Datasheet M10

Universal Device Interface

Features

- High resolution and speed in a compact and cost-effective package.
- Permits simple interfacing of existing devices to a fast fiber-optic communication loop.
- Can be mounted on or close to the device being controlled
- Up to sixteen devices can be connected on a single fiber-optic loop
- Very low transition transient on analog output DACs, for compatibility with wide-band power supplies.
- User-definable output slew-rate control
- High-speed digital pulse output option.

Applications

- Remote control of power supplies and similar devices over fiber-optic.
- Waveform generation for scanned or swept devices.
- Control of devices across high voltage barriers.
- Connection of multiple devices to a PC host. Each device independently addressable.
- Fully automated systems operating in electrically noisy environments.
- Addition of high-performance remote control to existing systems.

Specifications

Analog output	Number of independent outputs	2
	Output voltage range	-10 V to + 10 V
	Output current compliance	+/- 5 mA
	Settling time	< 8 µs to within +/- 10 mV for any step
	Linearity max deviation over span	< 0.1%of full scale any point to a linear fit
	Noise	< 0.5 mV RMS at 16.7 or 20 msec averaging Typical measured noise with external DVM < 50 µV
	Crosstalk	< 1mV for 10V output on other channel
	Thermal stability	< 200 µV C-1
	Resolution over full voltage span	16 bit
	Update rate	Up to 50 kHz
	Slewing limit	User selectable via software in V s-1, up to limit of update rate.

Analog input	Number of independent inputs	2
	Configuration	Differential, high impedance (> 1 Mohm)
	Input voltage range	-10 V to +10 V (software configurable to +/- 5V, 0 to +5V, or 0 to +10V)
	Input protection	10 kohm series on + and - inputs.
	Linearity max deviation over span	< 0.1% of full scale any point to a linear fit
	Noise	< 0.5 mV RMS at 16.7 or 20 msec averaging Typical measured rms noise with shorted inputs: < 100 µV at 1e-4 s averaging < 20 µV at 1e-2 s averaging < 6 µV at 1 s averaging
	Crosstalk	< 1 mV with 10 VDC on other input < 30 mV with 10 VAC 1 MHz on other input
	Common mode rejection	>20 dB (high CMRR available as option)
	Digitization	16 bit successive approximation
	Sample rate	50 kSa/s
	Sample rate to host	Up to 10 kSa/s via realtime loop controller

Digital outputs	Number of independent outputs	4
	Voltage levels	TTL
	Maximum current drive capability	3 mA (source or sink)
	Output series impedance	100 ohm
Digital inputs	Number of independent inputs	4
	Voltage levels	TTL
	Configuration	Active low, internal 48 kohm pullup to +5 V
	Logic levels	Software configurable allocation of logic states to TTL levels
	Input impedance	>= 1 Mohm
Pulse train (-P purchase option only)	Pulse length	12.5 nsec to 440 µsec
	Frequency	2.3 kHz to 40 MHz
	Number of pulses	1 to 65535

Specifications (continued)

Circuit temperature	On-board sensor, +/- 3 C accuracy

Power input	+24V (+/- 2V) DC, 250 mA
Controls	16 position rotary switch for address selection
Displays	Status LEDs (power, processor status, comms status)
Case material	Stainless steel sheet.
Weight	0.24kg (0.55 lb)
Operating environment	10 to 35C, < 80% humidity, non-condensing, vibration < 0.5g all axes, 1 to 100Hz
Storage environment	0 to 50C, < 80% humidity, non-condensing, vibration < 2g all axes, 1 to 100Hz

Interfacing and control

Interfaces	Fiber-optic loop, 10 Mbit/sec serial.
Data rate	Typical read/write rate >= 1 kHz, depending upon loop configuration. Rate to A500 host memory (special applications) >= 10kHz.
	Fibre-optic loop to host system interfacing via Ethernet available using loop controllers: A360 (dual-loop controller), A500, A560 (real-time controllers)
Host computer	PSI Diagnostic and PTC DiagnosticG2 host programs provided for Windows PC. IG2 interface provides interface to EPICS and EPICS clients including Labview™, Python, C#, C++.

Connectors

Fiber optics	Two 1mm Avago HFBR ST bayonet, 640 nm (red) light
Power in	2.1mm threaded jack. Mates with Switchcraft S761K or equivalent.
Signal	25 way DSub female

1	PSU 0V in	14	+24V DC in
2	Shield (M10 case)	15	Analog ground
3	Analog In 1 +	16	Analog In 1 -
4	Digital out 1	17	Digital out 2
5	Analog In 2 +	18	Analog In 2 -
6	Analog ground	19	Analog out 1
7	Analog ground	20	Analog out 2
8	Analog ground	21	+5V digital out
9	Digital ground	22	Digital out 3
10	Digital out 4	23	Digital ground
11	Digital In 4	24	Digital In 3
12	Digital In 2	25	Digital In 1
13	Digital ground		

Ordering information

M10	M10 device with two voltage analog outputs, two analog inputs, four digital inputs and four digital outputs. Including PSIDiagnostic and PTC GiagnosticG2 host software packages and IG2 EPICS connectivity.
-CMR	High common-mode rejection ratio option on analog inputs.
-P	Fast programmable pulse train feature on digital outputs.
M10C	M10 device with one 0-20 mA current output, one voltage analog output, two analog inputs, four digital inputs and four digital outputs. Including PTCDiagnostic host software See separate data sheet.

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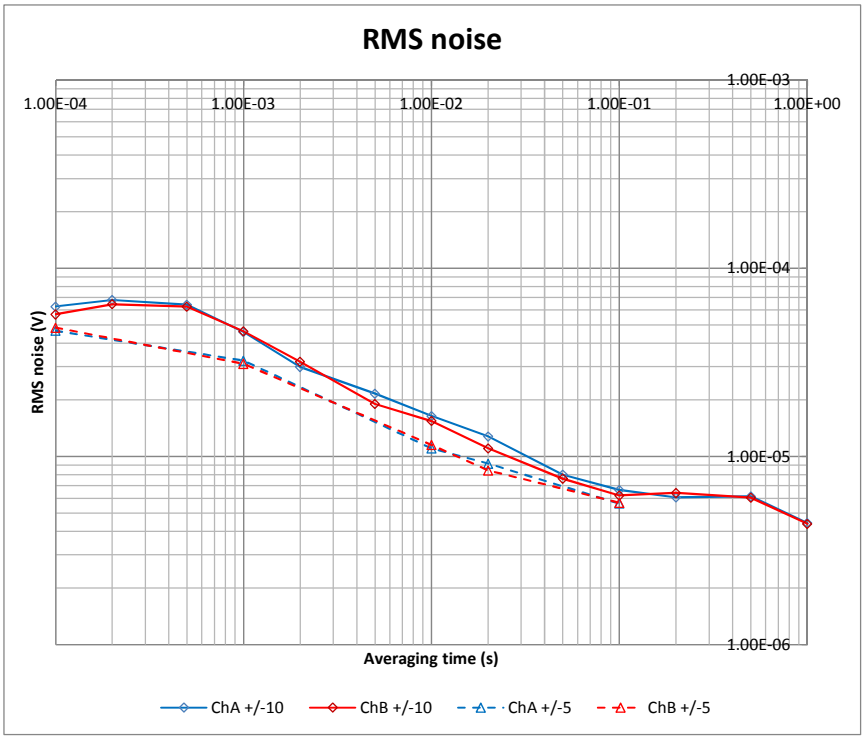
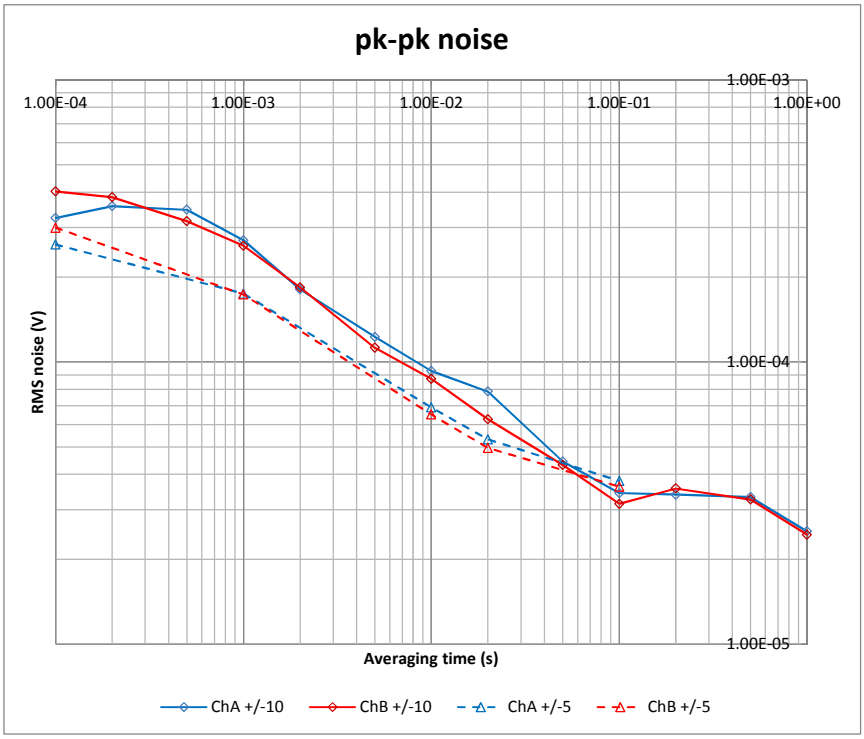
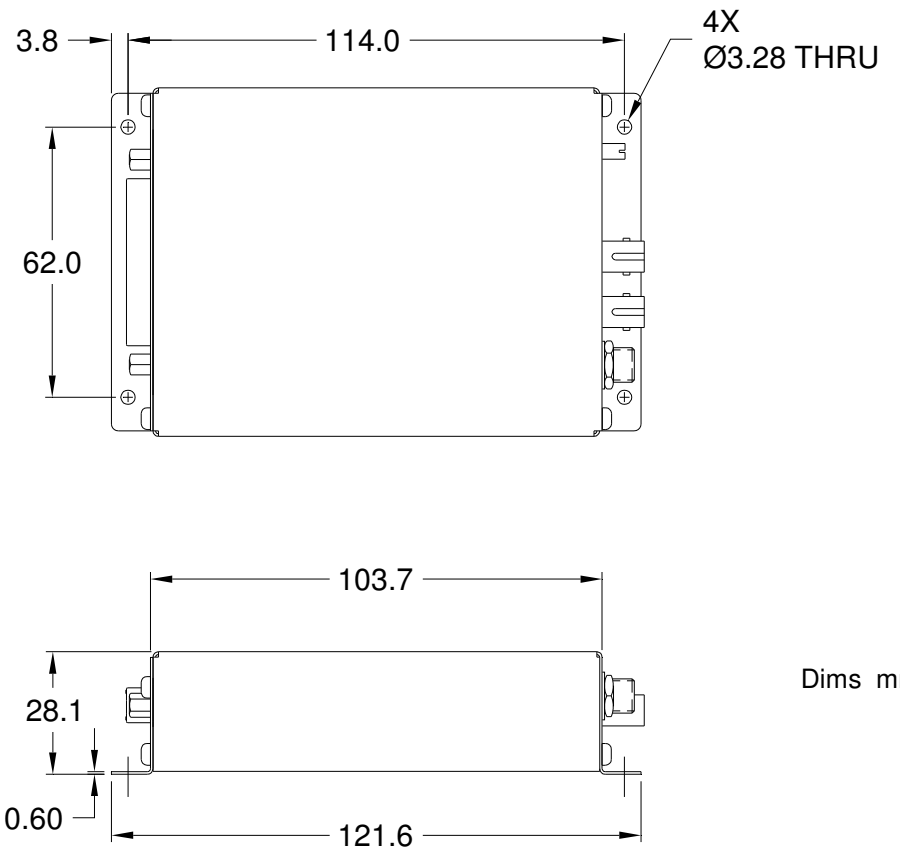
Typical noise performance (analog inputs)

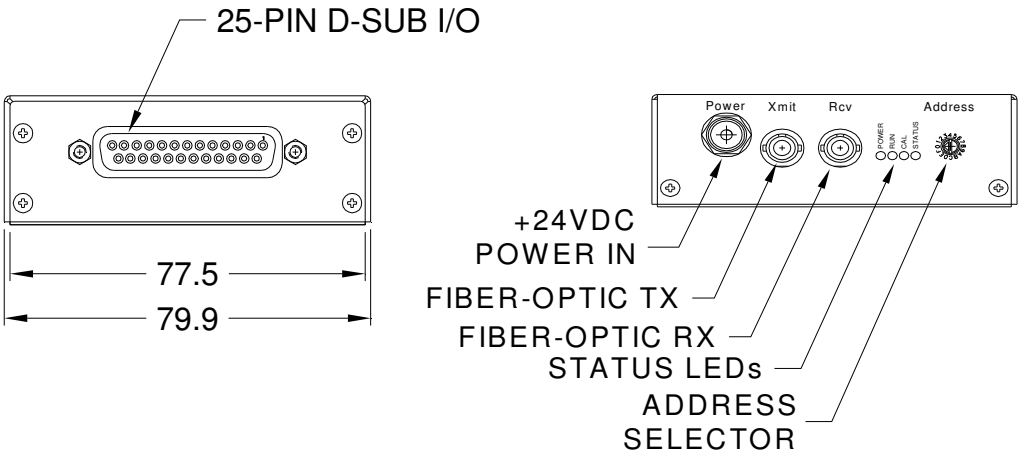
Typical measured noise on shorted analog inputs as a function of averaging time.
10V bipolar range and 5 V bipolar range settings.





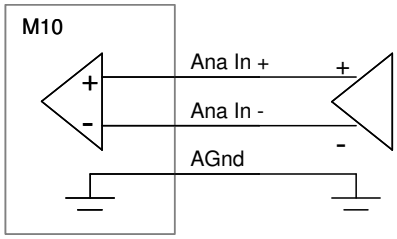

3.8
114.0
4X
Ø3.28 THRU
62.0
103.7
28.1
0.60
121.6

Dims mm

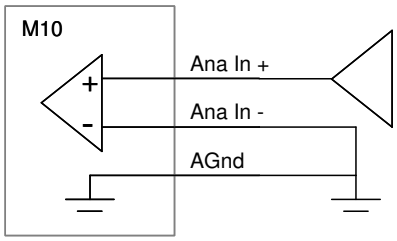

25-PIN D-SUB I/O
77.5
79.9
Power
Xmit
Rcv
Address
+24VDC
POWER IN
FIBER-OPTIC TX
FIBER-OPTIC RX
STATUS LEDs
ADDRESS
SELECTOR

Recommended Connection Arrangements

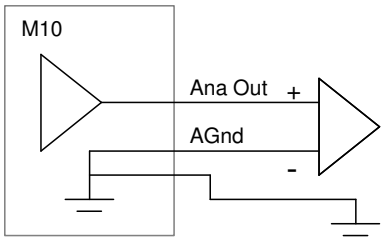
Analog input : differential source



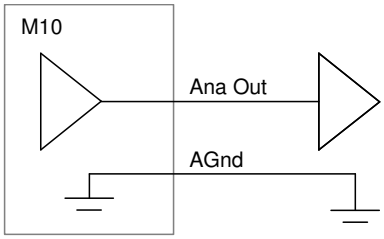
Analog input : single-ended source



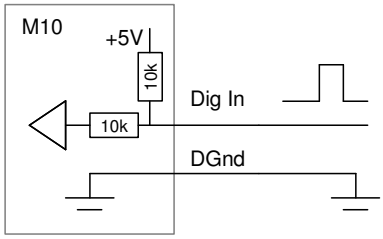
Analog output : differential destination



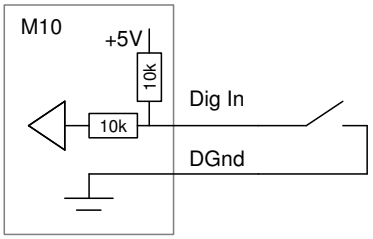
Analog output : single-ended destination



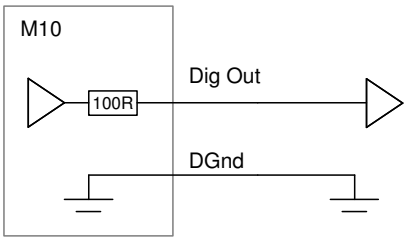
Digital input : TTL input



Digital input : volts-free contact



Digital output : TTL load



Digital output : optoisolator