VectoDAQ Flight

Miniature pressure scanner and data reduction in an all-in-one device

- 5- + static ring and 14-hole probes + heater porwer supply + TAT sensor
- Robust design with aluminum housing and Lemo connector
- Data acquisition over CAN, or USB Port

General	
Weight	130 g *
Dimensions	84 x 55 x 28 mm *
Probe options	5- and 14-hole probe heads
Environmental Conditions	
Operating temperature	-20 ... 70 °C (-4 … 158 °F)
Operating medium	Air and other non-corrosive gases
Humidity	0 ... 95%, non-condensing

* for 5-hole version

General

The VectoDAQ Flight is an Air Data Computer designed to measure multiple pressure signals and temperature simultaneously. With its capabilities, this device not only enables data reduction but also allows you to conveniently monitor and record engineering data in real time. Whether you are working in the field or in a laboratory environment, this versatile setup seamlessly integrates with any laptop.

Setting it apart from its predecessor, the Air model, the VectoDAQ Flight is specifically designed to meet the rigorous demands of flight applications. This advanced version offers the added functionality of powering a heated probe (anti-icing). This feature expands its usability in challenging environmental conditions, making it an ideal choice for diverse scenarios.

Moreover, the VectoDAQ Flight goes beyond merely measuring flow parameters. It incorporates sophisticated features that facilitate the calculation of vital data relevant to piloted flight applications. From pressure altitudes and query codes (QNH, etc.) to ICAO standard velocities, this device provides comprehensive information essential for optimizing flight performance.

Figure 1 VectoDaq Flight

Figure 2 Front panel (Example for 5-hole probes)

Figure 3 5-hole probe

Pressure Acquisition	
Pressure acquisition	Up to 14 differential pressure sensors with variable pressure ranges
Accuracy	Max +/- 0.25 % FS (typical +/- 0.1 %)
Acquisition of absolute pressure	Barometric pressure sensor
Accuracy	1.25 hPa

Temperature Acquisition	
Temperature measurement	Thermocouple Type K or PT100
Accuracy	< 1 K

Sensor Options	
Differential pressure range (kPa)	**Max. Mach number**
0.25	0.06
0.50	0.09
1.25	0.13
2.50	0.19
5.00	0.26
7.50	0.32

Measurement Errors	
Angle	< 1°
Velocity	< 1.0 m/s or < 1.0 % whichever is greater
Temperature	< 1 K

Interface	
USB	Communication with Host PC (configuration and data acquisition)
Power	5 V via USB or 7 – 36 V (via CAN)
Pressure connection	Metal tube ⌀ 1,06 mm or ⌀ 1,6 mm
Cable (included)	1,8 m Lemo (FGG.0B.307 to USB)
Cable (optional)	Lemo (FGG.0B.307 D-SUB 9 (CAN))
Max. data transmission rate	50Hz

Heater	
Heater power supply	24V (40W)

Sensors and Electronics

The VectoDAQ Flight is equipped with up to 14 differential pressure sensors as well as one absolute pressure sensor. All differential pressure sensors can be selected by pressure range. The temperature-compensated pressure transducers feature high accuracy and a minimal offset drift. The high-proof pressure provides sufficient protection against accidental overloads.

The measurement of the total air temperature (TAT) is performed by at PT100 or optionally by a thermocouple.

PC Communication

The VectoDAQ Flight offers convenient options for data transmission, allowing you to choose between USB or CAN protocol. With a transmission rate that can be set up to 50Hz, the device accommodates your specific requirements while reducing the rate, if needed, based on the number of outputs requested.

When connected via USB, the pressure scanner seamlessly interfaces with the host PC as a virtual COM port. This means that any software supporting serial protocols can be utilized for smooth communication. Furthermore, the device simplifies the power supply process by drawing a 5V power directly from the USB connection.

In terms of CAN-bus protocol, the VectoDAQ Flight follows the CAN 2.0A or CAN 2.0B specification, supporting baud rates of up to 1 Megabaud. To facilitate integration into measurement environments, a supplied DBC file in vector format streamlines the process. Additionally, CAN/Power connector cables, including a CAN termination resistor, can be provided as necessary. Power is conveniently supplied through the CAN bus connector (Lemo connector), ensuring efficient operation. For optimal performance, it is generally recommended to ground the device.

Data acquisition becomes a seamless process with VectoVis. This user-friendly software offers a real-time view of all data, enabling active monitoring and analysis. Furthermore, it provides the valuable functionality of data recording, allowing you to save data in easily readable file formats such as .csv, ensuring accessibility and compatibility.

Outputs

Output **	
Name	**Unit**
P1…P5 (differential pressure)	[Pa]
Pabs (absolute pressure)	[Pa]
Ttc (temperature of RTD or TC)	[°C]
Theta (cone angle)	[°]
Phi (roll angle)	[°]
Alpha (angle of attack)	[°]
Beta (yaw angle)	[°]
V_{mag} (velocity magnitude)	[m/s]
u (x-component of velocity)	[m/s]
v (y-component of velocity)	[m/s]
w (z-component of velocity)	[m/s]
P_d (dynamic pressure)	[Pa]
P_s (static pressure)	[Pa]
ρ (air density)	[kg/m^3]
T_{tot} (total temperature)	[°C]
T_s (static temperature)	[°C]
M (Mach number)	[-]
Alt (baro altitude)	[m]
AltAbs (absolute altitude)	[m]
Num (counter)	[-]
Error	[-]

Flight Parameters **	
Name	**Unit**
Indicated Air Speed-IAS	[m/s]
Calibrated Air Speed-CAS	[m/s]
Equivalent Air Speed- EAS	[m/s]
True Air Speed - TAS	[m/s]
Dynamic Pressure derived from True Airspeed	[Pa]
Mach Number derived from True Airspeed	[-]
Local speed of sound	[m/s]
Flight Level Query Nautical Elevation	[m]
Height Query Field Elevation	[m]
Altitude Query Nautical Height	[m]
Pressure Altitude	[m]
Density Altitude	[m]

** Details see Manual

Contact

Vectoflow GmbH, Germany
T: +49 89 124149570
M: info@vectoflow.com
w: www.vectoflow.com