

# Instruction Sheet

## Sound Level Microphone

### for the Micromate® Monitoring Unit

The Sound Level Microphone for the Micromate monitoring unit, automates noise monitoring from building activities, construction, traffic, and mining operations. The Micromate monitoring unit combines noise and vibration monitoring in the same unit, making it a cost effective and flexible device for these applications.

The Sound Level Microphone meets the requirements for IEC 61672 Class 1, including A and C weighted specifications and has a measuring range from 30 dB to 140 dB with a Fast or Slow response.

There are four record modes to choose from:

- Manual trigger
- Waveform (records up to 90 seconds, once triggered)
- Histogram (2 seconds to 30 minute intervals)
- Histogram-Combo (records both Histogram and Waveform simultaneously)

### Range of Applications

- Building Activities
- Construction
- Quarries
- Traffic
- Mining

### Tools and Materials Required

Choose one of:

- Micromate ISEE Base Unit . . . . . (P/N: 721A2501)
- Micromate DIN Base Unit . . . . . (P/N: 721A2601)
- Micromate Swedish Blasting Base Unit . . . (P/N: 721A3601)
- Micromate Swedish Pile Driving Base Unit . (P/N: 721A3801)
- Sound Level Microphone . . . . . (P/N: 721A2301)  
(stand and windscreen included)
- Extension cables, as required
  - 10 m (32.8 ft) . . . . . (P/N: 721A0803)
  - 30 m (98.4 ft) . . . . . (P/N: 721A0801)
  - 75 m (246.1 ft) . . . . . (P/N: 721A0802)
  - Custom Extension Cable Kit . . . . . (P/N: 721A3201)
- THOR software . . . . . (free version)
- THOR Advanced software . . . . . (P/N: 72300201)
- A choice of three optional field calibration devices:
  - Delta OHM HD9101 Class 1
  - Brüel & Kjaer Sound Calibrator Type 4231
  - Rion NC-74 Sound Calibrator



### Specifications

Field	Values
Response Standard	IEC 61672 Class 1
Frequency Weighting	A-Weight or C-Weight
Response	Fast (125 ms) or Slow (1 s)
Frequency Range	10 Hz - 20 kHz
Amplitude Range	30 dB to 140 dB max 160 dB
Trigger Levels	33 dB to 140 dB
Sample Rates	1,024 - 4,096 S/s
Resolution	0.05 dB (display limit 0.1dB)
Cable Length	2 m (6.6 ft)
Maximum Cable Length	75 m (246.1 ft)
Temperature Range	-10° to 50°C (14° to 122°F)

Note: Micromate units with serial numbers below 8000 require a factory update to support the Sound Level Microphone.

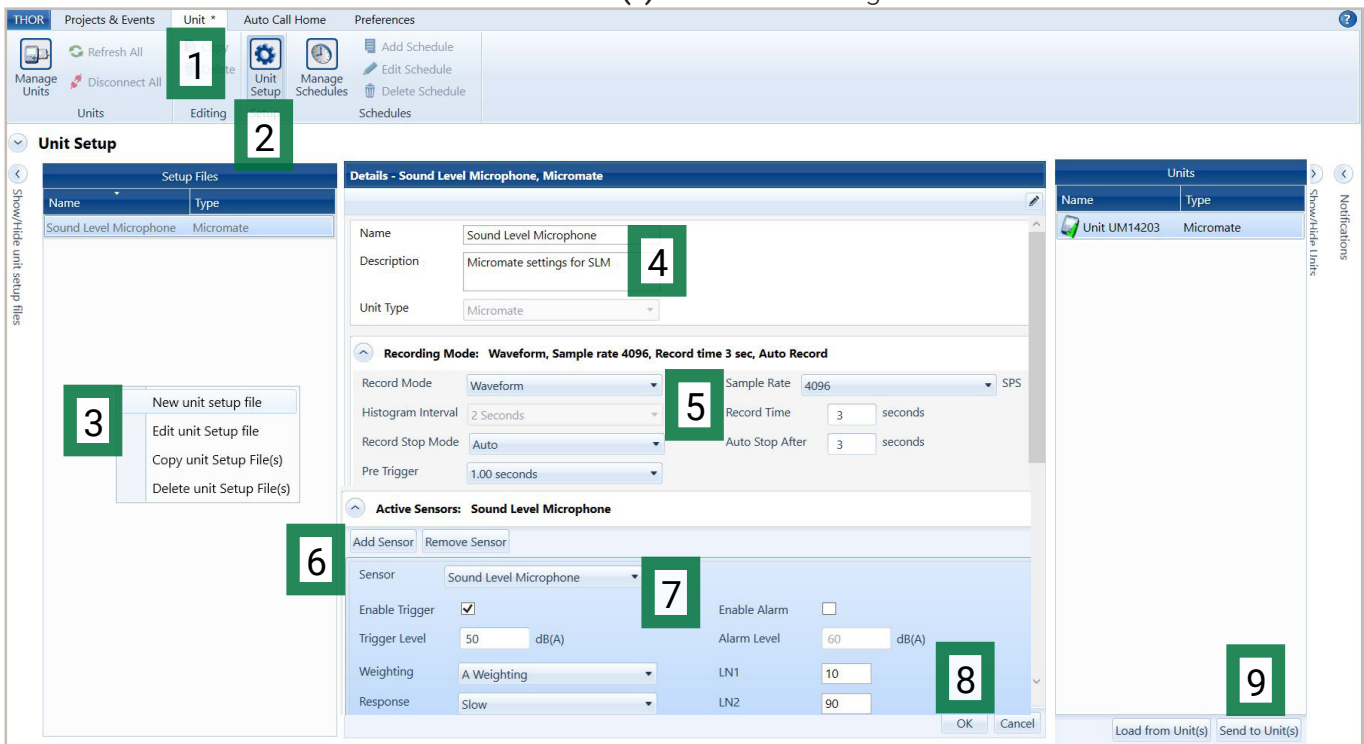
## Micromate Monitoring Unit Setup

- On the Micromate monitoring unit keypad, press the **Power** button.  
Note: To navigate the menus, use the arrow keys followed by the checkmark key or tap on the touchscreen display.
- Press the **Setup** key then tap **View/Edit Current Setup**.
- Tap **Active Sensors** until either **Microphone** or **Geophone/Microphone** is selected.
- Tap **Microphone Type** until **Sound Level** is selected.
- Select the desired **Record Mode** (Waveform Manual, Waveform, Histogram or Histogram-Combo).
- Tap **Trigger Level**, then tap **Microphone Trigger** until **Enabled** is selected.
- Tap **Trigger Level**, then swipe up or down on the spinner wheel or use the arrow keys.
- Press the **Checkmark** key, this prompts you to save any changes. Use the **Checkmark** key to save the changes or the **Cancel** key to cancel the changes and return to the previous screen.
- Tap **Response Time** to toggle between Fast=125 ms (milliseconds) or Slow=1 s (second).
- Tap **Frequency Weighting** to toggle between either A (A-Weight) or C (C-Weight).
- Tap **LN1** then swipe up or down until the desired value is reached.
- Tap **LN2** then swipe up or down until the desired value is reached. (Note: LN2 must be greater than LN1)
- Tap either the **Save** icon on the touchscreen display or press the **Cancel** key for a prompt to save the changes to a **Setup File**.
- Select the **Checkmark** and then **Save to Current File/Overwrite File**.
- Perform steps 13 and 14 a second time for the higher level settings.

## THOR Software Setup

The Sound Level Microphone for the Micromate monitoring unit can be configured using THOR software and then sent to the connected unit.

- Within the THOR software, click on the **Unit Tab**.
- Click on the **Unit Setup** icon.
- In the **Unit Setup** section, right-click and select **New Unit Setup File**.
- Fill in the details and select **Unit Type: Micromate**.
- Select the desired **Record Mode** and fill in the recording details.
- Under **Active Sensors**, click on **Add Sensor**.
- Under **Sensor** select **Sound Level Microphone**.
- Fill in any **Trigger** details for Trigger level, Weighting, Response, LN1 and LN2 and click **OK**. In this section you can also configure the external alarm.
- Select the Micromate unit and click **Send to Unit(s)** to send the configuration file to the Micromate unit.



## Calibration

The Sound Level Microphone **must be sent** to a manufacturer certified calibration facility, or InstanTEL headquarters for calibration. Please visit our calibration facility locator at [www.instanTEL.com](http://www.instanTEL.com). InstanTEL recommends calibrating all Sound Level Microphones once a year and provides the Next Calibration dates on the unit and sensors. The factory calibration process ensures that the microphone is performing as it was designed and accurately measuring according to the IEC 61672 Class 1 standard.

Using a manufacturer certified facility ensures the proper procedures are followed when calibrating your microphone. This removes any uncertainty associated with the reliability and measurement accuracy of your microphone. It also helps ensure the integrity of the measured recorded events if they are ever called upon as evidence in a court of law. Using unauthorized facilities may have negative legal consequences if the reference equipment is not traceable, the proper procedures are not followed or if the certification documents are incomplete. Please visit our calibration facility locator at [instanTEL.com](http://instanTEL.com).

## Field Calibration

The Micromate monitoring unit provides an option to calibrate the Sound Level Microphone in the field. A field calibration only uses one reference signal of 94 dB at 1 kHz. (The Brüel & Kjaer Sound Calibrator Type 4231 is also capable of generating a 114 dB signal, make sure you set the device to 94 dB at 1 kHz.) A successful field calibration will store the values for Sound Pressure, Gain and Offset on the hardware of the microphone, if there is an error during calibration, no values are overwritten. In this case you can either try again or have the Sound Level Microphone calibrated at InstanTEL or one of its authorized calibration facilities. Reports generated by the Micromate monitoring unit will specify the serial number, calibration date and calibration method.

Example:

Factory Calibration: **UA12345, January 1, 2022 by InstanTEL**

Field Calibration: **UA12345, January 1, 2022 by Field Calibration**

Note: Swapping Sound Level Microphones from one Micromate unit to another Micromate unit is permitted. As calibration values are stored on the Sound Level Microphone, this will not impact any Micromate unit settings.

## Field Calibration Procedure

1. Turn on the Micromate unit and connect the Sound Level Microphone, then press the **Setup** key on the unit.
2. Tap **Maintenance Menu** then scroll down and tap **Calibrate Sound Level Microphone**.
3. Follow the field calibration device's operator instructions to properly join the microphone with the field calibration unit. Set the reference to 94 dB at 1 kHz then turn the calibrator on.

Note: When using either of the three 94 dB field calibrators, it is recommended that the ambient noise be at least 30 dB lower than this reference signal.

For additional information please see [https://www.pcb.com/Contentstore/mktgcontent/WhitePapers/WPL\\_36\\_Acoustic\\_methods\\_calibration\\_PCB.pdf](https://www.pcb.com/Contentstore/mktgcontent/WhitePapers/WPL_36_Acoustic_methods_calibration_PCB.pdf)

4. Tap the **Calibrate** button on the Micromate monitoring unit screen.
5. Tap the **Checkmark** key to confirm the **Proceed with calibration** popup box. This will display **Running Calibration**.
6. When the calibration is finished, the Micromate unit will display **Field Calibration Complete** along with the values for the measured **Sound Pressure, Gain, and Offset**.
7. In the **Field Calibration Complete** confirmation box, tap the **Checkmark** key.

### Important Notes:

- Only use an InstanTEL recommended calibration device (see the Tools and Materials Required section).
- Remove the microphone's windscreen **before** attaching it to the field calibration device, as this can impede proper calibration.
- Slide the Sound Level Microphone into and out of the field calibration device **without** twisting either end.
- Before reinstalling the Sound Level Microphone in the field, **hand-tighten** the microphone's housing extension and cap.

### Note:

Field calibration is not as precise as factory calibration.

The Field Calibration Procedure will change the date and **overwrite** the factory calibration values.

The traceability will then be linked to the Field Calibration device.

## Setting Up the Sound Level Microphone

1. If required, assemble the stand (see Installing the Sound Level Microphone Stand below).
2. Point the microphone in the direction of the sound or noise source.
3. Place the windscreen on the end of the microphone.
4. Connect the microphone to the Micromate unit by aligning the red end of the connector with the indicated red microphone port.
5. Make sure the Micromate unit has the proper **Setup File** (see THOR Software Setup on page 2), then perform a **Sensor Check** by pressing the **Sensor Check** key on the keypad.

## Installing the Sound Level Microphone Stand

(See also Section 14.4. of the Micromate Monitoring Unit Operator Manual)

The microphone installation procedures are based on ISEE field practice guidelines for blasting seismographs. This section illustrates the installation procedures recommended by InstanTel. Your particular monitoring activities may employ one, or a combination of all, of the following procedures.

The Sound Level Microphone is supplied with a 3-piece microphone stand. The top section has a clip to hold the microphone, the extension section is threaded at both ends and the bottom section is pointed to assist in the installation. When the three pieces are assembled, the microphone stand is approximately 80 cm (31.5 in) tall. Additional extension sections can be purchased if required. (Microphone Stand Extension Rod, P/N: 400-720020-000)

### Stand Installation Steps:

1. Assemble the microphone stand at the desired location (see Figure 1). Section 1 has a pointed tip to drive the stand into the ground. Section 2 has a male and female thread. Screw in the female threaded end of section 2 into the male threaded end of section 1. Section 3 contains the microphone clip. Screw in the female threaded end of section 3 into the male threaded end of section 2.  
Note: Do not use a metal hammer or other hard object as it may damage the top of the microphone stand.
2. Push the pointed end of the microphone stand into the ground. If the ground is too hard, use a rubber mallet to install the microphone stand.
3. Attach the windscreen to reduce false triggering caused by wind.
4. Install the Sound Level Microphone in the clip at the top of the microphone stand and point the microphone in the direction of the noise source.
5. Ensure that the microphone cable is securely attached to the Micromate unit.
6. Press the **Sensor Check** key on the Micromate unit ensuring the microphone is properly attached and has passed the Sensor Check. If the Sensor Check fails, ensure the ambient noise is at a minimum and repeat the test.



Figure 1.  
3-Piece  
Microphone Stand



Figure 2.  
Soft Ground Installation



Figure 3.  
Hard Ground Installation



Figure 4.  
Installing the Microphone



## Warranty

InstanTel products come with a limited one-year warranty against defects in materials or workmanship unless otherwise stated. The warranty begins on the date of shipment from the InstanTel factory to the customer and is subject to certain exclusions and conditions as stated below. Monitoring units and sensors will have the warranty extended for a second year if they are returned to the InstanTel factory for service and calibration within 30 days of the 'Next Calibration' date printed on the calibration label located on the product.

If, within a period of one year from the date of shipment to a customer, the instrument fails to perform in accordance with InstanTel's published specifications under normal use and operating conditions, it will be repaired or replaced at the sole discretion of InstanTel free of charge. Components subject to fair wear and tear in regular use, as solely determined by InstanTel, are excluded from this coverage. This warranty will not apply if the damage or malfunction occurs due to (i) adjustments, additions, alternations, abuse, misuse or tampering of the instrument; (ii) instrument operation or use contrary to the operating instructions; (iii) power fluctuations; or (iv) any other cause not within the cause or control of InstanTel. If inspection by InstanTel fails to disclose any defect covered by this limited equipment warranty, the instrument will be repaired or replaced at customer's expense and InstanTel's regular service charges will apply. This warranty is non-transferable.

Any shipments returned directly to InstanTel must have prior approval, and all packages must display the Return of Material Authorization (RMA) number issued by InstanTel. Shipping charges to InstanTel's factory will be paid by the customer and return shipment to the customer will be paid by InstanTel.

To protect your warranty, you must complete and return a Warranty Registration Certificate, or complete the online Warranty Registration Form, within ten days of purchase. Products will be assumed out of warranty if no warranty card is on file at InstanTel. Retain this warranty statement and the proof of purchase for your records.

Except for the foregoing limited equipment warranty, InstanTel makes no other warranties and hereby disclaims and excludes all other warranties, whether statutory, express or implied, whether arising under law or equity or custom or usage, including any implied warranty of merchantability, fitness for a particular purpose, non-infringement, satisfactory quality, or quiet enjoyment, and any warranty that the product supplied may not be compromised, or that the product will in all cases provide the function for which it is intended.

## EC Warning

This is a Class B product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.