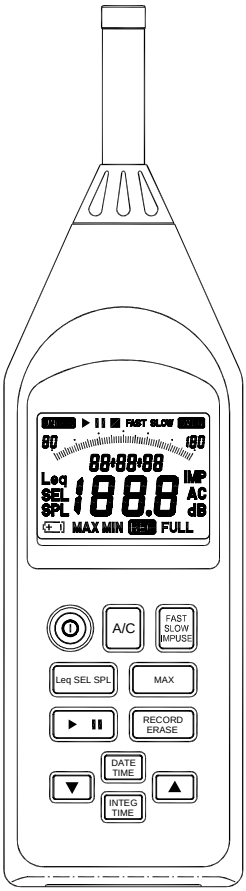
INTEGRATING
Sound Level Meter

TES-1353S

INSTRUCTION MANUAL

※Enclosed CD : Software & Protocol Inside.



TES ELECTRICAL ELECTRONIC CORP.

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1. INSTRUMENT CARE

- ❒ Do not attempt to remove the mesh cover from the microphone as this will cause damage and affect the accuracy of the instrument.
- ❒ Protect the instrument from impact. Do not drop it or subject it to rough handling. Transport it in the supplied carrying case.
- ❒ Protect the instrument from water, dust, extreme temperatures, high humidity and direct sunlight during storage and use.
- ❒ Protect the instrument from air with high salt or sulphur content, gases and stored chemicals, as this may damage the delicate microphone and sensitive electronics.
- ❒ Always turn the instrument off after use. Remove the batteries from the instrument if it is not to be used for a long time. Do not leave exhausted batteries in the instrument, as they may leak and cause damage.
- ❒ Clean the instrument only by wiping it with a soft, dry cloth or, when necessary, with a cloth lightly moistened with water. Do not use any solvents, alcohol or cleaning agents.

2. FEATURES

The Sound Level Meter complies with the requirements of **IEC 61672-1:2003** standard for a Class 2 instrument.

The instrument contains several features which permit sound level measurements under a variety of conditions.

Features include:

- ❒ Ease of use.
- ❒ Easy to read large display.
- ❒ Five measurement ranges.
- ❒ Fast, Slow and Impulse time weightings.
- ❒ A and C frequency weightings.
- ❒ Storage of up to 200M measurement records (microSD CARD 4GB).
- ❒ USB serial port for downloading records to a computer or real time analysis to a computer.
- ❒ Both AC and DC signal outputs are available from a single standard 3.5mm coaxial socket suitable for use with a frequency analyzer, level recorder, FFT analyzer, graphic recorder, etc.
- ❒ SPL, Leq, SEL, SPL MAX, SPL MIN, PH (Peak Hold), L05, L10, L50, L90, and L95, eleven measured parameters are monitored during measurement and can be viewed selectively by pressing the 

button.
- ❒ Sound level alarm output connector.

3. MEASUREMENT PARAMETERS

The following parameters are used on the instrument.

- ❒ A → "A" frequency weighting sound pressure level
- ❒ C → "C" frequency weighting sound pressure level
- ❒ FAST → Fast time weighting
- ❒ SLOW → Slow time weighting
- ❒ IMP → Impulse time weighting
- ❒ SPL → Current time-weighted sound pressure level
- ❒ Leq → Equivalent continuous sound level
- ❒ SEL → Sound exposure level
- ❒ SPL MAX → Maximum sound pressure level
- ❒ SPL MIN → Minimum sound pressure level
- ❒ PH → Peak Hold sound pressure level
- ❒ L:05 → 5% percentile sound level
- ❒ L:10 → 10% percentile sound level
- ❒ L:50 → 50% percentile sound level
- ❒ L:90 → 90% percentile sound level
- ❒ L:95 → 95% percentile sound level
- ❒ SPL "MAX" → Maximum time-weighted sound pressure level (MAX symbol blink)

The various settings depend on the condition the instrument was in before it was last turned off.

4. SPECIFICATIONS

❑ **Applicable standards:** IEC61672-1: 2003 Class 2

ANSI S1.4 : 1983 Type 2

❑ **Measurement functions:**

- **Main processing functions**

Sound level: Current time-weighted sound pressure level A or current time-weighted sound pressure level C

Maximum time-weighted sound pressure level A or Maximum time-weighted sound pressure level C

Minimum time-weighted sound pressure level A or Minimum time-weighted sound pressure level C

Equivalent continuous sound level Leq A or Leq C

Sound exposure level SEL A or SEL C

Peak Hold sound level PH A or PH C

Percentile sound level L : 05 A or L : 05 C
L : 10 A or L : 10 C
L : 50 A or L : 50 C
L : 90 A or L : 90 C
L : 95 A or L : 95 C

- **Measurement time** : 1second to 24 hours
- **Measuring ranges**

  RMS : **Total range**: 30 to 130dB

  Peak Hold : A – weighted or C – weighted over the top 30dB of each measurement range.
  30 – 90 : 63 – 93dB Peak Hold
  40 – 100 : 73 – 103dB Peak Hold
  50 – 110 : 83 – 113dB Peak Hold
  60 – 120 : 93 – 123dB Peak Hold
  70 – 130 : 103 – 133dB Peak Hold
- **Max. measurement level**: 130dB
- **Self-generated noise level:**

  Typical values at 23℃ using the nominal microphone equivalent capacitance of 27pF (30-90dB range)

Weighting	Electrical	Total
"A"	22.7dB	26.1dB
"C"	21.8dB	29.5dB

Linearity operating range: A-weighted, 1000Hz, 60dB dynamic range.

Total linear operating range:
In accordance with IEC 61672-1, A-weighted, 1000Hz: 30dB to 130dB.

Level range selection:
5 ranges in 10dB steps 30 to 90dB , 40 to 100dB
50 to 110dB , 60 to 120dB
70 to 130dB

LINEAR OPERATING RANGES (L.O.R.)

RANGE: 30 – 90 dB. Test starting point 64 dB for all weightings and frequencies except 31.5Hz A-weighted, for which the starting point is 44 dB.

FREQUENCY Hz	WEIGHTING	L.O.R. dB	WEIGHTING	L.O.R. dB
31.5	A	36.1 – 50.6	C	39.5 – 87.0
1000	A	36.1– 90.0	C	39.5 – 90.0
4000	A	36.1 – 90.0	C	39.5 – 89.2
8000	A	36.1 – 88.9	C	39.5 – 87.0

RANGE: 40 – 100 dB. Test starting point 74 dB for all weightings and frequencies except 31.5Hz A-weighted, for which the starting point is 54 dB.

FREQUENCY Hz	WEIGHTING	L.O.R. dB	WEIGHTING	L.O.R dB
31.5	A	40.0 – 60.6	C	40.0 – 97.0
1000	A	40.0 – 100.0	C	40.0 – 100.0
4000	A	40.0 – 100.0	C	40.0 – 99.2
8000	A	40.0 – 98.9	C	40.0 – 97.0

RANGE: 50 – 110 dB. Test starting point 84 dB for all weightings and frequencies except 31.5Hz A-weighted, for which the starting point is 64 dB.

FREQUENCY Hz	WEIGHTING	L.O.R dB	WEIGHTING	L.O.R dB
31.5	A	50.0 – 70.6	C	50.0 – 107.0
1000	A	50.0 – 110.0	C	50.0 – 110.0
4000	A	50.0 – 110.0	C	50.0 – 109.2
8000	A	50.0 – 108.9	C	50.0 – 107.0

RANGE: 60 – 120 dB. Test starting point 94 dB for all weightings and frequencies except 31.5Hz A-weighted, for which the starting point is 74 dB.

FREQUENCY Hz	WEIGHTING	L.O.R. dB	WEIGHTING	L.O.R. dB
31.5	A	60.0 – 80.6	C	60.0 – 117.0
1000	A	60.0 – 120.0	C	60.0 – 120.0
4000	A	60.0 – 120.0	C	60.0 – 119.2
8000	A	60.0 – 118.9	C	60.0 – 117.0

RANGE: 70 – 130 dB. Test starting point 104 dB for all weightings and frequencies except 31.5Hz A-weighted, for which the starting point is 84 dB.

FREQUENCY Hz	WEIGHTING	L.O.R. dB	WEIGHTING	L.O.R. dB
31.5	A	70.0 – 90.6	C	70.0 – 127.0
1000	A	70.0 – 130.0	C	70.0 – 130.0
4000	A	70.0 – 130.0	C	70.0 – 129.2
8000	A	70.0 – 128.9	C	70.0 – 127.0

Frequency range: Overall characteristics including microphone: 31.5 to 8000Hz

Frequency weighting: **A**, meets the requirement of IEC 61672-1 for class 2 “A” weighting.

C, meets the requirement of IEC 61672-1 for class 2 “C” weighting.

Time weighting (RMS detection): **Fast**, according to IEC 61672-1 class 2.
Slow, according to IEC 61672-1 class 2.
Impulse, according to IEC 61672-1 class 2.

- **Reference conditions:**
  Type of the acoustic field: Free
  Reference sound pressure level: 94.0dB (related to 20μPa)
  Reference level range: 60 to 120dB
  Reference frequency: 1000Hz
  Reference temperature: +23℃
  Reference relative humidity: 50%RH
  Reference static pressure: 101.325 kPa
  Reference incidence direction: Perpendicular to the front of the microphone diaphragm.

- **Calibration:** Acoustic using calibrator TES-1356 or equivalent.
  Calibration check frequency is 1000Hz.
  Nominal calibration level for the free field: 94.1dB
  Nominal calibration level for the diffuse field: 94.0dB

- **Frequency for acoustic testing:** 8000Hz**.**

- **Warm-up time:** ≦2min

- **Sampling interval:** Bar graph indication → 125 ms approx.
  Numeric indication → 1 sec approx.

- **Data record capacity:** Data can be stored in the memory.
  Max. 200M data can be stored (micro SD CARD 4GB).
  Max. 255 blocks can be split.

- **Microphone equivalent electrical impedance (electrical input device):**
  Replace the microphone capsule with a series capacitance of 27pF +/- 3pF.

❑ **Display LCD**

- **Display screens**:
  4 digit numerical indication of sound level, from 30.0 to 130.0dB with 0.1dB resolution.
  Bar-graph indication of current sound level with 1dB resolution.
  Sound level range indicator: 30–90dB, 40–100dB, 50–110dB, 60–120dB or 70–130dB in five ranges.
  Time display; year – month – day and hour: minute: second.

- **Display update rate:** 1 second

- **Display first indication:** Depends on the condition the instrument when it was last turned off.

- **Warning indications:**
  Out-of-range indications:
  OVER displayed at upper limit of the range
  UNDER displayed at lower limit of the range

❑ **Outputs**

- **AC output** (using selected frequency weighting)
  Output voltage: 2Vrms (at full-scale of the range)
  Output impedance: 5kΩ
  Load impedance: ≧1MΩ

- **DC output**
  Output voltage: 10mV/dB
  Output impedance: 5kΩ
  Load impedance: ≧1MΩ

- **I/O connector:** Sound level meter control from and data output to a computer (USB)

- **Alarm output:** 5Vdc, typical

❑ **Power requirements**

- **Qty 4 x 1.5V IEC R6P (size "AA") manganese super heavy duty batteries or equivalent.**
- **Battery life**: Approx. 24 hours
- **External power source:** DC voltage from 5V to 6V
  Current rating: Approx. 20mA @ 6V

❑ **Ambient conditions:**

- **Operating conditions**: -10℃ to +50℃, 30% to 90%RH non-condensing
- **Storage conditions**: -10℃ to +60℃, <70%RH non-condensing
- **Effect of temperature:** < 0.5dB (-10 to +50℃)
- **Effect of humidity:** < 0.5dB (for 30%RH to 90%RH at 40℃, 1000Hz)
- **Effect of vibration:** A 40 Hz 1m/s vibration produces no noticeable effect.
- **Effect of magnetic field:** No noticeable effect.

❑ **Compliance with standards:**

- CE: indicates compliance with applicable European Union Directives.
- **EMC Emission**: IEC 61000-6-3, Generic emission standard for residential, commercial and light industrial environments.
  No significant emissions from the instrument.
  IEC 61672-1, Instrumentation standard classification group X and performance class 2 sound level meter.
- **EMC Immunity**: IEC 61000-6-2, Generic standard-Immunity for industrial environments.
  No degradation in performance when subjected to 10V/m unmodulated.

IEC 61672-1, Instrumentation standard classification group X and performance class 2 sound level meter.

No permanent degradation of performance, loss of function, change of operating state or configuration, or loss or corruption of stored data due to ESD discharges as specified in the above standard.

- No degradation in performance when the instrument was subjected to ESD at 8kV per IEC 801-2.

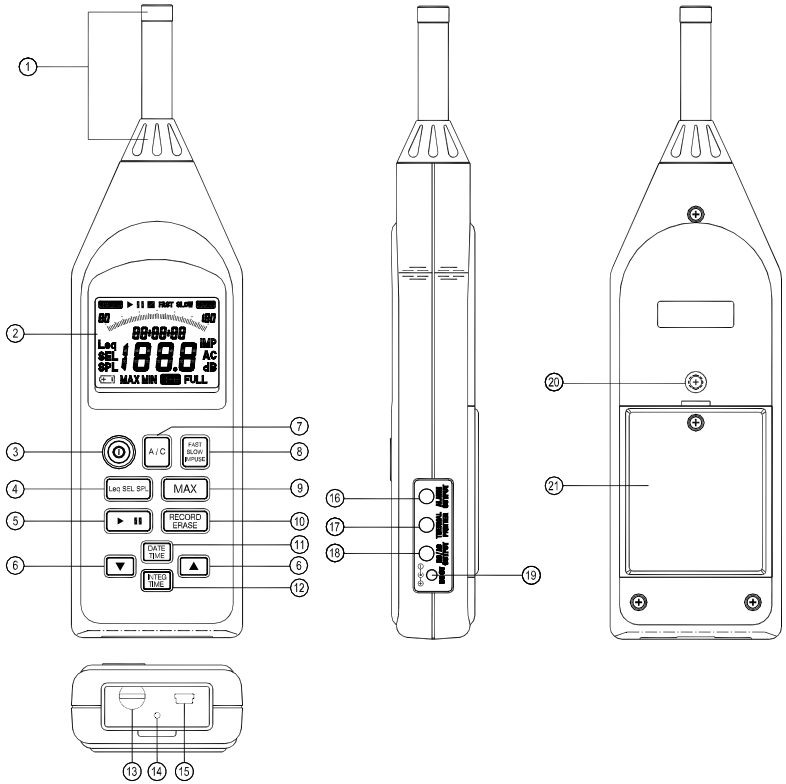
❑ **Dimensions**: Approx. 265(L)×72(W)×36(H) mm

❑ **Weight (including battery)**: Approx. 380g

❑ **Supplied accessories**: Instruction manual, Batteries, Adjustment screwdriver, CD software, Windscreen, USB connecting cable, 3.5ϕ plug, Carrying case.

❑ **Optional equipment (Not supplied):** AC adaptor, Sound calibrator TES-1356, Portable thermal printer, Thermal printer connecting cable, Microphone extension cable.

5. CONTROLS AND FUNCTIONS



1. 1/2-inch microphone

2. **Display:** The LCD shows the sound level as a numeric value and a bar graph. The display also shows the operation mode of the instrument, the selected measurement parameters and warning indications.

3. ⏻ **Button**: Press to turn the instrument on and off.

4. Leq SEL SPL **button** : Press this button the following parameters are monitored during integrating measurement and can be viewed selectively :
Leq with integrating start time.
SEL with integrating stop time.
SPL MAX Maximum sound level with time.
SPL MIN Minimum sound level with time.
PH Peak Hold sound level.
L05, L10, L50, L90, and L95 percentile sound levels.

5.  **button :**

① Press to start ("▶" measurement symbol) or pause ("▮▮" pause symbol) the integrating sound level measurement (including the various processing functions) or the data recording. When the measurement period is completed, the ("■" end symbol) indication is shown on the display.

② Press this button 2 seconds to exit the integrating measurement or the data record. If the end "■" symbol is shown on the display, press this button 2 seconds will clear the last integrating measure data and the "■" symbol will disappear, back to normal sound level measurement mode.

6.  **button :**

① Level range buttons: select the level range for the measurement.
The following five settings are available: 30 to 90dB, 40 to 100dB, 50 to 110dB, 60 to 120dB, 70 to 130dB.

② Press these buttons to increment or decrement setting values.

7. 

button : Sets the frequency weighting to A or C mode.

8. 

button : Sets the time weighting to FAST, SLOW or IMPULSE mode.

FAST : uses a 125ms-time constant. This setting is used in most situations.

SLOW : uses a 1s time constant, which smooth out fluctuating levels.

IMPULSE : uses a 35ms time constant with a slow decay, which allows readings of short-duration sound events.

9. 

button : Used for reading the maximum time-weighted sound level encountered during a measurement.

Press this button to enter maximum recording mode. The "**MAX**" indicator will blink appear on the display. Press again to exit maximum recording mode.

10. 

button :

① Data records mode : Press this button enter to data records mode.

② Erase all records : Turn off the meter, press and hold down this button then turn on the meter, until the "**CLr**" indication is shown on the display.

11. 

button :

① Press this button, will change displayed from "**hour : minute : second**" to "**year – month - day**" about 2 seconds.

② Setting the current date and time. Turn off the meter, press and hold down this button then turn on the meter enter to date and time setting mode.

③ Preset the start time of the data records. Press this button 3 seconds to setting the start time of the data records.

12.  **button :**

① Select the default measurement time : Press this button one time enter to integrating measurement time select mode, use "  " buttons to select the measurement time, new manual setting time→--:--:--→1sec→3sec→10sec →30sec→1min→5min →8min→10min→15min→30min→1hour→8hour→24hour.

② Setting to desired measurement time : Press this button 2 seconds enter to other desired integrating measurement time setting mode, the setting range from 1 second to 100 hours.

13. micro SD CARD 4GB.

14. CAL potentiometer: Calibration potentiometer for level adjustment.

15. Micro-USB: USB input/output connector for input of control signals and output of measurement data.

16. ALARM output: Sound level alarm output.

17. Thermal printer output jack: Connection the PROVA 300XP printer.

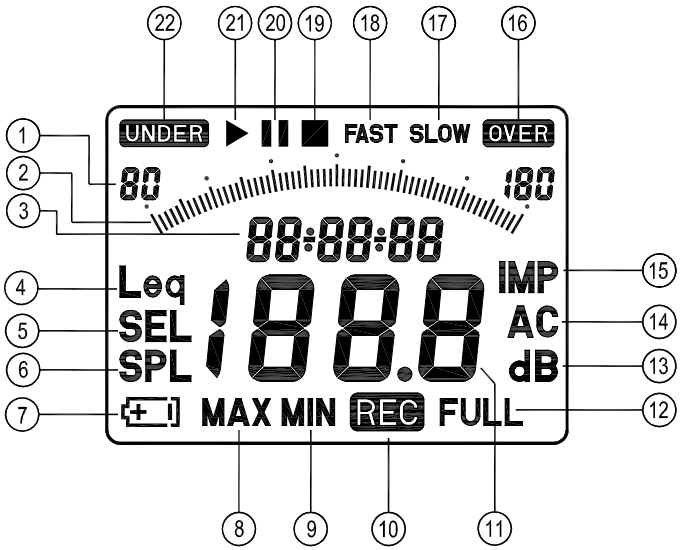
18. AC/DC output socket: AC output signal with frequency weighting.
DC output signal corresponding to sound level.

19. External DC power supply socket: Type 1.3 coaxial power connector; center negative, nominal 6V DC.

20. Tripod mounting: ¼" - 20 UNC Female thread.

21. Battery cover.

6. LCD DISPLAY DESCRIPTION



1. Sound level range indicator (5 ranges): 30–90dB, 40–100dB, 50–110dB, 60–120dB and 70–130dB
2. Bar graph shows the current sound level (1dB resolution).
3. Date/time and elapsed time indicator : During integrating this indicator shows the elapsed time in seconds.

   During viewed the peak hold sound level this indicator the "**PH**".

   During viewed the percentile tile sound level this indicator shows the L:05, L:10, L:50, L:90 and L:95 parameters.

   Others this indicator shows the "**year - month - day**" or "**hour : minute : second**".
4. Leq: Equivalent continuous sound level reading
5. SEL: Sound exposure level reading
6. SPL: Time-weighted sound level reading "**Sound Pressure Level**"
7. Low-battery indication
8. MAX: Maximum time-weighted sound level reading (blink displayed). Maximum sound level reading.
9. MIN: Minimum sound level reading.
10. REC : Data records indicator
11. Sound level reading (0.1dB resolution): 30.0 – 130.0dB
12. FULL: Data records full indicator
13. dB: Sound level unit
14. A, C: "A" Frequency weighting or "C" Frequency weighting indicator.
15. IMP: Impulse time weighting indicator
16. **OVER** : Over-range indicator, if this indicator is flashing, to indicate that over-range data were included in the sound level measurement values for processing.
17. SLOW: "Slow" time weighting indicator
18. FAST: "Fast" time weighting indicator
19. ■ : End integrating sound level measurement indicator.

    Press  button 2 seconds exit this mode.
20. ▮▮ : Pause integrating sound level measurement indicator.

    Press  button again to resume measurement.
21. ▶ : Start and continuous integrating measurement indicator.
22. **UNDER**: Under-range indicator, if this indicator is flashing, to indicate that under – range data were included in the sound level measurement values for processing.

7. PREPARATION FOR USE

Power Supply

The instrument can be powered by internal batteries, or for extended operation by an optional external 6V DC supply such as a suitable AC mains adapter or battery pack. Rechargeable batteries may be used in the instrument, but cannot be recharged when fitted as the instrument is not designed to recharge batteries.
Before inserting or replacing the batteries and before connecting the AC adaptor, be sure to turn the instrument off.

1. Battery Installation

When the low battery indication symbol " " appears on the display, there is insufficient power to make accurate measurements and the batteries must be replaced.

① Before replacing the batteries, press the ⏻ button to turn off the instrument.

② Use a screwdriver to loosen the screw in the battery cover. Remove the cover from the battery compartment. Retain the screw and cover.

③ Observing correct polarity as indicated in the compartment, insert four batteries of the type given in section 4. "Specifications".

④ Refit the battery cover and screw. Use a screwdriver to tighten the screw.

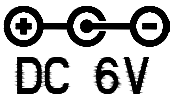
⑤ Press the ⏻ button to turn on the instrument and check for correct operation.

Note: Take care not to reverse the (+) and (-) polarity when inserting the batteries, otherwise the instrument may be damaged.
Always replace all four batteries at the same time.
Do not mix old and new batteries or batteries of different types.
Remove the batteries from the instrument if it is not to be used for a month or longer.

2. Using an external power source.

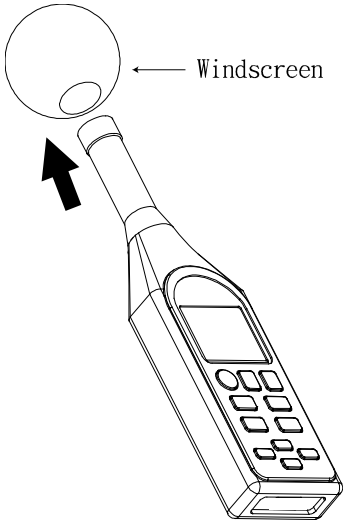
Insert the plug of the AC adaptor or external battery pack into the DC 6V (DC source from 5V to 6V) socket on the side of the instrument. When a connector is inserted into this socket, the internal batteries will be disconnected and the instrument will be powered from the external source. The low battery symbol " " will appear on the display if the external voltage is insufficient for the instrument to provide accurate measurements.

Note: Ensure the external power source is connected with the polarity as indicated in the following diagram, otherwise damage may be caused to the instrument and external power source.



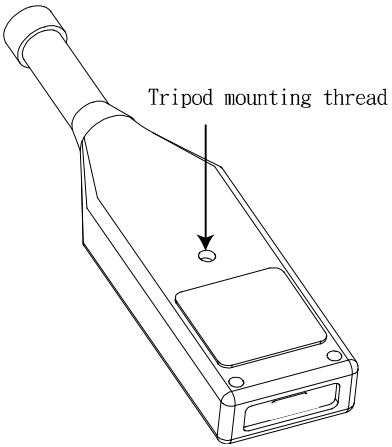
3. Windscreen

When making measurements outdoors in strong winds or when measuring air conditioning equipment or similar, wind noise and strong air movements at the microphone can cause measurement errors. Such effect can be reduced by using the windscreen.



4. Tripod Mounting

For long-term measurements, the instrument may be mounted on a standard camera tripod using the integral ¼" x 20 UNC mounting thread.

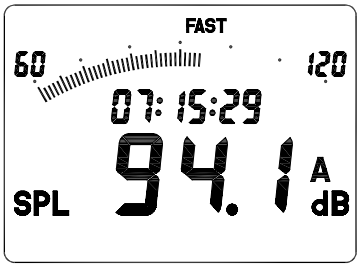


8. CALIBRATION PROCEDURE

Most national standards recommend that you calibrate your sound level meter before each set of measurements and check the calibration after each set.

The procedure to check/adjust the displayed sound level in response to acoustic calibrator types TES-1356 or equivalent is as follows:

1. Turn off the sound calibrator.
2. Press the ⏻ button to turn on the instrument.
3. Use the " ▲ ▼ " buttons to select the 60 to 120dB reference sound level range.
4. Use the " A / C " button to select "**A**" frequency weighting.
5. Use the " FAST SLOW IMPUSE " button to select "**FAST**" time weighting.
6. Insert the microphone very carefully and slowly all the way into the sound calibrator coupling orifice.
7. Switch on the 1000Hz sound calibrator in its nominal 94 dB level setting.
8. Adjust the CAL potentiometer of the instrument, until the display reading for diffuse field is the same as the certified pressure level of the calibrator, or is 0.1 dB higher than this pressure level for free-field. This applies to calibrators type TES-1356.



9. Set the power switch of the sound calibrator to OFF.
10. Remove the microphone very carefully and slowly from the coupler.

9. MEASUREMENT PROCEDURE

9-1 Sound level measurement

1. Press the ⏻ button to turn on the instrument. The initial state depends on the condition the instrument was in before it was last turned off.
2. Press the " A/C " button to select the desired frequency weighting. For normal sound level measurements, select the "**A**" setting.
3. Press the " FAST SLOW IMPUSE " button to select the desired time weighting (dynamic characteristics). Normally, the "**FAST**" setting should be used.
4. When performing measurement according to IEC or other standards, the frequency weighting and time weighting setting required by the standard should be selected.
5. Press the " ▲ or ▼ " buttons to select desired level range. Choose a setting in which the bar graph indication registers approximately the middle of the range. If the " **OVER** " indicator appear during measurement, the upper limit of the selected range has been exceeded. Increase the range setting until the symbol remains off during measurement. Similarly, if the " **UNDER** " indicator appears, reduce the range setting until the symbol remains off during measurement. Both indicators are non-latching and will clear when the correct range is selected.
6. The numeric level indication shows the currently measured sound level. The reading is updated once every second.

   Press DATE TIME button changed from current time "**hour : minute : second**" to current date "**year – month - day**" displayed about 2 seconds.
7. Press the " MAX " button to record the maximum time-weighted sound level encountered during a measurement period; the "**MAX**" indicator will blink appear on the display. Press this button again to exit this mode.

9-2 Equivalent continuous sound level (Leq) measurement
Sound exposure level (SEL) measurement
Maximum sound level (SPL MAX) measurement
Minimum sound level (SPL MIN) measurement
Peak Hold sound level (PH) measurement
Percentile sound level (L05, L10, L50, L90 and L95) measurement

When using this meter in a mode other than sound level measurement, all processing functions provided by the meter are carried out simultaneously. For example, when equivalent continuous sound level measurement is selected, the exposure level, and percentile level, are also deterimined.

1. Press ⏻ button turn on the meter.
2. Press A/C button to select desired frequency weighting. For normal measurements, select the "**A**" setting.
3. Press FAST SLOW IMPUSE button to select desired time weighting. Normally, the "**FAST**" setting should be used.

4. Press ▲ or ▼ buttons to select desired level range. Choose a setting in which the bar graph indication registers to about the middle of the range. If the "**OVER**" or "**UNDER**" indicators light up frequently, change the level range setting.

5. Setting the integrating measurement time.

① Press INTEG TIME button one time enter to select the default integrating measurement time mode.

Press ▲ and ▼ buttons to cycle select the measurement time.

New manual setting time→ --:--:-- →1sec→3sec→10sec→30sec→1min

24hours←8hours←1hours ←30min←15min ←10min ←8min←5min

Waiting for about 5 seconds will auto stored the selected and exit this mode.

When you select "**--:--:--**" means the integrating measurement time without limit.

② Press INTEG TIME button 3 seconds enter to manual setting the integration measurement time mode.

A flashing cursor indicates the currently selected parameter (the second).

Press ▲ and ▼ buttons to set desired second. Press INTEG TIME button move to the next parameter (the minute), repeat this procedure until you have set to desired minute and hour. Press INTEG TIME button to stored the desired measurement time to the new manual setting time and exit this mode. The maximum measurement time setting is 100 hours.

6. Press ► II button to start the measurement, the "►" symbol and the elapsed measurement time is displayed.

When the measurement time has elapsed, the measurement terminates automatically, the terminate symbol "■" is shown.

During measurement, press ► II button can be used to pause and resume the measurement.

During pause, the pause symbol "II " is shown.

When wishing to terminate the measurement earlier, press ► II button, the pause symbol "II" is shown.

If an under-range condition or over-range condition occurs at least once during measurement, the "**OVER**" or "**UNDER**" indicator appears, to shown that the processing data contain over-range or under-range data.

During this procedure most of the buttons such as A / C button and level range buttons are inoperative. Only the ► II and Leq SEL SPL two buttons can be used. All other settings must be made before starting the measurement. Any pause intervals are not included in the measurement time.

7. When the measurement is pause or completed, press Leq SEL SPL button to cycle switch displaying the following measurement result.
   Leq : Equivalent continuous sound level with start measurement time.
   SEL : Sound exposure level with terminate measurement time.
   SPL MAX : Maximum sound level with time.
   SPL MIN : Minimum sound level with time.
   PH : Peak Hold sound level
   L:05→5% percentile sound level
   L:10→10% percentile sound level
   L:50→50% percentile sound level
   L:90→90% percentile sound level
   L:95→95% percentile sound level
   SPL INST→Current sound level with current time.
   If "**OVER**" is flashing shown, the sound level data used for processing contained over-range data.
   If "**UNDER**" is flashing shown, the sound level data used for processing contained under-range data.
   It is also possible to use the Leq SEL SPL button during measurement to read the Leq, SEL, SPL MAX, SPL MIN, PH (Peak Hold), L05, L10, L50, L90, L95 and SPL sound level up to that point. This applies only to the numeric level display, the bar graph indication shows the current sound level.
   The percentile sound level only calculated to 100 hours.
8. Press ▶ II button 2 seconds exit this measurement mode and clear the measured result, the "II" "▶" or "■" symbol are disappeared, back to normal sound level measurement.

10. SETTING THE CURRENT TIME AND DATE

Date and time information is stored with each record block. Therefore, it is important to make sure that this information is correct.

1. Press ⏻ button turn off the meter.
2. Press and hold down DATE TIME button, then press ⏻ button turn on the meter, enter to current date and time setting mode.
3. A flashing cursor indicates the currently selected parameter (the second), press ▲ and ▼ buttons to set the current second.
4. Press DATE TIME button move to the next parameter (the minute), press ▲ and ▼ buttons to set the current minute.
5. Repeat step 4 until you have set the current hour, day, month, and year.
6. Press DATE TIME button to store the new date and time, and exit this mode.

11. STORE RECORD DATA OPERATION

The meter incorporates a memory which can be used to store measurement data.
The maximum has 200M data capacity can be split up to 255 blocks record.
The record sampling interval time has been fixed at 1 second.
The record data has two method, with or without preset start time for record data.

11-1 Setting the record measurement time

1. Press [INTEG TIME] button one time enter to select the default integrating measurement time mode.
   Press [▲] and [▼] buttons to cycle select the measurement time.
   New manual setting time→ --:--:-- →1sec→3sec→10sec→30sec→1min
   24hours←8hours←1hours ←30min←15min ←10min ←8min←5min
   Waiting for about 5 seconds will auto stored the selected and exit this mode.
   When you select "**--:--:--**" means the integrating measurement time without limit.
2. Press [INTEG TIME] button 3 seconds enter to manual setting the integration measurement time mode.
   A flashing cursor indicates the currently selected parameter (the second).
   Press [▲] and [▼] buttons to set desired second. Press [INTEG TIME] button move to the next parameter (the minute), repeat this procedure until you have set to desired minute and hour. Press [INTEG TIME] button to stored the desired measurement time to the new manual setting time and exit this mode. The maximum measurement time setting is 100 hours.

11-2 Setting the measurement weighting and range

1. Press [A / C] button to select desired frequency weighting. For normal measurements, select the "**A**" setting.
2. Press [FAST SLOW IMPUSE] button to select desired time weighting. Normally, the "FAST" setting should be used.
3. Press [▲] or [▼] buttons to select desired level range. Choose a setting in which the bar graph indication registers to about the middle of the range. If the "**OVER**" or "**UNDER**" indicators light up frequently, change the level range setting.

11-3 Record data

A. Record data without preset start time

1. Press [RECORD ERASE] button the " REC " symbol is displayed then press [► II] button to start the measurement, the start symbol "►", the " **REC** " symbol is flashing, and the elapsed measurement time is displayed, enter to record data mode and integrating sound measurement mode.

2. During measurement, press ▶ ⏸ button can be used to pause and resume the measurement.
   During pause the pause symbol "⏸" is shown and the " **REC** " symbol stop flash.

   When wishing to terminate the measurement earlier, press ▶ ⏸ enter to pause mode.

   When the measurement time has elapsed, the measurement terminate automatically, the terminate symbol "■" is shown.

   If an under-range condition or over-range condition occurs at least once during measurement, the "**OVER**" or "**UNDER**" indicator appears, to shown that the processing data contain over-range or under-range data.

   During this procedure most of the buttons such as A / C button and level range buttons are inoperative. Only the ▶ ⏸ and Leq SEL SPL two buttons can be used. All other settings must be made before starting the measurement. Any pause intervals are not included in the measurement time.

3. When the measurement is pause or completed, press Leq SEL SPL button to cycle switch displaying the following measurement result.
   Leq : Equivalent continuous sound level with start measurement time.
   SEL : Sound exposure level with terminate measurement time.
   SPL MAX : Maximum sound level with time.
   SPL MIN : Minimum sound level with time.
   PH : Peak Hold sound level
   L:05 : 5% percentile sound level
   L:10 : 10% percentile sound level
   L:50 : 50% percentile sound level
   L:90 : 90% percentile sound level
   L:95 : 95% percentile sound level
   SPL : Current sound level with current time.

   If "**OVER**" is flashing shown, the sound level data used for processing contained over-range data.

   If "**UNDER**" is flashing shown, the sound level data used for processing contained under-range data.

   It is also possible to use the Leq SEL SPL button during measurement to read the Leg, SEL, SPL MAX, SPL MIN, PH (Peak Hold), L05, L10, L50, L90, L95 and SPL sound level up to that point. This applies only to the numeric level display, the bar graph indication shows the current sound level.

   The percentile sound level only calculated to 100 hours.

4. If the measurement terminates automatically, the recorded blocks number (1 to 255) display one time and auto exit record mode, the " **REC** " symbol disappeared, press ▶ ⏸ button 2 seconds to exit integrating sound level measurement and the terminate symbol "■" disappeared.

In the pause mode, press ▶ ▮▮ button 2 seconds the recorded blocks number (1 to 255) display one time and exit record mode, the pause symbol "▮▮" and " REC " symbol are disappeared.

5. When memory is filled (200M data or 255 blocks is full used), the " REC **FULL**" symbol is displayed.
6. The recorded data only download by PC, can not recall display by meter.

B. Record data with preset start time

1. Press DATE TIME button 2 seconds enter to preset record data start time setting mode, the "PrE" symbol is displayed.
2. A flashing cursor indicates the currently selected parameter (the second), press ▲ and ▼ buttons to set the desired start second.
3. Press DATE TIME button move to the next parameter (the minute), press ▲ and ▼ buttons to set the desired start minute.
4. Repeated step 3 until you have set the desired start hour, day, month, and year.
5. Press DATE TIME button to stored the preset start date and time, and exit this mode, the "▶" and "▮▮" two symbols flashing, until the start time is reach.
6. When the preset start time is reached, the record data is starting automatically, the start symbol "▶", the " REC " flashing symbol, and the elapsed measurement time is displayed, enter to record data mode and integrating sound measurement mode.
7. During measurement, press ▶ ▮▮ button can be used to pause and resume the measurement.
   During pause the pause symbol "▮▮" is shown and the " REC " symbol stop flash.
   When wishing to terminate the measurement earlier, press ▶ ▮▮ enter to pause mode.
   When the measurement time has elapsed, the measurement terminate automatically, the terminate symbol "■" is shown.
   If an under-range condition or over-range condition occurs at least once during measurement, the "**OVER**" or "**UNDER**" indicator appears, to shown that the processing data contain over-range or under-range data.
   During this procedure most of the buttons such as A / C button and level range buttons are inoperative. Only the ▶ ▮▮ and Leq SEL SPL two buttons can be used. All other settings must be made before starting the measurement. Any pause intervals are not included in the measurement time.
8. When the measurement is pause or completed, press Leq SEL SPL button to cycle switch displaying the following measurement result.
   Leq : Equivalent continuous sound level with start measurement time.
   SEL : Sound exposure level with terminate measurement time.

SPL MAX : Maximum sound level with time.

SPL MIN : Minimum sound level with time.

L:05 : 5% percentile sound level

L:10 : 10% percentile sound level

L:50 : 50% percentile sound level

L:90 : 90% percentile sound level

L:95 : 95% percentile sound level

SPL : Current sound level with current time.

If "**OVER**" is flashing shown, the sound level data used for processing contained over-range data.

If "**UNDER**" is flashing shown, the sound level data used for processing contained under-range data.

It is also possible to use the Leq SEL SPL button during measurement to read the Leg, SEL, SPL MAX, SPL MIN, L05, L10, L50, L90, L95 and SPL sound level up to that point. This applies only to the numeric level display, the bar graph indication shows the current sound level.

The percentile sound level only calculated to 100 hours.

9. If the measurement terminates automatically, the recorded blocks number (1 to 255) display one time and auto exit record mode, the "RECORD" symbol disappeared, press ▶ ▮▮ button 2 seconds to exit integrating sound level measurement and the terminate symbol "■" disappeared.

   In the pause mode, press ▶ ▮▮ button 2 seconds the recorded blocks number (1 to 255) display one time and exit record mode, the pause symbol "▮▮" and " **REC** " symbol are disappeared.

10. When memory is filled (200M data or 255 blocks is full used), the " **REC FULL**" symbol is displayed.

11. The recorded data only download by PC, can not recall display by meter.

11-4 Clearing stored data

1. Press ⏻ button turn off the meter.
2. Press and hold down RECORD ERASE button then press ⏻ button turn on the meter, the "CLr" shown on the display, all stored data are clear.

12. PRINTING DATA (OPTIONAL – PROVA 300XP PRINTER)

1. Using thermal printer cable connecting the meter and the printer.
2. Turn on the printer.
3. Setting the meter printing interval time.
   ① Press ⏻ button turn off the meter.
   ② Press and hold down INTEG TIME button then turn on the meter, enter to sampling interval time setting mode, the " intr " symbol is displayed.
   ③ A flashing cursor indicates the currently parameter (the second), press ▲ and ▼ buttons to set desired sampling interval time (from 5 second to 255 seconds).
   ④ Press INTEG TIME button to stored the setting and exit this mode.
4. Press and hold down MAX button, then press ⏻ button turn on the meter, enter to printing data mode.

13. OUTPUT CONNECTORS

13-1 AC Output:

An AC signal corresponding to the frequency-weighted signal is available at this connector.

Output voltage: 2Vrms±100mVrms (scale upper limit)

Output impedance: approx. 5kΩ

Load impedance: ≧1MΩ

The output voltage when the instrument is in calibration mode (-6dB from scale upper limit, 1000Hz sine wave) is 0.5Vrms.

13-2 DC Output:

A level-converted DC signal generated by RMS detection and logarithmic compression is available at this connector. The signal reflects the frequency and time weighting settings of the instrument.

Output voltage: 10mV±0.1mV/dB

Output impedance: approx. 5kΩ

Load impedance: ≧1MΩ

The output voltage when the instrument is reading 94dB is nominally 0.94V DC.

13-3 Alarm output

Setting the sound level alarm high limit

1. Press ⏻ button turn off the meter.
2. Press and hold down Leq SEL SPL button then turn on the meter, enter to sound level high limit setting mode, the "**ALARM**" symbol is displayed.
3. Press ▲ and ▼ buttons to set desired sound level high limit value.
4. Press Leq SEL SPL button to stored the setting and exit this mode.
5. If the measured dB level exceeds the set limit, the over limit signal will appear at the alarm output connector (5Vdc output). The output signal will remain active as long as the sound level exceed the set limit.

14. SOFTWARE INSTALLATION AND OPERATION

- For the detailed instruction, please refer to the content of attached CD-ROM, which has the complete instruction of software operation and relevant information.
- Protocol : are enclosed within the content of CD-ROM, please open the CD-ROM for details.

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