VECTOFLOW

DATA SHEET

Eagle ADC

PRODUCT NAME

Eagle ADC

TYPE

Air Data Computer

Fig. 1 *Eagle ADC front panel with pneumatic and electrical interfaces*

Fig. 2 *Eagle ADC back panel with communication and antenna connectors*

DESCRIPTION

All-in-one air data computer designed to meet the rigorous demands of flight applications

The *Eagle ADC* is Vectoflow's flagship air data computer, engineered for exceptional durability and reliability in harsh environments. Compliant with RTCA DO-160G standards, it combines rugged construction with a compact, lightweight design for versatile installation and portability.

Equipped with high-precision sensors and a robust computational core, the *Eagle ADC* delivers real-time measurements of pressure and temperature, as well as accurate calculation of engineering values. Paired with Vectoflow's calibrated 5-hole probe and total air temperature (TAT) probe or a pitot-static probe, it forms a complete and precise air data solution.

GENERAL

Weight	~ 600 g
Dimensions	Width: 80 mm Length: 120 mm Height: 50 mm
Casing	Casing: Die-cast aluminum

ENVIRONMENTAL CONDITIONS

Operating temperature	-40 … 85°C
Operating medium	Air and other non-corrosive gases
Humidity	0 … 95%, non-condensing

OPERATION

The *Eagle ADC* functions as a precision pressure and temperature scanner, designed for seamless integration with an Air Data Boom equipped with a 5-hole probe and a Total Air Temperature (TAT) probe. It acquires accurate pressure and temperature signals and is also compatible with Pitot and Pitot-Static probes, offering flexibility across a range of air data measurement applications.

Using these inputs, along with the calibrated data from the connected probes, the *Eagle ADC* leverages Vectoflow's advanced data reduction algorithms to calculate a comprehensive set of air data properties. Refer to the "Outputs" table for a detailed list of calculated parameters.

The *Eagle ADC* features aerospace-grade electrical and pneumatic connectors, ensuring reliable and robust connections to both the probes and the flight computer.

POWER AND HEATER

The *Eagle ADC* features two distinct heating solutions:

- **Integrated Heater:** An internal heater with precise temperature control keeps the device, particularly the pressure sensors, within their operating temperature range, ensuring accurate performance in low-temperature environments and at high altitudes.
- **External Heater Power Supply**: The ADC also provides dedicated power to a heater installed within the Air Data Boom or Pitot-Static probe, maintaining reliable probe performance in challenging conditions

There are two ways to power a *Eagle ADC*, either with 5 V via USB, or with a DC power supply of up to 5 – 36 V. DC power supply is required whenever the heaters are in use. More information on the power supply can be found in the section on Interfaces. It is generally recommended to ground the ADC.

HEATER

Probe heater	Up to 150 W
Internal heater	Up to 100 W

SENSORS

The *Eagle ADC* is equipped with one or two sets per channel of highly accurate, temperature-compensated differential pressure sensors and one absolute pressure sensor. The temperature-compensated pressure transducers feature high accuracy and a minimal offset drift. The high proof pressure provides sufficient protection against accidental overloads.

Due to its dual pressure range, the *Eagle ADC* can dynamically optimize measurement accuracy based on the flight speed, allowing for maximum performance across the entire flight envelope. Sensors are available in ranges as low as ± 65 Pa all the way up to 1 MPa. Please contact Vectoflow so we can help you select the right sensor ranges for your application.

The *Eagle ADC* allows for temperature measurement through a thermocouple or Pt100 thermistor. This allows precise calculation of all Air Data quantities. Additionally, the *Eagle ADC* is equipped with an IMU which captures gyroscope and accelerometer data.

PRESSURE ACQUISITION

Differential pressure	5 x 2 differential pressure sensors
Accuracy	Typical ± 0.05% FS (max ± 0.2% FS)
Absolute pressure	1 barometric pressure sensor (typically 100 or 200 kPa)
Accuracy	Typical ± 0.1% FS (max ± 0.25% FS)

TEMPERATURE ACQUISITION

Temperature measurement	Thermocouple (typically Type K) or Pt100
Accuracy	< 1 K

COMMUNICATION

The *Eagle ADC* provides data transmission over the following protocols: USB 2.0, CAN 2.0, or TCP/IP. The data output rate is up to 100 Hz. When connected via USB, the ADC identifies itself to the host PC as a virtual COM port. Thus, any software supporting serial protocols can be used for communication. The USB mode is convenient for device configuration, integration, and testing.

When using CAN or TCP/IP communication, a 5-36 VDC power supply is required. The CAN-bus protocol is implemented according to the CAN 2.0A or CAN 2.0B specification with Baud rates up to 1 Megabaud. A DBC file (vector-format) is supplied for easy integration. The TCP/IP output follows the same serial format as the USB mode. The full list of outputs can be found in the Outputs table.

INTERFACES

The front panel of the *Eagle ADC* features the interfaces between the ADC and the flow probe. There is a pneumatic connector with steel bulged tubulations to be connected to each channel of the flow probe. Clamps are provided to secure the tubing from the probe to the tubulations. The front panel of the Eagle ADC features the interfaces between the ADC and the flow probe. There is a pneumatic connector with a mating part to connect the channels of the flow probe to the ADC. There is a *Glenair 806* series connector for heater power and temperature sensing.

On the back panel of the ADC is another *Glenair 806* series connector with USB, CAN 2.0, Ethernet, and input power connections. There are also 3 status LEDs.

The *Glenair 806* connectors are miniaturized circular connectors that meet the specifications of MIL-STD-38999 Series III.

CONNECTIONS

Power	5 V via USB or 5 – 36 VDC
Pressure connection	Circular connector with 8x bulged tubulations Ø 1.6 mm
Cables	Forked cable with USB 2.0, CAN connection with 120 Ω termination resistor, Ethernet jack, flying leads for power supply

OUTPUTS

The complete list of *Eagle ADC* output values is given below. Full definitions of each along with coordinate systems can be found in the product manual.

Name	Unit
P_1...P_5 (differential pressure)	Pa
P_{abs} (absolute pressure)	Pa
T_{tc} (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, v, w (velocity components)	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
Alt_{Abs} (absolute altitude)	m
Num (counter)	-
Error	-
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 TAS	Pa
Mach Number derived from TAS	-
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
IMU velocity uncertainty	m/s
Yaw, pitch, roll	deg
Gyroscope X, Y, Z	rad/s
Accelerometer X, Y, Z	m/s^2

ENVIRONMENTAL QUALIFICATIONS

The *Eagle ADC* is tested against RTCA DO-160G environmental standards, verifying its performance in harsh flight conditions. This robustness is further ensured by its ruggedized casing and MIL-qualified connectors.

PRODUCT DRAWING