

## ProntoFlow™ Control Series

### C633 Multi-mode Miniature Fan Controller

The miniature C633 multi-mode fan controller is an industry-first device, which controls & modulates fan RPM, based on one of three control parameters, sensed by the device itself:

- Air velocity
- Air temperature
- Fan RPM

The user decides which control parameter is most suitable for their product, and can reprogram the set point for each control mode. DegreeC will ship preconfigured for production requirements.

- Air velocity mode: This is an ideal way to ensure the linear air velocity determined during system design, is available and maintained in the actual system, while external factors like filter clog, inlet blockage, or different populations of components & cabling, affect the air flow rate. The controller will modulate the fan RPM to maintain a desired flow velocity and send a low flow alarm if it cannot be maintained.
- Air temperature mode: The controller will drive the fans to maintain a desired air temperature set by the user or with interaction over the communication interface, a specified delta temperature from a known ambient could be controlled. Should the desired temperature not be maintained, an alarm will be initiated.
- Fan RPM mode: In this mode, the controller will modulate fan PWM to maintain a specified fan RPM. If a fan begins to fail, or system impedance changes fan RPM behavior, the controller will drive the fan harder to maintain the required fan speed. Should the required RPM not be maintained, an alarm will be initiated.

In all operational modes, an alarm pin is available to communicate alarm status. Additionally, with the I2C/UART communication built in, the C633 can be interrogated and real-time information accessed for use in more complex system level environmental algorithms within your product. Use of this device to set optimal filter replacement schemes or set system shutdown flags are other suggested implementations. In all cases, optimizing fan speed based on thermal management saves power, reduces operational costs, and increases product reliability.

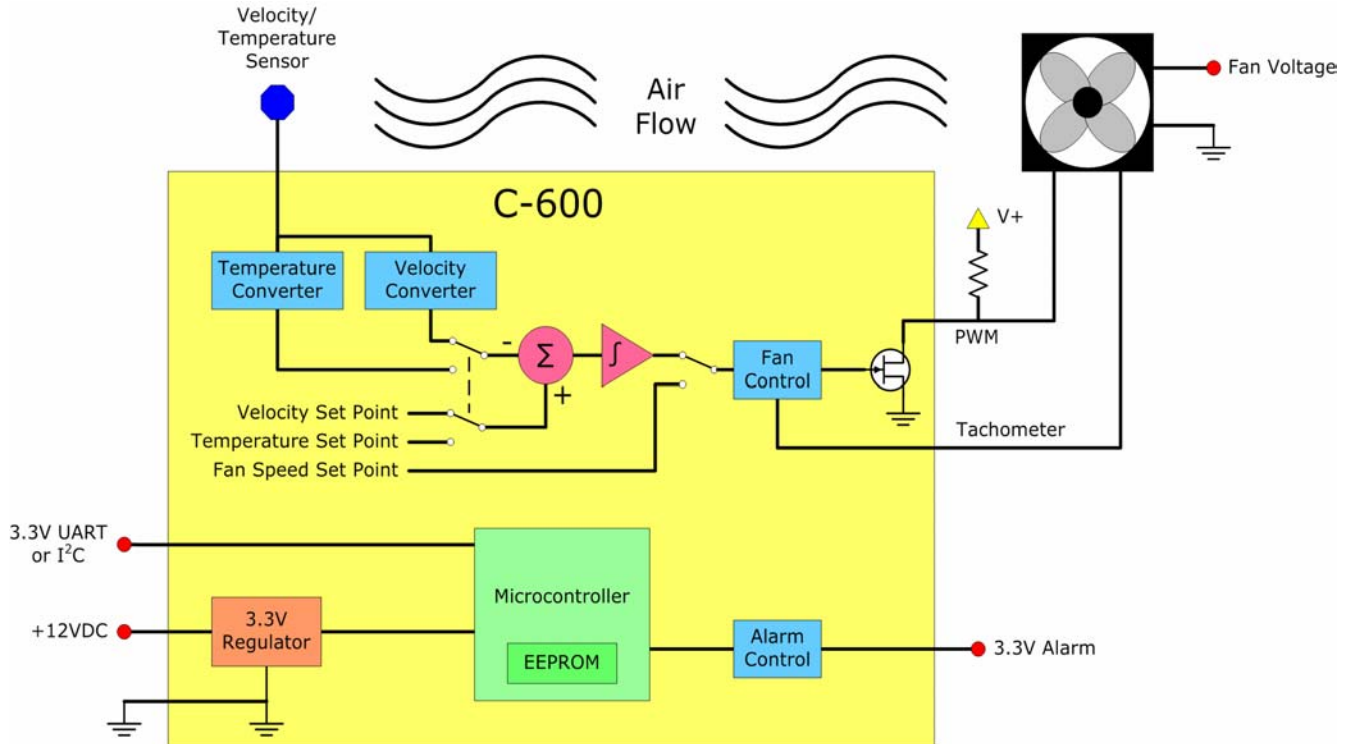
*Are you wondering if this controller fits your application? Call us today @ 877-degreeC and improve your thermal management. Customizations are available.*

The ProntoFlow series is a line of off-the-shelf programmable fan controllers from degreeC which sense air velocity, temperature and fan speed, and are used for thermal management and monitoring of all kinds of electronic enclosures and devices. Years of experience in thermal management and fan controller development have been distilled into these products to ensure reliable and flexible operation.

#### Feature List

- ✓ Designed specifically for use with 12V/24V or 48V fans which have tachometer output and PWM input.
  - ✓ Fan is powered by the system, only Tach and PWM connected to C633.
- ✓ Full range of fan RPM control across PWM range configurable from minimum (or zero) to full RPM.
- ✓ Supports fan PWM from 1KHz to 30KHz
- ✓ Fan shutdown based on sensed temperature possible.
- ✓ Failure and performance monitoring of the fan and sensed parameter.
- ✓ Multiple communication modes.
- ✓ Dedicated alarm pin.
- ✓ Custom firmware can be provided by Degree Controls.
- ✓ Can be shipped pre-configured to your contract manufacturer.
- ✓ Small size, less than 1 in<sup>2</sup>, standard 0.1" pitch spacing.
- ✓ RoHS compliant
- ✓ May be integrated into telecom equipment, medical products, and industrial process equipment.
- ✓ Smallest intelligent fan controller on the market
- ✓ Optimizes power consumption of your cooling fans

## Implementation Diagram

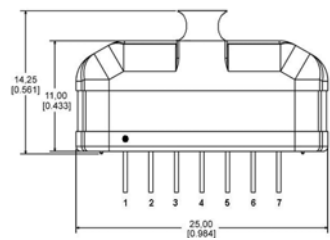


## Technical Specifications

	Air Velocity Control	Temperature Control	Fan Speed Control
Operating temp. range	-20°C to 70°C (-4°F to 158°F) <sup>1</sup>	-20°C to 70°C (-4°F to 158°F)	-20°C to 70°C (-4°F to 158°F)
Set point range	0.5m/s to 5.0m/s (100fpm to 1000fpm)	-20°C to 70°C (-4°F to 158°F)	Zero to maximum RPM
Read Accuracy	± 20% <sup>2</sup>	± 3°C	3% of maximum RPM
Set point resolution	± 0.001m/s (2 fpm)	± 0.01°C	± 1 RPM
Acceptance angle	± 45° to axis	N/A	N/A
Sampling time	2-3 seconds	2-3 seconds	2-3 seconds
Fault response	Alarm initiated if air velocity setpoint cannot be maintained	Alarm initiated if air temperature setpoint cannot be maintained	Alarm initiated if fan RPM setpoint cannot be maintained
User Configurable Parameters			
Alarm output configuration	Active low or high on velocity below minimum set point	Active low or high on high temperature set point	Active low or high on fan speed below minimum set point
Alarm disable	Available	Available	Available
Tunable control loop	Available	Available	NA
Alarm delay	5 – 60 seconds	5 – 60 seconds	5 – 60 seconds
Alarm hysteresis	Configurable based on LFM tolerance desired	Configurable based on temperature tolerance desired	Configurable based on RPM tolerance desired

General Specifications	
Storage temperature	-40°C to 85°C
Relative humidity	5-95% (non-condensing)
Supply power	+12 VDC, 10ma nominal
Input (3.3v logic level)	Tach (requires external pull-up)
Output (3.3v logic level)	Alarm
PWM output	Open drain (requires ext. pull-up)
PWM frequency range	1KHz – 30Khz
Communication (3.3v)	I2C or UART
Plastic enclosure	UL94-V0

Pin	UART (3.3V)	I2C (3.3V)
1	ALARM	ALARM
2	TACH	TACH
3	GND	GND
4	+12V	+12V
5	OUT	OUT
6	TXD	SDA
7	RXD	SCLK



6.4mm x 14.3mm x 25.0mm  
0.25in x 0.56in x 0.98in

<sup>1</sup> In Air Velocity Control Mode, the air velocity sensing is available between 15°C to 60°C (59°F to 140°F). When outside this temperature range, the C633 will set the fan speed to user configurable minimum or maximum fan speed.

<sup>2</sup> Absolute read accuracy is ± 20%, reading to reading accuracy is better than ± 10%.