



***DEAR DRIVER,***

*This Manual should acquaint you with the correct operation and routine maintenance of your new vehicle AVIA.*

*It also provides the important safety information.*

*We recommend you to read it thoroughly and to follow instructions and warnings mentioned.*

*We would be pleased if you manage to make a full use of its advantages and possibilities.*

*We believe that the vehicle AVIA will serve you many years to your complete satisfaction.*

**Avia Ashok Leyland Motors s.r.o.**  
Beranových 14  
Praha - Letňany  
Czech Republic

## Vehicle documentation Information

### Operation Manual

To get acquainted with the vehicle properly, it is necessary to read through the "Operation Manual" and all manuals, which were delivered together with your vehicle (e.g. operating instructions for the use of auto radio, tachograph, battery warranty card, etc.).

### Service Booklet

The vehicle documentation also contains the "Service Booklet", in which you can find:

- vehicle identification data
- guarantee conditions
- warranty card and data on the owner
- records on regular service inspections
- service jobs and maintenance intervals
- body condition records
- special servicing and maintenance
- directory of authorized service stations

The vehicle equipment parts marked with \* have been factory installed on certain models or are delivered as option only.

### Warning!

■ The texts in frames named "Warning!" must be unconditionally observed.

If you sell your vehicle, remember to overhand the complete vehicle documentation to a new owner.

## List of contents

### Description

Interior .....	4
Keys .....	6
Doors .....	6
Electrically actuated windows* .....	7
Instrument board - gauges .....	8
Indicator lights .....	8
Display of AdBlue Level .....	11
Combined lever switch .....	12
Engine brake .....	13
Controllers .....	14
Cruise control .....	16
Vehicle height adjustment by remote control* .....	17
Diagnostic sockets .....	17
Ignition switch and steering lock ...	18
Gearshift lever .....	19
Steering wheel adjustment .....	19
Heating and ventilation .....	20
Air-conditioning* .....	22
Seats .....	24
Head restraints .....	25
Sleep couch .....	25
Seat belts .....	26
Rear-view mirrors .....	28
Rear-view mirrors remote control* .....	28
Headlights levelling device .....	29
Cabin interior lighting .....	29
Digital clock* .....	30

Socket / cigarette lighter .....	30
Sun visors .....	30
Cup holder .....	31
Ashtray .....	31
Clothes hooks, glove compartment .....	31
Bonnet .....	32
Tools and equipment .....	33
Hydraulic cabin tilting .....	34
Instructions for cabin tilting .....	34
Cabin tilting at special versions .....	35
Chassis c/w cabin .....	36

## **Operating instructions**

Check before the drive .....	38
Vehicle running-in .....	38
Maintenance .....	38
Starting the engine .....	39
During driving .....	40
Stopping the engine .....	41
Idle run .....	41
Engine .....	42
Belt tensioning .....	43
Lubrication system .....	44
Turbocharger .....	45
Fuel tank .....	46
Fuel .....	46
Draining the fuel filter .....	46
AdBlue fluid tank .....	47
AdBlue fluid .....	47
Cooling system .....	48

Air filter .....	49
Steering .....	49
Gearbox .....	50
Clutch .....	51
Front axle .....	52
Rear axle .....	52
Brake system .....	53
Service brake .....	54
Checking the brake lining .....	56
Brake system inspections .....	56
Anti - blocking - system .....	57
ASR .....	57
Emergency brake .....	58
Parking brake .....	58
Windshield washer and wipers .....	60
Tyres and wheels .....	61
Transport of loads .....	62
Electronic vehicle height adjustment (ECAS)* .....	63
Draining the condensate from air tanks .....	64
Basic rules for the trailer coupling .....	65
Electrical equipment .....	67
Location of battery .....	68
Battery .....	69
Battery circuit breaker .....	69
Alternator .....	69
Headlamps and lights - location .....	70
Vehicle care .....	71

## **Troubleshooting**

Engine .....	73
Electrical equipment .....	77
Monoblock hydraulic power steering .....	78
Brakes .....	78
Towing, vehicle recovery .....	80
Spare wheel holder (L, E, S, G) .....	81
Wheel chock (L, E, S, G) .....	81
Spare wheel holder (K, N) .....	82
Wheel chock (K, N) .....	82
Changing the wheel .....	84
Replacing bulbs .....	85
Fuse box .....	91
Use of jumper cables to start the engine .....	93

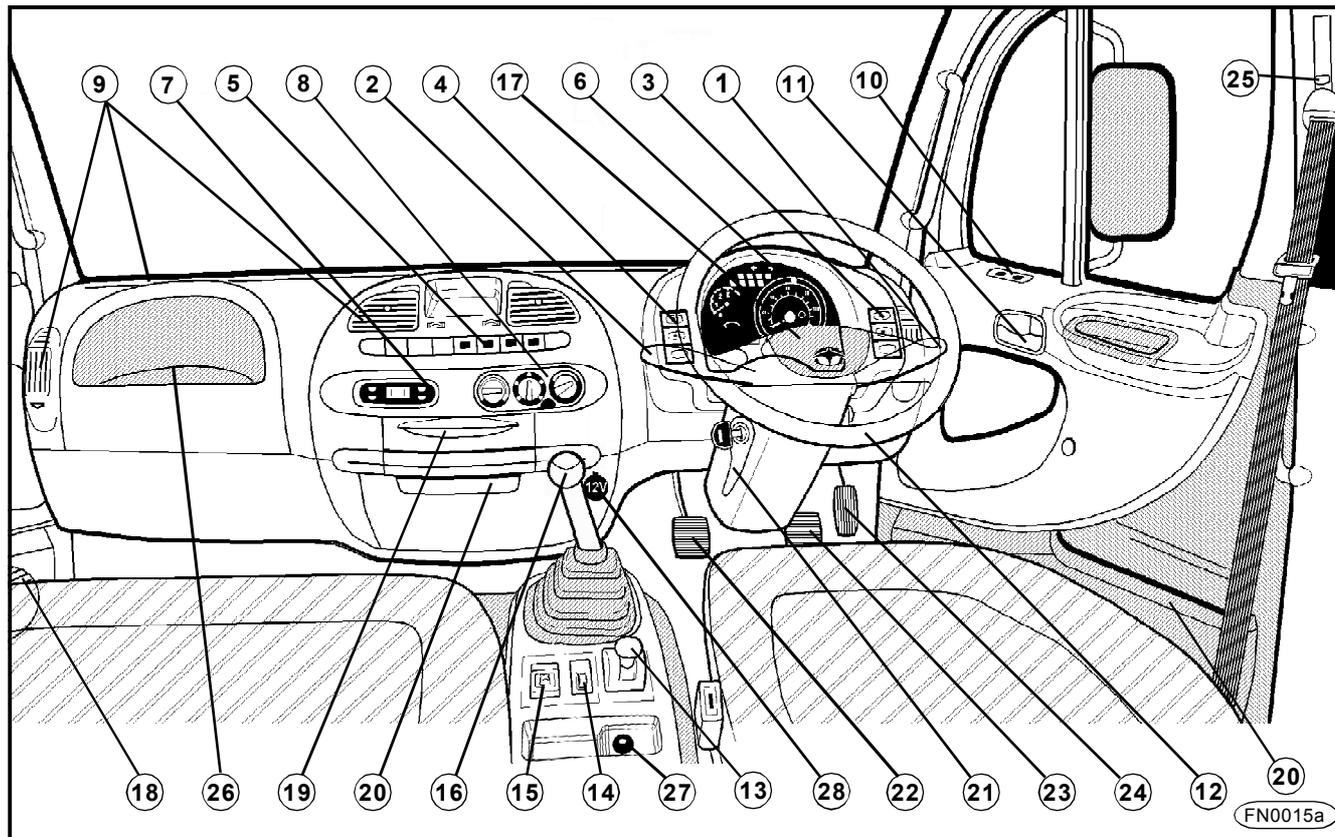
## **Technical data**

Engine .....	95
Undercarriage .....	96
Dimensions of chassis c/w cabin .....	98
Weights and axle loads .....	99
Wheel turning diameter .....	101
Tires inflation pressures .....	102
Maximum speeds and climbing abilities .....	103
Operation fillings .....	104
Vehicle Identification Number .....	105
Vehicle labels .....	106

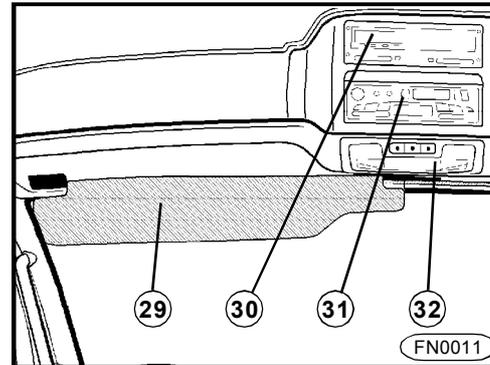
<b>INDEX .....</b>	<b>107</b>
--------------------	------------

## DESCRIPTION

### Interior

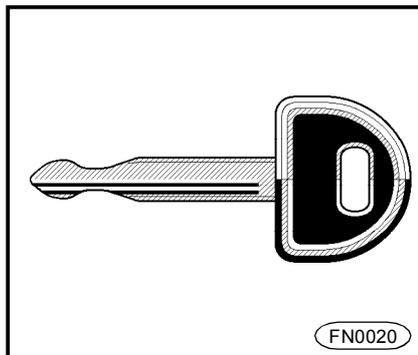


- |   |                              |                                     |
|---|------------------------------|-------------------------------------|
| 1 Combined lever switch                     | 10 Window lift mechanism*    | 21 Steering wheel positioning lever |
| - turn signals                              | 11 Door opening and locking  | 22 Clutch pedal                     |
| - side marker lights                        | 12 Ignition switch           | 23 Service brake pedal              |
| - low beam                                  | 13 Parking brake             | 24 Accelerator pedal                |
| - high beam                                 | 14 Headlamps beam adjustment | 25 Seat belts height adjustment*    |
| 2 Combined lever switch                     | 15 Main rear-view mirrors    | 26 Storage box (c/w cover*),        |
| - wipers                                    | remote control*              | fuse box                            |
| - washers                                   | 16 Gearshift lever           | 27 Cigarette lighter                |
| - engine brake                              | 17 Horn                      | 28 12 V socket                      |
| 3 Controllers                               | 18 Loudspeaker               | 29 Sun visor                        |
| - front fog lamps                           | 19 Ashtray                   | 30 Digital tachograph*              |
| - tail fog lamps                            | 20 Storage compartments      | 31 Auto radio*                      |
| - display of AdBlue Level                   |                              | 32 Dome light                       |
| 4 Controllers                               |                              |                                     |
| - emergency flasher                         |                              |                                     |
| - rear-view mirrors heating                 |                              |                                     |
| 5 Controllers                               |                              |                                     |
| - power-take-off drive (PTO)*               |                              |                                     |
| - differential lock                         |                              |                                     |
| - superstructure lighting*                  |                              |                                     |
| - air-conditioning*                         |                              |                                     |
| - cruise control                            |                              |                                     |
| - cruise control - off / on                 |                              |                                     |
| - cruise control - set / resume             |                              |                                     |
| 6 Measuring instruments and indicator lamps |                              |                                     |
| 7 Digital clock*                            |                              |                                     |
| 8 Heater control                            |                              |                                     |
| 9 Adjustable heater vents                   |                              |                                     |



## DESCRIPTION

### Keys

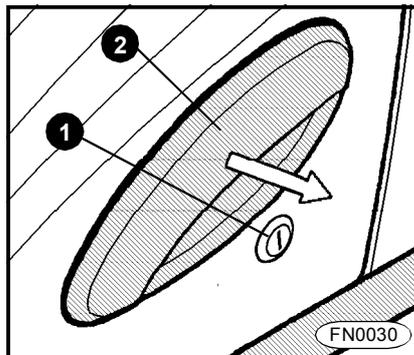


■ Your vehicle is delivered with two keys - you should keep one in a safe place outside the vehicle as a spare one.

■ Keys are provided with a label, on which the key number is stamped. You should keep the label in a safe place outside the vehicle and put down the number somewhere.

■ If the vehicle is fitted with the analogue tachograph, the key to open it is delivered with the vehicle.

### Doors

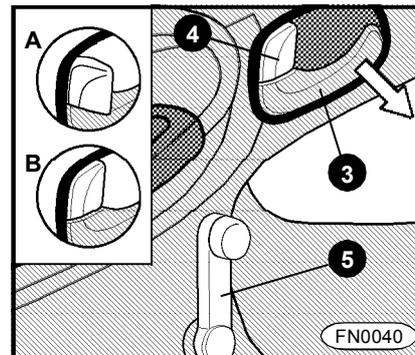


#### From outside

Both doors can be unlocked and locked from outside by the key which you insert and turn in the lock (item 1). Grasp the handle grip (item 2) and pull it toward you to open the door.

**Unlocking** - insert the key, give it 90° turn towards the face of the vehicle and back into the initial position when you can remove it.

**Locking** - insert the key, gently turn it towards the rear of the vehicle and back into the initial position.



#### From inside

■ (item 4)

**A** - door unlocked

**B** - door locked (when the door is locked in that manner, it cannot be opened neither from the outside, nor from the inside).

■ Pull the lever (item 3) to open the door.

■ Turn the handle (item 5) to open or to shut the window.

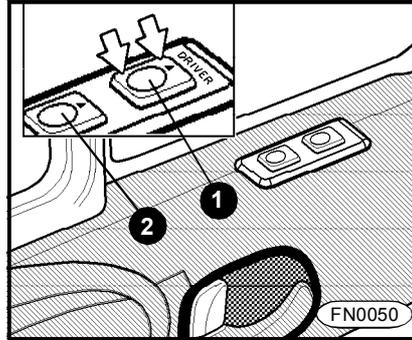
## Electrically actuated windows\*

### Central door locking\*

Use the central door locking to lock or to unlock both doors simultaneously from the driver's side.

#### Warning!

- Remember always to remove the key from the ignition switch before leaving the vehicle.
- Take care that the tailgate and side door of the box body are locked properly. It is not allowed to transport the loads which do not allow a safe closing of the door. Should the box body be damaged due to the tailgate or side door closed wrong, the manufacturer does not provide any guarantee for it.



- The windows can be lowered when the ignition is in position "ON" only.
- The windows lowering is active only when the button is hold depressed.
- The control buttons are situated on the top of the door.
- Both side windows can be controlled from the driver's place.
- Only the window on the RH side can be controlled from the co-driver's side.
- The control button (item 1) - for the window on the driver's side.
- The control button (item 2) - for the window on the co-driver's side.

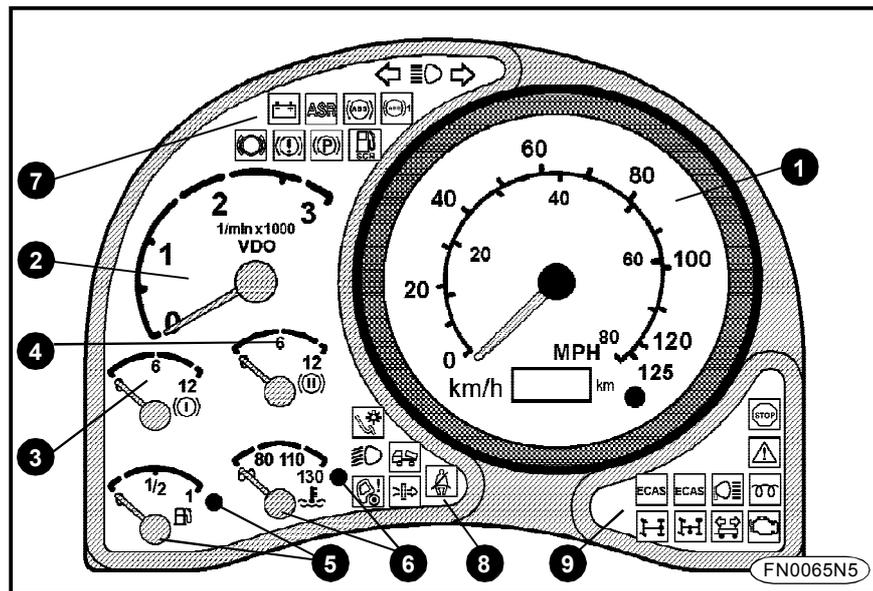
- Push the front part of the rocker switch to open the windows, push the other half of the rocker switch to shut the windows.

#### Warning!

- Do not leave your fingers on the window glass when closing it - the mechanism can develop the force, which may cause injury.
- The lowering button musn't be held pushed down if the door window is fully in its extreme stop positions. If disregarded, the window lowering system can be damaged.

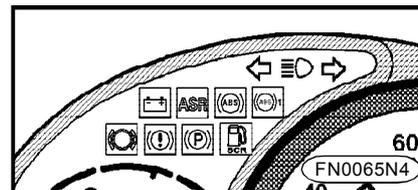
## DESCRIPTION

### Instrument board - gauges



- |   |  |
|---|--|
| 1 Tachometer  | 6 Coolant thermometer, indicator light |
| 2 Engine speed - indicator                            | 7 Group of indicator lights I          |
| 3 Air pressure gauge of 1 <sup>st</sup> brake circuit | 8 Group of indicator lights II         |
| 4 Air pressure gauge of 2 <sup>nd</sup> brake circuit | 9 Group of indicator lights III        |
| 5 Fuel gauge, indicator light                         |  |

### Indicator lights



#### Turn signals



- The left or the right indicator light flashes when you operate the turn signal lever.
- A short interval of flashing indicates a defective bulb in the turn signal light (replace it immediately).



#### High beam

It lights with the high beam on.



#### Batteries charging

- It lights when the ignition is turned "ON" and it must go out after starting the engine.

- If it does not go out after starting or it lights up during driving, move the vehicle a safe distance off the road, shut the engine off and proceed per Chapter **Troubleshooting**.



### **ASR\***

- It glows whilst ASR is in operation
- Svítí při poruše systému ASR. Neúčinnost systému ASR nemá vliv na běžný provoz vozidla.



### **ABS (vehicle)**



### **ABS (trailer)**

- It lights when the ignition is turned "ON" (to check the function), it must go out after a short while.
- If it does not go out after a short while or lights up on the move, it is necessary to stop and proceed per Chapter **Troubleshooting**.



### **Wear of brake pads**

- It lights when the brake pads wear exceeds the max. allowable limit. Adapt the driving speed and proceed per Chapter **Troubleshooting**.



### **Parking brake**

- It lights when the parking brake is applied and at low air pressure in the parking brake circuit.
- If it lights, do not move off or if it lights up on the move, stop and proceed per Chapter **Troubleshooting**.



### **Brake system malfunction**

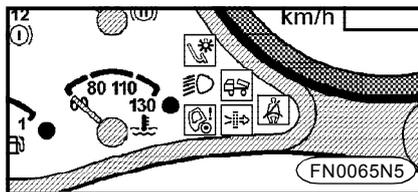
- It lights when the ignition is turned "ON" (to check the function), after the air brake system circuit is fully pressured it must go out
- If it does not go out after a short while or lights up on the move, it is necessary to stop and proceed per Chapter **Troubleshooting**.



### **Signalisation of AdBlue liquid level (reserve) in the tank**

- It lights when the AdBlue level in the tank is low (cca 12l).
- Top up the AdBlue liquid at next diesel re-fuelling
- Simultaneously warning bulb lights up  „Engine - warning or engine maintenance“.

## DESCRIPTION



### **Stop light**

- It comes on whilst brakes are being applied and a bulb of brake lights is defective.
- Replace the faulty bulb immediately.

### **Low beam**

It lights with the low beam turned on.

### **Cabin tilting**

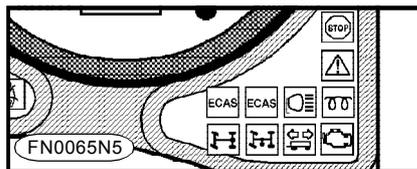
It lights when the cabin does not rest properly in its rear location (correct it immediately).

### **Air filter (polluted)**

- It lights when the filter cartridge has been clogged.
- It is necessary to replace the filter cartridge.

### **Seat belt\***

It reminds you of not buckling by the seat belt.



### **Pneumatic suspension\* /yellow control light/**

Glowing if the tail part of the vehicle is outside the driving position (level).

### **Differential lock**

It lights when the differential lock is ON.

### **Failure in the pneumatic suspension system\* /red warning light/**

- Glowing if there is a system failure.
- If it doesn't go off after short time-out, or it starts glowing while driving, the vehicle must be halted and it must be proceeded following the chapter Failures - repairs.

### **PTO\***

Power - take off drive (PTO). It lights when the PTO is on.

### **Reverse light**

It lights when the reverse speed is engaged.

### **Trailer turn signals\***

- They light when the turn signals are switched on and a trailer is coupled.
- A short flashing interval indicates a faulty bulb in the turn signal light (replace the faulty bulb immediately).

### **Engine - stop**

- It lights when the ignition is turned "ON" (to check the function), it must go out after a short while.
- It lights at a serious defect of the engine.
- If it does not go out after a short while or if it lights up on the move, move a safe distance off the road, stop the engine and proceed per Chapter **Troubleshooting**.

**Engine - warning light**

- It lights when the ignition is turned "ON" (to check the function), it must go out after a short while.
- It comes on when a malfunction or defect on the engine component occurs or "effective" level of fluid AdBlue is lower than 12 litres. Simultaneously warning bulb lights up  „Signalisation of AdBlue liquid level (reserve) in the tank.
- If it does not go out after a short while or if it lights up on the move, move a safe distance off the road, stop the engine and proceed per Chapter **Troubleshooting**.
- If it flashes with the ignition in position "ON" for about 30 seconds, it is necessary to proceed per Chapter **Troubleshooting**.
- If it does not go out after a short while or it flashes, proceed per Chapter **Troubleshooting**.

**Glowing**

It lights when the ignition is turned „ON“.

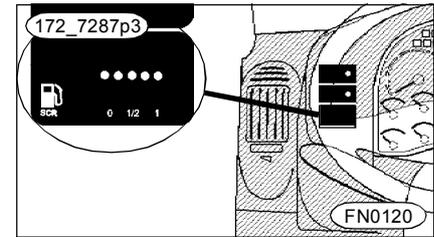
You shall start the engine only after it goes out.

**SCR system malfunction**

- It lights with the ignition in position "ON" (to check the function), it must go out after a short while.
- It lights when a fault or malfunction in the SCR (Selective Catalytic Reduction) system occurs.
- If the warning light flashes, the fluid AdBlue in the tank is lower than 10 l. It is necessary to refill the AdBlue at the nearest occasion.
- If it does not go out after a short while or flashes even after topping up the AdBlue fluid, it is necessary to proceed per Chapter **Troubleshooting**.

**Warning!**

**In order to prevent crystallization of AdBlue on components of the SCR system, a certain amount of AdBlue remain in the tank – so called unusable amount – approx. 9 l.**

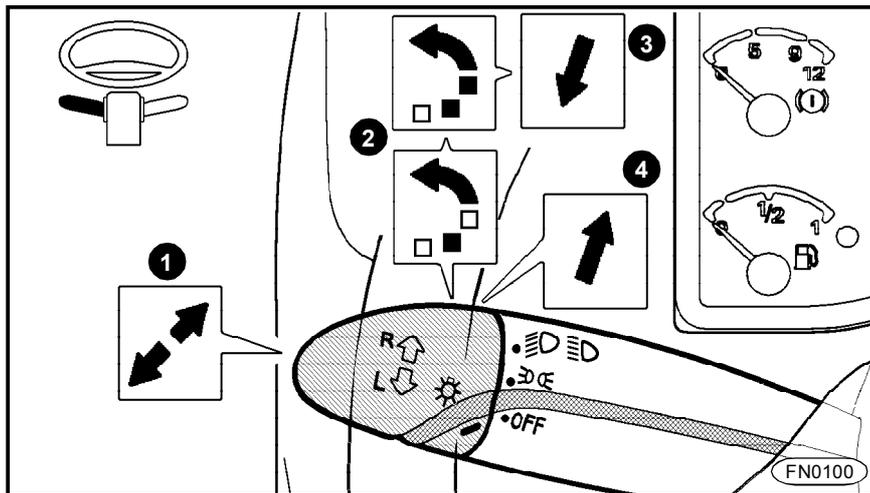
**Display of AdBlue Level**

- Signals continuously AdBlue level in the tank.
- If the AdBlue tank is emptied, warning light  "SCR system malfunction" starts flashing.

**Warning!**

**If the AdBlue tank is emptied, then after the first engine stop the output of the engine is reduced for next drives. This stage lasts until the AdBlue tank is re-filled.**

## Combined lever switch



### 1 Turn signals

Turn signals are active when the ignition is in the position "ON". Move the lever perpedicularly towards the steering wheel axis to switch the turn signals on.

- R ↑ right turn signal - lever up
- L ↓ left turn signal - lever down

### 2 Side marker lights and low beam

Turn the rotary end of the lever to switch them on.

The lights, whose symbol is against the mark, are on:

- OFF lights off
- ↻ lights side marker lights on
- ≡ lights low beam (and/or high beam) on

- The audible signalling is active when the lights are on and the door is open.

### 3 Low / high beam changing

- To turn on the high beam, push the lever away from the steering wheel (the indicator light will come on to indicate the high beam function).
- Pull the lever to the initial position to change over to the low beam.

### 4 Headlight flasher

- Move the lever slightly toward the steering wheel (the high beam indicator light will come on).
- Headlights are on until you release the lever.

### 5 Windshield washer

- Windshield wipers and washer are active when the ignition is turned "ON".
- Push the switch at the end of the control lever to turn on the washer. The washer pump will operate until you release the switch.

### 6 Windshield wipers

Turn the rotary end of the lever to switch the wipers on:

OFF wipers off

INT intermittent wiping (you can select any wiping interval by the rotary ring in steps - item 7)

LO low speed and continuous wiping

HI high speed and continuous wiping

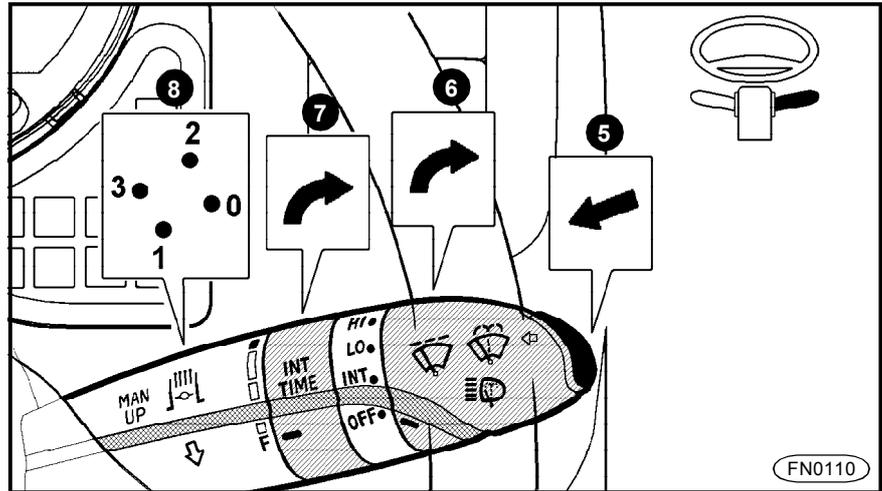
### 7 Intermittent wiping interval control

The wiping interval is the shortest in the position F, increase it by turning the ring.

### 8 Engine brake

Position 0 - move the controller away from you and down - the engine brake is off.

Position 1 - move the controller toward



you and down - the engine brake is activated when the service brake is applied.

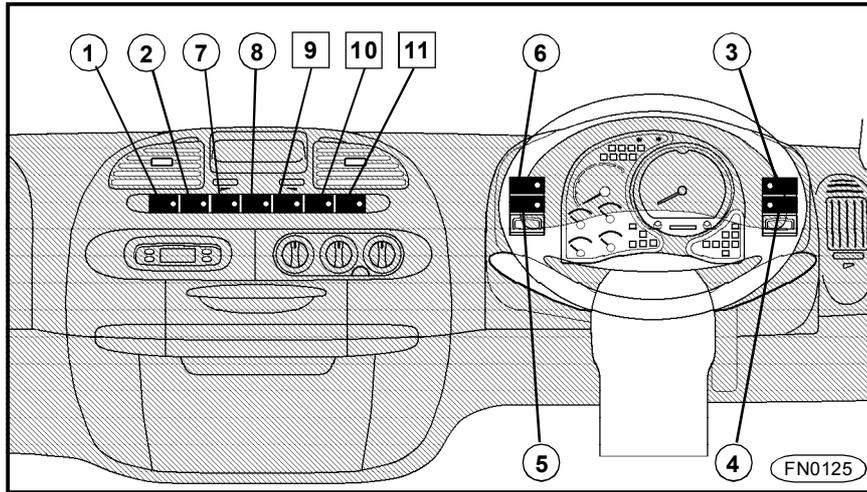
Position 2 - move the controller away from you and up - the engine brake works when the accelerator pedal is released (in the speed zone above the idle run).

Position 3 - move the controller towards you and up - combined function.

### Warning!

- For the sake of proper operation the engine brake has to be switched on (switched off) at least once a week. Its lifetime will be prolonged by this measure.
- Depress the accelerator pedal to put the engine brake automatically out of function.

## Controllers



### 1 Power take-off drive \*

- It can be engaged on vehicle at standstill and after the engine speed drops - after about 6 s.
- When the engine is running, depress the clutch pedal to engage the PTO.
- The indicator light comes on to indicate the PTO engagement.

### 2 Differential lock on /off

- It can be engaged on vehicle at standstill and after the engine speed drops - after about 6 s.
- Use it only for the necessarily needed time to overcome the hard driving conditions.
- The indicator light comes on to indicate the differential lock engagement.

### Warning!

Positions 1 and 2 can be engaged when the airpressure exceeds 0.55 MPa - otherwise the engagement cannot be guaranteed.

We recommend you to switch the differential lock on / off once a week at least - hereby the service life will increase

### 3 Emergency flasher

- The bulb in the switch indicates the function.
- It can be turned on even with the ignition off.

### 4 Main rear-view mirrors heating \*

- It is indicated by the bulb in the switch.

### Warning!

Operate the heating for the necessarily required time only.

**5 Tail fog lamps** 

- The tail fog lamps can be turned on only when the low beam or front fog lamps are on.
- With regard to a dazzling effect, it can be turned on only in fog, heavy rain or snow.
- The bulb in the switch comes on to indicate the function.

**6 Fog headlights** 

- Fog headlights can be turned on when the side marker lights and low beam and/or high beam are on.
- The bulb in the switch comes on to indicate the function.

**7 Loading space lighting\***

The bulb in the switch comes on to indicate the function.

**8 Air-conditioning** 

- The cooling equipment works with the engine running only.
- The air-conditioning does not work when the rotary switch of the fan is off.
- The bulb in the switch indicates its function.

**9 Resume / reduce** 

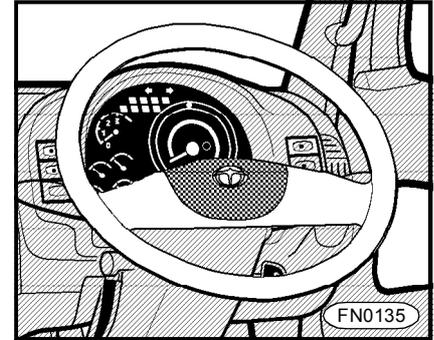
- It resumes the speed already set on the cruise control.
- This can also reduce the engine speed during driving or in the PTO regime.

**10 Permanent (main)** 

- It activates the cruise control or PTO regime speed setting.

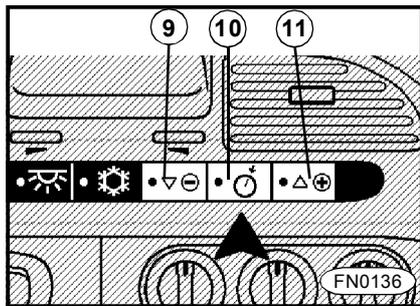
**11 Adjust / increase** 

- It stores the instantaneous speed of the cruise control.
- This control switch can also increase the engine speed during driving or in the PTO regime.
- When the diagnostic test is performed, another malfunction code will enter when pushed.

**Horn** 

The horn switch is situated in the middle of the steering wheel.

## Cruise control



- The cruise control allows you to maintain a desired speed (engine speed - both on the move and in the PTO regime) - without actuating the accelerator pedal.
- Use three control buttons located on the central panel of the instrument board to control it.
- The cruise control starts to operate when the speed reaches about 48 km/h and in the PTO regime up to 48 km/h (it can be selected).

### Adjustment of cruise control

- Push the button 10 to activate the cruise control.
- When the desired speed has been achieved, push briefly the button 11 "adjust / increase" - now the speed is stored and maintained by the engine without applying the accelerator pedal.
- The speed can be increased by depressing the accelerator pedal - after releasing it, the cruise control function is resumed (however, first the cruise control must be activated).
- All functions will be cancelled by depressing the clutch or brake pedal and/or by switching off the button 10. The resuming of the cruise control function can be performed when you push briefly the button 9 "resume / reduce", it means that the cruise control need not be set again.
- If the exhaust brake's stalk is in the position 1,2 or 3 and if vehicle speed exceeds the set-up speed about approx. 3 km/h (riding downhill) the exhaust brake is automatically applied. When the desired speed is reached the exhaust brake will come out.

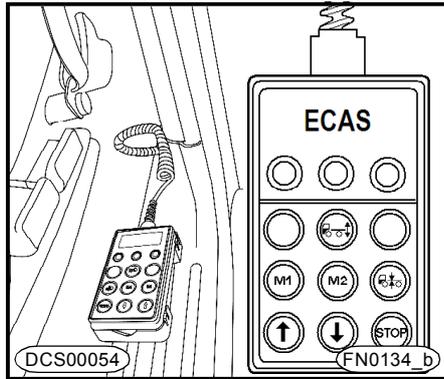
### Setting the PTO speed on vehicle at standstill

- Push the button 10 to activate the PTO.
- Push and hold the button 11 "adjust / increase" depressed (the adjustable speed range  $850 \div 2,500$  rpm) to increase the speed - hold the button depressed to increase the PTO speed gradually - when the button is depressed repeatedly, the PTO speed increases by about 25 rpm steps.
- Push the button 9 "resume / reduce" to activate the speed 1,200 rpm automatically.
- By pressing the button 11 "adjust / increase" 850 rpm will be automatically set.
- Other rpm values may be set upon special request by the manufacturer.

### Warning!

- When the cruise control is not used, the "permanent (main)" control button 10 must be switched off.
- The vehicle speed can be influenced by driving uphill or by the load weight. For that reason use the cruise control only when driving on level ground or in slight hilly terrain.

## Vehicle height adjustment by remote control\*



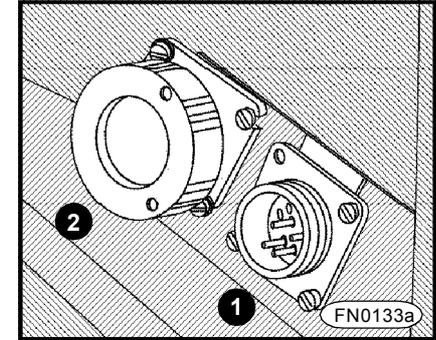
■ Operated by remote control device, placed in the holder on the rear wall of the cab, in extended cab versions at the driver's seat.

-  **System "switch-on"** - indicated by control lamp on the remote control device
-  **Memory 1** - memory input, move to saved position
-  **Memory 2** - memory input, move to saved position
-  **Automatic adjustment to normal (operational) driving height.**
-  **Move "Upwards"**
-  **Move "Downwards"**
-  **STOP** - the operation - raising or lowering the pneumatic suspension - is immediately halted..

### Warning!

■ **Operating and more detailed instructions for handling the pneumatic suspension can be found in the chapter "Operating guidelines"**

## Diagnostic sockets

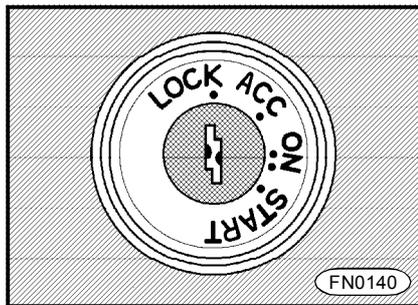


■ Diagnostic sockets are situated under the storage box in the instrument board.

■ They are accessible after removal of the storage box bottom, which is released by turning the two rotary holders (sense of rotation is shown on the cover).

- 1 Socket for the ABS, ECAS diagnostics
- 2 Socket for the engine diagnostics

## Ignition switch and steering lock



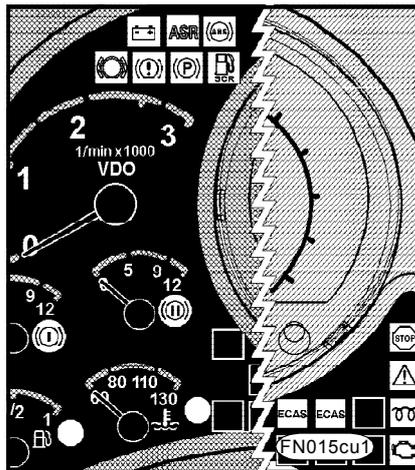
### Switch positions

#### ■ "LOCK" position

Only in this position the key can be inserted and removed. Only tachograph, electric clock or radio are powered. The steering shaft will be automatically locked in this position.

#### ■ "ACC" position

Steering is unlocked, electric circuits connected through the ignition switch are not powered. When turning the ignition from "ON" into this position, the engine will be stopped.



#### ■ Position "ON"

The indicator lights (see Fig.) of battery charging, brake system malfunction, parking brake, ASR function, glowing, ABS, coolant temperature and reserve fuel amount, engine - stop, engine - warning, engine - maintenance, SCR and ECAS system malfunction will come on. After several seconds only the indicator lights of battery charging, parking brake and/or glowing and the operation

fluids levels dependent, also the indicator lights of the fuel minimum level and the AdBlue fluid minimum level remain on. If the air pressure in the brake system is insufficient, the indicator light of the brake system malfunction remains ON. When the parking brake is applied its warning lamp will stay on. When the glowing light goes out, the engine is ready to be started. Electric circuits connected via ignition switch are powered.

### Warning!

**If after a moment any indicator light, at which its own test was activated, remains on, proceed per Chapter "Troubleshooting".**

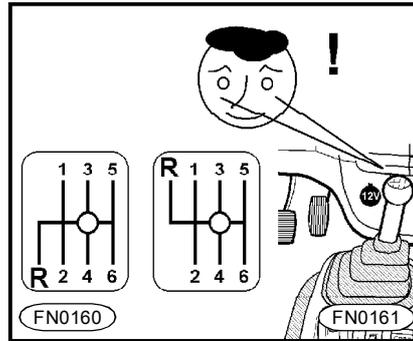
## Gearshift lever

### ■ "START" position

The engine can be started only when no gear speed is shifted.

Do not depress the accelerator pedal while starting.

The position is not arrested. When starting repeatedly, move the key back to position "ACC" - this prevents to start the already running engine and avoids damage to starter.



### Warning!

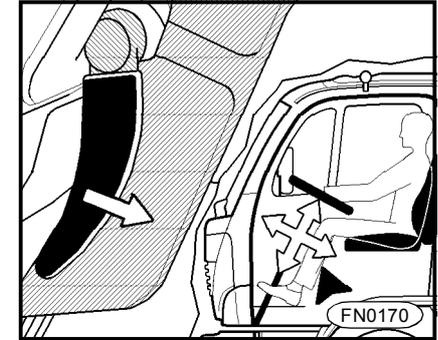
■ The ignition switch function is secured with the battery circuit breaker on.

■ Do not switch off the battery circuit breaker or do not disconnect battery clamps to avoid damage to alternator or some electric consumers.

	Type of gearbox	Number of gear speeds
	ZF 6 S 850	6

Engage gear speeds mechanically by the gearshift lever with the clutch pedal depressed.

## Steering wheel adjustment



■ Pull the positioning lever towards you to release the steering wheel and adjust the steering wheel into the desired position.

■ After the desired steering wheel position has been achieved, push the positioning lever as far as it goes.

### Warning!

It is not permitted to adjust the steering wheel during driving.

## DESCRIPTION

### Heating and ventilation

■ The cabin is heated by the hot-water heating. It can be used also for heating of coolant in the cooling and heating circuits after starting the engine.

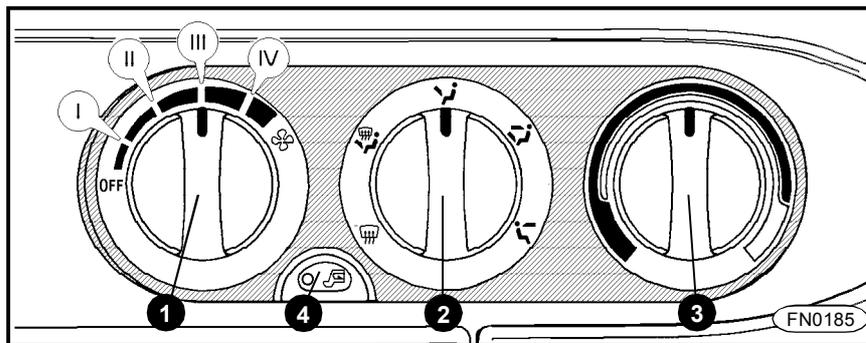
■ The heater is controlled by heater control elements on the instrument board.

■ By turning the heating control knob (item 3) you will regulate volume of cold and hot air flowing into the cab (turn the control knob to the red zone to supply the hot air).

■ Use the control knob (item 1) to adjust the fan speed and thus the air volume circulating through the system. The airflow speed can be set in four steps.

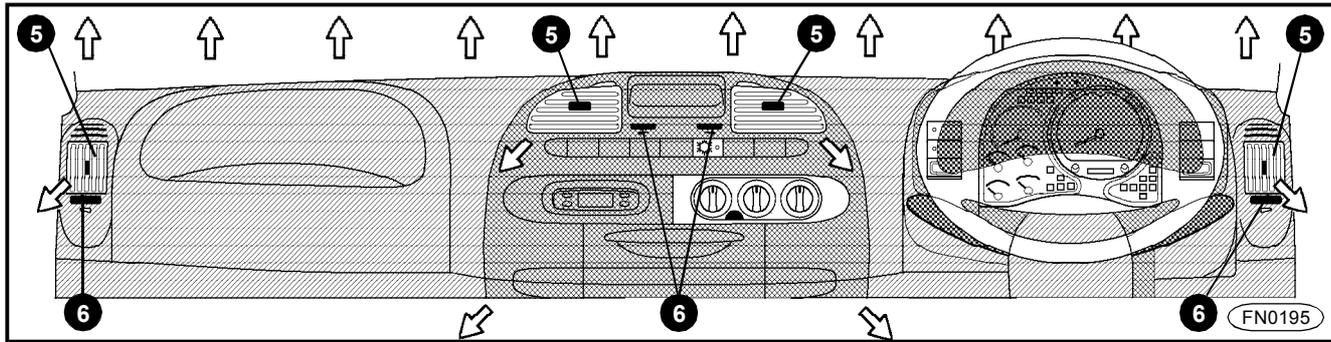
■ The control knob of the airflow direction (item 2) allows you to change the direction of airflow (way of cabin heating).

■ Push the button (item 4) to turn on / off the regime of circulating air in the cabin.



■ Deflect the fins (item 5) at air vents to change the angle of airflow. The air volume emitted from individual vents is controlled by thumbwheels (item 6).

- 1 Heater fan control
- 2 Airflow direction control
  - ↖ to crew heads
  - ↘ to crew feet and heads
  - ↙ to crew feet
  - ↗ to feet, windshield and side windows
  - ↔ to windshield and side windows
- 3 Heater valve control knob - regulation of temperature of the airflow
- 4 Regime of air circulation



### Window defogging

- (item 1) fully to position IV
- (item 3) to extreme left
- (item 2) to position
- Close air vents by thumbwheels.

### Windshield defrosting

- (item 1) fully to position IV
- (item 3) to extreme left
- (item 2) to position
- Switch on the regime of air circulation
- Close air vents by thumbwheels.

### Keeping windows being not fogged under increased humidity

When windows are still being fogged

(for example in rainy weather), it is necessary:

- (item 1) to position II or III.
- (item 2) to position
- (item 3) if necessary, turn on heating.

### Ventilation

- (item 1) to desired position.
  - (item 3) to extreme right.
  - (item 2) to position
- (or to desired position).

### Optimum heating

- (item 1) to position II or III.
- (item 3) to desired heating output.

- (item 2) to position

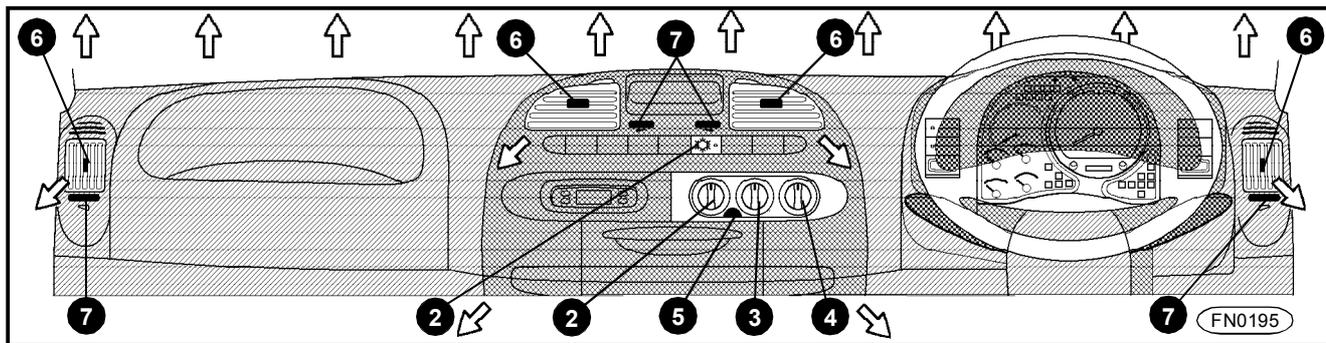
### Maximum heating

- (item 1) to position IV.
- (item 3) to extreme left
- (item 2) to position
- Switch on the regime of air circulation.

### Warning!

The heating output depends on the coolant temperature. The maximum heating output can be obtained after the engine has reached the operating temperature.

## Air-conditioning\*

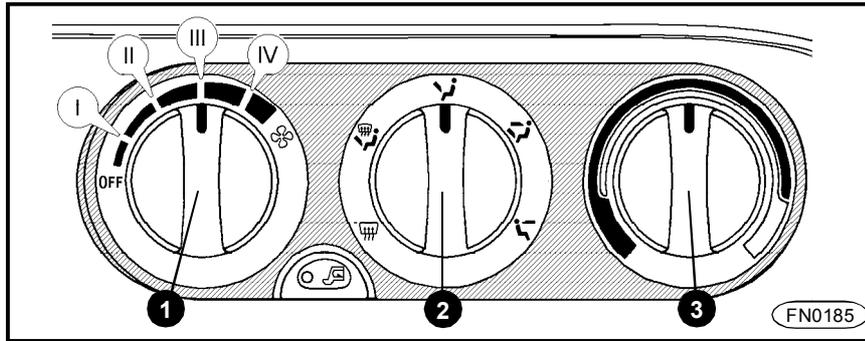


- The air-conditioning is a combined cooling and heating device.
- The a/c cooling unit cools down the air and dehumidifies it.
- The cooling unit works with the engine running only.

### Control elements

- Switch on/off the air-conditioning by means of the switch (item 1)  (signalled by the bulb in the switch).
- The air-conditioning does not work if the fan rotary switch is off.
- Depending on the heater valve control knob position (item 4), the temperature of the drawn airflow is controlled (when in the red zone, the hot air is circulated and contrariwise). It can be used even with the air-conditioning on.

- Use the control knob (item 2) to control the fan speed and thus also the air volume circulating through the system. Adjust the air volume by selecting one of four fan speeds.
- The airflow direction control knob (item 2) allows to change the airflow direction (way of cabin heating).
- Push the button (item 5) to switch on/off the regime of circulating air in cabin (signalled by the bulb in the button).
- Deflect the fins (item 6) at air vents to adjust the airflow in desired angle. The air volume is controlled by thumbwheels (item 7).



### Optimum cooling

- (item 1) to desired position (position II or III are optimum)
- (item 3) to extreme right, turn it slightly to left to adjust the temperature if needed
- (item 2) move it to position
- Push the button with symbol ☀ (the bulb comes on in the switch)
- The outside air is being sucked up and cooled in that regime

### Maximum cooling

- Close all windows
- (item 1) to position IV
- (item 3) to extreme right
- (item 2) turn it to position
- Push the button with symbol ☀ (the bulb comes on in the switch)
- Switch on the regime of air circulation

### Warning!

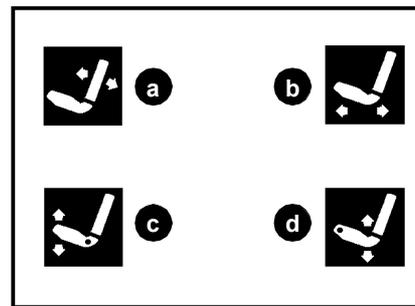
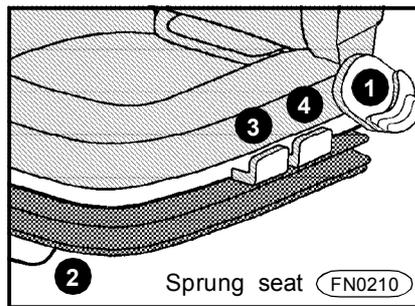
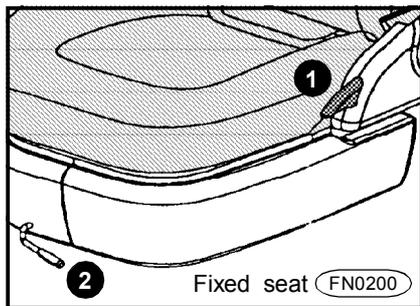
Smoking is not advisable when being in regime of air circulation.

### Warning!

- When the vehicle was parked in the direct sun, remember to open the windows before switching on the air-conditioning.
- It is recommended to switch on the air-conditioning once a week at least (even in the winter months) to prolong the a/c service life.

## DESCRIPTION

### Seats



#### Seatback adjustment (a)

Lift the control lever (item 1) with your body weight taken on the seatback to tilt the seatback to the rear. To adjust the seatback to the front, lift the control lever with your body weight taken on the seatback slightly and after that release the seatback, which will tilt automatically forward. Release the lever to lock the seatback in position.

#### Forward and backward adjustment (b)

■ Pull the control lever (item 2) up to release the longitudinal shift and the seat can be adjusted into desired position. Release the lever to lock the seat.

■ The seat should be adjusted so that the driver could control the pedals safely.

#### Seat cushion inclination (c) and height (d) adjustment on the pneumatically controlled driver's seat\*

- Raise the lever (item 3) to adjust the front part of the seat cushion.
- Raise the lever (item 4) to adjust the rear part of the seat cushion.
- Take your body weight off to adjust the seat cushion height.

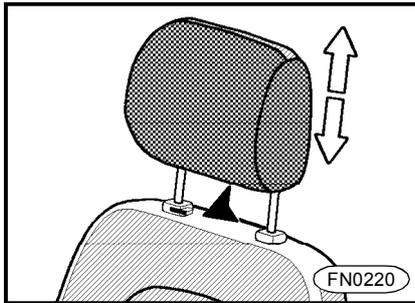
#### Correct adjustment of seats

- The seatback should be adjusted so that the driver can hold the steering wheel at its top point with hands slightly bent.
- A quick and safe handling the controls required for the drive must be secured.
- Keeping your body at ease for the maximum protection offered by seat belts must be obtained.

#### Warning!

For reasons of safety the driver's seat may be adjusted on vehicle at standstill only.

## Head restraints

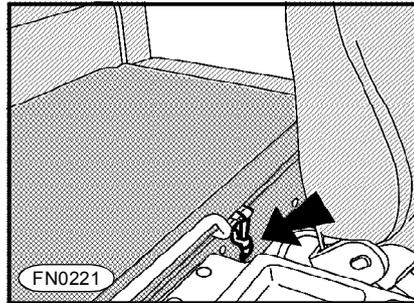


- Head restraints are height adjustable.
- To adjust the head restraint vertically, push the stop toward the rear cab wall.
- Adjust the head restraint so that its position is adapted to fit the seating height of occupant.

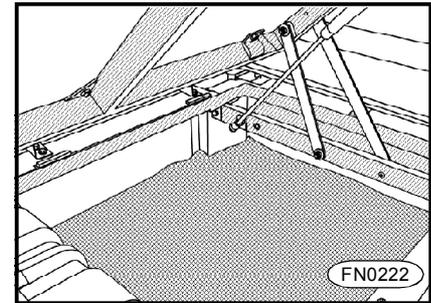
### Warning!

- The head restraint being set properly will support the back of the skull when the vehicle is crashed from the rear.
- For reasons of safety the head restraint may be adjusted on vehicle at standstill only.

## Sleep couch



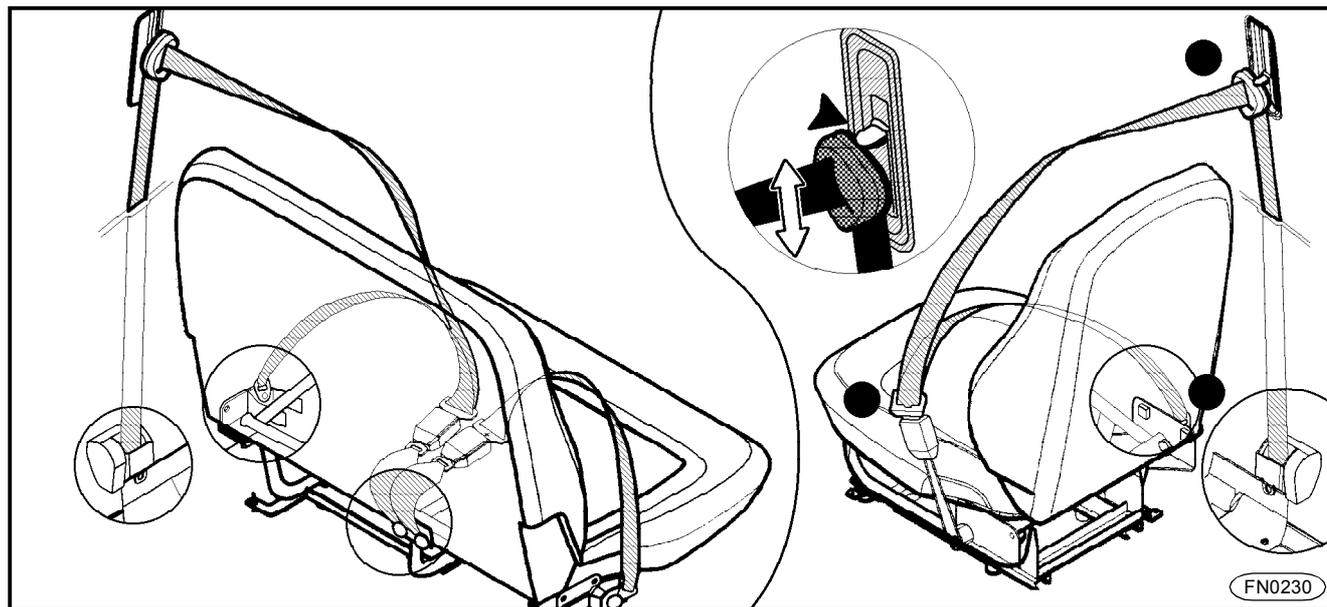
On vehicle versions with a long cab, there is an emergency couch with a storage compartment in the rear part of the cab.



The storage compartment is accessible after unlocking the rubber element and tilting the couch.

## DESCRIPTION

### Seat belts



■ The cabin is equipped with three-point seat belts and retractors on two side seats.

■ The middle seat has got the two-point seat belt and mechanical adjusting equipment.

■ Seat belts offer a protection for passengers in case of an accident.

■ Seat belts have to be buckled whenever you drive the vehicle - even in urban driving.

**Use of seat belts**

- The respective warning light reminds you of necessity of the use of seat belts \*.
- Grasp the belt holding it at tongue and slowly fit it across the chest and pelvis.
- The belt must fit snugly to the centre of arm and to your pelvis.
- If the belt locks when being pulled out, release it, let it rewind and after that pull it out again.
- Insert the belt tongue into a respective seat buckle. The belt is anchored properly when it clicks into a buckle.
- To release the seat belt, press the red marked cap on the buckle.

**Seat belts height adjustment\***

- Due to the height adjustable belt anchorage, the belt can be adapted to fit the body dimensions.
- To adjust the belt height, push the button downwards, tilt the upper anchorage toward you (up) and adjust it to the desired position.

**Warning!**

- **The belt strap must not be worn over rigid or breakable objects, which are stored in your clothing in pockets.**
- **Seat belts, which have been subject to an accident or have been damaged, must be unconditionally replaced with new ones.**
- **Take care that the belt is not twisted and is worn across pelvis and not across soft parts of the body if possible.**
- **The maximum effect can be reached only with a correct seating position in cabin.**
- **Do not strap in more than one person with each belt.**
- **Keep the seat belts clean (dirt impairs the function of the retractor). Use the soap water to clean the seat belts.**
- **If the seat belt has been damaged, it is necessary to have it replaced.**

## DESCRIPTION

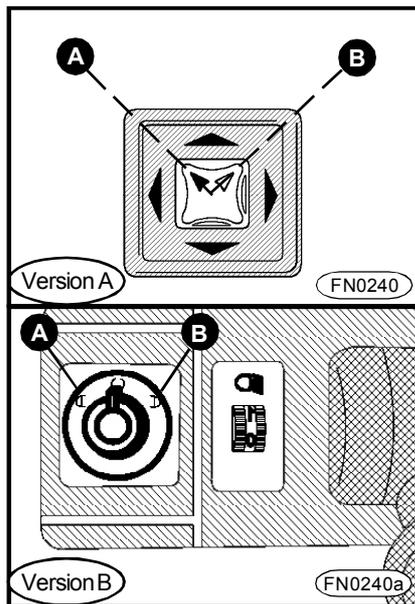
### Rear-view mirrors

- Vehicles are equipped with heated main rear-view mirrors.
- The heating is controlled by the controller on the instrument board and is indicated by the indicator light situated directly in the controller.
- Use the heating for the necessary time only.

#### Warning!

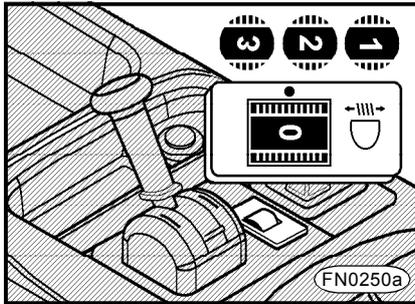
- For reasons of safety the mirrors must be adjusted prior to move off.
- Pay extreme attention when considering the size and distances of cars and other objects when seen in a convex mirror. Always remember that they will look smaller and appear farther away than in reality.

### Rear-view mirrors remote control\*



- Turn the controller to select adjustment of the left or right mirror.  
**to left - left mirror - position A**  
**to right - right mirror - position B**
- Deflect the four-position controller to obtain the desired position of the mirror.

## Headlights levelling device



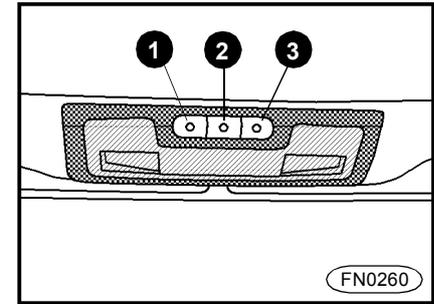
- Use the thumbwheel to change the headlights beam inclination.
- The basic adjustment of headlamps has been performed on the unloaded vehicle (the control thumbwheel mark is against zero).
- Payloads for the respective vehicle version are mentioned in table **Weights and axle loads**.

	Vehicle load out of the max. payload			
	30%	50%	70%	100%
K	1		2	3
N	1		2	3
L		1		2
E		1		2
S			1	2
G			1	2

### Warning!

**The driver is obliged to adjust the headlamps depending on the instantaneous vehicle load.**

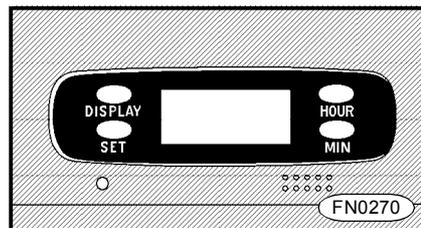
## Cabin interior lighting



- Bulbs of the dome light are turned on/off by switches situated in the light directly.
- Use the switch (item 1) and (item 2) to turn on/off the light on the driver's side.
- Use the switch (item 3) to turn on/off the light on the co-driver's side.

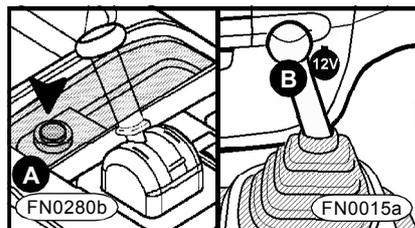
## DESCRIPTION

### Digital clock\*



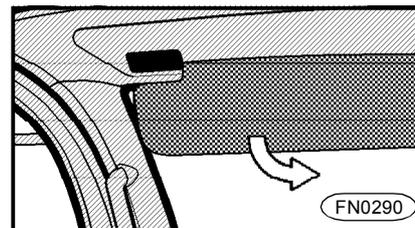
- Use button "HOUR" to set hours.
- Use button "MIN" to set minutes.
- Use button "SET" to zero minutes to whole hours.
- The button "DISPLAY" will show the clock when the ignition is in "LOCK" position only. The clock displays only when the button is hold depressed.

### Socket / cigarette lighter



- The socket (item A) can be used for cigarette lighter only. The socket (item B) can be used for 12 V appliances.
- Push the knob in to switch on the cigarette lighter. When the spiral is ready for use, it will spring back. Pull out the lighter and use it immediately (the heating spiral will loose the thermal energy soon).

### Sun visors

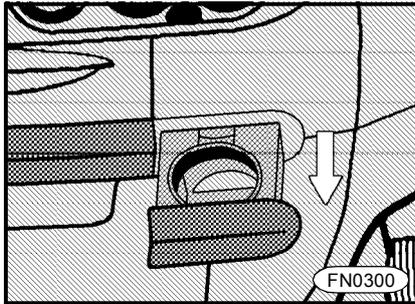


- Sun visors are situated above the windshield in the cabin ceiling.
- They can be tilted as desired.
- Adjust the sun visors to protect you against sun glare.

### Warning!

- It is forbidden to use the cigarette lighter socket for other appliances, the electroinstallation might be damaged.
- Pay attention not to burn yourself when handling the cigarette lighter.
- If the lighter does not spring back after about 30 seconds, it must be removed not to burn through.

## Cup holder

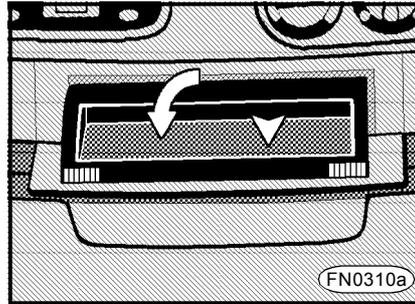


- To slide the holder out, push it and release.
- After use, slide it back.

### Warning!

- Do not use the cup holder if the vehicle is in motion.
- Do not use the cup holder to hold other objects.

## Ashtray

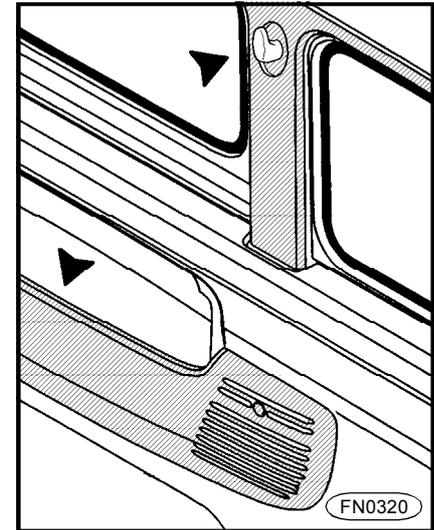


- Pull it to open it.
- To clean it, remove the sheet insert.

### Warning!

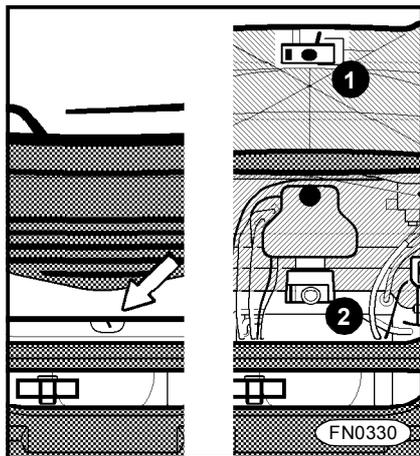
Never put paper and other flammable objects in the ashtray - danger of fire!

## Clothes hooks, glove compartment



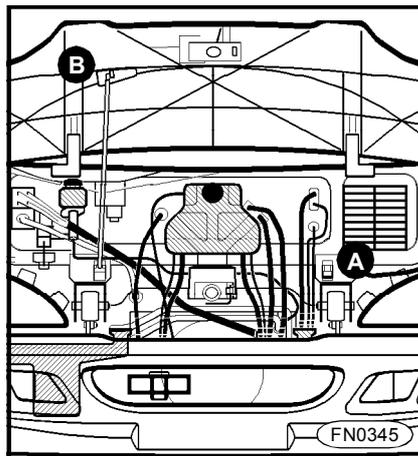
## DESCRIPTION

### Bonnet



#### Opening the bonnet

- Push the bonnet in its lower part, press the release lever (item 1) to left.
- Raise the bonnet.
- Take strut out of holder (item A) and insert the strut end in hole (item B) to secure the lifted bonnet.



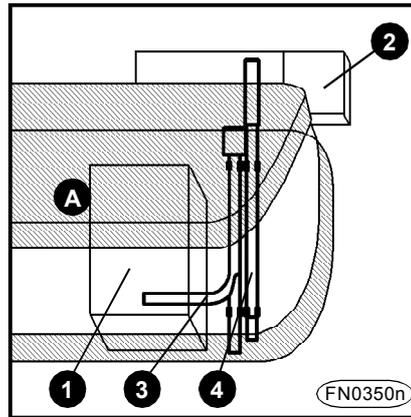
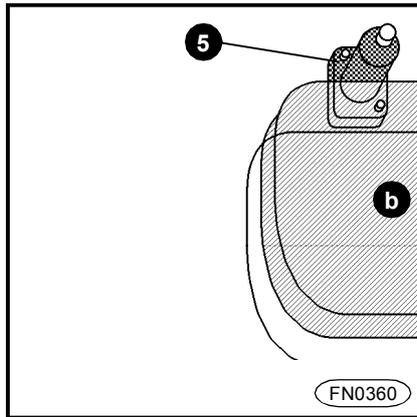
#### Closing the bonnet

- Raise the bonnet slightly.
- Unhook strut from hole and put it in holder (item A).
- Tilt the bonnet in the vertical position and push its lower edge until it clicks into lock (item 2).
- When the bonnet snaps in, you can hear it.

#### Warning!

You should check a proper bonnet locking whenever you move off.

## Tools and equipment



A - co-driver's seat

B - driver's seat

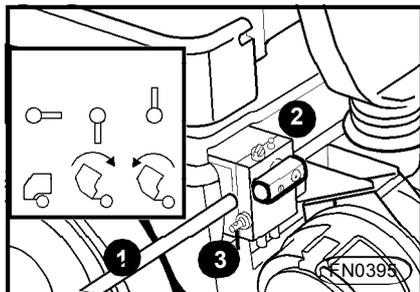
- Tools and equipment are placed under the co-driver's seat and are accessible after tilting the seat cushion.
- The hydraulic jack is attached to the cab floor behind the driver's seat.
- Tools must be attached firmly.

### Warning!

- Tools, which is not stored properly, may cause a personal injury or disturb you by vibrations during driving.
- The jack delivered with the vehicle is determined to be used with this vehicle model only. It must not be used to lift other vehicles or other loads.
- Tools and equipment must be attached properly on the move or during the cabin tilting.

Wrench 24 x 24	item 1
Wrench 30 x 30	
Lever adaptor	
Box with bulbs	
First aid kit	
Warning triangle	item 2
Lug wrench	item 3
Rod for jack and cabin tilting	item 4
Hydraulic jack	item 5

### Hydraulic cabin tilting



#### Cabin tilting

- Move the distributor lever (item 3) into vertical position upwards (see schema on the pump).
- Insert rod (item 1) into lever of the hydraulic pump (item 2) and pump. Hydraulic locks of the rear location will open and cabin starts to tilt itself.
- The cabin must be tilted fully to its tilted position - a partial tilting is not allowable for entering beneath the cabin.
- Let the distributor lever be in vertical position with the cabin lifted.

#### Cabin lowering

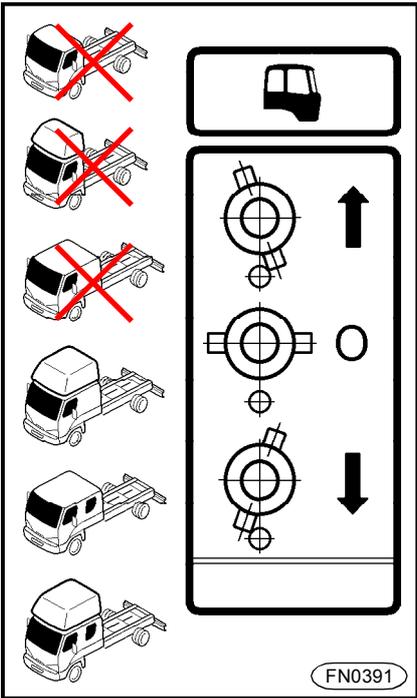
- Move the distributor lever (item 3) into vertical position downwards.
- Pump until locks of the rear location are closed (cabin rests down in place and is locked).
- Move the distributor lever (item 3) into horizontal position.

### Instructions for cabin tilting

#### Warning!

- Prior to tilt the cabin, shut the engine off and shift into neutral.
- Set the vehicle parking brake.
- Secure the objects which are placed inside the cabin and shut the doors properly .
- Prior to start tilting, we recommend to open the bonnet.
- Take an extreme care when tilting.
- Be very careful when working beneath the tilted cabin.
- It is not allowed to stay ahead of the cabin tilted.
- It is not allowed to stay beneath the cabin if tilted partially.
- The necessary workshop height to tilt the cab is 3,000 mm and 3,800 mm with the additional superstructure.
- If the vehicle is equipped with the safete bar of the tilted cab, it has to be always used!

### Cabin tilting at special versions



#### Cabin tilting

- Move the distributor into position. ↑
- Pump until the cabin is tilted completely (cabin will not fall over its zero point).

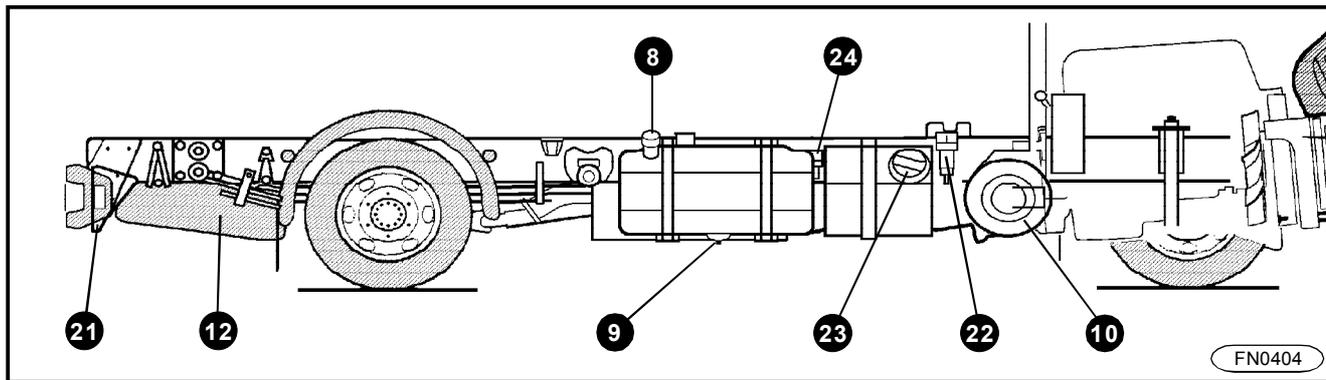
Note: The cabin starts to raise itself only after several lever strokes.

#### Cabin lowering

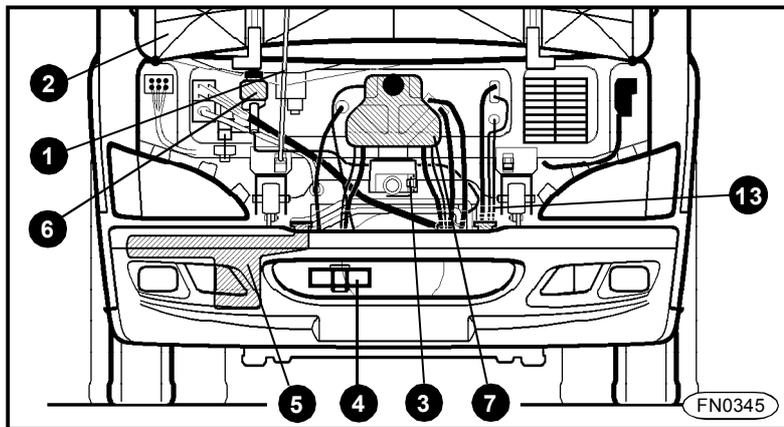
- Move the distributor into position ↓
- Continue to pump until the locks click in place and until you feel an increased resistance on the lever.
- Move the distributor into position. ↑
- Go on pumping by about 15 strokes to adjust the position of the cabin pin into a centre of the oval hole in the cylinder eye.
- Move the distributor into position O.

## DESCRIPTION

### Chassis c/w cabin

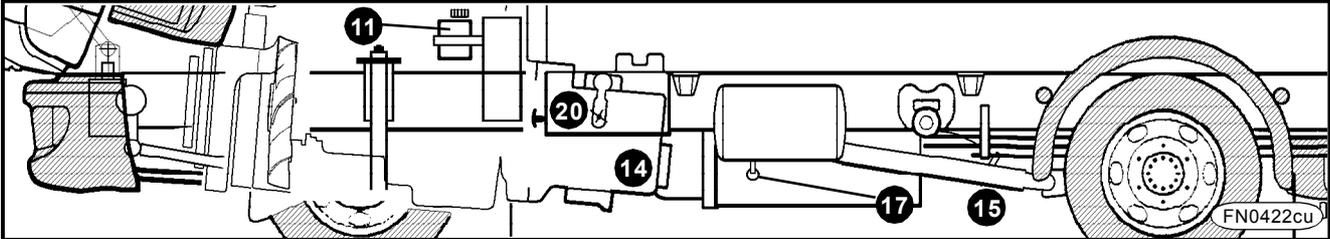


FN0404

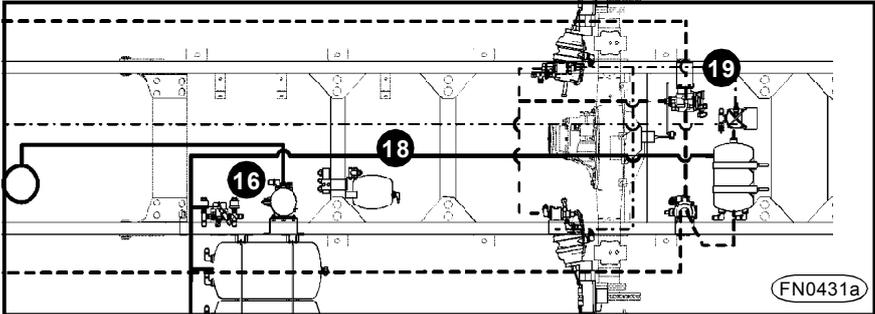


FN0345

- 1 Strut
- 2 Bonnet
- 3 Bonnet lock
- 4 Front coupling (for towing)
- 5 Washer tank
- 6 Clutch tank
- 7 Expansion tank
- 8 Fuel tank filler neck
- 9 Fuel tank drain plug
- 10 Air filter
- 11 Power-steering tank
- 12 Spare wheel (four positions - vehicle version dependent)



- 13 Oil dipstick
- 14 Gearbox
- 15 Propeller shaft
- 16 Air pressure regulator  
c/w air drier
- 17 Drain valve (2x)
- 18 Regenerating air reservoir 4.5 l
- 19 Brake pressure regulator
- 20 Battery case c/w circuit breaker
- 21 Wheel chock
- 22 Fuel filter
- 23 AdBlue fluid tank filler neck
- 24 Air intake filter into the SCR unit



### Check before the drive

- engine lubricating oil level – check/top-up
- urea (AdBlue) level – check/top-up
- drive belts + belts tensioner - check/correct
- fuel – check/top-up
- fuel-water separator – drain
- crankcase breather tube – inspect
- cooling fan – inspect
- engine coolant level – check/correct
- intercooler - check condition
- air cleaner – inspect
- air intake piping – inspect
- brake fluid in clutch booster circuit – check/top-up
- brake fluid in steering power circuit – check/top-up
- brakes and parking brake – check
- air tanks – drain (after trip)
- If the draining air contains excessive amount of water it is necessary to change air drier filter
- tyres – check pressure and condition
- cab – secure in locks at rear
- hood – secure in lock
- fluid level in tank of washers – check/top-up
- outside lamps, indicators and brake lamps – check
- head lamps – adjust tilt with regard to load weight
- check for possible leakage of fluids (oils, brake fluid, ... etc.) – by sight – on the spot where your vehicle was stopped after last trip
- In case of towing a trailer it is necessary to check the trailer connection to towing coupling, connection and functionality of electrical wiring and air brake hoses.

### Vehicle running-in

- The running-in of a new vehicle or vehicle after the general overhaul is terminated after covering 3,000 km (practically, the vehicle engine will reach the maximum possible output after covering several further thousands of kilometres).
- During the running-in period, do not run the engine above 3/4 of its top speed or at maximum fuel delivery under low engine speed.
- Avoid full throttle starts, running the engine at high speed and abrupt stops.
- Do not run the cold engine at high speed.
- Do not let engine labor. Downshift when engine no longer runs smoothly.
- Vehicle must not be loaded extremely.

#### Warning!

The way of running in the vehicle has a great influence upon its service life.

### Maintenance

- To achieve a maximum use value, economic and safe operation and maximum possible service life, it is necessary to carry out all maintenance works at regular intervals as stipulated in the Service Booklet.
- The vehicle maintenance must be carried out by **authorized service stations**, which have been acquainted with the vehicle design, do their work on a professional level, have the necessary equipment and are in direct contact with the manufacturer.

#### Warning!

- For the sake of proper operation the engine brake has to be switched on (switched off) at least once a week. Its lifetime will be prolonged by this measure.
- The differ. lock should be engaged / diseng. once a week at least. Its service life will be increased.

## Starting the engine

- Insert the ignition key and turn in "ON" position. Indicator and warning lights as shown in the illustration on the next page will come on.
- Starting the engine is possible only with no gear shifted in gearbox. Do not depress the accelerator pedal.
- When the glow plug warning lamp has gone out (applies to cold and even hot engine), start the engine by turning the ignition key to "START" position and hold it for a while (the engine will crank when holding the key in this position), until the engine starts running, however, for 10 seconds as a maximum. When starting repeatedly, keep the interval of min. 30 s between individual starting attempts.

### Warning!

- Should the indicator and warning lights of brake system malfunction, parking brake, engine - stop, engine - warning, engine - maintenance, SCR and ECAS be still on after turning the ignition to "ON" position even after a short while, you must not move off - find out the cause of the defect per Chapter "Troubleshooting".
- Use the winterized Diesel fuel and engine oil of the viscosity grade in accordance with climatic conditions in the winter months.

- After starting the engine, release the key, it will automatically return to "ON" position. After a regular engine run has been achieved, the glowing and charging indicator lights must go out. If not, find out the cause of the defect according to chapter **Troubleshooting**.

### Warning!

- When the indicator and warning lights of battery charging, parking brake, engine - stop, engine - warning; engine - maintenance, SCR and ECAS do not go out after starting the engine, do not move off.
- The vehicle must not be put in motion in any way unless the battery circuit breaker is on and the ignition key is inserted into ignition switch and turned in position "ON". The steering is unlocked in this position. Before you move off, check whether the steering wheel is free to turn.
- Do not run the cold engine at high speed - it could be damaged.

## During driving

■ After the vehicle is set in motion, check the efficiency of the service brake. Checking the braking efficiency is important especially in winter, after washing the vehicle or after fording (passing through a deeper pool of water). Brake up the vehicle repeatedly to allow a quick drying out of the brake system.

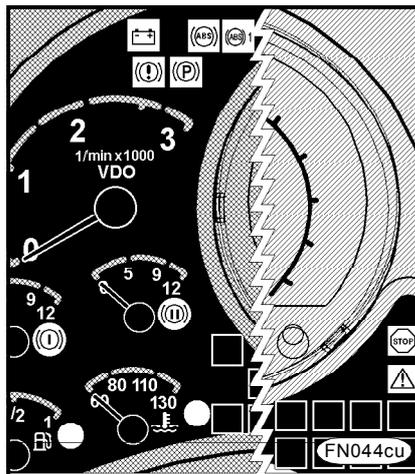
■ Do not brake sharply - on one hand the tires and brake system would be worn quickly and too much, on the other hand this way of braking would endanger the other motorists.

■ Depress the accelerator pedal gradually.

■ Depress the clutch pedal as far as it goes.

■ Shift to gears smoothly not to stress the engine extremely. Before engaging the reverse run, put the vehicle to a full stop not to cause damage to gearbox.

■ Before shifting to reverse gear at the gearbox model ZF 6 S 850 it is necessary to wait 3 to 5 seconds after depressing the clutch pedal (to allow stopping of shafts in gearbox) and only after that engage the reverse gear.



■ It is not allowed to drive without the engine running and the gear shifted.

■ Watch the indicator and warning lights on the move from time to time.

■ If any of the warning lamp shown in the picture above comes on while driving, it is necessary to stop the vehicle (at the soonest with regards to the traffic circumstances for the sake of safety). In addition, if the engine - stop light comes on, it is also necessary to shut

the engine off.

Then proceed according to Chapter:

### Troubleshooting.

If the coolant temperature indicator light comes on, it is necessary to reduce the vehicle speed, to downshift, and stop the vehicle as soon as possible and allow cooling down the engine by the enhanced speed (1,200÷1,500 rpm).

### Warning!

**In any case it is not allowed to shut the engine off when the coolant temperature indicator light comes on.**

If the fuel reserve indicator light comes on (item 1), it is still about 16 l fuel in the fuel tank.

If the yellow control light ECAS\* starts glowing, then the rear part of the vehicle is outside the driving height position (level) Applicable for version with pneumatic suspension only.

## Stopping the engine

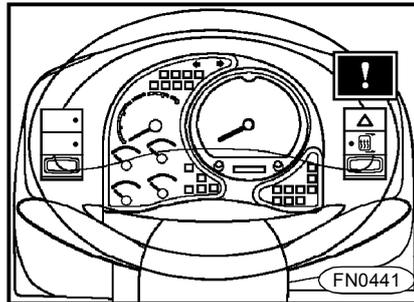
- Turn the ignition key from position "ON" to position "ACC" to stop the engine.

### Warning!

■ Turn off the battery master switch only 30 seconds after turning off the ignition to allow data processing by ECM (Engine Control Module) and to allow air to blow through the AdBlue injection system into the exhaust system (noise from the area of AdBlue tank may be heard). If the instruction as above is not followed a fault may be reported by warning lamps or the SCR system and/or damage of the SCR system may be caused due to insufficient removal of AdBlue residues (possible crystallization or freezing) and thus causing blockage of it.

### Warning!

- Never shut the engine off by turning off the battery circuit breaker - it may result in damage to wiring cables and alternator.
- The ignition key may be removed from the ignition switch only after full stopping of the vehicle.
- Before stopping the engine after a full load operation, allow it to idle 1 minute at least - see the label on the instrument board.

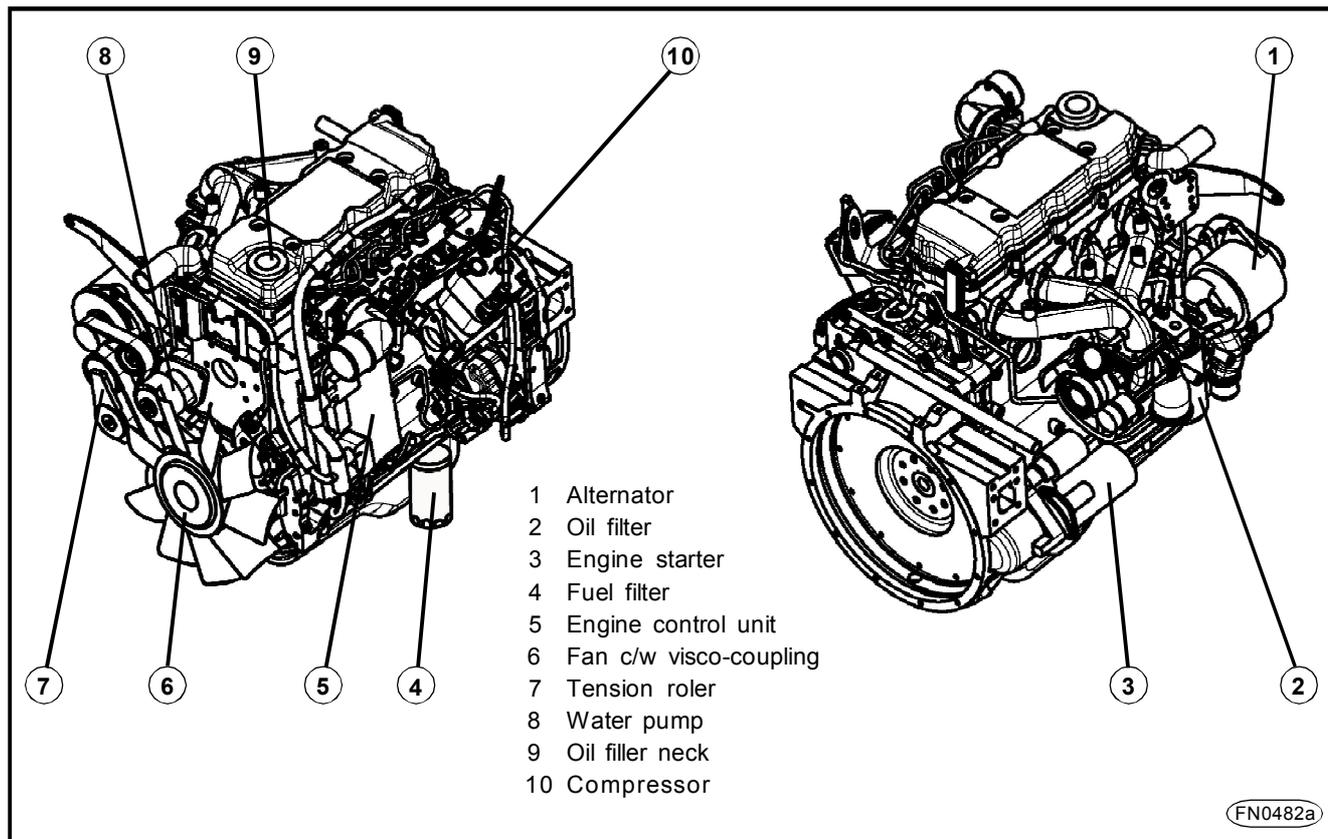


## Idle run

### Warning!

Do not let the engine run at idle or at speed to 1,000 rpm without load for more than 10 minutes. When the engine is running for a long time in these regimes, the temperature of the combustion space will drop so that the fuel cannot be burned completely. This may result in creation of carbon in the surrounding of holes of injection nozzles and piston rings what may lead to damage the engine. In addition, low temperatures will cause that all oil penetrating from valve gaskets will not burn in exhaust channels. The oil not burned can cause damage to turbocharger.

## Engine



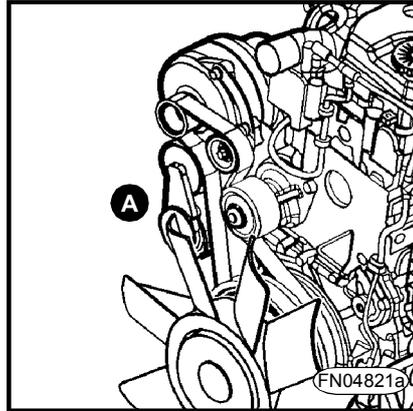
## Belt tensioning

### Cummins ISB4 160

- Diesel engine
- four-cylinder
- 16 valves
- max. power output  
117 kW / 2,500 rpm

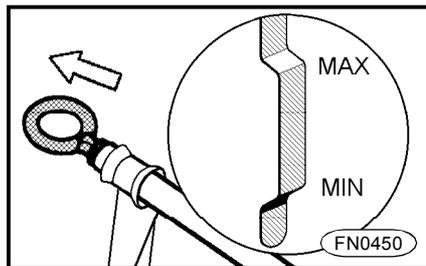
### Cummins ISB4 185

- Diesel engine
- four-cylinder
- 16 valves
- max. power output  
136 kW / 2,500 rpm



- The belt is tensioned automatically by the pulley (item A), which cares of the constant tension.
- When the belt has been damaged, it must be replaced immediately.

## Lubrication system



### Checking the oil level and kind of oil

- It is necessary to check the oil level before each drive (the oil is consumed a little by the vehicle operation).
- The vehicle must stand on level ground to check the oil level.
- Check the oil level before starting the engine when the oil level is stabilized.
- Pull dipstick out, wipe it clean with a rag and push it in a hole all the way.
- Pull dipstick out again. The oil level is correct when it is between marks on the dipstick. It must not be above the **MAX** mark, because the engine could be damaged.
- Add the oil in time not to allow the oil level to drop below the **MIN** mark.

- Always add the oil of the same quality.
- For the oil change intervals see the **Service Booklet**.

### Warning!

- **Have the oil changed and oil filter replaced at the authorized service station.**
- **The insufficient oil level will cause damage to engine.**
- **Keep the environment clean when handling the oil.**
- **When it looks that oil quality got worse (presence of water), contact the authorized service station promptly.**
- **Dispose of used oil in accordance with environmental regulations.**

Engine oil specification	Recommended oil viscosity grade
<b>A C E A</b>	<b>S A E</b>
E5 or E7	10 W - 40 5 W - 40

- The oil class, which was filled in the engine in the manufacturing plant, is mentioned on a sticker on the cap of oil filler hole.

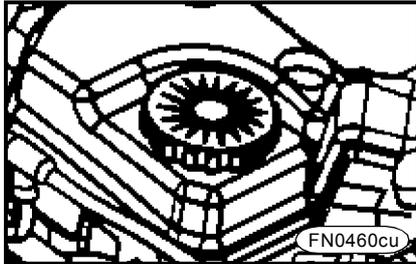
- **Always use the approved engine oils only.**

- Use of special oil additives is forbidden, because some additives combined with brand name engine oils may result in impairing the function resulting in damage to engine.

### Warning!

- **The manufacturer is not responsible for damages caused by neglecting the oil economy .**
- **The manufacturer does not provide any guarantee for engines damaged by use of oil additives.**

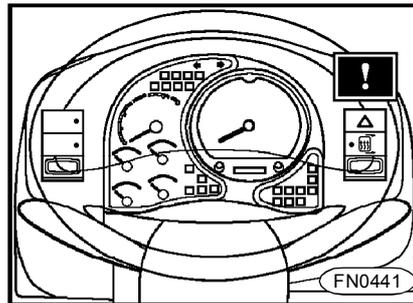
## Turbocharger



### Filling the engine with oil

- Unscrew the filler neck cap.
- Keep the environment perfectly clean when adding the oil.
- Do not fill the oil above **MAX** mark.
- When the oil level is correct, mount the cap again.

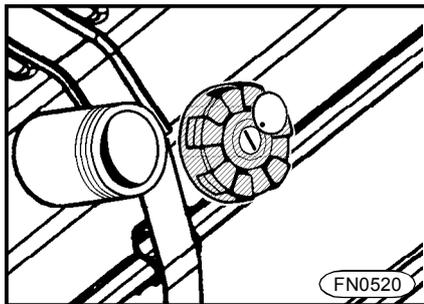
- Keep the environment clean and avoid mechanical damage to impeller of centrifugal blower by sucking in the mechanical dirt (for example during operation without installed coarse air filter).
- Before stopping the engine from a full load operation, allow it to run at idle for one minute at least (see the label on the instrument board) to secure the cooling down of turbocharger by oil and thus to avoid burning-in of carbon on the turbocharger shaft.



### Warning!

- If the turbocharger is defective, have it repaired at the authorized service station.
- To increase the service life of turbocharger, keep the air filter and the whole intake manifold perfectly clean.

### Fuel tank



■ To prevent air from entering the fuel system, never allow the fuel tank be completely empty.

■ The fuel tank capacity is 120 l (160 l\*, 200 l\*).

The float device is installed in the fuel tank. The fuel reserve in tank is checked by the fuel gauge on the instrument board.

■ The minimum fuel reserve makes 16 l (20 l\*) as indicated by the signal bulb at the fuel gauge.

■ The fuel gauge is operative with ignition turned in "ON" position.

■ The fuel tank neck is fitted with a lockable cap.

### Fuel

■ Your Diesel engine has been specifically designed to operate on Diesel fuel per ČSN EN 590 (656506). Prefer using the Diesel fuel with a low sulphur content (0.05% hm), which is available on the market.

■ In the winter months (from November 1 to March 31) you should use the Diesel fuel whose filtering ability (CFPP specification) meets the climatic conditions.

■ To assure the operation under low temperatures, you may put additives into Diesel fuel, which improve the filtering ability under low temperatures. Perform the mixing according to manufacturer's instructions.

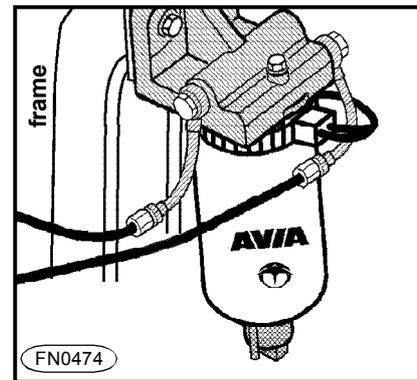
#### Warning!

■ Do not allow all the fuel be pumped out of the fuel tank.

■ The use of bio-Diesel is not permitted.

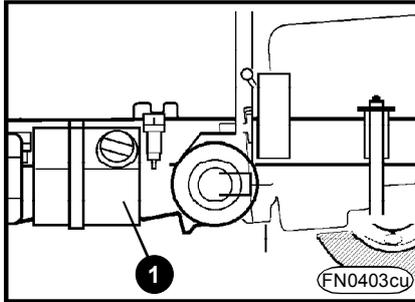
■ It is not allowed to add petrol into Diesel fuel.

### Draining the fuel filter



Unscrew drain bolts on the fuel filter bottom to allow draining of water from the fuel filter. When all dirt particles drip out, screw the bolts again.

## AdBlue fluid tank



- The tank “usable capacity” (item 1) is 23 l (total capacity 30 l).

In the tank the fluid level measuring device is installed. The shortage of fluid is indicated by the indicator light on the instrument board.

- When the AdBlue fluid level drops below **3 l of the usable capacity**, the warning lamp „**engine - warning**“ comes on and when the AdBlue fluid level of the usable capacity drops below **10 l**, the warning lamp „**SCR system malfunction**“ starts flashing

- Make it a habit to check the AdBlue fluid level in tank at every Diesel refueling.

AdBlue consumption fluctuates from 0,5 up to 3% of fuel consumption depending on ways how your vehicle is being operated and on engine load.

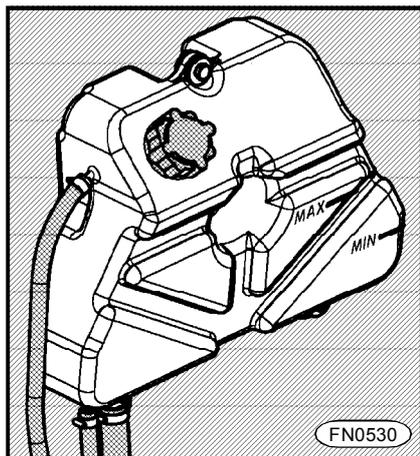
### Warning!

**If the warning lamp “SCR system malfunction” is on you must not drive the vehicle – exhaust emissions do not meet required values. Driving with the illuminating warning lamp is stored in the engine ECM.**

## AdBlue fluid

- Use exclusively the AdBlue fluid determined for the vehicle operation (standard DIN 70070).
- It is not permitted to replace the AdBlue fluid with other product or to mix it with other product. The catalytic converter system reducing the exhaust emissions could suffer a damage.
- Always remember to handle the AdBlue fluid with care. The AdBlue is a corrosive agent, which must never come in contact with other chemicals.
- If you stain your skin or hit your eyes with the AdBlue fluid, rinse the stained spots with a lot of water. Call a doctor if needed.

### Cooling system



#### Checking and adding the coolant

- The label saying which kind of coolant has been filled, is situated on the expansion tank or by the expansion tank. The cooling system has been filled with the fluid based on ethylene-glycol. The mentioned coolants can be mixed with coolants based on ethylene-glycol (C type).
- Check the coolant level at regular terms.
- The coolant level must be between

**MIN** and **MAX** marks when the engine is cold (when the engine is warm, the coolant level may exceed slightly the **MAX** mark). If the coolant level is too low, it is necessary to add it.

- For year round, add antifreeze (specification ASTM 4985) and distilled water in the ratio specified (see the manufacturer's instructions on the antifreeze packing).

- All year-round use of antifreeze protects the cooling and heating system against corrosion and sediments. For that reason do not reduce the concentration of the antifreeze by adding water even during the warm season of the year (always add it in the ratio with antifreeze).

- Take care not to spill the antifreeze on the body paint.

- Before the winter season comes, check the antifreeze in the cooling system for condition and concentration.

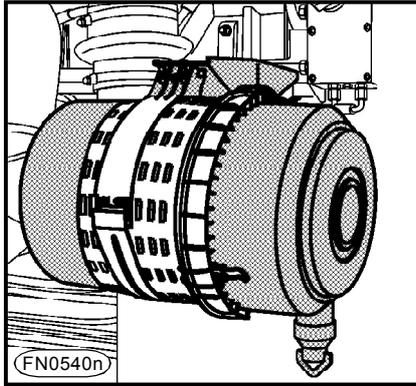
- Before the summer season comes and anytime when the face body area has been polluted, clean the radiator with compressed air or stream of hot water from the engine side.

Check the expansion tank cap.

#### Warning!

- Have the coolant changed at the authorized service station.
- Do not open the cap of coolant reservoir when the engine is hot - danger of scalding!
- Never run the engine with the thermostat removed.
- The expansion reservoir prevents the bleeding of the cooling and heating circuit. Remember to check the coolant level.
- When the engine overheats or the coolant leaks, have it corrected by the authorized service station.

## Air filter

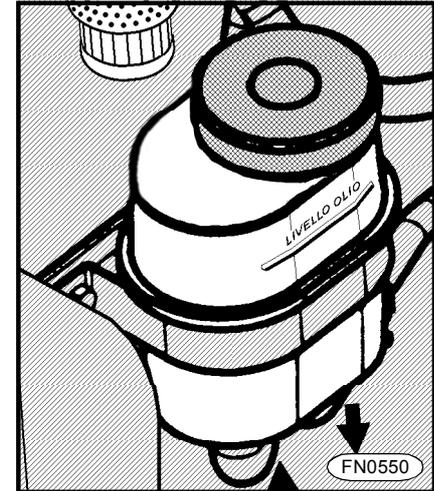


- The air filter cartridge replacement interval is stated in the Service Booklet.
- The clogged filter cartridge is indicated by the indicator light. When it comes on, you should visit the authorized repair shop immediately.
- Without regard to the pollution signalling, keep the replacement interval as mentioned in the Service Booklet.
- The condition of the air filter and intake manifold have a great influence upon the service life of turbocharger.

### Warning!

- Have the air filter cartridge replaced at the authorized service station.
- When the vehicle is operated in very dusty conditions, reduce the replacement intervals accordingly.

## Steering



### Checking and adding the steering oil

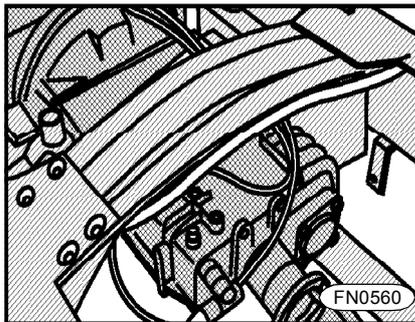
- Check the oil level regularly.
- The oil level in the tank must reach the "LIVELLO OLIO" mark. If it drops below this mark, it is necessary to add the oil of the ATF D II specification into circuit.
- If the steering play was found out, it is necessary to have it adjusted and/or repaired at the authorized service station.

### Gearbox

■ If the steering effort increases considerably during the vehicle operation, stop immediately and check the oil level in the tank of monoblock hydraulic power steering and check the hydraulic circuit for condition.

#### Warning!

- Have the oil changed and oil filter replaced at the authorized service station.
- If the oil needs to be refilled too often, visit the authorized service station.
- Do not run the engine when there is no oil in the power steering hydraulic circuit.
- Keep the environment clean when handling the oil.

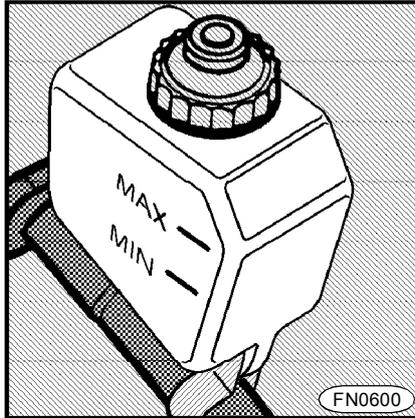


- Check oil level and quality in gearbox during service inspections.
- Check the gearbox for leaks. If you find out leakage, visit the authorized service station.

#### Warning!

- Have the oil changed at the authorized service station.
- When the vehicle is towed with engine at standstill and no gear shifted, disconnect the propeller shaft (at the rear axle) to avoid damage to gearbox due to insufficient lubrication.
- Do not start the engine when there is no oil in gearbox.

## Clutch



- The clutch is actuated hydraulically and completed with the air booster.
- In case that the fluid circuit has been aerated (clutch will disengage poorly), it is necessary to look for the authorized service station.
- When the clutch plate has been worn, the clutch system will be set automatically what is evident by discharging the fluid into tank (the fluid volume increases in the tank).

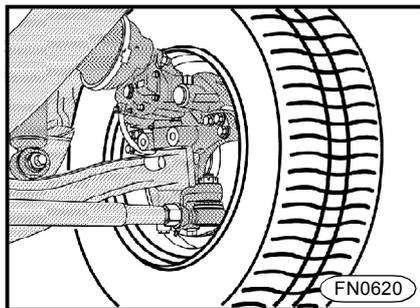
### Checking and adding the fluid

- Check the fluid level in circuit regularly.
- The fluid level must be between **MIN** and **MAX** marks. If it drops below MIN mark, add the fluid of the specification **DOT3, DOT4, DOT4+ or SAE J 1703**.

### Warning!

- Have the fluid changed at the authorized service station.
- Keep the environment clean when handling the fluid.
- When air leaks from the air system (for example during a long-term vehicle storage), the air booster will be put out of function what results in increasing the force needed to press down the clutch pedal.
- If the fluid needs to be added too often, contact the authorized service station.
- The fluid is harmful to health.

**Front axle**

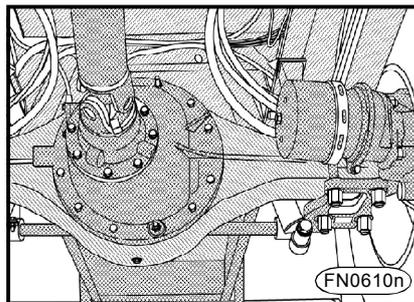


- If you notice that tyre treads wear unevenly on the front axle, check and/or have the front axle geometry adjusted at the authorized service station.
- The life of shock absorbers and their function depend on the way of driving and kind of operation.

**Warning!**

**Entrust some authorized service station to carry out all repairs, refills or adjustments.**

**Rear axle**



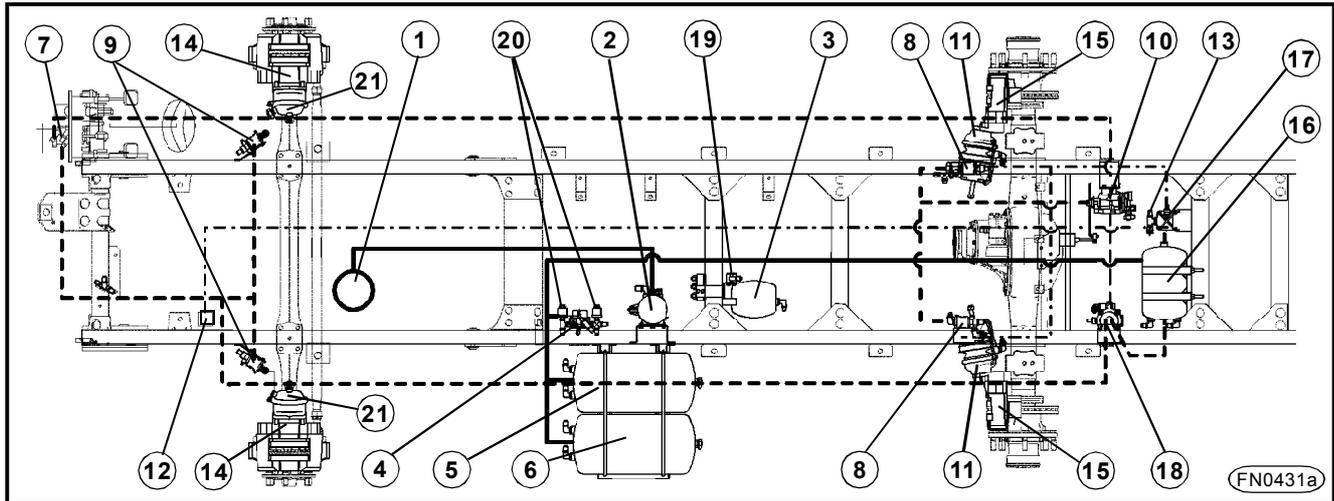
- Check the oil level and change the oil in axle final drive housings during service inspections.
- Visually check the axle final drive housings for leaks only. If you find out leakage, have it repaired at the authorized service station.

Transmission oil specification	Recommended viscosity grade
API	SAE
GL - 5	85 W - 140 H

**Warning!**

**Have the oil changed at the authorized service station.**

## Brake system



FN0431a

- |  |   |
|--|---|
| 1 Compressor                           | 11 Combined brake cylinder                                  |
| 2 Air pressure regulator c/w air drier | 12 Manual brake valve of parking brake                      |
| 3 Air reservoir 4.5 l                  | 13 Switch of minimum air pressure of spring loaded cylinder |
| 4 Four-way relief valve                | 14 Front axle brake system                                  |
| 5 Air reservoir 30 l                   | 15 Rear axle brake system                                   |
| 6 Air reservoir 30 l                   | 16 Air reservoir of parking brake circuit                   |
| 7 Master brake valve                   | 17 Valve relay  |
| 8 ABS valve (1 <sup>st</sup> circuit)  | 18 Trailer brake valve*                                     |
| 9 ABS valve (2 <sup>nd</sup> circuit)  | 19 ASR valve*   |
| 10 Automatic brake pressure regulator  | 20 Minimum air pressure sensor in circuits of service brake |
|  | 21 Membrane brake cylinder                                  |

### Service brake

- Disc brakes are mounted on both axles.
- The service brake system is dual-circuit, controlled pneumatically.
- Vehicles are standard equipped with ABS, the ASR is installed as option.
- The first circuit of the master brake valve controls the rear brake system.
- The second circuit of the master brake valve controls the front brake system.
- The automatic brake pressure regulator controls the braking force of rear axle wheels in dependence on the vehicle load.

#### Correct function of the service brake is indicated by:

1. Air pressure gauges picking up the pressures in 1<sup>st</sup> and 2<sup>nd</sup> circuits.
2. ABS indicator light.

#### Air pressure in circuit of service brake

Nominal pressure

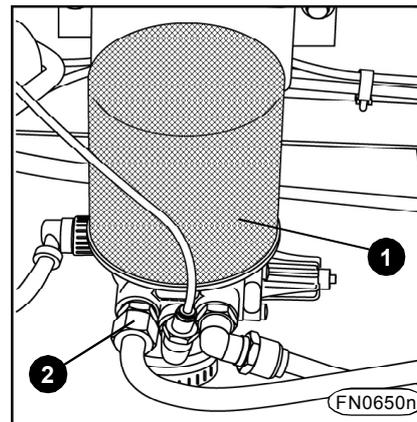
**0.85 ± 0.02 MPa (8.5 bar)**

Minimum pressure

**0.55 MPa (5.5 bar)**

#### Warning!

If it is not possible to reach the minimum level of the air pressure in the brake system, there is a fault in the service brake circuit which must be promptly repaired at the authorized service station. It is not permitted to continue to drive the vehicle until the fault is repaired.



#### Air pressure regulator c/w air drier

- This serves to clean and dry the air supplied from the compressor and to control the operating pressure in brake circuits.

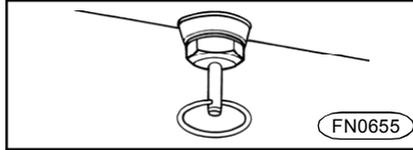
## Draining the condensate from air tanks

### Air drier filter replacement (Item1)

- Replace the air drier filter **always before the winter season**. If you find out water in drain valves, replace it immediately (water can be found in drain valves during regular service inspections).
- **No air pressure is allowed in the air drier.**
- Prior to start the replacement, clean the surface of the air drier and loosen the union nut to release the pressure (item 2) on the inlet.
- Clean the upper part of the air drier body, gently oil the gasket of a new filter and hand tighten to **15 Nm**.

### Warning!

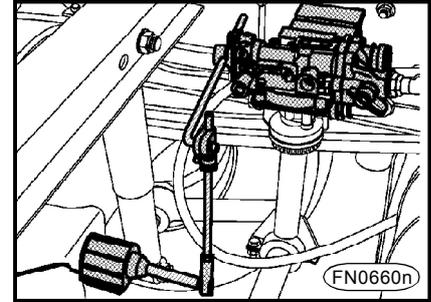
The used filter must be disposed of in accordance with environmental regulations (it may contain oil).



- In all air tanks of the pneumatic suspension and pneumatic brakes a water condensate accumulates, which has to be drained after every journey.
- When draining, a full operational air pressure must be in the system. Water condensate must be drained by swinging the handling levers of draining valves placed at the bottom part of air tanks.

### Warning!

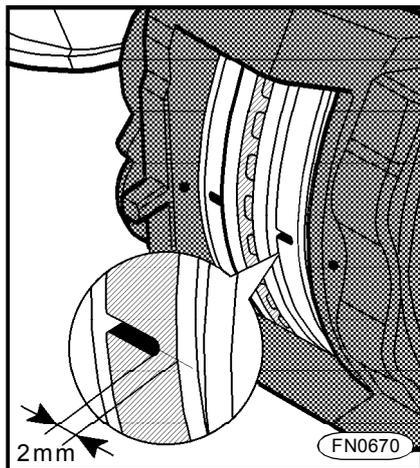
- In winter season and humid weather the draining has to be done several times a day..
- If the draining is not done regularly, as a consequence the vehicle safety can be compromised and instruments can be damaged; for such cases warranty is not applicable.



### Automatic brake pressure regulator

- The automatic load sensing valve serves to control the air pressure entering the combined cylinder of the rear axle dependent on the load on the rear axle.
- All adjustments must be carried out at the authorized service station. During operation, check visually the connection of regulator lever with axle, a free travel of the regulator lever and instrument tightness.
- The vehicle operator only gives the adjusting values of the brake pressure regulator according to vehicle version in case that real values do not respond to ones given on the label in the cabin.

### Checking the brake lining



#### Wheels brake system

- Disc brakes are mounted on both axles.
- Brake pads have been worn if the indicator light on the instrument board and diode on the check module under the glove box of the instrument board come on.

- Brake pads need to be replaced when there is no gap in their centres (see the figure).
- The minimum thickness of the brake pad friction material is 2 mm.
- The minimum total thickness of the brake pad is 9 mm.
- Replace the pads with ones of the approved type only.

#### Warning!

**Only the authorized service station may perform the replacement of brake pads.**

### Brake system inspections

- To assure a correct function of the brake system, it is necessary to check it for a good condition at regular terms.
- **Daily:**
  - drain the air reservoirs
- **Once a month:**
  - clean the air reservoirs from outside and check whether they have not corroded and if attached properly. Replace the damaged air reservoir immediately.
  - check the compressor intake manifold and check whether the air filter has not been polluted.
  - check the screwed connections and manifolds of the whole brake system for leaks.
  - check the pipes and hoses for a good condition. If damaged, carry out a replacement.

## Anti - Blocking - System

The ABS system enhances considerably the active driving safety of the vehicle. Compared with common brake systems, it keeps a good driving maneuverability even at sudden braking on wet roads because the wheels will not block.

However, you cannot expect that the braking distance will be reduced with ABS under all circumstances!

The ABS has been designed not to shorten the braking distance, but to keep the control ability over the vehicle. If the circumferential wheel speed is too low related to the vehicle speed and the wheel tends to slip, the braking pressure of this wheel will be reduced. The braking pressure controls each axle separately. Hereby the braking effect will be balanced and the driving maneuverability is kept as much as possible.

To allow a good function of ABS, the brake pedal must be hold depressed - **never brake up interruptedly!**

### Warning!

■ **When the ignition is on, the ABS indicator light must always come on. If the ABS indicator light does not go out in several seconds after the ignition is on, or when it does not come on at all and/or comes on during driving, the system is defective and the vehicle is braked without ABS. Only the normal brake system is operative on vehicle. Proceed to your nearest authorized service station in that case.**

■ **The enhanced safety which is offered by the ABS must not tempt you to undergo any risking!**

■ **All repairs and interventions in ABS may be performed by the authorized service station only.**

## ASR\*

■ The ASR system facilitates the acceleration and driving when the road adhesion is decreased. At the moment when the wheel on the driving axle starts to slip, it will be braked up and hereby the torque on the wheel with better adhesion conditions will be increased. At the same time engine speed (revolutions) and torque is being decreased.

■ While the ASR is being in operation the ASR warning lamp is illuminating.

### Warning!

■ **If the ASR indicator light does not go out in several seconds after the ignition is on, or when it does not come on at all and/or comes permanently on while driving, the system is defective and ASR is probably out of function. Proceed to your nearest authorized service station in that case.**

■ **When ASR is not functional, the normal vehicle operation is not influenced.**

■ **All repairs and interventions in ASR may be performed by the authorized service station only.**

### Emergency brake

The brake system has been designed so that when one circuit is defective, the emergency braking effect is secured.

#### **A loss of operating braking effect may be caused by:**

- Malfunction in the pneumatic part of the service brake due to air loss. The defect is indicated by the decreased pressure in one of two service brake circuits.
- Defect in the pneumatic part ahead of the four-way relief valve.
- Defect in one of four pneumatic circuits behind the four-way relief valve.
- Defect in the electrical part of the brake system - in the ABS system.
- Failure of the trailer brake system.

#### **Warning!**

The use of emergency brake always means the endangering of the vehicle operation because the emergency braking effect is always much lower than that of the service brake.

#### **Conclusion**

- Always before the set out for the drive and when driving, do not forget to check a good function of the brake

system so that you are watching air gauges and warning lamps of the brake system.

- Check a good function of bulbs of the brake system indicator lights by turning the ignition key from "ACC" to "ON" position when the indicator lights must come on.
- After full operating air pressure in the system is reached the warning lamps must go out.
- After the indicator lights have gone out, you may move off.

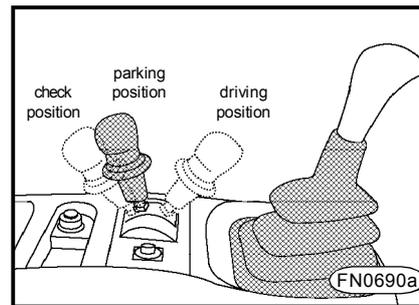
#### **Brake system instruments**

The vehicle user is obliged to carry out the continuous inspections of the brake system to check its condition and function. When some defect or suspicion of the defect has been found out, have the diagnostics and possible repair performed by the authorized service station.

#### **Warning!**

Any unprofessional intervention into the brake system is not allowed and all repairs and interventions must be entrusted to authorized service stations.

### Parking brake



- The parking brake is of spring-loaded type and acts on wheels of the rear axle.
- The energy needful to brake up the vehicle is accumulated in the spring of combined brake cylinder being air compressed. Air pressure will press the spiral spring and this way the parking brake is released.
- The parking brake is controlled by means of the manual brake valve lever, which is located behind the gearshift lever.

#### **Position of the parking brake lever**

- Parking position:

To brake up the vehicle, it is necessary to move the manual brake lever rearwards into the parking position (before the parking position is achieved, you have to overcome a point of pressure resistance and then the lever is automatically secured in the parking position).

■ **Check position**

(it applies to some vehicle versions only)

This position is designed to check if the parking brake system of the towing vehicle is capable to brake up the vehicle combination in a certain gradient in a safe manner. A function of the parking brake of the trailer brake is disengaged after pushing the manual brake lever and its displacing from the parking position rearwards into the check position; hereby the vehicle combination will be braked up by the parking brake of the towing vehicle only (hold the lever in this position during inspection). After releasing, the control lever will automatically return into the parking position.

■ **Driving position**

After releasing, gently raise the lock ring of the manual brake lever and move the lever forwards into a driving position.

**Warning!**

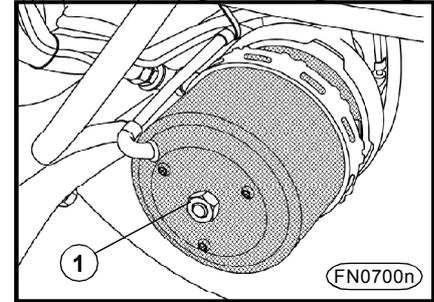
■ **The use of parking brake during driving is dangerous - danger of loss of control and skidding. Apply the parking brake only in case of urgent need.**

■ **It is not allowed to drive the vehicle when the indicator light of minimum air pressure in the spring-loaded brake lights - the vehicle is being braked up.**

■ **Pressures in a circuit of the spring-loaded brake:**

Nominal pressure  
**0.85 ± 0.02 MPa (8.5 bar)**

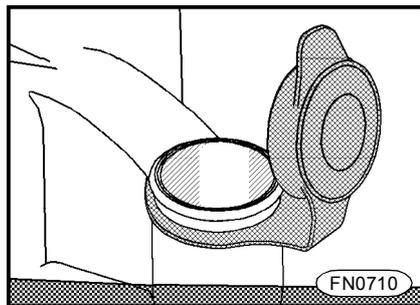
Minimum pressure  
**0.55 MPa (5.5 bar)**



**Releasing the combined brake cylinder - for the need of towing only**

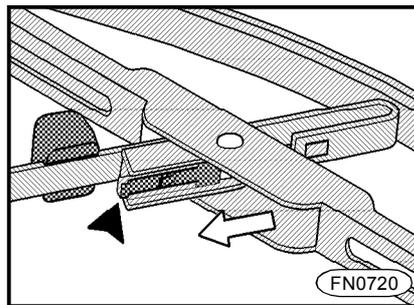
- Place the wheel chock to secure the vehicle against motion.
- Turn the nut **1** to unscrew the stem out of spring-loaded cylinder.

### Windshield washer & wipers



#### Fluid container

- The windshield washer container is situated in the front bumper.
- The container capacity is 7.5 l.
- The fluid can be added after opening the front bonnet.
- The respective indicator light\* indicates the minimum fluid level.
- Use water with glass washer solvent agent to add the fluid. In winter keep the stipulated ratio not to allow the fluid will freeze up (follow instructions mentioned on the antifreeze package).



#### Wipers

- For reasons of safety, keep the wiper blades in a perfect condition to assure good visibility.
- To assure good wiping, wash the rubber blades with glass washing agent regularly.
- On the wiper arm there are washer jets.
- The jets can be adjusted with a needle.
- The whole wiper arm body c/w jets can be moved freely along the arm.

#### Replacement of wiper blade

- Tilt the wiper arm.
- Tilt the wiper blade horizontally.
- Depress the plastic locking spring and remove blade by pulling it from location.
- Installation is a reverse of removal.

#### Warning!

- Do not use wipers to wipe dry glass - they may scratch it.
- Do not use wipers when there is a layer of snow on the windshield - clean the glass first.
- In the winter months, make sure first whether the wipers have not frozen up to the glass.

## Tyres and wheels

- Check the tyre pressures always before you drive the vehicle. Remember also to check the tyres if they are in a good condition (look for the tyre repair shop if they have been damaged).
- Tyre inflation pressures are mentioned on the plate inside the cabin and in table in Chapter **Technical Data**.
- No cuts, bruises or other damages showing the tyre casing cord are allowed on tyre treads or sides.
- In case of the uneven wear of tyre treads on front axles, check and/or adjust the front axle wheels geometry.
- The depth of tread grooves of tyres must be **1.6 mm at least**. If tyres treads are marked REGROOVABLE, the treads can be cut through to make them deeper (only a specialist may perform it).
- Only balanced tyres may be mounted on front wheels and all wheels must be in a good technical condition.
- Only tyres stated for the given type of the vehicle and recommended by the tyre manufacturer may be used on the vehicle.
- Protect tyres against oils and fuel.

- If the vehicle is put out of operation for a long time, it should be slightly raised to relieve the tyres.
- The dismantled wheels (tyres) should be stored in a dry and dark place.
- Check the tightening-up of wheel nuts at intervals stipulated in the **Service Booklet**.
- In addition, check the tightening-up of nuts on wheel bolts after covering the first **50 ÷ 100 km** and after every wheel removal to the torque of:  
 D 60-100 **370 ± 30Nm (6 x M18)**  
 D110-120 **485 ± 35Nm (8 x M20)**

### The service life of tyres depends on:

- way of driving and driving habits
- correct tyres inflation
- vehicle operating conditions
- geometry of front axle
- proper distribution of load on the load space

### Wheels and wheels data

Wheels of the front axle - 2 balanced ones  
 Wheels of the rear axle - 4 non-balanced ones  
 Spare wheel - 1 balanced one

#### Disc wheel:

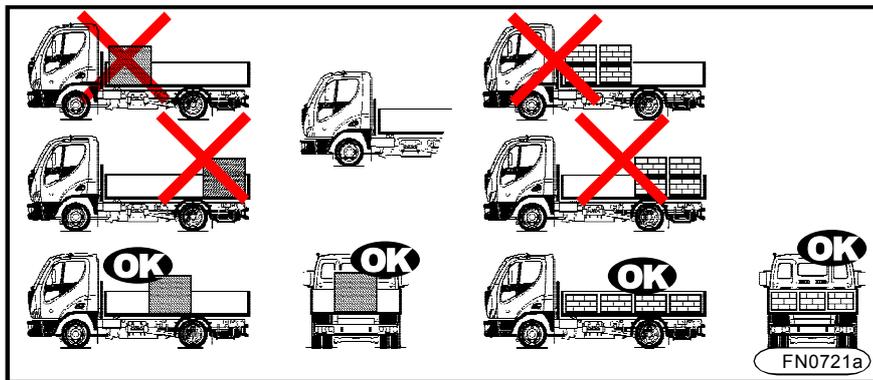
D 60-100: **17,5 x 6,00**  
 D110-120: **17,5 x 6,75**  
**19,5 x 6,75**

#### Tyres(radial):

**D60-90:** 215/75R 17,5  
 9,5R 17,5  
 225/75R 17,5  
**D100:** 225/75R 17,5  
 9,5R 17,5  
**D110-120:** 245/70R 17,5  
 265/70R 17,5  
 245/70R 19,5  
 265/70R 19,5  
 235/75R 17,5 (D110)

#### ALL STEEL TUBELESS

## Transport of loads



During the load transport, it is necessary to abide by the below mentioned instructions:

- Do not exceed the maximum allowable front axle load (see Chapter: **Weights and axle loads** in the section Tech. Data).
- Take care that the load is distributed correctly on the load space of the vehicle:
  - place the load to the centre of the load space
  - place the load evenly on the whole load space
  - keep a correct distribution of the weight (1/3 to the front ax. and 2/3 to the rear ax.)

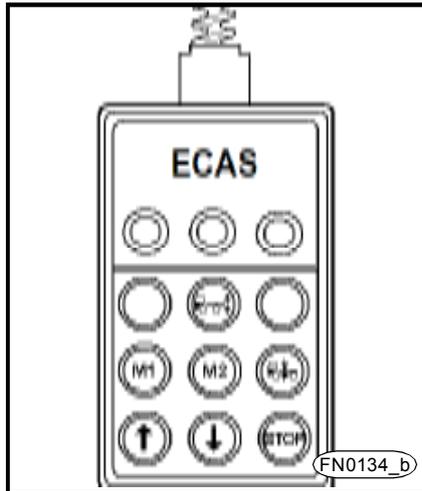
### Loading the train combination - towing vehicle with trailer

- For combinations with central axles trailer (trailer with fixed towbar) it is necessary to consider for calculating the total load of the towing vehicle a vertical static load coming from the trailer, developing load strain onto the coupling point (up to 10% of the total trailer weight, max.1000kg). This additional load surcharges the rear axle and simultaneously discharges the front axle of the towing vehicle.

### Warning!

- The towing combination load must be equally distributed in such a way, that the minimal front axle load is at least 30% of the total axle load of the towing vehicle and at the same time the maximal axle loads on all axles are not exceeded.
- For unloaded towing vehicle is allowed to tow only an unloaded central axle trailer with fixed towbar. This guideline is however not applicable for standard trailer with steering bogie.

## Electronic vehicle height adjustment (ECAS)\*



- The pneumatic suspension allows you to adjust the height of the vehicle tail part, suitable for coupling/discoupling the trailer or for loading/unloading the vehicle at a ramp.

- The height can be adjusted also while driving, however maximally up to 10 km/h speed.

- If the vehicle height is outside the driving position (level), the height will be automatically corrected after exceeding the speed 15 km/h.

### Operating guidelines

#### ■ System "switch on"

By pushing the button the system becomes active. Activated system is indicated by the control light over the button.

#### ■ Adjustment of desired height

By buttons or choosing the height desired.

#### ■ Memory utilisation

Note: there are 2 memories for saving two different heights.

To reach the height desired push the button "STOP" and simultaneously push button or . Desired height is saved in the selected Memory.

Then in case you operate the button

or , the height saved in the selected memory is automatically adjusted. Different height can be adjusted in the same way.

#### ■ Button utilisation

By pushing the button the operation raising / lowering the pneumatic suspension is immediately stopped.

By pushing the button while switching off the ignition the "Stand by" function is activated, which enables normal handling of the pneumatic suspension for 60 seconds (this is limited by air pressure).

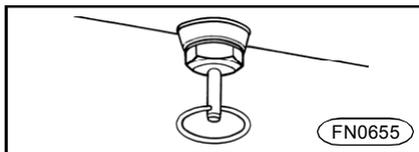
### Warning!

- In case of any danger the operation can be stopped by pushing the button .

- Fix the rear axle to the vehicle frame when raising the whole vehicle in order to avoid so called "sagging" of the rear axle.

If this instruction is not respected, the damage on pneumatic suspension bellows may be the consequence.

### Draining the condensate from air tanks



- In all air tanks of the pneumatic suspension and pneumatic brakes a water condensate accumulates, which has to be drained after every journey.
- When draining, a full operational air pressure must be in the system. Water condensate must be drained by swinging the handling levers of draining valves placed at the bottom part of air tanks.

#### **Warning!**

- In winter season and humid weather the draining has to be done several times a day..
- If the draining is not done regularly, as a consequence the vehicle safety can be compromised and instruments can be damaged; for such cases warranty is not applicable.

## Basic rules for the trailer coupling

- Secure the trailer rear wheels with chocks.
- The front trailer axle must remain steering.
- Adjust the trailer draw bar into a height of the trailer hitch.
- When engaging the reverse speed, make sure that nobody is standing between the trailer and vehicle.
- Make sure that the trailer is coupled correctly.
- Attach the brake hoses coupling heads and plug connectors of electric conductors.
- Check the brake system and lights for a correct function.
- Proceed very carefully when towing a trailer and do not exceed the allowable load limits.
- When stopping during uphill or downhill driving, check the manual brake for a good efficiency. It must hold the whole vehicle combination in a gradient on the spot.

### Warning!

The pieces of information mentioned in this chapter are the basic ones only. You should abide mainly by the instructions given in the Operation Manual for the connected vehicle.



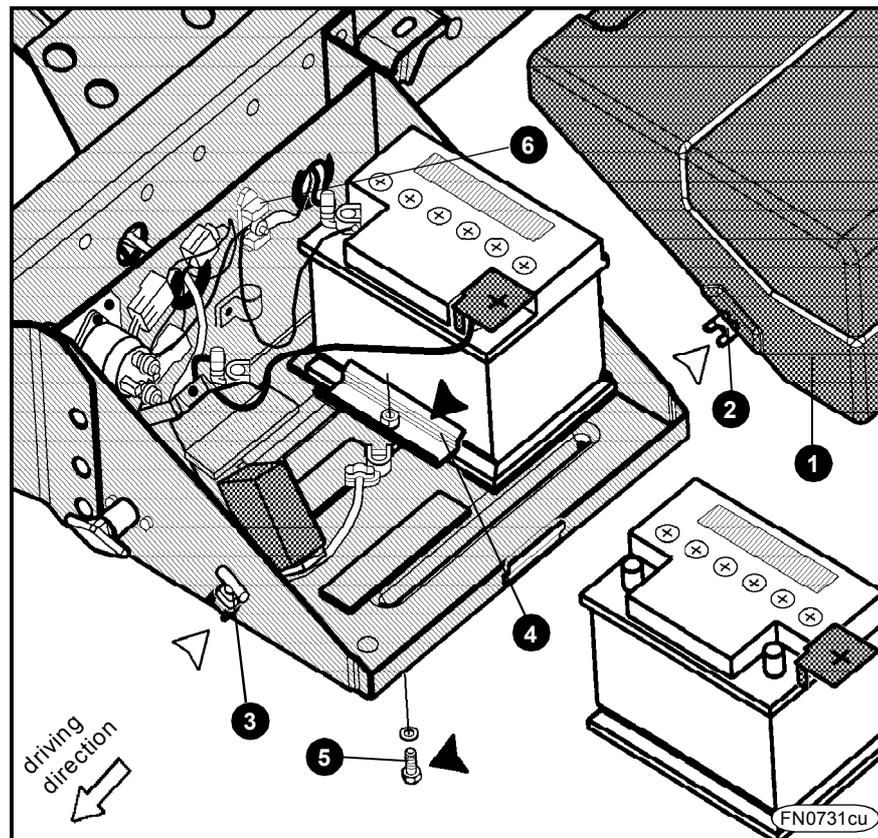
## Electrical equipment

- Clamps of all electrical consumers of the vehicle must be connected correctly and their polarity must not be mutually exchanged.
- Always charge the batteries outside the vehicle.
- With the engine running, do not switch off the battery circuit breaker and do not disconnect battery terminals.
- During handling the vehicle when short-circuit could occur, remember to switch off the battery circuit breaker.
- When you wash the vehicle, protect starter, alternator, glowing regulator and battery case against water to avoid short-circuit.
- For reasons of safety, during vehicle standstill (when parking in garage, etc.), when leaving the vehicle or when you find out any fault in the electrical equipment, switch the battery off.
- When the fire could occur, use the battery circuit breaker to disconnect the electrical equipment.

### Warning!

- **When the engine is not running, the battery is discharged by use of electrical consumers.**
- **Interdiction of electric arc welding outside the dealer service network. In case of breach of this interdiction damages on vehicle electrical components will be the consequence.**

## Location of battery



- 1 Plastic cover
- 2 Holder clip
- 3 Rubber holder
- 4 Profiled battery holder
- 5 Battery holder screw
- 6 Central ground point

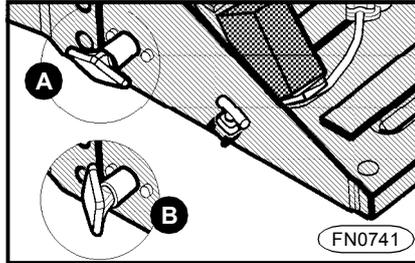
## Battery

- Instructions for the operation and maintenance are a part of the battery warranty card delivered with the vehicle.
- Check the battery condition, electrolyte level and tightening-up of the ground screw (item 7 on the previous page) every six months.
- When disconnecting the battery terminals, be sure to disconnect first the negative ("-") terminal. Proceed with care during removal of battery terminals not to cause short-circuit between "+" battery terminal and vehicle ground. After cleaning and careful connection of terminals connect the positive terminal ("+") to the battery circuit breaker again.
- Replace the discharged battery with a battery of the same capacity, voltage, ampere load and size.

### Warning!

- Charge up the battery always outside the vehicle.
- The used battery must be disposed of with regard to environmental regulations.

## Battery circuit breaker



A circuit breaker on / B circuit breaker off

### Warning!

- Turn off the battery master switch only 30 seconds after turning off the ignition to allow data processing by ECM (Eng. Cont. Mod.) and to allow air to blow through the AdBlue injection sys. into the exhaust system (noise from the area of AdBlue tank may be heard). If the instruction as above is not followed a fault may be reported by warning lamps or the SCR sys. and/or damage of the SCR sys. may be caused due to insufficient removal of AdBlue residues (possible crystallization or freezing) and thus causing blockage of it.

### Warning!

Never shut the engine off by the battery circuit breaker - this could damage the electrical equipment and alternator.

## Alternator

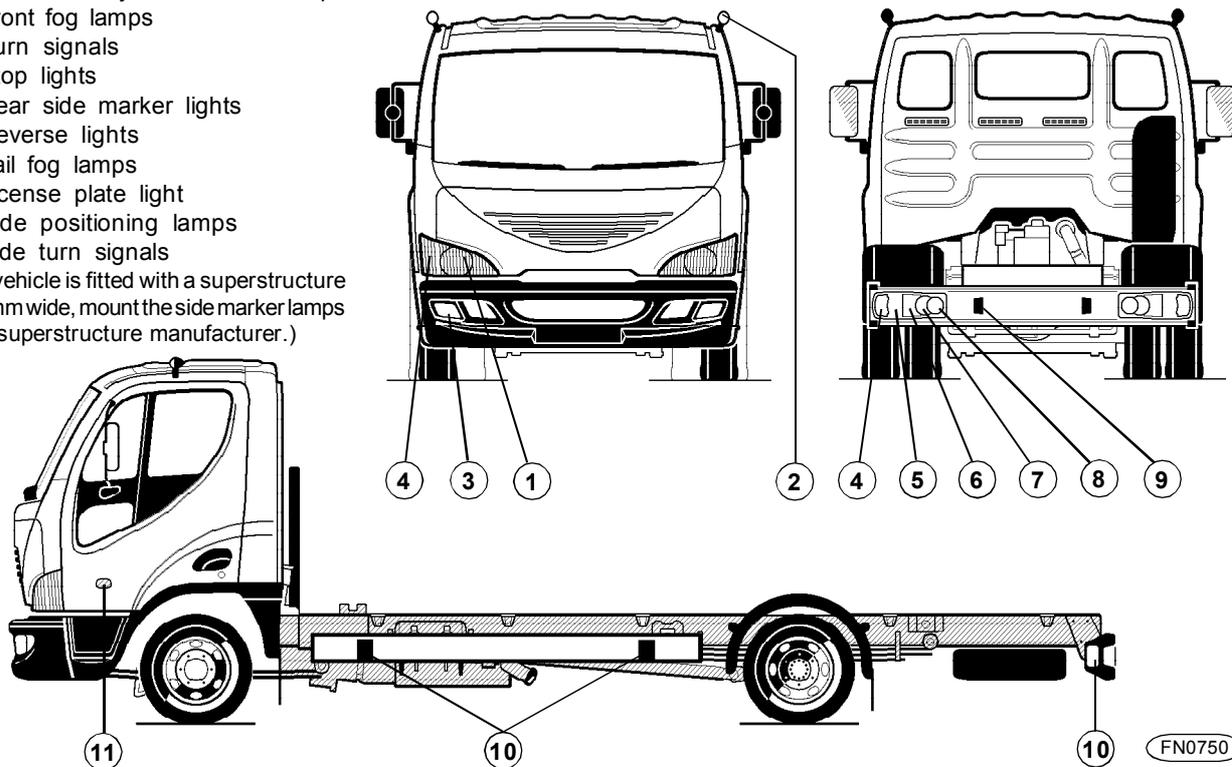
### Warning!

With the engine running the alternator terminals must not be disconnected and the battery circuit breaker must not be switched off - the alternator must not run without load.

## Headlamps and lights - location

- 1 Front headlamps
- 2 Front auxiliary side marker lamps
- 3 Front fog lamps
- 4 Turn signals
- 5 Stop lights
- 6 Rear side marker lights
- 7 Reverse lights
- 8 Tail fog lamps
- 9 License plate light
- 10 Side positioning lamps
- 11 Side turn signals

(If the vehicle is fitted with a superstructure 2,550mm wide, mount the side marker lamps of the superstructure manufacturer.)



FN0750

## Vehicle care

### Warning!

In case that the vehicle is fitted with a superstructure and the tailgate covers the rear cluster lamps in a tilted condition, the driver is obliged to place a warning triangle behind the vehicle under decreased visibility with the tailgate tilted and standing on a road. The special label inside the cabin being visible from the driver's place reminds you of this obligation.

### Cleaning agents

- As far as the cleaning agents or other chemical vehicle-care products are concerned, you should follow the manufacturer's directions when using them both for the vehicle interior or exterior.
- The non-suitable cleaning agents may impair the value of vehicle components.
- You should not use the volatile agents (acetone, diluents, gasoline), cleaning agents (wash powders) and bleaching or other aggressive agents except for those recommended to remove spots from clothes.
- Take care that the ventilation is enough when working in interior (vapours of some agents are harmful to health).

### Care of the vehicle interior

It is important to use correct cleaning agents and procedures (see instructions mentioned on cleaning agents). When not observing these instructions, hard removable spots may stay on interior materials after cleaning.

### Plastic parts

- Use wet rag to clean the plastic parts.
- After a rough cleaning by wet rag, you can apply the agents recommended.

### Seat belts

Clean them with a soap water solution.

### Warning!

- The seat belts should be kept clean - dirt would affect the function of retractor.
- Before winding, the seat belts must be perfectly dry.
- The seat belts must not be cleaned chemically.

### Doors and windows seals

Apply rubber preserving agents to seals of doors and windows from time to time to increase their life.

### Windows

- Use window cleaning agents.
- Use a plastic scraper to remove snow in winter.

### Care of the vehicle exterior

- Frequent washing and preserving are a good protection of the vehicle against negative influences of the environment.
- Regular care will contribute to maintain the value of your vehicle.
- It is important to use correct cleaning agents and procedures (see instructions mentioned on packages of cleaning agents). When not observing these instructions, hard removable spots may stay on exterior surface materials after cleaning.

### Washing the vehicle

- The best way how to maintain the paint in a good condition is to wash it very often.
- Use the lukewarm or cold water to wash the vehicle.
- Do not use hot water or do not wash the vehicle in direct sunlight.
- First use plenty of water to wash off the dirt thoroughly.
- After washing off the dirt, use a soft sponge to clean the body from the roof down using water and car-wash shampoo in ratio as mentioned on the packing. It is necessary to rinse the sponge often during washing.
- Use plenty of water to rinse the vehicle off after washing (do not allow the agents to dry on the body paint) and dry it out with a chamois.

### Warning!

**Keep environmental regulations when washing the vehicle.**

### Waxing and polishing

- When waxing and polishing the vehicle regularly, you will obtain a good shine and easier maintenance during the next washing.
- Apply wax to a clean and dry body.

### Warning!

**Do not apply polishing and waxing agents to plastic parts.**

### Damage to the body paint

Correct each damage to paint promptly not to allow a rapid corrosion of the bare metal. Entrust the work to a specialized workshop.

## Engine

### **1. Starter does not crank the engine or cranks slowly**

**A) Fault: Battery circuit breaker is off**

Remedy: Switch the battery circuit breaker on

**B) Fault: Engaged gear**

Remedy: Move the gearshift lever to the neutral position.

**C) Fault: Blown fuse**

Remedy: Replace the fuse. If the new fuse blows immediately again, have the vehicle checked at the authorized service station

**D) Fault: Charged battery**

Remedy: Charge the battery according to instructions mentioned in the battery warranty card delivered with the vehicle

**E) Fault: Faulty electric wiring**

Remedy:

- Check and clean battery outlets and terminals
- Check and/or clean connections from battery to engine
- Check the cables connection of starter and/or tighten

**F) Fault: Faulty neutral switch**

Remedy: Contact and have it repaired at the auth. serv. station

**G) Fault: Faulty starter**

Remedy: Contact and have it repaired at an authorized service station

### **2. Starter cranks the engine but the engine cannot be started**

**A) Fault: No fuel in tank**

Remedy: Fill the fuel and bleed the fuel system

### **3. Engine starts but will not keep running**

**A) Fault: Too low idle run speed**

Remedy: Contact and have it repaired at an authorized service station

**B) Fault: Faulty fuel inlet**

Remedy: Contact and have it repaired at an authorized service station

**C) Fault: Clogged fuel filter cartridge**

Remedy: Contact and have it repaired at an authorized service station

**D) Fault: Air penetrates into the fuel system**

Remedy: Contact and have it repaired at an authorized service station

### Engine

#### **4. Engine will not reach the rated output**

**A) Fault: Fuel filter has been clogged with dirt**

Remedy: Contact and have it repaired at an authorized service station

**B) Fault: Wrong function of injection system**

Remedy: Contact and have it repaired at an authorized service station

**C) Fault: AdBlue tank empty**

Remedy: AdBlue tank re-filling

#### **5. Engine is knocking**

Remedy: Contact and have it repaired at an authorized service station

#### **6. Engine smokes excessively**

**A) Fault: Faulty or wrong adjusted injection unit or fuel injectors**

Remedy: Contact and have it repaired at an authorized service station

**B) Fault: Faulty turbocharger**

Remedy: Contact and have it repaired at an authorized service station

#### **7. Engine overheats**

**A) Fault: Insufficient coolant level**

Remedy: Check the cooling circuit for leaks, repair the fault and add the fluid

**B) Fault: Insufficient function of cooler**

Remedy: Clean the cooler surface

**C) Fault: Faulty thermostat**

Remedy: Contact and have it repaired at an authorized service station

**D) Fault: Faulty function of the fan visco-coupling**

Remedy: Contact and have it repaired at an authorized service station

#### **CAUTION:**

If the cooling indicator light comes on, it is necessary to stop the vehicle as soon as possible and to cool down the engine by enhanced engine speed (1,200 ÷ 1,500 rpm).

In any case do not shut the engine off after the cooling indicator light comes on.

## Engine

### **8. "Engine - stop" indicator light ON**



**Fault:** Serious engine defect (it may be probably the coolant temperature, charge air temperature or oil pressure)

**Remedy:** Stop the vehicle and shut the engine off.

Carry out the diagnostic test (the diagnostic procedure is mentioned on the following page). If the light code lights up during this test, there is a serious defect in the engine and it is necessary to contact the authorized service station. It is strictly prohibited to continue to drive the vehicle. However, when the indicator lights "engine - stop" and "engine - warning" light together permanently during the diagnostic test, you can continue to drive the vehicle.

### **9. Indicator light "engine - warning" is ON**



**Fault:** Fault in the engine system or in the engine component and/or the AdBlue fluid volume drop in the tank below 3 l

**Remedy:** Add the AdBlue fluid to tank. If the indicator light still remains ON, you can continue to operate the vehicle, but when you reach the nearest service station, have the fault repaired - this situation is not considered to be a state of emergency.

### **10. Indicator light "engine - warning" flashes**



**Fault:** If the indicator light flashes for about 30 seconds when the ignition is in the position "ON". It reminds you of carrying out the necessary service job (e.g. the engine oil change) or it indicates the presence of water in fuel.

**Remedy:** Drain the fuel filter according to Chapter "Draining the fuel filter".

If the indicator light is still ON, it is necessary to contact the authorized service station.

**Note:** After the oil has been changed do not forget to store this action into the engine ECM - have it carried out by the authorized repair shop.

### **11. Indicator light "SCR system malfunction" is ON**



**Fault:** The tank of AdBlue is empty

**Remedy:** The vehicle may be still operated, but when you reach the nearest service station, have the fault repaired - this situation is not considered to be a state of emergency.

## 12. Indicator light



### "SCR system malfunction" flashes

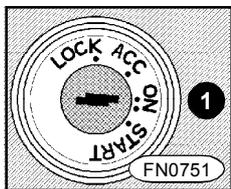
**Fault: Fluid AdBlue level drop below 10 liters**

**Remedy:** Add the AdBlue fluid level to tank during the next Diesel refuelling

## 13. Diagnostic test

**Fault:** The indicator lights

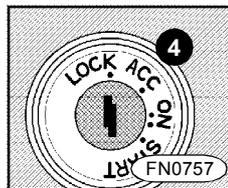
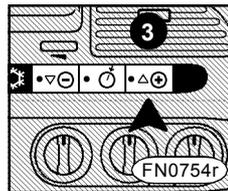
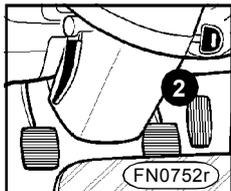
"engine - stop"  "engine - warning"  are ON



Which of two indicator lamps is on determines the kind of defect (three- to four-digit fault code).

How to start the diagnostic test:

- 1) The ignition key must be in position "ON" (item 1).
- 2) Depress three times the accelerator pedal and release it (item 2) -
- 3) The orange indicator light "engine - warning" will begin lighting and when it goes out, the red indicator light "engine - stop" will start blinking to show



the fault code.

The fault code blinking repeats itself continuously. It is necessary to put down the fault code number. To detect other faults, it is necessary to push the cruise control switch (item 3) marked "+" and the procedure of fault code blinking will begin to repeat itself - either the same fault code appears (if there is no other fault code) or another fault code displays (put it down) and by repeated pushing the cruise control switch "+" further blinking of the fault code will be activated - go on in that way until the first fault code appears again.

On termination of the diagnostic test, move the ignition key (item 4 to position "ACC" and wait 30 seconds.

## Engine

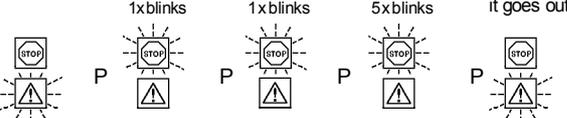
## Electrical equipment

**Example of fault codes**

**Fault code 115:**

P=pause

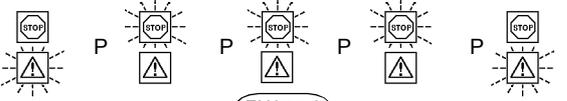
1xblinks      1xblinks      5xblinks      it goes out



1 it lights      it comes on

**Fault code 244:**

2xblinks      4xblinks      4xblinks      it goes out



1 it lights      it comes on

FN075 8

**The indicator light "engine-stop" displays the fault code number. The example of fault code determination is illustrated.**

- after the orange indicator light "engine-warning" goes out
- 1x the red light blinks
- pause 1-2 s
- 1x the red light blinks
- pause 1-2 s
- 5x the red light blinks
- pause 1-2 s
- the orange light come on again (end of fault code lighting)

**fault code = 115**

### **1. The battery charging indicator light is on**

#### **A) Fault: Fault in the charging circuit**

Remedy: First check whether all cables of alternator, accumulator batteries and battery circuit breaker are tightened thoroughly and/or connected to respective terminals. Check also whether connections including the battery ground cable have not been corroded. If all the above have been checked and found correct it is necessary to go to an authorised repair shop.

### **2. The battery charging indicator light does not come ON when the ignition is ON**

Remedy: Contact and have it repaired at an authorized service station

**Monoblock hydraulic power steering****3. The parking brake has been blocked, the air pressure gauge of brake system indicates the pressure below the minimum value, the vehicle cannot be put in motion**

Remedy: If even after several minutes of engine running the operating air pressure in the system is not reached, release the spring brake cylinders (see Chapter Parking brake) and have the vehicle towed to the nearest repair shop.

**4. The ABS indicator light is on**

Remedy: The equipment is not OK, the vehicle is braked without ABS function. Only the normal brake system is functioning on the vehicle. In that case it is promptly necessary to visit the authorized service station. Adapt the driving to the situation.

**Brakes****5. The ASR indicator light is on**

Remedy: The equipment is not OK, the ASR system is not working. It is necessary to visit the authorized service station.

**Note:** When the ASR system is out of function, the common vehicle operation is not influenced.

**6. Warning lamp is flashing "Air suspension system failure" /red warning lamp/**

Repair: The pneumatic suspension system is out of order.

If the situation allows that, it is possible to drive to the nearest authorised workshop. The driver however has to drive with maximum precaution with regard to existing circumstances so that the road circulation safety or his own personal safety are not endangered.

If the vehicle height is below the driving height (level), continuation of the journey is inadmissible and Assistance service has to be called in.

**3. The parking brake has been blocked, the air pressure gauge of brake system indicates the pressure below the minimum value, the vehicle cannot be put in motion**

Remedy: If even after several minutes of engine running the operating air pressure in the system is not reached, release the spring brake cylinders (see Chapter Parking brake) and have the vehicle towed to the nearest repair shop.

**4. The ABS indicator light is on**



Remedy: The equipment is not OK, the vehicle is braked without ABS function. Only the normal brake system is functioning on the vehicle. In that case it is promptly necessary to visit the authorized service station. Adapt the driving to the situation.

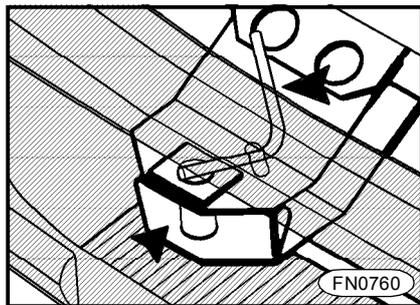
**5. The ASR indicator light is on**

ASR

Remedy: The equipment is not OK, the ASR system is not working. It is necessary to visit the authorized service station.

**Note:** When the ASR system is out of function, the common vehicle operation is not influenced.

## Towing



- Use the pin to attach the towing bar in the middle part of the front bumper.
- When towing the vehicle with the engine at standstill and no gear speed shifted in gearbox, disconnect the propeller shaft not to damage the gearbox due to insufficient lubrication and release the spring-loaded cylinder in accordance with Chapter "Parking brake".
- The ratio of the towed and towing vehicles weights must be **1.4:1** at least.

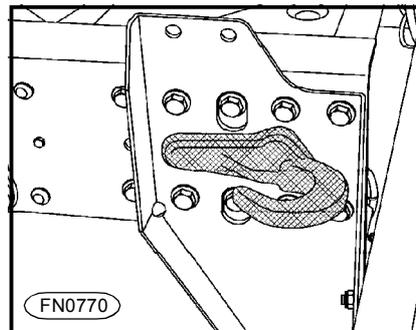
### Warning!

- With the engine off, the power steering and brake booster are out of function.
- Use only the tow bar to tow the vehicle; other connection is not permitted.

### Disconnecting the propeller shaft

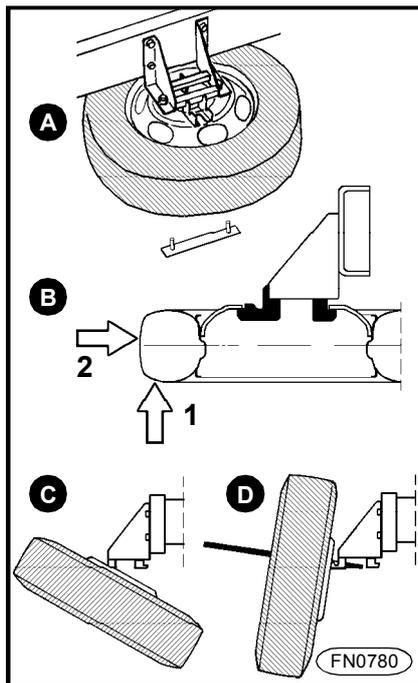
- Secure the vehicle against motion.
- Dismount bolts fixing the propeller shaft to the axle final drive housing flange.
- Attach the propeller shaft to the vehicle frame in a suitable manner.
- After the vehicle towing and repair have been accomplished, remount the propeller shaft to the axle final drive housing flange again; tighten the self-locking nuts to  **$M_k = 60 \pm 10$  Nm**.

## Vehicle recovery



There is a special hook welded to the left bracket on the rear bumper to hold a rope in case of recovery.

## Spare wheel holder (L, E, S, G)



### Removal of spare wheel

■ Dismount the spring split pin and two nuts to loosen the thrust plate (Fig. A).

- Raise the wheel while holding the tire (Fig. B) in point 1 and with the wheel lifted, push in point 2 towards the centre of the vehicle (the wheel will swing - see Fig.C - danger of injury).
- Remove the wheel from holder.

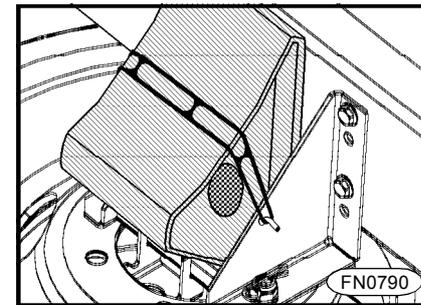
### Installation of spare wheel

- Use the assembling bar for the cabin lifting to raise the wheel so that it remains hanging in grooves of front holder brackets (Fig.D).
- Swing the wheel into the horizontal position towards you so that it rests on the contact surface of the rear bracket and simultaneously on contact surfaces of front brackets ahead of stop lugs.
- Tighten the thrust plate from below by two nuts and secure with the wire clip at one of two bolts.

### Warning!

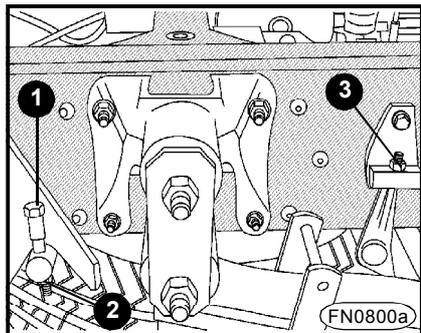
Proceed with extreme care with regard to the wheel weight.

## Wheel chock (L, E, S, G)



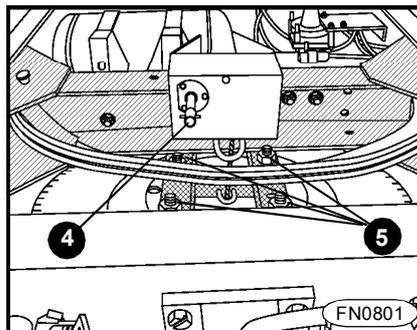
It is fitted above the holder of the spare wheel.

## Spare wheel holder (K, N)



### Removal of spare wheel

- Dismount bolt 1 c/w nut 2 and nut 3 on the LH and RH side of the spare wheel hanger.
- Put the handle out of the vehicle equipment onto a winch 4 and turn the handle to lower the spare wheel c/w hanger on ground.
- Dismount four bolts c/w nuts 5 and remove the wheel from hanger.



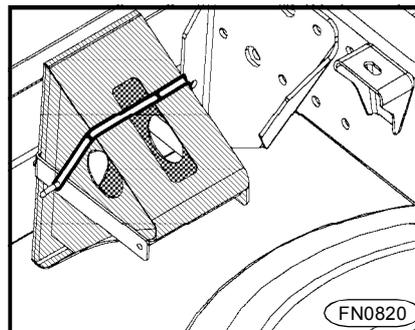
### Installation of spare wheel

- During installation first attach the spare wheel by four bolts c/w nuts to the hanger, use the winch to attract the hanger c/w spare wheel to the frame and secure the hanger with bolt 1 c/w nut 2 and nut 3 on each side.

### Warning!

Proceed with extreme care with regard to the wheel weight.

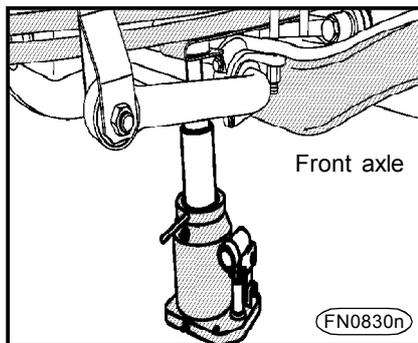
## Wheel chock (K, N)



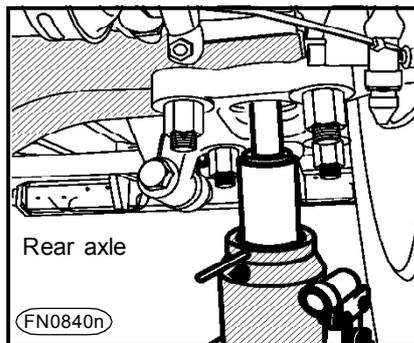
It is fitted on the rear bumper.



## Changing the wheel



- When changing a wheel, the vehicle must stand on level ground if possible.
- Secure the vehicle with the wheel chock and set the parking brake.
- Remove the spare wheel from holder.
- Loosen the wheel nuts by a lug wrench (from the vehicle equipment) by 1/2 turn.
- Location of jack:
  - on the front axle, place the jack with its head into a hole in the metal sheet guide situated under the leaf spring ahead of the axle (see the figure).
  - on the rear axle, place the jack with its head into a recess of the clamping plate of the leaf spring shackle.



### Warning!

**The jack must stand firmly on the firm subgrade.**

- Raise the wheel by several centimetres above the ground by moving the lever (with the valve closed).
- Unscrew the wheel nuts, remove the wheel and fit the spare wheel in place.
- The contact surfaces of disc and wheel hub must be clean.
- Tighten the wheel nuts partially and evenly.

### Warning!

**With the vehicle lifted, never start the engine.**

- Open the jack valve slowly and carefully lower the vehicle on ground.
- Tighten the wheel nuts completely to:
  - D 60-100 **370 ± 30 Nm (6 X M18)**
  - D 110-120 **485 ± 35 Nm (8 X M20)**
- Check tightness of wheel nuts after covering 50 ÷ 100 km.

### Warning!

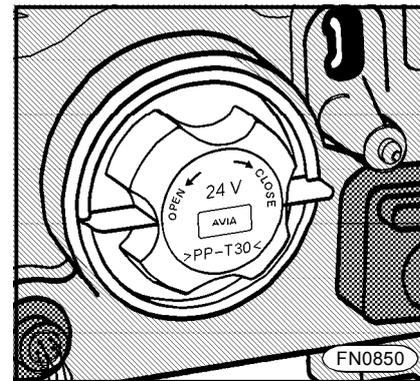
**Operating and transporting positions are shown on stickers placed directly on the jack.**

## Replacing bulbs

- Prior to the bulb replacement, switch off the respective light.
- Replace the defective bulbs with bulbs of the same parameters (designation and parameters are mentioned on the bulb).
- Do not touch the halogen bulb glass with bare fingers - it would loose its efficiency after switching on.

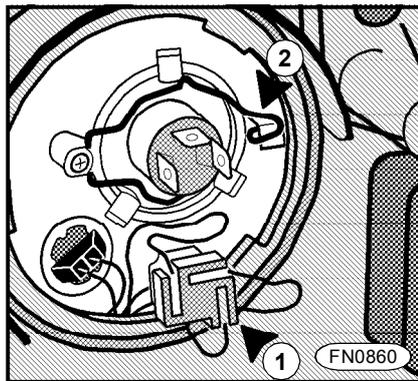
### Warning!

- Only the authorized service station may adjust the main headlamps.
- A new bulb must correspond to the specified bulb by its type and output.



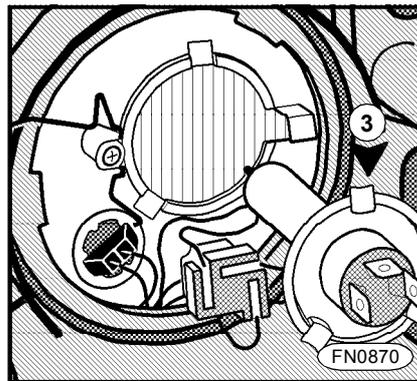
### Main headlamp

- Tilt the cabin to replace the bulb.
- Slightly turn the cover plastic lid of the headlamp counterclockwise and remove.

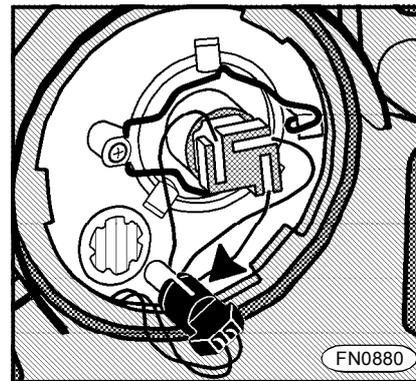


### Low and high beam

- Unplug the connector (item 1) from the bulb.
- Unhook and fold the flexible wire holder (item 2).



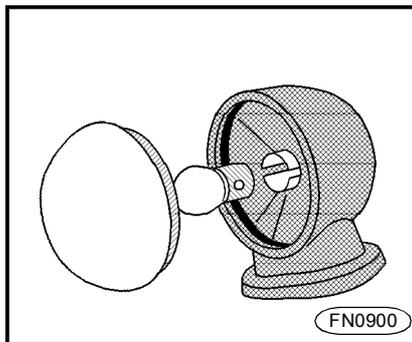
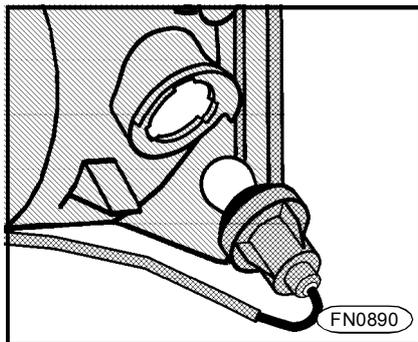
- Remove the faulty bulb and fit a new bulb - lugs (item 3) on the bulb base must engage into recesses of the headlamp.
- Installation is reverse of removal.



### Front side marker lights

- Remove the socket out of the headlamp.
- Take the bulb out of socket.
- Insert a new bulb and proceed in a reverse manner.

Front part	H4	24 V	70/75 W	2	headlamp - low and high beam
		24 V	5 W	2	side marker light



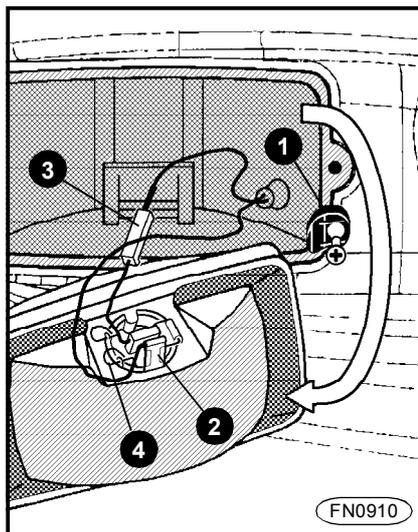
### Front turn signals

- To make a faulty bulb better accessible, open the cabin door.
- Turn the plastic socket of the bulb counterclockwise and pull it out of the light housing.
- Push the faulty bulb into socket, twist counterclockwise and remove.
- Fit a new bulb, push it and turn clockwise.
- Install the bulb socket into a light housing and turn clockwise as far as it goes.

### Front auxiliary side positioning lights

- Use a screwdriver to remove cover from the light housing.
- Push the faulty bulb into socket, twist counterclockwise and remove.
- Fit a new bulb, push it and turn clockwise.
- Install cover and push it in place.

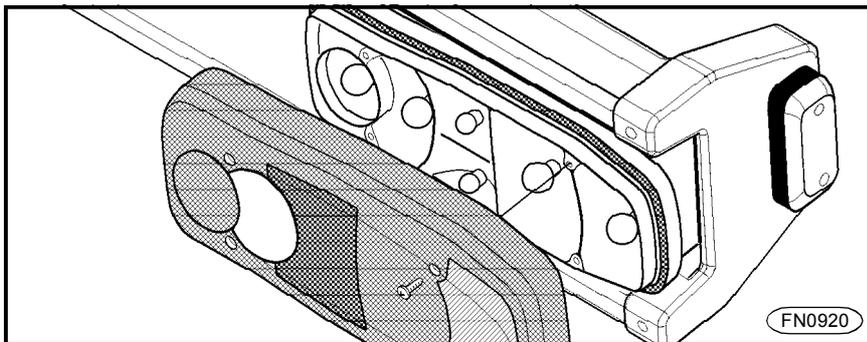
<b>Front part</b>		24 V	21 W	2	turn signals
		24 V	5 W	2	auxiliary side positioning lights



### Front fog lamps

- Unscrew plastic clips (item 1) from the fog lamp housing.
- Remove the housing.
- Bend the ground connector perpendicularly (item 2).
- Disconnect the cable (item 3) by pulling it out.
- Unhook and fold the flexible wire holder (item 4).
- Remove the defective bulb and insert a new one (slots on the bulb socket must engage into lugs in the fog lamp housing).
- To reinstall, reverse the above procedure (do not forget to bend the ground connector back into the initial position).
- The designation **TOP** must be directed up.
- Have the headlamps adjusted at the authorized service station.

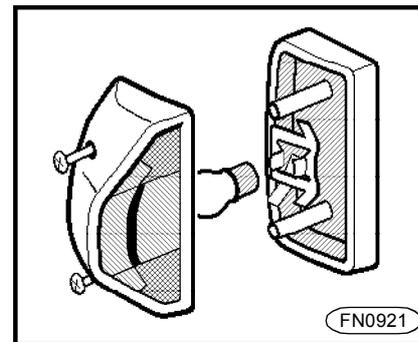
Front part	H3	24 V	70 W	2	fog lamps
------------	----	------	------	---	-----------



**Rear cluster lamps**

- Unscrew the lamp cover.
- Push the defective bulb into socket, twist counterclockwise and remove.

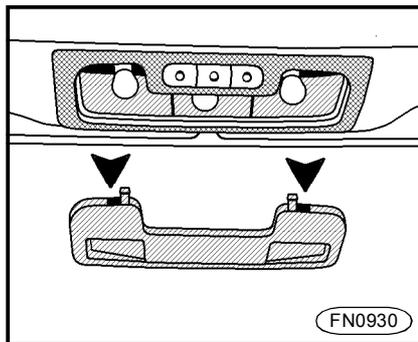
- Fit a new bulb, push it and turn clockwise.
- Install and screw the cover. Tighten the cover carefully as this may crack.



**License plate light**

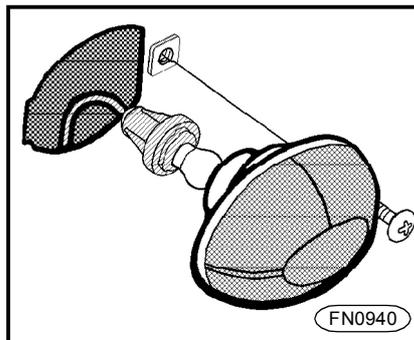
- Unscrew the lamp cover.
- Push the defective bulb into socket, twist counterclockwise and remove.
- Fit a new bulb, push it and turn clockwise.
- Install and screw the cover. Tighten the cover carefully as this may crack.

<b>Rear part</b>		24 V	10 W	2	red side marker light
		24 V	21 W	2	red stop light
		24 V	21 W	2	orange turn signal
		24 V	21 W	2	red fog lamp
		24 V	21 W	2	white reverse light
		24 V	10 W	2	license plate lights



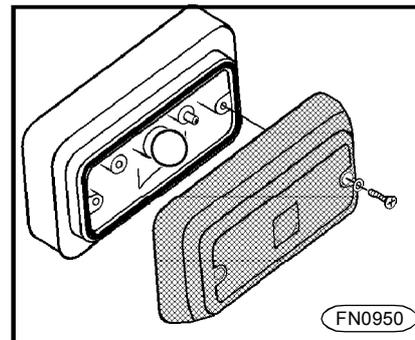
## Dome light

- Use a small screwdriver to pull cover out of the light housing (you can see two slots to insert the screwdriver in the cover).
- Push the faulty bulb into socket, twist counterclockwise and remove.
- Fit a new bulb, push it and turn clockwise.
- Carefully install cover and push it in place.



## Side turn signals

- Unscrew the lamp.
- Push the faulty bulb into socket, twist counterclockwise and remove.
- Fit a new bulb, push it and turn clockwise.
- Install the lamp spring clip in the front part and screw. Tighten it carefully as this may crack.



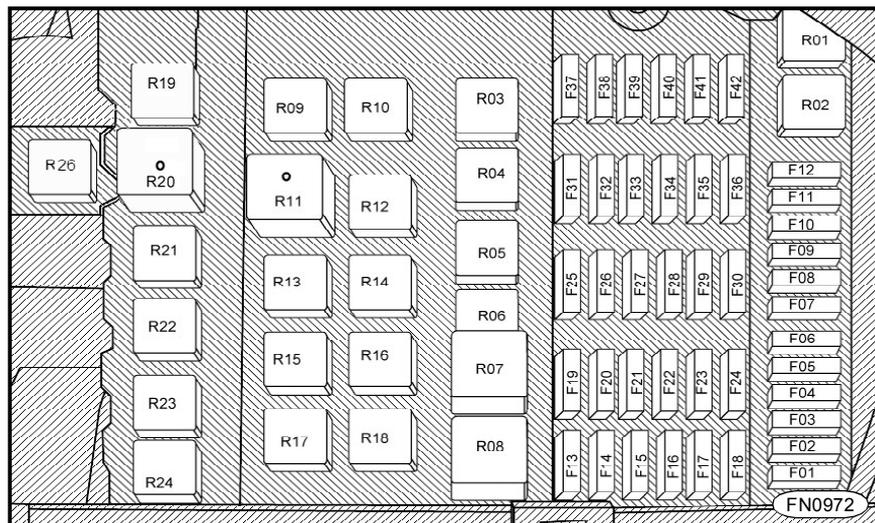
## Side positioning lights

- Unscrew the light cover.
- Push the defective bulb into socket, twist counterclockwise and remove.
- Fit a new bulb, push it and turn clockwise.
- Install and screw the cover. Tighten the cover carefully as this may crack.

<b>Interior</b>		24 V	12 W	3	dome light
<b>Side</b>		24 V	21 W	2	side turn signals
<b>part</b>		24 V	4 W	6	side positioning lights

## Fuse box

<b>Fuses</b>	
<b>F1</b>	10A speedometer, tachograph, clock
<b>F2</b>	10A brake lamps, instrument cluster
<b>F3</b>	10A indicator lights
<b>F4</b>	10A reverse lamps
<b>F5</b>	10A cab and cont lamps*
<b>F6</b>	10A horn
<b>F7</b>	10A wipers
<b>F8</b>	25A heated mirrors
<b>F9</b>	25A blower motor
<b>F10</b>	25A air condition*
<b>F11</b>	25A power windows*
<b>F12</b>	10A differential lock / PTO / clock display
<b>F13</b>	10A engine control unit-tell tale
<b>F14</b>	10A central door locking*, cigarette lighter
<b>F15</b>	25A converter 24V/12V
<b>F16</b>	10A instrument cluster, speedometer, tachograph
<b>F17</b>	10A radio
<b>F18</b>	10A plug EURO 12V
<b>F19</b>	10A LH position lamps, RH outl. lamps, instrument cluster illumination
<b>F20</b>	10A RH pos. lamps, LH outl. lamps, switches illumination
<b>F21</b>	10A LH low beam
<b>F22</b>	10A RH low beam RH, headlamp level motor
<b>F23</b>	10A LH high beam
<b>F24</b>	10A RH high beam
<b>F25</b>	10A LH front fog lamp*
<b>F26</b>	10A RH front fog lamp*
<b>F27</b>	10A rear fog lamp
<b>F28</b>	10A engine starter
<b>F29</b>	10A fuel heating
<b>F30</b>	10A air heating
<b>F31</b>	30A engine control unit
<b>F32</b>	20A SCR dosing unit
<b>F33</b>	5A engine control unit (ECM)
<b>F34</b>	5A SCR dosing unit
<b>F35</b>	10A ABS control unit
<b>F36</b>	10A ABS control unit
<b>F37</b>	10A ABS control unit - towed vehicle
<b>F38</b>	10A ABS control unit - towed vehicle
<b>F39</b>	25A power for towed vehicle
<b>F40</b>	10A trailer indicators
<b>F41</b>	20A sensor NOx
<b>F42</b>	5A airsuspension - control unit
<b>F0</b>	80A heating of air sucked in (in the battery box)



## Replacing a fuse

- The fuse box is situated under the glove box in the instrument board.
- Fuses are accessible after removal of the glove box bottom which will be released by turning two rotary holders (sense of turning is illustrated on the cover).
- The individual electric circuits are secured by fuses.

- The blown fuse can be recognized by the burnt metal strip.
- Switch off the battery circuit breaker during the fuse replacement.
- A new fuse must have the same ampere value.
- It is necessary to keep spare fuses on hand in vehicle.

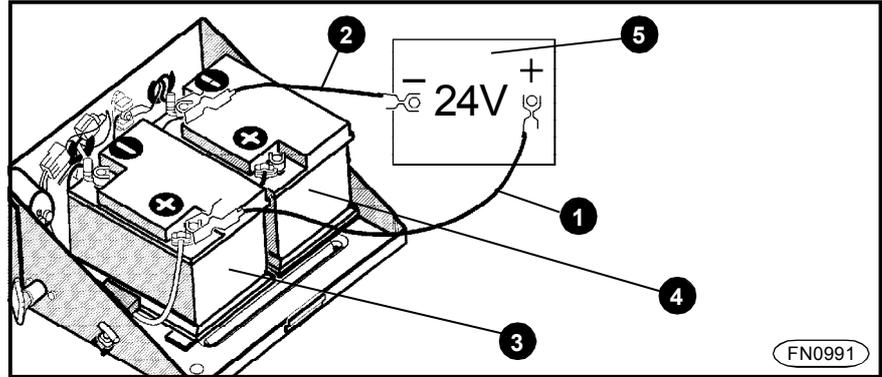
## Relays

- R01 relay IGN 2
- R02 relay IGN 1
- R03 side light relay
- R04 low beam relay
- R05 high beam relay
- R06 intermittent wire relay
- R07 rear fog control module
- R08 front fog relay\*
- R09 break lights relay
- R10 stop lamp monitor
- R11 turn signal relay
- R12 hazard relay 1
- R13 wiper activate relay 1
- R14 wiper activate relay 2
- R15 power windows relay 1\*
- R16 power windows relay 2\*
- R17 power windows relay 3\*
- R18 power windows relay 4\*
- R19 air condition relay\*
- R20 heated mirror timer
- R21 relay "start"
- R22 relay "starter lockout"
- R23 ground relay
- R24 heated fuel relay
- R26 trailer indicators\*

## Use of jumper cables to start the engine

### Warning!

- Replace the blown fuse with a fuse of the same ampere value. Do not use a fuse of higher amperage because this could cause damage the electrical part or even cause a fire.
- If the fuse blows repeatedly after switching on the respective electrical consumer, it is necessary to contact and have the vehicle repaired at the authorized service station.
- Never repair the blown fuses.
- Do not use a screwdriver or other metal object to remove the fuse.



- The vehicle with a discharged battery may be started only by connecting it to the battery of some other vehicle with the same nominal voltage.

### Warning!

**The battery of the other vehicle must have the nominal voltage of 24V.**

- Only approved jumper cables of sufficient cross section may be used.
- Do not use cables with insulated clamps only.

- When starting, the engine of the vehicle, whose battery is used to start, must run.

### Connecting procedure

1. Connect one clamp of "+" cable (item 1) to positive terminal of the front discharged battery (item 3).
2. Connect clamp on opposite end of the same cable to positive terminal of 24V booster battery (item 5).
3. Connect clamp of "-" cable (item 2) to negative terminal of 24V booster battery (item 5).

4. Firmly connect clamp on opposite end of the same cable to "-" terminal of the rear discharged battery (item 4).
5. The engine of the vehicle, whose battery is used to start the other vehicle, must run all the time.

### **Starting the engine**

- Start the engine in accordance with Chapter **Starting the engine**.
- After the engine starts to run, remove jumper cables in reverse order.

### **Warning!**

- **When using the jumper cables to start the vehicle, the auto radio must be turned off because this may be damaged.**
- **Non-insulated parts of cable clamps must not touch each other. The jumper cable connected to the positive terminal of the battery must not come in contact with the vehicle ground because this could lead to short circuit.**

## Engine

■ Diesel with direct injection   
 ■ turbocharged by one turbocharger   
 ■ with charge-air cooling   
 ■ OHV, four-stroke   
 ■ four-cylinder, in-line   
 ■ water cooled

### Engine type designation

#### **CUMMINS**

#### **ISBe4 160**

#### **ISBe4 185**

Number of cylinders / valves	4 / 16	4 / 16
Cylinders bore	104 mm	104 mm
Pistons stroke	132 mm	132 mm
Displacement	4,500 cm <sup>3</sup>	4,500 cm <sup>3</sup>
Compression ratio	17.3	17.3
Maximum output	117 kW / 2,500 rpm	136 kW / 2,500 rpm
Maximum torque	602 Nm / 1,200 ÷ 1,600 rpm	700 Nm / 1,200 ÷ 1,600 rpm
Injection system	CommonRail Bosch; electronic control unit	CommonRail Bosch; electronic control unit

### Undercarriage

#### Engine cooling system

- fluid
- overpressure type with the forced coolant circulation by means of the centrifugal pump
- cooling circuit is fitted with two-flap thermostat and expansion tank

#### Air filter

dry filter cartridge

#### Clutch

- dry
- one-disc
- with asbestos-free lining
- with mesh damper
- hydraulically controlled, with air booster

#### Gearbox

- mechanical
- with layshaft gear
- with gears in constant mesh
- synchronized
- gearshift lever control on floor
- gearbox allows to mount the power take-off drive with pump, outlet shaft or flange

#### Propeller shaft

- the version "K" has the one-shaft arrangement with two universal joints
- versions N, L, E with two-shaft arrangement and three cross-shaped joints with one intermediate bearing and sliding splined adaptor
- versions S,G with three-shaft arrangement and four cross-shaped joints with two intermediate bearings and sliding splined adaptor

#### Rear axle

- driving, banjo-type rigid axle
- axle final drive with single hypoid gearing and bevel differential
- mechanical differential lock
- parabolic spring suspension with stabilizer bar /non-existent in the version with pneumatic suspension/, or pneumatic suspension.
- fluid shock absorbers with lower stop
- rubber upper stop for the version with pneumatic suspension in the bel-

low.

- hypoid gears:  
3,31 - 5,13

#### Front axle

- rigid, with forged axle casing
- parabolic spring suspension with stabilizer bar, liquid shock absorbers with lower stop

### **Steering**

- monoblock hydraulic power steering
- gear ratio from 14 to 16.6 - changeable during turning the steering wheel between full locks
- split steering shaft c/w longitudinally splined cardan joints

### **Frame**

- ladder-type
- cold riveted
- screwed
- brackets or clips to attach chassis groups or components are riveted or screwed to the frame
- holes for brackets ready to attach superstructures or directly riveted brackets on frame longitudinal beams
- towing hook for the vehicle recovery situated on the rear bumper bracket

### **Service brake system**

- dual circuit
- pneumatic
- with brake pressure control of the rear axle wheels (adjusted values of the load sensing valve are stated on the plate placed on the front door frame)
- TT system of brake circuits connection
- Anti-blocking Brake System (ABS) as standard

### **Brake system**

- disc brakes with rigid yoke on both axles
- the brake system completed with the parking brake equipment on the rear axle
- two pressure gauges on the instrument board indicate the air pressures in the brake system

### **Emergency brake**

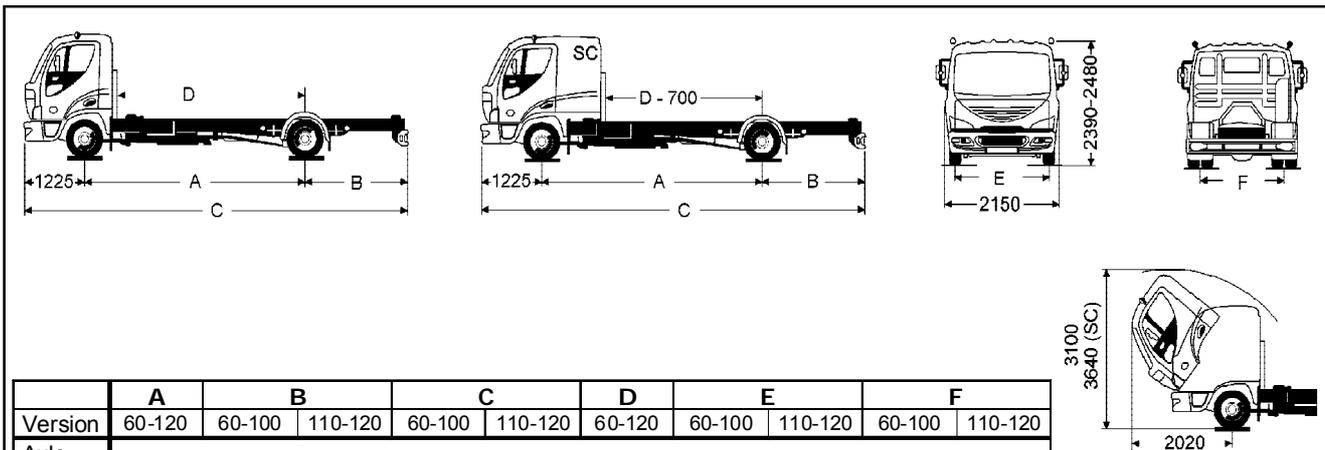
the emergency braking is secured by one non-defective brake circuit

### **Parking brake system**

- parking braking secured by spring-loaded brake
- controlled by the manual brake valve situated near to driver behind the gear-shift lever
- the air pressure drop in the chamber of spring-loaded cylinders to the value, at which the spring-loaded brake is activated, is indicated to a driver by the respective indicator light.

# TECHNICAL DATA

## Dimensions of chassis c/w cabin



Version	A		B		C		D		E		F	
	60-120	60-100	110-120	60-100	110-120	60-120	60-100	110-120	60-100	110-120		
Axle base	( mm )											
<b>K*</b>	2950*	1415*	-	5590*	-	2280*	1849	1845	1736	1740		
<b>N</b>	3400	1415	1365	6040	5990	2730						
<b>L</b>	3900	1670	1620	6795	6745	3230						
<b>E</b>	4500	2070	2020	7795	7745	3830						
<b>S</b>	5100	2470	2420	8795	8745	4430						
<b>G*</b>	5600**	-	2520**	-	9345**	4930**						

The tolerance  $\pm 1\%$ , holds for the dimensions if not stated otherwise.

\*wheelbase "K" only for versions D60 – D90

\*\*wheelbase "G" only for versions D110 – D120

FN1001

## Weights and axle loads

Vehicle type		D 60/65/70/75/80/85/90/100/110/120					
Vehicle version		K	N	L	E	S	G
		kg					
Curb weight chassis + cabin	D60-75	3250	3300	3350	3400	3450	-
	D80	3270	3310	3360	3410	3460	-
	D85-90	3320	3370	3420	3470	3510	-
	D100	-	3390	3440	3490	3530	-
	D110-120	-	3510	3560	3610	3660	3720
Portion of the chassis c/w cab service weight to front axle	D60-75	2090	2130	2170	2210	2250	-
	D80	2110	2150	2190	2230	2270	-
	D85-90	2110	2150	2190	2230	2270	-
	D100	-	2160	2200	2240	2280	-
	D110-120	-	2230	2270	2310	2350	2390
Portion of the chassis c/w cab service weight to rear axle	D60-75	1160	1170	1180	1190	1200	-
	D80	1160	1160	1170	1180	1190	-
	D85-90	1210	1220	1230	1240	1240	-
	D100	-	1230	1240	1250	1250	-
	D110-120	-	1280	1290	1300	1310	1330
Carrying capacity of chassis + cabin (c/w crew)	D60-75	2740- 4240	2690- 4190	2640- 4140	2590- 4090	2540- 4040	-
	D80	4720	4680	4630	4580	4530	-
	D85-90	5170- 5680	5120- 5530	5070- 5580	5020- 5530	4980- 5490	-
	D100	-	6600	6550	6500	6460	-
	D110-120	-	7480- 8480	7430- 8430	7380- 8380	7330- 8330	7270- 8270

The table is continued on the next page

**Weights and axle loads**

<b>Vehicle type</b>		<b>D 60/65/70/75/80/85/90/100/110/120</b>					
<b>Vehicle version</b>		<b>K</b>	<b>N</b>	<b>L</b>	<b>E</b>	<b>S</b>	<b>G</b>
		<b>kg</b>					
<b>Max.vehicle overall weight<sup>1</sup></b>	D60	5990					
	D65	6490					
	D70	6990					
	D75	7490					
	D80	7990					
	D85	8490					
	D90	9000					
	D100	9990					
	D110	10990					
	D120	11990					
<b>The maximum allowable front axle load</b>	D60-90	3400					
	D100	3500					
	D110	4000					
	D120	4200					
<b>The maximum allowable rear axle load</b>	D60	4100					
	D65	4450					
	D70	4800					
	D75-80	5200					
	D85	5800					
	D90	6200					
	D100	6600					
	D110	7400					
D120	8200						

The table is continued on the next page

## Weights and axle loads Wheel turning diameters

Vehicle type		D 60/65/70/75/80/85/90/100/110/120					
Vehicle version		K	N	L	E	S	G
		kg					
Maximum permitted weight of braked trailer with steering bogie	D 60-80						
	D 85-90						
	D 100						
	D 110-120				10000		
Maximum allowable weight of the non-braked trailer	D 60-120			750			
Maximum permitted weight of trailer with inertia brake	D 60-120			3500			
Maximum permitted weight of central axle trailer with lowered drawbar	D 60-80						
	D 85-90						
	D 100						
	D 110-120				10000 <sup>2</sup>		
Maximum permitted weight of central axle trailer with trailer coupling fixed at frame rear end cross-member.	D 60-80						
	D 85-90						
	D 100						
	D 110-120				6500		
Max. allowable vehicle combination (truck + trailer) weight	D 60-80						
	D 85-90						
	D 100						
	D 110-120				22000		

<sup>1</sup>The individual maximum allowable loads must not be exceeded!

The tolerance  $\pm 3\%$  holds for the weight data

<sup>2</sup>Maximum distance from the coupling pin to the rear axle must be  $\geq 1550$  mm!

### Warning!

The instantaneous front axle load must be 30% out of the instantaneous vehicle weight as a minimum.

Vehicle version	Turning diameter external wheel (mm)	External wall-to-wall turning diameter (mm)
K	10410 +500	11790 +500
N	11640 +500	13080 +500
L	14150 +500	14540 +500
E	14760 +500	16130 +500
S	16570 +500	17990 +500
G	17850 +500	19260 +500

## TECHNICAL DATA

### Tyres inflation pressures

205/75 R 17,5 front / rear / spare wheel						
type / version	K	N	L	E	S	G
D 60/75	750 / 550 / 550	750 / 550 / 550	750 / 550 / 550	750 / 550 / 550	750 / 550 / 550	

215/75 R 17,5 front / rear / spare wheel						
type / version	K	N	L	E	S	G
D 60/75	550 / 500 / 700	600 / 500 / 700	600 / 500 / 700	600 / 500 / 700	600 / 500 / 700	
D 80/90	700 / 700 / 700	700 / 670 / 700	700 / 670 / 700	700 / 670 / 700	700 / 670 / 700	

225/75 R 17,5 front / rear / spare wheel						
type / version	K	N	L	E	S	G
D 60/75	600 / 500 / 700	600 / 500 / 700	600 / 500 / 700	600 / 500 / 700	600 / 500 / 700	
D 80/90	680 / 650 / 700	680 / 650 / 700	680 / 650 / 700	680 / 650 / 700	680 / 650 / 700	
D 100	680 / 700 / 700	680 / 700 / 700	680 / 700 / 700	680 / 700 / 700	680 / 700 / 700	

235/75 R 17,5 front / rear / spare wheel						
type / version	K	N	L	E	S	G
D 110		800 / 800 / 800	800 / 800 / 800	800 / 800 / 800	800 / 800 / 800	800 / 800 / 800

245/70 R 17,5 front / rear / spare wheel						
type / version	K	N	L	E	S	G
D 120		750 / 800 / 800	750 / 800 / 800	750 / 800 / 800	750 / 800 / 800	750 / 800 / 800

265/70 R 17,5 front / rear / spare wheel						
type / version	K	N	L	E	S	G
D 120		650 / 675 / 675	650 / 675 / 675	650 / 675 / 675	650 / 675 / 675	650 / 675 / 675

245/70 R 19,5 front / rear / spare wheel						
type / version	K	N	L	E	S	G
D 120		750 / 800 / 800	750 / 800 / 800	750 / 800 / 800	750 / 800 / 800	750 / 800 / 800

265/70 R 19,5 front / rear / spare wheel						
type / version	K	N	L	E	S	G
D 120		650 / 675 / 675	650 / 675 / 675	650 / 675 / 675	650 / 675 / 675	650 / 675 / 675

9,5 R 17,5 front / rear / spare wheel						
type / version	K	N	L	E	S	G
D 60/75	600 / 500 / 750	600 / 500 / 750	600 / 500 / 750	600 / 500 / 750	600 / 500 / 750	
D 80/90	670 / 500 / 750	670 / 500 / 750	670 / 500 / 750	670 / 500 / 750	670 / 500 / 750	
D 100		750 / 750 / 750	750 / 750 / 750	750 / 750 / 750	750 / 750 / 750	

The plate with the tire inflation pressures is situated in the door space on the driver's side.

**Maximum speeds and climbing abilities**

Drive train	Engine	ISBe4 160 (117kW)						ISBe4 185 (136kW)					
	Gearbox	ZF 6 S 850											
	Rear axle ratio	I = 3,73	I = 4,10	I = 4,56	I = 3,73	I = 4,10	I = 4,56	I = 3,73	I = 4,10	I = 4,56	I = 3,73	I = 4,10	I = 4,56
Disc dimension		17,5			19,5			17,5			19,5		
Max. theoretical speed (km/h)		121	110	99	131	119	107	121	110	99	131	119	107
Max. theoretical climbing ability (%)	D60-75	56,9	64,9	76,3	-	-	-	71,3	83,1	101,5	-	-	-
	D80	52,2	59,2	69,1	-	-	-	64,7	74,8	89,5	-	-	-
	D85-90	44,9	50,5	58,2	-	-	-	54,9	62,5	73,2	-	-	-
	D100	39,5	44,3	50,7	-	-	-	48,0	54,2	62,7	-	-	-
	D110-120	32,0	35,7	40,4	-	32,7	37,0	38,4	43,0	49,1	35,2	39,3	44,7

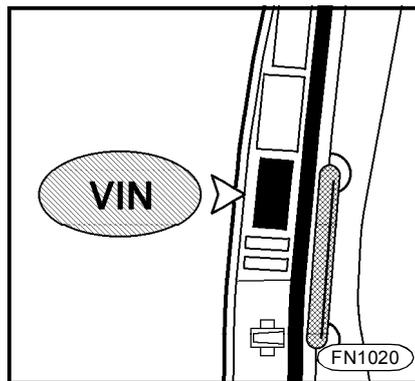
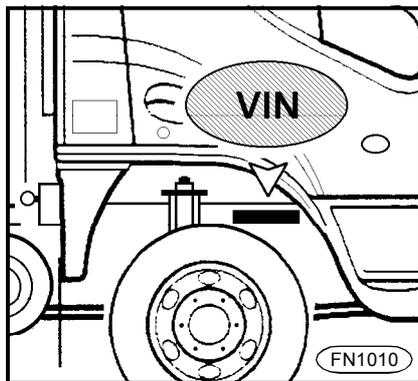
## TECHNICAL DATA

---

### Operation fillings

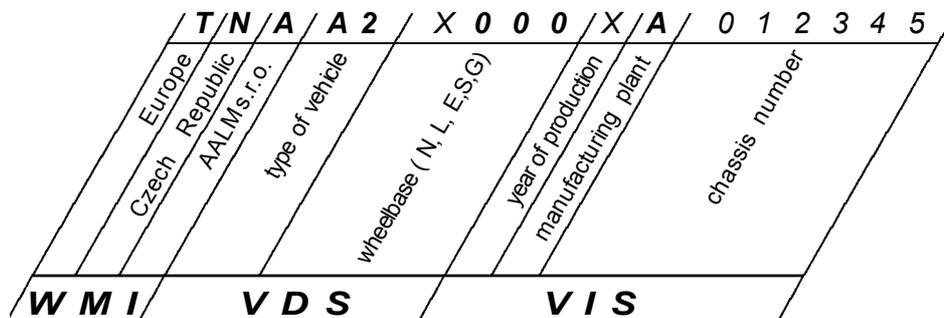
Engine oil	13 l
Cooling circuit c/w heater circuit	19 l
Gearbox ZF 6 S 850	7.5 l (with PTO 8 l)
Fuel tank capacity	120 l (165 l, 200 l)
Minimum fuel reserve	16 l
AdBlue tank capacity	30 l (usable capacity is 23 l)
Rear axle - 5.14 differential	4 l
wheel body	0,25 l
Rear axle - 8.20 differential	8 l
wheel body	0,25 l
Monoblock power steering	1.7 l
Windshield washer tank	7.5 l
Hydraulic circuit for clutch release	0.5 l
Hydraulic circuit for cabin tilting	0.65 l

## Vehicle Identification Number

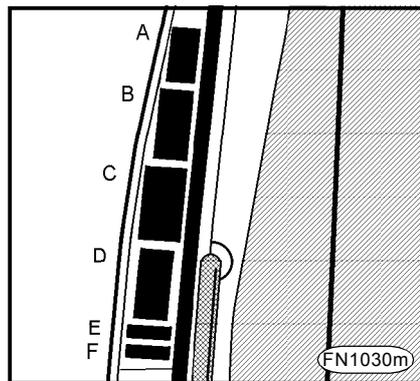


### VIN (Vehicle Identification Number)

- The vehicle is marked with the VIN number in accordance with the unified international vehicle marking.
- The VIN number is stamped on the web of the right frame longitudinal beam ahead of the shock absorber holder of the front axle. The manufacturer's plate VIN is situated also on the right door jamb above the door lock.

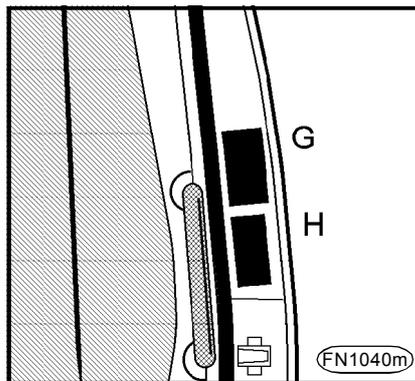


## Vehicle labels



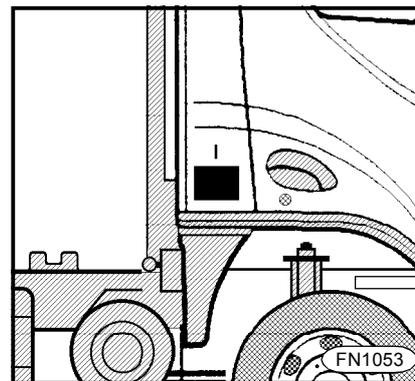
### On the right door jamb above the door lock

- homologation (A)
- homologation (B)
- automatic brake pressure control (C)
- VIN (D)
- headlamps adjustment (E)
- cabin (F)



### On the left door jamb above the door lock

- tires inflation pressures (G)
- warning - batteries circuit breaker (H)



### On the cabin right side in the rear information about cabin tilting (I).

## INDEX

<b>A</b> .....	
AdBlue fluid .....	47
AdBlue fluid tank .....	47
Air filter .....	49
Air-conditioning* .....	22
Alternator .....	69
Anti - blocking - system .....	57
Ashtray .....	31
ASR .....	57
Axle (front) .....	52
Axle (rear) .....	52
<b>B</b> .....	
Basic rules for the trailer coupling ..	65
Battery .....	69
Battery circuit breaker .....	69
Battery location .....	68
Belt tensioning .....	43
Bonnet .....	32
Brake (emergency) .....	58
Brake (parking) .....	58
Brake (service) .....	54
Brake lining - checking .....	56
Brake system D60 - 120 .....	53
Brake system inspections .....	56
<b>C</b> .....	
Cabin interior lighting .....	29
Cabin tilting .....	34
Cabin tilting at special versions .....	35

Cabin tilting (instructions) .....	34
Clothes, hooks, glove compartment	31
Clutch .....	51
Combined lever switch .....	12
Controllers .....	14
Cooling system .....	48
Cruise control .....	16
Cup holder .....	31

<b>D</b> .....	
Diagnostic socket .....	17
Digital clock* .....	30
Doors .....	6
Draining the fuel filter .....	46
Draining the condensate from air tanks .....	55, 64
During driving .....	40

<b>E</b> .....	
Electronic vehicle height adjustment (ECAS)* .....	63
Electrical equipment .....	67
Electrically actuated windows* .....	7
Engine .....	42
Engine brake .....	13

<b>F</b> .....	
Fuel .....	46
Fuel tank .....	46
Fuse box .....	91

<b>G</b> .....	
Gearbox .....	50
Gearshift lever .....	19

<b>H</b> .....	
Head restraints .....	25
Headlamps and lights - location ....	70
Headlamps leveling device .....	29
Heating and ventilation .....	20

<b>CH</b> .....	
Changing the wheel .....	84
Chassis c/w cabin .....	36
Check before the drive .....	38

<b>I</b> .....	
Idle run .....	41
Ignition switch and steering lock ....	18
Indicator lights .....	8
Instrument board - gauges .....	8
Interior .....	4

<b>K</b> .....	
Keys .....	6

<b>L</b> .....	
Lubrication system .....	44

<b>M</b> .....	
Maintenance .....	38

<b>R</b> .....	- Weights and axle load ..... 99	<b>V</b> .....	Vehicle care ..... 71
Rear-view mirrors ..... 28	Tools and equipment ..... 33	Vehicle height adjustment by remote control* ..... 17	Vehicle identification number ..... 105
Rear-view mirrors remote control* ..... 28	Towing, vehicle recovery ..... 80	Vehicle labels ..... 106	Vehicle running-in ..... 38
Replacing bulbs ..... 85	Transport of loads ..... 62		
<b>S</b> .....	Troubleshooting .....	<b>W</b> .....	
Seat belts ..... 26	- Brakes ..... 78	Wheel chock (L, E, S, G) ..... 81	
Seats ..... 24	- Electrical equipments ..... 77	Wheel chock (K, N) ..... 82	
Sleep couch ..... 25	- Engine ..... 73	Wheel turning diameter ..... 101	
Socket / cigarette lighter ..... 30	- Monoblock hydraulic power steering ..... 78	Windshield washer and wipers ..... 60	
Spare wheel holder (L, E, S, G) ..... 81	Turbocharger ..... 45		
Spare wheel holder (K, N) ..... 82	Tyres and wheels ..... 61		
Starting the engine ..... 39	<b>U</b> .....		
Steering ..... 49	Use of jumper cables to start the engine ..... 93		
Steering wheel adjustment ..... 19			
Stopping the engine ..... 41			
Sun visors ..... 30			
<b>T</b> .....			
Technical data .....			
- Dimensions of chassis			
c/w cabin ..... 98			
- Engine ..... 95			
- Maximum speeds and climbing abilitie ..... 103			
- Operation fillings ..... 104			
- Tires inflation pressures ..... 102			
- Undercarriage ..... 96			



Version 5b / Aj / 3 / 2008  
D60/65/70/75/80/85/90/  
100/110/120 E4,5\_RHD  
Alternations reserved



**Avia Ashok Leyland Motor s.r.o.**  
Beranových 140  
199 03 Praha - Letňany