Special torque tightening figures

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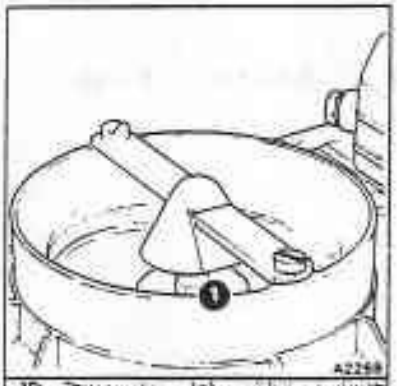
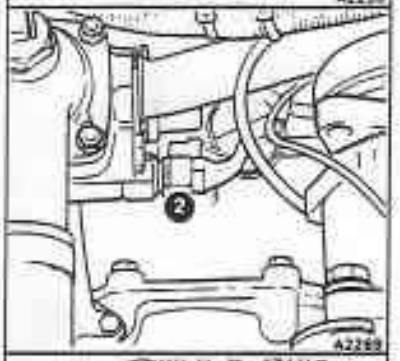
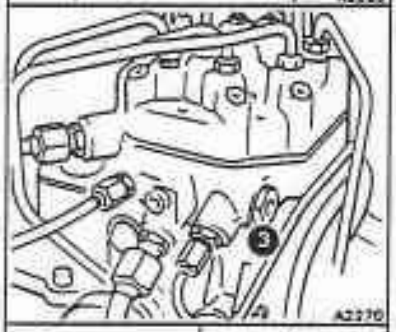
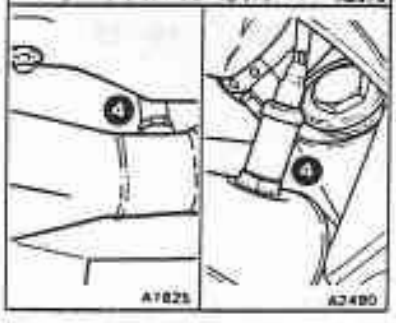
Special torque tightening figures

Introduction
This section contains the special torque tightening figures applicable to this Workshop Manual.

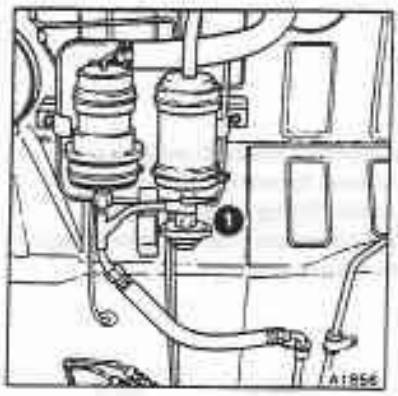
For standard torque tightening figures refer to Chapter P, in Workshop Manual TSD 4700.

Components used during manufacture of the vehicle have different thread formations (Metric, UNF, UNC, etc.). Therefore, when fitting nuts, bolts, and setscrews it is important to ensure that the correct type and size of thread formation is used.

Chapter B	Ref.	Component	Nm	kgf m	lbf ft
	1	Air flow sensor plate – setscrew	5	0,5 – 0,55	44 – 48 lbf. in.
	2	Thermal time switch	30	3,0	22
	3	Primary system pressure regulator (large hexagon)	13 – 15	1,3 – 1,5	9,5 – 11
	4	Oxygen sensor When fitting an oxygen sensor, always smear the threads with Never-seez assembly compound. Do not allow the assembly compound onto the slotted shield below the threaded portion	50 – 59	5,1 – 6,1	37 – 44

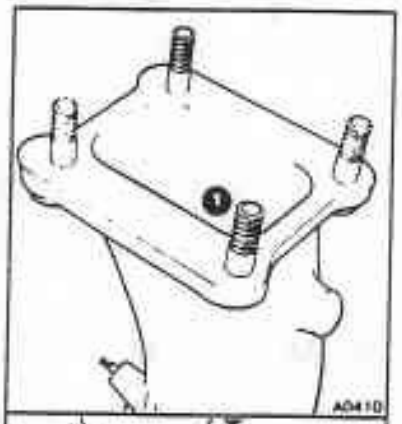
Chapter C

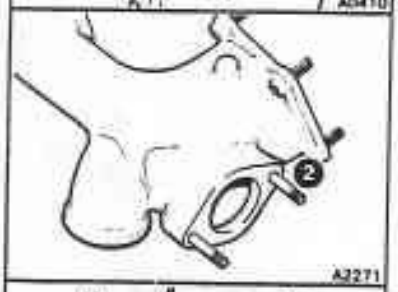
Ref.	Component	Nm	kgf m	lbf ft
1	Fuel pressure damper to fuel pump When tightening the component ensure that the pump outlet is held firmly with a spanner, otherwise the flexible pump mounts may be strained	16 – 24	1,7 – 2,5	12 – 18

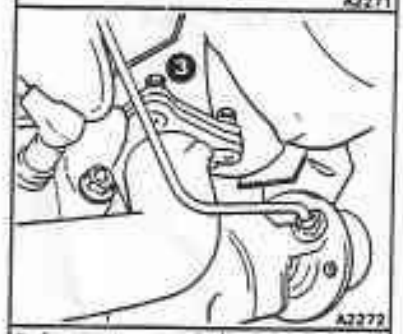


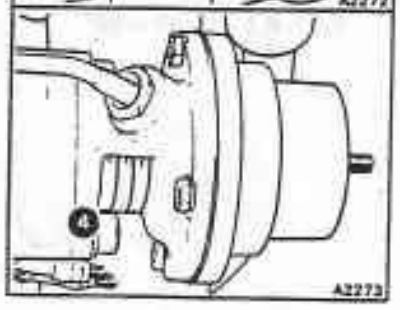
Chapter D

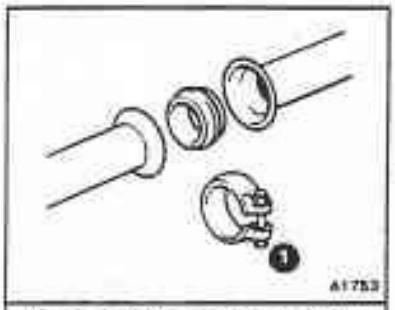
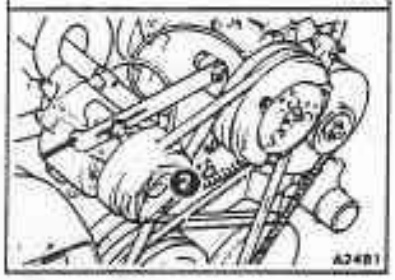
Ref.	Component	Nm	kgf m	lbf ft
1	Turbocharger assembly to exhaust manifold – stud 4 off	11 – 13	1,2 – 1,3	8 – 10
2	Wastegate assembly to exhaust manifold – stud 2 off	11 – 13	1,2 – 1,3	8 – 10
3	Turbocharger assembly to exhaust manifold – nut 4 off	17,7 – 20	1,8 – 2,0	13 – 15
4	Wastegate assembly to exhaust manifold – nut 2 off	17,7 – 20	1,8 – 2,0	13 – 15









Chapter F	Ref.	Component	Nm	kgf m	lbf ft
	1	Spherical clamp – nut	20	2,0	15
	2	Air pump clutched pulley – nut	34	3,5	25

Workshop tools

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Workshop tools

RH 8090	Pliers
RH 8725	Flowmeter
RH 9607	Adapter (for use with pressure tester)
RH 9608	Mixture adjusting tool
RH 9609	Guide ring
RH 9612	Pressure tester (6 bar gauge used on K-Jetronic)
RH 9873	Pressure tester (10 bar gauge used on K-Jetronic, KE2-Jetronic, and K-Motronic)
SPM1390/1	'Firtree' type nipple and nut
RH 9613	Fuel delivery quantity comparison tester
RH 9614	Injector test equipment
RH 9615	* 'Closed loop' system tester (Only use with RH 9979)
RH 9645	Hose and adapter (for use with pressure tester)
RH 9876	CO sample tapping adapter (for use on naturally aspirated cars fitted with catalytic converters)
RH 9881	Adapter (fuel distributor)
RH 9893	Adapter (electrical connection to EHA)
RH 9928	Removal/Fitting tool (fuel tank sender unit and in-tank filter)
RH 9960	Accessory kit (comprising fuel distributor adapters and AFS plate operating screw)
RH 9979	*Connection lead (Only use with RH 9615)
RH 12207	Setting tool (engine speed sensor air gap)
RH 12210	K-Motronic ECU interrogator (for use on turbocharged cars without the on-board fault diagnosis capability)
RH 12211	Atlas Copco belt tension meter
RH 12495	Mityvac vacuum/pressure pump and gauge assembly
RH 13014	* 'Closed loop' system tester (Only use with RH 13015)
RH 13015	*Connection lead (Only use with RH 13014)

* Alternatives in sets
(Use on cars with a K-Jetronic fuel injection system and a catalytic converter(s) fitted in the exhaust system)

Running changes

Contents

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Running changes
No 1 The fitting of two air pressure transducers

During production of the 1987 model year Bentley Turbo R, a change was introduced to the method of signalling induction manifold pressure to both the fuel injection system ECU and the boost control system ECU.

Originally, the signalling operation was carried out by one air pressure transducer (APT). The unit received a voltage feed from the fuel injection system ECU. Then, dependent upon induction manifold pressure (either positive or negative pressure), it electrically signalled the information primarily to the fuel injection system ECU and also to the boost control system ECU.

A modified crankcase was introduced during production of 1987 model year cars, that resulted in a change of frequency pick-up by the knock sensors, during detonation. This demanded a finer tuned system and therefore, a second identical APT was fitted adjacent to the existing unit (see fig. N2-1).

The fuel injection system and the boost control system now have their own APT which works independently of the other. Each APT receives its voltage feed from its own ECU and dependent upon induction manifold pressure, electrically signals the information back to its respective ECU.

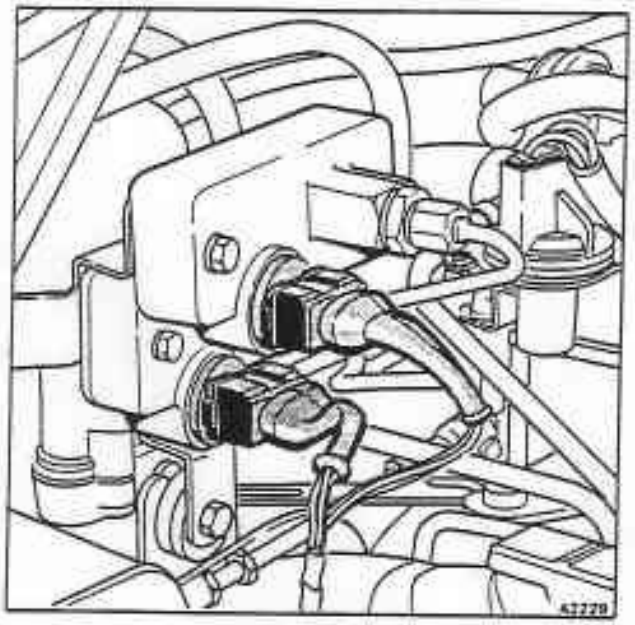


Fig. N2-1 Air pressure transducers

Running changes
No 2 1988 Model year changes

The information contained within this running change up-dates the manual for 1988 model year cars.

The main changes to the various build specifications affect cars produced to a Swiss or Austrian specification. For the 1988 model year these cars are fitted with a catalytic converter and a power train very similar to that fitted to cars produced to a North American specification. The only differences are that the Swiss and Austrian cars do not have an oxygen sensor warning lamp on the facia. They do however, have a new type of exhaust gas sample tapping (see fig. N3-1) fitted in front of the catalytic converter.

The other change that affects all 1988 model year cars is that the model year identification letter in the vehicle identification number (VIN) has changed. The tenth digit in the VIN of 1988 model year cars is the letter J (e.g. *SCAZS02A6JCX21057*).

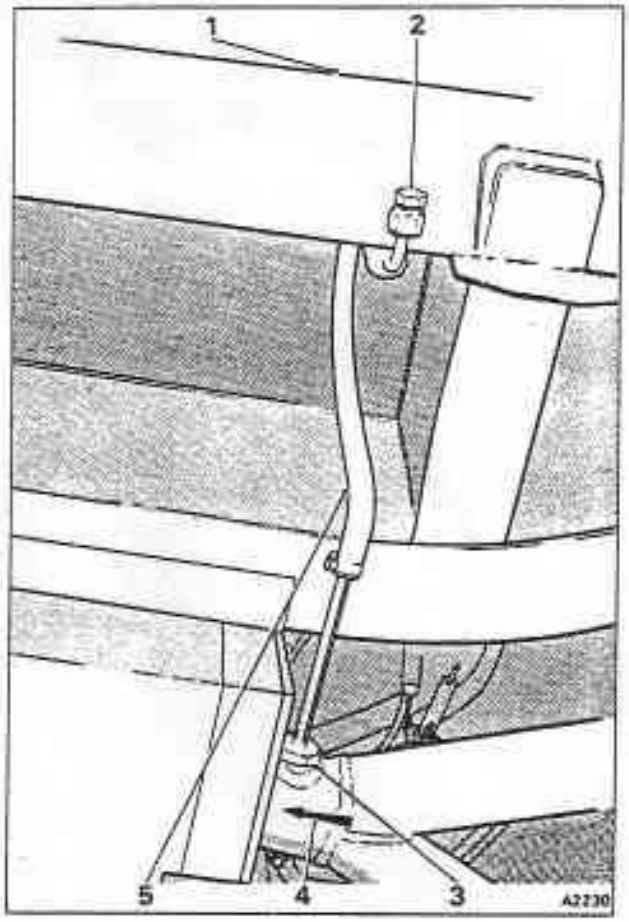


Fig. N3-1 Exhaust gas sample take-off

1 Outside edge of vehicle
2 Tube end cap
3 Exhaust adapter
4 Exhaust gas flow into catalytic converter
5 Heat resistant flexible tube

Running changes
No 3 K-Motronic ECU interrogator RH 12210

1989 model year Bentley Turbo R motor cars are equipped with a Bosch K-Motronic engine management system.

The K-Motronic electronic control unit (ECU) provides a self diagnostic fault finding facility for the engine management system.

On cars fitted with full emission control systems including catalytic converters, this fault finding facility is interpreted as a blink code via the facia mounted CHECK ENGINE warning panel. Refer to Chapter B, Section B4 for full details.

On all other 1989 model year turbocharged cars, the K-Motronic ECU incorporates the self diagnostic capability but there is no 'on-board' facility for displaying the information. To carry out a fault finding check on these cars use test box RH 12210. This test box will interrogate the K-Motronic ECU and exhibit its findings as blink codes on the test box indicator lamp.

The procedure for using the interrogator is as follows.

1. Ensure that the usual workshop safety precautions are carried out.
2. Open the cover to reveal the main fuseboard.
3. Closely inspect the area below and behind the fuseboard (see fig. N4-1). Locate the two cables, one green/yellow, the other black, taped back into the loom. These two cables should be freed and positioned as shown in the illustration.

Note If the ECU has not previously been interrogated by this method it may be necessay to improve access to the loom. Disconnect the battery. Refer to TSD 4848 and release the fuseboard assembly from its mounting. Carefully move the fuseboard assembly into the car to provide the improved access.

. If the ECU has been subjected to interrogation by this method previously, the green/yellow and the black cables will be readily accessible and Operations 4 to 7 inclusive omitted.

4. Ensure that the two cables are insulated.
5. Connect the battery.
6. Carry out a thorough road test on the car.
7. Upon return, carry out the usual workshop safety precautions. Ensure that the ignition is switched off and withdraw fuse B5 from fuse panel F1 on the main fuseboard.
8. Connect the test box RH 12210 to the car as shown in figure N4-1.
9. Insert fuse B5 and note that the indicator lamp on the test box is illuminated.
10. Turn the ignition key to the RUN position.
11. Depress the button on the test box for a minimum of four seconds.
12. Release the button and monitor the blink code displayed on the test box indicator lamp.

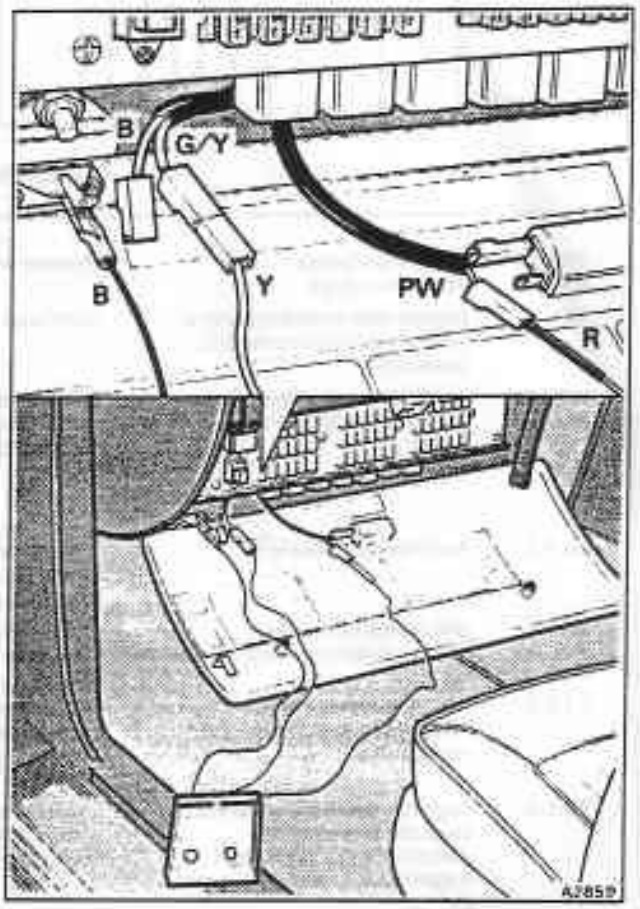


Fig. N4-1 Bosch K-Motronic interrogator in position

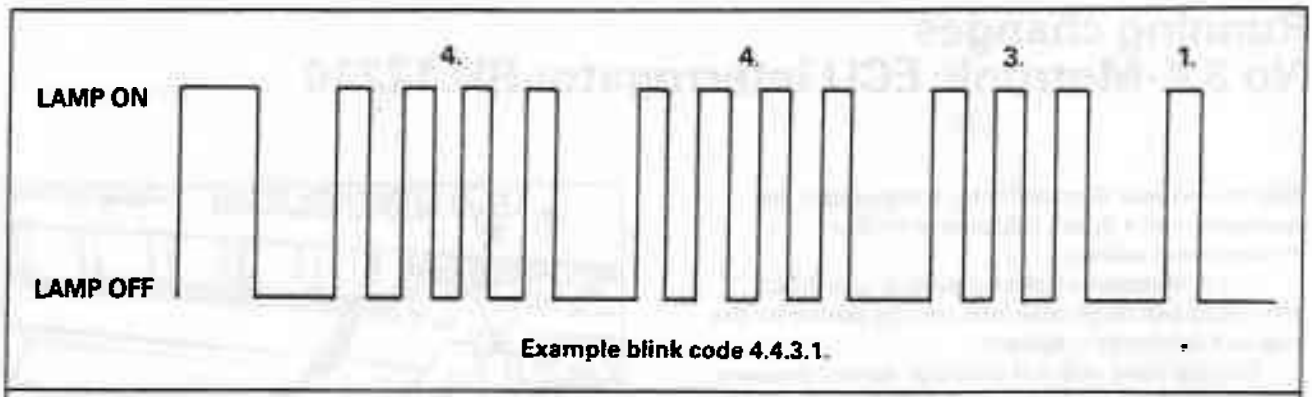
The initial period will be 2.5 seconds lamp on and 2.5 seconds lamp off. Afterwards, the fault code will be revealed (see fig. N4-2).

The fault code 4.4.3.1. is shown in the illustration.

13. Once a blink code has been initiated, it will keep repeating the information (with further initiation periods identifying blink code commencement), until the button on the test box is depressed for another four seconds period.

This procedure must be repeated until all stored blink codes have been extracted from the K-Motronic ECU.

14. If there are no more fault codes stored, the condition is identified by the unique code 1.1.1.1. The test box indicator lamp on/off periods for this code are of 2.5 seconds duration.
15. To reset the ECU following fault extraction and/or rectification, isolate the vehicle battery for more than four seconds. Use the master switch located in the luggage compartment, whenever possible.
16. If there are no faults stored in the ECU, the blink



Example blink code 4.4.3.1.

Blink code	Fault description	System method of recognition	Limp home facility
4.4.4.4.	No faults stored		
4.3.1.2.	Engine reference sensor and/or its connection to the ECU defective	Synchronization lost	Dependent upon ECU data update prior to the engine reference sensor failure
2.3.1.2.	Coolant temperature sensor output outside operating range	Coolant temperature less than –46°C (–50.8°F) or more than 186°C (366.8°F)	K-Motronic ECU provides EHA with mA compensation equivalent to 80°C (176°F) coolant temperature for all operational modes other than starting which is set to 20°C (68°F)
2.2.3.2.	Incorrect air flow signal	Volumetric air flow rate outside pressure upper and lower limits	Ignition and fuelling switched to full load map
2.1.2.1.	Idle switch fault. Idle control maps not recognised	Idle switch closed. Air sensor plate voltage ratio greater than 0.56 for more than 0.3 seconds	Ignition and fuelling switched to part load map
2.1.2.3.	Full load switch fault. Full load control maps not recognised	Full load switch closed but ECU recognises part load engine operation for more then 0.3 seconds	Ignition and fuelling switched to part load map
2.1.1.3.	Engine speed sensor and/or connection to the ECU defective. Air sensor plate mechanism or fuel distributor plunger stuck	Ignition switched on, volumetric air flow rate more than $9m^3/hr$ but no engine speed signal	None
4.4.3.1.	Idle speed actuator connecting plug open or short circuit	End stage within K-Motronic ECU	Limp home engine idle speed of 900 rev/min. Normal engine operation except idle mode
1.1.1.1.	No more faults stored in ECU memory	Blink lamp on/off periods for this code are of 2.5 seconds duration	

Fig. N4-2 Bosch K-Motronic ECU fault codes

code 4.4.4.4. will register on the test box indicator lamp.

17. Upon completion of the tests, switch off the ignition, withdraw fuse B5 from fuse panel F1 on the main fuseboard, and remove the test box connections.

18. Connect the cable to the fuseboard illumination lamp.

19. Insulate the green/yellow and the black cables. Tape them back to the loom behind the fuseboard, ensuring that they are safe but accessible for future use.

The importance of correctly insulating and stowing these two cables cannot be over emphasized. The cable connectors must not be allowed to contact other components.

20. Insert fuse B5.

Running Changes
No 4 Atlas Copco belt tension meter RH 12211

When checking the tension of the air pump driving belt, use the Atlas Copco tension meter RH 12211.

The tension meter consists of two main components, the clamping unit, incorporating a hydraulic cylinder and a trigger operated read-out unit (see fig. N5-1).

The tension meter should be fitted close to the mid-point of the drive belt span, as shown in figure N5-2. The procedure for using the tension meter is as follows.

1. Ensure that the usual workshop safety precautions are carried out.
2. Ensure that the engine is cold. A warm engine will return a higher belt tension reading.
3. Inspect the drive belt for either cracks or glazing. Renew the belt if necessary.
4. Examine the back of the drive belt around the mid-point of the span. If any irregularities are found where the clamping unit is to be fitted, rotate the engine until the area of the belt is acceptable.
5. Belt tension readings should always be taken over one belt only. Therefore, the belt blocker should be fitted prior to using the gauge for the first time and thereafter remain in position in the clamping unit (see fig. N5-1).
6. Open the jaws of the clamping unit by applying pressure at the two points indicated by the arrows in figure N5-1.
7. Position the clamping unit with the jaws open, onto the mid-point of the belt span as shown in figure N5-2. Release the clamping unit.
8. Initially, adjust the small Allen screw situated on the top of the clamping unit until the clamping unit will only just slide along the belt. This operation need only be carried out if the clamping unit is a poor fit on the belt.
9. Squeeze the trigger of the read-out unit. The reading displayed on the gauge when the red lamp illuminates is the belt tension.

Repeat this procedure until the clamping unit has settled on the belt and the readings become consistent. Note this figure.

10. Remove the clamping unit from the belt.
11. Rotate the engine.
12. Repeat Operations 6 to 9 inclusive. The average of the two noted readings is the drive belt tension.

If the two readings vary by more than 45 N (10 lbf), take a third reading by again removing the clamping unit, rotating the engine, and repeating Operations 6 to 9 inclusive. Discard the exceptional value and then average the two remaining readings.

13. Do not adjust the drive belt unless the tension has fallen below the minimum acceptable tension of 200 N (40 lbf).
14. If necessary, adjust the belt tension as described in Chapter F, of this Workshop Manual. The air pump drive belt should be tensioned to a figure of between 250 N and 300 N (55 lbf and 65 lbf).
15. When adjusting the tension of the drive belt, the following points should be noted.

a) the belt should be cold.
b) rotate the engine and check the belt tension several times until a consistent reading is obtained.
c) the pivot fixings should not be loosened by more than is necessary to allow the belt to be tensioned.

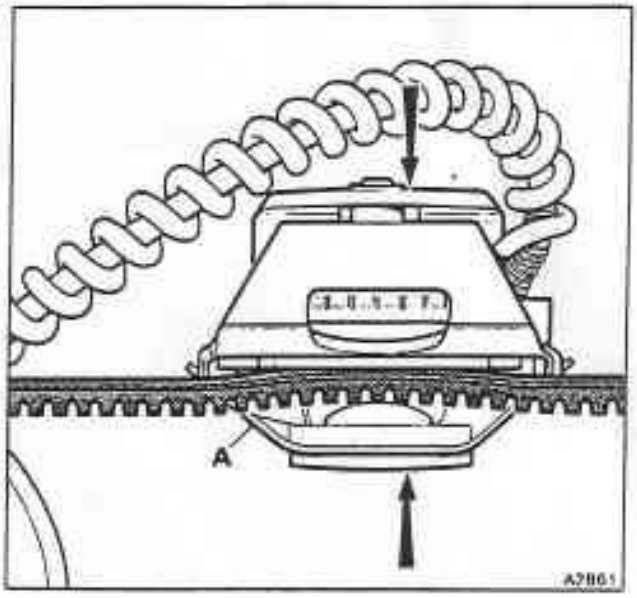


Fig. N5-1 Clamping unit
A Belt blocker

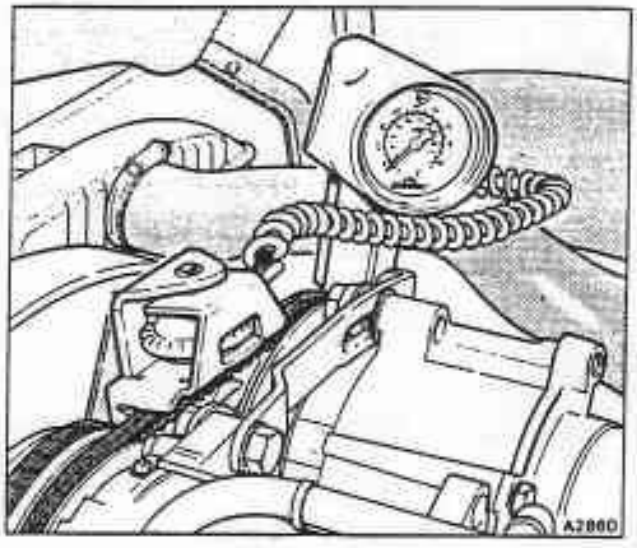


Fig. N5-2 Belt tension meter in position

d) the belt tensioning figures quoted in Operation 14, apply equally to replacement or existing drive belts.
e) if a new belt has been fitted and tensioned, the belt tension must be checked after the engine has run for 15 minutes.