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Air Velocity Click

PID: MIKROE-5448

Air Velocity Click is a compact add-on board that measures direct airspeed. This board features the FS3000-1005, a surface-mount type air velocity module utilizing a MEMS thermopile-based sensor from Renesas. This I2C-configurable air velocity module features a digital output with a 12-bit resolution with a wide operational range of 0-7.2meter/second (0-16.2mph). The sensor comprises a “solid” thermal isolation technology and silicon-carbide coating to protect it from abrasive wear and water condensation. This Click board™ is suitable for air handling systems, HVAC, analytic gas monitoring systems, data centers, and air quality systems to detect failures in the fan or blower, fan speed control, or filter clogging.

Air Velocity Click is fully compatible with the mikroBUS™ socket and can be used on any host system supporting the mikroBUS™ standard. It comes with the mikroSDK open-source libraries, offering unparalleled flexibility for evaluation and customization. What sets this Click board™ apart is the groundbreaking ClickID feature, enabling your host system to seamlessly and automatically detect and identify this add-on board.

How does it work?

Air Velocity Click is based on the FS3000-1005, a high-performance surface-mount type air velocity module utilizing a MEMS thermopile-based sensor from Renesas. The FS3000-1005 measures the direct local air, which allows the system control to make adjustments quickly. It features a digital output with a 12-bit resolution with a wide operational range of 0-7.2meter/second (0-16.2mph). By providing a closed-loop control, systems can reduce the energy cost of the system. The FS3000-1005 targets low-profile applications and is designed to measure airflow around critical components such as analytic gas monitoring systems, data centers, and air quality systems to detect failures in the fan or blower, fan speed control, or

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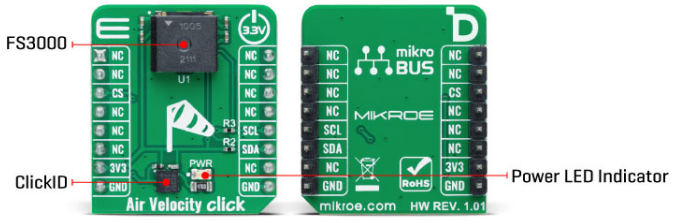
filter clogging.



The FS3000-1005 comprises a “solid” thermal isolation technology and silicon-carbide coating to protect it from abrasive wear and water condensation. This Click board™ communicates with MCU using the standard I2C 2-Wire interface to read data and configure settings, supporting a Fast Mode operation up to 400kHz. It continuously measures in operation, where the data is sent in byte packages.

This Click board™ can be operated only with a 3.3V logic voltage level. The board must perform appropriate logic voltage level conversion before using MCUs with different logic levels. However, the Click board™ comes equipped with a library containing functions and an example code that can be used as a reference for further development.

Specifications

Type	Environmental
Applications	Can be used for air handling systems, HVAC, analytic gas monitoring systems, data centers, and air quality systems to detect failures in the fan or blower, fan speed control, or filter clogging
On-board modules	FS3000-1005 - air velocity module from Renesas
Key Features	MEMS thermopile-based sensor, thermal isolation technology, resistant to surface contamination, low power application, I2C interface, and more
Interface	I2C
Feature	ClickID
Compatibility	mikroBUS™
Click board size	S (28.6 x 25.4 mm)
Input Voltage	3.3V

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Pinout diagram

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

Notes	Pin	mikroBUS				Pin	Notes
	NC	1	AN	PWM	16	NC	
	NC	2	RST	INT	15	NC	
ID COMM	**CS**	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	NC	
Ground	**GND**	8	GND	GND	9	**GND**	Ground

Onboard settings and indicators

Label	Name	Default	Description
LD1	PWR	-	Power LED Indicator

Air Velocity Click electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage	-	3.3	-	V
Air Velocity	0	-	7.23	m/s
Resolution	-	-	12	bit

Software Support

We provide a library for the Air Velocity Click as well as a demo application (example), developed using MikroElektronika compilers. The demo can run on all the main MikroElektronika 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 Air Velocity Click driver.

Key functions

- airvelocity_read_output This function reads the raw output counts by using I2C serial interface.
- airvelocity_convert_counts_to_mps This function converts raw output counts to velocity in m/sec (0-7.23).

Example Description

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This example demonstrates the use of Air Velocity Click board™ by reading and displaying the output counts and air velocity in m/sec.

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.

Other Mikroe Libraries used in the example:

- MikroSDK.Board
- MikroSDK.Log
- Click.AirVelocity

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 MikroElektronika compilers.

mikroSDK

This Click board™ is supported with mikroSDK - MikroElektronika 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

Air Velocity click example on Libstock

FS3000 datasheet

Air Velocity click schematic v101

Air Velocity click 2D and 3D files v101