



**VOD/DATA RECORDERS**  
**&**  
**ASSOCIATED ACCESSORIES**  
**2012 PRODUCT LIST**

MREL DOCUMENT #: PROD111221

**THESE PRODUCTS ARE AVAILABLE TO**  
**PRE-SCREENED, PRE-APPROVED CUSTOMERS ONLY.**

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## SELECTING THE VOD AND OR DATA RECORDER FOR YOUR APPLICATION:

Use the following table to determine which of the three rugged, portable, recorders offered by MREL will suit your recording application.

If it is the HandiTrap II™ VOD Recorder, then please refer to Page 3.

If it is the MicroTrap™ VOD/Data Recorder, then please refer to Page 4.

If it is the DataTrap II™ Data/VOD Recorder, then please refer to Page 5.

<b>VOD/DATA RECORDER SELECTION GUIDE</b>	<a href="#"><u>HandiTrap II</u></a>	<a href="#"><u>MicroTrap</u></a>	<a href="#"><u>DataTrap II</u></a>
Record VODs in an Explosives Sample	yes	yes	yes <sup>2</sup>
Record VODs in One Blasthole	yes	yes	yes <sup>2</sup>
Record Explosive Deck Delay Times	yes	yes	yes <sup>2</sup>
Record VODs in Multiple Blastholes	-	yes	yes <sup>2</sup>
Record Delay Times Between Blastholes	-	yes	yes <sup>2</sup>
Record VODs in Multiple Explosives Samples that are Detonated Simultaneously	-	-	yes <sup>2</sup>
Record VODs in Multiple Blastholes that are Detonating Simultaneously	-	-	yes <sup>2</sup>
Record VODs and Other Gauges Simultaneously	-	yes <sup>1</sup>	yes <sup>2</sup>
Record 1-4 Other Gauges	-	yes <sup>1</sup>	-
Record 1-8 Other Gauges	-	-	yes
Record Strain Gauges	-	-	yes <sup>3</sup>
Sync. Multiple Recorders to Expand	-	-	yes
Maximum Recording Speed	1 MHz	2 MHz VOD 1 MHz per channel Scope	10 MHz per channel
Maximum Memory Size (# of Data Points)	131,072	8 million	512 million
Vertical (distance or voltage) Resolution	12 bit	14 bit	14 bit
Relative Price	\$	\$	\$

<sup>1</sup> with optional MicroTrap Scope Upgrade

<sup>2</sup> with optional DataTrap II VOD Upgrade

<sup>3</sup> with optional DataTrap II Strain Upgrade

## HANDITRAP II™ VOD RECORDER:

### HOW TO SELECT THIS PRODUCT:

Select Product 1-02-01. Select one or more of the Required Accessories listed below. Consider selecting one or more of the Recommended and Optional Accessories listed below.

<u>Product #</u>	<u>Product Name</u>	<u>Unit</u>	
<b>1-02-01</b>	<b>HANDITRAP II™ VOD RECORDER</b>	<b>each</b>	
Portable 1 channel continuous explosives velocity of detonation (VOD) recorder for explosives in one blasthole and explosives samples. Resolution = 12 bits, 1 part in 4,096. Recording speed is 1 MHz. Memory of 100,000 data points = 100 milliseconds recording time. Internal and external trigger mode. Pre-trigger time is 25% of the total recording time. Operates from internal rechargeable NiCad batteries (up to 8 hours). Includes HandiTrap II™ VOD Recorder, 120 or 230 VAC Battery Charger (as specified by the Customer), Communications Cable with USB Adapter, External Trigger Adapter, padded HandiTrap II™ Carry Case, HandiTrap II™ Operations Manual (English), HandiTrap II™ Advanced Analytical Software for Windows XP™ and later. Includes MREL's 2 years Comprehensive 100% Parts and Labour Warranty.			

**HANDITRAP II™ VOD RECORDER - REQUIRED ACCESSORIES:** Products 1-05-04 or 1-05-10 or 1-05-11 or 1-05-16.

**HANDITRAP II™ VOD RECORDER - RECOMMENDED ACCESSORIES:** Product 1-06-01.

**HANDITRAP II™ VOD RECORDER - OPTIONAL ACCESSORIES:** Product 1-08-01.

## **MICROTRAP™ VOD/DATA RECORDER:**

### HOW TO SELECT THIS PRODUCT:

Select Product 1-03-01. Select Product 1-03-03 if you want to add other recording capabilities to the existing VOD recording capabilities of the MicroTrap™ VOD/Data Recorder. Select Product 1-03-04 to double the memory if you require a longer recording time. If you are conducting VOD tests, then select one or more of the Required Accessories listed below. Consider selecting one or more of the Recommended and Optional Accessories listed below.

<b>Product #</b>	<b>Product Name</b>	<b>Unit</b>	
1-03-01	MICROTRAP™ VOD/DATA RECORDER	each	
<p>Portable 1 channel continuous explosives velocity of detonation (VOD) recorder for explosives in one or more blastholes and explosives samples. Resolution = 14 bits, 1 part in 16,384. Recording speed is adjustable from 1 Hz to 2 MHz. Standard memory of 4,000,000 data points = 2 seconds recording time at a 2 MHz recording speed. Adjustable internal and multiple external trigger modes. Pre-trigger time is adjustable from 0% to 100% of the total recording time. Multiple event storage of up to 16 events in non-volatile memory. Operates from the internal rechargeable NiCad battery (up to 12 hours), or VAC mains, or an external 12-20 VDC power source (power source not included). Includes MicroTrap™ VOD/Data Recorder (VOD recording capabilities only), 120 or 230 VAC Battery Charger (as specified by the Customer), USB Communications Cable, padded MicroTrap™ Carry Case, MicroTrap™ Advanced Analytical Software for Windows XP and later, MicroTrap™ VOD Operations Manual (English or Spanish as specified by Customer). Double the standard MicroTrap™ recording time with the optional MicroTrap™ Memory Upgrade, Product 1-03-04. Add 4 channels of vibration and pressure recording capabilities with the optional MicroTrap™ Scope Upgrade, Product 1-03-03. Includes MREL's 2 years Comprehensive 100% Parts and Labour Warranty.</p>			
1-03-03	MICROTRAP™ SCOPE UPGRADE	each	
<p>Factory installed by MREL in the MicroTrap™. Provides additional 4 channels of digital oscilloscope recording capabilities to the MicroTrap™ VOD/Data Recorder. Allows recording of any sensor (vibration, pressure, acceleration, temperature etc.) that produces a DC voltage signal between -10 VDC to +10 VDC. Adjustable input ranges +/-2.5, +/-5, +/-7.5, +/-10, 0-2.5, 0-5, 0-7.5, 0-10 VDC for each channel independently. Resolution = 14 bits, 1 part in 16,384. Recording speed is adjustable from 1 Hz to 1 MHz per channel. Utilizes the memory in the MicroTrap™. Adjustable internal and multiple external trigger modes. Pre-trigger time is adjustable from 0% to 100% of the total recording time. Multiple event storage of up to 16 events in non-volatile memory. Includes installation of MicroTrap™ Scope Upgrade circuit board, MicroTrap™ Scope Operations Manual (English). Includes MREL's 2 years Comprehensive 100% Parts and Labour Warranty.</p>			
1-03-04	MICROTRAP™ MEMORY UPGRADE	each	
<p>Factory installed by MREL in the MicroTrap™. Provides additional 4,000,000 data points of memory to the MicroTrap™ VOD/Data Recorder. This upgrades the MicroTrap™ memory to 8 million data points = 4 seconds recording time at a 2 MHz recording rate. Reducing the recording speed increases the recording time. Includes MREL's 2 years Comprehensive 100% Parts and Labour Warranty.</p>			

### **MICROTRAP™ VOD/DATA RECORDER - REQUIRED ACCESSORIES (FOR VOD RECORDING):**

Products 1-05-03 or 1-05-04 or 1-05-05 or 1-05-06 or 1-05-07 or 1-05-08 or 1-05-09 or 1-05-10 or 1-05-11 or 1-05-16.

### **MICROTRAP™ VOD/DATA RECORDER - RECOMMENDED ACCESSORIES (FOR VOD RECORDING):**

Products 1-06-01 or 1-06-02.

### **MICROTRAP™ VOD/DATA RECORDER - OPTIONAL ACCESSORIES (FOR VOD RECORDING):**

Product 1-08-01.

### **MICROTRAP™ VOD/DATA RECORDER - RECOMMENDED ACCESSORIES (FOR AIRBLAST OVERPRESSURE RECORDING):**

See Page 9.

### **MICROTRAP™ VOD/DATA RECORDER - RECOMMENDED ACCESSORIES (FOR VIBRATION RECORDING):**

See Page 12.

### **MICROTRAP™ VOD/DATA RECORDER - RECOMMENDED ACCESSORIES (FOR UNDERWATER PRESSURE RECORDING):**

See Page 15.

## **DATATRAP II™ DATA/VOD RECORDER:**

### HOW TO SELECT THIS PRODUCT:

Select Product 1-04-01. Select Product 1-04-03 if you want to add VOD recording capabilities to the existing recording capabilities of the DataTrap II™ Data/VOD Recorder. Select Product 1-04-06 if you want to add Strain recording capabilities to the existing recording capabilities of the DataTrap II™ Data/VOD Recorder. Select Products 1-04-04 and 1-04-05 to increase the memory if you require a longer recording time. If you are conducting VOD tests, then select one or more of the Required Accessories listed below. Consider selecting one or more of the Recommended and Optional Accessories listed below.

<u>Product #</u>	<u>Product Name</u>	<u>Unit</u>	
1-04-01	DATATRAP II™ DATA/VOD RECORDER	each	
<p>Portable 8 channel, 10 MHz high speed, multi-purpose data acquisition recorder with standard 128 MB memory. Programmable recording speeds independently set on each channel from 1 Hz to 10MHz, flexible trigger inputs and internal/signal triggering on programmable levels. Programmable pre-trigger and post-trigger recording times. Internal non-volatile memory. Post-test data output via USB-2. Sync port to connect multiple DataTrap II™s for more channels. Includes DataTrap II™ Data/VOD Recorder (VOD recording capabilities are not included – see Product 1-04-03), 120 VAC or 230 VAC Battery Charger (as specified by the Customer), USB Communications Cable, External Trigger Adapter, DataTrap II™ Advanced Analytical Software for Windows XP and later, DataTrap II™ Operations Manual (English). Includes MREL's 1 year Comprehensive 100% Parts and Labour Warranty.</p>			
1-04-03	DATATRAP II™ VOD UPGRADE	each	
<p>Factory installed by MREL in the DataTrap II™. Provides VOD recording capability to each of the 8 channels of the DataTrap II™ Data/VOD Recorder allowing the Operator to select VOD or Scope input on each channel independently. Utilizes the memory in the DataTrap II™. Includes installation of DataTrap II™ VOD Upgrade circuit board, DataTrap II™ VOD Operations Manual (English). Includes MREL's 1 year Comprehensive 100% Parts and Labour Warranty.</p>			
1-04-04	DATATRAP II™ ENHANCED MEMORY UPGRADE FROM 128MB TO 256MB	each	
<p>Factory installed by MREL in the DataTrap II™. Doubles the memory of the standard DataTrap II™ Data/VOD Recorder. Includes MREL's 1 year Comprehensive 100% Parts and Labour Warranty.</p>			
1-04-05	DATATRAP II™ MAXIMUM MEMORY UPGRADE FROM 256MB TO 512MB	each	
<p>Factory installed by MREL in the DataTrap II™. Quadruples the memory of the standard DataTrap II™ Data/VOD Recorder. Requires that the DataTrap II™ Enhanced Memory Upgrade is also installed, Product 1-04-04. Includes MREL's 1 year Comprehensive 100% Parts and Labour Warranty.</p>			
1-04-06	DATATRAP II™ STRAIN UPGRADE	each	
<p>Can be attached to the lid of the DataTrap II™ by the Operator. Provides strain gauge recording capability to each of the 8 channels of the DataTrap II™ Data/VOD Recorder allowing the Operator to select strain input on each channel. Utilizes the memory in the DataTrap II™. Includes provision of the DataTrap II™ Strain Module, 8 ea. steel encased DataTrap II™ Strain Gauge Pre-Amplifiers (suitable for 120 ohm strain gauges, 350 ohm is optional – contact MREL), DataTrap II™ Strain Operations Guide (English). One Strain Signal &amp; Power Cable (Product 1-04-08 or 1-04-09) is required for each Pre-Amplifier to be used in a test. When utilizing the recommended MREL strain gauges (Product 1-19-01) the strain range is 0-3000 microstrain with resolution of 5 microstrain. Includes MREL's 1 year Comprehensive 100% Parts and Labour Warranty.</p>			
1-04-08	DATATRAP II™ STRAIN SIGNAL & POWER CABLE (20 m)	each	
<p>Transmits power from the DataTrap II™ Data/VOD Recorder to one Strain Gauge Pre-Amplifier (see Product 1-04-06) and also provides strain gauge signal transmission from the Strain Gauge Pre-Amplifier to the DataTrap II™. Price per one 20 metre (65.6 ft) cable including appropriate connectors. One cable required per each Strain Gauge Pre-Amplifier used in a test. Includes MREL's 1 year Comprehensive 100% Parts and Labour Warranty.</p>			

1-04-09	DATATRAP II™ STRAIN SIGNAL & POWER CABLE (100 m)	each	
Transmits power from the DataTrap II™ Data/VOD Recorder to one Strain Gauge Pre-Amplifier (see Product 1-04-06) and also provides strain gauge signal transmission from the Strain Gauge Pre-Amplifier to the DataTrap II™. Price per one 100 metre (328 ft) cable including appropriate connectors. One cable required per each Strain Gauge Pre-Amplifier used in a test. Includes MREL's 1 year Comprehensive 100% Parts and Labour Warranty.			

**DATATRAP II™ DATA/VOD RECORDER - REQUIRED ACCESSORIES (FOR VOD RECORDING):**

Products 1-05-03 or 1-05-04 or 1-05-05 or 1-05-06 or 1-05-07 or 1-05-08 or 1-05-09 or 1-05-10 or 1-05-11 or 1-05-16.

**DATATRAP II™ DATA/VOD RECORDER - RECOMMENDED ACCESSORIES (FOR VOD RECORDING):**

Products 1-06-01 or 1-06-02.

**DATATRAP II™ DATA/VOD RECORDER - OPTIONAL ACCESSORIES (FOR VOD RECORDING):**

Product 1-08-01.

**DATATRAP II™ DATA/VOD RECORDER - RECOMMENDED ACCESSORIES (FOR AIRBLAST OVERPRESSURE RECORDING):**

See Page 9.

**DATATRAP II™ DATA/VOD RECORDER - RECOMMENDED ACCESSORIES (FOR VIBRATION RECORDING):**

See Page 12.

**DATATRAP II™ DATA/VOD RECORDER - RECOMMENDED ACCESSORIES (FOR UNDERWATER PRESSURE RECORDING):**

See Page 15.

**DATATRAP II™ DATA/VOD RECORDER - RECOMMENDED ACCESSORIES (FOR STRAIN RECORDING):**

See Page 18.

## ACCESSORIES FOR VOD RECORDING:

<u>Product #</u>	<u>Product Name</u>	<u>Unit</u>	
1-05-03	VOD PROBEROD-2E (0.9 m long, 25 ea.)	package	
Two ended, calibrated rigid resistance probe for use when wiring together of several probes is desired in a test to monitor the continuous explosives VOD. Length = 0.9 m (3 ft.). Supplied 25 ea. per package. Compatible with MREL's MicroTrap™ VOD/Data Recorder and DataTrap II™ Data/VOD Recorder. Contact MREL for recommended applications. Custom lengths are available – contact MREL for details.			
1-05-04	VOD PROBECABLE-HT (30 m long, 12 ea.)	box	
Custom, calibrated resistance cable for use in explosives in a blasthole to monitor the continuous explosives VOD and deck delay times. PROBECABLE-HT is recommended for HandiTrap II™ VOD Recorder operators recording VODs in a single hole. Supplied in a ready-to-use length of 30 m (100 ft.) on a spool. Packaged 12 spools per box. Compatible with all MREL VOD Recorders.			
1-05-05	VOD PROBECABLE "GREEN" (1000 m)	box	
Custom, calibrated resistance cable for use in explosives in blastholes to monitor the continuous explosives VOD and hole/deck delay times. PROBECABLE is recommended for operators recording across single or multiple holes. Supplied in "Reel in a Box" boxes. Packaged 1,000 m (3,280 ft.) per box. Compatible with all MREL VOD Recorders except for the HandiTrap™ and HandiTrap II™ VOD Recorders.			
1-05-06	VOD PROBECABLE-LR "BLUE" (1000 m)	box	
Custom, calibrated resistance cable for use in explosives in blastholes to monitor the continuous explosives VOD and hole/deck delay times. PROBECABLE-LR is recommended for operators recording across multiple or many multiple holes. Supplied in "Reel in a Box" boxes. Packaged 1,000 m (3,280 ft.) per box. Compatible with all MREL VOD Recorders except for the HandiTrap™ and HandiTrap II™ VOD Recorders.			
1-05-07	VOD PROBECABLE-K "KEVLAR" (5000 m)	lot	
Custom, calibrated resistance cable for use in explosives in blastholes to monitor the continuous explosives VOD and hole/deck delay times. PROBECABLE-K contains Kevlar and is recommended for operators recording across single or multiple holes in blasting situations where the PROBECABLE incurs very high shocks due to holes detonating on previous delays. Supplied in "Reel in a Box" boxes. Packaged as 5 boxes with 1,000 m (3,280 ft.) per box. Compatible with all MREL VOD Recorders except for the HandiTrap™ and HandiTrap II™ VOD Recorders.			
1-05-08	VOD PROBEROD-HR (0.3 m long, 25 ea.)	package	
Custom, calibrated high-resistance rigid resistance probe for use in short explosives samples to monitor the continuous explosives VOD. Length = 0.3 m (1 ft.). Supplied 25 ea. per package. Compatible with all MREL VOD Recorders except for the HandiTrap™ and HandiTrap II™ VOD Recorders. Contact MREL for recommended applications. Custom lengths are available – contact MREL for details.			
1-05-09	VOD PROBEROD-HR/HS (0.3 m long, 25 ea.)	package	
Custom high-resistance, easily crushed, calibrated rigid resistance probe for use in short low energy explosives samples to monitor the continuous explosives VOD. Length = 0.3 m (1 ft.). Supplied 25 ea. per package. Compatible with all MREL VOD Recorders except for the HandiTrap™ and HandiTrap II™ VOD Recorders. Contact MREL for recommended applications. Custom lengths are available – contact MREL for details.			
1-05-10	VOD PROBEROD (1.0 m long, 25 ea.)	package	
Calibrated rigid resistance probe for use in explosives samples to monitor the continuous explosives VOD. Length = 1.0 m (3.3 ft.). Supplied 25 ea. per package. Compatible with all MREL VOD Recorders. Contact MREL for recommended applications. Custom lengths are available – contact MREL for details.			
1-05-11	VOD PROBEROD-HS (1.0 m long, 25 ea.)	package	
Easily crushed, calibrated rigid resistance probe for use in low energy explosives samples to monitor the continuous explosives VOD. Length = 1.0 m (3.3 ft.). Supplied 25 ea. per package. Compatible with all MREL VOD Recorders. Contact MREL for recommended applications. Custom lengths are available – contact MREL for details.			

1-05-16	VOD PROBEROD-XT (1.0 m long, 25 ea.)	package	
<p>Calibrated rigid resistance probe for use in explosives samples at high temperatures, verified to temperatures up to 200°C (400 °F), to monitor the continuous explosives VOD. Length = 1.0 m (3.3 ft.). Supplied 25 ea. per package. Compatible with all MREL VOD Recorders. Contact MREL for recommended applications. Custom lengths are available – contact MREL for details.</p>			
1-06-01	RG-58U COAXIAL CABLE (101 M) ON LIGHT-DUTY CABLE REEL	each	
<p>101 m (333 ft.) RG-58U coaxial cable, complete with plastic hand-held reel, to carry the VOD signal from the sensor or VOD PROBE to the MREL VOD Recorder. Compatible with all MREL VOD Recorders.</p>			
1-06-02	RG-58U COAXIAL CABLE (305 M) ON HEAVY-DUTY CABLE REEL	each	
<p>305 m (1000 ft.) RG-58U coaxial cable, complete with steel cable reel, to carry the VOD signal from the sensor or VOD PROBE to the MREL VOD Recorder. Compatible with all MREL VOD Recorders except for the HandiTrap™ and HandiTrap II™ VOD Recorders.</p>			
1-08-01	BLASTER'S OHMMETER MODEL 106	each	
<p>MSHA approved for use in blasting to determine the continuity and resistance of electrical circuits. This compact digital blaster's galvanometer is MSHA approved and safe for all blasting circuit measurements. Now equipped with a new LCD backlight feature and a standard Cordura protective case, this digital blaster's galvanometer employs solid state surface mount technology for ruggedness and reliability.</p> <p>Specifications:</p> <p>Weight: 0.14 kg (5 oz.)</p> <p>Size: 25 x 60 x 27 mm (4.6 x 2.4 x 1.1 in.)</p> <p>Seal: Dust and Damp</p> <p>MSHA Approved: Yes</p> <p>Range: 1 ohm - 2K ohms (1 ohm increments)</p> <p>Battery Type: 9V NEDA 1604/1604A</p> <p>Accessories: Cordura Case included</p> <p>Current Output: &lt; 4mA</p>			

## ACCESSORIES FOR AIRBLAST OVERPRESSURE RECORDING:

### HOW TO SELECT THIS PRODUCT:

Select one or more of Products 1-09-01 through 1-09-05 depending on the anticipated level of airblast overpressure to be measured. If you are unsure of anticipated airblast overpressure levels, then contact MREL's Blasting Instrumentation Department or your local MREL Blasting Instrumentation Distributor with details of your experiment including explosive type, explosive weight and distance(s) to the pencil probe(s). Select Product 1-11-02 if you anticipate requiring only one free field blast pressure pencil probe, or select Product 1-11-04 for multiple pencil probes, or 1-11-06 if gain (signal amplification) is desired. Select Product 1-11-06 if you wish to operate from DC power. Select sufficient number of Products 1-13-01 and 1-13-02 to support the pencil probes at locations suited to your experiments. Select sufficient number of Product 1-14-01, one for each pencil probe.

<u>Product #</u>	<u>Product Name</u>	<u>Unit</u>	
1-09-02	FREE FIELD BLAST PRESSURE PENCIL PROBE (0-50 PSI)	each	
<p>"Pencil" Probes were originally developed at Aberdeen Proving Ground for measuring blast effects on structures and humans. This Pencil Probe incorporates an acceleration-compensated quartz element and integral microelectronics for long cable driving, improved stability and low thermal sensitivity. Compatible with MREL's DataTrap II™ Data/VOD Recorder (Product 1-04-01) and MicroTrap™ VOD/Data Recorder (Product 1-03-01) containing the optional MicroTrap Scope Upgrade (Product 1-03-03). Requires excitation power from either Product 1-11-02, 1-11-03, 1-11-04 or Product 1-11-07. MREL recommends Products 1-13-01 and 1-13-02 to hold the Pencil Probe in place. The sale of this item is controlled by federal authorities – export approval must be obtained by MREL for all Customers.</p>			
1-09-03	FREE FIELD BLAST PRESSURE PENCIL PROBE (0-250 PSI)	each	
<p>"Pencil" Probes were originally developed at Aberdeen Proving Ground for measuring blast effects on structures and humans. This Pencil Probe incorporates an acceleration-compensated quartz element and integral microelectronics for long cable driving, improved stability and low thermal sensitivity. Compatible with MREL's DataTrap II™ Data/VOD Recorder (Product 1-04-01) and MicroTrap™ VOD/Data Recorder (Product 1-03-01) containing the optional MicroTrap Scope Upgrade (Product 1-03-03). Requires excitation power from either Product 1-11-02, 1-11-03, 1-11-04 or Product 1-11-07. MREL recommends Products 1-13-01 and 1-13-02 to hold the Pencil Probe in place. The sale of this item is controlled by federal authorities – export approval must be obtained by MREL for all Customers.</p>			
1-09-04	FREE FIELD BLAST PRESSURE PENCIL PROBE (0-500 PSI)	each	
<p>"Pencil" Probes were originally developed at Aberdeen Proving Ground for measuring blast effects on structures and humans. This Pencil Probe incorporates an acceleration-compensated quartz element and integral microelectronics for long cable driving, improved stability and low thermal sensitivity. Compatible with MREL's DataTrap II™ Data/VOD Recorder (Product 1-04-01) and MicroTrap™ VOD/Data Recorder (Product 1-03-01) containing the optional MicroTrap Scope Upgrade (Product 1-03-03). Requires excitation power from either Product 1-11-02, 1-11-03, 1-11-04 or Product 1-11-07. MREL recommends Products 1-13-01 and 1-13-02 to hold the Pencil Probe in place. The sale of this item is controlled by federal authorities – export approval must be obtained by MREL for all Customers.</p>			
1-09-05	FREE FIELD BLAST PRESSURE PENCIL PROBE (0-5000 PSI)	each	
<p>"Pencil" Probes were originally developed at Aberdeen Proving Ground for measuring blast effects on structures and humans. This Pencil Probe incorporates an acceleration-compensated quartz element and integral microelectronics for long cable driving, improved stability and low thermal sensitivity. Compatible with MREL's DataTrap II™ Data/VOD Recorder (Product 1-04-01) and MicroTrap™ VOD/Data Recorder (Product 1-03-01) containing the optional MicroTrap Scope Upgrade (Product 1-03-03). Requires excitation power from either Product 1-11-02, 1-11-03, 1-11-04 or Product 1-11-07. MREL recommends Products 1-13-01 and 1-13-02 to hold the Pencil Probe in place. The sale of this item is controlled by federal authorities – export approval must be obtained by MREL for all Customers.</p>			

1-09-12	PRESSURE SENSOR (0-5, 0-10, 0-20 PSI)	each	
ICP dynamic pressure sensor, 5 psi (for +/- 2.5V output), 10 psi (for +/- 5.0V output), 20 psi (for +/- 10V output), 500 mV/psi, acceleration compensated, provided with 3 m (10 ft.) of 003 cable terminating in a BNC jack for connecting to coaxial signal cable (Product 1-14-01). Compatible with MREL's DataTrap II Data/VOD Recorder (Product 1-04-01) and MicroTrap VOD/Data Recorder (Product 1-03-01) containing the optional MicroTrap Scope Upgrade (Product 1-03-03). Requires excitation power from either Product 1-11-02, 1-11-03, 1-11-04, or 1-11-07. MREL recommends Products 1-13-01 and 1-13-03 to hold the Sensor in place. Sensors with other maximum pressure levels are available, contact MREL for more information. The sale of this item is controlled by federal authorities – export approval must be obtained by MREL for all Customers.			
1-11-02	AC POWERED PROBE/SENSOR SIGNAL CONDITIONER (1 CHANNEL)	each	
Switchable 120/220 VAC powered 1 channel conditioner providing low noise power to one Probe/Sensor and couples it to an MREL Data Recorder. Gain is x1. Compatible with MREL's DataTrap II™ Data/VOD Recorder (Product 1-04-01) and MicroTrap™ VOD/Data Recorder (Product 1-03-01) containing the optional MicroTrap™ Scope Upgrade (Product 1-03-03). Conditioner's output current is factory set at 4 mA, which is adequate for most applications including for transmission of signals for distances up to and including 30 m (100 ft.). To operate this Product from a 12 VDC power source, Product 1-11-06 is required.			
1-11-03	AC POWERED PROBE/SENSOR SIGNAL CONDITIONER (4 CHANNELS)	each	
Switchable 120/220 VAC powered 4 channel conditioner providing low noise power to a Probe/Sensor and couples it to an MREL Data Recorder. Gain is x1. Compatible with MREL's DataTrap II™ Data/VOD Recorder (Product 1-04-01) and MicroTrap™ VOD/Data Recorder (Product 1-03-01) containing the optional MicroTrap™ Scope Upgrade (Product 1-03-03). Conditioner's output current is factory set at 4 mA, which is adequate for most applications including for transmission of signals for distances up to and including 30 m (100 ft.). To operate this Product from a 12 VDC power source, Product 1-11-06 is required.			
1-11-04	AC POWERED PROBE/SENSOR SIGNAL CONDITIONER (4 CHANNELS, GAIN)	each	
Switchable 120/220 VAC powered 4 channel conditioner providing low noise power to up to 4 Probes/Sensors and couples them to an MREL Data Recorder. Gain is adjustable: x1, x10, x100. Compatible with MREL's DataTrap II™ Data/VOD Recorder (Product 1-04-01) and MicroTrap™ VOD/Data Recorder (Product 1-03-01) containing the optional MicroTrap™ Scope Upgrade (Product 1-03-03). Conditioner's output current is factory set at 4 mA, which is adequate for most applications including for transmission of signals for distances up to and including 30 m (100 ft.). To operate this Product from a 12 VDC power source, Product 1-11-06 is required.			
1-11-06	LOW NOISE 12 VDC TO 120 VAC POWER INVERTER	each	
Provides low noise 120 VAC power (300 watt, pure sine wave) from a 12 VDC power source such as a 12 V battery or automobile power socket (VDC power source not supplied). Used to power Product Numbers 1-11-02, 1-11-03 and 1-11-04 from a 12 VDC power source.			
1-11-07	BATTERY POWERED PROBE/SENSOR SIGNAL CONDITIONER (1 CHANNEL, GAIN)	each	
Internal battery powered (3 x 9V batteries which are included) 1 channel conditioner providing low noise power to one Probe/Sensor and couples it to an MREL Data Recorder. Gain is adjustable: x1, x10, x100. Compatible with MREL's DataTrap II™ Data/VOD Recorder (Product 1-04-01) and MicroTrap™ VOD/Data Recorder (Product 1-03-01) containing the optional MicroTrap™ Scope Upgrade (Product 1-03-03).			
1-13-01	PENCIL PROBE AND UNDERWATER SENSOR STAND	each	
Adjustable, portable, steel stand for mounting one or more airblast Pencil Probe Mounting Clamps (Product 1-13-02) or Underwater Pressure Sensor Mount (Product 1-13-03).			
1-13-02	PENCIL PROBE MOUNTING CLAMP	each	
Adjustable, portable, precision machined stainless steel clamp for holding Pencil Probe securely to Pencil Probe Stand (Product 1-13-01).			

1-14-01	PROBE/SENSOR COAXIAL CABLE KIT	each	
30 m (100 ft.) RG-58U coaxial cable, complete with plastic handheld reel, to carry the Probe/Sensor signal to the Signal Conditioner. Also 3 m (10 ft.) RG-58U coaxial cable, to carry the signal from the Signal Conditioner to the MREL Data Recorder. Complete with appropriate connectors.			

## ACCESSORIES FOR VIBRATION RECORDING:

### HOW TO SELECT THIS PRODUCT:

Select one or more accelerometers depending on the anticipated level of vibration to be measured. Select sufficient number of signal cables and signal conditioners to support the number of triaxial or uniaxial accelerometers to be recorded per test. MREL's DataTrap II™ Data/VOD Recorder can record up to 2 triaxial or up to 8 uniaxial accelerometers per test. MREL's MicroTrap™ VOD/Data Recorder containing the optional MicroTrap Scope Upgrade can record up to 1 triaxial or up to 4 uniaxial accelerometers per test. Other ranges of triaxial and uniaxial accelerometers and associated signal conditioners and lengths of signal cables are available. Contact MREL's Blasting Instrumentation Department or your local MREL Blasting Instrumentation Distributor with details of your requirements and MREL will configure a system for you.

<u>Product #</u>	<u>Product Name</u>	<u>Unit</u>	
1-15-11	TRIAxIAL ACCELEROMETER (+/- 5g)	each	
Calibrated, high sensitivity, triaxial ceramic shear accelerometer for triaxial shock and vibration measurements. Sensitivity: ( $\pm 10\%$ ) 1000 mV/g (102 mV/(m/s <sup>2</sup> )) Measurement Range: $\pm 5$ g pk ( $\pm 49$ m/s <sup>2</sup> pk) Broadband Resolution: (1 to 10000 Hz) 0.00005 g rms (0.0005 m/s <sup>2</sup> rms) Frequency Range: ( $\pm 5\%$ ) 0.5 to 3000 Hz Electrical Connector: 1/4-28 4-Pin Weight: 0.88 oz (25 gm) Measures acceleration in three directions. Provided with bonding gell, adhesive mounting base and mounting stud. Compatible with MREL's DataTrap II™ Data/VOD Recorder (Product 1-04-01) and MicroTrap™ VOD/Data Recorder (Product 1-03-01) containing the optional MicroTrap™ Scope Upgrade (Product 1-03-03). Requires excitation power from Product 1-15-04 and signal cable Product 1-15-02 or 1-15-16 or 1-15-19.			
1-15-07	TRIAxIAL ACCELEROMETER (+/- 50g)	each	
Calibrated, triaxial ceramic shear accelerometer for routine, triaxial shock and vibration measurements. Sensitivity: ( $\pm 10\%$ ) 100 mV/g (10.2 mV/(m/s <sup>2</sup> )) Measurement Range: $\pm 50$ g pk ( $\pm 490$ m/s <sup>2</sup> pk) Broadband Resolution: (1 to 10000 Hz) 0.0002 g rms (0.002 m/s <sup>2</sup> rms) Frequency Range: ( $\pm 5\%$ ) 2 to 5000 Hz Electrical Connector: 1/4-28 4-Pin Weight: 0.37 oz (10.5 gm) Measures acceleration in three directions. Provided with bonding gell, adhesive mounting base and mounting stud. Compatible with MREL's DataTrap II™ Data/VOD Recorder (Product 1-04-01) and MicroTrap™ VOD/Data Recorder (Product 1-03-01) containing the optional MicroTrap Scope™ Upgrade (Product 1-03-03). Requires excitation power from Product 1-15-04 and signal cable Product 1-15-02 or 1-15-16 or 1-15-19.			
1-15-12	TRIAxIAL ACCELEROMETER (+/- 100g)	each	
Calibrated, triaxial quartz shear accelerometer for routine, triaxial shock and vibration measurements. Sensitivity: ( $\pm 10\%$ ) 50 mV/g (5.1 mV/(m/s <sup>2</sup> )) Measurement Range: $\pm 100$ g pk ( $\pm 981$ m/s <sup>2</sup> pk) Broadband Resolution: (1 to 10000 Hz) 0.0002 g rms (0.002 m/s <sup>2</sup> rms) Frequency Range: ( $\pm 5\%$ ) 1 to 5000 Hz Electrical Connector: 1/4-28 4-Pin Weight: 0.37 oz (10.5 gm) Measures acceleration in three directions. Provided with bonding gell, adhesive mounting base and mounting stud. Compatible with MREL's DataTrap II™ Data/VOD Recorder (Product 1-04-01) and MicroTrap™ VOD/Data Recorder (Product 1-03-01) containing the optional MicroTrap™ Scope Upgrade (Product 1-03-03). Requires excitation power from Product 1-15-04 and signal cable Product 1-15-02 or 1-15-16 or 1-15-19.			

1-15-06	TRIAxIAL ACCELEROMETER (+/- 200g)	each	
<p>Calibrated, triaxial quartz shear accelerometer for routine, triaxial shock and vibration measurements.  Sensitivity: (<math>\pm 10\%</math>) 25 mV/g (2.6 mV/(m/s<sup>2</sup>))  Measurement Range: <math>\pm 200</math> g pk (<math>\pm 1960</math> m/s<sup>2</sup> pk)  Broadband Resolution: (1 to 10000 Hz) 0.0002 g rms (0.002 m/s<sup>2</sup> rms)  Frequency Range: (<math>\pm 5\%</math>) 1 to 5000 Hz  Electrical Connector: 1/4-28 4-Pin  Weight: 0.37 oz (10.5 gm)  Measures acceleration in three directions. Provided with bonding gell, adhesive mounting base and mounting stud.  Compatible with MREL's DataTrap II™ Data/VOD Recorder (Product 1-04-01) and MicroTrap™ VOD/Data Recorder (Product 1-03-01) containing the optional MicroTrap™ Scope Upgrade (Product 1-03-03). Requires excitation power from Product 1-15-04 and signal cable Product 1-15-02 or 1-15-16 or 1-15-19.</p>			
1-15-05	TRIAxIAL ACCELEROMETER (+/- 500g)	each	
<p>Calibrated, triaxial ceramic shear accelerometer for routine, triaxial shock and vibration measurements.  Sensitivity: (<math>\pm 10\%</math>) 10 mV/g (1.02 mV/(m/s<sup>2</sup>))  Measurement Range: <math>\pm 500</math> g pk (<math>\pm 4900</math> m/s<sup>2</sup> pk)  Broadband Resolution: (1 to 10000 Hz) 0.0005 g rms (0.005 m/s<sup>2</sup> rms)  Frequency Range: (<math>\pm 5\%</math>) 1 to 5000 Hz  Electrical Connector: 1/4-28 4-Pin  Weight: 0.37 oz (10.5 gm)  Measures acceleration in three directions. Provided with bonding gell, adhesive mounting base and mounting stud.  Compatible with MREL's DataTrap II™ Data/VOD Recorder (Product 1-04-01) and MicroTrap™ VOD/Data Recorder (Product 1-03-01) containing the optional MicroTrap™ Scope Upgrade (Product 1-03-03). Requires excitation power from Product 1-15-04 and signal cable Product 1-15-02 or 1-15-16 or 1-15-19.</p>			
1-15-08	TRIAxIAL ACCELEROMETER (+/- 5000g)	each	
<p>Calibrated, triaxial miniature (4 gm) accelerometer for routine, triaxial shock and vibration measurements.  Sensitivity: (<math>\pm 20\%</math>) 1.0 mV/g (0.1 mV/(m/s<sup>2</sup>))  Measurement Range: <math>\pm 5000</math> g pk (<math>\pm 49050</math> m/s<sup>2</sup> pk)  Broadband Resolution: (1 to 10000 Hz) 0.03 g rms (0.29 m/s<sup>2</sup> rms)  Frequency Range: (<math>\pm 5\%</math>) (Y- &amp; Z-axis) 2 to 10000 Hz  Electrical Connector: 8-36 4-Pin  Weight: 0.14 oz (4 gm)  Measures acceleration in three directions. Provided with bonding gell, adhesive mounting base and mounting stud.  Compatible with MREL's DataTrap II™ Data/VOD Recorder (Product 1-04-01) and MicroTrap™ VOD/Data Recorder (Product 1-03-01) containing the optional MicroTrap™ Scope Upgrade (Product 1-03-03). Requires excitation power from Product 1-15-04. Signal cable is also required - and is custom quoted/ordered depending on Customer's requirements.</p>			
1-15-04	TRIAxIAL ACCELEROMETER SIGNAL CONDITIONER	each	
<p>Internal battery powered (3 x 9V batteries which are included) signal conditioner provides a low noise 27 volt, 3 mA constant current power to one triaxial accelerometer and couples it to an MREL Data Recorder. Gain of x1, x10 and x100. Compatible with MREL's DataTrap II™ Data/VOD Recorder (Product 1-04-01) and MicroTrap™ VOD/Data Recorder (Product 1-03-01) containing the optional MicroTrap Scope™ Upgrade (Product 1-03-03). Includes 3 ea. x 2 m (6 ft.) coaxial cable for connecting to the MREL Data Recorder.</p>			
1-15-02	TRIAxIAL ACCELEROMETER SIGNAL CABLE (30 m)	each	
<p>30 m (100 ft.) of low noise signal transmission cable for connecting between a triaxial accelerometer and the triaxial accelerometer signal conditioner. Complete with connectors installed.</p>			
1-15-19	TRIAxIAL ACCELEROMETER SIGNAL CABLE (6 m)	each	
<p>6 m (20 ft.) of low noise signal transmission cable for connecting between a triaxial accelerometer and the triaxial accelerometer signal conditioner. Complete with connectors installed.</p>			
1-15-16	TRIAxIAL ACCELEROMETER SIGNAL CABLE (3 m)	each	
<p>3 m (10 ft.) of low noise signal transmission cable for connecting between a triaxial accelerometer and the triaxial accelerometer signal conditioner. Complete with connectors installed.</p>			

1-15-15	UNIAXIAL ACCELEROMETER (+/- 500g)	each	
<p>Calibrated, uniaxial ceramic shear accelerometer for routine, triaxial shock and vibration measurements.  Sensitivity: (<math>\pm 5\%</math>) 10 mV/g (1.02 mV/(m/s<sup>2</sup>))  Measurement Range: <math>\pm 500</math> g pk (<math>\pm 4900</math> m/s<sup>2</sup> pk)  Broadband Resolution: (1 to 7000 Hz) 0.003 g rms (0.03 m/s<sup>2</sup> rms)  Frequency Range: (<math>\pm 5\%</math>) 1 to 7000 Hz  Electrical Connector: 10-32 Coaxial Jack  Weight: 0.38 oz (10.5 gm)  Measures acceleration in one direction. Provided with bonding gell, adhesive mounting base and mounting stud.  Compatible with MREL's DataTrap II™ Data/VOD Recorder (Product 1-04-01) and MicroTrap™ VOD/Data Recorder (Product 1-03-01) containing the optional MicroTrap™ Scope Upgrade (Product 1-03-03). Requires excitation power from Product 1-15-13 and signal cable Product 1-15-14.</p>			
1-15-13	UNIAXIAL ACCELEROMETER SIGNAL CONDITIONER	each	
<p>Internal battery powered (3 x 9V batteries which are included) signal conditioner provides a low noise 27 volt, 3 mA constant current power to one uniaxial accelerometer and couples it to an MREL Data Recorder. Gain of x1, x10 and x100. Compatible with MREL's DataTrap II™ Data/VOD Recorder (Product 1-04-01) and MicroTrap™ VOD/Data Recorder (Product 1-03-01) containing the optional MicroTrap™ Scope Upgrade (Product 1-03-03). Includes 1 ea. x 2 m (6 ft.) coaxial cable for connecting to the MREL Data Recorder.</p>			
1-15-14	UNIAXIAL ACCELEROMETER SIGNAL CABLE (10-32 to BNC, 30 m)	each	
<p>30 m (100 ft.) of low noise signal transmission cable for connecting between a uniaxial accelerometer with a 10-23 connector and the signal conditioner with BNC connector. Complete with connectors installed.</p>			
1-15-17	DC POWERED ACCELEROMETER SIGNAL CONDITIONER (4 CHANNELS, GAIN)	each	
<p>34-38 VDC, 200 mA powered 4 channel signal conditioner providing low noise power to up to 4 uni-axial accelerometers or 1 tri-axial accelerometer and couples them to an MREL Data Recorder. Gain is adjustable: x1, x10, x100. Compatible with MREL's DataTrap II™ Data/VOD Recorder (Product 1-04-01) and MicroTrap™ VOD/Data Recorder (Product 1-03-01) containing the optional MicroTrap™ Scope Upgrade (Product 1-03-03). Conditioner's output current is adjustable from 4 mA to 20 mA and is factory set by MREL to 20 mA, which is appropriate for transmission of signals for distances up to and including 335 m (1100 ft.) of RG-58/U coaxial cable. Includes one AC mains adapter for operation from 100-240 VAC, 47-63 Hz mains power. Includes 3 ea. x 2 m (6 ft.) coaxial cable for connecting to the MREL Data Recorder. To operate this Product from portable DC power, Product 1-15-18 is recommended.</p>			
1-15-18	DC POWER PACK FOR DC POWERED SIGNAL CONDITIONERS	each	
<p>DC power pack with output voltage of 36 VDC, 565 mA/hrs. Powered by 9V x 4 Duracell MN1604 (or equivalent) Alkaline Batteries. Recommended for use to provide Product 1-15-17 with DC power.</p>			

## **ACCESSORIES FOR UNDERWATER PRESSURE RECORDING:**

### HOW TO SELECT THIS PRODUCT:

Select one or more underwater pressure sensors depending on the anticipated level of pressure to be measured. Select sufficient number of signal cables and signal conditioners to support the number of pressure sensors to be recorded per test. MREL's DataTrap II™ Data/VOD Recorder can record up to 8 sensors per test. MREL's MicroTrap™ VOD/Data Recorder containing the optional MicroTrap™ Scope Upgrade can record up to 4 sensors per test. If you need to record other dynamic underwater pressure levels or if you are unsure of dynamic underwater pressure levels, then contact MREL's Blasting Instrumentation Department or your local MREL Blasting Instrumentation Distributor with details of your experiment including explosive type, explosive weight and distance(s) to the sensor(s) and MREL will make a suitable sensor recommendation.

<u>Product #</u>	<u>Product Name</u>	<u>Unit</u>	
1-09-07	UNDERWATER PRESSURE SENSOR (0-1000 PSI)	each	
<p>Tourmaline ICP omnidirectional underwater blast sensor measures shock wave pressures associated with underwater explosion testing, 19.3 cm (7.6 in.) length with 61 m (200 ft.) of 038 water tight cable terminating in a BNC plug. The sensor is structured with a volumetrically sensitive tourmaline crystal, suspended and sealed in an insulating, oil-filled vinyl tube. It has integral microelectronics. This underwater shock wave sensor provides a clean, non-resonant high-voltage output through long cables in adverse underwater environments. It contains a weight attachment hole to suspend the sensor in water at a given depth. Compatible with MREL's DataTrap II™ Data/VOD Recorder (Product 1-04-01) and MicroTrap™ VOD/Data Recorder (Product 1-03-01) containing the optional MicroTrap™ Scope Upgrade (Product 1-03-03). Requires excitation power from either Product 1-11-02, 1-11-03, 1-11-04, or Product 1-11-07. Sensors with other maximum pressure levels are available, contact MREL for more information. The sale of this item is controlled by federal authorities – export approval must be obtained by MREL for all Customers.</p>			
1-09-08	UNDERWATER PRESSURE SENSOR (0-5000 PSI)	each	
<p>Tourmaline ICP omnidirectional underwater blast sensor measures shock wave pressures associated with underwater explosion testing, 19.3 cm (7.6 in.) length with 61 m (200 ft.) of 038 water tight cable terminating in a BNC plug. The sensor is structured with a volumetrically sensitive tourmaline crystal, suspended and sealed in an insulating, oil-filled vinyl tube. It has integral microelectronics. This underwater shock wave sensor provides a clean, non-resonant high-voltage output through long cables in adverse underwater environments. It contains a weight attachment hole to suspend the sensor in water at a given depth. Compatible with MREL's DataTrap II™ Data/VOD Recorder (Product 1-04-01) and MicroTrap™ VOD/Data Recorder (Product 1-03-01) containing the optional MicroTrap™ Scope Upgrade (Product 1-03-03). Requires excitation power from either Product 1-11-02, 1-11-03, 1-11-04, or Product 1-11-07. Sensors with other maximum pressure levels are available, contact MREL for more information. The sale of this item is controlled by federal authorities – export approval must be obtained by MREL for all Customers.</p>			
1-09-09	UNDERWATER PRESSURE SENSOR (0-10000 PSI)	each	
<p>Tourmaline ICP omnidirectional underwater blast sensor measures shock wave pressures associated with underwater explosion testing, 19.3 cm (7.6 in.) length with 61 m (200 ft.) of 038 water tight cable terminating in a BNC plug. The sensor is structured with a volumetrically sensitive tourmaline crystal, suspended and sealed in an insulating, oil-filled vinyl tube. It has integral microelectronics. This underwater shock wave sensor provides a clean, non-resonant high-voltage output through long cables in adverse underwater environments. It contains a weight attachment hole to suspend the sensor in water at a given depth. Compatible with MREL's DataTrap II™ Data/VOD Recorder (Product 1-04-01) and MicroTrap™ VOD/Data Recorder (Product 1-03-01) containing the optional MicroTrap™ Scope Upgrade (Product 1-03-03). Requires excitation power from either Product 1-11-02, 1-11-03, 1-11-04, or Product 1-11-07. Sensors with other maximum pressure levels are available, contact MREL for more information. The sale of this item is controlled by federal authorities – export approval must be obtained by MREL for all Customers.</p>			

1-09-10	UNDERWATER PRESSURE SENSOR (0-25000 PSI)	each	
<p>Tourmaline ICP omnidirectional underwater blast sensor measures shock wave pressures associated with underwater explosion testing, 19.3 cm (7.6 in.) length with 61 m (200 ft.) of 038 water tight cable terminating in a BNC plug. The sensor is structured with a volumetrically sensitive tourmaline crystal, suspended and sealed in an insulating, oil-filled vinyl tube. It has integral microelectronics. This underwater shock wave sensor provides a clean, non-resonant high-voltage output through long cables in adverse underwater environments. It contains a weight attachment hole to suspend the sensor in water at a given depth. Compatible with MREL's DataTrap II™ Data/VOD Recorder (Product 1-04-01) and MicroTrap™ VOD/Data Recorder (Product 1-03-01) containing the optional MicroTrap™ Scope Upgrade (Product 1-03-03). Requires excitation power from either Product 1-11-02, 1-11-03, 1-11-04, or Product 1-11-07. Sensors with other maximum pressure levels are available, contact MREL for more information. The sale of this item is controlled by federal authorities – export approval must be obtained by MREL for all Customers.</p>			
1-09-11	UNDERWATER PRESSURE SENSOR (0-50000 PSI)	each	
<p>Tourmaline ICP omnidirectional underwater blast sensor measures shock wave pressures associated with underwater explosion testing, 19.3 cm (7.6 in.) length with 61 m (200 ft.) of 038 water tight cable terminating in a BNC plug. The sensor is structured with a volumetrically sensitive tourmaline crystal, suspended and sealed in an insulating, oil-filled vinyl tube. It has integral microelectronics. This underwater shock wave sensor provides a clean, non-resonant high-voltage output through long cables in adverse underwater environments. It contains a weight attachment hole to suspend the sensor in water at a given depth. Compatible with MREL's DataTrap II™ Data/VOD Recorder (Product 1-04-01) and MicroTrap™ VOD/Data Recorder (Product 1-03-01) containing the optional MicroTrap™ Scope Upgrade (Product 1-03-03). Requires excitation power from either Product 1-11-02, 1-11-03, 1-11-04, or Product 1-11-07. Sensors with other maximum pressure levels are available, contact MREL for more information. The sale of this item is controlled by federal authorities – export approval must be obtained by MREL for all Customers.</p>			
1-11-02	AC POWERED PROBE/SENSOR SIGNAL CONDITIONER (1 CHANNEL)	each	
<p>Switchable 120/220 VAC powered 1 channel conditioner providing low noise power to one Probe/Sensor and couples it to an MREL Data Recorder. Gain is x1. Compatible with MREL's DataTrap II™ Data/VOD Recorder (Product 1-04-01) and MicroTrap™ VOD/Data Recorder (Product 1-03-01) containing the optional MicroTrap™ Scope Upgrade (Product 1-03-03). Conditioner's output current is factory set at 4 mA, which is adequate for most applications including for transmission of signals for distances up to and including 30 m (100 ft.). To operate this Product from a 12 VDC power source, Product 1-11-06 is required.</p>			
1-11-03	AC POWERED PROBE/SENSOR SIGNAL CONDITIONER (4 CHANNELS)	each	
<p>Switchable 120/220 VAC powered 4 channel conditioner providing low noise power to a Probe/Sensor and couples it to an MREL Data Recorder. Gain is x1. Compatible with MREL's DataTrap II™ Data/VOD Recorder (Product 1-04-01) and MicroTrap™ VOD/Data Recorder (Product 1-03-01) containing the optional MicroTrap™ Scope Upgrade (Product 1-03-03). Conditioner's output current is factory set at 4 mA, which is adequate for most applications including for transmission of signals for distances up to and including 30 m (100 ft.). To operate this Product from a 12 VDC power source, Product 1-11-06 is required.</p>			
1-11-04	AC POWERED PROBE/SENSOR SIGNAL CONDITIONER (4 CHANNELS, GAIN)	each	
<p>Switchable 120/220 VAC powered 4 channel conditioner providing low noise power to up to 4 Probes/Sensors and couples them to an MREL Data Recorder. Gain is adjustable: x1, x10, x100. Compatible with MREL's DataTrap II™ Data/VOD Recorder (Product 1-04-01) and MicroTrap™ VOD/Data Recorder (Product 1-03-01) containing the optional MicroTrap™ Scope Upgrade (Product 1-03-03). Conditioner's output current is factory set at 4 mA, which is adequate for most applications including for transmission of signals for distances up to and including 30 m (100 ft.). To operate this Product from a 12 VDC power source, Product 1-11-06 is required.</p>			
1-11-06	LOW NOISE 12 VDC TO 120 VAC POWER INVERTER	each	
<p>Provides low noise 120 VAC power (300 watt, pure sine wave) from a 12 VDC power source such as a 12 V battery or automobile power socket (VDC power source not supplied). Used to power Product Numbers 1-11-02, 1-11-03 and 1-11-04 from a 12 VDC power source.</p>			

1-11-07	BATTERY POWERED PROBE/SENSOR SIGNAL CONDITIONER (1 CHANNEL, GAIN)	each	
Internal battery powered (3 x 9V batteries which are included) 1 channel conditioner providing low noise power to one Probe/Sensor and couples it to an MREL Data Recorder. Gain is adjustable: x1, x10, x100. Compatible with MREL's DataTrap II™ Data/VOD Recorder (Product 1-04-01) and MicroTrap™ VOD/Data Recorder (Product 1-03-01) containing the optional MicroTrap™ Scope Upgrade (Product 1-03-03).			
1-13-01	PENCIL PROBE AND UNDERWATER SENSOR STAND	each	
Adjustable, portable, steel stand for mounting one or more airblast Pencil Probe Mounting Clamps (Product 1-13-02) or Underwater Pressure Sensor Mount (Product 1-13-03).			
1-13-03	UNDERWATER PRESSURE SENSOR MOUNT	each	
Aluminum wedge mount for pressure sensors. This item attaches to the Pencil Probe and Underwater Sensor Stand (Product 1-13-01). Note: this Product is not for use with Products 1-09-07 though 1-09-11 which must be suspended in the water.			
1-14-01	PROBE/SENSOR COAXIAL CABLE KIT	each	
30 m (100 ft.) RG-58U coaxial cable, complete with plastic handheld reel, to carry the Probe/Sensor signal to the Signal Conditioner. Also 3 m (10 ft.) RG-58U coaxial cable, to carry the signal from the Signal Conditioner to the MREL Data Recorder. Complete with appropriate connectors.			

## ACCESSORIES FOR STRAIN RECORDING:

### HOW TO SELECT THIS PRODUCT:

Select Product 1-19-01 for recording strain using MREL's DataTrap II™ Data/VOD Recorder containing the optional Strain Upgrade. MREL's DataTrap II™ Data/VOD Recorder containing the optional DataTrap II™ Strain Upgrade can record up to 8 strain gauges per test.

Product #	Product Name	Unit	
1-19-01	SURFACE MOUNT STRAIN GAUGE (10 ea.)	box	
Strain gauge (120 ohms) designed for monitoring strain in steel structures or strain in concrete or masonry surfaces. Measuring range = 3,000 microstrain. Resolution = 5 microstrain. Complete with strain gauge, 2.5 m (9 ft.) signal cable and strain gauge adhesive. Compatible with MREL's DataTrap II™ Data/VOD Recorder (Product 1-04-01) containing the optional DataTrap II™ Strain Upgrade (Product 1-04-06).			

### ADDITIONAL INFORMATION:

All prices are EXW Kingston, Ontario, Canada.

More information on MREL's HandiTrap II VOD Recorder, MicroTrap VOD/Data Recorder and DataTrap II Data/VOD Recorder is available online at [www.mrel.com](http://www.mrel.com) .

For more information or to request a formal quotation please contact your local Authorized MREL Blasting Instrumentation Distributor, or MREL's Blasting Instrumentation Department:

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