

Engineering Guidelines LD20 Base Station

Connector Block for Electrical Contact



Summary

The LD20 base station has been designed as an easy-to-use tool for evaluating the LD20 liquid flow sensor. The connector block performs two main tasks: it mechanically holds the sensor in place via a clip-in mechanism and provides a simple electrical interface between the contact pads of the sensor and a PC or any other system for first bench-top tests.

It can be anchored to a test bench using the mounting holes. Basic ESD protection is implemented as well. The male M8 connector is compatible with all of Sensirion's SCC1 sensor cables.

It is designed for testing purposes only and will not be commercially available, except as part of the LD20 Connectivity Kit. Customers are expected to refine the mechanical and electrical interfaces to best suit their application's needs.

1 Using Sensirion's LD20 Base Station

Please follow the steps below when using and handling the LD20 base station:

Connecting:

- Make sure all parts are clean and free of debris.
- Check the proper alignment of the LD20 sensor (1): the orientation is correct if the contact pads of the flow sensor are located above the spring pins and the triangular recess of the LD20 sensor fits to the counterpart of the base station. Press the LD20 flow sensor down into the base station (2). Clip-in the sensor (3).

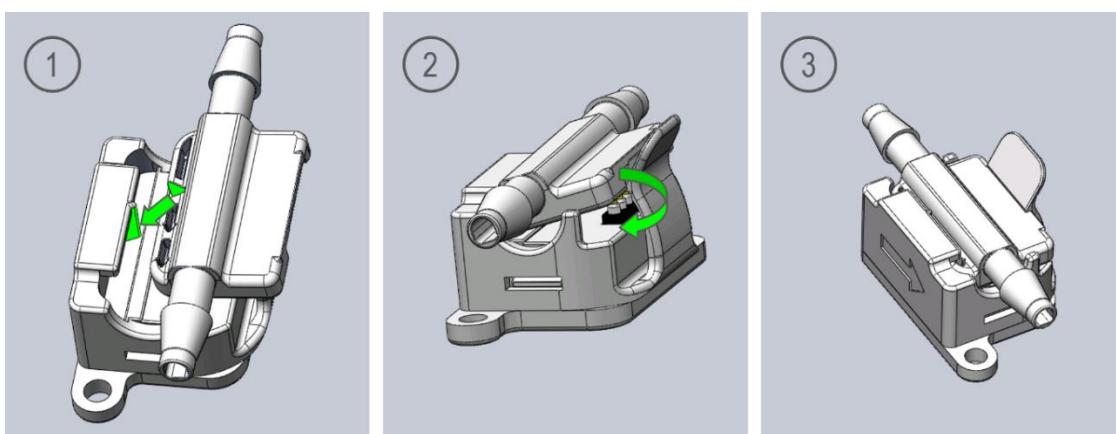


Figure 1: Proper alignment of the LD20 sensor to the Sensirion base station

- The base station is compatible with all LD20 versions.
- Connect the base station's male M8 connector with the SCC1-USB sensor cable for a plug-and-play connection to a PC. You can connect any of Sensirion's SCC1 sensor cables as well, if you want to use analog voltage output signals or RS485.

Disconnecting:

- To disconnect the sensor after testing, hold the base station in one hand without holding the sensor itself and slightly press the clip backwards (1) with the other hand. The sensor will snap out automatically (2).

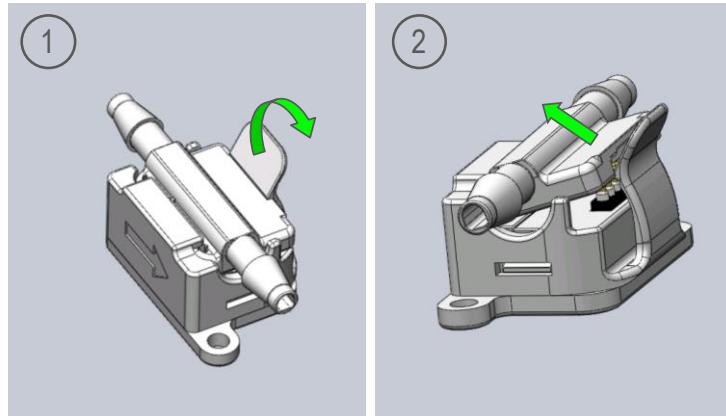


Figure 2: Disconnecting the LD20 sensor

Handling and cleaning:

- The 3D-printed LD20 base station needs to be handled with proper care. Especially the clip is sensitive and could break off if too much force is applied, while disconnecting or connecting the sensor.
- There is no fluidic sealing between sensor and base station. Thus avoid liquids from spilling onto the sensor when clipped into the base station.
- Because of the contained electronics and its housing material, the base station cannot be gamma sterilized or autoclaved. Contact Sensirion in case of further questions about possibilities to clean or sterilize the base station.

Opening:

- In order to reach the internal PCB and disconnect the short cable with the M8 connector, the two-part base station can be opened.
- Insert a small screwdriver or a similar tool into the slit at the base station's side and press slightly inwards while at the same time pulling at the mounting hole to lift off the bottom part.

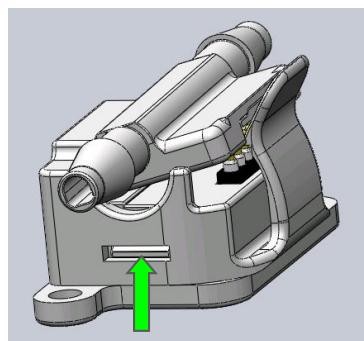


Figure 3: Opening the LD20 base station

- Due to the 3D-printed housing material, opening and closing cycles can be performed only a few times before the latch will be worn down and the base station won't close tightly.

2 Electronic Specifications of Sensirion's LD20 Base Station

The pad assignment of the LD20 sensor is shown in Table 1. The signals are fed to a male connector at the base station (type M8, 4-pin, threaded lock according to IEC 61076-2-104 / IEC 60947-5-2), which is compatible with all of Sensirion's SCC1 sensor cables. See Table 2 for the pinout of the M8 connector.

Pad	Description	Comments
1	SDA (data)	Serial data, bidirectional
2	VDD	Supply voltage
3	GND	Ground
4	SCL (clock)	Serial clock, bidirectional
5	VPP	Nonfunctional, connected to GND

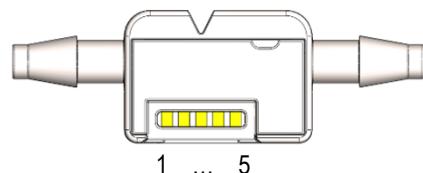


Table 1: Pad assignment of the LD20 sensor series

Pin	Description	Electrical pinout 4-pin M8 connector	Color Coding
1	SDA (data)	Serial data, bidirectional	Brown
2	GND	Ground	White
3	VDD	Supply voltage	Blue
4	SCL (clock)	Serial clock, bidirectional	Black

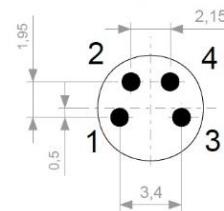


Table 2: Pinout at the connector side of the male M8 connector being part of the LD20 base station.

Digital communication between a master and the LD20 sensor (= slave) runs via the standard I²C-interface. The physical interface consists of two bus lines, a data line (SDA) and a clock line (SCL) which need to be connected via pull-up resistors to the bus voltage of the system.

For the detailed specifications of the I²C communication, please refer to the LD20 datasheet (www.sensirion.com/ld20).

Please find below the schematic electronic circuitry as it is implemented in Sensirion's LD20 base station to enable stable I²C communication, to have some ESD protection, and to stabilize the supply voltage (see Figure 4). The resistors R3 and R4 are necessary pull-up resistors for the I²C interface. They are not part of the built-in PCB and consequentially need to be added by the customer (recommended resistance between 2.2 kΩ and 10 kΩ depending on setup and communication speed).

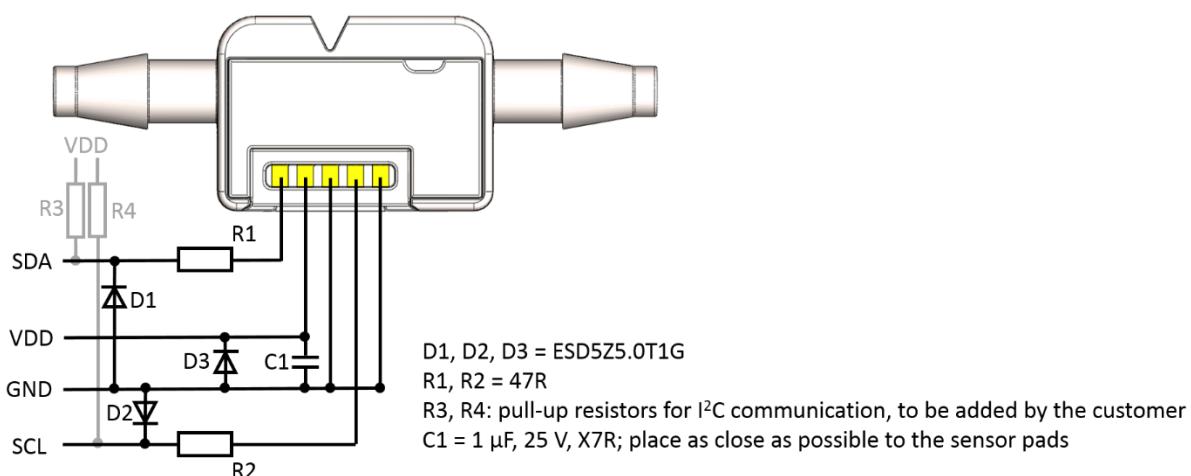


Figure 4: Electronic circuitry of the LD20 connector block

As there is no level shifter or voltage regulator integrated on the PCB, the LD20 base station shall only be operated at the same voltage levels than the LD20 sensors (see the LD20 datasheet for details).

Ordering information for the spring-loaded connectors used in the base station design from Sensirion:

Manufacturer: Preci Dip

Manufacturer part number: 821-S1-005-30-014101

Digikey part number: 1212-1737-ND

Different spring pins can be used, i.e. with different connector heights, if customer's design allows.

Lead times might be several weeks.

Ordering information for the Molex connector soldered to the PCB inside the base station from Sensirion:

Manufacturer: Molex, 1.25mm Pitch PicoBlade™ Connector System

Manufacturer part number: 53261-0471

Digikey part number: WM7622CT-ND

Lead times might be several weeks.

3 Engineering Guidelines for your LD20 Interface

Sensirion's LD20 base station is meant for testing purposes only. Customers are expected to design their own mechanical and electrical interface to best meet their application's requirements. The following engineering guidelines are provided for reference.

It is recommended to use only the middle section of the sensor's plastic body to hold and align the sensor in a customized interface (see colored surfaces in Figure 5). The outer dimensions of these surfaces are the same for all versions of the LD20 series independent of flow rate ranges or fluidic fittings. This enables an easy exchange of the different LD20 versions while using the same interface.

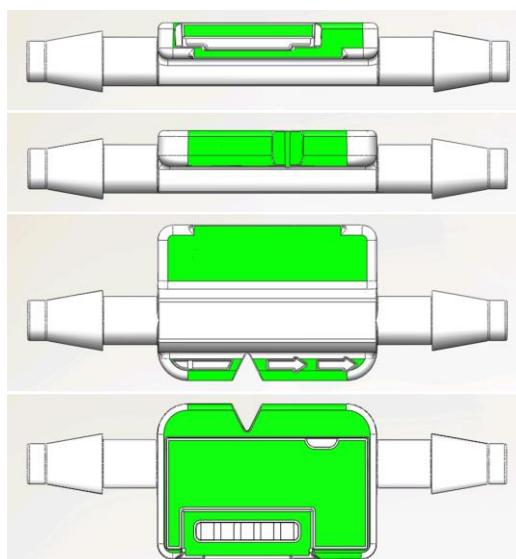


Figure 5: Surfaces (green) to be used to align and secure the LD20 sensor

For detailed layout dimensions of the LD20 sensors needed for a mechanical integration please see the corresponding datasheet at www.sensirion.com/ld20.

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