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TRUMMETER

Precision instrument for measuring belt tension



Hilger u. Kern **Drive Technology**

TRUMMETER

Precision instrument for measuring belt tension

A belt drive achieves its maximum lifetime when it is configured specifically to the application, the belt is perfectly tensioned and the pulleys are precisely aligned.

The TRUMMETER is an electronic measuring instrument that consists of a measuring probe and a microprocessor and is used for measuring the belt tension and checking the strand force of a belt drive.

The measurement result is displayed either in hertz or newtons.



Product advantages

- Exact measurement of the belt tensioning force
- Exact calculation of the strand force
- Required for recording in accordance with DIN EN ISO 9001ff
- Operator prompts and measured value displays in 4 languages
- Simple and safe operation
- Compact and handy to use

Scope of delivery

The TRUMMETER is supplied in a strong plastic case. Included in the scope of delivery are a measuring probe and a 9-V battery.

Measuring the belt tension

The belt tension can be measured only when the drive has been shut down and is stationary. The fitted and taut drive belt is tapped in order to make it oscillate with its natural oscillation. This static natural frequency is then measured by the probe with the aid of pulsed light. Care must be taken to ensure the

light is sufficiently reflected by the belt. The measured values are displayed in hertz.

Measuring the strand force

To calculate the strand force, the values measured for the belt tension, the belt mass and the belt length are entered into the microcomputer, which then uses these values to calculate the actual strand force. The force calculated is compared with the specified value defined when the drive was designed.

The microcomputer calculates the strand force using the formula

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

Where:

T = strand force in N
m = linear belt mass in kg/m
L = length of the free belt strand in m
f = natural frequency of the free belt measured in Hz

Technical data

Measuring range	10 – 300 Hz
Digital sampling error	< 1%
Indication error	+/- 1 Hz
Total error	< 5%
Nominal temp.	+20°C
Operating temp.	+10 – +50°C
Shipping temp.	-5 – +70°C
Casing	Plastic (ABS)
Dimensions, unit	80 x 126 x 37
Dimensions, case	226 x 178 x 50
Display	2-line LCD, 16 char./line
Languages	4
Input range:	
free strand length	up to 9.990 m
belt mass	up to 9.999 kg/m
Power supply	9-V battery

Buttons on the
membrane keyboard

Belt mass

Strand length

ENTER

ARROW UP

ARROW DOWN

ON/OFF



Measuring procedure

Attention!

The belt tension can be measured only once the drive has been shut down and is stationary.

Measuring steps

1. Switch on the TRUMMETER.
2. Tap the drive belt so that it begins to oscillate with its natural oscillation.
3. Hold the measurement probe approximately at the center of the free strand length at a distance of 3 to 20 mm above the drive belt.
4. Successful measurement is acknowledged by an acoustic signal and the indication "Measurement" appears on the display.
5. The measured value is displayed in Hz.

ons are due to the mechanical tolerances of the drive systems. If no measurement results are displayed despite careful preparations, this may be due to one of the following two reasons:

1. The drive belt oscillates below the minimum measurement limit of 10 Hz.

Remedy

Tighten the belt or, if the strand length is very long and open, support the belt in order to shorten the strand length. Enter the new belt length before repeating measurement.

2. Either no or low measuring values are displayed despite the drive belt being correctly tensioned.

Remedy

It may be the case that the light from the measuring probe is not sufficiently reflected. To improve reflection, affix a piece of light-colored adhesive tape to the belt or slightly moisten the belt at the measuring point.



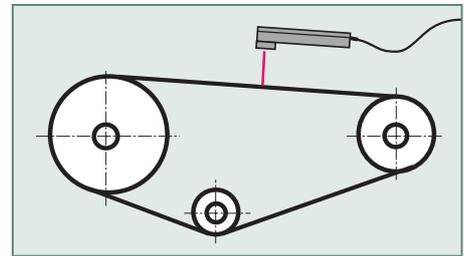
The distance between the drive belt and the measuring probe should be between 3 and 20 mm. See sketch for positioning.

Switching value display mode

The measured values can also be displayed in newtons. Please refer to the section entitled "Menu structure" on Page 5 for instructions on how to switch display mode.

Note

Measurement deviations of up to +/- 10% for several measurements taken on the same drive belt are as a rule not caused by a measurement error or fault in the unit. In most cases, measurement deviat-



Important note

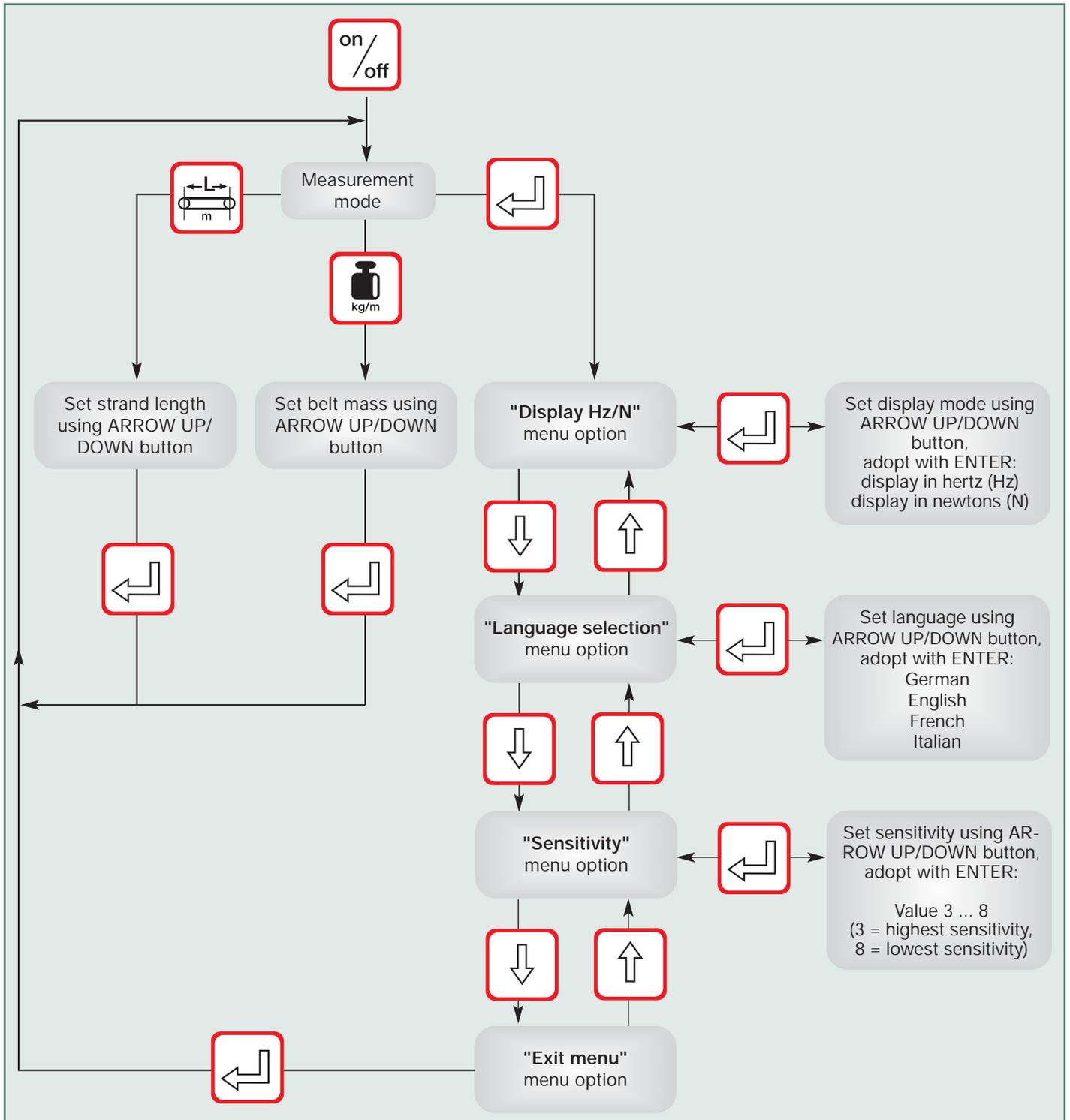
Preferably, the belt tension should always be measured at the center of the longer belt strand between the two drive pulleys.

Belt masses

To measure the belt mass precisely, we recommend that you weigh the drive belt and then recalculate this weight based on a belt length of 1 meter.

Ribbed V-belts	PJ = 0.082 PM = 1.100	PL = 0.320	kg/m per 10 ribs
V-belts	SPZ = 0.074 SPB = 0.195 10 = 0.064 17 = 0.196 22 = 0.324 32 = 0.668	SPA = 0.123 SPC = 0.377 13 = 0.109 20 = 0.266 25 = 0.420 40 = 0.958	kg/m per belt kg/m per belt
Power belts	SPZ = 0.120 SPB = 0.261 3V/9J = 0.120 8V/25J = 0.693	SPA = 0.166 SPC = 0.555 5V/15J = 0.252	kg/m per rib kg/m per rib
Polyurethane toothed belts	T 2,5 = 0.015 T 10 = 0.048 AT 3 = 0.023 AT 10 = 0.063	T 5 = 0.024 T 20 = 0.084 AT 5 = 0.034 AT 20 = 0.106	kg/m per 10 mm width kg/m per 10 mm width

Menu structure



Buttons on the membrane keyboard

Belt mass

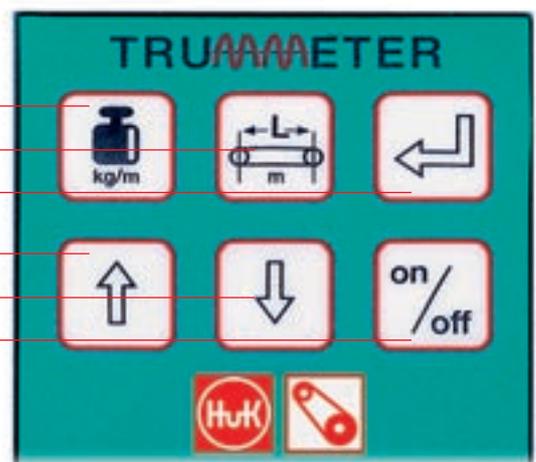
Strand length

ENTER

ARROW UP

ARROW DOWN

ON/OFF



The Hilger u. Kern / Dopag Group, with more than 320 employees and 6 subsidiaries outside Germany, is one of the world's largest manufacturers of metering and mixing systems, systems that are based on all common processing concepts used for multi-component polymers and 1-component media such as greases, oils and adhesives. The Group has been developing and building machines, installations and individual units tailored to your specific needs for more than 25 years.

Hilger u. Kern GmbH in Mannheim, with its Drive Engineering, Metering Systems, Industrial Electronics and Spray Technology divisions, is one of the leading manufacturers of high-quality and innovative technical capital goods in Germany.



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belts and drive elements
planetary gears



Metering Technology

Mixing and metering systems for polymers and single component media



Industrial Electronics

Electronical softstarter and brake units, microcomputer, monitoring system



Vibration Control

Rubber to metal bonded parts for vibration isolation and noise protection. Levelling feet.



Spray Technology

Spray systems, material supply, special systems



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