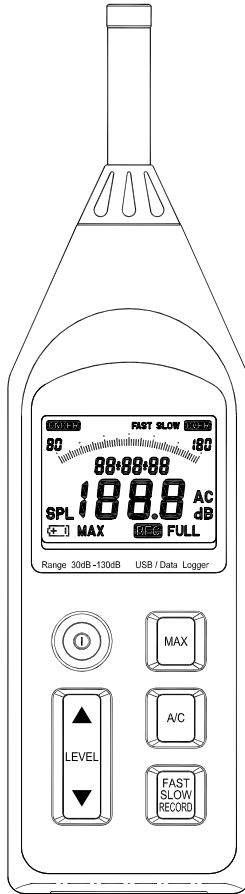# TES

Sound Level Meter

Veri Kaydedici ve Bilgisayar Yazılımı

TES-1352H

INSTRUCTION MANUAL

※Enclosed CD : Software & Protocol Inside.

TES ELECTRICAL ELECTRONIC CORP.

CONTENTS

Title	Page

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 and Slow time weightings.

- ❐ A and C frequency weightings.

- ❐ Storage of up to 32000 measurement records.

- ❐ 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.

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

- ❐ SPL ✲ Current time-weighted sound pressure level

- ❐ SPL MAX ✲ Maximum time-weighted sound pressure level

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

❑ **Applicable standards:** IEC61672-1: 2003 Class 2
IEC60651: 1979 Type 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

🕐**Total range**: 30 to 130dB

🕐**Max. measurement level**: 130dB

🕐**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

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.

🕐**Reference conditions:**

Type of the acoustic field: Free

Reference sound pressure level: 94.0dB (related to 20 ﹍Pa)

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 sound calibrator.
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. 32000 data can be stored.
                                 Max. 255 blocks can be split.

❑ **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)

❑ **Power requirements**

⌚**Qty 4 x 1.5V IEC R6P (size "AA") manganese super heavy duty batteries or
   equivalent.**

⌚**Battery life**: Approx. 50 hours

⌚**External power source:** DC voltage from 5V to 12V
   Current rating: Approx. 10mA @ 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)

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

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

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

❑ **Optional equipment (Not supplied):** AC adaptor, Termal Yazıcı Bağlantı Kablosu,
Sound calibrator, Portatif Termal Yazıcı.
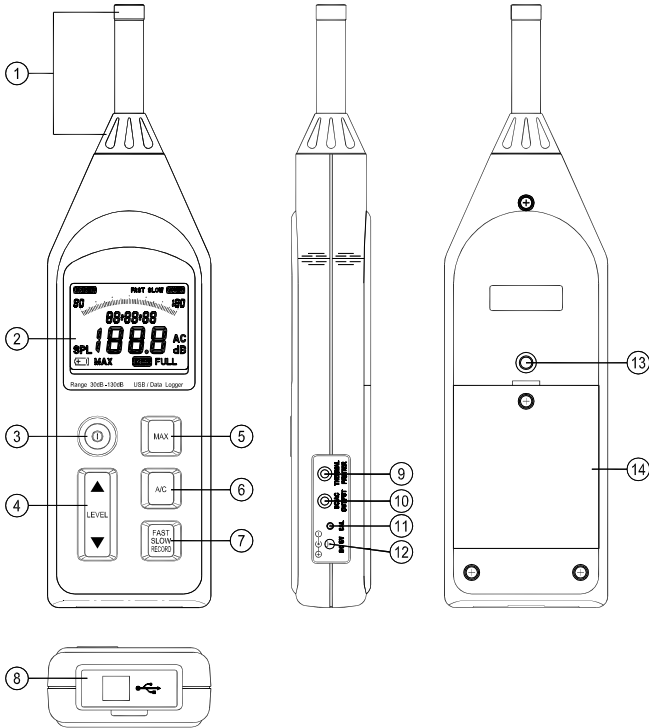
1. **Microphone :** Electret Condenser microphone

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. ⓪ **Button**: Press to turn the instrument on and off.

4. ▲LEVEL▼ **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.

5. MAX **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 appear on the display. Press again to exit maximum recording mode.

6. **A/C Button**: Sets the frequency weighting to A or C mode.

7. **FAST SLOW RECORD Button:** ① Sets the time weighting to FAST or SLOW mode.

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

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

    ② Data record mode: Press and hold this button for 3 seconds to enter data recording mode. The "RECORD" indicator will appear on the display and will flash to indicate recording is in progress. To exit data recording mode, press and hold for 3 seconds until the instrument returns to normal mode and the "RECORD" indicator disappears.

    ③ Erase all records: Turn off the instrument, press and hold down this button then turn on the instrument until the "CLr RECORD" indication appears on the display.

8. I/O connector: USB input/output connector for input of control signals and output of measurement data.

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

10. DC/AC çıkış soketi: DC/AC çıkış soketi: ses seviyesine eşit DC çıkış sinyali. Frekans ağırlıklandırmalı AC Çıkış sinyali.

11. CAL potentiometer: Calibration potentiometer for level adjustment.

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

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

14. Battery cover.

6. DISPLAY DESCRIPTION
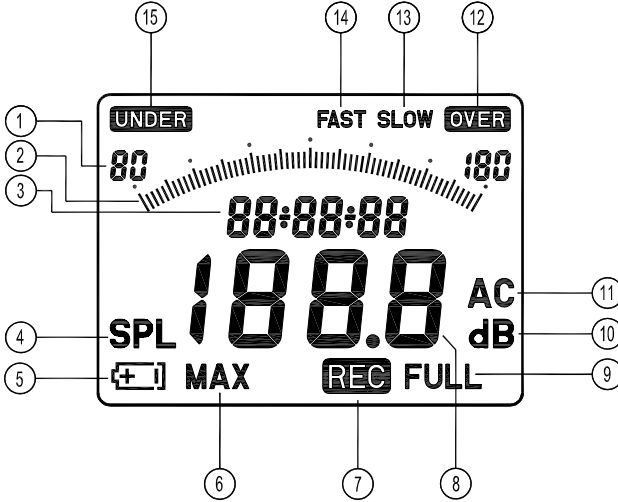
1. Sound level range indicator (5 ranges): 30–90dB, 40–100dB, 50–110dB, 60–120dB and 70–130dB

2. Bar graph shows the current sound level (1dB resolution).

3. Tarih/saat ve maksimum SPL ölçüm zamanı.

    This indicator shows the "year - month - day" or "hour: minute: second".

    TARİH: Tarih (yıl-ay-gün).

    SAAT: Saat (saat:dakika:saniye)

4. SPL: Time-weighted sound level reading "Sound Pressure Level"

5. Low-battery indication

6. MAX: Maximum time-weighted sound level reading.

7. RECORD: Data records indicator

8. Sound level reading (0.1dB resolution): 30.0 – 130.0dB

9. FULL: Data records full indicator

10. dB: Sound level unit

11. A, C: "A" Frequency weighting or "C" Frequency weighting indicator.

12. **OVER**: Over-range indicator.

13. SLOW: "Slow" time weighting indicator

14. FAST: "Fast" time weighting indicator

15. **UNDER**: Under-range indicator.

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 ⓪ 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 ⓪ 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 12V) 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.


DC 6V
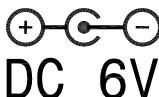
3. Windscreen

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.


Windscreen
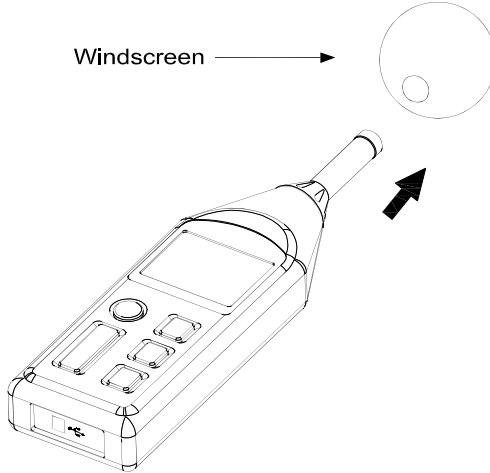
4. Tripod Mounting

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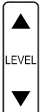

Tripod mounting thread
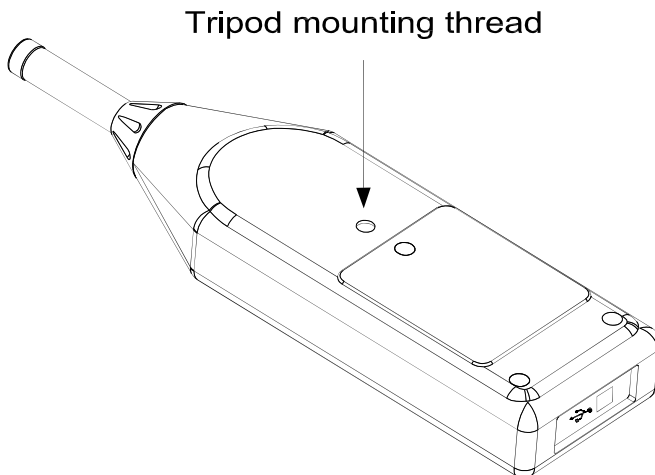
8. CALIBRATION PROCEDURE

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 sound calibrator :
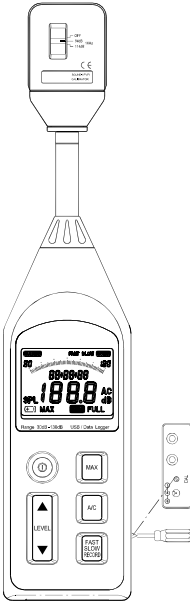
1. Turn off the sound calibrator.

2. Press the ⓞ button to turn on the instrument.

3. Use the "▲/▼ LEVEL" button 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 RECORD 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.
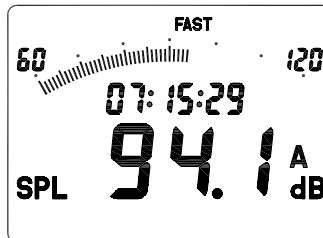
9. Set the power switch of the sound calibrator to OFF.

10. Remove the microphone very carefully and slowly from the coupler.

9. MEASUREMENT PROCEDURE

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 RECORD] 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 [▲ LEVEL ▼] 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.

7. Press the [MAX] button to record the maximum time-weighted sound level encountered during a measurement period; the "MAX" indicator will appear on the display. Press this button again to exit this mode.

10. GEÇERLİ SAAT VE TARİHİN AYARLANMASI

Her kayıt bloğunda tarih ve saat bilgileri kayıtlıdır. Bu yüzden bu bilgilerin doğru olduğundan emin olunması önemlidir.

1. Sayacı kapatmak için ⓞ tuşuna basınız

2. ▲ tuşuna basınız ve basılı tutunuz, ve daha sonra sayacı açmak için ⓞ tuşuna basınız ve geçerli saat ve tarih ayarlama moduna giriniz.

3. Yanıp sönen bir imleç mevcut parametreyi (saniye) gösterir, geçerli saniyeyi ayarlamak için ▲ ve ▼ tuşlarına basınız.

4. Bir sonraki parametreye geçmek için (dakika) [FAST SLOW RECORD] tuşuna basınız ve geçerli

dakikayı ayarlamak için ▲ ve ▼ tuşlarına basınız.

5. Geçerli saat, gün, ay ve yılı ayarlayana kadar 4. Adımı tekrar ediniz.

6. Yeni tarih ve saatti kaydetmek için [FAST SLOW RECORD] tuşuna basın ve bu moddan çıkın.

11. STORE/ERASE RECORDED DATA

The instrument incorporates a memory which can be used to store measurement data.

The maximum has a data capacity of 32000 readings which can be split into 255 blocks of records.

1. Kayıt Örnekleme Aralığı Zamanının Ayarlanması.

   ① Sayacı kapatmak için ⓞ tuşuna basınız.

   ② ▼ tuşuna basın ve basılı tutun, daha sonra sayacı açın, numune aralığı zamanı ayarlama moduna girin, " intr " sembolü gösterilir.

   ③ Yanıp sönen bir imleç mevcut parametreyi (saniye) gösterir, istenilen aralık zamanını (1 saniye- 255 saniye arası) girmek için ▲ ve ▼ tuşlarına basınız.

   ④ Ayarı kaydetmek için [FAST SLOW RECORD] tuşuna basın ve bu moddan çıkın.

2. Veriyi kaydetmek için, veri kayıt moduna girmek için [FAST SLOW RECORD] tuşuna basın ve 3 saniye basılı tutun. Ekran üzerinde "RECORD" göstergesi görünecektir ve kaydın devam ettiğini göstermek için yanıp sönecektir. Ver kayıt modundan çıkmak için, [FAST SLOW RECORD] tuşuna basın ve cihaz normal moduna dönene ve "RECORD" göstergesi kaybolana kadar 3 saniye boyunca basılı tutun.

3. When the memory is filled (32000 data or 255 blocks is full used), the "RECORD FULL" symbol will appear on the display.

4. The recorded data can only be reviewed after it has been downloaded to a PC. Recorded data cannot be displayed on the instrument.

5. To erase stored data, press the ⓞ button to turn the instrument off. Press and hold down the " [FAST SLOW RECORD] " button, then press the ⓞ button to turn the instrument on. "CLr RECORD" will appear on the display and all stored data will be erased.

12. VERİ YAZDIRMA (İSTEĞE BAĞLI – PROVA 300XP YAZICI)

1. Termal yazıcı kablosunu kullanarak sayaç ve yazıcıyı bağlayın.

2. Yazıcıyı Açın

3. Sayaç Yazdırma Aralık Zamanının Ayarlanması

   ① Sayacı kapatmak için ⓞ tuşuna basınız.

   ② ▼ tuşuna basın ve basılı tutun, daha sonra sayacı açın, numune aralığı zamanı ayarlama moduna girin, " intr " sembolü gösterilir.

   ③ Yanıp sönen bir imleç mevcut parametreyi (saniye) gösterir, istenilen aralık zamanını (1 saniye- 255 saniye arası) girmek için ▲ ve ▼ tuşlarına basınız.

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④Ayarı kaydetmek için ⃞FAST SLOW RECORD tuşuna basın ve bu moddan çıkın.

4. ⃞MAX tuşuna basın ve basılı tutun ve daha sonra sayacı açmak için ⃞⃝ tuşuna basın, veri yazdırma moduna girin.

13. OUTPUT CONNECTORS

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.

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.

14. SOFTWARE INSTALLATION AND OPERATİON

❑ Detaylı talimatlar için, lütfen yazılım işletiminin talimatlarının tamamı ve ilgili bilgileri içeren ekteki CD-ROM'un içeriğine bakınız.

❑ Protocol : are enclosed within the content of CD-ROM, please open the CD-ROM for details.

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