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# EVALUATION BOARD MANUAL

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## DIFFERENTIAL PRESSURE SENSOR

Evaluation board order code	Sensor order code
25132545xxx91	25131308xxx01

VERSION 1.0

OCTOBER 29, 2019

## Revision history

Manual version	Product version	Notes	Date
1.0	1.0	<ul style="list-style-type: none"><li>• Initial release of the manual</li></ul>	October 2019

## Abbreviations

Abbreviation	Description
I <sup>2</sup> C	Inter integrated circuit
MEMS	Micro electro mechanical system

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# 1 General description

## 1.1 Introduction

This evaluation board provides a straightforward and cost-effective option to test and evaluate the differential pressure sensors from Würth Elektronik eiSos. It can be connected to the host controller (e.g. Arduino) using I<sup>2</sup>C interface pins. Through hole pin header connections allow the board to be mounted on a bread board.

The differential pressure sensor (Part No: 25131308xxx01) is a MEMS based 15-bit piezo-resistive pressure sensor with a digital I<sup>2</sup>C and an analog interface. The sensor evaluation board is available in five pressure measurement ranges from 0.1 kPa to 1000 kPa (See table 1. In addition to the sensor and decoupling capacitors, the evaluation board consists of a mounted adapter with two nozzles. Pneumatic tubes can be connected to the nozzles. Barbed nozzle design improves the overall mechanical stability of the connection.

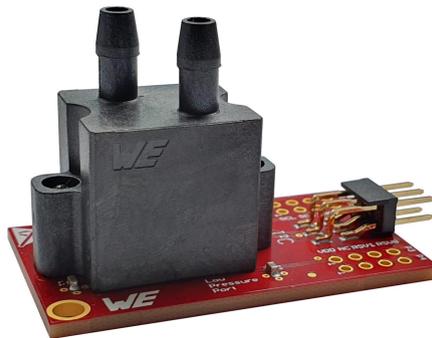


Figure 1: Evaluation board for the differential pressure sensor

## 1.2 Ordering Information

WE order code	Pressure range [kPa]	Sensor Marking	Dimensions [mm]	Description
2513254510091	± 0.1	PDB100IA0N	45 x 25 x 31	ESD bag packaging
2513254510191	± 1	PDB101IA0N		
2513254510291	± 10	PDB102IA0N		
2513254510391	0 to 100	PDU103IA0N		
2513254510491	-100 to 1000	PDU104IA0N		

Table 1: Ordering information

### 1.3 Material Contents

- **1 differential pressure sensor board:** With digital I<sup>2</sup>C and analog output; Includes all necessary de-coupling capacitors and SMT pin header
- **1 Adapter:** With barbed nozzles that can fit the pneumatic tubes with inner diameter 4 mm. (recommended tube: Festo PUN-6x1-XX)
- **2 O-rings:** 1.8 x 2 mm rubber (NBR-70) O-ring for sealing
- **2 Snap-rivets or Screws:** Provides quick and robust connection of the adapter with the PCB. Snap-rivets for operating pressure <500 kPa and screws (M3) for higher operating pressure >500 kPa.



EVAL boards with order codes 2513254510091, 2513254510191, 2513254510291 and 2513254510391 are shipped with snap-rivets.



EVAL boards with order code 2513254510491 are shipped with screw fasteners.



Figure 2: Evaluation board for the differential pressure sensor

## 1.4 Assembly

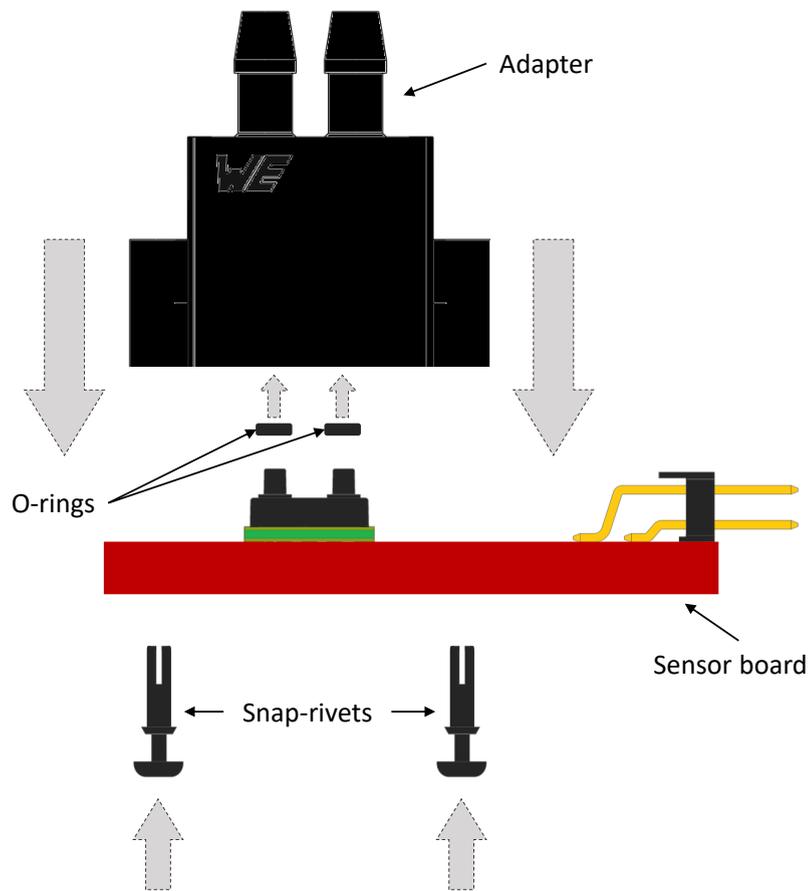


Figure 3: Assembly of the evaluation board



**Warning:** The adapter can withstand pressure upto 1000 kPa. Do not apply more than 1000 kPa to the adapter.

## 2 Functional description

The differential pressure sensor evaluation board supports the standard I<sup>2</sup>C communication interface as well as analog voltage output.

- A positive supply voltage 5V is applied to the sensor through *VDD* pin.
- The I<sup>2</sup>C interface pins *SDA* and *SCL* are connected with the interface pins on the host controller side
- 7-bit slave address of the differential pressure sensor on the board is 0x78.



*SDA* and *SCL* pins must be connected to the *VDD* through pull-up resistors on the host controller (master) side. There are no-pull up resistors on the sensor board (slave)



The sensor works with 5V supply. In case the host controller is working on 3V, proper hardware set up including level-shifters and stable 5V power supply must be used.

Pin No.	Name	Function	Input/output	Comments
1	<i>SCL</i>	I <sup>2</sup> C serial clock	Input	
2	<i>SDA</i>	I <sup>2</sup> C serial data	Input/Output	
3	<i>GND</i>	Negative supply voltage	Supply	
4	<i>VOUT</i>	Analog output	Output	
5	<i>VDD</i>	Positive supply voltage	Supply	
6	<i>NC</i>	No connection		
7	<i>RSVD</i>	Reserved		Do not connect
8	<i>RSVD</i>	Reserved		Do not connect

Table 2: Pin description of the sensor



Please refer to the corresponding data sheet of the sensor (Part No: 25131308xxx01) for more information about the sensor parameters and electrical properties.

## 2.1 Evaluation board in operation

### 2.1.1 Pin header connection

Pin no.	Description
1	<i>GND</i>
2	<i>SCL</i>
3	<i>SDA</i>
4	Not connected
5	<i>VOUT</i>
6	<i>VDD</i>

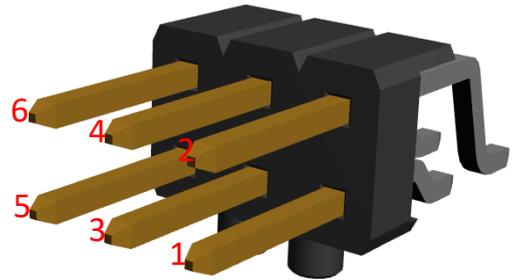


Table 3: Pin header connection to external boards

### 2.1.2 Analog Output

SJ1 is assembled with a 0  $\Omega$  resistor enabling the analog voltage output. The analog output can be read directly through the pin 6 (*VOUT*) of the pin header connection.

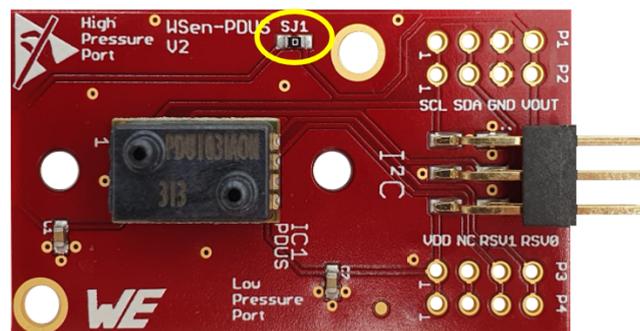


Figure 4: Analog output resistor



By removing the 0  $\Omega$  resistor (SJ1), the analog output can be disabled.

## 2.1.3 Through hole connection

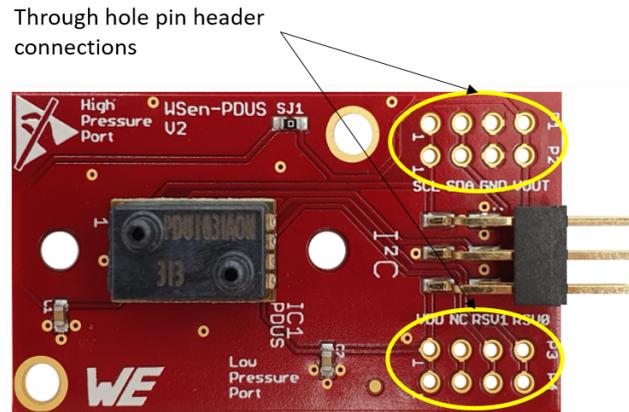


Figure 5: Through hole connection

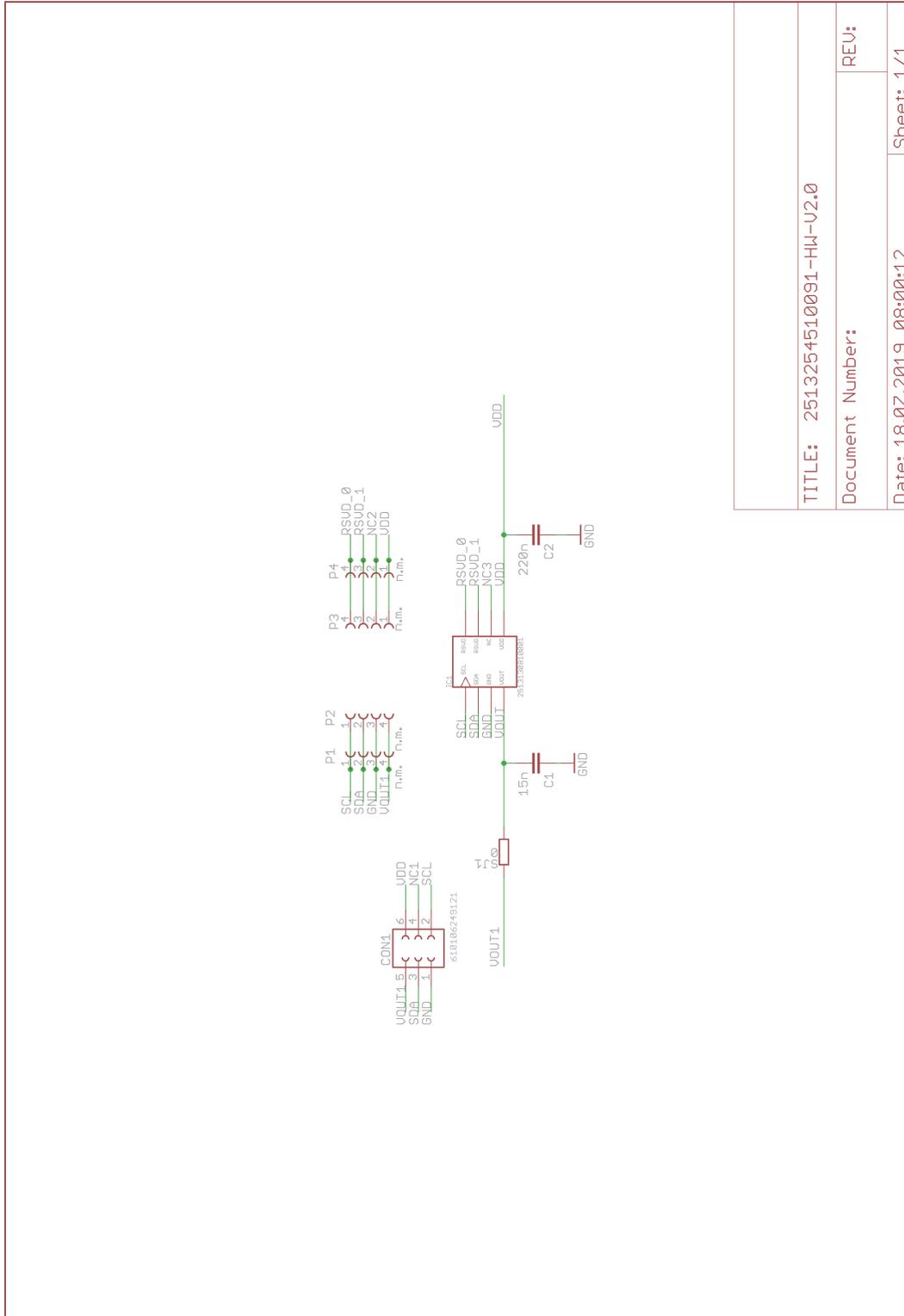


Please refer to Table 2 for the pin description of the sensor.



Please refer to the user manual of the differential pressure sensor for information regarding the conversion of digital and analog values into pressure SI unit.

## 2.2 Schematic diagram



TITLE: 2513254510091-HW-V2.0

Document Number: REV:

Date: 18.07.2019 08:00:12 Sheet: 1/1

Figure 6: Schematic diagram

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