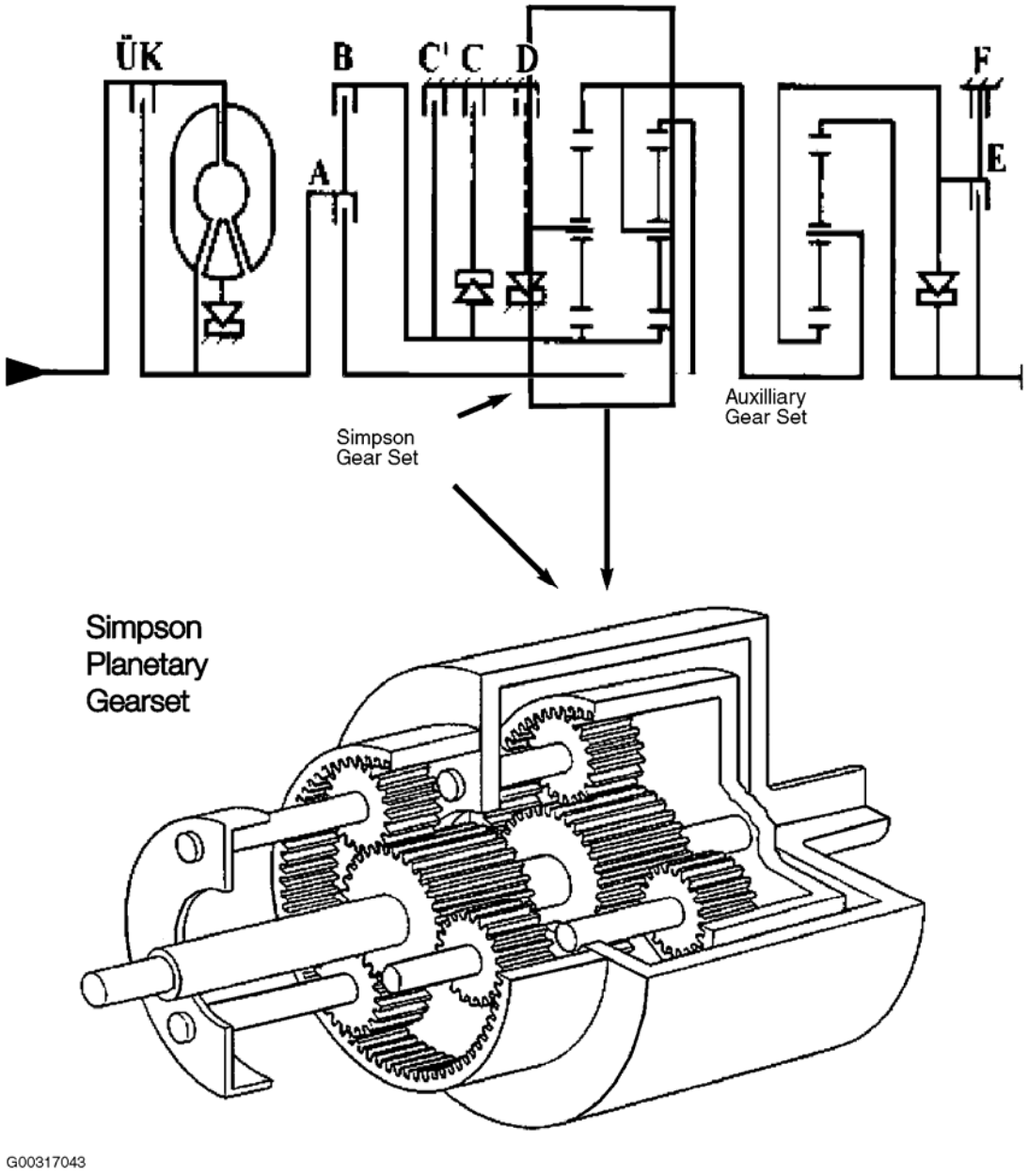


**Fig. 33: Identifying Power Flow Schematic**
**Courtesy of BMW OF NORTH AMERICA, INC.**

**Power Flow In First Gear**

Drive torque is applied to the torque converter impeller and transferred to the turbine. The turbine shaft rotates clockwise (CW). The "A" clutch locks the turbine shaft to the rear input ring gear. The rear input ring gear rotates CW driving the rear planet pinions CW. The planetary pinions drive the common sun gear CCW, which in turn drive the front planet pinions CW. The front planetary carrier is held from rotating CCW by one way

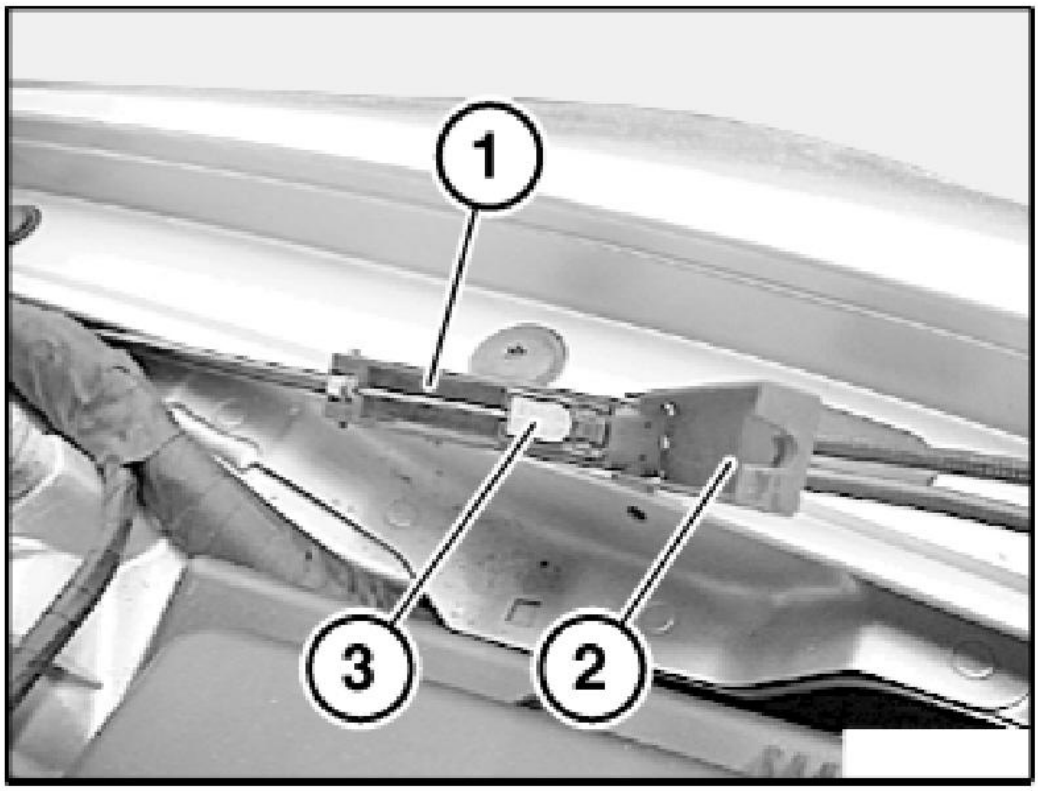


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**Fig. 127: Removing Cable Out Of Coupling**
**Courtesy of BMW OF NORTH AMERICA, INC.**

Unscrew screws (1).

Feed out hood/bonnet lock (2) with cable (3) in direction of arrow.

# BRAKES

## Disc - 650i

# 00 BRAKE TESTING AND BLEEDING

### 34 00 ... GENERAL INFORMATION

The brake system is one of the most important safety systems on any motor vehicle. It is therefore essential to act with utmost care when working on the brake system and to follow the instructions below.

**General:**

- Ensure cleanliness and only use rags which do not lose lint.
- Wash away or vacuum up brake dust, do not clear it away using compressed air. This dust is a health hazard.
- Ensure that no oils or grease enter the brake system: these substances would cause complete failure of the entire brake system.
- When cleaning brake components with brake cleaner (refer to BMW Parts Service), do not allow brake cleaner to get into the brake system.
- Even the most minute traces of brake cleaner must be avoided.

**Brake fluid:**

- Replace brake fluid at least every two years.
- Never re-use drained brake fluid.
- Always use BMW-approved brake fluid, refer to **BRAKES - OPERATING FLUIDS** .
- Always dispose of brake fluid in approved receptacles, refer to BMW Service Workshop Planning documentation.
- Do not allow brake fluid to drain into drain pipes, into the outside environment or into unsuitable facilities. This would create the risk of groundwater contamination since brake fluid is classed as a fluid that is hazardous to water.
- Do not allow brake fluid to come into contact with paintwork as this will destroy the paint.
- Brake fluid must not be allowed to remain on bare skin too long in order to avoid skin problems. Wash skin coated with brake fluid with water and soap.
- If brake fluid makes contact with eyes, immediately flush with large quantity of clean water and visit eye doctor.

**Wheel brakes:**

- Brake linings:

  Brake linings must be replaced when the warning threshold of the brake lining wear indicator is reached.

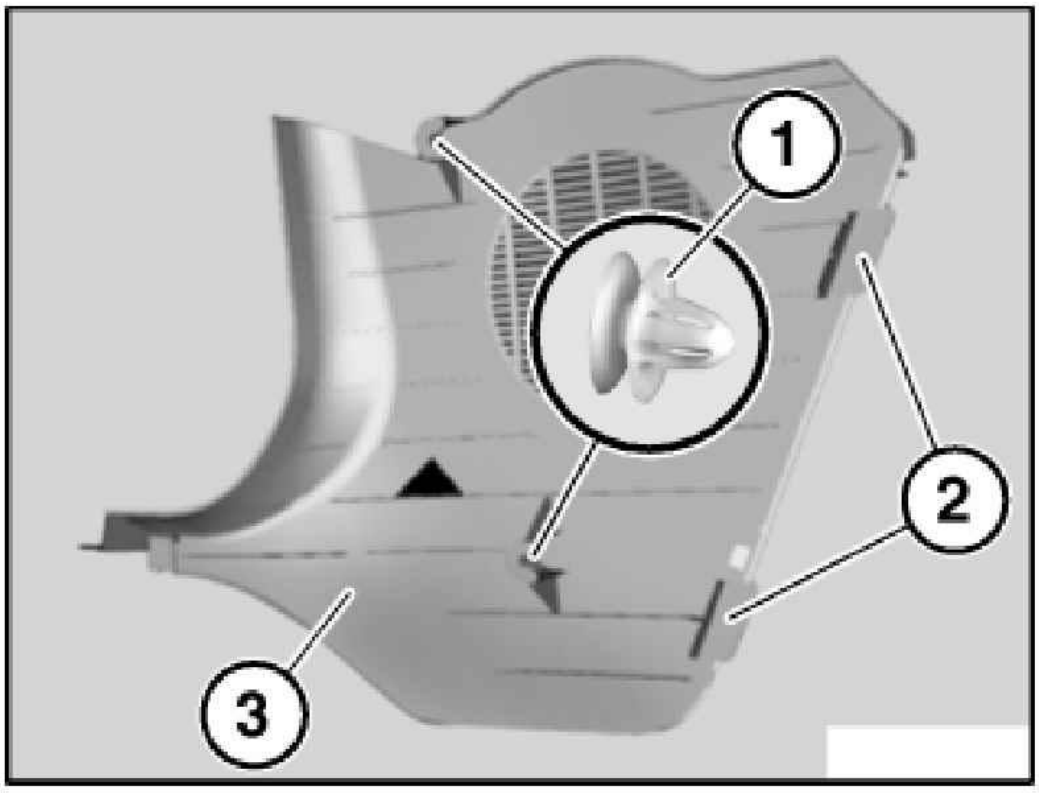


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**Fig. 6: Identifying System Overview For Active Cruise Control Inputs/Outputs: E65, E66 From 03/2005**
**Courtesy of BMW OF NORTH AMERICA, INC.**

**System circuit diagram**

- Do not disconnect battery leads and leads from alternator and starter motor while engine is running.
- Cars with IBS on battery negative terminal:

  Do not under any circumstances pull/lever off pole shoes by force.

  Do not under any circumstances release socket-head cap screw of IBS.

- Detach terminal of battery negative lead from car battery and second battery if fitted. Cover battery negative terminal(s) and secure.
- When work is carried out on the electrical system, faults may be caused in the fault memories of some control units when the battery is connected.
- When installing battery terminal: See tightening torque 61 21 1AZ in **61 21 BATTERY WITH TERMINAL** .

**After connecting battery:**

**IMPORTANT: After a power supply interruption some equipment is disabled and must be reactivated.**

**Likewise, individual settings are lost and must be activated.**

**Example:**

- **Vehicles with build date from 03/2007:**

  **Teach-in mid-position for power steering**

- **If necessary, activate sliding sunroof**
- **If necessary, carry out adjustment of active front steering**
- **If necessary, activate power windows**
- **If necessary, activate mirror with compass**

**Vehicles with a two-battery system**

Starter and equipment batteries

A two-battery system has a starter battery circuit and an equipment battery circuit. A secondary control unit monitors both battery circuits. Depending on the situation, the battery circuits are connected to or isolated from the secondary control unit via an isolating relay.

Two AGM batteries, whose design and properties are described in AGM batteries, are used as a storage battery.

**IMPORTANT: These batteries must not under any circumstances be charged with a voltage in excess of 14.8 V. Rapid programs must not be used either.**

Push roller bearing (2) onto special tool 21 2 052.

Using hydraulic press (1), press roller bearing into dual-mass flywheel as far as it will go on clutch side.

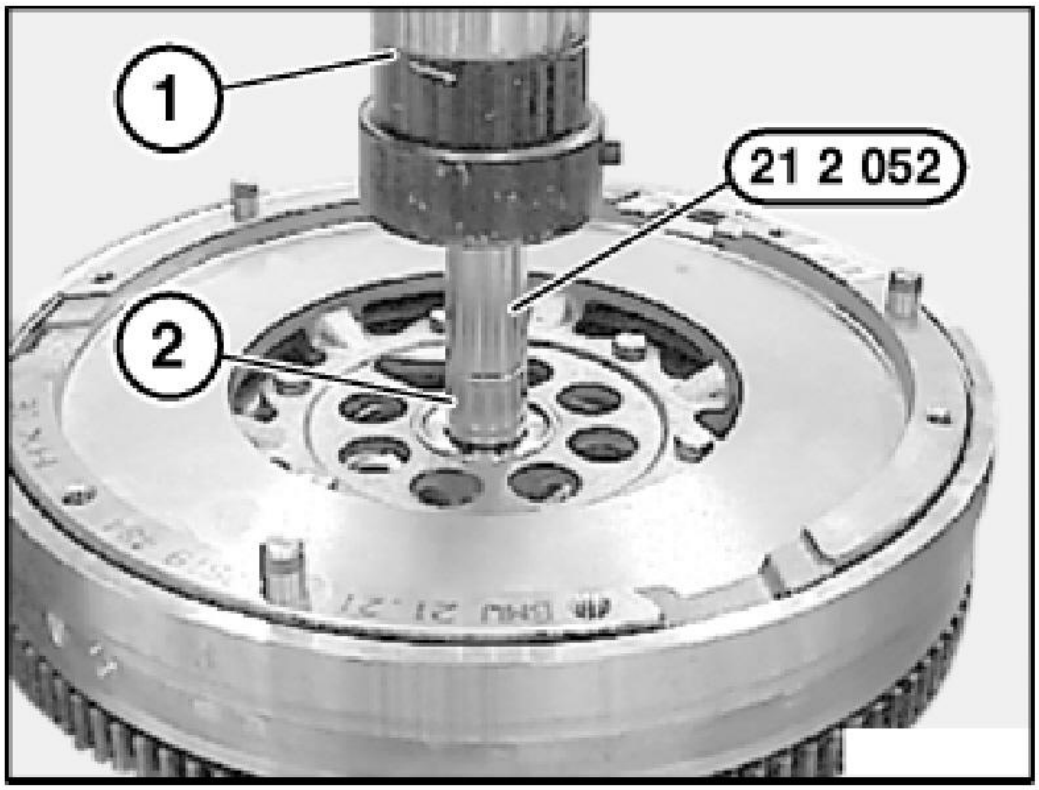


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**Fig. 144: Pressing Roller Bearing Into Dual-Mass Flywheel**
**Courtesy of BMW OF NORTH AMERICA, INC.**

**IMPORTANT: Risk of damage: Observe press-in instruction:**

- **Roller bearing must not be driven in.**
- **Roller bearing mounting force/travel monitored:**

  **Min. 2000N 1 mm before end of pressing in.**

  **Max. 15000N during entire press-in procedure.**

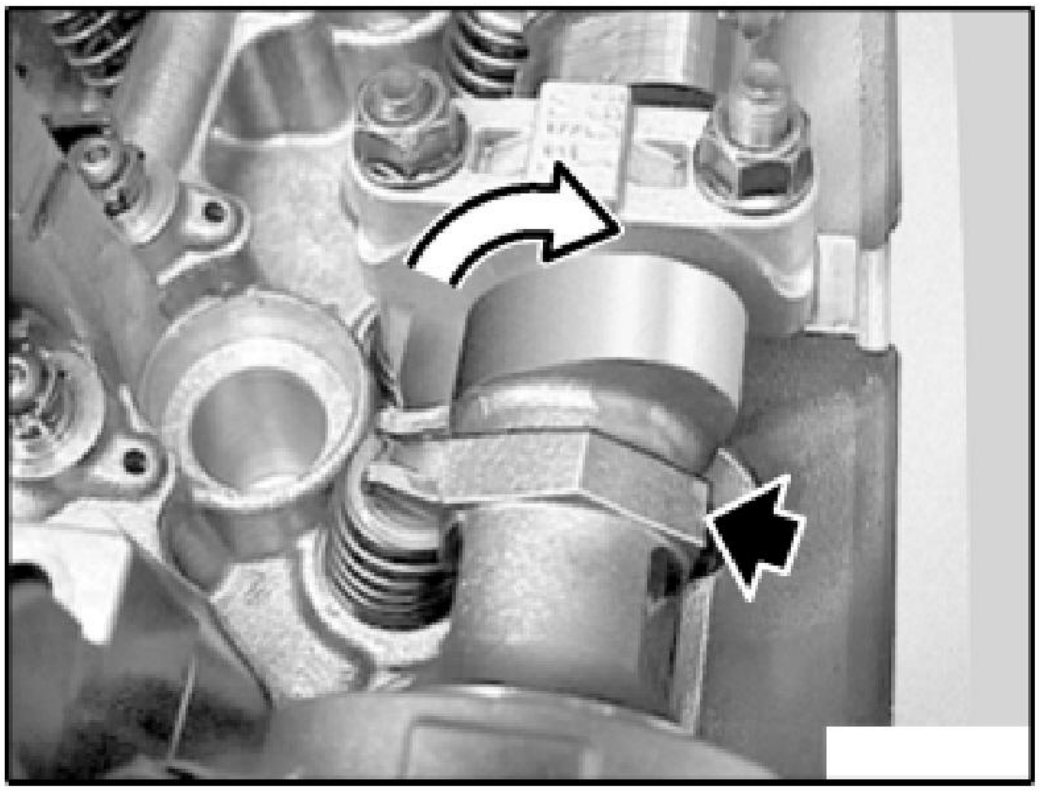

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**Fig. 480: Checking Locking Of Exhaust Adjustment Unit In Initial Position**
**Courtesy of BMW OF NORTH AMERICA, INC.**

**CAUTION: If the inlet or exhaust adjustment unit of the camshafts "cannot" be locked as described, the adjustment unit is faulty and must be replaced.**

Remove special tool 11 9 190.

Crank engine at central bolt against direction of rotation to 45° before TDC position.

Install **LEFT CYLINDER HEAD COVER**.

Install ignition coils on cylinder bank 5 to 8.

Install **SERVOMOTOR FOR LEFT ECCENTRIC SHAFT**.

Assemble engine.

**11 31 034 REMOVING AND INSTALLING/REPLACING RIGHT INLET CAMSHAFT (N62 FROM 9/03 AND N62TU)**

**Special tools required:**

- **11 9 470**
- **11 9 472**
- **11 9 473**
- **11 9 474**
- **11 9 475**
- **11 9 480**
- **11 9 490**

**(cylinder bank 1 to 4)**

*Necessary preliminary tasks:*

- Remove **SERVOMOTOR FOR RIGHT ECCENTRIC SHAFT**
- Remove ignition coils on cylinder bank 1 to 4
- Remove **RIGHT CYLINDER HEAD COVER**
- Remove spark plugs on cylinder bank 1 to 4
- Remove **RIGHT INLET AND EXHAUST ADJUSTMENT UNITS**

**IMPORTANT: The inlet camshaft must first be rotated so that when the bearing bracket is removed the intermediate levers do not slip out and damage the camshaft.**

Rotate inlet camshaft in direction of rotation until cam on 1st cylinder is positioned horizontally as shown in illustration.

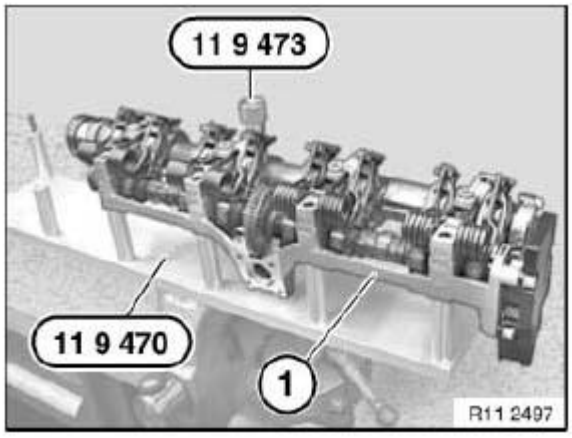


**Fig. 518: Identifying Special Tools (11 9 470) And (11 9 473)**
**Courtesy of BMW OF NORTH AMERICA, INC.**

**IMPORTANT: The lower section of the bearing bracket (1) is machined with the cylinder head and must not be mixed up.**

**NOTE: Lower section of bearing bracket (1) remains on cylinder head.**

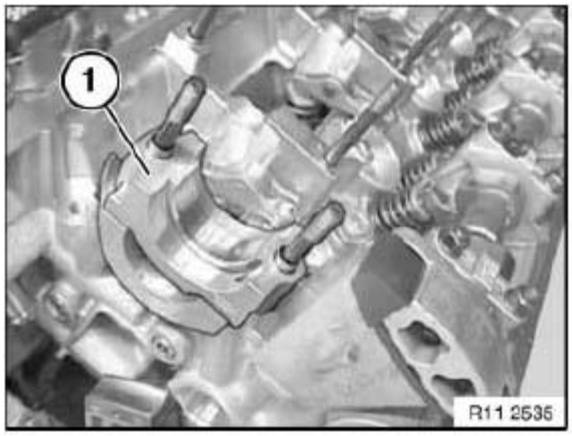


**Fig. 519: Identifying Lower Section Of Bearing Bracket**
**Courtesy of BMW OF NORTH AMERICA, INC.**

**NOTE: The mounting of the bearing bracket described later can only be carried out if the inlet camshaft has not been axially displaced.**

**Special tools 11 9 472 and 11 9 475 prevent the inlet camshaft from rotating and moving while the intermediate levers are installed.**

Fit special tool 11 9 472 and secure with special tool 11 9 475.

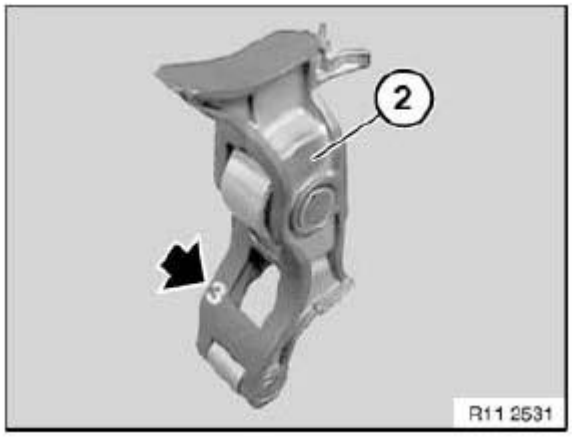


**Fig. 527: Locating Intermediate Levers**
**Courtesy of BMW OF NORTH AMERICA, INC.**

Raise torsion spring (1) with special tool 11 9 480.

Remove special tool 11 9 490.

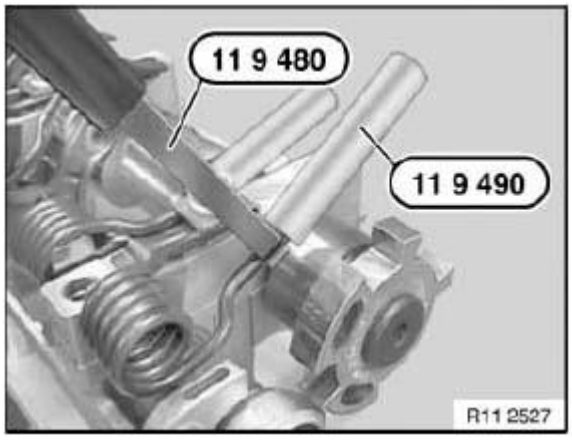


**Fig. 528: Identifying Special Tool (11 9 480) And (11 9 490)**
**Courtesy of BMW OF NORTH AMERICA, INC.**

Hold torsion spring (1) with special tool 11 9 480.

Install intermediate lever (2) from above.

Insert end of torsion spring (1) into guide on intermediate lever (2).

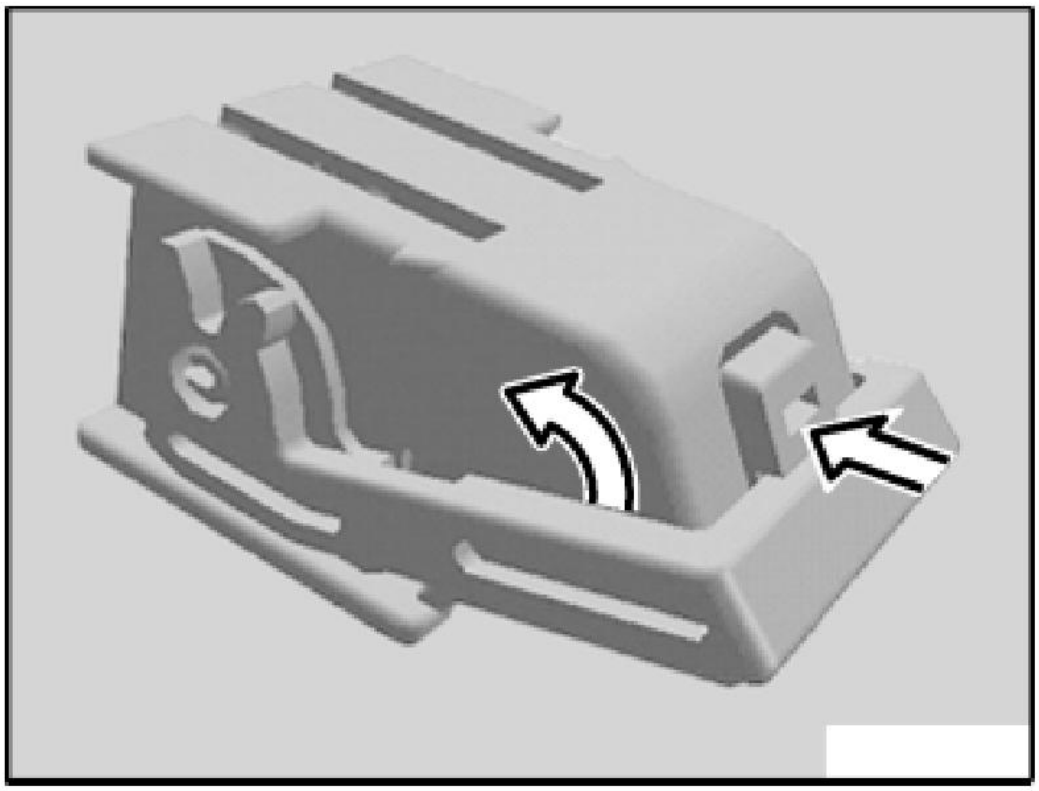

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**Fig. 22: Pressing Lock And Open Clip**
**Courtesy of BMW OF NORTH AMERICA, INC.**

Press lock and open clip in direction of arrow.

Disconnect plug connection.

- **Orientation by position indicator**

  A small, coloured symbol for each of the 4 menus appears in the top menu line: A diamond. The 4 corners of the diamond correspond to the 4 directions of the menus. A small square indicates the corner corresponding to the currently selected menu.

- **Status line for information at a glance**

  The status line contains the most important information on the various functions, such as settings of the air conditioning system or the radio station currently selected.

The start menu always appears when the menu button behind the controller is pressed.

**National versions**

The language package for the possible display languages is encoded at the end -of-line.

Subject to change.

## INSTRUMENT CLUSTER E60, E61, E63, E64

**Fig. 4: Identifying Instrument Cluster**
**Courtesy of BMW OF NORTH AMERICA, INC.**

Align support bearing by way of a stud (arrow) to marking on spring strut shock absorber.

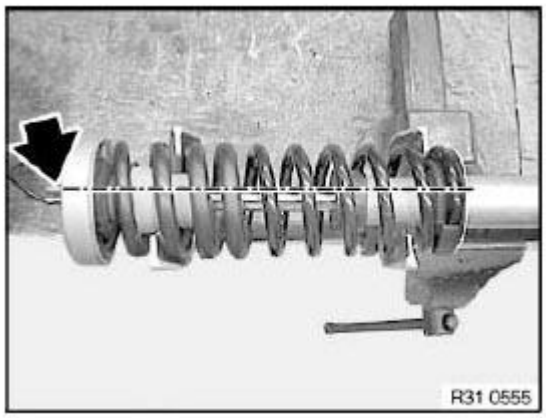


**Fig. 133: Align Support Bearing By Way Of A Stud (Arrow) To Marking On Spring Strut Shock Absorber**
**Courtesy of BMW OF NORTH AMERICA, INC.**

Relieve tension on coil spring slightly.

**NOTE: Make sure that lower and upper coils of coil spring rest completely in recess of spring plate or support bearing.**

Tighten down nut (gripping piston rod in the process).

Tightening torque 33 52 2AZ , see **52 SHOCK ABSORBER** .

Fully relieve tension on coil spring.

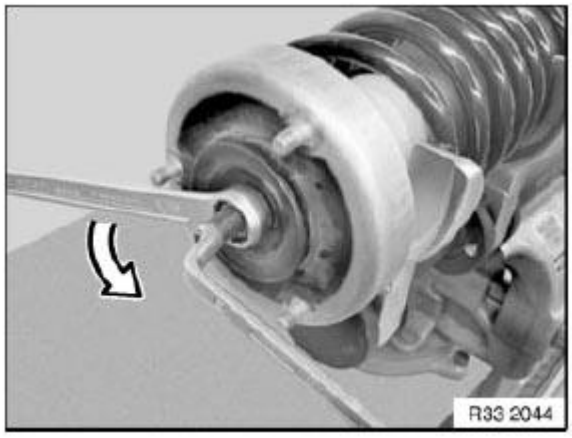


**Fig. 134: Releasing Nut**
**Courtesy of BMW OF NORTH AMERICA, INC.**

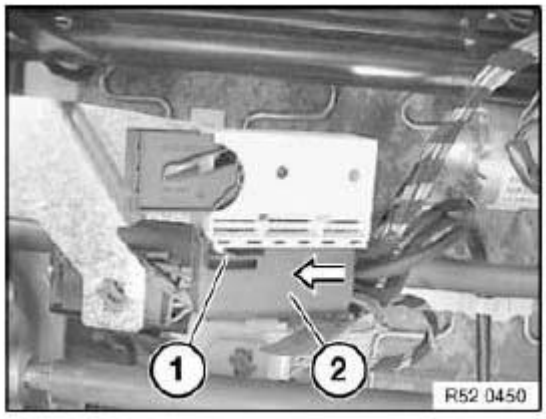


**Fig. 165: Identifying Cover**
**Courtesy of BMW OF NORTH AMERICA, INC.**

Disconnect plug connection (1) for seat heating from plug housing (2).

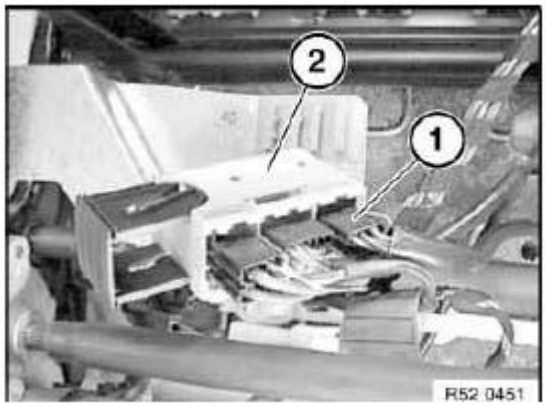


**Fig. 166: Identifying Plug Connection And Housing**
**Courtesy of BMW OF NORTH AMERICA, INC.**

Pull cable (1) out of holders (2).

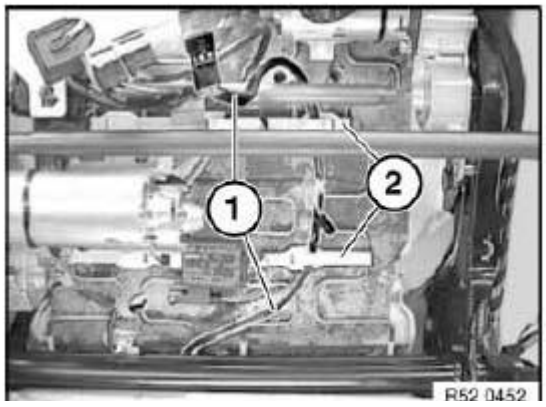

**Fig. 35: Forces Created Cause Thrust Member (1) To Be Unloaded Against Spring (2)**
**Courtesy of BMW OF NORTH AMERICA, INC.**

**IMPORTANT: Target status: steering must be free from play in all the mechanical components (except for steering gear and tie rod)!**

**NOTE: For checking purposes, the steering gear must be pressurized by means of electric or hydraulic assistance.**

- **Hydraulic steering assistance: Start engine.**
- **Electro-hydraulic steering assistance: Switch ignition on.**
- **Electric steering assistance: Turn on ignition and start engine.**

**32 11 100 REPLACING GAITER FOR STEERING GEAR ON LEFT OR RIGHT**

**IMPORTANT: The power steering gear must be replaced if the polished surface of the rack is damaged (e.g. by corrosion)!**

*Necessary preliminary tasks:*

- Remove **tie rod end**
- Remove underbody protective plate. See **51 47 490 REMOVING AND INSTALLING / REPLACING FRONT UNDERBODY PROTECTION** .
- If necessary, remove steering gear cover at side.

Clean tie rod.

Release band clamp (1) and ear clip (3).

Detach gaiter (2) from tie rod.

*Installation:*

Clean rack and check surface for damage (e.g. by corrosion).

Grease rack.

Clean tie rod and apply grease to taper.