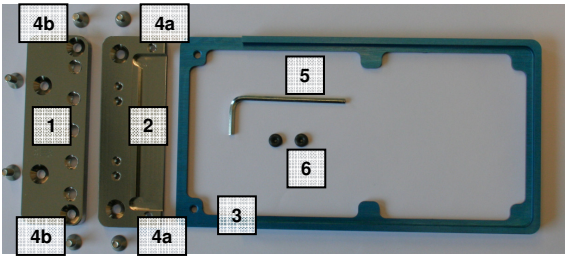

Figure 2.1. All the parts of the MR_FRAME_1507.

Part list MR_FRAME_1507

1. Frame top (Hastelloy C4)
2. Frame bottom (Hastelloy C4)
3. Protection frame (blue anodized Aluminium)
4. Screw set
    a. 2x M4x8 CSK
    b. 4x M4x10 CSK
5. Hex key (2.5)
6. Viton® O-rings (2x)

2.2 STEP 2: ASSEMBLY OF THE FRAME

The MR_FRAME_1507 is shipped clean, but additional cleaning (e.g. with IPA or Acetone) is advised before assembly of the parts.

The Frame bottom can be fixed onto the Protection frame using the two M4x8 CSK screws, see figure 2.2.

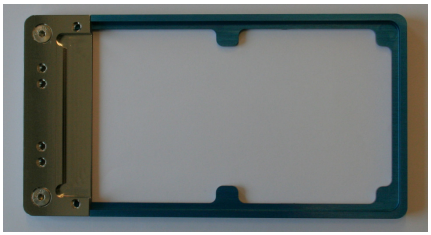

Figure 2.2. Frame bottom assembled on Protection frame.

The Frame top has cut-outs to fit the two o-rings (not wetted) which clamp the Micro reactor into the frame if desired, see figure 3. If the o-rings are not used, the Micro reactor can be removed and placed easily in the frame, without disconnecting the Frame top. The Micro reactor is not clamped in the latter case if no fluidic connections are assembled into the frame.

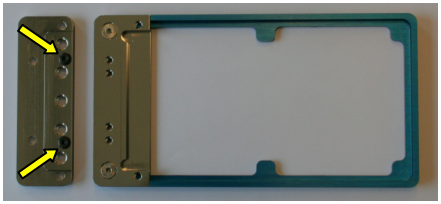

Figure 2.3a. Place the O-rings in the recesses on the bottom side of the Frame top.

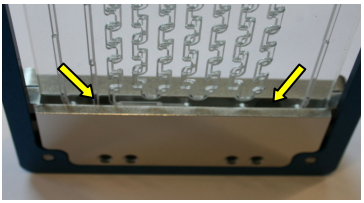

Figure 2.3b. O-rings inside assembled frame (see yellow arrows).

The Frame top can be fixed onto the Frame bottom using the four M4x10 CSK screws.

Figure 2.4. MR_FRAME_1507 with Micro reactor MR_1507.4_MRQ.01 assembled.

2.3 STEP 3: ASSEMBLE FLUIDIC CONNECTIONS

The MR_FRAME_1507 is preferably used in combination with the Micronit Fluidic connections (MR_TF_KIT), see chapter 3.

3 MR_TF_KIT

The MR_TF_KIT is a set of microfluidic connections using 1/8" tubing and 1/4-28 UNF threaded fittings. The PEEK fittings are specially designed to avoid over tightening of the fluidic connections.

3.1 ASSEMBLY OF THE CONNECTIONS

The MR_KIT includes approximately 1.5m of ETFE tube (OD=1/8", ID=0.062"), a set of 5 PEEK nuts, 5 ferrule assemblies (PEEK ferrule with stainless steel lock-ring), a PEEK assembly union and an ETFE Plug. For the assembly of a fluidic connection you will need the ETFE tube, a nut and a ferrule assembly and the union.

The first step is to cut the ETFE tube to the desired length. The tube is easy to cut, but a sharp knife is advised for a clean cut, see figure 3.1. After the tube is cut it should look similar to the tube end in figure 3.2.

Figure 3.1, ETFE tube cut to length.

Figure 3.2, ETFE tube end after it is cut.

The nut and ferrule assembly can now be assembled onto the tube. Micronit uses fittings which are protected against over tightening. For the ferrule assembly it is important to make sure the stainless steel lock-ring has its flared side directed to the ferrule, see figure 3.3 and 3.4. The straight end fits partially into the nut.

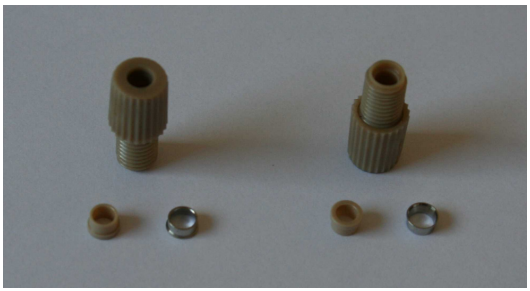

Figure 3.3, Nut and ferrule set; left) parts viewed from above, right) parts viewed from below.

Figure 3.4, parts placed around the tube.

When assembled correctly, place the tube end in the union and tighten the nut by hand. During the tightening keep the tube pressed into the union, such that the ferrule is assembled flush to the tube, see figure 3.5. When sufficiently tightened the nut makes a clicking sound.

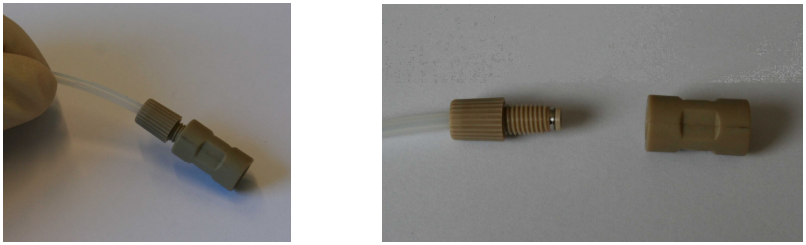

Figure 3.5, Tighten the nut by hand in the union and check the result.

On the free end of the tube you can connect other connections, to make the fluidic connection with for instance a syringe pump or other equipment.

The connection is now ready to use!

Figure 3.6, Properly assembled microfluidic connection.

3.1.1 NOTES

- Tightening any fluidic connection type should be done with care !
- Whenever a connection is damaged, replace it to avoid leakage in your system

4 SPECIFICATIONS

4.1 MR_FRAME_1507

Reactor Holder (top and bottom)

- Material holder : Hastelloy C4
- Material protection plate : Anodized Aluminium
- O-rings (not wetted) : Viton®
- Overall dimensions (l × w × h) : 170 × 90 × 15 mm
- Number of fluidic connections : 5

4.2 MR_TF_KIT (OPTIONAL)

MR_TF_KIT

- Dimensions capillaries : 1/8” OD, 1/16” ID, length 5ft
- Material capillaries : ETFE (Tefzel)
- Material nuts : PEEK (PolyEtherEtherKetone)
- Material fittings : PEEK (seals) / stainless steel (rings)

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