

D A T A   S H E E T



# RX0224

24 CHANNEL HIGH PERFORMANCE CHARGE  
VIBRATION MEASUREMENTS

## APPLICATIONS

Gas Turbine measurements  
Vibration Health Monitoring in Harsh Environments

## OVERVIEW

24 Channel Charge vibration measurements

Provides full charge signal conditioning with built in integrator for velocity output. Single ended or differential (isolated) operation

128 Ksa/Sec with 24 bit ADC per channel for high resolution data and wide dynamic range

Precise synchronization of measurements in a distributed environment through IEEE-1588

Rugged design; 20°C to +60°C operating range

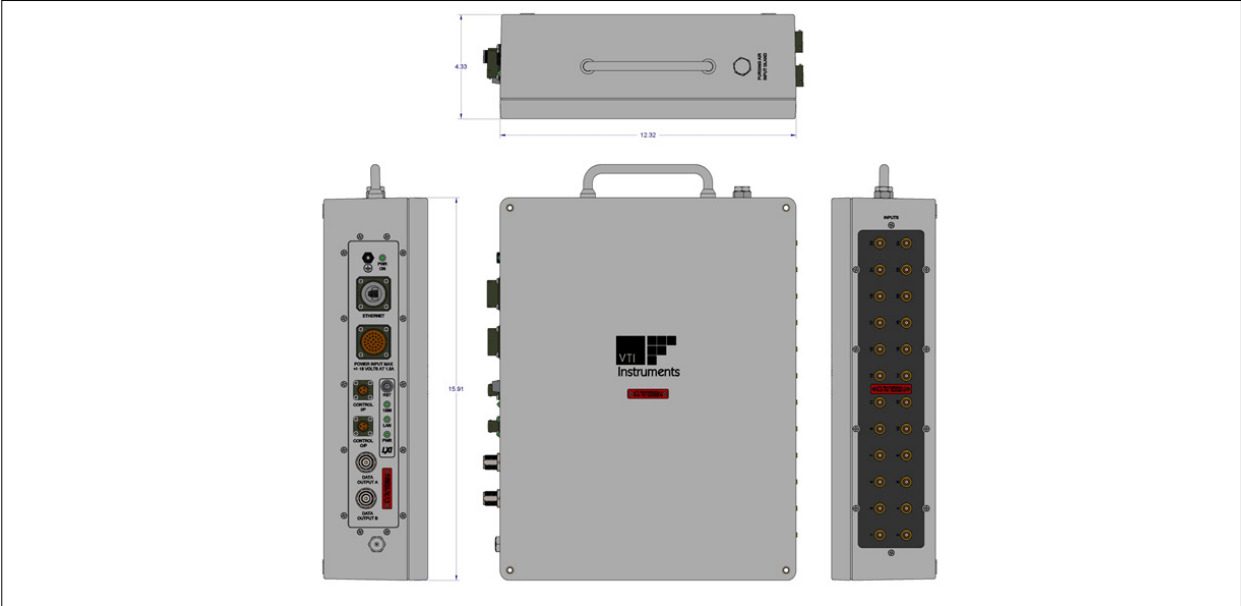
IP66 rated

GigE Ethernet connectivity via LXI industry standard

## SOFTWARE DRIVERS

IVI-COM, IVI-C, LabVIEW™

Specifications contained within this document are subject to change without notice



RX0224 - EXTERNAL DIMENSIONS

## OVERVIEW

The RX0224 is part of VTI's RX0XXX family of rugged instrument with built in sensor signal conditioning. All connections and operations are designed for rugged operation by using Mil-Grade connections for all inputs. The RX0224 is capable of:

- 24 channels of charge signal conditioning and simultaneous sampling ADC
- Ethernet interface for simplified scalability and distributability of measurements
- 24-bit A/D converters per channel with selectable sample rate of up to 128Ksa/s

Although the RX0224 has a single-ended charge converter, it behaves as a differential charge input that provides common mode rejection. This is because it operates from an isolated power supply.

### PRECISION ACCURACY FOR HARSH ENVIRONMENTS

The RX0224 is designed to allow users the ability to record charge type transducers in harsh environments. Multiple input ranges and 24 bit ADC per channel allow for very high resolution measurements so that large or small vibration events can be accurately captured.

Micro-dot connections provide direct connection for each input channel and the ability to select either single ended or differential inputs gives users more flexibility with a wider range of charge input devices. Power and communications are done using Mil-Standard type connectors for maximum reliability.

The unit has an IP66 rating, protecting against dust, spills, humidity, and water jets from every direction. All connections are designed for rugged operation through the incorporation of Mil-Grade connections for all inputs. The unit also has an extended operating temperature range of -20°C to +60°C and a compact, light-weight design. Using thermal conduction cooling techniques, the RX0224 is able to dissipate heat without the use of a fan.

## SELF-TEST DIAGNOSTICS

The RX0224 has a built in health monitoring capability. This allows for close monitoring of functions, including:

- Input Charge Ranges
- Volatile and Non-Volatile Memory of the System
- Closed loop end-to-end self-calibration to help ensure maximum accuracy over time and temperature

## BUILT-IN SIGNAL PROCESSING

The RX0224 leverages its internal FPGA for all necessary signal processing and provides the ability to output alias free data for maximum data reliability. Its advanced trigger model and high speed data streaming capability will allow users to capture all critical data.

ADC data can be corrected in real time and scaled to Engineering Units. Digital Filtering and Averaging are examples of digital signal processing that can be applied real time to the ADC data. DSP (Digital Signal Processing) allows for the user to change filter characteristics without changing hardware.

## TEMPERATURE MONITORING

The RX0224 can monitor its own internal temperature and airflow and provide over-temperature warning and temperature readings over Ethernet interfaces.

## SCALABLE FOR HIGH-SPEED SYNCHRONIZED DATA ACQUISITION

The VTI RX0224 supports easy integration and synchronization of multiple devices through the IEEE-1588 synchronization standard. Multiple instruments can be easily distributed extremely close to the measurement points of interest reducing the run length of analog cable, minimizing errors induced by noisy environments. All measurement data is returned with IEEE-1588 timestamp values with typical accuracies of <100 ns ensuring that acquired data is tightly correlated across the test article.

The precision timing sources can not only be used to synchronize modules within a single instrument, but can also be used to synchronize data across multiple instruments in a distributed data acquisition system. When multiple instruments are connected on a local network, the instrument with the most accurate clock source will automatically become the master, and other instruments will derive the clock from the master - simplifying data synchronization across multiple units.

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## SPECIFICATIONS

Parameter	Specification
Sensor Type	Charge, Piezo-Electric
No. of Channels	24
Input Type (Diff or Single-Ended)	Both Diff. (Isolated) & Single-Ended
Input Ground Isolation	LO side Isolated when Input set to Differential LO side grounded when Input set to Single-Ended
Input Range	$\pm 12.5\text{kpC-pk}$ , $\pm 100\text{kpC-pk}$ $\pm 512$ inch/sec (ips) peak when Integrator enabled when Range set to 100kpC and using 10pC/G accelerometer
Input High-Pass Filter	-3dB: 0.5Hz High-Pass Filter $\pm 10\%$
Charge Measurement Accuracy	Signal $>0.8\%$ FS 1 to 10 Hz: 2% of reading 10 to 10k Hz: 1% of reading Signal $<0.8\%$ FS 1 to 10 Hz: 2% of 0.8% FS 10 to 10k Hz: 1% 0.8% FS
Velocity Measurement Accuracy	Signal $>0.8\%$ FS 1 to 10 Hz: 2% of reading 10 to 5k Hz: 1% of reading Signal $<0.8\%$ FS 1 to 10 Hz: 2% of 0.8% FS 10 to 5k Hz: 1% 0.8% FS
SNR	$>100\text{dB}$
Analog Bandwidth (Anti-Alias Filter)	$<-60\text{dB}$ : 5MHz; $-3\text{dB}$ : 0.5Hz - 64kHz Typical for 10nF Source Capacitance (Sensor + Cable)
Input Ground Isolation	LO side Isolated when Input set to Differential LO side grounded when Input set to Single-Ended
Crosstalk	$< -80\text{dB}$ ; DC to 1kHz, sine with amplitude $< \text{FS}$ Input Range
Slew Rate: 10% to 90% of FS Range	$> 2\text{kpC}/\mu\text{s}$
Phase Accuracy vs. Trigger	$< 0.5 \mu\text{s}$ ; DC Coupling
Latency	$<50\text{mS}$

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## ENVIRONMENTAL SPECIFICATION

Parameter	Specification
Environmental Sealing	IP66 Rating (Dust & water jet tight)
Temperature	Operating Temperature: -20°C to +60°C Storage Temperature: -55°C to +80°C Cold Start: -54°C
Humidity	95% non-condensing
Internal Pressure	< 4 PSIA
Vibration & Shock	MIL-PRF-28800F Class 1
Acoustic Noise	Endurance: 160 dB for 30 minutes Continuous: 150 dB 50Hz - 10,000 Hz
Resistance to Corrosive Fluids	Per RR EIR2553 Fuel, Engine Oil, Hydraulic Fluid
X-Rays	Total Exposure: 195 rads 0.65 rads/min
CE Compliance	YES
EMC Directive	EMC EN 61326 Class A, Criteria A. Annex A
Service Life	> 10 Years
Dimensions	15.91" x 12.32" x 4.33"

## CONNECTORS

Parameter	QTY	Description	Part No.
Power Connector	1	MIL-C-26482 32-Pin Receptacle, Shell Size 18	62GB-12E-18-32P or LMH-02A-18-32P
Ethernet Connector	1	Rugged Sealed RJ-45	RJF 22B Series (Amphenol)
RX0224 Charge Sensor Input Connector	24	Isolated Microdofit (10-32 thread)	