



#### OPERATING MANUAL SPAN TENSION METER WF-TC1.0



#### OUR KNOW-HOW -YOUR ADVANTAGES



No presettings required, the device is immediately ready for use



Non-contact, acoustic measurement technology for exact measurement results



For all toothed belt, V-belt and V-ribbed suitable for belt types



Delivery with previous factory calibration, recalibration possible if required (e.g. due to internal guidelines)

#### LONG LIFE SPAN THROUGH AN OPTIMUM BELT TENSION

Optimum belt tension is necessary to to ensure a long life span of the belt and the trouble-free functioning of the entire drive.

Walther Flender is your expert for the perfect drive and will be happy to support you in calculating the exact life span or with solutions from the field of predictive maintenance. Feel free to contact us!

#### LATEST GENERATION USER-FRIENDLINESS

MALTHER FLEND

Modern, particularly highcontrast OLED display for good legibility, even from different viewing angles Integrated, rechargeable and sustainable lithium polymer Battery incl. USB-C cable

Small sensor head on the flexible gooseneck for measurements, even in places that are difficult to access

Ergonomic shape for optimal one-hand use

#### **CUSTOMIZED SOLUTIONS**

Do you need additional features such as data transfer via Bluetooth to your system?

Just talk to us! We would be happy to coordinate a possible individual version of the WF-TC measuring device with you.

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#### SCOPE OF DELIVERY IN A COMPACT SET



#### **MENU CONTROL**





#### SPAN TENSION METER WF-TC 1.0

#### Table of contents

1. Specifications	8
2. Safety notes	10
3. The measurement process	12
3.1. The measuring principle	13
3.2. Calculation formulas	15
3.3. Operation of the meter	16
3.4. Possible problem sources	19
4. Maintenance & calibration	21
5. Disposal instructions	22
6. Certificates	23

7

# **1. SPECIFICATIONS**

Measuring range	10 – 600 Hz
Measurement accuracy / Measurement tolerance	10 – 400 Hz: ± 1% 400 – 600 Hz: ± 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 in (37 x 19.5 mm)
Sensor	acoustic sensor with electronic noise suppression on an integrated gooseneck total length approx. 6.5 in (165 mm)
Dimensions (without gooseneck)	approx. 5.12 x 2.36 x 1.18 in (130 x 60 x 30 mm)
Weight	approx. 4.41 oz. (125 g)

# **2. SAFETY NOTES**

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.

#### **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 measuring 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.

#### 3.2. Calculation formulas

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

Formula A)

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

or Formula B)

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

*F<sub>v</sub>* = initial tension force (N) *m* = belt weight per meter (kg/m) *L* = oscillating belt length (m) *f* = belt oscillation frequency (Hz)

#### 3.3. 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.  $\bigcirc \rightarrow \bigcirc$ 

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

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. By pressing "Delete"  $\mathbf{X}$  (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 **X** (F3). By pressing **V** (F3) once more, you switch them on again.

"Return" **1** (F2) takes you back to the standard screen with the main menu.

"Scroll" **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.

# **3.4. 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. 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.

#### **5. 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.





#### **6. CERTIFICATES**

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Our detailed operating manual can be found in the download area of our website www.walther-flender.de



Management System ISO 9001:2015 Credit Management

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