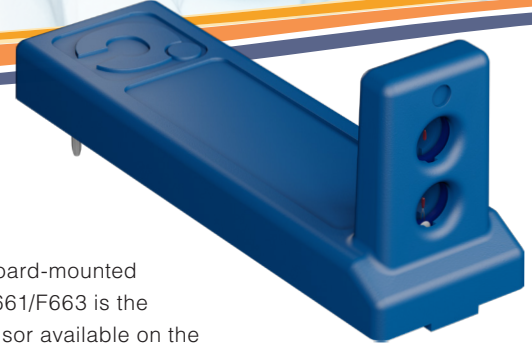# F661/F663

Board-Mounted, Digital Air Velocity & Temperature Sensor — Horizontal Profile

Applications

- Detecting filter clog status
- Detecting airflow blockage
- Detecting fan fail
- Real-time cooling watchdog
- Heatsink cooling
- DC-DC converter cooling
- Cooling coil performance
- Temperature rise information
- Flow uniformity monitoring
- Mass airflow calculations
- High performance server boards
- High performance embedded computing
- Telecom systems
- High performance audio amplifiers
- Biological and incubation products
- High performance digital projectors and displays
- Heat recovery ventilators and exhaust fans
- Thermal Load Cards

Degree Controls, Inc.

is an ISO-9001 certified, world-class designer and manufacturer of airflow sensing, monitoring, and control solutions. With over 25 years of proven experience, we pride ourselves on delivering solutions which provide the value, differentiation, and service required by our customers, to meet the rapidly changing competitive landscape that they face.

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Overview

The F661/F663 sensor is part of Degree Controls' board-mounted air velocity and temperature sensor platform. The F661/F663 is the smallest footprint, fully-integrated, digital airflow sensor available on the market today. Designed to measure spatial airflow inside electronic or ducted systems where a horizontal profile is needed, the F661/F663 uses high performance dual element sensing technology and can be soldered directly to a printed circuit board, or plugged into a surface-mount socket for easy removal or maintenance.

*For customers looking for a taller profile head, the **F660/F662** is a vertical profile version of the F661/F663.*

The F661/F663 can be calibrated for flow velocities ranging from 0.15 - 20 m/s (30 - 4000 fpm), with accuracy up to 5% of reading. The sensor outputs velocity readings in environments between -5 and 60 ˚C. At temperatures above and below this range, but within the stated storage temperature range, the sensor will not be harmed. The F661/F663 sensor uses the smallest possible sensor footprint (7mm x 10mm), thereby providing maximum positioning flexibility for the client.

The sensor is powered by 5 VDC (F663) or 18 VDC (F661) and communicates across the existing I^{2}C or UART bus, or can be configured with an alarm output, for switch-style operation. In its default configuration, the F661/F663 communicates over UART digital communication. Implementation of a resistor between the address pin (Pin 3) and ground, causes the sensor to operate in I^{2}C communication mode, with up to 32 possible addresses available, where the value of the resistor determines the I^{2}C address. In addressable, multi-sensor deployments, air velocity across an area or volume can be measured at multiple locations.

Utilizing RoHS-compliant, dual sensing elements, the F661/F663 sensor measures air velocity and air temperature in real time. For some applications, a flow learning command can be implemented, allowing for local calibration of the sensor after install by the board manufacturer.
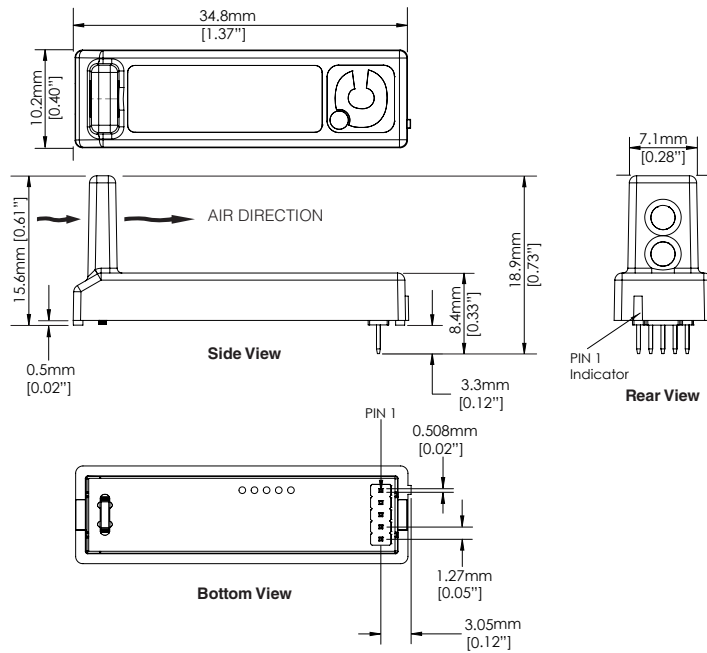
Features

- Smallest footprint air velocity sensor available
- Designed for high performance, slim form-factor boards
- Dual sensing element with protective shroud
- Provides fully linearized air velocity and air temperature with wide operating range
- Up to 5% accuracy and repeatability
- UART or I^{2}C communication
- Alarm output option for switch style operation
- I^{2}C addressing for multipoint measurement
- Available flow learning command for accuracy optimization, post-soldering
- <20mA consumption
- Simple design-in
- RoHS compliant

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Pin Assignment

Pin Description
1. Input Voltage Return (Gnd)
2. UART RX or I²C SDA
3. Address / Alarm
4. UART TX or I²C SCL
5. Input Voltage

Refer to manual for installation information

34.8mm [1.37"]
10.2mm [0.40"]
7.1mm [0.28"]
15.6mm [0.61"]
AIR DIRECTION
18.9mm [0.73"]
8.4mm [0.33"]
0.5mm [0.02"]
3.3mm [0.12"]

Side View

PIN 1 Indicator
Rear View

PIN 1
0.508mm [0.02"]
1.27mm [0.05"]
3.05mm [0.12"]

Bottom View

Specifications

Operating Temperature	-5°C to 60°C (23°F to 140°F)
Storage Temperature	-40°C to 105°C (-40°F - 221°F)
Velocity Range	0.15m/s – 20.0m/s (30fpm – 4000fpm)
Response Time	400 ms
Relative Humidity (non-condensing)	5-95%
F663 Operating Voltage F661 Recommended Operating Voltage F661 Maximum Operating Voltage*	4.5 – 13 VDC 15 – 18 VDC 12 – 24 VDC (with performance restrictions; see manual)
Digital Output	3.3 VDC UART or I²C
Optional Alarm Output	Configurable trip point
Housing Material	UL94-V0
Sensor Weight	About 2.5g (.09oz)

Air Velocity Performance

Repeatability ±1% of reading (under identical conditions)

Air Velocity Range
0.15 to 1.0 m/s (30 to 200 fpm)
0.5 to 10 m/s (100 to 2,000 fpm)
1.0 to 20 m/s (200 to 4,000 fpm)
*within compensation range

Air Velocity Accuracy*
± (5% of reading + 0.04 m/s [8 fpm])
± (5% of reading + 0.10 m/s [20 fpm]))
± (5% of reading + 0.15 m/s [30 fpm])

Resolution: 0.1°C

Temperature Compensation Range

Temperature Compensation Range: The F661/F663 is a thermal airflow sensor; it is sensitive to changes in air density and indicates velocity with reference to a set of standard conditions (21°C (70°F), 760mmHg (101.325kPa), and 0%RH). The F661/F663 has been designed so that when used over the stated temperature compensation range, the sensor indicates very close to actual air velocity and minimal compensation is only required to account for changes in barometric pressure or altitude.

Part Number Format

F66X - V

X = Nominal Input Voltage
1 = 18V
3 = 5V

V = Velocity Profile
A = 0.15 – 1.0 m/s [30-200 fpm]
B = 0.5 - 10.0 m/s [100-2000 fpm]
C = 1.0 – 20.0 m/s [200-4000 fpm]

RoHS

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