



MTS SISTEMAS DO BRASIL LTDA.

# CATÁLOGO INDUSTRIAL





## MTS BRASIL

Presente no Brasil desde 1986, a MTS Sistemas do Brasil Ltda. é uma empresa com foco nas áreas de testes, aquisição de dados e transdutores para sinais dinâmicos ou lineares, possuindo forte atuação em mercados como engenharia, qualidade, pesquisas e desenvolvimento de produtos, entre outros.

## REPRESENTAÇÃO & PARCERIAS

**PCB PIEZOTRONICS**  
AN AMPHENOL COMPANY

**IMI SENSORS**  
A PCB DIVISION

**THE MODAL SHOP**  
AN AMPHENOL COMPANY

**LARSON DAVIS**  
A PCB DIVISION

**ENDEVCO**  
AN AMPHENOL COMPANY

**ACCUMETRICS**  
AN AMPHENOL COMPANY

**Tempsonics**  
AN AMPHENOL COMPANY

**OPKON**  
*Sense the motion*

**CRYSTAL**  
INSTRUMENTS

**CONTROLS**

**MTS**  
®

## ESTRUTURA DE EXCELÊNCIA

Nosso centro de treinamento, laboratório de calibração e manutenção, juntamente com nosso escritório comercial, estão localizados no Parque de Inovação de São José dos Campos.

## SIGNALab<sup>®</sup>

O nosso Centro de Inovações abriga o SIGNALLab, o primeiro laboratório de calibração de acelerômetros de baixa frequência no Brasil, acreditado pela CGCRE (INMETRO).



MTS SISTEMAS DO BRASIL LTDA.



# GUIA DE SELEÇÃO DO SENSOR E ACESSÓRIOS

Sensor de posição linear magnetostritivo

INDUSTRIAL





Temposonics, LLC  
Cary, (North Carolina), USA



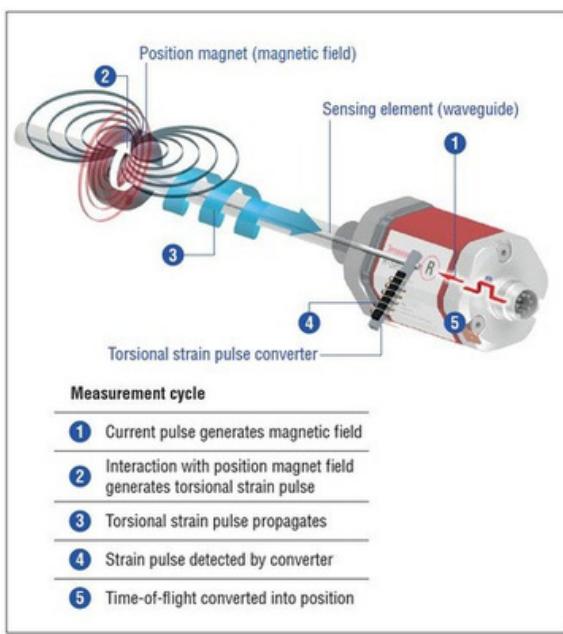
Temposonics, GmbH & Co. KG  
Lüdenscheid, Germany

## A Temposonics

A Temposonics é reconhecida como uma líder no setor de tecnologias e soluções de sensoriamento. Seus sensores e transmissores permitem medições de posição e/ou velocidade com alta precisão e dinamismo, sendo ideais para sistemas de automação avançados e aplicações críticas de segurança. Com um portfólio de produtos versátil e em constante expansão, e com foco em oferecer um suporte regional de excelência, a Temposonics trabalha em parceria com seus clientes para otimizar o desempenho dos sistemas e reduzir tempos de parada.

A combinação de qualidade excepcional com conhecimento prático garante aos clientes alta produtividade e sucesso nos seus processos. A empresa investe continuamente em pesquisa, desenvolvimento e produção de sistemas de sensores, criando constantemente novas soluções para medições nos setores industrial, de hidráulica móvel e de tecnologia de processos.

### -CONFIE EM QUEM É ESPECIALISTA-



## Tecnologia de medição

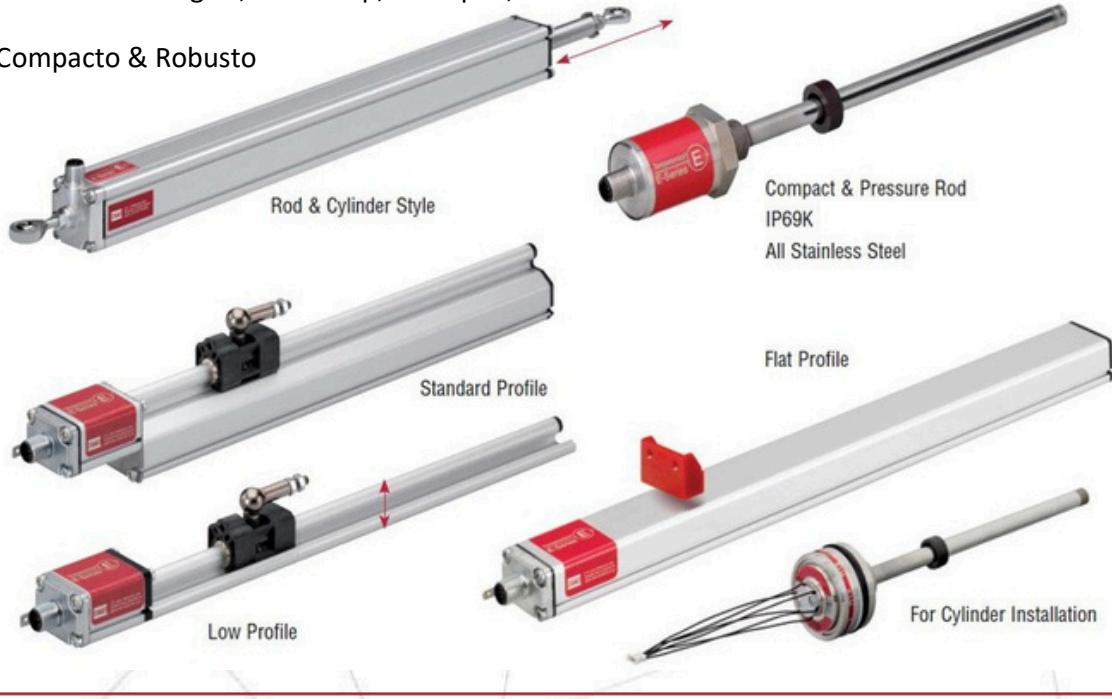
A Temposonics faz parte do grupo Amphenol Corporation (NYSE: APH) – uma das maiores fabricantes mundiais de produtos de interconexão. A Amphenol projeta, fabrica e comercializa conectores elétricos, eletrônicos e de fibra óptica, cabos coaxiais e flat-ribbon, além de sistemas completos de interconexão. Como fabricante de soluções em sensores, a Temposonics complementa o portfólio do grupo Amphenol, oferecendo aos clientes uma seleção ampliada e integrada de produtos. Pioneirismo e inovação desde 1975.

Os sensores de posição Temposonics funcionam com base na tecnologia da magnetostrição, que mede a posição com alta precisão e sem contato físico. Um ímã, preso ao objeto em movimento, interage com um pulso enviado por um guia de ondas, gerando uma deformação que é convertida em sinal elétrico. Como a velocidade da onda é conhecida, o tempo até o retorno do sinal indica a posição exata.

Essa combinação de precisão, robustez e confiabilidade torna os sensores Temposonics ideais para aplicações industriais exigentes, onde desempenho consistente e manutenção mínima são essenciais.

## Temposonics® Modelos da Série E

1. Vários estilos
2. Baixo custo
3. Interface: Analógico, Start-Stop, CANopen, SSI
4. Compacto & Robusto



## Temposonics® Modelos da Série G

1. Sem contato / Sem desgaste
2. Absoluto
3. Interfaces: SSI, Analógico (Tensão e Corrente)
4. Curso: até 3250 mm Antivibração: 15G
5. Opção fixação por rosca ou por pressão
6. Opção fixação por rosca ou por pressão
7. Temperatura de Operação: -40 a +100°C
8. IP67



Fixação por rosca M18x1,5  
GBM/GBT



Fixação por pressão  
GBS



## Temposonics® Modelos da Série RV

1. Sem contato / Sem desgaste
2. Absoluto Resolução de 0,5 µm ~ (Opção de Correção de Linearidade disponível)
3. Interfaces: CANbus, EtherCAT, EtherNet/IP, Profinet
4. RT, SSI, Analógica (Tensão e Corrente)
5. Diagnóstico por LED e Status do Sensor
6. Curso: até 7600 mm Antivibração: 30G
7. Temperatura de Operação: -40 a +85°C IP6
8. 7/IP69 K
9. Pronto para indústria 4.0

Certificação ATEX

HPH



Modelo Standart de haste

RH5



Com proteção IP68/IP69K

RM5



I AM THE NEW GENERATION

## Temposonics® Modelos da Série RV

1. Variedade de estilos

Modelo Standart perfil

RP5



Haste interna Flexível

R H5 /R F5



Eletrônica separada

RD5



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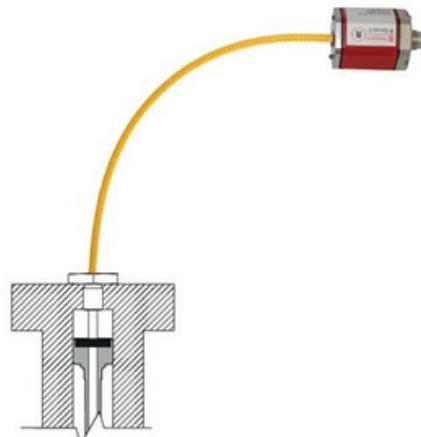
## Temposonics® Compatibilidade

1. Compatibilidade fixação mecânica
2. Compatibilidade de conexão
3. Compatibilidade de comunicação
4. Opção haste flexível

Example: RH5-B/J/M/S/T-A/B/M/V  
(rigid sensing element)



Example: RH5-B/M/S/T-F  
(flexible sensing element)

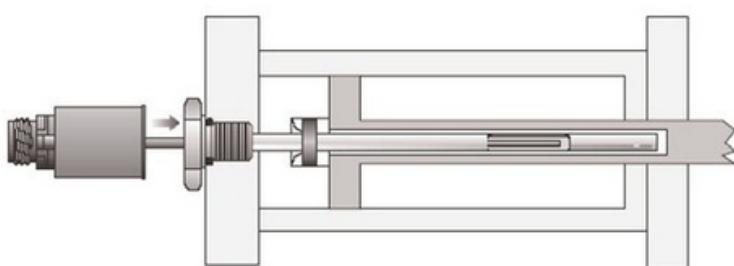
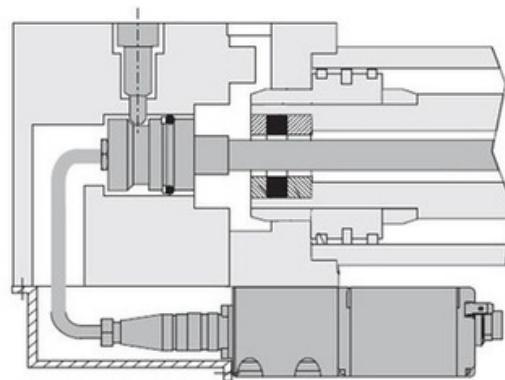


I AM THE NEW V GENERATION

## Montagem em Cilindros hidráulicos

1. Haste interna substituível: Elimina a necessidade de descarregar a pressão hidráulica ou romper a vedação hidráulica (modelos de sensores RH5, GB M ).
2. Haste interna flexível; disponível para espaços de instalação reduzidos (RF5, RH5).
3. Design ecologicamente adequado; Evita vazamentos na conexão entre o sensor e o cilindro.

### Eletrônica separada (RD5)



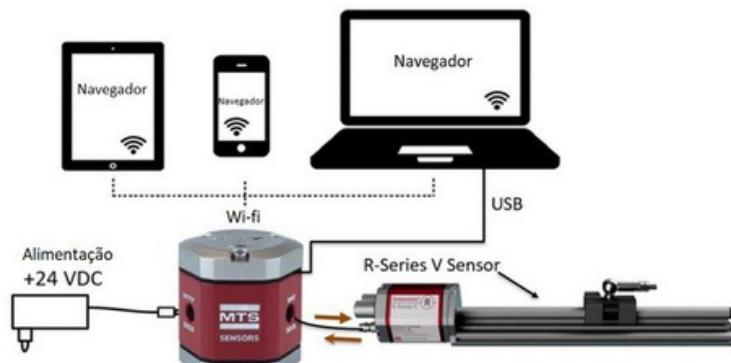
## Temposonics® Acessório Tempolink

1. Diagnósticos do sensor
2. Configurações e ajustes de parâmetros
3. Dados e status do sensor
4. Para usar em Campo
5. Não é necessário instalar driver, software ou App
6. Conexão Wi-fi ou USB



Tempolink

Acesso remoto via Wi-fi



I AM THE NEW V GENERATION

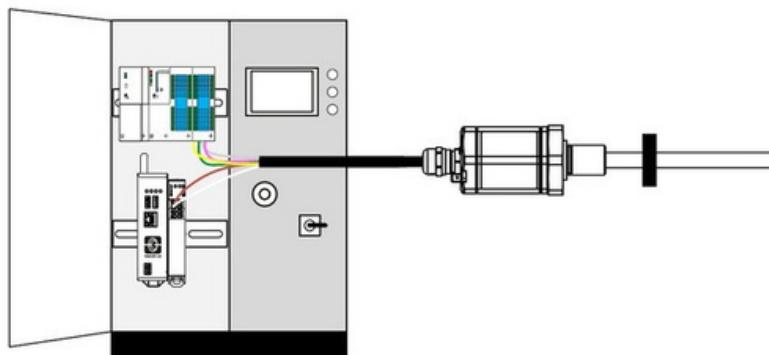
## Temposonics® Acessório Tempogate

1. Diagnósticos do sensor
2. Configurações e ajustes de parâmetros
3. Dados e status do sensor
4. Possibilidade de integrar na rede
5. Conexão Wi-fi e rede
6. Assistência remota através de um servidor OPC UA
7. Até 24 sensores



Tempogate

Acesso remoto via Wi-fi



I AM THE NEW V GENERATION

## Temposonics® Acessório Modelo FH

1. Corpo em aço inox (AISI 316L)
2. Suportes de alumínio
3. Curso de medição de até 3200mm
4. Pronto para ser usado com nossos sensores
5. Temperatura de operação na faixa de -40 °C...+150 °C
6. Fole em Nylon revestido de neoprenoresistente e trabalha na faixa de -40 a +105 °C



## Temposonics® Exemplos de montagem do FH

1. Variedades para fixação

Fixação por suportes



Kitparafixação usando abraçadeiras



Fixação por suporte de olhal 254985





# Temposonics

AN AMPHENOL COMPANY

**E**-Series

Compact  
Solutions

**GB**-Series

Innovative  
Design

**R**-Series V

The New  
Generation

## Guia Rápido dos modelos

FEATURES			
Velocity measurement	•		•
Multi-position measurement	•		•
Programmable sensor parameters		•	•
Diagnostic LEDs			•
Redundant version			

OUTPUT			
Analog - Current	•	•	•
Analog - Voltage	•	•	•
Start/Stop	•		
PWM			
SSI	•	•	•
PROFIBUS			
CANbus	•		
DeviceNet			
EtherCAT®			•
EtherNet/IP™			•
POWERLINK			•
PROFINET			•
IO-Link	•		

MINIMUM STROKE LENGTH			
25 mm (1 in.)		•	•
50 mm (2 in.)	•		

MAXIMUM STROKE LENGTH			
1500 mm (60 in.)	ER		
2540 mm (100 in.)	EH, EE		
2900 mm (114 in.)			
3000 mm (118 in.)	EP, EL, EP2, ET		
3250 mm (128 in.)		GB	
5080 mm (200 in.)			RDV
6350 mm (250 in.)			RP5
7615 mm (299.8 in.)			RM5
7620 mm (300 in.)			RH5

## Temposonics® Sensor de nível LLE

1. Baixo custo
2. Precisão +/-0.5 mm
3. Proteção IP69K
4. Sensor Temperatura RTD –PT100
5. Conjunto completo



Level | Interface | RTD | IP69K



## Temposonics® LiquidLevel

1. Nível produto
2. Nível de interface
3. Precisão de ±1mm
4. 16 pontos de temperatura
5. Cálculo e correção do volume
6. Não há necessidade de recalibração e manutenção
7. Certificados para áreas explosivas
8. Certificação INMETRO
9. Até 22 metros de curso de leitura
10. 4-20 mA (1 Loop or 2 Loop) com HART, Modbus

**Tank SLAYER®**



**LevelLimit®**



**RefineME®**



# Guia de sensores de nível



Features	LLE	RefineME®	Tank SLAYER®
Input voltage	+24 VDC	Loop powered or 10.5...28 VDC	Loop powered or 10.5...28 VDC
Output	<ul style="list-style-type: none"> <li>Analog (Current or Voltage)</li> <li>IO-Link</li> <li>SSI</li> <li>CANbus</li> <li>RTD</li> </ul>	<ul style="list-style-type: none"> <li>Modbus RTU</li> <li>DDA</li> <li>Analog (Current)</li> <li>HART®</li> </ul>	<ul style="list-style-type: none"> <li>Modbus RTU</li> <li>DDA</li> <li>Analog (Current)</li> <li>HART®</li> </ul>
Linearity deviation	±0.5 mm	±1 mm	±1 mm
Wetted parts	Ø 7 mm rod: Stainless steel 1.4301 (AISI 304) Ø 10 mm rod: Stainless steel 1.4306 (AISI 304L) or stainless steel 1.4404 (AISI 316L)	Stainless steel (AISI 316L), Nickel Alloy C-276 or FEP	Stainless steel (AISI 316L)
Rod diameter	7 mm or 10 mm	5/8"	7/8"
Approvals	-	Intrinsically Safe, Flameproof, Explosion Proof, SIL2	Intrinsically Safe, Flameproof, Explosion Proof, SIL2
Process temperature	-40...+85 °C (-40...+185 °F)	-40...+150 °C (-40...+302 °F)	-40...+125 °C (-40...+257 °F)
Max tank height	3000 mm (120 in.)	7620 mm (300 in.)	22000 mm (866 in.)
Use case	<ul style="list-style-type: none"> <li>Wash down applications (IP69K)</li> <li>Small package size</li> <li>Economical</li> </ul>	<ul style="list-style-type: none"> <li>Hazardous Area Approvals</li> <li>SIL Capable</li> <li>Loop Powered</li> <li>Integral Temperature Measurement</li> </ul>	<ul style="list-style-type: none"> <li>Flexible hose for large tanks</li> <li>Hazardous Area Approvals</li> <li>SIL Capable</li> <li>Integral Temperature Measurement</li> </ul>
Applications	<ul style="list-style-type: none"> <li>Hydraulic reservoir tanks</li> <li>Chemical totes</li> <li>Transmission fluid replacement Systems</li> </ul>	<ul style="list-style-type: none"> <li>LPG bullet tanks</li> <li>Separators / Settlers</li> <li>Sump tanks</li> </ul>	<ul style="list-style-type: none"> <li>Bulk refined fuel storage tanks</li> <li>LPG spheres</li> <li>Distillery storage tanks</li> </ul>



# Temposonics

AN AMPHENOL COMPANY



TEMPOSONICS@MTSBRASIL.COM.BR  
+55 (11) 5501-5300

PARQUE DE INOVAÇÃO TECNOLÓGICA  
DE SÃO JOSÉ DOS CAMPOS  
AV. DOUTOR ALTINO BONDESAN, 500  
EUGÉNIO DE MELO - SÃO JOSÉ DOS CAMPOS  
CEP: 12.247-016 | BRASIL  
ESCRITÓRIO COMERCIAL  
CENTRO EMPRESARIAL I - SALA 212B



MTS SISTEMAS DO BRASIL LTDA.

DISTRIBUIDOR EXCLUSIVO DA TEMPOSONICS NO BRASIL

ISO 9001  
CERTIFIED

LABORATÓRIO DE CALIBRAÇÃO, MANUTENÇÃO E  
CENTRO DE DISTRIBUIÇÃO E TREINAMENTO  
CENTRO EMPRESARIAL II - CONJUNTO 1402 E 1404



# SOLUTIONS FOR SAFETY AND UPTIME

MONITOR, MEASURE & TROUBLESHOOT:  
VIBRATION, COMBUSTION, PRESSURE, NOISE & GROUND FAULTS

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 **THE MODAL SHOP**  
AN AMPHENOL COMPANY

[modalshop.com/energy](http://modalshop.com/energy) 513 351 9919

# SERVING THE ENERGY SECTOR

Safety and uptime – critical concerns at every energy facility. Our teams are focused on delivering solutions designed specifically for Power Generation applications – from sensors to precision instrumentation. We believe there is strength in numbers – with wide ranging application experience, a global 24 / 7 support team, and 50+ years solving complex problems, The Modal Shop, PCB Piezotronics, Larson Davis, and Accumetrics are here to support you. Our specialist teams offer expertise in each area below – all solutions are available through our global sales and service network:

- CalibrationSystems & Digital Sensing  
The Modal Shop
- IndustrialVibration & Pressure Sensors  
PCB Piezotronics
- Noise&Vibration Industrial Hygiene  
Larson Davis
- GeneratorGround Fault Protection  
Accumetrics



## SENSING TO MEET YOUR NEEDS

### DIGITAL VIBRATION MEASUREMENTS

Harness the power of your smartphone to make simple, accurate and reliable vibration level measurements on critical machinery using the [Digital Vibration Meter Kit Model K333D01-VM](#). The USB Digital Accelerometer's wide range and accuracy captures machinery vibration events from imbalance to misalignment to bearing faults, gear mesh, and pump cavitation. With a hermetically sealed, stainless steel housing, the Digiducer is built to survive in tough environments.

- Turns your smartphone into a portable vibration meter
- Turn-key kit includes mounting hardware and connections
- Pre-programmed ISO vibration severity scales provide instant exceedance feedback
- PDF report generation with images of critical assets

**THE MODAL SHOP**  
AN AMPHENOL COMPANY



### USB-PROGRAMMABLE ELECTRONIC VIBRATION SWITCH

The [Series 686 Smart Vibration Switch](#) is highly versatile, fully user programmable via USB, low cost, and a drop-in replacement for most popular mechanical vibration switches. The Smart Vibration Switch provides the reliability not found in mechanical switches. It is a lower cost alternative when single relay action is required vs. higher cost dual relay models.

- Fully USB programmable for consistent results
- 2-wire operation uses existing mechanical switch wires
- Eliminates false trips with programmable delays
- Remote Reset Anywhere™ for safety and convenience
- Exclusive MAVT™ sets alarm threshold automatically
- Hazardous area approvals available

**IMI SENSORS**  
A PCB DIVISION



# ON-SITE VIBRATION CALIBRATION & VERIFICATION

## CONFIRMING VIBRATION PROTECTION SYSTEM OPERATION

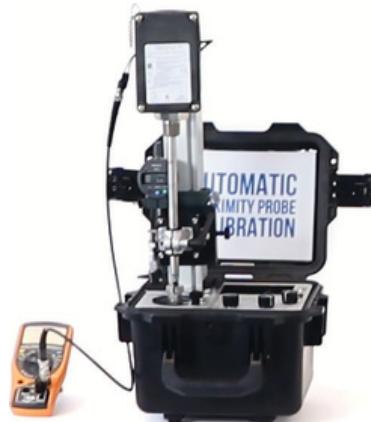
Reliability, Instrumentation & Controls, and Maintenance Teams need to answer a slew of questions: If a problem develops, will we receive advanced warning? Are we safe around the machinery? Is the instrumentation wired correctly and working? Is it protecting the machinery? Are vibration alarms real, or nuisance?

The answer to these questions lies in bringing vibration loop checks and calibration into the plant. With 30+ years of expertise in vibration transducer calibration, The Modal Shop is here to support you with a range of Portable Vibration Calibrator solutions.

## PORTABLE VIBRATION CALIBRATION

The [Portable Vibration Calibrator Model 9110D](#) is the industry leading battery-powered vibration shaker table – capable of field testing a diverse range of vibration instrumentation used in energy facilities from sensor, through cabling, to displayed vibration, alarms, programming, and scaling. An extended 5 Hz to 10 kHz frequency range and a powerful shaker with 800-gram max payload make it an ideal solution for a wide range of sensors. Turbines and compressors are too critical for unplanned outages. As the first line of defense against downtime, vibration monitoring systems are just as essential as the machinery they protect.

Output sensitivity of vibration instrumentation is automatically calculated on the display screen. CALROUTE firmware allows technicians to program repetitive test routines with pass/fail notification displayed after every data point for both frequency response and linearity. From data collected, it is easy to create professional, NIST-traceable, and ISO-17025 compliant calibration certificates by importing results from the device's memory into Microsoft Excel® via supplied workbook and USB drive. Portable Calibrators from The Modal Shop help:



- Prevent and troubleshoot false alarms
- Pass audits, while reducing insurance risk and instrumentation costs
- Build trust in the condition monitoring system
- Promote safety, reduce downtime

The energy industry uses a myriad of vibration monitoring solutions. Model 9110D has the payload capability and mounting flexibility to system test – from sensor to alarms – instrumentation and systems prevalent in the industry such as:

- Proximity probes (eddy current probes) used for radial or axial gas and steam turbine vibration as well as centrifugal compressor monitoring in the fluid-film bearings
- 4-20 mA loop powered vibration transmitters protecting critical air compressors, Rotors, and pumps
- Turbine accelerometer signal conditioners with AC current output
- Case mounted velocity sensors
- Accelerometers detecting bearing faults and gear box malfunctions
- High temperature charge, differential charge, or modulated current vibration sensors
- DCS, PLC, SCADA control system scaling, display and alarms
- SIL-rated systems with redundant high alarm shutdown logic



# PERSONAL NOISE EXPOSURE

 **LARSON DAVIS**  
A PCB DIVISION

## WORKER NOISE EXPOSURE MEASUREMENTS

For Industrial Hygienists, EHS Consultants, and Safety Managers, knowledge of a worker's daily noise exposure is critical in mitigation of hearing loss risk. Larson Davis offers Noise Dosimeters designed to help you comply with guidelines established by OSHA, ISO, and other global directives while providing exposure levels in an easy-to-understand format.

### WIRELESS NOISE DOSIMETRY

With the mobile-capable line of **Spartan Wireless Noise Dosimeters Models 730 and 730IS**, control test setup, timers, and measurements for up to four virtual dosimeters on a single device. Spartan Noise Dosimeters include preprogrammed parameters for NIOSH, ISO, ACGIH, and OSHA regulations. Perform tasks via Bluetooth from a PC or the LD Atlas™ app. Spartan facilitates faster, simpler, consistent operation designed to save time and money.

Use LD Atlas to perform essential tasks – viewing real-time exposure data, exceedances, battery life, and measurement metrics – via your phone or tablet. Spartan Noise Dosimeters are configured with built-in wireless charging pads in a robust travel case and available in 1-, 3-, 5-, and 10-packs. **Intrinsically Safe Noise Dosimeters** are available as Model 730IS.

- Produce reports and email results via mobile device
- Built-in bump detection and motion detection
- Programmable (on/off) LED alarm for exceedances or actions
- 730IS is ATEX, UL 913, IECEx, FCC, CAN/CSA C22.2 approved



## WORKPLACE NOISE MEASUREMENT

Designed for the Occupational Safety professional, **Spartan Sound Level Meter Model 821** includes everything needed to simplify workplace noise level and noise exposure measurements. Spartan's rugged packaging makes it ideal for measurements in a wide range of environments. The Spartan Model 821 includes a large, responsive touch display with all of the essentials for measuring workplace noise.

- Long battery life
- Wireless charging
- Automatic data transfer
- Built-in noise dose metrics



## EQUIPMENT RENTAL

Need a Portable Vibration Calibrator during your next outage? Want your technicians to try out a Digiducer? Need a batch of Noise Dosimeters for short-term monitoring?

The **Modal Shop's Rental Program** is an ideal way to access state-of-the-art technology at a fraction of the cost. Contact our team of experts, tell us about your testing needs, and we'll set up a schedule: [rentalteam@modalshop.com](mailto:rentalteam@modalshop.com) or 1 513 351 9919.

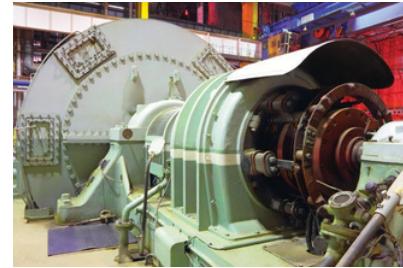


# GROUND FAULT PROTECTION



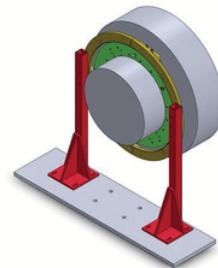
## MONITOR ROTOR WINDING INSULATION & PREVENT COSTLY REPAIRS

Ground faults caused by the breakdown of insulation within brushless generator rotor windings cost power generation companies millions of dollars in lost production and repairs. Installing the Accumetrics Ground Fault Detection System on your brushless generator and exciter will make this problem a thing of the past. Installed on the rotor for continuous monitoring, the system provides plants with early warning and location of the breakdown of insulation resistance on the generator rotor, allowing subsequent repairs to be scheduled for the next planned outage.



## EARTH FAULT RESISTANCE MONITORING

Accumetrics' Earth Fault Resistance Monitoring (EFREM) Systems monitor deterioration of rotor winding insulation to protect synchronous machines. Robust and reliable, EFREM Systems offer active, continuous monitoring for ground faults in the field windings of generators or motors with brushless excitors, no matter if your system is running or not. Systems detect a fault prior to rotor damage – identifying both the location and severity of the fault for simple resolution.



EFREM Mid-Shaft

Whether you need to outfit a new generator or retrofit an existing one, EFREM Systems are designed to gather objective data on the condition of your equipment to help prevent unplanned downtime. More than just a ground fault alarm, Accumetrics systems provide a continuous measurement of fault resistance, providing an early warning of insulation degradation and advanced notice of the need for field coil rewind.



EFREM End-of-Shaft

### Continuous Data Trending

- Provides data 24 / 7 – whether the system is rotating or at a standstill
- Automatically alerts operators of any system errors

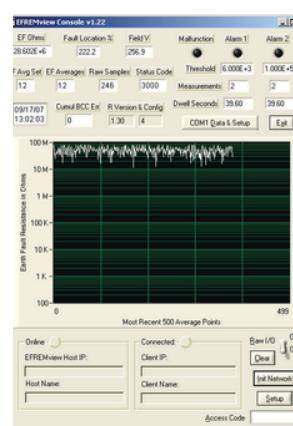
### Easy Installation and Retrofit

- Installs with little to no shaft modification Available in end-of-shaft or mid-shaft
- mounting configurations
- Eliminates the need to remove the exciter or decouple from generator for installation
- Interfaces directly to PLC, DCS, or SCADA systems, providing two relay alarms and

4-20 mA  
current loop resistance trending

### Low Maintenance

- Provides a rugged, reliable data stream – unlike slip rings or optical
- Offers peace of mind – unlike older systems, which are often no longer supported



EFREM Software



# ECHO® WIRELESS VIBRATION MONITORING



**IMI SENSORS**

A PCB DIVISION

[pcb.com/echo](http://pcb.com/echo) 1 800 959 4464



## PERFORMANCE

Why use valuable manpower to collect vibration data on healthy machines? Why settle for measurements once a month when you can have them multiple times daily? Why have people venture into unsafe areas to collect routine measurements? Echo® Wireless Vibration Sensors can safely “look” at the machine’s health several times per day and provide immediate notification when warning or critical levels are reached. This frees up technical experts, like certified vibration analysts, for higher value tasks such as fault analysis.

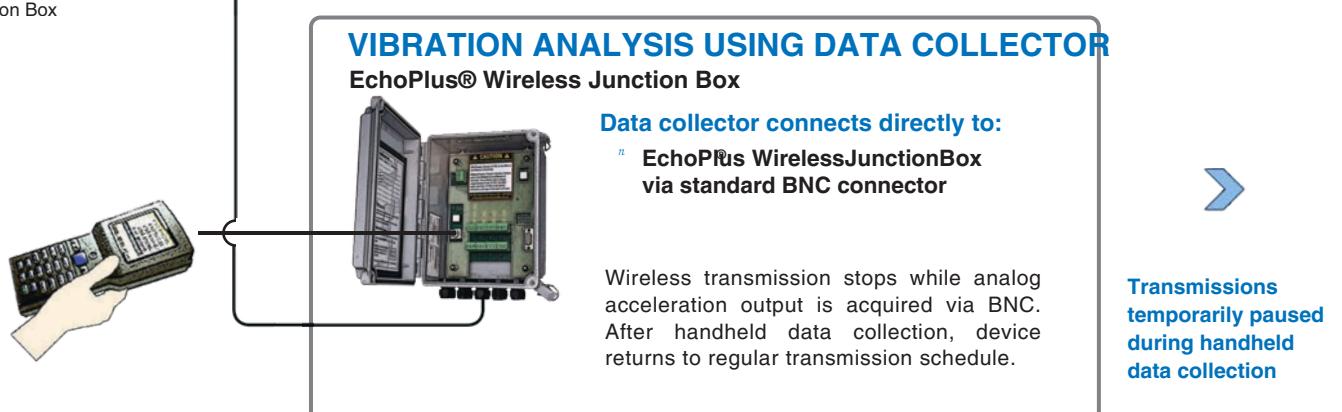
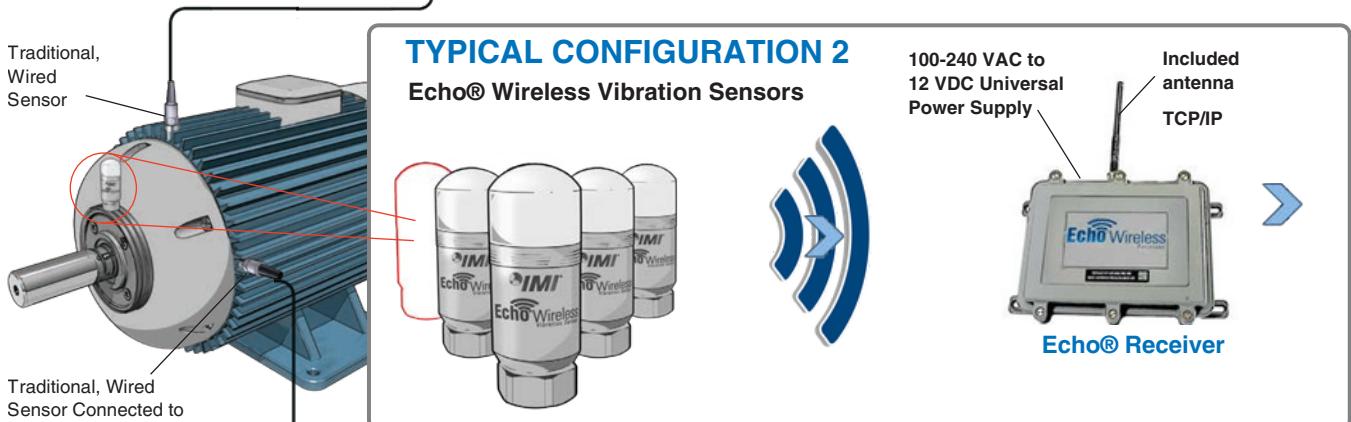
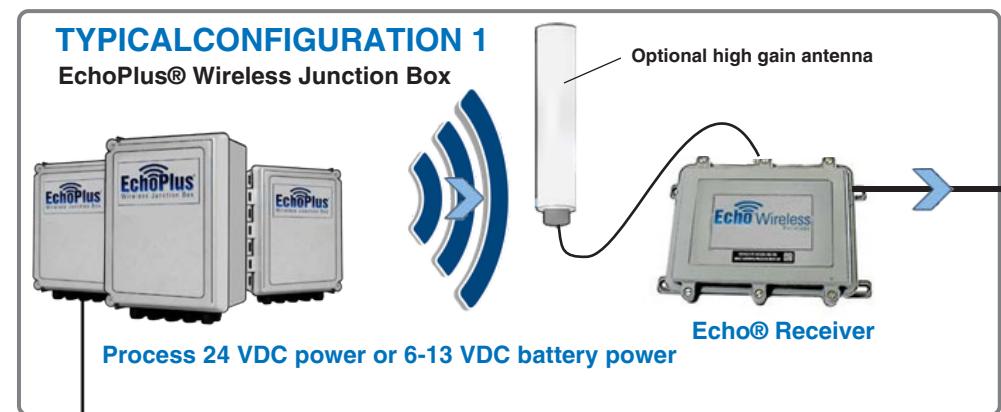
The Echo® Wireless Vibration Sensor and the EchoPlus® Wireless Junction Box make the set of overall vibration measurements, listed below, that provide early warning of most common machine faults. In addition to these measurements, Echo® provides accurate battery status. Using a user-programmable vibration threshold, Echo® can detect if the machine is not running and if not, skip a measurement to conserve battery power.

## HIGHLIGHTS

- Easily integrates with legacy vibration and plant monitoring systems via Modbus®
- Transmits long distances, eliminating expensive cable runs
- Runs standalone or with junction box
- Stores data in ODBC format
- Requires no repeaters, gateways, or mesh

# CONFIGURATION SCHEMATIC

## Typical Configuration





# STEEL ROLLING & ANNEALING

## STEEL ROLLING & ANNEALING

Steel mills not only have fans, pumps, compressors, gearboxes and cooling towers but also have machines and processes unique to the steel industry. The machine sizes, designs, operating speeds, cycle times, batch operations and harsh mill environments often command the use of carefully selected sensors and methods for effective equipment monitoring. Iron making and steel making areas often have an abundance of large belt conveyors, critical ultra-low speed machines with limited rotation, critical large electric overhead traveling cranes and large volume turbo blowers coupled with  $>2300^{\circ}\text{F}$  ( $1260^{\circ}\text{C}$ ) hot blast air, molten liquid iron, red hot slabs, often carbon monoxide risks and of course, rolling mills.

### HOT ROLLING MILLS

Hot rolling mills have large low speed gearboxes, pinion stands, drive shafts and large diameter rolls in bearings to reduce the thickness of red hot steel slabs. Running these at variable loads/speeds and cycle times which may last only 30 seconds during speed variations of  $>500\%$  presents challenges. Environmental factors here include reheat furnace temperatures, steam and scale from cooling water sprays and of course cooling red hot steel traveling at thousands of feet per minute.



#### HIGH TEMPERATURE ICP® ACCELEROMETER

MODEL HT602D01

- Low noise floor
- Low profile design
- Integral cable with or without armor available



#### HIGH TEMPERATURE KIT ACCELEROMETER

MODEL 600A02

- 26 pC/g change mode accelerometer (Model 612A01)
- 4 mV/pC inline charge converter (Model 422E20)
- 10ft low-noise cable (Model 045ER010CJ)



#### VERY HIGH TEMPERATURE ACCELEROMETER

SERIES EX600B1X

- Sensitivity: 10 mV/g (1.02 mV/(m/s<sup>2</sup>)) or 100 mV/g (10.2 mV/(m/s<sup>2</sup>))
- Frequency Range (+5%): 4.7 to 3.5 kHz
- Measurement Range:
  - $\pm 50$  g peak ( $\pm 490$  m/s<sup>2</sup>) or
  - 500 g peak (4900 m/s<sup>2</sup>)

## COLD ROLLING MILLS

Cold rolling mills have similar operating and cyclic challenges as hot rolling, but add in large numbers of roll “chock” bearings that are inherently difficult to instrument, run at varying speeds/loads in batch cycles. These “chocks” are removed and reinstalled into the mill with new rolls many times a day, after only minutes of operation at times. Couple this with stringent product quality critical requirements and again, many more extreme monitoring challenges are raised.

CE



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### 4-20 MA OUTPUT SENSOR

MODEL 640B01

- Available in top or side exit casings, also M12 connector
- Peak or RMS, acceleration or velocity
- Intrinsically safe / explosion proof versions available

### BEARING FAULT DETECTOR PRECISION ICP® ACCELEROMETER

MODEL 682C05

- Provides early warning of bearing and gear faults
- Operates with PLC, DCS, SCADA, alarm and control systems
- Outputs 4-20 mA signals for peak acceleration and overall vibration

### ACCELEROMETER

MODEL 626B01

- Low noise floor
- frequency response to 12 cpm (0.2 Hz)
- Full sweep calibration

## ANNEALING OPERATIONS

Annealing and coated product operations often run at quite low speeds and also have product quality critical requirements. Temperatures from annealing furnaces and molten zinc and aluminizing baths add many temperature, personnel safety and monitoring concerns as well.

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### LOW COST ICP® ACCELEROMETER

MODEL 603C01

- General purpose, hermetically sealed
- IMI's most popular
- accelerometer
- Small footprint

CE



### LOW COST ICP® ACCELEROMETER

MODEL 607A11

- Ideal for submersible applications
- Smallest true industrial accelerometer on the market
- Armored integral cable options available

CE



### PRECISION ACCELEROMETER

MODEL 622B01

- Full frequency sweep calibration: 5% sensitivity deviation tolerance
- 15 kHz high frequency response ideal for early detection of bearing fluting conditions
- Ideal for route-based data collection



# SOLUTIONS FOR MINING NOISE AND VIBRATION MONITORING

NOISE DOSIMETERS, HUMAN VIBRATION METERS, AND  
SOUND LEVEL METERS

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 **LARSON DAVIS**  
A PCB DIVISION

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# WORKER SAFETY

## PERSONAL NOISE EXPOSURE MONITORING

In the mining industry, noise exposure is prevalent in all areas of the operation: surface, processing plants, and underground. Employers have a responsibility to protect workers from noise induced hearing loss caused by occupational noise. In many cases it is also required to self-monitor employee exposure to noise. To help assess risk and validate the effectiveness of hearing protection programs, Larson Davis offers Noise Dosimeters designed to help you comply with guidelines established by MSHA, OSHA, and other global directives. The Larson Davis Spartan™ Series Noise Dosimeters provide exposure levels in an easy-to-understand format.



### SPARTAN INTRINSICALLY SAFE NOISE DOSIMETERS

#### MODEL 730IS

- Easily measure personal noise dose for compliance to OSHA, MSHA 30 CFR 62.100, ACGIH, ISO 9612, and EU Directive 2003/10/EC
- Experience full control, live monitoring, and easy report generation and sharing with LD Atlas™ mobile app
- Understand results with percent dose display and programmable LED alert and alarm
- Have confidence in the integrity of data with automatic bump and motion detection and optional sound recording
- Optional 1/1 octave band data available



SPARTAN-IS SAFETY RATINGS/MARKINGS:  
Model 730IS



APPROVAL NO. 18-A210001-0



ATEX/IECEx

II 1G Ex ia IIC T165°C Ga  
I 1M Ex ia I Ma IECEx  
ETL 19.0045X

ITS20ATEX20553  
8X -10 °C ≤ TAMB  
≤ +50 °C



CAN/USA

Class I, Zone 0, AEx ia  
IIC T165 °C Ga Class  
I, Division 1,

Groups A, B, C &  
D, T165 °C -10 °C  
≤ TAMB ≤ +50 °C

## PERSONAL VIBRATION EXPOSURE MONITORING

Exposure to vibration in the mining industry is common due to the tools and plant machinery used. Workers who experience vibration regularly can suffer from fatigue and risk of injury. Hand-arm vibration syndrome (HAVS), also known as white-finger syndrome, and carpal tunnel syndrome are common vibration-related injuries. In addition, vibration can affect nerves, blood vessels, muscles, and joints.



### HUMAN VIBRATION METER

#### MODEL HVM200

- Easily measure hand-arm and whole body vibration levels for compliance to worldwide standards and directives, such as ISO, ACGIH Threshold Limit Values, and 2002/44/EC
- Understand results with built-in weightings and standards
- Set up measurements, view data, and create reports from PC-based software or mobile app



## NOISE MONITORING METERS AND SYSTEMS

Mining operations are often required to implement a noise management system to meet environmental impact standards. Larson Davis Noise Monitoring Systems are ideal for noise surveys and long-term noise monitoring needed to meet these standards.

From handheld meters to systems for long-term deployment, each option allows you to own your data – no subscription is needed.

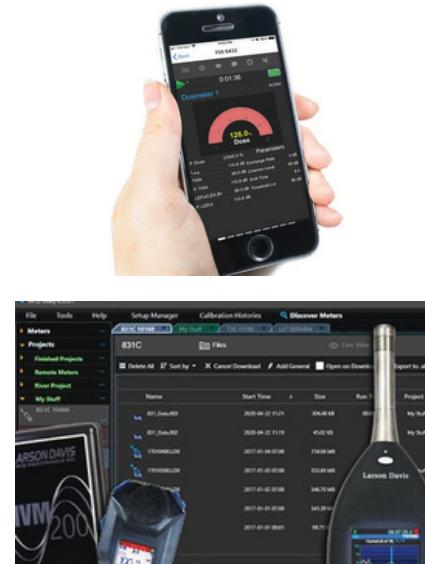
- Evaluate compliance to standards, ordinances, and regulations
- Evaluate noise mitigation efforts
- Receive alerts when noise exceeds allowable levels
- Publish noise levels to proactively manage community noise perception



## SOFTWARE AND APPS TO SIMPLIFY MEASUREMENTS

Simplify meter and measurement management with LD G4 Utility software for PC and the LD Atlas™ mobile app for iOS or Android. With G4 on PC, connect, control, download, and view data from multiple devices simultaneously. Then, view data, generate reports, and easily export via Excel® for further data analysis. Install LD Atlas on a phone or tablet to easily check meter status, make setup changes for a new measurement, analyze data, listen to recorded audio files, and even create and share PDF reports.

- Create and store device setups
- Push setup to multiple meters at once
- View live data
- Visualize data with graphing features
- Create shareable reports with a few simple clicks
- Manage all LD devices for your operation from a single place



## MINING MONITORING EQUIPMENT RENTAL PROGRAM

Need Noise Dosimeters, Human Vibration Meters, or Noise Monitoring Systems for short-term monitoring?

The Modal Shop, our sister company, offers a Rental Program that is an ideal way to access state-of-the-art Larson Davis technology at a fraction of the cost. Contact our team of experts, tell us about your testing needs, and we'll help you determine the best rental plan for your needs: [rentalteam@modalshop.com](mailto:rentalteam@modalshop.com) or 1 513 351 9919.





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SALA 212B

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