OPERATING INSTRUCTIONS

TRUMMETER PRO
BELT TENSION MEASUREMENT SYSTEM

VERSION 2.2

Table of contents

INTRODUCTION

Thank you for choosing your new Status Pro measurement system - the Trummeter Pro.
We hope to be able to fulfill your expectations of this modern measurement system.
Before making any measurements, be sure to read and follow the safety guidelines and precautionary measures.
We wish you great success in using your new measurement system

SAFETY GUIDELINES

The Trummeter Pro uses an extra bright, red LED (660 nm). For this reason, it is not necessary to take measures to protect your eyes. However, do not look directly into the bright measurement beam at close range.

Consider the following safety precautions.

Caution
Before making measurements, ensure that the instrument is switched off (master switch) and secured against unintentional restarting.
- Personnel must be informed in a timely manner that measurements will be performed.
- If necessary, clearly mark and cordon off the service area at or around the machine, for example, by using lines or ropes.
- The measuring and setting of the belt tension must only be performed by qualified, instructed technical staff while following the specific instruction manual for the instrument as well as the extended documentation from the supplier.

Caution
This instrument must not be operated in rooms with high humidity. Avoid direct exposure to heat, for example, through sunlight. **Moisture and rain, as well as extreme heat or cold, will damage the instrument**.

Note
Do not let the instrument drop or be bumped sharply. The delicate optics could be damaged and the measurements made unusable.

Caution
For connecting the Trummeter Pro to a PC, only use the special BG 810000 cable. If a normal RS232 cable is used, the instrument can be damaged.

Notes on batteries/Rechargeable batteries

If the instrument is not to be used for a long period of time, then the battery /rechargeable battery must be removed. Otherwise, there is a risk of discharging or ruining the battery/rechargeable battery, and consequently damaging the instrument.

Caution

Regular batteries must not be recharged, heated, or disposed of in an open flame (**explosion hazard**!).

Note

Please contribute to the protection of the environment.

Discharged batteries and rechargeable batteries should not be disposed of along with household waste. They can be taken to collection sites for used batteries or special waste.

Find out where these sites are located.

At the end of its service life, this product must not be disposed of along with normal waste but must be taken to a collection site for the recycling of electrical and electronic devices.
The materials can be reused according to how they are labeled. By recycling, reusing the materials or other forms of reusing old equipment, you will make an important contribution to the protection of our environment.

Instructions on caring for the instrument

The Trummeter Pro has been developed for industrial use and is protected against sprayed water and dust in accordance with IP55; the measurement probe is protected in accordance with IP66. For cleaning the housing, a soft cloth, with mild soapy water if necessary, should be used; the detector surface should only be cleaned with alcohol.

When cleaning the detector surface of the measurement probe, do not use paper towels or materials that could scratch the detector surface. For optimal operational conditions, the detector surface as well as the connections should be protected from becoming soiled or, for example, from coming into contact with oil or grease.

Maintenance

In case of any malfunction, contact the manufacturer. Do not open the instrument yourself.

The warranty will expire if unauthorized persons attempt to repair or otherwise tamper with the instrument.

Storage must always take place under dry conditions.

Transport the instrument only in its original case.

Note

The manufacturer assumes no responsibility for damages that arise as result of improper maintenance or repair work by third parties.

DISCLAIMER

Status Pro GmbH is not liable for damages that arise as a result of **improper use**. Knowledge of this handbook is also part of proper use. For this reason, strictly follow the instructions in this handbook and in the technical documents for the sensors. We can not be liable for errors that arise due to not following the operating instructions.

INTENDED USE

- The Trummeter Pro is a precision measuring instrument for measuring the belt tension and rotary speed of industrial machines and units.

⚠ **Note**
The Trummeter must only be used for the purposes specified above. Unintended usage, use of unsuitable components, or modifications in regard to intended use can lead to malfunctions in operation for which Status Pro GmbH assumes no liability.

DELIVERED ITEMS

This Trummeter Pro measurement instrument is delivered in a durable plastic case. A measurement probe and a 9 V battery are also supplied.

PRODUCT ADVANTAGES

• Precise measurement of belt tension

• Precise measurement of rotary speed

• Precise calculation of belt span tension

• Built-in frequency test for checking the measurement probe

• Required for recording in accordance with DIN EN ISO 9001ff

• Operational guidance and readout of measured values in a choice of 3 languages

• Simple and reliable operation

• Compact and handy design, rubber-coated for protection

PREPARATION MEASURES

CONNECTING THE MEASUREMENT PROBE

Remove the measurement probe from its case, insert the measurement probe connector into the socket on the Trummeter Pro. Secure the connector by tightening both screws.

Measurement probe

⚠️ **Caution**
Do not over tighten the two screws.

OPERATIONAL ELEMENTS

OVERVIEW

The operating buttons in "1" control various functions. The display in "2" shows settings and measurement results. The measurement probe "3" registers the characteristic frequency of the tensioned, free belt by using pulsed light or the rotary speed, and communicates the measurement values to the Trummeter Pro.
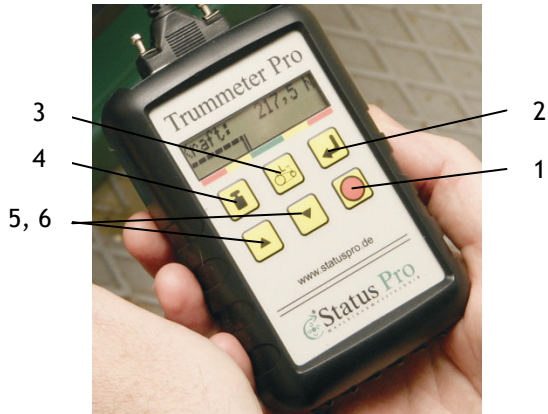

Trummeter Pro Overview

1. Operating buttons
2. Display
3. Measurement probe

OPERATING BUTTONS

The operating buttons control various functions.

1. ON/OFF switch or storage of measurements
2. ENTER
3. Strand length
4. Belt mass or belt type selection; in the storage mode, readout of measurement results
5. Arrow ▲: Change values - increase
6. Arrow ▼: Change values - decrease

OPERATION

Operating the Trummeter Pro is simple and straight forward.

GENERAL INFORMATION ON "BELT TENSION"

Measuring the belt span tension

To calculate the belt span tension or trum force, the measured values of the belt tension, the belt mass and the belt length are input. The calculated trum force is compared with the nominal value that is defined during the design of the drive.

The trum force is calculated using the following formula:

$$F = 4 \bullet m \bullet L^2 \bullet f^2$$

In this formula,

F = trum force in N

m = belt mass per unit length in kg/m

L = length of the free belt strand in m

f = measured characteristic frequency of the free belt in Hz

MEASURING THE BELT TENSION

The belt tension can only be measured when the drive is switched off and stopped.

⚠️ **Caution**
Before making measurements, ensure that the machine is switched off (master switch) and secured against unintentional restarting.

The installed and tensioned drive belt is set into natural oscillation with a short impulse or by striking it lightly.

This static characteristic frequency is measured by the probe by using light pulses. There must be a sufficient amount of light reflected from the belt.

By using the measured data along with the mass of the belt and the length of the free belt strand (from the integrated belt database, for example) the Trummeter Pro calculates the trum force.

The readout of the measured values takes place according to the settings; for example, frequency in Hertz or force in Newtons.

MEASUREMENT PROCEDURE

Please follow the instructions below. This will ensure that the measured values are correct and will avoid erroneous measurement results.

CHECKING THE MEASUREMENT PROBE – FREQUENCY TEST

Built into the Trummeter Pro software is an important and useful additional function for checking the measurement probe, for example, before making a measurement, see p. 18. During this "self-test", the Trummeter Pro outputs a nominal frequency of 25 Hz over the display. That is, the illumination of the display is switched off and on at a frequency of 25 Hz. If it is functioning properly, the measurement probe must readout this 25 Hz in the display. The readout can vary in the range from 24.7 Hz to 25.3 Hz.

1. Switch on the Trummeter Pro using the ON/OFF 1 button.
2. Switch to the "Freq-Test" using the ENTER button; see "Menu structure", p. 19.
3. Using the ▼/▲ button, switch on the frequency test; the display begins to "flicker" at a nominal frequency of 25 Hz.
4. Hold the measurement probe up close to the display.
5. The measurement probe measures the display frequency; the result is indicated in the display below on the right; an acoustic signal is output if the measurement is successful.
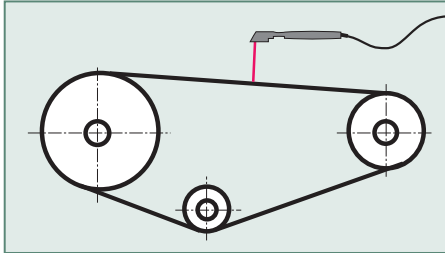
> Note
> If the result deviates from the nominal value of 25 Hz (readout in display: 24.7 – 25.3 Hz), then check the cables as well as the battery voltage.
> If in doubt, contact the manufacturer.

6. Using the ▼/▲ button, switch off the frequency test; switch to the measurement mode using ENTER.

Notes on positioning the measurement probe

The distance between the drive belt and the measurement probe should be between 3 - 20 mm. The measurement of the belt tension should take place at the longer strand of the belt, in the middle between the two drive rollers.
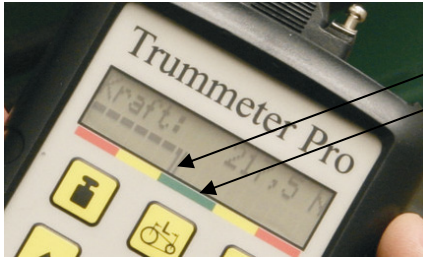
Measurement step

1. Switch on the Trummeter Pro using the ON/OFF 1 button. The instrument is ready for taking measurements.
2. Input the belt strand length and belt mass, see "Menu structure" p. 19.
3. Alternatively, select the belt data from the implemented belt database, see the next page.
4. Set the drive belt into natural oscillation by striking it.
5. Hold the measurement probe over the drive belt at approximately the center of the free belt span length. The distance from the belt can be between 3 and 20 mm.
6. In the display, the readout is in Newtons or Hertz. A successful measurement is acknowledged by a longer acoustic signal.
7. If the measurement is invalid, then the message "Instab" appears in the display; a short acoustic signal sounds.
8. Check the setup and repeat the measurement.
9. The measured value is displayed (in Hz or N).

MEASUREMENT EVALUATION, GREEN-YELLOW-RED

When using the Trummeter Pro, you will only be provided with a raw measurement result, for example, the force in "Newtons". You can evaluate the measurement results directly by using the indicator bar as well as the green-yellow-red markings below the display:

Status bar with markings:
green: OK, within tolerance
yellow: result is close to tolerance
red: bad measurement result

The position (trend) of the indicator bar indicates if the measured values lie below (left, belt too loose) or above (right, belt too tight) the nominal values.

In the above example, the result is in the green area (measured value OK); the trend shows that the force is tending more to be too small than to be too large.

In addition, an evaluation of the measurement result is shown in the display using distinct symbols (to the right, near the measured value):

√ : = Good

+ : = Acceptable

- : = Bad

STORING MEASUREMENTS

For documentation purposes, you may store the measurements that have been made in the instrument. The instrument has internal storage for up to 255 measurements. Using the optional Trummeter Pro PC-Software, convenient options are available for producing measurement data reports.

Procedure:

1. Measurement performed, measured value is displayed.
2. Press button ● "ON/OFF" 1, **Storage No. X** appears in the display.
3. Using ▼ ▲ arrow buttons 5, 6, select Storage No.
4. Confirm with ↵ ENTER, **Store?** appears in the display.
5. Confirm with ↵ ENTER **OK** or cancel using button ● "Store" 1 **Esc**.
6. After storing, the message **Stored in X** appears in the display.

CALLING UP STORED MEASUREMENTS

You may call up measurements stored in the instrument at any time.

Procedure:

1. Press button ● "ON/OFF" 1, **Storage No. X** appears in the display.
2. Using ▼ ▲ arrow buttons 5, 6, select Storage No.
3. Press button 🗄 4; the measurement result appears in the display.
4. If necessary, select an additional Storage No. using ▼ ▲ arrow buttons 5, 6 and display using button 🗄 4.
5. To end, press button ● "ON/OFF" 1 twice.

SWITCHING OFF THE INSTRUMENT

• Press ● ON/OFF and hold down until **Off...** appears in the display.

PC-Software belt data base (optional)

There are approx. 200 data records for common standard drive belts in the Trummeter Pro software.

This facilitates the input of necessary belt data.

> **Note**
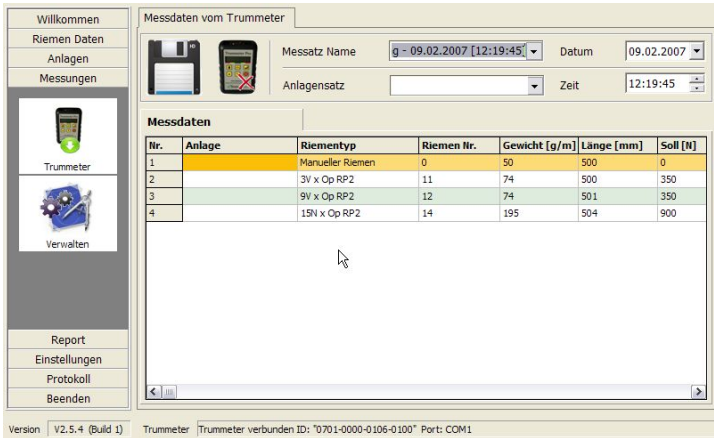> Please consult the continually updated belt database at www.statuspro.de.

1. Switch on the Trummeter Pro.
2. Press button 4 to input the mass of the belt, see Overview p. 9 as well as "Menu structure" p.19".
3. Press button 4 again; now, using the ▼/▲ buttons, select the belt data from the implemented PC-Software belt database.
4. Acquire the belt data using the ENTER button.
5. The instrument is now ready for making measurements.

TRUMMETER PRO PC-SOFTWARE (OPTIONAL)

The associated PC-Software facilitates the use of the Trummeter Pro in practice, and serves to evaluate measurements that have been made. In addition, you can easily manage the belt database and customize it through updates.

See the accompanying documentation entitled "Trummeter Pro PC-Software".

Caution

For connecting the Trummeter Pro to a PC, only use a special BG 810000 cable.

If a regular RS232 cable is used, the instrument can be damaged.

APPENDIX

SPECIFICATIONS

SP TRUM-PRO:

Measurement range	1 - 500 Hz
Modulation	5 kHz
Sensor test	25 Hz with OK message
Readout error	+/- 0.3 Hz
Resolution	+/- 0.1 Hz
Operation	-20°...+85°C; -68°...+185° F
Storage	-40°...+105°C; -40°...+221°F
Humidity	20 .. 95 %
Housing plastic (PVC);	IP20
Measurement sensor	plastic; IP66
Housing dimensions WxHxD	75 x 115 x 35 mm; 2.95 x 4.53 x 1.38 inches
Carrying-case dimensions	230 x 220 x 75 mm; 9.06 x 8.66 x 2.95 inches
Display	2 line LCD 12 x 60 mm (0.47 x 2.36 in) with background illumination
Languages language selection for three languages	
Input limits	free belt strand: 30 - 9,999 mm
Input limits	belt mass: 0.001 - 9.999 kg/m
Number of storage locations	255
Voltage supply	9 V alkaline battery, type E-Block 6LR61
Interface	RS232, DSUB9

MENU STRUCTURE
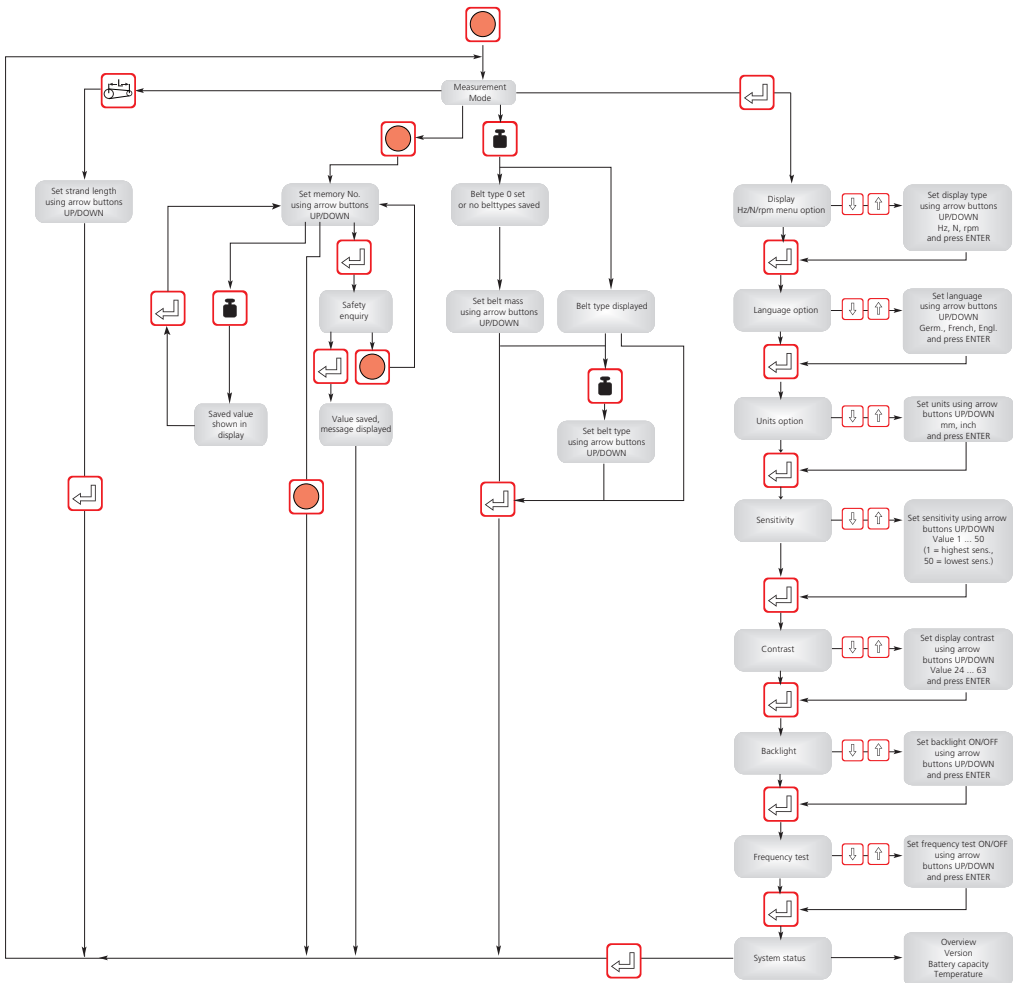
At the lower left in the display of the Trummeter Pro, each active function key appears superimposed on the corresponding menu item.

MANUFACTURER DATA

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