

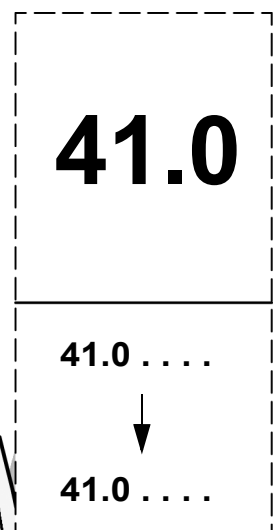
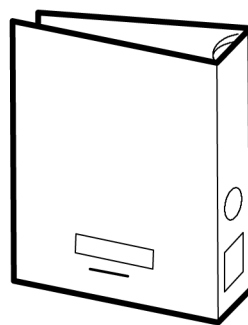
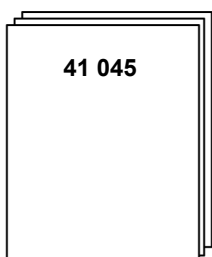
# 41 045 - GB - 04/2003

## STEERING

| RANGE      | FAMILY | VARIANT |
|------------|--------|---------|
| MIDLUM     | -      | -       |
| MIDLUM 4x4 |        |         |



*The above information may change in the course of time. Only the "Consult" section of the workshop manuals repertory in standard N° 10320 serves as reference.*



## CONTENTS

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## **GENERALITIES**

## **Warnings**

In this document, safety instructions are symbolized as follows:



**DANGER!** NON-OBSERVANCE OF THE PROCEDURE DESCRIBED OR LACK OF CARE OR ATTENTION RISK CAUSING SERIOUS INJURY OR EVEN DEATH.



**WARNING!** Any different or inappropriate working method risks causing damage to the product.



**NOTE!** Draws attention to particular or important points of the method.

## **Environment**

*Comply with the regulations in force relative to the recovery and treatment of used parts and waste.*

## Conventional symbols

### Fitting

|                                                                                   |                                                     |                                                                                   |                            |
|-----------------------------------------------------------------------------------|-----------------------------------------------------|-----------------------------------------------------------------------------------|----------------------------|
|  | Tighten to torque (Nm) (left-hand thread)           |  | Tighten by indicated value |
|  | Tighten to torque (Nm) (right-hand thread)          |  | Loosen by indicated value  |
|  | Tightening torque with lubricated threaded hardware |                                                                                   |                            |

### Dimensioning

|                                                                                     |                               |                                                                                     |                                  |
|-------------------------------------------------------------------------------------|-------------------------------|-------------------------------------------------------------------------------------|----------------------------------|
|    | Tightening                    |    | ... Greater than or equal to ... |
|    | Equal to                      |    | Wear limit                       |
|   | ... Less than ...             |   | Machining limit or dimension     |
|  | ... Greater than ...          |  | Maximum out-of-true              |
|  | ... Less than or equal to ... |  | Maximum parallelism error        |

### Repair

|                                                                                     |                                                             |                                                                                     |                                                              |
|-------------------------------------------------------------------------------------|-------------------------------------------------------------|-------------------------------------------------------------------------------------|--------------------------------------------------------------|
|  | Force to be exerted in the direction shown (hammer - press) |  | Smear or coat (see "Consumables" table)                      |
|  | Heat or cool: Temperature in degrees Celsius (e.g. + 80 °C) |  | Fill to level (see "Technical Data" and "Consumables" table) |
|  | Weld bead                                                   |  | Grease or oil (see "Consumables" table)                      |
|  | Repair time - Heating time                                  |  | Mark - Assemble according to marking                         |

**Adjustment**

|                                                                                   |                              |                                                                                   |                                                            |
|-----------------------------------------------------------------------------------|------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------|
|  | Rotating friction torque     |  | Turn anti-clockwise                                        |
|  | Turn in alternate directions |  | Turn anti-clockwise (the figure shows the number of turns) |
|  | Turn clockwise               |  | Turn clockwise (the figure shows the number of turns)      |
|  | Place in contact             |  | Move in the direction shown                                |
|  | Dimension to be assured (mm) |                                                                                   |                                                            |

**Various information**

|                                                                                     |                                  |                                                                                     |                                                                     |
|-------------------------------------------------------------------------------------|----------------------------------|-------------------------------------------------------------------------------------|---------------------------------------------------------------------|
|    | Exhaust - Outlet                 |    | Operation with a sequence                                           |
|  | Intake - Inlet                   |  | Involves                                                            |
|  | Weight in kg (example: 275 kg)   |  | Return to numbered operation -<br>Connected with numbered operation |
|  | Depending on versions or options |  | Withdraw - Delete                                                   |
|  | Wrong                            |  | Direction of disassembly<br>(the arrow shows the direction)         |
|  | Correct                          |  | Direction of assembly<br>(the arrow shows the direction)            |
|  | Injection                        |  | ... to ...                                                          |
|  | Repair dimension                 |  | Inspect - Check condition of part                                   |
|  | Part to be replaced              |  | Danger for persons, vehicle or equipment                            |

## TECHNICAL DATA

## Standard tightening torques

### Definitions

There are several types of tightening:

- Tightening to torque (in **Nm**)
- Tightening to angle (en °)
- Tightening to torque-angle (en **Nm + °**)

Torques given in **Nm**. are nominal torques (average value calculated on the basis of the minimum torque and the maximum torque).

The tightening precision class defines the tolerance of this torque in percent as a function of the nominal torque applied.

#### Tightening precision classes:

- **Class I**: Special threaded hardware (tolerances  $\pm 10\%$  of the final torque).
- **Class II**: Reserved for precise tightening (tolerance  $\pm 10\%$  of the nominal torque).
- **Class III**: Reserved for normal standard tightening (tolerance  $\pm 20\%$  of the nominal torque)

For standard threaded hardware indicated in the table below, use tightening class **III**).

For other torques, see the following page(s).



***"FIH" type (Nylstop) locknuts must be replaced whenever removed. "DRH" type (oval) locknuts can be re-used. If locknuts (DRH, FIH or other) are re-used, make absolutely certain that the screw-thread of the bolt protrudes least two threads above the top edge of the nut.***

## Standard tightening torques table



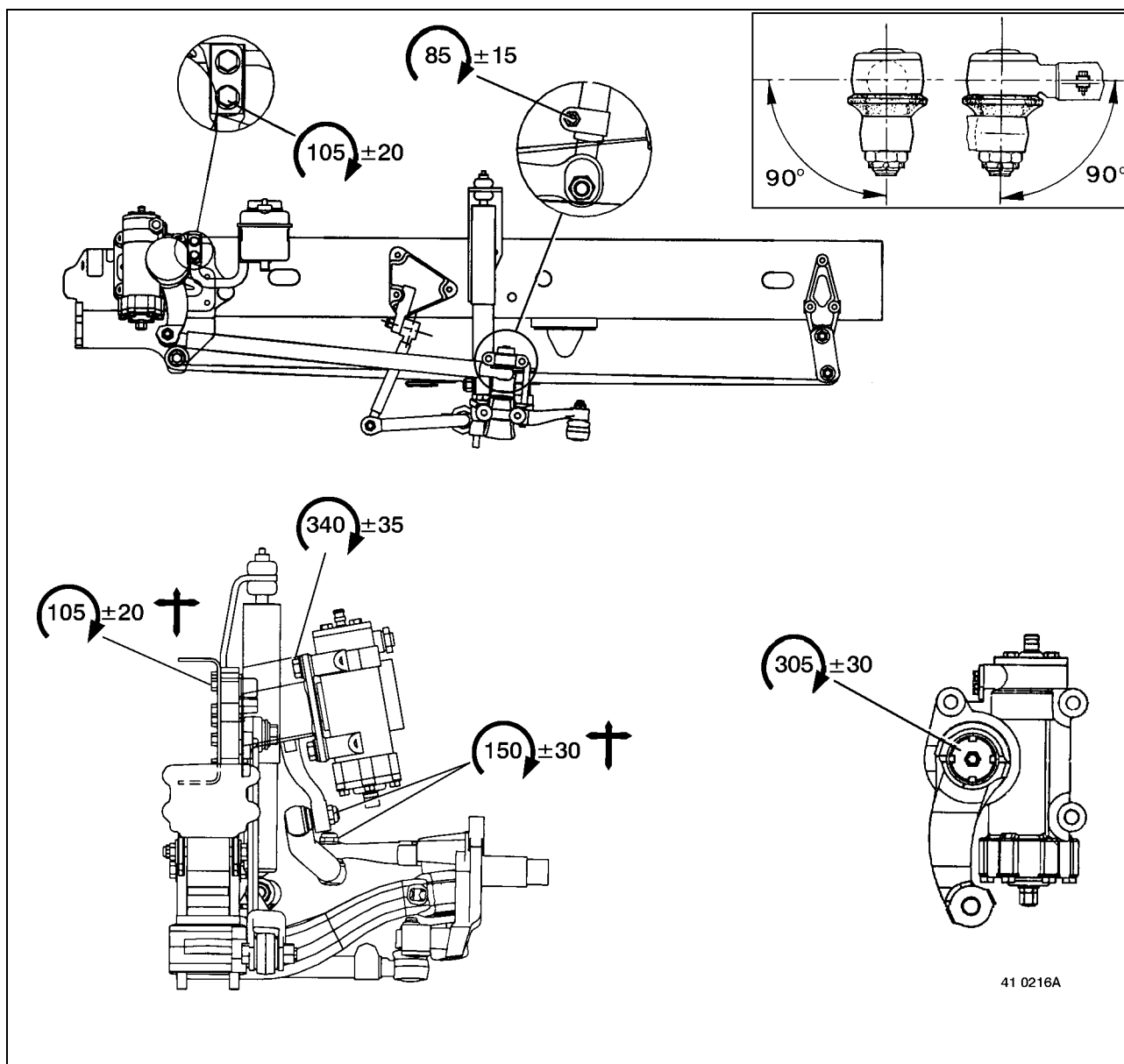
*The tightening torque values given in the table are based on standard 01.50.4002 and apply to new nuts and bolts fitted dry and re-used nuts and bolts with oil applied to the screw-threads. If any nuts and bolts are replaced, it is absolutely essential to use nuts and bolts recommended by the RENAULT TRUCKS Spare Parts Department (coefficient of friction in compliance with standard 01.50.4002).*

| Tightening torque values in Nm for conventional "metric system" threaded hardware based on standard 01.50.4002 (H: normal and HE: with flange) |                                     |                                     |
|------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|-------------------------------------|
| dia. and pitch of nuts and bolts                                                                                                               | Quality class 8.8                   | Quality class 10.9                  |
|                                                                                                                                                | Tightening class III ( $\pm 20\%$ ) | Tightening class III ( $\pm 20\%$ ) |
| 6 x 1.00                                                                                                                                       | 10                                  | 10                                  |
| 7 x 1.00                                                                                                                                       | 15                                  | 20                                  |
| 8 x 1.00                                                                                                                                       | 20                                  | 30                                  |
| 8 x 1.25                                                                                                                                       | 20                                  | 25                                  |
| 10 x 1.00                                                                                                                                      | 40                                  | 60                                  |
| 10 x 1.25                                                                                                                                      | 35                                  | 60                                  |
| 10 x 1.50                                                                                                                                      | 40                                  | 50                                  |
| 12 x 1.25                                                                                                                                      | 65                                  | 105                                 |
| 12 x 1.50                                                                                                                                      | 65                                  | 95                                  |
| 12 x 1.75                                                                                                                                      | 60                                  | 90                                  |
| 14 x 1.50                                                                                                                                      | 105                                 | 165                                 |
| 14 x 2.00                                                                                                                                      | 100                                 | 145                                 |
| 16 x 1.50                                                                                                                                      | 160                                 | 230                                 |
| 16 x 2.00                                                                                                                                      | 150                                 | 220                                 |
| 18 x 1.50                                                                                                                                      | 235                                 | 340                                 |
| 18 x 2.50                                                                                                                                      | 210                                 | 310                                 |
| 20 x 1.50                                                                                                                                      | 330                                 | 450                                 |
| 20 x 2.50                                                                                                                                      | 295                                 | 435                                 |
| 22 x 1.50                                                                                                                                      | 445                                 | 650                                 |
| 22 x 2.50                                                                                                                                      | 405                                 | 595                                 |

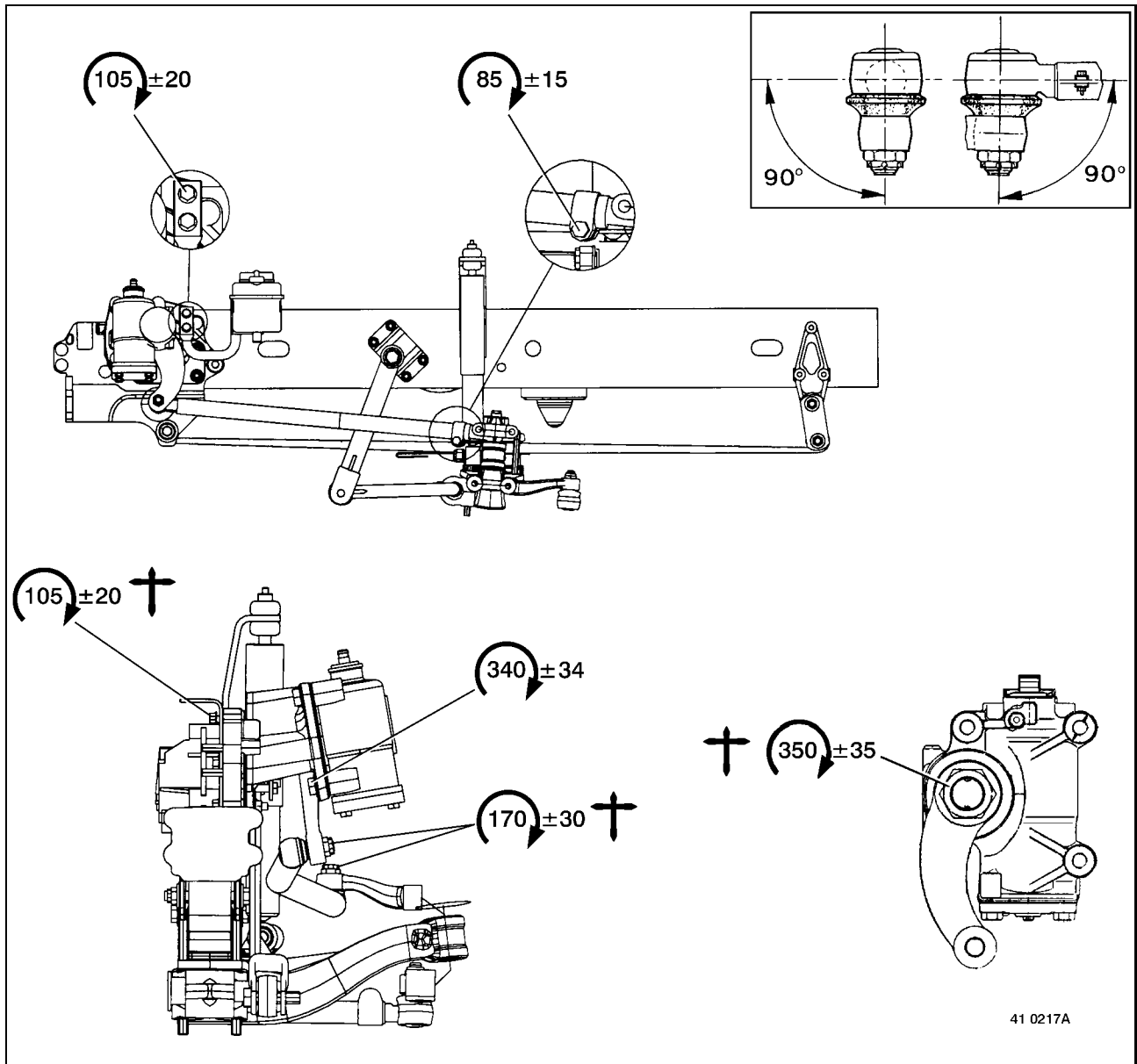


## Specific tightening torques

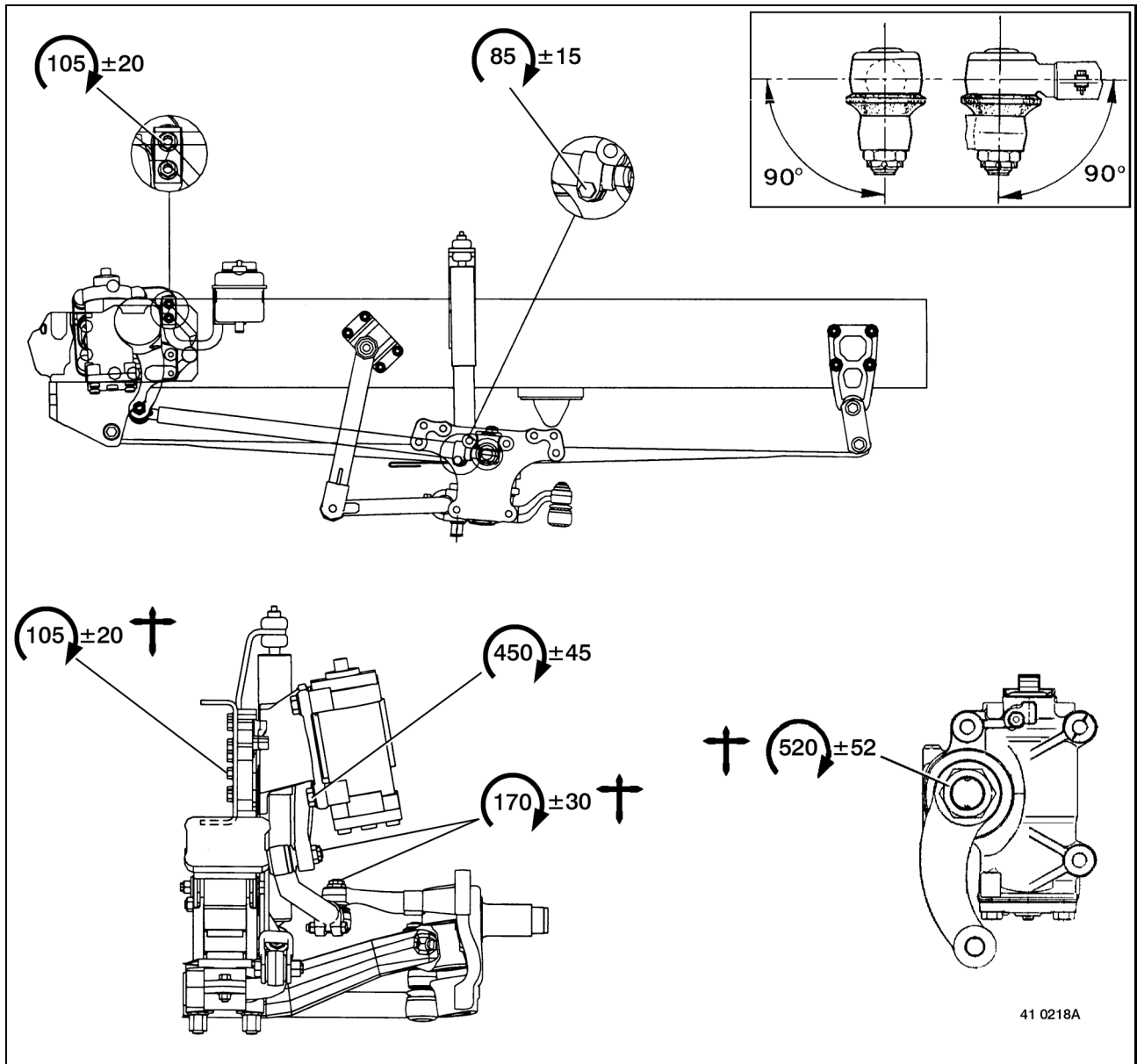
### Steering box SHEPPARD M83



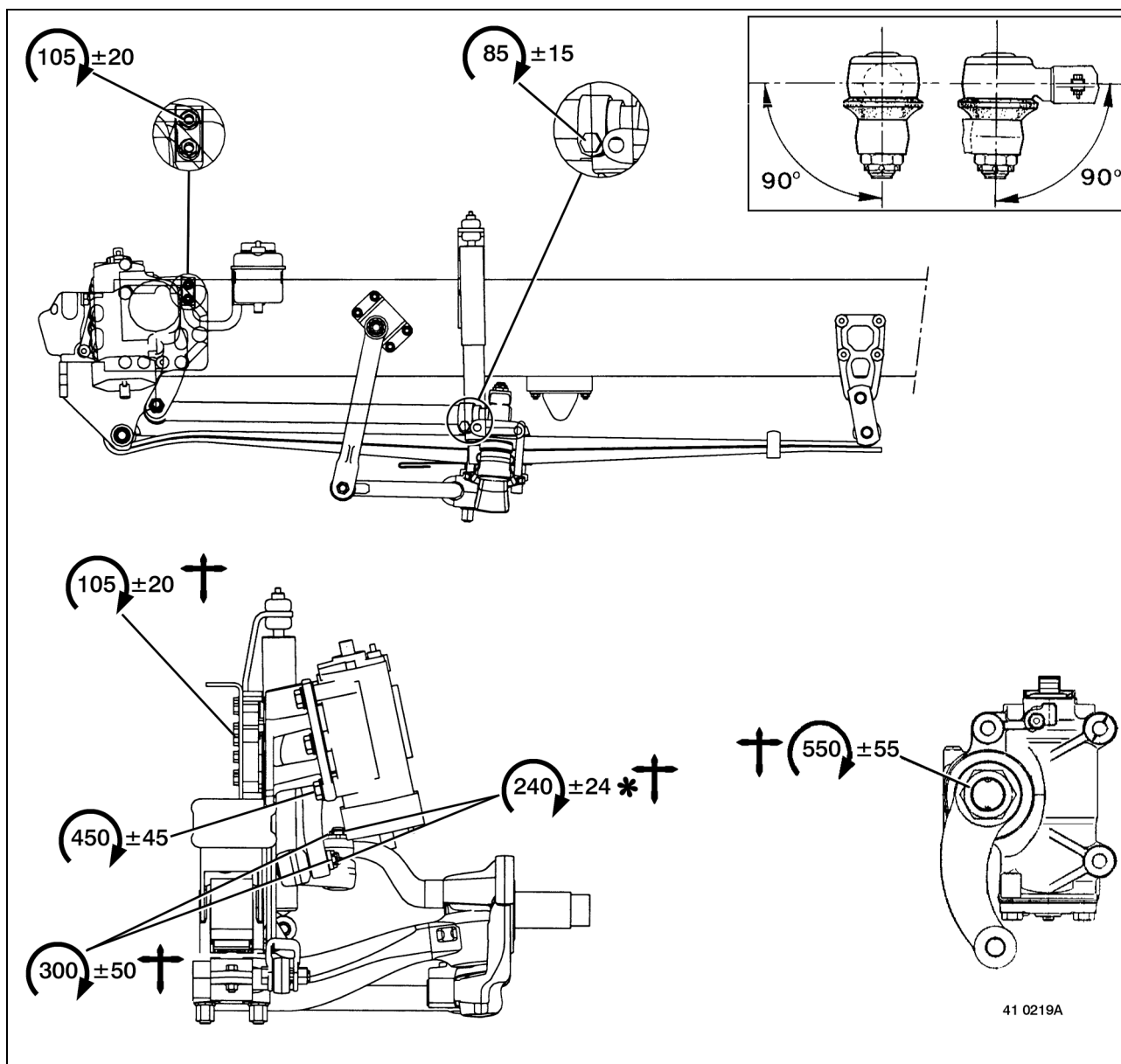
## Steering box ZF 8090



## Steering box ZF 8095

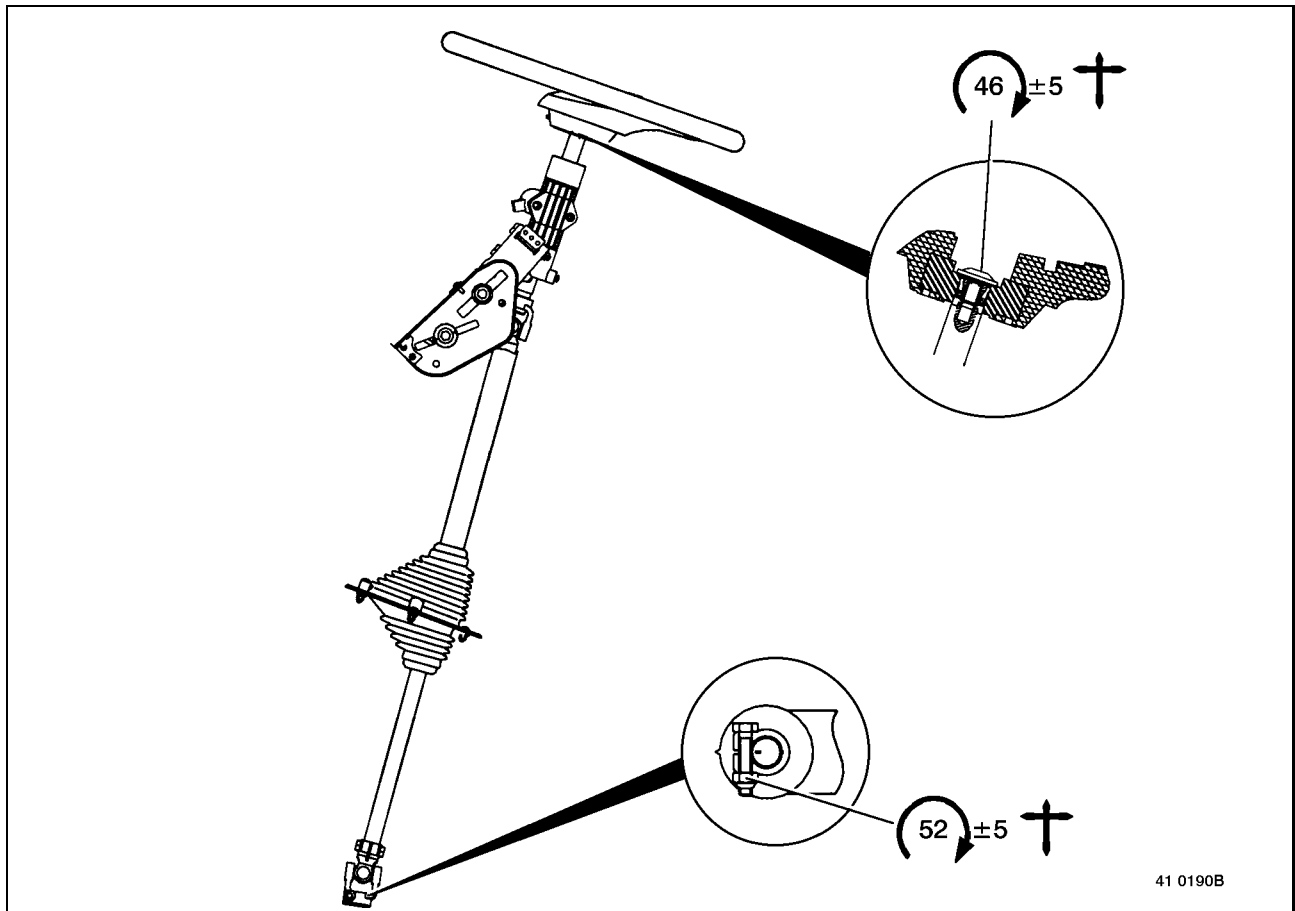


## Steering box ZF 8098



\* Assembly with washer

## Steering wheel





## TOOLS

## Generalities

RENAULT TRUCKS divide tools into three categories:

- **General-purpose tools:** proprietary tools.
  - **50 00 26 .... reference number** (possibility of purchasing through the RENAULT TRUCKS Spare Parts department).
  - **4-figure reference number** (tools classified by RENAULT TRUCKS but available from the supplier).
- **Special tools:** specifically created tools distributed by the RENAULT TRUCKS Spare Parts Department.
- **Locally manufactured tools:** these tools are classified differently according to their degree of sophistication:
  - **4-figure reference number** (represented by a drawing): tools that are simple to make without need for special qualification.
  - **50 00 26 .... reference number** (possibility of purchasing through the RENAULT TRUCKS Spare Parts department): a certain amount of skill is needed to make these tools.

**Three levels (or echelons)** determine their assignment:

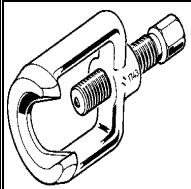
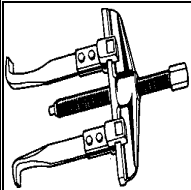
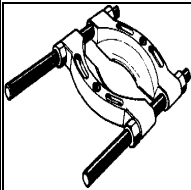
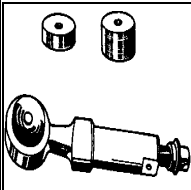
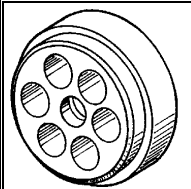
- **Level 1:** tools for servicing, maintenance and minor tasks.
- **Level 2:** tools for major repairs.
- **Level 3:** tools for refurbishment.



*Proprietary tools mentioned in this manual do not appear in the tools list.  
These tools are identified in the standard tools manual (MO) by a 4-figure number.*

## LIST OF TOOLS

### General-purpose tools

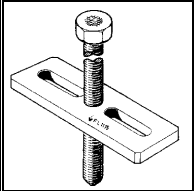
| Illustration                                                                        | RENAULT TRUCKS Ref. | Designation       | Manufacturer reference | Manufacturer code | Level | Qty |
|-------------------------------------------------------------------------------------|---------------------|-------------------|------------------------|-------------------|-------|-----|
|    | 5000261743          | BALL-JOINT PULLER |                        |                   | 1     | 1   |
|    | 5000260857          | PULLER            |                        |                   | 1     | 1   |
|   | 5000269366          | RAM               |                        | BB                | 1     | 1   |
|  | 5000260819          | UNSTICKER         |                        |                   | 1     | 1   |
|  | 5000260816          | RAM               |                        |                   | 1     | 1   |
|  | 5000262363          | SET OF PUSHERS    |                        |                   | 1     | 1   |

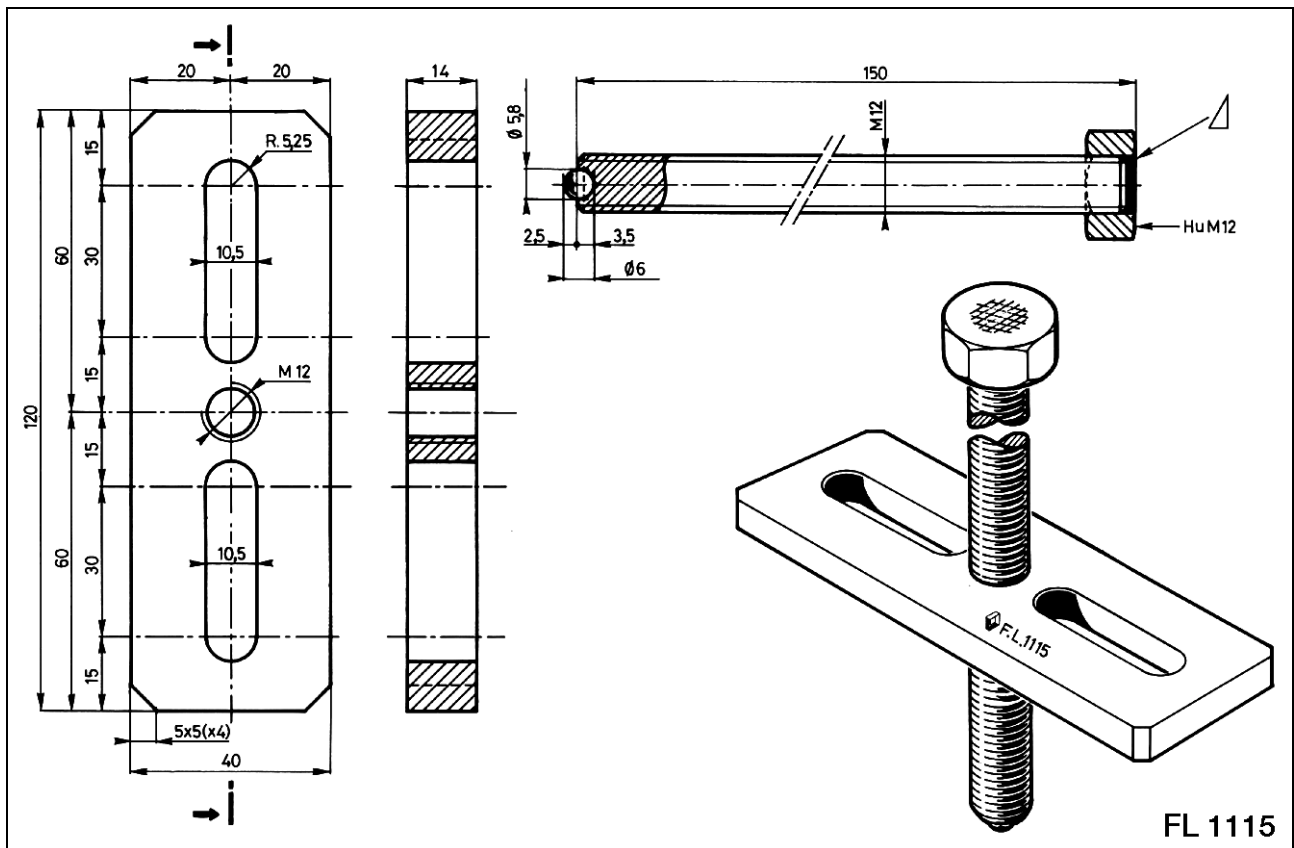
|    |                                                                                                  |                                                                                                  |        |
|----|--------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|--------|
| BB | SEFAC S.A.                                                                                       |                                                                                                  |        |
|    | 1 rue André Compain<br>BP 101                                                                    |                                                                                                  |        |
|    | 08800<br>MONTHERME                                                                               |                                                                                                  | FRANCE |
|    |  03.24.53.01.82 |  03.24.53.29.18 |        |

**Special Tools**

| Illustration                                                                      | RENAULT TRUCKS Ref. | Designation | Manufacturer reference | Manufacturer Code | Level | Qty |
|-----------------------------------------------------------------------------------|---------------------|-------------|------------------------|-------------------|-------|-----|
|  | 5000269804          | STRAP       |                        |                   | 1     | 1   |

## Locally manufactured tools

| Illustration                                                                      | RENAULT TRUCKS Ref. | Designation | Manufacturer Reference | Manufacturer Code | Level | Qty |
|-----------------------------------------------------------------------------------|---------------------|-------------|------------------------|-------------------|-------|-----|
|  | 1115                | FLANGE      |                        |                   | 1     | 1   |



## Proprietary tools

| Illustration                                                                      | RENAULT TRUCKS Ref. | Designation            | Manufacturer reference | Manufacturer code | Level | Qty |
|-----------------------------------------------------------------------------------|---------------------|------------------------|------------------------|-------------------|-------|-----|
|  | 9364                | 2-AXIS SWIVELLING HEAD |                        | BB                | 1     | 1   |

|    |                    |                                                                                                    |        |
|----|--------------------|----------------------------------------------------------------------------------------------------|--------|
| BB | SEFAC S.A.         |                                                                                                    |        |
|    |                    | 1 rue André Compain<br>BP 101                                                                      |        |
|    | 08800<br>MONTHERME |                                                                                                    | FRANCE |
|    | ) 03.24.53.01.82   |  03.24.53.29.18 |        |



## **REMOVAL / FITTING**

## Steering box ZF 8090/8095/8098

### Removal



IF THE VEHICLE IS EQUIPPED WITH AN AIRBAG SYSTEM, DISCONNECT THE BATTERY AND WAIT FOR 5 MINUTES BEFORE CARRYING OUT ANY WORK ON THE VEHICLE.

Remove the front bumper.

(see CMR **60 024**)

Tilt the cab.

Place the vehicle on a lift hoist.

Put safety trestles under the axles.

Clean the pipes.

Blank off the ports.

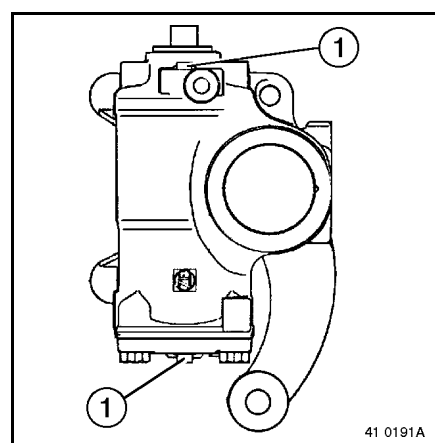


Steering box with automatic adjustment hydraulic lock-over limitation stops: before operating the steering arm, mark and remove the hydraulic lock stops (1).

The item numbers indicated in the drawing on page D-1-3 correspond to the **sequence of disassembly**.



IF THE VEHICLE IS EQUIPPED WITH AN AIRBAG SYSTEM, REMOVE STEERING COLUMN (2) AND IMMOBILIZE THE STEERING WHEEL TO KEEP THE MID-POINT POSITION OF THE ROTARY SWITCH. FOR FURTHER DETAILS, REFER TO THE AIRBAG REPAIR MANUAL.

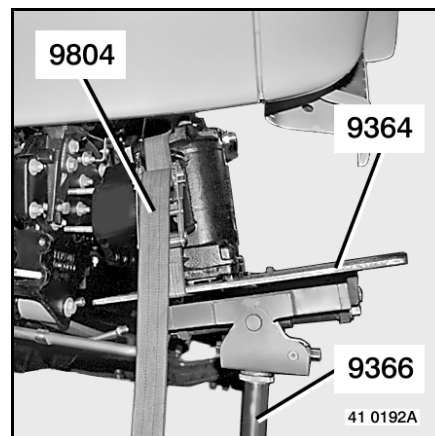


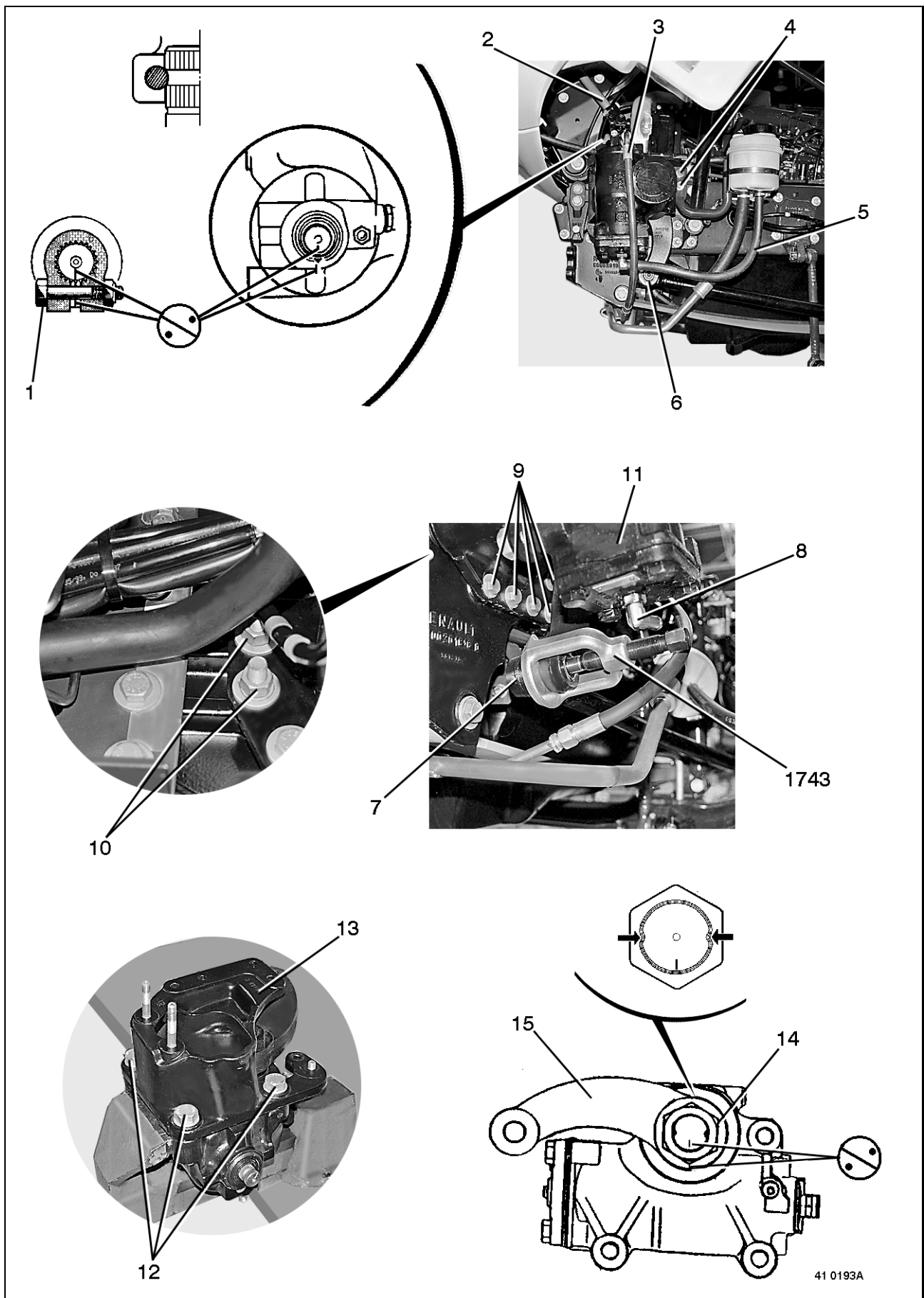
The table indicates the designation and the reference number of tools necessary for assembly / disassembly of the itemized parts.

| Item | Tool designation | Reference | Assembly | Disassembly |
|------|------------------|-----------|----------|-------------|
| 7    | Puller           | 1743      |          | x           |
| 15   | Puller           | 0857      |          | x           |

Install tool **9804 + 9366 + 9364**.

Remove steering box (11) complete with bracket (13).





**Fitting**

**Steering box with automatic adjustment hydraulic lockover limitation stops: before operating the steering arm, mark and remove the hydraulic lock stops (1).**

The item numbers indicated in the text refer to the drawing on page D-1-3.

Position drop arm **(15)**.

Screw up nut **(14)**.

Tighten to torque.

Lock **(14)**.

Retighten to lock properly. Never loosen.

Fit bracket **(13)**.

Tighten to torque.

Fasten bracket **(13)** to the chassis.

Tighten to torque.

Bring the steering box to the "mid-point" position (marks aligned).

Couple up steering universal joint **(2)**.

Ensure the position

Vehicle equipped with airbag system: line up the marks to fit the steering column to the steering box, in order to keep the mid-point of the rotary switch. For further details, refer to the airbag repair manual.

Fit nut and bolt **(1)**.

Tighten to torque.

Couple up drag link **(7)**.

See page(s) E-2.

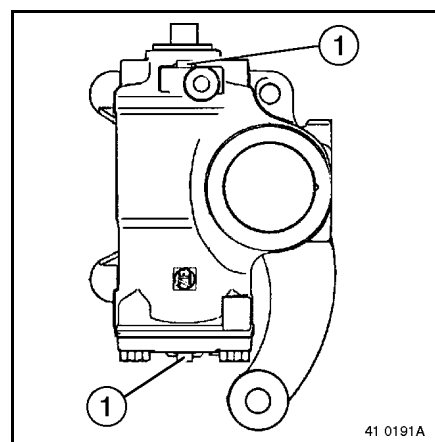
Fit automatic adjustment hydraulic lockover limitation stops **(1)**.

Check their adjustment.

See page(s) E-3.

Fill the steering hydraulic system and bleed the air from the circuit.

For hydraulic system filling, circuit bleeding and filter replacement operations (See Driving and Servicing Handbook).



## Steering box SHEPPARD M83

### Removal



IF THE VEHICLE IS EQUIPPED WITH AN AIRBAG SYSTEM, DISCONNECT THE BATTERY AND WAIT FOR 5 MINUTES BEFORE CARRYING OUT ANY WORK ON THE VEHICLE.

Remove the front bumper.

(see CMR **60 024**)

Tilt the cab.

Place the vehicle on a lift hoist.

Put safety trestles under the axles.

Clean the pipes.

Blank off the ports.

The item numbers indicated in the drawing on page D-2-2 correspond to the **sequence of disassembly**.

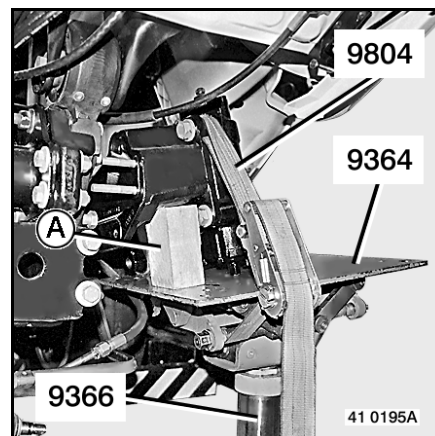


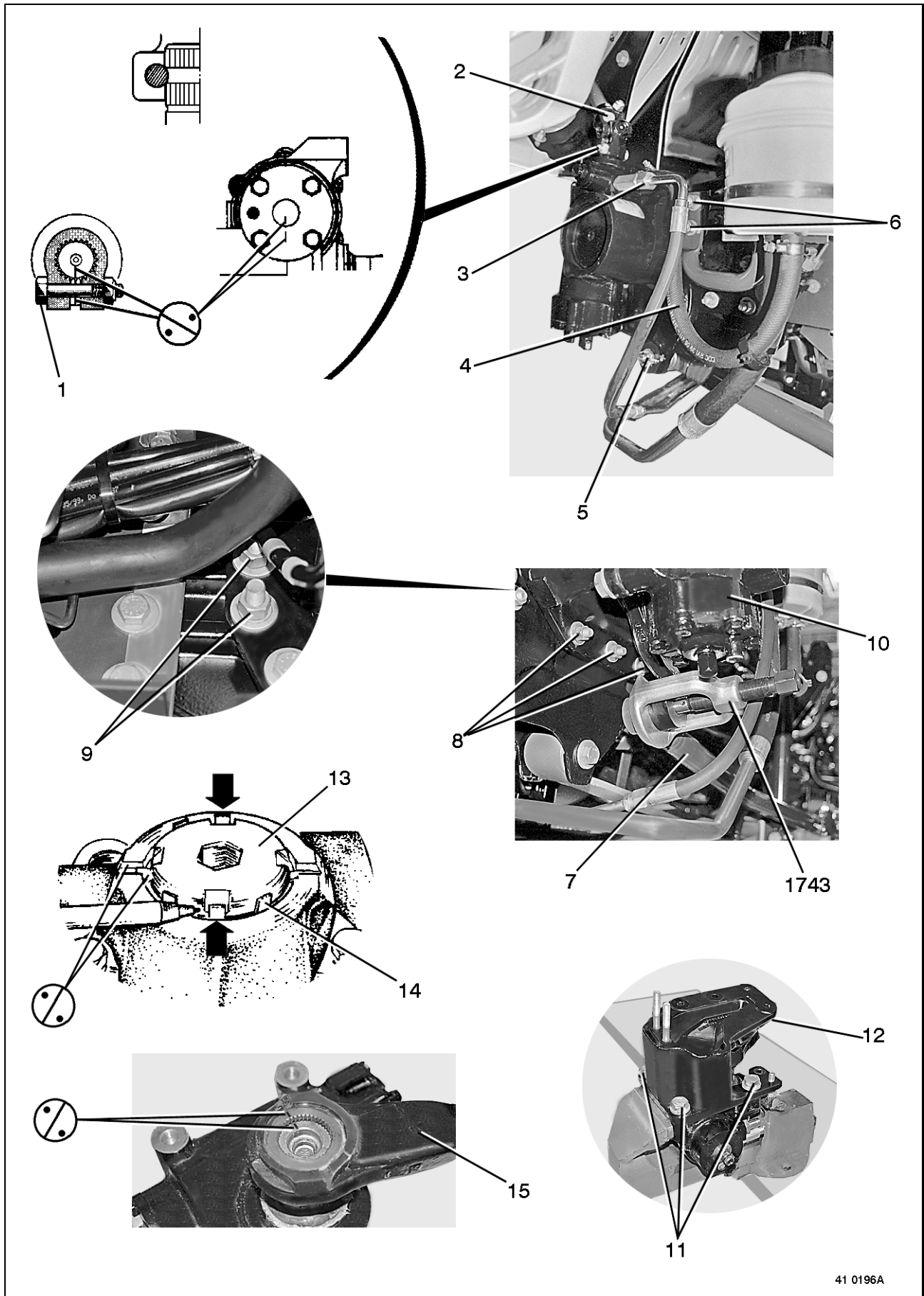
IF THE VEHICLE IS EQUIPPED WITH AN AIRBAG SYSTEM, REMOVE STEERING COLUMN (2) AND IMMOBILIZE THE STEERING WHEEL TO KEEP THE MID-POINT POSITION OF THE ROTARY SWITCH. FOR FURTHER DETAILS, REFER TO THE AIRBAG REPAIR MANUAL.

The table indicates the designation and the reference number of tools necessary for assembly / disassembly of the itemized parts.

| Item | Tool designation | Reference | Assembly | Disassembly |
|------|------------------|-----------|----------|-------------|
| 7    | Puller           | 1743      |          | x           |
| 15   | Puller           | 0857      |          | x           |
| 15   | Dislodger        | 0819      |          | x           |
| 15   | Ram              | 0816      |          | x           |
| 15   | Pusher set       | 2363      |          | x           |

Position the wooden block **A** / tool **9804** + **9366** + **9364** assembly.





41 0196A

The item numbers indicated in the text refer to the drawing on page D-2-2.

Position drop arm **(15)**.

Apply grease to and install lock washer **(14)**.

Tighten bolt **(13)**.

Tighten to torque.

Lock **(14)**.

Retighten to lock properly. Never loosen.

Lock **(13)**.

Fit bracket **(12)**.

Tighten to torque.

Fasten bracket **(12)** to the chassis.

Tighten to torque.

Bring the steering box to the "mid-point" position (marks aligned).

Couple up steering universal joint **(2)**.

Ensure the position

Vehicle equipped with airbag system: line up the marks to fit the steering column to the steering box, in order to keep the mid-point of the rotary switch. For further details, refer to the airbag repair manual.

Fit nut and bolt **(1)**.

Tighten to torque.

Couple up drag link **(7)**.

See page(s) E-2.

Fill the steering hydraulic system and bleed the air from the circuit.

For hydraulic system filling, circuit bleeding and filter replacement operations

(See Driving and Servicing Handbook).

Check the hydraulic lockover limitation.

See page(s) E-3.



## Steering wheel

### Removal

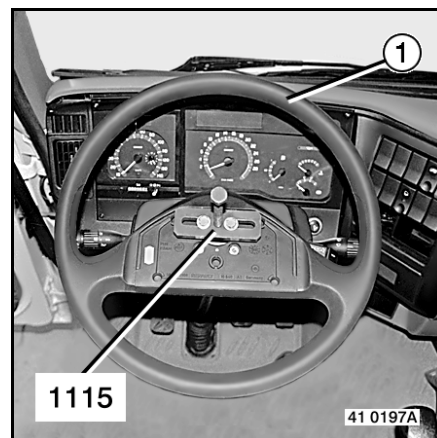


*If the vehicle is equipped with an airbag system, refer to the airbag repair manual.*

Remove nut.

Remove steering wheel (1).

Use tool **1115**.



### Fitting



*If the vehicle is equipped with an airbag system, refer to the airbag repair manual.*

For fitting, proceed in the reverse sequence to removal.

Tighten to torque.



## TESTING/ADJUSTMENT

## Preliminary checks

Before carrying out any work, proceed with the following checks:

- Condition and pressure of tyres.
- Condition and height of suspension.
- Efficiency of shock dampers.
- Play of front axle wheel hub bearings, swivel pins and joints.

With the front wheels in the "straight ahead" position, check the wheel alignment.

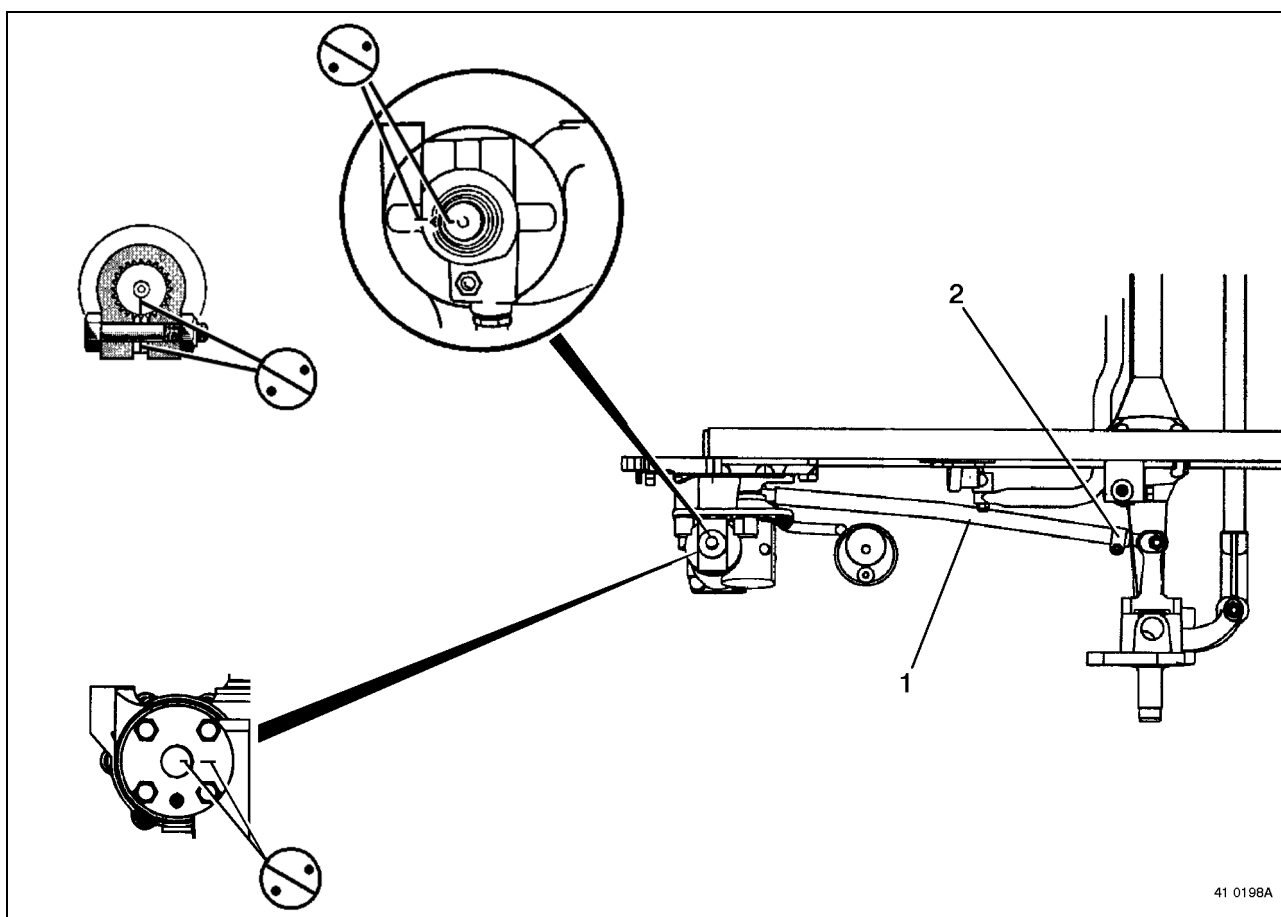
Check that the steering is in the "mid-point" position. For power-assisted steering systems, make sure there is no hydraulic pressure when the steering is in the "mid-point" position.

Carry out a road test after making adjustments found to be necessary during the above checks. If necessary, check the axle geometry angles.

### Inspection conditions:

- Vehicle unladen and in running order.
- Cab in "road" position (for vehicles with tilt cab).
- Vehicle on flat ground, steering axle wheels on pivoting plates.
- Vehicle equipped with lift-up axle: the axle must be lowered.
- Luminous projector.

## Adjustment of mid-point



Park the vehicle on flat ground, steering axle wheels on pivoting plates.

Set the front axle roadwheels to the straight-ahead position, wheel alignment already adjusted. Use a front axle tester.

Uncouple drag link (1).

Set the steering box to the mid-point position (marks aligned).

Adjust the drag link to the necessary length (ball-joints perpendicular to the track rod).

Tighten drag link clamp bolt (2).

Tighten to torque.

## Adjustment of steering lock angles

For steering lock angles, see MR 42 052.

### Steering box SHEPPARD M83

With the wheel alignment adjusted, screw the steering lock stops fully home.

Turn the steering wheel to the right until the required steering lock angle is obtained.

Unscrew the lock stop in question until contact is made with the axle.

Turn the steering wheel to the left and adjust the other lock stop in the same way.

Check that the tyres do not enter into contact with the chassis mechanical components.

### Steering box ZF 8090/8095/8098

With the wheel alignment adjusted, screw the mechanical steering lock stops fully home.

Turn the steering wheel carefully to the right until the required steering lock angle is obtained, without exceeding the angle so as not to maladjust the hydraulic lockover limitation stops on the steering box.

Unscrew the mechanical steering lock stop in question until contact is made with the axle.

Turn the steering wheel to the left and adjust the other steering lock stop in the same way.

Check that the tyres do not enter into contact with the chassis mechanical components.

## Adjustment of hydraulic pressure limitation stops

### Steering box ZF 8090/8095/8098

(To be carried out after adjusting the steering lock angles).

- Park the vehicle on flat ground, steering axle wheels on pivoting plates, or with the front roadwheels raised, with hydraulic power assistance.
- Turn the steering to the left until the lock stop makes contact with the axle (without forcing) .

The hydraulic steering lockover limitation stops are adjusted automatically.



*Correction is possible if the steering lock angle is increased (repeat the operations described above). If the steering lock angle is decreased, replace the hydraulic steering lockover limitation stops (see CMR 41 623).*

Check the hydraulic lockover limitation.

(see MR 41 050).

### Steering box SHEPPARD M83

**Adjustment of hydraulic pressure limitation stops (see MR 41 627).**

Check the hydraulic lockover limitation.

(see MR 41 050).

