CAN 8-Channel Aero Pressure Scanner, 8PA-V1 – Datasheet

The Izze-Racing 8-Channel Aero Pressure Scanner (8PA-V1) measures pressure with 8 dedicated 24-bit pressure transducers, and an isolated 24-bit pressure reference input for low-noise, high-precision differential pressure measurements. Pressure scanners are essential for aerodynamic tuning, development, and CFD verification.

This sensor is capable of measuring pressure from 10 to 1300 mbar with a precision of 0.01mbar and RMS noise as low as 0.02 mbar. Data is broadcasted via CAN with an output rate of up to 250Hz and packaged in a small IP67 aluminum enclosure.

SENSOR SPECIFICATIONS

Pressure Measurement Range	10 to 1300 mbar
Sensor Temperature Range	-40 to 85˚C
Pressure Accuracy (autozero at one point)	±0.5 mbar, 700-1100mbar, 25˚C ±1.0 mbar, 300-1100mbar, 0-50˚C ±2.5 mbar, 300-1100mbar, -20-85˚C ±3.0 mbar, 300-1100mbar, -40-85˚C
Temperature Accuracy	±0.8˚C, 25˚C ±2.0˚C, -20-85˚C ±4.0˚C, -40-85˚C
Pressure RMS Noise	0.02 mbar, 10Hz
Pressure Resolution	0.01 mbar / 1 Pa, Gauge 0.1 mbar / 10 Pa, Absolute
Temperature Resolution	0.1˚C
Sampling Frequency	250, 100, 50, 25, or 10Hz
Pressure Cavity Volume	0.017 ml
Long-term stability	-1 mbar/year

ELECTRICAL SPECIFICATIONS

Supply Voltage	5 to 16 V
Supply Current	15 mA (avg), 28 mA (max)
Features	• Reverse polarity protection • Over-temperature protection (125˚C)

MECHANICAL SPECIFICATIONS

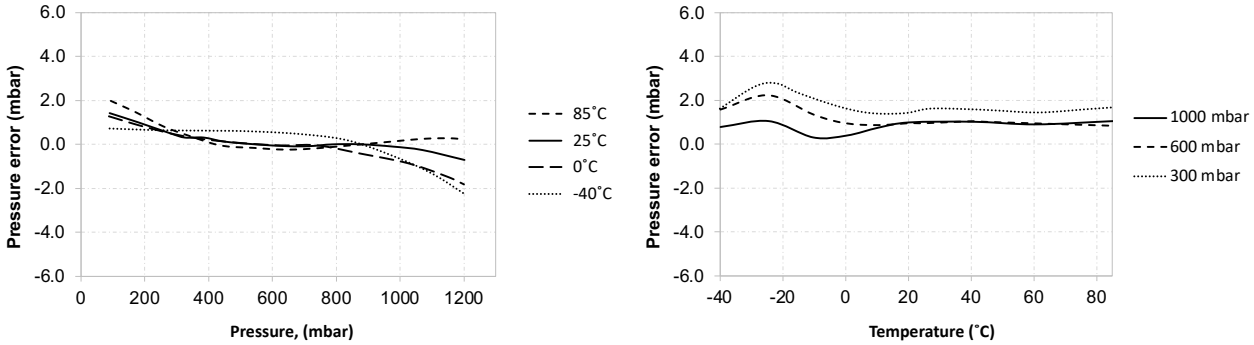
Weight	25g
L x W x H (max)	72 x 26 x 8.4 mm
Protection Rating	IP67
Tube Diameter	1.07mm / 0.043”

WIRING SPECIFICATIONS:

Wire	26 AWG SPEC 55, DR25
Cable Length	500 mm
Connector	None

Supply Voltage	Red	(twisted)
Ground	Black	
CAN +	Blue	(twisted)
CAN -	White	

PRESSURE ERROR (autozero at one point)



CAN SPECIFICATIONS

Standard	CAN 2.0A (11-bit identifier), ISO-11898
Bit Rate	1 Mbit/s (default)
Byte Order	Big-Endian / Motorola
Data Conversion	0.01mbar or 0.1mbar per bit, 0.1˚C per bit, signed
Base CAN ID's (Default)	Scanner 1: 1290 (Dec) / 0x50A (Hex) Scanner 2: 1293 (Dec) / 0x50D (Hex) Scanner 3: 1296 (Dec) / 0x510 (Hex)
Termination	None

CAN ID: 0x50A

Pressure, Port 1		Pressure, Port 2		Pressure, Port 3		Pressure, Port 4	
Byte 0 (MSB)	Byte 1 (LSB)	Byte 2 (MSB)	Byte 3 (LSB)	Byte 4 (MSB)	Byte 5 (LSB)	Byte 6 (MSB)	Byte 7 (LSB)

CAN ID: 0x50B

Pressure, Port 5		Pressure, Port 6		Pressure, Port 7		Pressure, Port 8	
Byte 0 (MSB)	Byte 1 (LSB)	Byte 2 (MSB)	Byte 3 (LSB)	Byte 4 (MSB)	Byte 5 (LSB)	Byte 6 (MSB)	Byte 7 (LSB)

CAN ID: 0x50C

Reference Pressure, Port 9		Temperature		Unused		Unused	
Byte 0 (MSB)	Byte 1 (LSB)	Byte 2 (MSB)	Byte 3 (LSB)	Byte 4 (MSB)	Byte 5 (LSB)	Byte 6 (MSB)	Byte 7 (LSB)

* The default CAN ID (0x50A) is adjustable

SENSOR CONFIGURATION:

To modify the 8PA's Base CAN ID, measurement mode, sampling frequency, or CAN bit rate, send the following CAN message at 1Hz for at least 10 seconds and then reset the 8PA by disconnecting power for 5 seconds.

CAN messages should only be sent to the scanner during the configuration sequence.
DO NOT continuously send CAN messages to the scanner.

CAN ID = Base ID (Default = 0x50A)

Programming Constant		New CAN Base ID (11-bit)		Measurement Mode	Frequency	Reserved	Bit Rate
Byte 0 (MSB)	Byte 1 (LSB)	Byte 2 (MSB)	Byte 3 (LSB)	Byte 4	Byte 5	Byte 6	Byte 7
30000 = 0x7530		1 = 0x001 ⋮ 2047 = 0x7FF		1 = Absolute 2 = Differential (Reference = R Port) 3 = Differential (Reference = 1000mbar)	1 = 250 Hz 2 = 100 Hz 3 = 50 Hz 4 = 25 Hz 5 = 10 Hz	0	1 = 1 Mbit/s 2 = 500 kbit/s 3 = 250 kbit/s 4 = 125 kbit/s

MEASURMENT MODES:

MODE 1 – ABSOLUTE PRESSURE
Resolution: 0.1mbar/bit
Reference: Absolute

MODE 2 – DIFFERENTIAL PRESSURE (DEFAULT)
Resolution: 0.01mbar/bit
Reference: Pressure relative to "R" pressure port

MODE 3 – DIFFERENTIAL PRESSURE, CONSTANT REFERENCE
Resolution: 0.01mbar/bit
Reference: Pressure relative to constant 1000mbar

ZEROING:

To zero the pressure sensors send the following CAN message.
DO NOT continuously send CAN messages to the scanner.

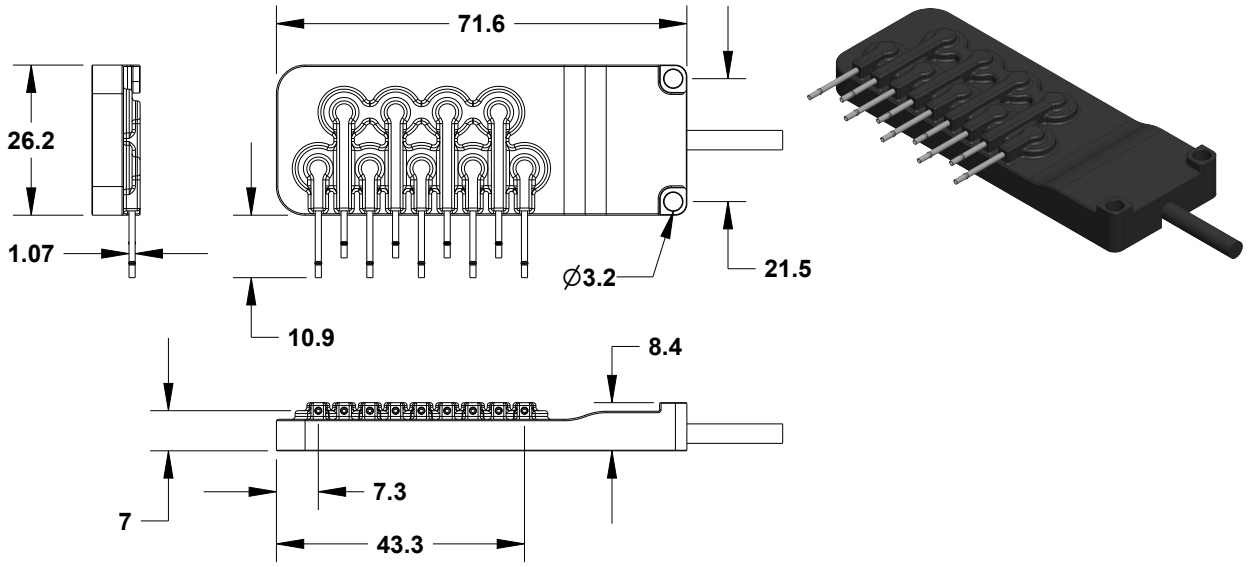
Absolute Pressure Zeroing (Mode 1)
CAN ID = Base ID (Default = 0x50A)

Programming Constant		Programming Constant		Active	Reserved	Reserved	Reserved
Byte 0 (MSB)	Byte 1 (LSB)	Byte 2 (MSB)	Byte 3 (LSB)	Byte 4	Byte 5	Byte 6	Byte 7
10000 = 0x2710		20000 = 0x4E20		1 = ON 0 = OFF	0	0	0

Differential Pressure Zeroing (Mode 2/3)
CAN ID = Base ID (Default = 0x50A)

Programming Constant		Programming Constant		Active	Reserved	Reserved	Reserved
Byte 0 (MSB)	Byte 1 (LSB)	Byte 2 (MSB)	Byte 3 (LSB)	Byte 4	Byte 5	Byte 6	Byte 7
10100 = 0x2774		20100 = 0x4E84		1 = ON 0 = OFF	0	0	0

DIMENSIONS:



PART NUMBERS:

Part No.	Description
8PA-V1	CAN 8-Channel Aero Pressure Scanner
BT-040-075	Bulged SS Tubulation, D = 0.043" / 1.07mm, L = 0.75" / 19mm
UTT-040	Urethane 0.040" tubing, per foot
PP-040	Surface Pressure Patch, Tubulation D = 0.043"

ADDITIONAL INFORMATION:

- For utmost accuracy, avoid mounting the scanner in environments subjected to large temperature swings.
- For high-velocity pressure taps where drilling is possible, use the bulged stainless steel tubulations (part no. BT-040-075) and cut length to size.
- For low-velocity pressure taps or surfaces in which you cannot drill/tap, use a surface pressure patch (part no. PP-040).
- For tubing, urethane with a diameter of 0.040" is highly recommended (part no. UTT-040).