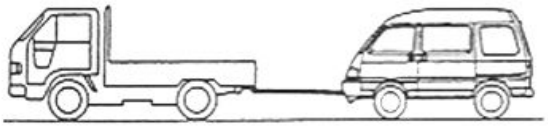
INDEX OF TOPICS

- IF THE ENGINE DOES NOT START, CHECK THAT THE CENTRAL DIFFERENTIAL LOCKING DEVICE IS FREE, LIFTING ONE OF THE WHEELS AND CHECKING THAT THESE TURN FREELY. ALSO IF THE DIFFERENTIAL LOCKING CHECKING DEVICE WARNING LIGHT INDICATES THAT IT IS FREE, IT IS POSSIBLE THAT IT IS NOT COMPLETELY FREE.

5. Move the ignition switch to «**ACC**».

6. Start haulage operations.

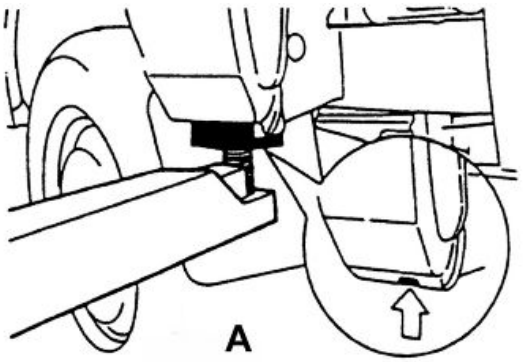


Lifting points

Support point for 4 arm lift

Front part:

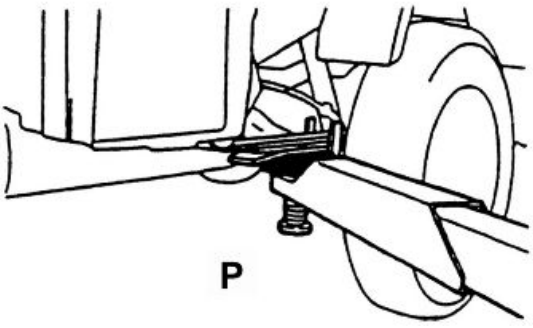
Support the vehicle at the bodywork points indicated in the figure.



(A): Front support Point

Rear part

Support the vehicle under the leaf spring.



(P): Rear support Point

Engine oil change and filter replacement

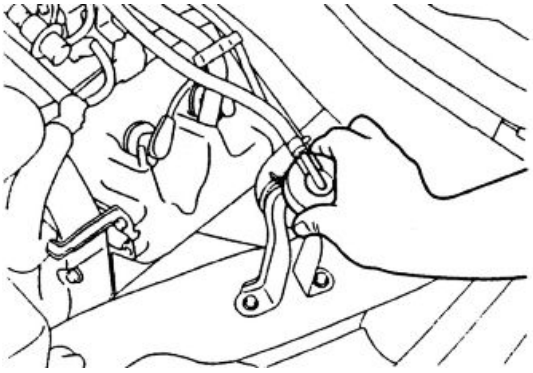
1. Shut off the engine after warming it up for a few minutes; remove the protection cover;

2. Remove the oil drainage plug and empty the engine sump;

3. Remove the oil filter with a suitable wrench;

4. Check and clean the filter fitting surface.

5. Apply engine oil on the sealing ring of the new filter before fitting it.

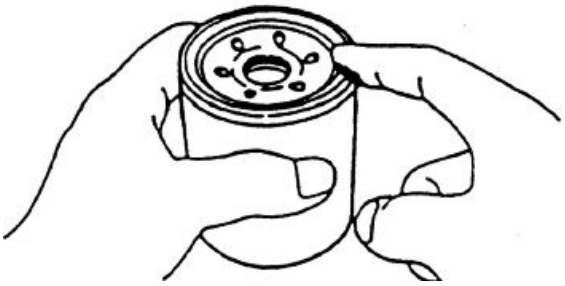


6. Finger screw the oil filter until the sealing ring makes contact with the filter fitting surface.

7. Tighten the oil filter 3/4 of a turn with a filter wrench

8. Clean the oil drainage plug. Fit the plug and place a new gasket in between.

- REMOVE GASKET WASTE OFF THE OIL SUMP USING A SUITABLE SCRAPER.

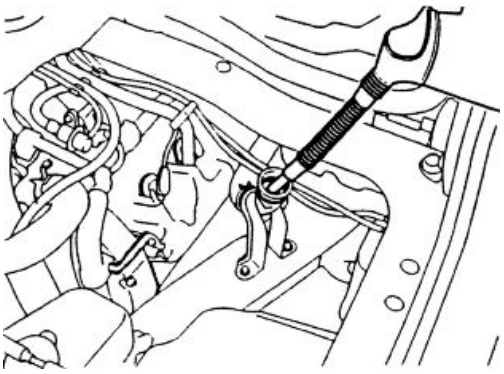


9. Pour oil in the engine until the maximum level in the oil dipstick is reached.

10. Start the engine and check that there are no leaks.

11. Stop the engine.

12. Check the level again and top up, if necessary.



Leaks

Check that there are no oil leaks from the gasket.

Gear-box oil replacement

Sostituzione olio cambio

Gearbox oil change

1. Remove the drainage plug and the filler cap.

Drain the gearbox oil.

2. Refit the drainage plug and place a new gasket in between.

3. Top up with recommended oil until it starts to come out through the fill opening.

Recommended products

AGIP ROTRA MP 80W-90 Transmission oil

2. Remote control

3 Turn indicators

4. Front right actuator

5. Electrical contacts for sliding doors

6. Rear right actuator

7. Rear left actuator

8. Front right actuator

9. Remote controls autodetection

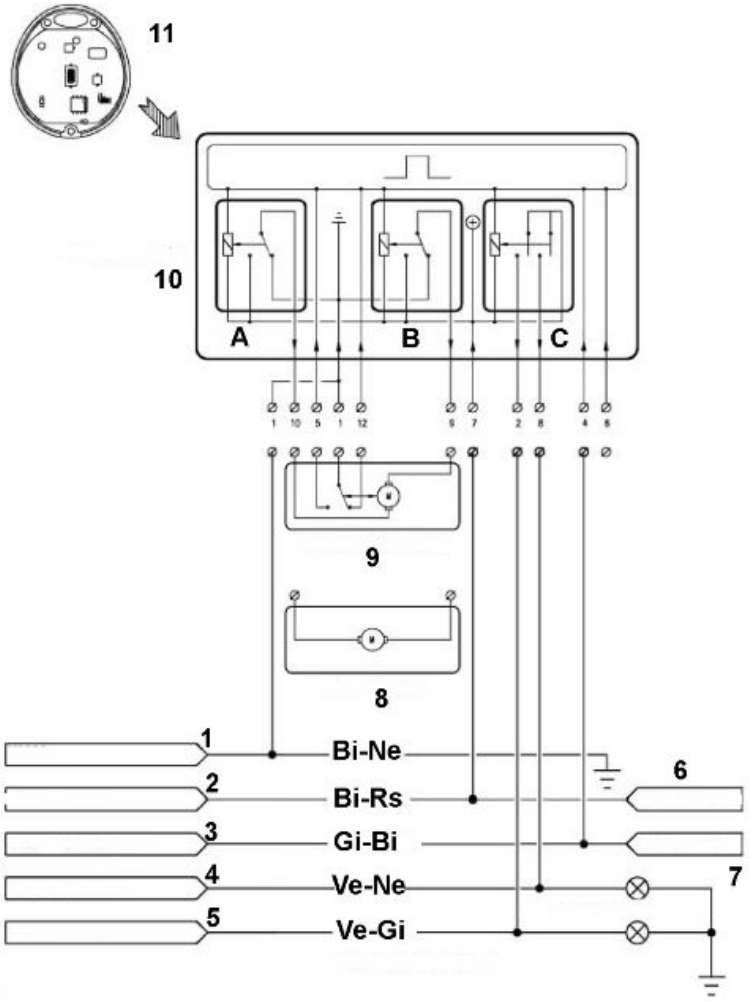
10. Fixed power supply

11. Ignition key

12. Live positive

N.B.

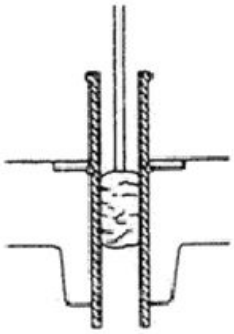
IN DIESEL ENGINE VEHICLES, THE LIVE DEVICE CONNECTION WIRE IS BLACK.



Da	A		
R/B (Relè principale (L))	L33	L40	R/B (Relè pompa carburante (+B))
R/B (Relè principale (+S))	L42	L39	R/B (Relè pompa carburante (+S))
Fusibile EFI n° 1	L41A	L41	R/B (Relè principale (+B))
Fusibile EFI n° 2	L48	L42	R/B (Relè principale (+S))
Collegamento a L17 ~ L21		L46	EFI ECU (A/T)
Collegamento a-X152		L50	Diodo (IN)
Fusible principale (B)	M1	M2	Principale F/L
Commutatore chiave (ST)	M3	M4	Motorino d'avviamento (ST)
Fusibile principale (L)	N1	N2	J/B A (Commutatore a chiave B))
Collegamento a N1-N2		N3	Commutatore a chiave (B)
Commutatore chiave (IG)	N7	N15	J/B A (Commutatore a chiave IG)
Collegamento a L2-L16		N8	Accensione
Collegamento a N7-N15		N16	J/B A (Commutatore a chiave (IG1))
EFI F/L	N35	N46	Fusibile EFI 1
Commutatore a chiave (IG2)	N30	N37	Fusibile EFI n° 2
Collegamento a L48-L42		N38	Controllo diagnostico (IG2)
Collegamento a N1-N2		N39	Fusibile (Fendinebbia)
Collegamento a N1-N2		01	Alternatore (B)
Quadro strumenti (Spia carica batteria)	03	04	Alternatore (L)
J/B C (Fusibile ACC(L))	R1	R2	Accendisigari (+)
Collegamento a R1-R2		R4	Autoradio (+)
Commutatore a chiave (ACC)	R6	R7	J/B A (Commutatore a chiave (ACC))
Autoradio (Altoparlante (+))	R13	R15	Altoparlante (+)
Autoradio (Altoparlante (-))	R14	R16	Altoparlante (-)
R/B (Relè pompa carburante (L))	U7	U12	Pompa carburante (+B)
EFI ECU diagnostica (W)	X2	T4	Quadro strumenti (Diagnosti-ca)

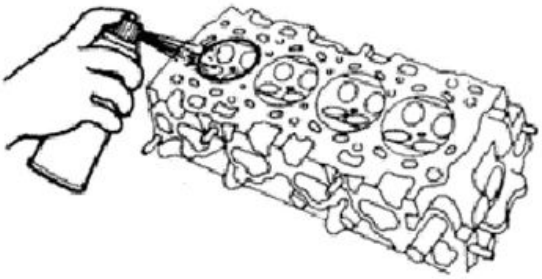
Valve guide bushing cleaning

With a brush for guides and solvent, clean all the valve guides.



Head cracking check

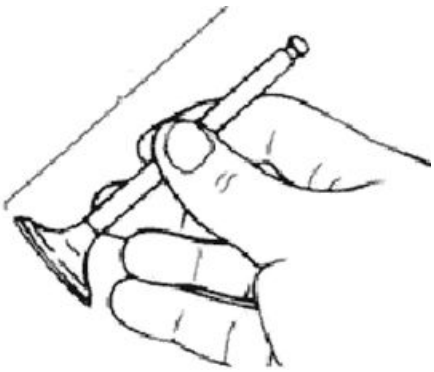
With a penetrating liquid, check if there are any cracks in the combustion chamber, inlet and exhaust ducts and on the head surface.
Replace the head if there are cracks.



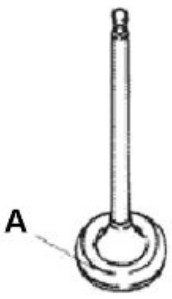
Valves

Valve check and rectification

1. Visually check if the valve stem has signs of seizure or damage.



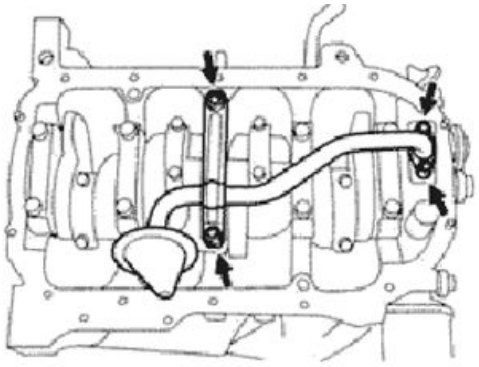
2. Visually check if the valve head shows signs of overheating or damage. If there are traces of overheating or damage, replace valve **A**. If the unevenness of the contact surface can be restored, rectify the contact surface of the valve seat.



Oil suction system fitting

Fit the oil suction system interposing a new gasket and spacer.

Lock the nuts.



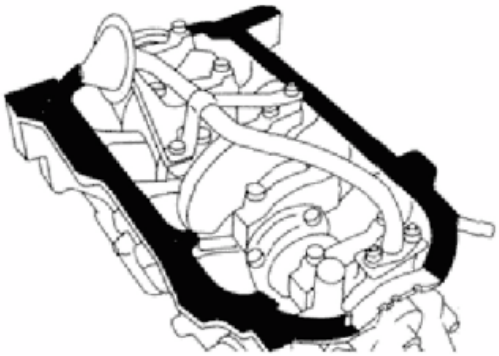
Locking torques (N*m)

Nut locking 15 ÷ 22

Oil sump fitting

1. Apply sealant onto the cylinder block surface.

- APPLY THE RIGHT SEALANT QUANTITY IN ORDER TO AVOID THE FORMATION OF EXCESSIVE RESIDUES INSIDE THE ENGINE.



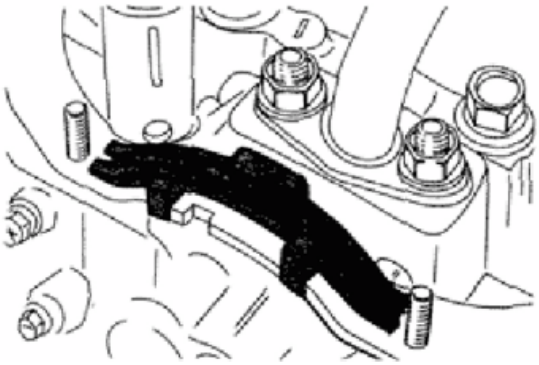
Recommended products

Three Bond 1207C SEALANT

-

2. Position the oil sump gaskets.

- MAKE SURE THAT THE FINAL SECTION OF THE OIL SUMP GASKET OVERLAPS AT LEAST 10 MM WITH ADHESIVE.



3. Fit the oil sump

Tighten the screws and nuts fixing the oil sump to the specified torque value evenly and operate in two or three stages.

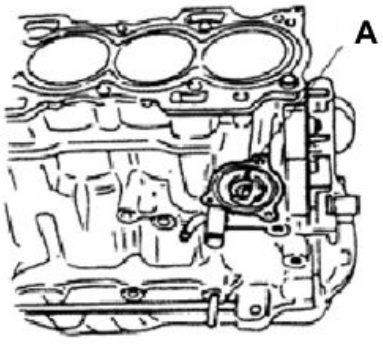
Locking torques (N*m)

Oil sump - Cylinder block 7÷12

Fitting the thermostat in the cylinder block

Fit the thermostat in the cylinder block so that the wander plug section **A** can be placed on the upper side.

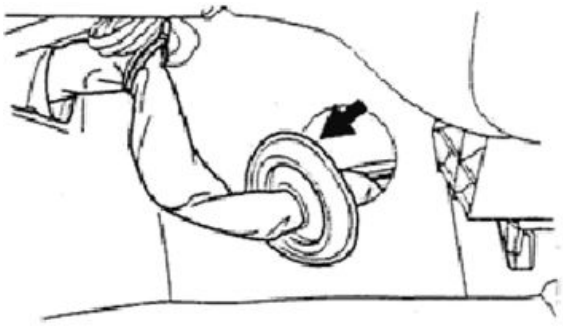
- BE CAREFUL TO FIT THE THERMOSTAT WANDER PLUG IN THE RIGHT DIRECTION. FAILURE TO OBSERVE THIS SAFETY MEASURE CAN CAUSE OVERHEATING.



CONNECTORS. CHECK VERY CAREFULLY THE CONNECTORS OF THE SENSOR AND THE ACTUATOR

Short circuit:

this is caused by a short circuit between the cable harness and the chassis ground, or by a short circuit inside the switches, etc.



- IF A SHORT CIRCUIT IS DETECTED BETWEEN THE CABLE HARNESS AND THE CHASSIS GROUND, CHECK IF THE WIRES ARE ENTANGLED, IF THE WIRE IS RUBBED, IF THE INSULATING PART IS BROKEN ALLOWING A CONTACT WITH OTHER PARTS, AND IF THE WIRE IS LOCKED PROPERLY.

Resistance check (short circuit check)

1. Disconnect the connector on both sides

2. Measure the resistance between the relevant connector terminals and the chassis ground. Besides, check connectors on both sides.

- SLIGHTLY SHAKE THE CABLE HARNESS LONGITUDINALLY AS WELL AS HORIZONTALLY DURING THE MEASUREMENT OF RESISTANCE.

Characteristic

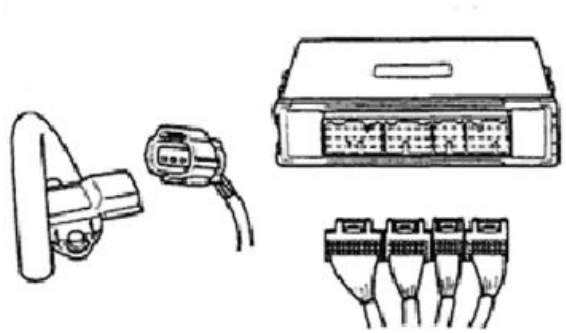
Resistance:

10 MΩ or more

Continuity check (interrupted wire check)

1. Disconnect the connector on both sides of the electronic control unit and the sensor

2. Measure resistance between the connector terminals

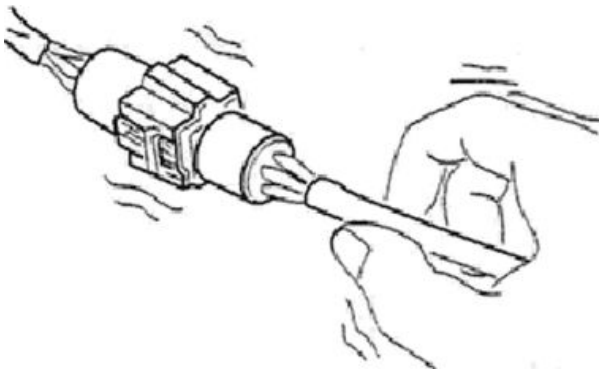


- SLIGHTLY SHAKE THE CABLE HARNESS LONGITUDINALLY AS WELL AS HORIZONTALLY DURING THE MEASUREMENT OF RESISTANCE.

Characteristic

Resistance:

10 Ω or less



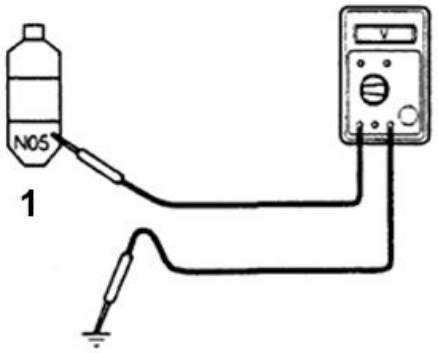
- With the ignition switch set to ON, measure voltage between the body ground and each one of the cable harness side connectors N05, N53, N54 and N83 of all the ignition coils.

Characteristic

Specified value

battery voltage

If failures are detected during checks proceed with step **5**.



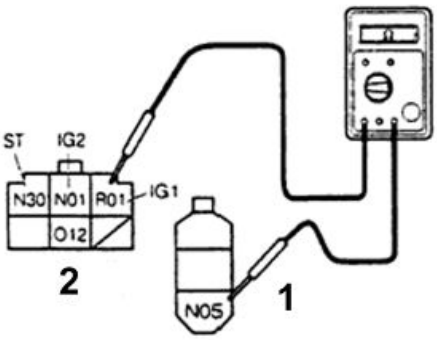
KEY:

1. Ignition coil wire on the cable harness side

4. Checking the ignition coil power supply voltage

Check there are no interrupted or short-circuited wires in the cable harness, connector and fuse referring to the checking of wires and connectors.

- Set the ignition switch to OFF.
- Disconnect the connectors of the ignition switch and ignition unit on the Electronic Control Unit side.



- Between the ignition switch and the ignition unit terminal **B1**.
- Between the ignition switch and each connector **NO5 N53 N54** and **N83** of all the ignition coils.

Repair and replace the cable harness or the connector, if necessary, or replace the fuse, otherwise replace the ignition switch.

KEY:

1. Ignition coil wire on the cable harness side

2. Ignition switch wire on the cable harness side

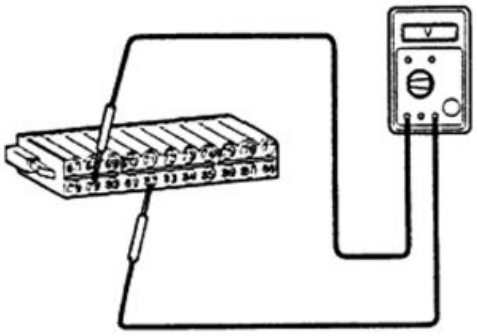
5. Checking the ignition signal and the ionic signal

Check that ignition and ionic signals are generated by the Electronic Control Unit and input with an oscilloscope.

P1510 - Malfunzionamento circuito segnale avviamento

Checking procedure

The diagnosis diagram is based on the assumption that the engine is started under normal conditions.

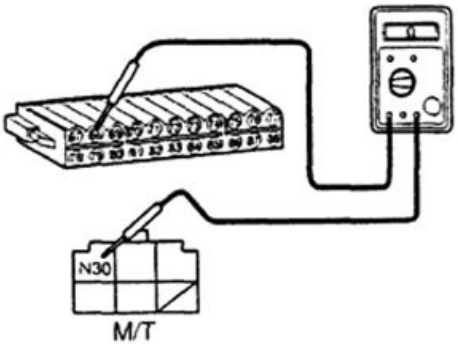


1. Checking the input signal of the STA Electronic Control Unit

- Set the special tool (sub-wiring harness).
- Measure voltage between connectors 68 and 82 STA-E01 of the special tool with the following conditions.

Condition	Specified value
Engine started with starter motor	6 - 10 V
After the engine start-up:	0V

If the value measured matches the specified value, check the malfunction that is detected intermittently and bad contacts, otherwise proceed with step **2**.



2. Checking the cable harnesses between the ignition switch and the Electronic Control Unit (M/T vehicles)

- Set the ignition switch to OFF.
- Disconnect the ignition switch connector.
- Disconnect the connector of the special tool on the Electronic Control Unit side.
- M/T vehicles: Connector N30 on the ignition switch side - connector 68 STA on the Electronic Control Unit side. Repair or replace the cable harness or the connector, if necessary, otherwise check or replace the Engine Electronic Control Unit side.

P/N 90045-20272 (Brown) Thickness: 2.02 mm

P/N 90045-20273 (Blue) Thickness: 1.98 mm

P/N 90045-20274 (No colour) Thickness: 1.94 mm

P/N 90045-20275 (Brown) Thickness: 1.90 mm

P/N 90045-20276 (Blue) Thickness: 1.86 mm

P/N 90045-20277 (No colour) Thickness: 1.82 mm

P/N 90045-20278 (Brown) Thickness: 1.78 mm

- MAKE SURE THAT THE GASKET OF THE RADIAL BALL BEARING IS FACING THE FRONT PART.
- DO NOT LET FALL THE SYNCHRONISATION RING AND THE HUB SLEEVE, WHILE THE RADIAL BALL BEARING IS BEING FITTED BY PRESSURE.
- THE RADIAL BALL BEARING SHALL BE FITTED FIRST.

Characteristic

Clearance:

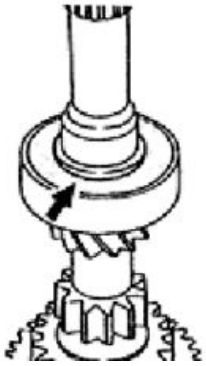
Specified value: 0

Value allowed: less than 0.16 mm

12. Fit the ball bearing by pressure.

13. Fit the elastic ring of the shaft (component to be selected) following the same procedure indicated in point **11.**

- MAKE SURE THAT THE GASKET OF THE RADIAL BALL BEARING IS FACING THE FRONT PART.
- DO NOT LET FALL THE SYNCHRONISATION RING AND THE HUB SLEEVE, WHILE THE RADIAL BALL BEARING IS BEING FITTED BY PRESSURE.
- THE RADIAL BALL BEARING SHALL BE FITTED FIRST.



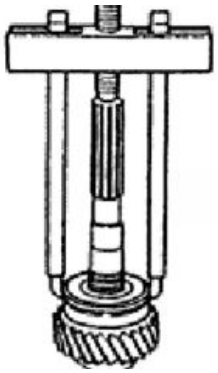
Main shaft

Removal

1. Remove the radial ball bearing (from the rear part), with the following special tool:

2. Take out the odometer pinion.

3. To avoid damage, lock the main shaft grooved section in a vice with soft shoes.



PICK UP FRONT WHEEL ALIGNMENT

Specification	Desc./Quantity
Tie rod	1° 23' +40'-50'
Caster angle	3°13' ± 1°
Steering angle	1°49' ± 1°

VAN FRONT WHEEL ALIGNMENT

Specification	Desc./Quantity
Camber angle	1° +40'-50'
Caster angle	3°02' ± 1°
Kingpin inclination angle	11°25' ± 1°

TOE-IN

Specification	Desc./Quantity
Toe-in with a passenger	2.0 +1.5-1.0
Toe-in with unloaded vehicle	1.5 +1.51.0

BEFORE MEASURING THE FRONT WHEEL ALIGNMENT, CHECK THE REGULAR VEHICLE HEIGHT AS IN THE CASE OF TOE-IN MEASUREMENT. BESIDES, MAKE SURE THAT NO PART OF THE VEHICLE IS LOOSE.

2. Place a turning radius gauge on a flat surface so as to keep the vehicle levelness. Perform measurement slowly.

3. Before measuring, swing the front and rear part of the vehicle up and down so that front and rear suspensions settle in their regular condition.

4. Perform the measurement with brakes locked.

Steering wheel

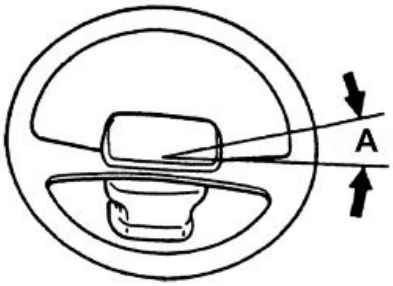
Controlli

Steering wheel clearance

Position the vehicle with the wheels straight.

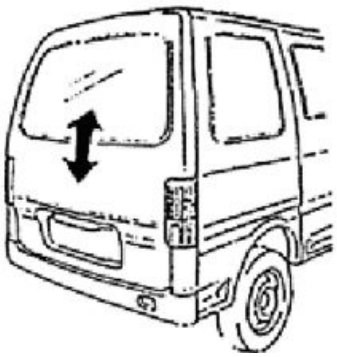
Check steering wheel clearance "**A**" turning it slightly with the fingers.

Specified value: less than 30 mm



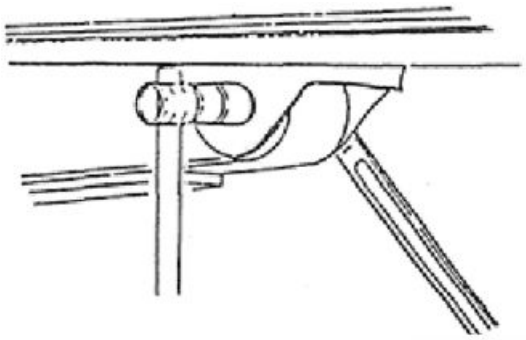
6. Fit the rear wheel.

7. Lower the vehicle. Move the vehicle rear suspension, upwards and downwards, two or three times to stabilise suspension.



8. With the vehicle unloaded, tighten the following sections:

- Elastic pin support side nut

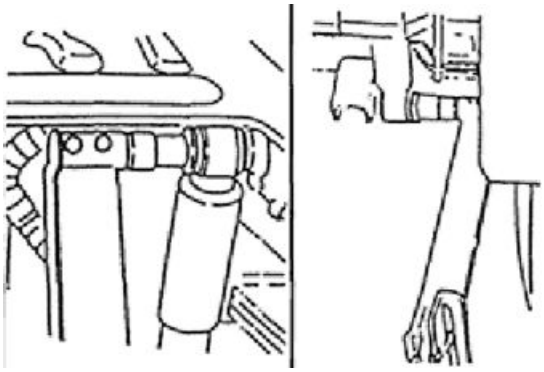


- Leaf spring subassembly upper and lower section nut

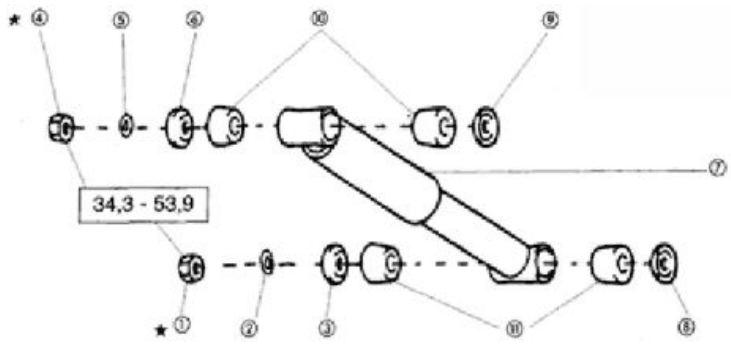
Locking torques (N*m)

Spring support pin - Leaf spring assembly. 88 ÷ 108

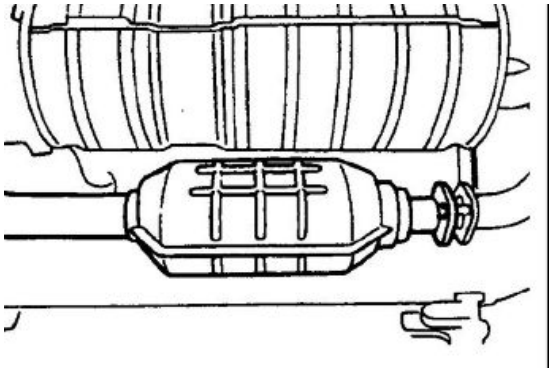
- Leaf spring shackle support nut.



Shock-absorbers removal



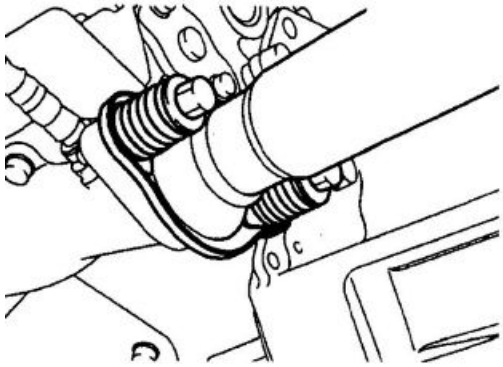
3. Install the new catalytic converter and tighten the relevant fixing nuts using a new gasket.



4. Tighten catalytic converter fixing bolts and the front pipe fixing nuts to the prescribed torque using new gaskets.

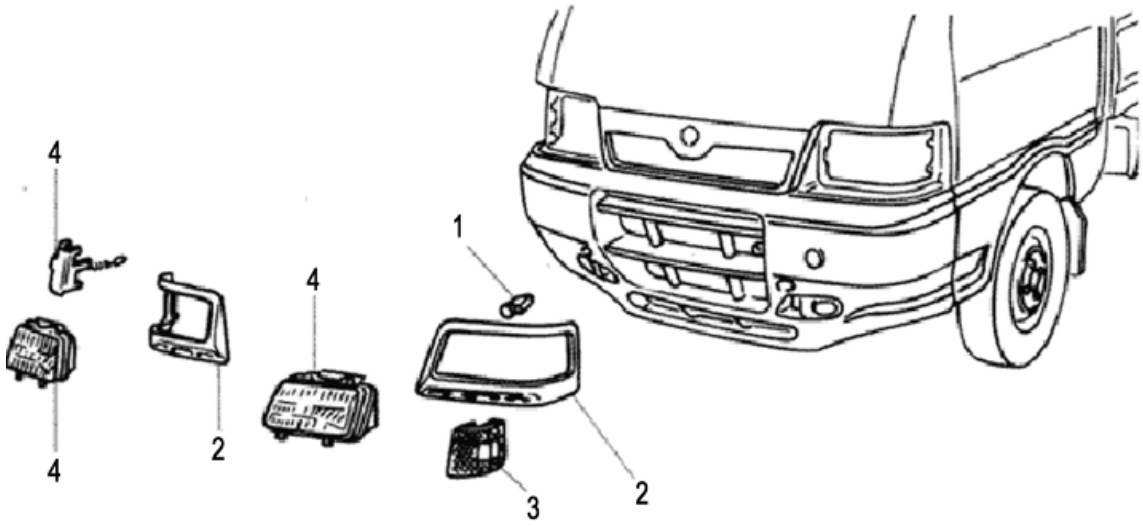
Locking torques (N*m)

Exhaust pipe - Catalytic converter **42 ÷ 56**



5. Start the vehicle and check if there are leaks from the catalytic converter flanges.

Light unit



COMPONENTS:

1. Clip

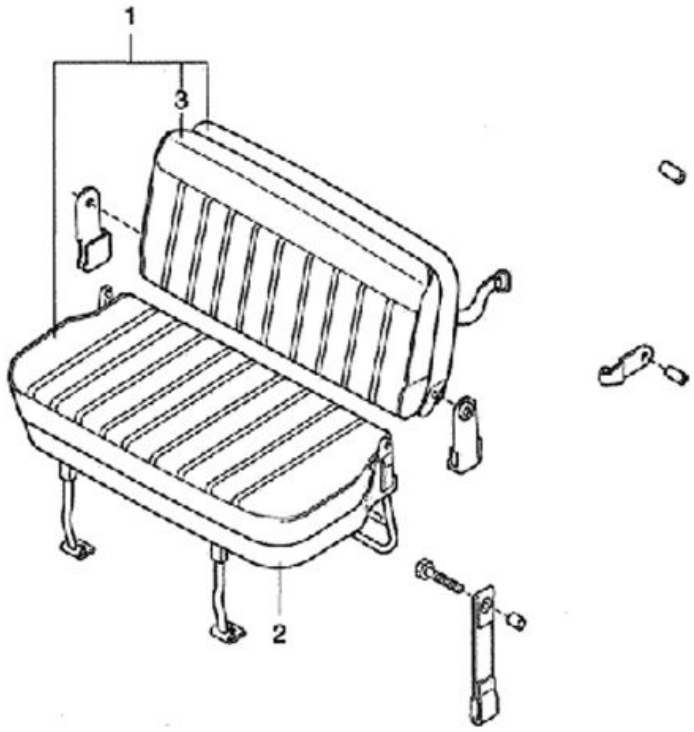
2. Headlamp support

3. Front/side turn indicator

4. Headlamp

	Code	Action	Duration
5	711151	SEAT BACK CLOSING FOR FRONT SEAT - ONE SIDE - RE-PLACEMENT	
6	711201	FRONT SEAT CUSHION COVER (ONE SIDE) - REPLACEMENT	
7	711251	SEAT BACK COVER FOR FRONT SEAT (ONE SIDE) - REPLACE-MENT	
8	711301	FRONT SAFETY BELT HOOK-ONE SIDE REPLACEMENT	
9	711351	FRONT SAFETY BELT - ONE SIDE REPLACEMENT	

Rear van seat



REAR SEAT (VAN)

	Code	Action	Duration
1	710051	REAR SEAT CUSHION AND/OR SEAT BACK - REPLACEMENT	
2	710101	REAR SEAT CUSHION COVER - REPLACEMENT	
3	710151	SEAT BACK COVER FOR REAR SEAT - REPLACEMENT	