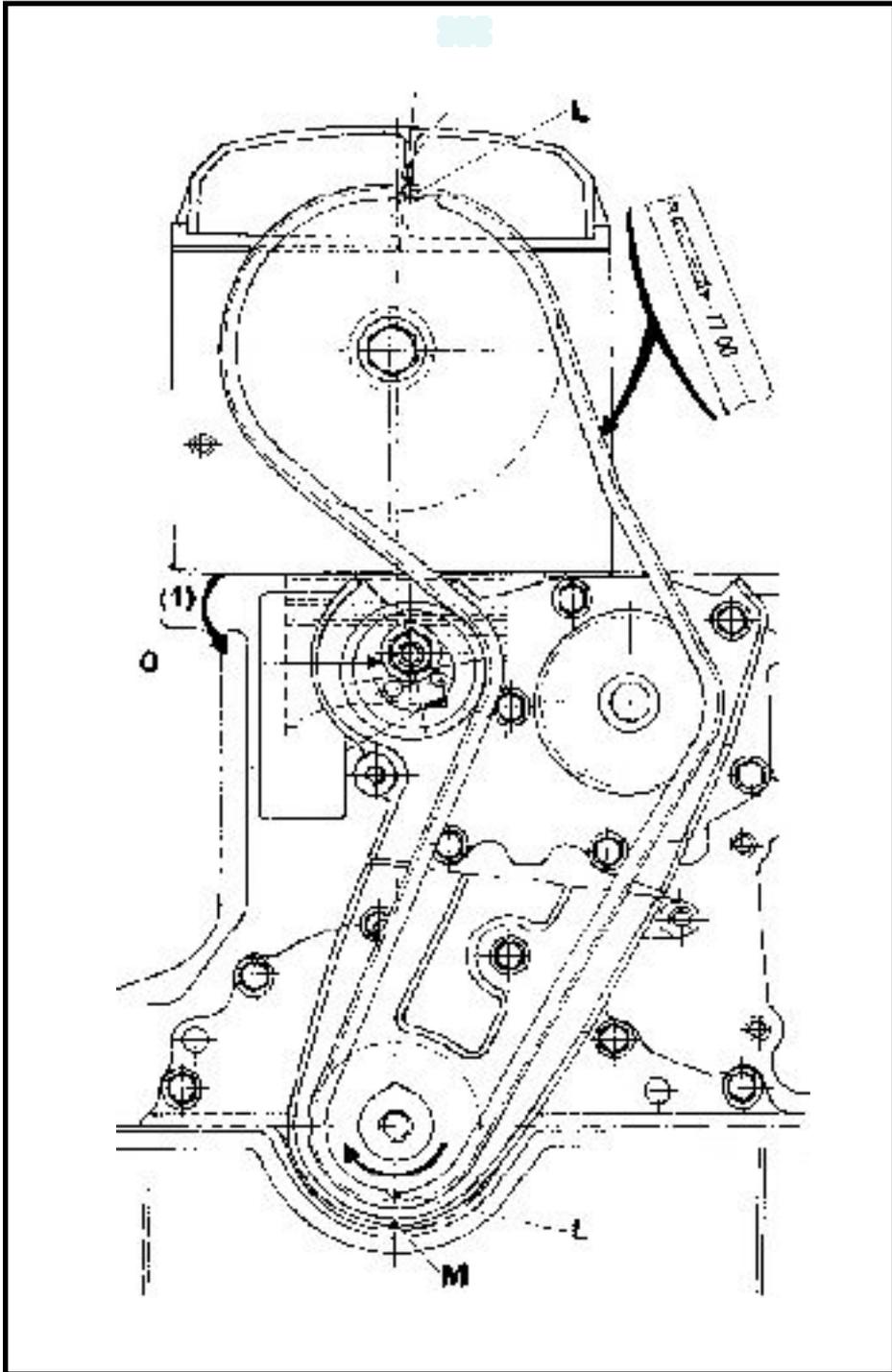


RECOVERY ENGINE

DISTRIBUTION



DIAGNOSING

Special device: **Tester CLIP - SAGEM** and accessories for physical measurements.

INSPECTION OF CHARGING CIRCUIT

The **CLIP - SAGEM** tester allows the inspection of the alternator, by measuring the voltage and the current supplied with, and without electric consumers.

NOTE: The Ampere pincers are of the inductive type (0-1000 A). Its mounting will be done without disconnecting the battery, thus allowing for the memorized data and the adapting values in the injection calculator to be preserved.

Mount the ammeter clamps directly to the alternator exit, having the arrow oriented towards this one.

The measurements are effected in three steps:

- measuring the battery voltage without contact on;
- measuring the regulated voltage and the current supplied without consumers;
- measuring the regulated voltage and the current supplied with a maximum of consumers.

The values obtained as a result of the measurements lead to the following interpretations:

-the voltage of the 'empty' battery < **12.3 V**: so, the battery is flat;

With no consumers:

-regulated voltage > **14.8 V**: so, the regulator is faulty;

-regulated voltage ('empty') < **13.2 V** or charging current < **2 A**: so, there is a defect of charging.

With consumers:

-regulated voltage > **14.8 V**: so, the regulator is faulty;

-regulated voltage ('empty') < **12.7 V**: the alternator charging current in regard to its characteristics must be checked.

| INTENSITY (A) | ENGINE | E7J | |
|---|--------|-----------|-----------|
| Rated intensity | | 75 | 80 |
| Minimal intensity, which has to be supplied by the alternator to all working consumers | | 51 | 60 |

If the measured output is too little, the following will be checks:

- wear of alternator (collector brushes, etc.);
- battery connections;
- the mass braid of the engine;
- conformity of alternator;
- tension of carrying belt.

If the measured output is correct and the regulated voltage is too little, the cause may be:

- the car has too many electric consumers;
- the battery is flat.

| | |
|-------|------------------------------------|
| STATE | <u>CONNECTION SPEED TRANSLATOR</u> |
|-------|------------------------------------|

| | |
|-------------|--|
| SUGGESTIONS | There should be no defect present or memorized |
|-------------|--|

| |
|---|
| Change the injection calculator if the car is unable to run at more than 40 km/h. If further problems arise, refer to the diagnosing of the car speed parameter. |
|---|

| | |
|--------------|------------------------------------|
| AFTER REPAIR | Perform again the conformity test. |
|--------------|------------------------------------|

| | |
|-------|---------------------|
| STATE | <u>ANTI-STARTER</u> |
|-------|---------------------|

| | |
|-------------|---|
| SUGGESTIONS | There should be no defect present or memorized. |
|-------------|---|

| |
|---|
| Check if the anti-starter device is defect. If the cause is the anti-starter device, remedy the defect before doing this diagnosing. |
|---|

| |
|--|
| Check the insulation and the continuity of the cabling along the circuit from pin 58 calculator. |
|--|

| |
|--|
| If the defect has not been eliminated, refer to the diagnosing of the anti-starter device. |
|--|

| | |
|--------------|------------------------------------|
| AFTER REPAIR | Perform again the conformity test. |
|--------------|------------------------------------|

CAMBER ANGLE $0^{\circ} \pm 30'$

It is formed by the wheel plane with the vertical that crosses the wheel axis.

A difference higher than 1° between the two angles leads to :

- the deviation from the trajectory that must be adjusted by means of the steering wheel.
- abnormal wear of the tires and bearings.

The angle is not adjustable.

THE BALL JOINT ANGLE $12^{\circ}45' \pm 30'$

It is formed in transversal plane between the axe connecting the attachment point of the shock absorber with the ball joint center and the vertical passing through the wheel axis. The ball joint angle is generating a negative offset, allowing the maintaining of the vehicle route when the braking is unequal distributed.

The angle is not adjustable.

THE CASTER ANGLE $2^{\circ}30'$

It is formed in longitudinal plane, between the axis connecting the attachment point of the shock absorber with the suspension ball joint center and the vertical axis passing through the wheel axis.

A difference higher than 1° between the two angles leads to :

- the deviation from the trajectory that must be adjusted by means of the steering wheel.
- a normal wear of the tires.

The angle is not adjustable.

STEERING BOX POSITIONING

The steering box must be at a certain height from the attachment points of the steering auxiliary connecting rod ball joints. The position of the steering box (choking) is influencing the variation of the parallelism. The steering box is mounted in the position for which the variation is minimal.

The modification of the parallelism between left side and right side leads to:

- the deviation of the vehicle, in one sense, upon accelerating;
- the deviation of the vehicle in the opposite side upon braking.
- the deviation of the trajectory on the hilly ground;
- the premature wear of the tires.

The horizontally of the steering box is ensured by the producer.

**PARALLELISM
 (TOE-IN OR ANGULAR SPREAD ANGLE)**

It is measured in horizontal plane as a difference between the front and rear part of the same axle wheels. The wheels are divergent. The value of the opening is between 0 – 2 mm (1 ± 1 mm).

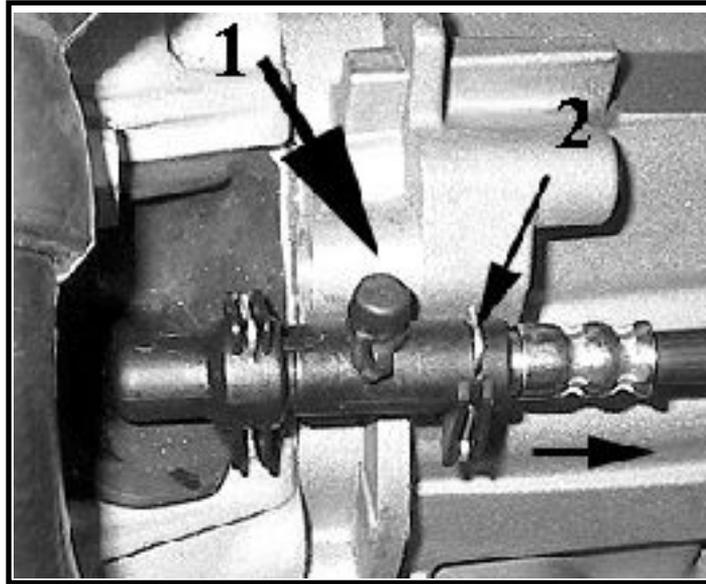
ATTENTION:

A too much opening causes the wear of the tires on the inner part of the camelback.

A too much closing causes the wear of the tires on the exterior part of the camelback.

The parallelism is adjustable by rotating the tie bar of the steering connecting rod.

- Retrieve the feeding pipe (towards the arrow) to enable the fluid passing through the connection 1.
 Bleed a little bit of fluid.
 Close the purging connection (move the feeding pipe in reverse way).



2. FINAL PURGING OF THE CIRCUIT

a) Slowly push the clutch pedal to maximum position and keep it pushed.

Wait approx. 10 seconds then open the purging connection.

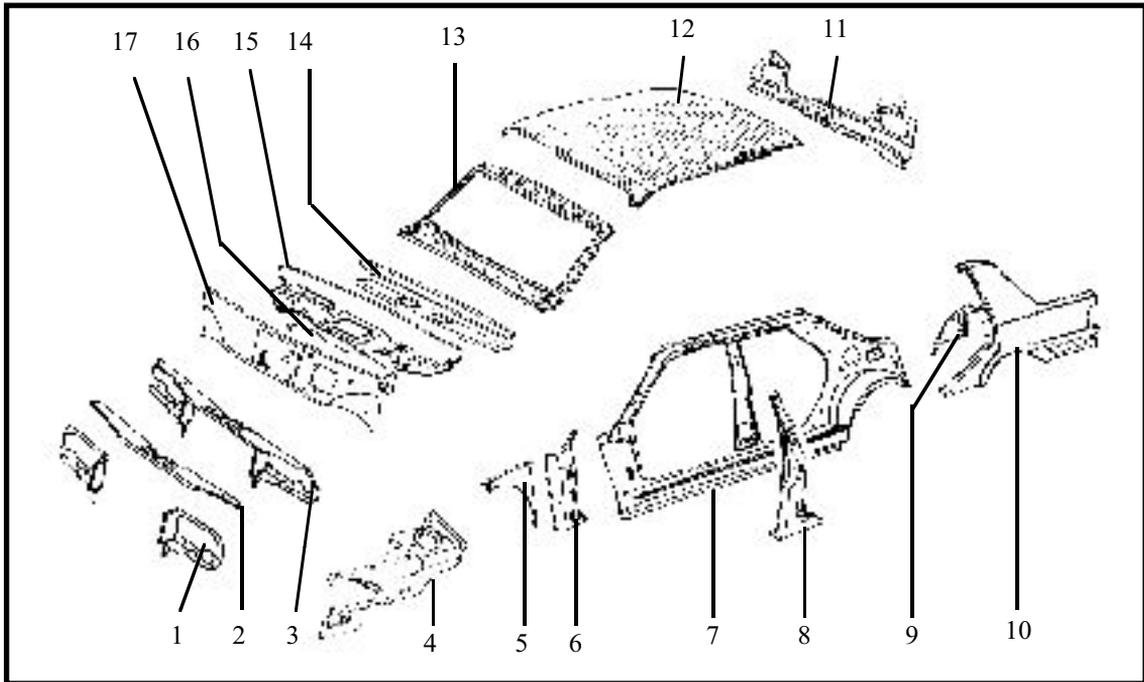
b) Close the purging connection, release the clutch pedal, and slowly lift it by hand to the upper position (if the pedal does not come back itself in this position).

Repeat the operations **a** and **b** till bubbles are not coming out through the purging connection, then repeat five more times these operations in order to be sure about a good circuit purging.

These repeated purging allow "the cleaning" of the circuit from the air bubbles eventually remained in the circuit after the circuit filling and purging.

An air bubble as little may be, remained in the circuit, may lead to operating deficiencies such as: defective clutch pedal return or gears change noise being able to lead to a wrong diagnosis or an inopportune replacement of a part of the clutch circuit.

UPPER STRUCTURE COMPOSING ELEMENTS



1. Headlamp support
2. Upper radiator cross bar
3. Front grill
4. Front wing lining
5. Front pillar lining
6. Front pillar
7. Side frame lining
8. Middle pillar
9. Inner wheel passage
10. Side panel
11. Rear panel
12. Ceiling
13. Windscreen frame
14. Windscreen lower cross bar
15. Climate control box
16. Climate control box central part
17. Cowl panel

At the reparation of the welded body elements, three welding categories may be used: protection gas welding (CO₂), electric spot welding and filling materials welding (autogenous).

At the autogenous welding, it is recommended that flame must be slightly inclined so that arch can be seen and the flame extremity to be maintained at aprox. 5 mm from the part to be welded.

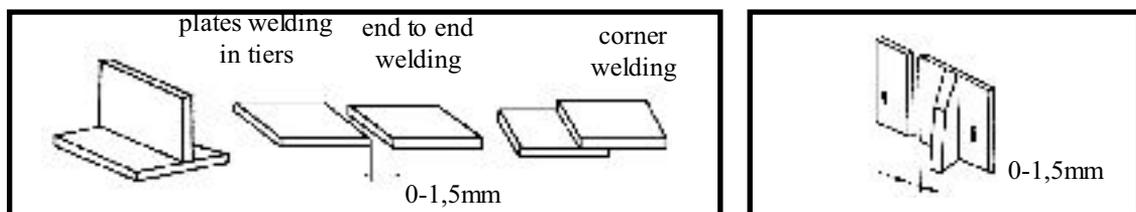
1. Spot welding resistive parameters for steel plates with carbon content $C < 0,15 \%$.

| Plate thickness (mm) | Welding current (KA) | Welding time (per) | Tightening force (dNm) |
|----------------------|----------------------|--------------------|------------------------|
| 0,5 | 6,5 | 5 | 130 |
| 0,8 | 8,0 | 8 | 200 |
| 1,0 | 9,5 | 10 | 250 |
| 1,25 | 10,5 | 10 | 295 |
| 1,5 | 10,0 | 14 | 310 |
| 2,0 | 12,0 | 16 | 350 |

NOTE

1 period = 1/50 part of a second

2. Welding parameters for the welding in protector gas for carbon steel plates or low-alloyed steel.



Horizontal welding position (pict.1)

| Plate thickness (mm) | 0,6 | 1,0 | 1,5 | 2,0 |
|-----------------------------|-----------|-----------|-----------|-----------|
| Electrode diameter (mm) | 0,6 0,8 | 0,8 1,0 | 0,8 1,0 | 0,8 1,0 |
| Welding wire speed (m/min) | 2,5 1,9 | 3,2 2,4 | 4,4 3,8 | 5,7 4,4 |
| Welding current (A) | 35 35 | 55 80 | 80 120 | 100 130 |
| Welding speed (m/min) | 0,25 0,25 | 0,35 0,33 | 0,33 0,50 | 0,45 0,45 |
| Welding voltage (V) | 17 17 | 18 18 | 19 19 | 20 20 |
| Protection gas flow (l/min) | | 12 - 17 | | |
| Electrode free length (mm) | | 6 - 12 | | |

3. TRACTION ACCESSORIES SET (CAR 504)

CELETTE bench is equipped with a traction accessories set CAR 504, which allows the operator to achieve different anchoring when a body strengthening is performed (pict.5).

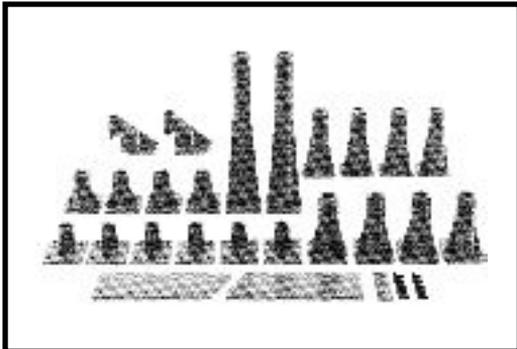


(pict. 5)

4. SET OF MZ TOWERS AND SPECIFIC SUPPORTS (CAR 503 +CAR 507)

This kit represents a MZ system and consists of two elements:

- kit of 22 MZ towers, universal CAR 503 – (see pict.6)
- kit of specific supports CAR 507



(pict. 6)

Each MZ tower has an arrow, which settles its orientation on the cross bar and a MZ reference (pict.7)

Example – MZ 080, where:

MZ- measurement on OZ axle of the vehicle.

080 – MZ tower height (in mm)

In the same way as for COMPACT assembly, the arrow (1) marked on the specific support must be oriented towards the bench front part, as follows:

→ attachment on the right part of the mobile bench

← attachment on the left part of the mobile bench

NOTE

The MZ towers may be used also for the checking/ straightening of the carriage bodies of other vehicles types, being then necessary the purchasing of the specific supports for each type of vehicle.

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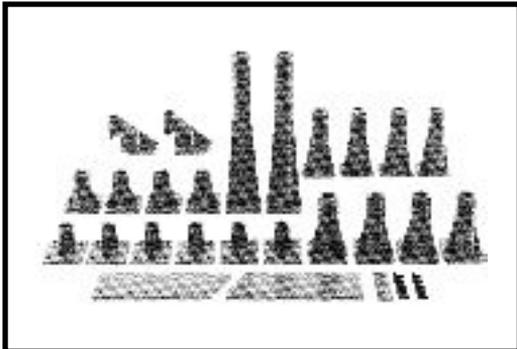


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FRONT/REAR BUMPER PAINTING/REPAINTING PROCEDURE

The necessary materials for the repainting operation are the following:

| | |
|---|---|
| -Abrasive paper gr 220; 4001 sheet/4 bumpers; | -Same color enamel |
| -Extraction petrol S27 0,05 kg./bumper; | -For opaque |
| -Gauze 0,05 mp./bumper; | -opaque enamel S 5505 180gr./bumper |
| -Primer P572-22 10-15 gr./bumper; | - catalytic agent S 3538 45gr./ bumper |
| -Fuller P565-777 80 gr./ bumper ; | -thinner S 4300 35 gr./bumper |
| -Catalytic agent P850-142 40 gr./bumper; | -For metallic paint |
| -Thinner 15 gr./bumper; | -metal enamel S 5901 175 gr./bumper |
| | -thinner S 5900 35 gr./bumper |
| | -catalytic agent S 493242 65 gr./bumper |
| | -lacquer thinner 362077 35 gr./bumper |
| | -Lacrit lacquer 28050 30 gr./bumper |

WORKING PROCEDURE

Smooth the margins of the exfoliated area (dry abrasive paper 220 grams; 400) and slightly depolish the whole bumper.

Ungrease with extraction petrol.

Using a gun, spray on exfoliated areas, Primer (liability ground)

Apply by spraying on the exfoliated areas, full till equalization then spray on a thin layer on the whole bumper.

In case after 20 minutes of fuller layer exposing in the air, the applied Fuller film does not present painting defects, spray using a gun two layers, wet + wet enamel in the vehicle color.

If the film presents painting defects, remove them by grinding and depolish the rest of the surface. The operation will be performed after 6 hours of air drying, and after 20-30 minutes when there is the possibility of drying at 60gr. C.

NOTE

For this operation, the dismantling of the bumper is not necessary with the condition that the areas, which might be exposed to the used materials, should be protected.

GENERALITES

The purpose of the air conditioning unit is to produce a decrease of the temperature in the passengers compartment and to obtain a lower value temperature compared to the external environment one, reducing in the same time the air moisture.

MAINTENANCE

For a vehicle equipped with air conditioning, it is recommended a frequent checking of the refrigerating agent level. During the year it is recommended

- the checking of the refrigerant fluid filling
- the cleaning and the air-blowing of the condenser and the cooling radiator fins;
- the checking of the condensation removal pipe on order not to be clogged.

For important leakage repair, for any components replacement (compressor, condenser, etc) and if moisture was noticed in the air conditioning circuit, the dryer filter tank is to be replaced and the unit draining is to be performed. The same is valid also in case the conditioning circuit remains open without protection covers more than 10 minutes.

IMPORTANT

During winter, it is recommended the frequent start of the system, in order to prolong the lifetime of the compressor and of the whole system.

The vehicle equipped with an air conditioning system shall be not exposed for more than 20 minutes in painting cabin where there are temperatures higher than 80 °C.

It is obligatory the use of the refrigerating agent and compressor oil type prescribed by the manufacturer.

It is absolutely forbidden to perform welding on the elements of the air condition circuits.

The filling of the air conditioning system can be performed only by means of charging units and observing the instructions of the manufacturer. For mechanical or body operations it is recommended piping protection in order to avoid their disconnection by accident.

Avoid the drip of the oil compressor on the painted vehicle body.

For component replacement implying the circuit draining, it is absolutely necessary the use of new parts and of a special oil for compressor.

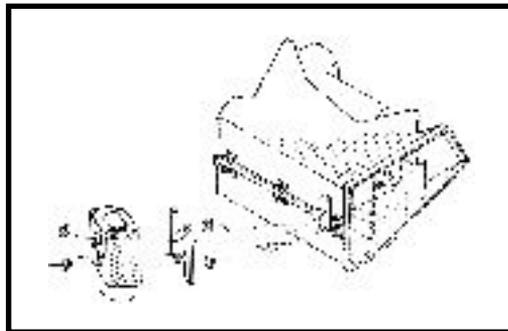
Basically, the air conditioning unit is formed of a closed circuit, composed by the following main elements:

- evaporator
- compressor
- condenser
- thermostatic expansion valve
- connection pipes.

The evaporator is the component that extracts the heat from the passengers compartment and is generally placed in the passengers compartment. In order to cool the passengers compartment the hot air must be absorbed, the heat extracted and the “cooled” air redistributed. The hot air is passing through the evaporator to who is giving part of the temperature reducing so, its own temperature. The cooled air is so conveyed in the passengers compartment, progressively reducing the temperature.

In the same time, the refrigerant fluid which goes into the evaporator, is absorbing the heat, from air passing through the evaporator and at the same temperature, is transforming it from liquid into vapors. At the evaporator exit, the refrigerant fluid is in vapor condition.

The evaporator is placed in the climate control unit and is protected by cases.



EVAPORATOR CASES ASSEMBLY REPLACEMENT

DISMOUNTING

Disconnect the battery.

Drain the refrigerant circuit

Dismount the sealing gasket on the climate box outliner.

Dismount the thermostatic expansion valve.

Dismount the climate case locking plate.

Disconnect the pipes evaporator – compressor and evaporator – tank filter.

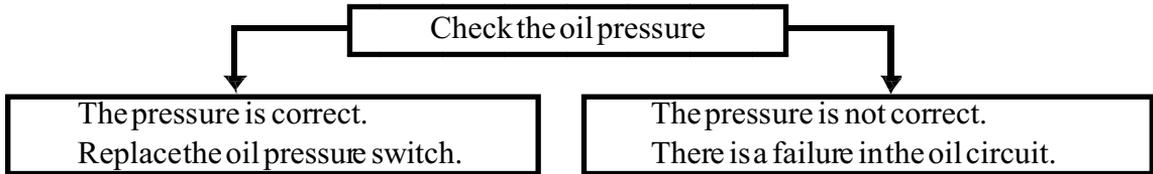
Dismount the evaporator case attachment nuts, on the right side.

Release the evaporator cases.

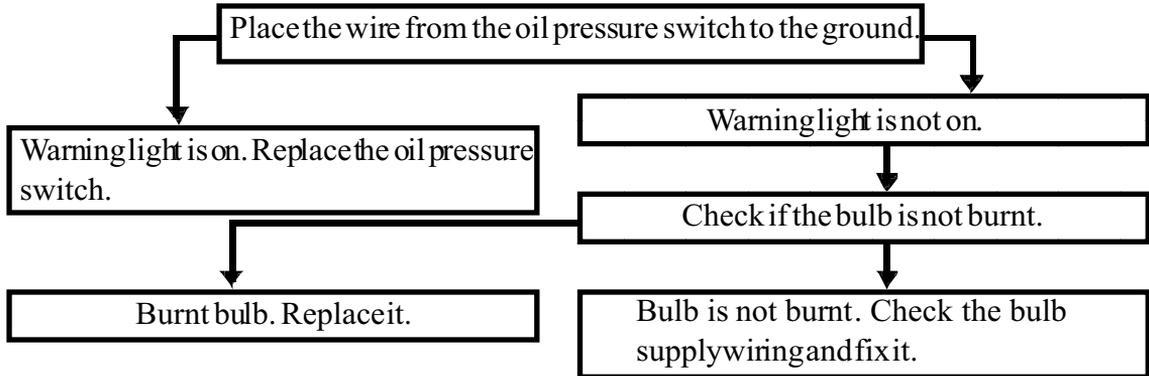
Replace the assembly

**INSTRUMENT PANEL
DIAGNOSTIC**

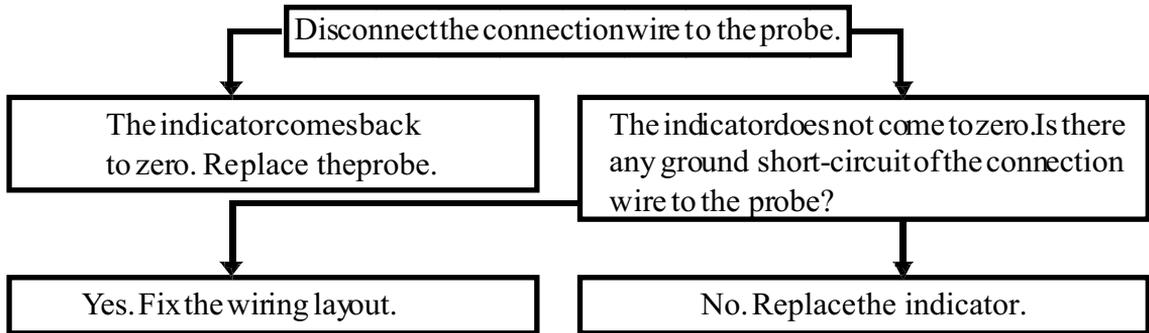
**OIL PRESSURE WARNING LIGHT STILL ON
AFTER ENGINE STARTING**

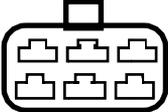


**OIL PRESSURE WARNING LIGHT IS NOT ON
WHEN CONTACT SWITCH ON**



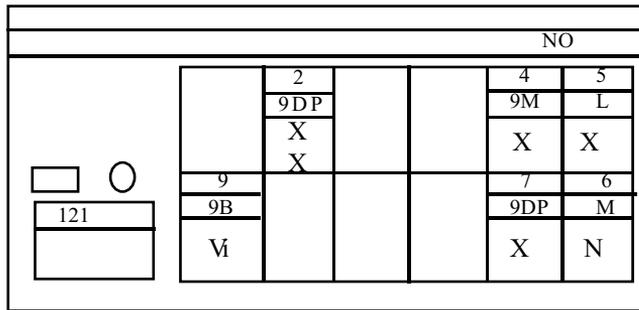
FUEL LEVEL INDICATOR SHOWING ALWAYS FULL



| | | |
|---|------------------|-----------|
|  | DASHBOARD WIRING | B41 01 |
|---|------------------|-----------|

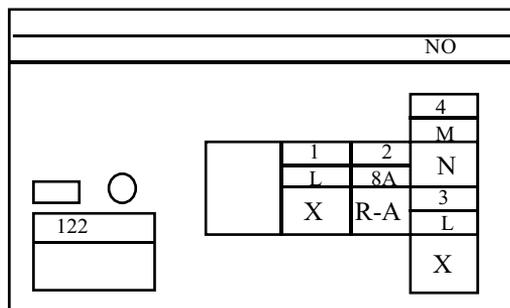
FOGLIGHT SWITCH

| Position | Sectioning |  | Destination |
|----------|------------|---|---|
| 2 | 0,5 | 9DP | +PROTECTED REAR FOGLIGHTS |
| | 0,5 | 9DP | +PROTECTED REAR FOGLIGHTS > FOGLIGHT SWITCH |
| 4 | 0,5 | 9M | SHUNT > LIGHTS SWITCH |
| 5 | 0,35 | L | + PARKING LIGHTS > FUSE OUTLET F05 |
| 6 | 0,35 | M | MASS |
| 7 | 0,5 | 9DP | SHUNT > + PROTECTED REAR FOGLIGHTS |
| 9 | 0,5 | 9B | CONTROL + REAR FOGLIGHT |



FOGLAMP SWITCH

| Position | Sectioning |  | Destination |
|----------|------------|---|------------------------------------|
| 1 | 0,5 | L | + PARKING LIGHTS > FUSE OUTLET F05 |
| 2 | 0,5 | 8A | CONTROL + FOGLAMPS RELAY |
| 3 | 0,35 | L | + PARKING LIGHTS > FUSE OUTLET F05 |
| 4 | 0,35 | M | MASS |



WIREFUNCTIONS EXPLANATION

| | |
|------|--|
| 20D | CONTROL + DOORS ELECTRIC LOCKING |
| 20F | RADIO-FREQUENCY RECEPTION SIGNAL |
| 28A | CONTROL - OIL PRESSURE INDICATOR |
| 31A | CONTROL - WATER TEMPERATURE INDICATOR |
| 34A | SIGNAL - LEFT REAR LOUDSPEAKER |
| 34B | SIGNAL - LEFT REAR LOUDSPEAKER |
| 34C | SIGNAL - RIGHT REAR LOUDSPEAKER |
| 34D | SIGNAL + RIGHT REAR LOUDSPEAKER |
| 34E | SIGNAL + RIGHT FRONT LOUDSPEAKER |
| 34F | SIGNAL - RIGHT FRONT LOUDSPEAKER |
| 34G | SIGNAL + LEFT FRONT LOUDSPEAKER |
| 34H | SIGNAL - LEFT FRONT LOUDSPEAKER |
| 38AH | CONTROL + CLIMATE CONTROL BLOWER SPEED 1 |
| 38AJ | CONTROL + CLIMATE CONTROL BLOWER SPEED 2 |
| 38AK | CONTROL + CLIMATE CONTROL BLOWER SPEED 3 |
| 38AL | CONTROL + CLIMATE CONTROL BLOWER SPEED 4 |
| 38AS | AC CONTROL |
| 38DH | CONTROL + AIR CONDITIONING |
| 38K | AC CONTROL RELAY > UCE INJECTION |
| 38N | CONTROL + AC CLUTCH RELAY > AC PRESSURE SENSOR |
| 38R | CONTROL + AC COMPRESSOR CLUTCH |
| 38U | - FREON PRESSURE SENSOR |
| 38X | FREON PRESSURE SENSOR SIGNAL |
| 38Y | + FREON PRESSURE SENSOR |
| 41A | SIGNAL + FUEL LEVEL TRANSMITTER |
| 42A | SIGNAL + WATER TEMPERATURE |
| 47A | - MINIMUM LEVEL FUEL WARNING |
| 47F | VEHICLE SPEED SIGNAL |
| 49B | CONTROL + COOLING BLOWER |
| 49C | CONTROL + COOLING BLOWER RELAY |
| 49F | CONTROL + AIR CONDITIONING |
| 49L | CONTROL + COOLING BLOWER LOW SPEED RESISTANCE |
| 64A | SUPPLY + TURNING |
| 64AP | + PROTECTED TURNING LIGHTS |
| 64B | CONTROL + TURNING RELAY |
| 64C | LEFT TURNING LIGHTS CONTROL |
| 64D | RIGHT TURNING LIGHTS CONTROL |
| 64E | CONTROL + TURNING INDICATOR |
| 64F | CONTROL + HAZARD INDICATOR |
| 64P | + PROTECTED SIGNALING |
| 65A | CONTROL + STOP LIGHTS |
| 67A | CONTROL + ACOUSTIC WARNING |
| 67C | CONTROL + ACOUSTIC WARNING FUSE |
| 80BC | + INERTIA CONTACT |
| 80BD | FLASH RELAY CONTROL |
| 80CA | RIGHT FRONT ULTRASONIC EMISSION |
| 80DA | LEFT FRONT ULTRASONIC DETECTION INFORMATION |
| 80E | ANTI-INTRUSION INDICATOR CONTROL |
| 80FC | SIREN CONTROL SUPPLY |
| 80T | CONTROL - ANTI-STARTING INDICATOR |
| 80X | ANTI-STARTING RECEIVER SIGNAL ROUTE |