

# Instructions for



## Model 261

Sound Level  
Detector/Controller

058-508  
Rev C. 04/00

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## MODEL 261 SOUND LEVEL DETECTOR/CONTROLLER

### GENERAL DESCRIPTION

The Quest Model 261 Sound Level Detector/Controller is a sound-activated switch that is used for monitoring noisy areas or noisy events. When activated, the Detector/Controller can be used to light up a sign. It can also be used to control machinery or other powered equipment.

Two easily adjustable controls are used to set the activation point to any level between 55 dB and 110 dB. Depending on the frequency content of the sound being detected, either "A" or "C" frequency weighting can be selected. (See Figure 3.)

Activation response times are easily programmed into the response circuit. They function as follows:

- If the Rise Time is set to "IMPULSE", a short duration sound will activate the unit if it exceeds the preset "dB THRESHOLD".
- If the Fall Time is set to "LATCH", the relay output will remain in the activated position until the "RELAY RESET" button (or optional Remote Reset button) is pressed.
- If either switch is set in the "SHORT", "MEDIUM", or "LONG" position, the time needed for activation and automatic deactivation of the switched output is correspondingly increased.
- This allows the unit to monitor noisy areas such as factory environments or school lunchrooms by slowly averaging the noise. If the noise exceeds the preset "dB Threshold" for a period of time, the switched output will activate.

The Model 261 is intended to be used to light the Quest Model LB-26 sign. This will inform the workers to wear hearing protection when the ambient becomes dangerously loud.

It can also be used to acoustically turn on or turn off any device that does not require more than 10 amps and 300 volts AC or DC.

### USES...

- Work Area Noise Level Alarm - Wear Hearing Protection.
- Shut down power machinery.
- Production and Process Control.
- Explosion Monitor.
- School - Hospital Hallway Monitor.

### SPECIFICATIONS:

#### dB Threshold Activation Range:

55 dB to 110 dB in 0.5 dB steps.

#### Microphone:

Electret, Built-in FET preamp.

#### Area Coverage:

Will monitor up to three areas with three microphones, each being up to 30 feet from the Model 261. (80 feet with the optional 50 foot extension cable.)

#### Frequency Weighting:

"A" and "C".

#### Response Time:

4 Rise Times and 4 Fall Times, easily selectable from the front panel. The LATCH Fall Time permits the relay to remain closed once activated. RELAY RESET or REMOTE RESET (optional) must be used to deactivate the relay.

#### Relay Contact Rating:

10 Amps Fused, 300 Volts Max., DPDT.

#### Accuracy:

± 1 dB at 20°C.

#### Temperature:

-30°C to +50°C operating.

#### Power Requirements:

117v / 234v, 50/60 Hz.

#### Construction:

Low power integrated circuitry in a rugged aluminum housing.

#### Size:

10 x 7 x 3 inches (260 x 180 x 80 mm)

#### Weight:

3 lbs. (1.4 kg.)

## CONTROLS

The controls are shown in Figure 1. A brief description of the controls indicates what each one does.

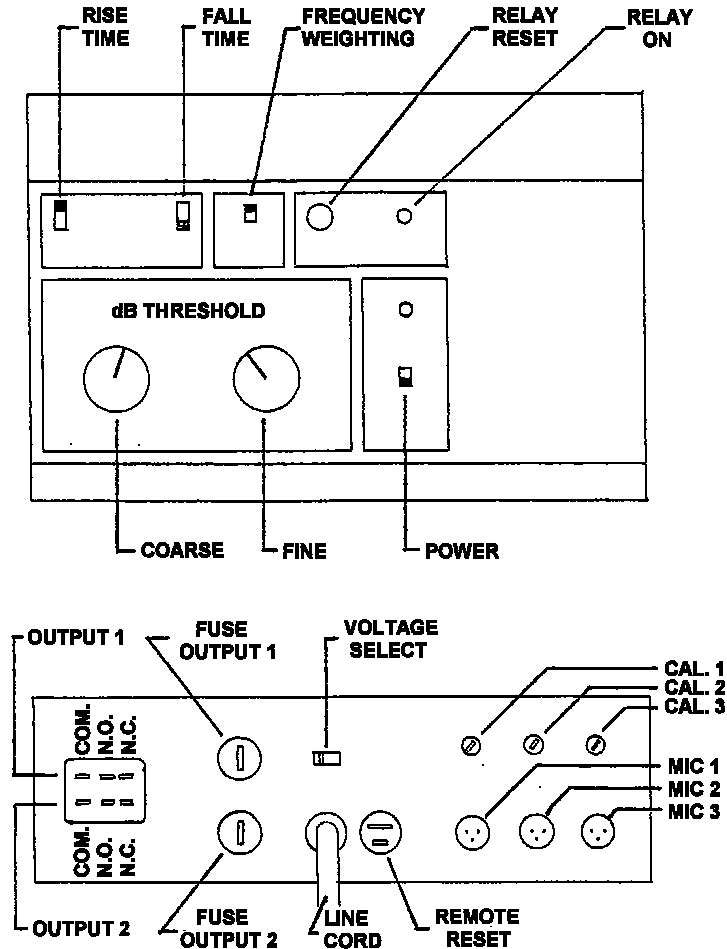


Figure 1. Controls

## POWER switch:

Turns the power on and off. When the power is on, the red light will be lit.

## dB THRESHOLD, COARSE:

This 11 position switch changes the relay activation level in 5 dB increments from 55 to 105 dB.

## dB THRESHOLD, FINE:

This 11 position switch changes the relay activation level in 0.5 dB increments from 0 to 5.0 dB. This setting is added to the COARSE setting to obtain the actual dB level that the relay will operate at.

## FREQUENCY WEIGHTING:

"A" and "C" scales per ANSI S1.4-1983. (See Figure 3.)

## RISE TIME:

"Impulse" is used to detect a rapidly occurring sound such as a gun shot. "Short", "Medium", and "Long" are used to give various delay times between the activating sound and the relay closure. (See Figure 4.)

## FALL TIME:

"Latch" is used to cause the relay to remain activated indefinitely or until the unit is reset. (See RELAY RESET/REMOTE RESET.) "Short", "Medium", and "Long" are used to give various delay times between the removal of the activating sound and the relay deactivation. (See Figure 5.)

## RELAY RESET:

Pressing this button will cause the activated relay to deactivate.

## RELAY ON:

When lit, the relay is in the activated condition.

#### REMOTE RESET:

Optional button and wiring to be supplied by the user. A Normally Open (N.O.) push button switch can be mounted up to 200 feet away from the Model 261. Pressing this button will cause the activated relay to deactivate.

#### MIC. 1 / MIC. 2 / MIC. 3:

Multiple microphone inputs allowing up to 3 microphones to simultaneously monitor room noise. When calibrated, each microphone will activate the relay at the same dB Threshold level.

#### CAL. 1 / CAL. 2 / CAL. 3:

Screwdriver adjustments to match (calibrate) the sensitivity of each microphone to the sensitivity of the amplifier.

#### LINE CORD:

Provides AC power to the circuitry of the Model 261.

#### VOLTAGE SELECT:

Allows the user to operate the unit on either 117v or 234v AC (50 to 60 Hz).

#### FUSE, OUTPUT 1 / FUSE, OUTPUT 2:

Protects the internal circuitry and relay against damage from an overload condition. Requires 10 amp, 3 AG fuses.

#### OUTPUT 1 / OUTPUT 2:

A 6 pin connector provides a relay output consisting of 2 poles, each being Normally Open (N.O.) or Normally Closed (N.C.). These are to be wired by the user to either activate or deactivate a device.

## PRINCIPLES OF OPERATION

### General

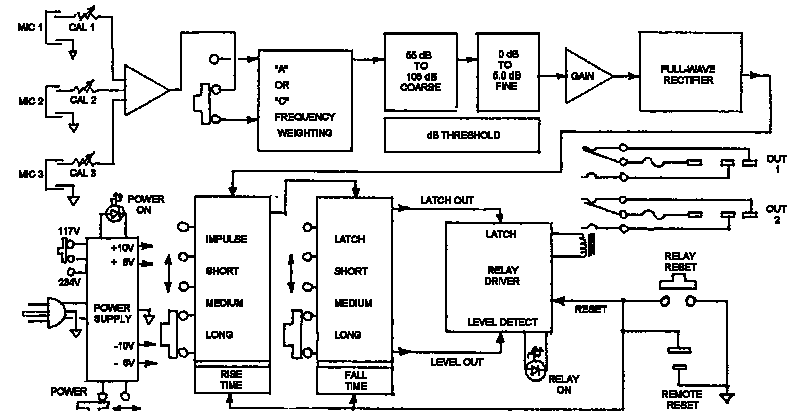
A block diagram (Figure 2) depicts the circuit operation. The microphone voltage (MIC. 1, MIC. 2, MIC. 3) is amplified (GAIN circuit) and fed into the "A" or "C" FREQUENCY WEIGHTING network. The output of this network is fed into the dB THRESHOLD attenuator circuit. This circuit is manually adjusted (COARSE and FINE) to the level that the RELAY is to activate at.

The dB THRESHOLD output is amplified (GAIN circuit) and then received by the FULL-WAVE RECTIFIER. This circuit converts the AC voltage to a DC voltage. Two switches on the front panel set the RISE TIME and FALL TIME. When the DC voltage reaches a specific level, it activates the RELAY DRIVER and the RELAY closes. By proper connection to OUT 1 and OUT 2, the relay contacts can control various electronic devices.

RELAY RESET and optional REMOTE RESET, when depressed, will discharge both RISE TIME and FALL TIME circuits while at the same time cause a deactivation of the RELAY if it is activated.

The Power Supply produces the voltages needed to operate the unit continuously from either 117v AC or 234v AC switch controllable.

Figure 2. Block Diagram



### Frequency Weighting

The Model 261 incorporates "A" and "C" frequency weighting. To detect sound the way that the human ear hears it, "A" weighting is used. To detect sound more closely to the way that it actually exists, "C" weighting is used. (See Figure 3.) Always use "A" weighting unless there is a special reason to use "C".

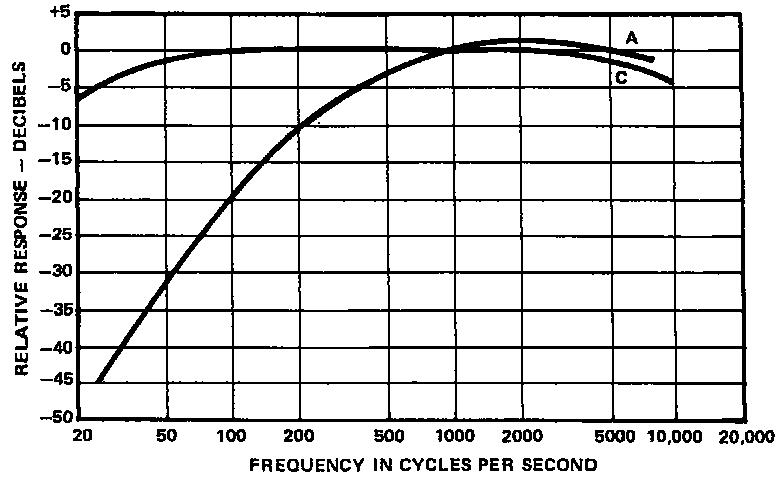


Figure 3. Weighting Characteristics

### Rise Time Characteristics

The Model 261 will respond with different time delays that are determined by the Rise Time switch setting and how much that the dB Level exceeds the Threshold. (See Figure 4.)

dB LEVEL OVER THRESHOLD	TIME TO ACTIVATE RELAY			
	IMPULSE	SHORT	MEDIUM	LONG
+1 dB	200 msec.	1.2 sec.	8 sec.	50 sec.
+4 dB	80 msec.	0.5 sec.	3 sec.	18 sec.
+10 dB	30 msec.	160 msec.	1.3 sec.	8 sec.
+20 dB	8 msec.	50 msec.	0.4 sec.	2 sec.

Figure 4. Rise Time

### Fall Time Characteristics

The Model 261 will respond with different time delays between signal removal and relay deactivation. This time delay is determined by the Fall Time switch setting and how much that the dB Level exceeds the Threshold. (See Figure 5.)

dB LEVEL OVER THRESHOLD	LATCH	TIME TO DEACTIVATE RELAY		
		SHORT	MEDIUM	LONG
+1 dB		0.2 sec.	3.5 sec.	35 sec.
+4 dB	Reset Button Must Be Pressed	1 sec.	8 sec.	80 sec.
+10 dB		2 sec.	18 sec.	180 sec.
+20 dB		4 sec.	36 sec.	360 sec.

Figure 5. Fall Time

## MICROPHONE LOCATION

### Factory Noise - General Ambient

The microphone should be mounted in one of the following ways:

- Suspend the microphone from the ceiling with its cable so that it is pointing downwards at the area to be monitored.
- Mount the microphone to some object and point it towards the area to be monitored. Care should be taken to use vibration isolation techniques so that the microphone does not pick up physical vibration and register it as sound.

For general noise, it is best to use the "A" Frequency Weighting.

An optional 50 foot extension cable will allow the microphone to be placed further away from the Model 261 if necessary.

### Machine Noise - Local

The microphone should be placed very close to the noise source that is to be detected. A good approximate distance is one or two feet and pointed at the noise source. Remember to mount the microphone with a vibration isolation method to reduce the actual vibration conducted from the machine to the microphone. It may be advantageous to use "C" Frequency Weighting if low frequencies are to be detected.

An optional 50 foot extension cable will allow the microphone to be placed further away from the Model 261.

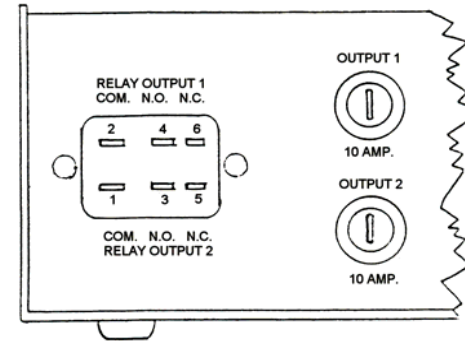
### TYPICAL CONNECTION TO OPERATE DEVICE

The Model 261 is designed as a sound-activated switch and is intended to turn on or turn off some type of electrical device. Typical connection to the output requires the use of a soldering iron and the proper gauge of wire to be used on the device being controlled by the Model 261. Quest recommends that nothing smaller than 16 gauge wire be used for the relay connection. Typical connection is shown in Figure 6.

Be careful not to exceed the 300 volt, 10 amp rating of the relay contacts as the 10 amp fuse may blow and possible damage to the relay contact could occur.

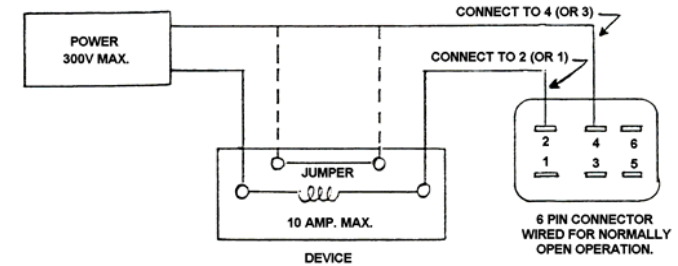
If the unit fails to operate the connected device, be sure to check the related 10 amp fuse for a possible open circuit. Replace fuse with nothing larger than a 10 amp 3 AG fuse to eliminate any potentially dangerous situation.

**CAUTION:** All connections should be wired by a licensed electrician to local codes.



**CAUTION**  
TO BE WIRED BY  
A LICENSED  
ELECTRICIAN TO  
LOCAL CODE.

### TO ACTIVATE A DEVICE WITH SOUND:



### TO DEACTIVATE A DEVICE WITH SOUND:

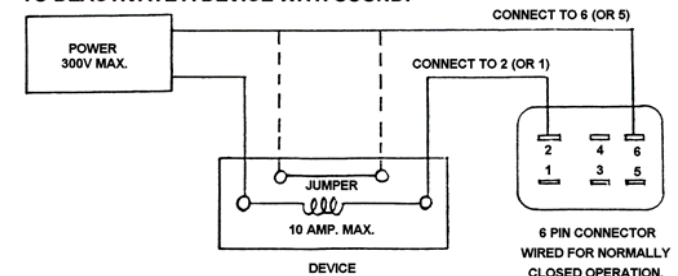


Figure 6. Typical Connection

## GENERAL OPERATING PROCEDURE

The Model 261 is designed to monitor a wide variety of noises. The microphone is simply placed in the location to be measured. The dB Threshold is then set to the desired dB level. The RISE TIME and FALL TIME switches are set for the appropriate delays that the situation requires. When the sound to be detected exceeds the preset threshold for sufficient time, the relay output will actuate, thus activating or deactivating the device connected to it, such as the LB-26 Light Box.

### RELAY RESET / REMOTE RESET

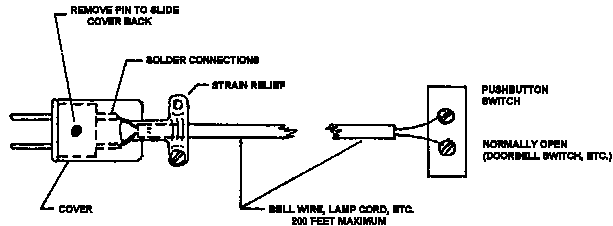
The RELAY RESET is intended to be used when the FALL TIME switch is in the LATCH position. In this mode, the relay will remain closed (activated) indefinitely until either the RELAY RESET button or the Remote Reset button (optional) is depressed.

The Reset feature can also operate as an inhibit feature. While depressed, the relay cannot operate. It will remain deactivated.

When used in all other RISE TIME and FALL TIME modes, the Rise Time and Fall Time circuitry is reset and will not operate until the button is released.

The Remote Reset button requires a 2-conductor wire (such as bell wire, lamp cord, etc.) to be soldered to the 2-pin connector supplied with the Model 261. It is recommended that this wire not be longer than 200 feet. A standard Normally Open push button (such as a doorbell button) can be used on the other end for the Remote Reset button. (See Figure 7.)

Figure 7. Remote Reset Connection



## CALIBRATION

The procedure for calibration of the Model 261 is as follows:

- Use a calibrator with one of the following outputs:
  - 110 dB, 1000 Hz  
or
  - 102 dB, 1000 Hz  
or
  - 94 db, 1000 Hz
- 1. Set the RISE TIME and FALL TIME switches to SHORT.
- 2. Set the FREQUENCY WEIGHTING to "A".
- 3. Place the microphone and adapter, if required into the calibrator coupler and switch the calibrator to ON.
- 4. Calibrate using the appropriate following section:
  - If using a 110 dB, 1000 Hz calibrator:
    - A) Set the COARSE dB THRESHOLD to 105 and the FINE dB THRESHOLD to 5.0. The RELAY STATUS light should not be lit.
    - B) Change the FINE dB THRESHOLD to 4.0. The RELAY STATUS light should light.
  - If using a 102 dB, 1000 Hz calibrator:
    - A) Set the COARSE dB THRESHOLD to 100 and the FINE dB THRESHOLD to 2.0. The RELAY STATUS light should not be lit.
    - B) Change the FINE dB THRESHOLD to 1.0. The RELAY STATUS light should light.
  - If using a 94 dB, 1000 Hz calibrator:
    - A) Set the COARSE dB THRESHOLD to 90 and the FINE dB THRESHOLD to 4.0. The RELAY STATUS light should not be lit.
    - B) Change the FINE dB THRESHOLD to 3.0. The RELAY STATUS light should light.
- 5. If the RELAY STATUS light does not respond correctly, adjust the proper "CAL." screw located above the respective microphone input and repeat steps 4 and 5 until the light responds properly.

NOTE: Microphone sensitivities vary. Therefore, it is important that the microphone(s), once calibrated, always be plugged into its respective input(s).

MODEL LB-26 LIGHT BOX

**GENERAL DESCRIPTION**

The Model LB-26 Light Box is designed to be used in any environment where hearing damage may occur from loud noise. When used with the Model 261, excessive noise automatically lights the sign. When lit, it warns people to wear hearing protection.

The sign can also be used as a stand-alone device to display the standard legend for hearing protection.

When power is applied to the LB-26, two light bulbs illuminate the plexiglass legend. Removal of the 4 screws holding the plexiglass legend permits easy access to the light bulbs for replacement.

**SPECIFICATIONS**

**Size:**  
20 x 8½ x 5 inches (508 x 216 x 127 mm)

**Construction:**  
Rugged aluminum case with translucent front and back legend panels.

**Lamps:**  
Two 25 watt bayonet base bulbs:

120 Volt Lamps  
G.E. Product Code #14683, Model 25T6½DC/F120

230 Volt Lamps  
G.E. Product Code #14687, Model 25T6½DC/F230

**Power Requirements:**  
120 Volt, 0.4 Amp or 230 Volt, 0.2 Amp. Supplied either through customer-wired 1/2 inch conduit or optional 3 wire line cord. (See Figure 9.)

**Temperature Range:**  
Operating, -10 to +60°C. Storage, -20 to +65°C.

**Mounting Methods:**  
One-half inch conduit from the top center of the LB-26 or two hooks and chain from top surface. (See Figure 8.)

**Standard Legend:**  
International Safety Symbol plus "HEARING PROTECTION REQUIRED WHEN THIS LIGHT IS ON."

THE LB-26 LIGHT BOX CAN BE MOUNTED TO SURFACES IN MANY WAYS. HERE ARE A FEW EXAMPLES.

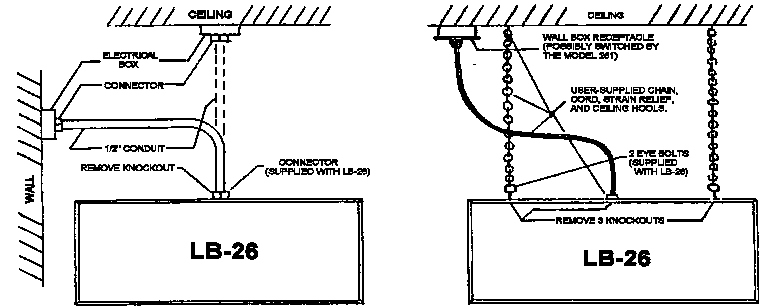


Figure 8. Mounting Options

THE FOLLOWING IS A WIRING SCHEME FOR THE CONNECTION OF THE MODEL 261 TO THE LB-26 LIGHT BOX

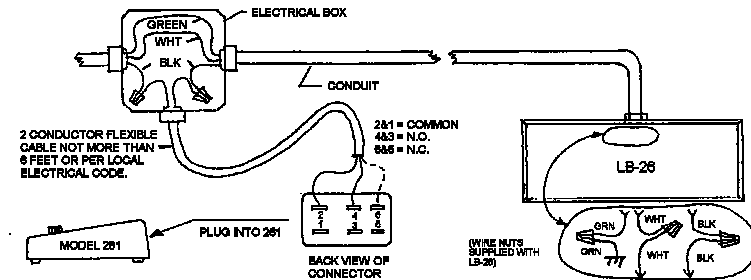


Figure 9. Typical connection to Model 261

## QUEST SERVICE POLICY

### Service Policy

The Quest product you have purchased is one of the finest acoustic instruments available. It is backed by our full one year warranty which seeks complete customer satisfaction. This is your assurance that you can expect prompt courteous service for your equipment from the entire Quest service organization.

Should your Quest equipment need to be returned for repair or recalibration, please contact the Service Department at (800)245-0779 (USA) or Fax (262)567-4047 for a Return Authorization Number. The RA number is valid for 30 days, and must be shown on the shipping label and purchase order/cover letter. If you are unable to return instruments in that time call for a new RA number. Send it prepaid and properly packed in the original shipping carton directly to Quest Technologies, 1060 Corporate Center Drive, Oconomowoc, WI 53066 U.S.A.

Repair or replacement work done under warranty will be performed free of charge, and the instrument will be returned to you prepaid. Your copy or a photocopy of the Quest Registration Card will serve as proof of warranty should the factory require this information.

If for any reason you should find it necessary to contact the factory regarding service or shipping damage, please direct your calls or letters to the attention of the Service Manager, Quest Technologies, (262) 567-9157 or (800) 245-0779. Office hours are from 7 AM to 6 PM (Central Standard Time) Monday through Friday.

For Service or recalibration outside the U.S.A., please contact your local Quest Dealer or fax Quest U.S.A. at 1-262-567-4047.

## QUEST WARRANTY POLICY

### Warranty Policy

Quest Technologies warrants our instruments to be free from defects in materials and workmanship for one year under normal conditions of use and service. For U.S.A. customers we will replace or repair (our option) defective instruments at no charge, excluding batteries, abuse, misuse, alterations, physical damage, or instruments previously repaired by other than Quest Technologies. Microphones, sensors, and printers may have shorter warranty periods. This warranty states our total obligation in place of any other warranties expressed or implied. Our warranty does not include any liability or obligation directly resulting from any defective instrument or product or any associated damages, injuries, or property loss, including loss of use or measurement data.

For warranty outside the U.S.A., a minimum of one year warranty applies to the same limitation and exceptions as above with service provided or arranged through the authorized Quest distributor or our Quest European Laboratory. Foreign purchasers should contact the local Quest distributor for details.