



POWER TRANSMISSION GROUP

VSM-1 Tension Gauge

Operating Instructions

CONTI VSM-1 Tension Gauge

Operating Instructions

The VSM-1 tension gauge is a fully electronic measuring device specially designed for measuring the tension of timing belts, V-ribbed belts and V-belts. The use of a microcontroller enables highly accurate and highly reproducible results. The display shows the natural frequency of forced vibrations on the free span length, from which you can then very easily calculate the initial tension in the belt.

$$F_{stat} = 4 \cdot m \cdot L_f^2 \cdot f^2$$

Where

F_{stat} = static belt tension in N
 m = belt weight in kg/m
 L_f = free span length in m
 f = natural frequency in Hz

Proceed as follows to measure the frequency:

1. Make sure that the drive system you are measuring is stationary. Never measure a belt drive that is still in operation!
2. Switch on the tension gauge by means of the ON/OFF switch. The device will first perform a power-on self test, and, if the switch is kept pressed, will also show the state of battery charge in mV. Let go of the switch.
3. The gauge is ready to start measurement when 0000 appears in the display.
4. Hold the gauge over the flat side of the belt half to be measured so that the sensor at the top of the flexible arm is centered above the section to be measured at a distance of about 1...20 mm. The most suitable measuring distance may vary depending on the colour and material of the belt. Generally, it applies that with light coloured materials having good reflection properties the sensor can be held further away from the belt (about 10...20 mm). With dark materials and a low reflectivity, the sensor must be closer to the belt (1...5 mm). A red beam spot on the belt shows the position of the sensors above the belt. Care must be taken to ensure that the sensor head is held parallel to the back of the belt (see diagram). Strike the belt so that it starts to vibrate. Try to generate uniform vibrating motion with a sufficiently high amplitude. You will find it easier to start belt vibration by hitting the belt with a tool, like the head of a screwdriver for instance.
5. The vibration frequency in Hz is indicated in the display. An acoustic signal confirms that the measurement was successful.
6. If the belt is still vibrating sufficiently after the first measurement, further measurements will be displayed automatically. Once the vibrations die down, the last measurement will remain displayed.
7. When you have finished, press the ON/OFF switch to turn the device off again.

Display Information:

1. The battery charge state is indicated in the display if the ON/OFF switch is kept pressed when switching on the device: 8250, for example, means 8250 mV or 8.25 V.
2. Display indicates 0000: the gauge is ready to start taking measurements.
3. Display indicates FEbA: operating voltage is too low; the device will switch itself off after 3 seconds. This happens when battery voltage drops to below 6.8 V.

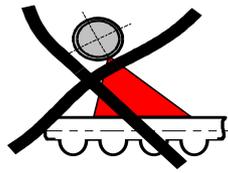
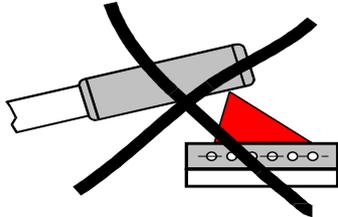
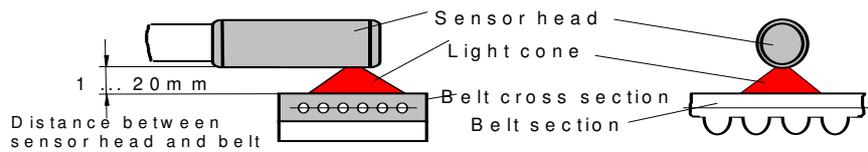
Handling Advice:

1. The device has an automatic shutoff feature after a 1 minute period of non-use in order to save the battery.
2. If no measurement is indicated in the display, the cause may be non-uniform belt vibrations with an insufficient amplitude. To remedy this
 - strike the belt with more force, or
 - hold the sensor closer to the belt
3. Only change the battery when the device is switched off.
4. If the device is used properly, it will operate without any problems at a battery voltage of 6.8 V and higher.
5. In the event that successively displayed measurements continue to be non-reproducible, it may be assumed that either belt vibration measurement is being prevented/affected by strong extraneous light or the belt is not vibrating freely at a sufficient amplitude. In this case, screen the device from any disturbing sources of light or switch them off altogether, and make sure that the belt is vibrating evenly.
6. If no measurement takes place, check that the measuring head sensors show no signs of dirt accumulation. If necessary they can easily be cleaned with a soft cloth (do not use a solvent!).

Important Precautions:

- Keep this device protected from moisture and heavy impact!
- The device must not come into contact with solvents or corrosive liquids!
- Make sure the device is protected from dirt and direct sunlight.
- Never conduct measurements while the drive is still running!
- Hold the sensor head above the belt so that a symmetrical cone of light appears in both side section planes. The illustrations on the back of these instructions show how to position the sensor correctly.

Example: Conducting measurements on a timing belt



Technical Data:

Measuring range:	10...500 Hz
Resolution:	1 Hz
L x W x H:	approx. 120 mm x 60 mm x 25 mm (without sensor)
Weight:	approx. 160 g
Sensor:	optical sensor at the end of a flexible arm
Sensor arm bending radius:	minimum of 45 mm
Battery:	9V block battery
Display:	4-digit LCD
Power consumption:	approx. 20 mA when switched on < 30 μ A when switched off
Nominal working temperature:	22 °C
Working temperature range:	+10...+50 °C

The above information does not represent any guarantee with respect to performance features.

We reserve the right to further develop this device.

Made in Germany.