

Technical Note Series

Setup and Connection of an Arduino board to a DegreeC F-Series Air Velocity and Air Temperature Sensor

Product Platform:	Airflow Research, Testing, and Development
Products:	F200 Digital Probe Style Sensor and F-Series Probe Style Sensors
Purpose:	Air Velocity Testing Using Open Source Development Platforms
Testing Range:	0.15 m/s to 20 m/s (30 fpm to 4,000 fpm)

ABSTRACT:

Understanding your airflow profile is crucial to understanding how to best approach the design and improvement process in today's applications in high-demand, fast-spaced, industries such as automotive, laboratory, HVAC, high-performance electronics, and more.

For automotive, engine compartment testing demands a clear understanding of the airflow and air temperature parameters to optimize heat exchange of the radiator and condenser, and for passenger comfort, knowing how air moves through the vents and cabin ensures that maximum airflow efficiency is able to be reached. For air balancers and HVAC certifiers, achieving optimal human comfort and energy-efficiency in facilities requires granular visibility of airflow and air temperature at all levels of infrastructure. Additionally, collected data should be efficiently and consistently outputted to your choice of communication platform through the most widely used communication delivery methods within the industry.



F200 Digital-Only Sensor



F3xx/4xx/5xx Series Sensor

SOLUTION:

For in-situ testing of air velocity (and air temperature) in today's demanding applications, a high-accuracy, simple to setup, professionally calibrated sensor ensures less-downtime and increasingly efficient testing scenarios. DegreeC offers a wide range of sensors built-to-order to meet any application requirement where air velocity and air temperature must be known.

The **F-Series** of probe-style sensors is a platform of non-directional air velocity and temperature sensors optimized for demanding applications with support for digital outputs (UART and I²C) and compatible with Arduino, Raspberry Pi, and all major microcontrollers and development boards. The newest addition, the **F200**, uses a digital-only interface that is best suited for new product designs and product and process control airflow applications.

Based on high-demand from our customers we have outlined step-by-step, best practices instructions on connecting an F-Series sensor to one of the most popular development boards, the Arduino. For the purposes of this guide, setup will be shown using the UNO REV3 board. DegreeC recommends using this particular board due to its popularity and ease of use.

CONNECTION AND SETUP INSTRUCTIONS:

Navigate to the Arduino website (<https://www.arduino.cc/>) and download the latest version of the Arduino IDE (<https://www.arduino.cc/en/Main/Software>).

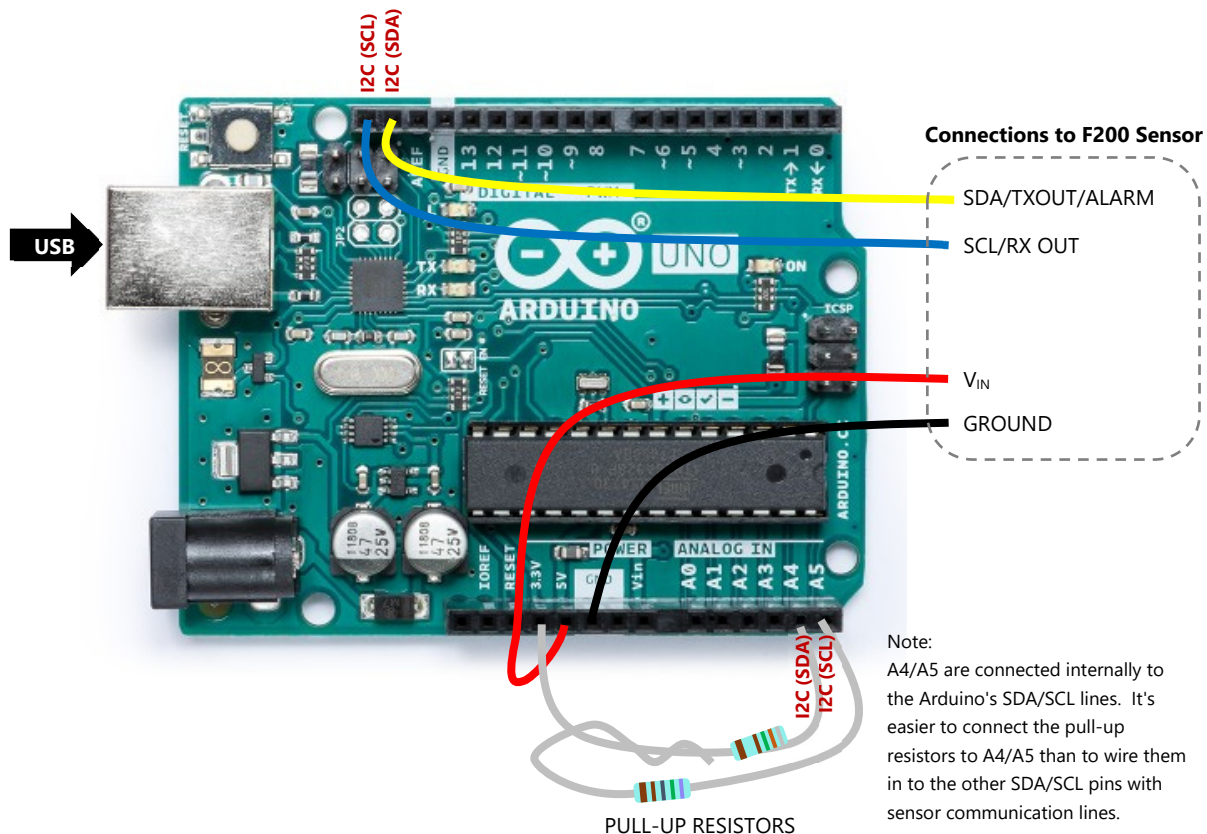
Follow the instructions to connect your style of sensor to the Arduino.

F200 Connection

Ensure the power source is disconnected prior to connecting the sensor. Additionally, please refer to the diagram on the right for pinouts.

Note: For I²C communication, external pull-up resistors to +3.3V for SDA and SCL are required. The F200 does not have internal pull-up resistors. The minimum allowable pull-up resistance is 200 Ohms.

First connect to ground, followed by the communication lines, and lastly power. Connect the Arduino to your PC via USB. See below diagram for wiring.

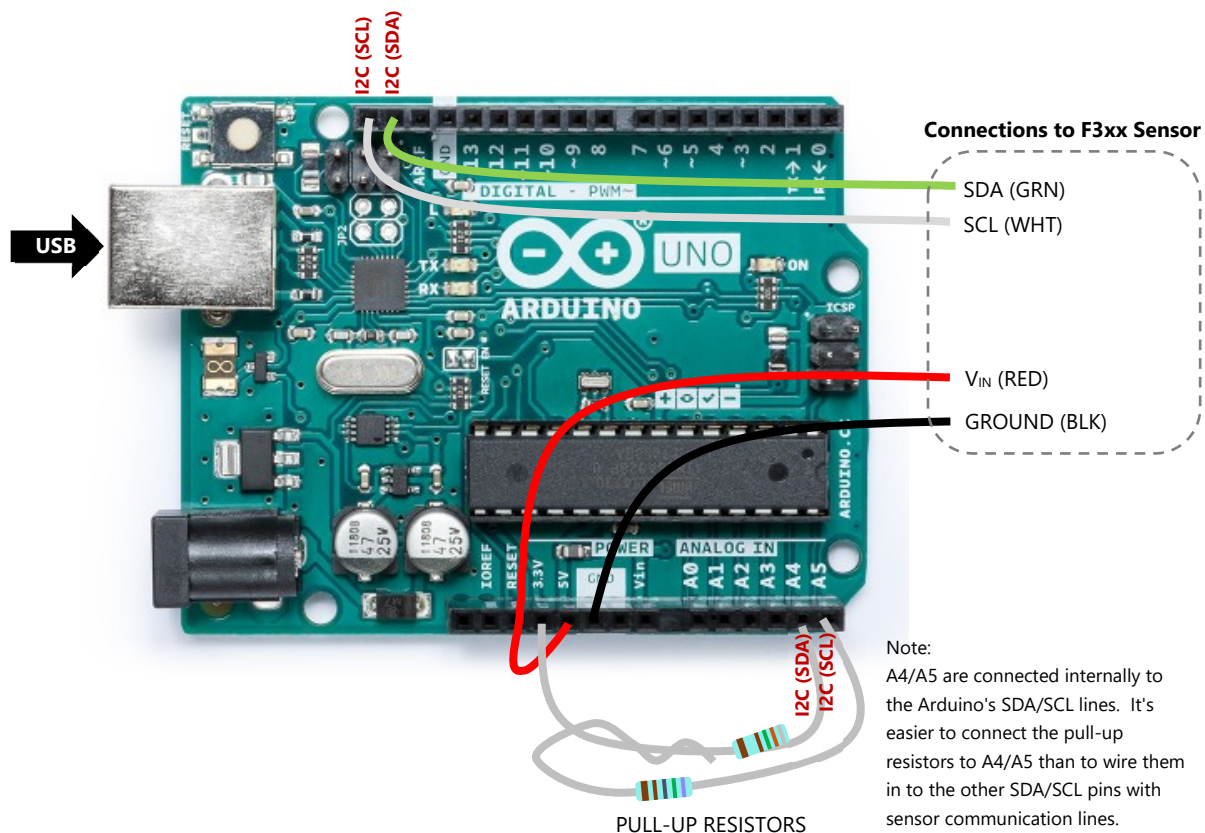


F3xx/4xx/5xx Connection

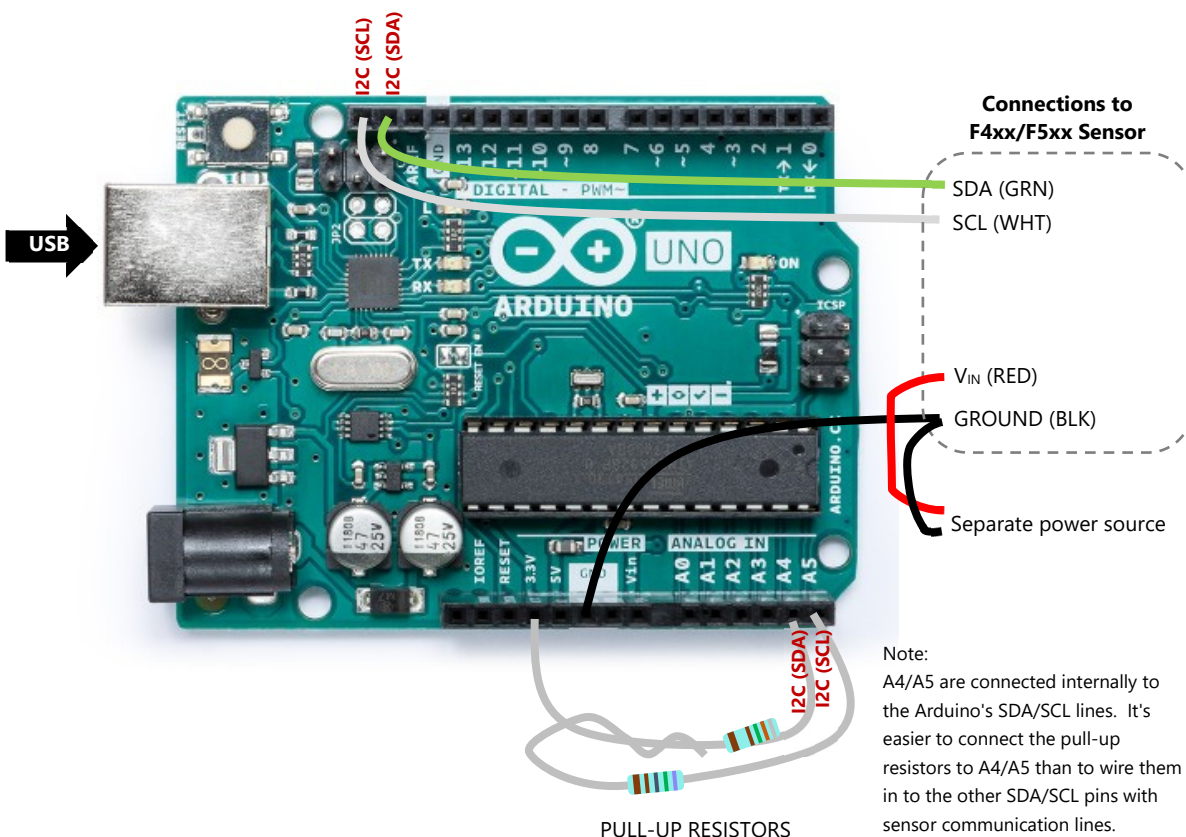
Please follow the same directions as in the F200 connection procedure on the previous page. The F3xx/4xx/5xx series sensors need to be separately powered. Power is connected to the red lead of the sensor (+), and the power ground should be connected one of the two ground pins on the Arduino (see image below). The second ground pin should be used to ground the sensor.

Note: For I²C communication, external pull-up resistors to +3.3V for SDA and SCL are required. The F3xx/4xx/5xx series sensors do not have internal pull-up resistors.

F3xx Sensor with Arduino Board



F4xx/F5xx Sensor with Arduino Board



Once all connections have been made, open up the Arduino Desktop IDE and power up your Arduino.

Note: DegreeC will provide you with a pre-compiled sketch to use when connecting your sensor to your Arduino:

- Using I2C - 64500SW000-XXX
- Using UART - 64500SW002-XXX

Simply upload the pre-compiled sketch to the IDE after powering up.

SENSOR PERFORMANCE CHARACTERISTICS:

F200 Digital Only Air Velocity & Air Temperature Sensor

Total Velocity Range Available	0.15 m/s to 20 m/s (30 fpm to 4,000 fpm)
Operating Temperature	0°C to 60°C (32°F to 140°F)
Digital Output	UART or I ² C available for flow/temperature
Alarm Output	Open drain, configurable trip point
Compatibility	Arduino, Raspberry Pi, and all major microcontrollers and development boards.

F-Series (F3x0, F4x0, F5x0) Air Velocity & Air Temperature Sensors

Total Velocity Range Available	0.15 m/s to 20 m/s (30 fpm to 4,000 fpm)
Operating Temperature	0°C to 60°C (32°F to 140°F)
Velocity/Temperature Output	0-5V or 0-10V; 0-20mA or 4-20mA
Digital Output	UART or I ² C available for flow/temperature
Alarm Output	Open drain, configurable trip point

CONTACT:

To find out more about Degree Controls' sensor products and solutions, contact us at 1-877-degreeC, or visit our website at www.degreeC.com. Email sales inquiries to sales@degreec.com.

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