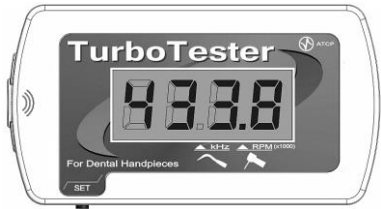


TurboTester® User Guide



Non-contact high speed tachometer for dental handpieces and frequency meter for ultrasonic dental equipment.



1. INTRODUCTION

We designed TurboTester® to provide long lifespan and outstanding performance on measuring the rotational speed of dental handpieces and frequency of ultrasonic dental equipment operating continuously or in bursts. This user guide holds indispensable information on the proper use and maintenance of the equipment. Please read it carefully before starting up the measurements.

WARNING! Improper use can lead to incorrect results

2. IMPORTANT INFORMATION

Users of cardiac pacemaker should not put the TurboTester® meter in their shirt pocket.



WARNING! The TurboTester® has a neodymium magnet inside that generates strong magnetic fields. Never place the meter near cardiac pacemakers or similar devices.

3. FEATURES

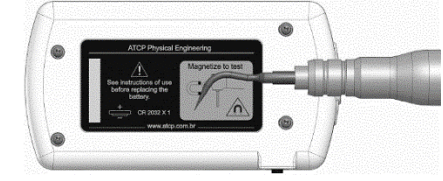
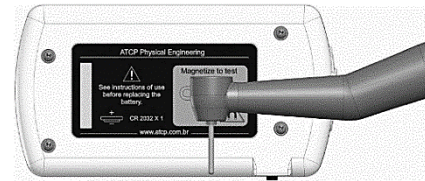


- (0) High-frequency magnetic sensor;
- (1) SET: On-off and selection button between frequency (kHz) and rotational speed (kRPM);
- (2&3) Decimal point and unit indication (kRPM or kHz);
- (4) Four digits LCD display;
- (5) Case top part;
- (6) Fixing screws;
- (7) Magnet region;
- (8) Serial number;
- (9) Case bottom part.

4. OPERATION

1) Magnetize the device to be measured.

- Position the TurboTester® with the back facing upwards, allowing you to see the gray rectangular region indicated as "Magnetize to test" (7).
- With the device to be measured turned off, touch its side edge to the magnetic region (7) for approximately 5 seconds. This procedure will magnetize the ultrasonic handpiece rotor or the ultrasonic tip for sensing by the magnetic sensor (0).



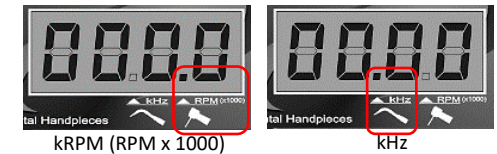
Before testing, the device to be measured must be magnetized.

2) Turning on the meter

Press the SET (1) button shortly. In the signal absence, the display will inform "00.00" or "000.0".

3) Select the operating mode

With the meter turned on, press the SET (1) button shortly to select the operating mode. Indicator points (2&3) will alternate to indicate the current setting RPM(x1000) or kHz.



4) Performing a measurement

Position the TurboTester® with the display (4) upwards, turn on the device to be measured and bring its end to the sensor (0) keeping it at a distance of approximately 1 cm (3/8 in). The measured result will be shown immediately on the display.



Before testing ultrasonic devices, make sure TurboTester® is in kHz mode. For handpieces, make sure the TurboTester® is in RPM(x1000) mode.

If an ultrasonic device is mistakenly measured in RPM(x1000) mode, the TurboTester® will show "Out". If a handpiece is measured in kHz mode, the rotation will be erroneously displayed divided by 60.



5) Turning the meter off

Press and hold the SET (1) button until the meter turns off.

6) Auto-shutdown

The meter automatically turns off after 3 minutes in idle to save the battery.

5. REPLACING THE LITHIUM COIN

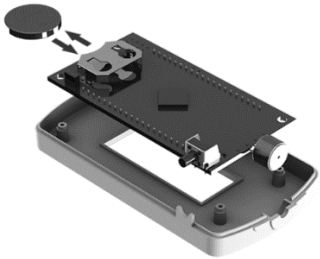


The meter operates with a lithium coin model CR 2032 (3V). Replace it when display shows the message "Lo b" (see image). It means "Low battery" (voltage below 2.3 Volts).



To replace the lithium coin:

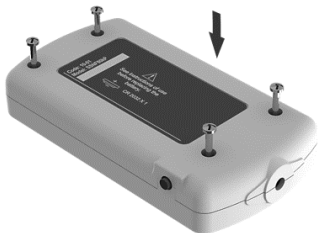
1° Remove the four screws (6) located on the case bottom part (9) using a small Phillips screwdriver and then remove the case bottom as shown in the figure;



2° Carefully remove the electronics of the case and push the lithium coin out of the holder;

3° Insert the new lithium coin in the holder (pay attention to the polarity indicated on the holder's top);

4° Replace the electronic circuit making sure to place it exactly over the four holders;



5° Attach the case bottom (9) and close the set. Insert and tighten the screws (6) until fix the case firmly.

6. WARRANTY

The TurboTester® has 02 years warranty from the date of purchase against defects in material and manufacturing. Factors that imply the loss of warranty:

- Failure to observe this user's guide recommendations;
- Modifications in the meter or in its parts;
- Accidents, fall, improper operation or any other damage caused by misuse or action of natural agents.

7. SPECIFICATIONS

Models: TT80k and TT50K.

Frequency range / resolution: 1-80 kHz / 10 Hz.

Rotational speed range / resolution: 1.0-999.9 kRPM / 250 RPM.

Measurement distance: 1 cm (3/8 in).

Measurable ultrasonic signals: Sinusoidal continuous or in bursts with duration ≥ 0.1 s.

Temperature drift: 7 ppm/°C (12.6 ppm/°F).

Uncertainty at 25 °C (77 °F) for 95 % confidence level:

± 480 RPM for rotational speed.

± 8 Hz for continuous ultrasonic signals and bursts with duration ≥ 0.35 s.

Latency: 0.1 s.

Refresh rate: Dynamic, 2 Hz typical.

Size: 9.1 x 5.1 x 1.6 cm (0.36 x 0.20 x 0.06 in).

Weight: <50 g (<1.6 oz) including battery.

Lithium coin: CR 2032 (1-year on standby or 1000 uses).

Weight: <50 g (<1.6 oz) including battery.

IP protection level: IP40.

Manufacturer: ATCP Physical Engineering.

Origin: Brazil.

HS code: 903089.

8. CALIBRATION

We recommend the calibration interval of 03 years with regards frequency and rotational speed accuracy. To perform the calibration, a standard ferrite core 100 μ H inductor with a calibrated frequency generator set on 10,000 kHz ± 1 Hz can be used. The calibration with regards sensitivity is not required.