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Continuous Vibration Monitoring and Protection of Critical Equipment

Using 4-20 mA output sensors and vibration transmitters with PLC, DCS, SCADA, and PI systems

Highlights

- Monitors and protects 24/7
- Operates off standard 24V loop power
- Interfaces with plant monitoring & PI systems
- Installs quickly and easily
- Provides critical machine information
- Avoids costly catastrophic failures

Applications

- Critical pumps and motors
- Cooling towers and fans
- Slow speed rolls
- Rotary and screw compressors

Continuous Vibration Monitoring Equipment

4-20 mA vibration output sensors and transmitters provide an easy, cost effective means of monitoring and protecting critical machinery, 24/7. IMI offers a full line of 4-20 mA output products that are compatible with most PLC, DCS, SCADA, and Plant Information Systems. Protect critical equipment and avoid costly downtime with cost-effective transmitters from IMI.

These products are backed up with IMI Sensors' industry leading Lifetime Warranty+, and Best Price Guarantee. IMI has 24-hour customer service, and our promise of Total Customer Satisfaction.

Two-wire, Loop-powered, 4-20 mA Vibration Sensors	2-pin MIL Connector		Integral Cable		Integral Armored Cable		Customer Supplied Conduit	
								
	Top	Side	Top	Side	Top	Side	1" NPT Body	Condulet with 1" NPT [1]
4-20 mA Output Signal Proportional to Peak Velocity (Low Frequency) - 180 to 60k cpm (3 to 1000 Hz)								
0-0.5 ips peak	640B00	642A00	640B10	642A10	640B60	642A60	640B70	EX640B70
0-1.0 ips peak	640B01	642A01	640B11	642A11	640B61	642A61	640B71	EX640B71
0-2.0 ips peak	640B02	642A02	640B12	642A12	640B62	642A62	640B72	EX640B72
4-20 mA Output Signal Proportional to RMS Velocity - 600 to 60k cpm (10 to 1000 Hz)								
0-0.5 ips RMS	641B00	643A00	641B10	643A10	641B60	643A60	641B70	EX641B70
0-1.0 ips RMS	641B01	643A01	641B11	643A11	641B61	643A61	641B71	EX641B71
0-2.0 ips RMS	641B02	643A02	641B12	643A12	641B62	643A62	641B72	EX641B72
4-20 mA Output Signal Proportional to RMS Acceleration (Low Range) - 0 to 5 g rms								
180 to 60k cpm (3 to 1000 Hz)	645B00	647A00	645B10	647A10	645B60	647A60	645B70	EX645B70
180 to 300k cpm (3 to 5000 Hz)	645B01	647A01	645B11	647A11	645B61	647A61	N/A	N/A
180 to 600k cpm (3 to 10k Hz)	645B02	647A02	645B12	647A12	645B62	647A62	N/A	N/A
4-20 mA Output Signal Proportional to RMS Acceleration (High Range) - 0 to 10 g rms								
180 to 60k cpm (3 to 1000 Hz)	646B00	648A00	646B10	648A10	646B60	648A60	646B70	EX646B70
180 to 300k cpm (3 to 5000 Hz)	646B01	648A01	646B11	648A11	646B61	648A61	N/A	N/A
180 to 600k cpm (3 to 10k Hz)	646B02	648A02	646B12	648A12	646B62	648A62	N/A	N/A
Available Options - designate with prefix letters to model number as shown (e.g., RV642A01)								
High Temperature Range	HT	HT	HT	HT	HT	HT	HT	HT
Raw Vibration Output	RV	RV	RV	RV	RV	RV	RV	RV
Temperature Output Signal	TO	TO	TO	TO	TO	TO	TO	TO
ATEX/CSA Certified [2]	EX	EX	EX	EX	EX	EX	n/a	included
Notes								
(1) Includes condulet elbow with 1-inch NPT fitting for conduit connection. Sensor is provided with screw terminal connections.								
(2) Includes hazardous area certification. See www.imi-sensors.com or www.pcb.com for full details of approved environments for specific models.								

Available Options

Option "HT" – High Temperature (e.g., HT640B01) increases the operating temperature range of the sensor from +185 °F (+85 °C) to +257 °F (+125 °C)

Option "RV" – Raw Vibration (Analog Acceleration) Output (e.g., RV640B01) has a third connection that provides the analog acceleration output at 100 mV/g (10.2 mV/(m/s^2) for use with a vibration data collector. This is also available with option "EX" Hazardous Area Approval.

Option "TO" – Temperature Output (e.g., TO640B31) has an embedded temperature sensor and two additional connections that provide a 4-20 mA output proportional to temperature. The range is -40 to +257 °F (-40 to +125 °C). Also available with "EX" Hazardous Area Approval.

Option "EX" – Hazardous Area Approval (e.g., EX640B01, EXRV640B01) provides ATEX and/or CSA certification for use in hazardous areas. Contact IMI for details on specific models.

Pin A: + 4-20 mA
Pin B: - 4-20 mA
Pin C: Analog Acceleration

(Sensor connector for "RV")

Pin A: + 4-20 mA Vibration
Pin B: - 4-20 mA Vibration
Pin C: + 4-20 mA Temperature
Pin D: - 4-20 mA Temperature

(Sensor connector for "TO")

Model 649A04

Model 653A01

Programmable 4-20 mA Output Sensor

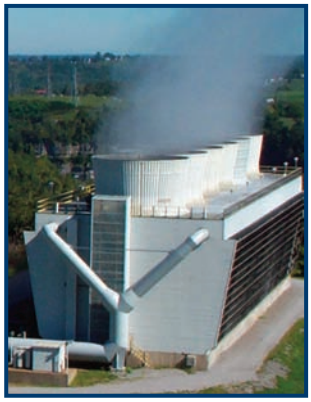
- Outputs acceleration, velocity, or displacement NEW
- Selectable low and high pass filters
- Selectable full scale range
- English or metric units

The Model 649A04 is a fully USB programmable, integrated vibration sensor and transmitter. It is housed in a hermetically sealed industrial sensor housing and mounts with a standard ¼-28 stud. It can be programmed to output a 4-20 mA signal proportional to peak acceleration, peak or rms velocity, or peak-peak displacement in either English or SI units. The sensor also has three selectable low pass filters and two high pass filters. It is 2-wire, loop-powered and fully compatible with most plant monitoring systems. The unit is available with a 2-pin MIL connector (Model 649A04), integral cable (Model 649A14), and with 2-pin terminal connector (Model 649A74). Optional Model 070A89 USB Programmer required for programming. USB Programmer kits that include software and required accessories are optionally available using Model 600A17 for 2-pin MIL versions and Model 600A18 for integral cable and terminal strip models.

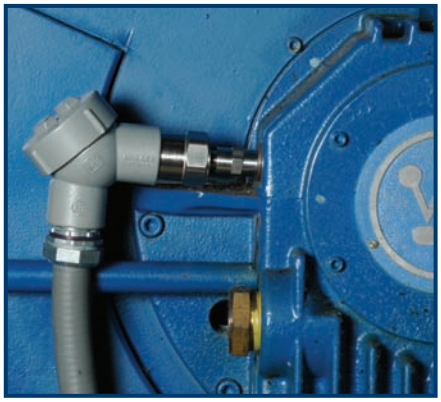
Ultra-low Frequency Displacement Sensor

- 4-20 mA output NEW
- Effective on slow speed machinery
- Measures absolute p-p displacement
- Accurate down to 90 CPM
- 2-wire loop powered
- Excellent for cooling towers

Displacement is the preferred measure for low frequency and balance measurements. It is often difficult to make good acceleration and even velocity measurements below 10 Hz (600 cpm). The 653A01 measures accurately down to 1.5 Hz (90 cpm) making it a very effective sensor for monitoring slow speed machinery. Since it is housed in a hermetically sealed stainless housing, it is an excellent choice for use in harsh and corrosive environments like cooling towers. The unit has a range of 40 mils p-p and a frequency range of 1.5 to 300 Hz (90 to 18,000 cpm). It is a 2-wire, loop-powered device and is fully compatible with most plant monitoring systems.



Vibration transmitters monitor cooling towers

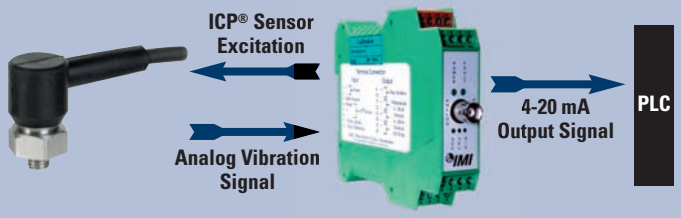


Bearing vibration monitoring on an electric motor

Vibration levels are monitored at the control room

Using ICP® Accelerometers with 4-20 mA Loops

Existing ICP® accelerometers may be easily adapted for use into 4-20 mA process loops with a transmitter that converts their raw analog output into a 4-20 mA signal, which is proportional to rms or peak vibration. A variety of transmitters are available to support this technique and are shown on the back of this brochure.



ICP® Accelerometer *Model 682B03 Transmitter*

Additional Vibration Transmitters and Accessories

ICP® Sensor to 4-20 mA Transmitter

Model 682B03

- Provides constant-current ICP® sensor excitation
- Adjustable low-pass and high-pass filtering
- Peak or rms proportional output
- Selectable acceleration, velocity, or displacement output signal format
- 24 VDC powered
- 4-20 mA output proportional to temperature (when used with ICP® sensors having the "TO" sensor option)

Bearing Fault Detector

Model 682B05
(US Patent Number 6,889,553)

- Provides early warning of bearing and gear faults
- Detects impacting associated with spalling, cracking, and lubrication problems
- Outputs 4-20 mA signals for peak acceleration and overall vibration
- Compatible with existing with PLC, DCS, SCADA, alarm, and control systems
- Offers analog output signal for spectral analysis and diagnostics
- Conducts continuous vibration monitoring- 24/7

Reciprocating Machinery Protector (RMP)

Model 649A01

- Detects faults and mechanical looseness in reciprocating compressors
- Improves on existing impact monitoring technology
- Provides continuous trending with alarm and alert levels for early warning
- Field programmable set points & alarm levels optimize performance
- Hermetically sealed, loop-powered design
- Hazardous Area Approvals Available

Indicator/Alarm

Model 683A

- Provides 24 VDC excitation for loop-powered 4-20 mA sensors
- Powers ICP® accelerometers (optional)
- Highly visible, fully scalable LED display
- Up to four programmable set-point relays
- Time delay eliminates false alarm trips
- Optional 4-20 mA output signal
- 1/8 DIN panel mount
- User friendly, menu-driven setup

Electronic Vibration Switch

CE Pending

Series 685B

- Offers two set points with individual alert and alarm relays
- 4-20 mA output signal for continuous vibration monitoring
- Analog, 100 mV/g (10.2 mV/(m/s²)) output signal for fault analysis and diagnostics
- Utilizes built-in or remote vibration sensor
- Choice of AC or DC power
- Adjustable time delay
- Hazardous Area Approvals Available

Model 682A16 ICP™ Universal Transmitter NEW

Model 682A06 Universal Transmitter

Model 682A06 &
Model 682A16
(shown with optional programmable display Model 070A80)

- Powers ICP® accelerometers (Model 682A16)
- Normalizes the vibration output
- Provides loop power for 2-wire, 4-20 mA sensors
- Offers 2 set points with Form A relay outputs
- Relays independently set NO or NC
- Accepts mA, ohm, RTD, thermocouple
- Accepts VDC input (Model 682A06)
- Fully programmable via detachable display
- DIN rail mount

Order Online @ www.imi-sensors.com

ICP™ Inline Transmitter NEW

Model 682A09

- Operates off 24 V loop power
- Powers ICP® accelerometers
- Outputs 4-20 mA proportional to velocity
- Offers 100 mV/g buffered output
- Compatible with plant monitoring equipment
- Converts installed ICP® sensors to loop power transmitters

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IMI Sensors designs and manufactures a full line of accelerometers, sensors, vibration switches, vibration transmitters, cables and accessories for predictive maintenance, continuous vibration monitoring, and machinery equipment protection. Products include rugged industrial ICP® accelerometers, 4-20 mA industrial vibration sensors and transmitters for 24/7 monitoring, electronic and mechanical vibration switches, the patented Bearing Fault Detector, high temperature accelerometers to +900 °F (+482 °C), 2-wire Smart Vibration Switch, and the patented Reciprocating Machinery Protector. CE approved and intrinsically safe versions are available for most products.

Visit **www.imi-sensors.com** *to locate your nearest sales office*