EMX Data Acquisition Devices

The EMX series of data acquisition devices introduces an unprecedented level of measurement performance in a compact IP67 environmentally sealed enclosure suitable for harsh environments. Typically this class of measurement performance would require much larger and more costly rack-size instrumentation equipment.

The EMX design is based on a modular chassis, offering combinations of multiple internal measurement modules. This provides cost-effective flexibility and efficiency for various channel count needs. Multiple input types are supported within a single EMX device, avoiding the higher cost and extra space needed for a cluster of chained-together devices having only one type of measurement.

The aerospace-grade IP67 connectors and sealed hard-anodized billet aluminum enclosure survive harsh testing environments where failure is not an option. All EMX devices come with a 3-year product warranty.

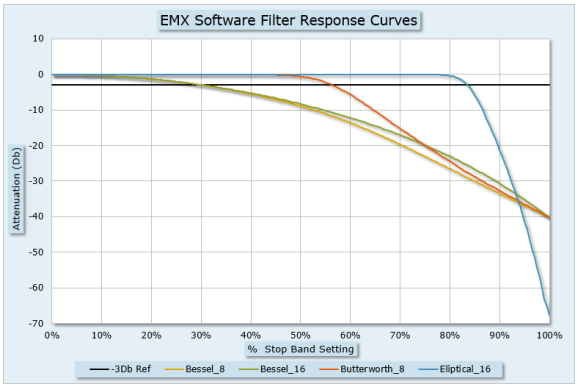
Measurement inputs typically provide a number of software configurable options including advanced DSP filtering algorithms with selectable filter response characteristics and stop band frequencies to ensure repeatable and accurate measurements.

IP67 Sealed Connectors

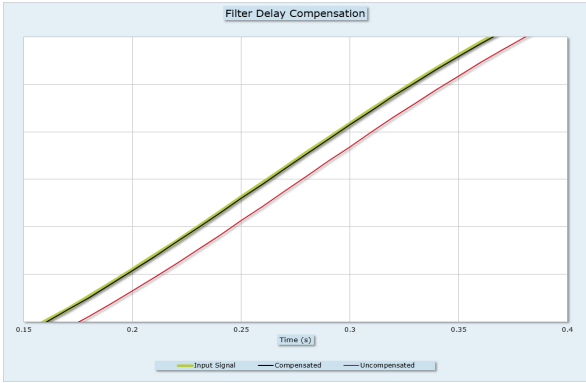
Internal Vibration Damping

Oleophobic Breathing

EMX Data Acquisition Series



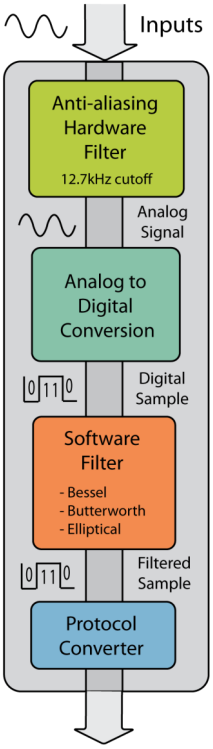
EMX measurement modules provide precision DSP software filters with user-configurable response characteristics to ensure high quality anti-aliased measurements.



The ATI VISION software has integrated Filter Delay Compensation which automatically time aligns EMX measurements with data from other sources such as ECU modules.

EMX I/O Module Types

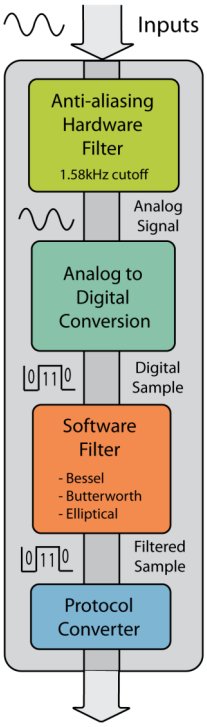
HSA8D High Speed Analog Input Module	
IOM.HSA8D HIGH-SPEED ANALOG INPUTS	The HSA8D module offers uncompromising high-end measurement performance in a compact size, typically only found on much larger and more expensive instrumentation equipment. It is ideal for a variety of wide bandwidth precision measurements.
Analog Inputs	
Number of Inputs	(8) unipolar/bipolar differential inputs, configurable per channel
Measurement Ranges	(26) ranges from ±25mV to ±70V, configurable per channel
A/D Resolution	14-bits
A/D Sampling Type	Simultaneous time-aligned sampling of all channels
Input Impedance	Ranges ≤ ±5V = >100MΩ Ranges > ±5V = >400kΩ When powered down = >100MΩ all ranges
Overvoltage Protection	>100V
Output Data Rate	Up to 10kHz per channel, configurable per channel (may be limited by chassis communications interface option)
Anti-Aliasing Filter	10th order precision Butterworth, cutoff 12.7kHz
Filter Stop Band Settings (Hz)	0.5, 1.0, 2.5, 5.0, 10, 25, 50, 100, 250, 500, 1K, 2.5K, 5K, 10K, 20K, Off
DSP Software Filter Types and Cutoff Frequency Ranges, all Configurable Per Channel	8th order Bessel – 0.15 to 3702Hz 16th order Bessel – 0.15 to 3743Hz 8th order Butterworth – 0.28 to 6521Hz 16th order Elliptical – 0.42 to 8857Hz
Sensor Power Outputs	
Number of Outputs	(2) sensor power outputs (may be shared by multiple sensors)
Output Voltage	3 to 15VDC, software configurable per output
Output Current	250mA maximum per output
Output Protection	Short circuit protection with fault monitoring



EMX Data Acquisition Series

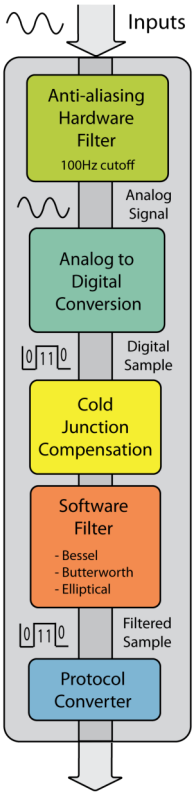
LSA8D Low Speed Analog Input Module

IOM.LSA8D LOW-SPEED ANALOG INPUTS	The LSA8D module is the leader in cost-effective precision analog voltage measurement, offering wide measurement ranges that cover most applications, as well as configurable precision DSP filtering to ensure accurate anti-aliased data.
Analog Inputs	
Number of Inputs	(8) bipolar differential inputs
Measurement Ranges	(5) ranges from ±0.1V to ±50V, configurable per channel
A/D Resolution	14-bits
A/D Sampling Type	Simultaneous time-aligned sampling of all channels
Input Impedance	Ranges ≤ ±5V = >100MΩ Ranges > ±5V = >200kΩ
Overvoltage Protection	>100V
Output Data Rate	Up to 2kHz per channel, configurable per channel
Anti-Aliasing Filter	4th order precision Butterworth, cutoff 1.58kHz
Filter Stop Band Settings (Hz)	0.1, 0.25, 0.5, 1.0, 2.5, 5.0, 10, 25, 50, 100, 250, 500, 1K, 2.5K, 5K
DSP Software Filter Types and Cutoff Frequency Ranges, all Configurable Per Channel	8th order Bessel – 0.03 to 925Hz 16th order Bessel – 0.03 to 936Hz 8th order Butterworth – 0.06 to 1710Hz 16th order Elliptical – 0.08 to 2214Hz
Sensor Power Outputs	
Number of Outputs	(2) sensor power outputs (may be shared by multiple sensors)
Output Voltage	3 to 15VDC, software configurable per output
Output Current	250mA maximum per output
Output Protection	Short circuit protection with fault monitoring



TC10 Thermocouple Input Module

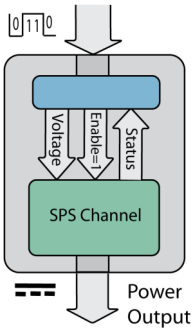
IOM.TC10 THERMOCOUPLE INPUTS	The TC10 module is the cost per channel leader in precision thermocouple measurement, offering multiple thermocouple type support and precision fast-response cold-junction compensation for accurate measurements under extreme conditions.
Thermocouple Inputs	
Number of Inputs	(10) differential thermocouple inputs
Thermocouples Types	B, E, J, K, N, R, S, and T, selectable per channel
A/D Resolution	24-bits
A/D Sampling Type	Simultaneous time-aligned sampling of all channels
Measurement Resolution	0.1°C
Cold Junction Compensation	Integrated in the I/O connector
Grounded Thermocouples	Supported
Overvoltage Protection	>100V
Output Data Rate	Up to 200Hz per channel, configurable per channel
Anti-Aliasing Filter	4th order precision Butterworth, cutoff 100Hz
Filter Stop Band Settings (Hz)	0.1, 0.25, 0.5, 1.0, 2.5, 5.0, 10, 25, 50, 100
DSP Software Filter Types and Cutoff Frequency Ranges, all Configurable Per Channel	8th order Bessel – 0.03 to 34.1Hz 16th order Bessel – 0.03 to 34.5Hz 8th order Butterworth – 0.06 to 61.7Hz 16th order Elliptical – 0.08 to 86.8Hz



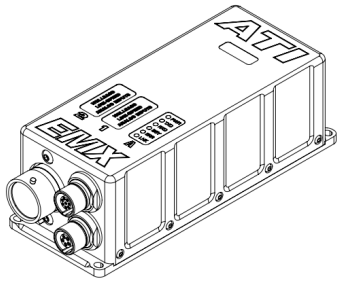
EMX Data Acquisition Series

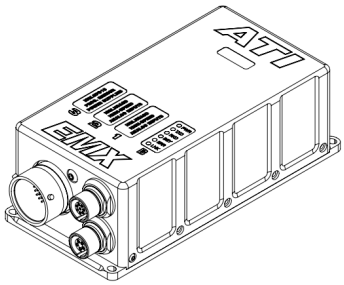
SPS16 Sensor Power Supply Module

IOM.SPS16 PROG. SENSOR POWER SUPPLIES	The SPS16 module can provide power to a wide range of sensors to reduce wiring complexity and eliminate the cost and space consumed by additional external power supplies. This module is typically used in combination with an EMX Analog Input module.
Sensor Power Outputs	
Number of Outputs	(16) sensor power outputs
Output Voltage	3 to 15VDC, software configurable per output
Output Current	50mA maximum per output
Output Protection	Short circuit protection with fault monitoring



EMX Enclosure Options

A-Chassis with CAN Interface	Specifications	
	Chassis Size	(2) EMX I/O modules of various types
	Communications Interface	CAN 2.0B up to 1Mbps
	LED Indicators	(6) power and activity status
	Power Supply Voltage	5 to 32VDC, automotive surge tolerant
	Operating/Storage Temperature	-40°C to +105°C / -50°C to +150°C -40°F to +221°F / -58°F to +302°F
	Construction	IP67 sealed billet aluminum enclosure
	Data/Power Connectors	(2) LEMO 1F-series 5-pin
	I/O Signal Connector	(1) Deutsch ASDD series 41-pin
	Weight (typical)	12.7oz / 360g
	Dimensions (max)	51mm x 45mm x 140mm / 2.01in x 1.77in x 5.51in

B-Chassis with CAN Interface	Specifications	
	Chassis Size	(3) EMX I/O modules of various types
	Communications Interface	CAN 2.0B up to 1Mbps
	LED Indicators	(6) power and activity status
	Power Supply Voltage	5 to 32VDC, automotive surge tolerant
	Operating/Storage Temperature	-40°C to +105°C / -50°C to +150°C -40°F to +221°F / -58°F to +302°F
	Construction	IP67 sealed billet aluminum enclosure
	Data/Power Connectors	(2) LEMO 1F-series 5-pin
	I/O Signal Connector	(1) Deutsch ASDD series 64-pin
	Weight (typical)	15.9oz / 450g
	Dimensions (max)	63mm x 45mm x 140mm / 2.48in x 1.77in x 5.51in

EMX Data Acquisition Series
Ordering Information

EMX Device Variants

Part Number	Enclosure	Modules				Com		Description
		HSA8D	LSA8D	SPS16	TC10	CAN 2.0B	Ethernet	
160-0005	B	2		1		✓		(16) high speed analog inputs; (4) high current sensor power outputs; (16) low current sensor power outputs
160-0006	A		2			✓		(16) low speed analog inputs; (4) high current sensor power outputs
160-0007	B				3	✓		(30) thermocouple inputs
160-0008	B	2				✓		(16) high speed analog inputs; (4) high current sensor power outputs
160-0009	B				2	✓		(20) thermocouple inputs
160-0010	B	1				✓		(8) high speed analog inputs; (2) high current sensor power outputs
160-0011	B	1		1		✓		(8) high speed analog inputs; (2) high current sensor power outputs; (16) low current sensor power outputs
160-0012	A				2	✓		(20) thermocouple inputs
160-0013	A		1		1	✓		(8) low speed analog inputs; (2) high current sensor power outputs; (10) thermocouple inputs
160-0014	A		1			✓		(8) low speed analog inputs; (2) high current sensor power outputs
160-0015	A				1	✓		(10) thermocouple inputs
160-0016	B		3			✓		(24) low speed analog inputs; (6) high current sensor power outputs
160-0017	B		2		1	✓		(16) low speed analog inputs; (4) high current sensor power outputs; (10) thermocouple inputs
160-0018	B		1		2	✓		(8) low speed analog inputs; (2) high current sensor power outputs; (20) thermocouple inputs

- **All EMX Devices have a 3-year warranty period**
- Other variants may be available—please contact ATI for details

EMX Data Acquisition Series
Ordering Information

EMX Cables and Accessories

Part Number	Length	Description
Communication Cables		
150-0128-15FT 150-0128-12FT 150-0128-6FT 150-0128-1FT 150-0128-6IN	4.57m/15ft 3.66m/12ft 1.83m/6ft 0.30m/1ft 0.15m/6in	Cable; VISION Network Hub to VID or EMX; LEMO 1B 5-pin plug to LEMO 1F 5-pin plug
150-0175-12FT 150-0175-12IN 150-0175-6FT 150-0175-6IN	3.66m/12ft 0.301m/12in 1.83m/6ft 0.15m/6in	Cable; EMX-to-EMX; LEMO 1F 5-pin plug
151-0033		CAN termination plug; EMX; LEMO 1F 5-pin plug
Hardware Accessories		
151-0034		Bracket, B-chassis; mounting bracket
I/O Cables / Connectors		
150-0164-6FT 150-0164-10FT	1.83m/6ft 3.05m/10ft	Cable, octopus; B-chassis compatible; 16 unterminated cables for sensor connections (input+, input-, sensor power, ground, and shield)
150-0185-2FT	0.61m/2ft	Cable, octopus; B-chassis compatible; 30 K-type thermocouple connectors
150-0189-2FT	0.61m/2ft	Cable, octopus; B-chassis compatible; 10 R-type and 20 K-type thermocouple connectors
Breakout Boxes		
151-0035		Accessory for 161-0013; Phoenix Screw Terminal (qty 16)
151-0036		Accessory for 161-0013; Phoenix Spring Cage (qty 16)
151-0037		Accessory for 161-0013; Phoenix Screw Terminal with flange (qty 16)
151-0038		Accessory for 161-0013; Phoenix Spring Cage with flange (qty 16)
161-0011		Breakout box; B-chassis compatible; 30 K-type thermocouple connectors
161-0013		Breakout box; B-chassis compatible; 16 analog channel connections for input, XVS and SPS signals

- Most cables and accessories have a 30-day warranty period
- Custom cabling and breakout box solutions are available—please contact ATI for details

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