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Guarantee

If this product fails through faulty materials or workmanship, contact our service department direct on: **+44 (0) 1926 818186**. Normal wear and tear are excluded as are consumable items and abuse.

TOOL CONNECTION
The Complete Connection

Distributed by The Tool Connection Ltd

Kineton Road, Southam, Warwickshire CV47 0DR
T +44 (0) 1926 815000 **F** +44 (0) 1926 815888
info@toolconnection.co.uk **www.toolconnection.co.uk**

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5846

LASER®

Belt Tension Gauge

Instructions

- The use of advanced technologies make this lightweight tension gauge both convenient to use and simple to operate. Its ruggedness will allow many years of use if the correct operating techniques are followed. Please read the following instructions carefully and always keep this manual with the machine for reference.
- For specific belt tension settings always refer to the vehicle manufacturers' data.

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Contents

Introduction

The Digital Belt Tension Gauge is a professional instrument that offers a highly accurate method of measuring and adjusting the tension of all types of rubber timing and auxiliary drive belts fitted to motor vehicles and machinery (maximum belt width 36mm). Tension can be displayed in a variety of standard and manufacturers' units. Tension limits can be set into the instrument by the user.

During belt tension measurement and adjustment, the belt tension can be displayed on the **visual display** and also via an **audible beep**. The audible beep changes depending on whether the tension is within or outside the user's set limits. **This avoids the user having to read the display while adjusting the belt**. The selected tension limits, measurement units and calibration parameters are stored in the memory of the tester, and remain in the memory even when the instrument is switched off and the batteries removed.

The gauge can communicate with a PC computer for statistics recording and printing by connecting the optional cable and software for USB interface.

Principle of Operation

The measuring head is placed on the belt and the clamp is tightened using the clamping knob (finger tight only). This deflects the belt through a known angle defined by the anvil and the fixed pillars.

A load cell attached to the clamp measures the force required to deflect the belt, which is proportional to the tension in the belt. The output signal from the load cell is fed into the handset to be digitized and scaled to give the correct tension reading on the instrument display.

Please read the following instructions carefully and always keep this manual with the machine for reference. **For specific belt tension settings always refer to the vehicle/ machinery manufacturers data**.

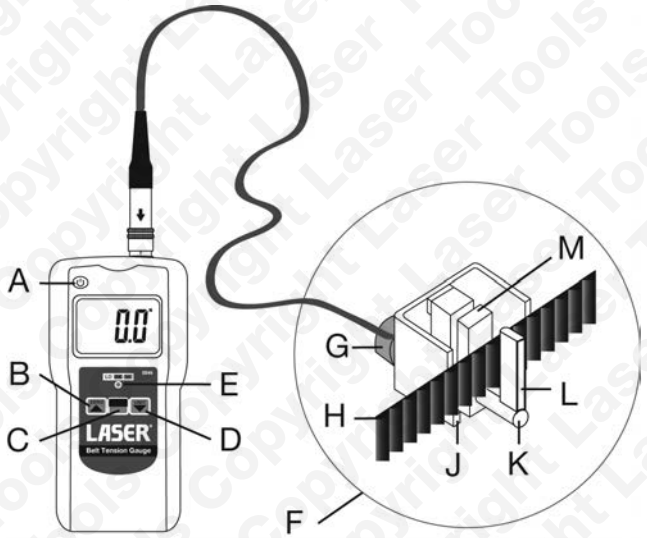
3. Specifications

Display: 4 digits, 10 mm LCD.
With colour coded LED indication of LOW, OK and HI.

Measurement range	0~750Newtons 0~120 Pounds 0~77 Kilograms 0~114 Seems
Belt width	Up to 36 mm
Overload alarm	750 Newtons
Maximum load	850 Newtons
Resolution	± 1 Newtons or 1 least significant digit of other units
Accuracy	± 5% of full-scale
Audible warning	Piezoelectric sounder
Power supply	4 x 1.5V AAA size batteries (supplied)
Battery life	Approximately 100 hours continuous operation
Dimensions	140 x 70 x 30mm
Handset weight	185g (including batteries)
Measuring head weight	230g

Optional: USB Cable and software.

Components



Code	Description
A	Auxiliary power button
B	ZERO/UP key
C	POWER key
D	UNIT/DOWN key
E	LED indicator
F	Measuring Head
G	Clamping knob
H	Belt
J	Locating lug
K	Clamping spindle
L	Clamping hook
M	Anvil

Controls and Indicators

Refer to diagram: the handset has a LCD (liquid crystal) display, one colour coded indicator LED (E), a beeper, and a keypad with 3 keys. The display is used for setting up the instrument and displaying the measured tension. To avoid the user having to read the display whilst adjusting the belt, the handset give an audible beep and the colour coded LED gives visual indication of whether the tension is within or outside the limits that have been preset by the user.

All 3 keys on the keypad have dual functions:

The POWER key (C) is used to switch the instrument on and off; during operation of the instrument, it functions as a multifunctional key which acts as the SET key and ENTER key.

The ZERO key (B) switches the instrument from measuring mode to zero mode. It also functions as a DOWN key to **decrease** a value in a set mode.

The UNIT key (D) switches between different measurement units (eg, Newtons / Pounds / Kilograms). It also functions as a UP key to **increase** a value in a set mode.

In measuring mode, the colour coded LED and the beeper indicate if the measured tension is below, within, or above the pre-set limits (Users can change the alarm limits AL1 or AL2 when required to give accurate low and high readings for a specific belt tension specification - Please refer to following section: **How to set the low limit or the high limit**.

If the measured tension is low, the LED's colour changes to that of LO (amber) and the beeper will emit a **single beep** after each measurement.

If the tension is OK, the LED's colour changes to that of OK (green) and the beeper will **not sound**.

If the tension is high, the LED's colour changes to that of HI (red) and the beeper will emit a **3-beep** sound after each measurement.

Setting and Tensioning a New Belt

Before using the instrument for the first time, remove the battery compartment cover, and fit 4 AAA size 1.5V alkaline batteries. Pay attention to the battery polarity as indicated in the battery compartment.

Plug the DIN connector of the Measuring Head into the DIN socket of the handset. Note: the arrow on DIN connector must line up with the marked line on the handset DIN socket. **Do not force** the DIN connector.

Power on the instrument by pressing the POWER key (C), The tester will switch on in the testing state it was last used in, with the lower and upper limits and unit measurement range as set previously.

How to Set the Low Limit or the High Limit:

If required, after referring to the manufacturer's belt tension specification, the lower and upper limits need to be changed, press and **hold** the POWER key (**C**) until **AL1** or **AL2** appears on the display. This can take a few seconds.

AL1 displays the low limit and **AL2** the high limit. The tester is now in setting mode. The value can be changed to the required setting by depressing the UP and DOWN keys to increase or decrease.

To save and quit, just press the POWER again. If the error info **Err4** shows on the display about 1 second, that indicates **AL1** is a higher value than **AL2** and requires resetting.

As an example, if the manufacturer's recommendation is 385 Newtons, a typical low limit setting would be 370 Newtons, and a typical high limit setting 400 Newtons.

Notes:

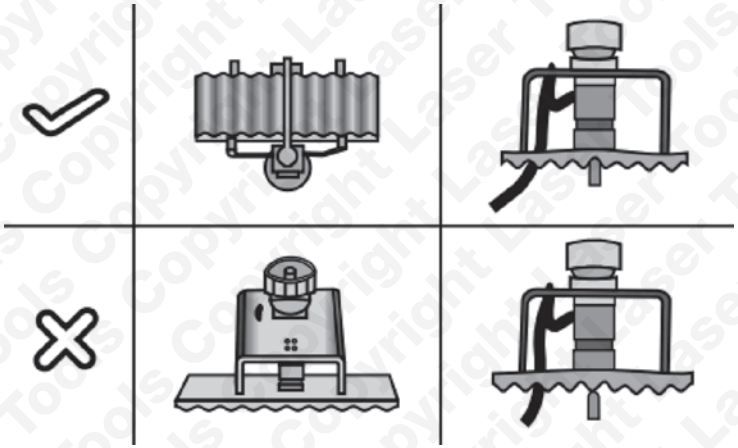
- To make the setting quicker, when the key is held down, the count will speed up after about 4 seconds.
- The first time the instrument is used, the default high and low limits are 250 and 200 Newtons respectively.
- The maximum value to which the high limit can be set is the maximum value that the unit will display in the currently selected units (see Specifications).
- The maximum value to which the low limit can be set is the high limit. The low limit cannot be set higher than the high limit.
- If the measurement unit is changed, the previously stored limit is erased and replaced with the maximum value for the selected unit.

Check the handset display reads zero, if not press the ZERO key. **Zeroing should be done every ten minutes**. When zeroing, the measuring head should not be clamped onto the belt, nor have any load applied to it. Ensure that the clamping knob is fully unscrewed.

Tensioning a New Belt

Slide the clamping hook (L) of the Measuring Head (F) over the belt at the measurement position indicated by the vehicle manufacturer, so that the edge of the belt touches the two locating lugs (J). If no position is indicated, position the measuring head in the centre of the longest free section of the belt. Refer to diagram: ensure that the clamping hook rests in the low 'trough', between the teeth of the ribbed belt and not on top of one of the teeth.

Turn the clamping knob (G) clockwise until the flat side of the belt contacts the anvil, and a resistance is felt. This should only be finger-tight. **Do not over tighten**.



Apply tension to the belt following the manufacturer's recommended method until the required reading is reached, using either display or LED/sound methods. Then lock off the tension adjustment.

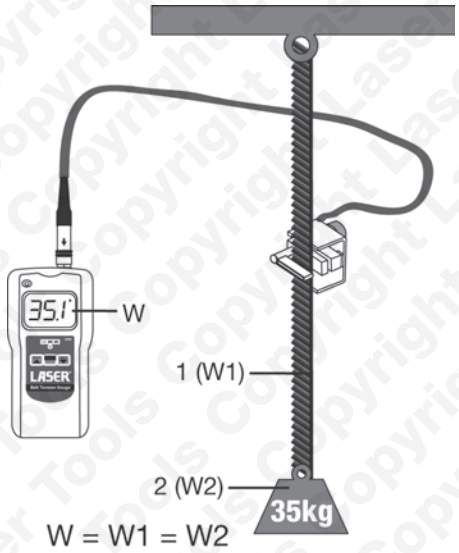
To ensure that the tension applied to the belt is correctly distributed, remove the Measuring Head and turn the crankshaft until the engine is in the position that would be appropriate for valve timing checking/belt replacement. This is normally TDC on the compression stroke on number one cylinder. Refit the 5846 and re-test.

Note: If at any time whilst tightening the clamp, the coloured LED goes off, the beeper sounds continuously and the message **INF1** appears on the display, **stop tightening the clamp immediately** or the measuring head will be damaged. If this happens, a new measuring head will need to be obtained and calibrated to the tester before using it again or the instrument must be returned to the manufacturer for head replacement.

Precautions

- To secure accurate results it is essential that the operating procedure is followed carefully.
- The belt tension between the measuring points will vary as the engine is rotated due to differing internal loads on the crankshaft, camshaft, etc. For this reason, it is recommended that at least two measurements are taken with the crankshaft turned to two different positions.
- Do not forget to remove the measuring head before rotating the crankshaft. Always zero the instrument every ten minutes if the instrument is being used for a long time.
- Do not forget that the zeroing must be done with the measuring head removed from the belt, and the clamp fully unscrewed.
- The instrument must only be used with the measuring head with which it has been calibrated. The measuring head can not be exchanged, swapped or replaced unless the machine is fully re-calibrated.
- If the instrument is used with a different measuring head, it must be re-calibrated before using.
- To avoid potential irreparable damage, never clamp the measuring head onto a belt unless the head is plugged in and the instrument is switched on. The instrument warns of a head overload condition, but only if the head is plugged in and the unit switched on.
- Never clamp the measuring head onto an inflexible object such as a metal or wooden bar.
- Never drop the instrument or subject it to sharp impacts.
- Never allow the instrument or measuring head to hang by the connecting cable.

Calibration Procedure



A feature of the Laser 5846 is its ability to be easily recalibrated by the user.

A calibration test-belt rig is set up using a **fixed and known weight (2)**. An **old cam belt (1)** is first weighed then set up as per the diagram. Make sure the cam belt is connected securely to the suspension beam and the weight. **The weight must be between 35 and 75kg**.

Switch on the 5846 handset. Clamp the Measuring Head into position about half way along the length of the belt. Turn the clamping knob clockwise until the flat side of the belt contacts the anvil, and a resistance is felt. This should only be finger-tight. **Do not over tighten**.

A reading will show on the display. Wait until the reading has stabilized, then press and hold the POWER key until **CAL** appears on the display. This is calibration mode. Change the displayed value to the calibration weight. The calibration weight (**W**) is the sum of the cam belt weight (**W1**) and the fixed known weight (**W2**). Thus in our example, **W = 35.1kg** (100g + 35kg). Use the UP and/or DOWN keys to enter the calibration weight into the handset.

To save and quit, press the POWER key again for a few seconds.

Note: If calibration mode (**CAL**) is entered and there is no weight connected or the weight is less that 35kg, then **Err1** will show on the display.

Auto Power Off

If no key is pressed for approximately 10 minutes, the instrument will switch itself off to save the battery. The unit can also be switched off at any time by holding down the power on button until 'OFF' is shown on the screen.

Low Battery Indication

1. When the battery voltage is less than approximately 5v, the battery symbol will appear on the display.
2. Slide the battery cover away from the instrument and remove batteries.
3. Install 4 x 1.5v AAA batteries correctly into the case.
4. If the instrument is not to be used for any extended period remove batteries.