

## IDENTIFICATION - DATA : POWER STEERING

NCTRM2E/1/1

## 1. Top of steering column

## 1.1. Identification

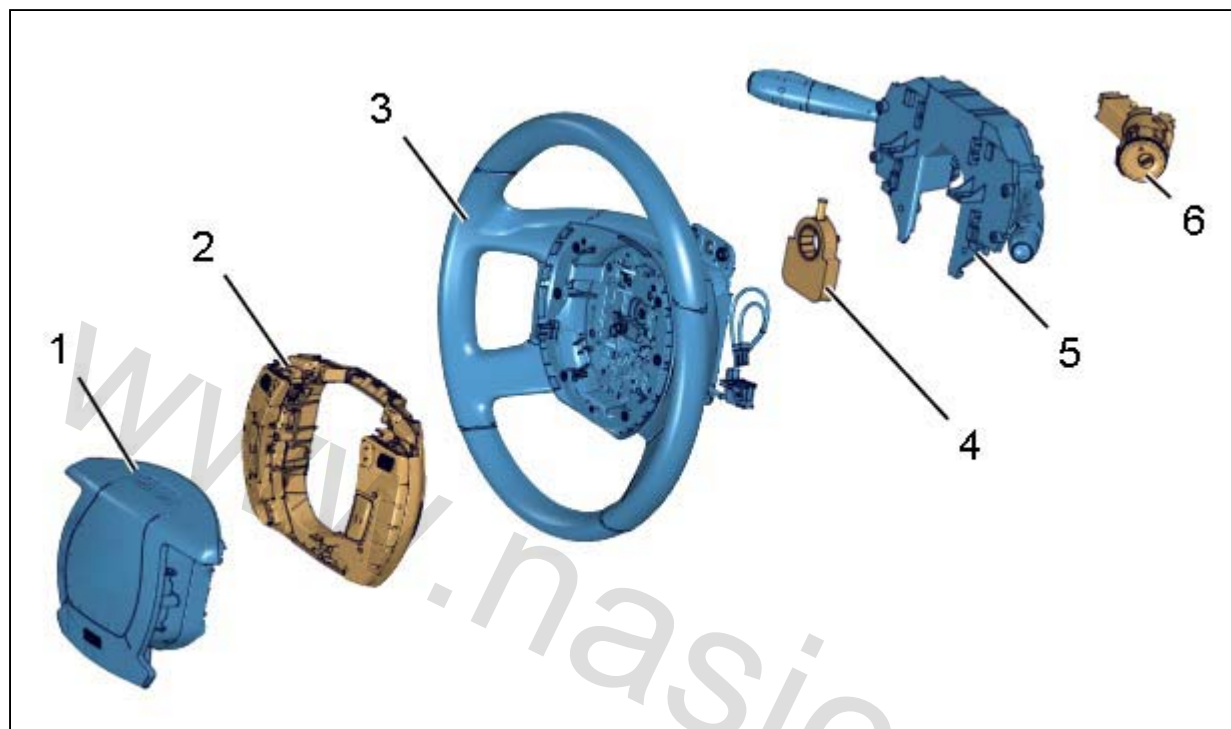


Figure : B3EM059D

- (1) Driver's airbag.
- (2) Controls on the steering wheel.
- (3) Fixed centred controls steering wheel.
- (4) Steering wheel angle sensor.
- (5) Controls located under the steering wheel.
- (6) Steering lock.

## 1.2. Fixed centred controls steering wheel

**URGENT** : Fit the tool [ 1 ] before removing the fixed centred controls steering wheel.

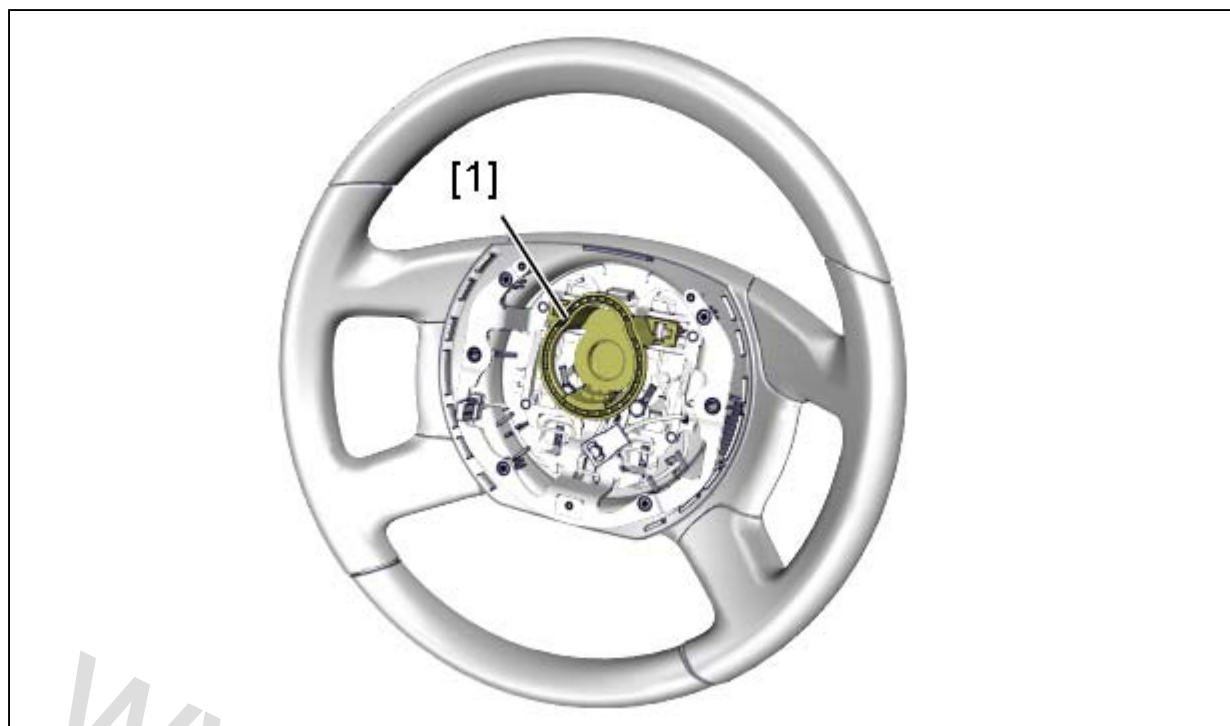


Figure : B3EM05AD

[ 1 ] tool for unlocking the fixed centred controls steering wheel 9702-T.

## 2. Steering column

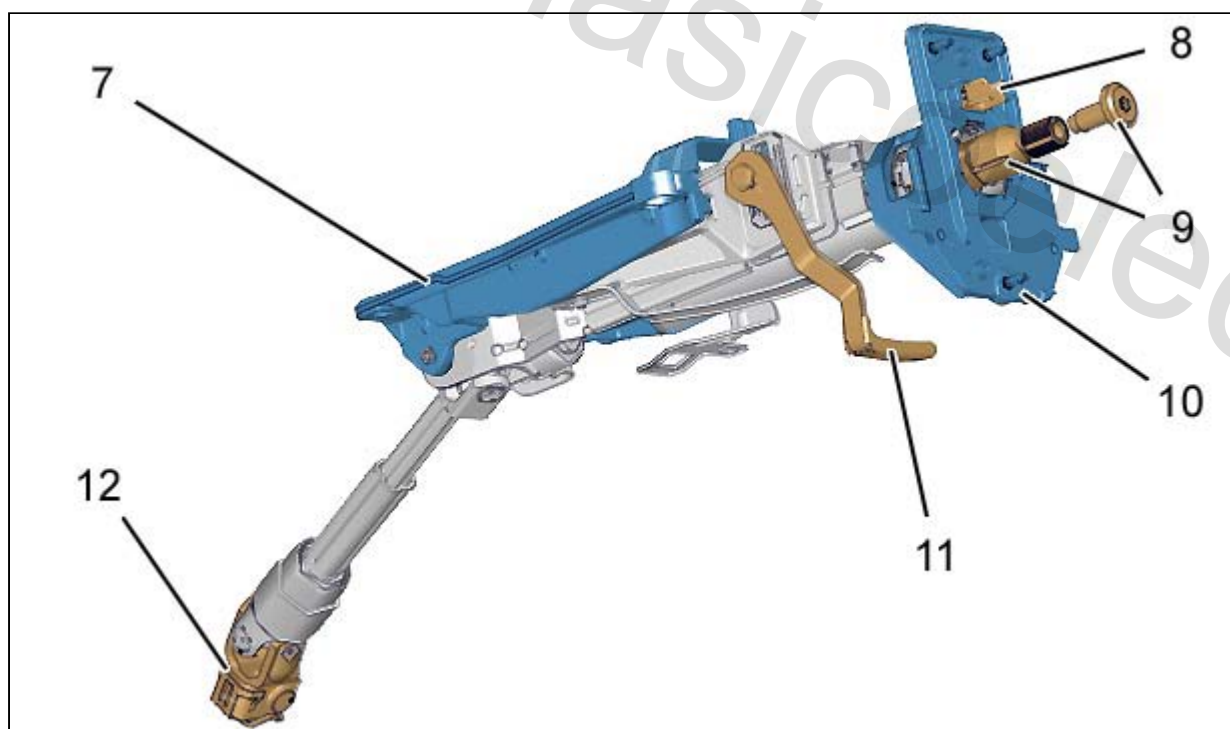


Figure : B3EM05BD

(7) Steering column support.

(8) Guide (Steering wheel angle sensor ).

(9) Fixing of the fixed centred controls steering wheel on the steering column.

(10) Steering column interface.

(11) Locking handle.

(12) Steering cardan fixing on power steering valve stem.

The steering column is aluminium.

The steering column is adjusted for height and reach via the handle ( 11).

### 3. Power steering circuit

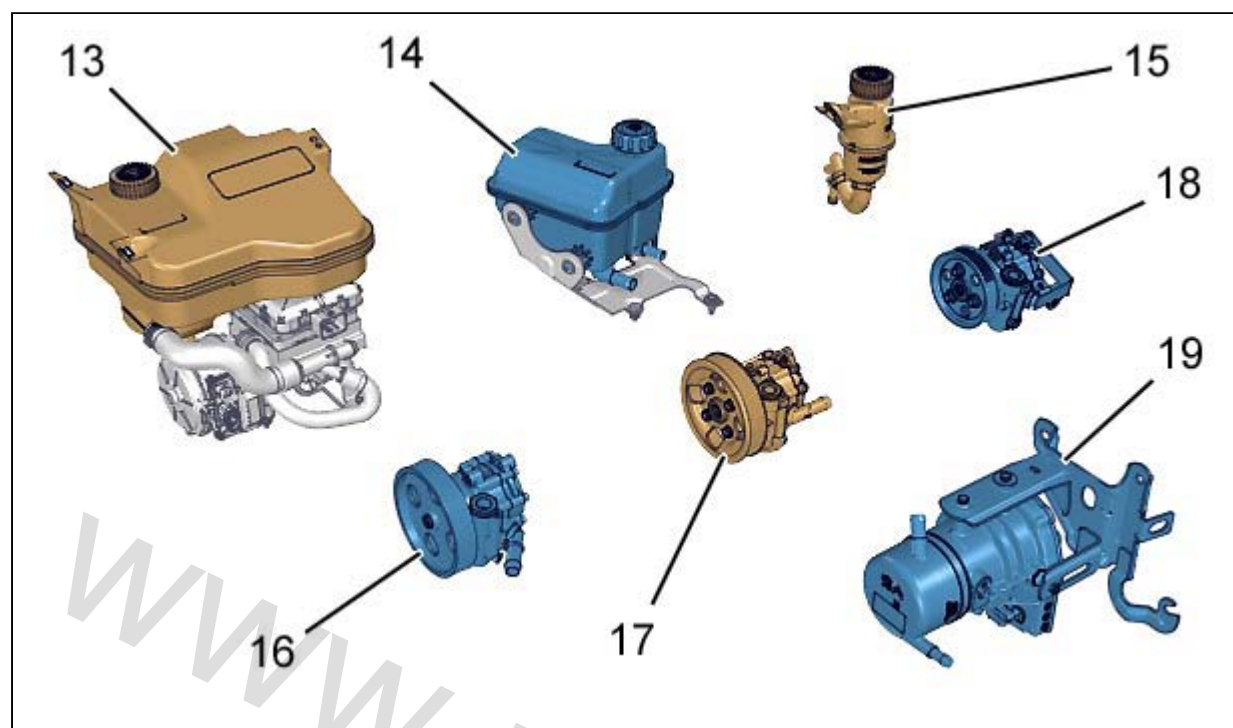


Figure : B3EM05CD

	Suspension	Coupled pump	Electric pump unit	Conventional tank	Tank with integrated hydraulic unit (BHI)
EW7A	Metallic	-	(19)	(15)	
EW10A	Metallic	-	(19)	(15)	
	HYDRAULIC	-	(19)	-	(13)
ES9A	HYDRAULIC	(17)	-	-	(13)
DV6TED4	Metallic	(16)	-	(14)	-
DV6TED4 ( 140 grammes of CO2 )	Metallic	-	(19)	(15)	-
DW10BTED4	Metallic	-	(19)	(15)	-
	HYDRAULIC	-	(19)	-	(13)
DW10CTED4	Metallic	-	(19)	(15)	-
	HYDRAULIC	-	(19)	-	(13)
DW12BTED4	HYDRAULIC	-	(19)	-	(13)
DT17BTED4	HYDRAULIC	(18)	-	-	(13)
DT20C	HYDRAULIC	(18)	-	-	(13)

### 4. Steering mechanism

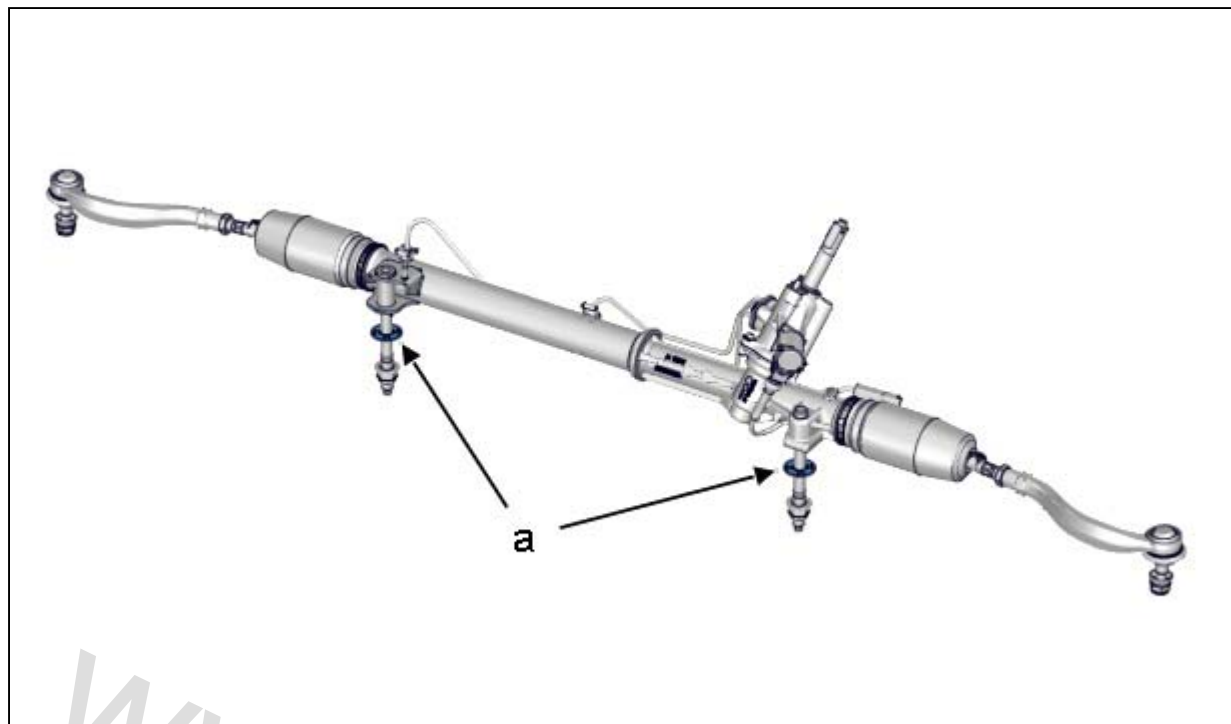


Figure : B3EM05DD

The steering mechanism with integral ram is fixed on the front subframe by means of two studs.  
The hydraulic supply and return pipes are mounted to the power-assisted steering valve with a bracket.

**URGENT** : The toothed washers " a " should be positioned between the steering mechanism and the front subframe.

Wheel diameter	Wheel 16"	Wheel 17" - 18" - 19"
Special feature	Long travel	Short travel
Steering rack travel	92 mm x 2	90 mm x 2

## 5. Power-assisted steering pump

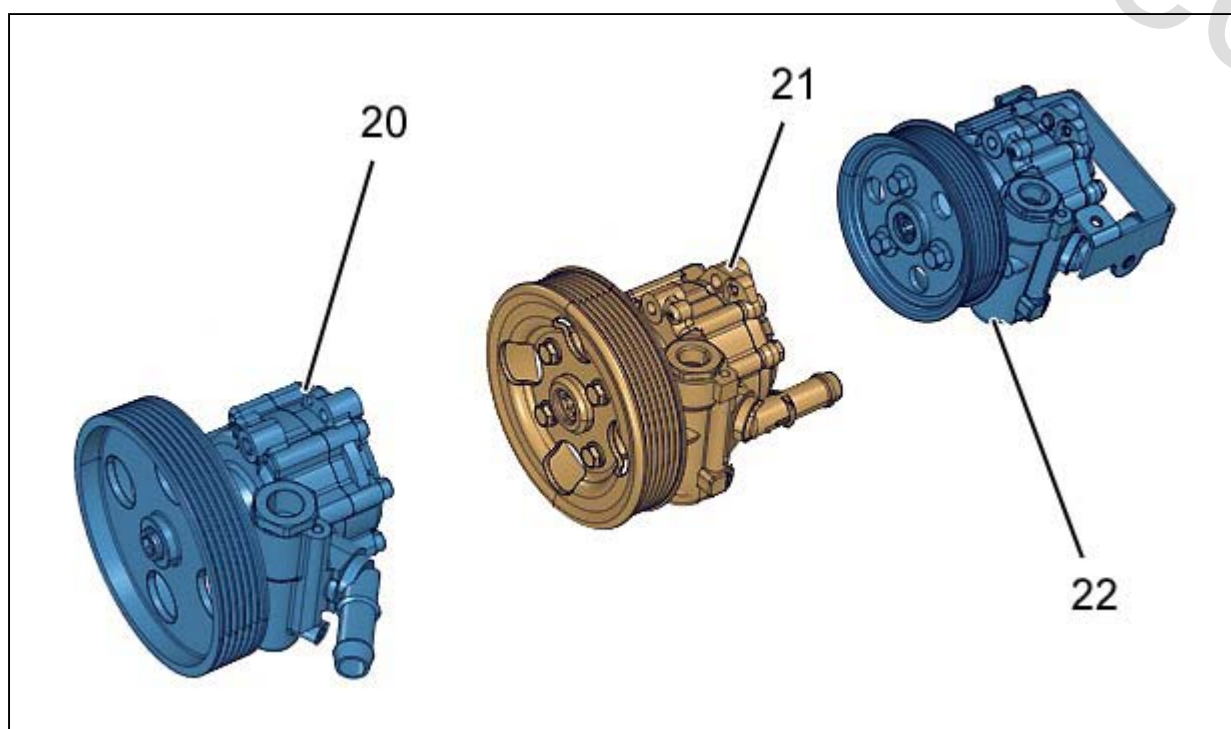


Figure : B3EM05ED

(20) Power-assisted steering pump - DV6 engine (Decreasing flow ).

(21) Power-assisted steering pump - ES9 engine (Constant flow ).

(22) Power-assisted steering pump - DT17 engine - DT20 (Constant flow ).

### 5.1. Reducing flow power steering pump ( DV6 engine)

The power steering pump is driven by the accessories drive belt.

Regulating pressure :  $100 \pm 5$  bars.

### 5.2. Constant flow power steering pump ( ES9A - DT17 - DT20 engines)

The power steering pump is driven by the accessories drive belt.

The fuel high pressure pipes.

Regulating pressure :  $115 \pm 5$  bars.

External diameter of the power steering pump pulley :

- ES9A engine : 128 mm
- DT17 - DT20 engine : 106 mm

## 6. Electro-pump (GEP)

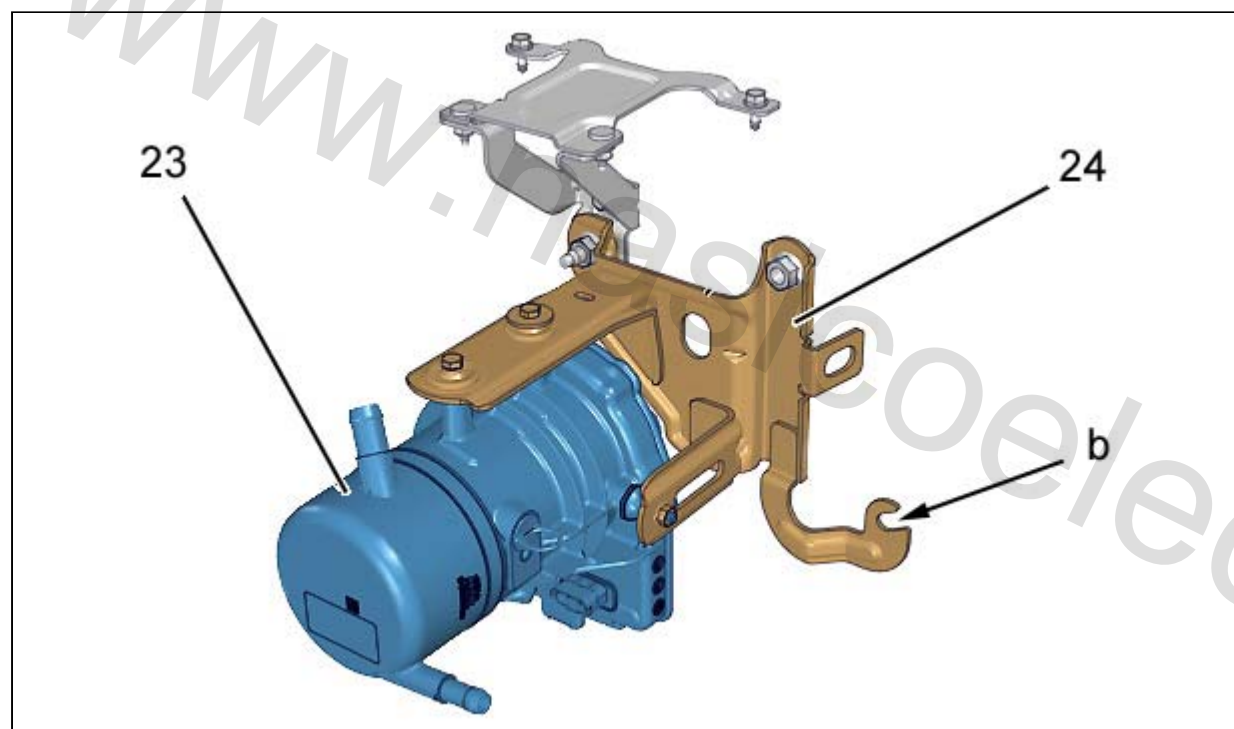


Figure : B3EM05FD

The steering assistance varies as a function of the following parameters :

- Vehicle speed
- Rotation speed of steering wheel

The electropump unit (23) and the mounting (24) cannot be separated.

The split fixing tab (at "b") allows the removal of the electropump unit/mounting assembly without removing the windscreen washer tank.

## TIGHTENING TORQUES : POWER STEERING

NCTRM2E/2/1

### 1. Steering column

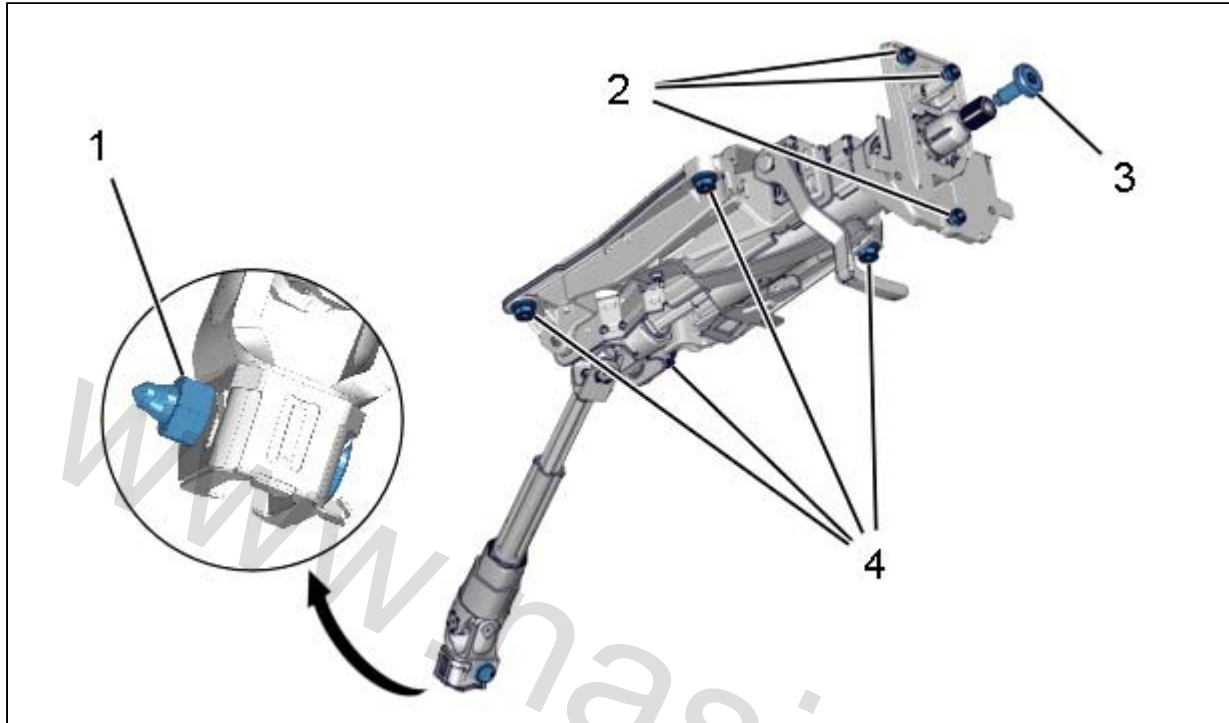


Figure : B3EM05GD

Reference	Description	Tightening torque
(1)	Steering cardan fixing on valve stem	2 daNm
(2)	Top nuts	0,8 daNm
(3)	Screw - The steering wheel	3,3 daNm
(4)	Bottom nuts	2 daNm

### 2. Steering mechanism with integral ram

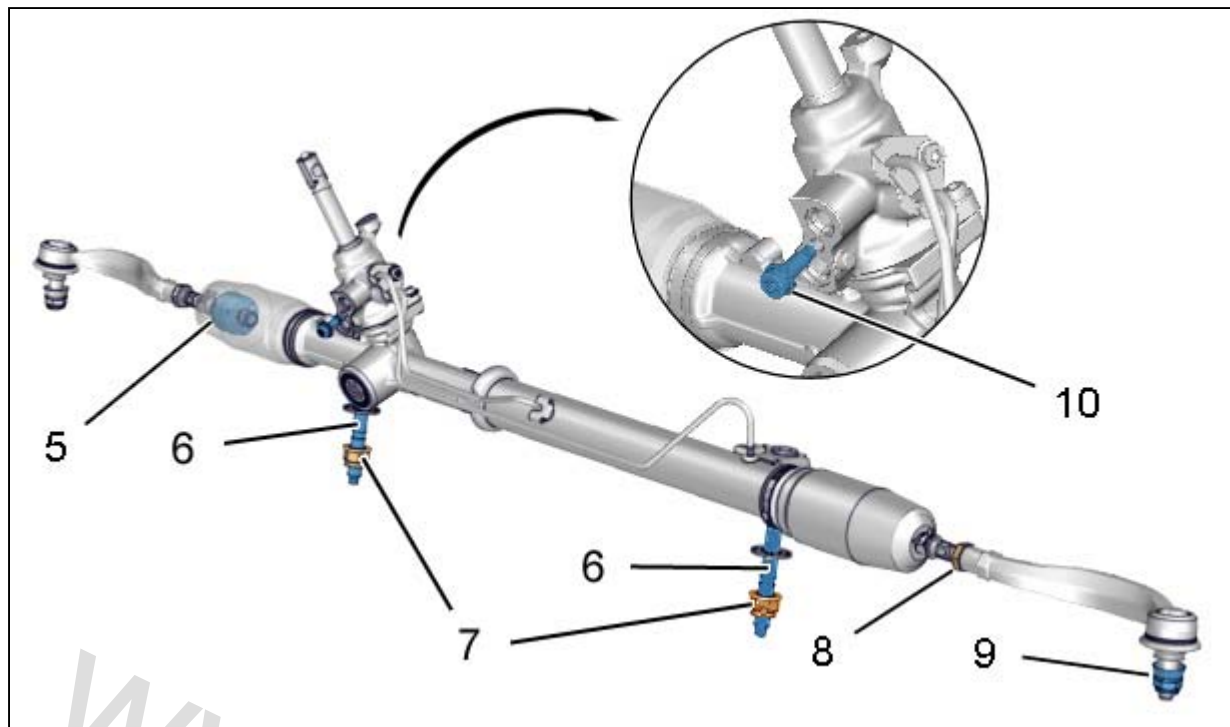


Figure : B3EM05HD

Reference	Description	Tightening torque
(5)	Steering rack ball-joint fixing	10 daNm
(6)	Stud - Steering mechanism	0,9 daNm
(7)	Nut - Steering mechanism	14 daNm
(8)	Lock nut for adjusting the steering track rods	5 daNm
(9)	Steering ball-joint nut	4,8 daNm
(10)	Supply pipe flange fixing on distributor valve	0,8 daNm

### 3. Power steering pump

#### 3.1. dv6 engine

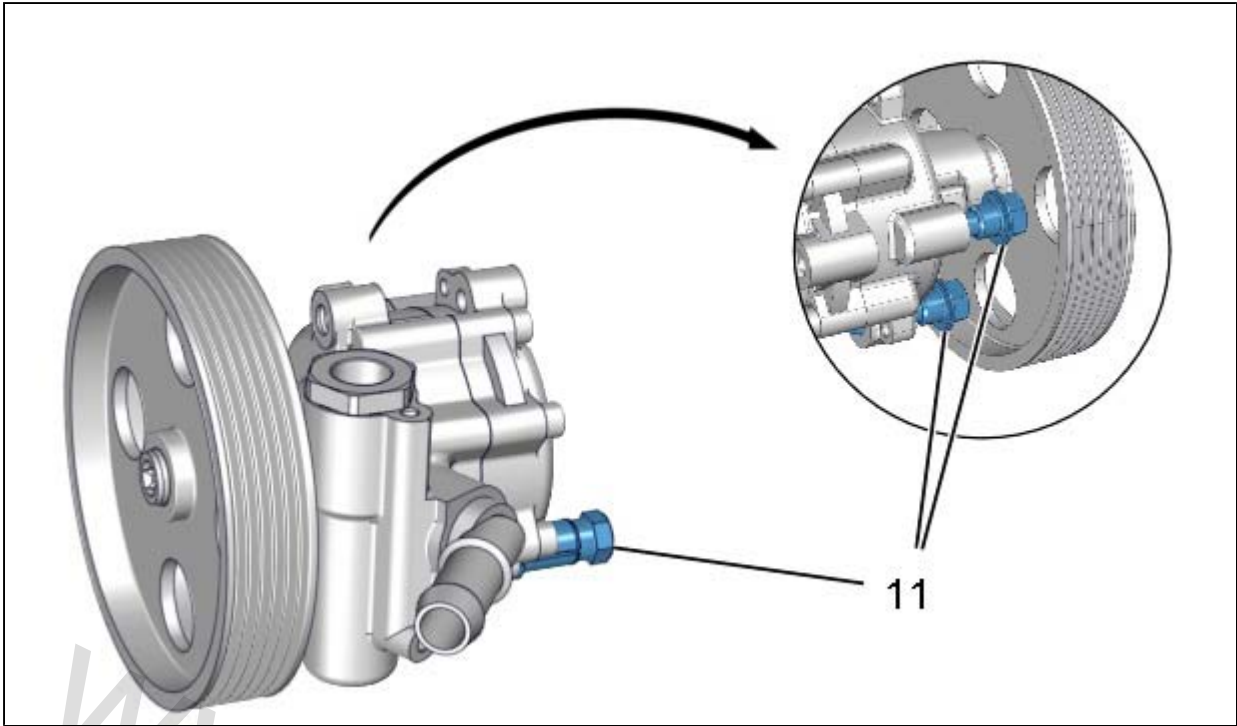


Figure : B3EM05JD

Reference	Description	Tightening torque
(11)	Fastener fastening power steering pump to mounting	2,2 daNm

### 3.2. ES9A engine

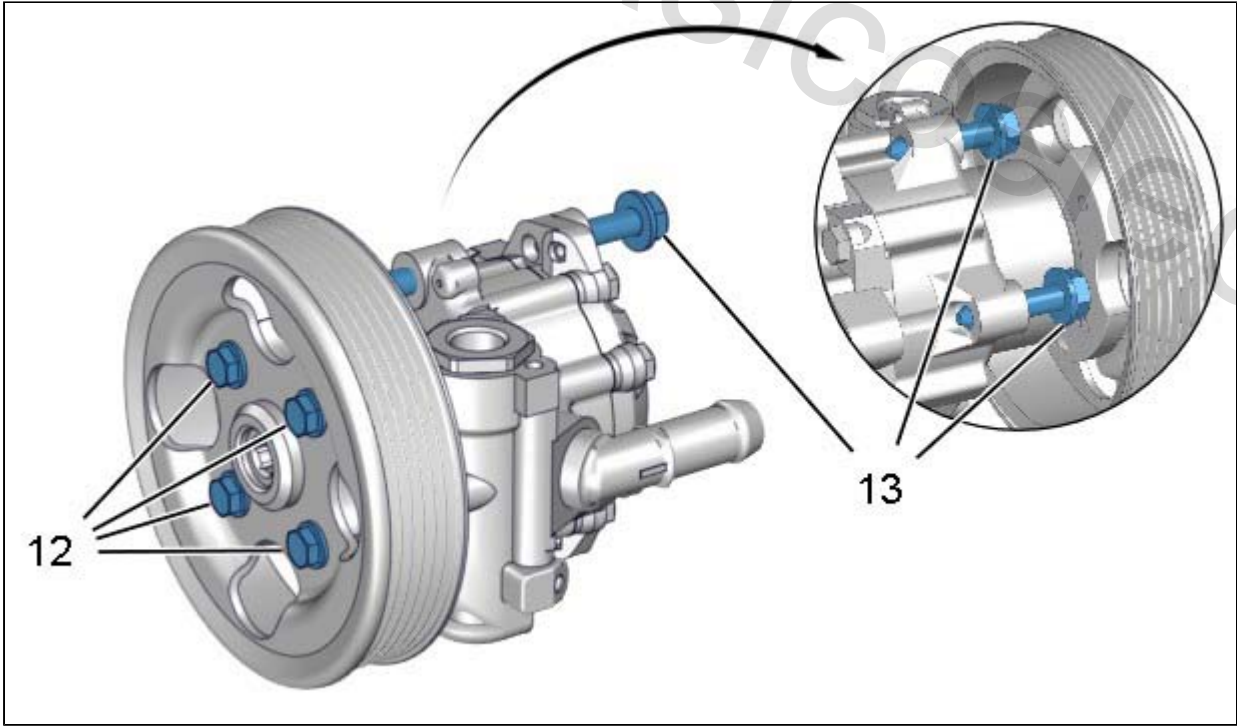


Figure : B3EM05KD

Reference	Description	Tightening torque
(12)	Pulley fixing on power steering pump	0,8 daNm
(13)	Fastener fastening power steering pump to mounting	2,5 daNm

### 3.3. DT17TED4 and DT20C engines

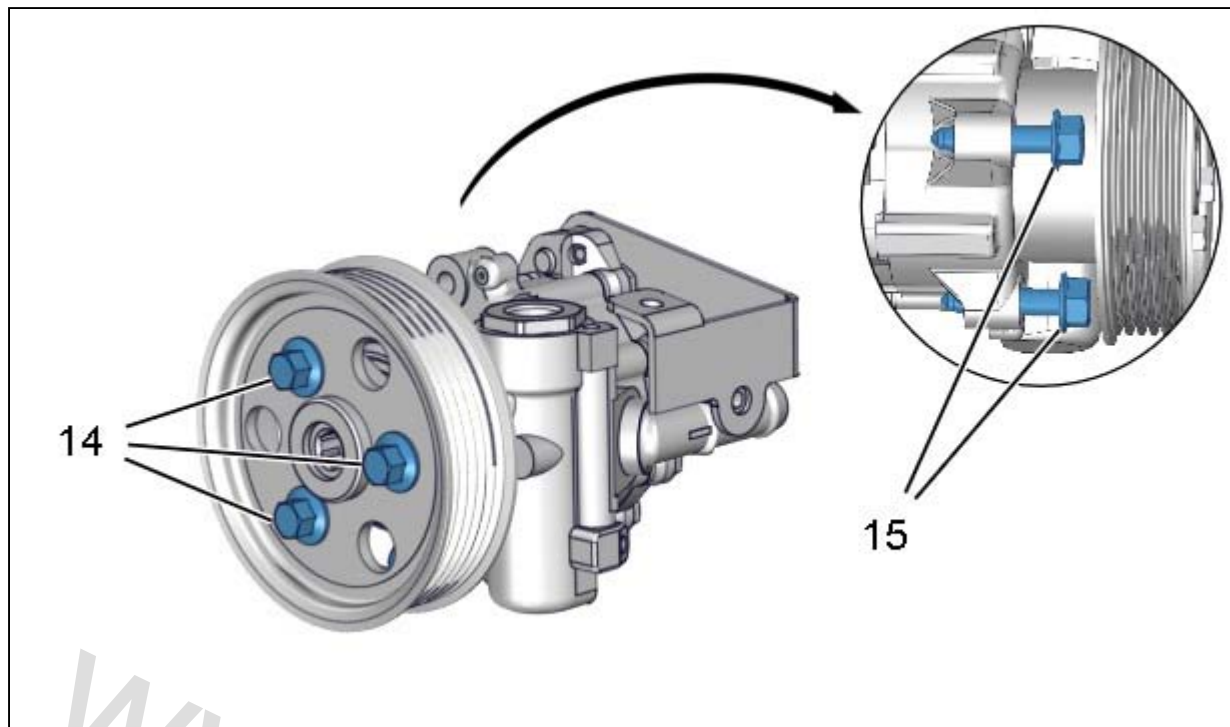


Figure : B3EM05LD

Reference	Description	Tightening torque
(14)	Pulley fixing on power steering pump	2,2 daNm
(15)	Fastener fastening power steering pump to mounting	2,2 daNm

### 3.4. Engines all types - Electro-pump motor (GEP)

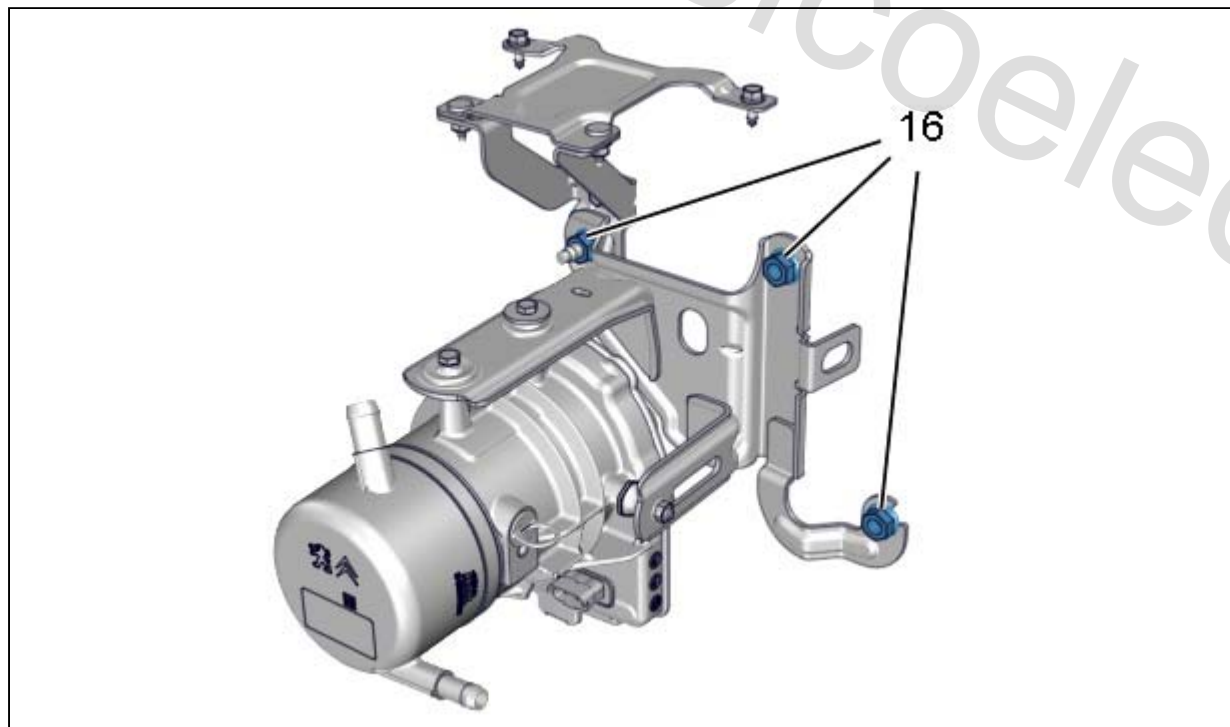


Figure : B3EM05MD

Reference	Description	Tightening torque
(16)	Electropump fixing on chassis member	3 daNm

## REMOVING - REFITTING : POWER-ASSISTED STEERING MECHANISM

NCTRM2E/3/1

**URGENT** : Observe the safety and cleanliness instructions ⓘ.

## 1. Recommended tools

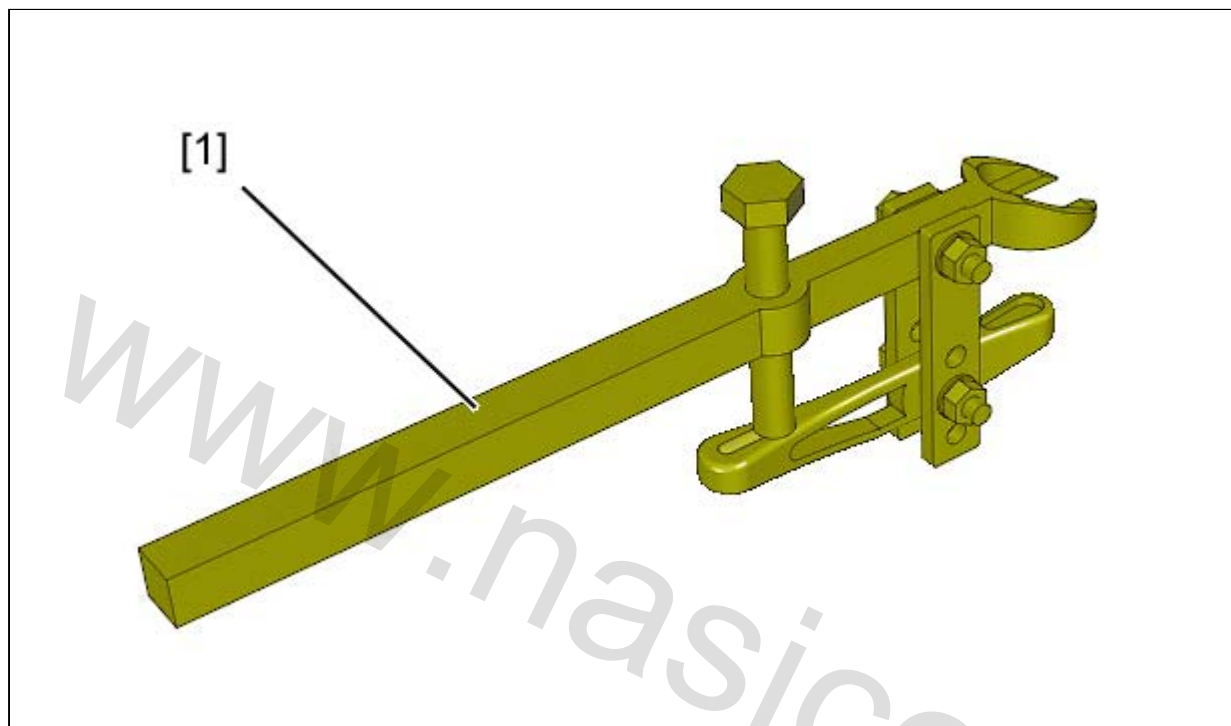


Figure : E5AM0JMD

[1] Ball-joint extractor 1892-T.

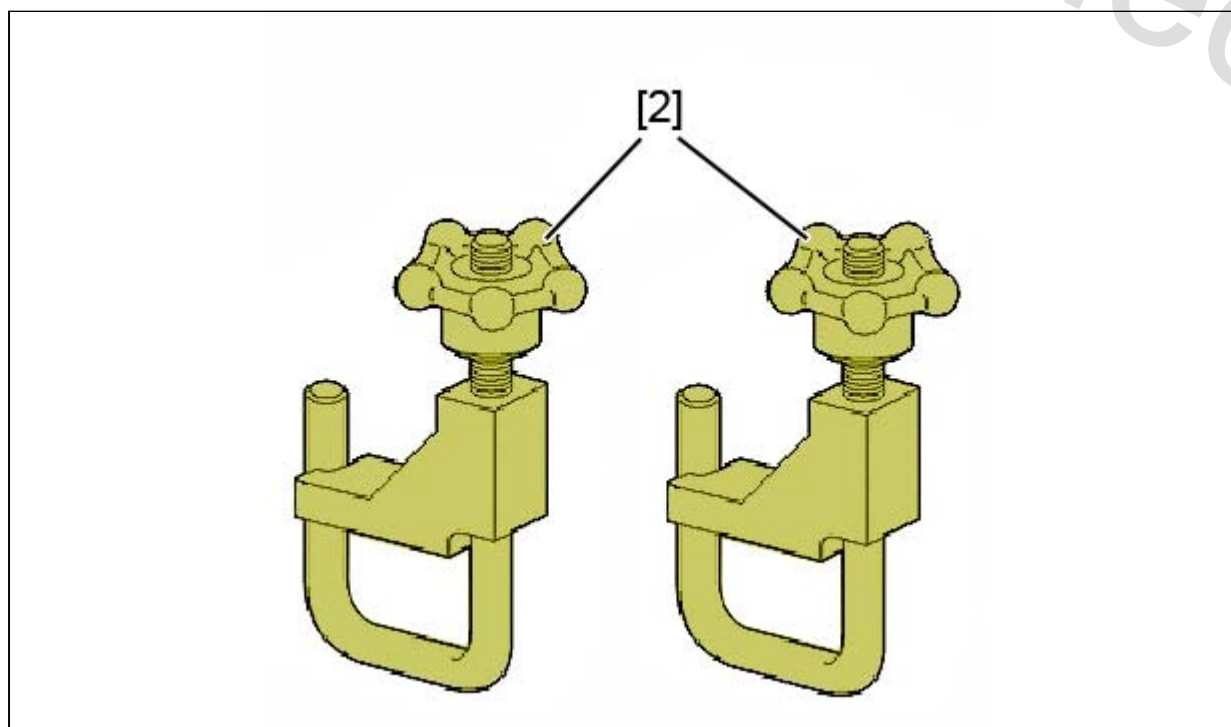


Figure : E5AP2YSD

[2] Set of 2 hose clamps 4153-T.

## 2. Removing

### 2.1. Hydraulic suspension

**URGENT** : If raising the vehicle on a lift, wheels hanging, remove the cap of the LDS fluid reservoir. Refit the cap of the LDS fluid reservoir, once you have lowered the vehicle.

**CAUTION** : Refer to the instructions for the operation "depressurising the suspension circuits".

### 2.2. Joint operations

Disconnect the battery.  
Remove the ignition key.  
Lock the steering wheel.  
Lift and support the vehicle with the wheels free.  
Remove the front road wheels.

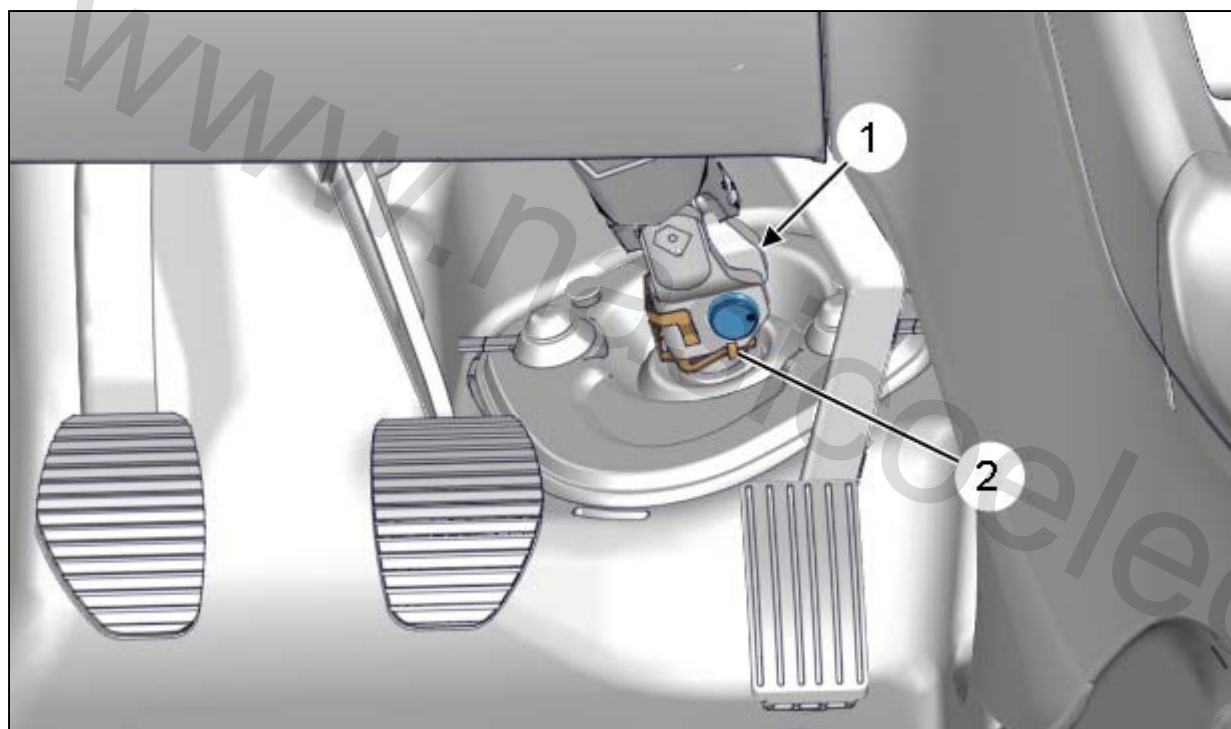


Figure : B3EM07JD

Remove : The trim below the fascia.  
Separate the tongue (2).  
Remove : The nut (1) and its pin.  
Detach the steering cardan joint by moving the security clip.

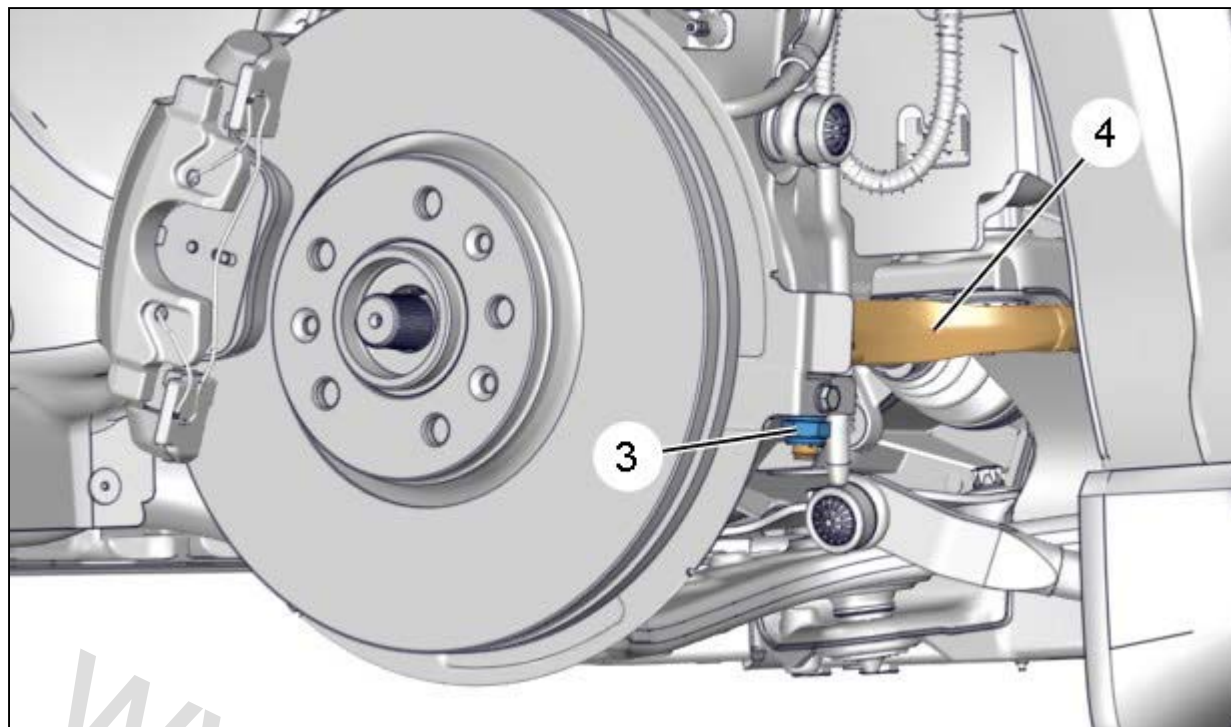


Figure : B3EM07KD

Remove the nut (3) (on each side).

Uncouple : The steering swivel joints (4) ; Using the extractor [1] (on each side).

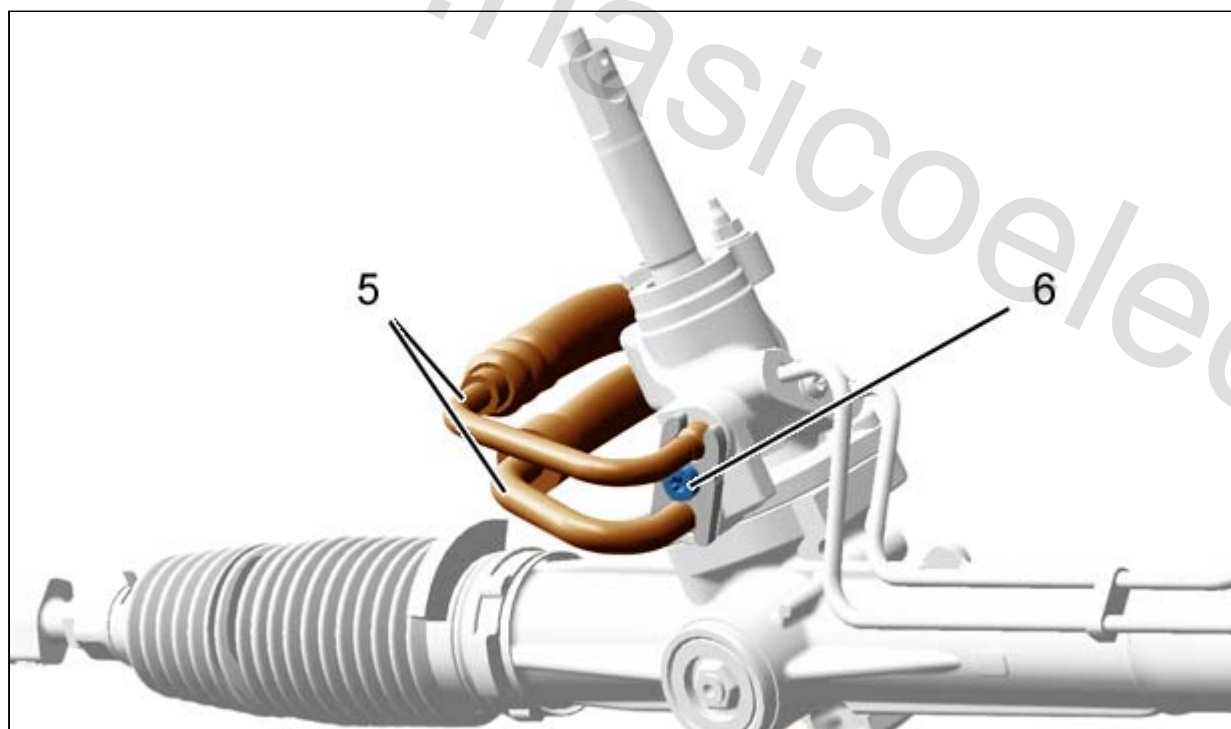


Figure : B3EP183D

**CAUTION** : Plug the inlets and outlets of the hydraulic circuit to prevent any penetration of contaminants.

Remove the bolt (6).

Uncouple the pipes (5) from the steering valve.

Remove the front subframe with the steering mechanism.

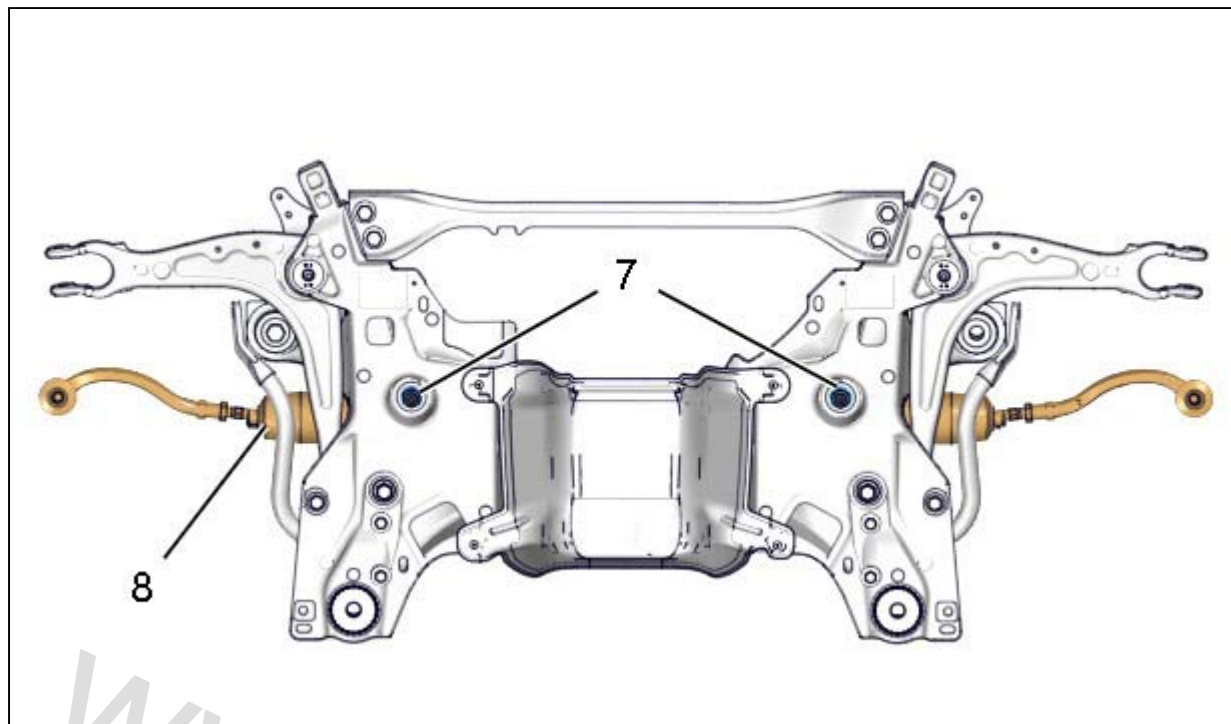


Figure : B3EM07LD

Remove :

- The nuts (7)
- The steering mechanism shims

Remove the steering mechanism (8).

### 3. Refitting

**CAUTION** : Always fit new Nylstop nuts.

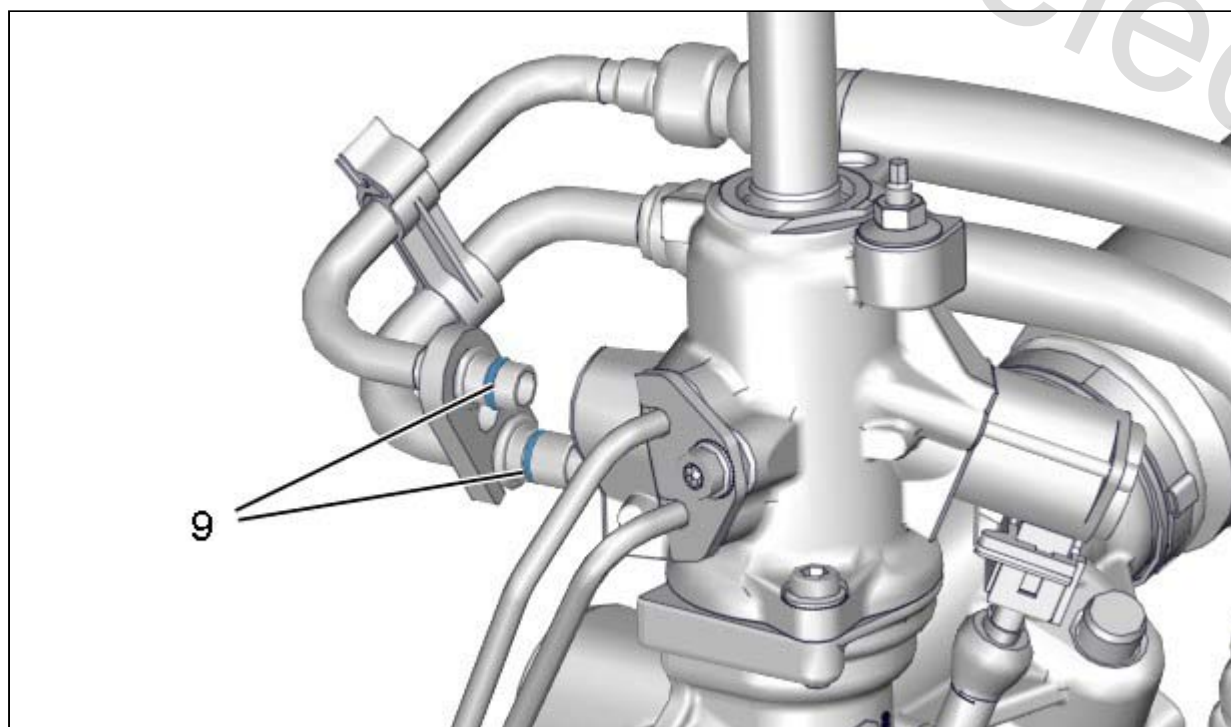


Figure : B3EM07ND

**CAUTION** : Replace the "o" ring seals (9).

Position the steering mechanism on the front subframe (8).

Fit :

- The nuts (7) ; Tighten to  $14 \text{ daNm} \pm 1,4 \text{ daNm}$
- The front subframe

Recouple the pipes (5).

Refit screw (6) ; Tighten to  $0,8 \text{ daNm} \pm 0,1 \text{ daNm}$ .

Couple up : The steering swivel joints (4).

Fit :

- The nut (3) ; Tighten to  $4,8 \text{ daNm} \pm 0,4 \text{ daNm}$
- The steering cardan joint
- The nut (1) and its pin ; Tighten to  $2 \text{ daNm} \pm 0,3 \text{ daNm}$
- The trim below the fascia

Remove tool [2].

Fit the wheels.

Tighten the wheel screws :

- Light alloy wheel : To  $9 \pm 0,9 \text{ da.Nm}$
- Steel wheel : To  $11 \pm 1,1 \text{ da.Nm}$

Reconnect the battery.

**CAUTION** : Perform the operations to be carried out following reconnection of the battery.

Fill and bleed the power steering hydraulic circuit.

Check the front wheel tracking and adjust it if necessary.

**DRAINING - REFILLING - DRAINING : POWER STEERING SYSTEM (ELECTRO-PUMP)**

NCTRM2E/4/1

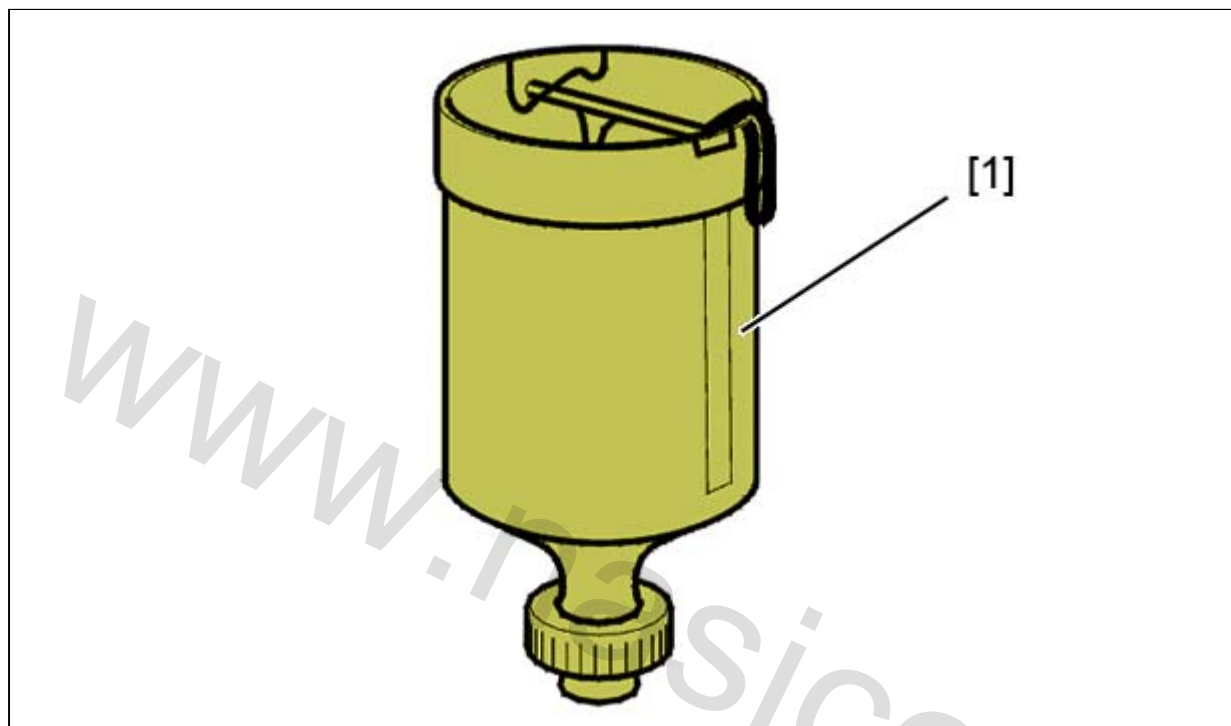
**URGENT** : Observe the safety and cleanliness instructions ⓘ.**1. Recommended tools**

Figure : E5AP2Z5D

[1] filling cylinder 4520-T.

**2. Precautions to be taken**

Proceed with care in order to avoid entry of pollutant particles.  
Use new oil for filling and topping up the hydraulic power steering circuit.  
Use only the hydraulic fluid TOTAL FLUIDE DA.

**3. Draining of the power steering hydraulic circuit****N.B.** : Draining of the hydraulic circuit must be carried out with the engine stopped.**3.1. Hydraulic suspension****URGENT** : If raising the vehicle on a lift, wheels hanging, remove the cap of the LDS fluid reservoir. Refit the cap of the LDS fluid reservoir, once you have lowered the vehicle.**CAUTION** : Refer to the instructions for the operation "depressurising the suspension circuits".**3.2. Joint operations**

Lift and support the vehicle with the wheels free.  
Disconnect the battery.  
Remove :

- The RH front road wheel
- The protective plate under the engine
- The RH front splash shield
- The cap of the power steering fluid tank

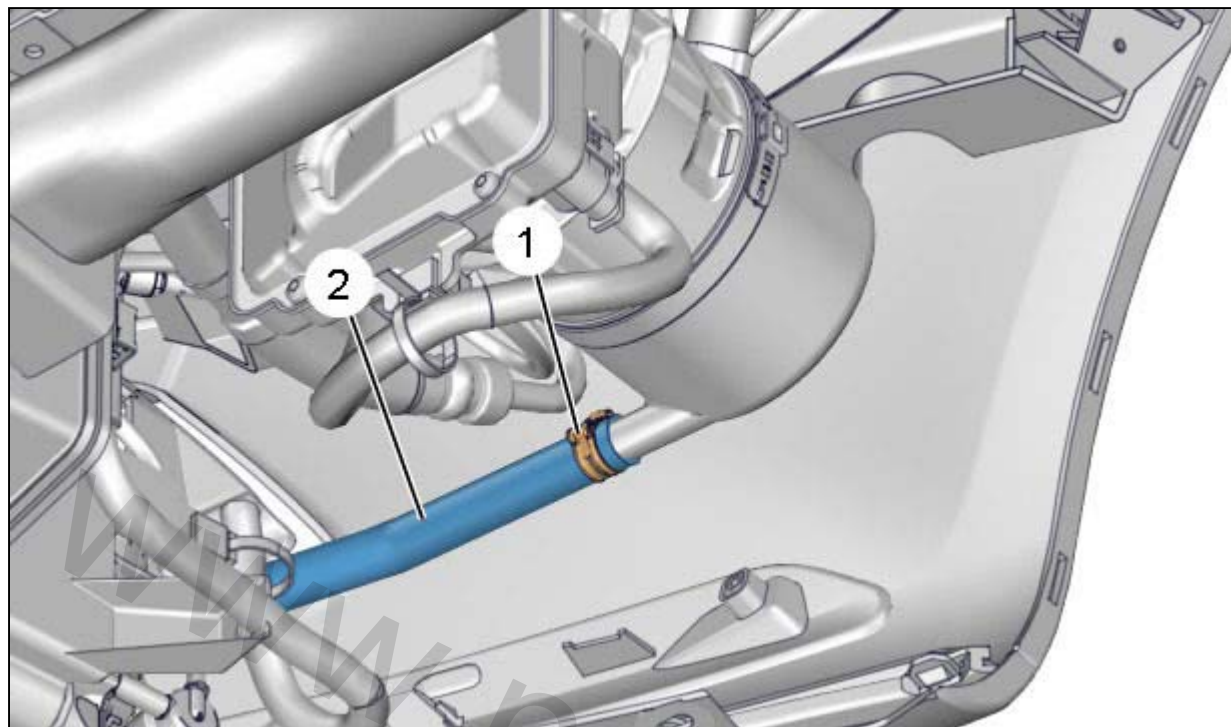


Figure : B3EM071D

Remove clip (1).  
Uncouple the pipe (2).  
Feed the pipe into a tray.  
Turn the steering from lock to lock in each direction.  
Wait for the fluid to finish draining.

#### 4. Filling the hydraulic power steering circuit

**CAUTION** : Proceed with care in order to avoid entry of pollutant particles.

Couple the pipe (2).  
Refit the clip (1).

Fit :

- The RH front splash shield
- The protective plate under the engine
- The RH front road wheel

Tighten the wheel screws :

- Light alloy wheel ; To  $9,0 \pm 0,9$  da.Nm
- Steel wheel ; To  $11,0 \pm 1,1$  da.Nm

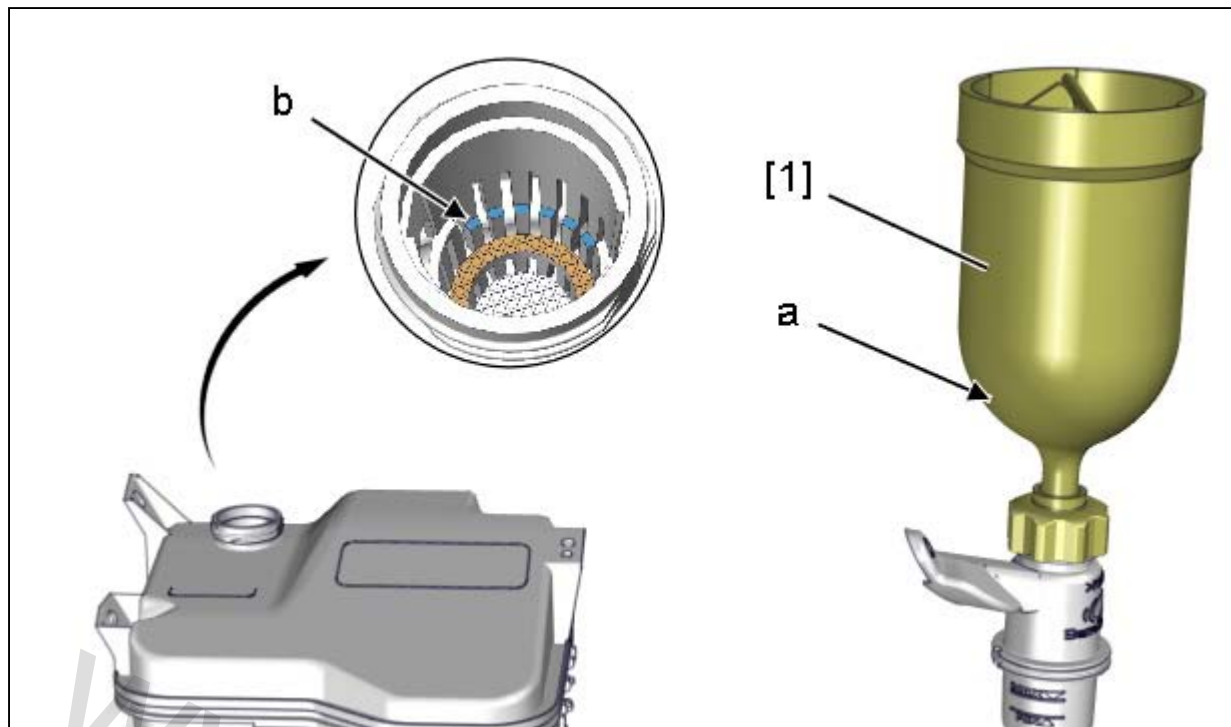


Figure : B3EM072D

Position tool [1] in its place.

Fill the fluid reservoir to the max. level (At "b") (Hydraulic suspension).

Refill the tank of the power steering electropump assembly up to level "a" of the tool [1] (Metallic suspension).

## 5. Bleeding the hydraulic power steering circuit

**CAUTION :** The electropump assembly must never be run without oil in the power steering circuit.

### 5.1. Hydraulic suspension

Apply a pressure of 0,5 bars in the LDS fluid tank ; (using a FACOM 920 tool).

Reconnect the battery.

Start the engine, with the wheels straight ahead without touching the steering wheel.

Wait for the vehicle height to stabilise.

Put the vehicle in the high position then in the low position.

Top up the level (if necessary).

Move the steering slowly, from stop to stop, in both directions, 10 or so times, with the wheels on the ground.

**N.B. :** Do not hold the steering on the stop in order to prevent the opening of the pressure limiter.

Check there are no bubbles in the tank.

If some bubbles are present in the tank, allow it to degas completely ( 3 to 5 minutes), engine running without moving the steering wheel.

Carry out 5 new movements of the steering slowly, from stop to stop, in both directions, with the wheels on the ground.

Repeat this phase until the bubbles completely disappear from the surface of the fluid in the tank.

Put the vehicle in the high position then in the low position.

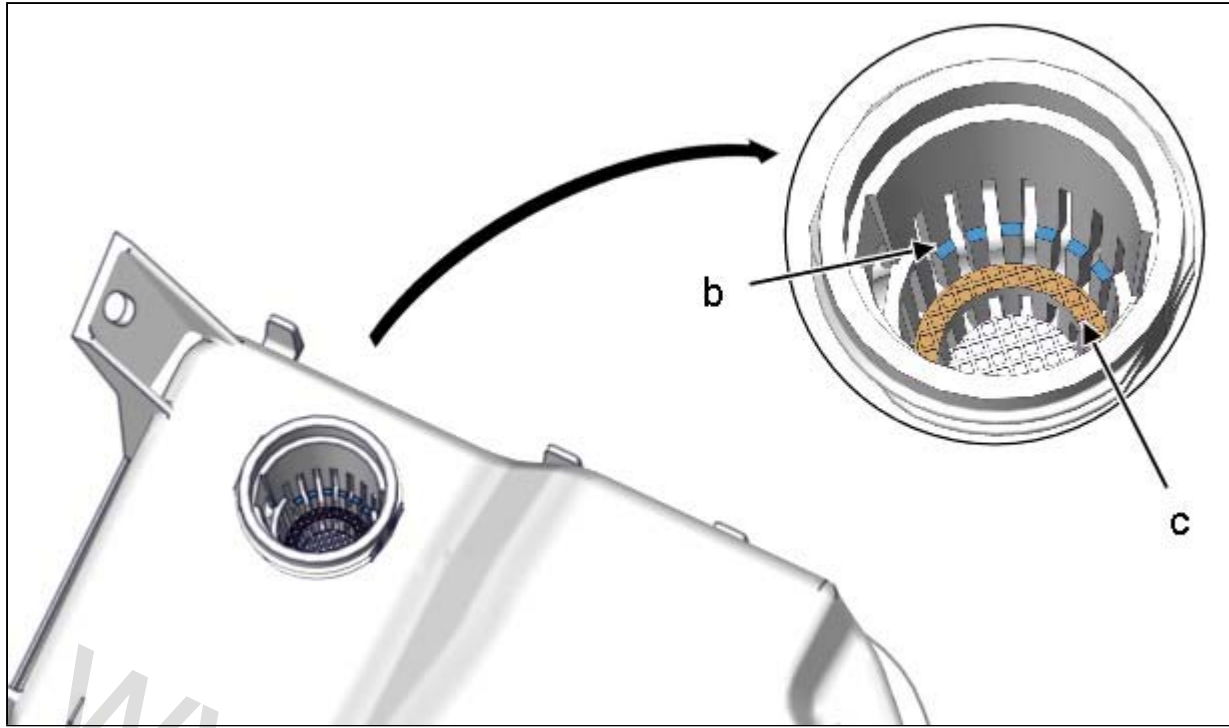


Figure : B3EM073D

Levels :

- At "b" : Max.
- At "c" : Min.

Check the level and that there are no bubbles in the tank.

Carry out a road test and check the level of power steering fluid (With the engine stopped, and the cap screwed on, oil temperature 30°C).

**N.B. :** There must be no bubbles in the tank, otherwise repeat the bleeding procedure.

## 5.2. Metallic suspension

Reconnect the battery.

Start the engine.

Turn on the engine and let it idle for 2 to 3 minutes, without moving the steering wheel (Top up with oil if necessary).

Move the steering slowly, from stop to stop, in both directions, 10 or so times, with the wheels on the ground.

**N.B. :** Do not hold the steering on the stop in order to prevent the opening of the pressure limiter.

Remove the tool [1].

Check there are no bubbles in the tank.

Top up the power steering fluid to the maximum level of the tank.

If some bubbles are present in the tank, allow it to degas completely ( 3 to 5 minutes), engine running without moving the steering wheel.

Carry out 5 new movements of the steering slowly, from stop to stop, in both directions, with the wheels on the ground.

Repeat this phase until the bubbles completely disappear from the surface of the fluid in the tank.

Carry out a road test and check the level of power steering fluid (With the engine stopped, and the cap screwed on, oil temperature 30°C).

**N.B. :** There must be no bubbles in the tank, otherwise repeat the bleeding procedure.

**OPERATION : ELECTRO-HYDRAULIC POWER STEERING**

NCTRM2E/6/1

**1. Nominal operation****1.1. Operation**

The "internal combustion engine status" information is transmitted by the engine ECU to the electropump assembly (GEP). When the ignition positive is present, the electropump assembly starts when it receives the internal combustion engine status "running" information.

The electropump assembly uses the speed of rotation of the steering wheel information to vary the hydraulic pump LDS fluid flow, while taking into account the vehicle speed and the temperature of the LDS fluid.

**1.2. Speed of rotation of the electropump assembly motor in rpm (Vehicle with 16 inch wheels)**

Speed of rotation of the electropump assembly motor in rpm					
Rotation speed of steering wheel (°/s)	Vehicle speed : 0 km/h	Vehicle speed : 15 km/h	Vehicle speed : 30 km/h	Vehicle speed : 50 km/h	Vehicle speed : 70 km/h
0	2010	3510	3000	2610	2310
30	3300	3540	3090	2640	2010
60	3300	3600	3210	2700	2100
90	3300	3600	3300	2760	2310
120	3300	3750	3510	3000	2400
190	3300	3840	3960	3150	2610
260	3300	4290	4110	3360	2790
340	3510	4950	4350	3750	3300
480	4800	5010	4890	4500	3990
620	5310	5310	5310	5310	5100

Speed of rotation of the electropump assembly motor in rpm					
Rotation speed of steering wheel (°/s)	Vehicle speed : 90 km/h	Vehicle speed : 110 km/h	Vehicle speed forced to 140 km/h	Vehicle speed : 170 km/h	Vehicle speed : 200 km/h
0	1800	1650	1560	1110	990
30	1710	1590	1560	1050	960
60	1740	1650	1500	960	900
90	1890	1650	1560	900	900
120	2010	1710	1560	1140	1110
190	2310	2190	2040	1800	1590
260	2490	2400	2310	2250	2190
340	3240	3000	2640	2550	2490
480	3750	3300	2760	2700	2640
620	4800	4500	4110	3990	3810

**1.3. Speed of rotation of the electropump assembly motor in rpm (Vehicle with 17,18 and 19 inch wheels)**

Speed of rotation of the electropump assembly motor in rpm					
Speed of rotation of the steering wheel (°/s)	Vehicle speed : 0 km/h	Vehicle speed : 15 km/h	Vehicle speed : 30 km/h	Vehicle speed : 50 km/h	Vehicle speed : 70 km/h
0	2010	3510	3000	2490	1650
30	3300	3360	2760	2250	1440

60	3300	3210	2610	2100	1260
90	3300	2940	2310	2010	990
120	3300	3510	2550	2250	1710
190	3300	4110	3060	2760	2400
260	3300	4500	3450	3290	2910
340	3510	4800	4710	4410	4260
480	4800	5190	5100	5010	4800
620	5310	5700	5490	5310	5250

Speed of rotation of the electropump assembly motor in rpm					
Speed of rotation of the steering wheel (°/s)	Vehicle speed : 90 km/h	Vehicle speed : 110 km/h	Vehicle speed forced to 140 km/h	Vehicle speed : 170 km/h	Vehicle speed : 200 km/h
0	1110	990	750	750	750
30	990	900	780	750	750
60	900	840	780	780	750
90	840	810	810	780	750
120	1380	1260	1200	1110	990
190	2340	2100	2010	1890	1650
260	2790	2550	2400	2340	2340
340	3840	3750	3690	3450	3150
480	4560	4410	4260	3750	3540
620	5100	4860	4650	4440	4260

#### 1.4. Flow strategy in relation to the LDS fluid temperature

The electropump assembly flow increases in relation to the LDS fluid temperature.

The compensation factor permits adaptation of the viscosity of the hydraulic fluid in relation to the LDS fluid temperature.

The compensation factor is applied to the speed of rotation of the electropump assembly (°/s)				
Temperature (°C)	The speed of rotation of the steering wheel : 0 °/s	The speed of rotation of the steering wheel : 100 °/s	The speed of rotation of the steering wheel : 200 °/s	The speed of rotation of the steering wheel : 400 °/s
10	0,75	0,8	0,9	1
25	0,8	0,85	0,95	1,1
50	0,9	0,95	1	1,2
70	1	1,1	1,15	1,2

#### 1.5. Condition for activation and deactivation of the electropump assembly (GEP)

Normal starting condition.

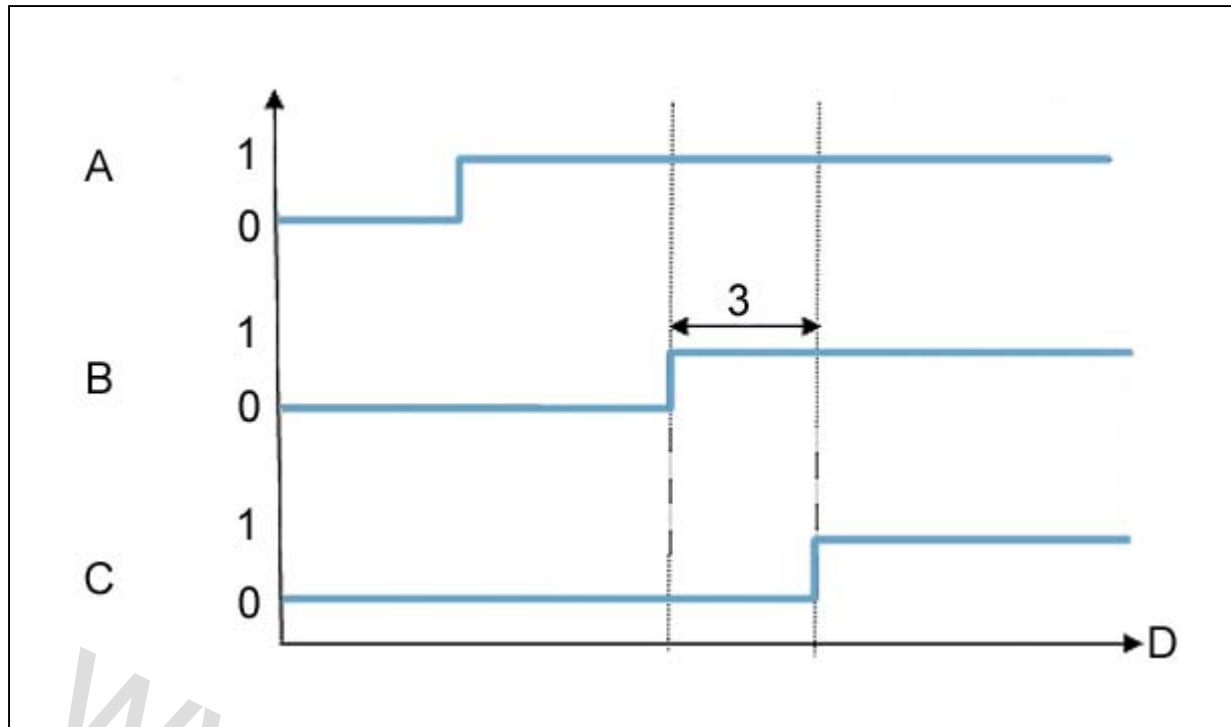


Figure : B3EP1AJD

"A" : Ignition plus signal.

"B" : Status of the internal combustion engine (3 datastreams).

"C" : Status of the electropump assembly.

"D" : Time.

The normal conditions for starting of the electropump assembly are the following :

- Ignition key at ignition
- 3 consecutive valid and identical datastreams of the "internal combustion engine status" variable

Condition for starting of the electropump assembly without a valid "internal combustion engine status" variable or when the variable is absent.

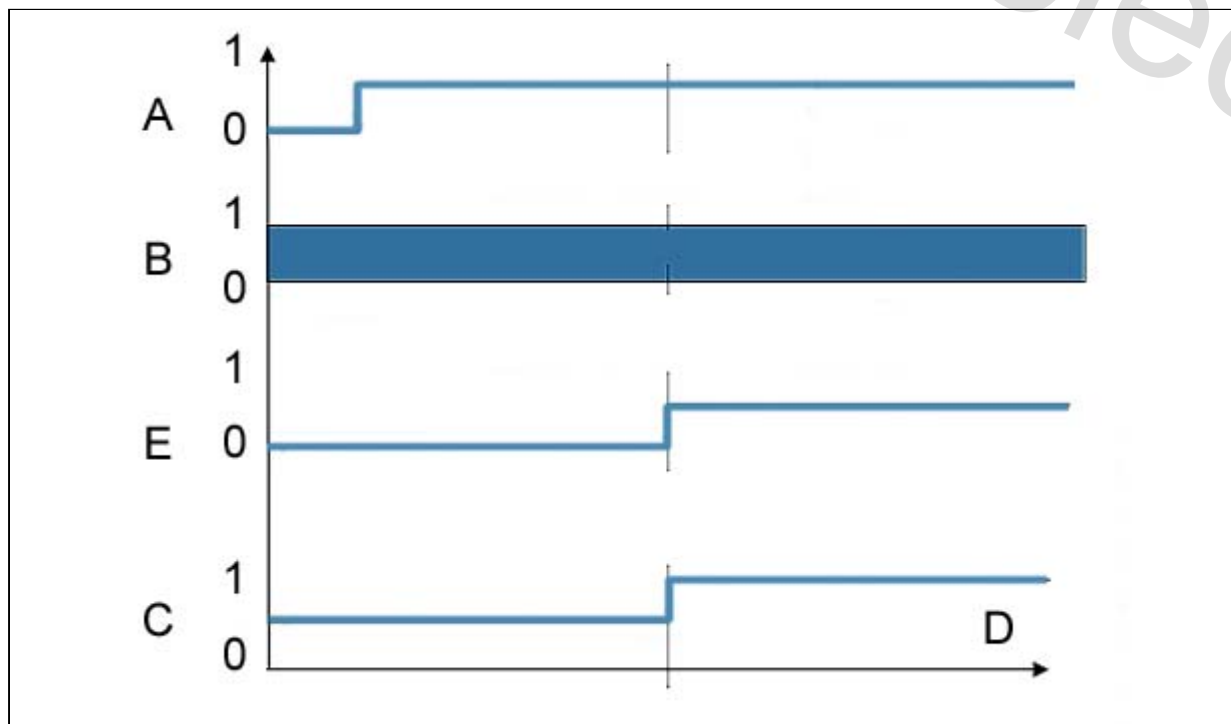


Figure : B3EP1AKD

"A" : Ignition plus signal.

"B" : Status of the internal combustion engine (Not valid or absent).

"C" : Status of the electropump assembly.

"D" : Time.

"E" : Valid vehicle speed value (Applicable = Passage from 0 to 1).

The conditions for starting of the electropump assembly without the "internal combustion engine status" variable are the following :

- Ignition positive signal present
- "internal combustion engine status" variable not present
- Valid vehicle speed between 8 km/h and 45 km/h

Conditions for stopping of the electropump assembly.

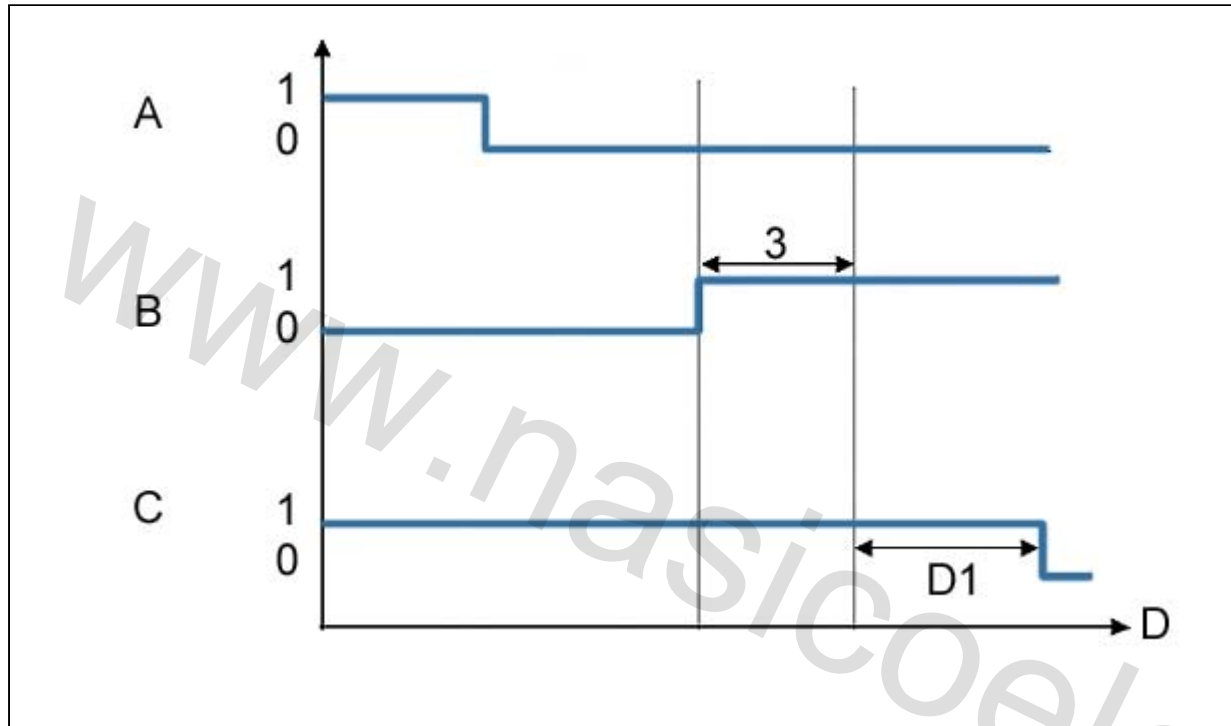


Figure : B3EP1ALD

"A" : Ignition plus signal.

"B" : Status of the internal combustion engine (3 datastreams).

"C" : Status of the electropump assembly.

"D" : Time.

Normal stopping following stopping by the driver when the ignition positive signal is cut.

The electro-pump unit is stopped following the time delay "D1" of 2 seconds, when the following various conditions are present :

- The ignition positive signal changes from the high status to the low status, following an action by the driver
- 3 consecutive and identical data streams of the internal combustion engine status are valid (Engine not running, or "internal combustion engine status" value not valid, or "internal combustion engine status" value absent)

Conditions for stopping of the electropump assembly with the high ignition positive signal.

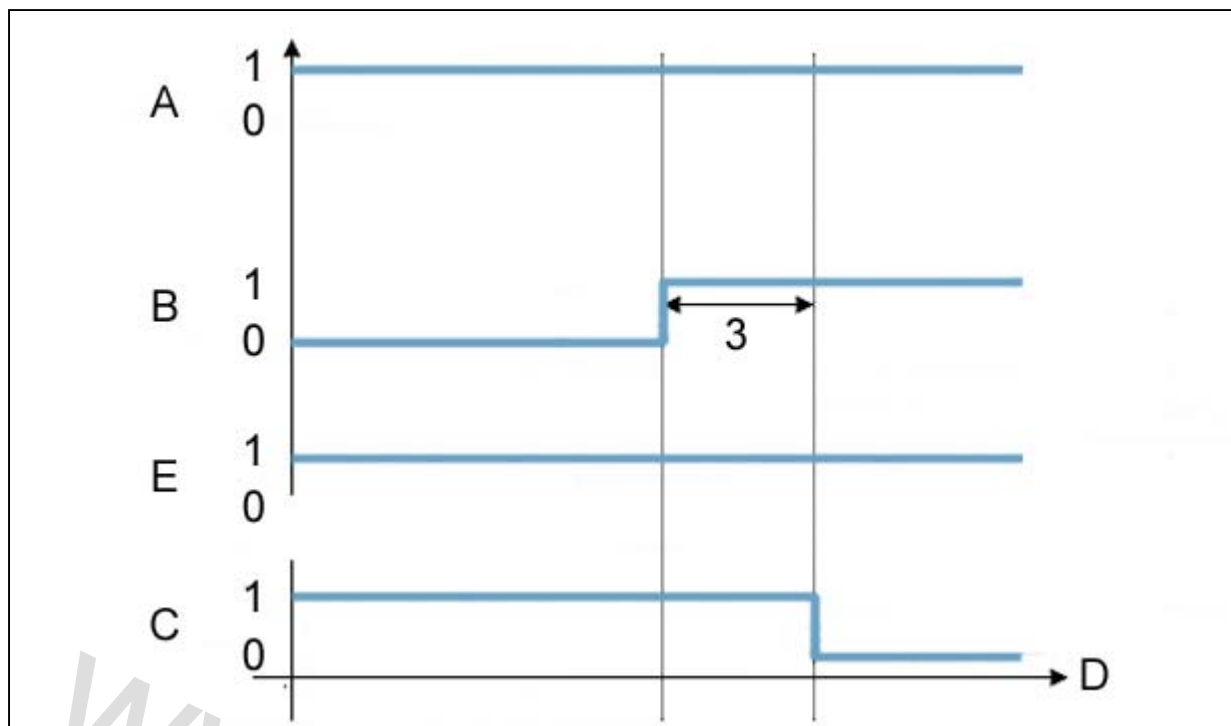


Figure : B3EP1AMD

"A" : Ignition plus signal.

"B" : Status of the internal combustion engine.

"C" : Status of the electropump assembly.

"D" : Time.

"E" : Valid vehicle speed value (Applicable = Passage from 0 to 1).

Example : Stalling when stationary.

Conditions for stopping of the electropump assembly if :

- The ignition positive signal has remained high
- 3 consecutive and identical data streams of the internal combustion engine status are valid (Engine not running, or "internal combustion engine status" value not valid, or "internal combustion engine status" value absent)
- Vehicle speed below 8 km/h

## 2. Sub function of the system

Special operation of the electropump assembly.

When the engine stalls, the electro-hydraulic power steering may remain in operation.

When the vehicle is pushed, with the engine not running and the ignition key at ignition plus, the electropump assembly starts and provides assistance at the steering wheel.

**CAUTION** : The electropump assembly operating mode with the internal combustion engine not running consumes the battery power.

## SYNOPSIS : ELECTRO-HYDRAULIC POWER STEERING

NCTRM2E/7/1

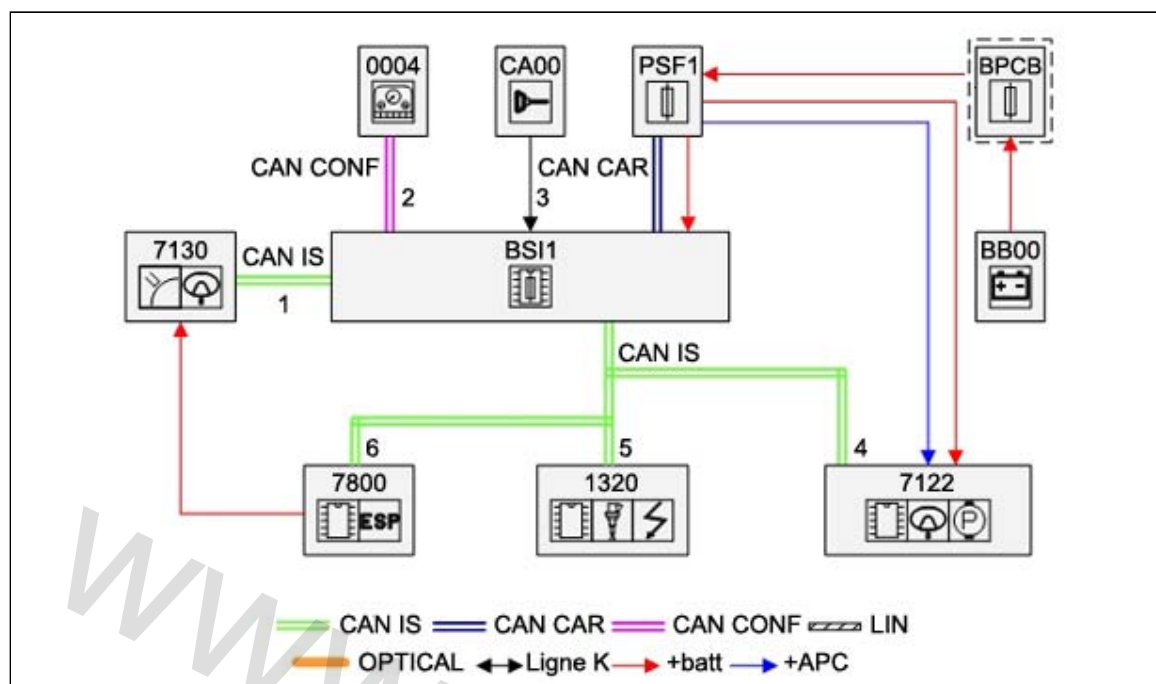


Figure : D4EM0GZD

Components description table	
Component	Description
BB00	Battery
BPCB	Battery cable protection housing (DT17 engine)
BSI11	Built-in systems interface (BSI)
CA00	Ignition switch
PSF1	Connection board - fuse box-Engine compartment
0004	Instrument panel
1320	Engine management ECU
7122	Power steering electropump assembly
7130	Steering wheel angle sensor
7800	ESP ECU

Description of the exchanges of information			
Connection n°	Signal	Transmitter/receiver	Signal type
1	Information on steering wheel angle	7130 / BSI1	CAN Is
	Information on speed of rotation of the steering wheel		
2	STOP warning lamp lighting control	BSI1 / 0004	COMFORT CAN
3	Ignition on information	CA00 / BSI1	Wire
4	Information on steering wheel angle	BSI1 / 7122	CAN Is
	Information on speed of rotation of the steering wheel		
	Vehicle speed information		
	Engine running information		
	Power steering fault information	7122 / BSI1	CAN Is
	Power steering status		
5	Engine running information	1320 / BSI1	CAN Is
6	Vehicle speed information	7800 / BSI1	CAN Is

**ELECTRICAL ARCHITECTURE : ELECTRO-HYDRAULIC POWER STEERING**

NCTRM2E/8/1

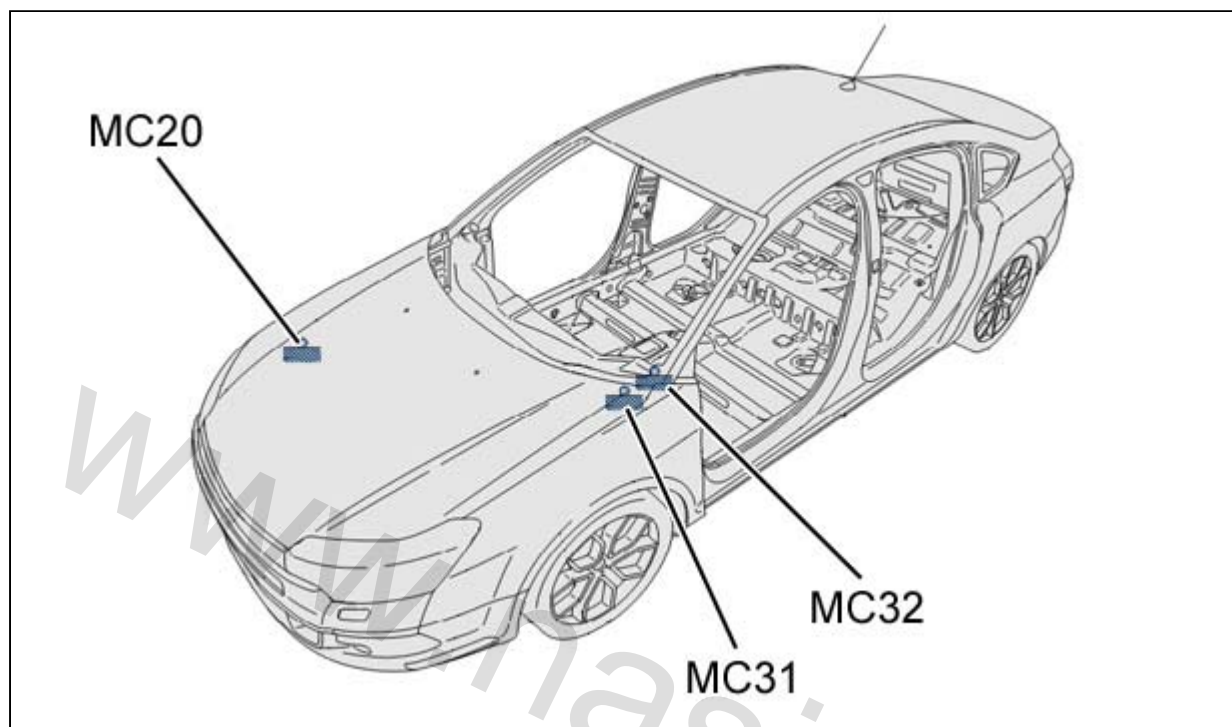
**1. Electrical supplies**

Figure : E1AM06WD

Components	Supply	Protection components	Fuses	Rating	Body earth
BSI1	Battery +	PSF1	MF04	80A	MC32 -
	Battery +	PSF1	MF08	80A	MC31
Instrument panel	Battery positive switched by the relay R7 of the BSI1	BSI1	F12	15A	MC31
Electro-pump	Ignition positive switched by the relay R6 of the PSF1	PSF1	F7	10A	MC20
	+ BAT	PSF1	MF03	80A	
Switch module at the steering wheel	Battery + / Shunts	BSI1	F8	20A	MC31

**2. System standby/triggering**

The electro-hydraulic power steering system cannot act on the network switch to standby/triggering.

The system is triggered as soon as the ignition positive is present.

The electro-pump establishes the pressure in the hydraulic circuit under certain conditions (Refer to the document describing the operation : Electro-hydraulic power steering).

**CHECKS : POWER STEERING PRESSURE ( ELECTRO-PUMP ) :**

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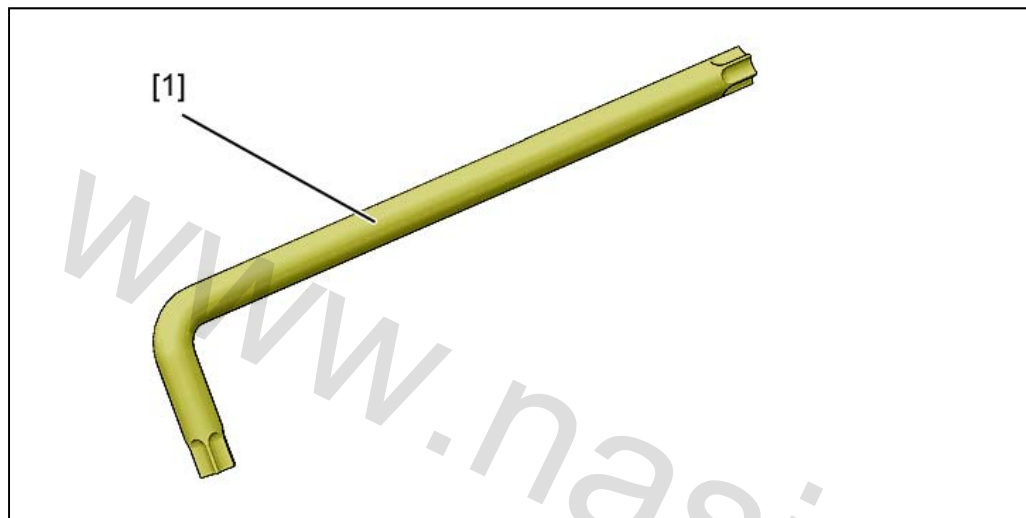
**URGENT** : Observe the safety and cleanness recommendations ⓘ .**URGENT** : If raising the vehicle on a lift, wheels hanging, remove the cap of the LDS fluid reservoir . Refit the cap of the LDS fluid reservoir, once you have lowered the vehicle .**1. Recommended tools**

Figure : E5AP3USD

[1] Spanner TORX T40 .

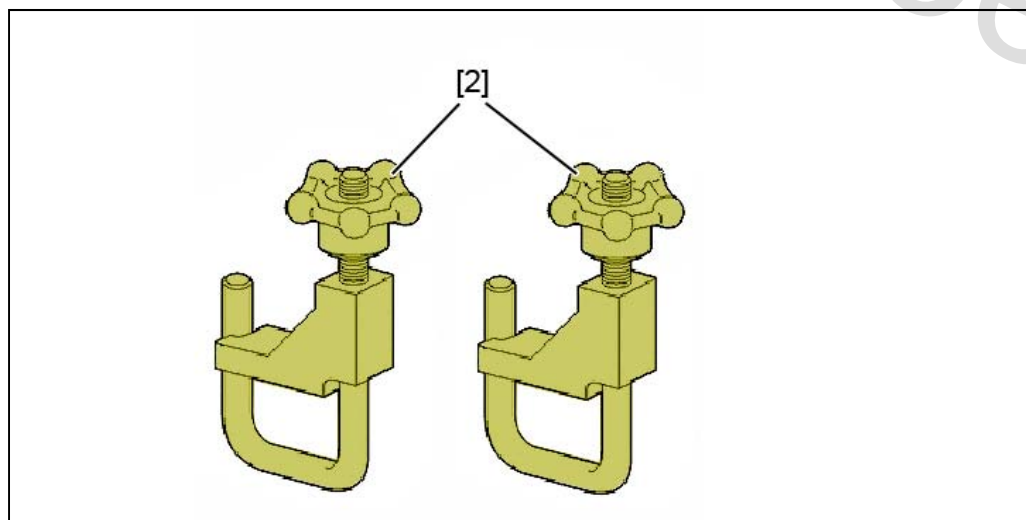


Figure : E5AP2YSD

[2] Set of 2 hose clamps 4153-T .

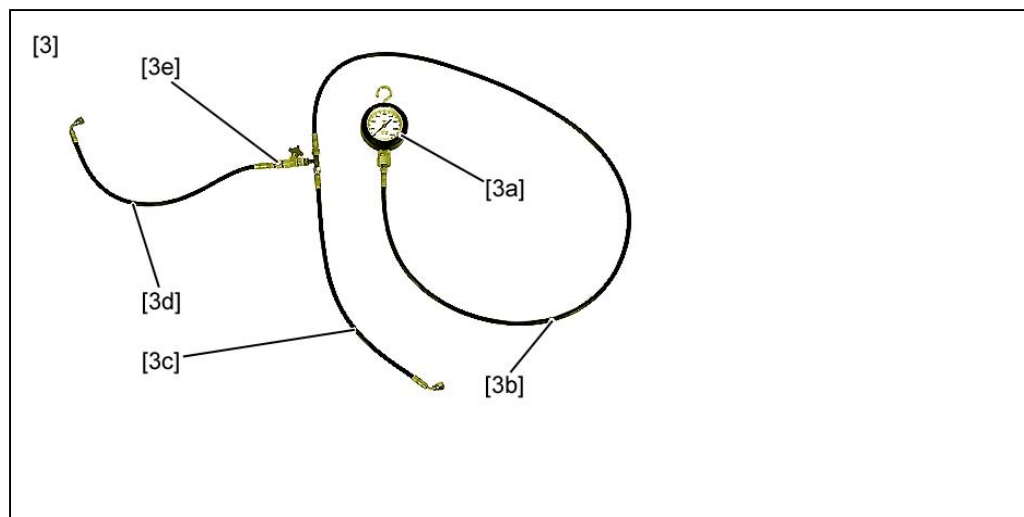


Figure : E5AP2PKD

Power steering pressures checking assembly [3] :

- [3a] pressure gauge (-).0710.AZ
- [3b] Pressure gauge checking hose with tap (-).0710.B1
- [3c] Checking hose for high pressure hose with tap (-).0710.B2
- [3d] Checking hose for high pressure pump with tap (-).0710.B3
- [3e] three way tap (-).0710.C

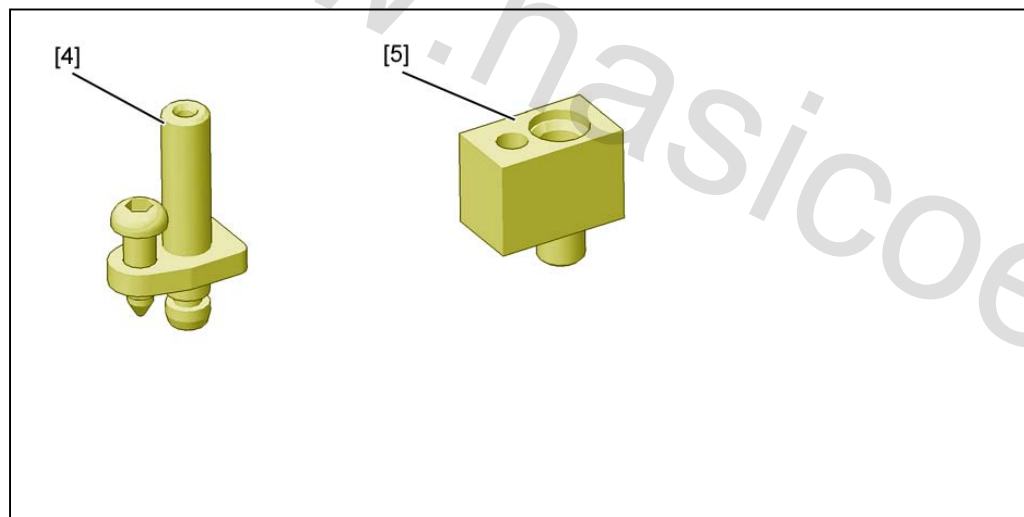


Figure : E5AP3UTD

[4] union (-).0710.J .

[5] union (-).0710.K .

## 2. Precautions to be taken

Proceed with care in order to avoid entry of pollutant particles .

**N.B. :** Correct operation of the equipment requires absolute cleanness of the fluid and the hydraulic components .

Check the LDS fluid level .

Verify : The condition of the pipes and unions .

## 3. Setting up the equipment

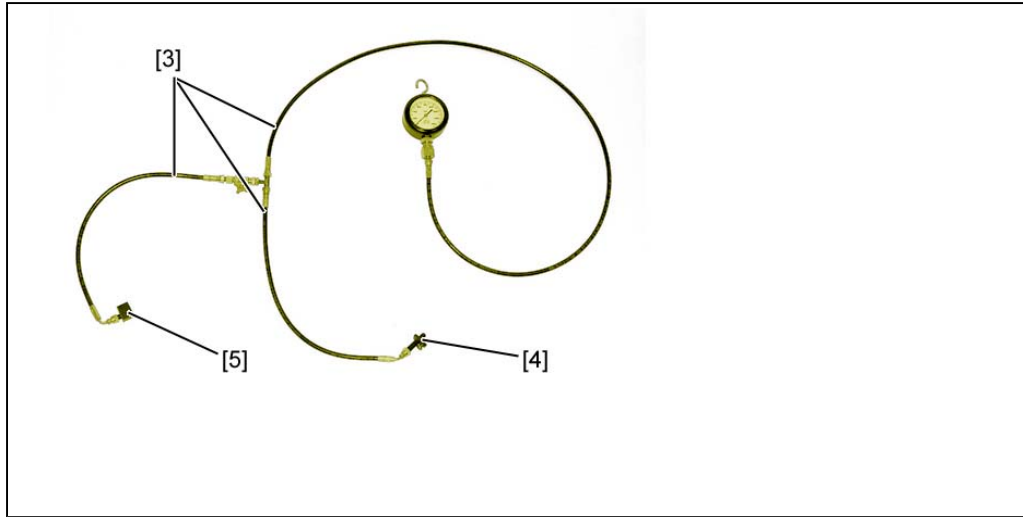


Figure : E5AP3UUD

Prepare the checking assembly [3], [4] and [5] .

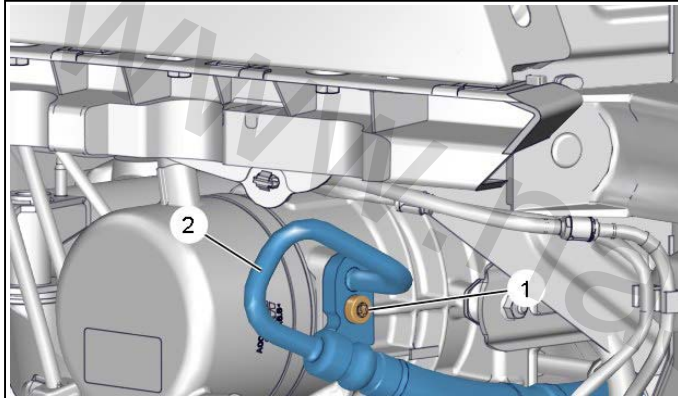


Figure : B3EM07MD

Remove the bolt (1) ; Using tool [1] .  
Uncouple and move aside : Piping (2) .  
Clamp the electropump assembly supply pipe ; Using tool [2] .

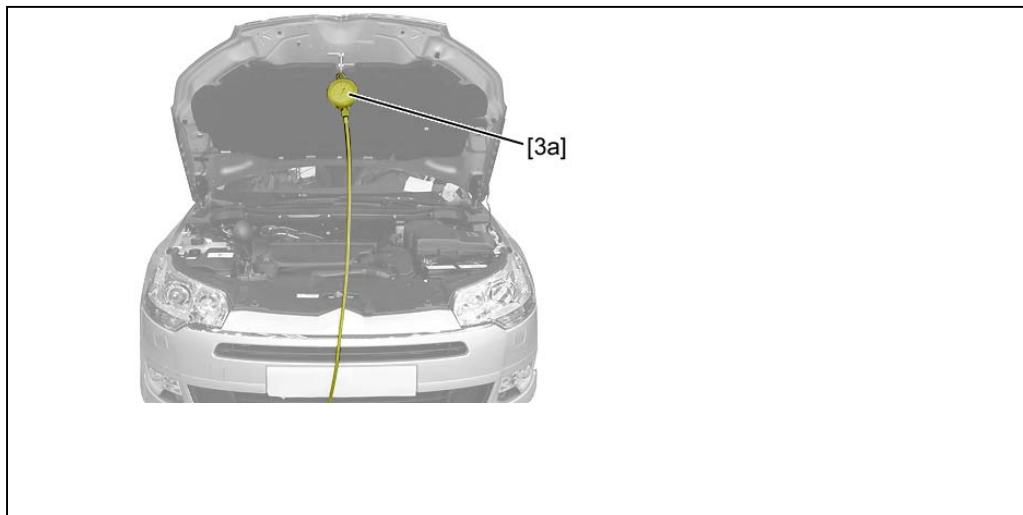


Figure : C4AM0MSD

Hook the tool [3a] on the bonnet .

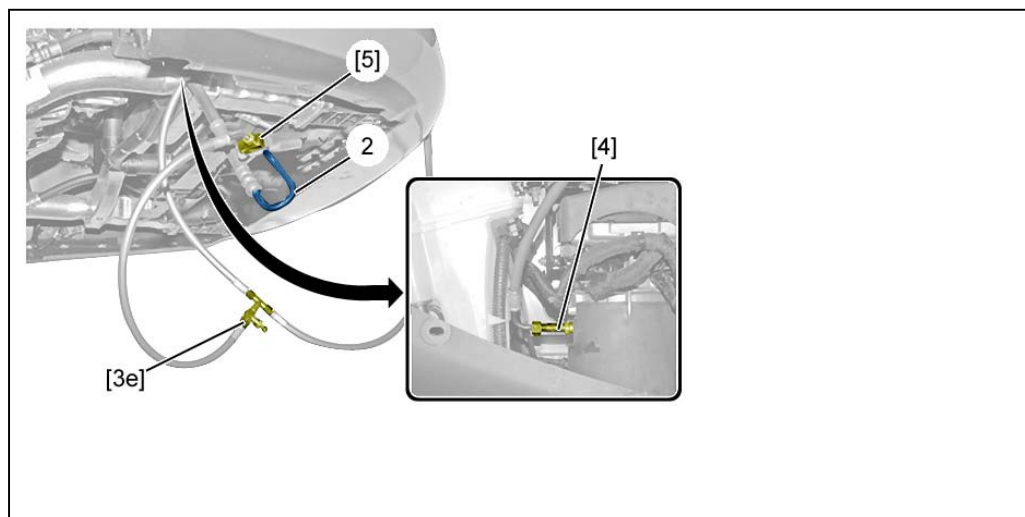


Figure : B3EM07PD

Do up :

- The union [5] on the pipe (2)
- The union [4] on the power steering pump

Connect the assembly [3] to the unions [4] and [5] .

Tighten all the unions .

Remove the tool [2] .

Open the tap [3e] .

Start the engine and let it run for 5 seconds .

Turn the steering several times in both directions .

Stop the engine .

Check that there are no leaks .

#### 4. Checking the pressure of the power steering pump

Start the engine .

Close the tap [3e] for 5 seconds .

Accelerate to between 1200 and 1500 rpm, the pressure should be  $115 \pm 5$  bars .

Open the tap [3e] .

Stop the engine .

#### 5. Bringing the vehicle to standard

Remove the tool [3] .

**Bleed the power steering hydraulic circuit** ⓘ .

**REMOVAL - REFITTING : STEERING LOCK :**

NCTRM2E/16/1

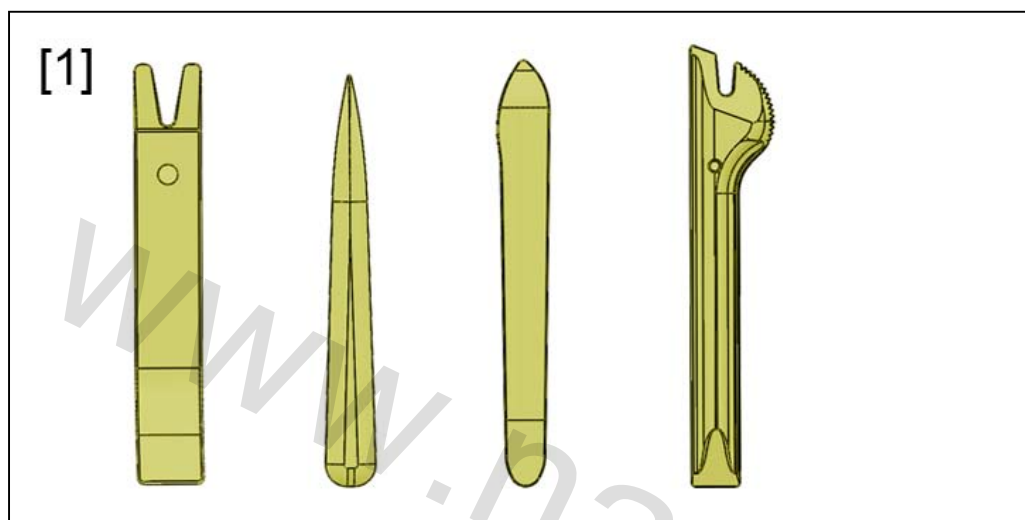
**URGENT** : Ensure that the precautions relating to safety and cleanliness are adhered to .**CAUTION** : Before taking any action ; Place the road wheels in the straight ahead position .**1. Recommended tools**

Figure : E5AP30WD

[1] Trim removing tool (-).1350-ZZ .

**2. Removal**

The following operations should be carried out :

- Slide the front seat rearwards as far as possible
- Switch off the ignition
- Wait 3 minutes before disconnecting the battery
- Disconnect the battery

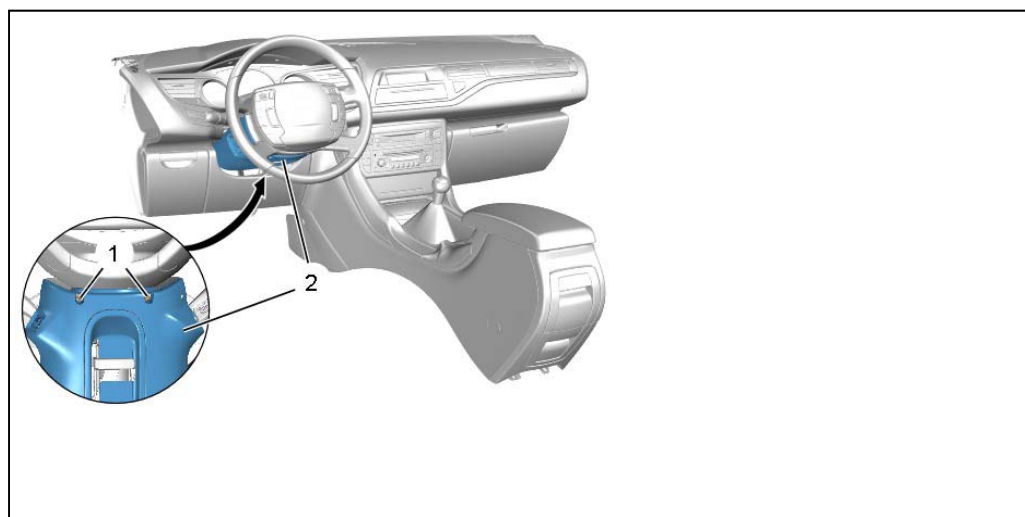


Figure : B3EM05TD

Unlock the steering column, pull fully and lower it .

Remove bolts (1) .

Detach : The steering column lower half cowl (2) .

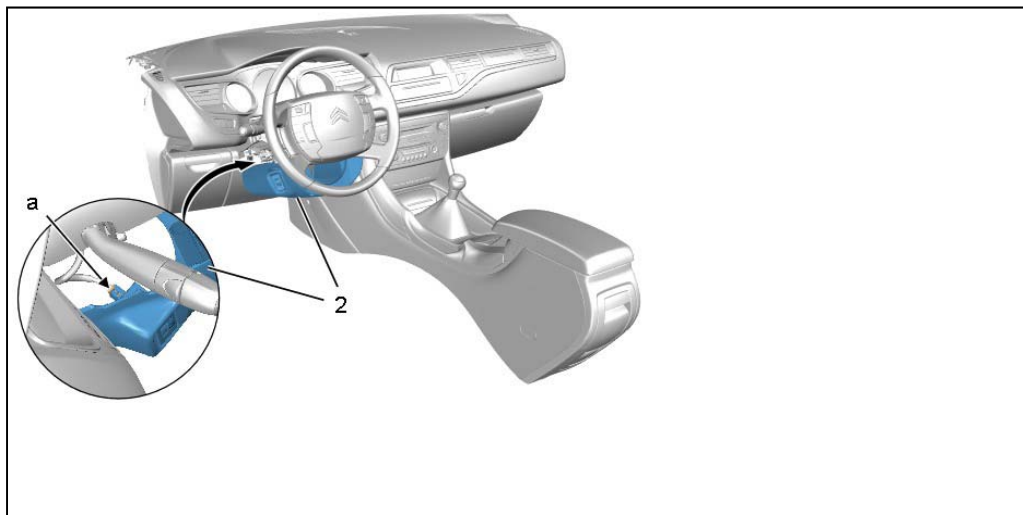


Figure : B3EM05UD

Disconnect the connector (at "a") .

Remove the steering column lower half cowl (2) .

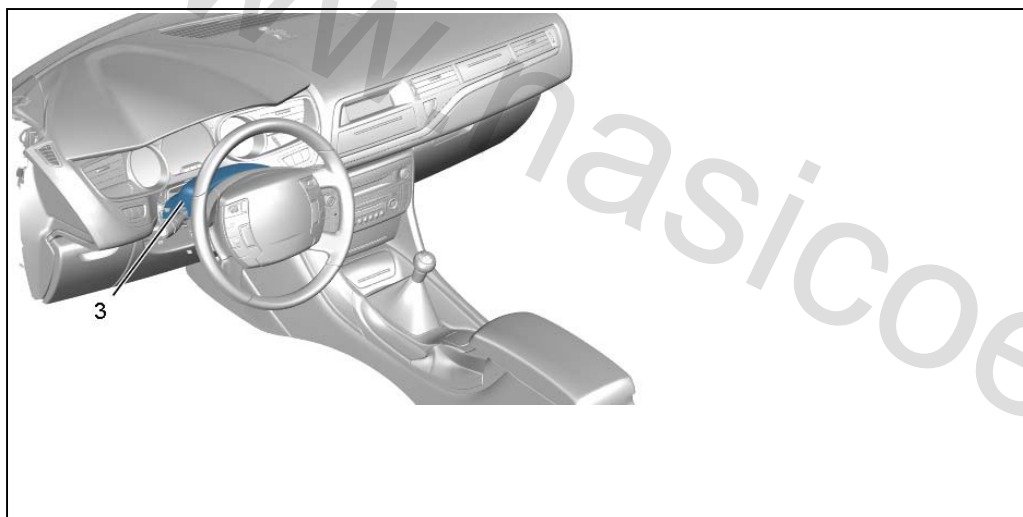


Figure : B3EM05VD

Remove : The steering column upper half cowl (3) .

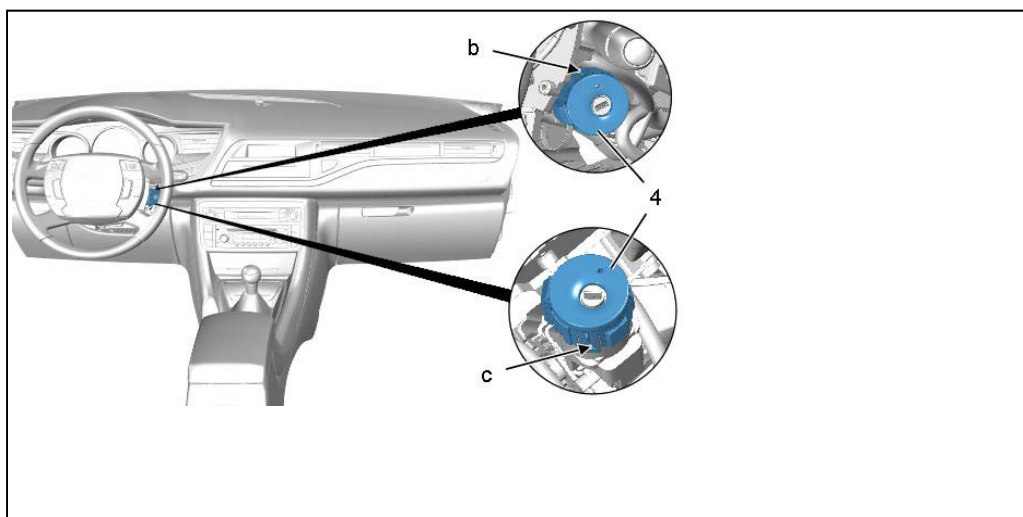


Figure : B3EM05WD

Unclip : The fixing tabs at "b", "c" ; Using a small, flat, thin screwdriver .

Detach : The transponder electric aerial sleeve (4) .

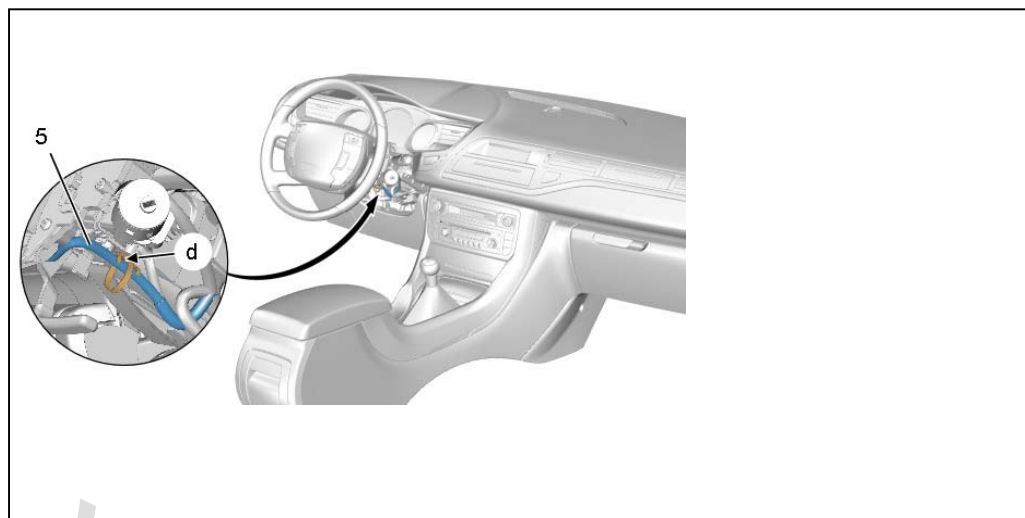


Figure : B3EM05XD

Unclip - Release the harness (5) (at "d") ; Using the tool [1] .

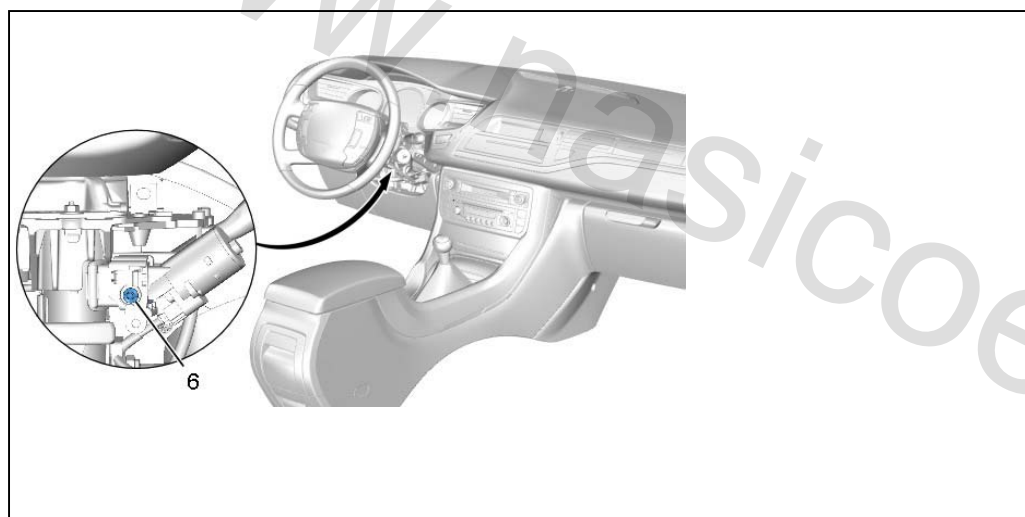


Figure : B3EM05YD

Slacken : The break-off bolt (6) ; Using a punch and a hammer .

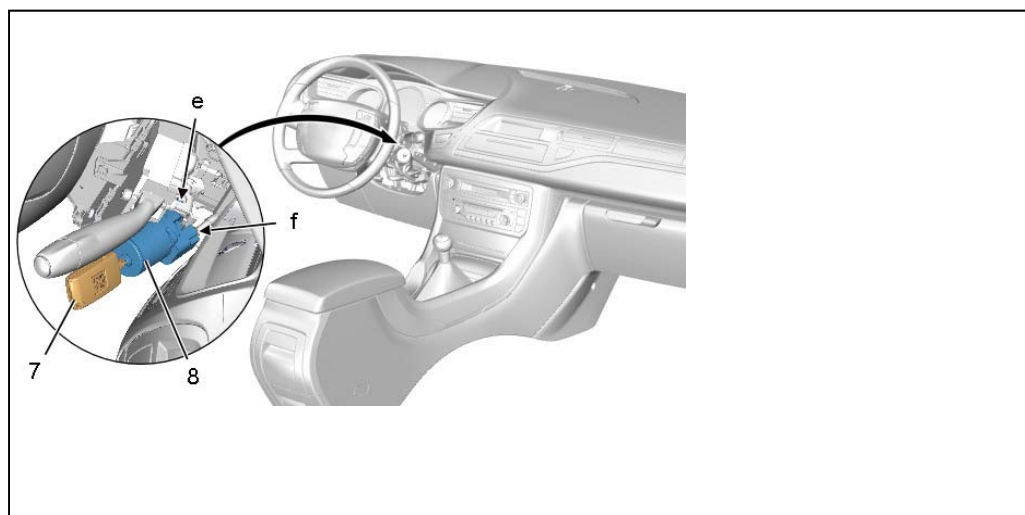


Figure : B3EM05ZD

Disconnect the connector (at "f") .  
Place the key in the "+ACC" position .  
Press on the lug (at "e") ; By means of a screwdriver .  
Remove the steering lock (8) .

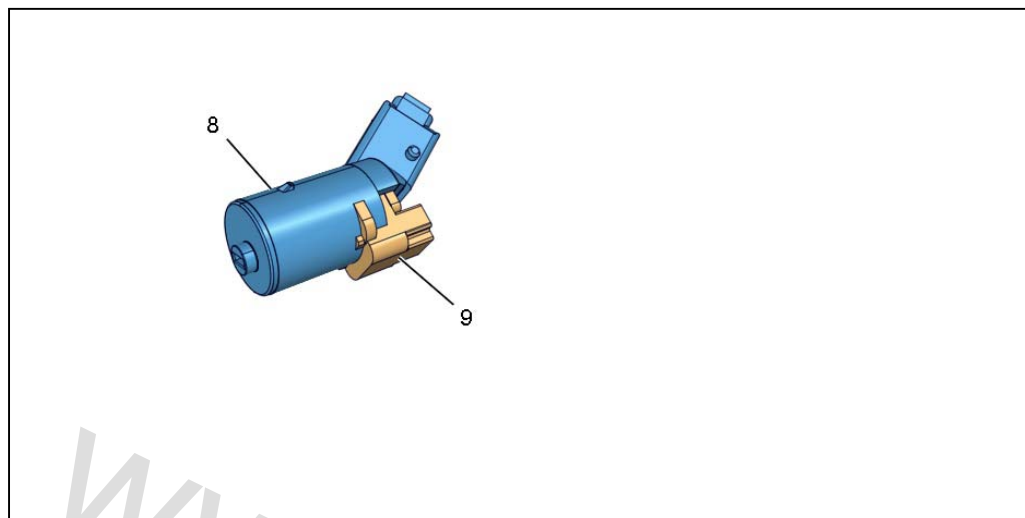


Figure : B3EM060D

**CAUTION :** Do not separate the steering column switch (8) from the terminal (9) or the steering column switch (8) will be damaged .

### 3. Refitting

**URGENT :** Always replace the faulty clips .

Fit : The steering lock (8) .  
Remove : The ignition key (7) .  
Check the correct locking of the steering system .  
Fit a new bolt ( Shear bolt ) .

**N.B. :** Tighten the new break-off bolt until its head snaps .

Check the locking of the lug (at "e") .  
Proceed in the reverse order to removal .  
Connect the battery .  
Check the electrical operation of the equipment .

**DESCRIPTION - OPERATION : LDS FLUID TEMPERATURE SENSOR**

NCTRM2E/17/1

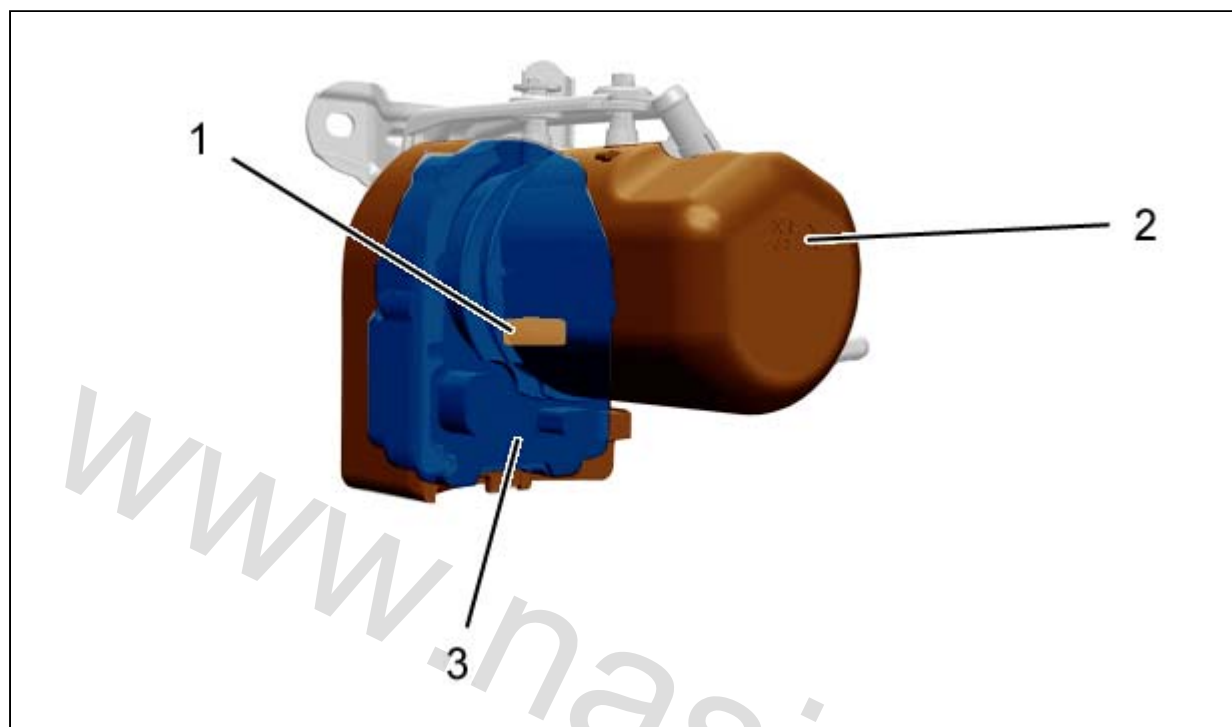
**1. Description**

Figure : B3EM05QD

(1) LDS fluid temperature sensor (Integrated in the electronic card).

(2) Electro-pump.

(3) Electronic card.

Name of the supplier : TRW.

**2. Role**

The sensor indirectly measures the temperature of the LDS fluid that circulates inside the electropump unit.

The sensor transmits the temperature of the LDS fluid to the ECU of the electro-pump unit.

**3. Operation**

The temperature sensor is integrated into the electronic board of the electro-pump unit.

The resistance of the sensor varies according to the temperature of the LDS fluid.

The LDS fluid temperature is a temperature which is deduced following measuring of the temperature of the electropump assembly electronic card.

**4. Electrical specifications**

Not applicable.

**5. Initialisation / Initialisation**

Not applicable.

DESCRIPTION OF THE BACK-UP MODE : ELECTRO-HYDRAULIC POWER STEERING

NCTRM2E/18/1

1. Condition for stopping of the electropump assembly following a failure

The electropump assembly is stopped following detection of the following events :

- Electrical over-voltage
- Critical temperature of the electronic card (125°C)
- Operating temperature too low (below -40°C)
- Fault on the Hall effect sensor, permitting measuring of the rotation of the electropump assembly motor
- Electropump assembly motor fault

2. Failure of the electronic card temperature sensor

If the LDS fluid temperature sensor is not operational, the electropump assembly ECU operates in down-grade mode and calculates the output of the pump using a default temperature value of 110°C.

3. Power limitation

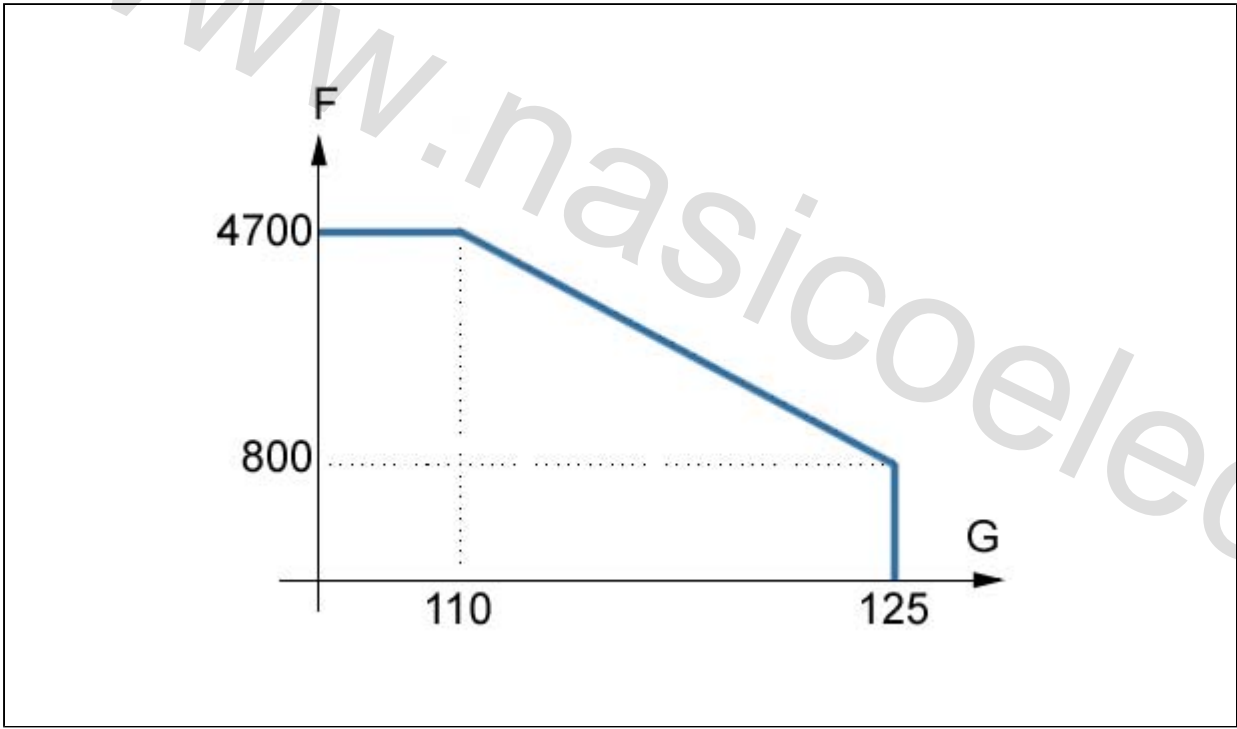


Figure : D4EM05MD

"F" Speed of rotation of the electropump assembly motor in rpm.

"G" Temperature in degrees Celsius.

Graph of the limiting of power in relation to the temperature of the electropump assembly.

When the electropump assembly is initialised, if the LDS fluid temperature is higher than 110°C, the power steering electropump assembly ECU gradually limits the power of the electropump assembly.

The limiting of power is stopped when the system cools down.

When the temperature of the electropump assembly reaches 125 °Celsius, the electropump assembly is stopped.

4. Back-up mode following a fault

Fault(s)	Back-up mode	Effect on the customer

Ignition plus supply fault	Assistance provided as normal	None
Vehicle speed data fault (value received incorrect)	Following the confirmation time, the vehicle speed is progressively fixed at a refuge value	None
Vehicle speed data fault (No signal)	Following the confirmation time, the vehicle speed is progressively fixed at a refuge value	None
Steering wheel speed of rotation information fault (value received incorrect)	Following the confirmation time, the speed of rotation of the steering wheel is progressively fixed at a refuge value	Steering assistance reduced
Steering wheel speed of rotation information fault (No signal)	Following the confirmation time, the speed of rotation of the steering wheel is progressively fixed at a refuge value	Steering assistance reduced
Internal combustion engine status information fault (value received incorrect)	When the assistance has not started, if the vehicle speed information is not received the assistance does not start, otherwise it starts when the minimum vehicle speed information is received. The assistance stops when the ignition positive is switched to Off	Risk of absence of steering assistance
	If the assistance has started, it stops when the ignition positive is switched to OFF	
Internal combustion engine status information fault (No signal)	When the assistance has not started, if the vehicle speed information is not received the assistance does not start, otherwise it starts when the minimum vehicle speed information is received. The assistance stops when the ignition positive is switched to Off	Risk of absence of steering assistance
	If the assistance has started, it stops when the ignition positive is switched to OFF	