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Diff Press 3 Click

PID: MIKROE-5771

Diff Press 3 Click is a compact add-on board that can measure differential pressure. It features the WSEN-PDUS (2513130810401), a differential pressure sensor from Würth Elektronik. The sensor is MEMS based and uses a piezo-resistive sensing principle. It is a fully calibrated pressure sensor with 15-bit digital and 11-bit analog outputs. In addition to pressure measurement, the 2513130810401 WSEN-PDUS sensor also has an embedded temperature sensor. This Click board™ makes the perfect solution for the development of HVAC, filter monitoring, gas leak detection applications, and more.

Diff Press 3 Click is supported by a mikroSDK compliant library, which includes functions that simplify software development. This Click board™ comes as a fully tested product, ready to be used on a system equipped with the mikroBUS™ socket.

How does it work?

Diff Press 3 Click is based on the WSEN-PDUS (2513130810401), a differential pressure sensor from Würth Elektronik. The sensor has high accuracy, can measure different transfer pressure ranges from -100kPa up to 1000kPa and has a response time of 2.2ms. There are two pots that except ∅2.2 hoses, where one of them is a high-pressure side, while the other is designated as the vacuum side. The hoses are not included with the Diff Press 3 Click. As for temperature, this sensor can measure temperatures in a range of 0 up to 70°C and in ADC resolution of 15 bits.

Diff Press 3 Click can use a standard 2-Wire I2C interface to communicate with the host MCU,

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where you can read both the pressure and the temperature measurements. In addition to the I2C interface, the output of the pressure output of the sensor can be read over the analog AN pin of the mikroBUS™ socket, where you can read only pressure measurements.

As the 2513130810401 WSEN-PDUS sensor works on 5V, this Click board™ comes equipped with the PCA9306, a dual bidirectional I2C bus and SMBus voltage-level translator from Texas Instruments, which allows the use of this Click board™ with systems with 3.3V logic level. AN SEL jumper allows you to use a 5V or 2.5V logic level over a voltage divider, where 2.5V is set by default.

This Click board™ can operate with either 3.3V or 5V logic voltage levels selected via the VCC SEL jumper. This way, both 3.3V and 5V capable MCUs can use the communication lines properly. Also, this Click board™ comes equipped with a library containing easy-to-use functions and an example code that can be used, as a reference, for further development.

Specifications

Type	Pressure
Applications	Can be used for the development of HVAC, filter monitoring, gas leak detection, inhalers, and more
On-board modules	WSEN-PDUS (2513130810401) differential pressure sensor from Würth Elektronik
Key Features	Low power consumption, excellent accuracy, digital and analog readings, calibrated sensor, MEMS-based piezo-resistive principle, additional temperature sensor that can be used for temperature compensation, fast response time, and more
Interface	Analog,I2C
ClickID	Yes
Compatibility	mikroBUS™
Click board size	M (42.9 x 25.4 mm)
Input Voltage	3.3V or 5V

Pinout diagram

This table shows how the pinout on Diff Press 3 Click corresponds to the pinout on the mikroBUS™ socket (the latter shown in the two middle columns).

Notes	Pin	mikroBUS				Pin	Notes
Analog Output	**AN**	1	AN	PWM	16	NC	
	NC	2	RST	INT	15	NC	
	NC	3	CS	RX	14	NC	
	NC	4	SCK	TX	13	NC	
	NC	5	MISO	SCL	12	**SCL**	I2C Clock
	NC	6	MOSI	SDA	11	**SDA**	I2C Data
Power Supply	**3.3V**	7	3.3V	5V	10	**5V**	Power Supply

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Ground	**GND**	8	GND	GND	9	**GND**	Ground

Onboard settings and indicators

Label	Name	Default	Description
LD1	PWR	-	Power LED Indicator
JP1	VCC SEL	Left	Logic Level Voltage Selection 3V3/5V: Left position 3V3, Right position 5V
JP2	AN SEL	Right	Analog Voltage Level Selection 2V5/5V: Left position 2V5, Right position 5V

Diff Press 3 Click electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage	3.3	-	5	V
Pressure Measurement Range	-100	-	1000	kPa
Accuracy	-0.3	±0.1	0.3	%FSS
Resolution	-	15	-	bit

Software Support

We provide a library for the Diff Press 3 Click as well as a demo application (example), developed using MIKROE compilers. The demo can run on all the main MIKROE development boards.

Package can be downloaded/installed directly from NECTO Studio Package Manager (recommended), downloaded from our LibStock™ or found on Mikroe github account.

Library Description

This library contains API for Diff Press 3 Click driver.

Key functions

- diffpress3_get_pressure Diff Press 3 get pressure function.
- diffpress3_get_temperature Diff Press 3 get temperature function.
- diffpress3_read_raw_adc Diff Press 3 read raw ADC value function.

Example Description

This library contains API for the Diff Press 3 Click driver. This demo application shows an example of differential pressure and temperature measurement.

The full application code, and ready to use projects can be installed directly from NECTO Studio Package Manager (recommended), downloaded from our LibStock™ or found on Mikroe github account.

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Other Mikroe Libraries used in the example:

- MikroSDK.Board
- MikroSDK.Log
- Click.DiffPress3

Additional notes and informations

Depending on the development board you are using, you may need USB UART click, USB UART 2 Click or RS232 Click to connect to your PC, for development systems with no UART to USB interface available on the board. UART terminal is available in all MIKROE compilers.

mikroSDK

This Click board™ is supported with mikroSDK - MIKROE Software Development Kit. To ensure proper operation of mikroSDK compliant Click board™ demo applications, mikroSDK should be downloaded from the LibStock and installed for the compiler you are using.

For more information about mikroSDK, visit the official page.

Resources

mikroBUS™

mikroSDK

Click board™ Catalog

Click Boards™

ClickID

Downloads

PCA9306 datasheet

WSEN-PDUS (2513130810401) datasheet

Diff Press 3 click 2D and 3D files

Diff Press 3 click example on Libstock

Diff Press 3 click schematic