



CFS1 (Dry or breath gas sensor)
Carbon Dioxide (0 to 10%)
Flow Rate (± 0 to 500 ± 1 LPM)
Pressure (0 to ± 5 psig $\pm 0.5\%$ FS)

Ultra fast and miniature - Carbon Dioxide, High Volumetric Flow rate, gauge pressure and Temperature sensor. CFS1 provides: 0-5V DC proportional outputs and UART bit stream comprising: CO₂ content, Volumetric Flow Rate, Gauge Pressure, temperature and product age. 4ms response is ideally suited for crisp Flow Rate & Carbon Dioxide measurement. Time constant, bi-directionally stable response, enables measurement of mixed gas CO₂ content to be used in various applications, such as measurement of metabolic health, tidal CO₂, Anxiety / Panic attack prediction, etc.

Specification:

Size	4.6" x 0.8" x 0.5" / 45g
Outputs	UART, LCD, Analog
Analog Flow output	0 to 5V DC Linearly proportional to ± 0 -500 LPM
Analog CO ₂ output	0 to 5V DC Linearly proportional to 0-10% CO ₂
Analog Pressure output	0 to 5V DC Linearly proportional to 0- ± 5 psig
Power Supply	Unregulated 8V to 32V DC / 14 ma
Display Switch	Toggles between CO ₂ , Flow Rate and Pressure on DigiDISP
CO ₂ Accuracy & resolution	0.03%
Flow Resolution	± 1 LPM
CO ₂ Range	0-20.8%
Max pressure	30 psig
Thermal Gradient _{max}	50 K/ meter
Operating Temperature	-45 to 70°C
Survival Temperature	-85 to +85°C
RS232 transmit Rate	200 bytes per second @ 19200 bits/sec
Calibration Retention	More than 10 years
Calibration	Factory
Flow I/O	Bi-directional via 1/2" male barbs
Response Time	4 mili-seconds
UART Frame content	CO ₂ [%], Flow Rate, Guage Pressure, Temperature[°C], Minutes of operation

Flow Direction Indicator	J1.3—Open Drain
--------------------------	-----------------

Features

USART / RS-232 output—TTL level
DigiFLO Computer Download Program is available.
Linear Analog outputs
LCD display output

CONNECTORS

J1 – Through Hole

Pin

1. (Square pad) 8 to 30V Unregulated DC Power Supply (+)
2. Flow Rate Analog Out. (0 to 5V_{DC} Linearly proportional to ±0- 500 LPM)
3. Direction of Flow. Open drain output: Open IN+ direction of flow; 0v IN- direction of flow.
4. Gauge pressure Analog Out. (0 to 5V_{DC} Linearly proportional to 0- ±5 psig)
5. Dual Function pin
 - 10Hz 5V 50% DS Square wave output.
 - PB Switch contact. Toggles between DigiDISP LCD display of CO₂, Flow Rate & pressure.
6. CO₂ Analog Out. (0 to 5V_{DC} Linearly proportional to 0- 10%)
7. UART TTL level TXD. Provides %CO₂, Volumetric Flow Rate, Pressure, Temperature and operational Minutes
8. 8 to 30V Unregulated DC Power Supply (-) - GND

J2 (RS232) – RS-232 I/O - Board Edge

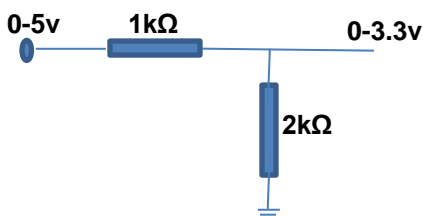
Connects to [DigiRS232](#)
For RS232 protocol, see HBS1 User Interface document.

J3 (DISPLAY) – Board Edge

Connect to [DigiDISP](#)

Connecting to a 3.3v Microcontroller

0 to 5v UART and / or Proportional analog outputs need to be reduced to a 0 to 3.3v range. This can be accomplished via a resistor circuit as follows:



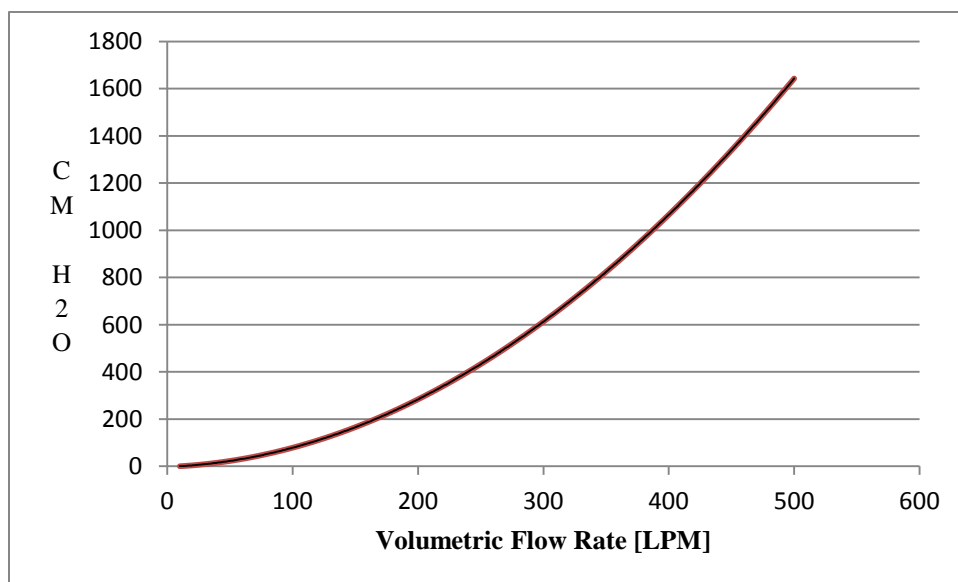
Connecting HBS1 to a computer via a COM port

Via [DigiRS232](#) CFS1 can be connected to a computer COM port, such that CFS1 measured Carbon Dioxide content, Flow rate, Temperature and minutes of operation can be stored in a file. DigiFLO program is available.

RS232

See HBS1 User Interface document.

Sensor Pressure Drop Vs. Flow Rate



CFS1 Directions of Flow



CFS1 Dimensions Drawing

Mounting holes spacing: 0.58" x 4.5"

