SOUND & VIBRATION RENTAL SELECTION GUIDE

WORLDWIDE

THE MODAL SHOP
AN AMPHENOL COMPANY

Effective January 2025
modalshop.com | 1 513 351 9919

What's New in Rental

Digital Signal Conditioning

Digiducer **333D** Series accelerometers offer easy connection to phones, tablets or computers. **485B39** Series allows any 2 channels of ICP or Voltage the same simple driver-free connection. Kits are available with a system controller and preinstalled software.

Vibration Testing

2500E Shaker and Accessories for testing to 500 lbf / 2224 N pk force
2000X15 Modal-Pod™ test fixture accessory for 2500E shaker allows standardized testing of 1U, 2U and 3U CubeSats

New Miniature 1 gram mass Triaxial Accels including

- New 5 000g and 20 000g **356A04/NC** and **356A05/NC**
- Model **TLD356A03/NC** offers TEDS for popular 356A03/NC sensor
- New versions **356A06/NC** and **356A09/NC** of the 1 gram mass 356A01/NC and 356A03/NC that omit the integral cable and add a mini 8-36 4-pin connector

More Triaxial Accels, including

- Model **356A19/NC** for testing to 13 kHz (also low outgassing and includes TEDS)
- Variants of popular adhesive mount **356A4x** Series for structural testing that include extended temperature testing (HT) and ground isolation (J) versions – and some with both! (HTJ versions)
- Case isolated **354B04** and **354B05** for testing in high magnetic fields or electrically noisy environments
- Model **354C02** ring-style through-hole mounted for installation requiring precise orientation
- Models **350B43/NC** and **350B42/NC** offer mechanically isolated and electrically filtered vibration testing for pyroshock, stage separation and metal-to-metal impact testing

New **098** Coaxial Cable can be used in place of 002 (white) and 003 (blue) style to offer a combination of great flexibility, low noise performance and good resistance to damage from bending.

Calibration

C9110D and **C9110D-T** variants of 9110D portable calibrator add ability to calibrate charge-mode piezoelectric sensors.
The **-T** kit offers accessories for smaller sensors typically used in test applications.

Wilcoxon **REF2510R** offers handheld 1g accelerometer and velocimeter testing at 3 frequencies. 61.4 Hz (1 in/s velocity), 100 Hz for standard, 159.2 Hz for 1g acceleration.

Traceable and accredited **Calibration Services** for accelerometers, microphones, impact hammers and more (where applicable) are detailed.

Acoustics

The new Larson Davis Sound Level Meter Model 821 sound meter is offered in two main versions: an environmental SoundExpert **821ENV** and industrial hygiene Spartan **821IH**, with various kits and options available for each, including the **NMS048** for unattended outdoor monitoring.

Additional Sound Level Meters are available including LD Sound Advisor® **831C**-based kits for unattended monitoring with sound recording and remote connectivity. New firmware is also available for the 831C including FFT, audiometry calibration, building acoustics and advanced remote scheduling and power control.

Soft dB **Mezzo** intensity probe and **I-Track** camera-based sound intensity visual mapping system is a powerful tool for fast, easy, and accurate sound mapping.

Data Acquisition

Hi-Techniques **Echelon** Series ruggedized DAQ with 1 Ms/s for ultra high frequency pressure and shock/pyroshock testing in the lab or the field.

Keyence **NR-Series** offers easy data logging / recording in a portable package.

Additional Sensing

Model 962 Fastener Test Analyzer
Measure fastener torque, angle of turn and clamp load

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Frequently Asked Questions Concerning The Modal Shop Rental Program

Rental Period

Is 30 days the minimum rental period?

No, depending on the product, 7 or 15 days are generally the minimum as shown on the top of each section. For most items any whole-day rental period is available starting with the minimum period, and pricing is scaled accordingly. The longer the initial rental period, the lower the per day rate. For reference, 7-day rentals are 45 % of the 30-day rate; 15-day rentals are 70 % of the 30-day rate. Additionally, long-term rentals may be discounted and a rent-to-own program is available. Contact us for day-definite rental rates and long-term discounts.

Selecting Equipment

Is there help available for selecting which equipment is right for my test?

Feel free to contact to an Application Engineer at The Modal Shop at 800.860.4867 or 513.351.9919, or email us at rentalteam@modalshop.com.

Are there online resources available to help with product selection?

Product and application video tutorials as well as detailed selection guides can be accessed by visiting our website at www.modalshop.com.

Where can I find additional information or datasheets for a certain product?

Datasheets and links to many products can be found on our website or via our sister companies' sites (www.pcb.com and www.larsondavis.com). If there are items you're interested in that aren't listed or you would like datasheets to be directly sent to you, please contact us.

I'm interested in items previously or currently sold by a PCB Group company that aren't listed; are they available?

Many specialty use or older products are not shown in the current pricelist. Depending on potential market, new items will be considered at any time. For special requests, please contact a TMS Application Engineer at 800.860.4867 or 513.351.9919, or email our team at rentalteam@modalshop.com.

Payment and Purchase Options

What payment options do you offer?

Purchase Orders with Net 30 terms are accepted from any company with an open account and approved credit from TMS. Visa, MasterCard and American Express card orders are also accepted from anyone with approved credit.

How do I set up an account with The Modal Shop?

If you do not have credit with us but do have active approved credit with PCB or any PCB Group company, please indicate this when placing a rental order. If you do not have approved credit with The Modal Shop, request a New Customer Credit Application from any Rental team member at TMS. This form can be approved within hours. You can download this form from our website and return it via email.

What buyout or purchase options exist for rental equipment?

Most items on rent can be purchased form the active rental. 40 % of the accrued paid rental fees apply toward buyout of the rented product, up to 80 % of the purchase cost at fair market value. Additionally, rental and demo units that are fully inspected and warranted may be available for purchase at discounted rates directly from rental inventory.

Factors Which Can Impede Rental Speed

Account credit status – am I in good standing?

Please contact The Modal Shop to check your account status or to open an account. Order shipment may be held if the account has overdue balances that are unsolved and can affect future credit terms.

Is my credit card information needed?

If using a credit card for the first time, please email the exact address where the credit card bills to the Rental Team Member, but do not email credit card number details. Call with card number details. Once on file we can reference the credit card for any future orders – no need to resend all information. Simply provide the name on the card, expiration date, and last 4 digits. Credit card information is stored on a secure server. Once on file we will be able to recall for future orders as noted above.

Are you waiting on my Rental Agreement return?

Once an order is entered at TMS, a Rental Agreement is emailed back to the customer. Please verify all items and address for accuracy, and sign and return prior to shipment.

Will my order take longer to review? – Government-rated orders and orders for critical safety systems

Unique terms, often found with government-rated orders, will be reviewed on a case by case basis require additional time for review. If your order falls into this category please provide the PO as soon as possible for review. The Modal Shop, Inc. ("TMS") is not a cleared facility and is not authorized to receive or handle classified information. Accordingly, TMS takes exception to any clauses or provisions in any purchase order or in any terms and conditions governing the purchase order referring to or concerned with classified information.

Shipping

How long do rentals take to process and ship?

Depending on the product mix and amount of testing required, two to three days is typically requested to test and prepare items and international logistics for shipment. Large rentals and systems may take longer for testing.

What shipping methods are available?

Shipping costs are not included in rental fees. Select any UPS, FedEx, or equivalent options for delivery. Provide an account number to bill, or charges are added to the invoice or credit card bill.

Where should I return my TMS rental products?

Rental returns can be shipped in original containers to The Modal Shop, 10310 Aerohub Boulevard, Cincinnati, OH 45215 USA. Products are tracked by serial/ID numbers, and shipments can be marked attn: Rental Return.

Application Support

Is on-site help available to me during my test?

The Modal Shop offers consulting services for some tests. Please contact us for details.

Equipment Calibration

Will the units arrive calibrated?

Yes, with NIST-traceable calibration certificates where applicable. The Modal Shop has internal calibration intervals of 1 year set for most test products. ANSI/ISO/IEC 17025:2000 makes clear that it is the responsibility of the end-user organization (in this case, the renter) to determine the appropriate calibration interval under the requirements of its own quality system. Per this, calibration certificates of rented equipment have "calibrated on" dates, but blank "calibration due" dates. Rentals ship with a customer-specific expected return date in mind - if equipment is expected out for 5 months, the last calibration date will be within the past 7 months. Calibration to additional standards (e.g. Z540 or specific FAA requirements) is available at an additional charge.

How often are rental units checked for functionality?

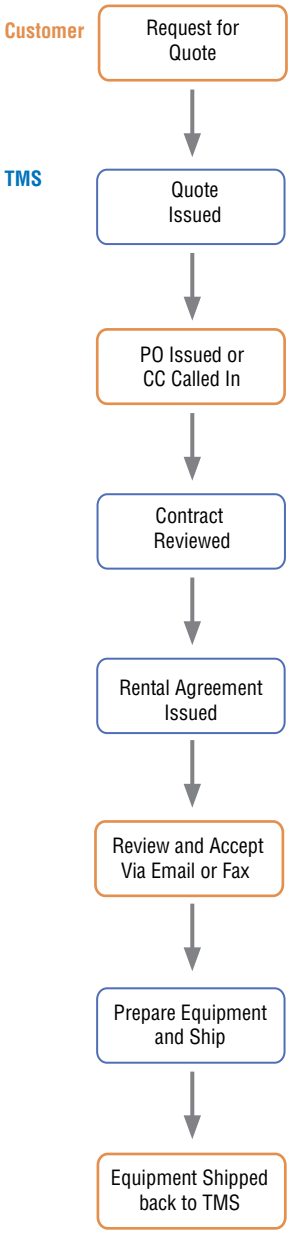
Rental products are functionally checked prior to each shipment and upon every rental return.

Miscellaneous

I have some unused PCB or Larson Davis items I am looking to sell. Are you interested in buying them?

Absolutely! Depending on the products, we are always looking to get items to buy utilized. Send us a list!

Rental Process Overview



Placing an Order

How do I place a rental order?

US customers can contact their direct field sales person or representative, or anyone in The Modal Shop Sales or Application Engineering Teams to have your request processed. Contact us at The Modal Shop: 10310 Aerohub Boulevard, Cincinnati, OH 45215 – Phone: 800.860.4867 or 513.351.9919 – Fax: 513.458.2172 – Email: rentalteam@modalshop.com. General sales requests can be made through sales@modalshop.com. International rentals may be placed with the appropriate international distributor.

Are there direct sales contacts in my area?

Yes! Please check The Modal Shop website for contacts of local direct sales employees, direct representatives and international distributors in your area.

Can items be reserved for rental?

Certain items may be reserved for testing, even months in advance. Typically these include large data acquisition or excitation systems, meters or analyzers used for consulting projects, large quantities of transducers or specialty transducers.

Is insurance available?

Our Incoterms are typically FCA: Cincinnati. Similar to a standard business purchase, the renter's responsibility begins when equipment leaves our dock via your choice of carrier and ends when we receive the equipment back at TMS. Often your business insurance will cover the product while you are responsible for it. Check your individual coverage with your insurance provider.

What else should I know about the rental process?

For each rental order placed, a Rental Agreement is sent (typically by email), along with the Terms and Conditions of our rental program. Please review the Rental Agreement carefully, as it details the shipping, billing and product information as understood by The Modal Shop (i.e., it indicates our order acceptance and confirmation). A signed Rental Agreement is required for the rental to ship, which indicates agreement with details listed and to our Terms and Conditions.

Rental Period

When does a rental period begin and end?

North American Rental Periods begin the calendar day after shipment and end the day everything is received at TMS/ Cincinnati. International Rentals Periods begin the date received and ends the date returned to TMS or TMS agent/ distribution.

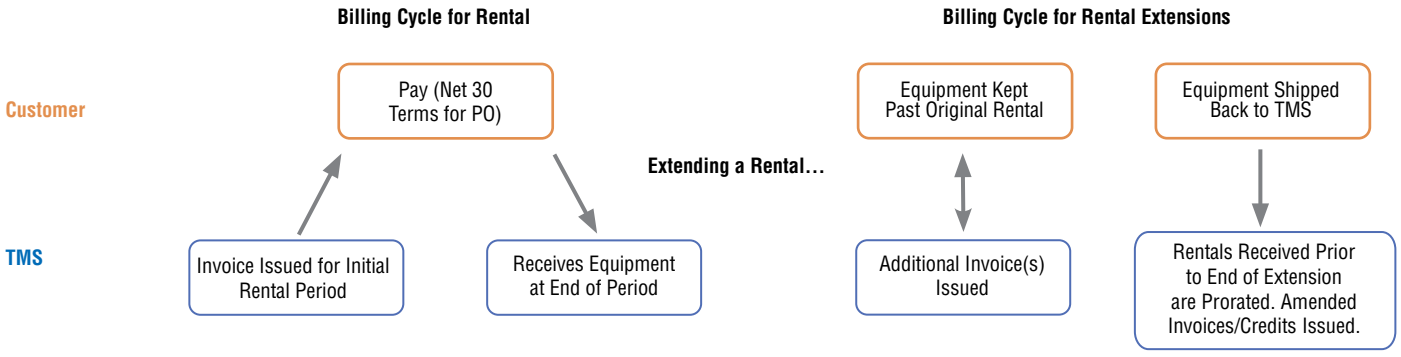
Are long-term rates available?

Depending on the product, certain long-term discounts may apply if the rental period is fixed from the rental start date.

I would like to extend my TMS rental – who do I need to contact?

You don't need to contact TMS to extend your rental, unless the rental had a fixed return date or a TMS representative has contacted you and requested a return. Invoices will be automatically sent each rental period for PO orders; credit card orders will be billed accordingly. Please ensure additional funds are added to the PO or send a new PO if necessary prior to extension date.

Rental Period	US and Canadian Customers	International Customers
	Begins calendar day after the equipment leaves TMS	Begins the date received
	Ends day equipment arrives back at TMS	Ends day equipment arrives back at TMS or TMS distributor



● ≥ 1000 g max ● 500 g max ● 50 g max ● 5 g and less

Uniaxial Accelerometers

Single Axis ICP® Accelerometers

ICP® is PCB Group's trademarked name for Integrated Electronic Piezoelectric (IEPE) sensors.

ICP stands for Integrated Circuit – Piezoelectric and is the industry standard. Some reasons why:

- Powers and transmits signal using standard coaxial two-wire cables, even over long lengths
- Minimizes possible noise contamination substantially, compared with charge mode sensors
- ICP® or equivalent signal conditioning often built into analyzers or can be rented (see Page 18)

Single direction, single axis units. Generally, start the selection with the maximum g amplitude range in mind. Next, verify other factors including temperature, range, mounting, and cable configuration. For multi-axis testing, consider a triaxial unit (Page 14-16) or use a triaxial mounting adaptor. Contact us for detailed selection assistance, or for unique requirements not shown.

TEDS Option

Units with TEDS option feature onboard digital memory. Model, serial, sensitivity, last calibration date and more are stored for use with TEDS-capable analyzers and conditioners. These units can be used with non-TEDS analyzers and operate as standard sensors. To find full specs on PCB.com, omit the T or TLD prefix.

Ground Isolated

Often the use of an anodized mounting base is required to help prevent ground loop problems and reduce electrical noise interference in required situations. These mounting bases are included where noted. Units with "J" prefix feature built-in ground isolation and are protected without the use of a base.

General Purpose

These units cover a wide range of tests ranging from vibration control to machine testing, and product qualification. Sensors detailed measure either ± 5 g to ± 500 g ranges, but piezoelectric accelerometers often measure an extremely high dynamic range and are perfectly suited for measurements of quite low vibration levels.


353B17


353B15
352C65


353B04
J353B04


353B18
352C68

General Purpose	Amplitude Range (± g pk)	Sensitivity (mV/g)	Frequency Range: (± 10% unless noted)	Resolution (g rms)	Mechanical Shock Limit (± g pk)	Temperature Range (°F)	Connector Type / Location	Cables compatible with sensor – To connect to BNC, use cable type	Sensor Mass (grams)	Mounting	Mounting Base included
352A60	500	10	5 - 60 000 [1]	0.002	5 000	-65 to +250	top 5-44	002P or 018C	6.0	10-32 s	-
TLD352C03	500	10	0.3 - 1 500	0.000 5	5 000	-65 to +250	side 10-32	002C or 098EBAC	5.8	10-32 t	080A
353B15	500	10	0.7 - 18 000	0.005	10 000	-65 to +250	side 5-44	002P or 018C	2.0	5-40 s	080A15
353B17	500	10	0.7 - 17 000	0.005	10 000	-65 to +250	integral cable⇨10-32 m	adaptor or cable [2]	1.7	5-40 s	080A15
353B18	500	10	0.7 - 18 000	0.005	10 000	-65 to +250	top 10-32	002C or 098EBAC	1.8	5-40 s	080A15
353B03	500	10	0.7 - 11000	0.003	10 000	-65 to +250	side 10-32	002C or 098EBAC	10.5	10-32 t	080A
353B04	500	10	0.7 - 11 000	0.003	10 000	-65 to +250	top 10-32	002C or 098EBAC	10.5	10-32 t	080A
J353B04	500	10	0.7 - 9 000	0.003	10 000	-65 to +250	top 10-32	002C or 098EBAC	10.5	10-32 t	080A
TLD352C33	50	100	0.3 - 15 000	0.000 15	5 000	-65 to +200	side 10-32	002C or 098EBAC	5.8	10-32 t	080A
JTLD352C33	50	100	0.3 - 15 000	0.000 15	5 000	-65 to +200	side 10-32	002C or 098EBAC	5.8	10-32 t	080A
JTLD352C34	50	100	0.3 - 15 000	0.000 15	5 000	-65 to +200	top 10-32	002C or 098EBAC	5.8	10-32 t	080A
352C65	50	100	0.3-12 000	0.000 16	5 000	-65 to +200	side 5-44	002P or 018C	2	5-40 s	080A15
352C68	50	100	0.3 - 12 000	0.000 16	5 000	-65 to +200	top 10-32	002C or 098EBAC	2	5-40 s	080A15
353B33	50	100	0.7 - 6 500	0.000 5	10 000	-65 to +250	side 10-32	002C or 098EBAC	27	10-32 t	080A12
352C33	50	100	0.3 - 15 000	0.000 15	5 000	-65 to +200	side 10-32	002C or 098EBAC	5.8	10-32 t	080A
JTLD352C33	50	100	0.3 - 15 000	0.000 6	5 000	-65 to +200	side 5-44	002P or 018C	1.8	adhesive	-
352B	5	1 000	1 - 15 000	0.000 08	1 000	-65 to +250	top 10-32	002C or 098EBAC	25	10-32 t	080A12

Shock

Designed to withstand and measure extreme high-level, short-duration transient accelerations, units also feature internal filtering for resonance suppression. Applications include metal-to-metal tests, impacts and armor testing, explosive studies, pile driver monitoring, and simulated pyroshock events. High-g shock calibration is included with rental of 350 Series units.


350D02
350B01


350C03
350C04


352B70

Shock	Amplitude Range (± g pk)	Sensitivity (mV/g)	Frequency Range: (± 3% unless noted)	Resolution (g rms)	Mechanical Shock Limit (± g pk)	Temperature Range (°F)	Connector Type / Location	Cables compatible with sensor – To connect to BNC, use cable type	Sensor Mass (grams)	Mounting	Mounting Base included
350B01	100 000	0.05	0.5 - 3 500 [1]	0.3	200 000	-65 to +200	integral cable⇨10-32 m	adaptor or cable [2]	4.4	1/4-28 s	-
350D02	50 000	0.1	2 - 25 000 [1]	0.5	150 000	0 to +150	integral cable⇨10-32 m	adaptor or cable [2]	4.5	1/4-28 s	-
350M90	25 000	0.1	2 - 25 000 [1]	0.5	150 000	-6 to +150	integral cable⇨10-32 m	adaptor or cable [2]	4.5	1/4-28 s	-
350C03	10 000	0.5	0.2 - 25 000 [1]	0.04	50 000	0 to +150	top 10-32	002C or 098EBAC	4.5	1/4-28 s	-
350C04	5 000	1	0.2 - 25 000 [1]	0.02	50 000	0 to +150	top 10-32	002C or 098EBAC	4.5	1/4-28 s	-
352B70	5 000	1	0.4 - 20 000 [1]	0.025	10 000	-65 to +250	top 10-32	002C or 098EBAC	4.3	10-32 t	080A04

°F -320 -65 0 150 200 250
°C -196 -54 -18 66 93 121

t: tapped hole
s: integral stud

1 – Frequency ranges specified to -3 dB for 350 series, 352B70, to ± 3 dB for 352A60, to ± 5% for 333 series.
2 – Sensor includes integral cable (generally 5 or 10 ft) that terminates in a 10-32 male connector. Can be used with scope input adaptor 070A02 to connect to BNC, or may be extended in length by using a combination of 070A05 10-32 feed through connector and joined with 002C or 098EBAC cable to terminate to BNC

○, and ⏚ – See Page 6 for notes on TEDS, and Ground Isolated options.

● ≥ 1000 g max ● 500 g max ● 50 g max ● 5 g and less

Uniaxial Accelerometers

Miniature

Lightweight units are ideal for high frequency testing with a small size and low mass. Applications include environmental testing, component qualification, structural testing, and operational behavior of lightweight or thin objects and fatigue testing.

⚠ When removing teardrop style sensors, it is essential to use the removal tool supplied along with an appropriate debonding agent.


352C23


352C22


352A24


352A21
352A25

Miniature	Amplitude Range (± g pk)	Sensitivity (mV/g)	Frequency Range: (± 10% unless noted)	Resolution (g rms)	Mechanical Shock Limit (± g pk)	Temperature Range (°F)	Connector Type / Location	Cables compatible with sensor – To connect to BNC, use cable type	Sensor Mass (grams)	Mounting	Mounting Base included
TLD352A57	2 000	2.5	0.3 - 15 000	0.001	5 000	-65 to +250	side 5-44	002P or 018C	1.3	adhesive	-
352A25	2 000	2.5	0.7 - 13 000	0.01	10 000	-65 to +250	side 3-56	030A10 included	0.6	adhesive	-
352A25/NC	2 000	2.5	0.7 - 13 000	0.01	10 000	-65 to +250	side 3-56	030A or 030C	0.6	adhesive	-
352A73	1 000	5	1.5 - 25 000	0.002	10 000	-65 to +250	side 10-32	002C or 098EBAC	0.3	adhesive	-
352C23 [3]	1 000	5	1.5 - 15 000	0.003	10 000	-65 to +250	side 3-56	030A10 included	0.2	adhesive	-
352C23/NC	1 000	5	1.5 - 15 000	0.003	10 000	-65 to +250	side 3-56	030A or 030C	0.2	adhesive	-
352C22 [3]	500	10	0.7 - 13 000	0.004	10 000	-65 to +250	side 3-56	030A10 included	0.5	adhesive	-
352C22/NC	500	10	0.7 - 13 000	0.004	10 000	-65 to +250	side 3-56	030A or 030C	0.5	adhesive	-
352A21	500	10	0.7 - 13 000	0.004	10 000	-65 to +250	side 3-56	030A10 included	0.6	adhesive	-
352A21/NC	500	10	0.7 - 13 000	0.004	10 000	-65 to +250	side 3-56	030A or 030C	0.6	adhesive	-
352A26	500	10	1.5 - 15 000	0.003	5 000	-65 to +250	side 3-56	030A or 030C	0.2	adhesive	-
352A26/NC	500	10	1.5 - 15 000	0.003	5 000	-65 to +250	side 3-56	030A or 030C	0.2	adhesive	-
352A24 [3]	50	100	0.8 - 10 000	0.000 2	5 000	-65 to +250	side 3-56	030A10 included	0.8	adhesive	-
352A24/NC	50	100	0.8 - 10 000	0.000 2	5 000	-65 to +250	side 3-56	030A or 030C	0.8	adhesive	-
352A75	50	100	1 - 10 000	0.000 2	5 000	-65 to +250	side 10-32	002C or 098EBAC	1.22	adhesive	-
352A74	50	100	0.8 - 10 000	0.000 2	5 000	-65 to +200	integral cable⇨10-32 m	adaptor or cable [2]	1.22	adhesive	-

Structural Test and Modal Analysis

Excellent phase characteristics and lightweight construction, ideal for structural vibration, multi-channel modal analysis, analytical model correlation, and force-response testing. Many units have TEDS functionality as an option, see information below. A wide range of structural test hardware is also available, including shakers and impact hammers, as well as large-channel cable management solutions.


TLD333B32


TLD333B50


333B and T333B
shown with socket/cable

Modal Array	Amplitude Range (± g pk)	Sensitivity (mV/g)	Frequency Range: (± 10% unless noted)	Resolution (g rms)	Mechanical Shock Limit (± g pk)	Temperature Range (°F)	Connector Type / Location	Cables compatible with sensor – To connect to BNC, use cable type	Sensor Mass (grams)	Mounting	Mounting Base included
TLD333B30	50	100	0.5 - 3 000 [1]	0.000 15	5 000	0 to +150	side 10-32	002C or 098EBAC	4	5-40 t	080A25
333B	50	100	2 - 1 000 [1]	0.000 07	3 500	0 to +150	base 3 pin	080Bxx (Page 11)	5.6	3-pin	-
T333B	50	100	2 - 1 000 [1]	0.000 07	3 500	0 to +150	base 3 pin	080Bxx (Page 11)	5.6	3-pin	-
TLD333B32	50	100	0.5 - 3 000 [1]	0.000 15	5 000	0 to +150	side 10-32	002C or 098EBAC	4	adhesive	-
TLD333B50	5	1 000	0.5 - 3 000 [1]	0.000 05	4 000	0 to +150	side 10-32	002C or 098EBAC	7.5	5-40 t	080A25
TLD333B52	5	1 000	0.5 - 3 000 [1]	0.000 05	4 000	0 to +150	side 10-32	002C or 098EBAC	7.5	adhesive	-
333B53	5	1 000	0.5 - 3 000 [1]	0.000 05	4 000	0 to +150	side 10-32	002C or 098EBAC	7.5	adhesive	-

High Temperature

Adjusted circuitry allows measurement of these units in temperatures to + 325 °F (163 °C) and are used with traditional ICP power systems. Slight low frequency and broadband resolution specifications may be affected. Testing above 325 °F? See Page 22, for charge mode accelerometers to measure at higher temperatures.


HT352A21


HT352C65

High Temp.	Amplitude Range (± g pk)	Sensitivity (mV/g)	Frequency Range: (± 10% unless noted)	Resolution (g rms)	Mechanical Shock Limit (± g pk)	Temperature Range (°F)	Connector Type / Location	Cables compatible with sensor – To connect to BNC, use cable type	Sensor Mass (grams)	Mounting	Mounting Base included
HT352A21	500	10	0.7 - 13 000	0.004	10 000	-65 to +325	side 3-56	030A10 included	0.6	adhesive	-
HT352A21/NC	500	10	0.7 - 13 000	0.004	10 000	-65 to +325	side 3-56	030A or 030C	0.2	adhesive	-
HT352C65	50	100	0.3-12 000	0.000 2	5 000	-65 to +250	side 5-44	002P or 018C	2	5-40 s	080A15

°F -320 -65 0 150 200 250
°C -196 -54 -18 66 93 121

t: tapped hole
s: integral stud

1 – Frequency ranges specified to -3 dB for 350 series, 352B70, to ± 3 dB for 352A60, to ± 5% for 333 series.
2 – Sensor includes integral cable (generally 5 or 10 ft) that terminates in a 10-32 male connector. Can be used with scope input adaptor 070A02 to connect to BNC, or may be extended in length by using a combination of 070A05 10-32 feed through connector and joined with 002C or 098EBAC cable to terminate to BNC
○, and ⏚ – See Page 6 for notes on TEDS, and Ground Isolated options.

≥ 1000 g max 500 g max 50 g max 5 g and less

Uniaxial Accelerometers, continued

Cryogenic

Cryogenic ICP® accelerometers are designed to operate at temperatures below the typical -65 °F (-54 °C) temperature limit of most voltage mode sensors. Specialized cryogenic circuitry and quartz sensing elements allow survivability in demanding environments.


351B14


351B41

Cryogenic	Amplitude Range (± g pk)	Sensitivity (mV/g)	Frequency Range: (± 10% unless noted)	Resolution (g rms)	Mechanical Shock Limit (± g pk)	Temperature Range (°F)	Connector Type / Location	Cables compatible with sensor – To connect to BNC, use cable type	Sensor Mass (grams)	Mounting	Mounting Base included
351B14	300	5	0.7 - 10 000	0.01	10 000	-320 to +250	top 10-32	002C or 098EBAC	1.8	5-40 s	-
J351B41	15	100	0.7 - 3 500	0.000 5	1 000	-320 to +250	side 10-32	002C or 098EBAC	28	10-32 t	-
351B41	15	100	0.7 - 3 500	0.000 5	1 000	-320 to +250	side 10-32	002C or 098EBAC	28	10-32 t	-

Environmental Stress Screening (ESS)

Environmental Stress Screening (ESS) is a general reliability testing term used to define the practice of exposing primarily electro-mechanical devices and delicate flight hardware to environmental stresses in an attempt to create failures and expose defects.


352A92
352A91


320C52


320C33

ESS	Amplitude Range (± g pk)	Sensitivity (mV/g)	Frequency Range: (± 10% unless noted)	Resolution (g rms)	Mechanical Shock Limit (± g pk)	Temperature Range (°F)	Connector Type / Location	Cables compatible with sensor – To connect to BNC, use cable type	Sensor Mass (grams)	Mounting	Mounting Base included
352A92	20 000	0.25	1 - 20 000	0.04	30 000	-65 to +325	side 10-32	002C or 098EBAC	0.16	adhesive	-
352A91	5 000	1	1 - 20 000	0.02	10 000	-65 to +325	side 10-32	002C or 098EBAC	0.17	adhesive	-
320C03	500	10	0.7 - 9 000	0.003	10 000	-100 to +325	side 10-32	002C or 098EBAC	10.5	10-32 f	-
320C04	500	10	0.7 - 9 000	0.003	10 000	-100 to +325	top 10-32	002C or 098EBAC	10.5	10-32 f	-
320C15	500	10	0.7 - 18 000	0.005	10 000	-100 to +325	side 5-44	002P or 018C	2	5-40 m	-
320C20	500	10	1.5 - 10 000	0.006	10 000	-100 to +325	top 10-32	002C or 098EBAC	6.5	10-32 m	-
320C52	500	10	0.6 - 15 000	0.004	5 000	-100 to +325	side 5-44	002P or 018C	1.85	thru-hole	-
320C33	50	100	0.7 - 6 000	0.000 3	2 000	-100 to +325	side 10-32	002C or 098EBAC	20	10-32 t	080A12

°F	-65	-50	0	150	176	180	200	250
°C	-54	-45	-18	65	80	82	93	121

Seismic/Low Frequency and Industrial Uniaxial Accelerometers

Seismic/Low Frequency

Ideal for bridges, civil structures, floor and foundation monitoring, optical instrument studies, semiconductor manufacturing, and construction and other site surveys for sensitive equipment. Low frequency certification is included with rental of 393 Series units (see Page 12).


393B04
393B05


393A03
393B12


393B31


393C

Seismic	Amplitude Range (± g pk)	Sensitivity (V/g)	Frequency Range: (± 3% unless noted)	Resolution (g rms)	Mechanical Shock Limit (± g pk)	Temperature Range (°F)	Connector Type / Location	Cables compatible with sensor – To connect to BNC, use cable type	Sensor Mass (grams)	Mounting	Mounting Stud included
393A03	5	1	0.2 - 6 000	0.000 01	5 000	-65 to +250	top MIL-C-5015	012E or 052BR	210	1/4-28	081B20
393B04	5	1	0.02 - 1 700	0.000 003	300	0 to +176	top 10-32	002C or 098EBAC	50	10-32	081B05
393C	2.5	1	0.01 - 1 200[1]	0.000 1	100 (!)	-65 to +200	side 10-32	002C or 098EBAC	885	10-32	081B05
393B05	0.5	10	0.2 - 1 700	0.000 004	300	0 to +176	top 10-32	002C or 098EBAC	50	10-32	081B05
393B12	0.5	10	0.05 - 4 000	0.000 008	5 000	-50 to +180	top MIL-C-5015	012E or 052BR	210	1/4-28	081B20
393B31	0.5	10	0.07 - 300[1]	**0.000 001**	**40 (!)**	0 to +150	top MIL-C-5015	012E or 052BR	635	1/4-28	081B20

°F	-65	-50	0	150	176	180	200	250
°C	-54	-45	-18	65	80	82	93	121

Notes for 393 Series sensor rentals:

- (!) The low mechanical shock limits of both the 393C and 393B31 require special handling during use and shipping
- Current traceable calibration for both standard (10 Hz-upper 5 %) and low frequencies (0.5 Hz-10 Hz) included
- In situ ± 1 g handheld calibration of 393B04 can be performed with model 394C06, for 393A03 use 699B02; for remainder of 393 sensors larger than 250-gram mass and/or less than ± 0.5 g maximum amplitude range, use calibrator model 9100D on Page 28
- Some units have triaxial mounting blocks available, rented separately. 393B04 and 393B05 use model 080B11, 393A03 and 393B12 use 080A57, 393C use 080M16, 393B31 use 080M189 (Page 11)

1 – Frequency ranges specified to ± 10% for 393B31.

O, and ⏚ – See Page 6 for notes on TEDS, and Ground Isolated options.

● 500 g max ● 50 g max ● 5 g and less

Seismic/Low Frequency and Industrial Uniaxial Accelerometers

Industrial

Ruggedized accelerometers from PCB's IMI Sensors feature stainless steel housings, typically a MIL-C-5015 connector and electrical case isolation to protect against electromagnetic interference, surface noise pickup and ground loop problems.


608A11/030AC
608M31


607A11


EX603C01


628F01


602D01


625B01

Industrial	Amplitude Range (± g pk)	Sensitivity (mV/g)	Frequency Range: (± 3% unless noted)	Resolution (g rms)	Mechanical Shock Limit (± g pk)	Temperature Range (°F)	Connector Type / Location	Cables compatible with sensor – To connect to BNC, use cable type	Sensor Mass (grams)	Mounting	Mounting Stud included
603C00	500	10	0.5 - 10 000	.002	5 000	-65 to +250	top MIL-C-5015	012E or 052BR	51	1/4-28 t	request
EX603C01	50	100	0.5 - 10 000	0.000 35	5 000	-65 to +250	top MIL-C-5015	012E or 052BR	51	1/4-28 t	request
628F01	50	100	0.33 - 12 000	0.001	5 000	-65 to +250	top MIL-C-5015	012E or 052BR	94	1/4-28 t	request
625B01	50	100	0.2 - 10 500	0.000 5	5 000	-65 to +250	side MIL-C-5015	012E or 052BR	145	1/4-28 s	request
602D01	50	100	0.5 - 8 000	0.000 35	5 000	-65 to +250	side MIL-C-5015	012E or 052BR	74	1/4-28 s	request
601A01	50	100	0.27 - 10 000	0.000 05	5 000	-65 to +250	top MIL-C-5015	012E or 052BR	80	1/4-28 t	request
601A02	10	500	0.17 - 10 000	0.000 035	5 000	-65 to +250	top MIL-C-5015	012E or 052BR	80	1/4-28 t	request
💧 608M31	250	20	0.5 - 10 000	0.001	5 000	-65 to +250	10 ft cable⇨pigtail	-	99.3	1/4-28 t	-
💧 608A11/030AC	50	100	0.5 - 10 000	0.000 35	5 000	-65 to +250	30 ft cable⇨pigtail	-	99.3	1/4-28 t	-
💧 607M03	100	50	0.43 - 10 000	0.000 75	5 000	-65 to +250	10 ft cable⇨pigtail	-	29	1/4-28 s	-
333D01	20	8.4% [1]	0.9 - 15 000	0.000 25	7 000	+14 to +158	integral 10 ft⇨USB	-	131	1/4-28 s	-

💧 – Submersible
1 – % fullscale value (FSV)/g. See Digiducer FAQ webpage for details.

°F -65 0 14 150 158 200 250
°C -54 -18 -10 66 70 93 121

t: tapped hole
s: integral stud

Specialty Use Accelerometers

Digital Piezoelectric

Digiducer Model 333D01 is the first fully integrated and ruggedized packaging of a high-resolution, broad-frequency piezoelectric accelerometer with integrated internal 24-bit DC digital output. Taking reliable, quality vibration measurements is as simple as recording audio input in a tablet or PC. See page 23 for more options.


333D01 Digiducer

High Temperature Accelerometers

Built-in electronics in typical ICP/IEPE sensors allow for many signal benefits, but generally limit sensor use to 250 °F or 325 °F. Charge mode sensors eliminate the built in electronics, and therefore can be used to higher temperatures, some up to 900 °F. See Pages 26 and 27.

DC Response Accelerometers

When analysis of very low frequency motion or constant acceleration is required, a DC accelerometer is necessary. Unlike piezoelectric accelerometers, DC sensors respond to 0 Hz and are, therefore often referred to as DC response sensors.


357B61
Charge Mode


357B14
Charge Mode


DC Low
Frequency Units

High Frequency Industrial Velocity Sensor

These piezoelectric sensors power with ICP like the acelerometers above but output a signal proportional to velocity for direct measurements on the plant floor.


VO622B01

	Amplitude Range (± in/s)	Sensitivity (mV/in/s)	Frequency Range (± 3 % unless noted)	Resolution (µin/s)	Mech. Shock Limit (± g pk)	Temperature Range (°F)	Connector Type/Location	Cables compatible with sensor – To connect to BNC, use cable type	Sensor Mass (grams)	Mounting	Mounting Base included with Rental
EXVO622B01	50	100	3 - 9 000	450	5 000	-65 to +250	top MIL-C-5015	012E or 052BR	94	1/4-28 t	-

Standard cables follow this example: model 003C03 is a 3-foot 003C (10-32 to BNC) series cable. Cable styles are described below.

Cable style:

002: White general purpose PTFE cable, -130 to 400 °F, 29 pF/ft capacitance, 1.9 mm diameter
003: Blue low-noise PTFE cable, -320 to 500 °F, 30 pF/ft capacitance, 2.01 mm diameter
012: Black RG58/U cable, -40 to 176 °F, 29 pF/ft capacitance, 4.9 mm diameter
018: Miniature, lightweight, black coaxial cable, -22 to 221 °F, 55 pF/ft capacitance, 1.37 mm diameter
030: Miniature, low-noise, blue coaxial PTFE cable, -130 to 500 °F, 30 pF/ft capacitance, 1.09 mm diameter
052: Black industrial polyurethane stranded conductor cable, -58 to 250 °F, 6.35 mm diameter
098: Green low noise flexible TFE stranded conductor cable, -130 to 500 °F, 2.06 mm diameter

Suggestions:

General Purpose: 098
Impact hammers, fixed microphones: 012
Industrial applications: 012 or 052
Ultra lightweight sensors: 030 or 018
Charge mode sensors: low noise cables
Strong or repetitive motion: stranded conductor cables

Standard Coaxial Cables for Sensor Connector to **BNC plug** *[AC]*

10-32 plug [EB] to BNC [AC]

ft.	002 Cable
3	002C03
5	002C05
10	002C10
20	002C20
30	002C30
50	002C50
100	002EB100AC

ft.	003 Cable
3	003C03
5	003C05
10	003C10
20	003C20
30	003C30
50	003C50
100	003EB100AC

ft.	098 Cable
3	098EB003AC
5	098EB005AC
10	098EB010AC
20	098EB020AC
30	098EB030AC
50	098EB050AC
100	098EB100AC

5-44 plug [AG] to BNC [AC]

ft.	003 Cable
3	003C03
5	003C05
10	003C10
20	003C20
30	003C30
50	003C50
100	003EB100AC

ft.	098 Cable
3	098AG003AC
5	098AG005AC
10	098AG010AC
20	098AG020AC
30	098AG030AC
50	098AG050AC

ft.	018 Cable
3	018C03
5	018C05
10	018C10
20	018C20
30	018C30

BNC plug [AC] to BNC [AC]

ft.	002 Cable
3	002T03
5	002T05
10	002T10
20	002T20
30	002T30
50	002AC050AC
100	002AC100AC

ft.	003 Cable
3	003D03
5	003D05
10	003D10
20	003D20
30	003D30
50	003AC050AC
100	003AC100AC

ft.	012 Cable
3	012A03
5	012A05
10	012A10
20	012A20
30	012A30
50	012A50
100	012AC100AC

ft.	098 Cable
5	098AC005AC
10	098AC010AC
20	098AC020AC
30	098AC030AC
50	098AC050AC

3-56 plug [EK] to BNC

ft.	030 Cable
5	030C05
10	030C10
20	030C20
30	030C30
50	030C50

2-socket MIL-C-5015 [AE] to BNC [AC]

ft.	012 Cable
5	012E05
10	012E10
20	012E20
30	012E30
50	012E50

ft.	052 Cable
5	052BR005AC
10	052BR010AC
20	052BR020AC
30	052BR030AC
50	052BR050AC

ft.	012 Cable
10	012R10

ft.	052 Cable
10	052AE010AC

ft.	012 Cable
100	012AE100AC

2-socket MIL-C-5015 [BR] to BNC [AC] with Drain Wire

ft.	508 Cable
10	508BR010AC
20	508BR020AC
30	508BR030AC
100	508BR100AC

Pigtail [AD] to BNC

ft.	002 Cable
10	002AC10AD
25	002AC25AD

Standard Coaxial Cables for Sensor Connector to **10-32 plug** *[EB]*

10-32 [EB] to 10-32 [EB]

ft.	002 Cable
10	002A10
20	002A20
30	002A30
50	002A50

ft.	003 Cable
3	003A03
10	003A10
20	003A20
30	003A30

ft.	098 Cable
10	098EB010EB
20	098EB020EB
30	098EB030EB

5-44 [EG] to 10-32 [EB]

ft.	003 Cable
10	003G10
20	003G20
30	003G30

ft.	098 Cable
10	098EG010EB
20	098EG020EB
30	098EG030EB

3-56 [EK] to 10-32 [EB]

ft.	030 Cable
10	030A10
20	030A20
30	030A30
50	030A50

Various Additional Coaxial Cables

ft.	Sensor Connector	Terminating Connector	Model
10	5-44 plug [AG]	10-32 plug [EB]	003G10
100	BNC jack [EB]	BNC plug [AC]	012AC100AB
200	BNC jack [EB]	BNC plug [AC]	012AC200AB
100	BNC jack [EB]	10-32 plug [EB]	003PH100AC

ft.	Sensor Connector	Terminating Connector	Model
10	SMB plug [FW]	BNC plug [AC]	003V10
7	BNC jack [EB]	SMB plug [FW]	002AB007FW
6	Pigtail [AD]	SMB plug [FW]	002FW006AD
10	Pigtail [AD]	BNC plug [AC]	002AC010AD

ft.	Sensor Connector	Terminating Connector	Model
25	Pigtail [AD]	BNC plug [AC]	002AC025AD
10	2-pin MIL	Pigtail [AD]	052BR010AD
20	2-pin MIL	Pigtail [AD]	052BR020AD
10	10-32 hex [AH]	BNC plug (AC)	002AH010AC

Cable Adaptors and Connectivity Accessories

070A02
Scope input adaptor, 10-32 jack to BNC plug

070A03
Connector adaptor, 10-32 plug to BNC jack

070A05
Cable feed-through connector, 10-32 jack to 10-32 jack

070A08
Cable adaptor, 10-32 jack to BNC jack

070A11
BNC 'T' connector, 2 BNC jacks, 1 BNC plug

070A12
Coupler, BNC jack to BNC jack

Mounting Accessories

Triaxial and Uniaxial Mounting Accessories

Adhesive mounting bases (and mating studs) are included with rental as shown in the accelerometer selection tables. For metric studs or additional items not shown, see below or inquire.

Adaptor Stud

081A90 5-40 to 10-32
081A08 10-32 to ¼-28
Metric available upon request

Mounting Stud

081A27 5-40 to 5-40
081B05 10-32 to 10-32 with shoulder
081B20 ¼-28 to ¼-28 with shoulder
081A40 ¼-28 x 0.438"
Metric available upon request

Mounting Stud Adaptors

TMSA6205 5-40 internal thread, 10-32 external
TMSA6264 10-32 internal thread, ¼-28 external

Adaptor Plate

080A149 5-40 f to 10-32 m
9155-MNT05 5-40 f to ¼-28 m
9155-MNT06 10-32 f to ¼-28 m
9155-MNT07 adhesive to ¼-28 m

Petro Wax

080A109 Petro Wax,
Petro wax provides a simple mounting method for many applications; ideal for temperatures below 160 °F / 70 °C, lower level (± 20 g and less for lightweight accelerometers under 40 grams) and lower frequency applications. One square, 1" x 1" x 0.25"

Quick Bond Gel

080A90 Quick Bond
Cyanoacrylate-based mounting methods offer an ideal mounting method for lightweight accelerometers (under 20 grams). A fast room temperature cure time coupled with both a wide useable frequency and temperature range makes this option very popular. Be sure to use a debonder such as Acetone and wait a few minutes when removing the sensor.

Triaxial Block for Array Accelerometer

080B55
Triaxial mounting block, outside mount. Used with 333B and T333B.

Removal Tool for Mini Accels

039 Series
Avoid sensor damage by using tool and applying shear force: one supplied for each model of applicable sensor rented. *Additional units available upon request*

039A27 for 352C22, 352A21, HT352A21, 352A25
039A26 for 352C23
039A28 for 352A24
039A07 for 740B02

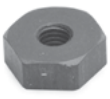
Petro Wax

080A24 Petro Wax,
Petro wax provides a simple mounting method for many applications; ideal for temperatures below 160 °F / 70 °C, lower level (± 20 g and less for lightweight accelerometers under 40 grams) and lower frequency applications. Four squares, 1" x 1" x 0.25"

Mounting Clips

Mounting clips can be attached to a test structure with double-sided tape or adhesive. Once installed, accelerometers are snapped into the clips. These units offer easy installation but limit the measureable frequency range and upper temperature for testing, see specifications. Typical grease mount frequency limit: 2 kHz (± 5 %), dry mount limit: 1 kHz (± 10 %). *Note that the clips have a 125 °F (52 °C) continuous and 175 °F (79 °C) short-term spec.*

Model	Size	Compatible with	Model
080A237	0.4"	356B21, 356A4X Series	080A172
	0.45"	356A32	080A173
080B160	0.55"	356A02, 356A14, 356A15	080A160



Hardcoat Aluminium Adhesive Mounting Base

5-40 Thread

Model	Hex Size	Thickness
080A15	5/16"	0.125"
080A25	1/2"	0.125"
080A145	3/4"	0.2"

10-32 Thread

Model	Hex Size	Thickness
080A04	3/8"	0.2"
080A	1/2"	0.187"
080A12	3/4"	0.2"
080A68	7/8"	0.2"

1/4-28 Thread

Model	Hex Size	Thickness
080M217	5/16"	0.125"
080A13	3/4"	0.2"

Style "A"

Style "B"

Style "C"

Triaxial Mounting Adaptors

Model	Dimensions	Mass	Material	Mounting via	Accel. Fasteners	Max. Hex	Style
080B16	0.37 in Cube		Anodized Aluminium	10-32 Thread	5-40 Thread	5/16 in	A
080A180	1.00 in Cube		Titanium	10-32 Screws	1/4-28 Thread	7/8 in	C
080B11	1.24 in Cube		Anodized Aluminium	10-32 Screws	10-32 Screws	7/8 in	B
080A57	1.00 in Cube		Stainless Steel	10-32 Screws	1/4-28 Screws	1-1/4 in	B

Model	Dimensions	Mass	Material	Mounting via	Accel. Fasteners	Notes
080A194	0.28 in Cube		Anodized Aluminium	Adhesive	Adhesive	For Teardrop Accels.
080A208	1.01 in Cube		Anodized Aluminium	6-32 Screws	4-40 Screws	Use with series 3711
080M189	1.24 in Cube	615 gram	Stainless Steel	10-32 Screws	1/4-28 Screws	Use with 393B31

Accelerometer Magnetic Mounting Bases

⚠ Use caution when using magnetic mounting bases, as the installation force can cause excessive shock and damage the sensor. Install the magnet base to the test object on the edge and "roll" the assembly gently into position, or install the magnet base to the test object first and then attach the sensor.

Flat Surface

080A30
2.5 lbf (11 N) pull,
⅜" hex, 5-40 thread,
0.23" (5.8 mm) thick
(for 2-gram or less sensors)

080A27
12 lbf (54 N) pull,
¾" hex, 10-32 stud,
0.27" (6.7 mm) thick

080A120
15 lbf (67 N) pull, 0.75" diameter,
0.43" (10.92 mm) thick,
¼-28 thread (shown with stud, ordered separately)

080A121
35 lbf (156 N) pull, 1" diameter,
0.53" (13.5 mm) thick,
¼-28 thread (shown with stud,
ordered separately)

080A122
50 lbf (222 N) pull, 1.5" diameter,
0.62" (15.2 mm) thick, ¼-28
thread (shown with stud, ordered
separately)

080A179
12 lbf (54 N) pull,
¾" hex, 10-32 threaded,
0.4" (10.16 mm) thick

Curved Surface

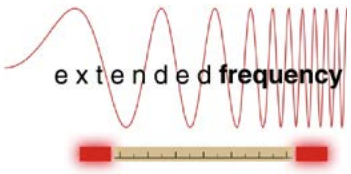
080A130
15 lbf (68 N) pull, 0.75"
diameter, 0.72" (18 mm) thick,
¼-28 thread (shown with stud,
ordered separately)

080A131
35 lbf (156 N) pull, 1.0" diameter,
1.02" (25.9 mm) thick,
¼-28 thread (shown with stud,
ordered separately)

080A132
55 lbf (225 N) pull, 1.5" diameter,
1.25" (32 mm) thick,
¼-28 thread (shown with stud,
ordered separately)

Frequently Requested Extras for Accelerometer Rentals

In addition to mounting bases, mounting studs, removal tools, and sometimes integral cables included as noted on accelerometer pages, the items below are the most requested optional add-ons to accelerometer rentals. Just ask if you have a special request!



Rental Rx Rental First Aid Kit. Includes no-charge incidental equipment to be used as needed, and returned with remainder of rental.
Murphy's Law can apply to even the best laid plans. A coaxial cable end may fail, or the cable may be a victim to rotating machines or an equipment cart. Or a small mounting base or stud falls into a machine, never to be seen again. Include part number "Rental Rx" when requesting a quote or order and get a no-charge bag of additional items (duplicate cables, bases, mounting studs and more) that may come in handy during testing. If cable failure occurs, please note the cable number (each have a unique ID) and include details of failure with the rental return. Certain items, such as mounting bases and studs, are also included. Use these items if the original items are inadvertently lost or additional are needed. Items not returned will be charged at list.

TMS WP Options for testing in wet, moist or dusty environments.
Using a hermetically sealed sensor where dust, moisture and water may be a concern – even fully submersible – can be achieved. For sensors with a 1/4-28 4-socket plug, various options are available with the 034W and 098W cables on Page XXX, including IP68 rating to a 1m depth for 4 hours. Need additional protection? Some sensor/cable junctions may be eligible for TMS WP which the TMS team will attach and seal a to the sensor's electrical connector with o-rings and heat-shrink tubing. This process offers even more protection and permits short-term underwater use.

Calibration *Although some sensors including the 393-series Seismic line are provided with low-frequency calibrations, most rental single and triaxial sensors include calibration from 10 Hz to upper 10 % of the frequency limit of the axis. NIST-traceable low-frequency calibration is available for any standard sensor at an additional charge. High frequency calibration is also available.*

Standard cables follow this example: model 010G05 is a 5-foot 010G (1/4-28 4 pin to (3) BNC Breakout) series cable. Cable styles are described below.

Cable style:

- 010: Blue general purpose FEP, -130 °F to 392 °F, 16 pF/ft, 2.54 mm diameter, 1-inch bend radius
- 019: Blue flexible lightweight Silicone, -76 °F to 500 °F, 15 pF/ft, 1.77 mm diameter, 1-inch bend radius
- 034: Blue general purpose low-noise FEP, -130 °F to 392 °F, 14 pF/ft, 1.96 mm diameter, 1-inch bend radius
- 036: Blue flexible Silicone, -76 °F to 392 °F, 15 pF/ft, 2.64 mm diameter, 1-inch bend radius
- 078: Blue rugged and flexible Polyurethane, -158 °F to 185 °F, 14 pF/ft, 3.02 mm diameter, 1-inch bend radius

	8-36 mini plug *[EH]*	Standard 1/4-28 microtech plug *[AY]*	IP68-rated 1/4-28 microtech plug* *[RB]*
			 *Use when water, moisture or dust is a concern, can even be submersible in water for short periods*
Pigtail *[DZ]* 		010P Series: 10 ft, 20 ft, 30 ft, 50 ft 034A Series: 5 ft, 50 ft	
BNC breakout *[JW]* 	034K Series: 10 ft, 20 ft, 30 ft, 50 ft 019B Series: 5 ft, 10 ft, 20 ft 034M21/030: 30 ft	010G Series: 5 ft, 10 ft, 15 ft, 20 ft, 25 ft, 30 ft, 50 ft 034G Series: 5 ft, 10 ft, 20 ft, 30 ft, 50 ft 034M22/030: 30 ft 078G Series: 10 ft, 20 ft, 30 ft, 50 ft 034M22: 20 ft 036G Series: 5 ft, 10 ft, 20 ft 036M Series: 20 ft, 30 ft	034W Series: 10 ft, 20 ft, 30 ft, 50 ft 078W Series: 10 ft, 20 ft, 30 ft, 50 ft
BNC shield grounded *[NF]* 		010T Series: 10 ft, 20 ft, 30 ft 034T Series: 10 ft, 20 ft, 30 ft	
10-32 breakout *[JY]* 	034H Series: 10 ft, 20 ft, 30 ft, 50 ft	034F Series: 10 ft, 20 ft, 30 ft, 50 ft	
1/4-28 microtech jack *[CA]* 	034EH050CA: 50 ft	010AY020CA: 20 ft 010AY035CA: 35 ft 010AY050CA: 50 ft 010AY100CA: 100 ft 078AY050CA: 50 ft 078AY100CA: 100 ft	
LEMO (9-pin) 	034M59-0002: 3 m (9.8 ft)	010M136/M003: 3 m (9.8 ft) 010M136/020: 20 ft *Connect standard triaxial accelerometers with one cable to a 9-pin LEMO input connector with pinout matched for Siemens PLM Simcenter SCADAS V-24 cards or SCADAS XS, Mueller BBM PAK modules with a 9-pin LEMO input including ICP42 G2 and more.*	
1/4-28 microtech plug *[AY]* 		010D Series: 5 ft, 10 ft, 20 ft, 25 ft, 30 ft, 50 ft	

● ≥ 1000 g max ● 500 g max ● 50 g max ● 5 g and less

Triaxial ICP® Accelerometers

Triaxial accelerometers are designed with three orthogonal sensing elements to enable simultaneous multi-axis measurements (x-, y-, and z-axis). Smaller units minimize mass loading effects and permit installation into confined areas. A unit with a tapped hole in its base may be secured with a screw passing through the object under test to aid in axis alignment, or may be stud-mounted to a separate adhesive mounting base.

Typically, ICP® types are preferred due to their ease of use, however, when temperatures exceed the limits established by their built-in electronics, then a charge output unit is recommended. These units typically feature a 4-pin electrical connector (for a single cable hook-up) or an integral 4-conductor cable.

General Purpose

This range of hermetically sealed 10.5 gram titanium triaxial accelerometers is our most popular style and covers a wide range of uses. Applications vary widely and include general vibration testing, motor and pump monitoring, design studies, and vibration control. Many units are available with optional TEDS (Transducer Electronic Datasheet) built in to simplify test setup with a TEDS-capable DAQ system.

10.5 gram sensors
Titanium

TLD356A16
Aluminum

354C02

General Purpose	Amplitude Range (± g pk)	Sensitivity (mV/g)	Frequency Range: (± 10% unless noted)	Resolution (g rms)	Mechanical Shock Limit (± g pk)	Temperature Range (°F)	Connector Type / Location	Cables compatible with sensor – To connect to BNC, use cable type	Sensor Mass (grams)	Mounting	Mounting Base included
354C02	500	10	0.3 – 4 000	0.000 5	5 000	-65 to +250	side 1/4-28 4-pin	010G, 034G, or 078G	15.5	thru-hole	-
356A02	500	10	0.5 – 6 000	0.000 5	7 000	-65 to +250	side 1/4-28 4-pin	010G, 034G, or 078G	10.5	10-32	080A12
○ TLD356A02	500	10	0.5 – 6 000	0.000 5	7 000	-65 to +250	side 1/4-28 4-pin	010G, 034G, or 078G	10.5	10-32	080A12
356A33	500	10	2 – 7 000 [2]	0.004	10 000	-65 to +250	side 1/4-28 4-pin	010G, 034G, or 078G	5.3	5-40	-
356A25	200	25	0.5 – 6 500	0.000 2	7 000	-65 to +250	side 1/4-28 4-pin	010G, 034G, or 078G	10.5	10-32	080A12
○ TLD356A26	100	50	0.7 – 6 500	0.000 2	7 000	-65 to +250	side 1/4-28 4-pin	010G, 034G, or 078G	10.5	10-32	080A12
○ TLD356A14	50	100	0.3 – 6 000	0.000 1	7 000	-65 to +176	side 1/4-28 4-pin	010G, 034G, or 078G	10.5	10-32	080A12
○ TLD356A15	50	100	1.4 – 6 500	0.000 2	7 000	-65 to +250	side 1/4-28 4-pin	010G, 034G, or 078G	10.5	10-32	080A12
○ TLD356A16	50	100	0.3 – 6 000	0.000 1	7 000	-65 to +250	side 1/4-28 4-pin	010G, 034G, or 078G	7.4	10-32	080A12
356A15	50	100	1.4 – 6 500	0.000 2	7 000	-65 to +250	side 1/4-28 4-pin	010G, 034G, or 078G	10.5	10-32	080A12
356A17	10	500	0.4 - 4 000	0.000 06	5 000	-65 to +176	side 1/4-28 4-pin	010G, 034G, or 078G	9.3	5-40	-

Ultra Miniature

Smaller, low mass accelerometers minimize mass loading effects and permit installation into confined areas.

356A01

353A13

356A06

Ultra Miniature	Amplitude Range (± g pk)	Sensitivity (mV/g)	Frequency Range: (± 10% unless noted)	Resolution (g rms)	Mechanical Shock Limit (± g pk)	Temperature Range (°F)	Connector Type / Location	Cables compatible with sensor – To connect to BNC, use cable type	Sensor Mass (grams)	Mounting	Mounting Base included
356A05	20 000	1	1 – 10 000	0.02	10 000	-65 to +325	cable⇨1/4-28 4-pin	010G, 034G, or 078G	0.8	adhesive	-
▲ 356A05/NC	20 000	1	1 – 10 000	0.02	10 000	-65 to +325	cable⇨1/4-28 4-pin	010G, 034G, or 078G	0.8	adhesive	-
356A04	5 000	1	1 – 10 000	0.02	10 000	-65 to +325	cable⇨1/4-28 4-pin	010G, 034G, or 078G	0.8	adhesive	-
▲ 356A04/NC	5 000	1	1 – 10 000	0.02	10 000	-65 to +325	cable⇨1/4-28 4-pin	010G, 034G, or 078G	0.8	adhesive	-
356A13	1 000	5	2 – 8 000 [2]	0.003	10 000	-65 to +250	cable⇨1/4-28 4-pin	010G, 034G, or 078G	1	adhesive	-
▲ 356A13/NC	1 000	5	2 – 8 000 [2]	0.003	10 000	-65 to +250	cable⇨1/4-28 4-pin	010G, 034G, or 078G	1	adhesive	-
356A01	1 000	5	2 – 8 000 [2]	0.003	10 000	-65 to +250	cable⇨1/4-28 4-pin	010G, 034G, or 078G	1	adhesive	-
▲ 356A01/NC	1 000	5	2 – 8 000 [2]	0.003	10 000	-65 to +250	cable⇨1/4-28 4-pin	010G, 034G, or 078G	1	adhesive	-
356A06	1 000	5	2 – 8 000 [2]	0.003	10 000	-65 to +250	side 8-36 4-pin	034K	1	adhesive	-
▲ 356A06/NC	1 000	5	2 – 8 000 [2]	0.003	10 000	-65 to +250	side 8-36 4-pin	034K	1	adhesive	-
356A09	500	10	2 – 8 000 [2]	0.003	5 000	-65 to +250	side 8-36 4-pin	034K	1	adhesive	-
▲ 356A09/NC	500	10	2 – 8 000 [2]	0.003	5 000	-65 to +250	side 8-36 4-pin	034K	1	adhesive	-
356A03	500	10	2 – 8 000 [2]	0.003	5 000	-65 to +250	cable⇨1/4-28 4-pin	010G, 034G, or 078G	1	adhesive	-
▲ 356A03/NC	500	10	2 – 8 000 [2]	0.003	5 000	-65 to +250	cable⇨1/4- 28 4-pin	010G, 034G, or 078G	1	adhesive	-
• TLD356A03/NC	500	10	2 – 8 000 [2]	0.003	5 000	-65 to +250	cable⇨1/4- 28 4-pin	010G, 034G, or 078G	1	adhesive	-

°F	-65	-20	0	14	122	150	170	176	250	325	356
°C	-54	-29	-18	-10	50	66	77	80	121	163	180

● ≥ 1000 g max ● 500 g max ● 50 g max ● 5 g and less

Triaxial ICP® Accelerometers

Miniature

Lightweight ceramic shear design, titanium cased hermetically sealed units that minimize effects of mass loading. Some units available with TEDS (Transducer Electronic Data Sheet) and high temperature options.


4 gram sensors


5-7 gram sensors


J356A44
J356A45


4.2 gram sensors

Miniature	Amplitude Range (± g pk)	Sensitivity (mV/g)	Frequency Range: (± 10% unless noted)	Resolution (g rms)	Mechanical Shock Limit (± g pk)	Temperature Range (°F)	Connector Type / Location	Cables compatible with sensor – To connect to BNC, use cable type	Sensor Mass (grams)	Mounting	Mounting Base included
356B20	5 000	1	2 – 10 000 [2]	0.03	7 000	-65 to +250	side 8-36 4-pin	034K	4	5-40	080A
▲ 356B20/NC	5 000	1	2 – 10 000 [2]	0.03	7 000	-65 to +250	side 8-36 4-pin	034K	4	5-40	080A
⏚ ○ J356A43	500	10	0.3 – 10 000 [2]	0.000 8	5 000	-65 to +250	side 1/4-28 4-pin	010G, 034G, or 078G	4.2	adhesive	-
356B21	500	10	2 – 10 000 [2]	0.004	10 000	-65 to +250	side 8-36 4-pin	034K	4	5-40	080A
▲ 356B21/NC	500	10	2 – 10 000 [2]	0.004	10 000	-65 to +250	side 8-36 4-pin	034K	4	5-40	080A
▲ 356A19/NC	500	10	0.6 – 15 000	0.006	10 000	-65 to +250	side 1/4-28 4-pin	010G, 034G, or 078G	4	5-40	080A
○ 356A43	500	10	0.4 – 10 000	0.000 8	5 000	-65 to +250	side 1/4-28 4-pin	010G, 034G, or 078G	4.2	adhesive	-
⏚ ○ J356A44	100	50	0.4 – 10 000	0.000 6	5 000	-65 to +250	side 1/4-28 4-pin	010G, 034G, or 078G	5.7	adhesive	-
⏚ ○ J356A45	100	50	0.4 – 10 000	0.000 5	5 000	-65 to +185	side 1/4-28 4-pin	010G, 034G, or 078G	5.7	adhesive	-
○ 356A45	50	100	0.4 – 10 000	0.000 5	5 000	-65 to +250	side 1/4-28 4-pin	010G, 034G, or 078G	4.2	adhesive	-
356A32	50	100	0.7 – 5 000	0.000 3	5 000	-65 to +250	side 8-36 4-pin	034K	5.4	5-40	080A
▲ 356A32/NC	50	100	0.7 – 5 000	0.000 3	5 000	-65 to +250	side 8-36 4-pin	034K	5.4	5-40	080A
○ TLD356A32	50	100	0.7 – 5 000	0.000 3	5 000	-65 to +250	side 8-36 4-pin	034K	6.4	adhesive	-
• TLD356A32/NC	50	100	0.7 – 5 000	0.000 3	5 000	-65 to +250	side 8-36 4-pin	034K	6.4	adhesive	-

High Temperature

Adjusted circuitry allows measurement of these units in temperatures to + 325 °F (163 °C) and are used with traditional ICP power systems. Slight low frequency and broadband resolution specifications may be affected. Testing above 325 °F? See Page 22, for charge mode accelerometers to measure at higher temperatures.


10.5 gram sensors


1 gram sensors


4 gram sensors

High Temperature	Amplitude Range (± g pk)	Sensitivity (mV/g)	Frequency Range: (± 10% unless noted)	Resolution (g rms)	Mechanical Shock Limit (± g pk)	Temperature Range (°F)	Connector Type / Location	Cables compatible with sensor – To connect to BNC, use cable type	Sensor Mass (grams)	Mounting	Mounting Base included
HT356B20	5 000	1	2 – 10 000 [2]	0.03	7 000	-65 to +250	side 8-36 4-pin	034K	4	5-40	080A
▲ HT356B20/NC	5 000	1	2 – 10 000 [2]	0.03	7 000	-65 to +250	side 8-36 4-pin	034K	4	5-40	080A
HT356B01	1 000	5	2 – 8 000 [2]	0.003	10 000	-65 to +356	cable⇨1/4-28 4-pin	010G, 034G, or 078G	1	adhesive	-
▲ HT356B01/NC	1 000	5	2 – 8 000 [2]	0.003	10 000	-65 to +356	cable⇨1/4-28 4-pin	010G, 034G, or 078G	1	adhesive	-
HT356B21	500	10	2 – 10 000 [2]	0.004	10 000	-65 to +325	side 8-36 4-pin	034K	4	5-40	080A
▲ HT356B21/NC	500	10	2 – 10 000 [2]	0.004	10 000	-65 to +325	side 8-36 4-pin	034K	4	5-40	080A
HT356A33	500	10	1.1 – 10 000 [2]	0.004	10 000	-65 to +325	side 1/4-28 4-pin	010G, 034G, or 078G	5.3	5-40	080A
○ HTTLD356A02	500	10	0.7 – 6 000	0.000 8	7 000	-65 to +325	side 1/4-28 4-pin	010G, 034G, or 078G	10.5	10-32	080A12
HT356A02	500	10	0.7 – 6 000	0.000 8	7 000	-65 to +325	side 1/4-28 4-pin	010G, 034G, or 078G	10.5	10-32	080A12
HT356A44	50	50	12 – 7 000	0.000 6	5 000	-65 to +200	side 1/4-28 4-pin	010G, 034G, or 078G	4.2	adhesive	-
○ HTTLD356A15	50	100	7 – 6 500	0.0005	7 000	-65 to +325	side 1/4-28 4-pin	010G, 034G, or 078G	10.5	10-32	080A12
HT356A15	50	100	7 – 6 500	0.0005	7 000	-65 to +325	side 1/4-28 4-pin	010G, 034G, or 078G	10.5	10-32	080A12

Shock / Filtered

Features built in low pass filtering designed to withstand and measure severe acceleration environments involving extreme high-level, short-duration transient accelerations.


62.5 gram sensors


350B50


27 gram sensors

Shock	Amplitude Range (± g pk)	Sensitivity (mV/g)	Frequency Range: (± 10% unless noted)	Resolution (g rms)	Mechanical Shock Limit (± g pk)	Temperature Range (°F)	Connector Type / Location	Cables compatible with sensor – To connect to BNC, use cable type	Sensor Mass (grams)	Mounting	Mounting Base included
350B42	50 000	0.1	4 – 10 000	0.5	150 000	-10 to +150	cable⇨1/4-28 4-pin	010G, 034G, or 078G	27	thru-hole	-
▲ 350B42/NC	50 000	0.1	4 – 10 000	0.5	150 000	-10 to +150	cable⇨1/4-28 4-pin	010G, 034G, or 078G	27	thru-hole	-
350B50	10 000	0.5	1.5 – 20 000 [1]	0.03	25 000	-65 to +250	cable⇨1/4-28 4-pin	010G, 034G, or 078G	8	thru-hole	080A197
▲ 350B50/NC	10 000	0.5	1.5 – 20 000 [1]	0.03	25 000	-65 to +250	cable⇨1/4-28 4-pin	010G, 034G, or 078G	8	thru-hole	080A197
350A43	10 000	0.5	0.2 – 20 000 [1]	0.04	50 000	0 to +150	cable⇨1/4-28 4-pin	010G, 034G, or 078G	62.5	thru-hole	-
▲ 350A43/NC	10 000	0.5	0.2 – 20 000 [1]	0.04	50 000	0 to +150	cable⇨1/4-28 4-pin	010G, 034G, or 078G	62.5	thru-hole	-
350B43	10 000	0.5	0.2 – 25 000 [1]	0.04	50 000	-10 to +150	cable⇨1/4-28 4-pin	010G, 034G, or 078G	27	thru-hole	-
▲ 350B43/NC	10 000	0.5	0.2 – 25 000 [1]	0.04	50 000	-10 to +150	cable⇨1/4-28 4-pin	010G, 034G, or 078G	27	thru-hole	-
356A67	500	10	0.5 – 3 000 [2]	0.000 5	7 000	-65 to +250	side 1/4-28 4-pin	010G, 034G, or 078G	10.5	10-32	080A12
356A63	500	10	2 – 4 000 [2]	0.008	10 000	-65 to +250	side 1/4-28 4-pin	010G, 034G, or 078G	5.3	5-40	080A
HT356A66	500	10	2 – 4 000 [2]	0.002	7 000	-65 to +325	side 1/4-28 4-pin	010G, 034G, or 078G	9	10-32	080A12

● ≥ 1000 g max ● 500 g max ● 50 g max ● 5 g and less

Triaxial ICP® Accelerometers

Case Isolated

Case isolated accelerometers ensure measurement accuracy in the presence of electrical noise sources, such as EMI and ground loops. They utilize ceramic sensing elements in a shear arrangement, offering high output and low noise for excellent signal to noise ratio.


354B04


354B05

Case Isolated	Amplitude Range (± g pk)	Sensitivity (mV/g)	Frequency Range: (± 5% unless noted)	Resolution (g rms)	Mechanical Shock Limit (± g pk)	Temperature Range (°F)	Connector Type / Location	Cables compatible with sensor – To connect to BNC, use cable type	Sensor Mass (grams)	Mounting	Mounting via
354B04	500	10	0.4 – 10 000 [1]	0.000 5	2 000	-65 to +325	cable⇨1/4-28 4-pin	010G, 034G, or 078G	14.5	thru-hole	6-32 SHCS
354B05	50	100	0.4 – 10 000 [1]	0.000 3	2 000	-65 to +325	cable⇨1/4-28 4-pin	010G, 034G, or 078G	14.5	thru-hole	6-32 SHCS

Structural Test / ODS / Modal

Suited for traditional experimental modal analysis or operational modal analysis, with tight phase specification vital for global parameter estimation. TEDS-enabled units help channel bookkeeping when used with compatible systems.


TLD356B18
356B18


TLD356M98

Modal Array	Amplitude Range (± g pk)	Sensitivity (mV/g)	Frequency Range: (± 10% unless noted)	Resolution (g rms)	Mechanical Shock Limit (± g pk)	Temperature Range (°F)	Connector Type / Location	Cables compatible with sensor – To connect to BNC, use cable type	Sensor Mass (grams)	Mounting	Mounting Base included
356B08	50	100	0.3 – 6 500	0.000 1	7 000	-65 to +170	side 1/4-28 4-pin	010G, 034G, or 078G	20	10-32	080A68
356B18	5	1 000	0.3 – 5 000	0.000 05	5 000	-20 to +170	side 1/4-28 4-pin	010G, 034G, or 078G	25	10-32	080A68
○ TLD356B18	5	1 000	0.3 – 5 000	0.000 05	5 000	-20 to +170	side 1/4-28 4-pin	010G, 034G, or 078G	25	10-32	080A68
⏚ TLD356M98	5	1 000	0.3 – 5 000	0.000 05	5 000	-20 to +170	side 1/4-28 4-pin	010G, 034G, or 078G	39	10-32	080A68

Human Vibration

Smaller, low mass accelerometers minimize mass loading effects and permit installation into confined areas.


356b41

Human Vibration	Amplitude Range (± g pk)	Sensitivity (mV/g)	Frequency Range: (± 10% unless noted)	Resolution (g rms)	Mechanical Shock Limit (± g pk)	Temperature Range (°F)	Connector Type / Location	Cables compatible with sensor – To connect to BNC, use cable type	Sensor Mass (grams)	Mounting	Mounting Base included
356B41	10	100	0.5 – 1 000 [1]	0.000 2	2 000	+14 to 122	cable⇨1/4-28 4-pin	010G, 034G, or 078G	272	contact	-
356B41/NC	10	100	0.5 – 1 000 [1]	0.000 2	2 000	+14 to 122	cable⇨1/4-28 4-pin	010G, 034G, or 078G	272	contact	-

°F -65 -20 0 122 150 170 250
°C -54 -29 -18 50 66 77 121

○ TEDS Option

Units with TEDS option feature onboard digital memory. Model, serial, sensitivity, last calibration date and more are stored for use with TEDS-capable analyzers and conditioners. These units can be used with non-TEDS analyzers and operate as standard sensors. To find full specs on PCB.com, omit the T or TLD prefix.

⏚ Ground Isolated

Often the use of an anodized mounting base is required to help prevent ground loop problems and reduce electrical noise interference in required situations. These mounting bases are included where noted. Units with "J" prefix feature built-in ground isolation and are protected without the use of a base.

▲ /NC Suffix

No cable option. Although the base model from PCB includes a cable, the NC option omits the cable to allow selection of length when rented separately.

Note: Cables are rented separately from rental sensors, to allow selection of length. See Page 13 for information.
1. 356B20, 356B21 and 356A33 family Y and Z axes specified to ± 5 %. X-axis specified from 2 - 7000 Hz at ± 5 %
2. 356A01, 356B01, 356A03, 356A06 and 356A09 family Y and Z axes specified to ± 5 %. X-axis 2-5000 Hz, ± 5 %
3. 356A04 and 356A05 family
4. 356A63 specified to ± 5 %
5. Noted 350 series triaxial sensor frequency ranges specified to -3 dB
6. 356B41 Seat Pad Accelerometer specified to ± 5 %, similar to Larson Davis' SEN027

3-Component Quartz Force Rings / Dynamic Triaxial Force Sensors and Force Limited Vibration Test Equipment

260 Series ICP

260 Series Charge Mode

261 Series ICP

261 Series Charge Mode

260 Series 3-Component Force Rings should be statically preloaded with the provided stud to provide friction to mating surface to transmit shear forces

261 Series 3-Component Force Links feature a force ring between two mounting plates and are already preloaded. These are ideal for impact testing and force plates.

Charge mode units have 3x 10-32 connectors and can be used to higher temperatures, and allow easy signal summing with for multiple force sensor array systems

ICP® voltage-mode units feature 1/4-28 4-pin connector and low impedance output allows simple connectivity and conditioning even in industrial environments and long cable runs without signal degradation.

Model	Configuration	Sensor Type	Measurement Range (lb [kN])		Low Frequency Response -5% (Hz)		Connector Jack Type	Used Primarily With Cable Type
			z-axis	x and y axes	z-axis	x and y axes		
260A01	Force Ring	ICP	1 000 [4.45]	500 [2.22]	0.01	0.001	1/4-28 4-pin	010G, 034G, or 078G
260A02	Force Ring	ICP	1 000 [4.45]	1 000 [4.45]	0.01	0.001	1/4-28 4-pin	
260A03	Force Ring	ICP	10 000 [44.5]	4 000 [17.7]	0.01	0.001	1/4-28 4-pin	
260A11	Force Ring	Charge	1 000 [4.45]	500 [2.22]	[*]	[*]	(3) 10-32 jacks	003G (ends in 10-32) 003C (ends in BNC)
260A31**	Force Ring	Charge*	1 000 [4.45]	500 [2.22]	[*]	[*]	(3) 10-32 jacks	
261A31**	Preloaded Link	Charge*	1 000 [4.45]	500 [2.22]	[*]	[*]	(3) 10-32 jacks	
260A12	Force Ring	Charge*	1 000 [4.45]	1 000 [4.45]	[*]	[*]	(3) 10-32 jacks	
260A13	Force Ring	Charge*	10 000 [44.5]	4 000 [17.7]	[*]	[*]	(3) 10-32 jacks	
261B01	Force Link	ICP	1 000 [4.45]	500 [2.22]	0.01	0.001	1/4-28 4-pin	010G, 034G, or 078G
261B02	Force Link	ICP	1 000 [4.45]	1 000 [4.45]	0.01	0.001	(3) 10-32 jacks	
261B03	Force Link	ICP	10 000 [44.5]	4 000 [17.7]	0.01	0.001	(3) 10-32 jacks	
261B11	Force Link	Charge*	1 000 [4.45]	500 [2.22]	[*]	[*]	(3) 10-32 jacks	003G (ends in 10-32) 003C (ends in BNC)
261B12	Force Link	Charge*	10 000 [44.5]	1 000 [4.45]	[*]	[*]	(3) 10-32 jacks	
261B13	Force Link	Charge*	1 000 [4.45]	4 000 [17.7]	[*]	[*]	(3) 10-32 jacks	

*-Measurement resolution and low-frequency response are dependent upon noise floor and discharge time constant of the signal conditioning and readout systems used. See Page 22 for in-line charge amplifier (converter) options.

**-Charge mode with reversed shear polarity.

Chassis / Power 443 and 070 modules below connect to a PCB 440 Series chassis. 441A39 9-slot: 441A101 1-slot AC power supply:

443B102 Dual Mode single channel amplifier For ICP® and charge output sensors. Able to be DC coupled to allow the preload of 260 series force sensors to be set during installation. Includes selectable gain, discharge time constant, and high and low pass filters. *Requires chassis with power supply.*

070M69 The Computational Signal Conditioner computes the difference and outputs up to four pairs of signals. Also provides an output summation of the differences. The unit can be used with voltage signals or supplies constant current excitation for ICP® sensors. 0.1x 1x 10x gain, eight BNC input, four BNC differenced outputs and one BNC summed difference output. *BNC summed difference output [(A-B) + (C-D) + (E-F) + (G-H)] × Gain, Differenced Output 4-Channel BNC: (A-B), (C-D), (E-F), (G-H).*

070M70 The Charge Summing Patch Panel allows the addition of up to eight charge inputs and sums them to provide one charge output. Eight BNC inputs, one BNC output. *Summed output (A + B + C + D + E + F + G + H).*

070A15 Charge Summing block, (4) 10-32 jack inputs to (1) BNC output. *For charge output sensors only. Used in cases e.g. measuring force over a large surface area using a plate with one force sensor under each corner. The force sensor signals may be summed via a 070A15 unit, and the resulting summed charge signal can be sent to a single charge amplifier.*

- Most Popular

Battery Powered ICP® Signal Conditioners

Battery powered signal conditioners provide a portable, convenient method for powering ICP®-compatible sensors and in-line charge converters. To use, connect a cable from the sensor to the input and a cable from the data acquisition system to the output. When power is turned on, a conditioned signal output is transmitted to the readout device. These units are powered with standard 9-volt alkaline batteries and provide an AC coupled output. Each unit features a color coded meter on the front panel that monitors sensor operation and detects cable faults.


480C02


480E09


480B21

Model	Manufacturer	Channel Count	Gain	Low Freq Response (-5 %)	High Freq Response) (-5 %)	Broadband Noise (µV rms)	Power	Input Type(s)	Output Type(s)	Mass (kg)	Notes
480C02	PCB	1	1x	0.05 Hz	500 kHz	3.25	(3) 9 V, 100 h	BNC	BNC	0.3	
480E09	PCB	1	1x 10x 100x	0.15 Hz	100 kHz	2	(3) 9 V, 40 h	BNC	BNC	0.34	General Purpose
480B21	PCB	3	1x 10x 100x	0.15 Hz	100 kHz	3.54	(3) 9 V, 25 h	4 pin microtech	BNC	0.5	
480M122	PCB	1	1x 10x 100x	0.15 Hz	100 kHz	3.25	(3) 9 V, 50 h	BNC	BNC	0.3	

482C Series 4-channel ICP® Signal Conditioners

482C series are 4-channel benchtop signal conditioners ranging from units with simple ICP® no gain operation to more complex units with options for gain, bridge/differential conditioning and powering charge-mode sensors. The 482C series models are DC powered, however, they are supplied with a universal AC power adaptor. All units except for the basic 482C05 and 482C15 include a computer interfaces and are supplied with PCB's Multi-Channel Signal Conditioner control software.


482C05 & 482C15


482C24 & 482C16

Model	Manufacturer	Channel Count	Gain	Low Freq Response (-5 %)	High Freq Response) (-5 %)	Broadband Noise (µV rms)	Power	Input Type(s)	Output Type(s)	Mass (kg)	Notes
482C05	PCB	4	1x	< 0.1 Hz	> 1 MHz	3.5	AC (DC avail)	BNC	BNC	0.57	
482C15	PCB	4	1x 10x 100x	0.05 Hz	100 kHz	21	AC (DC avail)	BNC	BNC	0.57	
482C24	PCB	4	0.1x–200x	0.05 Hz	50 kHz	50	AC (DC avail)	BNC	BNC	0.908	
482C16	PCB	4	0.1x–200x	0.05 Hz	> 50 kHz	50	AC	BNC	BNC	0.91	ICP and Voltage
482C27	PCB	4	0.1x–200x (ICP)[1]	0.05 Hz[1]	50 kHz	50	AC (DC avail)	BNC[1]	BNC	1.13	ICP, Bridge, Diff
482C54	PCB	4	0x–200x	0.05 Hz	> 75 Hz	50	AC	BNC	BNC	1.09	ICP, Charge, Voltage

1 – Mixed-mode conditioners that also powers Bridge/Differential mode sensors, specs are shown for ICP mode.

483C Series 8-channel ICP® Signal Conditioners

483C series are 8-channel rack mounted units which also are offered in a range from simple ICP no gain operation to more complex units with options for gain, bridge/differential conditioning and powering charge-mode sensors. These units are AC powered only. All units except for the basic 483C05 and 483C15 include a computer interfaces and are supplied with PCB's Multi-Channel Signal Conditioner control software for signal conditioner setup.


483C41


Other units

Model	Manufacturer	Channel Count	Gain	Low Freq Response (-5 %)	High Freq Response) (-5 %)	Broadband Noise (µV rms)	Power	Input Type(s)	Output Type(s)	Mass (kg)	Notes
483C05	PCB	4	1x	< 0.1 Hz	> 1 MHz	3.5	AC	BNC	BNC	0.57	
483C15	PCB	8	1x 10x 100x	< 0.05 Hz	> 17 kHz	5.6	AC	BNC	BNC	0.567	
483C28	PCB	8	0.1x–200x	0.05 (ICP)[1]	> 50 kHz	5.6	AC	BNC[1]	BNC	3.18	Also Bridge/ Differential
483C41	PCB	8	0.1x–200x	<0.05 Hz	> 80 kHz	5.6	AC	BNC	BNC	3.6	Also Voltage/ Charge

477A Series Low Pass Input Filter Chips for select 482C and 483C units

These robust filter chips can be installed in nearly all 482C and 483C unit except for basic unity gain (482C05 and 483C05) and those with selectable Low Pass Filtering included (483C41).

The 477A Series second-order Butterworth low pass (-12 dB/octave) filters are located at the front end of the signal path, before any gain has been applied. The Modal Shop typically installs these prior to rental shipment. Order in quantities based on channel count required. Filters can be mixed in any conditioner, please specify channel number with filter model if ordering a combination.

The low pass input filters are located at the front end of the signal path, before any gain has been applied. These Input Filters are PCB's 477A Series of plug-in filters. The standard models are second-order Butterworth low pass (-12 dB/octave) filters. Typical cutoff frequencies include:

Model	477M03	477A01	477A02	477A03	477A04	477A05	477A06	477A07	477A08	477A09	477A10
Filter Type Cutoff Frequency (-3 dB)	50 Hz	100 Hz	200 Hz	500 Hz	1 Hz	2 Hz	5 Hz	10 Hz	20 Hz	50 Hz	100 Hz

- Most Popular

485B39
2-channel, provides output direct to phone, tablet or PC

482A21
1-channel AC powered basic conditioner

482A22
4-channel AC powered basic conditioner

481A01
16-channel AC powered basic conditioner, 19" rack

Additional ICP® Signal Conditioning

Other than the newer 485B39 which both conditions and digitizes signals for lab-grade measurements anywhere, the rest of these are historic units for lab testing that provide conditioning for small or large channel measurements.

Model	Manufacturer	Channel Count	Gain	Low Freq Response (-5 %)	High Freq Response) (-5 %)	Broadband Noise (µV rms)	Power	Input Type(s)	Output Type(s)	Mass (kg)	Notes
482A21	PCB	1	1x	0.1 Hz	1000 kHz	3.25	DC	BNC	BNC	0.685	
485B39	PCB	2	adjustable	0.8 Hz	20.7	5	USB, 5 V at 100 mA	BNC	USB	0.125	Digital Signal Conditioner
482A22	PCB	4	1x	< 0.1 Hz	> 1MHz	3.25	AC	BNC	BNC	0.76	
481A01	PCB	16	1x	0.5 Hz	100 kHz	11	AC	BNC and DB 50-pin	BNC	6.8	Include front panel and computer control

What is ICP®?

ICP is an abbreviation of "integrated circuit piezoelectric", and is a registered trademark of PCB Group, Inc. – the parent company of The Modal Shop. Piezoelectric materials are used in various sensors to measure dynamic acceleration, force, pressure and strain. An ICP sensor includes built-in electronics (integrated circuit) that convert high-impedance charge signals generated by the piezoelectric sensing element into a low-impedance voltage signal suitable for input to a data acquisition system or recorder.

Why ICP®? What are the advantages?

Advantages of ICP systems include low mass, field robustness, and simplicity of cabling, which leads to lower overall system cost, and have made it the defacto industry standard. Low-impedance voltage outputs of an ICP transducer can be easily transmitted over ordinary two-wire or coaxial cables to any voltage readout or recording device. The output signal can be transmitted through long cables and used in a wide variety of environments with little signal degradation. ICP-based systems can also include other signal conditioning features, such as gain, filtering, and self-test features.

What are terms like IEPE and CCLD?

IEPE (integrated electronics piezoelectric) and CCLD (constant-current line-drive) are non-proprietary terms for ICP and completely compatible.

Does a sensor need to be a piezoelectric type to work with ICP® systems?

Not always. ICP-compatible interfaces for non-piezoelectric transducers are in common use. Common examples include microphones with preamplifiers including the popular PCB model 378B02 for precision acoustics, PCB 130F20 for array acoustics and The Modal Shop's LaserTach™ for rotational speed.

Do I always need an external ICP® Sensor Signal Conditioner with my system?

Maybe not. The ability to power and condition signals from ICP-compatible devices have been included in lab and field-based instruments for decades. Sound and vibration analyzers and digitizers from a wide range of manufacturers including HP, Agilent, VTI Instruments, Siemens PLM Software (formerly LMS International), National Instruments, Crystal Instruments, Data Physics, m+p international, Dactron, SKF, Rockwell/Entek, CSI, Bruel & Kjaer and many more. Check the specifications or manual of the particular instrument, and if possible check the instrument itself to make sure that the option is available.

How do I select the right ICP® Sensor Signal Conditioner?

Start by selecting the appropriate number of channels of course, keeping in mind that each triaxial sensor requires three separate channels of conditioning. Options are available for AC (line), DC, USB, and battery power. Most conditioners we rent are general enough for a variety of testing, but if your frequency or amplitudes are on the high or low end, make sure to verify the frequency and noise specifications. BNC connections are common, and a 50-pin connection is also offered for large-channel systems. Other options available include:

- Gain: Scale weak signals to maximize output. Available in fixed 10x and 100x selections, or programmable gain in various steps (e.g., 0.1 steps)
- Filter: Eliminate high frequency noise with a low-pass filter. Eighth order Elliptical filtering with over 500 cutoff frequency choices. Available on the 481A Bundle in rental. (PCB manufactures units with Butterworth filtering, inquire if interested)
- TEDS: Read and write transducer information with TEDS-enabled sensors. (More information on TEDS on Page 16)

Why do some ICP Sensor Signal Conditioners have adjustable current?

Current between 2 and 20 mA are available. The majority of sensors work with the minimum current, but some specialty units require additional current. Additionally, to extend life in battery powered situations and lower noise (best resolution), use lower current ranges. To drive long lengths of cables (to several thousand feet), adjust the current up to 20 mA maximum.

Mixed Mode Signal Conditioners

These units provide ICP Conditioning as well as various conditioning options for Bridge/Differential, power for Variable Capacitance DC sensors and Charge. More options exist for charge-mode piezoelectric sensors without internal electronics – see FAQ below.

478B05

482C16

Model	Manufacturer	Channel Count	Gain	Low Freq Response (-5 %)	High Freq Response) (-5 %)	Broadband Noise (µV rms)	Power	Input Type(s)	Output Type(s)	Mass (kg)	ICP	Bridge/ Diff	VC	Charge[2]
478A01	PCB	1	1x	DC	2 kHz	8	(3) 9 V, 20 hr	4 pin microtech	BNC	0.32			√	
478B05	PCB	3	1x	DC	2 kHz	30	AC	3x 4 pin microtech	BNC	0.91			√	
Model 136	Endevco	3	0x–1000x	DC	50 kHz	20	AC	9-Pin "D"	BNC	1.81		√	√	
482C27	PCB	4	0.1x–2000x[3]	0.05 Hz[3]	100 kHz	50	AC	8-socket DIN[3]	BNC	1.1	√	√	√	
483C28	PCB	8	0.1x–2000x[3]	0.05 Hz[3]	50 kHz	50	AC	8-socket DIN[3]	BNC	3.18	√	√	√	
443B102[1]	PCB	1	0.1x–1000	DC	200 kHz	3	AC	BNC	BNC	0.66	√			√
4418	Endevco	1	1x 10x 100x	25 kHz	50 KHz	20	Internal Lithium Ion	Binder 09-0416-00-05	BNC	0.38		√		

1 – Requires chassis to house and power signal conditioning module
2 – Additionally, PCB series 422E charge converteers can be used with any ICP conditioner to power charge mode sensors
3 – Mixed-mode conditioners that also power ICP mode sensors, specs are shown for Bridge/Differential mode.

How do I power a charge mode sensor?

Charge mode accelerometers do not require an external power source like ICP accelerometers. When mechanical stress is applied, a high impedance charge signal is generated from the piezoelectric sensing element. The high impedance signal requires conversion to a low impedance voltage signal prior to being analyzed by data acquisition or readout devices. The conversion can be done in two ways:

1. With a laboratory style charge amplifier.
2. With an in-line charge convertor (PCB Series 422E) and ICP power source.

Charge amplifiers typically include settings that allow for gain/range adjustment. Other options may include filtering, signal integration and time constant adjustment for low frequency measurements. In-line charge convertors have a fixed conversion factor (ie – 1 mV/pC or 10 mV/pC) and require power from an ICP signal conditioner.

What is DC offset?

Because MEMS accelerometers can measure static (constant) acceleration, the DC offset voltage will be affected by the positional alignment relative to the Earth's gravity. When the sensitive axis of the accelerometer is not aligned with gravity, the output will equal the zero-g offset voltage on the PCB calibration certificate. If the sensitive axis of the accelerometer is aligned with gravity, the output will be equal to the bias voltage plus 1g of output. Remember, to take advantage of the DC response of MEMS accelerometers, the readout device and conditioner (if used) must be in a DC coupled state.

Do I need a signal conditioner for a VC MEMS DC sensor (series 3711, 3713 and 3741)?

Depending on the type of MEMS sensor you may not need a specific signal conditioner to power the sensor. Since most PCB VC MEMS accelerometers contain a built-in voltage regulator, they may also be powered from any 6 to 30 VDC power source without adversely affecting performance, making them simple to use. PCB offers signal conditioner models 482C27 (4-channels) and 483C28 (8-channels) as VC MEMS power sources. Other acceptable power units include automotive or marine batteries, DC voltage laboratory supplies and low-voltage PC board voltage supplies. Consult individual model product manuals for additional powering details.

What signal conditioner do I need for a Piezoresistive MEMS sensor (series 3501, 3503, 3641, 3651 and 3991)?

PR MEMS sensors operate on a fully active Wheatstone bridge configuration. Because of this PR accelerometers should be powered with a regulated voltage source since sensitivity is proportional to excitation voltage. The recommendation is to use the excitation voltage listed on the calibration certificate to obtain the calibrated sensitivity value. PCB signal conditioner models 482C27 and 483C28 are commonly used to power piezoresistive MEMS sensors. PCB signal conditioner models 482C27 and 482C28 can be used to power piezoresistive MEMS sensors.

440 Module Signal Conditioner Cards

440 Module Signal Conditioner cards are used with the older 440 Series which require a chassis and power card. These traditionally are rented for users of existing 440 Series conditioning systems.

443B102

441A13 & 2 x 442A104

Model	Manufacturer	Channel Count	Gain	Low Freq Response (-5 %)	High Freq Response) (-5 %)	Broadband Noise (µV rms)	Power	Input Type(s)	Output Type(s)	Mass (kg)	Notes
443B102[2]	PCB	1	0.1x–1000x	0.2 Hz	200 kHz	3	AC	BNC	BNC	1.45	Requires 2 chassis slots. Charge and ICP
442A101[2]	PCB	1	1x 10x 100x	DC	100 kHz	9.11	AC	BNC	BNC	0.735	Requires 1 chassis slot
442A104[2]	PCB	4	1x 10x 100x	0.5 Hz	100 kHz	3.5	AC	BNC	BNC	0.89	Requires 1 chassis slot

1 – Includes options to provide either computer or front panel display and control, bundle includes continuous gain control, velocity and displacement output for up to two channels, programmable Elliptical low pass filter channels), selectable ICP or voltage inputs, BNC inputs/outputs.
2 – All specs for ICP usage. Some conditioners may support other sensors types as noted.

Angular and 6 DoF Inertial Sensors by Endevco

In typical dynamic measurements, both acceleration and angular rate data are essential parameters needed to fully characterize the complex behavior of a moving object. Until recently, engineers could only gather information using linear accelerometer, but the massive array of sensors required to collect rotational data can be impractical due to the expense and space required. With Endevco's angular rate and six degree of freedom (6 DoF) sensors, professionals in automotive and aircraft development are now able to easily measure linear and rotational dynamics that previously required multiple sensors much more space, and longer setup.

Model 7310A
Angular Rate

Model 7360A
600F Sensor

Model 7930
Triax & 6DOF mounting block

7310A-18K-120	Angular rate only sensor. Ranges of ±18000 deg/second. 10 ft cable to pigtail, requires 5–16 VDC power
7310A-8K-120	Angular rate only sensor. Ranges of ±8000 deg/second. 10 ft cable to pigtail, requires 5–16 VDC power 7310A-8K-240 20 ft cable
7310A-1K5-120	Angular rate only sensor. Ranges of ±1500 deg/second. 10 ft cable to pigtail, requires 5–16 VDC power
7310A-100-120	Angular rate only sensor. Ranges of ±100 deg/second. 10 ft cables to pigtail, requires 5–16 VDC power 7310A-100-300 30 ft cable
Series 7360A	6 DoF measurement sensor. Compact package with 2 cables. DC acceleration response with measurement ranges from ±2 to ±500 g and angular rate ranges from ±100 to ±18000 deg/second. Cables terminate in pigtail, requires 7–36 VDC power. Please call for available ranges and pricing.
7930	Triaxial and 6DOF mounting block for 7310 and 7264H

Additional Electronics

401B04	ICP® Sensor Simulator, use in place of an ICP® sensor to accept test signals from voltage sources including a voltage function generator. Used to connect voltage source into channel with fixed ICP conditioning or to verify signal conditioning settings, cable integrity, and tune long lines for optimum system performance. Requires ICP power.
401A05	Low-noise ICP® load, used for signal conditioner noise testing

High Temperature, Charge Output Accelerometers

Charge output accelerometers directly output an electrostatic charge signal proportional to acceleration. These sensors do not contain built-in signal conditioning electronics. External signal conditioning is required to interface their generated measurement signals to readout or recording instruments. The sensors' charge output signals can be conditioned with either a laboratory-style, adjustable charge amplifier or an in-line fixed charge converter (such as 422E series below).


357B14


356A70

- High Temp sensors to use the 422E3X series when the temperature exceeds 600 °F - Endevco Manufactured Accelerometer

	Amplitude Range (± g pk)	Sensitivity (pC/g)	Frequency Range (10%)	Mech. Shock Limit (± g pk)	Temperature Range (°F)	Connector Type/Location	To connect to BNC, use cable type (rented separately)	To connect to 10-32 used in 422E series, use cable type (rented separately)	Sensor Mass (grams)	Mounting
357B11 uniaxial	2 300	3	16 000	10 000	-95 to +500	side 5-44	003C	003A	2	5-40 s
357B14 uniaxial	2 300	3	16 000	10 000	-95 to +490	top 10-32	003C	003A	2	5-40 s
357B03 uniaxial	2 000	10	16 000	12 000	-95 to +500	side 10-32	003C	003A	11	10-32 t
357B04 uniaxial	2 000	10	16 000	12 000	-95 to +500	top 10-32	003C	003A	11	10-32 t
J357B04 uniaxial	2 000	10	16 000	12 000	-95 to +500	top 10-32	003C	003A	11	10-32 t
J357B04 uniaxial	2 000	10	16 000	12 000	-95 to +500	top 10-32	003C	003A	11	10-32 t
357A09 uniaxial	2 000	1.7	13 000	10 000	-100 to +350	side 3-56	003C	003A	0.6	adhesive
357A09/NC uniaxial	2 000	1.7	13 000	10 000	-100 to +350	side 3-56	003C	003A	0.6	adhesive
2222C uniaxial	1 000	1.4	8 000	10 000	-100 to +350	side 10-32	003C	003A	0.5	adhesive
357B53 uniaxial	150	100	3 500	2 000	-95 to +550	side 10-32	003C	003A	51	10-32 t
357A63 uniaxial	5 000	0.53	10 000	5 000	-65 to +900	side 10-32	003C	003A	11	5-40 t
357B61 uniaxial	1 000	10	5 000[1]	5 000	-65 to +900	side 10-32	023A hardline cable + 003A	023A hardline cable + 003A	30	10-32 t
357B61/NC uniaxial	1 000	10	5 000[1]	5 000	-65 to +900	side 10-32			30	10-32 t
356A70 triaxial	500	2.7	7 000	5 000	-95 to +490	(3) side 5-44	(3) each 003P	(3) each 003G	7.9	10-32 s

°F -95 -65 0 490 500 550 900
°C -70 -54 -18 254 260 287 482

t: tapped hole
s: integral stud

Notes:
[1] –357B61 frequency range specified to +5%
- Measurement resolution and low-frequency response are dependent upon noise floor and discharge time constant of the signal conditioning and readout systems used
- To use with standard ICP® signal conditioning, use 422E Series listed below.

422E Series Low-Noise In-Line Charge Amplifiers (Converters)

422E Series units are used with pC/g-output charge mode sensor to interface to ICP® power. Output voltage for the 422E0x or 422E1x converters is ±2.5 V pk. Output voltage for the 422E5x converters is ±5 V pk. temperature range: -65 to +250 °F. Use with low noise (003-style) cable to connect from sensor to 422E series 10-32 input. BNC output

Used with	Output (V pk)	-5% Cutoff frequency	Nominal Charge Conversion (mV/pC) / Input Range (pC) 0.1 / ± 25 000	1 / ± 2 500	10 / ± 250	100 / ± 25
Charge Output Sensors to 600 °F / 316 °C	± 2.5	0.5 Hz	422E04	422E03	422E02	422E01
	± 2.5	5 Hz	422E14	422E13	422E12	422E11
	± 5	5 Hz	422E54	422E53	422E52	422E51

422E3x Series units are used with ultra high temperature pC/g-output charge mode sensor, such as the 357B61, to interface to ICP® power. Output voltage: ±2.5 V pk, temperature range: -65 to +250 °F. Use with low noise (003-style) cable to connect from sensor to 422E series 10-32 input. BNC output

Used with	Output (V pk)	-5% Cutoff frequency	Nominal Charge Conversion (mV/pC) / Input Range (pC) 0.1 / ± 25 000	1 / ± 2 500	10 / ± 250	100 / ± 25
Sensors above 600 °F / 316 °C	± 2.5	5 Hz	422E38	422E35	422E36	–

What is the effective sensitivity and maximum measurable amplitude range for a charge-mode sensor and in-line converter pair?
Sensitivity is found by multiplying the actual sensitivity of the accelerometer (found on the calibration sheet) and the charge conversion of the converter (found etched on the converter or on the conformance sheet). If using the 422E0x or 422E1x series in-line charge amps, divide the ± 2.5 V voltage output by the net sensitivity calculated to yield the maximum g level measurable.

accelerometer sensitivity; charge conversion (422 series)

$$\frac{3\ \text{pC}}{\text{g}} \times \frac{10\ \text{mV}}{\text{pC}} = \frac{30\ \text{mV}}{\text{g}}$$

net sensitivity

charge mode sensor and cable can be used in high temperature

only use 422 converter unit in 250 °F maximum

voltage output range of 422E0x and 422E1x units

$$\frac{2.5\ \text{V}}{30\ \text{mV/g}} = 83.3\ \text{g}$$

maximum system measurable amplitude

calculated net sensitivity

Are traditional charge mode amplifiers to condition charge-output sensors offered for rental?
We offer limited channel counts of 443A101 dual-mode vibration amplifier placed in a 440-series rack, but generally for larger quantities, traditional standalone charge-mode amplifiers are not currently offered at this time. 422E Series in-line units are available for rental, even in large quantities.

Are any accelerometers available to rent for temperatures above 500 °F / 260 °C?
To view what is available, visit our High Temperature System Properties Calculator here: www.modalshop.com/HT-calc. Most shown in the table above.

Digiducer®

Imagine plugging a high resolution, broad frequency piezoelectric accelerometer directly into your phone, tablet, or laptop, with no intermediary signal conditioning or data acquisition needed. Sounds simple, right?

Benefits:

- Works with Windows, iOS, Linux, Android, and macOS – no drivers required
- Eliminates need for DAQ and signal conditioning
- Independent software and VAR-supported to provide an easy to use Vibration Analyzer
- 24-bit resolution and flat response to 8 kHz
- Piezoelectric element provides high dynamic range and a proven design
- Rugged package with a simple integrated cable terminating in USB

Software Dependent Features :

- Sensitivity Recognition
- Frequency Spectrum
- Time Waveform
- Record/Export
- Cloud Storage
- Overall Vibe Level
- Route-Based
- Report Generation

333D Series — Our 333D Series Digital Piezoelectric Accelerometers are offered in several different models, all with 0.9–15000 Hz (±3 dB), 2–8000 Hz (±5 %), 131 gram mass, 1/4-28 mounting thread, hermetically sealed stainless steel housing with top exit. 24-bit ADC, connect to tablets, laptops, and more. Software not included.

	± 20 g pk	± 100 g pk
Integral Cable Terminating in USB-A	333D01	333D04
Detachable M12 to USB-A cable	333D05	333D06
Detachable M12 to USB-C cable	333D05-C	333D06-C

K333D0x — Single Channel Vibration Monitoring Kit. System includes 333D0x Digiducer, magnetic mounting base, and system controller (choice of form function) with preinstalled software.

485B39 Digital Signal Conditioner

Want to use any ICP sensor with your phone, tablet, or laptop? The DigiDAQ™ Model 485B39 is a pocket-sized, dual-channel ICP® (IEPE) digital signal conditioner providing just that capability.

Benefits:

- Makes high quality measurement more accessible
- Pocket-sized ICP® to USB signal conditioning and analysis
- Analysis options from time domain to RMS to FFT and more
- Convenience of MEMs with the range and precision of piezoelectric
- No driver installation required
- Easily save and share data

Features:

- Portable sensor digitization
- 2 Channel ICP® digital signal conditioning
- 24-bit resolution with wide frequency range
- Windows, macOS, Android, and iOS compatible
- Integrated cable provides 1-piece solution
- Works with a variety of software packages

485B39 — 2-channel ICP® sensor signal conditioner. 2 BNC in, USB digital signal output. True plug and play analysis via USB without any cumbersome initial setup. View signals on any Windows, macOS, Android, and iOS devices.

IV485B39 — 2-channel, USB-powered, sensor signal conditioner with USB digital output (24-bit A/D). ICP input on channel 1, voltage input on channel 2.

V485B39 — 2-channel, voltage inputs, USB-powered, sensor signal conditioner with USB digital output (24-bit A/D).

K485B39 — Dual Channel Analysis Kit. System includes 485B39 and system controller (choice of form function) with preinstalled time and frequency analysis software.

Digital Tools FAQ

How do I get started?
Check out our quickstart guide that can be found here: https://modalshop.com/digital-sensing

Can I build my own scripts or applications for collecting and processing vibration signals from the 333D01 or 485B39?
Yes, any number of programs can be used to generate custom programs to use the 485B39 of 333D01 with. Please go to the following link for examples of MATLAB® scripts, as well as LabView® and LabWindows® applications: https://github.com/digiducer

Are there already any optimized software packages to use with the 333D01 or 485B39?
Yes there are a number of optimized software packages that are ready out of the box for usage with the 485B39 or 333D01. Please go to the following link for an overview of software available: https://www.modalshop.com/digital-sensing/products/software

What can I connect the 333D01 or 485B39 to?
The 333D01 and 485B39 are compatible with Windows® 7 and up. Windows XP is compatible, though limited to 16-bit resolution with standard Windows audio drivers.
They work with Mac® operating systems and iOS® mobile platform. For iOS devices with a lightning connector, Apple's Lightning to USB Camera Adaptor can be used.
They are also compatible with both Android phones and tablets, through the use of a USB OTG cable.

Do these devices have internal memory?
Yes, for storing self-identifying information and calibration information. It cannot store vibration data. It is similar in concept to the IEEE 1451.4 TEDS (Transducer Electronic Data Sheet) standard.

What is the communication method?
USB 2.0 full speed, using USB audio Class 1 device protocols for easy communications. 5V device power supplied by USB bus.

When analysis of very low frequency motion or constant acceleration is required, a DC accelerometer is necessary. Unlike piezoelectric accelerometers, DC sensors respond to 0 Hz and are, therefore often referred to as DC response sensors.

3711 Series Uniaxial Variable Capacitance DC Accelerometers with Single-Ended Output

These units offer DC response, ideal for low-frequency structural behavior testing including braking, suspension, RLDA, and shock absorption studies. Units also feature built-in microelectronics and an internal voltage regulator conditioning electronics to which allow sensor operation from unregulated DC power sources. Mounting patterns, power, and cabling accessories are the same for 3701 and 3801 Series below.

	Range (± g pk)	Sensitivity (mV/g)	Frequency Range (± 10 %)	Resolution (g RMS)	Mech. Shock Limit (± g pk)	Excitation Voltage (VDC)	Temperature Range (°F)	Connector Type/Location	Housing	Sealing	Sensor Mass (grams)
3711F11200G	200	6.75	DC – 2 500	0.006	5 000	5 – 32	-65 to +250 (-54 to +121 °C)	side 1/ 4-28 4-pin	Titanium	Hermetic	16.3
3711F1130G	30	45	DC – 2 000	0.001	5 000	6 – 30		side 1/ 4-28 4-pin	Titanium	Hermetic	16.3
3711B1210G/010CA	10	200	DC – 1 500	0.001 2	3 000	6 – 30		10 ft cable⇨ 4-pin jack	Titanium	Hermetic	16.3
3711D1FA3G	3	700	DC – 150	0.001 1	5 000	5 – 30		side 1/4-28 4-pin	Titanium	Hermetic	14.5

- Each 3711 Series unit mounts via 2 x 0.116" through-hole locations. Rentals are supplied with (2) 081A133 mounting screws and one 080A152 mounting base/clip, as well as phase and amplitude calibration from 2 Hz to + 5 % frequency range.

3701 and 3801 Series Uniaxial Variable Capacitance DC Accelerometers with Single-Ended Output

These units also offer true DC response, with improved resolution for low-amplitude/low frequency measurements. Ideal for ride quality assessments, building/bridge and aerospace testing, and tilt and orientation measurements for feedback control and stabilization testing. These units also offer built in electronics allow measurement with unregulated DC voltage excitation.

	Range (± g pk)	Sensitivity (mV/g)	Frequency Range (± 10 %)	Resolution (g RMS)	Mech. Shock Limit (± g pk)	Excitation Voltage (VDC)	Temperature Range (°F)	Connector Type/Location	Housing	Sealing	Sensor Mass (grams)
3801D1FB200G	200	10	DC - 800	0.001	3 000	5 – 30	-40 to +185 (-40 to +85 °C)	cable ⇨1/4-28 4-pin	Polymer	Epoxy	30
3701D3FA20G	20	100	DC – 500	0.000 08	3 000	16 – 30		side 1/4-28 4-pin	Titanium	Hermetic	17.5
3701G3FA3G	3	1 000	DC – 150	0.000 03	3 000	16 – 30		side 1/4-28 4-pin	Titanium	Hermetic	17.5

- Each capacitive unit mounts via 2 x 0.116" through-hole locations. Rentals are supplied with (2) 018A64 mounting screws and one 080A152 mounting base/clip as well as phase and amplitude calibration from 2 Hz to + 5 % frequency range.

Cabling for Uniaxial Single-Ended Output Sensors with ¼-28 4-pin Connection (Most 3711, 3701 and 3801 Series Units)

	1/4-28 microtec plug [AY]	Pigtail [DZ]	
			
1/4-28 microtec plug [AY] 	010D Series 10 ft 20 ft 30 ft	010P Series 10 ft 20 ft 30 ft 50 ft	034A Series 5 ft 50 ft

Accessories for Capacitive and single-ended units:

080A152	Easy mount clip, plastic (one included with each rental – price shown for extra)
080A153	Easy mount triaxial block, plastic, 1.265" square

Signal Conditioning for Single-Ended Sensors (3701, 3711, 3713 and 3801 Series Units)

478A01	1-channel, battery-powered, unity gain signal conditioner. ¼-28 4-pin input connector, BNC output connector, and DC offset null adjustment.
478B05	3-channel, line powered, unity gain signal conditioner. Terminal block input connections, BNC output connectors, and per-channel DC offset null adjustment.

3713 Series Triaxial Variable Capacitance DC Accelerometers with Single-Ended Output

Measure low-frequency DC response on 3-axes simultaneously in a hermetically sealed titanium housing. Units also feature built-in microelectronics and an internal voltage regulator conditioning electronics to which allow sensor operation from unregulated DC power sources. Select appropriate 037 Cabling to mate to pigtail or ¼-28 plug based on conditioning used.

	Range (± g pk)	Sensitivity (mV/g)	Frequency Range (± 3 dB)	Resolution (g RMS)	Mech. Shock Limit (± g pk)	Excitation Voltage (VDC)	Temperature Range (°F)	Connector Type/Location	Housing	Sealing	Sensor Mass (grams)
3713F11200G	200	7	DC – 2 500	0.006	3 000	5 – 32	-64 to +250 (-54 to +121°C)	side 9-pin	Titanium	Hermetic	17.3
3713E1150G	50	40	DC – 2 000	0.001	5 000	6 – 30		side 9-pin	Titanium	Hermetic	22.7
3713F1110G	10	135	DC – 1 500	0.035	3 000	5 – 32		side 9-pin	Titanium	Hermetic	17.3
3713F112G	2	675	DC – 350	0.000 1	3 000	5 – 32		side 9-pin	Titanium	Hermetic	17.3

*Calibrated range 2 Hz – 1000 Hz.

Cabling for 3713 series:

	Pigtail [DZ]	[JS] Triple splice assembly with (3) 1-ft 4-cond. cables each with a 1/4-28 microtec plug [AY connectors]	[NN] Triple splice assembly with (3) 1-ft 4-cond. cables each with a mini 8-pin DIN [LT connectors]
9 pin for DC triaxial [EN] 	037P Series 10 ft $62 20 ft $76 30 ft $90 100 ft $220	037A Series 10 ft $120 20 ft $140 30 ft $160	037ENNN Series 10 ft $90 30 ft $114

3741 Series Uniaxial DC Accelerometers with Differential Output

3741 Series offer DC response with common mode noise rejection, commonly used in aerospace flutter and GVT testing. Units operate with standard bridge conditioning equipment, and operate as a full bridge type device which does not require bridge completion circuitry. 3741 units incorporate voltage regulation, and may therefore operate from an unregulated positive DC supply source.

	Range (± g pk)	Sensitivity (mV/g)	Frequency Range (± 10 %)	Resolution (g RMS)	Mech. Shock Limit (± g pk)	Excitation Voltage (VDC)	Temperature Range (°F)	Connector Type/Location	Housing	Sealing	Sensor Mass (grams)
3741F12100G	100	27	DC – 2 500	0.006	5 000	5 – 32	-65 to +250 (-54 to +121 °C)	10 ft cable⇨pigtail	Anodized Aluminum	Epoxy	9.92
3741B1250G	50	40	DC – 1 500	0.005 2	3 000	6 – 30		10 ft cable⇨pigtail		Epoxy	9.9
3741F1230G	30	90	DC – 2 000	0.085	5 000	5 – 32		10 ft cable⇨pigtail		Epoxy	9.92
3741B1230G	30	66.7	DC – 1 500	0.003 5	3 000	6 – 30		10 ft cable⇨pigtail		Epoxy	9.9

- Each 3741 Series unit mounts via 2 x 0.125" through-hole locations. Rentals are supplied with (2) 081A103 mounting screws, as well as phase and amplitude calibration from 2 Hz to +5 % frequency range.
- 3741 Units may be used in single-ended operation by disconnecting and floating the white wire (- Signal) and attaching the yellow wire (+ Signal) to ground. In this "pseudo differential" method, sensitivity remains the same but there is a 2.5 VDC offset on the output.
- Aluminum triaxial mounting block for 3471 Series: 080A208

3503 Series Piezoresistive MEMS Uniaxial Shock Accelerometer

Piezoresistive (PR) accelerometers are ideal for measuring impacts and shock events. Typical applications include automotive crash testing, commercial drop testing, and high g weapons testing.

		Range (± g pk)	Sensitivity (mV/g)	Frequency Range (± 10 %)	Mech. Shock Limit (± g pk)	Excitation Voltage (VDC)	Temperature Range (°F)	Connector Type/Location	Housing	Sealing	Sensor Mass (grams)
3503A1120KG	Triaxial	20 000	0.01	DC – 10 kHz	60 000	15	-65 to +250 (-54 to +121 °C)	10 ft cable ⇨ pigtail	Titanium	Epoxy	2.83
3503A1160KG	Triaxial	80 000	0.03	DC – 10 kHz	80 000	15		10 ft cable ⇨ pigtail	Titanium	Epoxy	2.83

Line-Powered Signal Conditioning for bridge/differential sensors (including 3741, 3501 and 3503 Series units)

482C27	4-channel, incremental gain, Autozero. (4x) 8-pin mini DIN inputs (for bridge/differential) and (4x) BNC inputs (for ICP), (4x) BNC outputs.
483C28	8-channel, incremental gain, Autozero. (8x) 8-pin mini DIN inputs (for bridge/differential) and (8x) BNC inputs (for ICP), (8x) BNC outputs.
Model 136	3-channel, incremental gain, filtering, Auto-zero and shunt calibration. (3x) –pin female "D Connector" inputs and (3x) BNC outputs.

Mounting a transducer is key for field checks or calibrations. The items below include items to mate to popular items (1/4-28 and 10-32; handheld units also include an adaptor to mate to 5-40 threads). Additional adaptors are available for rental upon request. Not sure of mounting requirements? – provide a sensor list for us to verify.


394C06


699B02


REF2510R


4830B-CAL

Tools for Accelerometer and Channel Verification

394C06	Handheld shaker/accelerometer calibrator, 1 g at 159.2 Hz for accelerometers to 210-gram mass. *Note: do not use either for sensors with a max measurement level below 1 g!*
699B02	Handheld shaker/accelerometer calibrator, 1 g at 159.2 Hz for accelerometers to 250-gram mass. *Note: do not use either for sensors with a max measurement level below 1 g!*
REF2510R	Wilcoxon handheld shaker/accelerometer calibrator, 1 g at 61.4, 100 or 159.2 Hz for accelerometers to 250-gram mass. *Note: do not use either for sensors with a max measurement level below 1 g!*
4830B-CAL	Endevco accelerometer simulator, signal generator that simulates the electrical output of common types of accelerometers to troubleshoot, verify and calibrate measurement systems.

Portable Products for Field Validation and Calibration of Accelerometers, Velocity, and Proximity Probes

These products provide expanded sensor verification across a wide frequency range up to full traceable calibration in a small ruggedized battery-powered system with a display.


9100D / 9200D


9110D / 9210D

	5 Hz to 10 kHz, ± 20 g max	0.7 Hz to 2 kHz, ± 2 g max
Verify sensor performance, test alarms and measurement channels, store programmable test routines in memory	9100D	9200D
Above + provides ICP® conditioning for SUT with ability to view sensitivity, create cal certs, and provide pass/fail notification	9110D	9210D
Above + charge mode accel input and mounting accessories for test/measurement use	C9110D-T	-
Above with charge mode input but mounting accessories for industrial use	C9110D	-

Adaptors and conditioning are available for many sensor types, below are popular options. Contact us for items not shown!


9100-PPASH

9100-PPA01	Proximity probe adaptor kit, supports 5mm and 8mm size probes. Includes brackets for securing probes with 1/4 inch, 3/8 inch, 6mm, 8mm and 10mm diameter case threads. Includes Mitutoyo micrometer scaled in mils and 9100-PPA02 nickel-plated AISI 4140 steel target. *Note: metric available as MPPA01*
9100-PPASH	Proximity probe mounting adaptor kit for probes installed inside a 1/2" diameter housing, holder, sleeve or stinger. Also accommodates all 8mm proximity probe designs via supplied spare bracket.
9100-PS02	Modulated current and 4-20 mA vibration sensor USB power supply. Provides 24 VDC voltage output for connection to test sensor input of portable vibration calibrator.

Upgraded Calibration Options


9000A


9155D

9000A	SmartSine Calibration Driver used to control amp/shaker (not included) over a wide amplitude and frequency range for calibration of heavy sensors, vibration switches and more. Closed loop control requires reference accelerometer, not included.
K9140D10	Portable Vibration Calibration System provides lab-style control, automation and databasing of calibrations with a C9110D, software, and accessories. Rental unit includes system controller with installed software.
K9140-SW	9140 series vibration calibration software. Single seat license requires compatible Windows PC and TMS portable vibration calibrator. 9100-USB00 USB interface cable included.
9155D	Accelerometer calibration workstation. Turnkey, fully automated system. The 9155 system is a global market leading comprehensive system that traceably calibrates the largest selection of accelerometers in accordance with ISO 16063-21. Many options exist, please contact us for details.

Do rented accelerometers include traceable calibration?
Yes, ISO 17025 accredited (through A2LA) NIST-traceable calibration information is provided. Calibration certificates are provided electronically on a Modal Shop USB Drive in PDF format. Alternate methods of cal cert delivery are available including email or paper copies. The Modal Shop has internal calibration intervals of 1 year set for most test products. Per ANSI/ISO/IEC 17025:2000, it is the responsibility of the end-user (in this case, the renter) to determine the appropriate calibration interval under the requirements of its own quality system. Per this, calibration certificates of rented equipment have "calibrated on" dates, but blank "calibration due" dates. Rentals ship with a customer-specific expected return date in mind. For example, if equipment is expected out for 5 months, the last calibration date will be within the past 7 months. Calibration to additional standards (e.g. Z540 or specific FAA requirements) is available at an additional charge

Is post-test calibration available?
Yes. We understand that some critical tests require both pre-test calibration and post-test calibration be performed to ensure that measurements are accurate. For additional fees, accelerometers can be calibrated prior and post-test at The Modal Shop to provide you with this important information. See page 12 for the common A2LA accredited calibration codes and costs.

What specific calibration information is included with a particular sensor?
Most common piezoelectric accelerometers include sensitivity, frequency and phase information starting at least 10 Hz to upper 5 % of frequency range. Details can be found on specific pages for rental sensors on the TMS page. Certain units like most 393 Seismic Series accelerometers include low frequency calibration starting at 0.5 Hz. Low frequency or special calibration is available for any rental units for an additional fee.

Accredited Calibration Services

The Modal Shop's in-scope, in-house calibration laboratory holds accreditation to ISO / IEC 17025:2005 and ANSI / NCSL Z540-1-1994, internationally recognized standards which specify general requirements necessary to exhibit technical competence in carrying out various testing and calibration methods. Accordingly, The Modal Shop can be your partner in a well-documented transducer calibration program.

As part of this accreditation, The Modal Shop offers primary and secondary calibration of accelerometers, as well as services for condenser microphones, impulse force hammers, force sensors, and associated signal conditioning electronics.

Certificate Number 2649.01 Calibration Lab

Accelerometer Calibration Services

●	**MCS-A001**	Single axis accelerometer, amplitude and phase response from 5 Hz to upper 5% frequency. To start at 0.5 Hz, use code MCS-A001-A004For custom frequency range use MCS-A001-SP
●	**MCS-A001T**	Triaxial accelerometer, amplitude and phase response from 5 Hz to upper 5% frequency. To start at 0.5 Hz, use code MCS-A001-A004T
●	**MCS-A010**	Secondary comparison calibration for Reference Accelerometer. 5 Hz to 10 kHz, can include conditioner. If electronic data requested, use code MCS-A013
●	**MCS-35**	Single axis accelerometer, 5 Hz to 20 kHz with sensor bias and resonance sweep to 50 kHz. For triaxial accelerometer, use code MCS-35T

Handheld and Portable Calibration

▲	**MCS-A009**	Calibration of handheld calibrator, models 394C05, 394B06, and 394C06 or similar.
●	**9100-CAL01**	Calibration of 9100 Series Portable Vibration Calibrator.
	MCS-56	Calibration of speakerphone.

Impact Hammer Calibration Services

●	**MCS-H002**	Calibration of 086 series instrumented hammer or similar.
●	**MCS-H005**	Calibration of 086 series instrumented hammer or similar. Includes data for up to six tips and one extender mass if provided.

▲ NIST traceable ● NIST traceable and accredited to ISO 17025.

Signal Conditioner Electronics Calibration Services

●	**MCS-E001**	Calibration of in-line charge converters 422E Series and equivalent. NIST traceable. A2LA accredited.
●	**MCS-E004**	Calibration of single channel signal conditioner 480 Series and equivalent. NIST traceable. A2LA accredited.
●	**MCS-Exxx**	Many multichannel signal conditioner calibrations with various options available

Shock Accelerometers

●	**MCS-31**	Single axis accelerometer amplitude linearity calibration, 5 amplitudes to maximum 10,000 g range.For triaxial accelerometer / 5 amplitudes, use code MCS-31T
●	**MCS-53**	Single axis accelerometer amplitude linearity calibration, 3 amplitudes to maximum 10,000 g range For triaxial accelerometer / 3 amplitudes, use code MCS-53T
●	**MCS-A022**	Single axis amplitude and phase response calibration from 100 Hz to upper ±1dB frequency.

Acoustic Calibration Services

▲	**MCS-1**	Calibration of 130 series array microphone/preamplifier pair.
●	**MCS-2**	Calibration of standard precision condenser microphones.
●	**MCS-9**	Calibration of precision microphone/preamplifier pair.

SYSCOM ROCK

Ideally suited for large-scale vibration monitoring projects and vibration monitoring compliance, ROCK is highly autonomous and quickly installed on site. A cable-free vibration recorder, just switch it on and log into your SCS (Syscom Cloud Software) account to start monitoring from off-site in no time.

The rugged design offers best-in-class IP65 ingress protection for temporary immersion under water and the system is tailored for harsh outdoor environments. The small footprint allows it to fit in crowded areas where space is of concern.

SYSCOM Cloud Software (SCS) is cloud-based and provides easy access to your vibration recordings from anywhere. Setup of your personalized SCS account is easy and takes less than a few minutes. Centralize all the information from your monitoring projects and provide an overview of all active ROCK monitoring projects at a glance. Automatic project reporting and comparison with compliance curves are key features of the SCS. Link any ROCK device to your account and start generating results in no time.

For a more detailed overview please visit the website at www.modalshop.com/rental/SYSCOMROCK?ID=1360

Horizontal Mount ROCK

ROCK-2003I-H-A-X Horizontal Mount ROCK for ground/floor-mounted installation. Includes micro USB cable, charger, calibration and case.

ROCK-2003I-H-A-S Solar version of horizontal mount ROCK

Included:
- 81000631 - Micro USB Cable, 1.8m
- 87000318 – USB charger, North American Plug
- 74710129 – Carrying case, for up to 3 ROCK units
- Calibration – Documentation

Horizontal Mount ROCK Options and Accessories:

13100001 - Set of 3 Ground Spikes

13100020 - Mounting Plate

87000321 - Extender Antenna, Remote LTE Cat-M1 Antenna, 2 m Cable

90001052 - Anti-theft Field Cover/Band

Vertical Mount ROCK

ROCK-2003I-V-A-X Vertical Mount ROCK for wall-mounted installation. Includes wall mounting plate, micro USB cable, charger, calibration and case.

ROCK-2003I-V-A-S Solar version for Vertical mount ROCK

Included:
- 13100021 – Wall Mounting Plate
- 81000631 – Micro USB Cable, 1.8m
- 87000318 – USB charger, North American Plug
- 74710129 – Carrying case, for up to 3 ROCK units
- Calibration – Documentation

Vertical Mount ROCK Options and Accessories:

87000321 - Extender Antenna, Remote LTE Cat-M1 Antenna, 2m Cable

90001052 - Anti-theft Field Cover/Band

ICP® Free-Field Blast Pressure Sensors

These Pencil Probes are designed to measure shock waves caused from explosions in air found in defense and mining industries and in explosives research. They have an extremely fast microsecond response time, with resonant frequency above 400kHz. Some include dual channel probes that allow an easy way to capture shock speed close to the explosion.

137B Series

	Range (psi)	Sensitivity (mV/psi)	Useful Overrange (psi)	Low Frequency Response (Hz)	Resolution (mpsi)	Diaphragm Material	Mounting Thread	Connector Electrical	Connect to BNC, use cable type (rented separately unless specified)
137B22B	500	10	1000	0.001	0.02	Invar	5/16 - 24	10-32 coaxial jack	002C or 098EBAC
137B24B	250	20	500	0.005	5	Invar	5/16 - 24	10-32 coaxial jack	002C or 098EBAC
137B23B	50	100	100	0.01	2	Invar	5/16 - 24	10-32 coaxial jack	002C or 098EBAC
137B29B	25	200	50	0.5	1	Invar	5/16 - 24	10-32 coaxial jack	002C or 098EBAC

ICP® Dynamic Pressure Sensors

Piezoelectric pressure sensors are used for a variety of dynamic pressure measurements, such as cavitation, shock and blast waves, or hydraulic and pneumatic pressure fluctuations.

	Range (psi)	Sensitivity (mV/psi)	Useful Overrange (psi)	Low Frequency Response (Hz)	Resolution (mpsi)	Diaphragm Material	Mounting Thread	Connector Electrical	Connect to BNC, use cable type (rented separately unless specified)
113B22	5000	1	10000	0.001	0.02	Invar	`5/16-24	10-32 coaxial jack	002C or 098EBAC
113B24	1 000	5	2 000	0.005	5	Invar	5/16 - 24	10-32 coaxial jack	002C or 098EBAC
113B26	500	10	1 000	0.01	2	Invar	5/16 - 24	10-32 coaxial jack	002C or 098EBAC
113B27	100	50	200	0.5	1	Invar	5/16 - 24	10-32 coaxial jack	002C or 098EBAC
113B28	50	100	100	0.5	1	Invar	5/16 - 24	10-32 coaxial jack	002C or 098EBAC
102B06	500	10	1 000	0.01	2	Invar	3/8 - 24	10-32 coaxial jack	002C or 098EBAC
106B	8.3	300	2000	0.5	0.0001	316L Stainless Steel	`5/16-24	10-32 coaxial jack	002C or 098EBAC
106B50	5	500	-	0.5	0.07	316L Stainless Steel	3/4 - 16	10-32 coaxial jack	002C or 098EBAC
106B51	5	1 000	10	0.5	0.05	316L Stainless Steel	3/4 - 16	10-32 coaxial jack	002C or 098EBAC
106B52	1	5 000	-	2.5	0.02	316L Stainless Steel	3/4 - 16	10-32 coaxial jack	002C or 098EBAC
103B02	3	1 500	6	0.5	0.02	316L Stainless Steel	1/2 - 20	10-32 coaxial jack	002C or 098EBAC
121A45*	500	10	8000	0.5	0.003	316L Stainless Steel	1/4-18 NPT	2-Pin MIL-C-5015	012E or 052BR

* Hazardous area approved, ATEX and CSA (C-US) NRTL

General Purpose 113 Series
Designed with extremely fast, micro-second response with a wide amplitude and frequency range. These units excel in high frequency applications, where minimum sensor diameter is required. Can be used in applications such as combustion studies, air blast shockwaves and airbag testing.

High Sensitivity Dynamic Acoustic Pressure 106 Series
These units measure low-level pressure and high-intensity sound pressure levels, both acoustic and ultrasonic. These all-welded, stainless steel units are suited for monitoring pulsations, turbulence, and noise in hydraulic and pneumatic systems.

Ground Isolated 102B Series
These units have all of the same features and benefits of the Series 113B, plus the added benefit of having their output electrically isolated from ground, which helps prevent ground loop problems.

High Temperature pressure senor
PCB® High Temperature quartz dynamic pressure sensors are designed for operation at the highest temperatures. They are structured with quartz crystals and operate, without cooling, up to +750 °F (+399 °C) on compressors and pumps. See Page 18 for additional information on in line charge converters used with charge mode sensors.

	Range (psi)	Sensitivity (mV/psi)	Useful Overrange (psi)	Low Frequency Response (Hz)	Resolution (mpsi)	Diaphragm Material	Mounting Thread	Connector Type/ Location	Connect to BNC, use cable type (rented separately unless specified)
116B	1 000	5	2 000	0.005	5	Invar	-	10-32 coaxial jack electrical connector	002C or 098EBAC

Pressure Sensor Mounting Adaptors

062A01	1/8-27 NPT external threads, 5/16-24 internal threads for 111, 112, and 113 series sensors.
062A07	1/2-14 NPT external threads, 3/4-16 internal threads for 106B50, 106B51, and 106B52 sensors.
062A06	Pipe thread adaptor, 1/2-14 NPT (for 106B)
061A04	Sleeve clamp, 4-40 cap screw (used in 103 Series models including 103A and 103A11)
063A02	Mounting adaptor for 137 Series Free-field blast probe
064B01	Water-cooled adaptor, sensor recess mount, 1/2-20 thd, 1.0" hex (for Series 111, 112 & 113)

Can ICP pressure sensors measure static pressure?
No. Just as ICP accelerometers measure dynamic response and not DC/static acceleration (e.g., Earth gravity), ICP pressure sensors measure only dynamic pressure variation. ICP pressure sensors can be used in a high static pressure environment, such as a pressurized hydraulic system, to measure pressure fluctuations within the system when at pressure. Dynamic pressure measurements include turbulence, blast, ballistics, hydraulics, pneumatics, and engine combustion under varying conditions. Measuring the static pressure of an air tank, for example, would not be a suitable application for an ICP pressure transducer.

Dynamic Strain Sensor

740B02

Reusable ICP piezoelectric strain sensors can be used for measurement of dynamic strain-displacement relationships and load predictions, or in modal analysis to assess structural integrity of aircraft during ground vibration testing and flight testing to determine high stress levels. Mounting is easy to a wide range of surfaces from painted metals, composites, plastics and more with a gel-type super glue, and may be re-used or reapplied multiple times. Removal is similar to an accelerometer with a debonding agent and a supplied removal tool. Calibration data is also provided.

RHM240A01	Industrial dynamic strain sensor, ICP quartz, 100 mV/microstrain, +/-50 microstrain range, M6 x 1 thd, RoHS compliant
RHM240A02	Industrial dynamic strain sensor, ICP quartz, 50 mV/microstrain, +/-100 microstrain range, M6 x 1 thd, RoHS compliant
RHM240A03	Industrial dynamic strain sensor, ICP quartz, 10 mV/microstrain, +/300 microstrain range, M6 x 1 thd, RoHS compliant

Industrial Machinery and Project Monitoring

Echo® Wireless Vibration System

Eliminate in-plant cabling, free up analyst time by automating data collection, transmit data wirelessly over long distances, through walls, and analyze more frequently. System works with Echo® wireless sensors or existing installed sensors.

670A01 Echo

672A01 EchoPlus

673B01 Receiver

KEcho	Echo Wireless System. (1) Echo wireless sensor with Echo Receiver, monitoring software and system controller. *Expand channel count with additional 670A01 Echo wireless vibration sensor units.*
KEchoPlus	Echo Converter Kit. (1) 8-channel Echo wireless junction box with Echo Receiver, monitoring software and system controller. *Expand channel count with additional 8-channel 672A01 junction box units.*
670A01	Echo Wireless Vibration Sensor
672A01	EchoPlus® Wireless Junction Box (8-channels)
600A21	Echo Monitoring Software
673B01	Echo Receiver, 916 MHz

Industrial and Product Monitoring

333D01	Digiducer – Piezoelectric USB Accelerometer. Digital accelerometer with integral USB interface cable, Channel A range ± 20 g
485B39	2 Channel ICP® sensor signal conditioner. 2 BNC in, USB digital signal output.
K333D01	Single Channel Vibration Monitoring Kit. System includes 333D01 Digiducer, magnetic mounting base, and system controller (choice of form function) with preinstalled vibration monitoring software.
K485B39	Dual Channel Analysis Kit. System includes 485B39 and system controller (choice of form function) with preinstalled time and frequency analysis software.
IV485B39	2-channel, USB-powered, sensor signal conditioner with USB digital output (24-bit A/D). ICP input on channel 1, voltage input on channel 2.
V485B39	2-channel, voltage inputs, USB-powered, sensor signal conditioner with USB digital output (24-bit A/D).
CoCo-70X-2	Designed for machinery predictive maintenance (PdM) usage The CoCo-70X is IP-67 rates with a 6.5 inch display. 2 input channels with 1 output channel and easy navigation for route collection.
CoCo-70X-4	4-channel CoCo-70X configuration. Includes capabilities in CoCo-70X-2
BEAR	Band Energy Alert Recorder system, monitors multiple channel / multiple frequency band energy to help identify specific condition faults or degradation.
SDC002-Kit	Vibration Limit Switch, selectable 2 Hz to 20 kHz, with 4-20 mA and solid state relay outputs. Rental kit includes selectable single channel accelerometer, setup software, and serial connection cable. *SDC002-PS24P AC Power Supply with pigtail termination*
NDT Products	NDT Nondestructive Test, uses Resonant Acoustic Method to determine manufactured part integrity. Allows easy setup and test for product flaws in cast, powdered metal and stamped parts.
687A01	Handheld digital vibration meter kit, includes accelerometer and cable assembly, magnet, and headphones. *Unit is powered with included 9V battery and provides a display of overall acceleration in 50 Hz to 50000 Hz range to a maximum RMS of 20g or overall velocity in 10 Hz to 1000 Hz range to a maximum of 2 inches per second and complies with ISO2954 standard. Kit includes models 687A02 meter, 603C01 sensor, 050BQ006AC cable, 070A47 headphones, 080A131 magnet*
VO622A01	IMI 622A01 piezoelectric sensor with velocity output (VO) option, 100 mV/in/sec., top exit, 2-pin connector

086 Series ICP® Modally Tuned® Impact Hammers

Easy-to-use method for delivering impulse forces with measurable amplitude and frequency content. Often used in modal analysis, resonance detection and in structural health testing. All connect via BNC.

○ symbol indicates that units are also available with TEDS (T and TLD Prefixes), see Page 14.

	Force Range (± lbf pk)	Sensitivity (mV/lbf ± 15 %)	Typical Max Frequency (Hz)	Effective Mass (lb)	Length (in)	Includes *(for full details including model numbers, see website)*	Typical Uses
086E80	50	100	12 000+	0.17	4.2	10 ft cable with BNC adaptor, handle assembly, case	Disk drives, circuit boards, turbine blades
○ 086C01/TLD086C01	100	50	10 000	0.23	8.5	Extender mass, 4 tip ranges	Lightly damped panels and frames
○ 086C02/TLD086C02	100	50	8 000	0.34	8.5	Extender mass, 4 tip ranges	Machine tool parts, small engines
○ 086C03/TLD086C03	500	10	8 000	0.34	8.5	Extender mass, 4 tip ranges	Car frames, engines
○ 086C04/TLD086C04	1 000	5	8 000	0.34	8.5	Extender mass, 4 tip ranges	Car frames, engines
○ 086D05/TLD086D05	5 000	1	5 000	0.7	9	Extender mass, 4 tip ranges	Light trucks, pumps, turbines
○ 086D20/TLD086D20	5 000	1	1 000	2.4	14.5	4 tip ranges	Tool/Turbine foundations, storage tanks
○ 087B50/TLD087B50	5 000	1	500	12.1	16	2 tip ranges (grey supersoft omitted, use brown tip)	Heavy foundations, ships, buildings
086D50	5 000	1	500	12.1	35	2 tip ranges (grey supersoft omitted, use brown tip)	Heavy foundations, ships, buildings
○ 086M92-ES/ TLD086M92-ES	500	10	call		16	4 tip ranges, foot pedal trigger, AC/DC power, cables	Repeatable impacts for industrial use
086C09	500	10		3.5	9.7		Repeatable impacts for modal applications
088A	500	10	4 000		14.2	4 tip ranges, foam grip	Modal Punch to reach inaccessible areas

Note: If new within the past year, hammers from PCB include only calibration data from one tip type. Hammers calibrated by The Modal Shop include sensitivity for every type of tip provided. Please let us know when renting if you would prefer a full set of calibration information for your testing.

Dynamic Force Sensors

208 Series ICP® Sensors

General purpose quartz force sensors measure dynamic tension and compression used in impact, drop and materials testing. Also used in dynamic shaker testing: mount force sensor to object under test and connect to shaker via stinger.

All units are stainless steel, 22.7 gram mass, have a side 10-32 coaxial jack, have a temperature range of -65 to +250 °F (-54 to +121 °C), include impact cap 084A03 and 10-32 mounting stud 081B05. Use 003C-style cable to mate to connect to BNC. Metric mounting stud M081A62 available upon request.

	Meas. Range (Compression) lb (N)	Measurement Range (Tension) lb (N)	Sensitivity mV/lb (mV/N)	Broadband Resolution lb-RMS (N-RMS)	Lower Frequency Response (-5 %)	Max. Static Force (Compression) lb (kN)	Max. Static Force (Tension) lb (kN)
208C01	10 (44.5)	10 (44.5)	500 (112)	0.000 1 (0.000 45)	0.01 Hz	60 (0.27)	60 (0.27)
208C02	100 (445)	100 (445)	50 (11.2)	0.001 (0.004 5)	0.001 Hz	600 (2.7)	500 (2.2)
208C03	500 (2 224)	500 (2 224)	10 (2.25)	0.005 (0.02)	0.000 3 Hz	3 000 (13.5)	500 (2.2)
208C04	1 000 (4 448)	500 (2 224)	5 (1.12)	0.01 (0.044)	0.000 3 Hz	6 000 (26.7)	500 (2.2)
208C05	5 000 (22 240)	500 (2 224)	1 (0.225)	0.05 (0.222)	0.000 3 Hz	8 000 (35.6)	500 (2.2)

ICP dynamic force rings and impact sensors

200C20 ICP® quartz force sensor, impact, 20k lb comp., 0.25 mV/lb, 10-32 ele. conn., stainless steel construction, hermetically sealed.

200C50 ICP® quartz force sensor, impact, 50k lb comp., 0.10 mV/lb, 10-32 ele. conn., stainless steel construction, hermetically sealed

Cabling and Accessories for High Channel Count Tests

080B40 Cable, 10 ft with 3-pin mounting pad to IDC connector to patch panel *[Use with 333B, 333A, and 336 series. Not 333B32]*

080B55 Triaxial mounting block, outside mount

070C29 16-channel input patch (1/2" x 7" x 1.5"), (16) IDC and (16) BNC inputs to (1) DB-50 connector

009H25 Shielded 16-channel ribbon cable, DB50 pin connector both ends, mates 070C29 to 440 or another panel, 25 ft

009H50 Shielded 16-channel ribbon cable, DB50 pin connector both ends, mates 070C29 to 440 or another panel, 50 ft

009H100 Shielded 16-channel ribbon cable, DB50 pin connector both ends, mates 070C29 to 440 or another panel, 100 ft

009GC DB50, 50-pin gender changer, 50-pin female each side

009L05 Shielded 4-channel output cable, HP VXI to 4 BNC plugs, 5 ft

009S08 Shielded 4-channel output cable, HP VXI to HP VXI connectors, 8 ft

Productivity Tools for Large Channel Test Systems

8032S

400B76 TEDS sensor interface kit. Enables communication to TEDS sensors over PC USB interface. Includes Windows software, USB adaptor, and 10-32 microdot cable. Supports IEE 1451, P1451 and LMS templates.

8032S AirRide test fixture support. Air spring to support and isolate structures for modal testing; several may be used to test large structures. Offers typical mounting frequency of 2.88 Hz for 650-lb load. 1790 lb max capacity per support.

Shakers / Modal Exciter Kits

The Modal Shop's expanded line of electrodynamic exciters are ideal for a wide range of tests, from small component and sub-assembly testing to large aerospace modal analysis excitation. Rental kits include stinger kits, shakers with trunnion bases, amplifiers, cabling and power and shaker/amp interconnect accessories. Connect to an external signal source (not included) or rent additional items to complete a measurement setup, ranging from impedance heads (Page 34) or force sensor (Page 17), or a complete closed loop vibration control system (Pages 49-53).

Miniature Electrodynamic Inertial Shaker Kit

This extremely compact lightweight force generator mounts directly to the test structure or through a force sensor and can be operated in any orientation, making it well suited for modal or general excitation applications.

	Max Sine Force ± lbf (N) pk	Stroke In (mm) pk-pk	Minimum Frequency (Hz)	Maximum Frequency	Shaker Model	Amplifier Model	Shaker and Amp Weight lb (kg)	Stinger Kit(s)	Other Accessory Kit(s)	Shipment Weight, lb (kg)
K2002E01	2 (9)	0.35 (8.9)	20	3 000	2002E	2000E	0.56 (0.25) / 0.7 (0.32)		√	16 (16)

Miniature SmartShaker™ Kits

The Modal Shop Miniature SmartShaker™ kits include a miniature electrodynamic exciter with a new generation of ultra compact precision power amplifier built into the base. There is no need for a separate large lab-grade power amplifier - just plug the excitation signal from a dynamic signal analyzer or function generator directly into the BNC on the base of the shaker. Units include a DC power supply with a standard AC plug, but can be run directly from any 12-21 VDC supply.

	Max Sine Force ± lbf (N) pk	Stroke In (mm) pk-pk	Maximum Frequency (Hz)	Shaker Model	Amplifier Model	Shaker and Amp Weight lb (kg)	Cooling Package	Trunnion	Stinger Kit(s)	Other Accessory Kit(s)	Shipment Weight, lb (kg)
K2004E01	4.5 (20)	5 (0.2)	11 000	K2004E01	Integrated	7 (3)		√	√	√	16 (7)
K2007E01	7 (31)	13 (0.5)	9 000	K2007E01	Integrated	7 (3)		√	√	√	16 (7)

Modal Shaker Kits

2060E

In addition to the miniature SmartShaker, The Modal Shop offers shakers and kits with force ratings up to 445 N (100 lbf), perfect for a wide range of modal analysis applications. Kits are complete with everything from amplifiers to power the shaker, to stinger kits to connect to your test object; just supply a signal source (not included). Need help selecting a shaker system? We offer a Modal Shaker Selection Guide online, or feel free to contact us for assistance!

	Max Sine Force ± lbf (N) pk	Stroke In (mm) pk-pk	Maximum Frequency (Hz)	Shaker Model	Amplifier Model	Shaker/Amp Weight lb (kg)	Cooling Package	Trunnion	Stinger Kit(s)	Other Accessory Kit(s)	Shipment Weight, lb (kg)
K2025E013	13 (58)	18 (0.7)	9 000	2025E	2100E21-400	13 (6) / 9 (4)		√	√	√	38 (17)
K2025E013-HF	13 (58)	13 (0.5)	20 0000	2025E-HF	2100E21-400	11 (5) / 9 (4)		√	√	√	38 (17)
K2060E030	30 (133)	36 (1.4)	6 000	2060E	2100E21-400	37 (17) / 9 (4)		√	√	√	64 (29)
K2060E060	60 (267)	36 (1.4)	6 000	2060E	2150E09	37 (17) / 81 (37)	√	√	√	√	169 (77)
K2100E035	35 (156)	25 (1)	5 400	2100E11	2100E21-400	33 (15) / 9 (4)		√	√	√	110 (50)
K2100E100	100 (440)	25 (1)	5 400	2100E11	2100E18	33 (15) / 47 (21)	√	√	√	√	191 (87)

Vibration Shakers / Dual Purpose Shaker Kits

2075E

In addition to our Portable Vibration Calibrator products 9100D and 9110D (see Page 24) designed to calibrate accelerometers and prox probes in the lab or in the field, The Modal Shop units below include a large armature and platform table to support payloads up to 10 lb, ideal for traditional vibration control testing of components and subassemblies. Through-hole armature design also allows experimental modal testing via stinger attachment. Head expander and horizontal table options are available for larger and heavier objects.

	Max Sine Force ± lbf (N) pk	Stroke In (mm) pk-pk	Maximum Frequency (Hz)	Shaker Model	Amplifier Model	Shaker/Amp Weight lb (kg)	Cooling Package	Trunnion	Stinger Kit(s)	Other Accessory Kit(s)	Shipment Weight, lb (kg)
K2025E-HF	13 (58)*	12.7(0.5)	20 000	2025E-HF	2100E21-400	11 (5) / 9 (4)		√			38 (17)
K2075E040	40 (178)	25 (1)	6 500	2075E	2100E21-400	35 (16) / 9 (4)		√	√	√	64 (29)
K2075E075	75 (344)	25 (1)	6 500	2075E	2050E09	35 (16) / 81 (37)	√	√	√	√	169 (77)
K2110E110	110 (489)	25 (1)	6 500	2110E	2050E09-FS	56 (25) / 81 (37)	√	√	√	√	189 (86)
K2500E500	500 (2224)	25 (1)	4 500	2500E	2050E12-7	475 (215) / 280 (170)	√	√	√	√	900 (410)

*Force limited to 7 lbf from 14 000 to 20 000

Horizontal Table Vibration Shaker Kits

These kits are designed to test objects larger and/or heavier than what can be directly mounted to a particular shaker. Additionally, some test specifications may require test objects to be oriented in a specific direction relative to gravity which is facilitated with the larger table. Ideal for testing items like geophones, performing general stress screening, or qualification testing per SAE or MIL-STD. The K2500E-HT can be used with the Modal-Pod™ accessory as well. Note: these items are generally skidded and shipped via freight.

2075E-HT	Max Sine Force ± lbf (N) pk	Stroke In (mm) pk-pk	Maximum Frequency (Hz)	Shaker Model	Amplifier Model	Shaker/Amp Weight lb (kg)	Cooling Package	Trunnion	Stinger Kit(s)	Other Accessory Kit(s)	Shipment Weight, lb (kg)
K2075E040-HT	40 (178)	25 (1)	4 500	2075E	2100E21-400	70 (31) / 9 (4)		√		√	90 (41)
K2075E-HT	75 (344)	25 (1)	4 500	2075E	2050E09	70 (31) / 81 (37)	√	√		√	200 (91)
K2110E-HT	110 (489)	25 (1)	4 500	2010E	2050E09-FS	100 (45) / 81 (37)	√	√		√	240 (108)
K2500E500-HT	500 (2224)	25 (1)	3 000	2500E	2050E12-7	475 (215) / 280 (170)	√	√	√	√	900 (410)

Individual Shakers

2002E 2 lbf inertial — The Modal Shop miniature inertial shaker, 2 lbf (9 N) pk sine force, 0.35" pk-pk stroke, 0.141" x 1.5" mounting through-hole, includes cable, mounting screws, and spare fuses. *Amplifier 2100E21-100 drives to 2 lbf.*

2004E 4 lbf mini — The Modal Shop Miniature Shaker, 20 N (4.5 lbf) pk sine force, 5 mm (0.2") pk-pk stroke. Includes trunnion mounting base and 2110G06 stinger kit. *Rental includes heavy duty transportation case.*

2007E 7 lbf mini — The Modal Shop Miniature Shaker, 31 N (7 lbf) pk sine force, 13 mm (0.5") pk-pk stroke. Includes trunnion mounting base and 2110G06 stinger kit. *Rental includes heavy duty transportation case.*

2025E 13 lbf modal — The Modal Shop Modal Shaker, 58 N (13 lbf) pk sine force, 18 mm (0.7") pk-pk stroke, with adjustable collet stinger attachment and through-hole armature design, includes 2000X03 accessory kit and trunnion mounting base. *Amplifier 2100E21-400 drives system to 13 lbf peak.*

2060E 60 lbf modal — The Modal Shop Modal Shaker, 267 N (60 lbf) pk sine force, 36 mm (1.4") pk-pk stroke, with adjustable collet stinger attachment and through-hole armature design, includes 2000X03 accessory kit and trunnion mounting base. *Amplifier 2100E21-400 drives system to 30 lbf peak. To drive shaker to full 60 lbf peak, use amplifier 2050E09. Always use cooling package 2050E03 when driving shaker above 30 lbf pk sine force.*

2075E 75 lbf dual — The Modal Shop Dual Purpose Shaker, 334 N (75 lbf) pk sine force, 25.4 mm (1") pk-pk stroke, through-hole armature for stinger attachment/modal testing, 83 mm (3.25") diameter mounting surface. Trunnion base and 2000X03 accessory kit included. *Amplifier 2100E21-400 drives system to 40 lbf peak. To drive shaker to full 75 lbf peak, use amplifier 2050E09. Always use cooling package 2050E03 when driving shaker above 40 lbf pk sine force.*

2100E11 100 lbf modal — The Modal Shop Modal Shaker, 440 N (100 lbf) pk sine force, 25.4 mm (1") pk-pk stroke, with through-hole armature design, includes 2100E11-001 accessory kit and trunnion mounting base. *Rental includes heavy duty transportation case. Amplifier 2100E21-400 drives system to 35 lbf peak. Amplifier 2100E18 drives system to 100 lbf peak. Always use cooling package 2050E03 when driving shaker above 50 lbf pk sine force.*

2110E 110 lbf dual — The Modal Shop Dual Purpose Shaker, 489 N (110 lbf) pk sine force, 25.4 mm (1") pk-pk stroke, through-hole armature for stinger attachment/modal testing, 83 mm (3.25") diameter mounting surface. Trunnion base and 2000X03 accessory kit included.

2500E 500 lbf dual — The Modal Shop Electrodynamic Shaker, 2224 N (500 lbf) pk sine force, 25.4 mm (1") pk-pk stroke, 152 mm (6") diameter mounting surface. Trunnion base included. *Amplifier 2050E12-7 is rented separately and drives system to full peak, but cooling package 2000X12 required beyond 225 lbf pk sine force. Shipped via freight.*

2050E01 — MB Dynamics Modal 50 Shaker, 50 lbf pk sine force, 1" pk-pk stroke, 4 kHz maximum, 55 lb weight, modal accessory kit included.

Individual Amplifiers

2000E — Miniature Class-D Power Amplifier, clip and over-temperature detection, continuous gain adjustment, includes universal power supply.

2100E21-400 — The Modal Shop SmartAmp™ Power Amplifier, 400 W, interlock and clip detection, continuous gain adjustment, 100-240 V line power. *Lightweight general purpose unit appropriate for standard duty testing. Features silent fanless operation and advanced features including real-time warning feedback for signal distortion and automatic shutdown of the supply signal for DC faults. Over-current and over-temperature protection prevent unexpected damages during testing. Safe Start feature avoids sudden shaker transients when the amplifier is powered up.*

2050E05 — Linear Power Amplifier, selectable current/voltage mode, continuous gain adjustment, 100-240 V line power. *Classic general purpose linear amplifier. Includes voltage control mode, commonly used when performing burst random testing.*

2100E18 — Power Amplifier, 2400 W, continuous gain adjustment. *An appropriate choice to drive 2100E11 shaker to full capacity. Forced air cooling is required when driving the 2100E11 to excitation levels above 50 lbf (27 N); use cooling kit 2050E03. Amplifier and cooling kit included in shaker kit K2100E100.*

2100E18-230V — Power Amplifier, 2400 W, continuous gain adjustment, 230V line power.

2050E09 — Linear Power Amplifier, 900 W, selectable current/voltage mode, continuous gain adjustment. *200-240 V is required for the 2050E09 amplifier when used with a dual purpose platform shaker 2075E or 2110E. Renters are generally responsible for connecting a power plug for this amplifier. Contact us for more information.*

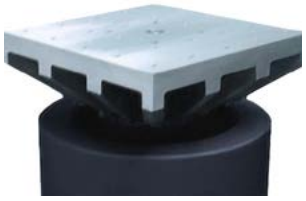
2050E09-FS — Linear Power Amplifier, 900 W, selectable current/voltage mode, continuous gain adjustment, 200-240V line power, internal DC field power supply.

2050E12-7 — Power Amplifier system for 2500E shaker, 65V, 2600 VA output. Includes control panel with output voltage and current meter, adjustable output current limiting, and interlock. *Shipped via freight.*

Shaker Accessories

9000A	SmartSine Calibration Driver – calibrate heavy sensors over a wide amplitude and frequency range. Shaker not included. See page 28 for more info
2000X04	Cooling Package for Shakers. *Provides forced air to safely drive 2060E, 2075E, 2100E11, 2050E01 and 2110E to full capacity. Included with shaker kits.*
2000X04-50	Cooling Package for Shakers - regenerative vacuum, single phase, 230V, 50Hz. *Provides forced air to safely drive 2060E, 2075E, 2100E11, 2050E01 and 2110E to full capacity. Included with shaker kits.*
2000X04-60	Cooling Package for Shakers - regenerative vacuum, single phase, 115-230V, 60Hz.
2000X12	Cooling Package for 2500E 115V AC, 60 Hz
2000X03	Shaker Accessory Kit for models 2025E, 2060E, 2075E, 2110E. Includes case, 2155G12 3/32" and 2150G12 1/16" stinger kits, adaptors, wrenches, fuses, and other accessories. *Included with any 2060E, 2075E shaker or related kit*
2100E11-001	Shaker Accessory Kit for model 2100E11. Includes case, 2150G12, 2155G12, and K2160 stinger kits, chuck, collets, adaptors, wrenches, fuses, and other accessories. *Included with any 2100E11 shaker or kit rental detailed above*
2050A	Lateral Excitation Shaker Stand kit, provides a versatile means of adapting a modal shaker for horizontal input. The stand facilitates excitation with a tensioned "piano" wire stinger (not included). *This item requires special shipping, ship weight 182 lb, crate 6 ft x 2 ft x 1 ft.*
Cables	Shaker extension cable for use between amplifier and shaker. 20 ft (6 m) long 2000X10-20 30 ft (9 m) long 2000X10-33

2000X01



2000X14

2000X15

Shaker Head Expanders

2000X01	Lightweight 1.043 kg (2.3 lb) magnesium head expander with 32 stainless steel inserts (10-32 UNF) on a 175 mm (7") diameter table. *Fits both 2075E and 2110E shakers.*
2000X14	Large 9.5 kg (21 lb) magnesium head expander with 25 stainless steel inserts (10-32 UNF) on a 304 mm (12") square table. *Fits 2500E shaker.*
2000X15	Modal-Pod™ test fixture for CubeSat vibration testing. Supports mounting different size satellites up to 3U in various orientations. Includes lightweight magnesium head expander, dead mass loads, mounting accessories, tools, and a heavy duty transportation case. *Fits 2500E shaker.*

288 Series ICP® Impedance Head Sensors

Colinear force and acceleration sensor used with structural shakers for driving-point measurements. All units feature 10-32 stinger mounting, have two 10-32 coaxial jacks and therefore require two channels of DAQ be used. Place on structure under test, connect the stinger last.

288D01	Impedance Head, ± 50 lbf force range, ± 50 g amplitude range. With TEDS TLD288D01
TLD288M25	Impedance Head, ± 100 lbf force range, ± 50 g amplitude range, with TEDS. *Used for shakers >50 lbf. Larger capacity shakers generally use 208C03 force sensor.*

Vibration Controller / Digital Shaker Control Systems

Closed loop vibration control systems for Dual Purpose shakers on the Page 32, or to be used with an existing shaker setup. Systems support test modes for vibration testing according to ISO, DIN, MIL-STD 810, IEC, and many other standards. *Sensors and shakers rented separately; contact us for specific control requests.*
Various options include modes for random with notching/force limiting, random data reduction, sine with notching/force limiting, sine resonance search and dwell, sine data.

Common vibration controllers are offered for rent from Crystal Instruments, m+p international, and DataPhysics SignalStar. The Crystal Instruments S81B (up to 4 input/1 output channels) and the S81 premium controller for 8 or more input channels and multiple outputs. The m+p VibPilot supports 4 channels minimum with 2 outputs and the VibRunner supports 8 or more channels and additional output channels.

See Pages 49–53 in the data acquisition and analysis section for more information.

For basic single point sinusoidal test The Modal Shop 9000A SmartSine Calibration Driver is an additional option. With the use of a separate control sensor on the shaker it provides control of frequency and amplitude of a shaker.

Sensors and shakers rented separately. Please see Pages 6–23 for sensors, Page 32 for shakers, or contact us for specific control requests.

Larson Davis Human Vibration / Severity Meter

The Larson Davis HVM200 is a small rugged vibration meter to measure hand-arm, whole body and general vibration. This 3-channel meter includes measurement filters compliant to ISO 8041:2021 and measures per ISO 2631-1, 2, and 5 and ISO 5349 in support of ACGIH Threshold Limit Values (TLVs) and Directive 2002/44/EC.

HVM200

KHVM200	Larson Davis HVM200 three channel vibration meter for general and human vibration. *Kit includes PSA035 line power supply/charger, computer interface cable, internal battery for 8+ hour use per recharge.*
HVM200-OB3	Option for HVM200 to adds 1/1 and 1/3 octave filters. *Determine frequency content of vibration levels; IEC 61260 class 1 compliant (0.5 Hz to 2000 Hz and 0.4 Hz to 2500 Hz).*
HVM200-RAW	Option for HVM200 to enable file recording of raw data. *Store and archive 24-bit sampled time data for all three channels. Files can be read with tools such as MATLAB® or GNU Octave for additional processing (not included).*

Compliance: ISO 18041:2021 Human response to vibration – Measuring Instrumentation (See manual for scope of compliance), IEC 61010-1 (2001) Safety, ISO 2631-1:1997 Whole-body vibration – General requirements, ISO 2631-2:2003 Whole-body vibration – Vibration in buildings, ISO 2631-4:2001 Whole-body vibration – Rotational motion, ISO 2631-5:2004 Whole-body vibration –Vibration containing shocks, ISO 5349-1:2001 Hand-transmitted vibration – General requirements, ISO 5349-2:2001 Hand-transmitted vibration – Practical guidance, EN 1032:2003 Mechanical vibration - Testing of mobile machinery, ANSI S2.70

Sensors for any HVM rental (Rented Separately)

SEN040F	Triaxial accelerometer used with impulsive testing, including chipping/grinding machines. 1 mV/g with integral filter, use with hand and handle adaptors or in direct mount applications. *Internal filter attenuates high frequency vibrations before sensor circuitry is overloaded.*
SEN041F	Triaxial accelerometerused with standard hand/arm testing, including rotating machines. 10 mV/g with integral filter, use with hand and handle adaptors or in direct mount applications. *Internal filter attenuates high frequency vibrations before sensor circuitry is overloaded.*
SEN026	Triaxial low profile accelerometer used with ADP063 palm adaptor and for glove transmissibility testing. 10 mV/g.
356B41/NC [SEN027]	Triaxial seat pad accelerometer, ceramic shear, 100 mV/g, 0.5 Hz to 1 kHz, 5 ft integral cable to 4-pin connector. *Similar to Larson Davis SEN027. Used for Whole Body testing. Includes removable elastomeric pad. Conforms to ISO 10326-1.*

Accelerometers — Additional rental accelerometers can be used with Human Vibration Meters. Check Pages 6–15 for additional options.

Accelerometers rented separately.
Human interface adaptors included at no charge with rented sensor(s).

ADP080A	"T" Adaptor: Accelerometer held between fingers.
ADP081A	Handle Adaptor: Accelerometer held to the side of the hand.
ADP082A	Clamp Adaptor: Clamp to handle of machine.
ADP063	Palm Adaptor: Measure at the palm / under a glove.


ADP080A


ADP081A


ADP082A


ADP063

Notes for Human Vibration rentals:

- Sensor(s) are rented separately. Popular sensors for the HVM are listed above, but any ICP sensor can be selected from Pages 6–16. If using existing sensors, please contact us to assure that cabling and adaptors interface properly.
- HVM Accessory Bundle: Include model KHVM2-ACC to provide at no additional charge: manual on CD, G4 software as described above, sensor cables and physical adaptors as required.

G4 software — Larson Davis Software for Sound Level Meters, Human Vibration Meters, and Noise Dosimeters allows setup and control, data download, reporting, and data export for HVM200, 730 Series and 821 Series LD instruments on this page

Larson Davis Spartan Series Workplace Noise Solutions

The wireless Spartan Noise Dosimeters Models 730 and 730IS offer faster, easier measurements via reliable hardware and the user friendly LD Atlas™ app. All essential measurement tasks, from test setup to sending reports, can be done from your mobile device.

– Completely wireless operation, charging, and data download powered by Bluetooth
– LD Atlas app offers test setup, monitoring, data review, and reporting via mobile device
– Accurate data collection with built-in bump and motion detection, available event sound recording and octave band filters

Notes on firmware options
730-ESR Sound Recording firmware for noise source identification and 730-OB1 1/1 octave band filters for frequency analysis

K730	Spartan 730 noise dosimeter kit with one dosimeter, wind screen, and two clips. 40 hour runtime between charges typical.
K730IS	Spartan 730IS intrinsically safe noise dosimeter kit adds various ATEX/IECEx/UKCA/MSHA for explosive environments. 30 hour runtime between charges typical.

Larson Davis Spartan Sound Level Meters offer a great solution for industrial noise measurements, site surveys and plant sound maps.

K821IH-D	Spartan 821IH-D Class 1 sound level meter kit for Occupational Health and Safety testing, with logging up to 1 s, and selectable 1/1 or 1/3 octave.

Notes for Spartan Series rentals

	730 and 730IS dosimeters	821IH sound level meter
Multipack Rentals	10% discount for (5) or more dosimeters	-
Minimum Rental Period	2 days	7 days
Long Term Rates	Weekly rates are shown. Longer term rentals offered at a lower daily rate than 7-day rates shown.	
Accessory Bundle	Order KSPARTAN-ACC to include a manual set, calibrator and necessary adaptor(s)	
Software	LD G4 Utility software included for unit setup / download and reporting at no charge with Accessory bundles above. Requires Windows computer with Admin rights access to install.	
Cases	Dosimeter cases are included with wireless charging pads and North American wall plugs by default	Carrying case included
Standards met	ANSI S1.25-1991 (R2017), IEC 61252 Ed. 1.2, ANSI/ASA S1.11-2014; IEC 61260-1:2014 Class 1	ANSI S1.4-2014 Class 1, IEC 61672-1:2013 Class 1 ANSI S1.25-1991, IEC 61252:2017 ANSI S1.11-2014 Clas 1, IEC 61260:2014 Class 1
Compliance	OSHA, MSHA, ACGIH, and ISO 9612, EU Directive 2003/10/EC	-

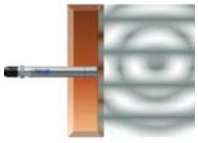
Microphones are tuned for three basic acoustic field types; free-field, random incidence, and pressure. The acoustic field response that is optimal for a microphone dictates the microphone designation. Details on each type are as follows:

Free-field

Designed for use in an environment without reflections. Anechoic rooms and outdoor spaces without structures are good examples of a free-field. A free-field microphone has a flat frequency response with respect to any source whose primary direction is collinear (0° angle of incidence) with the acoustic axis of the microphone.

Random

Designed for use in areas where the sound field comes from any direction and have very uniform directivity characteristics. Random incidence microphones are best for use in reverberant rooms and manufacturing floors where many sound sources are present.



Pressure response

These are used in a similar manner as a pressure transducer, flush mounted in a wall or coupler. It is unique in that the microphone is not designed to be in the sound field. Pressure microphones are not tuned to compensate for the microphone being part of the field and are commonly used as calibration transfer standards

- Highlighted product or spec
- ICP® microphones

Note: These units operate via standard ICP Power. Microphone and preamplifier are required.

Precision Condenser Microphone/Preamplifier Pairs from PCB

	Mic	Preamp	Type	Sensitivity (mV/Pa)	Freq Response (± 2 dB)	Dynamic Range (dB re: 20 µPa)	Connector Type
378C01	377C01	426B03	Freefield	2	5 Hz – 80 kHz	53 – 162	10-32
378A06	377A06	426E01	Freefield	12.6	3.15 Hz – 40 kHz	22 – 150	BNC
376B02	377B02	426A13 (short)	Freefield	50	3.75 Hz – 20 kHz	18.5 – 135	10-32
378B02	377B02	426E01	Freefield	50	3.15 Hz – 20 kHz	18.5 – 135	BNC
HT378B02	377B02	HT426E01 (high temp)	Freefield	50	3.15 Hz – 20 kHz	18.5 – 135	BNC
378A07	377A07	426E01	Freefield	50	0.13 Hz – 20 kHz	23 – 134	BNC
379A12	ruggedized pair		Freefield	50	3.75 Hz – 20 kHz	15.5 – 137	BNC
378A04	matched system		Freefield	450	10 Hz – 16 kHz	6.5 – 80	BNC
378A12	377A12	426B03	Pressure	0.25	5 Hz – 20 kHz	60 – 182	10-32
378C10	377C10	426B03	Pressure	1	5 Hz – 70 kHz	53 – 174	10-32
378A14	377A14	426A05	Pressure	1	4 Hz – 70 kHz	50 – 173	10-32
378C13	377C13	426E01	Pressure	12.6	3.15 Hz – 20 kHz	22 – 150	BNC
378A21	377A21	426E01	Random Inc.	12.6	4 Hz – 25 kHz	22 – 150	BNC
378C20	377C20	426E01	Random Inc.	50	3.15 Hz – 12.5 kHz	20 – 135	BNC
HT378C20	377C20	HT426E01 (high temp)	Random Inc.	50	3.15 Hz – 12.5 kHz	20 – 135	BNC

Precision Condenser Microphone Cartridges

0 V microphone shown including the popular 1/2" 377B02 and 1/4" 377C01 mate with 426 Series Preamplifiers in section below, and are powered with ICP®

	Manufacturer	Diameter (in)	Type	Sensitivity (mV/Pa)	Freq Response (±2dB)	Dynamic Range (dB re: 20 µPa)	Polarization Voltage (V DC)
377C01	PCB	1/4	Freefield	2	4 Hz – 80 kHz	35 – 170*	0
377B02	PCB	1/2	Freefield	50	3.15 Hz – 20 kHz	15 – 146*	0
377A06	PCB	1/2	Freefield	12.6	3.15 Hz – 31.5 kHz	20 – 160*	0
377A07	PCB	1/2	Freefield	50	0.07 Hz – 20 kHz	15 – 147*	0
377A12	PCB	1/4	Pressure	0.25	4 Hz – 20 kHz	65 – 178*	0
377C10	PCB	1/4	Pressure	1.0	4 Hz – 70 kHz	35 – 174*	0
377A14	PCB	1/4	Pressure	1.0	4 Hz – 70 kHz	35 – 178*	0
377C13	PCB	1/2	Pressure	12.6	3.15 Hz – 20 kHz	18 – 162*	0
377B11	PCB	1/2	Pressure	50	3.15 Hz – 10 kHz	15 – 146*	0
377A15	PCB	1	Pressure	50	5 Hz – 8 kHz	11.5 – 150	0
377C20	PCB	1/2	Random Inc.	50	3.15 Hz – 16 kHz	15 – 144*	0
377A21	PCB	1/2	Random Inc.	12.6	4 Hz – 25 kHz	20 – 162*	0

* - When used with ICP® power, reduce upper dynamic range level by about 8 dB

200 V Precision Condenser Microphone Cartridges

200 V microphones shown require the use of a separate power supply as shown in the Traditional Microphone Power Supply table on the following page.

	Manufacturer	Diameter (in)	Type	Sensitivity (mV/Pa)	Freq Response (±2dB)	Dynamic Range (dB re: 20 µPa)	Polarization Voltage (V DC)
377C41	PCB	1/2	Freefield	44.5	4 Hz – 20 kHz	15 – 146	200
2570	Larson Davis	1	Freefield	50.7	2.6 Hz – 18 kHz	10 – 146	200
2575	Larson Davis	1	Pressure	45.5	4 Hz – 8 kHz	10 – 146	200
377A60	PCB	1/2	Random Inc.	50	3.15 Hz – 10 kHz	15 – 146	200
40BI**	GRAS	1/4	Intensity Pair	3	IEC 651 Type 1	40 – 168	200
40AI**	GRAS	1/2	Intensity Pair	25	IEC 651 Type 1	21 – 152	200
40AK**	GRAS	1/2	Intensity Set	25	IEC 651 Type 1	21 – 152	200

** - Intensity microphone pair rentals include a pair of microphones and preamplifiers, Intensity set rentals, add spacers and adaptors

Preamplifiers

	Manufacturer	Diameter (in)	Connector	Use With	Additional Notes
426E01	PCB	0.5	BNC	1/2" 0 V (Prepolarized) Mics / ICP power	
HT426E01	PCB	0.5	BNC	1/2" 0 V (Prepolarized) Mics / ICP power	For high temp to 120 °C (248 °F)
426B03	PCB	0.25	10-32	1/4" 0 V (Prepolarized) Mics / ICP® power	
426A14	PCB	0.25 & 0.5	3-Pin XLR	Phantom Powered Systems	
PRM902	Larson Davis	0.5	LEMO 1B 7 pin	LD 824 and traditional microphone power	

Traditional Microphone Power Supplies (To condition 130 series array and precision 0 V polarized mics, use ICP power shown on Page 18 and 19)

	Manuf.	Channels	Gain (dB)	Weighting	Inputs/Outputs	Power	Notes
2200C	Larson Davis	2	-30 to +40 in 10 dB steps	A, C or flat	Switchcraft 5 pin male / BNC	Battery/ Line	Dual output allows simultaneous flat and weighted measurements
2210	Larson Davis	10	0 to +42 in 2 dB steps	A, B, C, flat	LEMO 7 pin/ 25pin D to BNC	Battery/ Line	Selectable highpass and lowpass filtering

Microphone Cabling

EXA Series	7 pin LEMO extension cable. EXA010 10 ft (3 m) EXA020 20 ft (6 m) EXA100 100 ft (30 m)
EXC Series	5 pin Switchcraft used with 831 and LxT. EXC010 10 ft (3 m) EXC020 20 ft (6 m) EXC050 50 ft (15 m) EXC100 100 ft (30 m)
Coaxial Cables	BNC and 10-32 cabling for ICP compatible microphones – refer to Page 10 for details/pricing

Underwater Acoustics and Marine Mammal Noise Measurements

Pictures not shown to scale


K831C-MM


TC4013


EC6081


Pistonphone


RA0043

K831C-MM Larson Davis Marine Mammal Noise Monitoring System, tests for compliance to Marine Mammals Protection Act to thresholds specified by NMFS. Includes SoundAdvisor 831C with ELA and SR options, ADP005 adaptor to connect to PRM831, G4 software with Marine Mammals Protection enabled. *Add hydrophone, cage, pistonphone and cal adaptor separately.*

TC4013 High sensitivity low frequency miniature hydrophone. 1 Hz–170 kHz, -211 dB ±3 dB re 1 V/uPa, 700 meter operating depth, various cable lengths available, cable terminating in LEMO. BNC adaptor included.

Never touch or bend the sensing point (nitrile rubber end) of the hydrophone. The small sensing area is easily damaged, leading to degradation or loss in performance. Shocks (including drops) on hard surfaces may result in damage to the transducer.

Use extreme caution when handling and using hydrophone to allow no damage to the cable. Once the integrity of the cable is compromised, the sensor assembly is likely unrepairable.

TC4013-1	10 ft (6 m)
TC4013-4	30 ft (10 m)
TC4013-5	65 ft (20 m)
TC4013-11	82 ft (25 m)
TC4013-13	98 ft (30 m)
TC4013-8	164 ft (50 m)
TC4013-9	196 ft (60 m)
TC4013-12	328 ft (100 m)

TL8013	Protective cage for TC4013 hydrophone
EC6081	VP2000 single ended Voltage Preamplifier for hydrophones, with 6-level gain and 12 high- and 12 low-pass filters. High input impedance allows for low frequency measurements. Includes 1 meter TL8088 DC supply cable, 3-pin female to universal plugs for DC power.
394A40	Pistonphone, 114.0 (± 0.08) dB output at 250 Hz, 1/2" opening.
42AC	Pistonphone, 134 dB (±0.1) dB output at 250 Hz, 1/2" opening.
RA0043	Pistonphone coupler for TC4013 hydrophone.

Specialty Acoustics

Ultra Low Noise ICP® Microphone

378A04
1/2" Prepolarized Ultra Low Noise Microphone/Preamplifier System for free-field applications, 5.5 dBA typical noise floor. Requires 4 mA ICP power, 5 Hz – 20000 Hz ±4 dB , BNC connector, includes TEDS.

Array Microphones

130A24
ICP® Water Resistant Array Microphone and preamplifier, 10 mV/Pa, 20 Hz – 16000 Hz ±2 dB range, BNC jack connector, IP55 rated, Includes TEDS.

130F22
ICP® Array Microphone with integral preamplifier, 1/4" diameter, 10 Hz – 20 000 Hz ±4 dB, SMB jack connector, includes TEDS. Inherent Noise: 29 dB re 20 µPa. 3% Distortion Limit: 122 dB.
Use with 079B10 mic clip, 079A07 windscreen, ADP109 cal adaptor, rented separately

130F20
ICP® Array Microphone with integral preamplifier, 1/2" diameter, 10 Hz – 20 000 Hz ±4 dB, BNC jack connector, includes TEDS. Inherent Noise: 29 dB re 20 µPa. 3% Distortion Limit: 122 dB.
Use with 079A11 mic clip, 079A06 windscreen, ADP109 cal adaptor, rented separately.

130F21
ICP® Array Microphone with integral preamplifier, 1/4" diameter, 10 Hz – 20 000 Hz ±4 dB, 10-32 jack connector, includes TEDS. Inherent Noise: 29 dB re 20 µPa. 3% Distortion Limit: 122 dB.
Use with 079B10 mic clip, 079A07 windscreen, ADP109 cal adaptor, rented separately.

Surface Microphone

130B40
Low-profile surface pressure microphone and preamplifier, prepolarized, 20 Hz – 20 000 Hz ±6 dB. *Used to measure surface noise measurements where wind is prevalent including automotive and aerospace wind tunnel testing.*

Sound Intensity

MEZZO 1
SoftdB MEZZO Intensity Probe per IEC 61043 (1993) standard with real time signal processing, standard 1/1, 1/3, 1/24 octave real-time digital filters and FFT analysis. Signal processing is built in to the probe. Intensity Analyzer Software included on a system controller with rentals.

GRAS Intensity Probe
GRAS Intensity Probe with probe handle, microphones, spacers.

I-Track
MEZZO I-Track System combines acoustic data provided by a MEZZO Probe with a calibrated Wide-Angle Digital Camera to provide a fast and easy high-definition sound image performed in a few minutes. The optical tracking system precisely locates the sound intensity probe. Sound intensity, pressure and PI index levels can be plotted for every frequency band as well as for global level. Correspondingly, the associated spectrum shows the spatial average of pressure, intensity, PI index (F3), P|I| index (F2), Extraneous sources index (F3-F2) and sound power. Includes camera, tracking pad with holder, cabling, case, and I-Track Module license.

High Temp Acoustics

HT426E01
High temperature 1/2-inch preamplifier for prepolarized microphones. *Mates with any 377 Series 0 V microphones to allow use in temperatures to 125 °C/257 °F, powers with ICP.*

377B26
ICP® Probe Microphone for tight spaces or high temp, near-field, exhaust testing, acoustic impedance measurements and more. Wide frequency range with calibration provided compared to 20 kHz compared with competitive units spec'd to 8 kHz.

Sound Camera

CAE SoundCam
64-channel acoustic camera system with Carry Case, Tripod and Headphones. Beamforming from 800 Hz to 24 kHz combined with optical camera, ideal for room and building acoustics, NVH and Buzz/Squeak/Rattle, Soundproofing verification and noise localization.

Frequently Asked Questions Concerning Sound Level Meters

- ***What Standards are to be met? What Class of Meter should be used?***

  All 821 and 831 units offered comply with current IEC, ANSI and DIN standards* for Sound Level Meters. A Class 1 higher accuracy, performance and calibration requirements. A Class 1 meter offers many benefits including the best accuracy over a wide frequency range and is generally recommended for a wide range of testing including Environmental Noise Monitoring, Building Acoustics, for Consulting Projects, and even Workplace Noise testing. Class 1 is also a requirement for any case that may involve litigation. [*Specifically IEC 60651:2001, IEC60804:2000, IEC61260:2014, IEC61672-1:2013, ANSI S1.11-2014, ANSI S1.4-2014, ANSI S1.43-1997 and DIN 45657. Dosimetry per IEC 61252:2017 and ANSI S1.25-1991 where applicable. Meters also meet additional safety standards, with additional details available.]

- ***What is measured?***

  Rental 721, 821 and 831C meters can measure:
  - Acoustic levels including Lmax, Lmin, Lpeak with occurrence date and time
  - Acoustic Averages (Equivalent Level Leq, Sound Exposure LE)
  - 721 and 821: 1/1 or 1/3 Octave Band (Leq, Lmax, Lmin), 831C: 1/1 and/or 1/3 with installed OB3 option
  - Simultaneous RMS and Peak Frequency Weighting: A, C and Z (unweighted)
  - Simultaneous RMS and Peak Frequency Weighting: A, C and Z (unweighted) and Detectors (Slow, Fast and Impulse)
  - Statistical Ln (6 user-selectable Ln s), including spectral Ln
  - Community Noise (LDN, LDEN, LDay, LEve, LNight)
  - Sound Exposure including LXVE, Lxavg, TWA(8), Dose, Projected Dose, SEA, and more
  - Record audio files for post processing and to determine noise sources/events (optional, only 831C can record continuously)
  - **821 only:** Option to compute, display and report NC and RC curves
  - **831C only**: Record audio files to determine noise source (optional)
  - **831C only**: Option to remotely connect and access data and make changes to the meter settings
  - **831C only**: Optional weather sensor for wind speed, gust speed, direction, temperature, humidity, barometric pressure
  - **831C only**: Option for location latitude, longitude, elevation with GPS

  Additional parameters are described in each meter's Selection Guide, available online.

- ***How often can each measurement be stored?*** Internally or on attached USB.

  Rental meters store three main bins of data, even simultaneously if needed:
  - Time History: stores fast measurements, available in a time range from 100 ms to 24 h time on 831C, 100 ms to 1 h on 721/821. Many parameters also available in 2.5 ms to 50 ms blocks on 831C.
  - Measurement History: long-term trends over time, selectable 1 m to 24 h on 831C, 1 m to 6 h on 721/821.
  - Events / Exceedances: additional storage when levels exceeded for minimum duration, based on fixed or dynamic threshold levels

- ***What are power options?***

  Rental meters can power via internal batteries, AC wall power or USB port of a computer with included adaptors. Outdoor systems have options to power via external DC, D-cell packs, or sealed lead acid rechargeable with or without a solar panel.

- ***How is data accessed?***

  With adequate power, units can be left out for weeks or longer and continue to take data.
  - All meters offer download via USB cable or USB memory stick
  - 721 and 821 units can also connect and download data via Bluetooth
  - 831C-based systems also can connect via cellular, WiFi and wired networking options are available to provide real time email or text alerts when levels are exceeded, and to download data remotely or to automatically push data files to SFTP or Dropbox

- ***Can I rent a calibrator? An extra long microphone extension cable?***

  With any sound meter rental, an accessory kit is provided at no additional charge. This includes a link to electronic manual sets, utility software to set up meters, calibration certificates, and a single calibrator is included as well. A 10ft (3m) cable is typically included for handheld rental meters, 20ft for outdoor kits, but specify if a particular length is required. Additional items are available for rent.

- ***Is meter setup and/or download service available?***

  Yes! Use SLM-DL code to add this, hourly rate for service.

- ***Is any particular equipment suggested for particular applications?*** Some Suggestions:

  Handheld Walkaround Analysis, Quick Testing

  $
  - **K821ENV-D** for most standard measurements, options to add Event Sound Recording and Industrial hygiene metrics

  Environmental Noise Monitoring (Community, Traffic, Airport, Rail, Construction, Mining, Industrial, Stadium, Wind Farm, Quiet Space):

  $$
  - For most testing (20 to 140dB measurement range): **KNMS048** 821-based kit. Includes 1/1, 1/3 octave capability, monopole or tripod, options for event sound recording and power

  $$$
  - Same as above but with more options including Weather data, GPS data, more flexible Sound Recordings for events and more **831C**-based kits offer flexibility to add many advanced options
  - Fully featured outdoor system plus remote monitoring and/or email and/or text alerts: **NMS044-SLA100*** 831C-based kit with solar panel for remote connectivity via WI-FI, Ethernet, or Cellular (add on 831C-SIM to include cellular data)
  - Extremely quiet measurements (down to 6.5 dBA!) for Product Testing, Environmental Anechoic Chambers, Quiet Spaces, etc.. **831C-LOWN-UPG** to add low noise **378A04** microphone/preamplifier to any 831C kit

  Building Acoustics / Room Acoustics (Architectural, Reverb Time, Sound Insulation, Classroom, etc.):
  - **K821ENV** 821-based kit, add X21-RCRC option for NC and RC measurement and reporting
  - **K831C** 831C-based kit with 831C-RA advanced Room Acoustics option. Additional options include hardware including Tapping Machines and Sources are shown on Page 46, and DNA Software for reporting and additional analysis.

  Occupational Noise Evaluation / Safety & Health:
  - Wearable **Spartan Wireless** noise dosimeters are on Page 35 for personal noise dose surveys.
  - **K821IH-D** 821IH-based kits for workplace noise exposure assessments and plant noise surveys.

  Firearm and Suppressor Acoustic Analysis:
  - **K821-QPR** 821-based kit with microphone designed to measure very high levels associated with ballistics and gunfire testing.

Ordering Notes

Don't forget to add any cables, mounting accsssories, or other items you may need for your test! Take a look at our FAQ (Page 4) or Process Details (Page 5). To request a quote or place an order, please email the rental team at rentalteam@modalshop.com or call 513.351.9919.

Model	QTY	Rental Period Length (7-day minimum for most items)	Notes

Sound Level Meter Overview and Selection

The Modal Shop offers a complete range of Larson Davis Sound Level Meters. Selecting the proper sound level meter testing system is one of the most important aspects of any sound test. The Modal Shop's Rental Program offers proven solutions with a variety of capabilities and kit configurations. Meters are available for both short- and long-term rentals. Every meter offered is an integrating unit that logs data (including Leq, Lmax, Ln s), meets Class 1 standards, and connects to a PC to setup and download data. First, a few points for each meter that answer some common questions:

The Model **831C** provides the most versatility with internet connectivity options and extensive software features making it an ideal choice for handheld operation and long-term environmental monitoring. Unattended monitoring projects are simplified with the ability to connect to the internet via Wi- Fi, Ethernet, or Cellular to change measurement parameters, download data remotely, and receive real-time alerts.

Model **821ENV** offers a basic meter with a simple user interface ideal for handheld or unattended environmental testing. Rental units include the ability to capture 1/1 or 1/3 octave data. Outdoor kit configurations are available. Options for Event Sound Recording and NC/RC Curves are available.

Model **LxT** is generally superseded by the 821 which offers better dynamic range, a simplified user interface and more options. We do continue to offer the LxT to legacy LxT users.

Model **831** is generally used for legacy users expanding capability with existing 831 meters. It provides a good solution for unattended environmental monitoring without remote connectivity.

Sound level meters are rented from TMS as complete kits (indicated by a "K" prefix before the Larson Davis model number) and as complete outdoor NMS (Noise Monitoring Station) systems. Rental kits include a microphone, preamplifier, microphone extension cable, windscreen, internal batteries, and calibration information. 821 and 831C units also include a hard case and AC line power supply. See individual meter pages for more details.

In addition, unless otherwise specified or arranged, all Sound Level Meter kit rentals of any quantity include Quantity 1 of the following line item at no charge. It appears as 100% discount for the line item and will not be charged for the duration of the paid meter kit rental:

Complimentary Accessory Bundle:

KSLM-ACC Standard accessory kit for SLM rental, includes manual sets, utility software for setup and data download (1 for each family of meter rented) with interface accessories, and a single calibrator. Contact The Modal Shop if additional items required.

Sound Meter Capability/Comparison *(Additional detail and specification shown on following page; even more detail available online)*

Features	831C	821	831	LxT1
Dynamic Range	>120 dB	>120 dB	>120 dB	>100 dB
Internal Memory (as rented)	2 G	8 G	2 G	2 G
Time History (Data Logging, including Leq and Lmax)	●	●	●	●
Measurement History (Intervals, including Ln data)	●	●	●	●
Exceedance History	●	●	●	-
1/1 and/or 1/3 Octave	○	○*	○	○
Sound Recording (events, timed, manual, and more)	○	○	○	-
Real-Time Email and Text Alert	●	-	○	-
Schedule run/stop times, modem usage, and alert type and recipient	○	-	-	-
WiFi / Ethernet	●	-	-	-
Supports USB Hub	●	●	-	-
FFT (narrowband frequency analysis)	○	-	○	-
Voice Annotation	●	-	○	○
Room Acoustics (RT60 and more)	○	-	○	-
Compute, Display and Report NC and RC curves	-	○	-	-
Audiometry (hearing level, FM, pulse, THD and more)	○	○	-	-
Industrial Hygiene Parameters (Dose)	-	○	●	●
Microphone Extension Cable	●	●	●	●
Source Output	○	-	○	-
Setup and Download Software	●	●	●	●
DNA Data Navigation and Analysis software	○	○	○	○
Outdoor Kits Available	○	○	○	○
GPS and NTS Time Sync	○	-	○	-
USB Memory Stick Data Transfer	●	-	●	○

* - Standard with rental, optional with purchase

● standard with rental ○ optional - not available

Complimentary Accessory Bundle *Included at no charge with all sound meter rentals*

KSLM-ACC Standard accessory kit for SLM rental, includes manual sets, utility software for setup and data download (1 for each family of meter rented) with interface accessories, and a single calibrator. Contact The Modal Shop if additional items required.

Preconfigured 821-Based Kits *Full details and pictures of items included in kits are shown online*

K821ENV-D SoundExpert 821 handheld kit with full-featured logging and selectable 1/1 and 1/3 octave. Includes microphone, preamplifier, extension and connectivity cabling, windscreen, handheld case and more.

K821-QPR SoundExpert 821 handheld kit for impulsive or high level sounds

821-Based Kits for Unnattended Monitoring *Full details and pictures of items included in kits are shown online*

KNMS048 SoundExpert 821-based outdoor Noise Monitoring Kit with full-featured logging and selectable 1/1 and 1/3 octave. Includes microphone and preamplifier with environmental protection, and accessories. Select tripod, battery options and/or line power.

Power Options for KNMS048
Select one of the three to the right for above kit

Options	Description
821-P1	Indoor use AC/DC power option for Larson Davis 821/721. Includes 21Ah battery BAT011, PSA040 charger and cabling.
821-P2	Outdoor AC/DC power option for Larson Davis 821/721. Includes 21 Ah battery BAT011, outdoor rated AC power supply PSA039, charge controller and connecting cables.
821-P3	D-Cell battery option for Larson Davis 821/721. Includes BAT024 that holds 6 or 12 D-Cell batteries (batteries not included).

KNMS048-SLA-S SoundExpert 821-based outdoor Noise Monitoring Kit with solar power. Includes full-featured logging and selectable 1/1 and 1/3 octave, microphone and preamplifier with environmental protection, and accessories.

Preconfigured 831C SoundAdvisor Kits *Full details and pictures of items included in kits are shown online*

K831C-L Larson Davis 831C Logging Analyzer Kit. Includes LOG, and ELA firmware, selectable microphone, preamplifier, windscreen, WiFi Dongle (DVX014), line power supply, case, calibration data, and 4 internal AA batteries.

K831C Same as K831C-L, but adds OB3 firmware

K831C-H Same as K831C-L, but adds OB3 and SR firmware

Low Noise 831C Upgrade *Full details and pictures of items included in kits are shown online.*

831C-LOWN-UPG Upgrade 831C kit with 378A04 microphone, ADP074 ICP® adaptor, and user selectable cable length to measure to 6.5 dBA.

831C-based Kits for Unattended Monitoring *Full details and pictures of items included in kits are shown online.*

NMS044-SLA100 Complete 831C based noise monitoring system capable of remote data access, email and text alerts when connected to internet via Ethernet, Wi-Fi, or Cellular network. Solar panel included to charge battery allowing system to run indefinitely. Includes Model 831C, with LOG and ELA firmware, PRM2103-FF, EPS044-SLA, EPS2116, SLP002 (solar panel) with charge controller & necessary cables. For use when solar insolation > 1 kW•h/m2/day. Cellular SIM card not included. *See Standard Outdoor Kit Components on the following pages.*

831C-SIM 4G Wireless SIM card for 831C based systems. Data plan with public IP address. International, roaming and overage charges may apply.

NMS-831C-L Outdoor Logging Noise Monitoring System. Includes 831C meter with LOG, ELA, and firmware, microphone, preamplifier, user selectable tripod, EPS2116 environmental protection kit, and battery case. *See Standard Outdoor Kit Components on the following pages.*

NMS-831C Same as NMS831C-L, but adds OB3 firmware

NMS-831C-H Same as NMS831C-L, but adds OB3 and SR firmware

Preconfigured 831-based Kits *Full details and pictures of items included in kits are shown online*

K831L Larson Davis 831 Logging Analyzer Kit. Includes LOG, ELA, and IH firmware, microphone, preamplifier, windscreen, line power supply, case, calibration data, and 4 internal AA batteries.

K831 Same as K831L, but adds OB3 firmware

K831H Same as K831L, but adds OB3 and SR firmware

831-based Kits for Unattended Monitoring *Older systems for existing users.*

NMS-831L Outdoor Logging Noise Monitoring System. Includes 831 meter with LOG, ELA, and IH firmware, microphone, preamplifier, user selectable tripod, EPS2116 environmental protection kit, and battery case. *See Standard Outdoor Kit Components on the following pages.*

NMS-831 Same as NMS-831L, but adds OB3 Firmware

NMS-831H Same as NMS-831L, but adds OB3 and SR Firmware

Preconfigured LxT-Based Kits *Older systems for existing users.*

KLxT1L Larson Davis LxT1 Logging Analyzer Kit. Includes CN, LOG and ENV firmware, microphone, preamplifier, windscreen, line power supply, case, calibration data, internal batteries and charger.

KLxT1H Same as KLxT1L, but adds OB3 firmware

KLxT-QPR Larson Davis LxT Sound Level Meter Kit for Firearms Acoustic Analysis with 1/4" microphone for impulsive and/or high-level sounds. Includes preamplifier (PRMLXT1) and adaptors (ADP043+ADP024). Add LXT-ENV option to allow reporting.

NMS-SE-FF Noise Monitoring System with SoundExpert LxT Class-1 SLM, 377B02 freefield mic (random incidence available), EPS042 enclosure (uses 8 D-Cell batteries), EXC010 cable, EPS2116 outdoor protection. *(Outdoor kit for unattended monitoring. Provides up to 17-day use. Tripod rented separately.,*

Customize or Build to Order 831C rental kits

Modify any K831C or NMS kit on the previous page with the items below to fit a specific test. If preferred, start with a base model and add items as required.

831C-BTO Base Model 831C SoundAdvisor™ rental. Includes meter with 2 GB memory and case.
Build your own rental by adding options below.

Firmware Any options can be added or removed	For Rental Kits - ● standard ○ option	K831CL	K831C	K831CH	NMS831C-L	NMS831C	NMS831C-H	NMS044-SLA100-U
831C-LOG	Logging of time histories (increments from 20 ms to 24 h).	●	●	●	●	●	●	●
831C-ELA	Measurement History adds exceedance/event logging, intervals, and daily histories.	●	●	●	●	●	●	●
831C-OB3	Selectable real time 1/1 and/or 1/3 octave filter set.	○	●	●	○	●	●	○
831C-SR	Sound Recording includes level and dynamic based event recording and more.	○	○	●	○	○	●	○
831C-SW	Direct support of Sierra Wireless RV-50 gateway	●	●	●	●	●	●	●
831C-SCH	Scheduling to control run/stop, alerts, thresholds and modem power	○	○	○	○	○	○	○
831C-AUD	Audiometer calibration per ANSI S3.6, IEC 60645, ANSI S3.7 and ANSI S3.1	○	○	○	○	○	○	○
831C-FFT	FFT analysis with tonal assessment in acoustic and engineering units	○	○	○	○	○	○	○
831C-RA	Room Acoustics including reverberation time (RT60) on the meter	○	○	○	○	○	○	○

831C specification in detail

System measurement range: A: 17–140 dB, Z: 24–140 dB ; System noise floor: A: 16 dB, Z: 23 dB with 377B02 microphone; Linearity range: A: ≥ 117 dB to 140 dB

Time weightings: Slow, Fast, Impulse, Integration and Peak simultaneously, Linear or Exponential Integration (Slow, Fast or Impulse); Frequency weightings: A, C, Z simultaneously; Ln Statistics (L0.01-L99.9), Voice notes and sound recording available, USB connectivity plus AC/DC outputs to recorder, >8 hours with (4) fast recharging AA batteries (included), 2 GB unit holds over 400 M Leq histories or 4 M 1/1- and 1/3-octave measurements

Standards met: Sound Level Meter: IEC61672-1 Ed. 2.0 (2013) Class 1, Group X; IEC60651 Ed 1.2 (2001) + Am. 1 (1993-02) and Am. 2 (2000-10) Type 1, Group X; IEC60804 (2000-10) Type 1, Group X; ANSI S1.4-2014, Class 1; ANSI S1.43-1997 (R 2007) Type 1; DIN 45657. **Octave Filter:** IEC61260 Ed. 2.0 (2014), Class 1, All filters; ANSI S1.11-2014 Class 1, All filters.

Customize or Build to Order 821 rental kits

Modify any K831C or NMS kit on the previous page with the items below to fit a specific test. If preferred, start with a base model and add items as required.

Firmware Any options can be added or removed	For Rental Kits - ● standard ○ option	K821ENV-D	K821-QPR	KNMS048
X21-OB3	Add 1/1 and 1/3 octave filters (Included on rental kits).	●	●	●
X21-NCRC	Enables computation, display and reporting of NC and RC curves.	●	○	●
X21-SR	Adds sound recording triggered on exceedance or logic input.	○	○	○

821 specification in detail

System measurement range: A: 17–140 dB typical, Z: 25–140 dB ; System noise floor: A: 17 dB, Z: 25 dB with 377B02 microphone; Linearity range: A: ≥ 116 dB (24-140 dB), C: >113 (27-140), Z: >103 (37-140) Time weightings: Slow, Fast, Impulse, Integration and Peak; Frequency weightings: A, C, and Z simultaneous; Ln Statistics (L0.01 through L99.9 available); USB connectivity plus AC/DC outputs to recorder, >40 hours continuous measurement with internal battery (screen off, 1s or slower time history), 12 hours with screen on and fast 0.1s time history), 8 GB removable MicroSD card memory allows for months of measurements.

Standards met: Acoustic: IEC61672-1:2013-05 Class 1, ANSI S1.4-2014 Class 1, ANSI S1.43-1777 Type 1, IEC 60651:2001 Type 1, IEC 60684:2000 Type 1. Filters per ANSI S1.11-2014 Class 1, IEC 61260-1:2014 Class 1 **Noise Dosimetry** (when used): ANSI S1.25-1991, IEC 61252:2017, Approvals: CCE, RoHS, WEEE

Customize or Build to Order 831 rental kits

Modify any K831 or NMS kit on the previous page with the items below to fit a specific test. If preferred, start with a base model and add items as required.

831-BTO Base model 831 rental. Includes meter with 2 GB memory and case.
Build your own rental by adding options below.

Firmware Any options can be added or removed	For Rental Kits - ● standard ○ option	K831L	K831	K831H	NMS-831L	NMS-831	NMS-831H
831-LOG	Logging of time histories (increments from 20 ms to 24 h).	●	●	●	●	●	●
831-ELA	Measurement History adds exceedance/event logging, intervals, and daily histories.	●	●	●	●	●	●
831-OB3	Selectable real time 1/1 and/or 1/3 octave filter set.	○	●	●	○	●	●
831-SR	Sound Recording includes level and dynamic based event recording and more.	○	○	●	○	○	●
831-FST	Fast logging of time histories, adds 2.5, 5 and 10 ms speeds (requires LOG and OB3).	○	○	○	○	○	○
831-RT	Reverberation Time for room acoustics per ISO 3382-2:2008 and ASTM E2235-04.	○	○	○	○	○	○

831 specifications in detail

System measurement range: A: 28–140 dB, Z: 35–140 dB ; System noise floor: A: 18 dB, Z: 23 dB with 377B02 microphone; Linearity range: A: ≥ 115 dB to 140 dB

Time weightings: Slow, Fast, Impulse, Integration and Peak simultaneously, Linear or Exponential Integration (Slow, Fast or Impulse); Frequency weightings: A, C, Z simultaneously; Ln Statistics (L0.01-L99.9), Voice notes and sound recording available, USB connectivity plus AC/DC outputs to recorder, >8 hours with (4) fast recharging AA batteries (included), 2 GB unit holds over 400 M Leq histories or 4 M 1/1 and 1/3 octave measurements

Standards met:Sound Level Meter: IEC61672-1 Ed. 1.0 (2002-05) Class 1, Group X; IEC60651 Ed 1.2 (2001) + Am. 1 (1993-02) and Am. 2 (2000-10) Type 1, Group X; IEC60804 (2000-10) Type 1, Group X; ANSI S1.4-1983 (R 2006) + Am.S1.4A-1985 (R 2006) Type 1; ANSI S1.43-1997 (R 2007) Type 1. **Octave Filter:** IEC61260 Ed. 1.0 (1995-08) + Am. 1 (2001-09), 1/1- and 1/3-octave Bands, Class 0, Group X, all filters; ANSI S1.11-2004 Class 1. **Noise Dosimeter:** IEC61252 Ed. 1.1 (2002-03) Type 1; ANSI S1.25-1991 Class 1

Notes about LXT rental kits

LxT kits can be modified to add/remove options for Logging, Environmental Data Logging/Ln stats, 1/1 and/or 1/3 octave, and Community Noise Ldn, Lden.

LxT specifications in detail

System measurement range: A: 39–140 dB, Z: 44–140 dB ; System noise floor: A: 29 dB, Z: 34 dB with 377B02 microphone; Linearity range: A: ≥ 104 dB to 140 dB; all values lower when PRMLxT1L low noise preamplifier used.

Time weightings: Slow, Fast, Impulse, Integration and Peak; Frequency weightings: A, C, Z; Voice message annotation available via ACC003; Ln Statistics (L0.01 through L99.9 available); USB connectivity plus AC/DC outputs to recorder, >16 hours continuous measurement with (4) fast recharging AA batteries (included), 256 MB unit holds up to 62 M Leq time histories, 1.3 M 1/3 octave, or 3.6 M dose measurements

Standards met:
Sound Level Meter: IEC61672-1 (2002-05) Class 1, Group X, IEC60651 (1979) plus Am. 1, (1993-02) and Am. 2 (2000-10) Type 1, Group X, IEC60804 (2000-10) Type 1, Group X, ANSI S1.4-1983 (R 2006) plus Am. S1.4A-1985 (R 2006), Type 1, ANSI S1,43-1997, Type 1 **Octave Filter(where applicable):** IEC61260 Ed. 1.0 (1995-07) plus Am. 1 (2001-09), 1/1- and 1/3-octave Bands, Class 0, Group X, all filters; ANSI S1.11-2004 Class 1. **Personal Noise Dosimeter:** IEC61252 Ed. 1.1 (2002-03) Type 1; ANSI S1.25-1991 Class 1

831C SoundAdvisor 831 LxT 821

Customize or Build to Order 831 rental kits

Model	Meter Compatibility	Size	Type	Noise Floor (dBA)	Low Range Indicator (dBA)	Overload (dBpk)
377B02		1/2"	Freefield	17.1	26.2	143.5
377C20		1/2"	Random	15.3	24.4	143.5
377C01*		1/4"	Freefield	35.7	44.8	172.3
377C10*		1/4"	Pressure	36.3	45.5	178.8
377A12*		1/4"	Pressure	37.5	48.6	192.8
378A04**		1/2"	Freefield	6.5	--	80/100**

*Requires ADP0109 1/4 inch microphone to 1/2 inch preamp adaptor
**100dB 10Hz – 5000Hz, 80dB for other frequencies. ADP074 and BNC cable required

Preamplifiers

PRM831
Standard Preamp for 831 and 831C for 1/2 inch mics

PRM821
Standard Preamp for 821 for 1/2 inch mics

PRMLxT1
Standard Preamp for LxT for 1/2 inch mics

PRMLxT1L
Low Noise Preamp for LxT for 1/2 inch mics, shifts useable range to 20-120 dB

PRM2103
Permanent Outdoor Preamplifier for Model 831 with Remote Calibration Check, humidity reading and heater, for 377B02 pre-polarized microphone. Requires CBL222-08 or CBL222-20.

ADP074
ICP cable adaptor for LD 831 Sound Level Meter (required for 378A04)

Cabling

EXCxxx 5 pin Switchcraft used with 831 and LxT.

EXC 010	10 ft (3 m)
EXC020	20 ft (6 m)
EXC050	50 ft (15 m)
EXC0100	100 ft (30 m)

CBL222-xx Extension cable for use with PRM2103 and EPS044. Provides data, control, and power via Anderson Powerpole connectors. 8 and 20 ft lengths available.

CBL222-08	8 ft
CBL222-020	20 ft

012Axx BNC-BNC cable for use with 378A04 and ADP074.

012A10	10 ft
012A20	20 ft
012A25	25 ft
012A30	30 ft
012A50	50 ft

Microphone Environemental Protection

KEPS2116
Environmental protection kit for 1/2 in preamplifiers. Includes EPS2116 with windscreen, desiccant and bird spike in custom case with ACC009 monopole and accessories.

EPS2106-2
Environmental protection for 1/2" ICP® preamplifiers (PRMLXT or PRM831) , includes windscreen, bird spikes, desiccants and threaded for 3/4" standard solid-wall PVC conduit thread (FEM)

EPS2108-2
Environmental protection for 1/2 in preamplifiers (PRMLXT or PRM831), with windscreen, bird spikes, desiccants, 1/4-20 thread (FEM) for use with tripods.

Tripods/Mounting Accessories

TRP001
Tripod with 3-way tilt/pan head for use with microphone mounting clips or outdoor microphone environmental protection kits. May support meter weight.

TRP003
Ultimate Support Tripod, max height 8 ft, used in unattended NMS systems, used in general all purpose weather conditions.

079A11
Mounting clip for 1/2" diameter preamp, 1/4-20 thread.

ADP034
Larson Davis adaptor used to connect the EPS2116 to the TRP003 tripod.

ACC010
Monopole for use in systems equiped with SuperClamp mount

079A24
Microphone stand to holder adaptor. 5/8"-27 microphone stand adaptor to 1/4"-20 stud.

079A29
Swivel head, stand to holder adaptor. 1/4-20 threaded base, 1/4"-20 stud to mate to mounting clip (supplied separately)

079C23
Swivel head, stand to holder adaptor. 1/4-20 threaded base, 1/4"-20 stud to mate to mounting clip (supplied separately)

079B10
Microphone holder for 1/4" array and condenser systems, designed to attach to 1/4"-20 stud.

831C SoundAdvisor 831 LxT 821

Meter Environmental Protection Cases

KEPS048
Environmental protection case for SoundExpert 721 and 821. Includes cable port and ADP116 power distribution block

EPS042
Small environmental enclosure kit with BAT015, (8) D-cell batteries included. Typically provides 5 days of operation for 831C, 9 days of operation for 831 and 15 days for LxT

EPS044-SLA
Noise monitor enclosure for 831A and 831C including CCS051, CCS052, BAT020 35 Ah SLA battery, ACC009, PSA038, CBL224-02, CBL225-01, CBL226-02 & CBL228-03

EPS037
Case on wheels (CCS035) with 100 Ah battery (BAT012) for permanent NMS.

Additional Power Accessories

SLP002
Portable folding 100 Watt solar panel with integrated stand and carrying case

CBL143
Model 831C or 831 12V power cable for 2 batteries

PSA039
AC power supply with North American plug, 15 V, 90 W, with MC4 connector for EPS044

PSA029
Model 831C or 831 12V power cable for 2 batteries

SLP004
Solar panel, 30 Watt, for use with SoundExpert 721/821-based EPS048 and NMS048 systems

PSA039
AC power supply with North American plug, 20 V, 90 W, with MC-4 connectors for use with EPS044 & NMS044

KBAT15
(4) AA rechargeable batteries. Batteries may be installed in meter.

PSA031
12 VDC to USB. Converter used with CBL169.

CBL169
External Power Cabling for one External 12 V battery (female cigar lighter)

PSA045
Universal AC power supply with USB-C output connector

PSA047
Solar Charge Controller for use with 721 or 821, 5A

PSA040
Battery Charger for SLA batteries with Anderson Powerpole connectors. Output cable length 1 ft (30 cm)

Acoustic Calibration

	Output (dB)	Freq (Hz)	Opening	1/8" Mic Adaptor	1/4" Mic Adaptor	3/8" Mic Adaptor	1/2" Mic Adaptor	1" Mic Adaptor	Notes
Larson Davis Handheld Field Calibrators									
CAL1200	94 and 114	1000	1/2"	ADP075*	ADP109	ADP031*	●	-	New in 2025
CAL1250	94 and 114	251.2 and 1000	1"	ADP120*	ADP119	ADP121*	ADP118	ADP119	New w/ display and internal barometer
CAL200	94 and 114	1000	1/2"	ADP075*	ADP109	ADP031*	●	-	Legacy unit for 1/2"
CAL250	114	251.2	1"	-	ADP114	ADP020*	ADP019	●	Legacy unit for 1"
GRAS Pistonphones									
42AA	114	250	1"	RA0069*	RA0049*	-	RA0048	RA0023*	per IEC 60942
42AC	134	250	1"	RA0069*	RA0049*	-	RA0048	RA0023*	High level, also IEC 60942
TMS Lab-Based Systems									
9917C	varies	20 to 10000	1/2"	Comparison calibrators per IEC 61094-5 for condenser and electret microphones					Mid range
9919C	to 104	20 to 20000	1/2"						High range
9350C	19 to 162	20 to 95000	Actuator	Condenser mics per IEC 61094-6 and IEC 60942					Calibration workstation

All CAL and 42 units IEC 60942 Class 1
*Adaptors available to rent at additional cost: All ADP adaptors $15/mo, all RA adaptors $60/mo
● Supported without the need for an adaptor

Connectivity

DVX012
USB to Ethernet Adaptor

DVX013
USB to Ethenet dongle, includes 3 port USB hub. Hub requires external 5V power, AC adaptor included.

DVX014
WiFi adaptor supporting 802.11 b/g/n for 831C (D-Link DWA-121)

DVX015
USB self-powered 2-port hub

CBL138
CABLE USB A to Mini-B 1.8 Meter. Connects 831 to PC, or powers/charges unit when used with PSA029 AC power adaptor

COM-RV50-DC-U
Sierra Wireless RV50 cellular 4G (XLTE) universal gateway for use in the US and Canada, 12 VDC power, with dual High gain antenna omni 3.2 inches tall, 18-inch cable

ACC003
Headset with microphone boom, 2.5 mm micro-jack. For voice annotation

CBL242-03
USB-C to USB-C cable, 3 ft. Includes USB-C to USB-A adaptor

Productivity Accessories

CCS001-831-4
Renting multiple 831 or LxT meters? Request they be put into this multi-case to save on shipping. This rugged case holds 4 meters, mics, preamps, and a calibrator.

SWW-SLM-G4 SLM utility software, download, translate, print text reports or export to spreadsheet.

SWW-DNA Data Navigation and Analysis Software. Navigate through extensive data with measurement organization, reporting, and data post-processing tools.

831-MEM32G Removable flash memory.

X21-SD-8GB Removable flash memory.

● 831C SoundAdvisor ● 831 ● LxT

Adaptors and Windscreens

ADP043
1/4" Microphone to 1/2" Preamplifier Adaptor.

ADP008
1" mic to 1/2" preamp adaptor.

079A06
3-1/2" dia windscreen for 1/2" microphones. *Similar to Larson Davis WS001*

079A07
3-1/2" dia windscreen for 1/4" microphones.

ACO-WS7
7-inch Windscreen for 1/2" microphones.

ACO-WS7-80T
7" Windscreen for 1/2" Microphones (80ppi) Dense-Treated Windscreen

ADP005
BNC to 1/2" microphone thread adaptor, 18 pF with shorting cap.

ADP009
1/2" mic to 1/4" preamp adaptor.

Additional Sensors for Meters

831-GPS
Includes Global Positioning information with measurements, for fixed or roving tests. Connects via aux USB input of 831.

SEN031
Combined weather sensor: wind speed and direction, temperature, humidity, pressure, rainfall - *requires CBL167 cable + DVX008A*
Optional TRP003-WTHR adaptor bar available.

SEN032
Combined Wind speed and direction sensor - requires CBL167 cable + DVX008A
Optional TRP003-WTHR adaptor bar available.

Weather Sensor Accessories

- CBL229 Cable for SEN031 and SEN032. Serial port for control and data, Anderson Powerpole connectors to power from EPS044. Connects to Model 831 with DVX008A.
- CBL225-01 Fused cable with Anderson to spade connectors
- ADP102 Tripod adaptor for SEN031 and SEN032. Includes 24" horizontal bar, heavy duty clamp and 3/4" X 4" PVC
- DVX008A USB Adaptor for DBM9 interface

Underwater Measurements

TC4013
Teledyne RESON miniature hydrophone, -211 dB ± 3 dB receiving sensitivity, 1 Hz–170 kHz. Various cable lengths available, cable terminates in 2-pin LEMO with BNC adaptor. Used for pile driving, dolphins, general purpose measurements. More information available online.

TC4013	10 ft (6 m)	TC4013-13	98 ft (30 m)
TC4013-4	30 ft (10 m)	TC4013-8	164 ft (50 m)
TC4013-5	65 ft (20 m)	TC4013-9	196 ft (60 m)
TC4013-11	82 ft (25 m)	TC4013-12	328 ft (100 m)

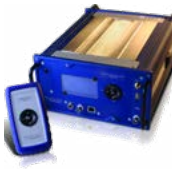
RA0043
Pistonphone coupler for TC4013 hydrophone.

TL8013
Protective cage for TC4013 hydrophone

394A40
Pistonphone, 114.0 (± 0.08) dB output at 250 (± 0.5 %) Hz, 1/2" opening.

Room Acoustics

BAS001
Omnidirectional source for Reverberation Time, Room and Building Acoustic Measurements – integrates with 831-RT option to offer easy ISO 3382-2 and ASTM E2235-04 testing.



BAS002
Larson Davis 500 Watt 110-125 BAC power amplifier for BAS001 or BAS003; includes remote control, carrying case. *Includes USB preloaded with arbitrary waveform for signal generation.*

BAS003
Larson Davis Directional speaker source; use with BAS002 power amplifier.

BAS004
Larson Davis Tapping machine w/ remote control, battery and charger. *Includes soft carrying case. Unit available for short-term rental.*

BAS006
Impulse generating source for building acoustics designed for wide frequency range.

TRP023
Speaker tripod for use with BAS001 or BAS003 speakers.

Notes BAS002 and BAS004 and shipped for 90–132.5 VAC, 55–65 Hz use with standard North American plug unless otherwise arranged. Each model ships as kit with "-U" suffix to denote North American power configuration.

Additional Additional Room Acoustics items are available. Firmware modules for Sound Meters 824 and 831 are shown on SLM pages, other items including DNA analysis software, Bruel & Kjaer Reference Sound Sources Types 4204 and 4205 and more are shown online.

For verification of audiometers quickly and accurately using ANSI S3.6-2010 and IEC 60645. Test virtually every type of transducer: supra-aural, extended range circumaural, bone vibrator, hearing aid, insert earphone and speaker. Automatically correct RETSPLs, perform level and frequency adjustments during audiometer tests, qualify booth ambient noise (MPANL), store and recall tests in databases, and print custom reports.

Audiometer Systems

The following systems offer modern complete audiometer testing: signal distortion, frequency, hearing level, linearity, pulsed signals, speech signals, frequency modulation, narrowband and broadband noise levels, sound booth noise levels, and cross-talk.

KAudCal	AudCal Software and System Controller to run a suite of tests and generate reports. Real-time results displayed on screen vs. standards-defined limits. Retest any failed frequency, level, or function individually during testing. Generate customizable reports with company logo and technician signatures. *AudCal is available as a no charge download for your own System Controller for iOS and Android devices on appropriate app stores.*
SYS014	Complete audiometric calibration system for audiometers, includes NBS 9-A Coupler. *Includes 831C, 831C-AUD, AEC100, 377A15 1"microphone, ADP008A, CAL250, CCS055 case and related accessories.*
SYS015	Complete audiometric calibration system for audiometers, includes NBS 9-A Coupler and artificial mastoid for systems with bone vibrators. *Includes 831C, 831C-AUD, AMC493C, AEC100, 377A15 1" microphone, ADP008A, CAL250, CCS055 case and related accessories.*
SYS016	Complete audiometric calibration system for audiometers, includes IEC 60318-1:2009 Ear Simulator with microphone. *Includes 831C, 831C-AUD, AEC201-A, 377A15 1" microphone, ADP008A, CAL250, CCS055 case and related accessories.*
SYS017	Complete audiometric calibration system for audiometers, includes IEC 60318-1:2009 Ear Simulator with microphone and artificial mastoid for systems with bone vibrators. *Includes 831C, 831C-AUD, AMC493C, AEC201-A, 377A15 1" microphone, ADP008A, CAL250, CCS055 case and related accessories.*

Note: For calibration of any supra-aural headset or circumaural headset, select SYS016 or SYS017, which also supports calibration up to 16 kHz.

Acoustic Couplers and Ear Simulators

Pictures not shown to scale


ADP010


AEC100


AEC201-A


AEC201-2


AEC202


AEC203


AEC206


AEC304


AMC493B

ACC001	Pillow with support board for AEC100, AEC101, and AEC201.
ADP010	Audiometer earphone testing adaptor.
AEC100	6cc NBS 9A Artificial Ear Coupler with weight and 2-3/4" retaining ring. *Rugged artificial ear unit for testing supra-aural earphones including TDH 39, TDH 49, TDH 50, HDA 280, DT-48, and Holmberg 8103. Includes vibration isolation pillow. Microphone not included, 2575 suggested. Calibrator and mastoid not included (CAL250 and AMC493B suggested).* *Mounting clip for 1/4" diameter preamp, 1/4-20 thread.*
AEC201-A	IEC 60318 Ear Simulator with Type 1 adaptor, weight, case, 1/2" microphone included. *Can be used with both supra-aural and circumaural earphones up to 16000 Hz. Meets IEC 60318-1:2009 Edition 2, IEC 60318-2:1998 and ANSI S3.7 section 5.4 requirements, and is compatible with earphones including TDH 39, TDH 49, TDH 50, HDA200 and Koss HV/1A. Supplied with removable 377B13 microphone, a Type 1 adaptor plate, vibration isolation pillow, weights and accessories in durable case.*
AEC201-2	Type 2 Adaptor for AEC201-A Artificial Ear. *Used when testing earphones such as Koss HV/1A.*
AEC202	Optional coupler for insert type hearing aids and earphones. 2cc IEC 60126, IEC60318-5 artificial coupler for 1/2 in microphone, compliant to ANSI S3.7. *Microphone not included.*
AEC203	2cc Coupler for 1" microphone. *Used for Insert Type Hearing Aids and Earphones including ER-3A and 3A (EAR). Meets IEC60126, IEC60318-5, and ANSI S3.7 (2 cc). Used in BTE (Behind the Ear) applications. Includes acoustic tubing #13 thick. Microphone not included, 2575 suggested. Calibrator not included, CAL250 suggested.*
AEC206	Headphone Test Fixture for in-ear/on-ear headphone testing, production quality assurance, ear muff testing, and headphone R&D. *Ships preassembled and ready-to-use, includes IEC 60318-4 (711) occluded ear simulators with microphones, ICP/IEPE preamplifiers with TEDS, 4 pinnae (2 left and 2 right).*
AEC304	IEC 60711 / IEC 60318-4 Occluded Ear Simulator with 1/2" microphone. *For the measurement of earphones coupled to the ear by ear inserts including HV/1A and HDA 200. Meets IEC60318-4, IEC60711:1981. Includes 377A13 1/2" 12.5mV/Pa matched microphone. For ITC (In the Canal), ITE (In the Ear) and RIC (Receiver in Canal) applications. Calibrator not included, CAL250 suggested.*
AMC493C	Artificial mastoid coupler and additional weight ring. Innovative transducer for bone vibrator testing. *This innovative transducer for bone vibrator testing is a precision mechanical coupler used to calibrate bone conduction hearing aids and audiometer bone vibrators. It provides a simple to use design that converts the vibrator force output to an acoustic signal measured with the system's sound level meter. It is used with the AEC100 coupler or AEC201-A Ear Simulator to perform bone vibrator tests.*

824 Based AudCal Systems

K824-AUD	K824 plus AUD audiometry calibration firmware option. Artificial ear, mastoid, and more available separately.
AUDIT	Larson Davis AUDIT audiometer calibration software.

Additional Sensing Technology

Non-Contact Laser Measurement Systems

Ometron non-Contact laser measurement systems

VH3000+	Portable and compact single point laser vibrometer to 25 kHz, and 65µm/s to 425 mm/s velocity range. Working distance from 16 inches to 82 ft without surface treatment. BNC output, AC powered (power supply included).

Polytec non-Contact laser measurement systems

PDV-100	Portable Digital Single Point Vibrometer, to 22 kHz, low pass and high pass filters available, analog and digital output, velocity resolution 0.05 µm/s/√Hz (20 mm/s/V range), AC powered.
VibroGo	Portable single point digital Laser Vibrometer great for field use. Large bandwidth, up to 100 kHz, and velocity range un to 2 m/s. Can operate on battery power or AC power. Simultaneous Digital and and Analog output signals as well as displacement and acceleration output available. Replaces PDV-100.
VibroFlex	Modular solution with different sensor head options allowing measurement of tiny structures with microscope optics, to relative motion, to high sensitivity needs. DC to 24 MHz bandwidth (configurable) and up to 30 m/s velocities. Reliable measurement on varying surfaces (dark, oily, shiny, hot).
RLV-5500	Rotational Laser Vibrometer for non-contact precision rpm, angular velocity and angular displacement measurements. Measures from 0 to 20,000 rpm. Class 2 low power visible laser. Standoff distance must be specified upon order placement; standoff distances of 70 mm and 400 mm available.
PSV-1D	PSV-400 or PSV-500-1D Scanning Vibrometer. Optical non-contact vibration mapping and analysis.
PSV-3D	PSV-400 or PSV-500-3D Scanning Vibrometer. Acquire and analyze vibration in 3D.

Additional non-contact laser systems may be available, including 3D, in-plane, scanning/out of plane, and rotational vibrometers. Please inquire.

Rotating Equipment

LT2	ICP® Laser Tachometer, BNC output, continuous laser operation, up to 300000 RPM, 20 in (0.5 m) operating range, includes mounting bracket. *New and updated LaserTach product, offers jitter-free operation and operates on any standard ICP current, even 2 mA.*
PulseDriver	The Modal Shop Magnetic Tachometer Pickup Preamplifier for direct interface to ICP sensor signal conditioners, includes selectable divider circuit.
TSC002	Structural Dynalysis Torsional Signal Conditioner, 2-channel, conditions output from a shaft encoder, mag pickup or Hall Effect sensor for torsional vibration measurements.
TSC004	4-channel version of TSC002 above.

Model 4830B Accelerometer Simulator

The 4830B accelerometer simulator is a hand held battery operated signal generator designed specifically to simulate the electrical output of common types of accelerometers to troubleshoot, verify and calibrate measurement systems.

– Signals mimic typical voltage, IEPE, and charge mode (single ended and differential)
– Also features a TTL compatible tachometer output for condition monitoring tracking filters to be set without a real time tachometer signal
– Up to 40 simulation profiles can be saved for easy recall
– Features FFT function to analyze a voltage proportional vibration signal to provide an indication of frequency and magnitude
– Signal outputs 1 Hz to 20 kHz with a 0.5 Hz resolution
– Outputs can be configured to be proportional to velocity or displacement

4830B-CAL	Handheld accelerometer simulator including quickstart guide, Twinax BNC plug, 10-32 to BNC adaptor, power supply, carrying case, USB interface cable

Fastener Testing

PCB Piezotronics

080962-01000	Model 962 Portable Data Recorder for Fastener Testing, Power Tool and Hand Torque Wrench Testing. *Testing Measure, record and report torque, angle and clamp load characteristics of threaded fastener components*
039225-50101/B	Rotary Torque Angle Transducer, 100 lbf-in (11.3 Nm), 1/4-inch Square Drive
039250-50101/B	Rotary Torque Angle Transducer, 100 lbf-ft (136 Nm), 1/2-inch Square Drive
097000-34445	Cable, RS to 10-pin Transducers to mate above to Model 962

Data Acquisition and Analysis

Analyzer Rentals from The Modal Shop Whether you need a completer turn key DAQ system or just need additional channels for your existing setup The Modal Shop has a number of options. Rent National Instruments or VTI/VXI hardware to expand channel count, or rent entire systems. Crystal Instruments and Siemens offer a small handheld battery powered system from 2-16 channels. Crystal Instruments, Data Physics, m+p, and OROS offer PC-based solutions from 2 to hundreds of channels with the ability to support IEPE and voltage mode sensors or even strain measurements

Need Extra Support for Your Rental? For those new to sound or vibration testing, or needing detailed assistance with setup, we can help! Rentals include no charge support for those familiar with analysis but requiring assistance navigating the rental system. Various additional support options are available for rental systems, including web conferencing or phone support to full on-site test support

System Controller

PCSC	A system controller can be added to any DAQ system rental for systems that do not include a controller standard. Useful if there is a compatibility issue or a network administration rights issue on an in house PC
IPCSC	Ruggedized Durabook system controller can be added to any DAQ system rental for systems that do not include a controller standard. Useful if there is a compatibility issue or a network administration rights issue on an in house PC

Crystal Instruments CoCo Series (crystalinstruments.com) Handheld Data Recorder/Dynamic Signal Analyzer, standalone multichannel portable analyzer, no PC required. 24-bit, 40 kHz bandwidth, up to 150 dB dynamic range, touchscreen, and built-in ICP® power. Data recording and Signal Analysis application software included. 6-hour use on battery, flash memory, single channel 24-bit output, and EDM host PC software. Options for Octave Analysis, Order Tracking, Arbitrary Signal Source, Waterfall, and Spectogram Display are included with rental units.

CoCo-70X 2	Designed for machinery predictive maintenance (PdM) usage The CoCo-70X is IP-67 rates with a 6.5 inch display. 2 input channels with 1 output channel and easy navigation for route collection.
CoCo-70X 4	4-channel CoCo-70X configuration. Includes capabilities in CoCo-70X-2
CoCo-80X-2	2-channel CoCo-80X system. CoCo-80X features a 7-inch touchscreen and supports CAN-Bus functionality. Includes time recording, transient capture, auto power and cross-power spectra, frequency response, coherence. BNC inputs.
CoCo-80X-4	4-channel CoCo-80X configuration. Includes capabilities in CoCo-80X-2
CoCo-80X-8	8-channel CoCo-80X configuration. Includes capabilities in CoCo-80X-2
CoCo-90X-16	16-channel CoCo-90X system. Includes time recording, transient capture, auto power and cross-power spectra, frequency response, coherence, SMB inputs. BNC adaptor cables provided.

Crystal Instruments Spider-20 Wireless Dynamic Signal Analyzer and Data Recorder. Powerful compact battery powered analyzer provides 4-channels of data recording or analysis in the field with ICP® power built-in and up to 6-hour battery life. 100 dB dynamic range, up to 46 kHz real time bandwidth, configurable tach or output channel, BNC inputs, and simple three button control.

Spider-20-2	2-channel Spider-20 system. Includes time recording, real time filters, FRF, octave analysis, order tracking, SRS analysis and more.
Spider-20-4	4-channel configuration of Spider-20. Includes capabilities in Spider-20-2

Crystal Instruments Spider-80X and Spider-80Xi High Channel Count Dynamic Measurement System. Scalable high channel count analyzer system ideal for a wide range of applications from machine condition monitoring to automotive and aerospace applications. Patented technology allows for 150 dB dynamic range, 8 BNC input connectors per 1U 19" rack unit, 2 outputs per card, units can be networked to form up to 512 inputs, voltage or ICP , single-ended or differential, AC or DC coupling, 150 dBFS dynamic functions available. For higher channel count systems please call.

S80X-8 or S80Xi-8	8-channel system.
S80X-16 or S80Xi-16	16-channel system. Chassis included.
S80X-24 or S80Xi-24	24-channel system. Chassis included.
S80X-32 or S80Xi-32	32-channel system. Chassis included.

Crystal Instruments Vibration Controllers

S81B-P02	Crystal Instruments Basic Spider-81B VCS System, 2 inputs: Sine, Random, Shock. Fourth generation system with embedded DSP technology for enhanced control performance, system reliability, and failure protection. Operates in PC-tethered mode or standalone Black Box mode.
S81B-P04	Crystal Instruments Basic Spider-81B VCS System, 4 inputs: Sine, Random, Shock. Fourth generation system with embedded DSP technology for enhanced control performance, system reliability, and failure protection. Operates in PC-tethered mode or standalone Black Box mode.
S81 VCS	Crystal Instruments Spider-81 VCS System, 8 inputs; Sine, Random, Classic Shock, Transient, SRS, Sine-on-Random, Randomon-Random, and more. Fourth generation system with embedded DSP technology for enhanced control performance, system reliability, and failure protection. Operates in PC-tethered mode or standalone Black Box mode.

Crystal Instruments Modal Analysis Software

EDM Modal	Crystal Instruments Modal Testing and Modal Analysis software. Supports Geometry creation/import/export/animation, Operational Deflection Shape analysis, Impact hammer modal testing, Single or multiple shaker modal testing, Single reference modal analysis, Poly-reference modal analysis, and Reporting to Microsoft Word

Data Physics DP900 series Analyzers (www.dataphysics.com) Scalable multi-channel front end, 100+ kHz bandwidth, 216 kSa/sec per channel, ICP power with TEDS support (Including ICP Tach Channels), and Stand-alone Operation, up to 6 channels including two reconfigurable channels (input, output, tach) per board with 24 bit analog to digital conversion with up to 150 dB dynamic range, ADC Ranges up to ± 30 V. DP906 features on-board 500 GB Time-domain Recording SSD, AC power.
Additional options and configurations are available: Additional Output Channels, Rotor Dynamics/Turbo Analysis, SRS Analysis, Demodulation, Stepped Sine, MIMO, Human Vibration Filters, Drop/Shock Test, Sine Data Reduction, Balancing, Acoustic Intensity, Event Capture, and shaped PSD or Swept Sine closed loop outputs.

DP901-930A 6-channel DP901 Single-Slot Chassis analyzer with configurable channels (4 Input Channels, 2 Input/Output/Tach Channels) , Auto-Power Spectrum, Transfer Function, Synchronous Average, Auto- & Cross-Correlation, Histogram analysis, Frequency Resolution up to 51200 lines, Frame Size up to 131072 samples, Zoom analysis, Time-domain Recording to disk, Waterfall Analysis, Multi-Measurement, Channel and Signal Math, Real Time Octave Analysis, RPM Analysis, and Real-Time Waterfall Based Order Tracking. Up to (2) ICP-Powered Tach Channels available per DP901.

DP901+6CH Additional 6-Channels of input, up to 36 channels. Consult Factory for pricing over 36 Channels.

DP906-930B 36-Channel DP906 6-Slot Chassis Analyzer with configurable channels (24 Input Channels, 12 Input/Output/Tach Channels) Call for Software Options.

Data Physics DP900 Controller (www.dataphysics.com) The 900 hardware's powerful, real time, distributed digital signal processing engine is ideal for closed loop vibration control. Features include: Standalone real time signal processing, Up to 6 channels including two reconfigurable channels (input, output, COLA) per board, Simultaneous recording of time data to on-board storage during measurements, Up to 216 kSamples/s for 80 kHz of alias free bandwidth, 24 bit analog to digital conversion with up to 150 dB dynamic range.

DP901-960A Data Physics DP901 Closed Loop Vibration Controller, 5 inputs, 1 output with Sine and Random. Includes Channel and Signal Math. (also available as 4 input, 1 output and COLA)
Up to (3) DP901-960B can be combined for additional input Channels (up to 17 Input channels).

DP901-960B Add on Classic Shock and SRS to DP901 Controller

DP901-960C Add on Time-domain Recording to DP901 Controller. Includes Multi Measurement.

DP906-960D Data Physics DP906 Closed Loop Vibration Controller, 35 inputs, 1 output with Sine and Random. Includes Channel and Signal Math. (also available as 34 inputs, 1 output and COLA)

Notching/Limiting included with Sine or Random option
Sine-on-Random, Random-on-Random, Mixed mode, Sine Resonance Search and Dwell, Time Domain Replication, Advanced Notching, Force Limiting, and Larger Channel count Pricing all available on request

DEWESoft SIRIUS® A rugged IP 20 rated, flexible solution for assorted measurements in the field or the lab. In addition to general time domain and FFT capabilities, the acoustic measurement package allows measurement of Narrow band FFT, 1/n octave band, A, B, C weighted, Leq and additional metrics. The structural analysis package provides FRF, coherence and phase for SISO, MIMO, capabilities with modal hammer or shaker as well as order analysis capabilities. Human vibration analysis according to ISOP 8041 and 2631-1 provided too.

SIRIUS 8-2 8-channel system with 8 24-bit high dynamic range voltage/ICP BNC inputs (DC and AC selectable coupling), 2 synchronized counters, and supports CAN 2.0b BUS. Max sampling rate of 200 kHz. Software is included and preinstalled on system controller.

Digilent (www.digilent.com)

DT9837A High Performance USB Data Acquisition. Four 24-bit BNC IEPE (ICP) sensor inputs up to 52.7 kHz sampling rate per channel, AC/DC coupling, 4 mA constant current. One BNC analog waveform output, 24 Bit, 52.7 kHz. One BNC tachometer input. Sync port for synchronizing acquisition on up to 4 modules. Powered via USB connection to PC.

DT9857E Sixteen 24-bit BNC IEPE (ICP) sensor inputs up to 105.4 kHz sampling rate per channel, AC/DC coupling, 4 mA constant current. Two BNC analog waveform output, 32 Bit, 216 kHz. One BNC trigger input. Digital I/O, Counter/Timer, Event counter, and tachometer accessible via 25 Pin connector. Ethernet sync ports for synchronizing acquisition on up to 4 modules (no distribution panel needed). Power supply included.

Hi-Techniques (www.hi-techniques.com) has provided high performance for over 35 years, specializing in transient recorders and data acquisition systems. The Echelon system offers an ideal platform to take high sample rate data for Shock and other fast transient events in the lab or in the field.

ECHELON System & Aspire™ Software Echelon series of Data Acquisition Systems combines lab quality input amplifiers and signal conditioning with unparalleled connectivity in a ruggedized IP 67 rated, portable package. The included Aspire software provides realtime setup, display and powerful analysis from any PC or tablet. Combine and view analog data, vehicle bus data, GPS mapping and realtime calculations in a single workspace. LiveCalc offers real-time DSP and post processing.

Start here

HT EM-CPU-XE System Processor Module for Echelon IP-67 Ruggedized Data Acquisition System. 4 input modules, 2 CAN (1 HT), 16 DIO, and 4 Quadratures. Includes power cabling, industrial SSD, cabling, and Aspire Software.

Add modules

HT EM-HS-10MA Four Channel High-Speed Universal Input Module for Echelon System. 4 independent 16-bit, 1 MS/s SAR type digitizers with pre and post-ADC anti-alias filtering, with 10mA IEPE current. Universal inputs support channel by channel direct connections for voltage, bridge, accelerometer and thermocouple measurements.

Add appropriate breakout interfaces

HT EC-HS-IEPE Four Channel IEPE BNC Breakout Cable for EM-HS Module. Individual jumpers allow channel by channel switching for DC, AC, or IEPE inputs.

HT EC-HS-SLT Four Channel Spring Loaded Terminal Breakout Interface for EM-HS module. Supports direct bridge, IEPE, and differential inputs.

Optional GPS

HT EP-GPS Echelon GPS Time Synchronization and Position. Allows all data to be time synchronized between systems. GPS position is also provided with 20 Hz fast update rate.

Keyence NR-Series Scalable DAQ (www.keyence.com) The Keyence NR Series is a new DAQ for simplified data collection/recording. These can be used for a wide range of measurements, from simple measurement to multi-aspect, multi-channel measurement. The compact size offers flexible testing options. The software is also easy to set up and use right away, even for first-time users. Collected data can be exported with one click. Main unit options offer PC-connected collection or standalone.

Select a Main Unit

NR-500 NR-Series main unit to connect to a PC via USB. Allows up to 8 measurement units to be connected. When using NR-CA04 measurement units, only 20 channels are supported using the NR-500 main unit. NR-U5 AC adaptor and AC cord used for AC power.

NR-X100W NR-Series main unit with built-in CPU. Can be used without a PC and data can be saved on the unit. Allows up to 72 measurement units and can be battery operable. When using NR-CA04 measurement units, 180 channels are supported using the NR-X100W main unit. Can power with DC 9 to 36V via terminal block, or add NR-XU1 for AC power, or NR-XU15 kit for battery power.

Select Measurement Units

Keyence offers many units from Temperature, Voltage, Current, Strain, Pulse, CAN and more. At this time we are focusing on the sound and vibration-focused NR-CA04, but ask if interested in another unit to integrate into a rental system!

NR-CA04 NR-Series 4-channel acceleration measurement unit. Optimized for voltage-mode and charge-mode piezoelectric accelerometers. (4) BNC inputs for voltage mode ICP-accelerometers, (4) 10-32 inputs for charge-mode PE accelerometers, 100 kS/s/ch, 16 bits, selectable input range, selectable AC/DC coupling.

Software

Software is not keyed to unit and can be installed on any PC with admin rights, which can be maintained after a rental for data recall in the future.

NR-XH1W NR-Series PC software. Includes WAVE LOGGER X, File Viewer X and LAN TOOL X. Offers an easy to understand data collection screen with time/waveform display and FFT, simple customization, simplified data output and data storage and retrieval tools.
This is included at no charge with rental of a NR-Series unit. User must have admin rights to install on PC. If not available, consider adding the PCSC rental option below.

Options

NR-XU15 Battery power supply unit including: NR-XB1 Battery, NR-XJ1 Charger, NR-XU1 AC adaptor, and OP-99022 AC Power cord.

NR-XCP30 Control Panel, allows configuration of acquisition settings and displays data and waveforms without connection to a PC

m+p SmartOffice (www.mpihome.com) Complete solution for noise and vibration measurement, vibration control, and analysis/reporting. The SO Analyzer solution runs on a wide range of measurement front ends, and each are easily scalable to add channels. Options and configurations are available, including ODS, time domain, PSD, FRF measurements, SDOF, MDOF, structural bundle. Can also serve as full featured vibration control system when used with VibPilot and VibRunner hardware. Vibration control options include modes for random with notching/force limiting, random data reduction, sine with notching/force limiting, sine resonance search and dwell, sine data reduction, sine force/displacement/velocity control, shock classical, shock response spectrum (SRS), external pulse, transient capture, sine-on-random (SoR), random-on-random (RoR), sine-on-random-on-random (SoRoR), time domain replication, time history recording to throughout disk.

m+p SO NI Smartoffice software to be paired with NI hardware. Includes System controller with software preinstalled. NI modules and chassis rented separately.

m+p SO VibPilot-4 Smartoffice software with VibPilot hardware. 4 channel system, 204.8 kHz max. sampling rate, 24-bit, USB and Ethernet interface, 2 output channels and 2 tachometer channels. System controller included. Ability to synchronize multiple VibPilots units together

m+p SO VibPilot-8 Smartoffice software with VibPilot hardware. 8 channel system, 204.8 kHz max. sampling rate, 24-bit, USB and Ethernet interface, 2 output channels and 2 tachometer channels. System controller included. Ability to synchronize multiple VibPilots units together

VibPilot + 8 Add on 8 channel VibPilot module

m+p SO VibRunner-24* Smartoffice software with VibRunner hardware. Configurable with 8-24 input channels, 2-12 source output channels, or 2-12 tacho inputs per VibRunner (max 24 channels between all channel types per VibRunner). System controller included.

VibRunner + 24* Add on 24 channel VibRunner module.

*VibRunner configured at TMS

Siemens Simcenter SCADAS XS The Simcenter SCADAS XS (formerly LMS SCADAS XS) is a handheld data acquisition system. It is capable of acquiring dynamic data simultaneously at 50,000 samples per second on up to 12 dynamic voltage/IEPE channels. There is a built-in battery which allows autonomous operation, or data can be acquired with a host PC. Includes GPS able to track speed ± 0.1 kph) and location (5 updates per second), CAN-bus, and two tachometer channels. Also incudes SPDIF for digital binaural head or similar.

Scadas XS-12 SCADAS XS with 12 ICP/voltage, 2 Tach, GPS, CAN-bus, SPDIF, and headset. 50 kHz sampling, Controlled with included tablet via Testlab Scope App or in standalone mode (data conversion software included). Accessories include USB cable and power adaptor, LEMO to BNC breakout for each voltage/ICP input and tacho input, CAN-bu adaptor, GPS antenna, microSD card and carrying case.

National Instruments (www.ni.com) Popular C-series chassis, cards and accessories to expand your existing channel count for vibration, acoustic, and strain testing.

cDAQ USB Chassis

NI cDAQ-9171	NI CompactDAQ 1-Slot USB Chassis. *NI Part 781425-01, rental includes 1m USB Cable with Locking Screw NI Part 198506-01.*
NI cDAQ-9179	NI CompactDAQ 14-Slot USB Chassis. *NI Part 785065-01, rental includes 2.3m US AC Power Cord NI Part 763000-01 and 2m USB Cable 784387-02, with optional NI Desktop Mounting Kit for 14-slot Chassis 784302-01.*
NI cDAQ-9178	NI CompactDAQ 8-Slot USB Chassis. *NI Part 781156-01, rental includes 2.3m US AC Power Cord NI Part 763000-01 and 1m USB Cable with Locking Screw NI Part 198506-01.*

cDAQ Ethernet chassis

NI cDAQ-9181	NI CompactDAQ 1-Slot Ethernet Chassis. *NI Part 781496-01, rental includes 2.3m US AC Power Cord NI Part 763000-01.*
NI cDAQ-9189	NI CompactDAQ 8-Slot, TSN-Enabled Ethernet CompactDAQ Chassis. *Replaces cDAQ-9188 and designed for distributed sensor measurement system: includes timing, synchronization and data transfer between modules. NI Part 783597-01, rental includes 2.3m US AC Power Cord NI Part 763000-01 and 2m CAT-5E Ethernet Cable NI Part 151733-02, with optional NI 9901 Desktop Mounting Kit 779473-01.*

Sound and vibration modules

NI-9230 (BNC)	National Instruments 3-Channel Sound and Vibration Input Module, BNC inputs, software selectable ICP/IEPE and AC/DC coupling, 12.8 kS/s/channel, ±30 V (784396-01)
NI 9234	National Instruments 4-Channel, 51.2 kS/s/channel, ±5 V, C Series Sound and Vibration Input Module (NI Part 779680-01)
NI USB-9234	4-Channel 24-bit dynamic signal acquisition (DSA) module, software selectable ICP/IEPE and AC/DC coupling, 20 kHz bandwidth. *Commonly used with accelerometers. Includes NI 9234 card and cDAQ-9171 1-slot USB chassis.*
NI 9231	National Instruments 8-Channel Sound and Vibration Input Module, 10-32 inputs, software selectable ICP/IEPE and AC/DC coupling, 51.2 kS/s/channel, ±5 V (783610-01)
NI 9250	National Instruments 2-Channel Sound and Vibration Input Module, BNC inputs, software selectable ICP/IEPE and AC/DC coupling, 102.4 kS/s/channel, ±5 V (783827-01)

Strain input modules

NI 9236	8-Channel 24-bit DSA module for strain/bridge testing, 10 kS/s/channel, 350 Ω Quarter-Bridge Strain Gage, *NI Part 779994-01, rental includes NI 9965, Backshell for 24 Pos Spring Terminal NI Part 780216-01.*
NI 9237 (RG-50)	4-Channel 24-bit DSA module for strain/bridge testing, programmable half- and full-bridge completion with up to 10V internal excitation. RJ50 Connectivity. *NI Part 779521-01, rental includes RJ50 Cables for 9944, 9945, and 9949, 2m (qty 4), NI Part 194612-02. Order with appropriate bridge completion accessory kits below if required.*
NI 9944	Quarter-Bridge Completion Accessories (qty 4), 120 Ω. *NI Part 194738-01. Used with NI 9237.*
NI 9945	Quarter-Bridge Completion Accessories (qty 4), 350 Ω. *NI Part 194739-01. Used with NI 9237*
NI 9949	RJ50 to Screw Terminal Blocks (qty 4), used with NI 9237 card. *NI Part 196809-01.*

Voltage output module

NI 9263 (Screw Term.)	National Instruments 4-channel Voltage Output Module, Screw Terminal connection, ±10 V, 100 kS/s/ch (779012-01)

Other inputs

NI 9212 (mini TC)	National Instruments 8-Channel Temperature Input Module, mini-TC front connection, ±78 mV, 95 S/s/ch Simultaneous, Isothermal Terminal Block (785259-01)
NI 9213	16-Channel, 75 S/s Aggregate, ±78 mV C Series Temperature Input Module.
NI 9216	8-Channel, 400 S/s Aggregate, 0 Ω to 400 Ω, PT100 RTD C Series Temperature Input Module
NI 9229	4-Channel 24-bit DSA module, ±60 V, 50 kS/s/ch, screw terminal input connection, CAT I channel-to-channel isolation. *Commonly used with high voltage devices including traditional tachometers. NI Part 779785-01, rental includes (4) EMI Suppression Ferrite 782801-01.*
NI 9203 (Spring Term.)	National Instruments 8-Channel Current Input Module, Spring Terminal inputs, 200 kS/s, ±20 mA (7837831-01)

NI Software

NI Flexlogger	FlexLogger software for data logging of mixed signals for NI hardware. Preinstalled on system controller.
	Contact us regarding software options if you are starting a rental test system from the beginning!

The Modal Shop

485B39	2 Channel ICP® sensor signal conditioner. 2 BNC in, USB digital signal output. True plug and play analysis via USB without any cumbersome initial setup. View signals on any Windows, macOS, Android, and iOS devices. *Overviewed on Page 19.*	)
K485B39	Dual Channel Analysis Kit. System includes 485B39 and system controller (choice of form function) with preinstalled time and frequency	440
IV485B39	2-channel, USB-powered, sensor signal conditioner with USB digital output (24-bit A/D). ICP input on channel 1, voltage input on channel 2.	200
V485B39	2-channel, voltage inputs, USB-powered, sensor signal conditioner with USB digital output (24-bit A/D).	200

Signal.X Technologies DSA 2.9 is a mixed-signal sound and vibration analysis software tool for routine sound and vibration projects, plus the ability to include strain, torsion, current, temperature and more.

SX DSA	Signal.X Technologies DSA Dynamic Signal Analyzer for sound and vibration analysis, includes Spectrum Analysis, Time/Frequency domain, Impact Testing, Octave Band and more. Supports National Instruments DAQ cards.	

SINUS Messtechnik GmbH (www.sinus-leipzig.de) APOLLO is a versatile multichannel sound and vibration analyzer that excels at acoustics-focused projects, SLM and third-octave standards including IEC 60651, IEC 60804, IEC 61260, IEC 61672-1, IEC 651 and IEC 804 standards. Sound level measurements, frequency analysis, acoustic intensity, pass-by noise, building acoustics, and more with easy USB 2.0 interface to a system controller. Either 200 V or 0 V microphones can be used.

APOLLO-4	4-channel acoustic configuration, includes Type 1 SLM, fractional octaves 1/1 - 1/24, FFT, recorder, HVM, Intensity, Sound Power, Architectural Acoustics and Vibration, Order Tracking and more. Select between BNC or LEMO inputs.	
APOLLO-I1	Complete Acoustic Intensity system includes multi-channel APOLLO analyzer, sound intensity probe, and phase calibrator with system controller.	
AP-BA	Apollo Building acoustics option for measurement of building acoustics, per ISO 140-3, 4, 5, 6, 7, 8, 12; ISO 717-1, 2; ISO 3382; DIN 4109, 4109-10 and ASTM E90, E336, E966, E492, E1007 standards.	
AP-SI2	Sound Intensity 2, allows sound power determination of noise sources from sound intensity measurements according to ISO 9614 Part 1 (Measurement at discrete points) and Part 2 (Measurement by scanning).	
AP-SP	Sound Power, allows determination of the sound power by means of the sound pressure method according to ISO 3744-46	

Vibrant Technologies (www.vibetech.com) **ME'scope VES** software series. Contains state of the art tools for performing: FRF-Based Modal Analysis, Operational Modal Analysis, Vibro-Acoustic Analysis, Dynamics Modeling & Simulation, Structural Dynamics Modification, Experimental FEA. The software is compatible with a variety of hardware platforms.

VT-350	**Visual Rapid Test™**. Calculate a single-reference set of FRFs from random response data acquired with two uniaxial accelerometers and a 2 channel DAQ using the "slinky"method.	Call
VT-620	**Visual ODS**. Interactive animated display of Operating Deflection Shapes and Mode Shapes from time or frequency domain data.	
VT-420	**Visual ODS Pro**. Visual ODS plus additional signal processing features (time and frequency analysis, FFT and IFFT, integrate and differentiate, waveform math, Auto and Cross spectrum, PSDs, ODS FRFs, and more)	
VT-570	**Visual Modal**. Visual ODS Pro plus modal features (Single reference SDOF and MDOF modal parameter estimation with FRF synthesis, MAC, CoMAC, and more)	
VT-550	**Visual Modal Pro**. Visual Modal plus Multi-Reference Modal Analysis (Multiple reference modal parameter estimation, Stability diagram, Pole diagram, and more)	
Additional	Operational Modal Analysis, Structural Dynamics Modification, Acoustics, FEA Options and more	

VTI Instruments 143X Legacy Series Digitizer Systems (www.vtiinstruments.com) (formerly VXI Technologies / Agilent Technologies / Hewlett Packard)

Chassis	C-size Mainframes: E8408A 4-slot: $395, E1421B 6-slot: $450. E1401B 13-slot: $980
Interface	Single slot Slot 0 Interface Cards: [illegible] FireWire IEEE-[illegible] $300. EX2500A [illegible] Ethernet (40 MB/s block transfer rates): $760
Digitizer Cards	E1432A / VT1432A 16 channel 16-bit 51.2 kSa/s: $1500, VT143[illegible] [illegible] 24-bit 102.4 kSa/s: $1700. E1433A 8 ch 16-bit 196 kSa/s
Source	E1434A 4-channel 65 kSa/s arbitrary source: $[illegible]
Data Disc	2-slot E1562D dual data disk and SCSI-2 inte[illegible]: $1400
Breakout Box	8 BNC input, two VXI output card VT3240A: $120, [illegible]ge inputs VT3241A: $400
Cables	009L05 VXI to 4 BNC plugs, 5 ft: $60, 009[illegible] to Agilent VXI connectors, 8 f[illegible]

VTI Instruments EMX Series Digitizer Systems (www.vtiinstruments.com)

Chassis	EMX18 18-slot (8 hybrid) 4U with Integrated Gigabit Ethernet LXI Interface
Digitizer Card	EMX-4250 16 Channel, 204.8 kS a/s DSA Digitizer
Breakout Box	EMX-4016 16 channel breakout box for use with EMX-4250 and 4251, BNC inputs, LED Channel Health Indicator
Cable	53-0515-030 Breakout Box Cable, 3 m, for EMX-4250. 2 cables per EMX-4250 required for 16 channels.

Ordering Notes

Don't forget to add any cables, mounting accsssories, or other items you may need for your test! Take a look at our FAQ (Page 4) or Process Details (Page 5). To request a quote or place an order, please email the rental team at rentalteam@modalshop.com or call 513.351.9919.

Model	QTY	Rental Period Length (7-day minimum for most items)	Notes

About The Modal Shop

Our name was chosen to combine the science of "modal," or structural testing, and the full-service attitude of our "shop-like" organization. Our business is dedicated to helping you test, model, and modify the dynamic behavior of structures and processes. We strive to provide the measurement community with a single source for all sound and vibration needs.

In addition to our Rental Program, The Modal Shop specializes in multi-channel sound and vibration sensing systems. Products include modal shakers and stingers, the LaserTach™, Air Ride supports and TEDS Sensor Interface Kits, as well as a host of other measurement accessories.

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