Mounting and Sealing of the SCP1000 Pressure Sensor

1. Objective

The SCP1000 pressure component (Figure 1) is designed for outdoor conditions and applications such as sports watches, GPS devices and similar applications. The SCP1000 housing is made of a seamless, one piece LCP (Liquid Crystal Plastic) and the sensing element is protected by a thin layer of gel to ensure reliable function in humid and wet conditions. If an application requires watertight sealing, this can be realized by using either an O-ring or, for more demanding applications, by a customized sealing structure.

Figure 1. The SCP1000 pressure component

2. Sealing the SCP1000 Pressure Component using the I-seal gasket or the O-ring

VTI Technologies has developed a customized, multi-functional sealing solution for the SCP1000 called the I-seal gasket (see Figure 2). The SCP1000 pressure component, when equipped with the I-seal gasket, is ISO Standard 2881 qualified and can withstand pressure up to 10 bars. I-seal gasket is made of MPR ALCRYN 2080 NC material which can withstand large pressure and temperature changes without loosing its sealing properties over the time.

Although the SCP1000 is not as light sensitive as traditional pressure components, due to the nature of the silicon based pressure sensing element, it is recommended to cover the sensing area against light. The I-seal gasket offers this function, simplifying substantially application's mechanical design work. The structure of the I-seal gasket also protects the sensitive part of pressure component against external particles and debris.

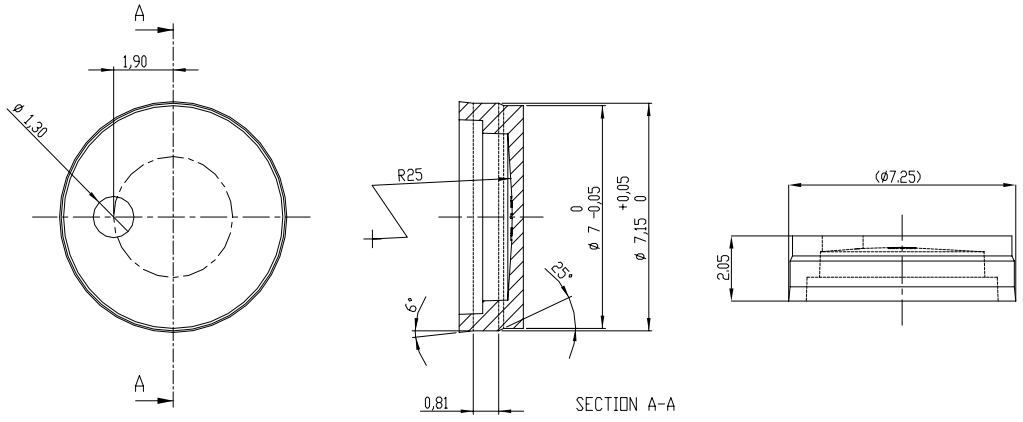
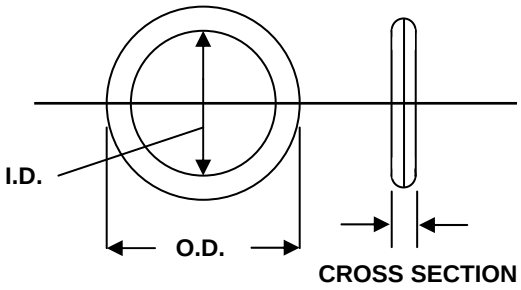


Figure 2. Dimensions of the I-seal gasket

If plash proof sealing is enough, standard O-ring sealing may be an option. Suggested O-ring size is 6.43 mm (outer dimension, O.D.), 5.21mm (internal dimension, I.D) and 0.61 mm (cross section).



3. Assembling the I-seal Gasket and the O-ring

The structure of the I-seal gasket is elastic but sufficiently rigid to ensure an easy and reliable manual assembly process. The first step in the assembly process is to mount the I-seal gasket onto the top of the component (see figure 3a.). The I-seal gasket-component assembly is then mounted into the gasket's seat like illustrated in figure 3b. The surface quality of the gasket's seat need to be a min. 1.6 Ra finished.

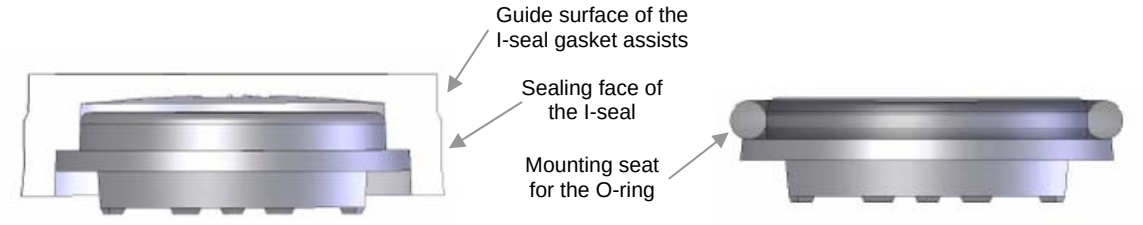


Figure 3a **Figure 3b**

Figure 3.(a) I-seal gasket – component assembly. (b) O-ring assembly

Those applications where the SCP1000 may be exposed to high pressure (for example water-resistant watches), it is recommended to support the pressure component from the backside to avoid movement of the component in the pressure seat.

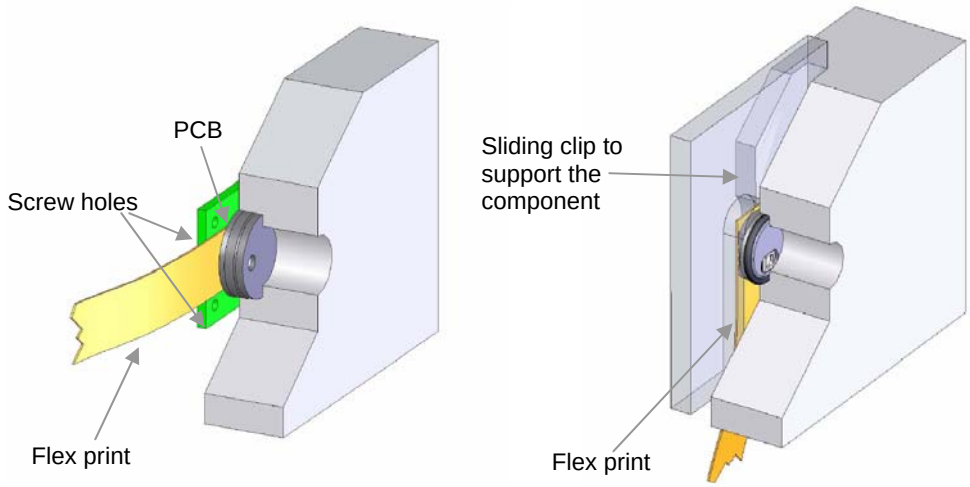


Figure 4a **Figure 4b**

Figure 4. (a) I-seal gasket - component assembled into a pressure port using a flexprint. Flexprint is supported with PCB which includes four holes for screw fastening. (b) Flexprint - component supported with a sliding clip. In both options I-seal gasket and O-ring sealing is possible

If pressure component is subject to direct light, then placing the pressure inlet hole of the I-seal gasket as far from the pressure sensing element as possible is recommended (Figure 5).

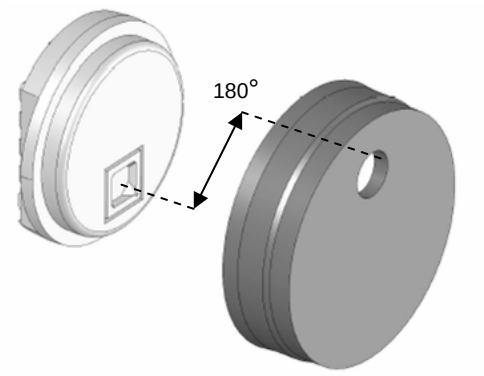


Figure 5. If component is subject to direct light, the pressure inlet hole of the gasket needs to be placed as far from the sensing element as possible.

4. Factory Validation of the I-seal Gasket

Aging of the I-seal gasket was simulated by temperature cycling. The temperature peaks were -30...+60 C° and the cycle period was one hour. Total cycling test lasted one week. The seal test of the gasket after aging was done at 4 bars absolute pressure in 10 min. No leakages were observed after the test.

The sealing is 10 bars overpressure tested and it applies to the ISO 2281 -standard.

5. Absolute Maximum Ratings

Parameter	Value	Tolerance
Proof Pressure of Sealing	10 Bar	
ESD (Human Body Model)	± 2.0 kV	
ESD (Charged Device Model)	± 0.5 kV	
Surface quality of the gasket's seat (finished min.)	min. 1.6 Ra	
Diameter of the Mounting Seat	7.00 mm	+0.02/-0.02 mm
Depth of the Mounting Seat	2.05 mm	+0.05/-0.05 mm

6. Document Revision History

Revision	Date	Change Description
0.01	12.10.2006	First release
0.02	26.10.2006	Proof pressure of sealing 10 bars
		Text refining
		Picture refining
		Material information of the I- seal gasket added
0.03	3.5.2007	Inner dimension of the I-seal gasket changed from 5.22 mm -> 5.17 mm and 6.07 mm -> 6.02 mm
		Outer dimensions tolerance changed from -0 / +0.02 mm -> - 0 / +0.05 mm
0.04	17.8.2007	I-seal material changed to MPR ALCRYN 2080 NC, mounting seat tolerance adjusted