



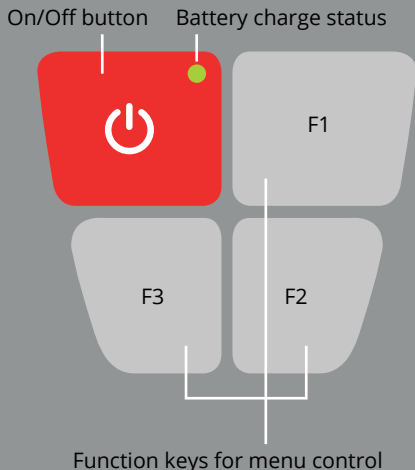
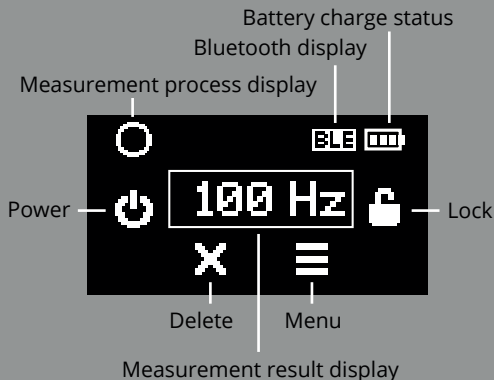
DRIVE
SOLUTIONS

OPERATION MANUAL
ACOUSTIC
SPAN TENSION METER

Items included and device description

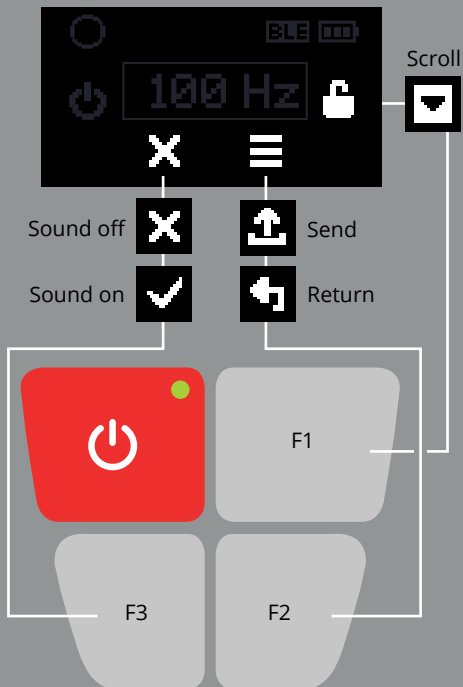


Standard display Main menu



Menu control via the function keys F1, F2 and F3

incl. alternative key assignment



F1 for right center functions
F2 for functions below right
F3 for functions below left

ACOUSTIC SPAN TENSION METER

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1. SPECIFICATIONS

Measuring range	10 – 600 Hz
Measurement accuracy / Measurement tolerance	10 – 400 Hz: $\pm 1\%$ 400 – 600 Hz: $\pm 2\%$
Measurement resolution	10 – 99.9 Hz: 0.1 Hz > 100 Hz: 1 Hz
Measurement method	contactless acoustically
Power supply	integrated lithium polymer battery pack 3.7 V / 850 mAh
Runtime	approx. 16 h continuous measurement
Energy consumption	< 50 mA

Display	OLED display monochrome white Dot Matrix 128 x 64 pixels Display size 1.45 x 0.75 inches (37 x 19.5 mm)
Sensor	acoustic sensor with electronic noise suppression on an integrated gooseneck total length approx. 6.5 inches (165 mm)
Dimensions (without gooseneck)	approx. 5.12 x 2.36 x 1.18 inches (130 x 60 x 30 mm)
Weight	approx. 4.41 oz. (125 g)
Mobile App	Compatible with iOS 12.0 or newer versions Android 6.0 or newer versions
Data transmission	via Bluetooth

2. SAFETY PRECAUTIONS

Caution! The measurement must never be carried out while the drive is running! Before starting the measurement, ensure that the drive unit is switched off and secured against being switched on unintentionally. The safety recommendations of the machine manufacturer must be observed.

Never use the device in hazardous areas.

Protect the device from shock, impact and strong vibrations.

Do not bring the device into contact with water, solvents or other liquids.

Clean the device with a dry cloth.

Never use cleaning agents containing solvents.

Protect the device from dust and dirt.

Please note that the OLED display only works in the temperature range between + 4°C and + 60°C. Measurement readings outside of this temperature range cannot be guaranteed.

The device contains a lithium polymer battery. Therefore, do not expose it to high temperatures and/or direct sunlight, e. g. when storing in the car. If handled improperly, lithium polymer batteries can explode, burn and release toxic gases as well as cause chemical burns or poisoning.

When shipping devices with a lithium polymer battery, it is essential to observe the relevant shipping regulations and warnings.

No technical changes may be made to the device.

If the safety instructions are not observed, the operator may be injured and the device may be damaged, for which we assume no liability.

3. THE MEASUREMENT PROCESS

General information

Caution! The measurement must never be carried out while the drive is running! Please note the safety instructions.

Make sure that there is as little interference and background noise as possible during the measurement. *More on this under 3.3. "Possible problem sources".*

When not in use, the device switches to an energy save mode, i.e. the display goes dark. This idle state is automatically terminated by pressing any function key or by transmitting acoustic signals. In order to optimize battery performance, the device switches off automatically after about 2 minutes of idle status.

Note on remounting belts: After remounting a belt, the drive should be rotated a few times by hand to allow the belt to fully seat, as well as enabling any tension differences in the belt spans to be equalized prior to measurement.

3.1. The measurement principle

This acoustic tension meter is used for quick and easy measurement of the belt tension, also called span tension, belt strand force or belt tension force.

Optimal belt tension is necessary to ensure a long service life of the belt and a trouble-free operation of your drive.

The device is fully electronic and equipped with the latest microprocessor technology for simple, high-precision measurements. It is suitable for all belt types, e. g. V-belts, toothed and power belts or ribbed belts, which are in the measuring frequency range between 10 and 600 Hz. The type, color and quality of the belt have no influence on the measurement result.

An impact impulse on the belt, e. g. by hand or a suitable tool, creates a fundamental frequency, which is measured in Hertz (Hz) and is shown on the display of the device. This fundamental oscillation is in a fixed relationship with the belt tension. This means the higher the frequency of a belt, the higher its tension.

Calculation formulas

The span force target value can be calculated using the following formulas:
Formula A)

$$f = \frac{1}{2 \cdot L} \cdot \sqrt{\frac{F_v}{m}}$$

or Formula B)

$$F_v = 4 \cdot m \cdot L^2 \cdot f^2$$

F_v = initial tension force (N)

m = belt weight per meter (kg/m)

L = oscillating belt length (m)

f = belt oscillation frequency (Hz)

3.2. OPERATION OF THE METER

The device is switched on with the on/off button.

The start screen „**Welcome**“ now appears briefly on the display.
The display then changes to the standard screen with the main menu.

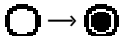
A short signal confirms readiness for measurement.
All acoustic impulses are immediately recorded by the sensor.

The measuring process on the belt can now begin.

The measurement should be taken in the middle of the free span length. Hold the sensor head at least 0.4 inches to max. 1.2 inches (1 cm to max. 3 cm) away from the straps. A greater distance can falsify the measurement result.


Strike the belt with your hand or a suitable tool, e. g. a wrench or hammer handle, in the middle of the span length.


The sensor now measures the fundamental oscillation frequency of the belt.

The ring symbol on the upper left side of the display is shown as a filled circle to indicate the measurement process. 

The measurement result is now shown in the field in the middle of the display in Hertz (Hz).




When using the App:

As soon as the measuring device is connected to the App and the „Start measurement“ function is activated, the Bluetooth symbol  appears in the upper right display field. The first measurement result is automatically transferred to the App.


In order to secure the measurement result, e. g. if access to the machine is difficult, the measurement should be saved by pressing „Lock“  (F1).


We recommend using the „Lock“ function for all measurements, since the measured value cannot be overwritten, e. g. by loud machine and background noise or an accidental hitting of the sensor.


When using the App:


To transfer a saved measurement result to the app once more, press „Lock“  (F1) again. The „Menu“ icon  changes to the „Send“ icon .



Now press „Send“ (F2) to transfer the measurement result to the app.


The Bluetooth symbol  now shows the data exchange again.

By pressing „Delete“  (F3) you delete the saved measurement result in order to carry out a new measurement.

If you have not secured the measurement result via „Lock“ , you can take a new measurement immediately without any further key operations.


The keys are coupled with a sound signal as standard. „Menu“  (F2) takes you to the submenu of the device.

By pressing **«Sound on/off»** you can switch off the sound signals  (F3).
By pressing  (F3) once more, you switch them on again.

„Return“  (F2) takes you back to the standard screen with the main menu.

„Scroll“  (F1) takes you one level down in the submenu.

There you can see the serial number of your device and the version of the firmware.

Use „Return“  (F2) to go back to the standard screen with the main menu.

3.3. Possible problem sources

Interfering background noise can falsify the measurement result. Therefore, ensure that background noise is kept to a minimum during the measurement. When measuring in a windy environment, the sensor should be shielded, as it also reacts to drafts.

Toothed belts have a certain transverse rigidity depending on the belt width. In the case of very short strand lengths in particular, this can lead to measurement results that are higher than the actual belt tension. The measurement should therefore be made on span lengths that are more than twenty times the length of the belt pitch.

If no measurement result appears despite repeated impact impulses on the belt, this can have several causes:

- The belt oscillates outside the measurable frequency range of 10 - 600 Hz.
- There is a noise source within the measurement environment that is in the same frequency range.
- The belt oscillates only slightly or not at all.
- The initial tension on the belt is too low.
- The distance between the belt and the sensor is too great.

4. ADDITIONAL MOBILE APP

Additional functions, e. g. the logging of the measurement with date, time, the assignment of a machine profile or a machine number can be made via a specially developed app, called «**TMconnect**».

The app «**TMconnect**» can be found on the following platforms:



The app «**TMconnect**» is suitable for Apple and Android mobile phones. It is compatible with operating iOS 12.0 or newer versions and Android 6.0 or newer versions.

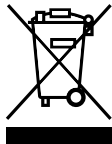
5. MAINTENANCE & CALIBRATION

Before delivery, the device is subjected to a factory calibration, during which the device is checked at defined measuring points within the measuring range and the results are confirmed in a calibration protocol.

If recalibration is required by internal guidelines, you can request a new factory calibration from us.

6. DISPOSAL INSTRUCTIONS

Lithium polymer batteries contain toxic substances and do not belong in the household waste! The customer is legally obliged to dispose of the batteries professionally and responsibly.



7. CERTIFICATES



Our Know-how – Your advantages

- Non-contact, acoustic measurement technology with a highly sensitive sensor for exact belt tension measurement
- Suitable for all belt types
- Small sensor head on a flexible gooseneck for measurements even in areas difficult to access
- Ergonomic shape for optimal one-handed use
- Integrated, rechargeable lithium polymer battery
- Additional functions via the use of a custom app





DRIVE
SOLUTIONS

Ergonomic shape
for optimal one-hand use



Small sensor head
on a flexible gooseneck

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