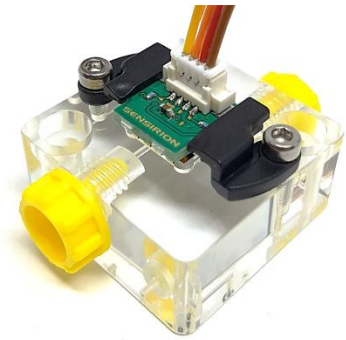


# Engineering Guidelines for LPG10 Integration

## Fluidic and Electronic Engineering Guidelines for LPG10 Sensor Integration



### Summary

The LPG10 connector cap has been designed as an easy-to-use tool for evaluating and integrating the LPG10 liquid flow sensor. The cap performs two main tasks: fixing the flow sensors (LPG10) in place and providing an electrical connection to the pads of the LPG10 chip. The cap allows for simple integration of the LPG10 chip into custom manifolds. Both, the

recommended (dis-)assembly method and the design requirements to custom manifold integrations are described. By following these instructions and design guidelines, the cap can be used to integrate the LPG10 sensor into existing and new fluidic system manifolds.

## 1 Introduction

The LPG10 connector cap has been designed as an easy-to-use tool for evaluating and integrating LPG10 liquid flow sensors in custom manifolds. The cap performs two main tasks: it mechanically fixes the flow sensors (LPG10) in place and provides an electrical connection to the pads of the LPG10 chip via spring pins. Additionally, basic ESD protection is implemented. The connector cap is available for purchase or may be regarded as a reference design, should custom solutions be required in a given application.

The fluidic base in the evaluation kit is made of Poly(methyl methacrylate) (PMMA) and equipped with two fluidic connector ports (UNF 1/4"-28 flat bottom)

## 2 Assembly

Please perform the following two steps to mount the assembly (see Figure 1):

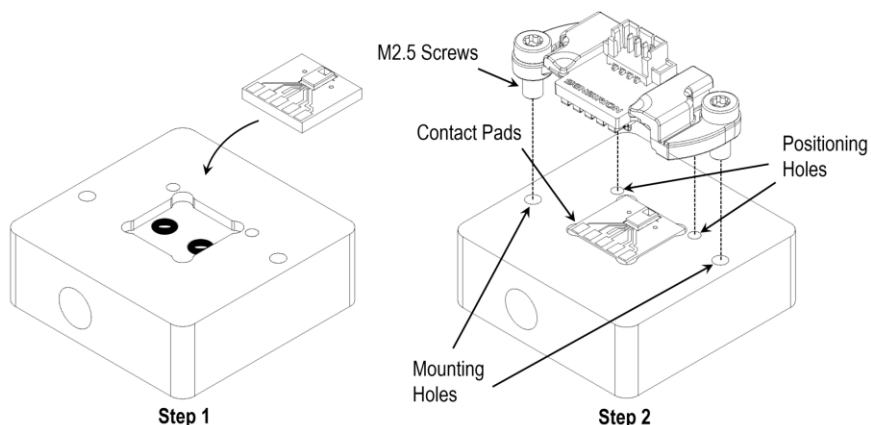


Figure 1: Mounting instructions

**Step 1:**

- Make sure all parts (manifold, sensor chip and connector cap) are clean, dry and free of debris.
- Make sure O-rings are properly inserted into their respective manifold recesses.
- Place LPG10 flow sensor into recess and check that it is properly aligned. The orientation is correct if the contact pads of the flow sensors are located opposite to the positioning pin holes, with the contacts facing up, see Figure 1.

**Step 2:**

- Hold and position the LPG10 connector cap over the flow sensor. Make sure the orientation is correct by checking positioning pin and screw hole positions.
- Place LPG10 connector cap onto the flow sensor, making sure to only apply vertical pressure (perpendicular to the manifold surface).
- If the positioning pins and holes are properly aligned, start driving the screws into the manifold, while holding down the cap.
- The required torque levels may be influenced by the chosen manifold material. Do not overtighten.

**2.1 Disassembly**

- Hold down the cap using only vertical pressure (perpendicular to the manifold).
- Remove the screws.
- Carefully reduce the pressure on the cap and remove it from the manifold.

Overall, uneven strain or stress on the sensor may adversely affect the sensor's burst pressure. Spillage of any and all liquids over the cap is to be avoided.

**3 Manifold Design**

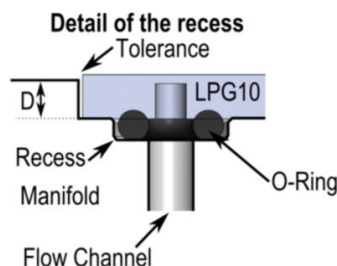


Figure 2: Detail of the recess design. D is the depth of the recess.

The LPG10 connector cap can also be used to integrate the LPG10 flow sensors into a custom manifold. When designing a recess for the LPG10 liquid flow sensor series the general tolerance of  $\pm 0.1$  mm in all dimensions of the product has to be considered (see [Datasheet](#)). The integration of the downmount LPG10 series into existing fluidic systems is straightforward:

Recesses for both the chip and the O-rings have to be created.

- The depth of the glass chip recess  $D$  is 1.35 mm, see Figure 2.
- The length and width of the glass chip recess have to be designed to include the positive tolerance mentioned above (10 mm + 0.1 mm).
- O-rings with a 1.15 mm opening, 1 mm thickness and a hardness of around 75 shore A are recommended (e.g. 15079712 from [www.maagtechnic.ch](http://www.maagtechnic.ch), or MicrOrings from [www.applerubber.com](http://www.applerubber.com)). The O-ring recesses of Sensirion's LPG10 Evaluation Kit are therefore designed with a diameter of 3.15 mm and a depth of 0.8 mm.
- The mounting holes of the cap are designed for M2.5 threaded screws.

Figure 3 shows a drawing of the recess dimensions and the relative position of the positioning pin and drill holes.

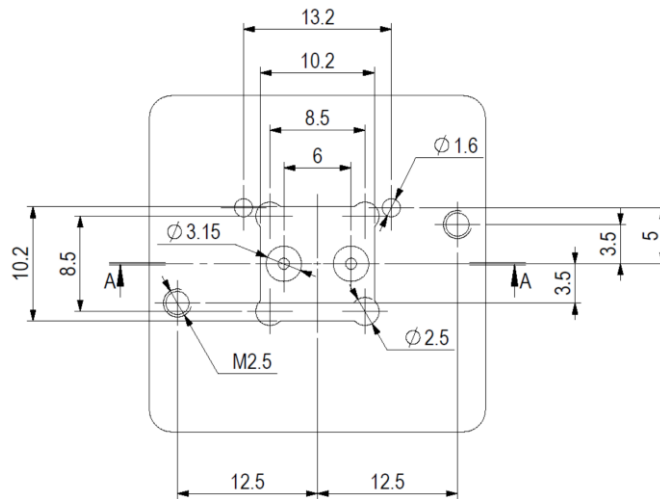


Figure 3: The position of drill holes and positioning pin holes shown relative to the recess (dimensions in mm).

## 4 Electric Specifications

The schematic and the pin assignment of the LPG10 series are shown in Figure 4. The implemented circuit features basic ESD protection and includes the supply voltage buffer. The connection is made using spring pins (TE Connectivity, Part No. 1746854-1) and the signals are fed to a Molex PicoBlade™ Header (Part No. 53398-0471). The schematic shown in Figure 4 represents the recommended way to connect to the LPG10 series.

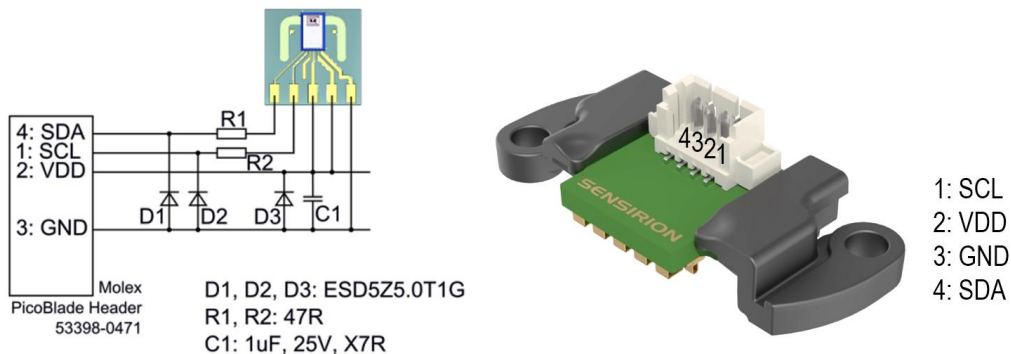


Figure 4: Schematic and pin assignment of the LPG10 series.

## 5 Ordering Information

Please see the LPG10 Series' Datasheets for ordering information.

## Headquarters and Subsidiaries

**Sensirion AG**  
Laubisruetistr. 50  
CH-8712 Staefa ZH  
Switzerland

phone: +41 44 306 40 00  
fax: +41 44 306 40 30  
[info@sensirion.com](mailto:info@sensirion.com)  
[www.sensirion.com](http://www.sensirion.com)

**Sensirion Taiwan Co. Ltd**  
phone: +886 3 5506701  
[info@sensirion.com](mailto:info@sensirion.com)  
[www.sensirion.com](http://www.sensirion.com)

**Sensirion Inc., USA**  
phone: +1 312 690 5858  
[info-us@sensirion.com](mailto:info-us@sensirion.com)  
[www.sensirion.com](http://www.sensirion.com)

**Sensirion Japan Co. Ltd.**  
phone: +81 3 3444 4940  
[info-jp@sensirion.com](mailto:info-jp@sensirion.com)  
[www.sensirion.co.jp](http://www.sensirion.co.jp)

**Sensirion Korea Co. Ltd.**  
phone: +82 31 337 7700~3  
[info-kr@sensirion.com](mailto:info-kr@sensirion.com)  
[www.sensirion.co.kr](http://www.sensirion.co.kr)

**Sensirion China Co. Ltd.**  
phone: +86 755 8252 1501  
[info-cn@sensirion.com](mailto:info-cn@sensirion.com)  
[www.sensirion.com.cn](http://www.sensirion.com.cn)

To find your local representative, please visit [www.sensirion.com/distributors](http://www.sensirion.com/distributors)

Copyright© 2019, by SENSIRION.  
CMOSens® is a trademark of Sensirion  
All rights reserved