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The Complete Connection

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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 & tear are excluded as are consumable items & abuse.

Instructions

LASER®

Cam Belt Tensioner Gauge

Measure the tension on most cam belts

RoHS Compliant

Contents

Introduction

The electronic belt tension gauge can be used to measure and adjust the tension of timing and auxiliary belts fitted to motor vehicles and other machines.

Tension can be displayed in a variety of standard and manufacturers' units. Tension limits can be programmed into the instrument, either manually or automatically.

During belt tension measurement and adjustment, the belt tension is displayed. A visual and audible indication of whether the tension is within or outside the set limits is also given. This avoids the user having to read the display whilst adjusting the belt.

The selected tension limits, measurement units and calibration parameters are stored in a non-volatile memory, and will be remembered even when the instrument is switched off and the batteries removed.

Note: Tension checking should always be carried out in accordance with the vehicle manufacturers' instructions.

BMW | FORD | ROVER | SEAT | VAG | VAUXHALL | VOLVO

Measurement Units

KILOGRAMS | LOWENER | NEWTONS | PEISELER POUNDS | SEEM

Principle of operation

The measuring head is placed on the belt and the clamp is tightened using the clamping knob. 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 voltage from the load cell is digitised and scaled to give the correct tension reading on the instrument display.

Controls and indicators

The main unit has a 16-character liquid crystal display, three indicator LED's, a beeper, and a keypad with five 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 beeper and LED's give an audible and visual indication of whether the tension is within or outside the preset limits.

Four of the five keys on the keypad have dual functions:

The **'I'** key switches on the instrument. During operation of the instrument, it functions as an **'ENTER'** key.

The **'SET'** key switches the instrument from measurement mode to setting mode. It also functions as an **'UP'** key to increment a value or scroll up through a menu.

The **'ZERO'** key switches the instrument from measurement mode to zero mode. It also functions as a **'DOWN'** key to decrement a value or scroll down through a menu.

The **'MENU'** key puts the instrument into **'MENU'** mode, or exits from it if a menu operation is not required. In some operating modes, pressing this key backs up one step in the procedure.

The **'0'** key switches off the instrument.

In measurement mode, the three LED's and the beeper indicate if the measured tension is below, within, or above the pre-set limits. If the tension is low, the yellow LED will light and the beeper will emit a single beep after each measurement. If the tension is OK, the green LED will light and the beeper will not sound. If the tension is high, the red LED will light and the beeper will emit a double beep after each measurement.

Precautions

1. This is a precision measuring instrument. To ensure accurate results it is essential that the operating procedure is correctly followed.
2. The instrument must only be used with the measuring head with which it has been calibrated. When the unit is supplied, the main unit and the measuring head will have the same serial number, for example:

   Main unit **H101000**
   Measuring head **H101000**
3. If the instrument is used with a different measuring head, it must be re-calibrated before using.
4. 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.
5. The instrument warns of a head overload condition, but is unable to if the head is unplugged or the instrument is switched off.
6. Never clamp the measuring head onto an inflexible object such as a metal or wooden bar.
7. Never drop the instrument or subject it to sharp impacts.
8. Never allow the instrument or measuring head to hang by the connecting cable.

Operation

1. Before using the instrument for the first time, remove the battery compartment cover, and fit four AA size 1.5V alkaline batteries. Ensure that the batteries are inserted correctly, as printed inside the battery compartment.
2. Plug the DIN connector of the measuring head into the DIN socket of the main unit.
3. Switch on the instrument by pressing the **'I'** key. The three LED's will flash for about two seconds whilst the unit initialises. If the LED's do not flash, then the batteries may be flat or incorrectly fitted.
4. The message **'LASER'** will appear for one second.
5. This is followed by the message **'DISPLAY CONTRAST'** then the prompt **'LIGHT / DARK / OK**
6. If the display is too light or too dark, the contrast may be adjusted by pressing and holding down the ↓ key to darken it, or the ↑ key to lighten it.

   When the display contrast is OK, press the **'*'** key. The display contrast is remembered when the instrument is switched off, even if the batteries are removed.

The contrast should not require further adjustment unless there is a large change in temperature, or the batteries are nearing the end of their life. If no display is visible, check that the contrast has not been set too low.

8. After setting the contrast, the unit checks if the measuring head is connected. If it is not, the message **'HEAD MISSING!'** will be displayed and the LED's will flash.

9. This message will also be displayed if the head becomes disconnected at any time during the setup and measurement procedure.

10. The message **'SET UNITS'** will be displayed for one second, followed by the currently selected measurement unit, for example: ***NEWTONS***

11. Use the ↑ and ↓ keys to scroll up and down through the alphabetical list of measurement units.

    BMW | ROVER | FORD | SEAT | VAG | VAUXHALL | VOLVO

    KILOGRAMS FORCE SEEM | LOWENER UNITS NEWTONS | PEISELER UNITS | POUNDS FORCE

12. When the required unit appears on the screen, press the → key to select them. The first time the instrument is used, the default unit is Newtons. If the units are changed, they will be remembered when the unit is switched off, even if the batteries are removed.

13. Where applicable, the part number of the relevant manufacturers' tensioning tool will be displayed alongside the measurement unit.
    For example: **ROVER KM4088AR**

14. BMW tension settings are dependent on belt thickness and cylinder head temperature. Therefore, to ensure accuracy, the vehicle manufacturers' tension checking instructions MUST be followed.

15. After selecting the measurement units, the message **'HIGH LIMIT: 250'** will be displayed. This shows the currently set high limit for the tension measurement.

16. Use the ↑ and ↓ keys to increase or decrease the tension to the required setting. Note: To make the setting quicker, if a key is held down, the count will speed up after about ten seconds.

17. When the tension is correct, press the ← key to confirm the setting. After setting the high limit, the message **'LOW LIMIT: 200'** will appear. This shows the currently set low limit for the tension measurement. The low limit is displayed and set in the same way as the high limit.

NOTES:

(a) The first time the instrument is used, the default high and low limits are 250 and 200 Newtons respectively.

(b) 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).

(c) The maximum value to which the low limit can be set is the high unit. The low limit cannot be set higher than the high limit.

(d) If the measurement unit is changed, the previously stored high limit is erased and replaced with the maximum value for the selected unit. After setting the limits, the message **'TO ZERO, PRESS ←** will be displayed. At this point 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.

18. Press the ← key to zero the instrument.
19. Next, the message **'MEASURE, PRESS ←** will be displayed.
20. Press the ← key to start the measurement.
21. To ensure that the tension applied to the belt is correctly distributed, 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 for No.1 or No.4 cylinder.
22. Slide the clamping hook of the measuring head over the belt at the measurement position indicated by the vehicle manufacturer, so that the edge of the belt touches the two locating lugs. If no position is indicated, position the measuring head in the centre of the longest free section of the belt. Ensure that the clamping hook rests in the 'trough' between the belt teeth.
23. Turn the tensioning knob clockwise until the flat side of the belt contacts the anvil, and the
24. knob is finger-tight. Do not over tighten.

25. If at any time whilst tightening the clamp, the three LED's illuminate, the beeper sounds continuously and the message 'WARNING-OVERLOAD' appears on the display, stop tightening the clamp immediately. If the load exceeds 850 Newtons or the equivalent, the message 'HEAD DAMAGED' will appear. If this happens, the instrument must be returned to the manufacturer for head replacement and re-calibration.

26. The display will now show the belt tension and the LED's and beeper will indicate if the measurement is within or outside the limits. The yellow LED lights if the tension is too low, and the beeper emits a single beep after each measurement. The red LED lights if the tension is too high, and the beeper emits a double beep.

27. If the tension is OK, the green LED lights and the If necessary, adjust the belt tension until it is within limits. Then re-check the tension as described in 'Getting the best results'.

28. If it is required to change the measurement unit, target tension or limits, the instrument can be switched from measuring mode to set mode by pressing the 'SET' key, then setting the units, tension and limits, as described from step 7.

Getting the best results

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 four measurements are taken with the crankshaft turned to four 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.

Menus

The instrument has the following menus, which can be accessed at any time by pressing the 'Menu' key.
When menus are selected, the menu header will appear.

MENUS, PRESS
Use the ↑ and ↓ keys to scroll up and down through the menu.

DISPLAY CONTRAST
RESTORE DEFAULTS
TURN BEEPER ON [OFF]
TURN LEDS ON [OFF]

CALIBRATION

Press the ← key to select the required option. This performs the menu operation and returns to the menu header screen, except for the calibration procedure, which had several steps. To exit the menus without making a selection, press the 'Menu' key again.

DISPLAY CONTRAST

This allows the user to access the display contrast setting if it requires adjustment at any time other than at switch-on. The procedure for adjustment is the same as at switch-on.

RESTORE DEFAULTS

This restores the following default settings:
Contrast
Units
Tension high limit
Tension low limit
50%
Newtons
250
200

TURN BEEPER ON [OFF]

When **'TURN BEEPER ON'** is displayed, pressing the ← key turns the beeper on for out of-limit indication.
When **'TURN BEEPER OFF'** is displayed, pressing the ← key turns the beeper off.

Note: The beeper always sounds to confirm a key press or a fault condition.

TURN LEDS ON [OFF]

When **'TURN LEDS ON'** is displayed, pressing the ← key turns the LED's on for out-of limit indication. When **'TURN LEDS OFF'** is displayed, pressing the ← key turns the LED's off.

Note: The LED's always light for a fault condition.

Calibration should be carried out after every 250 operations of the unit, or at 6 month intervals.

After 220 operations the message **'CAL. DUE: 30'** will be displayed whenever the instrument is switched on. This indicates that calibration will be due after the unit has been switched on 30 more times. This figure will decrease every time the unit is switched on. After 250 operations, the message **'CAL. OVERDUE: 01'** will be displayed whenever the instrument is switched on.

This will not prevent use of the instrument, but calibration should be carried out as soon as possible.

FAILURE TO RE-CALIBRATE THE UNIT WHEN REQUIRED WILL RESULT IN INCORRECT VALUES BEING DISPLAYED. THIS WILL RESULT IN INCORRECT TENSION BEING APPLIED TO A BELT, AND THE BELT COULD SUBSEQUENTLY FAIL. THE CONSEQUENCE OF WHICH COULD BE EXTENSIVE ENGINE DAMAGE.

Calibration procedure

Calibration should only be carried out by a service centre equipped with the appropriate calibration equipment. An invalid or failed calibration attempt will result in the instrument defaulting to **'failsafe'** mode, where the only options available to the user are to switch off or re-calibrate the unit. If the **'CALIBRATION'** option is inadvertently selected, the message **'ARE YOU SURE?'** will be displayed. Press the **'Menu'** key to abort the calibration procedure.

Auto power off

If no key is pressed for approximately 30 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 **'0'** key until the display disappears.

Low battery warning

If the battery needs changing, the red LED will flash and the display will show the message **'LOW BATTERY!'**

Note: If the battery is completely drained, the instrument will not operate at all.

Maintenance

The tension gauge requires no maintenance, other than the unit should be periodically wiped over with a clean cloth. The keypad is a sealed membrane type, which can easily be cleaned without damage. Do not clean with solvents.

Warranty procedures

The Tension Gauge is warranted against defects in material and workmanship under normal use and service for the period of one year from the original date of purchase.
Should the instrument become inoperative a repair will be carried out free of charge to the original purchaser within a one year period from the original date of purchase.
The warranty shall not apply and will be void if, in the opinion of the manufacturer, the tension gauge or any of its components have been damaged or subjected to misuse.
The tension gauge should be calibrated as described in this manual. The manufacturer reserves the right to refuse any warranty claim if it is a result of not complying with the calibration procedures.

Complete and return enclosed registration card.

Specification		
Belt width	Up to 36mm	
Measurement range	0 – 750 0 to 77 0 to 170 0 to 12.0 0 to 53 0 to 14.5 0 to 114	Newtons Kilograms Pounds Ford/Lowener/Vauxhall BMW Peiseler/Seat/VAG/Volvo Seem
Overload warning	750	Newtons
Maximum load	850	Newtons
Measurement resolution	+/- 10 (or at least 1 sig. digit)	Newtons
Measurement accuracy	+/- 5% of full scale	
Display	16 Characters LCD/3 LEDs	
Audible warning	Piezoelectric sound	
Key pad	5 key tactile membrane	
Power source	4 x 1.5v AA Battery	Supplied
Battery life	100 hours approximately	
Piezoelectric sounder		
5 key tactile membrane keypad		

NOTE:
The tension head is calibrated to this unit.
Calibration can be carried out by D-ZIGN UK LIMITED: 0161 621 5880